
Sandia National Laboratories, New Mexico

Environmental Restoration Operations

A U.S. Department of Energy Environmental Cleanup Program

Consolidated Quarterly Report

October – December 2013



April 2014



United States Department of Energy
Sandia Field Office

CONSOLIDATED QUARTERLY REPORT

April 2014

SANDIA NATIONAL LABORATORIES, NEW MEXICO

ENVIRONMENTAL RESTORATION OPERATIONS

U.S. DEPARTMENT OF ENERGY:
CONTRACTOR:
PROJECT MANAGER:

SANDIA FIELD OFFICE
SANDIA CORPORATION
John Cochran

NUMBER OF POTENTIAL RELEASE SITES SUBJECT TO THIS PERMIT: 33

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

REPORTING PERIOD: October – December 2013

OVERVIEW

This Sandia National Laboratories, New Mexico Environmental Restoration Operations (ER) Consolidated Quarterly Report (ER Quarterly Report) addresses all quarterly reporting requirements pertaining to the Hazardous and Solid Waste Amendments (HSWA) Module of the Resource Conservation and Recovery Act Permit, the Compliance Order on Consent, and the Chemical Waste Landfill Post-Closure Care Permit. The 33 sites in the Corrective Action regulatory process are listed in Table I-1. The 33 sites consist of 25 Solid Waste Management Units and 8 Areas of Concern (AOCs). 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:

SECTION I: Environmental Restoration Operations Consolidated Quarterly Report, October – December 2013

SECTION II: Perchlorate Screening Quarterly Groundwater Monitoring Report, October – December 2013

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

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

ABBREVIATIONS AND ACRONYMS

°C	degrees Celsius
µg/L	microgram(s) per liter
µmhos/cm	micromhos per centimeter
% Sat	percent saturation
AGMR	Annual Groundwater Monitoring Report
AOC	Area of Concern
AOP	Administrative Operating Procedure
AR	Analysis Request
BSG	Burn Site Groundwater
BW	background well
CAC	Corrective Action Complete
CAMU	Corrective Action Management Unit
CCBA	Coyote Canyon Blast Area
CCM	Current Conceptual Model
CFR	Code of Federal Regulations
CME	Corrective Measures Evaluation
CMI	Corrective Measures Implementation
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 ₂ SO ₄	sulfuric acid
HASL	Health and Safety Laboratory
HCL	hydrochloric acid

HE	high explosive(s)
HMX	tetrahexamine tetranitramine
HNO ₃	nitric acid
HQ	hazard quotient
L	liter
LCRS	leachate collection and removal system
LTMMMP	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
N	nitrogen
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
SFO	Sandia Field Office
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
TAG	Tijeras Arroyo Groundwater
TAL	Target Analyte List
TB	trip blank
Tetryl	2,4,6-trinitrophenylmethylnitramine
the Order	the Compliance Order on Consent
VOC	volatile organic compound
W	well

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SECTION I

TABLE OF CONTENTS

ENVIRONMENTAL RESTORATION OPERATIONS CONSOLIDATED QUARTERLY

	REPORT, October – December 2013	I-1
1.0	Introduction	I-1
2.0	Environmental Restoration Operations Work Completed.....	I-1
2.1	Mixed Waste Landfill.....	I-1
	2.1.1 MWL Evapotranspirative Cover Supplemental Watering Activities.....	I-2
	2.1.2 MWL Evapotranspirative Cover Maintenance Activities	I-2
2.2	Project Management and Site Closure	I-2
	2.2.1 Permit Modification Request Submitted in March 2006	I-2
	2.2.2 Permit Modification Request Submitted in January 2008	I-3
	2.2.3 Status of Permit Modification Requests Submitted in March 2006 and January 2008.....	I-3
	2.2.4 SWMU 52 Liquid Waste Disposal System	I-6
2.3	Hydrogeologic Characterization	I-6
	2.3.1 Technical Area V Groundwater	I-7
	2.3.2 Burn Site Groundwater.....	I-7
	2.3.3 Tijeras Arroyo Groundwater	I-7
	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-8
	2.3.11 SWMU 154 Groundwater	I-9
2.4	Environmental Restoration Operations Documents Submitted to the NMED Pending Regulatory Review and Approval	I-9
3.0	Long-Term Stewardship Work Completed	I-9
3.1	Chemical Waste Landfill.....	I-9
3.2	Corrective Action Management Unit	I-10
	3.2.1 CAMU Waste Management Activities	I-11
	3.2.2 CAMU Regulatory Activities.....	I-12

SECTION I (Concluded)
TABLE OF CONTENTS

3.3 Long-Term Stewardship Documents Submitted to the NMED Pending
Regulatory Review and Approval I-12

4.0 References I-12

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, October – December 2013

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 October, November, and December 2013 quarterly reporting period. Section 2 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 provides the status of LTS activities that relate to the Chemical Waste Landfill and the associated Corrective Action Management Unit.

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 initiated a 60-day public comment period on the MWL LTMMP on September 14, 2012 that was extended twice (November and December 2012) and ended February 11, 2013 (total of 150 days). NMED held a public meeting on the LTMMP on October 16, 2012. The LTMMP is pending NMED approval.

Reclamation field work at the MWL Borrow Pit in Technical Area (TA) III began in May and was completed on August 2, 2013. The reclamation field work was described in the previous ER Quarterly Report (SNL/NM January 2014) and addresses the final remaining condition associated with NMED approval of the MWL Corrective Measures Implementation (CMI) Plan (Bearzi December 2008).

A summary of the reclamation work was submitted to NMED on December 13, 2013 (Todd December 2013) and the summary documents completion of CMI Plan requirements relative to the MWL Borrow Pit (SNL/NM November 2005).

2.1.1 **MWL Evapotranspirative Cover Supplemental Watering Activities**

The supplemental watering system was decommissioned for the calendar year (CY) 2013 growing season on October 16, 2013. Water was drained from the connecting fire hose and supplemental watering system, and the fire hose was returned to the Environmental Resources Field Office for winter storage. The natural precipitation and supplemental watering totals for CY 2013 are 12.11 inches and 5 inches, respectively (total of 17.11 inches).

2.1.2 **MWL Evapotranspirative Cover Maintenance Activities**

MWL Evapotranspirative Cover (ET Cover) maintenance activities were performed from October 31 through November 12, 2013. These activities included erosion repair of small rills (generally less than 2 inches wide and deep) that formed on the northern and western side slopes during the September rain events (approximately 4.12 inches of rain in September in several large events), and weed removal from the ET Cover and surrounding perimeter. The small rills formed in the same locations as in July. Larger size, rounded rock (cobbles) were used to fill the rills, then covered with clean fill, and tamped to fix the rock and soil in place. Additional hand-raking was performed along the upper slope and on the side slopes to prevent surface water flow from focusing in the same pathways. All materials were placed using hand tools and wheelbarrows to minimize impact to the ET Cover vegetation.

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 Compliance Order on Consent (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 investigation sites (TA-V, Burn Site Groundwater [BSG], and Tijeras Arroyo Groundwater [TAG]).

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

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

This letter included four main sections:

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.2.3.8 and I.2.3.9, respectively, of this ER Quarterly Report.

- The section titled, “SWMUs/AOCs to be Restricted to Industrial Land Use,” indicates that the NMED intends to restrict the future land use of the following SWMUs/AOCs to industrial:

1. SWMU 4 – Liquid Waste Disposal System Surface Impoundments (TA-V)
2. SWMU 46 – Old Acid Waste Line Outfall
3. SWMU 91 – Lead Firing Site (Thunder Range)
4. SWMU 196 – Building 6597 Cistern (TA-V)
5. SWMU 234 – Storm Drain System Outfall
6. AOC 1090 – Building 6721 Septic System (TA-III)

- The section titled, “SWMUs/AOCs that do not Require Corrective Action,” includes the following 25 SWMUs/AOCs:

1. SWMU 4 – Liquid Waste Disposal System Surface Impoundments (TA-V)
2. SWMU 5 – Liquid Waste Disposal System Drainfield
3. SWMU 28-2 – Mine Shaft
4. SWMU 46 – Old Acid Waste Line Outfall
5. SWMU 49 – Building 9820 Drains (Lurance Canyon)
6. SWMU 91 – Lead Firing Site (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 and Drywell (Thunder Range)
12. SWMU 147 – Building 9925 Septic Systems (CTF)
13. SWMU 150 – Buildings 9939/9939A Septic System and Drainfield (CTF)
14. SWMU 161 – Building 6636 Septic System (TA-III)
15. SWMU 196 – Building 6597 Cistern (TA-V)
16. SWMU 233 – Storm Drain System Outfall
17. SWMU 234 – Storm Drain System Outfall
18. AOC 1090 – Building 6721 Septic System (TA-III)
19. AOC 1094 – Live Fire Range East Septic System (Lurance Canyon)
20. AOC 1095 – Building 9938 Seepage Pit (CTF)
21. AOC 1101 – Building 885 Septic System (TA-I)
22. AOC 1114 – Building 9978 Drywell (CTF)
23. AOC 1115 – Former Offices Septic System (Solar Tower Complex)
24. AOC 1116 – Building 9981A Seepage Pit (Solar Tower Complex)
25. AOC 1117 – Building 9982 Drywell (Solar Tower Complex)

The SWMU 52 - Liquid Waste Disposal System (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 October 2012, the NMED requested additional actions, as described in Section I.2.2.4 of this ER Quarterly Report.

In a letter dated July 27, 2012, the NMED granted CAC status to three SWMUs/AOCs 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. The NMED stated in their September 17, 2012 solicitation of public comments that persons who previously provided public comment, in response to the “Notice of Public Comment Period and Intent to Approve a Class 3 Permit Modification of the RCRA Permit for Sandia National Laboratories” for the

26 SWMUs/AOCs (NMED December 2007), before the public review and comment period ended on February 8, 2008, do not need to resubmit their comments. However, they may submit additional comments concerning any of the 24 SWMUs/AOCs currently being proposed for CAC status. However, those who requested a public hearing by the February 8, 2008 deadline must submit a new hearing request.

In summary, of the original 31 SWMUs/AOCs submitted for CAC status (26 in 2006 and 5 in 2008), 5 are undergoing additional groundwater investigations (summarized in Section I.2.3), 3 were granted CAC status, and 23 are still in the CAC regulatory process (one site, under the responsibility of SNL LTS Program rather than ER, brings the number in the CAC process to 24). There are also ongoing closure activities at SWMU 52, which is one of the 24 SWMUs/AOCs in the CAC process.

2.2.4 **SWMU 52 Liquid Waste Disposal System**

On October 10, 2012, the NMED requested that Tanks 2 and 4 at SWMU 52 be removed or filled with a permanent insoluble material (Kieling October 2012). NMED also requested that a schedule be submitted by December 11, 2012 and a written report submitted to the NMED by October 11, 2013 (Kieling October 2012). On December 10, 2012, DOE/Sandia requested a 30-day extension for providing the schedule to NMED (Beausoleil December 2012). On December 12, 2012, NMED approved the extension request (Kieling December 2012).

The letter providing a schedule for filling Tanks 2 and 4 with a permanent insoluble material by July 31, 2013 was submitted to NMED on February 26, 2013 (Beausoleil February 2013a). The letter also stated that a written report will be submitted to NMED by October 11, 2013.

Filling of Tanks 2 and 4 was completed on July 30, 2013. Site demobilization and cleanup was completed on July 31, 2013. The completion report "Solid Waste Management Unit (SWMU) 52: Filling Tanks 2 and 4 with a Permanent Insoluble Material" was submitted to NMED in October 2013 (SNL/NM September 2013a) and was approved by NMED on November 12, 2013 (Kieling November 2013a).

2.3 **Hydrogeologic Characterization**

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

ER Quarterly Report. Table I-2 summarizes the hydrogeologic characterization for these sites.

Analytical results for groundwater monitoring at TA-V; BSG; TAG; the MWL; the CWL; and SWMUs 68, 149, 154, 8/58, 49, and 116 will be presented in the SNL/NM CY 2013 Annual Groundwater Monitoring Report, which is an anticipated submittal to the NMED in summer 2014. Also, analytical results for the CWL groundwater monitoring will be presented and discussed in the CWL Annual Post-Closure Care Report for CY 2013.

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

Analytical results for the December 2013 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 October 2013 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-V was conducted in October and November 2013 and the results will be presented in the SNL/NM CY 2013 Annual Groundwater Monitoring Report, as noted above. In December 2013, DOE/NNSA and Sandia submitted a letter to NMED that summarized the current status of the Corrective Measures Evaluation at TA-V and petitioned to withdraw the 2005 TA-V CME Report from their review process. In its place, DOE/NNSA and Sandia will submit an updated Current Conceptual Model (CCM) and CME Report by November 21, 2014. This updated CCM and CME Report will include an evaluation of the remedial alternatives that accounts for the new data available since the DOE/NNSA and Sandia submitted the first version of the CME Report in July 2005. (Beausoleil December 2013).

2.3.2 **Burn Site Groundwater**

BSG investigation groundwater sampling was conducted in December 2013.

2.3.3 **Tijeras Arroyo Groundwater**

TAG investigation groundwater sampling was conducted in November 2013.

2.3.4 **Mixed Waste Landfill Groundwater**

No MWL groundwater monitoring activities were performed during this reporting period. Annual groundwater monitoring required under the Compliance Order on Consent (the Order) was performed in the January through March 2013 reporting period.

2.3.5 **Chemical Waste Landfill Groundwater**

No CWL groundwater monitoring activities were performed during this reporting period. Semiannual groundwater monitoring under the requirements of the CWL Post-Closure Care Permit (PCCP, NMED October 2009) was performed in the July through September 2013 reporting period. Groundwater monitoring results will be presented in the CWL Annual Post-Closure Care Report for CY 2013 that will be submitted to NMED in March 2014.

2.3.6 **SWMUs 8/58 Groundwater**

SWMUs 8/58 groundwater sampling was conducted in October 2013.

2.3.7 **SWMU 49 Groundwater**

No groundwater monitoring activities were performed at SWMU 49 during this reporting period. Groundwater at SWMU 49 is sampled annually and is scheduled to be sampled in the first quarter of 2014.

2.3.8 **SWMU 68 Groundwater**

SWMU 68 groundwater sampling was conducted in October 2013.

2.3.9 **SWMU 116 Groundwater**

No groundwater monitoring activities were performed at SWMU 116 during this reporting period. Groundwater at SWMU 116 is sampled annually and is scheduled to be sampled in the first quarter of 2014.

2.3.10 **SWMU 149 Groundwater**

SWMU 149 groundwater sampling was conducted in December 2013.

2.3.11 **SWMU 154 Groundwater**

SWMU 154 groundwater sampling was conducted in December 2013.

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

3.0 **Long-Term Stewardship Work Completed**

3.1 **Chemical Waste Landfill**

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

Post-Closure Care Report (due to the NMED in March 2014). Activities for this reporting period include the following:

- ET Cover maintenance was performed from October 2 through 4 and included manual weed removal from the ET Cover and surrounding perimeter and discrete herbicide application to kill smaller annual weed species that could not be pulled effectively. On the west side of the site from the perimeter fence to the road (area comprising approximately 0.5 acres), a pre-emergent granular herbicide was applied to minimize growth of annual weed species during the 2014 growing season.
- NMED approved the February 2013 Class 1 Permit modification request (Beausoleil February 2013b) on November 7, 2013 (Kieling November 2013b).
- Quarterly inspection of the CWL ET Cover surface, storm water diversion structures, security fence, and survey monuments was performed on December 2, 2013. No maintenance or repairs were required; however, tumbleweed debris was removed from the southern boundary swale (conditions met PCCP specifications, but the debris was removed as preventive maintenance).
- Preparation of the CY 2013 Annual Post-Closure Care Report began; this report will be submitted to NMED during the next reporting period (March 2014).

3.2 **Corrective Action Management Unit**

Corrective Action Management Unit (CAMU) post-closure care operations consist of vadose zone monitoring, leachate removal, and post-closure inspections as required in the PCCP.

Activities for this reporting period (October, November, and December 2013) 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,
 - On October 25, 2013, a contractor submitted a firm-fixed bid to perform work on the perimeter drainage.

- On November 13, 2013, a request was submitted to SNL/NM Facilities to provide a cost estimate on performing the work and to evaluate options for a more permanent solution.
- Quarterly monitoring of the Vadose Zone Monitoring System was conducted in November 2013. The results will be presented in the CAMU Vadose Zone Monitoring System Annual Monitoring Results Report (anticipated submittal to the NMED in September 2014).
- Composite leachate sampling for waste characterization was conducted on December 3, 2013.
- Weekly pumping of leachate from the leachate collection and removal system (LCRS) was performed. Waste management associated with the leachate collection and removal system during this reporting period is presented in Section I.3.2.1.
- Weekly inspections of the RCRA less than 90-day accumulation area were performed.
- Quarterly inspection of the site was performed on December 9 and December 12, 2013, which included the containment cell cover, storm-water diversion structures, security fences, gates, signs, and benchmarks. The inspection findings identified tumbleweed accumulation around monitoring location CSS-5 on December 10, 2013, which was removed on the same day.

3.2.1 **CAMU Waste Management Activities**

CAMU waste management data for the reporting period are documented in this section. All waste is removed from the site by Hazardous Waste Handling Facility personnel.

- Leachate and rinsate waste stored on site as of October 1, 2013 equaled 75 and 2 gallons, respectively. They were subsequently removed from the site on October 14, 2013.
- Leachate and rinsate waste generated on site during the reporting period equaled 103 and 2 gallons, respectively. Leachate and rinsate waste removed from the site on December 18, 2013 equaled 78 and 2 gallons, respectively.
- Leachate and rinsate waste remaining on site at the end of this reporting period equaled 25 and 0 gallons, respectively.

- Solid waste generated and removed from the site during this reporting period includes the following:
 - Personal protective equipment, paper wipes, and plastic drum pump not exceeding 10 pounds.
 - The old LCRS pump, electrical wiring, and polyvinyl chloride pipe totaling approximately 20 pounds.

3.2.2 **CAMU Regulatory Activities**

No regulatory activities occurred during this quarter.

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

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 2013b).

4.0 **References**

Bearzi, J.P. (New Mexico Environment Department), December 2008. Letter to K. Davis (U.S. Department of Energy NNSA/Sandia Site Office) and F. Nimick (Sandia Corporation), *Conditional Approval, Mixed Waste Landfill Corrective Measures Implementation Plan, November 2005, Sandia National Laboratories, NM5890110518, SNL-05-025*, December 22, 2008.

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

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

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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.
- TAG = Tijeras Arroyo Groundwater.

**Table I-2
Hydrogeologic Characterization**

Investigation Site	Sampling Frequency in CY 2013 ^a	Quarter of Sampling in CY 2013	Location of Analytical Results	Location of Perchlorate Analytical Results	Monitoring Wells in Network
TA-V Groundwater	Quarterly	1,2,3,4	AGMR	AGMR	AVN-1, LWDS-MW1, LWDS-MW2, TAV-MW2, TAV-MW3, TAV-MW4, TAV-MW5, TAV-MW6, TAV-MW7, TAV-MW8, TAV-MW9, TAV-MW10, TAV-MW11, TAV-MW12, TAV-MW13, TAV-MW14
BSG	Semiannually	1,2,4	AGMR	AGMR	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	Annually	1	AGMR	NA	MWL-BW2, MWL-MW4, MWL-MW5, MWL-MW6, MWL-MW7, MWL-MW8, MWL-MW9
CWL Groundwater	Semiannually	1,3	AGMR	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

^aNot all wells in a particular investigation are sampled at the same frequency; this represents the maximum frequency of sampling at a site.

- AGMR = Annual Groundwater Monitoring Report.
- BSG = Burn Site Groundwater.
- CWL = Chemical Waste Landfill.
- CY = Calendar Year.
- ER = Environmental Restoration Operations.
- MWL = Mixed Waste Landfill.
- NA = No wells in the site network are currently being sampled and analyzed for perchlorate.
- SWMU = Solid Waste Management Unit.
- TAG = Tijeras Arroyo Groundwater.
- TA-V = Technical Area V.

SECTION II

TABLE OF CONTENTS

PERCHLORATE SCREENING QUARTERLY GROUNDWATER MONITORING

	REPORT, October – December 2013	II-1
1.0	Introduction	II-1
2.0	Scope of Activities	II-2
3.0	Regulatory Criteria	II-4
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 Conclusions.....	II-8
6.0	References	II-8

LIST OF FIGURES

Figure	Title
II-1	Sandia National Laboratories, New Mexico, Current Perchlorate Screening Monitoring Well Network, October – December 2013

LIST OF TABLES

Table	Title
II-1	Current Perchlorate Screening Monitoring Well Network, Fourth Quarter, CY 2013
II-2	Wells Discussed in Previous Perchlorate Screening Reports
II-3	Sample Details for Fourth Quarter, CY 2013 Perchlorate Sampling

LIST OF TABLES (Concluded)

Table	Title
II-4	Summary of Perchlorate Screening Analytical Results for the Current Monitoring Well Network as of Fourth Quarter, CY 2013
II-5	Perchlorate Screening Groundwater Monitoring Field Water Quality Measurements, Fourth Quarter, CY 2013

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, October – December 2013

1.0 Introduction

Section IV.B of the Compliance Order on Consent (the Order), between the New Mexico Environment Department (NMED); the U.S. Department of Energy (DOE), and Sandia Corporation (Sandia), jointly referred to as DOE/Sandia, for Sandia National Laboratories, New Mexico (SNL/NM), effective on April 29, 2004, stipulates that a select group of groundwater monitoring wells at SNL/NM be sampled for perchlorate (NMED April 2004). This section of the Environmental Restoration Operations (ER) Consolidated Quarterly Report (ER Quarterly Report) summarizes the perchlorate screening groundwater monitoring completed during the Fourth Quarter of Calendar Year (CY) 2013 (October, November, and December) in response to the requirements of the Order. The outline of this report is based on the required elements of a “Periodic Monitoring Report” described in Section X.D. of the Order (NMED April 2004).

In November 2005, DOE/Sandia submitted a letter report on the status of perchlorate screening in groundwater at SNL/NM monitoring wells (SNL/NM November 2005). The purpose of the letter report was to summarize previous correspondence and sampling results and to outline proposed future work to comply with NMED requirements for perchlorate screening of groundwater. As specified in the letter report, quarterly reports will be submitted for wells active in the perchlorate screening monitoring well network.

Based on the NMED response (NMED January 2006), DOE/Sandia will submit each quarterly report within 90 days following the quarter that the data represent. In November 2008, DOE/Sandia received approval from the NMED to proceed to semiannual reporting (NMED November 2008); however, upon further consideration, the NMED once more required quarterly reporting (NMED April 2009). This did not alter the previously negotiated frequency for monitoring well CYN-MW6, an existing Burn Site Groundwater (BSG) study area monitoring well that has been under the sampling and reporting requirements of the Order since the well was installed, which remains at a semiannual frequency for sampling and reporting. In September 2011, DOE/Sandia requested an extension of the submittal dates by one month for ER Quarterly Reports (SNL/NM September 2011). The request was approved by the NMED (September 2011), which allows DOE/Sandia to submit perchlorate quarterly reports within 120 days following the quarter that the data represent.

This report is the thirty-second to be submitted since the November 2005 letter report; the previous reports were submitted for Fourth Quarter of CY 2005 through the Third Quarter of CY 2013 (SNL/NM February 2006 and January 2014).

Groundwater at Coyote Test Field (CTF) monitoring well CTF-MW2 has been sampled 12 times; monitoring well CTF-MW3 has been sampled 11 times; Solid Waste Management Units (SWMUs) 8/58 monitoring wells CCBA-MW1 and CCBA-MW2 have been sampled 9 times; and SWMU 68 monitoring wells OBS-MW1, OBS-MW2, and OBS-MW3 have been sampled 9 times (Table II-1). The Order requires that new wells be sampled for perchlorate for a minimum of four quarters (NMED April 2004). Reporting will continue as long as groundwater monitoring wells remain active in the perchlorate screening monitoring well network unless otherwise negotiated with the NMED.

2.0 **Scope of Activities**

This report provides perchlorate screening groundwater monitoring analytical results for the Fourth Quarter of CY 2013 (October, November, and December) for the wells currently active in the perchlorate screening program as shown on Figure II-1 and listed in Table II-1. In accordance with the requirements of Table XI-1 of the Order, a well with four consecutive quarters of nondetects (NDs) for perchlorate at the screening level/method detection limit (MDL) of 4 micrograms per liter ($\mu\text{g/L}$) is removed from the requirement of continued monitoring for perchlorate.

Data for numerous wells identified in the Order have satisfied this requirement; therefore, these wells have been removed from the perchlorate screening program. The perchlorate results for these wells have been provided in previous reports and are not discussed in this current report. Wells discussed in previous perchlorate screening reports are included in Table II-2.

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 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 First Quarter, Fiscal Year 2014” (SNL/NM September 2013a)
- “SWMU 68 Groundwater Monitoring, Mini-SAP for First Quarter, Fiscal Year 2014” (SNL/NM September 2013b)
- “SWMU 149 Groundwater Monitoring, Mini-SAP for First Quarter, Fiscal Year 2014” (SNL/NM November 2013a)
- “SWMU 154 Groundwater Monitoring, Mini-SAP for Fourth Quarter, Fiscal Year 2013” (SNL/NM November 2013b)

As described in the Mini-SAPs, groundwater sampling was performed in accordance with current SNL/NM Environmental Management, Long-Term Stewardship Project Field Operating Procedures (FOPs). A portable Bennett™ groundwater sampling system was used to collect the groundwater samples. The sampling pump and tubing bundle were decontaminated prior to insertion into monitoring wells in accordance with procedures described in FOP 05-03, “Groundwater Monitoring Equipment Decontamination” (SNL/NM January 2012a). Each well was purged a minimum of one saturated screen volume before sampling in accordance with FOP 05-01, “Groundwater Monitoring Well Sampling and Field Analytical Measurements” (SNL/NM January 2012b).

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

- Turbidity measurements are less than 5 nephelometric turbidity units (NTU), or within 10 percent for turbidity values greater than 5 NTU.
- pH is within 0.1 units.
- Temperature is within 1.0 degree Celsius.
- SC is within 5 percent.

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

The groundwater samples were submitted to GEL Laboratories LLC (GEL) for chemical analysis of perchlorate using U.S. Environmental Protection Agency (EPA) Method 314.0 (EPA November 1999). The sample identification, Analysis Request/Chain-of-Custody form number, and the associated groundwater investigation, are provided in Table II-3. The analytical report from GEL, including certificates of analyses (COA) (Appendix A), analytical methods, MDLs, practical quantitation limits, dates of analyses, and results of quality control (QC) analyses and data validation findings (Appendix B), have been submitted to the SNL/NM Records Center.

3.0 **Regulatory Criteria**

For a given monitoring well, four consecutive ND results using the screening level/MDL of 4 µg/L are considered by the NMED as evidence of the absence of perchlorate, such that additional monitoring for perchlorate in that well is not required. If perchlorate is detected using the screening level/MDL of 4 µg/L in a specific well, then monitoring will continue at that well at a frequency negotiated with the NMED. The Order (NMED April 2004) also requires that for detections equal to or greater than 4 µg/L, DOE/Sandia will evaluate the nature and extent of perchlorate contamination, based on a screening level/MDL of 4 µg/L, and incorporate the results of this evaluation into a Corrective Measures Evaluation (CME). Section VII.C of the Order clarifies that the CME process will be initiated where there is a documented release to the environment, and where corrective measures are necessary to protect human health and the environment.

3.1 **Burn Site Groundwater**

In March 2007, DOE/Sandia received a letter of approval from the NMED, which stated the requirement that DOE/Sandia “determine the nature and extent of the contamination and complete a CME for the perchlorate-impacted groundwater in the vicinity of CYN-MW6” (NMED March 2007). As this was based solely on 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 Order (NMED April 2004), a human health risk assessment has been performed to evaluate the potential for adverse health effects from the concentrations of perchlorate detected in monitoring well CYN-MW6 groundwater samples. The maximum perchlorate concentration to date of 8.93 µg/L was used in the risk assessment. The calculated hazard quotient (HQ) of 0.35 is less than the NMED target level of a hazard index (the sum of all HQs) of 1.0 (NMED June 2006, SNL/NM March 2008–Appendix E).

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

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

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

The April 2009 letter from the NMED to DOE/Sandia was not limited to the BSG study area (NMED April 2009). In the April 2009 letter, the NMED had also requested that DOE/Sandia monitor perchlorate concentrations for a minimum of four quarters at several Tijeras Arroyo Groundwater and Technical Area V monitoring wells (NMED April 2009); all 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 49—Annual sampling of existing monitoring well CYN-MW5. This well was sampled four times from May 2004 through February 2005. Based on four consecutive ND results, monitoring well CYN-MW5 was removed from the perchlorate monitoring network (SNL/NM November 2005).
- SWMU 116—Annual sampling of existing monitoring well CTF-MW1.
- SWMU 149—Submittal of a SAP and quarterly sampling of existing monitoring well CTF-MW3 for a minimum of eight quarters.
- SWMU 154—Submittal of a SAP and quarterly sampling of existing monitoring well CTF-MW2 for a minimum of eight quarters.

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

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

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

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

4.0 **Monitoring Results**

Table II-3 summarizes the details of samples collected from monitoring wells CCBA-MW1, CCBA-MW2, CTF-MW2, CTF-MW3, OBS-MW1, OBS-MW2, and OBS-MW3 in the fourth quarter of CY 2013. Table II-4 summarizes current and historical perchlorate results for wells currently in the perchlorate screening monitoring network. The analytical laboratory COA for the fourth quarter of CY 2013 perchlorate data is provided in Appendix A. Consistent with historical analytical results, no perchlorate was detected above the screening level in any samples collected from monitoring wells CCBA-MW1, CCBA-MW2, CTF-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 September 2013a,

September 2013b, November 2013a, and November 2013b), were identified during the fourth quarter of CY 2013 sampling activities.

5.0 **Summary and Conclusions**

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

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

DOE/Sandia will continue annual monitoring of perchlorate for 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 installation work plan is approved by the NMED and implemented.

6.0 **References**

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Figures

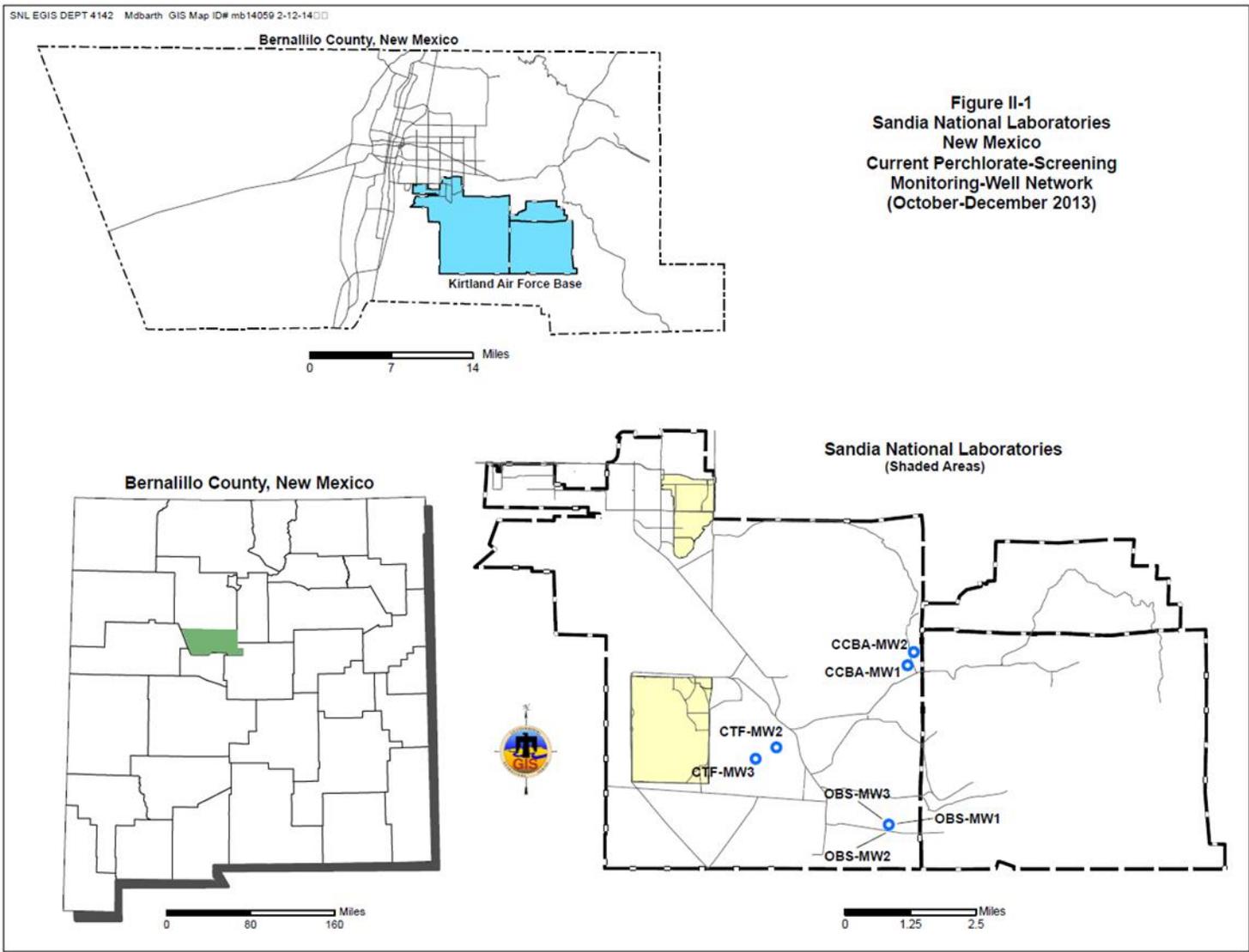


Figure II-1
Sandia National Laboratories, New Mexico
Current Perchlorate Screening Monitoring Well Network, October – December 2013

Tables

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

Well	Date Sampled	Number of Consecutive Sampling Events ^a	Remaining Number of Sampling Events ^b	Sampling Equipment
CCBA-MW1	10-Oct-13	9	TBD ^c	Bennett™ Pump
CCBA-MW2	14-Oct-13	9	TBD ^c	Bennett™ Pump
CTF-MW2	17-Dec-13	12	TBD ^c	Bennett™ Pump
CTF-MW3	13-Dec-13	11 ^d	TBD ^c	Bennett™ Pump
OBS-MW1	08-Oct-13	9	TBD ^c	Bennett™ Pump
OBS-MW2	07-Oct-13	9	TBD ^c	Bennett™ Pump
OBS-MW3	09-Oct-13	9	TBD ^c	Bennett™ Pump

Notes

^aIncludes this sampling event.

^bPer the requirements of Table XI-1 of the Order (NMED April 2004), a well will be removed from the perchlorate screening monitoring well network after four quarters unless perchlorate is detected above the screening level/MDL of 4 µg/L. However, the seven wells currently in the network are being sampled for a minimum of eight events based on site-specific NMED requirements (NMED April 2010).

^cTBD = To be determined. This well 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.

- 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.
- OBS = Old Burn Site.
- The Order = The Compliance Order on Consent.
- SWMU = Solid Waste Management Unit.

Table II-2
Wells Discussed in Previous Perchlorate Screening Reports

Well
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
NWT3-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.
 NWT3 = Northwest Technical Area (III).
 SWTA3 = Southwest Technical Area (III).
 TA = Technical Area.
 W = Well.

**Table II-3
Sample Details for Fourth Quarter, CY 2013 Perchlorate Sampling**

Well	Sample Identification	AR/COC Number	Associated Groundwater Investigation
CCBA-MW1	094774-020	615093	SWMUs 8/58
CCBA-MW2	094779-020	615095	SWMUs 8/58
CCBA-MW2 (Duplicate)	094780-020		
CTF-MW2	095086-020	615180	SWMU 154
CTF-MW3	095084-020	615179	SWMU 149
OBS-MW1	094767-020	615091	SWMU 68
OBS-MW1 (Duplicate)	094768-020		
OBS-MW2	094792-020	615089	SWMU 68
OBS-MW3	094771-020	615092	SWMU 68

Notes

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

**Table II-4
Summary of Perchlorate Screening Analytical Results for the
Current Monitoring Well Network as of Fourth Quarter, CY 2013**

Well	Sample Date	AR/COC Number	Sample Number	Result (µg/L)	MDL (µg/L)	PQL (µg/L)	MCL (µg/L)	Laboratory Qualifier ^a	Validation Qualifier ^b	Analytical Method ^c	Comments
CCBA-MW1	31-Oct-11	613883	091345-020	ND	4.0	12	NE	U		EPA 314.0	
	16-Jan-12	613958	091615-020	ND	4.0	12	NE	U		EPA 314.0	
			091616-020	ND	4.0	12	NE	U		EPA 314.0	Duplicate sample
	23-Apr-12	614155	092291-020	ND	4.0	12	NE	U		EPA 314.0	
	16-Jul-12	614288	092615-020	ND	4.0	12	NE	U		EPA 314.0	
			092616-020	ND	4.0	12	NE	U		EPA 314.0	Duplicate sample
	22-Oct-12	614466	093013-020	ND	4.0	12	NE	U		EPA 314.0	
	16-Jan-13	614567	093341-020	ND	4.0	12	NE	U		EPA 314.0	
			093342-020	ND	4.0	12	NE	U		EPA 314.0	Duplicate sample
	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		
		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		
CCBA-MW2	01-Nov-11	613885	091349-020	ND	4.0	12	NE	U		EPA 314.0	
			091350-020	ND	4.0	12	NE	U		EPA 314.0	Duplicate sample
	12-Jan-12	613956	091610-020	ND	4.0	12	NE	U		EPA 314.0	
			092296-020	ND	4.0	12	NE	U		EPA 314.0	
	24-Apr-12	614157	092297-020	ND	4.0	12	NE	U		EPA 314.0	Duplicate sample
			092610-020	ND	4.0	12	NE	U		EPA 314.0	
	23-Oct-12	614468	093018-020	ND	4.0	12	NE	U		EPA 314.0	
			093019-020	ND	4.0	12	NE	U		EPA 314.0	Duplicate sample
	15-Jan-13	614565	093336-020	ND	4.0	12	NE	U		EPA 314.0	
	25-Apr-13	614747	093878-020	ND	4.0	12	NE	U		EPA 314.0	
093879-020			ND	4.0	12	NE	U		EPA 314.0	Duplicate sample	
15-Jul-13	614937	094371-020	ND	4.0	12	NE	U		EPA 314.0		
14-Oct-13	615095	094779-020	ND	4.0	12	NE	U		EPA 314.0		
		094780-020	ND	4.0	12	NE	U		EPA 314.0	Duplicate sample	
CTF-MW2	08-Mar-11	613448	090237-020	ND	4.0	12	NE	U		EPA 314.0	
			090238-020	ND	4.0	12	NE	U		EPA 314.0	Duplicate sample
	31-May-11	613578	090670-020	ND	4.0	12	NE	U		EPA 314.0	
	29-Sep-11	613855	091259-020	ND	4.0	12	NE	U		EPA 314.0	
	09-Dec-11	613929	091525-020	ND	4.0	12	NE	U		EPA 314.0	
	30-Mar-12	614055	091949-020	ND	4.0	12	NE	U		EPA 314.0	
			091950-020	ND	4.0	12	NE	U		EPA 314.0	Duplicate sample
	19-Jun-12	614255	092538-020	ND	4.0	12	NE	U		EPA 314.0	
	25-Sep-12	614391	092862-020	ND	4.0	12	NE	U		EPA 314.0	
	18-Dec-12	614541	093251-020	ND	4.0	12	NE	U		EPA 314.0	
26-Mar-13	614663	093723-020	ND	4.0	12	NE	U		EPA 314.0		
		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		

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

Well	Sample Date	AR/COC Number	Sample Number	Result (µg/L)	MDL (µg/L)	PQL (µg/L)	MCL (µg/L)	Laboratory Qualifier ^a	Validation Qualifier ^b	Analytical Method ^c	Comments
CTF-MW2	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	
CTF-MW3	09-Mar-11	613450	090243-020	ND	4.0	12	NE	U		EPA 314.0	
			090244-020	ND	4.0	12	NE	U		EPA 314.0	Duplicate sample
	03-Jun-11	613579	090672-020	ND	4.0	12	NE	U		EPA 314.0	
	23-Sep-11	613854	091257-020	ND	4.0	12	NE	U		EPA 314.0	
	08-Dec-11	613928	091523-020	ND	4.0	12	NE	U		EPA 314.0	
			091943-020	ND	4.0	12	NE	U		EPA 314.0	
	26-Mar-12	614053	091944-020	ND	4.0	12	NE	U		EPA 314.0	Duplicate sample
			092536-020	ND	4.0	12	NE	U		EPA 314.0	
	21-Sep-12	614390	092860-020	ND	4.0	12	NE	U		EPA 314.0	
	14-Dec-12	614540	093249-020	ND	4.0	12	NE	H, U	UJ, H1	EPA 314.0	
	22-Mar-13	614661	093717-020	ND	4.0	12	NE	U		EPA 314.0	
			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		
OBS-MW1	25-Oct-11	613879	091335-020	ND	4.0	12	NE	U		EPA 314.0	
	09-Jan-12	613952	091600-020	ND	4.0	12	NE	U		EPA 314.0	
			092022-020	ND	4.0	12	NE	U		EPA 314.0	
	18-Apr-12	614081	092023-020	ND	4.0	12	NE	U		EPA 314.0	Duplicate sample
	17-Jul-12	614289	092618-020	ND	4.0	12	NE	U		EPA 314.0	
	16-Oct-12	614462	093003-020	ND	4.0	12	NE	U		EPA 314.0	
			093349-020	ND	4.0	12	NE	U		EPA 314.0	
	22-Jan-13	614570	093350-020	ND	4.0	12	NE	U		EPA 314.0	Duplicate sample
			093863-020	ND	4.0	12	NE	U		EPA 314.0	
	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		
		094768-020	ND	4.0	12	NE	U		EPA 314.0	Duplicate sample	
OBS-MW2	26-Oct-11	613880	091337-020	ND	4.0	12	NE	U		EPA 314.0	
	10-Jan-12	613954	091604-020	ND	4.0	12	NE	U		EPA 314.0	
			091605-020	ND	4.0	12	NE	U		EPA 314.0	Duplicate sample
	19-Apr-12	614082	092025-020	ND	4.0	12	NE	U		EPA 314.0	
	18-Jul-12	614290	092620-020	ND	4.0	12	NE	U		EPA 314.0	
			093007-020	ND	4.0	12	NE	U		EPA 314.0	
	17-Oct-12	614464	093008-020	ND	4.0	12	NE	U		EPA 314.0	Duplicate sample
			093344-020	ND	4.0	12	NE	U		EPA 314.0	
	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		
		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		

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

Well	Sample Date	AR/COC Number	Sample Number	Result (µg/L)	MDL (µg/L)	PQL (µg/L)	MCL (µg/L)	Laboratory Qualifier ^a	Validation Qualifier ^b	Analytical Method ^c	Comments
OBS-MW3	24-Oct-11	613882	091342-020	ND	4.0	12	NE	U		EPA 314.0	
			091343-020	ND	4.0	12	NE	U		EPA 314.0	Duplicate sample
	11-Jan-12	613955	091607-020	ND	4.0	12	NE	U		EPA 314.0	
	17-Apr-12	614079	092018-020	ND	4.0	12	NE	U		EPA 314.0	
	19-Jul-12	614292	092625-020	ND	4.0	12	NE	U		EPA 314.0	
			092626-020	ND	4.0	12	NE	U		EPA 314.0	Duplicate sample
	18-Oct-12	614465	093010-020	ND	4.0	12	NE	U		EPA 314.0	
	23-Jan-12	614571	093352-020	ND	4.0	12	NE	U		EPA 314.0	
	23-Apr-12	614744	093870-020	ND	4.0	12	NE	U		EPA 314.0	
			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	94771-020	ND	4.0	12	NE	U		EPA 314.0		

Notes

^a**Laboratory Qualifier**

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

^b**Validation Qualifier**

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

^c**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).

µg/L = Micrograms per liter.

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

Bold = Result exceeds the 4 µg/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.

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^a, Fourth Quarter, CY 2013

Well	Sample Date	Temperature (°C)	Specific Conductivity (µMHOS/CM)	Oxidation-Reduction Potential (mV)	pH	Turbidity (NTU)	Dissolved Oxygen (% Sat)	Dissolved Oxygen (mg/L)
CCBA-MW1	10-Oct-13	16.83	579	171.7	6.61	0.56	33.7	3.26
CCBA-MW2	14-Oct-13	16.82	670	160.0	7.54	0.42	65.3	6.32
CTF-MW2	17-Dec-13	15.16	3176.2	72.9	6.11	0.76	0.8	0.08
CTF-MW3	13-Dec-13	16.80	1570.6	326.4	7.10	0.21	86.5	8.37
OBS-MW1	08-Oct-13	16.77	592	166.1	7.46	0.55	38.8	3.74
OBS-MW2	07-Oct-13	18.12	588	175.1	7.29	0.43	36.5	3.44
OBS-MW3	09-Oct-13	17.37	587	159.2	7.43	0.47	47.8	4.58

Notes

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

- °C = Degrees Celsius.
- % Sat = Percent saturation.
- µmhos/cm = Micromhos per centimeter.
- CCBA = Coyote Canyon Blast Area.
- CTF = Coyote Test Field.
- CY = Calendar Year.
- 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).

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Appendix A
Analytical Laboratory Certificates of
Analysis for the Perchlorate Data

CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY

Internal Lab

Batch No. NA SMO Use 210418 AR/COC **615093**

Project Name: SWMU 8/58 GWM	Date Samples Shipped: <u>10/10/13</u>	SMO Authorization: <u>[Signature]</u>	<input type="checkbox"/> Waste Characterization <input type="checkbox"/> RMMA <input type="checkbox"/> Released by COC No. <input checked="" type="checkbox"/> 4° Celsius
Project/Task Manager: Clinton Lum	Carrier/Waybill No. <u>210418</u>	SMO Contact Phone: <u>910-556-8171</u>	
Project/Task Number: 146422.10.11.01	Lab Contact: Edie Kent/803-556-8171	Lorraine Herrera/505-844-3199	
Service Order: CF262-14	Lab Destination: GEL	Send Report to SMO: Rita Kavanaugh/505-284-2553	
Tech Area:		Contract No.: PO 1303873	

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

Sample No.	Fraction	Sample Location Detail	Depth (ft)	Date/Time Collected	Sample Matrix	Container		Preservative	Collection Method	Sample Type	Parameter & Method Requested	Lab Sample ID
						Type	Volume					
094773	-001	CCBA-FB1	NA	10/10/13 9:20	DIW	G	3x40 ml	HCL	G	FB	TCL VOC (SW846-8260B)	335372 001
094774	-001	CCBA-MW1	79	10/10/13 9:24	GW	G	3x40 ml	HCL	G	SA	TCL VOC (SW846-8260B)	335372 002
094774	-002	CCBA-MW1	79	10/10/13 9:25	GW	AG	4x1L	None	G	SA	TCL SVOC (SW846-8270C)	335372 003
094774	-009	CCBA-MW1	79	10/10/13 9:27	GW	P	500 ml	HNO3	G	SA	TAL Metals+U(SW846-6010/6020/7470)	335372 004
094774	-016	CCBA-MW1	79	10/10/13 9:28	GW	P	125 ml	None	G	SA	Anions-Br,Cl,F,SO4 (SW846-9056)	335372 005
094774	-017	CCBA-MW1	79	10/10/13 9:30	FGW	P	500 ml	HNO3	G	SA	Metals-Ca,Mg,K,Na (SW846-6020)	335380 001
094774	-018	CCBA-MW1	79	10/10/13 9:31	GW	P	125 ml	H2SO4	G	SA	NPN (EPA 353.2)	335372 006
094774	-020	CCBA-MW1	79	10/10/13 9:32	GW	P	250 ml	None	G	SA	Perchlorate (EPA 314.0)	335372 007
094774	-022	CCBA-MW1	79	10/10/13 9:33	GW	P	500 ml	None	G	SA	Alkalinity (SM2320B)	335372 008
094774	-024	CCBA-MW1	79	10/10/13 9:34	GW	AG	4x1L	None	G	SA	High Explosives (SW846-8321A mod)	335372 009

Last Chain: <input type="checkbox"/> Yes	Sample Tracking SMO Use	Special Instructions/QC Requirements:	Conditions on Receipt
Validation Req'd: <input checked="" type="checkbox"/> Yes	Date Entered:	EDD <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	
Background: <input type="checkbox"/> Yes	Entered by:	Turnaround Time <input type="checkbox"/> 7 Day* <input type="checkbox"/> 15 Day* <input checked="" type="checkbox"/> 30 Day	
Confirmatory: <input type="checkbox"/> Yes	QC inits.:	Negotiated TAT <input type="checkbox"/>	

Sample Team Members	Name	Signature	Init.	Company/Organization/Phone/Cell
	Robert Lynch	<u>[Signature]</u>	RL	SNL/4142/505-844-4013/505-250-7090
	Alfred Santillanes	<u>[Signature]</u>	AS	SNL/4142/505-844-5130/505-228-0710
	William Gibson	<u>[Signature]</u>	WG	SNL/4142/505-284-3307/505-239-7367

1. Relinquished by <u>[Signature]</u> Org. <u>4142</u> Date <u>10/10/13</u> Time <u>1000</u>	3. Relinquished by _____ Org. _____ Date _____ Time _____
1. Received by <u>[Signature]</u> Org. <u>4142</u> Date <u>10/10/13</u> Time <u>1000</u>	3. Received by _____ Org. _____ Date _____ Time _____
2. Relinquished by <u>[Signature]</u> Org. <u>4142</u> Date <u>10/10/13</u> Time <u>1100</u>	4. Relinquished by _____ Org. _____ Date _____ Time _____
2. Received by <u>[Signature]</u> Org. <u>4142</u> Date <u>10-11-13</u> Time <u>0735</u>	4. Received by _____ Org. _____ Date _____ Time _____

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

Lab Use

GEL LABORATORIES LLC

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

Certificate of Analysis

Report Date: November 7, 2013

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

Client Sample ID:	094774-020	Project:	SNLSGWater
Sample ID:	335372007	Client ID:	SNLS004
Matrix:	AQUEOUS		
Collect Date:	10-OCT-13 09:32		
Receive Date:	11-OCT-13	Client Desc.:	CCBA-MWI
Collector:	Client	Vol. Recv.:	

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Ion Chromatography											
EPA 314.0 Perchlorate by IC "As Received"											
Perchlorate	U	ND	0.004	0.012	mg/L	1	MAR1	10/12/13	1630	1338556	1

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	EPA 314.0 DOE-AL	

Notes:

CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY

Internal Lab

Batch No. *W*

SMO Use

AR/COC **615095**

Project Name: SWMU 8/58 GWM	Date Samples Shipped: <i>10/14/13</i>	SMO Authorization: <i>[Signature]</i>	<input type="checkbox"/> Waste Characterization <input type="checkbox"/> RMMA <input type="checkbox"/> Released by COC No. <input checked="" type="checkbox"/> 4° Celsius
Project/Task Manager: Clinton Lum	Carrier/Waybill No. <i>210620</i>	SMO Contact Phone: <i>[Blank]</i>	
Project/Task Number: 146422.10.11.01	Lab Contact: Edie Kent/803-556-8171	Lorraine Herrera/505-844-3199	
Service Order: CF262-14	Lab Destination: GEL	Send Report to SMO: Rita Kavanaugh/505-284-2553	
Contract No.: PO 1303873			

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

Tech Area: _____
 Building: _____ Room: _____ Operational Site: _____

Sample No.	Fraction	Sample Location Detail	Depth (ft)	Date/Time Collected	Sample Matrix	Container		Preservative	Collection Method	Sample Type	Parameter & Method Requested	Lab Sample ID
						Type	Volume					
✓ 094779	-001	CCBA-MW2	117	10/14/13 9:26	GW	G	3x40 ml	HCL	G	SA	TCL VOC (SW846-8260B)	335522 001
✓ 094779	-002	CCBA-MW2	117	10/14/13 9:27	GW	AG	4x1L	None	G	SA	TCL SVOC (SW846-8270C)	335522 002
✓ 094779	-009	CCBA-MW2	117	10/14/13 9:30	GW	P	500 ml	HNO3	G	SA	TAL Metals+U(SW846-6010/6020/7470)	335522 003
✓ 094779	-016	CCBA-MW2	117	10/14/13 9:31	GW	P	125 ml	None	G	SA	Anions-Br,Cl,F,SO4 (SW846-9056)	335522 004
✓ 094779	-017	CCBA-MW2	117	10/14/13 9:33	FGW	P	500 ml	HNO3	G	SA	Metals-Ca,Mg,K,Na (SW846-6020)	335523 001
✓ 094779	-018	CCBA-MW2	117	10/14/13 9:34	GW	P	125 ml	H2SO4	G	SA	NPN (EPA 353.2)	335522 005
✓ 094779	-020	CCBA-MW2	117	10/14/13 9:35	GW	P	250 ml	None	G	SA	Perchlorate (EPA 314.0)	335522 006
✓ 094779	-022	CCBA-MW2	117	10/14/13 9:36	GW	P	500 ml	None	G	SA	Alkalinity (SM2320B)	335522 007
✓ 094779	-024	CCBA-MW2	117	10/14/13 9:37	GW	AG	4x1L	None	G	SA	High Explosives (SW846-8321A mod)	335522 008
✓ 094779	-027	CCBA-MW2	117	10/14/13 9:40	GW	P	250 ml	NaOH	G	SA	Total Cyanide (SW846-9012)	335522 009

Last Chain: <input checked="" type="checkbox"/> Yes	Sample Tracking SMO Use	Special Instructions/QC Requirements:	Conditions on Receipt
Validation Req'd: <input checked="" type="checkbox"/> Yes	Date Entered:	EDD <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	
Background: <input type="checkbox"/> Yes	Entered by:	Turnaround Time <input type="checkbox"/> 7 Day* <input type="checkbox"/> 15 Day* <input checked="" type="checkbox"/> 30 Day	
Confirmatory: <input type="checkbox"/> Yes	QC inits.:	Negotiated TAT <input type="checkbox"/>	

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

Sample Disposal Return to Client Disposal by Lab

Return Samples By: _____

Comments: Send report to Tim Jackson/4142/MS 0729/284-2547
 FGW (filtered in field w/40 micron filter). Alkalinity (as total CaCO3,HCO3,CO3). If Perchlorate detected, perform verification analysis using SW846-6850M. Gamma Spectroscopy as short list isotopes.

1. Relinquished by <i>[Signature]</i> Org. <i>4142</i> Date <i>10/14/13</i> Time <i>10:13</i>	3. Relinquished by _____ Org. _____ Date _____ Time _____
1. Received by <i>[Signature]</i> Org. <i>4142</i> Date <i>10/14/13</i> Time <i>10:13</i>	3. Received by _____ Org. _____ Date _____ Time _____
2. Relinquished by <i>[Signature]</i> Org. <i>4142</i> Date <i>10/14/13</i> Time <i>11:00</i>	4. Relinquished by _____ Org. _____ Date _____ Time _____
2. Received by <i>[Signature]</i> Org. <i>CEL</i> Date <i>10-15-13</i> Time <i>07:25</i>	4. Received by _____ Org. _____ Date _____ Time _____

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

Lab Use

CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY (Continuation)

AR/COC **615095**

Project Name: SWMU 8/58 GWM		Project/Task Manager: Clinton Lum			Project/Task No.: 146422.10.11.01								
Tech Area:													
Building:		Room:											
Sample No.	Fraction	Sample Location Detail	Depth (ft)	Date/Time Collected	Sample Matrix	Container		Preservative	Collection Method	Sample Type	Parameter & Method Requested	Lab use	
						Type	Volume					Lab Sample ID	
094779	-033 ✓	CCBA-MW2	117	10/14/13 9:41 ✓	GW	P	1 L	HNO3	G	SA	Gamma Spectroscopy (EPA 901.0)	335522 016	
094779	-034 ✓	CCBA-MW2	117	10/14/13 9:43 ✓	GW	P	1 L	HNO3	G	SA	Gross Alpha and Beta (EPA 900.0)	335522 011	
094779	-035 ✓	CCBA-MW2	117	10/14/13 9:45 ✓	GW	P	1 L	HNO3	G	SA	Isotopic Uranium (HASL 300)	335522 012	
094780	-001 ✓	CCBA-MW2	117	10/14/13 9:26 ✓	GW	G	3x40 ml	HCL	G	DU	TCL VOC (SW846-8260B)	335522 013	
094780	-002 ✓	CCBA-MW2	117	10/14/13 9:27 ✓	GW	AG	4x1L	None	G	DU	TCL SVOC (SW846-8270C)	335522 014	
094780	-009 ✓	CCBA-MW2	117	10/14/13 9:30 ✓	GW	P	500 ml	HNO3	G	DU	TAL Metals+U(SW846-6010/6020/7470)	335522 015	
094780	-016 ✓	CCBA-MW2	117	10/14/13 9:31 ✓	GW	P	125 ml	None	G	DU	Anions-Br,Cl,F,SO4 (SW846-9056)	335522 016	
094780	-017 ✓	CCBA-MW2	117	10/14/13 9:33 ✓	FGW	P	500 ml	HNO3	G	DU	Metals-Ca,Mg,K,Na (SW846-6020)	335523 002	
094780	-018 ✓	CCBA-MW2	117	10/14/13 9:34 ✓	GW	P	125 ml	H2SO4	G	DU	NPN (EPA 353.2)	335522 017	
094780	-020 ✓	CCBA-MW2	117	10/14/13 9:35 ✓	GW	P	250 ml	None	G	DU	Perchlorate (EPA 314.0)	335522 018	
094780	-022 ✓	CCBA-MW2	117	10/14/13 9:36 ✓	GW	P	500 ml	None	G	DU	Alkalinity (SM2320B)	335522 019	
094780	-024 ✓	CCBA-MW2	117	10/14/13 9:37 ✓	GW	AG	4x1L	None	G	DU	High Explosives (SW846-8321A mod)	335522 020	
094780	-027 ✓	CCBA-MW2	117	10/14/13 9:40 ✓	GW	P	250 ml	NaOH	G	DU	Total Cyanide (SW846-9012)	335522 021	
094780	-033 ✓	CCBA-MW2	117	10/14/13 9:41 ✓	GW	P	1 L	HNO3	G	DU	Gamma Spectroscopy (EPA 901.0)	335522 022	
094780	-034 ✓	CCBA-MW2	117	10/14/13 9:43 ✓	GW	P	1 L	HNO3	G	DU	Gross Alpha and Beta (EPA 900.0)	335522 023	
094780	-035 ✓	CCBA-MW2	117	10/14/13 9:45 ✓	GW	P	1 L	HNO3	G	DU	Isotopic Uranium (HASL 300)	335522 024	
094781	-001 ✓	CCBA-TB3	NA	10/14/13 9:26 ✓	DIW	G	3x40 ml	HCL	G	TB	TCL VOC (SW846-8260B)	335522 025	
Recipient Initials <i>MK</i>													

GEL LABORATORIES LLC

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

Certificate of Analysis

Report Date: November 11, 2013

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

Client Sample ID:	094779-020	Project:	SNLSGWater
Sample ID:	335522006	Client ID:	SNLS004
Matrix:	AQUEOUS		
Collect Date:	14-OCT-13 09:35		
Receive Date:	15-OCT-13	Client Desc.:	CCBA-MW2
Collector:	Client	Vol. Recv.:	

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Ion Chromatography											
EPA 314.0 Perchlorate by IC "As Received"											
Perchlorate	U	ND	0.004	0.012	mg/L	1	MAR1	10/31/13	1903	1339586	1

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	EPA 314.0 DOE-AL	

Notes:

GEL LABORATORIES LLC

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

Certificate of Analysis

Report Date: November 11, 2013

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

Client Sample ID:	094780-020	Project:	SNLSGWater
Sample ID:	335522018	Client ID:	SNLS004
Matrix:	AQUEOUS		
Collect Date:	14-OCT-13 09:35		
Receive Date:	15-OCT-13	Client Desc.:	CCBA-MW2
Collector:	Client	Vol. Recv.:	

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Ion Chromatography											
EPA 314.0 Perchlorate by IC "As Received"											
Perchlorate	U	ND	0.004	0.012	mg/L	1	MARI	10/31/13	2000	1339586	1

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	EPA 314.0 DOE-AL	

Notes:

CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY

Internal Lab

Batch No. *NA*

Project Name: SWMU 68 GWM		Date Samples Shipped: 10/8/13		SMO Authorization: <i>[Signature]</i>		AR/COC 615091'	
Project/Task Manager: Clinton Lum		Carrier/Waybill No. 210471		SMO Contact Phone: Lorraine Herrera/505-844-3199		<input type="checkbox"/> Waste Characterization <input type="checkbox"/> RMMA <input type="checkbox"/> Released by COC No.	
Project/Task Number: 146422.10.11.01		Lab Contact: Edie Kent/803-556-8171		Send Report to SMO: Rita Kavanaugh/505-284-2553		<input checked="" type="checkbox"/> 4° Celsius	
Service Order: CF263-14		Lab Destination: GEL		Contract No.: PO 1303873		Bill to: Sandia National Laboratories (Accounts Payable), P.O. Box 5800, MS-0154 Albuquerque, NM 87185-0154	

Tech Area:		Operational Site:	
Building:	Room:		

Sample No.	Fraction	Sample Location Detail	Depth (ft)	Date/Time Collected		Sample Matrix	Container		Preservative	Collection Method	Sample Type	Parameter & Method Requested	Lab Sample ID
							Type	Volume					
094767	-001	OBS-MW1	153	10/8/13	9:10	GW	G	3x40 ml	HCL	G	SA	TCL VOC (SW846-8260B)	335138 001
094767	-002	OBS-MW1	153	10/8/13	9:11	GW	AG	4x1L	None	G	SA	TCL SVOC (SW846-8270C)	335138 002
094767	-009	OBS-MW1	153	10/8/13	9:14	GW	P	500 ml	HNO3	G	SA	TAL Metals+U(SW846-6010/6020/7470)	335138 003
094767	-014	OBS-MW1	153	10/8/13	9:15	GW	P	250 ml	None	G	SA	Hexavalent Chromium(SW846-7196A)	335138 004
094767	-016	OBS-MW1	153	10/8/13	9:16	GW	P	125 ml	None	G	SA	Anions-Br,Cl,F,SO4 (SW846-9056)	335138 005
094767	-017	OBS-MW1	153	10/8/13	9:18	FGW	P	500 ml	HNO3	G	SA	Metals-Ca,Mg,K,Na (SW846-6020)	335139 001
094767	-018	OBS-MW1	153	10/8/13	9:19	GW	P	125 ml	H2SO4	G	SA	NPN (EPA 353.2)	335138 006
094767	-020	OBS-MW1	153	10/8/13	9:20	GW	P	250 ml	None	G	SA	Perchlorate (EPA 314.0)	335138 007
094767	-022	OBS-MW1	153	10/8/13	9:21	GW	P	500 ml	None	G	SA	Alkalinity (SM2320B)	335138 008
094767	-024	OBS-MW1	153	10/8/13	9:22	GW	AG	4x1L	None	G	SA	High Explosives (SW846-8321A mod)	335138 009

Last Chain: <input type="checkbox"/> Yes		Sample Tracking		SMO Use		Special Instructions/QC Requirements:		Conditions on Receipt	
Validation Req'd: <input checked="" type="checkbox"/> Yes		Date Entered:				EDD <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No			
Background: <input type="checkbox"/> Yes		Entered by:				Turnaround Time <input type="checkbox"/> 7 Day* <input type="checkbox"/> 15 Day* <input checked="" type="checkbox"/> 30 Day			
Confirmatory: <input type="checkbox"/> Yes		QC inits.:				Negotiated TAT <input type="checkbox"/>			
Sample Team Members	Name		Signature		Init.		Company/Organization/Phone/Cell		
	Robert Lynch		<i>[Signature]</i>		<i>[Init]</i>		SNL/4142/505-844-4013/505-250-7090		
	Alfred Santillanes		<i>[Signature]</i>		<i>[Init]</i>		SNL/4142/505-844-5130/505-228-0710		
	William Gibson		<i>[Signature]</i>		<i>[Init]</i>		SNL/4142/505-284-3307/505-239-7367		
								Sample Disposal <input type="checkbox"/> Return to Client <input checked="" type="checkbox"/> Disposal by Lab	
								Return Samples By:	
								Comments: Send report to Tim Jackson/4142/MS 0729/284-2547 FGW (filtered in field w/40 micron filter). Alkalinity (as total CaCO3,HCO3,CO3). If Perchlorate detected, perform verification analysis using SW846-6850M. Gamma Spectroscopy as short list isotopes.	

1. Relinquished by <i>[Signature]</i> Org. 4142 Date 10/8/13 Time 09:55	3. Relinquished by	Org.	Date	Time
1. Received by <i>[Signature]</i> Org. 4142 Date 10/8/13 Time 09:55	3. Received by	Org.	Date	Time
2. Relinquished by <i>[Signature]</i> Org. 4142 Date 10/8/13 Time 10:00	4. Relinquished by	Org.	Date	Time
2. Received by <i>[Signature]</i> Org. 602 Date 10-9-13 Time 07:20	4. Received by	Org.	Date	Time

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

CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY (Continuation)

AR/COC **615091**

Project Name:		Project/Task Manager:		Project/Task No.:								Lab use	
SWMU 68		Clinton Lum		146422.10.11.01									
Tech Area:		Room:											
Building:													
Sample No.	Fraction	Sample Location Detail	Depth (ft)	Date/Time Collected	Sample Matrix	Container		Preservative	Collection Method	Sample Type	Parameter & Method Requested	Lab Sample ID	
						Type	Volume						
✓ 094767	-027	OBS-MW1	153	10/8/13 9:25	GW	P	250 ml	NaOH	G	SA	Total Cyanide (SW846-9012)	335138 010	
✓ 094767	-033	OBS-MW1	153	10/8/13 9:26	GW	P	1 L	HNO3	G	SA	Gamma Spectroscopy (EPA 901.0)	335138 011	
✓ 094767	-034	OBS-MW1	153	10/8/13 9:28	GW	P	1 L	HNO3	G	SA	Gross Alpha and Beta (EPA 900.0)	335138 012	
✓ 094767	-035	OBS-MW1	153	10/8/13 9:30	GW	P	1 L	HNO3	G	SA	Isotopic Uranium (HASL 300)	335138 013	
✓ 094768	-001	OBS-MW1	153	10/8/13 9:10	GW	G	3x40 ml	HCL	G	DU	TCL VOC (SW846-8260B)	335138 014	
✓ 094768	-002	OBS-MW1	153	10/8/13 9:11	GW	AG	4x1L	None	G	DU	TCL SVOC (SW846-8270C)	335138 015	
✓ 094768	-009	OBS-MW1	153	10/8/13 9:14	GW	P	500 ml	HNO3	G	DU	TAL Metals+U(SW846-6010/6020/7470)	335138 016	
✓ 094768	-014	OBS-MW1	153	10/8/13 9:15	GW	P	250 ml	None	G	DU	Hexavalent Chromium(SW846-7196A)	335138 017	
✓ 094768	-016	OBS-MW1	153	10/8/13 9:16	GW	P	125 ml	None	G	DU	Anions-Br,Cl,F,SO4 (SW846-9056)	335138 018	
✓ 094768	-017	OBS-MW1	153	10/8/13 9:18	FGW	P	500 ml	HNO3	G	DU	Metals-Ca,Mg,K,Na (SW846-6020)	335139 002	
✓ 094768	-018	OBS-MW1	153	10/8/13 9:19	GW	P	125 ml	H2SO4	G	DU	NPN (EPA 353.2)	335138 019	
✓ 094768	-020	OBS-MW1	153	10/8/13 9:20	GW	P	250 ml	None	G	DU	Perchlorate (EPA 314.0)	335138 020	
✓ 094768	-022	OBS-MW1	153	10/8/13 9:21	GW	P	500 ml	None	G	DU	Alkalinity (SM2320B)	335138 021	
✓ 094768	-024	OBS-MW1	153	10/8/13 9:22	GW	AG	4x1L	None	G	DU	High Explosives (SW846-8321A mod)	335138 022	
✓ 094768	-027	OBS-MW1	153	10/8/13 9:25	GW	P	250 ml	NaOH	G	DU	Total Cyanide (SW846-9012)	335138 023	
✓ 094768	-033	OBS-MW1	153	10/8/13 9:26	GW	P	1 L	HNO3	G	DU	Gamma Spectroscopy (EPA 901.0)	335138 024	
✓ 094768	-034	OBS-MW1	153	10/8/13 9:28	GW	P	1 L	HNO3	G	DU	Gross Alpha and Beta (EPA 900.0)	335138 025	
✓ 094768	-035	OBS-MW1	153	10/8/13 9:30	GW	P	1 L	HNO3	G	DU	Isotopic Uranium (HASL 300)	335138 026	
✓ 094769	-001	OBS-TB3	NA	10/8/13 9:10	DIW	G	3x40 ml	HCL	G	TB	TCL VOC (SW846-8260B)	335138 027	

Recipient Initials *MK*

GEL LABORATORIES LLC

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

Certificate of Analysis

Report Date: November 5, 2013

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

Client Sample ID:	094767-020	Project:	SNLSGWater
Sample ID:	335138007	Client ID:	SNLS004
Matrix:	AQUEOUS		
Collect Date:	08-OCT-13 09:20		
Receive Date:	09-OCT-13	Client Desc.:	OBS-MW1
Collector:	Client	Vol. Recv.:	

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Ion Chromatography											
EPA 314.0 Perchlorate by IC "As Received"											
Perchlorate	U	ND	0.004	0.012	mg/L	1	MAR1	10/10/13	2346	1337827	1

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	EPA 314.0 DOE-AL	

Notes:

GEL LABORATORIES LLC

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

Certificate of Analysis

Report Date: November 5, 2013

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

Client Sample ID:	094768-020	Project:	SNLSGWater
Sample ID:	335138020	Client ID:	SNLS004
Matrix:	AQUEOUS		
Collect Date:	08-OCT-13 09:20		
Receive Date:	09-OCT-13	Client Desc.:	OBS-MW1
Collector:	Client	Vol. Recv.:	

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Ion Chromatography											
EPA 314.0 Perchlorate by IC "As Received"											
Perchlorate	U	ND	0.004	0.012	mg/L	1	MAR1	10/11/13	0044	1337827	1

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	EPA 314.0 DOE-AL	

Notes:

CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY

Internal Lab

Batch No. <u> </u>		SMO Use		AR/COC 615089	
Project Name: <u>SWMU 68 GWM</u>		Date Samples Shipped: <u>10/7/13</u>		SMO Authorization: <u>[Signature]</u>	
Project/Task Manager: <u>Clinton Lum</u>		Carrier/Waybill No. <u>210426</u>		SMO Contact Phone: <u>540</u>	
Project/Task Number: <u>146422.10.11.01</u>		Lab Contact: <u>Edie Kent/803-556-8171</u>		Lorraine Herrera/505-844-3199	
Service Order: <u>CF263-14</u>		Lab Destination: <u>GEL</u>		Send Report to SMO: <u> </u>	
		Contract No.: <u>PO 1303873</u>		Rita Kavanaugh/505-284-2553	

Waste Characterization
 RMMA
 Released by COC No. 4° Celsius

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

Tech Area: <u> </u>		Operational Site: <u> </u>	
Building: <u> </u>	Room: <u> </u>		

Sample No.	Fraction	Sample Location Detail	Depth (ft)	Date/Time Collected		Sample Matrix	Container		Preservative	Collection Method	Sample Type	Parameter & Method Requested	Lab Sample ID
							Type	Volume					
✓ 094762	-001	OBS-MW2	252	10/7/13	9:28	GW	G	3x40 ml	HCL	G	SA	TCL VOC (SW846-8260B)	335046 001
✓ 094762	-002	OBS-MW2	252	10/7/13	9:29	GW	AG	4x1L	None	G	SA	TCL SVOC (SW846-8270C)	335046 002
✓ 094762	-009	OBS-MW2	252	10/7/13	9:31	GW	P	500 ml	HNO3	G	SA	TAL Metals+U(SW846-6010/6020/7470)	335046 003
✓ 094762	-014	OBS-MW2	252	10/7/13	9:32	GW	P	250 ml	None	G	SA	Hexavalent Chromium(SW846-7196A)	335046 004
✓ 094762	-016	OBS-MW2	252	10/7/13	9:33	GW	P	125 ml	None	G	SA	Anions-Br,Cl,F,SO4 (SW846-9056)	335046 005
✓ 094762	-017	OBS-MW2	252	10/7/13	9:35	FGW	P	500 ml	HNO3	G	SA	Metals-Ca,Mg,K,Na (SW846-6020)	335051 001
✓ 094762	-018	OBS-MW2	252	10/7/13	9:36	GW	P	125 ml	H2SO4	G	SA	NPN (EPA 353.2)	335046 006
✓ 094762	-020	OBS-MW2	252	10/7/13	9:37	GW	P	250 ml	None	G	SA	Perchlorate (EPA 314.0)	335046 007
✓ 094762	-022	OBS-MW2	252	10/7/13	9:38	GW	P	500 ml	None	G	SA	Alkalinity (SM2320B)	335046 008
✓ 094762	-024	OBS-MW2	252	10/7/13	9:39	GW	AG	4x1L	None	G	SA	High Explosives (SW846-8321A mod)	335046 009

Last Chain: <input type="checkbox"/> Yes		Sample Tracking		SMO Use		Special Instructions/QC Requirements:		Conditions on Receipt		
Validation Req'd: <input checked="" type="checkbox"/> Yes		Date Entered: <u> </u>				EDD <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No				
Background: <input type="checkbox"/> Yes		Entered by: <u> </u>				Turnaround Time <input type="checkbox"/> 7 Day* <input type="checkbox"/> 15 Day* <input checked="" type="checkbox"/> 30 Day				
Confirmatory: <input type="checkbox"/> Yes		QC initials: <u> </u>				Negotiated TAT <input type="checkbox"/>				
Sample Team Members	Name		Signature		Init.		Company/Organization/Phone/Cell		Sample Disposal <input type="checkbox"/> Return to Client <input checked="" type="checkbox"/> Disposal by Lab	
	Robert Lynch		<u>[Signature]</u>		RL		SNL/4142/505-844-4013/505-250-7090		Return Samples By:	
	Alfred Santillanes		<u>[Signature]</u>		AS		SNL/4142/505-844-5130/505-228-0710		Comments: Send report to Tim Jackson/4142/MS 0729/284-2547 FGW (filtered in field w/40 micron filter). Alkalinity (as total CaCO3,HCO3,CO3). If Perchlorate detected, perform verification analysis using SW846-6850M. Gamma Spectroscopy as short list isotopes.	
	William Gibson		<u>[Signature]</u>		WG		SNL/4142/505-284-3307/505-239-7367			

1. Relinquished by <u>Alfred Santillanes</u> Org. <u>4142</u> Date <u>10/7/13</u> Time <u>11:13</u>			3. Relinquished by <u> </u> Org. <u> </u> Date <u> </u> Time <u> </u>		
1. Received by <u> </u> Org. <u>4142</u> Date <u>10/7/13</u> Time <u>11:13</u>			3. Received by <u> </u> Org. <u> </u> Date <u> </u> Time <u> </u>		
2. Relinquished by <u> </u> Org. <u>4142</u> Date <u>10/7/13</u> Time <u>11:30</u>			4. Relinquished by <u> </u> Org. <u> </u> Date <u> </u> Time <u> </u>		
2. Received by <u> </u> Org. <u>4142</u> Date <u>10/8/13</u> Time <u>0730</u>			4. Received by <u> </u> Org. <u> </u> Date <u> </u> Time <u> </u>		

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

GEL LABORATORIES LLC

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

Certificate of Analysis

Report Date: November 4, 2013

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

Client Sample ID:	094762-020	Project:	SNLSGWater
Sample ID:	335046007	Client ID:	SNLS004
Matrix:	AQUEOUS		
Collect Date:	07-OCT-13 09:37		
Receive Date:	08-OCT-13	Client Desc.:	OBS-MW2
Collector:	Client	Vol. Recv.:	

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Ion Chromatography											
EPA 314.0 Perchlorate by IC "As Received"											
Perchlorate	U	ND	0.004	0.012	mg/L	1	MAR1	10/10/13	1802	1336270	1

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	EPA 314.0 DOE-AL	

Notes:

CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY

Internal Lab

Batch No. <u>4107</u>		SMO Use		AR/COC 615092	
Project Name: <u>SWMU 68 GWM</u>		Date Samples Shipped: <u>10/9/13</u>		SMO Authorization: <u>[Signature]</u>	
Project/Task Manager: <u>Clinton Lum</u>		Carrier/Waybill No. <u>210509</u>		SMO Contact Phone: <u>Lorraine Herrera/505-844-3199</u>	
Project/Task Number: <u>146422.10.11.01</u>		Lab Contact: <u>Edie Kent/803-556-8171</u>		Send Report to SMO: <u>Rita Kavanaugh/505-284-2553</u>	
Service Order: <u>CF263-14</u>		Lab Destination: <u>GEL</u>		<input type="checkbox"/> Waste Characterization <input type="checkbox"/> RMMA <input type="checkbox"/> Released by COC No. <input checked="" type="checkbox"/> 4° Celsius	
Contract No.: <u>PO 1303873</u>					

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

Sample No.	Fraction	Sample Location Detail	Depth (ft)	Date/Time Collected		Sample Matrix	Container		Preservative	Collection Method	Sample Type	Parameter & Method Requested	Lab Sample ID
							Type	Volume					
094770	-001	OBS-FB2	NA	10/9/13	9:19	DIW	G	3x40ml	HCL	G	FB	TCL VOC (SW846-8260B)	335241 001
094771	-001	OBS-MW3	208	10/9/13	9:22	GW	G	3x40ml	HCL	G	SA	TCL VOC (SW846-8260B)	335241 002
094771	-002	OBS-MW3	208	10/9/13	9:23	GW	AG	4x1L	None	G	SA	TCL SVOC (SW846-8270C)	335241 003
094771	-009	OBS-MW3	208	10/9/13	9:25	GW	P	500 ml	HNO3	G	SA	TAL Metals+U(SW846-6010/6020/7470)	335241 004
094771	-014	OBS-MW3	208	10/9/13	9:26	GW	P	250 ml	None	G	SA	Hexavalent Chromium(SW846-7196A)	335241 005
094771	-016	OBS-MW3	208	10/9/13	9:27	GW	P	125 ml	None	G	SA	Anions-Br,Cl,F,SO4 (SW846-9056)	335241 006
094771	-017	OBS-MW3	208	10/9/13	9:29	FGW	P	500 ml	HNO3	G	SA	Metals-Ca,Mg,K,Na (SW846-6020)	335242 001
094771	-018	OBS-MW3	208	10/9/13	9:30	GW	P	125 ml	H2SO4	G	SA	NPN (EPA 353.2)	335241 007
094771	-020	OBS-MW3	208	10/9/13	9:31	GW	P	250 ml	None	G	SA	Perchlorate (EPA 314.0)	335241 008
094771	-022	OBS-MW3	208	10/9/13	9:32	GW	P	500 ml	None	G	SA	Alkalinity (SM2320B)	335241 009

Last Chain: <input checked="" type="checkbox"/> Yes <input checked="" type="checkbox"/> *		Sample Tracking		SMO Use		Special Instructions/QC Requirements:		Conditions on Receipt		
Validation Req'd: <input checked="" type="checkbox"/> Yes		Date Entered:				EDD <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No				
Background: <input type="checkbox"/> Yes		Entered by:				Turnaround Time <input type="checkbox"/> 7 Day* <input type="checkbox"/> 15 Day* <input checked="" type="checkbox"/> 30 Day				
Confirmatory: <input type="checkbox"/> Yes		QC inits.:				Negotiated TAT <input type="checkbox"/>				
Sample Team Members	Name		Signature		Init.		Company/Organization/Phone/Cell		Sample Disposal <input type="checkbox"/> Return to Client <input checked="" type="checkbox"/> Disposal by Lab	
	Robert Lynch		<u>[Signature]</u>		RL		SNL/4142/505-844-4013/505-250-7090		Return Samples By:	
	Alfred Santillanes		<u>[Signature]</u>		AS		SNL/4142/505-844-5130/505-228-0710		Comments: Send report to Tim Jackson/4142/MS 0729/284-2547	
	William Gibson		<u>[Signature]</u>		WG		SNL/4142/505-284-3307/505-239-7367		FGW (filtered in field w/40 micron filter). Alkalinity (as total CaCO3,HCO3,CO3). If Perchlorate detected, perform verification analysis using SW846-6850M. Gamma Spectroscopy as short list isotopes.	

1. Relinquished by <u>Alfred Santillanes</u> Org. <u>4142</u> Date <u>10/9/13</u> Time <u>1000</u>				3. Relinquished by _____ Org. _____ Date _____ Time _____			
1. Received by <u>[Signature]</u> Org. <u>4142</u> Date <u>10/9/13</u> Time <u>1000</u>				3. Received by _____ Org. _____ Date _____ Time _____			
2. Relinquished by <u>[Signature]</u> Org. <u>4142</u> Date <u>10/9/13</u> Time <u>1100</u>				4. Relinquished by _____ Org. _____ Date _____ Time _____			
2. Received by <u>[Signature]</u> Org. <u>4142</u> Date <u>10-10-13</u> Time <u>0740</u>				4. Received by _____ Org. _____ Date _____ Time _____			

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

GEL LABORATORIES LLC

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

Certificate of Analysis

Report Date: November 6, 2013

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

Client Sample ID:	094771-020	Project:	SNLSGWater
Sample ID:	335241008	Client ID:	SNLS004
Matrix:	AQUEOUS		
Collect Date:	09-OCT-13 09:31		
Receive Date:	10-OCT-13	Client Desc.:	OBS-MW3
Collector:	Client	Vol. Recv.:	

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Ion Chromatography											
EPA 314.0 Perchlorate by IC "As Received"											
Perchlorate	U	ND	0.004	0.012	mg/L	1	MAR1	10/11/13	0103	1337827	1

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	EPA 314.0 DOE-AL	

Notes:

CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY

Internal Lab

Batch No.		SMO Use		AR/COC 615180	
Project Name: SWMU 154 GWM		Date Samples Shipped: 12/17/13		SMO Authorization: <i>Don Watawat</i>	
Project/Task Manager: Clinton Lum		Carrier/Waybill No. 212974		SMO Contact Phone: Lorraine Herrera/505-844-3199	
Project/Task Number: 146422.10.11.01		Lab Contact: Edie Kent/803-556-8171		Send Report to SMO: Rita Kavanaugh/505-284-2553	
Service Order: CF353-14		Lab Destination: GEL		<input type="checkbox"/> Waste Characterization <input type="checkbox"/> RMMA <input type="checkbox"/> Released by COC No. <input checked="" type="checkbox"/> 4° Celsius	
Tech Area:		Contract No.: PO 1303873		Bill to: Sandia National Laboratories (Accounts Payable), P.O. Box 5800, MS-0154 Albuquerque, NM 87185-0154	

Sample No.	Fraction	Sample Location Detail	Depth (ft)	Date/Time Collected	Sample Matrix	Container		Preservative	Collection Method	Sample Type	Parameter & Method Requested	Lab Sample ID
						Type	Volume					
095086	-001	CTF-MW2	129	12/17/13 9:35	GW	G	3x40ml	HCL	G	SA	TCL VOC (SW846-8260B)	339491 001
095086	-002	CTF-MW2	129	12/17/13 9:36	GW	AG	4x1L	None	G	SA	TCL SVOC (SW846-8270C)	339491 002
095086	-009	CTF-MW2	129	12/17/13 9:38	GW	P	500 ml	HNO3	G	SA	TAL Metals+U(SW846-6010/6020/7470)	339491 003
095086	-010	CTF-MW2	129	12/17/13 9:40	FGW	P	500 ml	HNO3	G	SA	TAL Metals+U(SW846-6010/6020/7470)	339491 001
095086	-016	CTF-MW2	129	12/17/13 9:41	GW	P	125 ml	None	G	SA	Anions (SW846-9056)	339491 004
095086	-018	CTF-MW2	129	12/17/13 9:42	GW	P	125 ml	H2SO4	G	SA	NPN (EPA 353.2)	339491 005
095086	-020	CTF-MW2	129	12/17/13 9:43	GW	P	250 ml	None	G	SA	Perchlorate (EPA 314.0)	339491 006
095086	-022	CTF-MW2	129	12/17/13 9:44	GW	P	500 ml	None	G	SA	Alkalinity (SM2320B)	339491 007
095086	-024	CTF-MW2	129	12/17/13 9:45	GW	AG	4x1L	None	G	SA	High Explosives(SW846-8321A mod.)	339491 008
095086	-033	CTF-MW2	129	12/17/13 9:47	GW	P	1 L	HNO3	G	SA	Gamma Spectroscopy (EPA 901.0)	339491 009

Last Chain: <input checked="" type="checkbox"/> Yes		Sample Tracking		SMO Use		Special Instructions/QC Requirements:		Conditions on Receipt	
Validation Req'd: <input checked="" type="checkbox"/> Yes		Date Entered:		Entered by:		EDD <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No			
Background: <input type="checkbox"/> Yes		QC inits.:		Turnaround Time		<input type="checkbox"/> 7 Day* <input type="checkbox"/> 15 Day* <input checked="" type="checkbox"/> 30 Day			
Confirmatory: <input type="checkbox"/> Yes				Negotiated TAT		<input type="checkbox"/> Return to Client <input checked="" type="checkbox"/> Disposal by Lab			
Sample Team Members	Name	Signature	Init.	Company/Organization/Phone/Cell		Sample Disposal		Lab Use	
	Robert Lynch	<i>Robert Lynch</i>	RL	SNL/4142/505-844-4013/505-250-7090		<input type="checkbox"/> Return to Client <input checked="" type="checkbox"/> Disposal by Lab			
	Alfred Santillanes	<i>Alfred Santillanes</i>	AS	SNL/4142/505-844-5130/505-228-0710		Comments: Send report to Tim Jackson/4142/MS 0729/284-2547 CTF-MW2 water has high buffering capacity, please check pH and add preservatives as needed. If perchlorate detected, then perform verification analysis using SW846-6850. Report anions as Br, Cl, F, SO4. Report Alkalinity as total CaCO3, HCO3, CO3. Report gamma Spec for short list isotopes.			
	William Gibson	<i>William Gibson</i>	WG	SNL/4142/505-284-3307/505-239-7367					
1. Relinquished by <i>Robert Lynch</i>		Org. 4142	Date 12/17/13	Time 0950	3. Relinquished by <i>Don Watawat</i>		Org. 4142	Date 12/17/13	Time 1100
1. Received by <i>T. Jackson</i>		Org. 4142	Date 12/17/13	Time 0950	3. Received by <i>Don Watawat</i>		Org.	Date 12/18/13	Time 0800
2. Relinquished by <i>T. Jackson</i>		Org. 4142	Date 12/17/13	Time 1010	4. Relinquished by		Org.	Date	Time
2. Received by <i>Don Watawat</i>		Org. 4142	Date 12/17/13	Time 1010	4. Received by		Org.	Date	Time

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

GEL LABORATORIES LLC

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

Certificate of Analysis

Report Date: January 23, 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:	095086-020	Project:	SNLSGWater
Sample ID:	339491006	Client ID:	SNLS004
Matrix:	AQUEOUS		
Collect Date:	17-DEC-13 09:43		
Receive Date:	18-DEC-13	Client Desc.:	CTF-MW2
Collector:	Client	Vol. Recv.:	

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Ion Chromatography											
EPA 314.0 Perchlorate by IC "As Received"											
Perchlorate	U	ND	0.004	0.012	mg/L	1	MAR1	01/06/14	1941	1357714	1

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	EPA 314.0 DOE-AL	

Notes:

CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY

Internal Lab

Batch No.		SMO Use		AR/COC 615179	
Project Name: SWMU 149 GWM		Date Samples Shipped: <u>12/13/13</u>		SMO Authorization: <u>[Signature]</u>	
Project/Task Manager: Clinton Lum		Carrier/Waybill No. <u>212725</u>		SMO Contact Phone: _____	
Project/Task Number: 146422.10.11.01		Lab Contact: Edie Kent/803-556-8171		Lorraine Herrera/505-844-3199	
Service Order: CF352-14		Lab Destination: GEL		Send Report to SMO: _____	
		Contract No.: PO 1303873		Rita Kavanaugh/505-284-2553	

<input type="checkbox"/> Waste Characterization
<input type="checkbox"/> RMMA
<input type="checkbox"/> Released by COC No. <input checked="" type="checkbox"/> 4° Celsius
Bill to: Sandia National Laboratories (Accounts Payable), P.O. Box 5800, MS-0154 Albuquerque, NM 87185-0154 339331

Sample No.	Fraction	Sample Location Detail	Depth (ft)	Date/Time Collected	Sample Matrix	Container		Preservative	Collection Method	Sample Type	Parameter & Method Requested	Lab Sample ID
						Type	Volume					
✓ 095084	-001	CTF-MW3	359	12/13/13 9:39	GW	G	3x40ml	HCL	G	SA	TCL VOC (SW846-8260B)	001
✓ 095084	-009	CTF-MW3	359	12/13/13 9:40	GW	P	500 ml	HNO3	G	SA	TAL Metals (SW846-6010/6020/7470)	002
✓ 095084	-010	CTF-MW3	359	12/13/13 9:41	FGW	P	500 ml	HNO3	G	SA	TAL Metals (SW846-6010/6020/7470)	001
✓ 095084	-016	CTF-MW3	359	12/13/13 9:42	GW	P	125 ml	None	G	SA	Anions (SW846-9056)	003
✓ 095084	-018	CTF-MW3	359	12/13/13 9:43	GW	P	125 ml	H2SO4	G	SA	NPN (EPA 353.2)	004
✓ 095084	-020	CTF-MW3	359	12/13/13 9:44	GW	P	250 ml	None	G	SA	Perchlorate (EPA 314.0)	005
✓ 095084	-022	CTF-MW3	359	12/13/13 9:45	GW	P	500 ml	None	G	SA	Alkalinity (SM2320B)	006
✓ 095085	-001	CTF-TB1	NA	12/13/13 9:39	DIW	G	3x40ml	HCL	G	TB	TCL VOC (SW846-8260B)	007

Last Chain: <input checked="" type="checkbox"/> Yes		Sample Tracking		SMO Use		Special Instructions/QC Requirements:		Conditions on Receipt
Validation Req'd: <input checked="" type="checkbox"/> Yes		Date Entered:		Entered by:		EDD <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		
Background: <input type="checkbox"/> Yes		QC inits.:		Turnaround Time <input type="checkbox"/> 7 Day* <input type="checkbox"/> 15 Day* <input checked="" type="checkbox"/> 30 Day		Negotiated TAT <input type="checkbox"/>		
Confirmatory: <input type="checkbox"/> Yes		Name		Signature		Sample Disposal <input type="checkbox"/> Return to Client <input checked="" type="checkbox"/> Disposal by Lab		
Sample Team Members		Robert Lynch		<u>[Signature]</u>		Return Samples By:		
		Alfred Santillanes		<u>[Signature]</u>		Comments: Send report to Tim Jackson/4142/MS 0729/284-2547 If perchlorate detected, then perform verification analysis using SW846-6850M. Report anions as Br, Cl, F, SO4. Report alkalinity as total CaCO3, HCO3, CO3.		
		William Gibson		<u>[Signature]</u>				

1. Relinquished by <u>Alfred Santillanes</u> Org. <u>4142</u> Date <u>12/13/13</u> Time <u>10:18</u>	3. Relinquished by _____ Org. _____ Date _____ Time _____
1. Received by <u>[Signature]</u> Org. <u>4142</u> Date <u>12/13/13</u> Time <u>10:18</u>	3. Received by _____ Org. _____ Date _____ Time _____
2. Relinquished by <u>[Signature]</u> Org. <u>4142</u> Date <u>12/13/13</u> Time <u>11:00</u>	4. Relinquished by _____ Org. _____ Date _____ Time _____
2. Received by <u>[Signature]</u> Org. <u>602</u> Date <u>12-14-13</u> Time <u>09:40</u>	4. Received by _____ Org. _____ Date _____ Time _____

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

GEL LABORATORIES LLC

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

Certificate of Analysis

Report Date: January 9, 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: 095084-020 Project: SNLSGWater
Sample ID: 339331005 Client ID: SNLS004
Matrix: AQUEOUS
Collect Date: 13-DEC-13 09:44
Receive Date: 14-DEC-13 Client Desc.: CTF-MW3
Collector: Client Vol. Recv.:

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Ion Chromatography											
EPA 314.0 Perchlorate by IC "As Received"											
Perchlorate	U	ND	0.004	0.012	mg/L	1	MAR1	12/17/13	1405	1354395	1

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	EPA 314.0 DOE-AL	

Notes:

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

Memorandum

Date: February 6, 2014
To: File
From: Linda Thal
Subject: Inorganic Data Review and Validation – SNL
Site: SWMU 154 GWM
AR/COC: 615180
SDG: 339491
Laboratory: GEL
Project/Task: 146422.10.11.01
Analysis: General Chemistry

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

Summary

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

Anions:

1. The sample for bromide was analyzed $>1X$ but $\leq 2X$ past the method specified holding time. The associated sample result was a detect and will be **qualified J,H1**.

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

Holding Times and Preservation

The sample was prepared and analyzed within the prescribed holding times and properly preserved except as noted above in the Summary section.

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.

Nitrate/Nitrite:

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

Laboratory Replicate

The replicate analyses met all QC acceptance criteria.

Nitrate/Nitrite:

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

Detection Limits/Dilutions

All detection limits were properly reported. The sample was diluted 100X for chloride and sulfate and 4X for bromide.

Other QC

No other specific issues that affect data quality were identified.

Reviewed by: Mary Donovan

Level: I

Date: 02/07/14



Sample Findings Summary



AR/COC: 615180

Page 1 of 3

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
EPA 900.0/SW846 9310			
	095086-034/CTF-MW2	ALPHA (12587-46-1)	J, FR7
EPA 901.1			
	095086-033/CTF-MW2	Americium-241 (14596-10-2)	BD, FR3
	095086-033/CTF-MW2	Cesium-137 (10045-97-3)	BD, FR3
	095086-033/CTF-MW2	Cobalt-60 (10198-40-0)	BD, FR3
	095086-033/CTF-MW2	Potassium-40 (13966-00-2)	BD, FR3
SW846 3005/6020 DOE-AL			
	095086-009/CTF-MW2	Cobalt (7440-48-4)	J, D1
	095086-009/CTF-MW2	Copper (7440-50-8)	J-, D1,CK3
	095086-009/CTF-MW2	Iron (7439-89-6)	J, D1
	095086-009/CTF-MW2	Manganese (7439-96-5)	J, MS1
	095086-009/CTF-MW2	Potassium (7440-09-7)	J, D1
	095086-009/CTF-MW2	Selenium (7782-49-2)	UJ, CK3
	095086-009/CTF-MW2	Zinc (7440-66-6)	J, MS1
	095086-010/CTF-MW2	Cobalt (7440-48-4)	J, D1
	095086-010/CTF-MW2	Copper (7440-50-8)	J-, D1,CK3
	095086-010/CTF-MW2	Iron (7439-89-6)	J, D1
	095086-010/CTF-MW2	Manganese (7439-96-5)	J, MS1
	095086-010/CTF-MW2	Potassium (7440-09-7)	J, D1
	095086-010/CTF-MW2	Selenium (7782-49-2)	J-, CK3
	095086-010/CTF-MW2	Zinc (7440-66-6)	J, MS1
SW846 3535/8321A Modified			
	095086-024/CTF-MW2	m-Nitrotoluene (99-08-1)	UJ, I4
	095086-024/CTF-MW2	o-Nitrotoluene (88-72-2)	UJ, I4
SW846 8260B DOE-AL			

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
	095086-001/CTF-MW2	1,1,1-Trichloroethane (71-55-6)	UJ, H1
	095086-001/CTF-MW2	1,1,2,2-Tetrachloroethane (79-34-5)	UJ, H1
	095086-001/CTF-MW2	1,1,2-Trichloroethane (79-00-5)	UJ, H1
	095086-001/CTF-MW2	1,1-Dichloroethane (75-34-3)	UJ, H1
	095086-001/CTF-MW2	1,1-Dichloroethylene (75-35-4)	UJ, H1
	095086-001/CTF-MW2	1,2,3-Trichlorobenzene (87-61-6)	UJ, H1
	095086-001/CTF-MW2	1,2,4-Trichlorobenzene (120-82-1)	UJ, H1
	095086-001/CTF-MW2	1,2-Dibromo-3-chloropropane (96-12-8)	UJ, H1
	095086-001/CTF-MW2	1,2-Dibromoethane (106-93-4)	UJ, H1
	095086-001/CTF-MW2	1,2-Dichlorobenzene (95-50-1)	UJ, H1
	095086-001/CTF-MW2	1,2-Dichloroethane (107-06-2)	UJ, H1
	095086-001/CTF-MW2	1,2-Dichloropropane (78-87-5)	UJ, H1
	095086-001/CTF-MW2	1,3-Dichlorobenzene (541-73-1)	UJ, H1
	095086-001/CTF-MW2	1,4-Dichlorobenzene (106-46-7)	UJ, H1
	095086-001/CTF-MW2	2-Butanone (78-93-3)	UJ, H1
	095086-001/CTF-MW2	2-Hexanone (591-78-6)	UJ, H1
	095086-001/CTF-MW2	4-Methyl-2-pentanone (108-10-1)	UJ, H1
	095086-001/CTF-MW2	Acetone (67-64-1)	UJ, H1
	095086-001/CTF-MW2	Benzene (71-43-2)	UJ, H1
	095086-001/CTF-MW2	Bromochloromethane (74-97-5)	UJ, H1
	095086-001/CTF-MW2	Bromodichloromethane (75-27-4)	UJ, H1
	095086-001/CTF-MW2	Bromoform (75-25-2)	UJ, H1
	095086-001/CTF-MW2	Bromomethane (74-83-9)	UJ, H1
	095086-001/CTF-MW2	Carbon disulfide (75-15-0)	UJ, H1
	095086-001/CTF-MW2	Carbon tetrachloride (56-23-5)	UJ, H1
	095086-001/CTF-MW2	Chlorobenzene (108-90-7)	UJ, H1
	095086-001/CTF-MW2	Chloroethane (75-00-3)	UJ, H1
	095086-001/CTF-MW2	Chloroform (67-66-3)	UJ, H1

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
	095086-001/CTF-MW2	Chloromethane (74-87-3)	UJ, H1
	095086-001/CTF-MW2	cis-1,2-Dichloroethylene (156-59-2)	UJ, H1
	095086-001/CTF-MW2	cis-1,3-Dichloropropylene (10061-01-5)	UJ, H1
	095086-001/CTF-MW2	Cyclohexane (110-82-7)	UJ, H1
	095086-001/CTF-MW2	Dibromochloromethane (124-48-1)	UJ, H1
	095086-001/CTF-MW2	Dichlorodifluoromethane (75-71-8)	UJ, H1
	095086-001/CTF-MW2	Ethylbenzene (100-41-4)	UJ, H1
	095086-001/CTF-MW2	Isopropylbenzene (98-82-8)	UJ, H1
	095086-001/CTF-MW2	m,p-Xylenes (N/A)	UJ, H1
	095086-001/CTF-MW2	Methyl acetate (79-20-9)	UJ, H1
	095086-001/CTF-MW2	Methylcyclohexane (108-87-2)	UJ, H1
	095086-001/CTF-MW2	Methylene chloride (75-09-2)	UJ, H1
	095086-001/CTF-MW2	o-Xylene (95-47-6)	UJ, H1
	095086-001/CTF-MW2	Styrene (100-42-5)	UJ, H1
	095086-001/CTF-MW2	tert-Butyl methyl ether (1634-04-4)	UJ, H1
	095086-001/CTF-MW2	Tetrachloroethylene (127-18-4)	UJ, H1
	095086-001/CTF-MW2	Toluene (108-88-3)	UJ, H1
	095086-001/CTF-MW2	trans-1,2-Dichloroethylene (156-60-5)	UJ, H1
	095086-001/CTF-MW2	trans-1,3-Dichloropropylene (10061-02-6)	UJ, H1
	095086-001/CTF-MW2	Trichloroethylene (79-01-6)	UJ, H1
	095086-001/CTF-MW2	Trichlorofluoromethane (75-69-4)	UJ, H1
	095086-001/CTF-MW2	Trichlorotrifluoroethane (76-13-1)	UJ, H1
	095086-001/CTF-MW2	Vinyl chloride (75-01-4)	UJ, H1
	095086-001/CTF-MW2	Xylenes (total) (1330-20-7)	UJ, H1
SW846 9056			
	095086-016/CTF-MW2	Bromide (24959-67-9)	J, H1

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

Memorandum

Date: January 22, 2014
To: File
From: Linda Thal
Subject: Inorganic Data Review and Validation – SNL
Site: SWMU 149 GWM
AR/COC: 615179
SDG: 339331
Laboratory: GEL
Project/Task: 146422.10.11.01
Analysis: General Chemistry

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

Summary

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

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

Holding Times and Preservation

The sample was 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.

Nitrate/Nitrite and Alkalinity:

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

Laboratory Replicate

The replicate analyses met all QC acceptance criteria.

Nitrate/Nitrite and Alkalinity:

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

Detection Limits/Dilutions

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

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 Donovan

Level: I

Date: 01/22/14



Sample Findings Summary



AR/COC: 615179

Page 1 of 1

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
SW846 3005/6020 DOE-AL			
	095084-009/CTF-MW3	Copper (7440-50-8)	J-, CK3
	095084-009/CTF-MW3	Nickel (7440-02-0)	J-, CK3
	095084-010/CTF-MW3	Copper (7440-50-8)	J-, CK3
	095084-010/CTF-MW3	Nickel (7440-02-0)	J-, CK3

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



Sample Findings Summary



AR/COC: 615089, 615090

Page 1 of 2

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
DOE EML HASL-300, U-02-RC			
	094765-035/OBS-EB1	Uranium-233/234 (13968-55-3/13966-29-)	BD, FR3
	094765-035/OBS-EB1	Uranium-235/236 (15117-96-1/13982-70-)	BD, FR3
	094765-035/OBS-EB1	Uranium-238 (7440-61-1)	BD, FR3
EPA 900.0/SW846 9310			
	094762-034/OBS-MW2	ALPHA (12587-46-1)	J, MS1
	094762-034/OBS-MW2	BETA (12587-47-2)	J, FR7,MS1
	094765-034/OBS-EB1	ALPHA (12587-46-1)	BD, FR3,MS1
	094765-034/OBS-EB1	BETA (12587-47-2)	BD, FR3,MS1
EPA 901.1			
	094762-033/OBS-MW2	Americium-241 (14596-10-2)	BD, FR3
	094762-033/OBS-MW2	Cesium-137 (10045-97-3)	BD, FR3
	094762-033/OBS-MW2	Cobalt-60 (10198-40-0)	BD, FR3
	094762-033/OBS-MW2	Potassium-40 (13966-00-2)	BD, FR3
	094765-033/OBS-EB1	Americium-241 (14596-10-2)	BD, FR3
	094765-033/OBS-EB1	Cesium-137 (10045-97-3)	BD, FR3
	094765-033/OBS-EB1	Cobalt-60 (10198-40-0)	BD, FR3
	094765-033/OBS-EB1	Potassium-40 (13966-00-2)	BD, FR3
SW846 3510C/8270D			
	094762-002/OBS-MW2	Hexachlorocyclopentadiene (77-47-4)	UJ, MS5
	094765-002/OBS-EB1	Hexachlorocyclopentadiene (77-47-4)	UJ, MS5
SW846 3535/8321A Modified			
	094762-024/OBS-MW2	m-Nitrotoluene (99-08-1)	UJ, I4
	094762-024/OBS-MW2	o-Nitrotoluene (88-72-2)	UJ, I4

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
	094762-024/OBS-MW2	p-Nitrotoluene (99-99-0)	UJ, I4
	094765-024/OBS-EB1	m-Nitrotoluene (99-08-1)	UJ, I4
	094765-024/OBS-EB1	o-Nitrotoluene (88-72-2)	UJ, I4
	094765-024/OBS-EB1	p-Nitrotoluene (99-99-0)	UJ, I4
SW846 7470A			
	094762-009/OBS-MW2	Mercury (7439-97-6)	UJ, B4
	094765-009/OBS-EB1	Mercury (7439-97-6)	UJ, B4
SW846 8260B DOE-AL			
	094764-001/OBS-FB1	Acetone (67-64-1)	J+, I5
SW846 9012B			
	094762-027/OBS-MW2	Cyanide, Total (57-12-5)	UJ, I5,B4
	094765-027/OBS-EB1	Cyanide, Total (57-12-5)	UJ, I5,B4

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

Memorandum

Date: November 12, 2013
To: File
From: Linda Thal
Subject: Inorganic Data Review and Validation – SNL
Site: SWMU 68 GWM
AR/COC: 615089 and 615090
SDG: 335046
Laboratory: GEL
Project/Task: 146422.10.11.01
Analysis: General Chemistry

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

Summary

Two samples were prepared and analyzed with accepted procedures using methods EPA 7196A (hexavalent chromium), EPA 9056 (anions by IC), EPA 353.2 (nitrate/nitrite), EPA 9012A (total cyanide), EPA 314.0 (perchlorate) and SM2320B (total alkalinity). Data were reported for all required analytes. Problems were identified with the data package that resulted in the qualification of data.

Total cyanide:

1. The intercept for total cyanide was negative with an absolute value > the MDL but $\leq 3X$ the MDL. The associated sample results were NDs and will be **qualified UJ,I5**.
2. Total cyanide was detected in the ICB at a negative value with an absolute value < 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.

Laboratory Control Sample (LCS)

All LCS acceptance criteria were met.

Matrix Spike (MS)

All MS/PS recoveries met QC acceptance criteria.

Perchlorate, nitrate/nitrite and alkalinity batch associated with the EB:

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

Laboratory Replicate

The replicate analyses met all QC acceptance criteria.

Perchlorate, nitrate/nitrite and alkalinity batch associated with the EB:

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

Detection Limits/Dilutions

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

Nitrate/Nitrite:

Sample -006 was diluted 10X.

Anions:

Sample -005 was diluted 10X for chloride and sulfate.

Other QC

An EB was submitted with AR/COC 615090 to be applied to the samples submitted with AR/COC 615091.

No other specific issues that affect data quality were identified.

Reviewed by: Monica Dymerski

Level I

Date: 12/12/13

Memorandum

Date: November 13, 2013
To: File
From: Linda Thal
Subject: Inorganic Data Review and Validation – SNL
Site: SWMU 68 GWM
AR/COC: 615091
SDG: 335138
Laboratory: GEL
Project/Task: 146422.10.11.01
Analysis: General Chemistry

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

Summary

Two samples were prepared and analyzed with accepted procedures using methods EPA 7196A (hexavalent chromium), EPA 9056 (anions by IC), EPA 353.2 (nitrate/nitrite), EPA 9012A (total cyanide), EPA 314.0 (perchlorate) and SM2320B (total alkalinity). Data were reported for all required analytes. Problems were identified with the data package that resulted in the qualification of data.

Total cyanide:

1. The intercept for total cyanide was negative with an absolute value > the MDL but $\leq 3X$ the MDL. The associated sample results were NDs and will be **qualified UJ,I5**.
2. Total cyanide was detected in the ICB/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 with the following exception.

The samples for hexavalent chromium were analyzed very slightly beyond the 24 hour holding time. Based on professional judgment, no sample results were qualified.

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.

Laboratory Control Sample (LCS)

All LCS acceptance criteria were met.

Matrix Spike (MS)

All MS/PS recoveries met QC acceptance criteria.

Total cyanide, anions and nitrate/nitrite:

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

Laboratory Replicate

The replicate analyses met all QC acceptance criteria.

Total cyanide, anions and nitrate/nitrite:

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

Detection Limits/Dilutions

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

Nitrate/Nitrite:

All samples were diluted 10X.

Anions:

All samples were diluted 10X for chloride and sulfate.

Other QC

An EB was submitted with AR/COC 615090 to be applied to the samples submitted with AR/COC 615091. A field duplicate pair was submitted with AR/COC 615091. There are no "required" review criteria for field duplicate analyses comparability; no data will be qualified as a result.

No other specific issues that affect data quality were identified.

Reviewed by: Monica Dymerski

Level I

Date: 11/15/13

Memorandum

Date: November 14, 2013
To: File
From: Linda Thal
Subject: Inorganic Data Review and Validation – SNL
Site: SWMU 68 GWM
AR/COC: 615092
SDG: 335241
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 7196A (hexavalent chromium), EPA 9056 (anions by IC), EPA 353.2 (nitrate/nitrite), EPA 9012A (total cyanide), EPA 314.0 (perchlorate) and SM2320B (total alkalinity). Data were reported for all required analytes. Problems were identified with the data package that resulted in the qualification of data.

Total cyanide:

1. The intercept for total cyanide was negative with an absolute value > the MDL but $\leq 3X$ the MDL. The associated sample result was ND and will be **qualified UJ,I5**.
2. Total cyanide was detected in the ICB/CCB at negative values with absolute values < the PQL. The associated sample result was ND and will be **qualified UJ,B4**.

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

Holding Times and Preservation

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

Calibration

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

Blanks

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

Laboratory Control Sample (LCS)

All LCS acceptance criteria were met.

Matrix Spike (MS)

All MS/PS recoveries met QC acceptance criteria.

Total cyanide, perchlorate, anions and total alkalinity:

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

Laboratory Replicate

The replicate analyses met all QC acceptance criteria.

Total cyanide, perchlorate, anions and total alkalinity:

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

Detection Limits/Dilutions

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

Nitrate/Nitrite:

The sample was diluted 10X.

Anions:

The sample was diluted 10X for chloride and sulfate.

Other QC

No other specific issues that affect data quality were identified.

Reviewed by: Monica Dymerski **Level I** **Date:** 11/20/13



Sample Findings Summary



AR/COC: 615091

Page 1 of 2

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
EPA 900.0/SW846 9310			
	094767-034/OBS-MW1	ALPHA (12587-46-1)	J, FR7,MS1
	094767-034/OBS-MW1	BETA (12587-47-2)	J, FR7,MS1
	094768-034/OBS-MW1	ALPHA (12587-46-1)	J, MS1
	094768-034/OBS-MW1	BETA (12587-47-2)	J, MS1
EPA 901.1			
	094767-033/OBS-MW1	Americium-241 (14596-10-2)	BD, FR3
	094767-033/OBS-MW1	Cesium-137 (10045-97-3)	BD, FR3
	094767-033/OBS-MW1	Cobalt-60 (10198-40-0)	BD, FR3
	094767-033/OBS-MW1	Potassium-40 (13966-00-2)	BD, FR3
	094768-033/OBS-MW1	Americium-241 (14596-10-2)	BD, FR3
	094768-033/OBS-MW1	Cesium-137 (10045-97-3)	BD, FR3
	094768-033/OBS-MW1	Cobalt-60 (10198-40-0)	BD, FR3
	094768-033/OBS-MW1	Potassium-40 (13966-00-2)	J, FR7
SW846 3005/6020 DOE-AL			
	094767-009/OBS-MW1	Copper (7440-50-8)	0.0019U, B2
	094767-009/OBS-MW1	Zinc (7440-66-6)	0.022U, B2
	094768-009/OBS-MW1	Zinc (7440-66-6)	0.022U, B2
SW846 3510C/8270D			
	094767-002/OBS-MW1	Hexachlorocyclopentadiene (77-47-4)	UJ, MS5
	094768-002/OBS-MW1	Hexachlorocyclopentadiene (77-47-4)	UJ, MS5
SW846 3535/8321A Modified			
	094767-024/OBS-MW1	m-Nitrotoluene (99-08-1)	UJ, I4
	094767-024/OBS-MW1	o-Nitrotoluene (88-72-2)	UJ, I4
	094767-024/OBS-MW1	p-Nitrotoluene (99-99-0)	UJ, I4

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
	094768-024/OBS-MW1	m-Nitrotoluene (99-08-1)	UJ, I4
	094768-024/OBS-MW1	o-Nitrotoluene (88-72-2)	UJ, I4
	094768-024/OBS-MW1	p-Nitrotoluene (99-99-0)	UJ, I4
SW846 7470A			
	094767-009/OBS-MW1	Mercury (7439-97-6)	UJ, B4
	094768-009/OBS-MW1	Mercury (7439-97-6)	UJ, B4
SW846 9012B			
	094767-027/OBS-MW1	Cyanide, Total (57-12-5)	UJ, I5,B4
	094768-027/OBS-MW1	Cyanide, Total (57-12-5)	UJ, I5,B4

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



Sample Findings Summary



AR/COC: 615092

Page 1 of 1

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
EPA 900.0/SW846 9310			
	094771-034/OBS-MW3	ALPHA (12587-46-1)	J, MS1
	094771-034/OBS-MW3	BETA (12587-47-2)	J, FR7,MS1
EPA 901.1			
	094771-033/OBS-MW3	Americium-241 (14596-10-2)	BD, FR3
	094771-033/OBS-MW3	Cesium-137 (10045-97-3)	BD, FR3
	094771-033/OBS-MW3	Cobalt-60 (10198-40-0)	BD, FR3
	094771-033/OBS-MW3	Potassium-40 (13966-00-2)	BD, FR3
SW846 3510C/8270D			
	094771-002/OBS-MW3	Hexachlorocyclopentadiene (77-47-4)	UJ, MS5
SW846 3535/8321A Modified			
	094771-024/OBS-MW3	m-Nitrotoluene (99-08-1)	UJ, I4
	094771-024/OBS-MW3	o-Nitrotoluene (88-72-2)	UJ, I4
	094771-024/OBS-MW3	p-Nitrotoluene (99-99-0)	UJ, I4
SW846 7470A			
	094771-009/OBS-MW3	Mercury (7439-97-6)	UJ, B4
SW846 9012B			
	094771-027/OBS-MW3	Cyanide, Total (57-12-5)	UJ, I5,B4

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

Memorandum

Date: November 15, 2013
To: File
From: Linda Thal
Subject: Inorganic Data Review and Validation – SNL
Site: SWMU 8/58 GWM
AR/COC: 615093
SDG: 335372
Laboratory: GEL
Project/Task: 146422.10.11.01
Analysis: General Chemistry

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

Summary

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

Total cyanide:

1. The intercept for total cyanide was negative with an absolute value > the MDL but $\leq 3X$ the MDL. The associated sample result was ND and will be **qualified UJ,I5**.
2. Total cyanide was detected in the ICB/CCB at negative values with absolute values < the PQL. The associated sample result was ND and will be **qualified UJ,B4**.

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

Holding Times and Preservation

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

Calibration

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

Blanks

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

Laboratory Control Sample (LCS)

All LCS acceptance criteria were met.

Matrix Spike (MS)

All MS/PS recoveries met QC acceptance criteria.

Nitrate/Nitrite, anions and total alkalinity:

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

Laboratory Replicate

The replicate analyses met all QC acceptance criteria.

Nitrate/Nitrite, anions and total alkalinity:

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

Detection Limits/Dilutions

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

Nitrate/Nitrite:

The sample was diluted 10X.

Anions:

The sample was diluted 5X for chloride and sulfate and 2X for fluoride.

Other QC

No other specific issues that affect data quality were identified.

Reviewed by: Monica Dymerski **Level I** **Date:** 11/20/13



Sample Findings Summary



AR/COC: 615093

Page 1 of 1

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
DOE EML HASL-300, U-02-RC			
	094774-035/CCBA-MW1	Uranium-235/236 (15117-96-1/13982-70-)	BD, FR3
EPA 900.0/SW846 9310			
	094774-034/CCBA-MW1	ALPHA (12587-46-1)	J, FR7,MS1
	094774-034/CCBA-MW1	BETA (12587-47-2)	J, FR7,MS1
EPA 901.1			
	094774-033/CCBA-MW1	Americium-241 (14596-10-2)	BD, FR3
	094774-033/CCBA-MW1	Cesium-137 (10045-97-3)	BD, FR3
	094774-033/CCBA-MW1	Cobalt-60 (10198-40-0)	BD, FR3
	094774-033/CCBA-MW1	Potassium-40 (13966-00-2)	BD, FR3
SW846 3510C/8270D			
	094774-002/CCBA-MW1	Hexachlorocyclopentadiene (77-47-4)	UJ, MS5
SW846 3535/8321A Modified			
	094774-024/CCBA-MW1	m-Nitrotoluene (99-08-1)	UJ, I4
	094774-024/CCBA-MW1	o-Nitrotoluene (88-72-2)	UJ, I4
	094774-024/CCBA-MW1	p-Nitrotoluene (99-99-0)	UJ, I4
SW846 8260B DOE-AL			
	094773-001/CCBA-FB1	Acetone (67-64-1)	10U, B
SW846 9012B			
	094774-027/CCBA-MW1	Cyanide, Total (57-12-5)	UJ, I5,B4

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

Memorandum

Date: November 25, 2013
To: File
From: Linda Thal
Subject: Inorganic Data Review and Validation – SNL
Site: SWMU 8/58 GWM
AR/COC: 615095
SDG: 335522
Laboratory: GEL
Project/Task: 146422.10.11.01
Analysis: General Chemistry

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

Summary

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

Total cyanide:

1. The intercept for total cyanide was negative with an absolute value > the MDL but $\leq 3X$ the MDL. The associated sample results were NDs and will be **qualified UJ,I5**.
2. Total cyanide was detected in the ICB/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.

A MB and an EB (sample 335480008) were reported for alkalinity 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.

Laboratory Replicate

The replicate analyses met all QC acceptance criteria.

Detection Limits/Dilutions

All detection limits were properly reported. The samples were diluted 10X for chloride, sulfate and nitrate/nitrite.

Other QC

The EB submitted with AR/COC 615094 is associated with the samples submitted with AR/COC 615095. A field duplicate pair was submitted with AR/COC 615095. There are no "required" review criteria for field duplicate analyses comparability; no data will be qualified as a result.

No other specific issues that affect data quality were identified.

Reviewed by: Monica Dymerski

Level I

Date: 11/26/13



Sample Findings Summary



AR/COC: 615095

Page 1 of 1

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
EPA 900.0/SW846 9310			
	094779-034/CCBA-MW2	ALPHA (12587-46-1)	J, MS1
	094779-034/CCBA-MW2	BETA (12587-47-2)	J, FR7,MS1
	094780-034/CCBA-MW2	ALPHA (12587-46-1)	J, MS1
	094780-034/CCBA-MW2	BETA (12587-47-2)	J, FR7,MS1
EPA 901.1			
	094779-033/CCBA-MW2	Americium-241 (14596-10-2)	BD, FR3
	094779-033/CCBA-MW2	Cesium-137 (10045-97-3)	BD, FR3
	094779-033/CCBA-MW2	Cobalt-60 (10198-40-0)	BD, FR3
	094779-033/CCBA-MW2	Potassium-40 (13966-00-2)	BD, FR3
	094780-033/CCBA-MW2	Americium-241 (14596-10-2)	BD, FR3
	094780-033/CCBA-MW2	Cesium-137 (10045-97-3)	BD, FR3
	094780-033/CCBA-MW2	Cobalt-60 (10198-40-0)	BD, FR3
	094780-033/CCBA-MW2	Potassium-40 (13966-00-2)	BD, FR3
SW846 3535/8321A Modified			
	094779-024/CCBA-MW2	m-Nitrotoluene (99-08-1)	UJ, I4
	094779-024/CCBA-MW2	o-Nitrotoluene (88-72-2)	UJ, I4
	094779-024/CCBA-MW2	p-Nitrotoluene (99-99-0)	UJ, I4
	094780-024/CCBA-MW2	m-Nitrotoluene (99-08-1)	UJ, I4
	094780-024/CCBA-MW2	o-Nitrotoluene (88-72-2)	UJ, I4
	094780-024/CCBA-MW2	p-Nitrotoluene (99-99-0)	UJ, I4
SW846 9012B			
	094779-027/CCBA-MW2	Cyanide, Total (57-12-5)	UJ, I5,B4
	094780-027/CCBA-MW2	Cyanide, Total (57-12-5)	UJ, I5,B4

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

SECTION III
TABLE OF CONTENTS

SOLID WASTE MANAGEMENT UNITS 149 AND 154 QUARTERLY GROUNDWATER

	MONITORING REPORT, October – December 2013	III-1
1.0	Introduction	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	Analytical Results	III-4
3.1	Field Water Quality Measurements.....	III-5
3.2	Volatile Organic Compounds.....	III-5
3.3	Semivolatile Organic Compounds	III-6
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	Quality Control Samples	III-9
4.1	Field Quality Control Samples	III-9
	Trip Blank Samples.....	III-9
4.2	Laboratory Quality Control Samples	III-9
4.3	Variances and Nonconformances.....	III-10
4.4	Project Field Notes and Comments.....	III-10
5.0	Summary	III-10
6.0	References	III-11

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
III-5	Gross Alpha Activities 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 Fourth Quarter, CY 2013 Groundwater Sampling, SWMUs 149 and 154 Groundwater Monitoring Quarterly Assessment, October – December 2013
III-3	Summary of Field Water Quality Measurements, SWMUs 149 and 154 Groundwater Monitoring Quarterly Assessment, October – December 2013
III-4	Summary of Detected Volatile Organic, Semivolatile Organic, and High Explosive Compounds, SWMUs 149 and 154 Groundwater Monitoring Quarterly Assessment, October – December 2013
III-5	Method Detection Limits for Volatile Organic Compounds, SWMU 149 Groundwater Monitoring Quarterly Assessment, October – December 2013
III-6	Method Detection Limits for Volatile and Semivolatile Organic Compounds, SWMU 154 Groundwater Monitoring Quarterly Assessment, October – December 2013
III-7	Method Detection Limits for High Explosive Compounds (EPA Method 8321A), SWMU 154 Groundwater Monitoring Quarterly Assessment, October – December 2013
III-8	Summary of Nitrate Plus Nitrite Results, SWMUs 149 and 154 Groundwater Monitoring Quarterly Assessment, October – December 2013

LIST OF TABLES (Concluded)

Table	Title
III-9	Summary of Anion and Alkalinity Results, SWMUs 149 and 154 Groundwater Monitoring Quarterly Assessment, October – December 2013
III-10	Summary of Perchlorate Results, SWMUs 149 and 154 Groundwater Monitoring Quarterly Assessment, October – December 2013
III-11	Summary of Unfiltered Total Metal Results, SWMU 149 Groundwater Monitoring Quarterly Assessment, October – December 2013
III-12	Summary of Filtered Total Metal Results, SWMU 149 Groundwater Monitoring Quarterly Assessment, October – December 2013
III-13	Summary of Unfiltered Total Metal Results, SWMU 154 Groundwater Monitoring Quarterly Assessment, October – December 2013
III-14	Summary of Filtered Total Metal Results, SWMU 154 Groundwater Monitoring Quarterly Assessment, October – December 2013
III-15	Summary of Gamma Spectroscopy, Gross Alpha, Gross Beta, and Isotopic Uranium Results, SWMU 154 Groundwater Monitoring Quarterly Assessment, October – December 2013
III-16	Summary of Constituents Detected above Established MCLs, SWMUs 149 and 154 Groundwater Monitoring Quarterly Assessments through December 2013

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, October – December 2013

1.0 Introduction

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

Monitoring 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 December 2013 sampling event, monitoring wells CTF-MW2 and CTF-MW3 had been sampled 22 times for a variety of constituents.

This report summarizes the twelfth and eleventh quarterly groundwater sampling event for CTF-MW2 and CTF-MW3, respectively, following the April 8, 2010 letter by NMED requiring eight quarters of additional groundwater monitoring. 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 Order) (NMED April 2004).

Monitoring wells CTF-MW3 and CTF-MW2 were sampled on December 13 and December 17, 2013, 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 (SAP) 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 December 2013 groundwater samples were compared with the U.S. Environmental Protection Agency (EPA) maximum contaminant levels (MCLs) for drinking water (EPA 2009). Except for arsenic and gross alpha, none of the analytical results for the monitoring well CTF-MW2 groundwater samples exceed the MCLs. Arsenic was detected above the MCL of 0.010 milligrams per liter (mg/L) in monitoring well CTF-MW2 groundwater samples in both unfiltered and filtered samples. Arsenic was reported at concentrations of 0.039 mg/L in the unfiltered sample and 0.0366 mg/L in the filtered sample. Gross alpha was reported above the MCL of 15 picocuries per liter (pCi/L) in the original analysis at 21.25 pCi/L. The reported values for both arsenic and gross alpha are comparable to historical values.

The elevated concentrations of arsenic and gross alpha in monitoring well CTF-MW2 groundwater samples are most likely from a naturally occurring source and not associated with SNL/NM testing activities. Monitoring well CTF-MW2 is screened in a fault-gouge zone in the Precambrian granite. 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 elevated arsenic and gross alpha values in samples from CTF-MW2 indicate that upwelling deeply-derived fluids are a contributing source of groundwater.

The quality control (QC) samples consisted of two trip blank (TB) samples, one for CTF-MW3 and one for CTF-MW2 that were also submitted for analysis during this quarterly sampling event. The following sections provide descriptions of the field methods used and discussions of the analytical and QC sampling results.

2.0 **Field Methods and Measurements**

The quarterly groundwater sampling field measurements were collected in conformance with the DOE/Sandia Response to the NMED letter of April 8, 2010 (SNL/NM June 2010). Groundwater monitoring at monitoring 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 Fourth Quarter of CY 2013.

2.1 **Equipment Decontamination**

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

2.2 **Well Evacuation**

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

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

Groundwater stability is considered acceptable when the following parameters are achieved:

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

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

2.3 **Groundwater Sample Collection**

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

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

3.0 **Analytical Results**

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

monitoring wells CTF-MW3 and CTF-MW2 are shown in tabulated form in Tables III-4 through III-16. Analytical reports, including certificates of analyses, analytical methods, MDLs, minimum detectable activity (MDA), critical level, practical quantitation limits, dates of analyses, results for QC analyses, and data validation findings are filed in the SNL/NM Records Center. The analytical 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, chloroform, and dibromochloromethane were detected above laboratory MDLs at concentrations comparable to historical values. Bromodichloromethane was detected at 0.600 micrograms per liter ($\mu\text{g/L}$), chloroform at 0.680 $\mu\text{g/L}$, and dibromochloromethane at 0.450 $\mu\text{g/L}$. 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 0.357 µg/L. 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 µg/L (NMED February 2012), which is approximately 17 times greater than CTF-MW2 analytical concentration. Table III-4 summarizes the HE compounds detected in the 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 5.71 mg/L.

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

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. No parameters were detected above established MCLs.

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. No parameters were detected above established MCLs.

3.7 **Perchlorate**

SWMU 149, Monitoring Well CTF-MW3. Perchlorate was not detected above the NMED-specified screening level/MDL of 4 µg/L (0.004 mg/L) in the sample from monitoring well CTF-MW3. Table III-10 presents the perchlorate results.

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

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

3.8 **Metals**

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

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

SWMU 154, Monitoring Well CTF-MW2. No metals were detected above established MCLs in the monitoring well CTF-MW2 groundwater sample, except for arsenic. Arsenic was detected above the MCL of 0.010 mg/L with a concentration of 0.039 mg/L in the unfiltered sample and 0.0366 mg/L in the filtered sample. 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. 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.

No radiological analyses exceeded established MCLs, except gross alpha. Gross alpha was reported above the MCL of 15 pCi/L in the original analysis at 21.25 pCi/L. These reported activities are comparable to historical values and is likely due to the monitoring well CTF-MW2 being screened in a fault-gouge zone in Precambrian granite sourced by a mixture of shallow and deeply-derived upwelling waters. Gross alpha activities since March 2011 are plotted on Figure III-5.

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 and gross alpha were the only constituents exceeding MCLs and were detected in the CTF-MW2 monitoring well samples. Figures III-4 and III-5 show the arsenic concentration and gross alpha activity, respectively over time for monitoring well CTF-MW2. The elevated concentrations of arsenic and gross alpha activity 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, field blank, and equipment blank groundwater samples were not required for this reporting period. The TB samples were submitted for analysis along with the groundwater samples in accordance with QC procedures specified in the SAPs.

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. TB samples consist of laboratory reagent-grade water with hydrochloric acid preservative contained in 40-milliliter volatile organic analysis vials prepared by the analytical laboratory, which accompany the empty sample containers supplied by the laboratory. The TB samples were brought to the field and accompanied each sample shipment.

SWMU 149, Monitoring Well CTF-MW3. One TB was submitted with the December 2013 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 December 2013 samples. No VOCs were detected above associated laboratory MDLs in the TB 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. The data validation sample findings summary sheets are provided in Appendix C. The data are acceptable and reported QC measures are adequate.

4.3 **Variations and Nonconformances**

No variations or nonconformances from the requirements in the Groundwater Monitoring SAP for SWMUs 149 and 154 (SNL/NM June 2010, Attachment 1 and 2) were identified during the December 2013 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:

- In October 2014, SNL/NM facilities repaired the service road that parallels the monitoring well. Facilities plans for a stormwater drainage system near the well are being evaluated.

5.0 **Summary**

During CY 2013 fourth 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 CY2013 fourth quarter sampling event represents the eleventh and twelfth 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 and gross alpha in monitoring well CTF-MW2. RDX was detected at a concentration of 0.357 µg/L that is significantly below the NMED tap water screening level for RDX of 6.03 µg/L. Arsenic was detected above the MCL of 0.010 mg/L at concentrations of 0.039 mg/L in the unfiltered sample and 0.0366 mg/L in the filtered sample. Gross alpha was reported above the MCL of 15 pCi/L in the original analysis at 21.25 pCi/L. These values are comparable to previous results. The elevated concentrations of arsenic and gross alpha 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.

6.0 **References**

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EPA, see U.S. Environmental Protection Agency.

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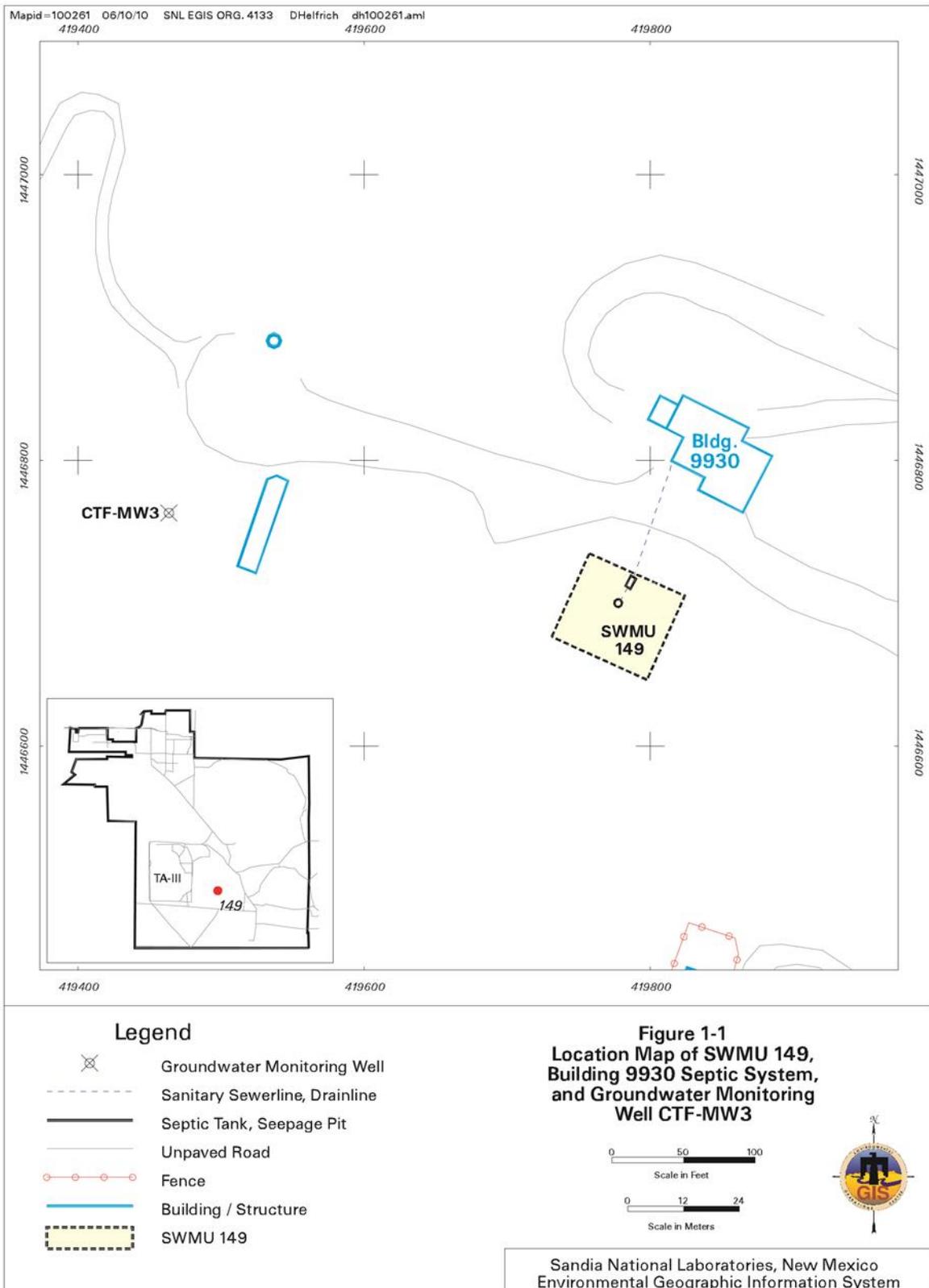
U.S. Environmental Protection Agency (EPA), 1999. "Perchlorate in Drinking Water Using Ion Chromatography," EPA 815/R-00-014, U.S. Environmental Protection Agency, Washington, D.C.

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Figures



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

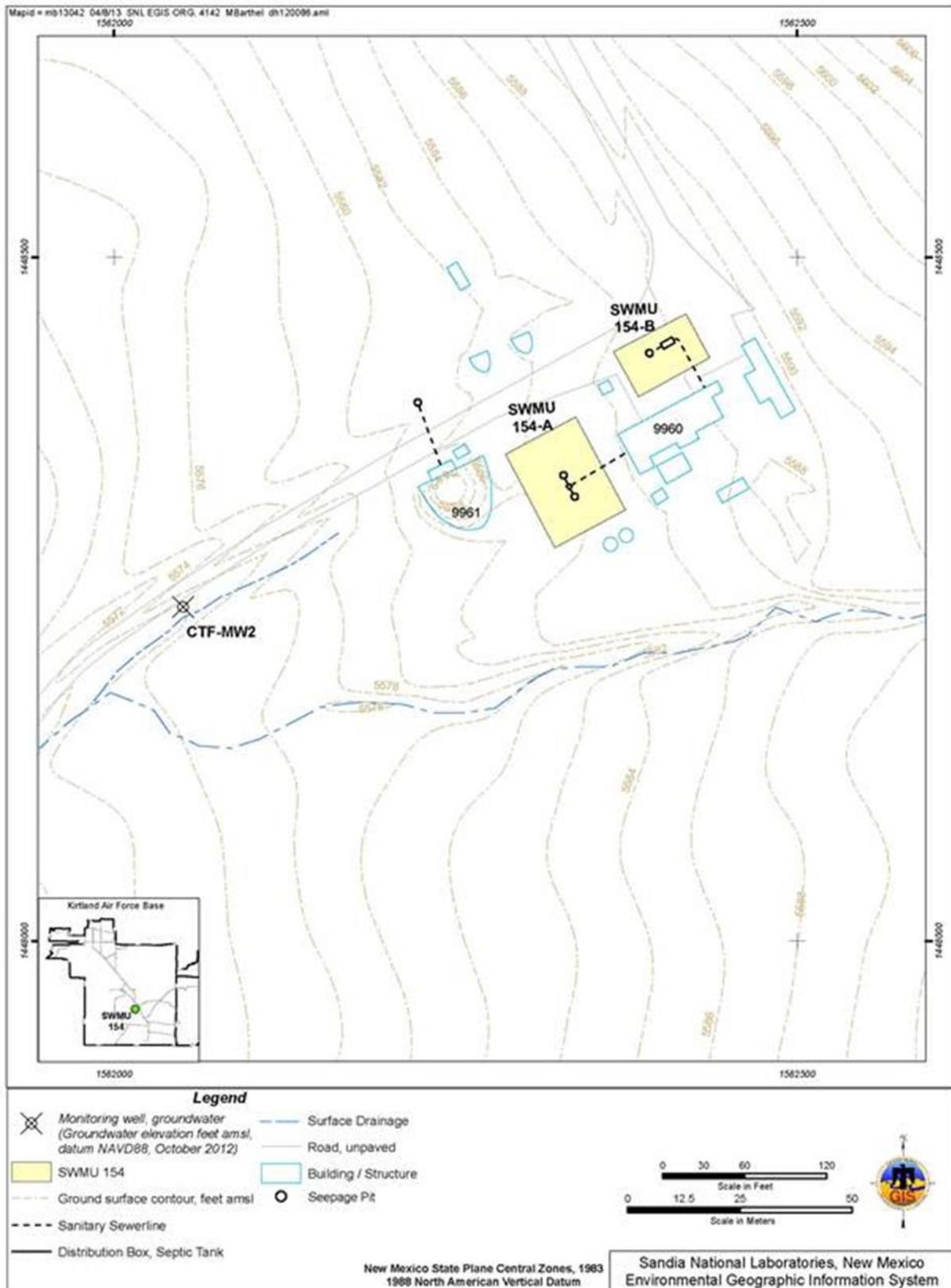


Figure III-2
Location of Monitoring Well CTF-MW2 near SWMU 154

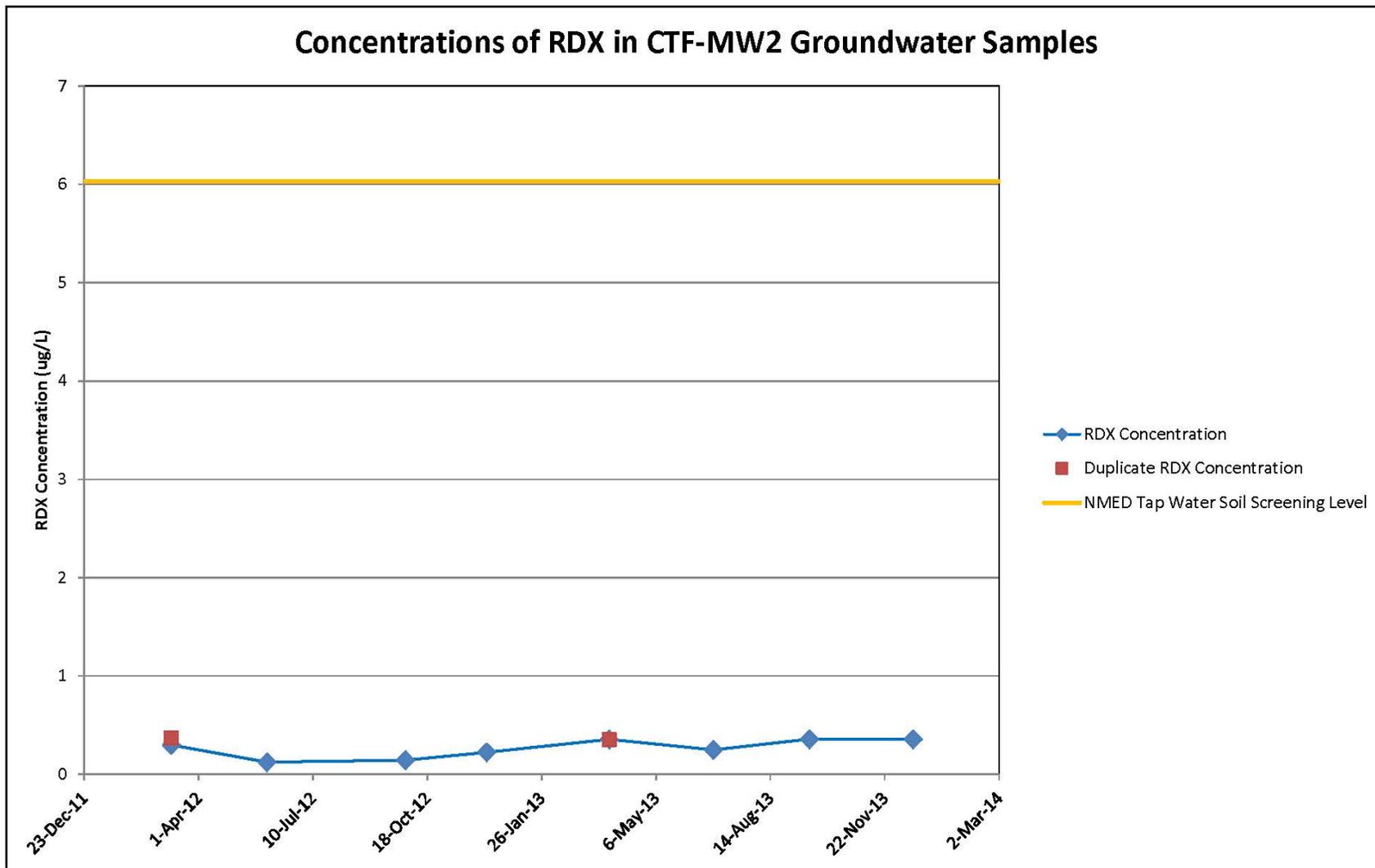


Figure III-3
Concentrations of RDX over Time in Monitoring Well CTF-MW2 near SWMU 154

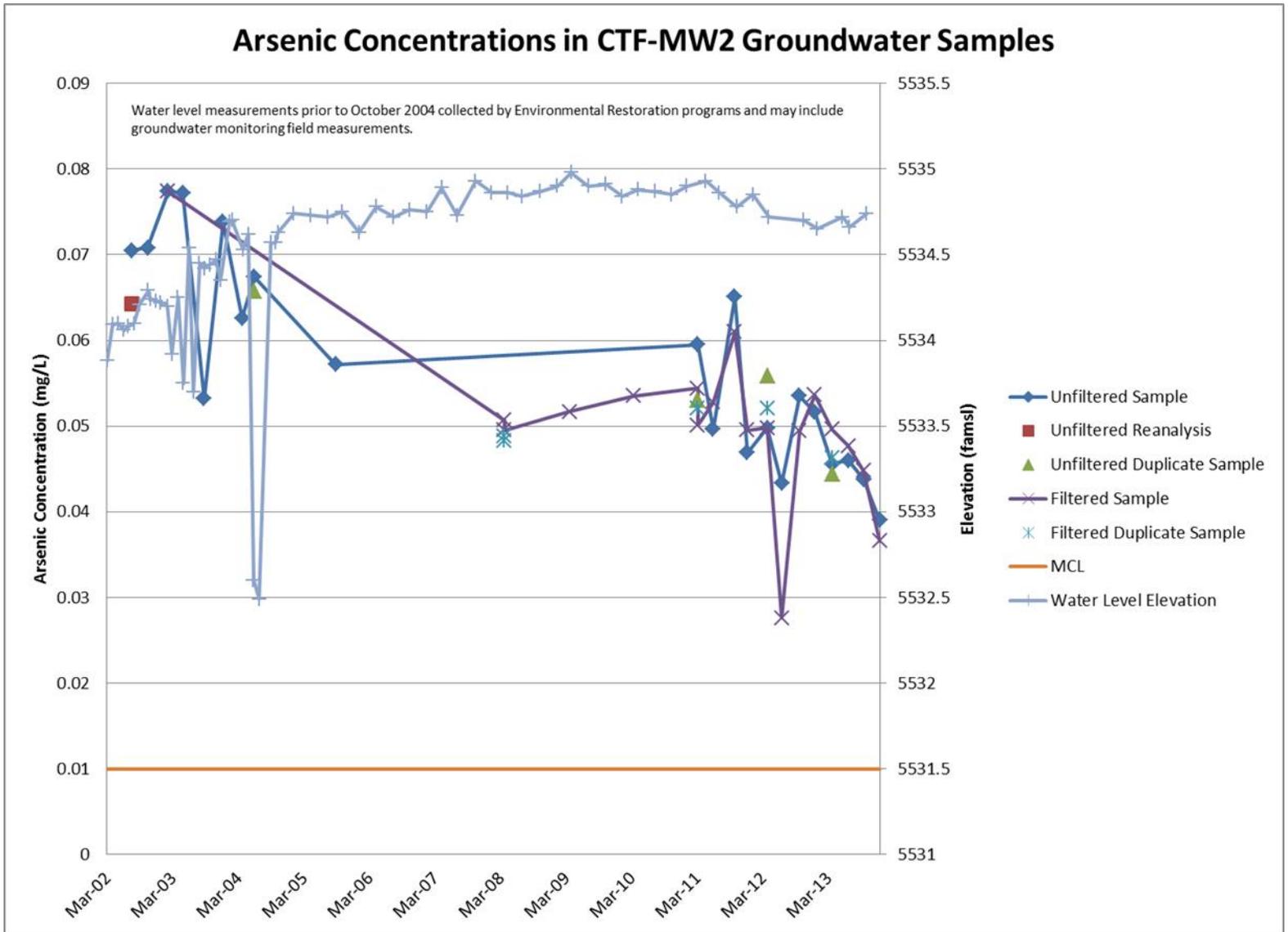


Figure III-4

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

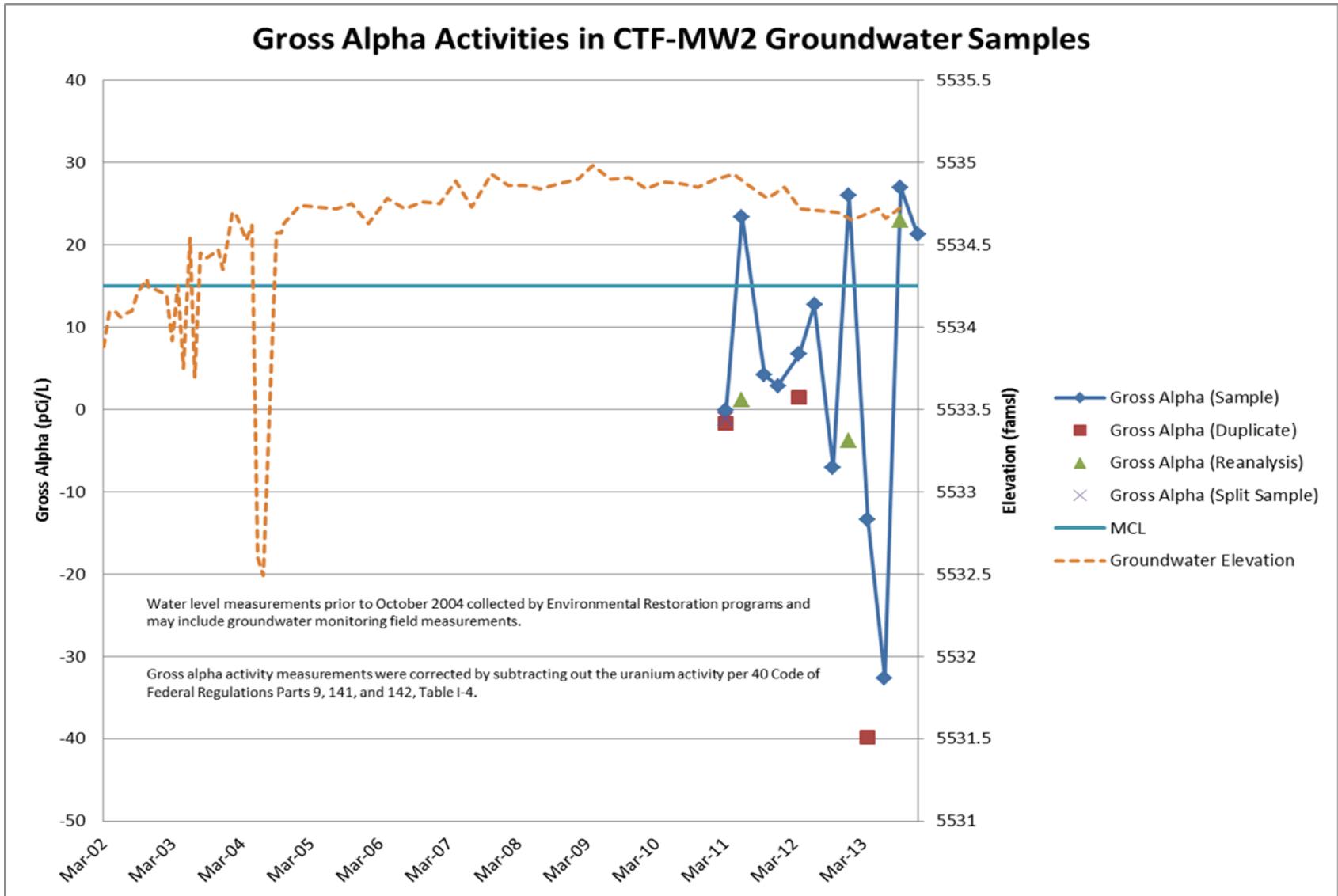


Figure III-5

Gross Alpha Activities and Groundwater Elevations over Time in Monitoring Well CTF-MW2 near SWMU 154

Tables

Table III-1

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

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

Notes

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

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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.

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

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

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

°C = Degrees Celsius.

EPA = U.S. Environmental Protection Agency.

H₂SO₄ = Sulfuric acid.

HASL = Health and Safety Laboratory.

HCl = Hydrochloric acid.

HNO₃ = Nitric acid.

L = Liter.

mL = Milliliter(s).

SM = Standard Method.

SWMU = Solid Waste Management Unit.

TAL = Target Analyte List.

Table III-2
Sample Details for Fourth Quarter, CY 2013 Groundwater Sampling
SWMUs 149 and 154 Groundwater Monitoring Quarterly Assessment,
October – December 2013

Well	Date Sampled	Sample Identification	AR/COC Number	Associated Groundwater Investigation
CTF-MW3	13-Dec-13	095084	615179	SWMU 149
CTF-MW2	17-Dec-13	095086	615180	SWMU 154

Notes

AR/COC = Analysis Request/Chain-of-Custody.
CTF = Coyote Test Field.
CY = Calendar Year.
MW = Monitoring well.
SWMU = Solid Waste Management Unit.

Table III-3
Summary of Field Water Quality Measurements^a
SWMUs 149 and 154 Groundwater Monitoring
Quarterly Assessment, October – December 2013

Well	Sample Date	Temperature (°C)	Specific Conductivity (µmhos/cm)	Oxidation Reduction Potential (mV)	pH	Turbidity (NTU)	Dissolved Oxygen (% Sat)	Dissolved Oxygen (mg/L)
SWMU 149								
CTF-MW3	13-Dec-13	16.80	1570.6	326.4	7.10	0.21	86.5	8.37
SWMU 154								
CTF-MW2	17-Dec-13	15.16	3176.2	72.9	6.11	0.76	0.8	0.08

Notes

^aField measurements collected prior to sampling.

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

Table III-4
Summary of Detected Volatile Organic, Semivolatile Organic, and High Explosive Compounds
SWMUs 149 and 154 Groundwater Monitoring
Quarterly Assessment, October – December 2013

Well	Analyte	Result (µg/L)	MDL (µg/L)	PQL (µg/L)	MCL (µg/L)	Laboratory Qualifier ^a	Validation Qualifier ^b	Sample Number	Analytical Method ^c
SWMU 149									
CTF-MW3 13-Dec-13	Bromodichloromethane	0.600	0.300	1.00	NE	J		095084-001	EPA 8260B
	Chloroform	0.680	0.300	1.00	NE	J		095084-001	EPA 8260B
	Dibromochloromethane	0.450	0.300	1.00	NE	J		095084-001	EPA 8260B
SWMU 154									
CTF-MW2 17-Dec-13	RDX	0.357	0.0865	0.270	NE			095086-024	EPA 8321A

Notes

^a**Laboratory Qualifier**

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

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

^b**Validation Qualifier**

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

^c**Analytical Method**

U.S. Environmental Protection Agency, 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 = 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.

SWMU = Solid Waste Management Unit.

Table III-5
Method Detection Limits for Volatile Organic Compounds
SWMU 149 Groundwater Monitoring
Quarterly Assessment, October – December 2013

Analyte	MDL (µg/L)	Analytical Method ^a	Analyte	MDL (µg/L)	Analytical Method ^a
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

Notes

µg/L = Micrograms per liter.

EPA = U.S. Environmental Protection Agency.

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

SWMU = Solid Waste Management Unit.

Table III-6
Method Detection Limits for Volatile and Semivolatile Organic Compounds
SWMU 154 Groundwater Monitoring
Quarterly Assessment, October – December 2013

Analyte	MDL (µg/L)	Analytical Method ^a	Analyte	MDL (µg/L)	Analytical Method ^a
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 III-6 (Concluded)
Method Detection Limits for Volatile and Semivolatile Organic Compounds
SWMU 154 Groundwater Monitoring
Quarterly Assessment, October – December 2013

Analyte	MDL (µg/L)	Analytical Method ^a	Analyte	MDL (µg/L)	Analytical Method ^a	Analyte	MDL (µg/L)	Analytical Method ^a
1'-Biphenyl 1	3.00	EPA 8270C	Acenaphthene	0.300	EPA 8270C	Fluoranthene	0.300	EPA 8270C
1,4-Dioxane	3.00	EPA 8270C	Acenaphthylene	0.300	EPA 8270C	Fluorene	0.300	EPA 8270C
1,2,4-Trichlorobenzene	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(2-Chloroethoxy)methane	3.00	EPA 8270C
3,3'-Dichlorobenzidine	3.00	EPA 8270C	Di-n-butyl phthalate	3.00	EPA 8270C	bis(2-Chloroethyl)ether	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

^a**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.

µg/L = Micrograms per liter.

EPA = U.S. Environmental Protection Agency.

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

SWMU = Solid Waste Management Unit.

Table III-7
Method Detection Limits for High Explosive Compounds (EPA Method 8321A)
SWMU 154 Groundwater Monitoring
Quarterly Assessment, October – December 2013

Analyte	MDL ($\mu\text{g/L}$)
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

- $\mu\text{g/L}$ = Micrograms per liter.
- EPA = U.S. Environmental Protection Agency.
- HMX = Tetrahexamine tetranitramine.
- MDL = Method detection limit. The minimum concentration that can be measured and reported with 99% confidence that the analyte is greater than zero; analyte is matrix-specific.
- RDX = Hexahydro-1,3,5-trinitro-1,3,5-triazine.
- SWMU = Solid Waste Management Unit.
- Tetryl = 2,4,6-trinitrophenylmethylnitramine.

Table III-8
Summary of Nitrate Plus Nitrite Results
SWMUs 149 and 154 Groundwater Monitoring
Quarterly Assessment, October – December 2013

Well	Analyte	Result (mg/L)	MDL (mg/L)	PQL (mg/L)	MCL (mg/L)	Laboratory Qualifier ^a	Validation Qualifier ^b	Sample Number	Analytical Method ^c
SWMU 149									
CTF-MW3 13-Dec-13	Nitrate plus nitrite	5.71	0.170	0.500	10.0			095084-018	EPA 353.2
SWMU 154									
CTF-MW2 17-Dec-13	Nitrate plus nitrite	ND	0.017	0.050	10.0	U		095086-018	EPA 353.2

Notes

^aLaboratory Qualifier

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

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

^bValidation Qualifier

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

^cAnalytical Method

U.S. Environmental Protection Agency, 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.

N = Nitrogen.

ND = Not detected (at MDL).

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

SWMU = Solid Waste Management Unit.

Table III-9
Summary of Anion and Alkalinity Results
SWMUs 149 and 154 Groundwater Monitoring
Quarterly Assessment, October – December 2013

Well	Analyte	Result (mg/L)	MDL (mg/L)	PQL (mg/L)	MCL (mg/L)	Laboratory Qualifier ^a	Validation Qualifier ^b	Sample Number	Analytical Method ^c
SWMU 149									
CTF-MW3 13-Dec-13	Bicarbonate Alkalinity	334	0.725	1.00	NE			095084-022	SM2320B
	Carbonate Alkalinity	ND	0.725	1.00	NE	U		095084-022	SM2320B
	Bromide	1.21	0.067	0.200	NE			095084-016	EPA 9056
	Chloride	124	3.35	10.0	NE			095084-016	EPA 9056
	Fluoride	2.47	0.033	0.100	4.0			095084-016	EPA 9056
	Sulfate	511	6.65	20.0	NE			095084-016	EPA 9056
SWMU 154									
CTF-MW2 17-Dec-13	Bicarbonate Alkalinity	1540	0.725	1.00	NE			095086-022	SM2320B
	Carbonate Alkalinity	ND	0.725	1.00	NE	U		095086-022	SM2320B
	Bromide	1.48	0.268	0.800	NE	H	J	095086-016	EPA 9056
	Chloride	437	6.70	20.0	NE			095086-016	EPA 9056
	Fluoride	2.57	0.033	0.100	4.0			095086-016	EPA 9056
	Sulfate	153	13.3	40.0	NE			095086-016	EPA 9056

Notes

^aLaboratory Qualifier

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

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

H = Analytical holding time was exceeded.

^bValidation Qualifier

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

J = The associated value is an estimated quantity.

^cAnalytical Method

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, 3rd ed.

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

Notes (continued)

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.
SM	= Standard Method.
SWMU	= Solid Waste Management Unit.

Table III-10
Summary of Perchlorate Results
SWMUs 149 and 154 Groundwater Monitoring
Quarterly Assessment, October – December 2013

Well	Perchlorate Result (mg/L)	MDL (mg/L)	PQL (mg/L)	MCL (mg/L)	Laboratory Qualifier ^a	Validation Qualifier ^b	Sample Number	Analytical Method ^c
SWMU 149								
CTF-MW3 13-Dec-13	ND	0.004	0.012	NE	U		095084-020	EPA 314.0
SWMU 154								
CTF-MW2 17-Dec-13	ND	0.004	0.012	NE	U		095086-020	EPA 314.0

Notes

^aLaboratory Qualifier

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

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

^bValidation Qualifier

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

^cAnalytical Method

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

CTF = Coyote Test Field.

EPA = U.S. Environmental Protection Agency.

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

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

mg/L = Milligrams per liter.

MW = Monitoring well.

ND = Not detected (at MDL).

NE = Not established.

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

SWMU = Solid Waste Management Unit.

Table III-11
Summary of Unfiltered Total Metal Results
SWMU 149 Groundwater Monitoring
Quarterly Assessment, October – December 2013

Well	Analyte	Result (mg/L)	MDL (mg/L)	PQL (mg/L)	MCL (mg/L)	Laboratory Qualifier ^a	Validation Qualifier ^b	Sample Number	Analytical Method ^c
CTF-MW3 13-Dec-13	Aluminum	ND	0.015	0.050	NE	U		095084-009	EPA 6020
	Antimony	ND	0.001	0.003	0.006	U		095084-009	EPA 6020
	Arsenic	ND	0.0017	0.005	0.010	U		095084-009	EPA 6020
	Barium	0.0301	0.0006	0.002	2.00			095084-009	EPA 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		095084-009	EPA 6020
	Cadmium	ND	0.00011	0.001	0.005	U		095084-009	EPA 6020
	Calcium	212	0.300	1.00	NE	B		095084-009	EPA 6020
	Chromium	ND	0.002	0.010	0.100	U		095084-009	EPA 6020
	Cobalt	0.000156	0.0001	0.001	NE	J		095084-009	EPA 6020
	Copper	0.00156	0.00035	0.001	NE		J-	095084-009	EPA 6020
	Iron	0.252	0.033	0.100	NE			095084-009	EPA 6020
	Lead	ND	0.0005	0.002	NE	U		095084-009	EPA 6020
	Magnesium	44.5	0.010	0.030	NE			095084-009	EPA 6020
	Manganese	ND	0.001	0.005	NE	U		095084-009	EPA 6020
	Mercury	ND	0.000067	0.0002	0.002	U		095084-009	EPA 7470
	Nickel	0.00329	0.0005	0.002	NE		J-	095084-009	EPA 6020
	Potassium	10.8	0.080	0.300	NE			095084-009	EPA 6020
	Selenium	0.0295	0.0015	0.005	0.050			095084-009	EPA 6020
	Silver	ND	0.0002	0.001	NE	U		095084-009	EPA 6020
	Sodium	182	0.400	1.25	NE			095084-009	EPA 6020
Thallium	ND	0.00045	0.002	0.002	U		095084-009	EPA 6020	
Vanadium	ND	0.001	0.005	NE	U		095084-009	EPA 6010	
Zinc	0.0174	0.0035	0.010	NE			095084-009	EPA 6020	

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

Notes

^aLaboratory Qualifier

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

- B = The analyte was 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.

^bValidation Qualifier

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

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

^cAnalytical 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).
- NE = Not established.
- PQL = Practical quantitation limit. The lowest concentration of analytes in a sample that can be reliably determined within specified limits of precision and accuracy by that indicated method under routine laboratory operating conditions.
- SWMU = Solid Waste Management Unit.

Table III-12
Summary of Filtered Total Metal Results
SWMU 149 Groundwater Monitoring
Quarterly Assessment, October – December 2013

Well	Analyte	Result (mg/L)	MDL (mg/L)	PQL (mg/L)	MCL (mg/L)	Laboratory Qualifier ^a	Validation Qualifier ^b	Sample Number	Analytical Method ^c
CTF-MW3 13-Dec-13	Aluminum	ND	0.015	0.050	NE	U		095084-010	EPA 6020
	Antimony	ND	0.001	0.003	0.006	U		095084-010	EPA 6020
	Arsenic	ND	0.0017	0.005	0.010	U		095084-010	EPA 6020
	Barium	0.0301	0.0006	0.002	2.00			095084-010	EPA 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		095084-010	EPA 6020
	Cadmium	ND	0.00011	0.001	0.005	U		095084-010	EPA 6020
	Calcium	202	0.300	1.00	NE	B		095084-010	EPA 6020
	Chromium	ND	0.002	0.010	0.100	U		095084-010	EPA 6020
	Cobalt	0.000196	0.0001	0.001	NE	J		095084-010	EPA 6020
	Copper	0.00143	0.00035	0.001	NE		J-	095084-010	EPA 6020
	Iron	0.230	0.033	0.100	NE			095084-010	EPA 6020
	Lead	ND	0.0005	0.002	NE	U		095084-010	EPA 6020
	Magnesium	44.6	0.010	0.030	NE			095084-010	EPA 6020
	Manganese	ND	0.001	0.005	NE	U		095084-010	EPA 6020
	Mercury	ND	0.000067	0.0002	0.002	U		095084-010	EPA 7470
	Nickel	0.00325	0.0005	0.002	NE		J-	095084-010	EPA 6020
	Potassium	10.7	0.080	0.300	NE			095084-010	EPA 6020
	Selenium	0.029	0.0015	0.005	0.050			095084-010	EPA 6020
	Silver	ND	0.0002	0.001	NE	U		095084-010	EPA 6020
	Sodium	175	0.400	1.25	NE			095084-010	EPA 6020
	Thallium	ND	0.00045	0.002	0.002	U		095084-010	EPA 6020
Vanadium	ND	0.001	0.005	NE	U		095084-010	EPA 6010	
Zinc	0.00432	0.0035	0.010	NE	J		095084-010	EPA 6020	

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

Notes

^aLaboratory Qualifier

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

- B = The analyte was 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.

^bValidation Qualifier

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

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

^cAnalytical 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).
- NE = Not established.
- PQL = Practical quantitation limit. The lowest concentration of analytes in a sample that can be reliably determined within specified limits of precision and accuracy by that indicated method under routine laboratory operating conditions.
- SWMU = Solid Waste Management Unit.

Table III-13
Summary of Unfiltered Total Metal Results
SWMU 154 Groundwater Monitoring
Quarterly Assessment, October – December 2013

Well	Analyte	Result (mg/L)	MDL (mg/L)	PQL (mg/L)	MCL (mg/L)	Laboratory Qualifier ^a	Validation Qualifier ^b	Sample Number	Analytical Method ^c
CTF-MW2 17-Dec-13	Aluminum	0.118	0.015	0.050	NE			095086-009	EPA 6020
	Antimony	ND	0.001	0.003	0.006	U		095086-009	EPA 6020
	Arsenic	0.039	0.0017	0.005	0.010			095086-009	EPA 6020
	Barium	0.0807	0.0006	0.002	2.00			095086-009	EPA 6020
	Beryllium	0.00265	0.0002	0.0005	0.004			095086-009	EPA 6020
	Cadmium	ND	0.00011	0.001	0.005	U		095086-009	EPA 6020
	Calcium	344	0.600	2.00	NE			095086-009	EPA 6020
	Chromium	ND	0.002	0.010	0.100	U		095086-009	EPA 6020
	Cobalt	0.00898	0.0001	0.001	NE		J	095086-009	EPA 6020
	Copper	0.0013	0.00035	0.001	NE		J-	095086-009	EPA 6020
	Iron	2.22	0.033	0.100	NE		J	095086-009	EPA 6020
	Lead	ND	0.0005	0.002	NE	U		095086-009	EPA 6020
	Magnesium	79.1	0.100	0.300	NE		J	095086-009	EPA 6020
	Manganese	3.01	0.010	0.050	NE			095086-009	EPA 6020
	Mercury	ND	0.000067	0.0002	0.002	U		095086-009	EPA 7470
	Nickel	0.0188	0.0005	0.002	NE			095086-009	EPA 6020
	Potassium	41.1	0.080	0.300	NE		J	095086-009	EPA 6020
	Selenium	ND	0.0015	0.005	0.050	U	UJ	095086-009	EPA 6020
	Silver	ND	0.0002	0.001	NE	U		095086-009	EPA 6020
	Sodium	488	1.60	5.00	NE			095086-009	EPA 6020
Thallium	0.00117	0.00045	0.002	0.002	J		095086-009	EPA 6020	
Uranium	0.0291	0.000067	0.0002	0.03			095086-009	EPA 6020	
Vanadium	ND	0.001	0.005	NE	U		095086-009	EPA 6010B	
Zinc	0.202	0.0035	0.010	NE		J	095086-009	EPA 6020	

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

Notes

^aLaboratory Qualifier

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

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

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

^bValidation Qualifier

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

J = The associated value is an estimated quantity.

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

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

^cAnalytical 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-14
Summary of Filtered Total Metal Results
SWMU 154 Groundwater Monitoring
Quarterly Assessment, October – December 2013

Well	Analyte	Result (mg/L)	MDL (mg/L)	PQL (mg/L)	MCL (mg/L)	Laboratory Qualifier ^a	Validation Qualifier ^b	Sample Number	Analytical Method ^c
CTF-MW2 17-Dec-13	Aluminum	0.104	0.015	0.050	NE			095086-010	EPA 6020
	Antimony	ND	0.001	0.003	0.006	U		095086-010	EPA 6020
	Arsenic	0.0366	0.0017	0.005	0.010			095086-010	EPA 6020
	Barium	0.0815	0.0006	0.002	2.00			095086-010	EPA 6020
	Beryllium	0.00255	0.0002	0.0005	0.004			095086-010	EPA 6020
	Cadmium	ND	0.00011	0.001	0.005	U		095086-010	EPA 6020
	Calcium	352	0.600	2.00	NE			095086-010	EPA 6020
	Chromium	ND	0.002	0.010	0.100	U		095086-010	EPA 6020
	Cobalt	0.00852	0.0001	0.001	NE		J	095086-010	EPA 6020
	Copper	0.00121	0.00035	0.001	NE		J-	095086-010	EPA 6020
	Iron	2.15	0.033	0.100	NE		J	095086-010	EPA 6020
	Lead	ND	0.0005	0.002	NE	U		095086-010	EPA 6020
	Magnesium	79.9	0.100	0.300	NE		J	095086-010	EPA 6020
	Manganese	3.00	0.010	0.050	NE			095086-010	EPA 6020
	Mercury	ND	0.000067	0.0002	0.002	U		095086-010	EPA 7470
	Nickel	0.0186	0.0005	0.002	NE			095086-010	EPA 6020
	Potassium	42.9	0.080	0.300	NE		J	095086-010	EPA 6020
	Selenium	0.00158	0.0015	0.005	0.050	J	J-	095086-010	EPA 6020
	Silver	ND	0.0002	0.001	NE	U		095086-010	EPA 6020
	Sodium	508	1.60	5.00	NE			095086-010	EPA 6020
Thallium	0.00125	0.00045	0.002	0.002	J		095086-010	EPA 6020	
Uranium	0.0298	0.000067	0.0002	0.03			095086-010	EPA 6020	
Vanadium	ND	0.001	0.005	NE	U		095086-010	EPA 6010B	
Zinc	0.282	0.0035	0.010	NE		J	095086-010	EPA 6020	

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

Notes

^aLaboratory Qualifier

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

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

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

^bValidation Qualifier

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

J = The associated value is an estimated quantity.

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

^cAnalytical 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, October – December 2013

Well	Analyte	Activity ^a (pCi/L)	MDA (pCi/L)	Critical Level ^b (pCi/L)	MCL (pCi/L)	Laboratory Qualifier ^c	Validation Qualifier ^d	Sample Number	Analytical Method ^e
CTF-MW2 17-Dec-13	Americium-241	9.17 ± 11.5	16.7	8.16	NE	U	BD	095086-033	EPA 901.1
	Cesium-137	1.66 ± 4.49	2.80	1.35	NE	U	BD	095086-033	EPA 901.1
	Cobalt-60	-0.435 ± 1.73	2.98	1.41	NE	U	BD	095086-033	EPA 901.1
	Potassium-40	2.60 ± 35.6	30.6	14.4	NE	U	BD	095086-033	EPA 901.1
	Gross Alpha	21.25	NA	NA	15 pCi/L	NA	None	095086-034	EPA 900.0
	Gross Beta	73.9 ± 14.4	8.52	4.09	4mrem/yr			095086-034	EPA 900.0
	Uranium-233/234	58.6 ± 7.87	0.0907	0.0354	NE			095086-035	HASL-300
	Uranium-235/236	0.479 ± 0.146	0.0817	0.0286	NE			095086-035	HASL-300
	Uranium-238	8.77 ± 1.26	0.0568	0.0185	NE			095086-035	HASL-300

Notes

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

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

^c**Laboratory Qualifier**

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.

^d**Validation Qualifier**

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

BD = Below detection limit as used in radiochemistry to identify results that are not statistically different from zero.

None = No data validation for corrected gross alpha activity.

^e**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, October – December 2013

Notes (continued)

- Bold** = Indicates the result exceeds the MCL.
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 December 2013

Well	Date	Analyte	Result	MCL	Laboratory Qualifier ^a	Validation Qualifier ^b	Sample Number	Analytical Method ^c
SWMU 154								
CTF-MW2	08-Mar-11	Arsenic—Filtered	0.0544 mg/L	0.010 mg/L			090237-010	EPA 6020
CTF-MW2 (Duplicate)	08-Mar-11	Arsenic—Filtered	0.0521 mg/L	0.010 mg/L			090238-010	EPA 6020
CTF-MW2	31-May-11	Arsenic—Filtered	0.0528 mg/L	0.010 mg/L			090670-010	EPA 6020
CTF-MW2	29-Sep-11	Arsenic—Filtered	0.0610 mg/L	0.010 mg/L			090670-010	EPA 6020
CTF-MW2	09-Dec-11	Arsenic—Filtered	0.0495 mg/L	0.010 mg/L			091525-010	EPA 6020
CTF-MW2	30-Mar-12	Arsenic—Filtered	0.0498 mg/L	0.010 mg/L			091949-010	EPA 6020
CTF-MW2 (Duplicate)	30-Mar-12	Arsenic—Filtered	0.0521 mg/L	0.010 mg/L			091950-010	EPA 6020
CTF-MW2	19-June-12	Arsenic—Filtered	0.0276 mg/L	0.010 mg/L			092538-010	EPA 6020
CTF-MW2	25-Sep-12	Arsenic—Filtered	0.0494 mg/L	0.010 mg/L			092862-010	EPA 6020
CTF-MW2	18-Dec-12	Arsenic—Filtered	0.0536 mg/L	0.010 mg/L		J-	093251-010	EPA 6020
CTF-MW2	26-Mar-13	Arsenic—Filtered	0.0496 mg/L	0.010 mg/L			093723-010	EPA 6020
CTF-MW2 (Duplicate)	26-Mar-13	Arsenic—Filtered	0.0463 mg/L	0.010 mg/L			093724-010	EPA 6020
CTF-MW2	25-Jun-13	Arsenic – Filtered	0.0477 mg/L	0.010 mg/L			094042-010	EPA 6020
CTF-MW2	17-Sept-13	Arsenic – Filtered	0.0488 mg/L	0.010 mg/L			094646-010	EPA 6020
CTF-MW2	17-Dec-13	Arsenic – Filtered	0.0366 mg/L	0.010 mg/L			095086-010	EPA 6020
CTF-MW2	08-Mar-11	Arsenic—Unfiltered	0.0595 mg/L	0.010 mg/L			090237-009	EPA 6020
CTF-MW2	31-May-11	Arsenic—Unfiltered	0.0496 mg/L	0.010 mg/L			090670-009	EPA 6020
CTF-MW2	29-Sep-11	Arsenic—Unfiltered	0.0651 mg/L	0.010 mg/L			091259-009	EPA 6020
CTF-MW2	09-Dec-11	Arsenic—Unfiltered	0.0469 mg/L	0.010 mg/L			091525-009	EPA 6020
CTF-MW2	30-Mar-12	Arsenic—Unfiltered	0.0498 mg/L	0.010 mg/L			091949-009	EPA 6020
CTF-MW2 (Duplicate)	30-Mar-12	Arsenic—Unfiltered	0.0559 mg/L	0.010 mg/L			091950-009	EPA 6020
CTF-MW2	19-June-12	Arsenic—Unfiltered	0.0433 mg/L	0.010 mg/L			092538-009	EPA 6020
CTF-MW2	25-Sept-12	Arsenic—Unfiltered	0.0535 mg/L	0.010 mg/L			092862-009	EPA 6020
CTF-MW2	18-Dec-12	Arsenic—Unfiltered	0.0516 mg/L	0.010 mg/L		J-	093251-009	EPA 6020
CTF-MW2	26-Mar-13	Arsenic—Unfiltered	0.0456 mg/L	0.010 mg/L			093723-009	EPA 6020
CTF-MW2 (Duplicate)	26-Mar-13	Arsenic—Unfiltered	0.0444 mg/L	0.010 mg/L			093724-009	EPA 6020
CTF-MW2	25-Jun-13	Arsenic—Unfiltered	0.046 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	0.039 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 December 2013

Well	Date	Analyte	Result	MCL	Laboratory Qualifier ^a	Validation Qualifier ^b	Sample Number	Analytical Method ^c
SWMU 154								
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

^aLaboratory Qualifier

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

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

NA = Not applicable.

^bValidation Qualifier

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

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

None = No data validation for corrected gross alpha activity.

^cAnalytical 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, 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).

mg/L = Milligrams per liter.

MW = Monitoring well.

pCi/L = Picocuries per liter.

SWMU = Solid Waste Management Unit.

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

GROUNDWATER SAMPLE COLLECTION FIELD EQUIPMENT CHECK LOG Page 1 of 2

SNL/NM Project Name: SWMU 149			SNL/NM Project No.: 146422.10.11.01			
Calibrations done by: R Lynch			Date: 12/13/13			
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			
Reference value:	4.00		7.00		10.00	
	Value	Temp	Value	Temp	Value	Temp
1. Time:	0640	3.99	19.1	7.00	19.1	10.02
2. Time:	1040	3.98	19.3	7.01	19.3	10.01
3. Time:						
4. Time:						
Standard lot no.:	3AD782		3AE725		3AD357	
Expiration date:	4/15		5/15		4/15	
SC Calibration						
Reference Value: 1225uS			Standard Lot No.: 3AE221			
	Value	Temp	Expiration Date: 5/15			
1. Time:	0642	1220	19.1			
2. Time:	1050	1222	19.3			
3. Time:						
4. Time:						
ORP Calibration						
Reference Value: 200mV			Standard Lot No. 1305755			
	Value	Temp	Expiration Date: 1/14			
1. Time:	0641	199.8	19.1			
2. Time:	1049	200.6	19.3			
3. Time:						
4. Time:						
DO Calibration						
Calibration Value:	81% air saturation @ 5200 ft.		Atmospheric Pressure in Hg			
1. Time:	0639	80.9	24.32			
2. Time:	1047	81.2	24.35			
3. Time:						
4. Time:						

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

SNL/NM Project Name: SWMU 149		Project No.: 146422.10.11.01		
Calibration done by: R Lynch		Date: 12/13/13		
TURBIDIMETER				
Make & Model: HACH 2100P HACH 2100Q		Serial No. S/N 10060C003010		
Reference Value	RL + 10	20	100	800
Standard Lot No.	0161	0167	0168	0161
1. Time	0817	10.1	19.7	103
2. Time	0950	9.98	19.6	101
3. Time				
4. Time				
Comments:				

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

Project Name: <u>SWMU-149</u>	Monitoring Well ID #: <u>CTF-MW3</u>	Date: <u>12/13/13</u>
The following equipment was decontaminated at completion of sampling activities in accordance with FOP-05-03		
Pump and Tubing Bundle ID #: <u>1806-792</u>	Water Level Indicator ID #: <u>62187</u>	
<u>Personnel Performing Decontamination:</u> Robert Lynch _____ Print Name: _____ Initial: <u>RL</u> William Gibson _____ Print Name: _____ Initial: <u>WJG</u>	<u>Personnel Performing Decontamination:</u> Robert Lynch _____ Print Name: _____ Initial: <u>RL</u> William Gibson _____ Print Name: _____ Initial: <u>WJG</u>	
Condition of Equipment		
Pump: <u>Good</u> Tubing Bundle: <u>Good</u> Water Level Indicator: <u>Good</u>		
List of Decontamination Materials		
Distilled or Deonized (circle one) Source: <u>Culligan</u> Lot Number: _____	HNO₃ Grade: <u>Reagent</u> UN #: <u>2031</u> Manufacturer: <u>AROC</u> Lot Number: <u>A0305629</u>	

Groundwater Monitoring Waste Generation Log

Waste Generator : <u>William Gibson</u> Phone: <u>239-7367</u> project leader: <u>Clinton Lum</u>			
Project Name	SWMU 149	SWMU 149	SWMU 149
Container ID # (site-date-sequence)	SWMU-CTF-MW3-121313-01	SWMU-CTF-MW3-121313-02	SWMU-121313
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.	~ 23 gal.	~ 30 gal.
Total Container Weight	~ 150 lbs.	~ 180 lbs.	~ 240 lbs.
COC#: Sample#-Fraction	_____	_____	_____
	CoC# 615179	CoC# 615179	CoC# 615179
	_____	_____	_____
	Sample# 095084	Sample# 095084	Sample# 095084
Accumulation Date	Start: 12/13/13	Start: 12/13/13	Start: 12/13/13
	Full: 12/13/13	Full: 12/13/13	Full: 12/13/13
Date Waste Moved to Accumulation Area	12/13/13	12/13/13	12/13/13
Accumulation Area Name	9925	9925	9925
Comments:			

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TAILGATE SAFETY MEETING FORM

Dept: 4142 Well Location: CTF-MW 3 Date: 12/13/13 Time: 0810

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

Weather Conditions:
 Temp: 46.5 °F Wind Speed: 0 MPH Humidity: 40.2 % Wind Chill NA °F

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

Safety Topics Presented

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

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

Attendees

Robert Lynch
 Printed Name

[Signature]
 Signature

ALFRED SANTILLANES
 Printed Name

[Signature]
 Signature

William Gibson
 Printed Name

[Signature]
 Signature

 Printed Name

 Signature

 Printed Name

 Signature

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GROUNDWATER SAMPLE COLLECTION FIELD EQUIPMENT CHECK LOG Page 1 of 2

SNL/NM Project Name: SWMU 154			SNL/NM Project No.: 146422.10.11.01			
Calibrations done by: R Lynch			Date: 12/17/13			
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			
Reference value:	4.00		7.00		10.00	
	Value	Temp	Value	Temp	Value	Temp
1. Time:	0630	3.99	18.9	7.01	18.9	10.00
2. Time:	1049	3.98	19.1	7.01	19.1	10.02
3. Time:						
4. Time:						
Standard lot no.:	3AD782		3AE725		3AD357	
Expiration date:	4/15		5/15		4/15	
SC Calibration						
Reference Value: 1225uS			Standard Lot No.: 3AE221			
	Value	Temp	Expiration Date: 5/15			
1. Time:	0632	1220	18.9			
2. Time:	1051	1221	19.1			
3. Time:						
4. Time:						
ORP Calibration						
Reference Value: 200mV			Standard Lot No. 1305755			
	Value	Temp	Expiration Date: 1/14			
1. Time:	0631	199.4	18.9			
2. Time:	1050	199.7	19.1			
3. Time:						
4. Time:						
DO Calibration						
Calibration Value:	81% air saturation @ 5200 ft.		Atmospheric Pressure in Hg			
1. Time:	0629	81.4	24.30			
2. Time:	1048	81.7	24.36			
3. Time:						
4. Time:						

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

SNL/NM Project Name: SWMU 154		Project No.: 146422.10.11.01		
Calibration done by: R Lynch		Date: 12/17/13		
TURBIDIMETER				
Make & Model: HACH 2100P HACH 2100Q		Serial No. S/N 10060C003010		
Reference Value	20 + 10	20	100	800
Standard Lot No.	0161	0167	0168	0161
1. Time	0804 10.1	19.7	101	796
2. Time	0950 9.97	19.9	103	795
3. Time				
4. Time				
Comments:				

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

Project Name: <u>SWMU 154</u>	Monitoring Well ID #: <u>CTF-MW2</u>	Date: <u>12-17-13</u>
The following equipment was decontaminated at completion of sampling activities in accordance with FOP-05-03		
Pump and Tubing Bundle ID #: <u>1806-792</u>	Water Level Indicator ID #: <u>62187</u>	
<u>Personnel Performing Decontamination:</u> Robert Lynch _____ <u>RL</u> Print Name: Initial: Alfred Santillanes _____ Print Name: Initial:	<u>Personnel Performing Decontamination:</u> Robert Lynch _____ <u>RL</u> Print Name: Initial: Alfred Santillanes _____ Print Name: Initial:	
Condition of Equipment		
Pump: <u>Good</u> Tubing Bundle: <u>Good</u> Water Level Indicator: <u>Good</u>		
List of Decontamination Materials		
Distilled or Deonized (circle one) Source: <u>Culligan</u> Lot Number: _____	HNO ₃ Grade: <u>Reagent</u> UN #: <u>2031</u> Manufacturer: <u>AROC</u> Lot Number: <u>A0305629</u>	

Groundwater Monitoring Waste Generation Log

Waste Generator : <u>William Gibson</u> Phone: <u>239-7367</u> project leader: <u>Clinton lum</u>			
Project Name	SWMU-154	SWMU-154	SWMU-154
Container ID # (site-date-sequence)	SWMU-CTF-MW2-121713-01	SWMU-CTF-MW2-121713-02	SWMU-121713
Initial Label Type (Hazardous or Non-Regulated)	Non- Regulated	Non- Regulated	Non- Regulated
Waste Matrix (purge water, decon water, HACH Accu-Vac ampule)	Purge Water	Purge Water	Decon Water
Container Type / Volume	CHPD/ 55 gal.	CHPD/ 55 gal.	CHPD/ 55 gal.
Volume of Waste	~ 24 gal.	~ 24 gal.	~ 30 gal.
Total Container Weight	~ 190 lbs.	~ 190 lbs.	~ 240 lbs.
COC#: Sample#-Fraction	CoC# 615180, 615181	CoC# 615180, 615181	CoC# 615180, 615181
	Sample # 095086	Sample # 095086	Sample # 095086
Accumulation Date	Start: 12/17/13	Start: 12/17/13	Start: 12/17/13
	Full: 12/17/13	Full: 12/17/13	Full: 12/17/13
Date Waste Moved to Accumulation Area	12/17/13	12/17/13	12/17/13
Accumulation Area Name	9925	9925	9925
Comments:			

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TAILGATE SAFETY MEETING FORM

Dept: 4142 Well Location: CTF-MW 2 Date: 12/17/13 Time: 0800

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

Weather Conditions:

Temp: 50.0 °F Wind Speed: 0 MPH Humidity: 36.2% Wind Chill NA °F

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

Safety Topics Presented

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

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

Attendees

Robert Lynch
Printed Name

[Signature]
Signature

William Gibson
Printed Name

[Signature]
Signature

ALFRED SANTILLANES
Printed Name

[Signature]
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

Batch No.

SMO Use

AR/COC **615179**

Project Name: SWMU 149 GWM	Date Samples Shipped: 12/13/13	SMO Authorization: <i>[Signature]</i>	<input type="checkbox"/> Waste Characterization
Project/Task Manager: Clinton Lum	Carrier/Waybill No.	SMO Contact Phone:	<input type="checkbox"/> RMMA
Project/Task Number: 146422.10.11.01	Lab Contact: Edie Kent/803-556-8171	Lorraine Herrera/505-844-3199	<input type="checkbox"/> Released by COC No. <input checked="" type="checkbox"/> 4° Celsius
Service Order: CF352-14	Lab Destination: GEL	Send Report to SMO:	
	Contract No.: PO 1303873	Rita Kavanaugh/505-284-2553	

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

Sample No.	Fraction	Sample Location Detail	Depth (ft)	Date/Time Collected	Sample Matrix	Container		Preservative	Collection Method	Sample Type	Parameter & Method Requested	Lab Sample ID
						Type	Volume					
✓ 095084	-001	CTF-MW3	359	12/13/13 9:39	GW	G	3x40ml	HCL	G	SA	TCL VOC (SW846-8260B)	
✓ 095084	-009	CTF-MW3	359	12/13/13 9:40	GW	P	500 ml	HNO3	G	SA	TAL Metals (SW846-6010/6020/7470)	
✓ 095084	-010	CTF-MW3	359	12/13/13 9:41	FGW	P	500 ml	HNO3	G	SA	TAL Metals (SW846-6010/6020/7470)	
✓ 095084	-016	CTF-MW3	359	12/13/13 9:42	GW	P	125 ml	None	G	SA	Anions (SW846-9056)	
✓ 095084	-018	CTF-MW3	359	12/13/13 9:43	GW	P	125 ml	H2SO4	G	SA	NPN (EPA 353.2)	
✓ 095084	-020	CTF-MW3	359	12/13/13 9:44	GW	P	250 ml	None	G	SA	Perchlorate (EPA 314.0)	
✓ 095084	-022	CTF-MW3	359	12/13/13 9:45	GW	P	500 ml	None	G	SA	Alkalinity (SM2320B)	
✓ 095085	-001	CTF-TB1	NA	12/13/13 9:39	DIW	G	3x40ml	HCL	G	TB	TCL VOC (SW846-8260B)	

Last Chain: <input checked="" type="checkbox"/> Yes	Sample Tracking	SMO Use	Special Instructions/QC Requirements:	Conditions on Receipt	
Validation Req'd: <input checked="" type="checkbox"/> Yes	Date Entered:		EDD <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		
Background: <input type="checkbox"/> Yes	Entered by:		Turnaround Time <input type="checkbox"/> 7 Day* <input type="checkbox"/> 15 Day* <input checked="" type="checkbox"/> 30 Day		
Confirmatory: <input type="checkbox"/> Yes	QC inits.:		Negotiated TAT <input type="checkbox"/>		
Sample Team Members	Name	Signature	Init.	Company/Organization/Phone/Cell	Sample Disposal <input type="checkbox"/> Return to Client <input checked="" type="checkbox"/> Disposal by Lab
	Robert Lynch	<i>[Signature]</i>	RL	SNL/4142/505-844-4013/505-250-7090	Return Samples By:
	Alfred Santillanes	<i>[Signature]</i>	AS	SNL/4142/505-844-5130/505-228-0710	Comments: Send report to Tim Jackson/4142/MS 0729/284-2547 If perchlorate detected, then perform verification analysis using SW846-6850M. Report anions as Br, Cl, F, SO4. Report alkalinity as total CaCO3, HCO3, CO3.
William Gibson	<i>[Signature]</i>	WG	SNL/4142/505-284-3307/505-239-7367		

1. Relinquished by <i>[Signature]</i> Org. 4142 Date 12/13/13 Time 10:18	3. Relinquished by _____ Org. _____ Date _____ Time _____
1. Received by <i>[Signature]</i> Org. 4142 Date 12/13/13 Time 10:18	3. Received by _____ Org. _____ Date _____ Time _____
2. Relinquished by _____ Org. _____ Date _____ Time _____	4. Relinquished by _____ Org. _____ Date _____ Time _____
2. Received by _____ Org. _____ Date _____ Time _____	4. Received by _____ Org. _____ Date _____ Time _____

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

CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY

Internal Lab

Batch No. _____	SMO Use _____	AR/COC 615180	
Project Name: SWMU 154 GWM	Date Samples Shipped: _____	SMO Authorization: <i>Don Williams</i>	<input type="checkbox"/> Waste Characterization <input type="checkbox"/> RMMA <input type="checkbox"/> Released by COC No. <input checked="" type="checkbox"/> 4° Celsius
Project/Task Manager: Clinton Lum	Carrier/Waybill No. _____	SMO Contact Phone: _____	
Project/Task Number: 146422.10.11.01	Lab Contact: Edie Kent/803-556-8171	Lorraine Herrera/505-844-3199	
Service Order: CF353-14	Lab Destination: GEL	Send Report to SMO: _____	
	Contract No.: PO 1303873	Rita Kavanaugh/505-284-2553	

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

Sample No.	Fraction	Sample Location Detail	Depth (ft)	Date/Time Collected	Sample Matrix	Container		Preservative	Collection Method	Sample Type	Parameter & Method Requested	Lab Sample ID
						Type	Volume					
✓ 095086	-001 ✓	CTF-MW2	129	12/17/13 9:35 ✓	GW	G	3x40ml ✓	HCL	G	SA	TCL VOC (SW846-8260B)	
✓ 095086	-002 ✓	CTF-MW2	129	12/17/13 9:36 ✓	GW	AG	4x1L ✓	None	G	SA	TCL SVOC (SW846-8270C)	
✓ 095086	-009 ✓	CTF-MW2	129	12/17/13 9:38 ✓	GW	P	500 ml ✓	HNO3	G	SA	TAL Metals+U(SW846-6010/6020/7470)	
✓ 095086	-010 ✓	CTF-MW2	129	12/17/13 9:40 ✓	FGW ✓	P	500 ml ✓	HNO3	G	SA	TAL Metals+U(SW846-6010/6020/7470)	
✓ 095086	-016 ✓	CTF-MW2	129	12/17/13 9:41 ✓	GW	P	125 ml ✓	None	G	SA	Anions (SW846-9056)	
✓ 095086	-018 ✓	CTF-MW2	129	12/17/13 9:42 ✓	GW	P	125 ml ✓	H2SO4	G	SA	MPN (EPA 353.2)	
✓ 095086	-020 ✓	CTF-MW2	129	12/17/13 9:43 ✓	GW	P	250 ml ✓	None	G	SA	Perchlorate (EPA 314.0)	
✓ 095086	-022 ✓	CTF-MW2	129	12/17/13 9:44 ✓	GW	P	500 ml ✓	None	G	SA	Alkalinity (SM2320B)	
✓ 095086	-024 ✓	CTF-MW2	129	12/17/13 9:45 ✓	GW	AG	4x1L ✓	None	G	SA	High Explosives(SW846-8321A mod.)	
✓ 095086	-033 ✓	CTF-MW2	129	12/17/13 9:47 ✓	GW	P	1 L ✓	HNO3	G	SA	Gamma Spectroscopy (EPA 901.0)	

Last Chain: <input checked="" type="checkbox"/> Yes	Sample Tracking	SMO Use	Special Instructions/QC Requirements:	Conditions on Receipt	
Validation Req'd: <input checked="" type="checkbox"/> Yes	Date Entered: _____		EDD <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		
Background: <input type="checkbox"/> Yes	Entered by: _____		Turnaround Time <input type="checkbox"/> 7 Day* <input type="checkbox"/> 15 Day* <input checked="" type="checkbox"/> 30 Day		
Confirmatory: <input type="checkbox"/> Yes	QC inits.: _____		Negotiated TAT <input type="checkbox"/>		
Sample Team Members	Name	Signature	Init.	Company/Organization/Phone/Cell	Sample Disposal <input type="checkbox"/> Return to Client <input checked="" type="checkbox"/> Disposal by Lab
	Robert Lynch	<i>Robert Lynch</i>	RL	SNL/4142/505-844-4013/505-250-7090	Return Samples By: Comments: Send report to Tim Jackson/4142/MS 0729/284-2547 CTF-MW2 water has high buffering capacity, please check pH and add preservatives as needed. If perchlorate detected, then perform verification analysis using SW846-6850. Report anions as Br, Cl, F, SO4. Report Alkalinity as total CaCO3, HCO3, CO3. Report gamma Spec for short list isotopes.
	Alfred Santillanes	<i>Alfred Santillanes</i>	AS	SNL/4142/505-844-5130/505-228-0710	
	William Gibson	<i>William Gibson</i>	WG	SNL/4142/505-284-3307/505-239-7367	

1. Relinquished by <i>Robert Lynch</i>	Org. 4142	Date 12/17/13	Time 0950	3. Relinquished by _____	Org. _____	Date _____	Time _____
1. Received by <i>T. Jackson</i>	Org. 4142	Date 12/17/13	Time 0950	3. Received by _____	Org. _____	Date _____	Time _____
2. Relinquished by <i>T. Jackson</i>	Org. 4142	Date 12/17/13	Time 1010	4. Relinquished by _____	Org. _____	Date _____	Time _____
2. Received by <i>Don Williams</i>	Org. 4142	Date 12/17/13	Time 1010	4. Received by _____	Org. _____	Date _____	Time _____

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

CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY

Internal Lab	SMO Use	AR/CO	615181
Batch No. _____	Date Samples Shipped: _____	SMO Authorization: <i>[Signature]</i>	
Project Name: <u>SWMU 154 GWM</u>	Carrier/Waybill No. _____	SMO Contact Phone: _____	
Project/Task Manager: <u>Clinton Lum</u>	Lab Contact: <u>Edie Kent/803-556-8171</u>	Lorraine Herrera/505-844-3199	
Project/Task Number: <u>146422.10.11.01</u>	Lab Destination: <u>GEL</u>	Send Report to SMO: _____	
Service Order: <u>CF353-14</u>	Contract No.: <u>PO 1303873</u>	Rita Kavanaugh/505-284-2553	

<input checked="" type="checkbox"/> Waste Characterization
<input type="checkbox"/> RMMA
<input type="checkbox"/> Released by COC No. <input checked="" type="checkbox"/> 4° Celsius
Bill to: Sandia National Laboratories (Accounts Payable), P.O. Box 5800, MS-0154 Albuquerque, NM 87185-0154

Sample No.	Fraction	Sample Location Detail	Depth (ft)	Date/Time Collected		Sample Matrix	Container		Preservative	Collection Method	Sample Type	Parameter & Method Requested	Lab Sample ID
				Type	Volume								
✓ 095086	-01✓	CTF-MW2	NA	12/17/13	9:26	FPW	P	500 ml	HNO3	G	WC	Arsenic (SW846-6020) ✓	

Last Chain: <input checked="" type="checkbox"/> Yes	Sample Tracking	SMO Use	Special Instructions/QC Requirements:	Conditions on Receipt		
Validation Req'd: <input type="checkbox"/> Yes	Date Entered:	EDD	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No			
Background: <input type="checkbox"/> Yes	Entered by:	Turnaround Time	<input type="checkbox"/> 7 Day* <input type="checkbox"/> 15 Day* <input checked="" type="checkbox"/> 30 Day			
Confirmatory: <input type="checkbox"/> Yes	QC inits.:	Negotiated TAT	<input type="checkbox"/>			
Sample Team Members	Name	Signature	Init.		Company/Organization/Phone/Cell	Sample Disposal
	Robert Lynch	<i>[Signature]</i>	RL	SNL/4142/505-844-4013/505-250-7090	Return Samples By:	
	Alfred Santillanes	<i>[Signature]</i>	AS	SNL/4142/505-844-5130/505-228-0710	Comments:	Send report to Tim Jackson/4142/MS 0729/284-2547
William Gibson	<i>[Signature]</i>	WG	SNL/4142/505-284-3307/505-239-7367			

1. Relinquished by <i>[Signature]</i> Org. 4142 Date <u>12/17/13</u> Time <u>0950</u>	3. Relinquished by _____ Org. _____ Date _____ Time _____
1. Received by <i>[Signature]</i> Org. 4142 Date <u>12-17-13</u> Time <u>0950</u>	3. Received by _____ Org. _____ Date _____ Time _____
2. Relinquished by <i>[Signature]</i> Org. 4142 Date <u>12-17-13</u> Time <u>1010</u>	4. Relinquished by _____ Org. _____ Date _____ Time _____
2. Received by <i>[Signature]</i> Org. 4142 Date <u>12/17/13</u> Time <u>1010</u>	4. Received by _____ Org. _____ Date _____ Time _____

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

Appendix C

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

Data Validation Summary Worksheet

AR/COC #: 615180
 SDG #: 339491 and 339494
 Matrix: Aqueous
 AR/COC(s) present: Yes

Site/Project: SWMU 154 GWM
 Laboratory: GEL
 # of Samples: 13 CVR present: Yes
 Sample Container Integrity: OK

Validation Date: 02/06/2014
 Validator: Linda Thal
 Analysis Type: Organic Metals
 Rad Gen Chem

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

Hold Time/Preservation Outliers								
Sample Number	Laboratory ID	Analysis	Pres.	Coll. Date	Prep. Date	Anal. Date	Anal. within 2X HT	Anal. beyond 2X HT
095086-001	339491001	8260B	>2	12/17/13	12/31/13	12/31/13	Y	N
095086-016	339491004	9056 (Br)	✓	12/17/13	01/17/14	01/17/14	Y	N

Comments: Sampled 12/17/2013. Metals and Rad samples received with a pH >2 further preserved upon receipt at the laboratory.

Validated by: *L. Thal*

Organic Worksheet (GC/MS)

AR/COC #: 615180

SDG #: 339491

Matrix: Aqueous

Laboratory Sample IDs: 339494001, -012

Method/Batch #: 8260B: 1356911

Tuning (pass/fail): Pass TICs Required? (yes/no): No

Analyte (outliers)	Calibration				Method Blank	5X (10X) MB	LCS %R	MS %R	MSD %R	MS/ MSD RPD	TB			
	Int.	RF	RSD/ R ²	(ICV) CCV %D										
Dibromochloromethane	NA	✓	23	✓	✓	NA	✓	✓	✓	✓	✓			
Bromoform	NA	✓	27	✓	✓	NA	✓	✓	✓	✓	✓			
1,2-Dibromo-3-chloropropane	NA	✓	26	✓	✓	NA	✓	✓	✓	✓	✓			
1,2,3-Trichlorobenzene	NA	✓	✓	-22	✓	NA	✓	✓	✓	✓	✓			
Surrogate Recovery Outliers														
Sample ID														
None														
IS Outliers														
Sample ID	Area	RT	Area	RT	Area	RT	Area	RT	Area	RT	Area	RT	Area	RT
None														

Comments: -001 pH=4 >1X but <2X HT: MS/MSD performed on -001 spiked with trichlorotrifluoroethane; ICAL VOA4.I 12/26/2013; Acetone linear int <MDL

Organic Worksheet (GC/MS)

AR/COC #: 615180

SDG #: 339491

Matrix: Aqueous

Laboratory Sample IDs: 339491002

Method/Batch #s: 8270D: 1355307/1355306 (prep)

Tuning (pass/fail): Pass

TICs Required? (yes/no): No

Analyte (outliers)	Calibration				Method Blank	5X (10X) Blank	LCS %R	MS %R	MSD %R	MS/ MSD RPD				
	Int.	RF	RSD/ R ²	(ICV) CCV %D										
p-Nitroaniline	NA	✓	16	✓	✓	NA	✓	✓	136	✓				
4-Nitrophenol	NA	✓	15.7	✓	✓	NA	✓	✓	✓	✓				
2-Methyl-4,6-dinitrophenol	NA	✓	18	✓	✓	NA	✓	✓	✓	✓				
2,4-Dinitrophenol	NA	✓	✓	(-27)	✓	NA	✓	✓	✓	✓				
Surrogate Recovery Outliers														
Sample ID														
None														
IS Outliers														
Sample ID	Area	RT	Area	RT	Area	RT	Area	RT	Area	RT	Area	RT	Area	RT
None														

Comments: HTs OK; MS/MSD on sample -002; ICAL MSD4.I 11/22/2013;

High Explosives Worksheet (LC/MS/MS)

AR/COC #: 615180

SDG #: 339491

Matrix: Aqueous

Laboratory Sample IDs: 339491008

Method/Batch #: 3535/8321A:1355388/1355387(prepare)

Analyte (Outliers)	Initial Calibration			Continuing Calibration				Method Blank	5X (10X) Blank	LCS %R	MS %R	MSD %R	MS/MSD RPD	CRI			
	Int.	RF	COD RSD/R ²	ICV	CCV	ICB	CCB										
m-Nitrotoluene	NA	.034	✓	✓	✓	✓	✓	✓	NA	✓	✓	✓	✓	✓			
o-Nitrotoluene	NA	.021	✓	✓	✓	✓	✓	✓	NA	✓	✓	✓	✓	✓			
Surrogate Recovery Outliers																	
Sample ID																	
None																	
Internal Standard Outliers																	
Sample ID	Area	RT	Sample ID	Area	RT	Sample ID	Area	RT									
None																	

Comments: HT OK. MS/MSD -008. LCMSMS#3All sample and QC extracts diluted 1:1 with HPLC grade water.

Inorganic Metals Worksheet

AR/COC #: 615180

SDG #: 339491 and 339494

Matrix: Aqueous

Laboratory Sample IDs: 339491003(UF) and 339494001(F)

Method/Batch #: **6010**: 1355846; **6020**: 1355848; **7470A**:1357402

ICPMS Mass Cal (pass/fail): Pass

ICPMS Resolution (pass/fail): Pass

Analyte (outliers)	Calibration						Method Blank mg/L	5X Blank or (5X MDL) mg/L	LCS %R	MS %R	Lab Rep RPD	Serial Dil. %D	ICS AB %R	ICS A ± MDL ug/L x50 (mg/L)	CRA CRI %R				
	Int. mg/L	R ²	ICV	CCV	ICB ug/L	CCB ug/L													
Cu	NA	✓	✓	✓	✓	✓	✓	NA	✓	✓	✓	12.1	✓	-.62(-.031)	✓				
K	NA	✓	✓	✓	✓	✓	✓	NA	✓	✓	✓	13.3	✓	✓	✓				
Mn	NA	✓	✓	✓	✓	✓	✓	NA	✓	180*	✓	✓	✓	✓	✓				
Zn	NA	✓	✓	✓	✓	✓	✓	NA	✓	60*	✓	✓	✓	✓	✓				
Co	NA	✓	✓	✓	✓	✓	✓	NA	✓	✓	✓	11.7	✓	✓	✓				
Fe	NA	✓	✓	✓	✓	✓	✓	NA	✓	✓	✓	17.5	✓	✓	✓				
Cd	NA	✓	✓	✓	✓	✓	✓	NA	✓	✓	✓	✓	✓	+1.199(.00995)	✓				
Se	NA	✓	✓	✓	✓	✓	✓	NA	✓	✓	✓	✓	✓	-1.59(-.0795)	✓				

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

Comments: HTs OK; ICP and Hg matrix QC on sample 339494001(F); ICP-MS matrix QC on sample 339495001 (ARCOG 615181 same SDG); Both diluted Na 20X, Ca, Mg and Mn 10X; Ca, Mg, Na, K, Mn, Zn >4X spike amount; Ca > ICS ICP-MS spike amount; Ca < ICS ICP-AES spike

CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY

Internal Lab

Batch No.

SMO Use

AR/COC **615180**

Project Name: SWMU 154 GWM	Date Samples Shipped: 12/17/13	SMO Authorization: <i>Don Watajny</i>	<input type="checkbox"/> Waste Characterization <input type="checkbox"/> RMMA <input type="checkbox"/> Released by COC No. <input checked="" type="checkbox"/> 4° Celsius
Project/Task Manager: Clinton Lum	Carrier/Waybill No. 212974	SMO Contact Phone:	
Project/Task Number: 146422.10.11.01	Lab Contact: Edie Kent/803-556-8171	Lorraine Herrera/505-844-3199	
Service Order: CF353-14	Lab Destination: GEL	Send Report to SMO: Rita Kavanaugh/505-284-2553	
Contract No.: PO 1303873			

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

Tech Area:		Operational Site:										Parameter & Method Requested		Lab Sample ID
Sample No.	Fraction	Sample Location Detail	Depth (ft)	Date/Time Collected		Sample Matrix	Container		Preservative	Collection Method	Sample Type			
							Type	Volume						
✓ 095086	-001	CTF-MW2	129	12/17/13	9:35	GW	G	3x40ml	HCL	G	SA	TCL VOC (SW846-8260B)		339491 001
✓ 095086	-002	CTF-MW2	129	12/17/13	9:36	GW	AG	4x1L	None	G	SA	TCL SVOC (SW846-8270C)		339491 002
✓ 095086	-009	CTF-MW2	129	12/17/13	9:38	GW	P	500 ml	HNO3	G	SA	TAL Metals+U(SW846-6010/6020/7470)		339491 003
✓ 095086	-010	CTF-MW2	129	12/17/13	9:40	FGW	P	500 ml	HNO3	G	SA	TAL Metals+U(SW846-6010/6020/7470)		339494 001
✓ 095086	-016	CTF-MW2	129	12/17/13	9:41	GW	P	125 ml	None	G	SA	Anions (SW846-9056)		339491 004
✓ 095086	-018	CTF-MW2	129	12/17/13	9:42	GW	P	125 ml	H2SO4	G	SA	NPN (EPA 353.2)		339491 005
✓ 095086	-020	CTF-MW2	129	12/17/13	9:43	GW	P	250 ml	None	G	SA	Perchlorate (EPA 314.0)		339491 006
✓ 095086	-022	CTF-MW2	129	12/17/13	9:44	GW	P	500 ml	None	G	SA	Alkalinity (SM2320B)		339491 007
✓ 095086	-024	CTF-MW2	129	12/17/13	9:45	GW	AG	4x1L	None	G	SA	High Explosives(SW846-8321A mod.)		339491 008
✓ 095086	-033	CTF-MW2	129	12/17/13	9:47	GW	P	1 L	HNO3	G	SA	Gamma Spectroscopy (EPA 901.0)		339491 009

Last Chain: <input checked="" type="checkbox"/> Yes	Sample Tracking	SMO Use	Special Instructions/QC Requirements:	Conditions on Receipt
Validation Req'd: <input checked="" type="checkbox"/> Yes	Date Entered:		EDD <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	
Background: <input type="checkbox"/> Yes	Entered by:		Turnaround Time <input type="checkbox"/> 7 Day* <input type="checkbox"/> 15 Day* <input checked="" type="checkbox"/> 30 Day	
Confirmatory: <input type="checkbox"/> Yes	QC inits.:		Negotiated TAT <input type="checkbox"/>	

Sample Team Members	Name	Signature	Init.	Company/Organization/Phone/Cell	Sample Disposal <input type="checkbox"/> Return to Client <input checked="" type="checkbox"/> Disposal by Lab	Return Samples By:
	Robert Lynch	<i>Robert Lynch</i>	RL	SNL/4142/505-844-4013/505-250-7090		
	Alfred Santillanes	<i>Alfred Santillanes</i>	AS	SNL/4142/505-844-5130/505-228-0710		
	William Gibson	<i>William Gibson</i>	WG	SNL/4142/505-284-3307/505-239-7367		
					Comments: Send report to Tim Jackson/4142/MS 0729/284-2547 CTF-MW2 water has high buffering capacity, please check pH and add preservatives as needed. If perchlorate detected, then perform verification analysis using SW846-6850. Report anions as Br, Cl, F, SO4. Report Alkalinity as total CaCO3, HCO3, CO3. Report gamma Spec for short list isotopes.	

1. Relinquished by <i>Robert Lynch</i> Org. 4142 Date 12/17/13 Time 0950	3. Relinquished by <i>Don Watajny</i> Org. 4142 Date 12/17/13 Time 1100
1. Received by <i>T. Jackson</i> Org. 4142 Date 12/17/13 Time 0950	3. Received by <i>Don Watajny</i> Org. 4142 Date 12/18/13 Time 0825
2. Relinquished by <i>T. Jackson</i> Org. 4142 Date 12/17/13 Time 1010	4. Relinquished by _____ Org. _____ Date _____ Time _____
2. Received by <i>Don Watajny</i> Org. 4142 Date 12/17/13 Time 1010	4. Received by _____ Org. _____ Date _____ Time _____

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

Memorandum

Date: February 6, 2014
To: File
From: Linda Thal
Subject: Inorganic Data Review and Validation – SNL
Site: SWMU 154 GWM
AR/COC: 615180
SDG: 339491
Laboratory: GEL
Project/Task: 146422.10.11.01
Analysis: General Chemistry

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

Summary

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

Anions:

1. The sample for bromide was analyzed $>1X$ but $\leq 2X$ past the method specified holding time. The associated sample result was a detect and will be **qualified J,H1**.

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

Holding Times and Preservation

The sample was prepared and analyzed within the prescribed holding times and properly preserved except as noted above in the Summary section.

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.

Nitrate/Nitrite:

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

Laboratory Replicate

The replicate analyses met all QC acceptance criteria.

Nitrate/Nitrite:

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

Detection Limits/Dilutions

All detection limits were properly reported. The sample was diluted 100X for chloride and sulfate and 4X for bromide.

Other QC

No other specific issues that affect data quality were identified.

Reviewed by: Mary Donovan

Level: I

Date: 02/07/14

Memorandum

Date: February 6, 2014
To: File
From: Linda Thal
Subject: LC/MS/MS Organic Data Review and Validation – SNL
Site: SWMU 154 GWM
AR/COC: 615180
SDG: 339491
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

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 initial calibration RFs for m-nitrotoluene and o-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 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.

Laboratory Control Sample (LCS)

All LCS recoveries met QC acceptance criteria.

Detection Limits/Dilutions

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

Other QC

No other specific issues that affect data quality were identified.

Reviewed by: Mary Donivan

Level: I

Date: 02/07/14

Memorandum

Date: February 6, 2014
To: File
From: Linda Thal
Subject: Inorganic Data Review and Validation – SNL
Site: SWMU 154 GWM
AR/COC: 615180
SDG: 339491 and 339494
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

One filtered and one unfiltered 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. The MS %Rs did not meet acceptance criteria for Zn and Mn. The parent sample results were >4X the spike amounts and, therefore, the associated sample results will not be qualified for these failing recoveries. The associated sample results were detects and will be **qualified J,MS1** due to lack of matrix specific accuracy information.
2. The original Cu, K, Co and Fe results for the serial dilution parent sample were >50X the MDL and the serial dilution %Ds were >10%. All associated sample results were detects and will be **qualified J,D1**.
3. Cu was detected in the ICS A at a negative value with an absolute value > the MDL but ≤2X the MDL. The associated sample results were detects <50X the ICS A value and will be **qualified J-,CK3**.
4. Se was detected in the ICS A at a negative value with an absolute value > the MDL but ≤2X the MDL. The associated result for sample 339491003 was ND and will be **qualified UJ,CK3**. The associated result for sample 339494001 was a detect <50X the absolute value of the ICS A result and will be **qualified J-,CK3**.

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. The samples were received with a pH >2 and were properly preserved on receipt at 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.

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. The samples were diluted 20X for Na and 10X for Ca, Mg and Mn.

ICP Interference Check Sample (ICS A and AB)

Results of the ICS A and AB analyses were evaluated because the sample concentrations of Ca were > those in the ICS solution for ICP-MS. All acceptance criteria were met except as noted above in the Summary section and as follows.

Cd was detected in the ICS A. The associated sample results were NDs and will not be qualified.

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: Mary Donovan

Level: I

Date: 02/07/14

Memorandum

Date: February 6, 2014
To: File
From: Linda Thal
Subject: Inorganic Data Review and Validation – SNL
Site: SWMU 154 GWM
AR/COC: 615180
SDG: 339491 and 339494
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

One filtered and one unfiltered 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. The MS %Rs did not meet acceptance criteria for Zn and Mn. The parent sample results were >4X the spike amounts and, therefore, the associated sample results will not be qualified for these failing recoveries. The associated sample results were detects and will be **qualified J,MS1** due to lack of matrix specific accuracy information.
2. The original Cu, K, Co and Fe results for the serial dilution parent sample were >50X the MDL and the serial dilution %Ds were >10%. All associated sample results were detects and will be **qualified J,D1**.
3. Cu was detected in the ICS A at a negative value with an absolute value > the MDL but $\leq 2X$ the MDL. The associated sample results were detects <50X the ICS A value and will be **qualified J,CK3**.
4. Se was detected in the ICS A at a negative value with an absolute value > the MDL but $\leq 2X$ the MDL. The associated result for sample 339491003 was ND and will be **qualified UJ,CK3**. The associated result for sample 339494001 was a detect <50X the absolute value of the ICS A result and will be **qualified J-,CK3**.

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. The samples were received with a pH >2 and were properly preserved on receipt at 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.

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. The samples were diluted 20X for Na and 10X for Ca, Mg and Mn.

ICP Interference Check Sample (ICS A and AB)

Results of the ICS A and AB analyses were evaluated because the sample concentrations of Ca were > those in the ICS solution for ICP-MS. All acceptance criteria were met except as noted above in the Summary section and as follows.

Cd was detected in the ICS A. The associated sample results were NDs and will not be qualified.

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: Mary Donovan

Level: I

Date: 02/07/14

Memorandum

Date: February 6, 2014
To: File
From: Linda Thal
Subject: Radiochemical Data Review and Validation – SNL
Site: SWMU 154 GWM
AR/COC: 615180
SDG: 339491
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

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.

Gammascpec:

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

Gross Alpha/Beta:

1. All sample results that were > the MDA but $\leq 3X$ the MDA will be **qualified J,FR7**.

Holding Times and Preservation

The sample was prepared and analyzed within the prescribed holding times. The sample was received with a pH >2 and was properly preserved on receipt at 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 sample was not diluted. All required detection limits were met.

Other QC

No other specific issues that affect data quality were identified.

Reviewed by: Mary Donovan

Level: I

Date: 02/07/14



Sample Findings Summary



AR/COC: 615180

Page 1 of 3

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
EPA 900.0/SW846 9310			
	095086-034/CTF-MW2	ALPHA (12587-46-1)	J, FR7
EPA 901.1			
	095086-033/CTF-MW2	Americium-241 (14596-10-2)	BD, FR3
	095086-033/CTF-MW2	Cesium-137 (10045-97-3)	BD, FR3
	095086-033/CTF-MW2	Cobalt-60 (10198-40-0)	BD, FR3
	095086-033/CTF-MW2	Potassium-40 (13966-00-2)	BD, FR3
SW846 3005/6020 DOE-AL			
	095086-009/CTF-MW2	Cobalt (7440-48-4)	J, D1
	095086-009/CTF-MW2	Copper (7440-50-8)	J-, D1,CK3
	095086-009/CTF-MW2	Iron (7439-89-6)	J, D1
	095086-009/CTF-MW2	Manganese (7439-96-5)	J, MS1
	095086-009/CTF-MW2	Potassium (7440-09-7)	J, D1
	095086-009/CTF-MW2	Selenium (7782-49-2)	UJ, CK3
	095086-009/CTF-MW2	Zinc (7440-66-6)	J, MS1
	095086-010/CTF-MW2	Cobalt (7440-48-4)	J, D1
	095086-010/CTF-MW2	Copper (7440-50-8)	J-, D1,CK3
	095086-010/CTF-MW2	Iron (7439-89-6)	J, D1
	095086-010/CTF-MW2	Manganese (7439-96-5)	J, MS1
	095086-010/CTF-MW2	Potassium (7440-09-7)	J, D1
	095086-010/CTF-MW2	Selenium (7782-49-2)	J-, CK3
	095086-010/CTF-MW2	Zinc (7440-66-6)	J, MS1
SW846 3535/8321A Modified			
	095086-024/CTF-MW2	m-Nitrotoluene (99-08-1)	UJ, I4
	095086-024/CTF-MW2	o-Nitrotoluene (88-72-2)	UJ, I4
SW846 8260B DOE-AL			

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
	095086-001/CTF-MW2	1,1,1-Trichloroethane (71-55-6)	UJ, H1
	095086-001/CTF-MW2	1,1,2,2-Tetrachloroethane (79-34-5)	UJ, H1
	095086-001/CTF-MW2	1,1,2-Trichloroethane (79-00-5)	UJ, H1
	095086-001/CTF-MW2	1,1-Dichloroethane (75-34-3)	UJ, H1
	095086-001/CTF-MW2	1,1-Dichloroethylene (75-35-4)	UJ, H1
	095086-001/CTF-MW2	1,2,3-Trichlorobenzene (87-61-6)	UJ, H1
	095086-001/CTF-MW2	1,2,4-Trichlorobenzene (120-82-1)	UJ, H1
	095086-001/CTF-MW2	1,2-Dibromo-3-chloropropane (96-12-8)	UJ, H1
	095086-001/CTF-MW2	1,2-Dibromoethane (106-93-4)	UJ, H1
	095086-001/CTF-MW2	1,2-Dichlorobenzene (95-50-1)	UJ, H1
	095086-001/CTF-MW2	1,2-Dichloroethane (107-06-2)	UJ, H1
	095086-001/CTF-MW2	1,2-Dichloropropane (78-87-5)	UJ, H1
	095086-001/CTF-MW2	1,3-Dichlorobenzene (541-73-1)	UJ, H1
	095086-001/CTF-MW2	1,4-Dichlorobenzene (106-46-7)	UJ, H1
	095086-001/CTF-MW2	2-Butanone (78-93-3)	UJ, H1
	095086-001/CTF-MW2	2-Hexanone (591-78-6)	UJ, H1
	095086-001/CTF-MW2	4-Methyl-2-pentanone (108-10-1)	UJ, H1
	095086-001/CTF-MW2	Acetone (67-64-1)	UJ, H1
	095086-001/CTF-MW2	Benzene (71-43-2)	UJ, H1
	095086-001/CTF-MW2	Bromochloromethane (74-97-5)	UJ, H1
	095086-001/CTF-MW2	Bromodichloromethane (75-27-4)	UJ, H1
	095086-001/CTF-MW2	Bromoform (75-25-2)	UJ, H1
	095086-001/CTF-MW2	Bromomethane (74-83-9)	UJ, H1
	095086-001/CTF-MW2	Carbon disulfide (75-15-0)	UJ, H1
	095086-001/CTF-MW2	Carbon tetrachloride (56-23-5)	UJ, H1
	095086-001/CTF-MW2	Chlorobenzene (108-90-7)	UJ, H1
	095086-001/CTF-MW2	Chloroethane (75-00-3)	UJ, H1
	095086-001/CTF-MW2	Chloroform (67-66-3)	UJ, H1

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
	095086-001/CTF-MW2	Chloromethane (74-87-3)	UJ, H1
	095086-001/CTF-MW2	cis-1,2-Dichloroethylene (156-59-2)	UJ, H1
	095086-001/CTF-MW2	cis-1,3-Dichloropropylene (10061-01-5)	UJ, H1
	095086-001/CTF-MW2	Cyclohexane (110-82-7)	UJ, H1
	095086-001/CTF-MW2	Dibromochloromethane (124-48-1)	UJ, H1
	095086-001/CTF-MW2	Dichlorodifluoromethane (75-71-8)	UJ, H1
	095086-001/CTF-MW2	Ethylbenzene (100-41-4)	UJ, H1
	095086-001/CTF-MW2	Isopropylbenzene (98-82-8)	UJ, H1
	095086-001/CTF-MW2	m,p-Xylenes (N/A)	UJ, H1
	095086-001/CTF-MW2	Methyl acetate (79-20-9)	UJ, H1
	095086-001/CTF-MW2	Methylcyclohexane (108-87-2)	UJ, H1
	095086-001/CTF-MW2	Methylene chloride (75-09-2)	UJ, H1
	095086-001/CTF-MW2	o-Xylene (95-47-6)	UJ, H1
	095086-001/CTF-MW2	Styrene (100-42-5)	UJ, H1
	095086-001/CTF-MW2	tert-Butyl methyl ether (1634-04-4)	UJ, H1
	095086-001/CTF-MW2	Tetrachloroethylene (127-18-4)	UJ, H1
	095086-001/CTF-MW2	Toluene (108-88-3)	UJ, H1
	095086-001/CTF-MW2	trans-1,2-Dichloroethylene (156-60-5)	UJ, H1
	095086-001/CTF-MW2	trans-1,3-Dichloropropylene (10061-02-6)	UJ, H1
	095086-001/CTF-MW2	Trichloroethylene (79-01-6)	UJ, H1
	095086-001/CTF-MW2	Trichlorofluoromethane (75-69-4)	UJ, H1
	095086-001/CTF-MW2	Trichlorotrifluoroethane (76-13-1)	UJ, H1
	095086-001/CTF-MW2	Vinyl chloride (75-01-4)	UJ, H1
	095086-001/CTF-MW2	Xylenes (total) (1330-20-7)	UJ, H1
SW846 9056			
	095086-016/CTF-MW2	Bromide (24959-67-9)	J, H1

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

Memorandum

Date: February 5, 2014
To: File
From: Linda Thal
Subject: GC/MS Organic Data Review and Validation – SNL
Site: SWMU 154 GWM
AR/COC: 615180
SDG: 339491
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

One sample was prepared and analyzed with accepted procedures using methods EPA 3510/8270D (SVOCs). All compounds were successfully analyzed. No problems were identified with the data package that resulted in the qualification of data.

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

Holding Times

The 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 %RSDs were >15% but ≤40% for 2-methyl-4,6-dinitrophenol, 4-nitrophenol and p-nitroaniline. The associated sample results were NDs and since no other calibration infractions occurred for these compounds, will not be qualified.

The ICV %D was >20% but ≤40% with negative bias for 2,4-dinitrophenol. The associated sample result was ND and since no other calibration infractions occurred for this compound, 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 follows.

The MSD recovery for p-nitroaniline was > the UAL. The associated sample result was ND and will not be qualified.

Laboratory Control Sample (LCS)

All LCS acceptance criteria were met.

Detection Limits/Dilutions

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

Tentatively Identified Compounds (TICs)

TIC reports were not required.

Other QC

No other specific issues that affect data quality were identified.

Reviewed by: Mary Donovan

Level: I

Date: 02/07/14

Memorandum

Date: February 5, 2014
To: File
From: Linda Thal
Subject: GC/MS Organic Data Review and Validation – SNL
Site: SWMU 154 GWM
AR/COC: 615180
SDG: 339491
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

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. Sample 339491001 was received with a pH >2 and was analyzed >1X but ≤2X past the method specified holding time. The associated sample results were NDs and will be **qualified UJ,H1**.

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 except as noted above in the Summary section.

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 bromoform, dibromochloromethane and 1,2-dibromo-3-chloropropane. The associated sample results were NDs and since no other calibration infraction occurred, will not be qualified.

The CCV %D was >20% with negative bias for 1,2,3-trichlorobenzene. 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.

Laboratory Control Sample (LCS)

All LCS acceptance criteria were met.

Detection Limits/Dilutions

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

Tentatively Identified Compounds (TICs)

TIC reports were not required.

Other QC

A TB was submitted with AR/COC 615180.

No other specific issues that affect data quality were identified.

Reviewed by: Mary Donivan

Level: I

Date: 02/07/14

SECTION IV
TABLE OF CONTENTS

SOLID WASTE MANAGEMENT UNITS 8/58 AND 68 QUARTERLY GROUNDWATER

	MONITORING REPORT, OCTOBER – DECEMBER 2013	IV-1
1.0	Introduction	IV-1
2.0	Field Methods and Measurements.....	IV-3
2.1	Equipment Decontamination.....	IV-3
2.2	Well Evacuation	IV-3
2.3	Groundwater Sample Collection	IV-4
3.0	Analytical Results	IV-4
3.1	Field Water Quality Measurements.....	IV-5
3.2	Volatile Organic Compounds.....	IV-5
3.3	Semivolatile Organic Compounds	IV-5
3.4	High Explosive Compounds.....	IV-6
3.5	Nitrate Plus Nitrite	IV-6
3.6	Anions and Alkalinity	IV-6
3.7	Perchlorate.....	IV-7
3.8	Hexavalent Chromium	IV-7
3.9	Metals	IV-7
3.10	Cations.....	IV-8
3.11	Gamma Spectroscopy and Radioisotopic Analyses	IV-8
3.12	Sample Results Exceeding Maximum Contaminant Levels	IV-9
4.0	Quality Control Samples	IV-9
4.1	Field 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	Laboratory Quality Control Samples	IV-11
4.3	Variances and Nonconformances.....	IV-12
5.0	Summary	IV-12
6.0	References	IV-13

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 Fourth Quarter, CY 2013 Groundwater Sampling, SWMUs 8/58 and 68 Groundwater Monitoring Quarterly Assessment, October – December 2013
IV-3	Summary of Field Water Quality Measurements, SWMUs 8/58 and 68 Groundwater Monitoring Quarterly Assessment, October – December 2013
IV-4	Method Detection Limits for Volatile and Semivolatile Organic Compounds, SWMUs 8/58 and 68 Groundwater Monitoring Quarterly Assessment, October – December 2013
IV-5	Method Detection Limits for High Explosive Compounds (EPA Method 8321A), SWMUs 8/58 and 68 Groundwater Monitoring Quarterly Assessment, October – December 2013
IV-6	Summary of Nitrate Plus Nitrite Results, SWMUs 8/58 and 68 Groundwater Monitoring Quarterly Assessment, October – December 2013
IV-7	Summary of Alkalinity, Anion, and Total Cyanide Results, SWMUs 8/58 and 68 Groundwater Monitoring Quarterly Assessment, October – December 2013
IV-8	Summary of Perchlorate Results, SWMUs 8/58 and 68 Groundwater Monitoring Quarterly Assessment, October – December 2013
IV-9	Summary of Hexavalent Chromium Results, SWMU 68 Groundwater Monitoring Quarterly Assessment, October – December 2013

LIST OF TABLES (Concluded)

Table	Title
IV-10	Summary of Unfiltered Total Metal Results, SWMUs 8/58 Groundwater Monitoring Quarterly Assessment, October – December 2013
IV-11	Summary of Unfiltered Total Metal Results, SWMU 68 Groundwater Monitoring Quarterly Assessment, October – December 2013
IV-12	Summary of Filtered Cation Results, SWMUs 8/58 and 68 Groundwater Monitoring Quarterly Assessment, October – December 2013
IV-13	Summary of Gamma Spectroscopy, Gross Alpha, Gross Beta, and Isotopic Uranium Results, SWMUs 8/58 and 68 Groundwater Monitoring Quarterly Assessment, October – December 2013
IV-14	Summary of Constituents Detected above Established MCLs, SWMUs 8/58 and 68 Groundwater Monitoring Quarterly Assessments through December 2013
IV-15	Summary of Duplicate Samples, SWMUs 8/58 and 68 Groundwater Monitoring Quarterly Assessment, October – December 2013

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, OCTOBER – DECEMBER 2013

1.0 Introduction

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

This is the ninth 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 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 Fourth Quarter, Calendar Year (CY) 2013 reporting period (October – December 2013).

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

Monitoring wells CCBA-MW1 and CCBA-MW2 were sampled on October 10 and October 14, 2013, respectively. The samples were analyzed for the required constituents, consisting of volatile organic compounds (VOCs), semivolatile organic compounds (SVOCs), high explosive (HE) compounds, nitrate plus nitrite (NPN), major anions (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, gross alpha/beta activity, and isotopic uranium.

Monitoring wells OBS-MW1, OBS-MW2, and OBS-MW3 were sampled from October 7 to October 9, 2013. 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 concentrations of 4.93 mg/L. Fluoride in both the CCBA-MW2 groundwater and groundwater duplicate samples were above the method detection limit (MDL) with a value of 1.52 mg/L.

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 Fourth Quarter, CY 2013.

2.1 **Equipment Decontamination**

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

2.2 **Well Evacuation**

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

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™ Model 6920 water quality meter. Turbidity was measured with a HACH™ Model 2100P turbidity meter. Purging continued until four stable measurements for turbidity, pH, temperature, and SC were obtained.

Groundwater stability is considered acceptable when the following parameters are achieved:

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

Table IV-3 summarizes the temperature, pH, SC, and turbidity measurements, which are discussed in Section IV.3.1. Field Measurement Logs 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 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 3.35 mg/L in the CCBA-MW2 groundwater 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 1.85 mg/L in both the OBS-MW1 groundwater and groundwater samples.

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 a concentration of 4.93 mg/L. This 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 both the CCBA-MW2 groundwater and groundwater duplicate sample was reported at a concentration of 1.52 mg/L. No other anions or total

cyanide were detected above established MCLs. There are no established MCLs for bromide, chloride, sulfate, or alkalinity.

SWMU 68, Monitoring Wells OBS-MW1, OBS-MW2, and OBS-MW3. Table IV-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 ($\mu\text{g/L}$) (0.004 mg/L) in any groundwater sample from SWMUs 8/58. Table IV-8 presents perchlorate results.

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

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

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

3.8 **Hexavalent Chromium**

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

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

3.9 **Metals**

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

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

3.10 **Cations**

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

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

3.11 **Gamma Spectroscopy and Radioisotopic Analyses**

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

Gross alpha activity is measured as a screening tool. In accordance with Title 40, Code of Federal Regulations, Parts 9, 141, and 142, Table I-4, gross alpha activity measurements were corrected by subtracting out the uranium activity, which is measured independently (see Table IV-10 and IV-11 for total uranium results).

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 samples 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-MW1 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-MW2 and OBS-MW1. RPD values were calculated only for detected chemical parameters. The work plans for SWMUs 8/58 and 68 do not specify QC acceptance criteria for duplicate groundwater

sample data; however, duplicate sample results show good correlation (RPD values of less than 20 for organic compounds and less than 35 for inorganic analytes) for all calculated parameters.

4.1.2 **Equipment Blank Samples**

A portable Bennett[™] groundwater sampling system was used to collect groundwater samples from all wells. The sampling pump and tubing bundle were decontaminated prior to installation into monitoring wells according to procedures described in SNL/NM FOP 05-03 “Groundwater Monitoring Equipment Decontamination” (SNL/NM January 2012a). In accordance with SNL/NM FOP 05-03, the following solutions were pumped through the sampling system: 5 gallons of deionized (DI) water mixed with 20 milliliters (mL) nonphosphate laboratory detergent, 5 gallons of DI water, 5 gallons of DI water mixed with 20 mL reagent-grade nitric acid, and 15 gallons of DI water. In addition, the outside of the pump tubing was rinsed with DI water. EB samples are collected to verify the effectiveness of the equipment decontamination process. EB samples were collected prior to sampling monitoring wells CCBA-MW2 and OBS-MW1 and were submitted for all analyses.

SWMUs 8/58, Monitoring Well CCBA-MW1. Alkalinity, barium, bromodichloromethane, chloroform, dibromochloromethane, and trichloroethene were detected above the laboratory MDLs. 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.

SWMU 68, Monitoring Well OBS-MW3. Acetone, barium, chloroform, copper, dibromochloromethane, and zinc were detected above laboratory MDLs. No corrective action was necessary since these compounds were not detected in groundwater samples or detected in groundwater samples at concentrations greater than five times the EB result, except for copper and zinc. Copper and zinc were detected in the EB sample at concentrations similar to values reported for the associated groundwater samples. Therefore, copper and zinc were qualified as not detected during data validation in OBS-MW1 groundwater samples.

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. TB samples consist of laboratory reagent-grade water with hydrochloric acid

preservative contained in 40-mL volatile organic analysis vials prepared by the analytical laboratory, which accompany the empty sample containers supplied by the laboratory. TBs were brought to the field and accompanied each sample shipment.

SWMUs 8/58. A total of three trip blanks were submitted with the October 2013 samples. No VOCs were detected above associated laboratory MDLs.

SWMU 68. A total of four trip blanks were submitted with the October 2013 samples. No VOCs were detected above associated laboratory MDLs.

4.1.4 **Field Blank Samples**

FB samples were collected for VOC analysis to assess whether contamination of the samples resulted from ambient field conditions. FB samples are prepared by pouring DI water into sample containers at the sampling point (monitoring wells CCBA-MW1 and OBS-MW3) to simulate the transfer of groundwater samples from the sampling system to the sample container.

SWMUs 8/58, Monitoring Well CCBA-MW1. The VOCs acetone, bromodichloromethane, chloroform, and dibromochloromethane were detected above laboratory MDLs. Acetone is a common laboratory contaminant (SNL/NM August 2010) that has not been detected consistently. Bromodichloromethane, chloroform, and dibromochloromethane are common by products 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 VOC chloroform was detected above laboratory MDLs and is a common by product of the water deionization process. No corrective action was necessary, 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. No significant data quality problems were noted. The data validation sample findings summary sheets are provided in Appendix C.

4.3 **Variations and Nonconformances**

No variations or nonconformances from requirements in the Groundwater Characterization Work Plan for SWMU 8/58 (SNL/NM September 2010) occurred during the October 2013 sampling activities.

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

5.0 **Summary**

During the Fourth Quarter of CY 2013, 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 4.93 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

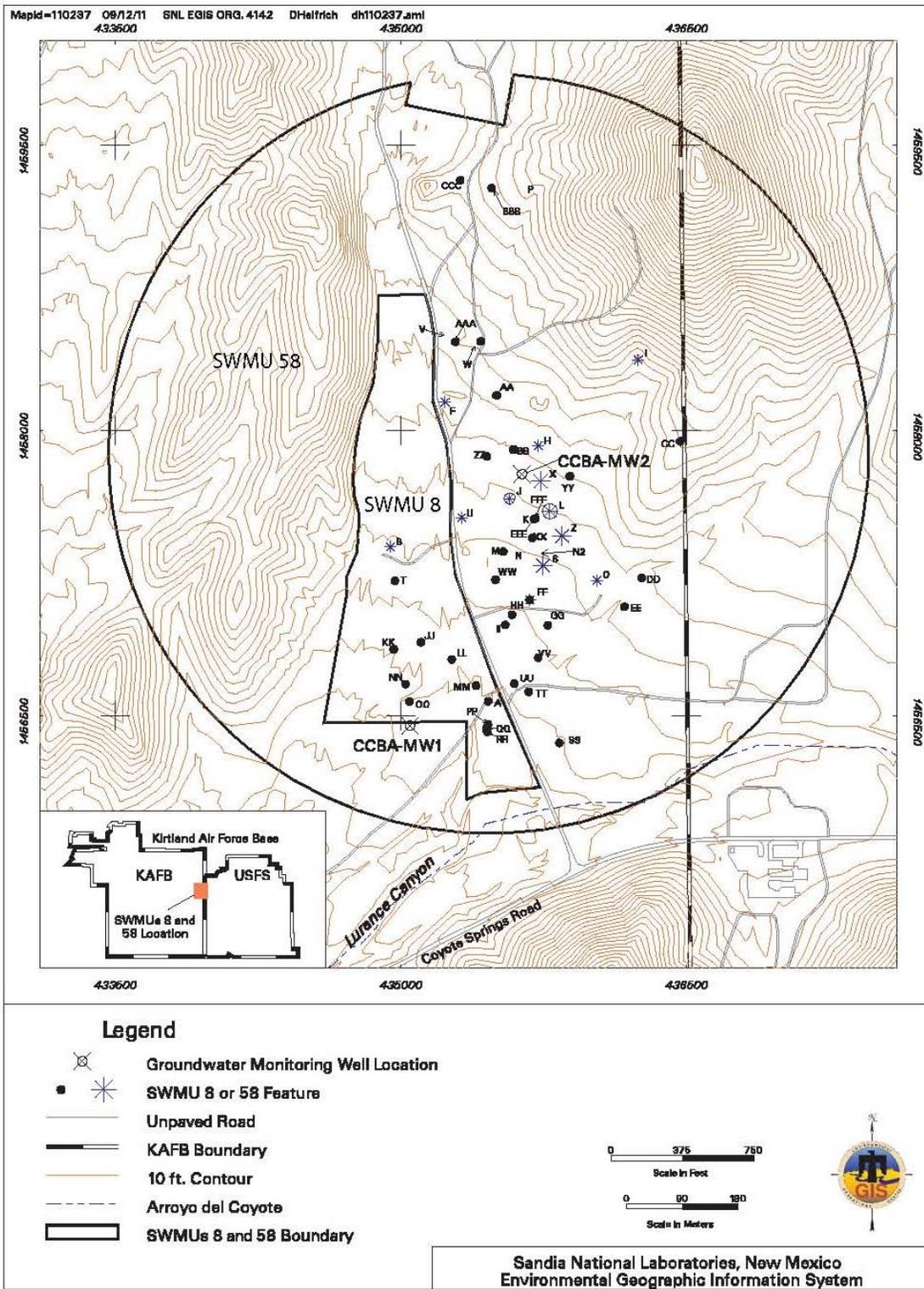


Figure IV-1

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

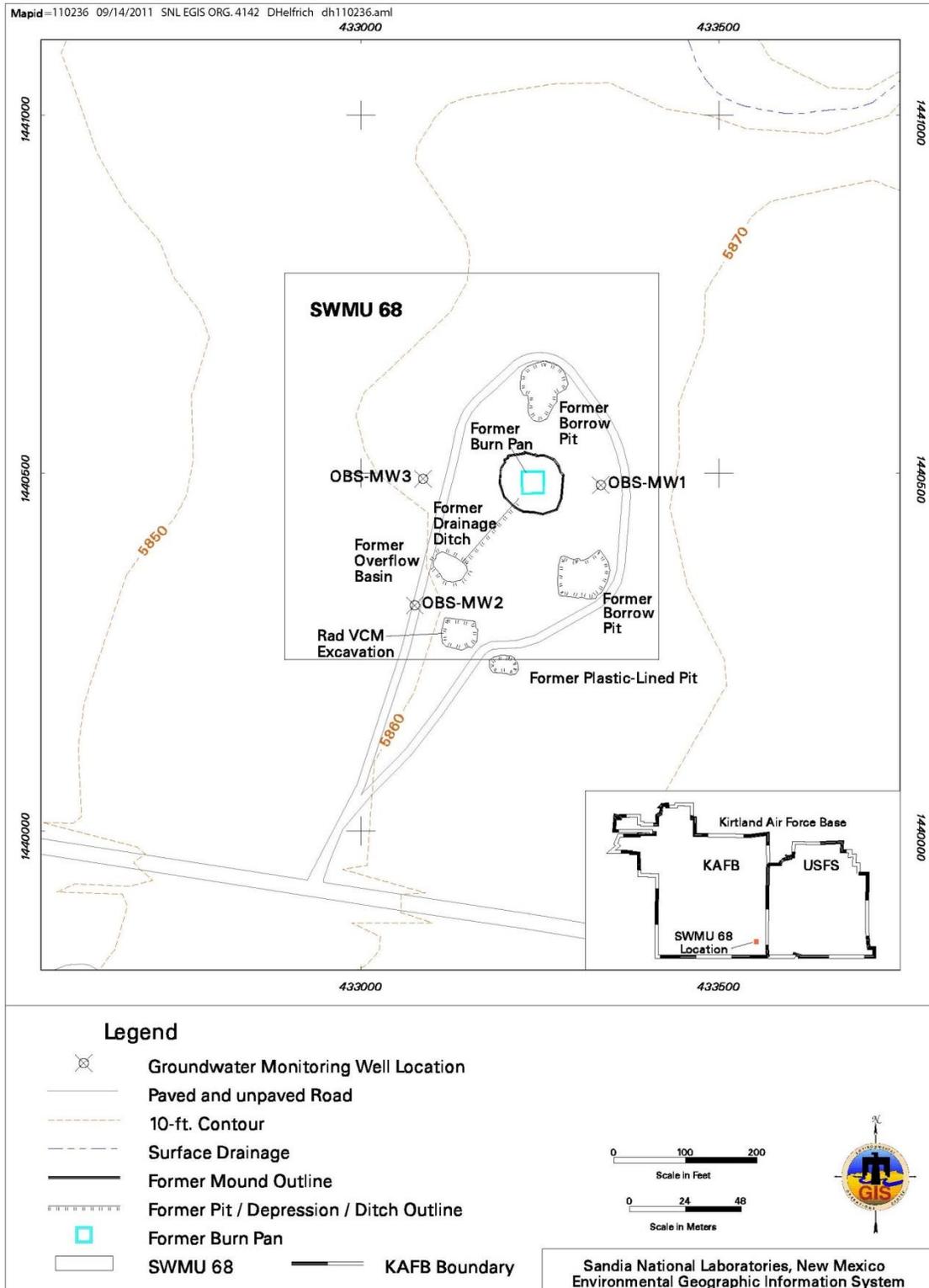


Figure IV-2

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^a	Volume and Container Type/ Preservation Requirements
Volatile Organic Compounds	EPA 8260B	3 x 40-mL glass, HCL, 4°C
Semivolatile Organic Compounds	EPA 8270C	3 x 1-L Amber Glass, 4°C
High Explosives	EPA 8321A	4 x 1-L Amber Glass, 4°C
Metals ^b	EPA 6010/6020/7470	1 x 500-mL polyethylene, HNO ₃ , 4°C
Hexavalent Chromium	EPA 7196A	1 x 250-mL polyethylene, 4°C
Perchlorate	EPA 314.0	1 x 250-mL polyethylene, 4°C
Major Anions and Cations ^c	EPA 6020/9056	1 x 500-mL polyethylene, 4°C
Alkalinity as Total, Carbonate, and Bicarbonate	SM 2320B	1 x 500-mL polyethylene, 4°C
Total Cyanide	EPA 9012	1 x 250-mL polyethylene, NaOH, 4°C
Nitrate plus Nitrite as Nitrogen	EPA 353.2	1 x 250-mL polyethylene, H ₂ SO ₄ , 4°C
Gross Alpha/Beta	EPA 900.0	1 x 1-L polyethylene, HNO ₃ , 4°C
Gamma Spectroscopy ^d	EPA 901.1	1 x 1-L polyethylene, HNO ₃ , 4°C
Isotopic Uranium	HASL-300	1 x 1-L polyethylene, HNO ₃ , 4°C

Notes

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

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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.

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

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

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

°C = Degrees Celsius.

EPA = U.S. Environmental Protection Agency.

H₂SO₄ = Sulfuric acid.

HASL = Health and Safety Laboratory.

HCL = Hydrochloric acid.

HNO₃ = Nitric acid.

L = Liter.

mL = Milliliter(s).

NaOH = Sodium Hydroxide.

SM = Standard Method.

SWMU = Solid Waste Management Unit.

TAL = Target Analyte List.

Table IV-2
Sample Details for Fourth Quarter, CY 2013 Groundwater Sampling
SWMUs 8/58 and 68 Groundwater Monitoring Quarterly Assessment
October – December 2013

Well	Sample Identification	AR/COC Number	Associated Groundwater Investigation
CCBA-MW1	094774	615093	SWMUs 8/58
CCBA-MW2	094779	615095	
CCBA-MW2 (duplicate)	094780		
OBS-MW1	094767	615091	SWMU 68
OBS-MW1 (duplicate)	094768		
OBS-MW2	094762	615089	
OBS-MW3	094771	615092	

Notes

AR/COC = Analysis Request/Chain-of-Custody.
 CCBA = Coyote Canyon Blast Area.
 CY = Calendar Year.
 MW = Monitoring well.
 OBS = Old Burn Site.
 SWMU = Solid Waste Management Unit.

Table IV-3
Summary of Field Water Quality Measurements^a
SWMUs 8/58 and 68 Groundwater Monitoring
Quarterly Assessment, October – December 2013

Well	Sample Date	Temperature (°C)	Specific Conductivity (µmhos/cm)	Oxidation Reduction Potential (mV)	pH	Turbidity (NTU)	Dissolved Oxygen (% Sat)	Dissolved Oxygen (mg/L)
SWMUs 8/58								
CCBA-MW1	10-Oct-13	16.83	579	171.7	6.61	0.56	33.7	3.26
CCBA-MW2	14-Oct-13	16.82	670	160.0	7.54	0.42	65.3	6.32
SWMU 68								
OBS-MW1	08-Oct-13	16.77	592	166.1	7.46	0.55	38.8	3.74
OBS-MW2	07-Oct-13	18.12	588	175.1	7.29	0.43	36.5	3.44
OBS-MW3	09-Oct-13	17.37	587	159.2	7.43	0.47	47.8	4.58

Notes

^aField measurements collected prior to sampling.

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

Table IV-4
Method Detection Limits for Volatile and Semivolatile Organic Compounds
SWMUs 8/58 and 68 Groundwater Monitoring
Quarterly Assessment, October – December 2013

SWMU 8/58					
Analyte	MDL (µg/L)	Analytical Method ^a	Analyte	MDL (µg/L)	Analytical Method ^a
1,1,1-Trichloroethane	0.300	EPA 8260B	Chlorobenzene	0.300	EPA 8260B
1,1,1,2-Tetrachloroethane	0.300	EPA 8260B	Chloroethane	0.300	EPA 8260B
1,1,1,2-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, October – December 2013

SWMU 8/58					
Analyte	MDL (µg/L)	Analytical Method ^a	Analyte	MDL (µg/L)	Analytical Method ^a
1'-Biphenyl 1	3.00 – 3.16	EPA 8270C	Butylbenzyl phthalate	3.00 – 3.16	EPA 8270C
1,2,4-Trichlorobenzene	3.00 – 3.16	EPA 8270C	Caprolactam	3.00 – 3.16	EPA 8270C
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	Nitro-benzene	3.00 – 3.16	EPA 8270C
4-Nitrophenol	3.00 – 3.16	EPA 8270C	Pentachlorophenol	3.00 – 3.16	EPA 8270C
Acenaphthene	0.300 – 0.316	EPA 8270C	Phenanthrene	0.300 – 0.316	EPA 8270C
Acenaphthylene	0.300 – 0.316	EPA 8270C	Phenol	3.00 – 3.16	EPA 8270C
Acetophenone	3.00 – 3.16	EPA 8270C	Pyrene	0.300 – 0.316	EPA 8270C
Anthracene	0.300 – 0.316	EPA 8270C	bis(2-Chloroethoxy)methane	3.00 – 3.16	EPA 8270C
Atrazine	3.00 – 3.16	EPA 8270C	bis(2-Chloroethyl)ether	3.00 – 3.16	EPA 8270C
Benzaldehyde	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, October – December 2013

SWMU 68					
Analyte	MDL (µg/L)	Analytical Method ^a	Analyte	MDL (µg/L)	Analytical Method ^a
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, October – December 2013

SWMU 68					
Analyte	MDL (µg/L)	Analytical Method ^a	Analyte	MDL (µg/L)	Analytical Method ^a
1'-Biphenyl 1	3.00 – 3.06	EPA 8270C	Butylbenzyl phthalate	3.00 – 3.06	EPA 8270C
1,2,4-Trichlorobenzene	3.00 – 3.06	EPA 8270C	Caprolactam	3.00 – 3.06	EPA 8270C
2,4,5-Trichlorophenol	3.00 – 3.06	EPA 8270C	Carbazole	0.300 – 0.306	EPA 8270C
1,4-Dioxane	3.00 – 3.06	EPA 8270C	Chrysene	0.300 – 0.306	EPA 8270C
2,4,6-Trichlorophenol	3.00 – 3.06	EPA 8270C	Di-n-butyl phthalate	3.00 – 3.06	EPA 8270C
2,4-Dichlorophenol	3.00 – 3.06	EPA 8270C	Di-n-octyl phthalate	3.00 – 3.06	EPA 8270C
2,4-Dimethylphenol	3.00 – 3.06	EPA 8270C	Dibenz[a,h]anthracene	0.300 – 0.306	EPA 8270C
2,4-Dinitrophenol	5.00 – 5.10	EPA 8270C	Dibenzofuran	3.00 – 3.06	EPA 8270C
2,4-Dinitrotoluene	3.00 – 3.06	EPA 8270C	Diethylphthalate	3.00 – 3.06	EPA 8270C
2,6-Dinitrotoluene	3.00 – 3.06	EPA 8270C	Dimethylphthalate	3.00 – 3.06	EPA 8270C
2-Chloronaphthalene	0.410 – 0.418	EPA 8270C	Dinitro-o-cresol	3.00 – 3.06	EPA 8270C
2-Chlorophenol	3.00 – 3.06	EPA 8270C	Diphenyl amine	3.00 – 3.06	EPA 8270C
2-Methylnaphthalene	0.300 – 0.306	EPA 8270C	Fluoranthene	0.300 – 0.306	EPA 8270C
2-Nitroaniline	3.00 – 3.06	EPA 8270C	Fluorene	0.300 – 0.306	EPA 8270C
2-Nitrophenol	3.00 – 3.06	EPA 8270C	Hexachlorobenzene	3.00 – 3.06	EPA 8270C
3,3'-Dichlorobenzidine	3.00 – 3.06	EPA 8270C	Hexachlorobutadiene	3.00 – 3.06	EPA 8270C
3-Nitroaniline	3.00 – 3.06	EPA 8270C	Hexachlorocyclopentadiene	3.00 – 3.06	EPA 8270C
4-Bromophenyl phenyl ether	3.00 – 3.06	EPA 8270C	Hexachloroethane	3.00 – 3.06	EPA 8270C
4-Chloro-3-methylphenol	3.00 – 3.06	EPA 8270C	Indeno(1,2,3-c,d)pyrene	0.300 – 0.306	EPA 8270C
4-Chlorobenzenamine	3.30 – 3.37	EPA 8270C	Isophorone	3.50 – 3.57	EPA 8270C
4-Chlorophenyl phenyl ether	3.00 – 3.06	EPA 8270C	Naphthalene	0.300 – 0.306	EPA 8270C
4-Nitroaniline	3.00 – 3.06	EPA 8270C	Nitro-benzene	3.00 – 3.06	EPA 8270C
4-Nitrophenol	3.00 – 3.06	EPA 8270C	Pentachlorophenol	3.00 – 3.06	EPA 8270C
Acenaphthene	0.300 – 0.306	EPA 8270C	Phenanthrene	0.300 – 0.306	EPA 8270C
Acenaphthylene	0.300 – 0.306	EPA 8270C	Phenol	3.00 – 3.06	EPA 8270C
Acetophenone	3.00 – 3.06	EPA 8270C	Pyrene	0.300 – 0.306	EPA 8270C
Anthracene	0.300 – 0.306	EPA 8270C	bis(2-Chloroethoxy)methane	3.00 – 3.06	EPA 8270C
Atrazine	3.00 – 3.06	EPA 8270C	bis(2-Chloroethyl)ether	3.00 – 3.06	EPA 8270C
Benzaldehyde	3.00 – 3.06	EPA 8270C	bis(2-Chloroisopropyl)ether	3.00 – 3.06	EPA 8270C
Benzo(a)anthracene	0.300 – 0.306	EPA 8270C	bis(2-Ethylhexyl)phthalate	3.00 – 3.06	EPA 8270C
Benzo(a)pyrene	0.300 – 0.306	EPA 8270C	m,p-Cresol	3.70 – 3.78	EPA 8270C
Benzo(b)fluoranthene	0.300 – 0.306	EPA 8270C	n-Nitrosodipropylamine	3.00 – 3.06	EPA 8270C
Benzo(ghi)perylene	0.300 – 0.306	EPA 8270C	o-Cresol	3.00 – 3.06	EPA 8270C
Benzo(k)fluoranthene	0.300 – 0.306	EPA 8270C			

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

Notes

^a 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 = Micrograms per liter.

EPA = U.S. Environmental Protection Agency.

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

SWMU = Solid Waste Management Unit.

Table IV-5
Method Detection Limits for High Explosive Compounds (EPA Method 8321A)
SWMUs 8/58 and 68 Groundwater Monitoring
Quarterly Assessment, October – December 2013

Analyte	MDL (µg/L)	
	SWMUs 8/58	SWMU 68
1,3,5-Trinitrobenzene	0.0829 – 0.0860	0.0812 – 0.0851
1,3-Dinitrobenzene	0.0829 – 0.0860	0.0812 – 0.0851
2,4,6-Trinitrotoluene	0.0829 – 0.0860	0.0812 – 0.0851
2,4-Dinitrotoluene	0.0829 – 0.0860	0.0812 – 0.0851
2,6-Dinitrotoluene	0.0829 – 0.0860	0.0812 – 0.0851
2-Amino-4,6-dinitrotoluene	0.0829 – 0.0860	0.0812 – 0.0851
2-Nitrotoluene	0.0859 – 0.0882	0.0832 – 0.0872
3-Nitrotoluene	0.0829 – 0.0860	0.0812 – 0.0851
4-Amino-2,6-dinitrotoluene	0.0829 – 0.0860	0.0812 – 0.0851
4-Nitrotoluene	0.155 – 0.161	0.152 – 0.160
HMX	0.0829 – 0.0860	0.0812 – 0.0851
Nitro-benzene	0.0829 – 0.0860	0.0812 – 0.0851
Pentaerythritol tetranitrate	0.104 – 0.108	0.102 – 0.106
RDX	0.0829 – 0.0860	0.0812 – 0.0851
Tetryl	0.0829 – 0.0860	0.0812 – 0.0851

Notes

- µg/L = Micrograms per liter.
- EPA = U.S. Environmental Protection Agency.
- HMX = Tetrahexamine tetranitramine.
- MDL = Method detection limit. The minimum concentration that can be measured and reported with 99% confidence that the analyte is greater than zero; analyte is matrix-specific.
- RDX = Hexahydro-1,3,5-trinitro-1,3,5-triazine.
- SWMU = Solid Waste Management Unit.
- Tetryl = 2,4,6-trinitrophenylmethylnitramine.

Table IV-6
Summary of Nitrate Plus Nitrite Results
SWMUs 8/58 and 68 Groundwater Monitoring
Quarterly Assessment, October – December 2013

Well	Analyte	Result (mg/L)	MDL (mg/L)	PQL (mg/L)	MCL (mg/L)	Laboratory Qualifier ^a	Validation Qualifier ^b	Sample Number	Analytical Method ^c
SWMUs 8/58									
CCBA-MW1 10-Oct-13	Nitrate plus nitrite as N	1.70	0.170	0.500	10.0			094774-018	EPA 353.2
CCBA-MW2 14-Oct-13	Nitrate plus nitrite as N	3.35	0.170	0.500	10.0			094779-018	EPA 353.2
CCBA-MW2 (Duplicate) 14-Oct-13	Nitrate plus nitrite as N	3.31	0.170	0.500	10.0			094780-018	EPA 353.2
SWMU 68									
OBS-MW1 08-Oct-13	Nitrate plus nitrite as N	1.85	0.170	0.500	10.0			094767-018	EPA 353.2
OBS-MW1 (Duplicate) 08-Oct-13	Nitrate plus nitrite as N	1.85	0.170	0.500	10.0			094768-018	EPA 353.2
OBS-MW2 07-Oct-13	Nitrate plus nitrite as N	1.59	0.170	0.500	10.0			094762-018	EPA 353.2
OBS-MW3 09-Oct-13	Nitrate plus nitrite as N	1.80	0.170	0.500	10.0			094771-018	EPA 353.2

Notes

^a**Laboratory Qualifier**

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

^b**Validation Qualifier**

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

^c**Analytical Method**

U.S. Environmental Protection Agency, 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.

Table IV-6 (Concluded)
Summary of Nitrate Plus Nitrite Results
SWMUs 8/58 and 68 Groundwater Monitoring
Quarterly Assessment, October – December 2013

Notes (continued)

- CCBA = Coyote Canyon Blast Area.
EPA = U.S. Environmental Protection Agency.
MCL = Maximum contaminant level. Established by the EPA Primary Water Regulations (40 Code of Federal Regulations 141.11, Subpart B), National Primary Drinking Water Standards (EPA, 2009).
MDL = Method detection limit. The minimum concentration that can be measured and reported with 99% confidence that the analyte is greater than zero; analyte is matrix-specific.
mg/L = Milligrams per liter.
MW = Monitoring well.
N = Nitrogen.
OBS = Old Burn Site.
PQL = Practical quantitation limit. The lowest concentration of analytes in a sample that can be reliably determined within specified limits of precision and accuracy by that indicated method under routine laboratory operating conditions.
SWMU = Solid Waste Management Unit.

Table IV-7
Summary of Alkalinity, Anion, and Total Cyanide Results
SWMUs 8/58 and 68 Groundwater Monitoring
Quarterly Assessment, October – December 2013

Well	Analyte	Result (mg/L)	MDL (mg/L)	PQL (mg/L)	MCL (mg/L)	Laboratory Qualifier ^a	Validation Qualifier ^b	Sample Number	Analytical Method ^c
SWMUs 8/58									
CCBA-MW1 10-Oct-13	Bicarbonate Alkalinity	182	0.725	1.00	NE			094774-022	SM 2320B
	Carbonate Alkalinity	ND	0.725	1.00	NE	U		094774-022	SM 2320B
	Bromide	0.347	0.067	0.200	NE			094774-016	EPA 9056
	Chloride	29.3	0.335	1.00	NE			094774-016	EPA 9056
	Fluoride	4.93	0.066	0.200	4.0			094774-016	EPA 9056
	Sulfate	57.9	0.665	2.00	NE			094774-016	EPA 9056
	Total Cyanide	ND	0.00167	0.005	0.200	U	UJ	094774-027	EPA 9012
CCBA-MW2 14-Oct-13	Bicarbonate Alkalinity	181	0.725	1.00	NE	B		094779-022	SM 2320B
	Carbonate Alkalinity	ND	0.725	1.00	NE	U		094779-022	SM 2320B
	Bromide	0.559	0.067	0.200	NE			094779-016	EPA 9056
	Chloride	36.9	0.670	2.00	NE			094779-016	EPA 9056
	Fluoride	1.52	0.033	0.100	4.0			094779-016	EPA 9056
	Sulfate	94.7	1.33	4.00	NE			094779-016	EPA 9056
	Total Cyanide	ND	0.00167	0.005	0.200	U	UJ	094779-027	EPA 9012
CCBA-MW2 (Duplicate) 14-Oct-13	Bicarbonate Alkalinity	181	0.725	1.00	NE	B		094780-022	SM 2320B
	Carbonate Alkalinity	ND	0.725	1.00	NE	U		094780-022	SM 2320B
	Bromide	0.560	0.067	0.200	NE			094780-016	EPA 9056
	Chloride	37.1	0.670	2.00	NE			094780-016	EPA 9056
	Fluoride	1.52	0.033	0.100	4.0			094780-016	EPA 9056
	Sulfate	96.3	1.33	4.00	NE			094780-016	EPA 9056
	Total Cyanide	ND	0.00167	0.005	0.200	U	UJ	094780-027	EPA 9012

Table IV-7 (Continued)
Summary of Alkalinity, Anion, and Total Cyanide Results
SWMUs 8/58 and 68 Groundwater Monitoring
Quarterly Assessment, October – December 2013

Well	Analyte	Result (mg/L)	MDL (mg/L)	PQL (mg/L)	MCL (mg/L)	Laboratory Qualifier ^a	Validation Qualifier ^b	Sample Number	Analytical Method ^c
SWMU 68									
OBS-MW1 08-Oct-13	Bicarbonate Alkalinity	181	0.725	1.00	NE			094767-022	SM 2320B
	Carbonate Alkalinity	ND	0.725	1.00	NE	U		094767-022	SM 2320B
	Bromide	0.373	0.067	0.200	NE			094767-016	EPA 9056
	Chloride	24.0	0.670	2.00	NE			094767-016	EPA 9056
	Fluoride	2.17	0.033	0.100	4.00			094767-016	EPA 9056
	Sulfate	82.0	1.33	4.00	NE			094767-016	EPA 9056
	Total Cyanide	ND	0.00167	0.005	0.200	U	UJ	094767-027	EPA 9012
OBS-MW1 (Duplicate) 08-Oct-13	Bicarbonate Alkalinity	185	0.725	1.00	NE			094768-022	SM 2320B
	Carbonate Alkalinity	ND	0.725	1.00	NE	U		094768-022	SM 2320B
	Bromide	0.395	0.067	0.200	NE			094768-016	EPA 9056
	Chloride	23.9	0.670	2.00	NE			094768-016	EPA 9056
	Fluoride	2.18	0.033	0.000	4.00			094768-016	EPA 9056
	Sulfate	81.3	1.33	4.00	NE			094768-016	EPA 9056
	Total Cyanide	ND	0.00167	0.005	0.200	U	UJ	094768-027	EPA 9056
OBS-MW2 07-Oct-13	Bicarbonate Alkalinity	172	0.725	1.00	NE			094762-022	SM 2320B
	Carbonate Alkalinity	ND	0.725	1.00	NE	U		094762-022	SM 2320B
	Bromide	0.388	0.067	0.200	NE			094762-016	EPA 9056
	Chloride	22.3	0.670	2.00	NE			094762-016	EPA 9056
	Fluoride	2.30	0.033	0.100	4.00			094762-016	EPA 9056
	Sulfate	83.6	1.33	4.00	NE			094762-016	EPA 9056
	Total Cyanide	ND	0.00167	0.005	0.200	U	UJ	094762-027	EPA 9012
OBS-MW3 09-Oct-13	Bicarbonate Alkalinity	176	0.725	1.00	NE			094771-022	SM 2320B
	Carbonate Alkalinity	ND	0.725	1.00	NE	U		094771-022	SM 2320B
	Bromide	0.370	0.067	0.200	NE			094771-016	EPA 9056
	Chloride	22.8	0.670	2.00	NE			094771-016	EPA 9056
	Fluoride	2.33	0.033	0.100	4.00			094771-016	EPA 9056
	Sulfate	84.2	1.33	4.00	NE			094771-016	EPA 9056
	Total Cyanide	ND	0.00167	0.005	0.200	U	UJ	094771-027	EPA 9012

Table IV-7 (Concluded)
Summary of Alkalinity, Anion, and Total Cyanide Results
SWMUs 8/58 and 68 Groundwater Monitoring
Quarterly Assessment, October – December 2013

Notes

^aLaboratory Qualifier

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

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

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

^bValidation Qualifier

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

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

^cAnalytical 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, 3rd 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, October – December 2013

Well	Result (mg/L)	MDL (mg/L)	PQL (mg/L)	MCL (mg/L)	Laboratory Qualifier ^a	Validation Qualifier ^b	Sample Number	Analytical Method ^c
SWMUs 8/58								
CCBA-MW1 10-Oct-13	ND	0.004	0.012	NE	U		094774-020	EPA 314.0
CCBA-MW2 14-Oct-13	ND	0.004	0.012	NE	U		094779-020	EPA 314.0
CCBA-MW2 (Duplicate) 14-Oct-13	ND	0.004	0.012	NE	U		094780-020	EPA 314.0
SWMU 68								
OBS-MW1 08-Oct-13	ND	0.004	0.012	NE	U		094767-020	EPA 314.0
OBS-MW1 (Duplicate) 08-Oct-13	ND	0.004	0.012	NE	U		094768-020	EPA 314.0
OBS-MW2 07-Oct-13	ND	0.004	0.012	NE	U		094762-020	EPA 314.0
OBS-MW3 09-Oct-13	ND	0.004	0.012	NE	U		094771-020	EPA 314.0

Notes

^a**Laboratory Qualifier**

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

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

^b**Validation Qualifier**

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

^c**Analytical Method**

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

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

Notes (continued)

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

Table IV-9
Summary of Hexavalent Chromium Results
SWMU 68 Groundwater Monitoring
Quarterly Assessment, October – December 2013

Well	Result (mg/L)	MDL (mg/L)	PQL (mg/L)	MCL (mg/L)	Laboratory Qualifier ^a	Validation Qualifier ^b	Sample Number	Analytical Method ^c
OBS-MW1 08-Oct-13	ND	0.0033	0.010	NE	U		094767-014	EPA 7196A
OBS-MW1 (Duplicate) 08-Oct-13	ND	0.0033	0.010	NE	U		094768-014	EPA 7196A
OBS-MW2 07-Oct-13	ND	0.0033	0.010	NE	U		094762-014	EPA 7196A
OBS-MW3 09-Oct-13	ND	0.0033	0.010	NE	U		094771-014	EPA 7196A

Notes

^aLaboratory Qualifier

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

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

^bValidation Qualifier

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

^cAnalytical Method

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

EPA = U.S. Environmental Protection Agency.

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

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

mg/L = Milligrams per liter.

MW = Monitoring well.

ND = Not detected (at MDL).

NE = Not established.

OBS = Old Burn Site.

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

SWMU = Solid Waste Management Unit.

Table IV-10
Summary of Unfiltered Total Metal Results
SWMUs 8/58 Groundwater Monitoring
Quarterly Assessment, October – December 2013

Well	Analyte	Result (mg/L)	MDL (mg/L)	PQL (mg/L)	MCL (mg/L)	Laboratory Qualifier ^a	Validation Qualifier ^b	Sample Number	Analytical Method ^c
CCBA-MW1 10-Oct-13	Aluminum	0.0312	0.015	0.050	NE	J		094774-009	EPA 6020
	Antimony	ND	0.001	0.003	0.006	U		094774-009	EPA 6020
	Arsenic	0.00205	0.0017	0.005	0.010	J		094774-009	EPA 6020
	Barium	0.00268	0.0006	0.002	2.00			094774-009	EPA 6020
	Beryllium	0.000422	0.0002	0.0005	0.004	J		094774-009	EPA 6020
	Cadmium	ND	0.00011	0.001	0.005	U		094774-009	EPA 6020
	Calcium	47.7	0.600	2.00	NE			094774-009	EPA 6020
	Chromium	ND	0.002	0.010	0.100	U		094774-009	EPA 6020
	Cobalt	ND	0.0001	0.001	NE	U		094774-009	EPA 6020
	Copper	0.000668	0.00035	0.001	NE	J		094774-009	EPA 6020
	Iron	0.0619	0.033	0.100	NE	J		094774-009	EPA 6020
	Lead	ND	0.0005	0.002	NE	U		094774-009	EPA 6020
	Magnesium	9.70	0.010	0.030	NE			094774-009	EPA 6020
	Manganese	0.00318	0.001	0.005	NE	J		094774-009	EPA 6020
	Mercury	ND	0.000067	0.0002	0.002	U		094774-009	EPA 7470
	Nickel	0.000974	0.0005	0.002	NE	J		094774-009	EPA 6020
	Potassium	3.97	0.080	0.300	NE			094774-009	EPA 6020
	Selenium	0.00248	0.0015	0.005	0.050	J		094774-009	EPA 6020
	Silver	ND	0.0002	0.001	NE	U		094774-009	EPA 6020
	Sodium	63.0	0.800	2.50	NE			094774-009	EPA 6020
Thallium	ND	0.00045	0.002	0.002	U		094774-009	EPA 6020	
Uranium	0.00203	0.000067	0.0002	0.03			094774-009	EPA 6020	
Vanadium	0.00105	0.001	0.005	NE	J		094774-009	EPA 6010	
Zinc	0.00375	0.0035	0.010	NE	J		094774-009	EPA 6020	

Table IV-10 (Continued)
Summary of Unfiltered Total Metal Results
SWMUs 8/58 Groundwater Monitoring
Quarterly Assessment, October – December 2013

Well	Analyte	Result (mg/L)	MDL (mg/L)	PQL (mg/L)	MCL (mg/L)	Laboratory Qualifier ^a	Validation Qualifier ^b	Sample Number	Analytical Method ^c
CCBA-MW2 14-Oct-13	Aluminum	ND	0.015	0.050	NE	U		094779-009	EPA 6020
	Antimony	ND	0.001	0.003	0.006	U		094779-009	EPA 6020
	Arsenic	0.00246	0.0017	0.005	0.010	J		094779-009	EPA 6020
	Barium	0.0446	0.0006	0.002	2.00			094779-009	EPA 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		094779-009	EPA 6020
	Cadmium	ND	0.00011	0.001	0.005	U		094779-009	EPA 6020
	Calcium	73.8	0.600	2.00	NE			094779-009	EPA 6020
	Chromium	ND	0.002	0.010	0.100	U		094779-009	EPA 6020
	Cobalt	ND	0.0001	0.001	NE	U		094779-009	EPA 6020
	Copper	0.000518	0.00035	0.001	NE	J		094779-009	EPA 6020
	Iron	0.0882	0.033	0.100	NE	J		094779-009	EPA 6020
	Lead	ND	0.0005	0.002	NE	U		094779-009	EPA 6020
	Magnesium	14.4	0.010	0.030	NE			094779-009	EPA 6020
	Manganese	ND	0.001	0.005	NE	U		094779-009	EPA 6020
	Mercury	ND	0.000067	0.0002	0.002	U		094779-009	EPA 7470
	Nickel	0.00104	0.0005	0.002	NE	J		094779-009	EPA 6020
	Potassium	1.18	0.080	0.300	NE			094779-009	EPA 6020
	Selenium	0.00467	0.0015	0.005	0.050	J		094779-009	EPA 6020
	Silver	ND	0.0002	0.001	NE	U		094779-009	EPA 6020
	Sodium	43.6	0.080	0.250	NE			094779-009	EPA 6020
	Thallium	ND	0.00045	0.002	0.002	U		094779-009	EPA 6020
Uranium	0.00486	0.000067	0.0002	0.03			094779-009	EPA 6020	
Vanadium	0.0102	0.001	0.005	NE			094779-009	EPA 6010	
Zinc	ND	0.0035	0.010	NE	U		094779-009	EPA 6020	

Table IV-10 (Continued)
Summary of Unfiltered Total Metal Results
SWMUs 8/58 Groundwater Monitoring
Quarterly Assessment, October – December 2013

Well	Analyte	Result (mg/L)	MDL (mg/L)	PQL (mg/L)	MCL (mg/L)	Laboratory Qualifier ^a	Validation Qualifier ^b	Sample Number	Analytical Method ^c
CCBA-MW2 (Duplicate) 14-Oct-13	Aluminum	ND	0.015	0.050	NE	U		094780-009	EPA 6020
	Antimony	ND	0.001	0.003	0.006	U		094780-009	EPA 6020
	Arsenic	0.00259	0.0017	0.005	0.010	J		094780-009	EPA 6020
	Barium	0.0461	0.0006	0.002	2.00			094780-009	EPA 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		094780-009	EPA 6020
	Cadmium	ND	0.00011	0.001	0.005	U		094780-009	EPA 6020
	Calcium	76.6	0.600	2.00	NE			094780-009	EPA 6020
	Chromium	ND	0.002	0.010	0.100	U		094780-009	EPA 6020
	Cobalt	ND	0.0001	0.001	NE	U		094780-009	EPA 6020
	Copper	0.000721	0.00035	0.001	NE	J		094780-009	EPA 6020
	Iron	0.0953	0.033	0.100	NE	J		094780-009	EPA 6020
	Lead	ND	0.0005	0.002	NE	U		094780-009	EPA 6020
	Magnesium	15.3	0.010	0.030	NE			094780-009	EPA 6020
	Manganese	ND	0.001	0.005	NE	U		094780-009	EPA 6020
	Mercury	ND	0.000067	0.0002	0.002	U		094780-009	EPA 7470
	Nickel	0.00111	0.0005	0.002	NE	J		094780-009	EPA 6020
	Potassium	1.28	0.080	0.300	NE			094780-009	EPA 6020
	Selenium	0.00468	0.0015	0.005	0.050	J		094780-009	EPA 6020
	Silver	ND	0.0002	0.001	NE	U		094780-009	EPA 6020
	Sodium	47.2	0.080	0.250	NE			094780-009	EPA 6020
	Thallium	ND	0.00045	0.002	0.002	U		094780-009	EPA 6020
Uranium	0.00515	0.000067	0.0002	0.03			094780-009	EPA 6020	
Vanadium	0.00983	0.001	0.005	NE			094780-009	EPA 6010	
Zinc	0.00377	0.0035	0.010	NE	J		094780-009	EPA 6020	

Table IV-10 (Concluded)
Summary of Unfiltered Total Metal Results
SWMUs 8/58 Groundwater Monitoring
Quarterly Assessment, October – December 2013

Notes

^aLaboratory Qualifier

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

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

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

^bValidation Qualifier

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

^cAnalytical Method

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

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, October – December 2013

Well	Analyte	Result (mg/L)	MDL (mg/L)	PQL (mg/L)	MCL (mg/L)	Laboratory Qualifier ^a	Validation Qualifier ^b	Sample Number	Analytical Method ^c
OBS-MW1 08-Oct-13	Aluminum	0.0157	0.015	0.050	NE	J		094767-009	EPA 6020
	Antimony	ND	0.001	0.003	0.006	U		094767-009	EPA 6020
	Arsenic	ND	0.0017	0.005	0.010	U		094767-009	EPA 6020
	Barium	0.0183	0.0006	0.002	2.00			094767-009	EPA 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		094767-009	EPA 6020
	Cadmium	ND	0.00011	0.001	0.005	U		094767-009	EPA 6020
	Calcium	80.4	0.600	2.00	NE			094767-009	EPA 6020
	Chromium	ND	0.002	0.010	0.100	U		094767-009	EPA 6020
	Cobalt	ND	0.0001	0.001	NE	U		094767-009	EPA 6020
	Copper	0.000851	0.00035	0.001	NE	J	0.0019U	094767-009	EPA 6020
	Iron	0.112	0.033	0.100	NE			094767-009	EPA 6020
	Lead	ND	0.0005	0.002	NE	U		094767-009	EPA 6020
	Magnesium	16.4	0.010	0.030	NE			094767-009	EPA 6020
	Manganese	0.00202	0.001	0.005	NE	J		094767-009	EPA 6020
	Mercury	ND	0.000067	0.0002	0.002	U	UJ	094767-009	EPA 7470
	Nickel	0.00105	0.0005	0.002	NE	J		094767-009	EPA 6020
	Potassium	1.66	0.080	0.300	NE			094767-009	EPA 6020
	Selenium	0.00372	0.0015	0.005	0.050	J		094767-009	EPA 6020
	Silver	ND	0.0002	0.001	NE	U		094767-009	EPA 6020
	Sodium	22.4	0.080	0.250	NE			094767-009	EPA 6020
	Thallium	ND	0.00045	0.002	0.002	U		094767-009	EPA 6020
Uranium	0.00983	0.000067	0.0002	0.03			094767-009	EPA 6020	
Vanadium	ND	0.001	0.005	NE	U		094767-009	EPA 6010	
Zinc	0.00481	0.0035	0.010	NE	J	0.022U	094767-009	EPA 6020	

Table IV-11 (Continued)
Summary of Unfiltered Total Metal Results
SWMU 68 Groundwater Monitoring
Quarterly Assessment, October – December 2013

Well	Analyte	Result (mg/L)	MDL (mg/L)	PQL (mg/L)	MCL (mg/L)	Laboratory Qualifier ^a	Validation Qualifier ^b	Sample Number	Analytical Method ^c
OBS-MW1 (Duplicate) 08-Oct-13	Aluminum	ND	0.015	0.050	NE	U		094768-009	EPA 6020
	Antimony	ND	0.001	0.003	0.006	U		094768-009	EPA 6020
	Arsenic	ND	0.0017	0.005	0.010	U		094768-009	EPA 6020
	Barium	0.0184	0.0006	0.002	2.00			094768-009	EPA 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		094768-009	EPA 6020
	Cadmium	ND	0.00011	0.001	0.005	U		094768-009	EPA 6020
	Calcium	84.1	0.600	2.00	NE			094768-009	EPA 6020
	Chromium	ND	0.002	0.010	0.100	U		094768-009	EPA 6020
	Cobalt	ND	0.0001	0.001	NE	U		094768-009	EPA 6020
	Copper	0.00199	0.00035	0.001	NE			094768-009	EPA 6020
	Iron	0.103	0.033	0.100	NE			094768-009	EPA 6020
	Lead	ND	0.0005	0.002	NE	U		094768-009	EPA 6020
	Magnesium	15.9	0.010	0.030	NE			094768-009	EPA 6020
	Manganese	0.00201	0.001	0.005	NE	J		094768-009	EPA 6020
	Mercury	ND	0.000067	0.0002	0.002	U	UJ	094768-009	EPA 7470
	Nickel	0.0011	0.0005	0.002	NE	J		094768-009	EPA 6020
	Potassium	1.61	0.080	0.300	NE			094768-009	EPA 6020
	Selenium	0.00351	0.0015	0.005	0.050	J		094768-009	EPA 6020
	Silver	ND	0.0002	0.001	NE	U		094768-009	EPA 6020
	Sodium	21.6	0.080	0.250	NE			094768-009	EPA 6020
	Thallium	ND	0.00045	0.002	0.002	U		094768-009	EPA 6020
	Uranium	0.00994	0.000067	0.0002	0.03			094768-009	EPA 6020
	Vanadium	ND	0.001	0.005	NE	U		094768-009	EPA 6010
Zinc	0.0039	0.0035	0.010	NE	J	0.022U	094768-009	EPA 6020	

Table IV-11 (Continued)
Summary of Unfiltered Total Metal Results
SWMU 68 Groundwater Monitoring
Quarterly Assessment, October – December 2013

Well	Analyte	Result (mg/L)	MDL (mg/L)	PQL (mg/L)	MCL (mg/L)	Laboratory Qualifier ^a	Validation Qualifier ^b	Sample Number	Analytical Method ^c
OBS-MW2 07-Oct-13	Aluminum	ND	0.015	0.050	NE	U		094762-009	EPA 6020
	Antimony	ND	0.001	0.003	0.006	U		094762-009	EPA 6020
	Arsenic	ND	0.0017	0.005	0.010	U		094762-009	EPA 6020
	Barium	0.0199	0.0006	0.002	2.00			094762-009	EPA 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		094762-009	EPA 6020
	Cadmium	ND	0.00011	0.001	0.005	U		094762-009	EPA 6020
	Calcium	76.8	0.300	1.00	NE			094762-009	EPA 6020
	Chromium	ND	0.002	0.010	0.100	U		094762-009	EPA 6020
	Cobalt	ND	0.0001	0.001	NE	U		094762-009	EPA 6020
	Copper	0.000369	0.00035	0.001	NE	J		094762-009	EPA 6020
	Iron	0.104	0.033	0.100	NE			094762-009	EPA 6020
	Lead	ND	0.0005	0.002	NE	U		094762-009	EPA 6020
	Magnesium	16.0	0.010	0.030	NE			094762-009	EPA 6020
	Manganese	ND	0.001	0.005	NE	U		094762-009	EPA 6020
	Mercury	ND	0.000067	0.0002	0.002	U	UJ	094762-009	EPA 7470
	Nickel	0.00119	0.0005	0.002	NE	J		094762-009	EPA 6020
	Potassium	1.60	0.080	0.300	NE			094762-009	EPA 6020
	Selenium	0.00343	0.0015	0.005	0.050	J		094762-009	EPA 6020
	Silver	ND	0.0002	0.001	NE	U		094762-009	EPA 6020
	Sodium	22.0	0.080	0.250	NE			094762-009	EPA 6020
	Thallium	ND	0.00045	0.002	0.002	U		094762-009	EPA 6020
Uranium	0.0135	0.000067	0.0002	0.03			094762-009	EPA 6020	
Vanadium	ND	0.001	0.005	NE	U		094762-009	EPA 6010	
Zinc	ND	0.0035	0.010	NE	U		094762-009	EPA 6020	

Table IV-11 (Continued)
Summary of Unfiltered Total Metal Results
SWMU 68 Groundwater Monitoring
Quarterly Assessment, October – December 2013

Well	Analyte	Result (mg/L)	MDL (mg/L)	PQL (mg/L)	MCL (mg/L)	Laboratory Qualifier ^a	Validation Qualifier ^b	Sample Number	Analytical Method ^c
OBS-MW3 09-Oct-13	Aluminum	ND	0.015	0.050	NE	U		094771-009	EPA 6020
	Antimony	ND	0.001	0.003	0.006	U		094771-009	EPA 6020
	Arsenic	ND	0.0017	0.005	0.010	U		094771-009	EPA 6020
	Barium	0.0269	0.0006	0.002	2.00			094771-009	EPA 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		094771-009	EPA 6020
	Cadmium	ND	0.00011	0.001	0.005	U		094771-009	EPA 6020
	Calcium	80.7	0.600	2.00	NE			094771-009	EPA 6020
	Chromium	ND	0.002	0.010	0.100	U		094771-009	EPA 6020
	Cobalt	ND	0.0001	0.001	NE	U		094771-009	EPA 6020
	Copper	0.000473	0.00035	0.001	NE	J		094771-009	EPA 6020
	Iron	0.113	0.033	0.100	NE			094771-009	EPA 6020
	Lead	ND	0.0005	0.002	NE	U		094771-009	EPA 6020
	Magnesium	16.1	0.010	0.030	NE			094771-009	EPA 6020
	Manganese	ND	0.001	0.005	NE	U		094771-009	EPA 6020
	Mercury	ND	0.000067	0.0002	0.002	U	UJ	094771-009	EPA 7470
	Nickel	0.00116	0.0005	0.002	NE	J		094771-009	EPA 6020
	Potassium	1.64	0.080	0.300	NE			094771-009	EPA 6020
	Selenium	0.00335	0.0015	0.005	0.050	J		094771-009	EPA 6020
	Silver	ND	0.0002	0.001	NE	U		094771-009	EPA 6020
	Sodium	22.6	0.080	0.250	NE			094771-009	EPA 6020
	Thallium	ND	0.00045	0.002	0.002	U		094771-009	EPA 6020
Uranium	0.0121	0.000067	0.0002	0.03			094771-009	EPA 6020	
Vanadium	0.00112	0.001	0.005	NE	J		094771-009	EPA 6010	
Zinc	ND	0.0035	0.010	NE	U		094771-009	EPA 6020	

Table IV-11 (Concluded)
Summary of Unfiltered Total Metal Results
SWMU 68 Groundwater Monitoring
Quarterly Assessment, October – December 2013

Notes

^aLaboratory Qualifier

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

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

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

^bValidation Qualifier

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

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

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

^cAnalytical Method

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

EPA = U.S. Environmental Protection Agency.

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

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

mg/L = Milligrams per liter.

MW = Monitoring well.

ND = Not detected (at MDL).

NE = Not established.

OBS = Old Burn Site.

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

SWMU = Solid Waste Management Unit.

Table IV-12
Summary of Filtered Cation Results
SWMUs 8/58 and 68 Groundwater Monitoring
Quarterly Assessment, October – December 2013

Well	Analyte	Result (mg/L)	MDL (mg/L)	PQL (mg/L)	MCL (mg/L)	Laboratory Qualifier ^a	Validation Qualifier ^b	Sample Number	Analytical Method ^c
SWMUs 8/58									
CCBA-MW1 10-Oct-13	Calcium	46.5	0.600	2.00	NE			094774-017	EPA 6020
	Magnesium	10.2	0.010	0.030	NE			094774-017	EPA 6020
	Potassium	4.25	0.080	0.300	NE			094774-017	EPA 6020
	Sodium	65.6	0.800	2.50	NE			094774-017	EPA 6020
CCBA-MW2 14-Oct-13	Calcium	77.0	0.600	2.00	NE			094779-017	EPA 6020
	Magnesium	15.1	0.010	0.030	NE			094779-017	EPA 6020
	Potassium	1.27	0.080	0.300	NE			094779-017	EPA 6020
	Sodium	45.7	0.080	0.250	NE			094779-017	EPA 6020
CCBA-MW2 (Duplicate) 14-Oct-13	Calcium	74.0	0.600	2.00	NE			094780-017	EPA 6020
	Magnesium	14.1	0.010	0.030	NE			094780-017	EPA 6020
	Potassium	1.16	0.080	0.300	NE			094780-017	EPA 6020
	Sodium	42.2	0.080	0.250	NE			094780-017	EPA 6020
SWMU 68									
OBS-MW1 08-Oct-13	Calcium	79.2	0.600	2.00	NE			094767-017	EPA 6020
	Magnesium	16.0	0.010	0.030	NE			094767-017	EPA 6020
	Potassium	1.65	0.080	0.300	NE			094767-017	EPA 6020
	Sodium	21.9	0.080	0.250	NE			094767-017	EPA 6020
OBS-MW1 (Duplicate) 08-Oct-13	Calcium	75.7	0.600	2.00	NE			094768-017	EPA 6020
	Magnesium	14.9	0.010	0.030	NE			094768-017	EPA 6020
	Potassium	1.52	0.080	0.300	NE			094768-017	EPA 6020
	Sodium	20.3	0.080	0.250	NE			094768-017	EPA 6020
OBS-MW2 07-Oct-13	Calcium	78.5	0.600	2.00	NE			094762-017	EPA 6020
	Magnesium	15.8	0.010	0.030	NE			094762-017	EPA 6020
	Potassium	1.55	0.080	0.300	NE			094762-017	EPA 6020
	Sodium	21.6	0.080	0.250	NE			094762-017	EPA 6020
OBS-MW3 09-Oct-13	Calcium	75.0	0.600	2.00	NE			094771-017	EPA 6020
	Magnesium	15.6	0.010	0.030	NE			094771-017	EPA 6020
	Potassium	1.57	0.080	0.300	NE			094771-017	EPA 6020
	Sodium	21.6	0.080	0.250	NE			094771-017	EPA 6020

Table IV-12 (Concluded)
Summary of Filtered Cation Results
SWMUs 8/58 and 68 Groundwater Monitoring
Quarterly Assessment, October – December 2013

Notes

^aLaboratory Qualifier

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

^bValidation Qualifier

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

^cAnalytical Method

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

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, October – December 2013

Well	Analyte	Activity ^a (pCi/L)	MDA (pCi/L)	Critical Level ^b (pCi/L)	MCL	Laboratory Qualifier ^c	Validation Qualifier ^d	Sample Number	Analytical Method ^e
SWMUs 8/58									
CCBA-MW1 10-Oct-13	Americium-241	7.67 ± 12.8	19.5	9.54	NE	U	BD	094774-033	EPA 901.1
	Cesium-137	0.377 ± 3.88	4.06	1.95	NE	U	BD	094774-033	EPA 901.1
	Cobalt-60	-1.7 ± 2.51	4.08	1.91	NE	U	BD	094774-033	EPA 901.1
	Potassium-40	1.15 ± 40.9	56.1	26.8	NE	U	BD	094774-033	EPA 901.1
	Gross Alpha	1.98	NA	NA	15 pCi/L	NA	None	094774-034	EPA 900.0
	Gross Beta	5.38 ± 1.56	1.98	0.965	4mrem/yr		J	094774-034	EPA 900.0
	Uranium-233/234	2.04 ± 0.334	0.125	0.0554	NE			094774-035	HASL-300
	Uranium-235/236	0.00 ± 0.0404	0.0598	0.0211	NE	U	BD	094774-035	HASL-300
	Uranium-238	0.637 ± 0.146	0.105	0.0451	NE			094774-035	HASL-300
CCBA-MW2 14-Oct-13	Americium-241	5.75 ± 16.8	25.7	12.6	NE	U	BD	094779-033	EPA 901.1
	Cesium-137	0.515 ± 1.73	3.11	1.49	NE	U	BD	094779-033	EPA 901.1
	Cobalt-60	0.0218 ± 1.67	2.94	1.37	NE	U	BD	094779-033	EPA 901.1
	Potassium-40	26.7 ± 39.7	29.2	13.6	NE	U	BD	094779-033	EPA 901.1
	Gross Alpha	-0.55	NA	NA	15 pCi/L	NA	None	094779-034	EPA 900.0
	Gross Beta	3.69 ± 1.31	1.82	0.890	4mrem/yr		J	094779-034	EPA 900.0
	Uranium-233/234	7.82 ± 1.03	0.0787	0.0349	NE			094779-035	HASL-300
	Uranium-235/236	0.127 ± 0.0526	0.0376	0.0133	NE			094779-035	HASL-300
	Uranium-238	1.62 ± 0.249	0.0658	0.0284	NE			094779-035	HASL-300
CCBA-MW2 (Duplicate) 14-Oct-13	Americium-241	4.39 ± 11.7	18.5	9.05	NE	U	BD	094780-033	EPA 901.1
	Cesium-137	0.835 ± 1.74	2.96	1.42	NE	U	BD	094780-033	EPA 901.1
	Cobalt-60	2.17 ± 2.04	3.49	1.65	NE	U	BD	094780-033	EPA 901.1
	Potassium-40	-15.2 ± 38.3	43.6	20.9	NE	U	BD	094780-033	EPA 901.1
	Gross Alpha	2.82	NA	NA	15 pCi/L	NA	None	094780-034	EPA 900.0
	Gross Beta	2.87 ± 1.25	1.83	0.894	4mrem/yr		J	094780-034	EPA 900.0
	Uranium-233/234	7.16 ± 0.933	0.0699	0.031	NE			094780-035	HASL-300
	Uranium-235/236	0.269 ± 0.0713	0.0334	0.0118	NE			094780-035	HASL-300
	Uranium-238	1.45 ± 0.222	0.0585	0.0252	NE			094780-035	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, October – December 2013

Well	Analyte	Activity ^a (pCi/L)	MDA (pCi/L)	Critical Level ^b (pCi/L)	MCL	Laboratory Qualifier ^c	Validation Qualifier ^d	Sample Number	Analytical Method ^e
SWMU 68									
OBS-MW1 08-Oct-13	Americium-241	5.32 ± 10.4	16.0	7.85	NE	U	BD	094767-033	EPA 901.1
	Cesium-137	-1.09 ± 3.51	3.83	1.85	NE	U	BD	094767-033	EPA 901.1
	Cobalt-60	1.61 ± 2.22	3.04	1.43	NE	U	BD	094767-033	EPA 901.1
	Potassium-40	26.0 ± 38.4	44.4	21.2	NE	U	BD	094767-033	EPA 901.1
	Gross Alpha	-5.17	NA	NA	15 pCi/L	NA	None	094767-034	EPA 900.0
	Gross Beta	7.48 ± 3.15	4.12	1.88	4 mrem/yr		J	094767-034	EPA 900.0
	Uranium-233/234	17.4 ± 2.24	0.108	0.0478	NE			094767-035	HASL-300
	Uranium-235/236	0.197 ± 0.0714	0.0516	0.0182	NE			094767-035	HASL-300
Uranium-238	3.27 ± 0.473	0.0903	0.039	NE			094767-035	HASL-300	
OBS-MW1 (Duplicate) 08-Oct-13	Americium-241	2.53 ± 6.55	9.74	4.77	NE	U	BD	094768-033	EPA 901.1
	Cesium-137	0.654 ± 1.53	2.71	1.30	NE	U	BD	094768-033	EPA 901.1
	Cobalt-60	-0.336 ± 1.44	2.55	1.19	NE	U	BD	094768-033	EPA 901.1
	Potassium-40	62.1 ± 28.9	24.8	11.5	NE		J	094768-033	EPA 901.1
	Gross Alpha	-3.56	NA	NA	15 pCi/L	NA	None	094768-034	EPA 900.0
	Gross Beta	4.38 ± 1.20	1.25	0.601	4 mrem/yr		J	094768-034	EPA 900.0
	Uranium-233/234	16.3 ± 2.08	0.0748	0.0332	NE			094768-035	HASL-300
	Uranium-235/236	0.203 ± 0.0625	0.0358	0.0126	NE			094768-035	HASL-300
Uranium-238	2.96 ± 0.416	0.0626	0.027	NE			094768-035	HASL-300	
OBS-MW2 07-Oct-13	Americium-241	6.72 ± 17.9	26.7	13.2	NE	U	BD	094762-033	EPA 901.1
	Cesium-137	-0.415 ± 3.44	4.25	2.07	NE	U	BD	094762-033	EPA 901.1
	Cobalt-60	0.114 ± 2.94	4.49	2.17	NE	U	BD	094762-033	EPA 901.1
	Potassium-40	29.4 ± 54.1	44.0	21.2	NE	U	BD	094762-033	EPA 901.1
	Gross Alpha	-1.53	NA	NA	15 pCi/L	NA	None	094762-034	EPA 900.0
	Gross Beta	8.29 ± 3.20	3.82	1.73	4 mrem/yr		J	094762-034	EPA 900.0
	Uranium-233/234	23.8 ± 3.14	0.137	0.0609	NE			094762-035	HASL-300
	Uranium-235/236	0.379 ± 0.115	0.0657	0.0232	NE			094762-035	HASL-300
Uranium-238	4.65 ± 0.678	0.115	0.0496	NE			094762-035	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, October – December 2013

Well	Analyte	Activity ^a (pCi/L)	MDA (pCi/L)	Critical Level ^b (pCi/L)	MCL	Laboratory Qualifier ^c	Validation Qualifier ^d	Sample Number	Analytical Method ^e
SWMU 68									
OBS-MW3 09-Oct-13	Americium-241	-1.85 ± 10.8	16.2	7.89	NE	U	BD	094771-033	EPA 901.1
	Cesium-137	-1.68 ± 3.30	3.53	1.71	NE	U	BD	094771-033	EPA 901.1
	Cobalt-60	0.707 ± 1.88	3.34	1.58	NE	U	BD	094771-033	EPA 901.1
	Potassium-40	5.80 ± 31.6	31.7	15.0	NE	U	BD	094771-033	EPA 901.1
	Gross Alpha	0.46	NA	NA	15 pCi/L	NA	None	094771-034	EPA 900.0
	Gross Beta	4.39 ± 1.27	1.55	0.748	4 mrem/yr		J	094771-034	EPA 900.0
	Uranium-233/234	21.3 ± 2.77	0.0884	0.0392	NE			094771-035	HASL-300
	Uranium-235/236	0.244 ± 0.0749	0.0423	0.0149	NE			094771-035	HASL-300
	Uranium-238	4.00 ± 0.565	0.0739	0.0319	NE			094771-035	HASL-300

Notes

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

^bThe lowest concentration of analytes in a sample that can be reliably determined within specified limits of precision and accuracy by that indicated method under routine laboratory operating conditions. The minimum activity that can be measured and reported with 99% confidence that the analyte is greater than zero; analyte is matrix-specific.
 NA = Not applicable.

^c**Laboratory Qualifier**

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

NA = Not applicable.

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

^d**Validation Qualifier**

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

BD = Below detection limit as used in radiochemistry to identify results that are not statistically different from zero.

J = The associated value is an estimated quantity.

None = No data validation for corrected gross alpha activity.

^e**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, October – December 2013

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 December 2013

Well	Date	Analyte	Result	MCL	Laboratory Qualifier ^a	Validation Qualifier ^b	Sample Number	Analytical Method ^c
SWMUs 8/58								
CCBA-MW1	31-Oct-11	Fluoride	5.36 mg/L	4.0 mg/L			091345-016	EPA 9056
CCBA-MW1	16-Jan-12	Fluoride	4.94 mg/L	4.0 mg/L			091615-016	EPA 9056
CCBA-MW1 (Duplicate)	16-Jan-12	Fluoride	4.94 mg/L	4.0 mg/L			091616-016	EPA 9056
CCBA-MW1	23-Apr-12	Fluoride	4.93 mg/L	4.0 mg/L			092291-016	EPA 9056
CCBA-MW1	16-Jul-12	Fluoride	5.03 mg/L	4.0 mg/L			092615-016	EPA 9056
CCBA-MW1 (Duplicate)	16-Jul-12	Fluoride	5.00 mg/L	4.0 mg/L			092616-016	EPA 9056
CCBA-MW1	22-Oct-12	Fluoride	5.32 mg/L	4.0 mg/L			093013-016	EPA 9056
CCBA-MW2	15-Jan-13	Benzo(a)pyrene	0.640 µg/L	0.440 µg/L	J		093336-002	EPA 8270C
CCBA-MW1	16-Jan-13	Fluoride	4.97 mg/L	4.0 mg/L			093341-016	EPA 9056
CCBA-MW1 (Duplicate)	16-Jan-13	Fluoride	5.00 mg/L	4.0 mg/L			093342-016	EPA 9056
CCBA-MW1	24-Apr-13	Fluoride	4.57 mg/L	4.0 mg/L			093863-016	EPA 9056
CCBA-MW1	16-Jul-13	Fluoride	4.78 mg/L	4.0 mg/L			094376-016	EPA 9056
CCBA-MW1 (Duplicate)	16-Jul-13	Fluoride	4.82 mg/L	4.0 mg/L			094377-016	EPA 9056
CCBA-MW1	10-Oct-13	Fluoride	4.93 mg/L	4.0 mg/L			094774-016	EPA 9056

Notes

^a**Laboratory Qualifier**

If cell is blank, then all quality control samples met acceptance criteria with respect to submitted samples.
 J = Estimated value, the analyte concentration fell above the effective MDL and below the effective PQL.

^b**Validation Qualifier**

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

^c**Analytical Method**

U.S. Environmental Protection Agency, 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.

µg/L = Micrograms per liter.

CCBA = Coyote Canyon Blast Area.

EPA = U.S. Environmental Protection Agency.

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

mg/L = Milligrams per liter.

MW = Monitoring well.

SWMU = Solid Waste Management Unit.

Table IV-15
Summary of Duplicate Samples
SWMUs 8/58 and 68 Groundwater Monitoring
Quarterly Assessment, October – December 2013

Well /Parameter	Environmental Sample (R1)	Duplicate Sample (R2)	RPD ^a
	mg/L unless otherwise noted		
CCBA-MW2			
Nitrate plus Nitrite	3.35	3.31	1
Bicarbonate Alkalinity	181	181	< 1
Bromide	0.559	0.560	< 1
Chloride	36.9	37.1	1
Fluoride	1.52	1.52	< 1
Sulfate	94.7	96.3	2
Arsenic	0.00246	0.00259	5
Barium	0.0446	0.0461	3
Calcium	73.8	76.6	4
Copper	0.000518	0.000721	33
Iron	0.0882	0.0953	8
Magnesium	14.4	15.3	6
Nickel	0.00104	0.00111	7
Potassium	1.18	1.28	8
Selenium	0.00467	0.00468	< 1
Sodium	43.6	47.2	8
Uranium	0.00486	0.00515	6
Vanadium	0.0102	0.00983	4
Filtered Calcium	77.0	74.0	4
Filtered Magnesium	15.1	14.1	7
Filtered Potassium	1.27	1.16	9
Filtered Sodium	45.7	42.2	8
OBS-MW1			
Nitrate plus Nitrite	1.85	1.85	< 1
Bicarbonate Alkalinity	181	185	2
Bromide	0.373	0.395	6
Chloride	24.0	23.9	< 1
Fluoride	2.17	2.18	< 1
Sulfate	82.0	81.3	1
Barium	0.0183	0.0184	1
Calcium	80.4	84.1	4
Iron	0.112	0.103	8
Magnesium	16.4	15.9	3
Manganese	0.00202	0.00201	< 1
Nickel	0.00105	0.0011	5
Potassium	1.66	1.61	3

Table IV-15 (Concluded)
Summary of Duplicate Samples
SWMUs 8/58 and 68 Groundwater Monitoring
Quarterly Assessment, October – December 2013

Well /Parameter	Environmental Sample (R1)	Duplicate Sample (R2)	RPD ^a
	mg/L unless otherwise noted		
OBS-MW1			
Selenium	0.00372	0.00351	6
Sodium	22.4	21.6	4
Uranium	0.00983	0.00994	1
Filtered Calcium	79.2	75.7	5
Filtered Magnesium	16.0	14.9	7
Filtered Potassium	1.65	1.52	8
Filtered Sodium	21.9	20.3	8

Notes

^aRPD

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

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

where: R₁ = analysis result.
R₂ = duplicate analysis result.

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

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

GROUNDWATER SAMPLE COLLECTION FIELD EQUIPMENT CHECK LOG Page 1 of 2

SNL/NM Project Name: SWMU 8/58			SNL/NM Project No.: 146422.10.11.01			
Calibrations done by: R LYNCH			Date: 10/10/13			
Make & Model: YSI 6920V2						
YSI 6820 Sonde (S/N) with DO, Ec, pH, ORP, and temperature probes: 08H100033						
YSI 650 MDS (S/N): NA						
pH Calibration						
pH Calibrated to (std): 7.00			pH sloped to (std): 10.00			
Reference value:	4.00		7.00		10.00	
	Value	Temp	Value	Temp	Value	Temp
1. Time:	0632	4.02	19.1	7.00	19.1	10.01
2. Time:	1053	4.01	19.3	6.99	19.3	10.02
3. Time:						
4. Time:						
Standard lot no.:	3AD782		3AE725		3AD357	
Expiration date:	APR/15		MAY/15		APR/15	
SC Calibration						
Reference Value: 1413 uS			Standard Lot No.: 3AE221			
	Value	Temp	Expiration Date: MAY/15			
1. Time:	0634	1411	19.1			
2. Time:	1055	1413	19.2			
3. Time:						
4. Time:						
ORP Calibration						
Reference Value: 200 mV			Standard Lot No. 1305755			
	Value	Temp	Expiration Date: JAN/14			
1. Time:	0633	199.8	19.1			
2. Time:	1054	200.1	19.3			
3. Time:						
4. Time:						
DO Calibration						
Calibration Value:	81% air saturation @ 5200 ft.		Atmospheric Pressure in Hg			
1. Time:	0631	80.7	24.17			
2. Time:	1052	80.5	24.15			
3. Time:						
4. Time:						

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

SNL/NM Project Name: SWMU 8/58		Project No.: 146422.10.11.01		
Calibration done by: R LYNCH		Date: 10/10/13		
TURBIDIMETER				
Make & Model: HACH 2100P HACH 2100Q		Serial No. S/N 10050C002897		
Reference Value	PL 10	20	100	800
Standard Lot No.	0161	0167	0168	0161
1. Time 0800	10.1	19.7	99.6	802
2. Time 0936	9.99	19.9	101	805
3. Time				
4. Time				
Comments:				

GROUNDWATER SAMPLE COLLECTION FIELD EQUIPMENT CHECK LOG Page 1 of 2

SNL/NM Project Name: SWMU 8/58			SNL/NM Project No.: 146422.10.11.01				
Calibrations done by: R LYNCH			Date: 10/14/13				
Make & Model: YSI 6920V2							
YSI 6820 Sonde (S/N) with DO, Ec, pH, ORP, and temperature probes: 08H100033							
YSI 650 MDS (S/N): NA							
pH Calibration							
pH Calibrated to (std): 7.00			pH sloped to (std): 10.00				
Reference value:	4.00		7.00		10.00		
	Value	Temp	Value	Temp	Value	Temp	
1. Time:	0626	3.98	18.1	7.00	18.1	9.99	18.1
2. Time:	1050	3.99	18.2	7.00	18.3	10.01	18.3
3. Time:							
4. Time:							
Standard lot no.:	3AD782		3AE725		3AD357		
Expiration date:	APR/15		MAY/15		APR/15		
SC Calibration							
Reference Value: 1413 uS			Standard Lot No.: 3AE221				
	Value	Temp	Expiration Date: MAY/15				
1. Time:	0628	1409	18.1				
2. Time:	1052	1411	18.4				
3. Time:							
4. Time:							
ORP Calibration							
Reference Value: 200 mV			Standard Lot No. 1305755				
	Value	Temp	Expiration Date: JAN/14				
1. Time:	0627	198.9	18.1				
2. Time:	1051	199.6	18.2				
3. Time:							
4. Time:							
DO Calibration							
Calibration Value:	81% air saturation @ 5200 ft.		Atmospheric Pressure in Hg				
1. Time:	0625	81.3	24.33				
2. Time:	1049	81.2	24.34				
3. Time:							
4. Time:							

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

SNL/NM Project Name: SWMU 8/58		Project No.: 146422.10.11.01		
Calibration done by: R LYNCH		Date: 10/14/13		
TURBIDIMETER				
Make & Model: HACH 2100P HACH 2100Q		Serial No. S/N 10050C002897		
Reference Value	25 10	20	100	800
Standard Lot No.	0161	0167	0168	0161
1. Time 0805	9.97	19.8	101	796
2. Time 0950	10.2	19.9	103	794
3. Time				
4. Time				
Comments:				

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

Project Name: <u>SWMU 8/58</u>	Monitoring Well ID #: <u>CCBA-MW1</u>	Date: <u>10-¹¹10-13</u> <u>RL</u>
The following equipment was decontaminated at completion of sampling activities in accordance with FOP-05-03		
Pump and Tubing Bundle ID #: <u>1806-792</u>	Water Level Indicator ID #: <u>62187</u>	
<u>Personnel Performing Decontamination:</u> William Gibson <u>WJG</u> Print Name: Initial: Alfred Santillanes <u>AS</u> Print Name: Initial:		<u>Personnel Performing Decontamination:</u> William Gibson <u>WJG</u> Print Name: Initial: Alfred Santillanes <u>AS</u> Print Name: Initial:
Condition of Equipment		
Pump: <u>Good</u> Tubing Bundle: <u>Good</u> Water Level Indicator: <u>Good</u>		
List of Decontamination Materials		
Distilled or Deonized (circle one) Source: <u>Culligan</u> Lot Number: <u>8-3-13</u>	HNO ₃ Grade: <u>Reagent</u> UN #: <u>2031</u> Manufacturer: <u>AROC</u> Lot Number: <u>A0305629</u>	

Groundwater Monitoring Waste Generation Log

Waste Generator : <u>William Gibson</u> Phone: <u>239-7367</u> project leader: <u>Clinton Lum</u>			
Project Name	SWMU 8/58	SWMU 8/58	SWMU 8/58
Container ID # (site-date-sequence)	SWMU-CCBA-MW1-101013-01	SWMU-CCBA-MW1-101013-02	SWMU-101013 11
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 # 615093	CoC # 615093	CoC # 615093
	_____	_____	_____
	Sample # 094774	Sample # 094774	Sample # 094774
Accumulation Date	Start: 10-10-13	Start: 10-10-13	Start: 10-10-13 11
	Full: 10-10-13	Full: 10-10-13	Full: 10-10-13 11
Date Waste Moved to Accumulation Area	10-10-13	10-10-13	10-10-13 11
Accumulation Area Name	9925	9925	9925
Comments:			

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Groundwater Monitoring Waste Generation Log

Waste Generator : <u>William Gibson</u> Phone: <u>239-7367</u> project leader: <u>Clinton Lum</u>			
Project Name	SWMU 8/58	SWMU 8/58	SWMU 8/58
Container ID # (site-date-sequence)	SWMU-CCBA-MW2-101413-01	SWMU-CCBA-MW2-101413-02	SWMU-101413
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 # 615095	CoC # 615095	CoC # 615095
	_____	_____	_____
	Sample # 094779, 094780	Sample # 094779, 094780	Sample # 094779, 094780
Accumulation Date	Start: 10-14-13	Start: 10-14-13	Start: 10-14-13
	Full: 10-14-13	Full: 10-14-13	Full: 10-14-13
Date Waste Moved to Accumulation Area	10-14-13	10-14-13	10-14-13
Accumulation Area Name	9925	9925	9925
Comments:			

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TAILGATE SAFETY MEETING FORM

Dept: 4142 Well Location: CCBA-MW 1 Date: 10/10/13 Time: 0757

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

Weather Conditions:
 Temp: 64.4 °F Wind Speed: ~20 MPH Humidity: 40.6 % Wind Chill 60.2°F

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

Safety Topics Presented

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

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

Attendees

Robert Lynch
 Printed Name

[Signature]
 Signature

ALFRED SANTILLANES
 Printed Name

[Signature]
 Signature

William Gibson
 Printed Name

[Signature]
 Signature

 Printed Name

 Signature

 Printed Name

 Signature

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TAILGATE SAFETY MEETING FORM

Dept: 4142 Well Location: CCBA-MW 2 Date: 10/14/13 Time: 0800

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

Weather Conditions:
 Temp: 67.1 °F Wind Speed: 45 MPH Humidity: 36.4 % Wind Chill NA °F

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

Safety Topics Presented

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

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

Attendees

Robert Lynch
 Printed Name

[Signature]
 Signature

William Gibson
 Printed Name

[Signature]
 Signature

ALFRED SANTILLANES
 Printed Name

[Signature]
 Signature

 Printed Name

 Signature

 Printed Name

 Signature

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GROUNDWATER SAMPLE COLLECTION FIELD EQUIPMENT CHECK LOG Page 1 of 2

SNL/NM Project Name: SWMU 68			SNL/NM Project No.: 146422.10.11.01			
Calibrations done by: R LYNCH			Date: 10/7/13			
Make & Model: YSI 6920V2						
YSI 6820 Sonde (S/N) with DO, Ec, pH, ORP, and temperature probes: 08H100033						
YSI 650 MDS (S/N): NA						
pH Calibration						
pH Calibrated to (std): 7.00			pH sloped to (std): 10.00			
Reference value:	4.00		7.00		10.00	
	Value	Temp	Value	Temp	Value	Temp
1. Time:	0645	3.99	17.8	7.00	17.8	9.99
2. Time:	1040	4.01	18.6	7.01	18.6	10.01
3. Time:						
4. Time:						
Standard lot no.:	3AD782		3AE725		3AD357	
Expiration date:	APR/15		MAY/15		APR/15	
SC Calibration						
Reference Value: 1413 uS			Standard Lot No.: 3AE221			
	Value	Temp	Expiration Date: MAY/15			
1. Time:	0647	1410	17.8			
2. Time:	1042	1414	18.6			
3. Time:						
4. Time:						
ORP Calibration						
Reference Value: 200 mV			Standard Lot No. 1305755			
	Value	Temp	Expiration Date: JAN/14			
1. Time:	0646	199.7	17.9			
2. Time:	1041	201.1	18.6			
3. Time:						
4. Time:						
DO Calibration						
Calibration Value:	81% air saturation @ 5200 ft.		Atmospheric Pressure in Hg			
1. Time:	0644	81.9	24.49			
2. Time:	1039	81.8	24.49			
3. Time:						
4. Time:						

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

SNL/NM Project Name: SWMU 68		Project No.: 146422.10.11.01		
Calibration done by: R LYNCH		Date: 10/7/13		
TURBIDIMETER				
Make & Model: HACH 2100P HACH 2100Q		Serial No. S/N 10050C002897		
Reference Value	PL + 10	20	100	800
Standard Lot No.	0161	0167	0168	0161
1. Time	0805 10.3	20.2	99.8	795
2. Time	0944 10.5	20.1	99.5	797
3. Time				
4. Time				
Comments:				

GROUNDWATER SAMPLE COLLECTION FIELD EQUIPMENT CHECK LOG Page 1 of 2

SNL/NM Project Name: SWMU 68			SNL/NM Project No.: 146422.10.11.01				
Calibrations done by: R LYNCH			Date: 10/8/13				
Make & Model: YSI 6920V2							
YSI 6820 Sonde (S/N) with DO, Ec, pH, ORP, and temperature probes: 08H100033							
YSI 650 MDS (S/N): NA							
pH Calibration							
pH Calibrated to (std): 7.00			pH sloped to (std): 10.00				
Reference value:	4.00		7.00		10.00		
	Value	Temp	Value	Temp	Value	Temp	
1. Time:	0639	3.99	17.6	7.00	17.6	9.99	17.6
2. Time:	0958	3.99	17.9	7.01	17.9	9.98	17.9
3. Time:							
4. Time:							
Standard lot no.:	3AD782		3AE725		3AD357		
Expiration date:	APR/15		MAY/15		APR/15		
SC Calibration							
Reference Value: 1413 uS			Standard Lot No.: 3AE221				
	Value	Temp	Expiration Date: MAY/15				
1. Time:	0641	1409	17.6				
2. Time:	1000	1411	17.9				
3. Time:							
4. Time:							
ORP Calibration							
Reference Value: 200 mV			Standard Lot No. 1305755				
	Value	Temp	Expiration Date: JAN/14				
1. Time:	0640	199.6	17.6				
2. Time:	0959	199.7	17.9				
3. Time:							
4. Time:							
DO Calibration							
Calibration Value:	81% air saturation @ 5200 ft.		Atmospheric Pressure in Hg				
1. Time:	0638	81.3	24.34				
2. Time:	0957	81.4	24.36				
3. Time:							
4. Time:							

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

SNL/NM Project Name: SWMU 68		Project No.: 146422.10.11.01		
Calibration done by: R LYNCH		Date: 10/8/13		
TURBIDIMETER				
Make & Model: HACH 2100P HACH 2100Q		Serial No. S/N 10050C002897		
Reference Value	RT 10	20	100	800
Standard Lot No.	0161	0167	0168	0161
1. Time	0800 10.1	19.7	101	796
2. Time	0931 10.3	20.1	103	801
3. Time				
4. Time				
Comments:				

GROUNDWATER SAMPLE COLLECTION FIELD EQUIPMENT CHECK LOG Page 1 of 2

SNL/NM Project Name: SWMU 68			SNL/NM Project No.: 146422.10.11.01			
Calibrations done by: R LYNCH			Date: 10/9/13			
Make & Model: YSI 6920V2						
YSI 6820 Sonde (S/N) with DO, Ec, pH, ORP, and temperature probes: 08H100033						
YSI 650 MDS (S/N): NA						
pH Calibration						
pH Calibrated to (std): 7.00			pH sloped to (std): 10.00			
Reference value:	4.00		7.00		10.00	
	Value	Temp	Value	Temp	Value	Temp
1. Time:	0636	3.99	17.7	6.99	17.7	10.01
2. Time:	1017	4.01	18.0	7.01	18.0	10.00
3. Time:						
4. Time:						
Standard lot no.:	3AD782		3AE725		3AD357	
Expiration date:	APR/15		MAY/15		APR/15	
SC Calibration						
Reference Value: 1413 uS			Standard Lot No.: 3AE221			
	Value	Temp	Expiration Date: MAY/15			
1. Time:	0638	1410	17.6			
2. Time:	1019	1414	18.0			
3. Time:						
4. Time:						
ORP Calibration						
Reference Value: 200 mV			Standard Lot No. 1305755			
	Value	Temp	Expiration Date: JAN/14			
1. Time:	0637	199.5	17.7			
2. Time:	1018	201.0	18.0			
3. Time:						
4. Time:						
DO Calibration						
Calibration Value:	81% air saturation (@ 5200 ft)		Atmospheric Pressure in Hg			
1. Time:	0635	80.9	24.23			
2. Time:	1016	81.1	24.25			
3. Time:						
4. Time:						

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

SNL/NM Project Name: SWMU 68		Project No.: 146422.10.11.01		
Calibration done by: R LYNCH		Date: 10/9/13		
TURBIDIMETER				
Make & Model: HACH 2100P HACH 2100Q		Serial No. S/N 10050C002897		
Reference Value	10 RL 10	20	100	800
Standard Lot No.	0161	0167	0168	0161
1. Time	0805 10.2	19.7	103	801
2. Time	0938 10.4	19.9	104	805
3. Time				
4. Time				
Comments:				

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

Project Name: <u>SWMU</u>	Monitoring Well ID # : <u>OBS-MW2</u>	Date: <u>10-07-13</u>
The following equipment was decontaminated at completion of sampling activities in accordance with FOP-05-03		
Pump and Tubing Bundle ID #: <u>1806-792</u>	Water Level Indicator ID #: <u>62187</u>	
<u>Personnel Performing Decontamination:</u> William Gibson _____ Print Name: <u>WJG</u> Initial:	<u>Personnel Performing Decontamination:</u> William Gibson _____ Print Name: <u>WJG</u> Initial:	
Alfred Santillanes _____ Print Name: <u>AS</u> Initial:	Alfred Santillanes _____ Print Name: <u>AS</u> Initial:	
Condition of Equipment		
Pump: <u>Good</u>	Tubing Bundle: <u>Good</u>	Water Level Indicator: <u>Good</u>
List of Decontamination Materials		
<p align="center">Distilled or Deionized (circle one)</p> <p>Source: <u>Culligan</u></p> <p>Lot Number: <u>10-3-13</u></p>	<p align="center">HNO₃</p> <p>Grade: <u>Reagent</u></p> <p>UN #: <u>2031</u></p> <p>Manufacturer: <u>AROC</u></p> <p>Lot Number: <u>A0305629</u></p>	

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

Project Name: <u>SWMU 68</u>	Monitoring Well ID #: <u>OBS-MW1</u>	Date: <u>10/08/13</u>
The following equipment was decontaminated at completion of sampling activities in accordance with FOP-05-03		
Pump and Tubing Bundle ID #: <u>1806-792</u>	Water Level Indicator ID #: <u>62187</u>	
<u>Personnel Performing Decontamination:</u> Robert Lynch _____ Print Name: _____ Initial: <u>RL</u> William Gibson _____ Print Name: _____ Initial: <u>WJG</u>	<u>Personnel Performing Decontamination:</u> Robert Lynch _____ Print Name: _____ Initial: <u>RL</u> William Gibson _____ Print Name: _____ Initial: <u>WJG</u>	
Condition of Equipment		
Pump: <u>Good</u> Tubing Bundle: <u>Good</u> Water Level Indicator: <u>Good</u>		
List of Decontamination Materials		
Distilled or Deonized (circle one) Source: <u>Culligan</u> Lot Number: <u>8-3-13</u>	HNO ₃ Grade: <u>Reagent</u> UN #: <u>2031</u> Manufacturer: <u>AROC</u> Lot Number: <u>A0305629</u>	

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

Project Name: <u>SWMU 68</u>	Monitoring Well ID #: <u>OBS-MW3</u>	Date: <u>10-09-13</u>
The following equipment was decontaminated at completion of sampling activities in accordance with FOP-05-03		
Pump and Tubing Bundle ID #: <u>1806-792</u>	Water Level Indicator ID #: <u>62187</u>	
<u>Personnel Performing Decontamination:</u> Robert Lynch _____ <u>RL</u> Print Name: Initial: Alfred Santillanes _____ <u>AS</u> Print Name: Initial:		<u>Personnel Performing Decontamination:</u> Robert Lynch _____ <u>RL</u> Print Name: Initial: Alfred Santillanes _____ <u>AS</u> Print Name: Initial:
Condition of Equipment		
Pump: <u>Good</u> Tubing Bundle: <u>Good</u> Water Level Indicator: <u>Good</u>		
List of Decontamination Materials		
Distilled or Deonized (circle one) Source: <u>Culligan</u> Lot Number: <u>8-3-13</u>	HNO ₃ Grade: <u>Reagent</u> UN #: <u>2031</u> Manufacturer: <u>AROC</u> Lot Number: <u>A0305629</u>	

Groundwater Monitoring Waste Generation Log

Waste Generator : <u>William Gibson</u> Phone: <u>239-7367</u> project leader: <u>Clinton Lum</u>			
Project Name	SWMU 68	SWMU 68	SWMU 68
Container ID # (site-date-sequence)	SWMU-OBS-MW2-100713-01	SWMU-OBS-MW2-100713-02	SWMU-100713
Initial Label Type (Hazardous or Non-Regulated)	Non- Regulated	Non- Regulated	Non- Regulated
Waste Matrix (purge water, decon water, HACH Accu-Vac ampule)	Purge Water	Purge Water	Decon Water
Container Type / Volume	CHPD/ 55 gal.	CHPD/ 55 gal.	CHPD/ 55 gal.
Volume of Waste	~24 gal.	~16 gal.	~30 gal.
Total Container Weight	~ 190 lbs.	~ 130 lbs.	~ 240 lbs.
COC#: Sample#-Fraction	_____	_____	_____
	CoC # 615089	CoC # 615089	CoC # 615089
	_____	_____	_____
	Sample # 094762	Sample # 094762	Sample # 094762
Accumulation Date	Start: 10-07-13	Start: 10-07-13	Start: 10-07-13
	Full: 10-07-13	Full: 10-07-13	Full: 10-07-13
Date Waste Moved to Accumulation Area	10-07-13	10-07-13	10-07-13
Accumulation Area Name	9925	9925	9925
Comments:			

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Groundwater Monitoring Waste Generation Log

Waste Generator : <u>William Gibson</u> Phone: <u>239-7367</u> project leader: <u>Clinton Lum</u>			
Project Name	SWMU 68	SWMU 68	SWMU 68
Container ID # (site-date-sequence)	SWMU-OBS-MW1-100813-01	SWMU-OBS-MW1-100813-02	SWMU- 100813
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 # 615091	CoC # 615091	CoC # 615091
	_____	_____	_____
	Sample # 094767, 094768	Sample # 094767, 094768	Sample # 094767, 094768
Accumulation Date	Start: 10-08-13	Start: 10-08-13	Start: 10-08-13
	Full: 10-08-13	Full: 10-08-13	Full: 10-08-13
Date Waste Moved to Accumulation Area	10-08-13	10-08-13	10-08-13
Accumulation Area Name	9925	9925	9925
Comments:			

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Groundwater Monitoring Waste Generation Log

Waste Generator : <u>William Gibson</u> Phone: <u>239-7367</u> project leader: <u>Clinton Lum</u>			
Project Name	SWMU 68	SWMU 68	SWMU 68
Container ID # (site-date-sequence)	SWMU-OBS-MW3-100913-01	SWMU-OBS-MW3-100913-02	SWMU-100913
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 # 615092	CoC # 615092	CoC # 615092
	_____	_____	_____
	Sample # 094771	Sample # 094771	Sample # 094771
Accumulation Date	Start: 10-09-13	Start: 10-09-13	Start: 10-09-13
	Full: 10-09-13	Full: 10-09-13	Full: 10-09-13
Date Waste Moved to Accumulation Area	10-09-13	10-09-13	10-09-13
Accumulation Area Name	9925	9925	9925
Comments:			

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TAILGATE SAFETY MEETING FORM

Dept: 4142 Well Location: OBS-MW 2 Date: 10/7/13 Time: 0800

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

Weather Conditions:
 Temp: 52.8 °F Wind Speed: 8 MPH Humidity: 38.7 % Wind Chill NA °F

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

Safety Topics Presented

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

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

Attendees

Robert Lynch
 Printed Name

[Signature]
 Signature

William Gibson
 Printed Name

[Signature]
 Signature

ALFRED SANTI LLANOS
 Printed Name

[Signature]
 Signature

 Printed Name

 Signature

 Printed Name

 Signature

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TAILGATE SAFETY MEETING FORM

Dept: 4142 Well Location: OBS-MW 1 Date: 10/8/13 Time: 0752

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

Weather Conditions:
 Temp: 58.6 °F Wind Speed: 8 MPH Humidity: 36.7 % Wind Chill N/A °F

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

Safety Topics Presented

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

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

Attendees

Robert Lynch
 Printed Name

[Signature]
 Signature

ALFRED SANTILLANES
 Printed Name

[Signature]
 Signature

William Gibson
 Printed Name

[Signature]
 Signature

 Printed Name

 Signature

 Printed Name

 Signature

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TAILGATE SAFETY MEETING FORM

Dept: 4142 Well Location: OBS-MW 3 Date: 10/9/13 Time: 0800

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

Weather Conditions:
 Temp: 58.4 °F Wind Speed: 0 MPH Humidity: 40.0 % Wind Chill NA °F

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

Safety Topics Presented

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

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

Attendees

Robert Lynch
 Printed Name

[Signature]
 Signature

William Gibson
 Printed Name

[Signature]
 Signature

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

CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY

Internal Lab	Batch No. <i>NA</i>	SMO Use	AR/COC	615093
Project Name: SWMU 8/58 GWM	Date Samples Shipped: <i>10/10/13</i>	SMO Authorization: <i>[Signature]</i>	<input type="checkbox"/> Waste Characterization <input type="checkbox"/> RMMA <input type="checkbox"/> Released by COC No. <input checked="" type="checkbox"/> 4° Celsius	
Project/Task Manager: Clinton Lum	Carrier/Waybill No.	SMO Contact Phone: <i>[Signature]</i>	Bill to: Sandia National Laboratories (Accounts Payable), P.O. Box 5800, MS-0154 Albuquerque, NM 87185-0154	
Project/Task Number: 146422.10.11.01	Lab Contact: Edie Kent/803-556-8171	Lorraine Herrera/505-844-3199		
Service Order: CF262-14	Lab Destination: GEL	Send Report to SMO: Rita Kavanaugh/505-284-2553		
Contract No.: PO 1303873				

Tech Area:	Operational Site:	
Building:	Room:	

Sample No.	Fraction	Sample Location Detail	Depth (ft)	Date/Time Collected	Sample Matrix	Container		Preservative	Collection Method	Sample Type	Parameter & Method Requested	Lab Sample ID
						Type	Volume					
094773	-001	CCBA-FB1	NA	10/10/13 9:20	DIW	G	3x40 ml	HCL	G	FB	TCL VOC (SW846-8260B)	
094774	-001	CCBA-MW1	79	10/10/13 9:24	GW	G	3x40 ml	HCL	G	SA	TCL VOC (SW846-8260B)	
094774	-002	CCBA-MW1	79	10/10/13 9:25	GW	AG	4x1L	None	G	SA	TCL SVOC (SW846-8270C)	
094774	-009	CCBA-MW1	79	10/10/13 9:27	GW	P	500 ml	HNO3	G	SA	TAL Metals+U(SW846-6010/6020/7470)	
094774	-016	CCBA-MW1	79	10/10/13 9:28	GW	P	125 ml	None	G	SA	Anions-Br,Cl,F,SO4 (SW846-9056)	
094774	-017	CCBA-MW1	79	10/10/13 9:30	FGW	P	500 ml	HNO3	G	SA	Metals-Ca,Mg,K,Na (SW846-6020)	
094774	-018	CCBA-MW1	79	10/10/13 9:31	GW	P	125 ml	H2SO4	G	SA	NPN (EPA 353.2)	
094774	-020	CCBA-MW1	79	10/10/13 9:32	GW	P	250 ml	None	G	SA	Perchlorate (EPA 314.0)	
094774	-022	CCBA-MW1	79	10/10/13 9:33	GW	P	500 ml	None	G	SA	Alkalinity (SM2320B)	
094774	-024	CCBA-MW1	79	10/10/13 9:34	GW	AG	4x1L	None	G	SA	High Explosives (SW846-8321A mod)	

Last Chain: <input type="checkbox"/> Yes	Sample Tracking	SMO Use	Special Instructions/QC Requirements:	Conditions on Receipt	
Validation Req'd: <input checked="" type="checkbox"/> Yes	Date Entered:		EDD <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		
Background: <input type="checkbox"/> Yes	Entered by:		Turnaround Time <input type="checkbox"/> 7 Day* <input type="checkbox"/> 15 Day* <input checked="" type="checkbox"/> 30 Day		
Confirmatory: <input type="checkbox"/> Yes	QC inits.:		Negotiated TAT <input type="checkbox"/>		
Sample Team Members	Name	Signature	Init.	Company/Organization/Phone/Cell	Sample Disposal <input type="checkbox"/> Return to Client <input checked="" type="checkbox"/> Disposal by Lab
	Robert Lynch	<i>[Signature]</i>	RL	SNL/4142/505-844-4013/505-250-7090	Return Samples By: Comments: Send report to Tim Jackson/4142/MS 0729/284-2547 FGW (filtered in field w/40 micron filter). Alkalinity (as total CaCO3,HCO3,CO3). If Perchlorate detected, perform verification analysis using SW846-6850M. Gamma Spectroscopy as short list isotopes.
	Alfred Santillanes	<i>[Signature]</i>	AS	SNL/4142/505-844-5130/505-228-0710	
William Gibson	<i>[Signature]</i>	WG	SNL/4142/505-284-3307/505-239-7367		

1. Relinquished by <i>[Signature]</i> Org. 4142 Date 10/10/13 Time 1000	3. Relinquished by	Org.	Date	Time
1. Received by <i>[Signature]</i> SMO Org. 4142 Date 10/10/13 Time 1000	3. Received by	Org.	Date	Time
2. Relinquished by	4. Relinquished by	Org.	Date	Time
2. Received by	4. Received by	Org.	Date	Time

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

CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY

Internal Lab

Page 1 of 2Batch No. *W*

SMO Use

AR/COG **615095** ✓

Project Name: <u>SWMU 8/58 GWM</u>	Date Samples Shipped: _____	SMO Authorization: <i>Dutton</i>	<input type="checkbox"/> Waste Characterization
Project/Task Manager: <u>Clinton Lum</u>	Carrier/Waybill No. _____	SMO Contact Phone: _____	<input type="checkbox"/> RMMA
Project/Task Number: <u>146422.10.11.01</u>	Lab Contact: <u>Edie Kent/803-556-8171</u>	Lorraine Herrera/505-844-3199	<input type="checkbox"/> Released by COC No. <input checked="" type="checkbox"/> 4° Celsius
Service Order: <u>CF262-14</u>	Lab Destination: <u>GEL</u>	Send Report to SMO: _____	
	Contract No.: <u>PO 1303873</u>	Rita Kavanaugh/505-284-2553	

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

Sample No.	Fraction	Sample Location Detail	Depth (ft)	Date/Time Collected	Sample Matrix	Container		Preservative	Collection Method	Sample Type	Parameter & Method Requested	Lab Sample ID
						Type	Volume					
✓ 094779	-001 ✓	CCBA-MW2	117	10/14/13 9:26 ✓	GW	G	3x40 ml ✓	HCL	G	SA	TCL VOC (SW846-8260B)	
✓ 094779	-002 ✓	CCBA-MW2	117	10/14/13 9:27 ✓	GW	AG	4x1L ✓	None	G	SA	TCL SVOC (SW846-8270C)	
✓ 094779	-009 ✓	CCBA-MW2	117	10/14/13 9:30	GW	P	500 ml	HNO3	G	SA	TAL Metals+U(SW846-6010/6020/7470)	
✓ 094779	-016 ✓	CCBA-MW2	117	10/14/13 9:31	GW	P	125 ml	None	G	SA	Anions-Br,Cl,F,SO4 (SW846-9056)	
✓ 094779	-017 ✓	CCBA-MW2	117	10/14/13 9:33 ✓	FGW	P	500 ml	HNO3	G	SA	Metals-Ca,Mg,K,Na (SW846-6020)	
✓ 094779	-018 ✓	CCBA-MW2	117	10/14/13 9:34 ✓	GW	P	125 ml	H2SO4	G	SA	NPN (EPA 353.2)	
✓ 094779	-020 ✓	CCBA-MW2	117	10/14/13 9:35 ✓	GW	P	250 ml	None	G	SA	Perchlorate (EPA 314.0)	
✓ 094779	-022 ✓	CCBA-MW2	117	10/14/13 9:36 ✓	GW	P	500 ml	None	G	SA	Alkalinity (SM2320B)	
✓ 094779	-024 ✓	CCBA-MW2	117	10/14/13 9:37 ✓	GW	AG	4x1L	None	G	SA	High Explosives (SW846-8321A mod)	
✓ 094779	-027 ✓	CCBA-MW2	117	10/14/13 9:40 ✓	GW	P	250 ml	NaOH	G	SA	Total Cyanide (SW846-9012)	

Last Chain: <input checked="" type="checkbox"/> Yes	Sample Tracking	SMO Use	Special Instructions/QC Requirements:	Conditions on Receipt	
Validation Req'd: <input checked="" type="checkbox"/> Yes	Date Entered: _____		EDD <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		
Background: <input type="checkbox"/> Yes	Entered by: _____		Turnaround Time <input type="checkbox"/> 7 Day* <input type="checkbox"/> 15 Day* <input checked="" type="checkbox"/> 30 Day		
Confirmatory: <input type="checkbox"/> Yes	QC inits.: _____		Negotiated TAT <input type="checkbox"/>		
Sample Team Members	Name	Signature	Init.	Company/Organization/Phone/Cell	Sample Disposal <input type="checkbox"/> Return to Client <input checked="" type="checkbox"/> Disposal by Lab
	Robert Lynch	<i>Robert Lynch</i>	<i>RL</i>	SNL/4142/505-844-4013/505-250-7090	Return Samples By: Comments: Send report to Tim Jackson/4142/MS 0729/284-2547 FGW (filtered in field w/40 micron filter). Alkalinity (as total CaCO3,HCO3,CO3). If Perchlorate detected, perform verification analysis using SW846-6850M. Gamma Spectroscopy as short list isotopes.
	Alfred Santillanes	<i>Alfred Santillanes</i>	<i>AS</i>	SNL/4142/505-844-5130/505-228-0710	
William Gibson	<i>William Gibson</i>	<i>WG</i>	SNL/4142/505-284-3307/505-239-7367		
					Lab Use

1. Relinquished by <i>Alfred Santillanes</i> Org. <u>4142</u> Date <u>10/14/13</u> Time <u>10:13</u>	3. Relinquished by _____ Org. _____ Date _____ Time _____
1. Received by <i>Clinton Lum</i> Org. <u>4142</u> Date <u>10/14/13</u> Time <u>10:13</u>	3. Received by _____ Org. _____ Date _____ Time _____
2. Relinquished by _____ Org. _____ Date _____ Time _____	4. Relinquished by _____ Org. _____ Date _____ Time _____
2. Received by _____ Org. _____ Date _____ Time _____	4. Received by _____ Org. _____ Date _____ Time _____

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

CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY (Continuation)

Page 2 of 2

AR/COC **615095**

Project Name:		SWMU 8/58 GWM		Project/Task Manager:		Clinton Lum		Project/Task No.:		146422.10.11.01		Lab use		
Tech Area:														
Building:		Room:												
Sample No.	Fraction	Sample Location Detail		Depth (ft)	Date/Time Collected	Sample Matrix	Container		Preservative	Collection Method	Sample Type	Parameter & Method Requested		Lab Sample ID
							Type	Volume						
✓ 094779	-033 ✓	CCBA-MW2		117	10/14/13 9:41 ✓	GW	P	1 L	HNO3	G	SA	Gamma Spectroscopy (EPA 901.0)		
✓ 094779	-034 ✓	CCBA-MW2		117	10/14/13 9:43 ✓	GW	P	1 L	HNO3	G	SA	Gross Alpha and Beta (EPA 900.0)		
✓ 094779	-035	CCBA-MW2		117	10/14/13 9:45	GW	P	1 L	HNO3	G	SA	Isotopic Uranium (HASL 300)		
✓ 094780	-001 ✓	CCBA-MW2		117	10/14/13 9:26 ✓	GW	G	3x40 ml	HCL	G	DU	TCL VOC (SW846-8260B)		
✓ 094780	-002 ✓	CCBA-MW2		117	10/14/13 9:27 ✓	GW	AG	4x1L ✓	None	G	DU	TCL SVOC (SW846-8270C)		
✓ 094780	-009 ✓	CCBA-MW2		117	10/14/13 9:30 ✓	GW	P	500 ml	HNO3	G	DU	TAL Metals+U(SW846-6010/6020/7470)		
✓ 094780	-016	CCBA-MW2		117	10/14/13 9:31 ✓	GW	P	125 ml	None	G	DU	Anions-Br,Cl,F,SO4 (SW846-9056)		
✓ 094780	-017 ✓	CCBA-MW2		117	10/14/13 9:33 ✓	FGW	P	500 ml	HNO3	G	DU	Metals-Ca,Mg,K,Na (SW846-6020)		
✓ 094780	-018 ✓	CCBA-MW2		117	10/14/13 9:34 ✓	GW	P	125 ml	H2SO4	G	DU	NPN (EPA 353.2)		
✓ 094780	-020	CCBA-MW2		117	10/14/13 9:35 ✓	GW	P	250 ml	None	G	DU	Perchlorate (EPA 314.0)		
✓ 094780	-022	CCBA-MW2		117	10/14/13 9:36 ✓	GW	P	500 ml	None	G	DU	Alkalinity (SM2320B)		
✓ 094780	-024 ✓	CCBA-MW2		117	10/14/13 9:37 ✓	GW	AG	4x1L	None	G	DU	High Explosives (SW846-8321A mod)		
✓ 094780	-027 ✓	CCBA-MW2		117	10/14/13 9:40 ✓	GW	P	250 ml	NaOH	G	DU	Total Cyanide (SW846-9012)		
✓ 094780	-033 ✓	CCBA-MW2		117	10/14/13 9:41	GW	P	1 L	HNO3	G	DU	Gamma Spectroscopy (EPA 901.0)		
✓ 094780	-034	CCBA-MW2		117	10/14/13 9:43	GW	P	1 L	HNO3	G	DU	Gross Alpha and Beta (EPA 900.0)		
✓ 094780	-035 ✓	CCBA-MW2		117	10/14/13 9:45	GW	P	1 L	HNO3	G	DU	Isotopic Uranium (HASL 300)		
✓ 094781	-001 ✓	CCBA-TB3		NA	10/14/13 9:26 ✓	DIW	G	3x40 ml	HCL	G	TB	TCL VOC (SW846-8260B)		
Recipient Initials _____														

CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY

Print to CLBA - mw2
Page 1 of 2

Internal Lab

Batch No. *N/A*

SMO Use

AR/COC **615094**

Project Name: SWMU 8/58 GWM	Date Samples Shipped: <i>10/11/13</i>	SMO Authorization: <i>[Signature]</i>	<input type="checkbox"/> Waste Characterization
Project/Task Manager: Clinton Lum	Carrier/Waybill No. <i>210582</i>	SMO Contact Phone: <i>[Signature]</i>	<input type="checkbox"/> RMMA
Project/Task Number: 146422.10.11.01	Lab Contact: Edie Kent/803-556-8171	Lorraine Herrera/505-844-3199	<input type="checkbox"/> Released by COC No. <input checked="" type="checkbox"/> 4° Celsius
Service Order: CF262-14	Lab Destination: GEL	Send Report to SMO: Rita Kavanaugh/505-284-2553	
	Contract No.: PO 1303873		

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

Tech Area: _____
Building: _____ Room: _____ Operational Site: _____

Sample No.	Fraction	Sample Location Detail	Depth (ft)	Date/Time Collected	Sample Matrix	Container		Preservative	Collection Method	Sample Type	Parameter & Method Requested	Lab Sample ID
						Type	Volume					
094776	-001	CCBA-FB2	NA	10/11/13 8:20	DIW	G	3x40 ml	HCL	G	FB	TCL VOC (SW846-8260B)	
094777	-001	CCBA-EB1	NA	10/11/13 8:21	DIW	G	3x40 ml	HCL	G	EB	TCL VOC (SW846-8260B)	
094777	-002	CCBA-EB1	NA	10/11/13 8:22	DIW	AG	4x1L	None	G	EB	TCL SVOC (SW846-8270C)	
094777	-009	CCBA-EB1	NA	10/11/13 8:24	DIW	P	500 ml	HNO3	G	EB	TAL Metals+U(SW846-6010/6020/7470)	
094777	-016	CCBA-EB1	NA	10/11/13 8:25	DIW	P	125 ml	None	G	EB	Anions-Br,Cl,F,SO4 (SW846-9056)	
094777	-017	CCBA-EB1	NA	10/11/13 8:27	FDIW	P	500 ml	HNO3	G	EB	Metals-Ca,Mg,K,Na (SW846-6020)	
094777	-018	CCBA-EB1	NA	10/11/13 8:28	DIW	P	125 ml	H2SO4	G	EB	NPN (EPA 353.2)	
094777	-020	CCBA-EB1	NA	10/11/13 8:29	DIW	P	250 ml	None	G	EB	Perchlorate (EPA 314.0)	
094777	-022	CCBA-EB1	NA	10/11/13 8:30	DIW	P	500 ml	None	G	EB	Alkalinity (SM2320B)	
094777	-024	CCBA-EB1	NA	10/11/13 8:31	DIW	AG	4x1L	None	G	EB	High Explosives (SW846-8321A mod)	

Last Chain: <input type="checkbox"/> Yes	Sample Tracking	SMO Use	Special Instructions/QC Requirements:	Conditions on Receipt	
Validation Req'd: <input checked="" type="checkbox"/> Yes	Date Entered:		EDD <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		
Background: <input type="checkbox"/> Yes	Entered by:		Turnaround Time <input type="checkbox"/> 7 Day* <input type="checkbox"/> 15 Day* <input checked="" type="checkbox"/> 30 Day		
Confirmatory: <input type="checkbox"/> Yes	QC inits.:		Negotiated TAT <input type="checkbox"/>		
Sample Team Members	Name	Signature	Init.	Company/Organization/Phone/Cell	Sample Disposal <input type="checkbox"/> Return to Client <input checked="" type="checkbox"/> Disposal by Lab
	Alfred Santillanes	<i>[Signature]</i>	<i>[Init]</i>	SNL/4142/505-844-5130/505-228-0710	Return Samples By: Comments: Send report to Tim Jackson/4142/MS 0729/284-2547 FDIW (filtered in field w/40 micron filter). Alkalinity (as total CaCO3,HCO3,CO3). If Perchlorate detected, perform verification analysis using SW846-6850M. Gamma Spectroscopy as short list isotopes.
	William Gibson	<i>[Signature]</i>	<i>[Init]</i>	SNL/4142/505-284-3307/505-239-7367	

1. Relinquished by <i>[Signature]</i> Org. 4142 Date <i>10/11/13</i> Time <i>0915</i>	3. Relinquished by _____ Org. _____ Date _____ Time _____
1. Received by <i>[Signature]</i> SMO Org. 4142 Date <i>10/11/13</i> Time <i>0915</i>	3. Received by _____ Org. _____ Date _____ Time _____
2. Relinquished by _____ Org. _____ Date _____ Time _____	4. Relinquished by _____ Org. _____ Date _____ Time _____
2. Received by _____ Org. _____ Date _____ Time _____	4. Received by _____ Org. _____ Date _____ Time _____

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

CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY

Internal Lab

Batch No. <i>NA</i>	SMO Use	AR/COG	615091'
Project Name: SWMU 68 GWM	Date Samples Shipped:	SMO Authorization: <i>Doni Lum</i>	<input type="checkbox"/> Waste Characterization <input type="checkbox"/> RMMA <input type="checkbox"/> Released by COC No. <input checked="" type="checkbox"/> 4° Celsius
Project/Task Manager: Clinton Lum	Carrier/Waybill No.:	SMO Contact Phone:	
Project/Task Number: 146422.10.11.01	Lab Contact: Edie Kent/803-556-8171	Lorraine Herrera/505-844-3199	
Service Order: CF263-14	Lab Destination: GEL	Send Report to SMO:	
	Contract No.: PO 1303873	Rita Kavanaugh/505-284-2553	

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

Sample No.	Fraction	Sample Location Detail	Depth (ft)	Date/Time Collected	Sample Matrix	Container		Preservative	Collection Method	Sample Type	Parameter & Method Requested	Lab Sample ID
						Type	Volume					
✓ 094767	-001	OBS-MW1	153	10/8/13 9:10	GW	G	3x40 ml	HCL	G	SA	TCL VOC (SW846-8260B)	
✓ 094767	-002	OBS-MW1	153	10/8/13 9:11	GW	AG	4x1L	None	G	SA	TCL SVOC (SW846-8270C)	
✓ 094767	-009	OBS-MW1	153	10/8/13 9:14	GW	P	500 ml	HNO3	G	SA	TAL Metals+U(SW846-6010/6020/7470)	
✓ 094767	-014	OBS-MW1	153	10/8/13 9:15	GW	P	250 ml	None	G	SA	Hexavalent Chromium(SW846-7196A)	
✓ 094767	-016	OBS-MW1	153	10/8/13 9:16	GW	P	125 ml	None	G	SA	Anions-Br,Cl,F,SO4 (SW846-9056)	
✓ 094767	-017	OBS-MW1	153	10/8/13 9:18	FGW	P	500 ml	HNO3	G	SA	Metals-Ca,Mg,K,Na (SW846-6020)	
✓ 094767	-018	OBS-MW1	153	10/8/13 9:19	GW	P	125 ml	H2SO4	G	SA	NPN (EPA 353.2)	
✓ 094767	-020	OBS-MW1	153	10/8/13 9:20	GW	P	250 ml	None	G	SA	Perchlorate (EPA 314.0)	
✓ 094767	-022	OBS-MW1	153	10/8/13 9:21	GW	P	500 ml	None	G	SA	Alkalinity (SM2320B)	
✓ 094767	-024	OBS-MW1	153	10/8/13 9:22	GW	AG	4x1L	None	G	SA	High Explosives (SW846-8321A mod)	

Last Chain: <input type="checkbox"/> Yes	Sample Tracking	SMO Use	Special Instructions/QC Requirements:	Conditions on Receipt	
Validation Req'd: <input checked="" type="checkbox"/> Yes	Date Entered:		EDD <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		
Background: <input type="checkbox"/> Yes	Entered by:		Turnaround Time <input type="checkbox"/> 7 Day* <input type="checkbox"/> 15 Day* <input checked="" type="checkbox"/> 30 Day		
Confirmatory: <input type="checkbox"/> Yes	QC inits.:		Negotiated TAT <input type="checkbox"/>		
Sample Team Members	Name	Signature	Init.	Company/Organization/Phone/Cell	Sample Disposal <input type="checkbox"/> Return to Client <input checked="" type="checkbox"/> Disposal by Lab
	Robert Lynch	<i>Robert Lynch</i>	<i>RL</i>	SNL/4142/505-844-4013/505-250-7090	Return Samples By: Comments: Send report to Tim Jackson/4142/MS 0729/284-2547 FGW (filtered in field w/40 micron filter). Alkalinity (as total CaCO3,HCO3,CO3). If Perchlorate detected, perform verification analysis using SW846-6850M. Gamma Spectroscopy as short list isotopes.
	Alfred Santillanes	<i>Alfred Santillanes</i>	<i>AS</i>	SNL/4142/505-844-5130/505-228-0710	
	William Gibson	<i>William Gibson</i>	<i>WG</i>	SNL/4142/505-284-3307/505-239-7367	
					Lab Use

1. Relinquished by <i>Alfred Santillanes</i>	Org. 4142	Date 10/8/13	Time 09:55	3. Relinquished by	Org.	Date	Time
1. Received by <i>Doni Lum</i>	Org. 4142	Date 10/8/13	Time 09:55	3. Received by	Org.	Date	Time
2. Relinquished by	Org.	Date	Time	4. Relinquished by	Org.	Date	Time
2. Received by	Org.	Date	Time	4. Received by	Org.	Date	Time

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

CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY (Continuation)

Page 2 of 2AR/COC **615091**

Project Name: SWMU 68		Project/Task Manager: Clinton Lum		Project/Task No.: 146422.10.11.01									
Tech Area:													
Building:		Room:										Lab use	
Sample No.	Fraction	Sample Location Detail	Depth (ft)	Date/Time Collected	Sample Matrix	Container		Preservative	Collection Method	Sample Type	Parameter & Method Requested	Lab Sample ID	
						Type	Volume						
✓ 094767	-027	OBS-MW1	153	10/8/13 9:25 ✓	GW	P	250 ml	NaOH	G	SA	Total Cyanide (SW846-9012)		
✓ 094767	-033 ✓	OBS-MW1	153	10/8/13 9:26 ✓	GW	P	1 L	HNO3	G	SA	Gamma Spectroscopy (EPA 901.0)		
✓ 094767	-034 ✓	OBS-MW1	153	10/8/13 9:28 ✓	GW	P	1 L	HNO3	G	SA	Gross Alpha and Beta (EPA 900.0)		
✓ 094767	-035 ✓	OBS-MW1	153	10/8/13 9:30 ✓	GW	P	1 L	HNO3	G	SA	Isotopic Uranium (HASL 300)		
✓ 094768	-001 ✓	OBS-MW1	153	10/8/13 9:10 ✓	GW	G	3x40 ml	HCL	G	DU	TCL VOC (SW846-8260B)		
✓ 094768	-002 ✓	OBS-MW1	153	10/8/13 9:11 ✓	GW	AG	4x1L	None	G	DU	TCL SVOC (SW846-8270C)		
✓ 094768	-009	OBS-MW1	153	10/8/13 9:14 ✓	GW	P	500 ml	HNO3	G	DU	TAL Metals+U(SW846-6010/6020/7470)		
✓ 094768	-014 ✓	OBS-MW1	153	10/8/13 9:15 ✓	GW	P	250 ml	None	G	DU	Hexavalent Chromium(SW846-7196A)		
✓ 094768	-016 ✓	OBS-MW1	153	10/8/13 9:16 ✓	GW	P	125 ml	None	G	DU	Anions-Br,Cl,F,SO4 (SW846-9056)		
✓ 094768	-017 ✓	OBS-MW1	153	10/8/13 9:18 ✓	FGW	P	500 ml	HNO3	G	DU	Metals-Ca,Mg,K,Na (SW846-6020)		
✓ 094768	-018 ✓	OBS-MW1	153	10/8/13 9:19 ✓	GW	P	125 ml	H2SO4	G	DU	NPN (EPA 353.2)		
✓ 094768	-020 ✓	OBS-MW1	153	10/8/13 9:20 ✓	GW	P	250 ml	None	G	DU	Perchlorate (EPA 314.0)		
✓ 094768	-022 ✓	OBS-MW1	153	10/8/13 9:21 ✓	GW	P	500 ml	None	G	DU	Alkalinity (SM2320B)		
✓ 094768	-024 ✓	OBS-MW1	153	10/8/13 9:22 ✓	GW	AG	4x1L ✓	None	G	DU	High Explosives (SW846-8321A mod)		
✓ 094768	-027	OBS-MW1	153	10/8/13 9:25 ✓	GW	P	250 ml	NaOH	G	DU	Total Cyanide (SW846-9012)		
✓ 094768	-033 ✓	OBS-MW1	153	10/8/13 9:26 ✓	GW	P	1 L	HNO3	G	DU	Gamma Spectroscopy (EPA 901.0)		
✓ 094768	-034 ✓	OBS-MW1	153	10/8/13 9:28 ✓	GW	P	1 L	HNO3	G	DU	Gross Alpha and Beta (EPA 900.0)		
✓ 094768	-035 ✓	OBS-MW1	153	10/8/13 9:30 ✓	GW	P	1 L	HNO3	G	DU	Isotopic Uranium (HASL 300)		
✓ 094769	-001 ✓	OBS-TB3 ✓	NA	10/8/13 9:10	DIW	G	3x40 ml	HCL	G	TB	TCL VOC (SW846-8260B)		
Recipient Initials _____													

CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY

Internal Lab ✓

Batch No. _____	SMO Use _____	AR/COC	615089
Project Name: <u>SWMU 68 GWM</u>	Date Samples Shipped: _____	SMO Authorization: <u><i>David...</i></u>	<input type="checkbox"/> Waste Characterization <input type="checkbox"/> RMMA <input type="checkbox"/> Released by COC No. <input checked="" type="checkbox"/> 4° Celsius
Project/Task Manager: <u>Clinton Lum</u>	Carrier/Waybill No. _____	SMO Contact Phone: _____	
Project/Task Number: <u>146422.10.11.01</u>	Lab Contact: <u>Edie Kent/803-556-8171</u>	Lorraine Herrera/505-844-3199	
Service Order: <u>CF263-14</u>	Lab Destination: <u>GEL</u>	Send Report to SMO: _____	
	Contract No.: <u>PO 1303873</u>	Rita Kavanaugh/505-284-2553	Bill to: Sandia National Laboratories (Accounts Payable), P.O. Box 5800, MS-0154 Albuquerque, NM 87185-0154

Tech Area: _____	Operational Site: _____
Building: _____	Room: _____

Sample No.	Fraction	Sample Location Detail	Depth (ft)	Date/Time Collected		Sample Matrix	Container		Preservative	Collection Method	Sample Type	Parameter & Method Requested	Lab Sample ID
							Type	Volume					
✓ 094762	-001 ✓	OBS-MW2	252	10/7/13	9:28 ✓	GW	G	3x40 ml	HCL	G	SA	TCL VOC (SW846-8260B)	
✓ 094762	-002 ✓	OBS-MW2	252	10/7/13	9:29 ✓	GW	AG	4x1L	None	G	SA	TCL SVOC (SW846-8270C)	
✓ 094762	-009 ✓	OBS-MW2	252	10/7/13	9:31 ✓	GW	P	500 ml	HNO3	G	SA	TAL Metals+U(SW846-6010/6020/7470)	
✓ 094762	-014 ✓	OBS-MW2	252	10/7/13	9:32 ✓	GW	P	250 ml	None	G	SA	Hexavalent Chromium(SW846-7196A)	
✓ 094762	-016 ✓	OBS-MW2	252	10/7/13	9:33 ✓	GW	P	125 ml	None	G	SA	Anions-Br,Cl,F,SO4 (SW846-9056)	
✓ 094762	-017 ✓	OBS-MW2	252	10/7/13	9:35 ✓	FGW	P	500 ml	HNO3	G	SA	Metals-Ca,Mg,K,Na (SW846-6020)	
✓ 094762	-018 ✓	OBS-MW2	252	10/7/13	9:36 ✓	GW	P	125 ml	H2SO4	G	SA	NPN (EPA 353.2)	
✓ 094762	-020 ✓	OBS-MW2	252	10/7/13	9:37 ✓	GW	P	250 ml	None	G	SA	Perchlorate (EPA 314.0)	
✓ 094762	-022 ✓	OBS-MW2	252	10/7/13	9:38 ✓	GW	P	500 ml	None	G	SA	Alkalinity (SM2320B)	
✓ 094762	-024 ✓	OBS-MW2	252	10/7/13	9:39 ✓	GW	AG	4x1L	None	G	SA	High Explosives (SW846-8321A mod)	

Last Chain: <input type="checkbox"/> Yes	Sample Tracking	SMO Use	Special Instructions/QC Requirements:	Conditions on Receipt	
Validation Req'd: <input checked="" type="checkbox"/> Yes	Date Entered: _____		EDD <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		
Background: <input type="checkbox"/> Yes	Entered by: _____		Turnaround Time <input type="checkbox"/> 7 Day* <input type="checkbox"/> 15 Day* <input checked="" type="checkbox"/> 30 Day		
Confirmatory: <input type="checkbox"/> Yes	QC inits.: _____		Negotiated TAT <input type="checkbox"/>		
Sample Team Members	Name	Signature	Init.	Company/Organization/Phone/Cell	Sample Disposal <input type="checkbox"/> Return to Client <input checked="" type="checkbox"/> Disposal by Lab
	Robert Lynch	<i>Robert Lynch</i>	RL	SNL/4142/505-844-4013/505-250-7090	Return Samples By: Comments: Send report to Tim Jackson/4142/MS 0729/284-2547 FGW (filtered in field w/40 micron filter). Alkalinity (as total CaCO3,HCO3,CO3). If Perchlorate detected, perform verification analysis using SW846-6850M. Gamma Spectroscopy as short list isotopes.
	Alfred Santillanes	<i>Alfred Santillanes</i>	AS	SNL/4142/505-844-5130/505-228-0710	
William Gibson	<i>William Gibson</i>	WG	SNL/4142/505-284-3307/505-239-7367		
					Lab Use

1. Relinquished by <u>Alfred Santillanes</u> Org. <u>4142</u> Date <u>10/7/13</u> Time <u>11:13</u>	3. Relinquished by _____ Org. _____ Date _____ Time _____
1. Received by <u>David...</u> Org. <u>4142</u> Date <u>10/7/13</u> Time <u>11:13</u>	3. Received by _____ Org. _____ Date _____ Time _____
2. Relinquished by _____ Org. _____ Date _____ Time _____	4. Relinquished by _____ Org. _____ Date _____ Time _____
2. Received by _____ Org. _____ Date _____ Time _____	4. Received by _____ Org. _____ Date _____ Time _____

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

CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY

Internal Lab	SMO Use	AR/COC	615092
Batch No. <i>W/A</i>	Date Samples Shipped: <i>10/9/13</i>	<input type="checkbox"/> Waste Characterization <input type="checkbox"/> RMMA <input type="checkbox"/> Released by COC No. <input checked="" type="checkbox"/> 4° Celsius	
Project Name: SWMU 68 GWM	Carrier/Waybill No.	SMO Authorization: <i>[Signature]</i> SMO Contact Phone: <i>9MO</i> Lorraine Herrera/505-844-3199	
Project/Task Manager: Clinton Lum	Lab Contact: Edie Kent/803-556-8171	Send Report to SMO: Rita Kavanaugh/505-284-2553	
Project/Task Number: 146422.10.11.01	Lab Destination: GEL		
Service Order: CF263-14	Contract No.: PO 1303873		

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

Sample No.	Fraction	Sample Location Detail	Depth (ft)	Date/Time Collected	Sample Matrix	Container		Preservative	Collection Method	Sample Type	Parameter & Method Requested	Lab Sample ID
						Type	Volume					
094770	-001	OBS-FB2	NA	10/9/13 9:19	DIW	G	3x40ml	HCL	G	FB	TCL VOC (SW846-8260B)	
094771	-001	OBS-MW3	208	10/9/13 9:22	GW	G	3x40ml	HCL	G	SA	TCL VOC (SW846-8260B)	
094771	-002	OBS-MW3	208	10/9/13 9:23	GW	AG	4x1L	None	G	SA	TCL SVOC (SW846-8270C)	
094771	-009	OBS-MW3	208	10/9/13 9:25	GW	P	500 ml	HNO3	G	SA	TAL Metals+U(SW846-6010/6020/7470)	
094771	-014	OBS-MW3	208	10/9/13 9:26	GW	P	250 ml	None	G	SA	Hexavalent Chromium(SW846-7196A)	
094771	-016	OBS-MW3	208	10/9/13 9:27	GW	P	125 ml	None	G	SA	Anions-Br,Cl,F,SO4 (SW846-9056)	
094771	-017	OBS-MW3	208	10/9/13 9:29	FGW	P	500 ml	HNO3	G	SA	Metals-Ca,Mg,K,Na (SW846-6020)	
094771	-018	OBS-MW3	208	10/9/13 9:30	GW	P	125 ml	H2SO4	G	SA	NPN (EPA 353.2)	
094771	-020	OBS-MW3	208	10/9/13 9:31	GW	P	250 ml	None	G	SA	Perchlorate (EPA 314.0)	
094771	-022	OBS-MW3	208	10/9/13 9:32	GW	P	500 ml	None	G	SA	Alkalinity (SM2320B)	

Last Chain: <input checked="" type="checkbox"/> Yes *	Sample Tracking	SMO Use	Special Instructions/QC Requirements:	Conditions on Receipt	
Validation Req'd: <input checked="" type="checkbox"/> Yes	Date Entered:		EDD <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Receipt	
Background: <input type="checkbox"/> Yes	Entered by:		Turnaround Time <input type="checkbox"/> 7 Day* <input type="checkbox"/> 15 Day* <input checked="" type="checkbox"/> 30 Day		
Confirmatory: <input type="checkbox"/> Yes	QC inits.:		Negotiated TAT <input type="checkbox"/>		
Sample Team Members	Name	Signature	Init.	Company/Organization/Phone/Cell	Sample Disposal <input type="checkbox"/> Return to Client <input checked="" type="checkbox"/> Disposal by Lab
	Robert Lynch	<i>[Signature]</i>	RL	SNL/4142/505-844-4013/505-250-7090	Return Samples By:
	Alfred Santillanes	<i>[Signature]</i>	AS	SNL/4142/505-844-5130/505-228-0710	
	William Gibson	<i>[Signature]</i>	WG	SNL/4142/505-284-3307/505-239-7367	
					Comments: Send report to Tim Jackson/4142/MS 0729/284-2547 FGW (filtered in field w/40 micron filter). Alkalinity (as total CaCO3,HCO3,CO3). If Perchlorate detected, perform verification analysis using SW846-6850M. Gamma Spectroscopy as short list isotopes.

1. Relinquished by <i>[Signature]</i> Org. 4142 Date <i>10/9/13</i> Time <i>1000</i>	3. Relinquished by	Org.	Date	Time
1. Received by <i>[Signature]</i> Org. 4142 Date <i>10/9/13</i> Time <i>1000</i>	3. Received by	Org.	Date	Time
2. Relinquished by	4. Relinquished by	Org.	Date	Time
2. Received by	4. Received by	Org.	Date	Time

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

CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY

Prior to OBS - MW
Page 1 of 2

Internal Lab	SMO Use	AR/COC	615090
Batch No. <i>NH</i>			
Project Name: SWMU 68 GWM	Date Samples Shipped:	SMO Authorization: <i>[Signature]</i>	<input type="checkbox"/> Waste Characterization <input type="checkbox"/> RMMA <input type="checkbox"/> Released by COC No. <input checked="" type="checkbox"/> 4° Celsius
Project/Task Manager: Clinton Lum	Carrier/Waybill No.:	SMO Contact Phone:	
Project/Task Number: 146422.10.11.01	Lab Contact: Edie Kent/803-556-8171	Lorraine Herrera/505-844-3199	
Service Order: CF263-14	Lab Destination: GEL	Send Report to SMO:	
	Contract No.: PO 1303873	Rita Kavanaugh/505-284-2553	

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

Sample No.	Fraction	Sample Location Detail	Depth (ft)	Date/Time Collected		Sample Matrix	Container		Preservative	Collection Method	Sample Type	Parameter & Method Requested	Lab Sample ID
							Type	Volume					
✓ 094764	-001	OBS-FB1	NA	10/7/13	10:34	DIW	G	3x40 ml	HCL	G	FB	TCL VOC (SW846-8260B)	
✓ 094765	-001	OBS-EB1	NA	10/7/13	10:34	DIW	G	3x40 ml	HCL	G	EB	TCL VOC (SW846-8260B)	
✓ 094765	-002	OBS-EB1	NA	10/7/13	10:35	DIW	AG	4x1L	None	G	EB	TCL SVOC (SW846-8270C)	
✓ 094765	-009	OBS-EB1	NA	10/7/13	10:37	DIW	P	500 ml	HNO3	G	EB	TAL Metals+U(SW846-6010/6020/7470)	
✓ 094765	-014	OBS-EB1	NA	10/7/13	10:38	DIW	P	250 ml	None	G	EB	Hexavalent Chromium(SW846-7196A)	
✓ 094765	-016	OBS-EB1	NA	10/7/13	10:39	DIW	P	125 ml	None	G	EB	Anions-Br,Cl,F,SO4 (SW846-9056)	
✓ 094765	-017	OBS-EB1	NA	10/7/13	10:41	FDIW	P	500 ml	HNO3	G	EB	Metals-Ca,Mg,K,Na (SW846-6020)	
✓ 094765	-018	OBS-EB1	NA	10/7/13	10:42	DIW	P	125 ml	H2SO4	G	EB	NPN (EPA 353.2)	
✓ 094765	-020	OBS-EB1	NA	10/7/13	10:43	DIW	P	250 ml	None	G	EB	Perchlorate (EPA 314.0)	
✓ 094765	-022	OBS-EB1	NA	10/7/13	10:44	DIW	P	500 ml	None	G	EB	Alkalinity (SM2320B)	

Last Chain: <input type="checkbox"/> Yes	Sample Tracking	SMO Use	Special Instructions/QC Requirements:	Conditions on Receipt	
Validation Req'd: <input checked="" type="checkbox"/> Yes	Date Entered:		EDD <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		
Background: <input type="checkbox"/> Yes	Entered by:		Turnaround Time <input type="checkbox"/> 7 Day* <input type="checkbox"/> 15 Day* <input checked="" type="checkbox"/> 30 Day		
Confirmatory: <input type="checkbox"/> Yes	QC inits.:		Negotiated TAT <input type="checkbox"/>		
Sample Team Members	Name	Signature	Init.	Company/Organization/Phone/Cell	Sample Disposal <input type="checkbox"/> Return to Client <input checked="" type="checkbox"/> Disposal by Lab
	Robert Lynch	<i>[Signature]</i>	RL	SNL/4142/505-844-4013/505-250-7090	Return Samples By: Comments: Send report to Tim Jackson/4142/MS 0729/284-2547 FDIW (filtered in field w/40 micron filter). Alkalinity (as total CaCO3,HCO3,CO3). If Perchlorate detected, perform verification analysis using SW846-6850M. Gamma Spectroscopy as short list isotopes.
	Alfred Santillanes	<i>[Signature]</i>	AS	SNL/4142/505-844-5130/505-228-0710	
William Gibson	<i>[Signature]</i>	WG	SNL/4142/505-284-3307/505-239-7367		

1. Relinquished by <i>[Signature]</i> Org. 4142 Date 10/7/13 Time 11:08	3. Relinquished by	Org.	Date	Time
1. Received by <i>[Signature]</i> Org. 4142 Date 10/7/13 Time 11:08	3. Received by	Org.	Date	Time
2. Relinquished by	4. Relinquished by	Org.	Date	Time
2. Received by	4. Received by	Org.	Date	Time

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

Appendix C

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

Memorandum

Date: November 15, 2013
To: File
From: Linda Thal
Subject: Inorganic Data Review and Validation – SNL
Site: SWMU 8/58 GWM
AR/COC: 615093
SDG: 335372
Laboratory: GEL
Project/Task: 146422.10.11.01
Analysis: General Chemistry

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

Summary

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

Total cyanide:

1. The intercept for total cyanide was negative with an absolute value > the MDL but $\leq 3X$ the MDL. The associated sample result was ND and will be **qualified UJ,I5**.
2. Total cyanide was detected in the ICB/CCB at negative values with absolute values < the PQL. The associated sample result was ND and will be **qualified UJ,B4**.

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

Holding Times and Preservation

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

Calibration

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

Blanks

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

Laboratory Control Sample (LCS)

All LCS acceptance criteria were met.

Matrix Spike (MS)

All MS/PS recoveries met QC acceptance criteria.

Nitrate/Nitrite, anions and total alkalinity:

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

Laboratory Replicate

The replicate analyses met all QC acceptance criteria.

Nitrate/Nitrite, anions and total alkalinity:

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

Detection Limits/Dilutions

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

Nitrate/Nitrite:

The sample was diluted 10X.

Anions:

The sample was diluted 5X for chloride and sulfate and 2X for fluoride.

Other QC

No other specific issues that affect data quality were identified.

Reviewed by: Monica Dymerski **Level I** **Date:** 11/20/13

Memorandum

Date: November 15, 2013

To: File

From: Linda Thal

Subject: LC/MS/MS Organic Data Review and Validation – SNL
Site: SWMU 8/58 GWM
AR/COC: 615093
SDG: 335372
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

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 initial calibration RFs for m-nitrotoluene, o-nitrotoluene and p-nitrotoluene were <0.05 but ≥ 0.01 . All associated sample results were NDs and will be **qualified UJ,I4**.

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

Laboratory Control Sample (LCS)

All LCS recoveries met QC acceptance criteria.

Detection Limits/Dilutions

All detection limits were properly reported. 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: 11/20/13

Memorandum

Date: November 15, 2013

To: File

From: Linda Thal

Subject: Inorganic Data Review and Validation – SNL
Site: SWMU 8/58 GWM
AR/COC: 615093
SDG: 335372 and 335380
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

One unfiltered sample was prepared and analyzed with approved procedures using methods EPA 6010B (ICP-AES), EPA 6020 (ICP-MS) and EPA 7470A (CVAA mercury). One filtered sample was prepared and analyzed with approved procedure using method EPA 6020 (ICP-MS). Data were reported for all required analytes. No problems were identified with the data package that resulted in the qualification of data.

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

Holding Times and Preservation

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

ICP-MS Instrument Tune

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.

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.

ICP-AES and ICP-MS:

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

Laboratory Replicate

The replicate met all QC acceptance criteria.

ICP-AES and ICP-MS:

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)

The LCS met all QC acceptance criteria.

Detection Limits/Dilutions

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

ICP Interference Check Sample (ICS A and AB)

Results of the ICS A and AB analyses were not evaluated because the 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.

ICP-AES and ICP-MS:

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

Other QC

No other specific issues that affect data quality were identified.

Reviewed by: Monica Dymerski **Level I** **Date:** 11/20/13



Sample Findings Summary



AR/COC: 615093

Page 1 of 1

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
DOE EML HASL-300, U-02-RC			
	094774-035/CCBA-MW1	Uranium-235/236 (15117-96-1/13982-70-)	BD, FR3
EPA 900.0/SW846 9310			
	094774-034/CCBA-MW1	ALPHA (12587-46-1)	J, FR7,MS1
	094774-034/CCBA-MW1	BETA (12587-47-2)	J, FR7,MS1
EPA 901.1			
	094774-033/CCBA-MW1	Americium-241 (14596-10-2)	BD, FR3
	094774-033/CCBA-MW1	Cesium-137 (10045-97-3)	BD, FR3
	094774-033/CCBA-MW1	Cobalt-60 (10198-40-0)	BD, FR3
	094774-033/CCBA-MW1	Potassium-40 (13966-00-2)	BD, FR3
SW846 3510C/8270D			
	094774-002/CCBA-MW1	Hexachlorocyclopentadiene (77-47-4)	UJ, MS5
SW846 3535/8321A Modified			
	094774-024/CCBA-MW1	m-Nitrotoluene (99-08-1)	UJ, I4
	094774-024/CCBA-MW1	o-Nitrotoluene (88-72-2)	UJ, I4
	094774-024/CCBA-MW1	p-Nitrotoluene (99-99-0)	UJ, I4
SW846 8260B DOE-AL			
	094773-001/CCBA-FB1	Acetone (67-64-1)	10U, B
SW846 9012B			
	094774-027/CCBA-MW1	Cyanide, Total (57-12-5)	UJ, I5,B4

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

Memorandum

Date: November 15, 2013
To: File
From: Linda Thal
Subject: Radiochemical Data Review and Validation – SNL
Site: SWMU 8/58 GWM
AR/COC: 615093
SDG: 335372
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

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.

Gammascpec and Alphaspec U:

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 ≤3X the MDA will be **qualified J,FR7**.

Holding Times and Preservation

The sample was 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.

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 sample was not diluted. All required detection limits were met.

Other QC

No other specific issues that affect data quality were identified.

Reviewed by: Monica Dymerski

Level I

Date: 11/20/13

Memorandum

Date: November 15, 2013
To: File
From: Linda Thal
Subject: GC/MS Organic Data Review and Validation – SNL
Site: SWMU 8/58 GWM
AR/COC: 615093
SDG: 335372
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

One sample was prepared and analyzed with accepted procedures using methods EPA 3510/8270D (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 was > laboratory acceptance criteria for hexachlorocyclopentadiene. The associated sample result was ND and will be **qualified UJ,MS5**.

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

Holding Times

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

Instrument Tune

All instrument tune requirements were met.

Calibration

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

The ICAL intercept for 4-nitrophenol was positive and > the MDL. The associated sample result was ND and will not be qualified.

The ICAL %RSDs were >15% but ≤40% for 2,4-dinitrophenol; p-nitroaniline 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 blank.

Surrogates

All surrogate recoveries met QC acceptance criteria.

Internal Standards

All internal standards met QC acceptance criteria.

Matrix Spike/Matrix Spike Duplicate (MS/MSD)

All MS/MSD acceptance criteria were met except as noted above in the Summary section. It should be noted that the MS/MSD was performed on a sample of similar matrix from another SNL SDG. No data will be qualified as a result.

Laboratory Control Sample (LCS)

All LCS acceptance criteria were met.

Detection Limits/Dilutions

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

Tentatively Identified Compounds (TICs)

TIC reports were not required.

Other QC

No other specific issues that affect data quality were identified.

Reviewed by: Monica Dymerski

Level I

Date: 11/20/13

Memorandum

Date: November 15, 2013
To: File
From: Linda Thal
Subject: GC/MS Organic Data Review and Validation – SNL
Site: SWMU 8/58 GWM
AR/COC: 615093
SDG: 335372
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

Three 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. Acetone was detected in the MB at < the PQL. The associated result for the FB, sample 335372001, was a detect < the PQL and <10X the MB value and will be **qualified 10U,B** at the PQL.

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

Holding Times

The samples were analyzed within the prescribed holding 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 follows.

The ICAL intercept was positive and > the MDL for 1,2-dibromo-3-chloropropane. The associated sample results were NDs and will not be qualified.

The ICAL %RSD was >15% but ≤40% and the CCV was > 20% with positive bias for bromoform. The associated sample results were NDs and since a positive CCV is not considered a second infraction, will not be qualified.

The ICV %Ds were >20% with positive bias for 2-hexanone and 2-butanone. The associated sample results were NDs and will not be qualified.

Blanks

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

Chloroform and bromodichloromethane were detected at > the PQL and dibromochloromethane was detected at < the PQL in the FB, sample 335372001. The 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.

Detection Limits/Dilutions

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

Tentatively Identified Compounds (TICs)

TIC reports were not required.

Other QC

A TB and a FB were submitted with AR/COC 615093.

No other specific issues that affect data quality were identified.

Reviewed by: Monica Dymerski

Level I

Date: 11/20/13

Data Validation Summary Worksheet

AR/COC #: 615093

Site/Project: SWMU 8/58 GWM

Validation Date: 11/14/2013

SDG #: 335372 and 335380

Laboratory: GEL

Validator: Linda Thal

Matrix: Aqueous

of Samples: 15 CVR present: Yes

Analysis Type: Organic Metals

AR/COC(s) present: Yes

Sample Container Integrity: OK

Rad Gen Chem

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

Hold Time/Preservation Outliers								
Sample Number	Laboratory ID	Analysis	Pres.	Coll. Date	Prep. Date	Anal. Date	Anal. within 2X HT	Anal. beyond 2X HT
None								

Comments: Sampled 10/10/2013

Validated by: 

Organic Worksheet (GC/MS)

AR/COC #: 615093

SDG #: 335372

Matrix: Aqueous

Laboratory Sample IDs: 335372001, -002 and -014

Method/Batch #: 8260B: 1341413

Tuning (pass/fail): Pass TICs Required? (yes/no): No

Analyte (outliers)	Calibration				Method Blank	5X (10X) MB	LCS %R	MS %R	MSD %R	MS/ MSD RPD	TB -014	TB X5	FB -001	FB X5 (X10)
	Int.	RF	RSD/ R ²	(ICV) CCV %D										
Acetone	NA	✓	✓	✓	3.98J	(39.8)	✓	✓	✓	✓	✓	NA	3.31J	(33.1)
Bromodichloromethane	NA	✓	✓	✓	✓	NA	✓	✓	✓	✓	✓	NA	1.02	5.1
Chloroform	NA	✓	✓	✓	✓	NA	✓	✓	✓	✓	✓	NA	3.12	15.6
Dibromochloromethane	NA	✓	✓	✓	✓	NA	✓	✓	✓	✓	✓	NA	0.6J	3.0
Bromoform	NA	✓	17	+24.6	✓	NA	✓	✓	✓	✓	✓	NA	✓	NA
1,2-Dibromo-3-chloropropane	+1.5	NA	✓	✓	✓	NA	✓	✓	✓	✓	✓	NA	✓	NA
2-Butanone	NA	✓	✓	(+27)	✓	NA	✓	✓	✓	✓	✓	NA	✓	NA
2-Hexanone	NA	✓	✓	(+33)	✓	NA	✓	✓	✓	✓	✓	NA	✓	NA
Surrogate Recovery Outliers														
Sample ID														
None														
IS Outliers														
Sample ID	Area	RT	Area	RT	Area	RT	Area	RT	Area	RT	Area	RT	Area	RT
None														

Comments: HTs OK: ICAL VOA6.I 10/21/2013; MS/MSD performed on -002 spiked with trichlorotrifluoroethane; Methylene chloride linear intercept < MDL; 1,2-Dibromo-3-chloropropane linear intercept >MDL

Organic Worksheet (GC/MS)

AR/COC #: 615093

SDG #: 335372

Matrix: Aqueous

Laboratory Sample IDs: 335372003

Method/Batch #: 8270D: 1338333/1338332 (prep)

Tuning (pass/fail): Pass

TICs Required? (yes/no): No

Analyte (outliers)	Calibration				Method Blank	5X (10X) Blank	LCS %R	MS %R	MSD %R	MS/ MSD RPD				
	Int.	RF	RSD/ R ²	(ICV) CCV %D										
2,4-Dinitrophenol	NA	✓	16.6	✓	✓	NA	✓	✓	✓	✓				
4-Nitrophenol	+3.9	NA	✓	✓	✓	NA	✓	✓	✓	✓				
p-Nitroaniline	NA	✓	18	✓	✓	NA	✓	✓	✓	✓				
2-Methyl-4,6-dinitrophenol	NA	✓	19.2	✓	✓	NA	✓	✓	✓	✓				
Hexachlorocyclopentadiene	NA	✓	✓	✓	✓	NA	✓	✓	✓	39.9				
Surrogate Recovery Outliers														
Sample ID														
None														
IS Outliers														
Sample ID	Area	RT	Area	RT	Area	RT	Area	RT	Area	RT	Area	RT	Area	RT
None														

Comments: HTs OK; MS/MSD on sample from another SNL SDG; ICAL MSD5.I 10/08/2013;

High Explosives Worksheet (LC/MS/MS)

AR/COC #: 615093

SDG #: 335372

Matrix: Aqueous

Laboratory Sample IDs: 335372009

Method/Batch #: 8321A: 1338561/1338560 (prep)

Analyte (Outliers)	Initial Calibration			Continuing Calibration				Method Blank	5X (10X) Blank	LCS %R	MS %R	MSD %R	MS/MSD RPD	CRI	EB 335046 -024		
	Int.	RF	COD RSD/R ²	ICV	CCV %D	ICB	CCB										
m-Nitrotoluene	NA	.029	✓	✓	✓	✓	✓	✓	NA	✓	✓	✓	✓	✓	✓		
o-Nitrotoluene	NA	.043	✓	✓	✓	✓	✓	✓	NA	✓	✓	✓	✓	✓	✓		
p-Nitrotoluene	NA	.019	✓	✓	✓	✓	✓	✓	NA	✓	✓	✓	✓	✓	✓		
Surrogate Recovery Outliers																	
Sample ID																	
None																	
Internal Standard Outliers																	
Sample ID	Area	RT	Sample ID	Area	RT	Sample ID	Area	RT									
None																	

Comments: HTs OK; MS/MSD on SNL sample from another SDG; primary analytes only; LCMSMS#3; all sample and QC extracts diluted 1:1

Inorganic Metals Worksheet

AR/COC #: 615093

SDG #: 335372 and 335380

Matrix: Aqueous

Laboratory Sample IDs: 335372004 (UF); 335380001 (F – Na, K, Mg and Ca only)

Method/Batch #: **6010**: 1339649; **6020**: 1339756 (F&UF); **7470A**:1342669

ICPMS Mass Cal (pass/fail): Pass

ICPMS Resolution (pass/fail): Pass

Analyte (outliers)	Calibration						Method Blank mg/L	5X Blank or (5X MDL) mg/L	LCS %R	MS %R	Lab Rep RPD	Serial Dil. %D	ICS AB %R	ICS A ± MDL ug/L x50 (mg/L)	CRA CRI %R				
	Int. mg/L	R ²	ICV	CCV	ICB ug/L	CCB ug/L													
None																			

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

Comments: HTs OK; ICP and ICP-MS matrix QC on samples from other SNL SDGs; Hg matrix QC on -004; Ca, Mg, Na >4X spike amount;
Ca and Na diluted 10X for all samples

CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY

Internal Lab

Batch No. N/A

SMO Use

AR/COC **615093**

Project Name: <u>SWMU 8/58 GWM</u>	Date Samples Shipped: <u>10/10/13</u>	SMO Authorization: <u>[Signature]</u>
Project/Task Manager: <u>Clinton Lum</u>	Carrier/Waybill No.: <u>210418</u>	SMO Contact Phone: <u>[Signature]</u>
Project/Task Number: <u>146422.10.11.01</u>	Lab Contact: <u>Edie Kent/803-556-8171</u>	Lorraine Herrera/505-844-3199
Service Order: <u>CF262-14</u>	Lab Destination: <u>GEL</u>	Send Report to SMO: <input checked="" type="checkbox"/> <u>4° Celsius</u>
	Contract No.: <u>PO 1303873</u>	Rita Kavanaugh/505-284-2553

Waste Characterization
 RMMA
 Released by COC No.
 4° Celsius

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

Tech Area: _____
 Building: _____ Room: _____ Operational Site: _____

Sample No.	Fraction	Sample Location Detail	Depth (ft)	Date/Time Collected	Sample Matrix	Container		Preservative	Collection Method	Sample Type	Parameter & Method Requested	Lab Sample ID
						Type	Volume					
094773	-001	CCBA-FB1	NA	10/10/13 9:20	DIW	G	3x40 ml	HCL	G	FB	TCL VOC (SW846-8260B)	335372 001
094774	-001	CCBA-MW1	79	10/10/13 9:24	GW	G	3x40 ml	HCL	G	SA	TCL VOC (SW846-8260B)	335372 002
094774	-002	CCBA-MW1	79	10/10/13 9:25	GW	AG	4x1L	None	G	SA	TCL SVOC (SW846-8270C)	335372 003
094774	-009	CCBA-MW1	79	10/10/13 9:27	GW	P	500 ml	HNO3	G	SA	TAL Metals+U(SW846-6010/6020/7470)	335372 004
094774	-016	CCBA-MW1	79	10/10/13 9:28	GW	P	125 ml	None	G	SA	Anions-Br,Cl,F,SO4 (SW846-9056)	335372 005
094774	-017	CCBA-MW1	79	10/10/13 9:30	FGW	P	500 ml	HNO3	G	SA	Metals-Ca,Mg,K,Na (SW846-6020)	335380 001
094774	-018	CCBA-MW1	79	10/10/13 9:31	GW	P	125 ml	H2SO4	G	SA	NPN (EPA 353.2)	335372 006
094774	-020	CCBA-MW1	79	10/10/13 9:32	GW	P	250 ml	None	G	SA	Perchlorate (EPA 314.0)	335372 007
094774	-022	CCBA-MW1	79	10/10/13 9:33	GW	P	500 ml	None	G	SA	Alkalinity (SM2320B)	335372 008
094774	-024	CCBA-MW1	79	10/10/13 9:34	GW	AG	4x1L	None	G	SA	High Explosives (SW846-8321A mod)	335372 009

Last Chain: <input type="checkbox"/> Yes	Sample Tracking	SMO Use	Special Instructions/QC Requirements:	Conditions on Receipt	
Validation Req'd: <input checked="" type="checkbox"/> Yes	Date Entered:		EDD <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		
Background: <input type="checkbox"/> Yes	Entered by:		Turnaround Time <input type="checkbox"/> 7 Day* <input type="checkbox"/> 15 Day* <input checked="" type="checkbox"/> 30 Day		
Confirmatory: <input type="checkbox"/> Yes	QC inits.:		Negotiated TAT <input type="checkbox"/>		
Sample Team Members	Name	Signature	Init.	Company/Organization/Phone/Cell	Sample Disposal <input type="checkbox"/> Return to Client <input checked="" type="checkbox"/> Disposal by Lab
	Robert Lynch	[Signature]	RL	SNL/4142/505-844-4013/505-250-7090	Return Samples By: Comments: Send report to Tim Jackson/4142/MS 0729/284-2547 FGW (filtered in field w/40 micron filter). Alkalinity (as total CaCO3,HCO3,CO3). If Perchlorate detected, perform verification analysis using SW846-6850M. Gamma Spectroscopy as short list isotopes.
	Alfred Santillanes	[Signature]	AS	SNL/4142/505-844-5130/505-228-0710	
	William Gibson	[Signature]	WG	SNL/4142/505-284-3307/505-239-7367	

1. Relinquished by <u>[Signature]</u> Org. <u>4142</u> Date <u>10/10/13</u> Time <u>1000</u>	3. Relinquished by _____ Org. _____ Date _____ Time _____
1. Received by <u>[Signature]</u> Org. <u>SMO</u> Date <u>10/10/13</u> Time <u>1000</u>	3. Received by _____ Org. _____ Date _____ Time _____
2. Relinquished by <u>[Signature]</u> Org. <u>4142</u> Date <u>10/10/13</u> Time <u>1100</u>	4. Relinquished by _____ Org. _____ Date _____ Time _____
2. Received by <u>[Signature]</u> Org. <u>GEL</u> Date <u>10-11-13</u> Time <u>0735</u>	4. Received by _____ Org. _____ Date _____ Time _____

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

Memorandum

Date: November 18, 2013

To: File

From: Linda Thal

Subject: LC/MS/MS Organic Data Review and Validation – SNL
Site: SWMU 8/58 GWM
AR/COC: 615094
SDG: 335480
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

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 initial calibration RFs for m-nitrotoluene, o-nitrotoluene and p-nitrotoluene were <0.05 but ≥ 0.01 . All associated sample results were NDs and will be **qualified UJ,I4**.

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

Laboratory Control Sample (LCS)

All LCS recoveries met QC acceptance criteria.

Detection Limits/Dilutions

All detection limits were properly reported. 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: 11/20/13

Memorandum

Date: November 18, 2013
To: File
From: Linda Thal
Subject: Inorganic Data Review and Validation – SNL
Site: SWMU 8/58 GWM
AR/COC: 615094
SDG: 335480
Laboratory: GEL
Project/Task: 146422.10.11.01
Analysis: General Chemistry

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

Summary

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

Total cyanide:

1. The intercept for total cyanide was negative with an absolute value > the MDL but $\leq 3X$ the MDL. The associated sample result was ND and will be **qualified UJ,I5**.
2. Total cyanide was detected in the ICB/CCB at negative values with absolute values < the PQL. The associated sample result was ND and will be **qualified UJ,B4**.

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

Holding Times and Preservation

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

Calibration

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

Blanks

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

Laboratory Control Sample (LCS)

All LCS acceptance criteria were met.

Matrix Spike (MS)

All MS/PS recoveries met QC acceptance criteria.

All analyses:

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

Laboratory Replicate

The replicate analyses met all QC acceptance criteria.

All analyses:

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

Detection Limits/Dilutions

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

Other QC

The EB submitted with AR/COC 615094 is associated with the samples submitted with AR/COC 615095.

No other specific issues that affect data quality were identified.

Reviewed by: Monica Dymerski

Level I

Date: 11/20/13

Memorandum

Date: November 18, 2013
To: File
From: Linda Thal
Subject: Inorganic Data Review and Validation – SNL
Site: SWMU 8/58 GWM
AR/COC: 615094
SDG: 335480 and 335483
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

One unfiltered sample was prepared and analyzed with approved procedures using methods EPA 6010B (ICP-AES), EPA 6020 (ICP-MS) and EPA 7470A (CVAA mercury). One filtered sample was prepared and analyzed with approved procedure using method EPA 6020 (ICP-MS). Data were reported for all required analytes. No problems were identified with the data package that resulted in the qualification of data.

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

Holding Times and Preservation

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

ICP-MS Instrument Tune

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 follows.

Ba was detected at < the PQL in the unfiltered EB, sample 335480004. The associated samples are in another SDG submitted with AR/COC 615095. No data in this SDG were 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.

All analyses:

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

Laboratory Replicate

The replicate met all QC acceptance criteria.

All analyses:

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)

The LCS met all QC acceptance criteria.

Detection Limits/Dilutions

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

ICP Interference Check Sample (ICS A and AB)

Results of the ICS A and AB analyses were not evaluated because the 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.

ICP-AES and ICP-MS:

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

Other QC

The EB submitted with AR/COC 615094 is associated with the samples submitted with AR/COC 615095.

No other specific issues that affect data quality were identified.

Reviewed by: Monica Dymerski

Level I

Date: 11/20/13

Memorandum

Date: November 18, 2013

To: File

From: Linda Thal

Subject: Radiochemical Data Review and Validation – SNL
Site: SWMU 8/58 GWM
AR/COC: 615094
SDG: 335480
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

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.

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**.

Holding Times and Preservation

The sample was 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.

Laboratory Replicate

All replicate error ratio acceptance criteria were met.

Gammascpec and Alphascpec U:

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

Laboratory Control Sample (LCS)

All LCS recoveries met QC acceptance criteria.

Detection Limits/Dilutions

The sample was not diluted. All required detection limits were met.

Other QC

The EB submitted with AR/COC 615094 is associated with the samples submitted with AR/COC 615095.

No other specific issues that affect data quality were identified.

Reviewed by: Monica Dymerski **Level I** **Date:** 11/20/13



Sample Findings Summary



AR/COC: 615094

Page 1 of 1

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
DOE EML HASL-300, U-02-RC			
	094777-035/CCBA-EB1	Uranium-233/234 (13968-55-3/13966-29-)	BD, FR3
	094777-035/CCBA-EB1	Uranium-235/236 (15117-96-1/13982-70-)	BD, FR3
	094777-035/CCBA-EB1	Uranium-238 (7440-61-1)	BD, FR3
EPA 900.0/SW846 9310			
	094777-034/CCBA-EB1	ALPHA (12587-46-1)	BD, FR3,MS1
	094777-034/CCBA-EB1	BETA (12587-47-2)	BD, FR3,MS1
EPA 901.1			
	094777-033/CCBA-EB1	Americium-241 (14596-10-2)	BD, FR3
	094777-033/CCBA-EB1	Cesium-137 (10045-97-3)	BD, FR3
	094777-033/CCBA-EB1	Cobalt-60 (10198-40-0)	BD, FR3
	094777-033/CCBA-EB1	Potassium-40 (13966-00-2)	BD, FR3
SW846 3535/8321A Modified			
	094777-024/CCBA-EB1	m-Nitrotoluene (99-08-1)	UJ, I4
	094777-024/CCBA-EB1	o-Nitrotoluene (88-72-2)	UJ, I4
	094777-024/CCBA-EB1	p-Nitrotoluene (99-99-0)	UJ, I4
SW846 9012B			
	094777-027/CCBA-EB1	Cyanide, Total (57-12-5)	UJ, I5,B4

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

Memorandum

Date: November 18, 2013
To: File
From: Linda Thal
Subject: GC/MS Organic Data Review and Validation – SNL
Site: SWMU 8/58 GWM
AR/COC: 615094
SDG: 335480
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

One sample was prepared and analyzed with accepted procedures using methods EPA 3510/8270D (SVOCs). All compounds were successfully analyzed. No problems were identified with the data package that resulted in the qualification of data.

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

Holding Times

The 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 2-methyl-4,6-dinitrophenol. The associated sample results were NDs and since no other calibration infractions occurred, will not be qualified.

The ICV %D was >20% but ≤40% with negative bias for hexachlorocyclopentadiene. The CCV %D was >20% but ≤40% with negative bias for bis(2-chloroisopropyl)ether. The associated sample results were NDs and since no other calibration infractions occurred for these compounds, will not be qualified.

The ICV %Ds were >20% with positive bias for nitrobenzene; isophorone; 2,6-dinitrotoluene and 2,4-dinitrotoluene. The associated sample results were NDs and will not be qualified.

Blanks

No target analytes were detected in the blank.

Surrogates

All surrogate recoveries met QC acceptance criteria.

Internal Standards

All internal standards met QC acceptance criteria.

Matrix Spike/Matrix Spike Duplicate (MS/MSD)

All MS/MSD acceptance criteria were met. It should be noted that the MS/MSD analyses were performed on a sample of similar matrix from another SNL SDG. No sample data will be qualified as a result.

Laboratory Control Sample (LCS)

All LCS acceptance criteria were met.

Detection Limits/Dilutions

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

Tentatively Identified Compounds (TICs)

TIC reports were not required.

Other QC

The EB submitted with AR/COC 615094 should be applied to samples submitted with AR/COC 615095.

No other specific issues that affect data quality were identified.

Reviewed by: Monica Dymerski

Level I

Date: 11/26/13

Memorandum

Date: November 18, 2013
To: File
From: Linda Thal
Subject: GC/MS Organic Data Review and Validation – SNL
Site: SWMU 8/58 GWM
AR/COC: 615094
SDG: 335480
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

Three samples were prepared and analyzed with accepted procedures using method EPA 8260B (VOCs). All compounds were successfully analyzed. No problems were identified with the data package that resulted in the qualification of data.

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

Holding Times

The samples were analyzed within the prescribed holding 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 follows.

The ICAL intercept was positive and > the MDL for 1,2-dibromo-3-chloropropane. The associated sample results were NDs and will not be qualified.

The ICAL %RSD was >15% but ≤40% and the CCV was > 20% with positive bias for bromoform. The associated sample results were NDs and since a positive CCV is not considered a second infraction, will not be qualified.

The ICV %Ds were >20% with positive bias for 2-hexanone and 2-butanone. The associated sample results were NDs and will not be qualified.

Blanks

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

Acetone was detected in the MB at < the PQL. The associated sample results were NDs and will not be qualified.

Chloroform was detected at > the PQL and bromodichloromethane, dibromochloromethane and trichloroethylene were detected at < the PQL in the EB, sample 335480002. The samples associated with the EB were submitted with AR/COC 615095.

Chloroform was detected at > the PQL and bromodichloromethane and dibromochloromethane were detected at < the PQL in FB sample 335480001. No sample data were qualified at the client's request.

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 analyses were 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 acceptance criteria were met.

Detection Limits/Dilutions

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

Tentatively Identified Compounds (TICs)

TIC reports were not required.

Other QC

A TB and a FB were submitted with AR/COC 615094. The EB submitted with AR/COC 615094 should be applied to the samples submitted with AR/COC 615095. No sample data should be qualified by the FB.

No other specific issues that affect data quality were identified.

Reviewed by: Monica Dymerski **Level I** **Date:** 11/26/13

Data Validation Summary Worksheet

AR/COC #: 615094
 SDG #: 335480 and 335483
 Matrix: Aqueous
 AR/COC(s) present: Yes

Site/Project: SWMU 8/58 GWM
 Laboratory: GEL
 # of Samples: 15 CVR present: Yes
 Sample Container Integrity: OK

Validation Date: 11/18/2013
 Validator: Linda Thal
 Analysis Type: Organic Metals
 Rad Gen Chem

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

Hold Time/Preservation Outliers								
Sample Number	Laboratory ID	Analysis	Pres.	Coll. Date	Prep. Date	Anal. Date	Anal. within 2X HT	Anal. beyond 2X HT
None								

Comments: Sampled 10/11/2013; EB to be applied to samples on AR/COC 615095

Validated by:

Organic Worksheet (GC/MS)

AR/COC #: 615094

SDG #: 335480

Matrix: Aqueous

Laboratory Sample IDs: 335480001, -002 and -014

Method/Batch #: 8260B: 1341413

Tuning (pass/fail): Pass TICs Required? (yes/no): No

Analyte (outliers)	Calibration				Method Blank	5X (10X) MB	LCS %R	MS %R	MSD %R	MS/ MSD RPD	EB -002	EB X5	FB -001	FB X5 (X10)
	Int.	RF	RSD/ R ²	(ICV) CCV %D										
Acetone	NA	✓	✓	✓	3.98J	(39.8)	✓	✓	✓	✓	✓	NA	✓	NA
Bromodichloromethane	NA	✓	✓	✓	✓	NA	✓	✓	✓	✓	.62J	3.1	0.6J	3.0
Chloroform	NA	✓	✓	✓	✓	NA	✓	✓	✓	✓	2.36	11.8	2.42	12.1
Dibromochloromethane	NA	✓	✓	✓	✓	NA	✓	✓	✓	✓	.44J	2.2	.53J	2.65
Trichloroethylene	NA	✓	✓	✓	✓	NA	✓	✓	✓	✓	0.8J	4.0	✓	NA
Bromoform	NA	✓	17	+24.6	✓	NA	✓	✓	✓	✓	✓	NA	✓	NA
1,2-Dibromo-3-chloropropane	+1.5	NA	✓	✓	✓	NA	✓	✓	✓	✓	✓	NA	✓	NA
2-Butanone	NA	✓	✓	(+27)	✓	NA	✓	✓	✓	✓	✓	NA	✓	NA
2-Hexanone	NA	✓	✓	(+33)	✓	NA	✓	✓	✓	✓	✓	NA	✓	NA
Surrogate Recovery Outliers														
Sample ID														
None														
IS Outliers														
Sample ID	Area	RT	Area	RT	Area	RT	Area	RT	Area	RT	Area	RT	Area	RT
None														

Comments: HTs OK: ICAL VOA6.I 10/21/2013; MS/MSD performed on SNL sample from another SDG, spiked with trichlorotrifluoroethane; Methylene chloride linear intercept < MDL; 1,2-Dibromo-3-chloropropane linear intercept >MDL; EB applies the samples on AR/COC 615095. FB not applied to anything per client request.

Organic Worksheet (GC/MS)

AR/COC #: 615094

SDG #: 335480

Matrix: Aqueous

Laboratory Sample IDs: 335480003

Method/Batch #s: 8270D: 1339885/1339884 (prep)

Tuning (pass/fail): Pass

TICs Required? (yes/no): No

Analyte (outliers)	Calibration				Method Blank	5X (10X) Blank	LCS %R	MS %R	MSD %R	MS/ MSD RPD				
	Int.	RF	RSD/ R ²	(ICV) CCV %D										
Nitrobenzene	NA	✓	✓	(+24)	✓	NA	✓	✓	✓	✓				
Isophorone	NA	✓	✓	(+23)	✓	NA	✓	✓	✓	✓				
Hexachlorocyclopentadiene	NA	✓	✓	(-26)	✓	NA	✓	✓	✓	✓				
2,6-Dinitrotoluene	NA	✓	✓	(+26)	✓	NA	✓	✓	✓	✓				
2,4-Dinitrotoluene	NA	✓	✓	(+27)	✓	NA	✓	✓	✓	✓				
bis(2-Chloroisopropyl)ether	NA	✓	✓	-27	✓	NA	✓	✓	✓	✓				
2-Methyl-4,6-dinitrophenol	NA	✓	15.8	✓	✓	NA	✓	✓	✓	✓				
Surrogate Recovery Outliers														
Sample ID														
None														
IS Outliers														
Sample ID	Area	RT	Area	RT	Area	RT	Area	RT	Area	RT	Area	RT	Area	RT
None														

Comments: HTs OK; MS/MSD on sample from another SNL SDG; ICAL MSD4.I 09/04/2013;

High Explosives Worksheet (LC/MS/MS)

AR/COC #: 615094

SDG #: 335480

Matrix: Aqueous

Laboratory Sample IDs: 335480009

Method/Batch #: 8321A: 1338561/1338560 (prep)

Analyte (Outliers)	Initial Calibration			Continuing Calibration				Method Blank	5X (10X) Blank	LCS %R	MS %R	MSD %R	MS/MSD RPD	CRI			
	Int.	RF	COD RSD/R ²	ICV	CCV %D	ICB	CCB										
m-Nitrotoluene	NA	.029	✓	✓	✓	✓	✓	✓	NA	✓	✓	✓	✓	✓			
o-Nitrotoluene	NA	.043	✓	✓	✓	✓	✓	✓	NA	✓	✓	✓	✓	✓			
p-Nitrotoluene	NA	.019	✓	✓	✓	✓	✓	✓	NA	✓	✓	✓	✓	✓			
Surrogate Recovery Outliers																	
Sample ID																	
None																	
Internal Standard Outliers																	
Sample ID	Area	RT	Sample ID	Area	RT	Sample ID	Area	RT									
None																	

Comments: HTs OK; MS/MSD on SNL sample from another SDG; primary analytes only; LCMSMS#3; all sample and QC extracts diluted 1:1

CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY

Internal Lab

Batch No. *N/A*

AR/COC **615094**

Project Name: SWMU 8/58 GWM	Date Samples Shipped: 10/11/13	SMO Authorization: <i>[Signature]</i>	<input type="checkbox"/> Waste Characterization <input type="checkbox"/> RMMA <input type="checkbox"/> Released by COC No. <input checked="" type="checkbox"/> 4° Celsius
Project/Task Manager: Clinton Lum	Carrier/Waybill No.: 210582	SMO Contact Phone: GMO	
Project/Task Number: 146422.10.11.01	Lab Contact: Edie Kent/803-556-8171	Lorraine Herrera/505-844-3199	
Service Order: CF262-14	Lab Destination: GEL	Send Report to SMO: Rita Kavanaugh/505-284-2553	
Contract No.: PO 1303873			

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

Tech Area:		Operational Site:											Parameter & Method Requested		Lab Sample ID
Sample No.	Fraction	Sample Location Detail	Depth (ft)	Date/Time Collected		Sample Matrix	Container		Preservative	Collection Method	Sample Type				
094776	-001	CCBA-FB2	NA	10/11/13	8:20	DIW	G	3x40 ml	HCL	G	FB	TCL VOC (SW846-8260B)		335480 001	
094777	-001	CCBA-EB1	NA	10/11/13	8:21	DIW	G	3x40 ml	HCL	G	EB	TCL VOC (SW846-8260B)		335480 002	
094777	-002	CCBA-EB1	NA	10/11/13	8:22	DIW	AG	4x1L	None	G	EB	TCL SVOC (SW846-8270C)		335480 003	
094777	-009	CCBA-EB1	NA	10/11/13	8:24	DIW	P	500 ml	HNO3	G	EB	TAL Metals+U(SW846-6010/6020/7470)		335480 004	
094777	-016	CCBA-EB1	NA	10/11/13	8:25	DIW	P	125 ml	None	G	EB	Anions-Br,Cl,F,SO4 (SW846-9056)		335480 005	
094777	-017	CCBA-EB1	NA	10/11/13	8:27	FDIW	P	500 ml	HNO3	G	EB	Metals-Ca,Mg,K,Na (SW846-6020)		335480 001	
094777	-018	CCBA-EB1	NA	10/11/13	8:28	DIW	P	125 ml	H2SO4	G	EB	NPN (EPA 353.2)		335480 006	
094777	-020	CCBA-EB1	NA	10/11/13	8:29	DIW	P	250 ml	None	G	EB	Perchlorate (EPA 314.0)		335480 007	
094777	-022	CCBA-EB1	NA	10/11/13	8:30	DIW	P	500 ml	None	G	EB	Alkalinity (SM2320B)		335480 008	
094777	-024	CCBA-EB1	NA	10/11/13	8:31	DIW	AG	4x1L	None	G	EB	High Explosives (SW846-8321A mod)		335480 009	

Last Chain: <input type="checkbox"/> Yes		Sample Tracking		SMO Use		Special Instructions/QC Requirements:			Conditions on Receipt
Validation Req'd: <input checked="" type="checkbox"/> Yes		Date Entered:				EDD <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No			
Background: <input type="checkbox"/> Yes		Entered by:				Turnaround Time <input type="checkbox"/> 7 Day* <input type="checkbox"/> 15 Day* <input checked="" type="checkbox"/> 30 Day			
Confirmatory: <input type="checkbox"/> Yes		QC inits.:				Negotiated TAT <input type="checkbox"/>			
Sample Team Members	Name	Signature	Init.	Company/Organization/Phone/Cell		Sample Disposal <input type="checkbox"/> Return to Client <input checked="" type="checkbox"/> Disposal by Lab			Lab Use
	Alfred Santillanes	<i>[Signature]</i>	<i>[Init]</i>	SNL/4142/505-844-5130/505-228-0710		Return Samples By:			
	William Gibson	<i>[Signature]</i>	<i>[Init]</i>	SNL/4142/505-284-3307/505-239-7367		Comments: Send report to Tim Jackson/4142/MS 0729/284-2547 FDIW (filtered in field w/40 micron filter). Alkalinity (as total CaCO3,HCO3,CO3). If Perchlorate detected, perform verification analysis using SW846-6850M. Gamma Spectroscopy as short list isotopes.			

1. Relinquished by <i>[Signature]</i> Org. 4142 Date 10/11/13 Time 0915	3. Relinquished by	Org.	Date	Time
1. Received by <i>[Signature]</i> Org. 4142 Date 10/11/13 Time 0915	3. Received by	Org.	Date	Time
2. Relinquished by <i>[Signature]</i> Org. 4142 Date 10/11/13 Time 0951	4. Relinquished by	Org.	Date	Time
2. Received by <i>[Signature]</i> Org. 4142 Date 10-12-13 Time 0850	4. Received by	Org.	Date	Time

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

Memorandum

Date: November 25, 2013
To: File
From: Linda Thal
Subject: Inorganic Data Review and Validation – SNL
Site: SWMU 8/58 GWM
AR/COC: 615095
SDG: 335522
Laboratory: GEL
Project/Task: 146422.10.11.01
Analysis: General Chemistry

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

Summary

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

Total cyanide:

1. The intercept for total cyanide was negative with an absolute value > the MDL but $\leq 3X$ the MDL. The associated sample results were NDs and will be **qualified UJ,I5**.
2. Total cyanide was detected in the ICB/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.

A MB and an EB (sample 335480008) were reported for alkalinity 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.

Laboratory Replicate

The replicate analyses met all QC acceptance criteria.

Detection Limits/Dilutions

All detection limits were properly reported. The samples were diluted 10X for chloride, sulfate and nitrate/nitrite.

Other QC

The EB submitted with AR/COC 615094 is associated with the samples submitted with AR/COC 615095. A field duplicate pair was submitted with AR/COC 615095. There are no "required" review criteria for field duplicate analyses comparability; no data will be qualified as a result.

No other specific issues that affect data quality were identified.

Reviewed by: Monica Dymerski

Level I

Date: 11/26/13

Memorandum

Date: November 25, 2013
To: File
From: Linda Thal
Subject: Inorganic Data Review and Validation – SNL
Site: SWMU 8/58 GWM
AR/COC: 615095
SDG: 335522 and 335523
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

Two unfiltered samples were prepared and analyzed with approved procedures using methods EPA 6010B (ICP-AES), EPA 6020 (ICP-MS) and EPA 7470A (CVAA mercury). Two filtered samples were prepared and analyzed with approved procedure using method EPA 6020 (ICP-MS). Data were reported for all required analytes. No problems were identified with the data package that resulted in the qualification of data.

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

Holding Times and Preservation

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

ICP-MS Instrument Tune

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 follows.

Ba was detected at < the PQL in the unfiltered EB, sample 335480004. The associated sample results were detects >5X the EB value 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 were diluted 10X 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

The EB submitted with AR/COC 615094 is associated with the samples submitted with AR/COC 615095. A field duplicate pair was submitted with AR/COC 615095. There are no "required" review criteria for field duplicate analyses comparability; no data will be qualified as a result.

No other specific issues that affect data quality were identified.

Reviewed by: Monica Dymerski

Level I

Date: 11/26/13

Memorandum

Date: November 25, 2013
To: File
From: Linda Thal
Subject: LC/MS/MS Organic Data Review and Validation – SNL
Site: SWMU 8/58 GWM
AR/COC: 615095
SDG: 335522
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

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

1. The initial calibration RFs for m-nitrotoluene, o-nitrotoluene and p-nitrotoluene were <0.05 but ≥ 0.01 . All associated sample results were NDs and will be **qualified UJ,I4**.

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

The EB submitted with AR/COC 615094 should be applied to samples submitted with AR/COC 615095. A field duplicate pair was submitted with AR/COC 615095. There are no "required" review criteria for field duplicate analyses comparability; no data will be qualified as a result.

No other specific issues that affect data quality were identified.

Reviewed by: Monica Dymerski

Level I

Date: 11/26/13

Memorandum

Date: November 25, 2013

To: File

From: Linda Thal

Subject: Radiochemical Data Review and Validation – SNL
Site: SWMU 8/58 GWM
AR/COC: 615095
SDG: 335522
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

Two 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.

Gammaspect:

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 ≤3X the MDA will be **qualified J,FR7**.

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.

Laboratory Replicate

All replicate error ratio acceptance criteria were met.

Alphaspec U:

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

Laboratory Control Sample (LCS)

All LCS recoveries met QC acceptance criteria.

Detection Limits/Dilutions

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

Other QC

The EB submitted with AR/COC 615094 is associated with the samples submitted with AR/COC 615095. A field duplicate pair was submitted with AR/COC 615095. There are no "required" review criteria for field duplicate analyses comparability; no data will be qualified as a result.

No other specific issues that affect data quality were identified.

Reviewed by: Monica Dymerski

Level I

Date: 11/26/13



Sample Findings Summary



AR/COC: 615095

Page 1 of 1

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
EPA 900.0/SW846 9310			
	094779-034/CCBA-MW2	ALPHA (12587-46-1)	J, MS1
	094779-034/CCBA-MW2	BETA (12587-47-2)	J, FR7,MS1
	094780-034/CCBA-MW2	ALPHA (12587-46-1)	J, MS1
	094780-034/CCBA-MW2	BETA (12587-47-2)	J, FR7,MS1
EPA 901.1			
	094779-033/CCBA-MW2	Americium-241 (14596-10-2)	BD, FR3
	094779-033/CCBA-MW2	Cesium-137 (10045-97-3)	BD, FR3
	094779-033/CCBA-MW2	Cobalt-60 (10198-40-0)	BD, FR3
	094779-033/CCBA-MW2	Potassium-40 (13966-00-2)	BD, FR3
	094780-033/CCBA-MW2	Americium-241 (14596-10-2)	BD, FR3
	094780-033/CCBA-MW2	Cesium-137 (10045-97-3)	BD, FR3
	094780-033/CCBA-MW2	Cobalt-60 (10198-40-0)	BD, FR3
	094780-033/CCBA-MW2	Potassium-40 (13966-00-2)	BD, FR3
SW846 3535/8321A Modified			
	094779-024/CCBA-MW2	m-Nitrotoluene (99-08-1)	UJ, I4
	094779-024/CCBA-MW2	o-Nitrotoluene (88-72-2)	UJ, I4
	094779-024/CCBA-MW2	p-Nitrotoluene (99-99-0)	UJ, I4
	094780-024/CCBA-MW2	m-Nitrotoluene (99-08-1)	UJ, I4
	094780-024/CCBA-MW2	o-Nitrotoluene (88-72-2)	UJ, I4
	094780-024/CCBA-MW2	p-Nitrotoluene (99-99-0)	UJ, I4
SW846 9012B			
	094779-027/CCBA-MW2	Cyanide, Total (57-12-5)	UJ, I5,B4
	094780-027/CCBA-MW2	Cyanide, Total (57-12-5)	UJ, I5,B4

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

Memorandum

Date: November 25, 2013
To: File
From: Linda Thal
Subject: GC/MS Organic Data Review and Validation – SNL
Site: SWMU 8/58 GWM
AR/COC: 615095
SDG: 335522
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

Two samples were prepared and analyzed with accepted procedures using methods EPA 3510/8270D (SVOCs). All compounds were successfully analyzed. No problems were identified with the data package that resulted in the qualification of data.

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

Holding Times

The samples were 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 2-methyl-4,6-dinitrophenol. The associated sample results were NDs and since no other calibration infractions occurred, will not be qualified.

The ICV %D was >20% but ≤40% with negative bias for hexachlorocyclopentadiene. The CCV %D was >20% but ≤40% with negative bias for bis(2-chloroisopropyl)ether. The associated sample results were NDs and since no other calibration infractions occurred for these compounds, will not be qualified.

The ICV %Ds were >20% with positive bias for nitrobenzene; isophorone; 2,6-dinitrotoluene and 2,4-dinitrotoluene. The associated sample results were NDs and will not be qualified.

Blanks

No target analytes were detected in the blanks.

Surrogates

All surrogate recoveries met QC acceptance criteria.

Internal Standards

All internal standards met QC acceptance criteria.

Matrix Spike/Matrix Spike Duplicate (MS/MSD)

All MS/MSD acceptance criteria were met.

Laboratory Control Sample (LCS)

All LCS acceptance criteria were met.

Detection Limits/Dilutions

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

Tentatively Identified Compounds (TICs)

TIC reports were not required.

Other QC

The EB submitted with AR/COC 615094 should be applied to samples submitted with AR/COC 615095. A field duplicate pair was submitted with AR/COC 615095. There are no “required” review criteria for field duplicate analyses comparability; no data will be qualified as a result.

No other specific issues that affect data quality were identified.

Reviewed by: Monica Dymerski

Level I

Date: 11/26/13

Data Validation Summary Worksheet

AR/COC #: 615095

Site/Project: SWMU 8/58 GWM

Validation Date: 11/25/2013

SDG #: 335522 and 335523

Laboratory: GEL

Validator: Linda Thal

Matrix: Aqueous

of Samples: 27 CVR present: Yes

Analysis Type: Organic Metals

AR/COC(s) present: Yes

Sample Container Integrity: OK

Rad Gen Chem

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

Hold Time/Preservation Outliers								
Sample Number	Laboratory ID	Analysis	Pres.	Coll. Date	Prep. Date	Anal. Date	Anal. within 2X HT	Anal. beyond 2X HT
None								

Comments: Sampled 10/14/2013; EB from AR/COC 615094 to be applied to samples on AR/COC 615095

Validated by: 

Organic Worksheet (GC/MS)

AR/COC #: 615095

SDG #: 335522

Matrix: Aqueous

Laboratory Sample IDs: 335522001, -013 and -025

Method/Batch #: 8260B: 1341413

Tuning (pass/fail): Pass TICs Required? (yes/no): No

Analyte (outliers)	Calibration				Method Blank	5X (10X) MB	LCS %R	MS %R	MSD %R	MS/ MSD RPD	EB 335480 -002	EB X5	TB -025	
	Int.	RF	RSD/ R ²	(ICV) CCV %D										
Acetone	NA	✓	✓	✓	3.98J	(39.8)	✓	✓	✓	✓	✓	NA	✓	
Bromodichloromethane	NA	✓	✓	✓	✓	NA	✓	✓	✓	✓	.62J	3.1	✓	
Chloroform	NA	✓	✓	✓	✓	NA	✓	✓	✓	✓	2.36	11. 8	✓	
Dibromochloromethane	NA	✓	✓	✓	✓	NA	✓	✓	✓	✓	.44J	2.2	✓	
Trichloroethylene	NA	✓	✓	✓	✓	NA	✓	✓	✓	✓	0.8J	4.0	✓	
Bromoform	NA	✓	17	+24.6	✓	NA	✓	✓	✓	✓	✓	NA	✓	
1,2-Dibromo-3-chloropropane	+1.5	NA	✓	✓	✓	NA	✓	✓	✓	✓	✓	NA	✓	
2-Butanone	NA	✓	✓	(+27)	✓	NA	✓	✓	✓	✓	✓	NA	✓	
2-Hexanone	NA	✓	✓	(+33)	✓	NA	✓	✓	✓	✓	✓	NA	✓	
Surrogate Recovery Outliers														
Sample ID														
None														
IS Outliers														
Sample ID	Area	RT	Area	RT	Area	RT	Area	RT	Area	RT	Area	RT	Area	RT
None														

Comments: HTs OK: ICAL VOA6.I 10/21/2013; MS/MSD performed on SNL sample from another SDG, spiked with trichlorotrifluoroethane; Methylene chloride linear intercept < MDL; 1,2-Dibromo-3-chloropropane linear intercept >MDL; EB from AR/COC 615094 applies the samples on AR/COC 615095.

Inorganic Metals Worksheet

AR/COC #: 615095

SDG #: 335522 and 335523

Matrix: Aqueous

Laboratory Sample IDs: 335522003 and -015 (UF); 335523001 and -002 (F – Na, K, Mg and Ca only)

Method/Batch #: **6010**: 1339649; **6020**: 1339756 (F&UF); **7470A**:1343366

ICPMS Mass Cal (pass/fail): Pass

ICPMS Resolution (pass/fail): Pass

Analyte (outliers)	Calibration						Method Blank mg/L	5X Blank or (5X MDL) mg/L	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 -004	EB X5		
	Int. mg/L	R ²	ICV	CCV	ICB ug/L	CCB ug/L													
Ba	NA	✓	✓	✓	✓	✓	NA	✓	✓	✓	NA	NA	NA	✓	.000632J	.0032			

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

Comments: HTs OK; ICP and Hg matrix QC on sample -003; ICP-MS matrix QC on sample -001; Ca, Mg, Na >4X spike amount;

EB from AR/COC 615094 to be applied to samples on AR/COC 615095

All samples diluted 10X for Ca

CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY

Internal Lab

Batch No. *W*

SMO Use

Page 1 of 2

AR/COC **615095**

Project Name: SWMU 8/58 GWM	Date Samples Shipped: 10/14/13	SMO Authorization: <i>[Signature]</i>	<input type="checkbox"/> Waste Characterization <input type="checkbox"/> RMMA <input type="checkbox"/> Released by COC No. <input checked="" type="checkbox"/> 4° Celsius
Project/Task Manager: Clinton Lum	Carrier/Waybill No.: 210620	SMO Contact Phone: Lorraine Herrera/505-844-3199	
Project/Task Number: 146422.10.11.01	Lab Contact: Edie Kent/803-556-8171	Send Report to SMO: Rita Kavanaugh/505-284-2553	
Service Order: CF262-14	Lab Destination: GEL	Contract No.: PO 1303873	

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

Sample No.	Fraction	Sample Location Detail	Depth (ft)	Date/Time Collected	Sample Matrix	Container		Preservative	Collection Method	Sample Type	Parameter & Method Requested	Lab Sample ID
						Type	Volume					
✓ 094779	-001	CCBA-MW2	117	10/14/13 9:26	GW	G	3x40 ml	HCL	G	SA	TCL VOC (SW846-8260B)	335522 001
✓ 094779	-002	CCBA-MW2	117	10/14/13 9:27	GW	AG	4x1L	None	G	SA	TCL SVOC (SW846-8270C)	335522 002
✓ 094779	-009	CCBA-MW2	117	10/14/13 9:30	GW	P	500 ml	HNO3	G	SA	TAL Metals+U(SW846-6010/6020/7470)	335522 003
✓ 094779	-016	CCBA-MW2	117	10/14/13 9:31	GW	P	125 ml	None	G	SA	Anions-Br,Cl,F,SO4 (SW846-9056)	335522 004
✓ 094779	-017	CCBA-MW2	117	10/14/13 9:33	FGW	P	500 ml	HNO3	G	SA	Metals-Ca,Mg,K,Na (SW846-6020)	335522 001
✓ 094779	-018	CCBA-MW2	117	10/14/13 9:34	GW	P	125 ml	H2SO4	G	SA	NPN (EPA 353.2)	335522 005
✓ 094779	-020	CCBA-MW2	117	10/14/13 9:35	GW	P	250 ml	None	G	SA	Perchlorate (EPA 314.0)	335522 006
✓ 094779	-022	CCBA-MW2	117	10/14/13 9:36	GW	P	500 ml	None	G	SA	Alkalinity (SM2320B)	335522 007
✓ 094779	-024	CCBA-MW2	117	10/14/13 9:37	GW	AG	4x1L	None	G	SA	High Explosives (SW846-8321A mod)	335522 008
✓ 094779	-027	CCBA-MW2	117	10/14/13 9:40	GW	P	250 ml	NaOH	G	SA	Total Cyanide (SW846-9012)	335522 009

Last Chain: <input checked="" type="checkbox"/> Yes	Sample Tracking	SMO Use	Special Instructions/QC Requirements:	Conditions on Receipt
Validation Req'd: <input checked="" type="checkbox"/> Yes	Date Entered:		EDD <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	
Background: <input type="checkbox"/> Yes	Entered by:		Turnaround Time <input type="checkbox"/> 7 Day* <input type="checkbox"/> 15 Day* <input checked="" type="checkbox"/> 30 Day	
Confirmatory: <input type="checkbox"/> Yes	QC initials:		Negotiated TAT <input type="checkbox"/>	

Sample Team Members	Name	Signature	Init.	Company/Organization/Phone/Cell	Sample Disposal
	Robert Lynch	<i>[Signature]</i>	<i>[Init]</i>	SNL/4142/505-844-4013/505-250-7090	<input type="checkbox"/> Return to Client <input checked="" type="checkbox"/> Disposal by Lab
	Alfred Santillanes	<i>[Signature]</i>	<i>[Init]</i>	SNL/4142/505-844-5130/505-228-0710	Return Samples By: Comments: Send report to Tim Jackson/4142/MS 0729/284-2547 FGW (filtered in field w/40 micron filter). Alkalinity (as total CaCO3,HCO3,CO3). If Perchlorate detected, perform verification analysis using SW846-6850M. Gamma Spectroscopy as short list isotopes.
	William Gibson	<i>[Signature]</i>	<i>[Init]</i>	SNL/4142/505-284-3307/505-239-7367	

1. Relinquished by <i>[Signature]</i> Org. 4142 Date 10/14/13 Time 10:13	3. Relinquished by _____ Org. _____ Date _____ Time _____
1. Received by <i>[Signature]</i> Org. 4142 Date 10/14/13 Time 10:13	3. Received by _____ Org. _____ Date _____ Time _____
2. Relinquished by <i>[Signature]</i> Org. 4142 Date 10/14/13 Time 11:00	4. Relinquished by _____ Org. _____ Date _____ Time _____
2. Received by <i>[Signature]</i> Org. GEL Date 10-15-13 Time 07:25	4. Received by _____ Org. _____ Date _____ Time _____

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

CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY (Continuation)

AR/COC 615095

Project Name: SWMU 8/58 GWM		Project/Task Manager: Clinton Lum			Project/Task No.: 146422.10.11.01							Lab use	
Tech Area:													
Building:		Room:											
Sample No.	Fraction	Sample Location Detail	Depth (ft)	Date/Time Collected	Sample Matrix	Container		Preservative	Collection Method	Sample Type	Parameter & Method Requested	Lab	
						Type	Volume					Sample ID	
✓ 094779	-033 ✓	CCBA-MW2	117	10/14/13 9:41 ✓	GW	P	1 L	HNO3	G	SA	Gamma Spectroscopy (EPA 901.0)	335522 016	
✓ 094779	-034 ✓	CCBA-MW2	117	10/14/13 9:43 ✓	GW	P	1 L	HNO3	G	SA	Gross Alpha and Beta (EPA 900.0)	335522 011	
✓ 094779	-035	CCBA-MW2	117	10/14/13 9:45	GW	P	1 L	HNO3	G	SA	Isotopic Uranium (HASL 300)	335522 012	
✓ 094780	-001 ✓	CCBA-MW2	117	10/14/13 9:26 ✓	GW	G	3x40 ml	HCL	G	DU	TCL VOC (SW846-8260B)	335522 013	
✓ 094780	-002 ✓	CCBA-MW2	117	10/14/13 9:27 ✓	GW	AG	4x1L	None	G	DU	TCL SVOC (SW846-8270C)	335522 014	
✓ 094780	-009 ✓	CCBA-MW2	117	10/14/13 9:30 ✓	GW	P	500 ml	HNO3	G	DU	TAL Metals+U(SW846-6010/6020/7470)	335522 015	
✓ 094780	-016	CCBA-MW2	117	10/14/13 9:31 ✓	GW	P	125 ml	None	G	DU	Anions-Br,Cl,F,SO4 (SW846-9056)	335522 016	
✓ 094780	-017 ✓	CCBA-MW2	117	10/14/13 9:33 ✓	FGW	P	500 ml	HNO3	G	DU	Metals-Ca,Mg,K,Na (SW846-6020)	335523 002	
✓ 094780	-018 ✓	CCBA-MW2	117	10/14/13 9:34 ✓	GW	P	125 ml	H2SO4	G	DU	NPN (EPA 353.2)	335522 017	
✓ 094780	-020	CCBA-MW2	117	10/14/13 9:35 ✓	GW	P	250 ml	None	G	DU	Perchlorate (EPA 314.0)	335522 018	
✓ 094780	-022	CCBA-MW2	117	10/14/13 9:36 ✓	GW	P	500 ml	None	G	DU	Alkalinity (SM2320B)	335522 019	
✓ 094780	-024 ✓	CCBA-MW2	117	10/14/13 9:37 ✓	GW	AG	4x1L	None	G	DU	High Explosives (SW846-8321A mod)	335522 020	
✓ 094780	-027 ✓	CCBA-MW2	117	10/14/13 9:40 ✓	GW	P	250 ml	NaOH	G	DU	Total Cyanide (SW846-9012)	335522 021	
✓ 094780	-033 ✓	CCBA-MW2	117	10/14/13 9:41	GW	P	1 L	HNO3	G	DU	Gamma Spectroscopy (EPA 901.0)	335522 022	
✓ 094780	-034 ✓	CCBA-MW2	117	10/14/13 9:43	GW	P	1 L	HNO3	G	DU	Gross Alpha and Beta (EPA 900.0)	335522 023	
✓ 094780	-035 ✓	CCBA-MW2	117	10/14/13 9:45 ✓	GW	P	1 L	HNO3	G	DU	Isotopic Uranium (HASL 300)	335522 024	
✓ 094781	-001 ✓	CCBA-TB3	NA	10/14/13 9:26 ✓	DIW	G	3x40 ml	HCL	G	TB	TCL VOC (SW846-8260B)	335522 025	
Recipient Initials <u>MK</u>													

Memorandum

Date: November 25, 2013
To: File
From: Linda Thal
Subject: GC/MS Organic Data Review and Validation – SNL
Site: SWMU 8/58 GWM
AR/COC: 615095
SDG: 335522
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

Three samples were prepared and analyzed with accepted procedures using method EPA 8260B (VOCs). All compounds were successfully analyzed. No problems were identified with the data package that resulted in the qualification of data.

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

Holding Times

The samples were analyzed within the prescribed holding 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 follows.

The ICAL intercept was positive and > the MDL for 1,2-dibromo-3-chloropropane. The associated sample results were NDs and will not be qualified.

The ICAL %RSD was >15% but ≤40% and the CCV %D was > 20% with positive bias for bromoform. The associated sample results were NDs and since a positive CCV is not considered a second infraction, will not be qualified.

The ICV %Ds were >20% with positive bias for 2-hexanone and 2-butanone. The associated sample results were NDs and will not be qualified.

Blanks

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

Acetone was detected in the MB at < the PQL. The associated sample results were NDs and will not be qualified.

Chloroform was detected at > the PQL and bromodichloromethane, dibromochloromethane and trichloroethylene were detected at < the PQL in the EB, sample 335480002. The 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. It should be noted that the MS/MSD analyses were performed on a sample of similar matrix from another SNL SDG. No sample data will be qualified as a result.

Laboratory Control Sample (LCS)

All LCS acceptance criteria were met.

Detection Limits/Dilutions

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

Tentatively Identified Compounds (TICs)

TIC reports were not required.

Other QC

A TB was submitted with AR/COC 615095. The EB submitted with AR/COC 615094 should be applied to the samples submitted with AR/COC 615095. A field duplicate pair was submitted with AR/COC 615095. There are no “required” review criteria for field duplicate analyses comparability; no data will be qualified as a result.

No other specific issues that affect data quality were identified.

Reviewed by: Monica Dymerski

Level I

Date: 11/26/13



Sample Findings Summary



AR/COC: 615089, 615090

Page 1 of 2

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
DOE EML HASL-300, U-02-RC			
	094765-035/OBS-EB1	Uranium-233/234 (13968-55-3/13966-29-)	BD, FR3
	094765-035/OBS-EB1	Uranium-235/236 (15117-96-1/13982-70-)	BD, FR3
	094765-035/OBS-EB1	Uranium-238 (7440-61-1)	BD, FR3
EPA 900.0/SW846 9310			
	094762-034/OBS-MW2	ALPHA (12587-46-1)	J, MS1
	094762-034/OBS-MW2	BETA (12587-47-2)	J, FR7,MS1
	094765-034/OBS-EB1	ALPHA (12587-46-1)	BD, FR3,MS1
	094765-034/OBS-EB1	BETA (12587-47-2)	BD, FR3,MS1
EPA 901.1			
	094762-033/OBS-MW2	Americium-241 (14596-10-2)	BD, FR3
	094762-033/OBS-MW2	Cesium-137 (10045-97-3)	BD, FR3
	094762-033/OBS-MW2	Cobalt-60 (10198-40-0)	BD, FR3
	094762-033/OBS-MW2	Potassium-40 (13966-00-2)	BD, FR3
	094765-033/OBS-EB1	Americium-241 (14596-10-2)	BD, FR3
	094765-033/OBS-EB1	Cesium-137 (10045-97-3)	BD, FR3
	094765-033/OBS-EB1	Cobalt-60 (10198-40-0)	BD, FR3
	094765-033/OBS-EB1	Potassium-40 (13966-00-2)	BD, FR3
SW846 3510C/8270D			
	094762-002/OBS-MW2	Hexachlorocyclopentadiene (77-47-4)	UJ, MS5
	094765-002/OBS-EB1	Hexachlorocyclopentadiene (77-47-4)	UJ, MS5
SW846 3535/8321A Modified			
	094762-024/OBS-MW2	m-Nitrotoluene (99-08-1)	UJ, I4
	094762-024/OBS-MW2	o-Nitrotoluene (88-72-2)	UJ, I4

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
	094762-024/OBS-MW2	p-Nitrotoluene (99-99-0)	UJ, I4
	094765-024/OBS-EB1	m-Nitrotoluene (99-08-1)	UJ, I4
	094765-024/OBS-EB1	o-Nitrotoluene (88-72-2)	UJ, I4
	094765-024/OBS-EB1	p-Nitrotoluene (99-99-0)	UJ, I4
SW846 7470A			
	094762-009/OBS-MW2	Mercury (7439-97-6)	UJ, B4
	094765-009/OBS-EB1	Mercury (7439-97-6)	UJ, B4
SW846 8260B DOE-AL			
	094764-001/OBS-FB1	Acetone (67-64-1)	J+, I5
SW846 9012B			
	094762-027/OBS-MW2	Cyanide, Total (57-12-5)	UJ, I5,B4
	094765-027/OBS-EB1	Cyanide, Total (57-12-5)	UJ, I5,B4

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

Memorandum

Date: November 12, 2013
To: File
From: Linda Thal
Subject: Inorganic Data Review and Validation – SNL
Site: SWMU 68 GWM
AR/COC: 615089 and 615090
SDG: 335046
Laboratory: GEL
Project/Task: 146422.10.11.01
Analysis: General Chemistry

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

Summary

Two samples were prepared and analyzed with accepted procedures using methods EPA 7196A (hexavalent chromium), EPA 9056 (anions by IC), EPA 353.2 (nitrate/nitrite), EPA 9012A (total cyanide), EPA 314.0 (perchlorate) and SM2320B (total alkalinity). Data were reported for all required analytes. Problems were identified with the data package that resulted in the qualification of data.

Total cyanide:

1. The intercept for total cyanide was negative with an absolute value > the MDL but $\leq 3X$ the MDL. The associated sample results were NDs and will be **qualified UJ,I5**.
2. Total cyanide was detected in the ICB at a negative value with an absolute value < 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.

Laboratory Control Sample (LCS)

All LCS acceptance criteria were met.

Matrix Spike (MS)

All MS/PS recoveries met QC acceptance criteria.

Perchlorate, nitrate/nitrite and alkalinity batch associated with the EB:

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

Laboratory Replicate

The replicate analyses met all QC acceptance criteria.

Perchlorate, nitrate/nitrite and alkalinity batch associated with the EB:

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

Detection Limits/Dilutions

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

Nitrate/Nitrite:

Sample -006 was diluted 10X.

Anions:

Sample -005 was diluted 10X for chloride and sulfate.

Other QC

An EB was submitted with AR/COC 615090 to be applied to the samples submitted with AR/COC 615091.

No other specific issues that affect data quality were identified.

Reviewed by: Monica Dymerski

Level I

Date: 12/12/13

Memorandum

Date: November 12, 2013
To: File
From: Linda Thal
Subject: LC/MS/MS Organic Data Review and Validation – SNL
Site: SWMU 68 GWM
AR/COC: 615089 and 615090
SDG: 335046
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

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

1. The initial calibration RFs for m-nitrotoluene, o-nitrotoluene and p-nitrotoluene were <0.05 but ≥ 0.01 . All associated sample results were NDs and will be **qualified UJ,I4**.

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 615090 to be applied to the samples submitted with AR/COC 615091.

No other specific issues that affect data quality were identified.

Reviewed by: Monica Dymerski

Level I

Date: 12/12/13

Memorandum

Date: November 12, 2013/December 11, 2013
To: File
From: Linda Thal
Subject: Inorganic Data Review and Validation – SNL
Site: SWMU 68 GWM
AR/COC: 615089 and 615090
SDG: 335046 and 335051
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

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

CVAA:

1. Hg was detected at a negative value with an absolute value < the PQL in a CCB bracketing the samples. 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.

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.

Ba, Cu and Zn were detected at < the PQL in the EB, sample 335046018. The EB is associated with samples submitted with AR/COC 615091 and, therefore, no sample results in these SDGs will 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.

ICP-AES and ICP-MS:

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

Laboratory Replicate

The replicate met all QC acceptance criteria.

ICP-AES and ICP-MS:

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)

The LCS met all QC acceptance criteria.

Detection Limits/Dilutions

All detection limits were properly reported. Sample 335051001 was diluted 10X for Ca. The Ca result for sample -003 was queried by the client and the laboratory re-analyzed the sample on 11/21/2013 at a 5X dilution for Ca only. The Ca result from the re-analysis was used in the final report.

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.

ICP-AES and ICP-MS:

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

Other QC

An EB was submitted with AR/COC 615090 to be applied to the samples submitted with AR/COC 615091.

No other specific issues that affect data quality were identified.

Reviewed by: Monica Dymerski **Level I** **Date: 12/12/13**

Memorandum

Date: November 12, 2013

To: File

From: Linda Thal

Subject: GC/MS Organic Data Review and Validation – SNL
Site: SWMU 68 GWM
AR/COC: 615089 and 615090
SDG: 335046
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

Two samples were prepared and analyzed with accepted procedures using methods EPA 3510/8270D (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 was > laboratory acceptance criteria for hexachlorocyclopentadiene. 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 intercept for 4-nitrophenol was positive and > the MDL. The associated sample results were NDs and will not be qualified.

Memorandum

Date: November 13, 2013

To: File

From: Linda Thal

Subject: Radiochemical Data Review and Validation – SNL
Site: SWMU 68 GWM
AR/COC: 615089 and 615090
SDG: 335046
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

Two 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 $\leq 3X$ the MDA will be **qualified J,FR7**.

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

Holding Times and Preservation

The samples were 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 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.

Other QC

An EB was submitted with AR/COC 615090 to be applied to the samples submitted with AR/COC 615091.

No other specific issues that affect data quality were identified.

Reviewed by: Monica Dymerski

Level I

Date: 12/12/13

Memorandum

Date: November 12, 2013
To: File
From: Linda Thal
Subject: GC/MS Organic Data Review and Validation – SNL
Site: SWMU 68 GWM
AR/COC: 615089 and 615090
SDG: 335046
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

Five 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 intercept was positive and > the MDL for acetone. The associated result for sample 335046015 was a detect <3X the value of the intercept and will be **qualified J+,I5**.

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

Holding Times

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 ≤40% for bromoform. The associated sample results were NDs and since no other calibration infraction occurred, will not be qualified.

The ICV %D was >20% but ≤40% with negative bias for dichlorodifluoromethane. The associated sample results were NDs and since no other calibration infraction occurred, will not be qualified.

The %D was >20% but ≤40% with negative bias for acetone. The CCV was associated with the MS/MSD only and, therefore no sample results will be qualified.

Blanks

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

Bromodichloromethane and chloroform were detected at > the PQL and dibromochloromethane was detected at < the PQL in the EB, sample -016. The EB is associated with samples submitted with AR/COC 615091 and, therefore, no sample results in these SDGs were qualified.

Bromodichloromethane and chloroform were detected at > the PQL and dibromochloromethane and acetone were detected at < the PQL in the FB, sample -015. No samples were associated with the FB and, therefore, no data will be qualified.

Surrogates

All surrogate recoveries met QC acceptance criteria.

Internal Standards

All internal standards met QC acceptance criteria.

Matrix Spike/Matrix Spike Duplicate (MS/MSD)

All MS/MSD acceptance criteria were met. It should be noted that the MS/MSD was performed on a sample of similar matrix from another SNL SDG. No data will be qualified as a result.

Laboratory Control Sample (LCS)

All LCS acceptance criteria were met.

Detection Limits/Dilutions

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

Tentatively Identified Compounds (TICs)

TIC reports were not required.

Other QC

Two TBs were submitted, one with each AR/COC. A FB was submitted with AR/COC 615090. An EB was submitted with AR/COC 615090 to be applied to samples submitted with AR/COC 615091.

No other specific issues that affect data quality were identified.

Reviewed by: Monica Dymerski

Level I

Date: 12/12/13

Memorandum

Date: November 13, 2013
To: File
From: Linda Thal
Subject: Inorganic Data Review and Validation – SNL
Site: SWMU 68 GWM
AR/COC: 615091
SDG: 335138
Laboratory: GEL
Project/Task: 146422.10.11.01
Analysis: General Chemistry

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

Summary

Two samples were prepared and analyzed with accepted procedures using methods EPA 7196A (hexavalent chromium), EPA 9056 (anions by IC), EPA 353.2 (nitrate/nitrite), EPA 9012A (total cyanide), EPA 314.0 (perchlorate) and SM2320B (total alkalinity). Data were reported for all required analytes. Problems were identified with the data package that resulted in the qualification of data.

Total cyanide:

1. The intercept for total cyanide was negative with an absolute value > the MDL but $\leq 3X$ the MDL. The associated sample results were NDs and will be **qualified UJ,I5**.
2. Total cyanide was detected in the ICB/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 with the following exception.

The samples for hexavalent chromium were analyzed very slightly beyond the 24 hour holding time. Based on professional judgment, no sample results were qualified.

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.

Laboratory Control Sample (LCS)

All LCS acceptance criteria were met.

Matrix Spike (MS)

All MS/PS recoveries met QC acceptance criteria.

Total cyanide, anions and nitrate/nitrite:

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

Laboratory Replicate

The replicate analyses met all QC acceptance criteria.

Total cyanide, anions and nitrate/nitrite:

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

Detection Limits/Dilutions

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

Nitrate/Nitrite:

All samples were diluted 10X.

Anions:

All samples were diluted 10X for chloride and sulfate.

Other QC

An EB was submitted with AR/COC 615090 to be applied to the samples submitted with AR/COC 615091. A field duplicate pair was submitted with AR/COC 615091. There are no "required" review criteria for field duplicate analyses comparability; no data will be qualified as a result.

No other specific issues that affect data quality were identified.

Reviewed by: Monica Dymerski

Level I

Date: 11/15/13

Memorandum

Date: November 13, 2013

To: File

From: Linda Thal

Subject: LC/MS/MS Organic Data Review and Validation – SNL
Site: SWMU 68 GWM
AR/COC: 615091
SDG: 335138
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

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

1. The initial calibration RFs for m-nitrotoluene, o-nitrotoluene and p-nitrotoluene were <0.05 but ≥ 0.01 . All associated sample results were NDs and will be **qualified UJ,I4**.

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

Laboratory Control Sample (LCS)

All LCS recoveries met QC acceptance criteria.

Detection Limits/Dilutions

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

Other QC

An EB was submitted with AR/COC 615090 to be applied to the samples submitted with AR/COC 615091. A field duplicate pair was submitted with AR/COC 615091. There are no "required" review criteria for field duplicate analyses comparability; no data will be qualified as a result.

No other specific issues that affect data quality were identified.

Reviewed by: Monica Dymerski

Level I

Date: 11/15/13

Memorandum

Date: November 13, 2013
To: File
From: Linda Thal
Subject: Inorganic Data Review and Validation – SNL
Site: SWMU 68 GWM
AR/COC: 615091
SDG: 335138 and 335139
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

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

CVAA:

1. Hg was detected at a negative value with an absolute value < the PQL in a CCB bracketing the samples. The associated sample results were NDs and will be **qualified UJ,B4**.

ICP-MS:

1. Zn was detected at < the PQL in the EB, sample 335046018. The associated results for samples 335138003 and -016 were detects <5X the EB value and will be **qualified 0.022U,B2** at 5X the EB value.
2. Cu was detected at < the PQL in the EB, sample 335046018. The associated result for sample 335138003 was a detect <5X the EB value and will be **qualified 0.0019U,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.

Cu was detected at < the PQL in the EB, sample 335046018. The associated result for sample 335138016 was a detect >5X the EB value and will not be qualified.

Ba was detected at < the PQL in the EB, sample 335046018. The associated sample results were detects >5X the EB value 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.

All analyses:

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

Laboratory Replicate

The replicate met all QC acceptance criteria.

All analyses:

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)

The LCS met all QC acceptance criteria.

Detection Limits/Dilutions

All detection limits were properly reported. All samples were diluted 10X 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.

ICP-AES and ICP-MS:

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

Other QC

An EB was submitted with AR/COC 615090 to be applied to the samples submitted with AR/COC 615091. A field duplicate pair was submitted with AR/COC 615091. There are no “required” review criteria for field duplicate analyses comparability; no data will be qualified as a result.

No other specific issues that affect data quality were identified.

Reviewed by: Monica Dymerski

Level I

Date: 11/15/13

Memorandum

Date: November 13, 2013

To: File

From: Linda Thal

Subject: Radiochemical Data Review and Validation – SNL
Site: SWMU 68 GWM
AR/COC: 615091
SDG: 335138
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

Two 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.

Gamma Spec:

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

Gross Alpha/Beta:

1. 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**.

Gross Alpha/Beta and Gamma Spec:

1. All sample results that were > the MDA but $\leq 3X$ the MDA will be **qualified J,FR7**.

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

Holding Times and Preservation

The samples were 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 except as follows.

The U-232 tracer recovery was <50% for the LCS. The LCS tracer area counts were >400 and the LCS recovery met acceptance criteria. Therefore, no sample results will be qualified based on professional judgment.

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.

Gamma Spec:

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.

Other QC

An EB was submitted with AR/COC 615090 to be applied to the samples submitted with AR/COC 615091. A field duplicate pair was submitted with AR/COC 615091. There are no "required" review criteria for field duplicate analyses comparability; no data will be qualified as a result.

No other specific issues that affect data quality were identified.

Reviewed by: Monica Dymerski

Level I

Date: 11/15/13



Sample Findings Summary



AR/COC: 615091

Page 1 of 2

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
EPA 900.0/SW846 9310			
	094767-034/OBS-MW1	ALPHA (12587-46-1)	J, FR7,MS1
	094767-034/OBS-MW1	BETA (12587-47-2)	J, FR7,MS1
	094768-034/OBS-MW1	ALPHA (12587-46-1)	J, MS1
	094768-034/OBS-MW1	BETA (12587-47-2)	J, MS1
EPA 901.1			
	094767-033/OBS-MW1	Americium-241 (14596-10-2)	BD, FR3
	094767-033/OBS-MW1	Cesium-137 (10045-97-3)	BD, FR3
	094767-033/OBS-MW1	Cobalt-60 (10198-40-0)	BD, FR3
	094767-033/OBS-MW1	Potassium-40 (13966-00-2)	BD, FR3
	094768-033/OBS-MW1	Americium-241 (14596-10-2)	BD, FR3
	094768-033/OBS-MW1	Cesium-137 (10045-97-3)	BD, FR3
	094768-033/OBS-MW1	Cobalt-60 (10198-40-0)	BD, FR3
	094768-033/OBS-MW1	Potassium-40 (13966-00-2)	J, FR7
SW846 3005/6020 DOE-AL			
	094767-009/OBS-MW1	Copper (7440-50-8)	0.0019U, B2
	094767-009/OBS-MW1	Zinc (7440-66-6)	0.022U, B2
	094768-009/OBS-MW1	Zinc (7440-66-6)	0.022U, B2
SW846 3510C/8270D			
	094767-002/OBS-MW1	Hexachlorocyclopentadiene (77-47-4)	UJ, MS5
	094768-002/OBS-MW1	Hexachlorocyclopentadiene (77-47-4)	UJ, MS5
SW846 3535/8321A Modified			
	094767-024/OBS-MW1	m-Nitrotoluene (99-08-1)	UJ, I4
	094767-024/OBS-MW1	o-Nitrotoluene (88-72-2)	UJ, I4
	094767-024/OBS-MW1	p-Nitrotoluene (99-99-0)	UJ, I4

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
	094768-024/OBS-MW1	m-Nitrotoluene (99-08-1)	UJ, I4
	094768-024/OBS-MW1	o-Nitrotoluene (88-72-2)	UJ, I4
	094768-024/OBS-MW1	p-Nitrotoluene (99-99-0)	UJ, I4
SW846 7470A			
	094767-009/OBS-MW1	Mercury (7439-97-6)	UJ, B4
	094768-009/OBS-MW1	Mercury (7439-97-6)	UJ, B4
SW846 9012B			
	094767-027/OBS-MW1	Cyanide, Total (57-12-5)	UJ, I5,B4
	094768-027/OBS-MW1	Cyanide, Total (57-12-5)	UJ, I5,B4

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

Memorandum

Date: November 13, 2013
To: File
From: Linda Thal
Subject: GC/MS Organic Data Review and Validation – SNL
Site: SWMU 68 GWM
AR/COC: 615091
SDG: 335138
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

Two samples were prepared and analyzed with accepted procedures using methods EPA 3510/8270D (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 was > laboratory acceptance criteria for hexachlorocyclopentadiene. 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 intercept for 4-nitrophenol was positive and > the MDL. The associated sample results were NDs and will not be qualified.

The ICAL %RSDs were >15% but ≤40% for 2,4-dinitrophenol; p-nitroaniline 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. It should be noted that the MS/MSD was performed on a sample of similar matrix from another SNL SDG. No data will 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 615090 to be applied to the samples submitted with AR/COC 615091. A field duplicate pair was submitted with AR/COC 615091. There are no “required” review criteria for field duplicate analyses comparability; no data will be qualified as a result.

No other specific issues that affect data quality were identified.

Reviewed by: Monica Dymerski

Level I

Date: 11/15/13

Memorandum

Date: November 13, 2013
To: File
From: Linda Thal
Subject: GC/MS Organic Data Review and Validation – SNL
Site: SWMU 68 GWM
AR/COC: 615091
SDG: 335138
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

Three samples were prepared and analyzed with accepted procedures using method EPA 8260B (VOCs). All compounds were successfully analyzed. No problems were identified with the data package that resulted in the qualification of data.

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

Holding Times

The samples were analyzed within the prescribed holding 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 follows.

The ICAL intercept was positive and > the MDL for acetone. The associated sample results were NDs and will not be qualified.

The ICAL %RSD was >15% but ≤40% for bromoform. The associated sample results were NDs and since no other calibration infraction occurred, will not be qualified.

The ICV %D was >20% but ≤40% with negative bias for dichlorodifluoromethane. The associated sample results were NDs and since no other calibration infraction occurred, will not be qualified.

The CCV %D was >20% but ≤40% with negative bias for acetone. The associated sample results were NDs and since a positive intercept is not considered another calibration infraction, will not be qualified.

Blanks

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

Bromodichloromethane and chloroform were detected at > the PQL and dibromochloromethane was detected at < the PQL in the EB, sample 335046016. The 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.

Detection Limits/Dilutions

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

Tentatively Identified Compounds (TICs)

TIC reports were not required.

Other QC

A TB was submitted with AR/COC 615091. An EB was submitted with AR/COC 615090 to be applied to the samples submitted with AR/COC 615091. A field duplicate pair was submitted with AR/COC 615091. There are no “required” review criteria for field duplicate analyses comparability; no data will be qualified as a result.

No other specific issues that affect data quality were identified.

Reviewed by: Monica Dymerski

Level I

Date: 11/15/13

Data Validation Summary Worksheet

AR/COC #: 615091

Site/Project: SWMU 68 GWM

Validation Date: 11/13/2013

SDG #: 335138 and 335139

Laboratory: GEL

Validator: Linda Thal

Matrix: Aqueous

of Samples: 29 CVR present: Yes

Analysis Type: Organic Metals

AR/COC(s) present: Yes

Sample Container Integrity: OK

Rad Gen Chem

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

Hold Time/Preservation Outliers								
Sample Number	Laboratory ID	Analysis	Pres.	Coll. Date	Prep. Date	Anal. Date	Anal. within 2X HT	Anal. beyond 2X HT
094767-014	335138004	7196A	✓	10/8/2013 9.15	10/9/2013 10.25	10/9/2013 10.25	Yes	No
094768-014	335138017	7196A	✓	10/8/2013 9.15	10/9/2013 10.29	10/9/2013 10.29	Yes	No

Comments: Sampled 10/08/2013

Validated by: *L. Thal*

Organic Worksheet (GC/MS)

AR/COC #: 615091

SDG #: 335138

Matrix: Aqueous

Laboratory Sample IDs: 335138001, -014 and -027

Method/Batch #: 8260B: 1340220

Tuning (pass/fail): Pass TICs Required? (yes/no): No

Analyte (outliers)	Calibration				Method Blank	5X (10X) MB	LCS %R	MS %R	MSD %R	MS/ MSD RPD	TB -027	TB X5	EB 335046 -016	EB X5 (X10)
	Int.	RF	RSD/ R ²	(ICV) CCV %D										
Acetone	+4.4	NA	✓	-22	✓	NA	✓	✓	✓	✓	✓	NA	✓	NA
Bromodichloromethane	NA	✓	✓	✓	✓	NA	✓	✓	✓	✓	✓	NA	1	5
Chloroform	NA	✓	✓	✓	✓	NA	✓	✓	✓	✓	✓	NA	2.77	13.85
Dibromochloromethane	NA	✓	✓	✓	✓	NA	✓	✓	✓	✓	✓	NA	0.6J	3.0
Bromoform	NA	✓	16	✓	✓	NA	✓	✓	✓	✓	✓	NA	✓	NA
Dichlorodifluoromethane	NA	✓	✓	(-23)	✓	NA	✓	✓	✓	✓	✓	NA	✓	NA
Surrogate Recovery Outliers														
Sample ID														
None														
IS Outliers														
Sample ID	Area	RT	Area	RT	Area	RT	Area	RT	Area	RT	Area	RT	Area	RT
None														

Comments: HTs OK: ICAL VOA9.I 10/17/2013; MS/MSD performed on -001 spiked with trichlorotrifluoroethane; Acetone linear intercept >MDL; Methylene chloride linear intercept < MDL; EB from ARCOG 615090 applied to samples on ARCOG 615091

Organic Worksheet (GC/MS)

AR/COC #: 615091

SDG #: 335138

Matrix: Aqueous

Laboratory Sample IDs: 335138002and -015

Method/Batch #: 8270D: 1338333/1338332 (prep)

Tuning (pass/fail): Pass

TICs Required? (yes/no): No

Analyte (outliers)	Calibration				Method Blank	5X (10X) Blank	LCS %R	MS %R	MSD %R	MS/ MSD RPD	EB 335046 -017			
	Int.	RF	RSD/ R ²	(ICV) CCV %D										
2,4-Dinitrophenol	NA	✓	16.6	✓	✓	NA	✓	✓	✓	✓	✓			
4-Nitrophenol	+3.9	NA	✓	✓	✓	NA	✓	✓	✓	✓	✓			
p-Nitroaniline	NA	✓	18	✓	✓	NA	✓	✓	✓	✓	✓			
2-Methyl-4,6-dinitrophenol	NA	✓	19.2	✓	✓	NA	✓	✓	✓	✓	✓			
Hexachlorocyclopentadiene	NA	✓	✓	✓	✓	NA	✓	✓	✓	39.9	✓			
Surrogate Recovery Outliers														
Sample ID														
None														
IS Outliers														
Sample ID	Area	RT	Area	RT	Area	RT	Area	RT	Area	RT	Area	RT	Area	RT
None														

Comments: HTs OK; MS/MSD on sample from another SNL SDG; ICAL MSD5.I 10/08/2013;

Inorganic Metals Worksheet

AR/COC #: 615091

SDG #: 335138 and 335139

Matrix: Aqueous

Laboratory Sample IDs: 335138003and -016(UF); 335139001 and -002 (F – Na, K, Mg and Ca only)

Method/Batch #: **6010**: 1339649; **6020**: 1339756 (F&UF); **7470A**:1342180

ICPMS Mass Cal (pass/fail): Pass

ICPMS Resolution (pass/fail): Pass

Analyte (outliers)	Calibration						Method Blank mg/L	5X Blank or (5X MDL) mg/L	LCS %R	MS %R	Lab RepRPD	Serial Dil. %D	ICS AB %R	ICS A ± MDL ug/L x50 (mg/L)	CRA CRI %R	EB 335046 -018 UF	EB X5
	Int. mg/L	R ²	ICV	CCV	ICB ug/L	CCB ug/L											
Ba	NA	✓	✓	✓	✓	✓	NA	✓	✓	✓	✓	NA	NA	✓	.00108J	.0054	
Cu	NA	✓	✓	✓	✓	✓	NA	✓	✓	✓	✓	NA	NA	✓	.000387J	.0019	
Zn	NA	✓	✓	✓	✓	✓	NA	✓	✓	✓	✓	NA	NA	✓	.00447J	.022	
Hg	✓	✓	✓	✓	✓	-.068	✓	(.00034)	✓	✓	✓	✓	NA	NA	✓	✓	NA

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

Comments: HTs OK; All matrix QC on samples from other SNL SDGs; Ca, Mg, Na >4X spike amount;
Ca diluted 10X for all samples

CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY

Internal Lab

Batch No. *NA*

SMO Use

AR/COC **615091'**

Project Name: SWMU 68 GWM	Date Samples Shipped: 10/8/13	SMO Authorization: <i>[Signature]</i>
Project/Task Manager: Clinton Lum	Carrier/Waybill No. 210471	SMO Contact Phone: Lorraine Herrera/505-844-3199
Project/Task Number: 146422.10.11.01	Lab Contact: Edie Kent/803-556-8171	Send Report to SMO: Rita Kavanaugh/505-284-2553
Service Order: CF263-14	Lab Destination: GEL	
	Contract No.: PO 1303873	

Waste Characterization
 RMMA
 Released by COC No. **4° Celsius**

Tech Area: _____
 Building: _____ Room: _____ Operational Site: _____

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

Sample No.	Fraction	Sample Location Detail	Depth (ft)	Date/Time Collected	Sample Matrix	Container		Preservative	Collection Method	Sample Type	Parameter & Method Requested	Lab Sample ID
						Type	Volume					
094767	-001	OBS-MW1	153	10/8/13 9:10	GW	G	3x40 ml	HCL	G	SA	TCL VOC (SW846-8260B)	335138 001
094767	-002	OBS-MW1	153	10/8/13 9:11	GW	AG	4x1L	None	G	SA	TCL SVOC (SW846-8270C)	335138 002
094767	-009	OBS-MW1	153	10/8/13 9:14	GW	P	500 ml	HNO3	G	SA	TAL Metals+U(SW846-6010/6020/7470)	335138 003
094767	-014	OBS-MW1	153	10/8/13 9:15	GW	P	250 ml	None	G	SA	Hexavalent Chromium(SW846-7196A)	335138 004
094767	-016	OBS-MW1	153	10/8/13 9:16	GW	P	125 ml	None	G	SA	Anions-Br,Cl,F,SO4 (SW846-9056)	335138 005
094767	-017	OBS-MW1	153	10/8/13 9:18	FGW	P	500 ml	HNO3	G	SA	Metals-Ca,Mg,K,Na (SW846-6020)	335139 001
094767	-018	OBS-MW1	153	10/8/13 9:19	GW	P	125 ml	H2SO4	G	SA	NPN (EPA 353.2)	335138 006
094767	-020	OBS-MW1	153	10/8/13 9:20	GW	P	250 ml	None	G	SA	Perchlorate (EPA 314.0)	335138 007
094767	-022	OBS-MW1	153	10/8/13 9:21	GW	P	500 ml	None	G	SA	Alkalinity (SM2320B)	335138 008
094767	-024	OBS-MW1	153	10/8/13 9:22	GW	AG	4x1L	None	G	SA	High Explosives (SW846-8321A mod)	335138 009

Last Chain: <input type="checkbox"/> Yes		Sample Tracking		SMO Use		Special Instructions/QC Requirements:		Conditions on Receipt
Validation Req'd: <input checked="" type="checkbox"/> Yes		Date Entered:		EDD <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		Turnaround Time <input type="checkbox"/> 7 Day* <input type="checkbox"/> 15 Day* <input checked="" type="checkbox"/> 30 Day		
Background: <input type="checkbox"/> Yes		Entered by:		Negotiated TAT <input type="checkbox"/>		Sample Disposal <input type="checkbox"/> Return to Client <input checked="" type="checkbox"/> Disposal by Lab		
Confirmatory: <input type="checkbox"/> Yes		QC inits.:		Return Samples By:		Comments: Send report to Tim Jackson/4142/MS 0729/284-2547 FGW (filtered in field w/40 micron filter). Alkalinity (as total CaCO3,HCO3,CO3). If Perchlorate detected, perform verification analysis using SW846-6850M. Gamma Spectroscopy as short list isotopes.		
Sample Team Members	Name	Signature	Init.	Company/Organization/Phone/Cell				
	Robert Lynch	<i>[Signature]</i>	<i>[Init]</i>	SNL/4142/505-844-4013/505-250-7090				
	Alfred Santillanes	<i>[Signature]</i>	<i>[Init]</i>	SNL/4142/505-844-5130/505-228-0710				
	William Gibson	<i>[Signature]</i>	<i>[Init]</i>	SNL/4142/505-284-3307/505-239-7367				

1. Relinquished by <i>[Signature]</i> Org. 4142 Date 10/8/13 Time 09:55	3. Relinquished by _____ Org. _____ Date _____ Time _____
1. Received by <i>[Signature]</i> Org. 4142 Date 10/8/13 Time 09:55	3. Received by _____ Org. _____ Date _____ Time _____
2. Relinquished by <i>[Signature]</i> Org. 4492 Date 10/8/13 Time 1000	4. Relinquished by _____ Org. _____ Date _____ Time _____
2. Received by <i>[Signature]</i> Org. 62 Date 10-9-13 Time 0720	4. Received by _____ Org. _____ Date _____ Time _____

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

CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY (Continuation)

AR/COC **615091**

Project Name: SWMU 68		Project/Task Manager: Clinton Lum		Project/Task No.: 146422.10.11.01										Lab use	
Tech Area:															
Building:		Room:													
Sample No.	Fraction	Sample Location Detail	Depth (ft)	Date/Time Collected	Sample Matrix	Container		Preservative	Collection Method	Sample Type	Parameter & Method Requested	Lab Sample ID			
						Type	Volume								
✓ 094767	-027	OBS-MW1	153	10/8/13 9:25	GW	P	250 ml	NaOH	G	SA	Total Cyanide (SW846-9012)	335138 010			
✓ 094767	-033	OBS-MW1	153	10/8/13 9:26	GW	P	1 L	HNO3	G	SA	Gamma Spectroscopy (EPA 901.0)	335138 011			
✓ 094767	-034	OBS-MW1	153	10/8/13 9:28	GW	P	1 L	HNO3	G	SA	Gross Alpha and Beta (EPA 900.0)	335138 012			
✓ 094767	-035	OBS-MW1	153	10/8/13 9:30	GW	P	1 L	HNO3	G	SA	Isotopic Uranium (HASL 300)	335138 013			
✓ 094768	-001	OBS-MW1	153	10/8/13 9:10	GW	G	3x40 ml	HCL	G	DU	TCL VOC (SW846-8260B)	335138 014			
✓ 094768	-002	OBS-MW1	153	10/8/13 9:11	GW	AG	4x1L	None	G	DU	TCL SVOC (SW846-8270C)	335138 015			
✓ 094768	-009	OBS-MW1	153	10/8/13 9:14	GW	P	500 ml	HNO3	G	DU	TAL Metals+U(SW846-6010/6020/7470)	335138 016			
✓ 094768	-014	OBS-MW1	153	10/8/13 9:15	GW	P	250 ml	None	G	DU	Hexavalent Chromium(SW846-7196A)	335138 017			
✓ 094768	-016	OBS-MW1	153	10/8/13 9:16	GW	P	125 ml	None	G	DU	Anions-Br,Cl,F,SO4 (SW846-9056)	335138 018			
✓ 094768	-017	OBS-MW1	153	10/8/13 9:18	FGW	P	500 ml	HNO3	G	DU	Metals-Ca,Mg,K,Na (SW846-6020)	335139 002			
✓ 094768	-018	OBS-MW1	153	10/8/13 9:19	GW	P	125 ml	H2SO4	G	DU	NPN (EPA 353.2)	335138 019			
✓ 094768	-020	OBS-MW1	153	10/8/13 9:20	GW	P	250 ml	None	G	DU	Perchlorate (EPA 314.0)	335138 020			
✓ 094768	-022	OBS-MW1	153	10/8/13 9:21	GW	P	500 ml	None	G	DU	Alkalinity (SM2320B)	335138 021			
✓ 094768	-024	OBS-MW1	153	10/8/13 9:22	GW	AG	4x1L	None	G	DU	High Explosives (SW846-8321A mod)	335138 022			
✓ 094768	-027	OBS-MW1	153	10/8/13 9:25	GW	P	250 ml	NaOH	G	DU	Total Cyanide (SW846-9012)	335138 023			
✓ 094768	-033	OBS-MW1	153	10/8/13 9:26	GW	P	1 L	HNO3	G	DU	Gamma Spectroscopy (EPA 901.0)	335138 024			
✓ 094768	-034	OBS-MW1	153	10/8/13 9:28	GW	P	1 L	HNO3	G	DU	Gross Alpha and Beta (EPA 900.0)	335138 025			
✓ 094768	-035	OBS-MW1	153	10/8/13 9:30	GW	P	1 L	HNO3	G	DU	Isotopic Uranium (HASL 300)	335138 026			
✓ 094769	-001	OBS-TB3	NA	10/8/13 9:10	DIW	G	3x40 ml	HCL	G	TB	TCL VOC (SW846-8260B)	335138 027			

Recipient Initials MK

Data Validation Summary Worksheet

AR/COC #: 615089 and 615090

Site/Project: SWMU 68 GWM

Validation Date: 11/12/2013

SDG #: 335046 and 335051

Laboratory: GEL

Validator: Linda Thal

Matrix: Aqueous

of Samples: 31 CVR present: Yes

Analysis Type: Organic Metals

AR/COC(s) present: Yes

Sample Container Integrity: OK

Rad Gen Chem

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

Hold Time/Preservation Outliers								
Sample Number	Laboratory ID	Analysis	Pres.	Coll. Date	Prep. Date	Anal. Date	Anal. within 2X HT	Anal. beyond 2X HT

Comments: Sampled 10/07/2013

Validated by: 

Organic Worksheet (GC/MS)

AR/COC #: 615089and 615090

SDG #: 335046

Matrix: Aqueous

Laboratory Sample IDs: 335046001, -014, -015, -016 and -029

Method/Batch #: 8260B: 1340220

Tuning (pass/fail): Pass TICs Required? (yes/no): No

Analyte (outliers)	Calibration				Method Blank	5X (10X) MB	LCS %R	MS %R	MSD %R	MS/ MSD RPD	FB -015	FB X5 (X10)	EB -016	EB X5 (X10)
	Int.	RF	RSD/ R ²	(ICV) CCV %D										
Acetone	+4.4	NA	✓	-22*	✓	NA	✓	✓	✓	✓	6.29J	(62.9)	✓	NA
Bromodichloromethane	NA	✓	✓	✓	✓	NA	✓	✓	✓	✓	1.08	5.4	1	5
Chloroform	NA	✓	✓	✓	✓	NA	✓	✓	✓	✓	2.88	14.4	2.77	13.85
Dibromochloromethane	NA	✓	✓	✓	✓	NA	✓	✓	✓	✓	0.61J	3.05	0.6J	3.0
Bromoform	NA	✓	16	✓	✓	NA	✓	✓	✓	✓	✓	NA	✓	NA
Dichlorodifluoromethane	NA	✓	✓	(-23)	✓	NA	✓	✓	✓	✓	✓	NA	✓	NA
Surrogate Recovery Outliers														
Sample ID														
None														
IS Outliers														
Sample ID	Area	RT	Area	RT	Area	RT	Area	RT	Area	RT	Area	RT	Area	RT
None														

Comments: HTs OK: ICAL VOA9.I 10/17/2013; MS/MSD performed on SNL sample from SDG 335138 spiked with trichlorotrifluoroethane; Acetone linear intercept >MDL; Methylene chloride linear intercept < MDL; EB applies to samples on ARCOG 615091 and to its associated FB on the same COC;*associated with MS/MSD only

Organic Worksheet (GC/MS)

AR/COC #: 615089 and 615090

SDG #: 335046

Matrix: Aqueous

Laboratory Sample IDs: 335046002and -017

Method/Batch #s: 8270D: 1338333/1338332 (prep)

Tuning (pass/fail): Pass

TICs Required? (yes/no): No

Analyte (outliers)	Calibration				Method Blank	5X (10X) Blank	LCS %R	MS %R	MSD %R	MS/ MSD RPD	EB -017			
	Int.	RF	RSD/ R ²	(ICV) CCV %D										
2,4-Dinitrophenol	NA	✓	16.6	✓	✓	NA	✓	✓	✓	✓	✓			
4-Nitrophenol	+3.9	NA	✓	✓	✓	NA	✓	✓	✓	✓	✓			
p-Nitroaniline	NA	✓	18	✓	✓	NA	✓	✓	✓	✓	✓			
2-Methyl-4,6-dinitrophenol	NA	✓	19.2	✓	✓	NA	✓	✓	✓	✓	✓			
Hexachlorocyclopentadiene	NA	✓	✓	✓	✓	NA	✓	✓	✓	39.9	✓			
Surrogate Recovery Outliers														
Sample ID														
None														
IS Outliers														
Sample ID	Area	RT	Area	RT	Area	RT	Area	RT	Area	RT	Area	RT	Area	RT
None														

Comments: HTs OK; MS/MSD on -002; ICAL MSD5.I 10/08/2013;

Inorganic Metals Worksheet

AR/COC #: 615089 and 615090

SDG #: 335046 and 335051

Matrix: Aqueous

Laboratory Sample IDs: 335046003and -018(UF); 335051001 and -002 (F – Na, K, Mg and Ca only)

Method/Batch #: **6010**: 1339649; **6020**: 1339756 (F&UF); **7470A**:1342180

ICPMS Mass Cal (pass/fail): Pass

ICPMS Resolution (pass/fail): Pass

Analyte (outliers)	Calibration						Method Blank mg/L	5X Blank or (5X MDL) mg/L	LCS %R	MS %R	Lab RepRPD	Serial Dil. %D	ICS AB %R	ICS A ± MDL ug/L x50 (mg/L)	CRA CRI %R	EB -018 UF	EB X5		
	Int. mg/L	R ²	ICV	CCV	ICB ug/L	CCB ug/L													
Ba	NA	✓	✓	✓	✓	✓	NA	✓	✓	✓	✓	NA	NA	✓	.00108J	.0054			
Cu	NA	✓	✓	✓	✓	✓	NA	✓	✓	✓	✓	NA	NA	✓	.000387J	.0019			
Zn	NA	✓	✓	✓	✓	✓	NA	✓	✓	✓	✓	NA	NA	✓	.00447J	.022			
Hg	✓	✓	✓	✓	✓	-.067	✓	(.00034)	✓	✓	✓	✓	NA	NA	✓	✓	NA		

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

Comments: HTs OK;ICP and ICP-MS matrix QC on samples from other SNL SDGs (F&UF); Hg -003; Ca, Mg, Na >4X spike amount;

Ca diluted 10X for samples -001 and 003, however, sample -003 looked as if it was performed on a 5X dilution. The sample was reanalyzed on 11/21/13 at a 5X dilution and this result was reported.

Memorandum

Date: November 14, 2013
To: File
From: Linda Thal
Subject: Inorganic Data Review and Validation – SNL
Site: SWMU 68 GWM
AR/COC: 615092
SDG: 335241
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 7196A (hexavalent chromium), EPA 9056 (anions by IC), EPA 353.2 (nitrate/nitrite), EPA 9012A (total cyanide), EPA 314.0 (perchlorate) and SM2320B (total alkalinity). Data were reported for all required analytes. Problems were identified with the data package that resulted in the qualification of data.

Total cyanide:

1. The intercept for total cyanide was negative with an absolute value > the MDL but $\leq 3X$ the MDL. The associated sample result was ND and will be **qualified UJ,I5**.
2. Total cyanide was detected in the ICB/CCB at negative values with absolute values < the PQL. The associated sample result was ND and will be **qualified UJ,B4**.

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

Holding Times and Preservation

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

Calibration

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

Blanks

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

Laboratory Control Sample (LCS)

All LCS acceptance criteria were met.

Matrix Spike (MS)

All MS/PS recoveries met QC acceptance criteria.

Total cyanide, perchlorate, anions and total alkalinity:

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

Laboratory Replicate

The replicate analyses met all QC acceptance criteria.

Total cyanide, perchlorate, anions and total alkalinity:

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

Detection Limits/Dilutions

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

Nitrate/Nitrite:

The sample was diluted 10X.

Anions:

The sample was diluted 10X for chloride and sulfate.

Other QC

No other specific issues that affect data quality were identified.

Reviewed by: Monica Dymerski **Level I** **Date:** 11/20/13

Memorandum

Date: November 14, 2013

To: File

From: Linda Thal

Subject: LC/MS/MS Organic Data Review and Validation – SNL
Site: SWMU 68 GWM
AR/COC: 615092
SDG: 335241
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

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 initial calibration RFs for m-nitrotoluene, o-nitrotoluene and p-nitrotoluene were <0.05 but ≥ 0.01 . All associated sample results were NDs and will be **qualified UJ,I4**.

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

Laboratory Control Sample (LCS)

All LCS recoveries met QC acceptance criteria.

Detection Limits/Dilutions

All detection limits were properly reported. 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: 11/20/13

Memorandum

Date: November 14, 2013
To: File
From: Linda Thal
Subject: Inorganic Data Review and Validation – SNL
Site: SWMU 68 GWM
AR/COC: 615092
SDG: 335241 and 335242
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

One unfiltered sample was prepared and analyzed with approved procedures using methods EPA 6010B (ICP-AES), EPA 6020 (ICP-MS) and EPA 7470A (CVAA mercury). One filtered sample was 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.

CVAA:

1. Hg was detected at a negative value with an absolute value < the PQL in a CCB bracketing the sample. The associated sample result was ND and will be **qualified UJ,B4**.

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

Holding Times and Preservation

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

ICP-MS Instrument Tune

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.

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.

All analyses:

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

Laboratory Replicate

The replicate met all QC acceptance criteria.

All analyses:

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)

The LCS met all QC acceptance criteria.

Detection Limits/Dilutions

All detection limits were properly reported. All samples were diluted 10X 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.

ICP-AES and ICP-MS:

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

Other QC

No other specific issues that affect data quality were identified.

Reviewed by: Monica Dymerski

Level I

Date: 11/20/13

Memorandum

Date: November 14, 2013

To: File

From: Linda Thal

Subject: Radiochemical Data Review and Validation – SNL
Site: SWMU 68 GWM
AR/COC: 615092
SDG: 335241
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

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.

Gamma Spec:

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

Gross Alpha/Beta:

1. 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 ≤3X the MDA will be **qualified J,FR7**.

Holding Times and Preservation

The sample was 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 except as follows.

The U-232 tracer recovery was <50% for the LCS. The LCS tracer area counts were >400 and the LCS recovery met acceptance criteria. Therefore, no sample results will be qualified based on professional judgment.

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 and Alphaspec Uranium:

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 sample was not diluted. All required detection limits were met.

Other QC

No other specific issues that affect data quality were identified.

Reviewed by: Monica Dymerski

Level I

Date: 11/20/13



Sample Findings Summary



AR/COC: 615092

Page 1 of 1

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
EPA 900.0/SW846 9310			
	094771-034/OBS-MW3	ALPHA (12587-46-1)	J, MS1
	094771-034/OBS-MW3	BETA (12587-47-2)	J, FR7,MS1
EPA 901.1			
	094771-033/OBS-MW3	Americium-241 (14596-10-2)	BD, FR3
	094771-033/OBS-MW3	Cesium-137 (10045-97-3)	BD, FR3
	094771-033/OBS-MW3	Cobalt-60 (10198-40-0)	BD, FR3
	094771-033/OBS-MW3	Potassium-40 (13966-00-2)	BD, FR3
SW846 3510C/8270D			
	094771-002/OBS-MW3	Hexachlorocyclopentadiene (77-47-4)	UJ, MS5
SW846 3535/8321A Modified			
	094771-024/OBS-MW3	m-Nitrotoluene (99-08-1)	UJ, I4
	094771-024/OBS-MW3	o-Nitrotoluene (88-72-2)	UJ, I4
	094771-024/OBS-MW3	p-Nitrotoluene (99-99-0)	UJ, I4
SW846 7470A			
	094771-009/OBS-MW3	Mercury (7439-97-6)	UJ, B4
SW846 9012B			
	094771-027/OBS-MW3	Cyanide, Total (57-12-5)	UJ, I5,B4

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

Memorandum

Date: November 14, 2013
To: File
From: Linda Thal
Subject: GC/MS Organic Data Review and Validation – SNL
Site: SWMU 68 GWM
AR/COC: 615092
SDG: 335241
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

One sample was prepared and analyzed with accepted procedures using methods EPA 3510/8270D (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 was > laboratory acceptance criteria for hexachlorocyclopentadiene. The associated sample result was ND and will be **qualified UJ,MS5**.

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

Holding Times

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

Instrument Tune

All instrument tune requirements were met.

Calibration

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

The ICAL intercept for 4-nitrophenol was positive and > the MDL. The associated sample result was ND and will not be qualified.

The ICAL %RSDs were >15% but ≤40% for 2,4-dinitrophenol; p-nitroaniline 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 blank.

Surrogates

All surrogate recoveries met QC acceptance criteria.

Internal Standards

All internal standards met QC acceptance criteria.

Matrix Spike/Matrix Spike Duplicate (MS/MSD)

All MS/MSD acceptance criteria were met except as noted above in the Summary section. It should be noted that the MS/MSD was performed on a sample of similar matrix from another SNL SDG. No data will be qualified as a result.

Laboratory Control Sample (LCS)

All LCS acceptance criteria were met.

Detection Limits/Dilutions

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

Tentatively Identified Compounds (TICs)

TIC reports were not required.

Other QC

No other specific issues that affect data quality were identified.

Reviewed by: Monica Dymerski

Level I

Date: 11/20/13

Memorandum

Date: November 14, 2013
To: File
From: Linda Thal
Subject: GC/MS Organic Data Review and Validation – SNL
Site: SWMU 68 GWM
AR/COC: 615092
SDG: 335241
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

Three samples were prepared and analyzed with accepted procedures using method EPA 8260B (VOCs). All compounds were successfully analyzed. No problems were identified with the data package that resulted in the qualification of data.

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

Holding Times

The samples were analyzed within the prescribed holding 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 follows.

The ICAL intercept was positive and > the MDL for acetone. The associated sample results were NDs and will not be qualified.

The ICAL %RSD was >15% but ≤40% for bromoform. The associated sample results were NDs and since no other calibration infraction occurred, will not be qualified.

The ICV %D was >20% but ≤40% with negative bias for dichlorodifluoromethane. The associated sample results were NDs and since no other calibration infraction occurred, will not be qualified.

The CCV %D was >20% but ≤40% with negative bias for acetone. The associated sample results were NDs and since a positive intercept is not considered another calibration infraction, will not be qualified.

Blanks

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

Chloroform was detected at > the PQL in the FB, sample 335241001. The associated sample result was ND and will not be qualified.

Surrogates

All surrogate recoveries met QC acceptance criteria.

Internal Standards

All internal standards met QC acceptance criteria.

Matrix Spike/Matrix Spike Duplicate (MS/MSD)

All MS/MSD acceptance criteria were met. It should be noted that the MS/MSD analyses were performed on a sample of similar matrix from other SNL SDG. No sample data will be qualified as a result.

Laboratory Control Sample (LCS)

All LCS acceptance criteria were met.

Detection Limits/Dilutions

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

Tentatively Identified Compounds (TICs)

TIC reports were not required.

Other QC

A TB and a FB were submitted with AR/COC 615092.

No other specific issues that affect data quality were identified.

Reviewed by: Monica Dymerski

Level I

Date: 11/20/13

Data Validation Summary Worksheet

AR/COC #: 615092
 SDG #: 335241 and 335242
 Matrix: Aqueous
 AR/COC(s) present: Yes

Site/Project: SWMU 68 GWM
 Laboratory: GEL
 # of Samples: 16 CVR present: Yes
 Sample Container Integrity: OK

Validation Date: 11/14/2013
 Validator: Linda Thal
 Analysis Type: Organic Metals
 Rad Gen Chem

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

Hold Time/Preservation Outliers								
Sample Number	Laboratory ID	Analysis	Pres.	Coll. Date	Prep. Date	Anal. Date	Anal. within 2X HT	Anal. beyond 2X HT
None								

Comments: Sampled 10/09/2013

Validated by: 

Organic Worksheet (GC/MS)

AR/COC #: 615092

SDG #: 335241

Matrix: Aqueous

Laboratory Sample IDs: 335241001, -002 and -015

Method/Batch #s: 8260B: 1340220

Tuning (pass/fail): Pass TICs Required? (yes/no): No

Analyte (outliers)	Calibration				Method Blank	5X (10X) MB	LCS %R	MS %R	MSD %R	MS/ MSD RPD	TB -015	TB X5	FB -001	FB X5 (X10)
	Int.	RF	RSD/ R ²	(ICV) CCV %D										
Acetone	+4.4	NA	✓	-22	✓	NA	✓	✓	✓	✓	✓	NA	✓	NA
Chloroform	NA	✓	✓	✓	✓	NA	✓	✓	✓	✓	✓	NA	1.52	7.6
Bromoform	NA	✓	16	✓	✓	NA	✓	✓	✓	✓	✓	NA	✓	NA
Dichlorodifluoromethane	NA	✓	✓	(-23)	✓	NA	✓	✓	✓	✓	✓	NA	✓	NA
Surrogate Recovery Outliers														
Sample ID														
None														
IS Outliers														
Sample ID	Area	RT	Area	RT	Area	RT	Area	RT	Area	RT	Area	RT	Area	RT
None														

Comments: HTs OK: ICAL VOA9.I 10/17/2013; MS/MSD performed on SNL sample from another SDG spiked with trichlorotrifluoroethane; Acetone linear intercept >MDL; Methylene chloride linear intercept < MDL;

Organic Worksheet (GC/MS)

AR/COC #: 615092

SDG #: 335241

Matrix: Aqueous

Laboratory Sample IDs: 335341003

Method/Batch #: 8270D: 1338333/1338332 (prep)

Tuning (pass/fail): Pass

TICs Required? (yes/no): No

Analyte (outliers)	Calibration				Method Blank	5X (10X) Blank	LCS %R	MS %R	MSD %R	MS/ MSD RPD				
	Int.	RF	RSD/ R ²	(ICV) CCV %D										
2,4-Dinitrophenol	NA	✓	16.6	✓	✓	NA	✓	✓	✓	✓				
4-Nitrophenol	+3.9	NA	✓	✓	✓	NA	✓	✓	✓	✓				
p-Nitroaniline	NA	✓	18	✓	✓	NA	✓	✓	✓	✓				
2-Methyl-4,6-dinitrophenol	NA	✓	19.2	✓	✓	NA	✓	✓	✓	✓				
Hexachlorocyclopentadiene	NA	✓	✓	✓	✓	NA	✓	✓	✓	39.9				
Surrogate Recovery Outliers														
Sample ID														
None														
IS Outliers														
Sample ID	Area	RT	Area	RT	Area	RT	Area	RT	Area	RT	Area	RT	Area	RT
None														

Comments: HTs OK; MS/MSD on sample from another SNL SDG; ICAL MSD5.I 10/08/2013;

Inorganic Metals Worksheet

AR/COC #: 615092

SDG #: 335241 and 335242

Matrix: Aqueous

Laboratory Sample IDs: 335241004 (UF); 335242001 (F – Na, K, Mg and Ca only)

Method/Batch #s: **6010**: 1339649; **6020**: 1339756 (F&UF); **7470A**:1342180

ICPMS Mass Cal (pass/fail): Pass

ICPMS Resolution (pass/fail): Pass

Analyte (outliers)	Calibration						Method Blank mg/L	5X Blank or (5X MDL) mg/L	LCS %R	MS %R	Lab Rep RPD	Serial Dil. %D	ICS AB %R	ICS A ± MDL ug/L x50 (mg/L)	CRA CRI %R				
	Int. mg/L	R ²	ICV	CCV	ICB ug/L	CCB ug/L													
Hg	✓	✓	✓	✓	✓	-0.068	✓	(.00034)	✓	✓	✓	✓	NA	NA	✓				

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

Comments: HTs OK; All matrix QC on samples from other SNL SDGs; Ca, Mg, Na >4X spike amount;
Ca diluted 10X for all samples

CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY

Internal Lab

Batch No. 41A

SMO Use

AR/COC **615092**

Project Name: <u>SWMU 68 GWM</u>	Date Samples Shipped: <u>10/9/13</u>	SMO Authorization: <u>[Signature]</u>	<input type="checkbox"/> Waste Characterization
Project/Task Manager: <u>Clinton Lum</u>	Carrier/Waybill No.: <u>210509</u>	SMO Contact Phone: <u>Lorraine Herrera/505-844-3199</u>	<input type="checkbox"/> RMMA
Project/Task Number: <u>146422.10.11.01</u>	Lab Contact: <u>Edie Kent/803-556-8171</u>	Send Report to SMO: <u>Rita Kavanaugh/505-284-2553</u>	<input type="checkbox"/> Released by COC No. <input checked="" type="checkbox"/> 4° Celsius
Service Order: <u>CF263-14</u>	Lab Destination: <u>GEL</u>		
	Contract No.: <u>PO 1303873</u>		

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

Sample No.	Fraction	Sample Location Detail	Depth (ft)	Date/Time Collected	Sample Matrix	Container		Preservative	Collection Method	Sample Type	Parameter & Method Requested	Lab Sample ID
						Type	Volume					
094770	-001	OBS-FB2	NA	10/9/13 9:19	DIW	G	3x40ml	HCL	G	FB	TCL VOC (SW846-8260B)	335241 001
094771	-001	OBS-MW3	208	10/9/13 9:22	GW	G	3x40ml	HCL	G	SA	TCL VOC (SW846-8260B)	335241 002
094771	-002	OBS-MW3	208	10/9/13 9:23	GW	AG	4x1L	None	G	SA	TCL SVOC (SW846-8270C)	335241 003
094771	-009	OBS-MW3	208	10/9/13 9:25	GW	P	500 ml	HNO3	G	SA	TAL Metals+U(SW846-6010/6020/7470)	335241 004
094771	-014	OBS-MW3	208	10/9/13 9:26	GW	P	250 ml	None	G	SA	Hexavalent Chromium(SW846-7196A)	335241 005
094771	-016	OBS-MW3	208	10/9/13 9:27	GW	P	125 ml	None	G	SA	Anions-Br,Cl,F,SO4 (SW846-9056)	335241 006
094771	-017	OBS-MW3	208	10/9/13 9:29	FGW	P	500 ml	HNO3	G	SA	Metals-Ca,Mg,K,Na (SW846-6020)	335242 001
094771	-018	OBS-MW3	208	10/9/13 9:30	GW	P	125 ml	H2SO4	G	SA	NPN (EPA 353.2)	335241 007
094771	-020	OBS-MW3	208	10/9/13 9:31	GW	P	250 ml	None	G	SA	Perchlorate (EPA 314.0)	335241 008
094771	-022	OBS-MW3	208	10/9/13 9:32	GW	P	500 ml	None	G	SA	Alkalinity (SM2320B)	335241 009

Last Chain: <input checked="" type="checkbox"/> Yes *	Sample Tracking	SMO Use	Special Instructions/QC Requirements:	Conditions on Receipt
Validation Req'd: <input checked="" type="checkbox"/> Yes	Date Entered:		EDD <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	
Background: <input type="checkbox"/> Yes	Entered by:		Turnaround Time <input type="checkbox"/> 7 Day* <input type="checkbox"/> 15 Day* <input checked="" type="checkbox"/> 30 Day	
Confirmatory: <input type="checkbox"/> Yes	QC inits.:		Negotiated TAT <input type="checkbox"/>	
Sample Team Members	Name	Signature	Init.	Company/Organization/Phone/Cell
	Robert Lynch	[Signature]	RL	SNL/4142/505-844-4013/505-250-7090
	Alfred Santillanes	[Signature]	AS	SNL/4142/505-844-5130/505-228-0710
	William Gibson	[Signature]	WG	SNL/4142/505-284-3307/505-239-7367
				Sample Disposal <input type="checkbox"/> Return to Client <input checked="" type="checkbox"/> Disposal by Lab
				Return Samples By:
				Comments: Send report to Tim Jackson/4142/MS 0729/284-2547 FGW (filtered in field w/40 micron filter). Alkalinity (as total CaCO3,HCO3,CO3). If Perchlorate detected, perform verification analysis using SW846-6850M. Gamma Spectroscopy as short list isotopes.

1. Relinquished by <u>Alfred Santillanes</u> Org. <u>4142</u> Date <u>10/9/13</u> Time <u>1000</u>	3. Relinquished by _____ Org. _____ Date _____ Time _____
1. Received by <u>[Signature]</u> Org. <u>4142</u> Date <u>10/9/13</u> Time <u>1000</u>	3. Received by _____ Org. _____ Date _____ Time _____
2. Relinquished by <u>[Signature]</u> Org. <u>4142</u> Date <u>10/9/13</u> Time <u>1100</u>	4. Relinquished by _____ Org. _____ Date _____ Time _____
2. Received by <u>[Signature]</u> Org. <u>4142</u> Date <u>10-10-13</u> Time <u>0740</u>	4. Received by _____ Org. _____ Date _____ Time _____

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

