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National Nuclear Security Administration
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NMED
Hazardous Waste Bureau

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

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

Dear Mr. Kieling:

Enclosed is the *Environmental Restoration Operations Consolidated Quarterly Report, July 2014*, for the Department of Energy/National Nuclear Security Administration, Sandia Corporation that addresses all quarterly reporting (January through March 2014) required under the *Hazardous and Solid Waste Amendments Module of the Resource Conservation and Recovery Act Permit*, the *Compliance Order on Consent and the Chemical Waste Landfill Closure Plan* for Sandia National Laboratories/New Mexico, Environmental Protection Agency identification number NM5890110518.

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

Sincerely,

James W. Todd
Assistant Manager for
Engineering

Enclosure

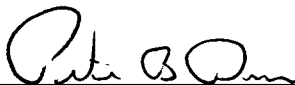
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CERTIFICATION STATEMENT FOR APPROVAL AND FINAL RELEASE OF DOCUMENTS

Document title: Environmental Restoration Operations Consolidated Quarterly
Report, July 2014

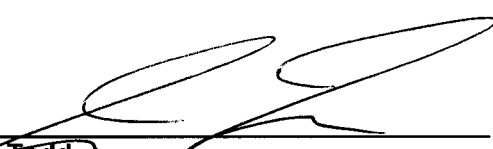
Document author: John Cochran, Department 06234

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision according to a system designed to ensure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine or imprisonment for knowing violations.

Signature: 
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7/10/14
Date

and

Signature: 
James W. Todd
U.S. Department of Energy
National Nuclear Security Administration
Sandia Site Office
Owner and Co-Operator

17 July 2014
Date

Sandia National Laboratories, New Mexico

Environmental Restoration Operations

A U.S. Department of Energy Environmental Cleanup Program

Consolidated Quarterly Report

January – March 2014



July 2014



United States Department of Energy
Sandia Field Office

CONSOLIDATED QUARTERLY REPORT

July 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: January – March 2014

OVERVIEW

This Sandia National Laboratories, New Mexico Environmental Restoration Operations (ER) Consolidated Quarterly Report (ER Quarterly Report) fulfills all quarterly reporting requirements set forth in the Hazardous and Solid Waste Amendments (HSWA) Module of the Resource Conservation and Recovery Act Permit, the 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, January – March 2014

SECTION II: Perchlorate Screening Quarterly Groundwater Monitoring Report, January – March 2014

SECTION III: Solid Waste Management Units 149 and 154 Quarterly Groundwater Monitoring Report, January – March 2014

SECTION IV: Solid Waste Management Units 8/58 and 68 Quarterly Groundwater Monitoring Report, January – March 2014

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
ALTMM	Annual Long-Term Monitoring and Maintenance
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
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
TO	Technical Order
VOC	volatile organic compound
W	well

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SECTION I

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SECTION I

ENVIRONMENTAL RESTORATION OPERATIONS CONSOLIDATED

QUARTERLY REPORT, January – March 2014

1.0 Introduction

This Environmental Restoration Operations (ER) Consolidated Quarterly Report (ER Quarterly Report) provides the status of ongoing corrective actions and related Long-Term Stewardship (LTS) activities being implemented by Sandia National Laboratories, New Mexico (SNL/NM) ER for the January, February and March 2014 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 (CWL) and the associated Corrective Action Management Unit (CAMU).

2.0 Environmental Restoration Operations Work Completed

2.1 Mixed Waste Landfill

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

The work plan for the three multi-port, soil-vapor monitoring wells (SNL/NM January 2014) specified in the MWL LTMMP was submitted to the NMED on January 15, 2014 and was approved by the NMED on February 14, 2014 (Blaine February 2014). Contracting and planning for the drilling field effort continued during this reporting period. The anticipated start date for mobilization of the drilling contractor and installation of the soil-vapor wells is May 2014.

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 (Technical Area [TA]-V, Burn Site Groundwater [BSG], and Tijeras Arroyo Groundwater [TAG]).

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

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

This letter included four main sections:

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

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

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

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

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

Groundwater monitoring results are summarized in Sections I.2.3.7 and I.2.3.9, respectively, of this ER Quarterly Report.

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

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

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

1. SWMU 4 – LWDS Surface Impoundments (TA-V)
2. SWMU 5 – LWDS Drainfield
3. SWMU 28-2 – Mine Shafts
4. SWMU 46 – Old Acid Waste Line Outfall
5. SWMU 49 – Building 9820 Drains (Lurance Canyon)
6. SWMU 91 – Lead Firing Site (Thunder Range)
7. SWMU 101 – Building 9926/9926A Septic System and Seepage Pit (CTF)
8. SWMU 105 – Mercury Spill Building 6536
9. SWMU 116 – Building 9990 Septic System (CTF)
10. SWMU 138 – Building 6630 Septic Systems (TA-III)
11. SWMU 140 – Building 9965 Septic System (Thunder Range)
12. SWMU 147 – Building 9925 Septic Systems (CTF)
13. SWMU 150 – Buildings 9939/9939A Septic System and Drainfield (CTF)
14. SWMU 161 – Building 6636 Septic System (TA-III)
15. SWMU 196 – Building 6597 Cistern (TA-V)
16. SWMU 233 – Storm Drain System Outfall
17. SWMU 234 – Storm Drain System Outfall
18. AOC 1090 – Building 6721 Septic System (TA-III)
19. AOC 1094 – Live Fire Range East Septic System (Lurance Canyon)
20. AOC 1095 – Building 9938 Seepage Pit (CTF)
21. AOC 1101 – Building 885 Septic System (TA-I)
22. AOC 1114 – Building 9978 Drywell (CTF)
23. AOC 1115 – Former Offices Septic System (Solar Tower Complex)
24. AOC 1116 – Building 9981A Seepage Pit (Solar Tower Complex)
25. AOC 1117 – Building 9982 Drywell (Solar Tower Complex)

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

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 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 Calendar Year (CY) 2014 Annual Groundwater Monitoring Report, which is an anticipated submittal to the NMED in summer 2015. Also, analytical results for the CWL groundwater monitoring will be presented and discussed in the CWL Annual Post-Closure Care Report for CY 2014.

Perchlorate analysis of groundwater samples for SWMUs 8/58, 49, 68, 116, 149, and 154 is discussed in Section II of this ER Quarterly Report.

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

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

2.3.1 **Technical Area V Groundwater**

Groundwater sampling at TA-V was conducted in February and March 2014 and the results will be presented in the SNL/NM CY 2014 Annual Groundwater Monitoring Report, as noted above.

2.3.2 **Burn Site Groundwater**

No groundwater monitoring activities were performed at BSG during this reporting period. Groundwater at BSG is sampled semiannually and is scheduled to be sampled in the second quarter of 2014.

2.3.3 **Tijeras Arroyo Groundwater**

TAG investigation groundwater sampling was conducted in March 2014.

2.3.4 **Mixed Waste Landfill Groundwater**

No MWL groundwater monitoring activities were performed during this reporting period. The first semiannual groundwater monitoring event under the MWL LTMMP will be performed in the second quarter of 2014 and includes compliance monitoring wells MWL-BW2, MWL-MW7, MWL-MW8, and MWL-MW9.

2.3.5 **Chemical Waste Landfill Groundwater**

Semiannual CWL groundwater monitoring activities were performed January 9 through 15, 2014. Groundwater monitoring results will be presented in the CWL Annual Post-Closure Care Report for CY 2014 that will be submitted to NMED in March 2015.

2.3.6 **SWMUs 8/58 Groundwater**

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

2.3.7 **SWMU 49 Groundwater**

SWMU 49 groundwater sampling was conducted in January 2014.

2.3.8 **SWMU 68 Groundwater**

SWMU 68 groundwater sampling was conducted in January 2014.

2.3.9 **SWMU 116 Groundwater**

SWMU 116 groundwater sampling was conducted in January 2014.

2.3.10 **SWMU 149 Groundwater**

SWMU 149 groundwater sampling was conducted in March 2014.

2.3.11 **SWMU 154 Groundwater**

SWMU 154 groundwater sampling was conducted in March 2014.

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

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

- The BSG Interim Measures Work Plan submitted to the NMED on May 26, 2005 (SNL/NM May 2005)
- The BSG Current Conceptual Model of Groundwater Flow and Contaminant Transport submitted to the NMED on April 9, 2008 (SNL/NM March 2008)
- The TA-V Geophysical Logs and Slug Test Results Report submitted to the NMED on November 24, 2010 (SNL/NM November 2010)
- MWL Groundwater Monitoring Report for CY 2010 submitted to the NMED on September 30, 2011 (SNL/NM September 2011)
- Monitoring Well Plug and Abandonment Plan and Well Construction Plan (SNL/NM September 2013b).
- Letter from DOE/National Nuclear Security Administration (NNSA) and Sandia to NMED summarizing the current status of the Corrective Measures Evaluation at TA-V and petitioning to withdraw the 2005 TA-V CME Report from their review process (Beausoleil December 2013).

3.0 **Long-Term Stewardship Work Completed**

3.1 **Mixed Waste Landfill**

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

- Quarterly radon air monitoring was initiated on January 14, 2014.
- The ET Cover System Inspection was performed on February 18, 2014. Tumbleweed accumulations along the perimeter fence were noted and will be removed in early April (prior to the 60-day time limit) to allow for an efficient removal effort given the persistent spring winds.
- The ET Cover Biology Inspection was performed on February 18, 2014. The vegetation is dominated by native perennial grass species with even coverage across the ET Cover (approximately 51 percent foliar coverage). The ET Cover meets successful revegetation criteria as stipulated in the MWL LTMMP (SNL/NM March 2012). From October 2013 to March 2014 there has been 2.07 inches of precipitation as measured at the nearby SNL/NM meteorological station A36 in TA-III.
- The MWL supplemental watering system was decommissioned for the CY 2013 growing season on October 16, 2013 and remained inactive for the reporting period. Reactivation of the system is anticipated in May due to very low precipitation totals for the reporting period (0.38 inches for January through March 2014).
- Semiannual groundwater monitoring will be conducted at wells MWL-BW2, MWL-MW7, MWL-MW8, and MWL-MW9 in April 2014.
- Planning and contracting for the drilling and installation of the three multi-port soil-vapor monitoring wells required by the MWL LTMMP continued throughout the reporting period. The start of drilling is anticipated in May 2014.

3.2 **Chemical Waste Landfill**

The CWL Post-Closure Care Permit (PCCP) (NMED October 2009) became effective on June 2, 2011, when the NMED approved the CWL Final RCRA Closure Report (Kieling June 2011), transitioning the CWL from SNL/NM ER to LTS. A summary of post-closure care activities at the CWL for this reporting period is provided in this ER Quarterly Report. More detailed documentation of ongoing activities under the PCCP will be reported in the CY 2014 CWL Annual Post-Closure Care Report (due to the NMED in March 2015). Activities for this reporting period include the following:

- Semiannual groundwater monitoring and annual soil-gas monitoring were performed in January 2014. The groundwater and soil-gas monitoring networks and sampling equipment were inspected during the respective monitoring events.
- The quarterly ET Cover System Inspection (surface, storm water diversion structures, security fence, and survey monuments) was performed on March 3, 2014. Tumbleweed accumulations were noted adjacent to the two culverts along the southern boundary swale and along the perimeter fence. These weeds will be removed during the next reporting period.
- The CY 2013 CWL Annual Post-Closure Care Report was submitted to NMED on March 26, 2014.

3.3 **Corrective Action Management Unit**

The CAMU post-closure care operations consist of vadose zone monitoring, leachate removal, and post-closure inspections as required in the PCCP.

Activities for this reporting period (January, February, and March 2014) include the following:

- The September 2013 quarterly inspection identified the need to remove sediment accumulation and make minor repairs to the perimeter drainage at the toe of the containment cell. Consequently,
 - After evaluating various options and alternatives for performing the work, a statement of work was drafted in March 2014 to formally solicit a contractor cost estimate to perform work on the perimeter drainage.
- Quarterly monitoring of the Vadose Zone Monitoring System was conducted in February 2014. The results will be presented in the CAMU Vadose Zone Monitoring System Annual Monitoring Results Report (anticipated submittal to the NMED in September 2014).
- Composite leachate sampling for waste characterization was conducted on February 11, 2014.
- Weekly pumping of leachate from the leachate collection and removal system (LCRS) was performed. Waste management associated with the LCRS during this reporting period is presented in Section I.3.2.1.

- Weekly inspections of the RCRA less than 90-day accumulation area were performed.
- Quarterly inspection of the site was performed on March 5 and March 24, 2014, which included the containment cell cover, storm-water diversion structures, security fences, gates, signs, and benchmarks. The inspection findings identified tumbleweeds along the perimeter fence, drainage sump, and western most benchmark that will be removed in early April.

3.3.1 **CAMU Waste Management Activities**

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

- Leachate and rinsate waste stored on site as of January 1, 2014 equaled 25 and 0 gallons, respectively.
- Leachate and rinsate waste generated on site during the reporting period equaled 102 and 2 gallons, respectively. Leachate and rinsate waste removed from the site on February 20, 2014 equaled 80 and 2 gallons, respectively.
- Leachate and rinsate waste remaining on site at the end of this reporting period equaled 47 and 0 gallons, respectively.

3.3.2 **CAMU Regulatory Activities**

No regulatory activities occurred during this quarter.

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

Not included in the previous quarterly report was mention of the request sent to the NMED on October 25, 2013 (Beausoleil October 2013) for modification to the hazardous waste permit for the CAMU. The modification would allow the use of alternative analytical methods for soil-gas samples. It would include Environmental Protection Agency Method Technical Order (TO)-15. The request was made because numerous analytical laboratories,

including the laboratories under contract to Sandia, are phasing out the TO-14 analytical method and switching to the more rigorous TO-15 method.

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

4.0 **References**

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

Notes

^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.
ALTMM = Annual Long-Term Monitoring and Maintenance.
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.
PCCP = Post-Closure Care Permit.
SWMU = Solid Waste Management Unit.
TAG = Tijeras Arroyo Groundwater.
TA-V = Technical Area V.

SECTION II

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SECTION II

PERCHLORATE SCREENING QUARTERLY GROUNDWATER MONITORING REPORT, January – March 2014

1.0 Introduction

Section IV.B of the Compliance Order on Consent (the Order), between the New Mexico Environment Department (NMED); the U.S. Department of Energy (DOE), and Sandia Corporation (Sandia), jointly referred to as DOE/Sandia, for Sandia National Laboratories, New Mexico (SNL/NM), effective on April 29, 2004, stipulates that a select group of groundwater monitoring wells at SNL/NM be sampled for perchlorate (NMED April 2004). This section of the Environmental Restoration Operations (ER) Consolidated Quarterly Report (ER Quarterly Report) summarizes the perchlorate screening groundwater monitoring completed during the First Quarter of Calendar Year (CY) 2014 (January, February, and March) in response to the requirements of the Order. The outline of this report is based on the required elements of a “Periodic Monitoring Report” described in Section X.D. of the Order (NMED April 2004).

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

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

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

Groundwater at Coyote Test Field (CTF) monitoring well CTF-MW1 has been sampled 4 times; monitoring well CTF-MW2 has been sampled 13 times; monitoring well CTF-MW3 has been sampled 12 times; monitoring well CYN-MW5 has been sampled 4 times; Solid Waste Management Units (SWMUs) 8/58 monitoring wells CCBA-MW1 and CCBA-MW2 have been sampled 10 times; and SWMU 68 monitoring wells OBS-MW1, OBS-MW2, and OBS-MW3 have been sampled 10 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 First Quarter of CY 2014 (January, February, and March) for the wells currently active in the perchlorate screening program as shown on Figure II-1 and listed in Table II-1. In accordance with the requirements of Table XI-1 of the Order, a well with four consecutive quarters of nondetects (NDs) for perchlorate at the screening level/method detection limit (MDL) of 4 micrograms per liter ($\mu\text{g/L}$) 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 nine wells on the dates listed in Table II-1. Several of the wells were installed after the Order was finalized (NMED April 2004) and were therefore required to be sampled for perchlorate as “new” wells; the other wells were sampled to meet other regulatory requirements (discussed in Section II.3.0).

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

- “SWMUs 8/58 Groundwater Monitoring, Mini-SAP for Second Quarter, Fiscal Year 2014” (SNL/NM December 2013a)
- “SWMU 68 Groundwater Monitoring, Mini-SAP for Second Quarter, Fiscal Year 2014” (SNL/NM December 2013b)
- “SWMU 149 Groundwater Monitoring, Mini-SAP for Second Quarter, Fiscal Year 2014” (SNL/NM February 2014a)
- “SWMU 154 Groundwater Monitoring, Mini-SAP for Second Quarter, Fiscal Year 2013” (SNL/NM February 2014b)
- “SWMUs 49 and 116 Groundwater Monitoring, Mini-SAP for Fiscal Year 2014 Annual Sampling (SNL/NM January 2014)

As described in the Mini-SAPs, groundwater sampling was performed in accordance with current SNL/NM Environmental Management, Long-Term Stewardship Project Field Operating Procedures (FOPs). A portable BennettTM 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 YSITM Model EXO1 water quality meter. Turbidity was measured with a HACHTM 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 8/58—Installation of at least two groundwater monitoring wells west of and near Features YY and OO, submittal and approval of a work plan.
- SWMU 49—Annual sampling of existing monitoring well CYN-MW5.
- SWMU 68—Installation of monitoring wells near the burn pan and associated ditch/surface impoundments, submittal and approval of a work plan.
- SWMU 116—Annual sampling of existing monitoring well CTF-MW1.
- SWMU 149—Submittal of a SAP and quarterly sampling of existing monitoring well CTF-MW3 for a minimum of eight quarters.
- SWMU 154—Submittal of a SAP and quarterly sampling of existing monitoring well CTF-MW2 for a minimum of eight quarters.

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

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

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

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

4.0 **Monitoring Results**

Table II-3 summarizes the details of samples collected from monitoring wells CCBA-MW1, CCBA-MW2, CTF-MW1, CTF-MW2, CTF-MW3, CYN-MW5, OBS-MW1, OBS-MW2, and OBS-MW3 in the first quarter of CY 2014. Table II-4 summarizes current and historical perchlorate results for wells currently in the perchlorate screening monitoring network. The analytical laboratory COA for the first quarter of CY 2014 perchlorate data is provided in Appendix A. Consistent with historical analytical results, no perchlorate was detected above the screening level in any samples collected from monitoring wells CCBA-MW1, CCBA-MW2, CTF-MW1, CTF-MW2, CTF-MW3, CYN-MW5, OBS-MW1, OBS-MW2, or OBS-MW3.

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

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

No variances or nonconformances in perchlorate sampling field activities, or field conditions from requirements in the groundwater monitoring Mini-SAPs (SNL/NM December 2013a,

December 2013b, January 2014, February 2014a, and February 2014b), were identified during the first quarter of CY 2014 sampling activities.

5.0 **Summary and Conclusions**

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

- No perchlorate was detected in the environmental samples from groundwater monitoring wells CCBA-MW1, CCBA-MW2, CTF-MW1, CTF-MW2, CTF-MW3, CYN-MW5, OBS-MW1, OBS-MW2, or OBS-MW3 at the screening level/MDL of 4 µg/L.
- Since June 2004 (the start of sampling as required by the Order), perchlorate was detected above the screening level/MDL (4 µg/L) in groundwater samples from only one of the wells (CYN-MW6) in the perchlorate screening monitoring well network. Due to a deficiency of water in CYN-MW6, perchlorate samples have not been collected since October 2012.

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

The semiannual monitoring for the well that will replace monitoring well CYN-MW6 (CYN-MW15) will begin after the well installation work plan is approved by the NMED and implemented.

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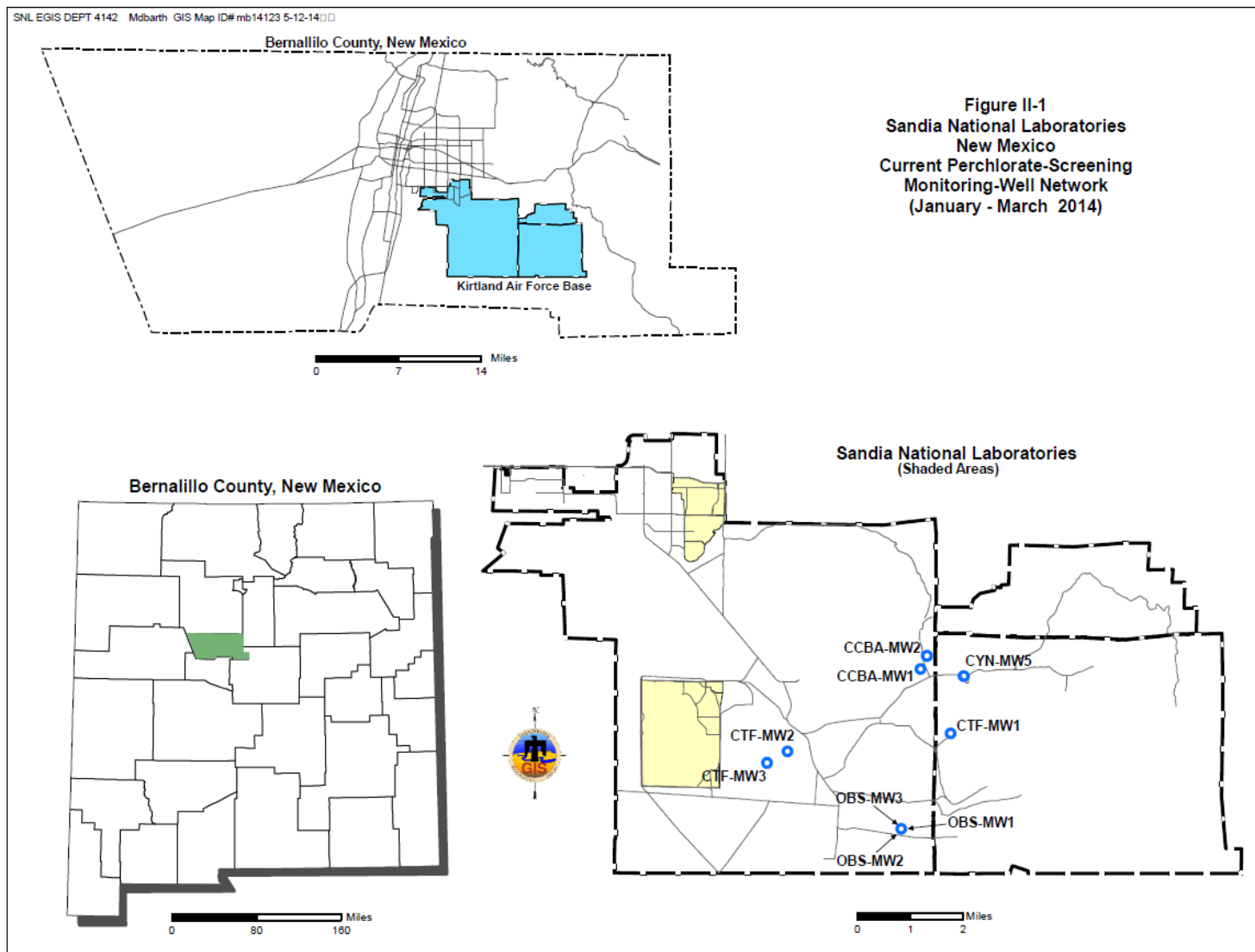


Figure II-1
Sandia National Laboratories, New Mexico
Current Perchlorate Screening Monitoring Well Network, January – March 2014

Tables

Table II-1
Current Perchlorate Screening Monitoring Well Network
First Quarter, CY 2014

Well	Date Sampled	Number of Consecutive Sampling Events ^a	Remaining Number of Sampling Events ^b	Sampling Equipment
CCBA-MW1	27-Jan-14	10	TBD ^c	Bennett™ Pump
CCBA-MW2	23-Jan-14	10	TBD ^c	Bennett™ Pump
CTF-MW1	29-Jan-14	4	TBD ^d	Bennett™ Pump
CTF-MW2	18-Mar-14	13	TBD ^c	Bennett™ Pump
CTF-MW3	14-Mar-14	12 ^e	TBD ^c	Bennett™ Pump
CYN-MW5	28-Jan-14	4	TBD ^d	Bennett™ Pump
OBS-MW1	20-Jan-14	10	TBD ^c	Bennett™ Pump
OBS-MW2	22-Jan-14	10	TBD ^c	Bennett™ Pump
OBS-MW3	21-Jan-14	10	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 of the nine wells currently in the network are being sampled for a minimum of eight events based on site-specific NMED requirements (NMED April 2010).

^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.

^dTBD = To be determined. This well monitors a SWMU that is subject to groundwater monitoring controls and is sampled annually per NMED requirements (NMED April 2010).

^eDue 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.
CYN = Canyons (Burn Site).
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-MW3
CYN-MW1D
CYN-MW6
CYN-MW7
CYN-MW8
CYN-MW9
CYN-MW10
CYN-MW11
CYN-MW12
LWDS-MW1
MRN-2
MRN-3D
MWL-BW1
MWL-BW2
MWL-MW1
MWL-MW7
MWL-MW8
MWL-MW9
NWTA3-MW2
SWTA3-MW4
TA1-W-03
TA1-W-06
TA1-W-08
TA2-W-01
TA2-W-27
TAV-MW11
TAV-MW12
TAV-MW13
TAV-MW14

Notes

BW = Background well.
 CTF = Coyote Test Field.
 CYN = Canyons (Burn Site).
 LWDS = Liquid Waste Disposal System.
 MRN = Magazine Road North.
 MW = Monitoring well.
 MWL = Mixed Waste Landfill.
 NWTA = Northwest Technical Area (III).
 SWTA = Southwest Technical Area (III).
 TA = Technical Area.
 W = Well.

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

Well	Sample Identification	AR/COC Number	Associated Groundwater Investigation
CCBA-MW1	095213-020	615211	SWMUs 8/58
CCBA-MW1 (Duplicate)	095214-020		
CCBA-MW2	095208-020	615209	SWMUs 8/58
CTF-MW1	095246-020	615220	SWMU 116
CTF-MW1 (Duplicate)	095247-020		
CTF-MW2	095579-020	615417	SWMU 154
CTF-MW2 (Duplicate)	095580-020		
CTF-MW3	095572-020	615415	SWMU 149
CTF-MW3 (Duplicate)	095573-020		
CYN-MW5	095241-020	615218	SWMU 49
OBS-MW1	095196-020	615205	SWMU 68
OBS-MW2	095201-020	615207	SWMU 68
OBS-MW2 (Duplicate)	095202-020		
OBS-MW3	095205-020	615208	SWMU 68

Notes

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

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

Well	Sample Date	AR/COC Number	Sample Number	Result (µg/L)	MDL (µg/L)	PQL (µg/L)	MCL (µg/L)	Laboratory Qualifier ^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
CCBA-MW2	01-Nov-11	613885	094779-020	ND	4.0	12	NE	U		EPA 314.0	
			095213-020	ND	4.0	12	NE	U		EPA 314.0	Duplicate sample
	12-Jan-12	613956	095214-020	ND	4.0	12	NE	U		EPA 314.0	
			091610-020	ND	4.0	12	NE	U		EPA 314.0	Duplicate sample
	24-Apr-12	614157	092296-020	ND	4.0	12	NE	U		EPA 314.0	
			092297-020	ND	4.0	12	NE	U		EPA 314.0	Duplicate sample
	12-Jul-12	614286	092610-020	ND	4.0	12	NE	U		EPA 314.0	
			093018-020	ND	4.0	12	NE	U		EPA 314.0	
	23-Oct-12	614468	093019-020	ND	4.0	12	NE	U		EPA 314.0	Duplicate sample
			093336-020	ND	4.0	12	NE	U		EPA 314.0	
	15-Jan-13	614565	093878-020	ND	4.0	12	NE	U		EPA 314.0	
			093879-020	ND	4.0	12	NE	U		EPA 314.0	Duplicate sample
CTF-MW1	15-Jul-13	614937	094371-020	ND	4.0	12	NE	U		EPA 314.0	
			094779-020	ND	4.0	12	NE	U		EPA 314.0	
	14-Oct-13	615095	094780-020	ND	4.0	12	NE	U		EPA 314.0	Duplicate sample
			095208-020	ND	4.0	12	NE	U		EPA 314.0	
	23-Jan-14	615209	090227-020	ND	4.0	12	NE	U		EPA 314.0	
	07-Mar-11	613444	091700-020	ND	4.0	12	NE	U		EPA 314.0	
			091701-020	ND	4.0	12	NE	U		EPA 314.0	Duplicate sample
	28-Jan-13	614574	093359-020	ND	4.0	12	NE	U		EPA 314.0	
	29-Jan-14	615220	095246-020	ND	4.0	12	NE	U		EPA 314.0	
			095247-020	ND	4.0	12	NE	U		EPA 314.0	Duplicate sample

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

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	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	
	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	
	18-Mar-14	615417	095579-020	ND	4.0	12	NE	U		EPA 314.0	
			095580-020	ND	4.0	12	NE	U		EPA 314.0	Duplicate sample
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	
	26-Mar-12	614053	091943-020	ND	4.0	12	NE	U		EPA 314.0	
			091944-020	ND	4.0	12	NE	U		EPA 314.0	Duplicate sample
	16-Jun-12	614254	092536-020	ND	4.0	12	NE	U		EPA 314.0	
	21-Sep-12	614390	092860-020	ND	4.0	12	NE	U		EPA 314.0	
	14-Dec-12	614540	093249-020	ND	4.0	12	NE	H, U	UJ, H1	EPA 314.0	
	22-Mar-13	614661	093717-020	ND	4.0	12	NE	U		EPA 314.0	
			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	
	14-Mar-14	615415	095572-020	ND	4.0	12	NE	U		EPA 314.0	
			095573-020	ND	4.0	12	NE	U		EPA 314.0	Duplicate sample

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

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
CYN-MW5	26-May-04	607546	065032-044	ND	4.0	12	NE	U		EPA 314.0	
	16-Sep-04	607811	065738-016	ND	4.0	12	NE	U		EPA 314.0	
	16-Nov-04	608047	066427-020	ND	4.0	12	NE	U		EPA 314.0	
	22-Feb-05	608285	067442-020	ND	4.0	12	NE	U		EPA 314.0	
	10-Mar-11	613446	090232-020	ND	4.0	12	NE	U		EPA 314.0	
			090232-020	ND	4.0	12	NE	U		EPA 314.0	Duplicate sample
	31-Jan-12	613979	091692-020	ND	4.0	12	NE	U		EPA 314.0	
	24-Jan-13	614573	093356-020	ND	4.0	12	NE	U		EPA 314.0	
			093357-020	ND	4.0	12	NE	U		EPA 314.0	Duplicate sample
	28-Jan-14	615218	095241-020	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
			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	
	22-Jan-13	614570	093349-020	ND	4.0	12	NE	U		EPA 314.0	
			093350-020	ND	4.0	12	NE	U		EPA 314.0	Duplicate sample
	18-Apr-13	614741	093863-020	ND	4.0	12	NE	U		EPA 314.0	
	09-Jul-13	614933	094361-020	ND	4.0	12	NE	U		EPA 314.0	
			094767-020	ND	4.0	12	NE	U		EPA 314.0	
	08-Oct-13	615091	094768-020	ND	4.0	12	NE	U		EPA 314.0	Duplicate sample
			095196-020	ND	4.0	12	NE	U		EPA 314.0	
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	
			094365-020	ND	4.0	12	NE	U		EPA 314.0	
	10-Jul-13	614935	094366-020	ND	4.0	12	NE	U		EPA 314.0	Duplicate sample
			094762-020	ND	4.0	12	NE	U		EPA 314.0	
	07-Oct-13	615089	095201-020	ND	4.0	12	NE	U		EPA 314.0	
			095202-020	ND	4.0	12	NE	U		EPA 314.0	Duplicate sample
	22-Jan-14	615207	095202-020	ND	4.0	12	NE	U		EPA 314.0	Duplicate sample

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

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	094771-020	ND	4.0	12	NE	U		EPA 314.0	
	21-Jan-14	615208	095205-020	ND	4.0	12	NE	U		EPA 314.0	

Notes

^a**Laboratory Qualifier**

H = Analytical holding time was exceeded.
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.

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

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

^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.

CYN = Canyons (Burn Site).

EPA = U.S. Environmental Protection Agency.

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

Notes (continued)

MCL	= Maximum contaminant level. Established by the U.S. Environmental Protection Agency Primary Water Regulations (40 CFR 141.11, Subpart B) and subsequent amendments or Title 20, Chapter 7, Part 1 of the New Mexico Administrative Code, incorporating 40 CFR 141.
MDL	= Method detection limit. The minimum concentration that can be measured and reported with 99% confidence that the analyte is greater than zero; analyte is matrix-specific.
MW	= Monitoring well.
ND	= Not detected (at MDL).
NE	= Not established.
OBS	= Old Burn Site.
PQL	= Practical quantitation limit. The lowest concentration of analytes in a sample that can be reliably determined within specified limits of precision and accuracy by the indicated method under routine laboratory operating conditions.

Table II-5
Perchlorate Screening Groundwater Monitoring
Field Water Quality Measurements^a, First Quarter, CY 2014

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	27-Jan-14	13.53	395.0	324.6	6.76	0.49	32.3	3.45
CCBA-MW2	23-Jan-14	12.09	439.4	299.0	7.69	0.29	58.2	6.26
CTF-MW1	29-Jan-14	16.55	527.7	304.9	7.46	0.24	71.7	6.97
CTF-MW2	18-Mar-14	13.65	3299	-40.6	5.64	0.39	3.5	0.36
CTF-MW3	14-Mar-14	18.57	1398.5	193.2	7.08	0.71	53.6	5.01
CYN-MW5	28-Jan-14	14.40	275.5	340.5	6.15	1.32	46.4	4.73
OBS-MW1	20-Jan-14	15.81	427.6	270.1	7.51	0.52	36.2	3.58
OBS-MW2	22-Jan-14	15.61	420.1	301.2	7.51	0.12	34.6	3.44
OBS-MW3	21-Jan-14	16.30	427.6	290.8	7.51	0.46	44.8	4.47

Notes

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

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

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Appendix A

Analytical Laboratory Certificates of
Analysis for the Perchlorate Data

Client Sample Results

Client: Sandia National Laboratories
Project/Site: SWMU 8/58 GWM

TestAmerica Job ID: 160-5474-1
SDG: 160-5474

Client Sample ID: 095213-020/CCBA-MW1

Lab Sample ID: 160-5474-1

Date Collected: 01/27/14 09:29

Matrix: Water

Date Received: 02/07/14 09:45

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perchlorate	ND		0.012	0.0040	mg/L			02/13/14 08:52	1

Client Sample ID: 095214-020/CCBA-MW1

Lab Sample ID: 160-5474-2

Date Collected: 01/27/14 09:29

Matrix: Water

Date Received: 02/07/14 09:45

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perchlorate	ND		0.012	0.0040	mg/L			02/13/14 12:10	1

CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY

Internal Lab

Batch No. *n/a*Page 1 of 2

Project Name: SWMU 8/58 GWM	Date Samples Shipped: <i>1/23/14</i>	SMO Use	AR/COC 615209
Project/Task Manager: Clinton Lum	Carrier/Waybill No. <i>244044</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 Number: 146422.10.11.01	Lab Contact: Edie Kent/808-556-8171	SMO Contact Phone: <i>[Signature]</i>	
Service Order: CF262-14	Lab Destination: GEL	Lorraine Herrera/505-844-3199	
	Contract No.: PO 1303873	Send Report to SMO: Rita Kavanaugh/505-284-2553	

Tech Area:	Room:	Operational Site:	Bill to: Sandia National Laboratories (Accounts Payable), P.O. Box 5800, MS-0154 Albuquerque, NM 87185-0154
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Sample No.	Fraction	Sample Location Detail	Depth (ft)	Date/Time Collected	Sample Matrix	Container Type	Volume	Preservative	Collection Method	Sample Type	Parameter & Method Requested	Lab Sample ID
095207	-001	CCBA-FB1	NA	1/23/14 9:25	DIW	G	3x40 ml	HCL	G	FB	TCL VOC (SW846-8260B)	341902 001
095208	-001	CCBA-MW2	117	1/23/14 9:25	GW	G	3x40 ml	HCL	G	SA	TCL VOC (SW846-8260B)	341902 002
095208	-002	CCBA-MW2	117	1/23/14 9:27	GW	AG	4x1L	None	G	SA	TCL SVOC (SW846-8270C)	341902 003
095208	-009	CCBA-MW2	117	1/23/14 9:28	GW	P	500 ml	HNO3	G	SA	TAL Metals+U(SW846-6010/6020/7470)	341902 004
095208	-016	CCBA-MW2	117	1/23/14 9:29	GW	P	125 ml	None	G	SA	Anions-Br,Cl,F,SO4 (SW846-9056)	341902 005
095208	-017	CCBA-MW2	117	1/23/14 9:30	FGW	P	500 ml	HNO3	G	SA	Metals-Ca,Mg,K,Na (SW846-6020)	341902 001
095208	-018	CCBA-MW2	117	1/23/14 9:31	GW	P	125 ml	H2SO4	G	SA	NPN (EPA 353.2)	341902 006
095208	-020	CCBA-MW2	117	1/23/14 9:32	GW	P	250 ml	None	G	SA	Perchlorate (EPA 314.0)	341902 007
095208	-022	CCBA-MW2	117	1/23/14 9:33	GW	P	500 ml	None	G	SA	Alkalinity (SM2320B)	341902 008
095208	-024	CCBA-MW2	117	1/23/14 9:35	GW	AG	4x1L	None	G	SA	High Explosives (SW846-8321A Mod.)	341902 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 initials:		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
	Gilbert Quintana	<i>[Signature]</i>	<i>[Init.]</i>	SNL/4143/505-844-2507/505-228-0826	Return Samples By:
	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	
					Comments: Send Report to Tim Jackson/4142/MS 0729/505-284-2547 FGW (filtered in field w/45 micron filter). Alkalinity (as 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>1/23/14</i> Time <i>1020</i>	3. Relinquished by	Org.	Date	Time
1. Received by <i>[Signature]</i> Org. <i>4142</i> Date <i>1/23/14</i> Time <i>1020</i>	3. Received by	Org.	Date	Time
2. Relinquished by <i>[Signature]</i> Org. <i>4142</i> Date <i>1/23/14</i> Time <i>1045</i>	4. Relinquished by	Org.	Date	Time
2. Received by <i>[Signature]</i> Org. <i>4142</i> Date <i>1-24-14</i> Time <i>0725</i>	4. Received by	Org.	Date	Time

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

Client Sample Results

Client: Sandia National Laboratories
Project/Site: SWMU 8/58 GWM

TestAmerica Job ID: 160-5472-1
SDG: 160-5472

Client Sample ID: 095208-020/CCBA-MW2

Lab Sample ID: 160-5472-1

Date Collected: 01/23/14 09:32

Matrix: Water

Date Received: 02/07/14 09:45

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perchlorate	ND		0.012	0.0040	mg/L			02/13/14 07:45	1

CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY

OBS - MW1

Internal Lab

Page 1 of 2

Batch No.		SMO Use		AR/COC		615205						
Project Name: SWMU 68 GWM		Date Samples Shipped: 1/20/14		SMO Authorization: Don Watson		<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. 213 630		SMO Contact Phone: Lorraine Herrera/505-844-3199		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/808-556-8171		Send Report to SMO: Rita Kavanaugh/505-284-2553								
Service Order: CF263-14		Lab Destination: GEL										
		Contract No.: PO 1303873										
Tech Area:		Operational Site:										
Building:		Room:										
Sample No.	Fraction	Sample Location Detail	Depth (ft)	Date/Time Collected	Sample Matrix	Container Type	Volume	Preservative	Collection Method	Sample Type	Parameter & Method Requested	Lab Sample ID
095196	-001	OBS-SA1		1/20/14 9:29	GW	G	3x40 ml	HCL	G	SA	TCL VOC (SW846-8260B)	341691/001
095196	-002	OBS-SA1		1/20/14 9:31	GW	AG	4x1L	None	G	SA	TCL SVOC (SW846-8270C)	341691/002
095196	-009	OBS-SA1		1/20/14 9:32	GW	P	500 ml	HNO3	G	SA	TAL Metals+U (SW846-6010/6020/7470)	341691/003
095196	-014	OBS-SA1		1/20/14 9:33	GW	P	250 ml	None	G	SA	Hexavalent Chromium (SW846-7196A)	341691/004
095196	-016	OBS-SA1		1/20/14 9:34	GW	P	125 ml	None	G	SA	Anions-Br, Cl, F, SO4 (SW846-9056)	341691/005
095196	-017	OBS-SA1		1/20/14 9:35	FGW	P	500 ml	HNO3	G	SA	Metals-Ca, Mg, K, Na (SW846-6020)	341692/001
095196	-018	OBS-SA1		1/20/14 9:36	GW	P	125 ml	H2SO4	G	SA	NPN (EPA 353.2)	341691/006
095196	-020	OBS-SA1		1/20/14 9:37	GW	P	250 ml	None	G	SA	Perchlorate (EPA 314.0)	341691/007
095196	-022	OBS-SA1		1/20/14 9:38	GW	P	500 ml	None	G	SA	Alkalinity (SM2320B)	341691/008
095196	-024	OBS-SA1		1/20/14 9:40	GW	AG	4x1L	None	G	SA	High Explosives (SW846-8321A Mod.)	341691/009
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 initials:				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:						
	Alfred Santillanes	[Signature]	AS	SNL/4142/505-844-5130/505-228-0710		Comments: Send Report to Tim Jackson/4142/MS 0729/505-284-2547 FGW (filtered in field w/45 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 [Signature]		Org. 4142	Date 1/20/14	Time 10:15	3. Relinquished by		Org.	Date	Time			
1. Received by [Signature]		Org. 4142	Date 1/20/14	Time 10:15	3. Received by		Org.	Date	Time			
2. Relinquished by [Signature]		Org. 4142	Date 1/20/14	Time 11:00	4. Relinquished by		Org.	Date	Time			
2. Received by [Signature]		Org. GEL	Date 1-21-14	Time 07:30	4. Received by		Org.	Date	Time			

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

Lab Use

Client Sample Results

Client: Sandia National Laboratories

Project/Site: SWMU 68 GWM

OBS-MW1

TestAmerica Job ID: 160-5467-1

SDG: 160-5467

Client Sample ID: 095196-020/OBS-SA1

Lab Sample ID: 160-5467-1

Date Collected: 01/20/14 09:37

Matrix: Water

Date Received: 02/07/14 09:45

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perchlorate	ND		0.012	0.0040	mg/L			02/13/14 02:53	1

CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY

OBS-mw2

Internal Lab

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Batch No. *N/A*

SMO Use

AR/COC **615207**

Project Name: SWMU 68 GWM	Date Samples Shipped: 1/22/14	SMO Authorization: <i>[Signature]</i>	<input type="checkbox"/> Waste Characterization
Project/Task Manager: Clinton Lum	Carrier/Waybill No. 213985	SMO Contact Phone: Lorraine Herrera/505-844-3199	<input type="checkbox"/> RMMA
Project/Task Number: 146422.10.11.01	Lab Contact: Edie Kent/808-556-8171	Send Report to SMO: Rita Kavanaugh/505-284-2553	<input type="checkbox"/> Released by COC No. <input checked="" type="checkbox"/> 4° Celsius
Service Order: CF263-14	Lab Destination: GEL		
	Contract No.: PO 1303873		

Tech Area:	Building:	Room:	Operational Site:	Bill to: Sandia National Laboratories (Accounts Payable), P.O. Box 5800, MS-0154 Albuquerque, NM 87185-0154
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Sample No.	Fraction	Sample Location Detail	Depth (ft)	Date/Time Collected	Sample Matrix	Container Type	Volume	Preservative	Collection Method	Sample Type	Parameter & Method Requested	Lab Sample ID
095201	-001	OBS-SA2		1/22/14 9:30	GW	G	3x40 ml	HCL	G	SA	TCL VOC (SW846-8260B)	341691 046
095201	-002	OBS-SA2		1/22/14 9:32	GW	AG	4x1L	None	G	SA	TCL SVOC (SW846-8270C)	341691 047
095201	-009	OBS-SA2		1/22/14 9:36	GW	P	500 ml	HNO3	G	SA	TAL Metals+U(SW846-6010/6020/7470)	341691 048
095201	-014	OBS-SA2		1/22/14 9:37	GW	P	250 ml	None	G	SA	Hexavalent Chromium(SW846-7196A)	341691 049
095201	-016	OBS-SA2		1/22/14 9:38	GW	P	125 ml	None	G	SA	Anions-Br,Cl,F,SO4 (SW846-9056)	341691 050
095201	-017	OBS-SA2		1/22/14 9:39	FGW	P	500 ml	HNO3	G	SA	Metals-Ca,Mg,K,Na (SW846-6020)	341692 004
095201	-018	OBS-SA2		1/22/14 9:40	GW	P	125 ml	H2SO4	G	SA	NPN (EPA 353.2)	341691 051
095201	-020	OBS-SA2		1/22/14 9:41	GW	P	250 ml	None	G	SA	Perchlorate (EPA 314.0)	341691 052
095201	-022	OBS-SA2		1/22/14 9:42	GW	P	500 ml	None	G	SA	Alkalinity (SM2320B)	341691 053
095201	-024	OBS-SA2		1/22/14 9:43	GW	AG	4x1L	None	G	SA	High Explosives (SW846-8321A Mod.)	341691 054

Last Chain: <input checked="" type="checkbox"/> Yes <input checked="" type="checkbox"/> No		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
	William Gibson	<i>[Signature]</i>	<i>[Init]</i>	SNL/4142/505-284-3307/505-239-7367		Return Samples By:		
	Robert Lynch	<i>[Signature]</i>	<i>[Init]</i>	SNL/4142/505-844-4013/505-250-7090		Comments: Send Report to Tim Jackson/4142/MS 0729/505-284-2547		
	Alfred Santillanes	<i>[Signature]</i>	<i>[Init]</i>	SNL/4142/505-844-5130/505-228-0710		FGW (filtered in field w/45 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 1/22/14 Time 10:15	3. Relinquished by	Org.	Date	Time
1. Received by <i>[Signature]</i> Org. 4142 Date 1/22/14 Time 10:15	3. Received by	Org.	Date	Time
2. Relinquished by <i>[Signature]</i> Org. 4142 Date 1/22/14 Time 10:02	4. Relinquished by	Org.	Date	Time
2. Received by <i>[Signature]</i> Org. 601 Date 1-23-14 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

Internal Lab

Page 1 of 2

Batch No.		SMO Use		AR/COC 615211								
Project Name: SWMU 8/58 GWM		Date Samples Shipped: 1/27/14		SMO Authorization: <i>Don Jackson</i>								
Project/Task Manager: Clinton Lum		Carrier/Waybill No. 214140		SMO Contact Phone: Lorraine Herrera/505-844-3199								
Project/Task Number: 146422.10.11.01		Lab Contact: Edie Kent/808-556-8171		Send Report to SMO: Rita Kavanaugh/505-284-2553								
Service Order: CF262-14		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								
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 Type	Volume	Preservative	Collection Method	Sample Type	Parameter & Method Requested	Lab Sample ID
✓ 095213	-001	CCBA-MW1	79	1/27/14 9:18	GW	G	3x40 ml	HCL	G	SA	TCL VOC (SW846-8260B)	342030 001
✓ 095213	-002	CCBA-MW1	79	1/27/14 9:20	GW	AG	4x1L	None	G	SA	TCL SVOC (SW846-8270C)	342030 002
✓ 095213	-009	CCBA-MW1	79	1/27/14 9:24	GW	P	500 ml	HNO3	G	SA	TAL Metals+U (SW846-6010/6020/7470)	342030 003
✓ 095213	-016	CCBA-MW1	79	1/27/14 9:25	GW	P	125 ml	None	G	SA	Anions-Br, Cl, F, SO4 (SW846-9056)	342030 004
✓ 095213	-017	CCBA-MW1	79	1/27/14 9:26	FGW	P	500 ml	HNO3	G	SA	Metals-Ca, Mg, K, Na (SW846-6020)	342031 001
✓ 095213	-018	CCBA-MW1	79	1/27/14 9:28	GW	P	125 ml	H2SO4	G	SA	NPN (EPA 353.2)	342030 005
✓ 095213	-020	CCBA-MW1	79	1/27/14 9:29	GW	P	250 ml	None	G	SA	Perchlorate (EPA 314.0)	342030 006
✓ 095213	-022	CCBA-MW1	79	1/27/14 9:30	GW	P	500 ml	None	G	SA	Alkalinity (SM2320B)	342030 007
✓ 095213	-024	CCBA-MW1	79	1/27/14 9:31	GW	AG	4x1L	None	G	SA	High Explosives (SW846-8321A Mod.)	342030 008
✓ 095213	-027	CCBA-MW1	79	1/27/14 9:35	GW	P	250 ml	NaOH	G	SA	Total Cyanide (SW846-9012)	342030 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								
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		
	William Gibson	<i>William Gibson</i>		SNL/4142/505-284-3307/505-239-7367		Return Samples By:						
	Robert Lynch	<i>Robert Lynch</i>		SNL/4142/505-844-4013/505-250-7090		Comments: Send Report to Tim Jackson/4142/MS 0729/505-284-2547						
	Alfred Santillanes	<i>Alfred Santillanes</i>		SNL/4142/505-844-5130/505-228-0710		FGW (filtered in field w/ .45 micron filter). Alkalinity (as CaCO3, HCO3, CO3). If Perchlorate detected, perform verification analysis using SW846-6650M. Gamma Spectroscopy as short list isotopes.						
1. Relinquished by <i>Alfred Santillanes</i>		Org. 4142	Date 1/27/14	Time 10:15		3. Relinquished by		Org.	Date	Time		
1. Received by <i>Don Jackson</i>		Org. 4142	Date 1/27/14	Time 10:15		3. Received by		Org.	Date	Time		
2. Relinquished by <i>Don Jackson</i>		Org. 4142	Date 1/27/14	Time 11:00		4. Relinquished by		Org.	Date	Time		
2. Received by <i>Mike Jackson</i>		Org. GEL	Date 1-28-14	Time 08:25		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

Internal Lab

Batch No. *n/a*Page 1 of 2

SMO Use

AR/COC **615209**

Project Name: SWMU 8/58 GWM	Date Samples Shipped: <i>1/23/14</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>244044</i>	SMO Contact Phone: <i>[Signature]</i>	
Project/Task Number: 146422.10.11.01	Lab Contact: Edie Kent/808-556-8171	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	

Building:	Room:	Operational Site:	Bill to: Sandia National Laboratories (Accounts Payable), P.O. Box 5800, MS-0154 Albuquerque, NM 87185-0154
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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					
095207	-001	CCBA-FB1	NA	1/23/14 9:25	DIW	G	3x40 ml	HCL	G	FB	TCL VOC (SW846-8260B)	341902 001
095208	-001	CCBA-MW2	117	1/23/14 9:25	GW	G	3x40 ml	HCL	G	SA	TCL VOC (SW846-8260B)	341902 002
095208	-002	CCBA-MW2	117	1/23/14 9:27	GW	AG	4x1L	None	G	SA	TCL SVOC (SW846-8270C)	341902 003
095208	-009	CCBA-MW2	117	1/23/14 9:28	GW	P	500 ml	HNO3	G	SA	TAL Metals+U(SW846-6010/6020/7470)	341902 004
095208	-016	CCBA-MW2	117	1/23/14 9:29	GW	P	125 ml	None	G	SA	Anions-Br,Cl,F,SO4 (SW846-9056)	341902 005
095208	-017	CCBA-MW2	117	1/23/14 9:30	FGW	P	500 ml	HNO3	G	SA	Metals-Ca,Mg,K,Na (SW846-6020)	341902 001
095208	-018	CCBA-MW2	117	1/23/14 9:31	GW	P	125 ml	H2SO4	G	SA	NPN (EPA 353.2)	341902 006
095208	-020	CCBA-MW2	117	1/23/14 9:32	GW	P	250 ml	None	G	SA	Perchlorate (EPA 314.0)	341902 007
095208	-022	CCBA-MW2	117	1/23/14 9:33	GW	P	500 ml	None	G	SA	Alkalinity (SM2320B)	341902 008
095208	-024	CCBA-MW2	117	1/23/14 9:35	GW	AG	4x1L	None	G	SA	High Explosives (SW846-8321A Mod.)	341902 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 initials:				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
	Gilbert Quintana	<i>[Signature]</i>	<i>[Init.]</i>	SNL/4143/505-844-2507/505-228-0826		Return Samples By:		
	Robert Lynch	<i>[Signature]</i>	<i>[Init.]</i>	SNL/4142/505-844-4013/505-250-7090		Comments: Send Report to Tim Jackson/4142/MS 0729/505-284-2547 FGW (filtered in field w/45 micron filter). Alkalinity (as CaCO3,HCO3,CO3). If Perchlorate detected, perform verification analysis using SW846-6850M. Gamma Spectroscopy as short list isotopes.		
	Alfred Santillanes	<i>[Signature]</i>	<i>[Init.]</i>	SNL/4142/505-844-5130/505-228-0710				

1. Relinquished by <i>[Signature]</i> Org. <i>4142</i> Date <i>1/23/14</i> Time <i>1020</i>	3. Relinquished by _____ Org. _____ Date _____ Time _____
1. Received by <i>[Signature]</i> Org. <i>4142</i> Date <i>1/23/14</i> Time <i>1020</i>	3. Received by _____ Org. _____ Date _____ Time _____
2. Relinquished by <i>[Signature]</i> Org. <i>4142</i> Date <i>1/23/14</i> Time <i>1045</i>	4. Relinquished by _____ Org. _____ Date _____ Time _____
2. Received by <i>[Signature]</i> Org. <i>4142</i> Date <i>1-24-14</i> Time <i>0725</i>	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

OBS - MW1

Internal Lab

Page 1 of 2

Batch No.		SMO Use		AR/COC		615205						
Project Name: SWMU 68 GWM		Date Samples Shipped: 1/20/14		SMO Authorization: Don Watson		<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. 213 630		SMO Contact Phone: Lorraine Herrera/505-844-3199		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/808-556-8171		Send Report to SMO: Rita Kavanaugh/505-284-2553								
Service Order: CF263-14		Lab Destination: GEL										
		Contract No.: PO 1303873										
Tech Area:		Operational Site:										
Building:		Room:										
Sample No.	Fraction	Sample Location Detail	Depth (ft)	Date/Time Collected	Sample Matrix	Container Type	Volume	Preservative	Collection Method	Sample Type	Parameter & Method Requested	Lab Sample ID
095196	-001	OBS-SA1		1/20/14 9:29	GW	G	3x40 ml	HCL	G	SA	TCL VOC (SW846-8260B)	341691/001
095196	-002	OBS-SA1		1/20/14 9:31	GW	AG	4x1L	None	G	SA	TCL SVOC (SW846-8270C)	341691/002
095196	-009	OBS-SA1		1/20/14 9:32	GW	P	500 ml	HNO3	G	SA	TAL Metals+U (SW846-6010/6020/7470)	341691/003
095196	-014	OBS-SA1		1/20/14 9:33	GW	P	250 ml	None	G	SA	Hexavalent Chromium (SW846-7196A)	341691/004
095196	-016	OBS-SA1		1/20/14 9:34	GW	P	125 ml	None	G	SA	Anions-Br, Cl, F, SO4 (SW846-9056)	341691/005
095196	-017	OBS-SA1		1/20/14 9:35	FGW	P	500 ml	HNO3	G	SA	Metals-Ca, Mg, K, Na (SW846-6020)	341692/001
095196	-018	OBS-SA1		1/20/14 9:36	GW	P	125 ml	H2SO4	G	SA	NPN (EPA 353.2)	341691/006
095196	-020	OBS-SA1		1/20/14 9:37	GW	P	250 ml	None	G	SA	Perchlorate (EPA 314.0)	341691/007
095196	-022	OBS-SA1		1/20/14 9:38	GW	P	500 ml	None	G	SA	Alkalinity (SM2320B)	341691/008
095196	-024	OBS-SA1		1/20/14 9:40	GW	AG	4x1L	None	G	SA	High Explosives (SW846-8321A Mod.)	341691/009
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 initials:				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 0729/505-284-2547 FGW (filtered in field w/45 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 1/20/14	Time 10:15	3. Relinquished by		Org.	Date	Time			
1. Received by <i>[Signature]</i>		Org. 4142	Date 1/20/14	Time 10:15	3. Received by		Org.	Date	Time			
2. Relinquished by <i>[Signature]</i>		Org. 4142	Date 1/20/14	Time 11:00	4. Relinquished by		Org.	Date	Time			
2. Received by <i>[Signature]</i>		Org. GEL	Date 1-21-14	Time 07:30	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

OBS-mw2

Internal Lab

Page 1 of 2

Batch No. *N/A*

SMO Use

AR/COC **615207**

Project Name: SWMU 68 GWM	Date Samples Shipped: 1/22/14	SMO Authorization: <i>[Signature]</i>	<input type="checkbox"/> Waste Characterization
Project/Task Manager: Clinton Lum	Carrier/Waybill No. 213985	SMO Contact Phone: Lorraine Herrera/505-844-3199	<input type="checkbox"/> RMMA
Project/Task Number: 146422.10.11.01	Lab Contact: Edie Kent/808-556-8171	Send Report to SMO: Rita Kavanaugh/505-284-2553	<input type="checkbox"/> Released by COC No. <input checked="" type="checkbox"/> 4° Celsius
Service Order: CF263-14	Lab Destination: GEL		
	Contract No.: PO 1303873		

Tech Area:	Building:	Room:	Operational Site:	Bill to: Sandia National Laboratories (Accounts Payable), P.O. Box 5800, MS-0154 Albuquerque, NM 87185-0154
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Sample No.	Fraction	Sample Location Detail	Depth (ft)	Date/Time Collected	Sample Matrix	Container Type	Volume	Preservative	Collection Method	Sample Type	Parameter & Method Requested	Lab Sample ID
095201	-001	OBS-SA2		1/22/14 9:30	GW	G	3x40 ml	HCL	G	SA	TCL VOC (SW846-8260B)	341691 046
095201	-002	OBS-SA2		1/22/14 9:32	GW	AG	4x1L	None	G	SA	TCL SVOC (SW846-8270C)	341691 047
095201	-009	OBS-SA2		1/22/14 9:36	GW	P	500 ml	HNO3	G	SA	TAL Metals+U(SW846-6010/6020/7470)	341691 048
095201	-014	OBS-SA2		1/22/14 9:37	GW	P	250 ml	None	G	SA	Hexavalent Chromium(SW846-7196A)	341691 049
095201	-016	OBS-SA2		1/22/14 9:38	GW	P	125 ml	None	G	SA	Anions-Br,Cl,F,SO4 (SW846-9056)	341691 050
095201	-017	OBS-SA2		1/22/14 9:39	FGW	P	500 ml	HNO3	G	SA	Metals-Ca,Mg,K,Na (SW846-6020)	341692 004
095201	-018	OBS-SA2		1/22/14 9:40	GW	P	125 ml	H2SO4	G	SA	NPN (EPA 353.2)	341691 051
095201	-020	OBS-SA2		1/22/14 9:41	GW	P	250 ml	None	G	SA	Perchlorate (EPA 314.0)	341691 052
095201	-022	OBS-SA2		1/22/14 9:42	GW	P	500 ml	None	G	SA	Alkalinity (SM2320B)	341691 053
095201	-024	OBS-SA2		1/22/14 9:43	GW	AG	4x1L	None	G	SA	High Explosives (SW846-8321A Mod.)	341691 054

Last Chain: <input checked="" type="checkbox"/> Yes <input checked="" type="checkbox"/> No		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
	William Gibson	<i>[Signature]</i>	<i>[Init]</i>	SNL/4142/505-284-3307/	505-239-7367	Return Samples By:		
	Robert Lynch	<i>[Signature]</i>	<i>[Init]</i>	SNL/4142/505-844-4013/	505-250-7090	Comments: Send Report to Tim Jackson/4142/MS 0729/505-284-2547		
	Alfred Santillanes	<i>[Signature]</i>	<i>[Init]</i>	SNL/4142/505-844-5130/	505-228-0710	FGW (filtered in field w/45 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 1/22/14 Time 10:15	3. Relinquished by	Org.	Date	Time
1. Received by <i>[Signature]</i> Org. 4142 Date 1/22/14 Time 10:15	3. Received by	Org.	Date	Time
2. Relinquished by <i>[Signature]</i> Org. 4142 Date 1/22/14 Time 10:02	4. Relinquished by	Org.	Date	Time
2. Received by <i>[Signature]</i> Org. 601 Date 1-23-14 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 **615207**

Project Name: SWMU 68 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 Type	Volume	Preservative	Collection Method	Sample Type	Parameter & Method Requested	Lab Sample ID		
095201	-027	OBS-SA2		1/22/14 9:47 ✓	GW	P	250 ml	NaOH	G	SA	Total Cyanide (SW846-9012)	341691 055		
095201	-033	OBS-SA2		1/22/14 9:48 ✓	GW	P	1 L	HNO3	G	SA	Gamma Spectroscopy (EPA 901.0)	341691 056		
095201	-034	OBS-SA2		1/22/14 9:50 ✓	GW	P	1 L	HNO3	G	SA	Gross Alpha and Beta (EPA 900.0)	341691 057		
095201	-035	OBS-SA2		1/22/14 9:52 ✓	GW	P	1 L	HNO3	G	SA	Isotopic Uranium (HASL 300)	341691 058		
095202	-001	OBS-SA3		1/22/14 9:30 ✓	GW	G	3x40 ml	HCL	G	DU	TCL VOC (SW846-8260B)	341691 059		
095202	-002	OBS-SA3		1/22/14 9:32 ✓	GW	AG	4x1L	None	G	DU	TCL SVOC (SW846-8270C)	341691 060		
095202	-009	OBS-SA3		1/22/14 9:36 ✓	GW	P	500 ml	HNO3	G	DU	TAL Metals+U(SW846-6010/6020/7470)	341691 061		
095202	-014	OBS-SA3		1/22/14 9:37 ✓	GW	P	250 ml	None	G	DU	Hexavalent Chromium(SW846-7196A)	341691 062		
095202	-016	OBS-SA3		1/22/14 9:38 ✓	GW	P	125 ml	None	G	DU	Anions-Br,Cl,F,SO4 (SW846-9056)	341691 063		
095202	-017	OBS-SA3		1/22/14 9:39 ✓	FGW	P	500 ml	HNO3	G	DU	Metals-Ca,Mg,K,Na (SW846-6020)	341691 065		
095202	-018	OBS-SA3		1/22/14 9:40 ✓	GW	P	125 ml	H2SO4	G	DU	NPN (EPA 353.2)	341691 064		
095202	-020	OBS-SA3		1/22/14 9:41 ✓	GW	P	250 ml	None	G	DU	Perchlorate (EPA 314.0)	341691 065		
095202	-022	OBS-SA3		1/22/14 9:42 ✓	GW	P	500 ml	None	G	DU	Alkalinity (SM2320B)	341691 066		
095202	-024	OBS-SA3		1/22/14 9:43 ✓	GW	AG	4x1L	None	G	DU	High Explosives (SW846-8321A Mod.)	341691 067		
095202	-027	OBS-SA3		1/22/14 9:47 ✓	GW	P	250 ml	NaOH	G	DU	Total Cyanide (SW846-9012)	341691 068		
095202	-033	OBS-SA3		1/22/14 9:48 ✓	GW	P	1 L	HNO3	G	DU	Gamma Spectroscopy (EPA 901.0)	341691 069		
095202	-034	OBS-SA3		1/22/14 9:50 ✓	GW	P	1 L	HNO3	G	DU	Gross Alpha and Beta (EPA 900.0)	341691 070		
095202	-035	OBS-SA3		1/22/14 9:52 ✓	GW	P	1 L	HNO3	G	DU	Isotopic Uranium (HASL 300)	341691 071		
095203	-001	OBS-TB3	NA	1/22/14 9:30 ✓	DIW	G	3x40 ml	HCL	G	TB	TCL VOC (SW846-8260B)	341691 072		
Recipient Initials <u>MIC</u>														

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

AR/COC **615207**

Project Name: SWMU 68 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 Type	Volume	Preservative	Collection Method	Sample Type	Parameter & Method Requested	Lab Sample ID		
095201	-027	OBS-SA2		1/22/14 9:47 ✓	GW	P	250 ml	NaOH	G	SA	Total Cyanide (SW846-9012)	341691 055		
095201	-033	OBS-SA2		1/22/14 9:48 ✓	GW	P	1 L	HNO3	G	SA	Gamma Spectroscopy (EPA 901.0)	341691 056		
095201	-034	OBS-SA2		1/22/14 9:50 ✓	GW	P	1 L	HNO3	G	SA	Gross Alpha and Beta (EPA 900.0)	341691 057		
095201	-035	OBS-SA2		1/22/14 9:52 ✓	GW	P	1 L	HNO3	G	SA	Isotopic Uranium (HASL 300)	341691 058		
095202	-001	OBS-SA3		1/22/14 9:30 ✓	GW	G	3x40 ml	HCL	G	DU	TCL VOC (SW846-8260B)	341691 059		
095202	-002	OBS-SA3		1/22/14 9:32 ✓	GW	AG	4x1L	None	G	DU	TCL SVOC (SW846-8270C)	341691 060		
095202	-009	OBS-SA3		1/22/14 9:36 ✓	GW	P	500 ml	HNO3	G	DU	TAL Metals+U(SW846-6010/6020/7470)	341691 061		
095202	-014	OBS-SA3		1/22/14 9:37 ✓	GW	P	250 ml	None	G	DU	Hexavalent Chromium(SW846-7196A)	341691 062		
095202	-016	OBS-SA3		1/22/14 9:38 ✓	GW	P	125 ml	None	G	DU	Anions-Br,Cl,F,SO4 (SW846-9056)	341691 063		
095202	-017	OBS-SA3		1/22/14 9:39 ✓	FGW	P	500 ml	HNO3	G	DU	Metals-Ca,Mg,K,Na (SW846-6020)	341692 005		
095202	-018	OBS-SA3		1/22/14 9:40 ✓	GW	P	125 ml	H2SO4	G	DU	NPN (EPA 353.2)	341691 064		
095202	-020	OBS-SA3		1/22/14 9:41 ✓	GW	P	250 ml	None	G	DU	Perchlorate (EPA 314.0)	341691 065		
095202	-022	OBS-SA3		1/22/14 9:42 ✓	GW	P	500 ml	None	G	DU	Alkalinity (SM2320B)	341691 066		
095202	-024	OBS-SA3		1/22/14 9:43 ✓	GW	AG	4x1L	None	G	DU	High Explosives (SW846-8321A Mod.)	341691 067		
095202	-027	OBS-SA3		1/22/14 9:47 ✓	GW	P	250 ml	NaOH	G	DU	Total Cyanide (SW846-9012)	341691 068		
095202	-033	OBS-SA3		1/22/14 9:48 ✓	GW	P	1 L	HNO3	G	DU	Gamma Spectroscopy (EPA 901.0)	341691 069		
095202	-034	OBS-SA3		1/22/14 9:50 ✓	GW	P	1 L	HNO3	G	DU	Gross Alpha and Beta (EPA 900.0)	341691 070		
095202	-035	OBS-SA3		1/22/14 9:52 ✓	GW	P	1 L	HNO3	G	DU	Isotopic Uranium (HASL 300)	341691 071		
095203	-001	OBS-TB3	NA	1/22/14 9:30 ✓	DIW	G	3x40 ml	HCL	G	TB	TCL VOC (SW846-8260B)	341691 072		
Recipient Initials <u>MIC</u>														

Client Sample Results

Client: Sandia National Laboratories
Project/Site: SWMU 68 GWM

TestAmerica Job ID: 160-5470-1
SDG: 160-5470

Client Sample ID: 095201-020/OBS-SA2

OBS - MW 2 - SA

Lab Sample ID: 160-5470-1

Date Collected: 01/22/14 09:41

Matrix: Water

Date Received: 02/07/14 09:45

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perchlorate	ND		0.012	0.0040	mg/L			02/13/14 04:45	1

Client Sample ID: 095202-020/OBS-SA3

- DUP

Lab Sample ID: 160-5470-2

Date Collected: 01/22/14 09:41

Matrix: Water

Date Received: 02/07/14 09:45

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perchlorate	ND		0.012	0.0040	mg/L			02/13/14 06:15	1

CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY

Internal Lab

OBS-MW3

Page 1 of 2

Batch No. *N/A*

SMO Use

AR/COC **615208**

Project Name: SWMU 68 GWM		Date Samples Shipped: <i>1/21/14</i>		SMO Authorization: <i>[Signature]</i>		<input type="checkbox"/> Waste Characterization						
Project/Task Manager: Clinton Lum		Carrier/Waybill No. <i>213933</i>		SMO Contact Phone: <i>505-844-3199</i>		<input type="checkbox"/> RMMA						
Project/Task Number: 146422.10.11.01		Lab Contact: Edie Kent/808-556-8171		Lorraine Herrera/505-844-3199		<input type="checkbox"/> Released by COC No.						
Service Order: CF263-14		Lab Destination: GEL		Send Report to SMO:		<input checked="" type="checkbox"/> 4° Celsius						
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								
Tech Area:		Operational Site:										
Building:		Room:										
Sample No.	Fraction	Sample Location Detail	Depth (ft)	Date/Time Collected	Sample Matrix	Container Type	Volume	Preservative	Collection Method	Sample Type	Parameter & Method Requested	Lab Sample ID
095204	-001	OBS-FB2		1/21/14 9:20	DIW	G	3x40 ml	HCL	G	FB	TCL VOC (SW846-8260B)	341691 031
095205	-001	OBS-SA4		1/21/14 9:20	GW	G	3x40 ml	HCL	G	SA	TCL VOC (SW846-8260B)	341691 032
095205	-002	OBS-SA4		1/21/14 9:22	GW	AG	4x1L	None	G	SA	TCL SVOC (SW846-8270C)	341691 033
095205	-009	OBS-SA4		1/21/14 9:23	GW	P	500 ml	HNO3	G	SA	TAL Metals+U(SW846-6010/6020/7470)	341691 034
095205	-014	OBS-SA4		1/21/14 9:24	GW	P	250 ml	None	G	SA	Hexavalent Chromium(SW846-7196A)	341691 035
095205	-016	OBS-SA4		1/21/14 9:25	GW	P	125 ml	None	G	SA	Anions-Br,Cl,F,SO4 (SW846-9056)	341691 036
095205	-017	OBS-SA4		1/21/14 9:26	FGW	P	500 ml	HNO3	G	SA	Metals-Ca,Mg,K,Na (SW846-6020)	341691 003
095205	-018	OBS-SA4		1/21/14 9:27	GW	P	125 ml	H2SO4	G	SA	NPN (EPA 353.2)	341691 037
095205	-020	OBS-SA4		1/21/14 9:28	GW	P	250 ml	None	G	SA	Perchlorate (EPA 314.0)	341691 038
095205	-022	OBS-SA4		1/21/14 9:29	GW	P	500 ml	None	G	SA	Alkalinity (SM2320B)	341691 039
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 initials:				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		
	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 0729/505-284-2547 FGW (filtered in field w/45 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 1/21/14 Time 11:15		3. Relinquished by		Org.		Date		Time				
1. Received by <i>[Signature]</i> Org. 4142 Date 1/21/14 Time 11:15		3. Received by		Org.		Date		Time				
2. Relinquished by <i>[Signature]</i> Org. 4142 Date 1/21/14 Time 11:15		4. Relinquished by		Org.		Date		Time				
2. Received by <i>[Signature]</i> Org. 4142 Date 1/21/14 Time 11:15		4. Received by		Org.		Date		Time				

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

Client Sample Results

Client: Sandia National Laboratories
Project/Site: SWMU 68 GWM

TestAmerica Job ID: 160-5471-1
SDG: 160-5471

Client Sample ID: 095205-020/OBS-SA4

Lab Sample ID: 160-5471-1

Date Collected: 01/21/14 09:28

Matrix: Water

Date Received: 02/07/14 09:45

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perchlorate	ND		0.012	0.0040	mg/L			02/13/14 07:00	1

CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY

5477

Internal Lab

Batch No. *NA*Page 1 of 2

Project Name: <i>SWMU:49/116 GWM</i>		Date Samples Shipped: <i>1/29/14</i>		SMO Use: <i>214255</i>		SMO Authorization: <i>[Signature]</i>		AR/COC 615220	
Project/Task Manager: <i>Mike Skelly</i>		Carrier/Waybill No. <i>214255</i>		SMO Contact Phone: <i>Lorraine Herrera/505-844-3199</i>		Send Report to SMO: <i>Rita Kavanaugh/505.284.2553</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 Number: <i>146422.10.11.01</i>		Lab Contact: <i>Edie Kent:808-556-8171</i>		Lab Destination: <i>GEL</i>		Contract No.: <i>PO.1303873</i>		Bill to: Sandia National Laboratories (Accounts Payable), P.O. Box 5800, MS-0154 Albuquerque, NM 87185-0154	
Service Order: <i>CF249-14</i>		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					
095246	-001	CTF-MW1	260	1/29/14 9:42	GW	G	3x40 ml	HCL	G	SA	TCL VOC (SW846-8260B)	342110 023
095246	-009	CTF-MW1	260	1/29/14 9:43	GW	P	500 ml	HNO3	G	SA	TAL Metals+U (SW846-6010/6020/7470)	342110 024
095246	-016	CTF-MW1	260	1/29/14 9:44	GW	P	125 ml	None	G	SA	Anions-Br,Cl,F,SO4 (SW846-9056)	342110 025
095246	-017	CTF-MW1	260	1/29/14 9:46	FGW	P	500 ml	HNO3	G	SA	Metals-Ca,Mg,K,Na (SW846-6020)	342122 003
095246	-018	CTF-MW1	260	1/29/14 9:47	GW	P	125 ml	H2SO4	G	SA	NPN (EPA 353.2)	342110 026
095246	-020	CTF-MW1	260	1/29/14 9:48	GW	P	250 ml	None	G	SA	Perchlorate (EPA 314.0)	342110 027
095246	-022	CTF-MW1	260	1/29/14 9:49	GW	P	500 ml	None	G	SA	Alkalinity (SM2320B)	342110 028
095246	-024	CTF-MW1	260	1/29/14 9:50	GW	AG	4x1L	None	G	SA	High Explosives (SW846-8321A Mod.)	342110 029
095246	-027	CTF-MW1	260	1/29/14 9:54	GW	P	250 ml	NaOH	G	SA	Total Cyanide (SW846-9012)	342110 030
095247	-001	CTF-MW1	260	1/29/14 9:42	GW	G	3x40 ml	HCL	G	DU	TCL VOC (SW846-8260B)	342110 031

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 initials:		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				Sample Disposal <input type="checkbox"/> Return to Client <input checked="" type="checkbox"/> Disposal by Lab		Return Samples By:		

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

1. Relinquished by <i>William Gibson</i> Org. <i>4142</i> Date <i>1/29/14</i> Time <i>1035</i>				3. Relinquished by <i>[Signature]</i> Org. <i>[Blank]</i> Date <i>2-6-14</i> Time <i>14:00</i>			
1. Received by <i>[Signature]</i> Org. <i>4142</i> Date <i>1/29/14</i> Time <i>1035</i>				3. Received by <i>[Signature]</i> Org. <i>[Blank]</i> Date <i>2/7/14</i> Time <i>0745</i>			
2. Relinquished by <i>[Signature]</i> Org. <i>4142</i> Date <i>1/29/14</i> Time <i>1100</i>				4. Relinquished by <i>[Blank]</i> Org. <i>[Blank]</i> Date <i>[Blank]</i> Time <i>[Blank]</i>			
2. Received by <i>[Signature]</i> Org. <i>602</i> Date <i>1-30-14</i> Time <i>0755</i>				4. Received by <i>[Blank]</i> Org. <i>[Blank]</i> Date <i>[Blank]</i> Time <i>[Blank]</i>			

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

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

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AR/COC	615220
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[illegible]

2/21/2014

Client Sample Results

Client: Sandia National Laboratories
Project/Site: SWMU 49/116 GWM

TestAmerica Job ID: 160-5477-1
SDG: 160-5477

Client Sample ID: 095246-020/CTF-MW1

Lab Sample ID: 160-5477-1

Date Collected: 01/29/14 09:48

Matrix: Water

Date Received: 02/07/14 09:45

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perchlorate	ND		0.012	0.0040	mg/L			02/13/14 13:40	1

Client Sample ID: 095247-020/CTF-MW1

Lab Sample ID: 160-5477-2

Date Collected: 01/29/14 09:48

Matrix: Water

Date Received: 02/07/14 09:45

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perchlorate	ND		0.012	0.0040	mg/L			02/13/14 14:02	1

CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY

5475

Internal Lab

Batch No. *111A*Page 1 of 2

Project Name: SWMU 49/116 GWM		Date Samples Shipped: <i>1/28/14</i>		SMO Use <i>29</i>		SMO Authorization: <i>[Signature]</i>		AR/COC 615218	
Project/Task Manager: Mike Skelly		Carrier/Waybill No: <i>214648</i>		SMO Contact Phone: <i>940</i>		Lorraine Herrera/505-844-3199		<input type="checkbox"/> Waste Characterization <input type="checkbox"/> RMMA <input type="checkbox"/> Released by COC No. <input checked="" type="checkbox"/> 4° Celsius	
Project/Task Number: 146422.10.11.01		Lab Contact: Edie Kent 808-556-8171		Send Report to SMO:		Rita Kavanaugh/505.284.2553		Bill to: Sandia National Laboratories (Accounts Payable), P.O. Box 5800, MS-0154 Albuquerque, NM 87185-0154	
Service Order: CF249-14		Lab Destination: GEL		Contract No.: PO 1303873					
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					
095240	-001	CYN-FB1	NA	1/28/14 9:16	DIW	G	3x40 ml	HCL	G	FB	TCL VOC (SW846-8260B)	342110 001
095241	-001	CYN-MW5	155	1/28/14 9:16	GW	G	3x40 ml	HCL	G	SA	TCL VOC (SW846-8260B)	342110 002
095241	-009	CYN-MW5	155	1/28/14 9:17	GW	P	500 ml	HNO3	G	SA	TAL Metals+U (SW846-6010/6020/7470)	342110 003
095241	-016	CYN-MW5	155	1/28/14 9:18	GW	P	125 ml	None	G	SA	Anions-Br,Cl,F,SO4 (SW846-9056)	342110 004
095241	-017	CYN-MW5	155	1/28/14 9:20	FGW	P	500 ml	HNO3	G	SA	Metals-Ca,Mg,K,Na (SW846-6020)	342122 001
095241	-018	CYN-MW5	155	1/28/14 9:21	GW	P	125 ml	H2SO4	G	SA	NPN (EPA 353.2)	342110 005
095241	-020	CYN-MW5	155	1/28/14 9:22	GW	P	250 ml	None	G	SA	Perchlorate (EPA 314.0)	342110 006
095241	-022	CYN-MW5	155	1/28/14 9:23	GW	P	500 ml	None	G	SA	Alkalinity (SM2320B)	342110 007
095241	-024	CYN-MW5	155	1/28/14 9:24	GW	AG	4x1L	None	G	SA	High Explosives (SW846-8321A Mod.)	342110 008
095241	-027	CYN-MW5	155	1/28/14 9:26	GW	P	250 ml	NaOH	G	SA	Total Cyanide (SW846-9012)	342110 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:		Entered by:		EDD <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No			
Background: <input type="checkbox"/> Yes		QC initials:		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				Sample Disposal <input type="checkbox"/> Return to Client <input checked="" type="checkbox"/> Disposal by Lab		Return Samples By:			
Sample Team Members		Name		Signature		Init.		Company/Organization/Phone/Cell	
		William Gibson		<i>[Signature]</i>		WJG		SNL/4142/505-284-3307/505-239-7367	
		Robert Lynch		<i>[Signature]</i>		RL		SNL/4142/505-844-4013/505-250-7090	
		Alfred Santillanes		<i>[Signature]</i>		AS		SNL/4142/505-844-5130/505-228-0710	

1. Relinquished by <i>[Signature]</i> Org. <i>4142</i> Date <i>1/28</i> Time <i>0955</i>		3. Relinquished by <i>[Signature]</i> Org. <i>4142</i> Date <i>2-6-14</i> Time <i>14:00</i>	
1. Received by <i>[Signature]</i> Org. <i>4142</i> Date <i>1/28/14</i> Time <i>0955</i>		3. Received by <i>[Signature]</i> Org. <i>4142</i> Date <i>2/7/14</i> Time <i>0945</i>	
2. Relinquished by <i>[Signature]</i> Org. <i>4142</i> Date <i>1/28/14</i> Time <i>1015</i>		4. Relinquished by <i>[Signature]</i> Org. <i>4142</i> Date <i>1-30-14</i> Time <i>0755</i>	
2. Received by <i>[Signature]</i> Org. <i>4142</i> Date <i>1-30-14</i> Time <i>0755</i>		4. Received by <i>[Signature]</i> Org. <i>4142</i> Date <i>1-30-14</i> Time <i>0755</i>	

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

1/29/14

[illegible]

2/21/2014

Client Sample Results

Client: Sandia National Laboratories
Project/Site: SWMU 49/116 GWM

TestAmerica Job ID: 160-5475-1
SDG: 160-5475

Client Sample ID: 095241-020/CYN-MW5

Lab Sample ID: 160-5475-1

Date Collected: 01/28/14 09:22

Matrix: Water

Date Received: 02/07/14 09:45

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perchlorate	ND		0.012	0.0040	mg/L			02/13/14 12:33	1

CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY

Internal Lab

Batch No. *M/A*Page 1 of 2

Project Name: SWMU 149 GWM		Date Samples Shipped: <i>3/19/14</i>		SMO Use		SMO Authorization: <i>[Signature]</i>		AR/COC 615415	
Project/Task Manager: Clinton Lum		Carrier/Waybill No.		SMO Contact Phone: <i>[Signature]</i>		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 Bill to: Sandia National Laboratories (Accounts Payable), P.O. Box 5800, MS-0154 Albuquerque, NM 87185-0154	
Service Order: CF352-14		Lab Destination: GEL		Contract No.: PO 1303873					
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					
095571	-001	CTF-FB2	NA	3/14/14 9:48	DIW	G	3x40ml	HCL	G	FB	TCL VOC (SW846-8260B)	344710 001
095571	-009	CTF-FB2	NA	3/14/14 9:48	DIW	P	500 ml	HNO3	G	FB	TAL Metals (SW846-6010/6020/7470)	002
095571	-010	CTF-FB2	NA	3/14/14 9:48	FDIW	P	500 ml	HNO3	G	FB	TAL Metals (SW846-6010/6020/7470)	003
095572	-001	CTF-MW3	359	3/14/14 9:48	GW	G	3x40ml	HCL	G	SA	TCL VOC (SW846-8260B)	004
095572	-009	CTF-MW3	359	3/14/14 9:50	GW	P	500 ml	HNO3	G	SA	TAL Metals (SW846-6010/6020/7470)	005
095572	-010	CTF-MW3	359	3/14/14 9:53	FGW	P	500 ml	HNO3	G	SA	TAL Metals (SW846-6010/6020/7470)	006
095572	-016	CTF-MW3	359	3/14/14 9:54	GW	P	125 ml	None	G	SA	Anions (SW846-9056)	007
095572	-018	CTF-MW3	359	3/14/14 9:55	GW	P	125 ml	H2SO4	G	SA	Nitrate + Nitrite (EPA 353.2)	008
095572	-020	CTF-MW3	359	3/14/14 9:56	GW	P	250 ml	None	G	SA	Perchlorate (EPA 314.0)	009
095572	-022	CTF-MW3	359	3/14/14 9:57	GW	P	500 ml	None	G	SA	Alkalinity (SM2320B)	010

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				Sample Disposal <input type="checkbox"/> Return to Client <input checked="" type="checkbox"/> Disposal by Lab		Return Samples By:		
Sample Team Members	Name	Signature	Init.	Company/Organization/Phone/Cell		Comments:		
	Robert Lynch	<i>[Signature]</i>	RL	SNL/4142/505-844-4013/505-250-7090		Send report to Tim Jackson/4142/MS 0729/284-2547		
	Alfred Santillanes	<i>[Signature]</i>	AS	SNL/4142/505-844-5130/505-228-0710		If Perchlorate detected, then perform verification analysis using SW846-6850M.		
	William Gibson	<i>[Signature]</i>	WG	SNL/4142/505-284-3307/505-239-7367		Report Anions as Br, Cl, F, SO4. Report Alkalinity as total CaCO3, HCO3, CO3.		

1. Relinquished by <i>[Signature]</i> Org. <i>4142</i> Date <i>3/14/14</i> Time <i>1050</i>		3. Relinquished by Org. Date Time	
1. Received by <i>[Signature]</i> Org. <i>4142</i> Date <i>3/14/14</i> Time <i>1050</i>		3. Received by Org. Date Time	
2. Relinquished by <i>[Signature]</i> Org. <i>4142</i> Date <i>3/14/14</i> Time <i>1115</i>		4. Relinquished by Org. Date Time	
2. Received by <i>[Signature]</i> Org. <i>4142</i> Date <i>3-15-14</i> Time <i>0900</i>		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: April 11, 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: 095572-020
Sample ID: 344710009
Matrix: AQUEOUS
Collect Date: 14-MAR-14 09:56
Receive Date: 15-MAR-14
Collector: Client

Project: SNLSGWater
Client ID: SNLS004
Client Desc.: CTF-MW3
Vol. Recv.:

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Ion Chromatography											
EPA 314.0 Perchlorate by IC "As Received"											
Perchlorate	U	ND	0.004	0.012	mg/L	1	MARI	04/03/14	1713	1375005	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: April 11, 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: 095573-020
Sample ID: 344710016
Matrix: AQUEOUS
Collect Date: 14-MAR-14 09:56
Receive Date: 15-MAR-14
Collector: Client

Project: SNLSGWater
Client ID: SNLS004

Client Desc.: CTF-MW3
Vol. Recv.:

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Ion Chromatography											
EPA 314.0 Perchlorate by IC "As Received"											
Perchlorate	U	ND	0.004	0.012	mg/L	1	MAR1	04/03/14	1810	1375005	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

Page 1 of 2

Batch No. *NA*

SMO Use

AR/COC

615417

Project Name: SWMU 154 GWM	Date Samples Shipped: 3/18/14	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. 214988	SMO Contact Phone: <i>[Signature]</i>	
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			

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 Type	Volume	Preservative	Collection Method	Sample Type	Parameter & Method Requested	Lab Sample ID
095578	-001	CTF-FB4	NA	3/18/14 9:37	DIW	G	3x40ml	HCL	G	FB	TCL VOC (SW846-8260B)	001
095579	-001	CTF-MW2	129	3/18/14 9:47	GW	G	3x40ml	HCL	G	SA	TCL VOC (SW846-8260B)	002
095579	-002	CTF-MW2	129	3/18/14 9:50	GW	AG	4x1 L	None	G	SA	TCL SVOC (SW846-8270C)	003
095579	-009	CTF-MW2	129	3/18/14 9:54	GW	P	500 ml	HNO3	G	SA	TAL Metals+U(SW846-6010/6020/7470)	004
095579	-010	CTF-MW2	129	3/18/14 9:56	FGW	P	500 ml	HNO3	G	SA	TAL Metals+U(SW846-6010/6020/7470)	005
095579	-016	CTF-MW2	129	3/18/14 9:58	GW	P	125 ml	None	G	SA	Anions (SW846-9056)	006
095579	-018	CTF-MW2	129	3/18/14 10:00	GW	P	125 ml	H2SO4	G	SA	NPN (EPA 353.2)	007
095579	-020	CTF-MW2	129	3/18/14 10:02	GW	P	250 ml	None	G	SA	Perchlorate (EPA 314.0)	008
095579	-022	CTF-MW2	129	3/18/14 10:04	GW	P	500 ml	None	G	SA	Alkalinity (SM2320B)	009
095579	-024	CTF-MW2	129	3/18/14 10:08	GW	AG	4x1 L	None	G	SA	High Explosives (SW846-8321A mod.)	010

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		Lab Use
	Robert Lynch	<i>[Signature]</i>	RL	SNL/4142/505-844-4013/505-250-7090		Return Samples By:		
	Tim Jackson	<i>[Signature]</i>	TJ	SNL/4142/505-284-2547/505-263-6639		Comments: Send report to Tim Jackson/4142/MS 0729/284-2547		
	CTF-MW2 water has a 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>TJ</i>	Org. 4142	Date 3/18/14	Time 1055	3. Relinquished by	Org.	Date	Time
1. Received by <i>[Signature]</i>	Org. 4142	Date 3/18/14	Time 1055	3. Received by	Org.	Date	Time
2. Relinquished by <i>[Signature]</i>	Org. 4142	Date 3/18/14	Time 1200	4. Relinquished by	Org.	Date	Time
2. Received by <i>[Signature]</i>	Org. 621	Date 3-19-14	Time 0735	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 615417

Project Name: SWMU 154 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 Type	Volume	Preservative	Collection Method	Sample Type	Parameter & Method Requested	Lab Sample ID		
095579	-033	CTF-MW2	129	3/18/14 10:14	GW	P	1 L	HNO3	G	SA	Gamma Spectroscopy (EPA 901.0)	011		
095579	-034	CTF-MW2	129	3/18/14 10:16	GW	P	1 L	HNO3	G	SA	Gross Alpha and Beta (EPA 900.0)	012		
095579	-035	CTF-MW2	129	3/18/14 10:18	GW	P	1 L	HNO3	G	SA	Isotopic Uranium (HASL 300)	013		
095580	-001	CTF-MW2	129	3/18/14 9:48	GW	G	3x40ml	HCL	G	DU	TCL VOC (SW846-8260B)	014		
095580	-002	CTF-MW2	129	3/18/14 9:53	GW	AG	4x1 L	None	G	DU	TCL SVOC (SW846-8270C)	015		
095580	-009	CTF-MW2	129	3/18/14 9:55	GW	P	500 ml	HNO3	G	DU	TAL Metals+U(SW846-6010/6020/7470)	016		
095580	-010	CTF-MW2	129	3/18/14 9:57	FGW	P	500 ml	HNO3	G	DU	TAL Metals+U(SW846-6010/6020/7470)	017		
095580	-016	CTF-MW2	129	3/18/14 9:59	GW	P	125 ml	None	G	DU	Anions (SW846-9056)	018		
095580	-018	CTF-MW2	129	3/18/14 10:01	GW	P	125 ml	H2SO4	G	DU	NPN (EPA 353.2)	019		
095580	-020	CTF-MW2	129	3/18/14 10:03	GW	P	250 ml	None	G	DU	Perchlorate (EPA 314.0)	020		
095580	-022	CTF-MW2	129	3/18/14 10:05	GW	P	500 ml	None	G	DU	Alkalinity (SM2320B)	021		
095580	-024	CTF-MW2	129	3/18/14 10:11	GW	AG	4x1 L	None	G	DU	High Explosives (SW846-8321A mod.)	022		
095580	-033	CTF-MW2	129	3/18/14 10:15	GW	P	1 L	HNO3	G	DU	Gamma Spectroscopy (EPA 901.0)	023		
095580	-034	CTF-MW2	129	3/18/14 10:17	GW	P	1 L	HNO3	G	DU	Gross Alpha and Beta (EPA 900.0)	024		
095580	-035	CTF-MW2	129	3/18/14 10:19	GW	P	1 L	HNO3	G	DU	Isotopic Uranium (HASL 300)	025		
095581	-001	CTF-TB4	NA	3/18/14 9:37	DIW	G	3x40 ml	HCL	G	TB	TCL VOC (SW846-8260B)	026		

Recipient Initials AK

GEL LABORATORIES LLC

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

Certificate of Analysis

Report Date: April 14, 2014

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

Client Sample ID: 095579-020
Sample ID: 344844008
Matrix: AQUEOUS
Collect Date: 18-MAR-14 10:02
Receive Date: 19-MAR-14
Collector: Client

Project: SNLSGWater
Client ID: SNLS004
Client Desc.: CTF-MW2
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	04/03/14	1829	1375005	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: April 14, 2014

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

Client Sample ID: 095580-020
Sample ID: 344844020
Matrix: AQUEOUS
Collect Date: 18-MAR-14 10:03
Receive Date: 19-MAR-14
Collector: Client

Project: SNLSGWater
Client ID: SNLS004

Client Desc.: CTF-MW2
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	04/03/14	1848	1375005	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 - Revised

Date: March 12, 2014

To: File

From: Linda Thal

Subject: Inorganic Data Review and Validation – SNL
Site: SWMU 68 GWM
AR/COC: 615205
SDG: 160-5467
Laboratory: TestAmerica Laboratories, Inc. –St Louis
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 method EPA 314.0 (perchlorate). Data were reported for all required analytes. Problems were identified with the data package that resulted in the qualification of data.

1. The MS/MSD was performed on an EB, sample 160-5469-A-1 from AR/COC 615206. The associated sample result was ND and will be **qualified UJ,MS1**.

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)/Matrix Spike Duplicate (MSD)

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

Laboratory Replicate

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

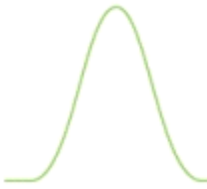
Detection Limits/Dilutions

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

Other QC

No other specific issues that affect data quality were identified.

Reviewed by: Mary Donovan **Level:** I **Date:** 03/12/14



Sample Findings Summary



AR/COC: 615205

Page 1 of 1

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
314.0_WC	095196-020/OBS-SA1	PERCHLORATE (14797-73-0)	UJ, MS1

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

Memorandum

Date: March 12, 2014

To: File

From: Linda Thal

Subject: Inorganic Data Review and Validation – SNL
Site: SWMU 68 GWM
AR/COC: 615207
SDG: 160-5470
Laboratory: TestAmerica Laboratories, Inc. –St Louis
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 method EPA 314.0 (perchlorate). Data were reported for all required analytes. Problems were identified with the data package that resulted in the qualification of data.

1. The MS/MSD was performed on an EB, sample 160-5469-A-1 from AR/COC 615206. The associated sample results were NDs and will be **qualified UJ,MS1**.

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

Holding Times and Preservation

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

Calibration

All initial and continuing calibration met QC acceptance criteria.

Blanks

No target analytes were detected in the blanks.

Laboratory Control Sample (LCS)

All LCS acceptance criteria were met.

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

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

Laboratory Replicate

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

Detection Limits/Dilutions

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

Other QC

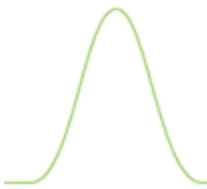
An EB was submitted with AR/COC 615206 and was applied to the samples on AR/COC 615207. A field duplicate pair was submitted with AR/COC 615207. There are no “required” review criteria for field duplicate analyses comparability; no data will be qualified as a result.

No other specific issues that affect data quality were identified.

Reviewed by: Mary Donovan

Level: I

Date: 03/12/14



Sample Findings Summary



AR/COC: 615207

Page 1 of 1

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
314.0_WC			
	095201-020/OBS-SA2	PERCHLORATE (14797-73-0)	UJ, MS1
	095202-020/OBS-SA3	PERCHLORATE (14797-73-0)	UJ, MS1

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

Memorandum

Date: March 12, 2014
To: File
From: Linda Thal
Subject: Inorganic Data Review and Validation – SNL
Site: SWMU 68 GWM
AR/COC: 615208
SDG: 160-5471
Laboratory: TestAmerica Laboratories, Inc. –St Louis
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 method EPA 314.0 (perchlorate). Data were reported for all required analytes. Problems were identified with the data package that resulted in the qualification of data.

1. The MS/MSD was performed on an EB, sample 160-5469-A-1 from AR/COC 615206. The associated sample result was ND and will be **qualified UJ,MS1**.

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)/Matrix Spike Duplicate (MSD)

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

Laboratory Replicate

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

Detection Limits/Dilutions

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

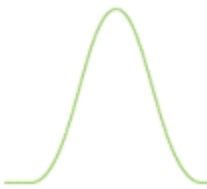
Other QC

No other specific issues that affect data quality were identified.

Reviewed by: Mary Donovan

Level: I

Date: 03/12/14



Sample Findings Summary



AR/COC: 615208

Page 1 of 1

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
314.0_WC	095205-020/OBS-SA4	PERCHLORATE (14797-73-0)	UJ, MS1

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

Memorandum - Revised

Date: March 12, 2014

To: File

From: Linda Thal

Subject: Inorganic Data Review and Validation – SNL
Site: SWMU 8/58 GWM
AR/COC: 615209
SDG: 160-5472
Laboratory: TestAmerica Laboratories, Inc. –St Louis
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 method EPA 314.0 (perchlorate). Data were reported for all required analytes. Problems were identified with the data package that resulted in the qualification of data.

1. The MS/MSD was performed on an EB, sample 160-5469-A-1 from AR/COC 615206. The associated sample result was ND and will be **qualified UJ,MS1**.

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)/Matrix Spike Duplicate (MSD)

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

Laboratory Replicate

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

Detection Limits/Dilutions

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

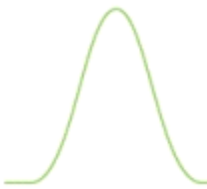
Other QC

No other specific issues that affect data quality were identified.

Reviewed by: Mary Donovan

Level: I

Date: 03/12/14



Sample Findings Summary



AR/COC: 615209

Page 1 of 1

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
314.0_WC	095208-020/CCBA-MW2	PERCHLORATE (14797-73-0)	UJ, MS1

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

Memorandum

Date: March 12, 2014

To: File

From: Linda Thal

Subject: Inorganic Data Review and Validation – SNL
Site: SWMU 8/58 GWM
AR/COC: 615211
SDG: 160-5474
Laboratory: TestAmerica Laboratories, Inc. –St Louis
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 method EPA 314.0 (perchlorate). Data were reported for all required analytes. Problems were identified with the data package that resulted in the qualification of data.

1. The MS/MSD was performed on an EB, sample 160-5469-A-1 from AR/COC 615206. The associated sample results were NDs and will be **qualified UJ,MS1**.

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

Holding Times and Preservation

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

Calibration

All initial and continuing calibration met QC acceptance criteria.

Blanks

No target analytes were detected in the blanks.

Laboratory Control Sample (LCS)

All LCS acceptance criteria were met.

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

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

Laboratory Replicate

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

Detection Limits/Dilutions

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

Other QC

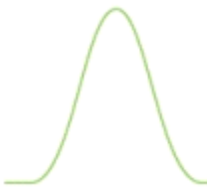
An EB was submitted with AR/COC 615210 and was applied to the samples on AR/COC 615211. A field duplicate pair was submitted with AR/COC 615211. There are no “required” review criteria for field duplicate analyses comparability; no data will be qualified as a result.

No other specific issues that affect data quality were identified.

Reviewed by: Mary Donovan

Level: I

Date: 03/13/14



Sample Findings Summary



AR/COC: 615211

Page 1 of 1

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
314.0_WC			
	095213-020/CCBA-MW1	PERCHLORATE (14797-73-0)	UJ, MS1
	095214-020/CCBA-MW1	PERCHLORATE (14797-73-0)	UJ, MS1

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

Memorandum

Date: March 12, 2014

To: File

From: Linda Thal

Subject: Inorganic Data Review and Validation – SNL
Site: SWMU 49/116 GWM
AR/COC: 615218
SDG: 160-5475
Laboratory: TestAmerica Laboratories, Inc. –St Louis
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 method EPA 314.0 (perchlorate). Data were reported for all required analytes. Problems were identified with the data package that resulted in the qualification of data.

1. The MS/MSD was performed on an EB, sample 160-5469-A-1 from AR/COC 615206. The associated sample result was ND and will be **qualified UJ,MS1**.

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)/Matrix Spike Duplicate (MSD)

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

Laboratory Replicate

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

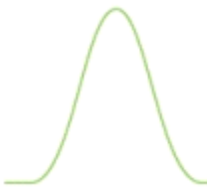
Detection Limits/Dilutions

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

Other QC

No other specific issues that affect data quality were identified.

Reviewed by: Mary Donovan **Level:** I **Date:** 03/13/14



Sample Findings Summary



AR/COC: 615218

Page 1 of 1

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
314.0_WC	095241-020/CYN-MW5	PERCHLORATE (14797-73-0)	UJ, MS1

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

Memorandum

Date: March 17, 2014

To: File

From: Linda Thal

Subject: Inorganic Data Review and Validation – SNL
Site: SWMU 49/116 GWM
AR/COC: 615220
SDG: 160-5477
Laboratory: TestAmerica Laboratories, Inc. –St Louis
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 method EPA 314.0 (perchlorate). Data were reported for all required analytes. Problems were identified with the data package that resulted in the qualification of data.

1. The MS and/or MSDs were performed on EBs, samples 160-5469-A-1 and 160-5476-1 from AR/COC 615206 and 615219. The associated sample results were NDs and will be **qualified UJ,MS1**.

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

Holding Times and Preservation

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

Calibration

All initial and continuing calibration met QC acceptance criteria.

Blanks

No target analytes were detected in the blanks.

Laboratory Control Sample (LCS)

All LCS acceptance criteria were met.

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

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

Laboratory Replicate

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

Detection Limits/Dilutions

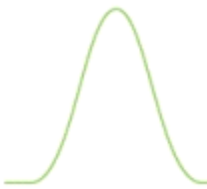
All detection limits were properly reported. The samples were not diluted.

Other QC

An EB was submitted with AR/COC 615219 and was applied to the samples on AR/COC 615220. A field duplicate pair was submitted with AR/COC 615220. There are no “required” review criteria for field duplicate analyses comparability; no data will be qualified as a result.

No other specific issues that affect data quality were identified.

Reviewed by: Monica Dymerski **Level I** **Date:** 03/18/14



Sample Findings Summary

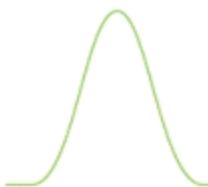


AR/COC: 615220

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Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
314.0_WC			
	095246-020/CTF-MW1	PERCHLORATE (14797-73-0)	UJ, MS1
	095247-020/CTF-MW1	PERCHLORATE (14797-73-0)	UJ, MS1

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



Sample Findings Summary



AR/COC: 615415

Page 1 of 2

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
SW846 3005/6020 DOE-AL			
	095571-009/CTF-FB2	Magnesium (7439-95-4)	UJ, D1
	095571-009/CTF-FB2	Manganese (7439-96-5)	UJ, D1
	095571-010/CTF-FB2	Iron (7439-89-6)	0.046U, B
	095571-010/CTF-FB2	Magnesium (7439-95-4)	UJ, D1
	095571-010/CTF-FB2	Manganese (7439-96-5)	0.012UJ, B,D1
	095572-009/CTF-MW3	Copper (7440-50-8)	J-, CK3
	095572-009/CTF-MW3	Magnesium (7439-95-4)	J, D1
	095572-009/CTF-MW3	Manganese (7439-96-5)	J, D1
	095572-010/CTF-MW3	Copper (7440-50-8)	0.0035UJ, B2,CK3
	095572-010/CTF-MW3	Magnesium (7439-95-4)	J, D1
	095572-010/CTF-MW3	Manganese (7439-96-5)	0.012UJ, B,D1
	095572-R09/CTF-MW3	Barium (7440-39-3)	J, D1
	095572-R09/CTF-MW3	Copper (7440-50-8)	J-, CK3
	095572-R09/CTF-MW3	Nickel (7440-02-0)	J-, CK3
	095572-R10/CTF-MW3	Barium (7440-39-3)	J, D1
	095572-R10/CTF-MW3	Copper (7440-50-8)	0.0035UJ, B2,CK3
	095572-R10/CTF-MW3	Manganese (7439-96-5)	0.0065U, B
	095572-R10/CTF-MW3	Nickel (7440-02-0)	J-, CK3
	095573-009/CTF-MW3	Copper (7440-50-8)	0.0045UJ, B2,CK3
	095573-009/CTF-MW3	Magnesium (7439-95-4)	J, D1
	095573-009/CTF-MW3	Manganese (7439-96-5)	0.012UJ, B,D1
	095573-010/CTF-MW3	Copper (7440-50-8)	0.0035UJ, B2,CK3

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
	095573-010/CTF-MW3	Magnesium (7439-95-4)	J, D1
	095573-010/CTF-MW3	Manganese (7439-96-5)	0.012UJ, B,D1
	095573-R09/CTF-MW3	Barium (7440-39-3)	J, D1
	095573-R09/CTF-MW3	Copper (7440-50-8)	0.0045UJ, B2,CK3
	095573-R09/CTF-MW3	Manganese (7439-96-5)	0.0065U, B
	095573-R09/CTF-MW3	Nickel (7440-02-0)	J-, CK3
	095573-R10/CTF-MW3	Antimony (7440-36-0)	UJ, IS2
	095573-R10/CTF-MW3	Barium (7440-39-3)	J, D1
	095573-R10/CTF-MW3	Copper (7440-50-8)	0.0035UJ, B2,CK3
	095573-R10/CTF-MW3	Manganese (7439-96-5)	0.0065U, B
	095573-R10/CTF-MW3	Nickel (7440-02-0)	J-, CK3
SW846 8260B DOE-AL			
	095571-001/CTF-FB2	Acetone (67-64-1)	10UJ, I3,B
	095571-001/CTF-FB2	Carbon disulfide (75-15-0)	UJ, MS3
	095572-001/CTF-MW3	Carbon disulfide (75-15-0)	UJ, MS3
	095573-001/CTF-MW3	Acetone (67-64-1)	10UJ, I3,B
	095573-001/CTF-MW3	Carbon disulfide (75-15-0)	UJ, MS3
	095573-001/CTF-MW3	Dibromochloromethane (124-48-1)	J+, C2
	095574-001/CTF-TB2	Acetone (67-64-1)	10UJ, I3,B
	095574-001/CTF-TB2	Carbon disulfide (75-15-0)	UJ, MS3

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

Memorandum

Date: April 25, 2014
To: File
From: Linda Thal
Subject: Inorganic Data Review and Validation – SNL
Site: SWMU 149 GWM
AR/COC: 615415
SDG: 344710
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 314.0 (perchlorate) and SM2320B (total alkalinity). Data were reported for all required analytes. No problems were identified with the data package that resulted in the qualification of data.

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

Holding Times and Preservation

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

Calibration

All initial and continuing calibration met QC acceptance criteria.

Blanks

No target analytes were detected in the blanks except as follows. Chloride was detected at < the PQL in the ICB and EB, sample 344709005. The associated sample results were detects >5X the blank values and will not be qualified.

Laboratory Control Sample (LCS)

All LCS acceptance criteria were met.

Matrix Spike (MS)

All MS/PS recoveries met QC acceptance criteria.

Laboratory Replicate

The replicate analyses met all QC acceptance criteria.

Detection Limits/Dilutions

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

Anions:

The samples were diluted 50X for chloride and sulfate.

Nitrate/Nitrite:

The samples were diluted 10X.

Other QC

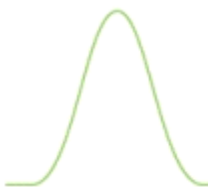
The EB submitted with AR/COC 615414 was associated with samples on AR/COC 615415. A field duplicate pair was submitted with AR/COC 615415. There are no “required” review criteria for field duplicate analyses comparability; no data will be qualified as a result.

No other specific issues that affect data quality were identified.

Reviewed by: Mary Donovan

Level: I

Date: 05/08/14



Sample Findings Summary



AR/COC: 615416, 615417

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Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
DOE EML HASL-300, U-02-RC			
	095576-035/CTF-EB2	Uranium-233/234 (13968-55-3/13966-29-)	BD, FR3
	095576-035/CTF-EB2	Uranium-235/236 (15117-96-1/13982-70-)	BD, FR3
	095576-035/CTF-EB2	Uranium-238 (7440-61-1)	BD, FR3
EPA 900.0/SW846 9310			
	095576-034/CTF-EB2	ALPHA (12587-46-1)	BD, FR3
	095576-034/CTF-EB2	BETA (12587-47-2)	BD, FR3
	095579-034/CTF-MW2	ALPHA (12587-46-1)	J, FR7
EPA 901.1			
	095576-033/CTF-EB2	Americium-241 (14596-10-2)	BD, FR3
	095576-033/CTF-EB2	Cesium-137 (10045-97-3)	BD, FR3
	095576-033/CTF-EB2	Cobalt-60 (10198-40-0)	BD, FR3
	095576-033/CTF-EB2	Potassium-40 (13966-00-2)	BD, FR3
	095579-033/CTF-MW2	Americium-241 (14596-10-2)	BD, FR3
	095579-033/CTF-MW2	Cesium-137 (10045-97-3)	BD, FR3
	095579-033/CTF-MW2	Cobalt-60 (10198-40-0)	BD, FR3
	095579-033/CTF-MW2	Potassium-40 (13966-00-2)	R, Z2
	095580-033/CTF-MW2	Americium-241 (14596-10-2)	BD, FR3
	095580-033/CTF-MW2	Cesium-137 (10045-97-3)	BD, FR3
	095580-033/CTF-MW2	Cobalt-60 (10198-40-0)	BD, FR3
	095580-033/CTF-MW2	Potassium-40 (13966-00-2)	R, Z2
SW846 3005/6020 DOE-AL			
	095575-009/CTF-FB3	Manganese (7439-96-5)	J, MS1
	095575-010/CTF-FB3	Manganese (7439-96-5)	J, MS1
	095576-009/CTF-EB2	Manganese (7439-96-5)	J, MS1

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
	095576-010/CTF-EB2	Manganese (7439-96-5)	UJ, MS1
	095579-009/CTF-MW2	Copper (7440-50-8)	0.0040UJ, B2,CK3
	095579-009/CTF-MW2	Manganese (7439-96-5)	J, MS1
	095579-010/CTF-MW2	Copper (7440-50-8)	J-, CK3
	095579-010/CTF-MW2	Manganese (7439-96-5)	J, MS1
	095580-009/CTF-MW2	Copper (7440-50-8)	0.0040UJ, B2,CK3
	095580-009/CTF-MW2	Manganese (7439-96-5)	J, MS1
	095580-010/CTF-MW2	Copper (7440-50-8)	J-, CK3
	095580-010/CTF-MW2	Manganese (7439-96-5)	J, MS1
SW846 3510C/8270D			
	095576-002/CTF-EB2	Indeno(1,2,3-cd)pyrene (193-39-5)	UJ, MS5
	095579-002/CTF-MW2	Indeno(1,2,3-cd)pyrene (193-39-5)	UJ, MS5
	095580-002/CTF-MW2	Indeno(1,2,3-cd)pyrene (193-39-5)	UJ, MS5
SW846 3535/8321A Modified			
	095576-024/CTF-EB2	m-Nitrotoluene (99-08-1)	UJ, I4
	095576-024/CTF-EB2	o-Nitrotoluene (88-72-2)	UJ, I4
	095576-024/CTF-EB2	p-Nitrotoluene (99-99-0)	UJ, I4
	095579-024/CTF-MW2	m-Nitrotoluene (99-08-1)	UJ, I4
	095579-024/CTF-MW2	o-Nitrotoluene (88-72-2)	UJ, I4
	095579-024/CTF-MW2	p-Nitrotoluene (99-99-0)	UJ, I4
	095579-024/CTF-MW2	RDX (121-82-4)	J+, C2
	095580-024/CTF-MW2	m-Nitrotoluene (99-08-1)	UJ, I4
	095580-024/CTF-MW2	o-Nitrotoluene (88-72-2)	UJ, I4
	095580-024/CTF-MW2	p-Nitrotoluene (99-99-0)	UJ, I4
	095580-024/CTF-MW2	RDX (121-82-4)	J+, C2

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

Memorandum

Date: May 06, 2014
To: File
From: Linda Thal
Subject: Inorganic Data Review and Validation – SNL
Site: SWMU 154 GWM
AR/COC: 615416 and 615417
SDG: 344844
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

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

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

Holding Times and Preservation

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

Calibration

All initial and continuing calibration met QC acceptance criteria except as follows. The intercept for chloride was positive and > the MDL. The associated sample results were either detects >3X the value of the intercept or ND and will not be qualified.

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.

Perchlorate, Nitrate/Nitrite and Alkalinity (associated with sample 344844037)

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

Laboratory Replicate

The replicate analyses met all QC acceptance criteria.

Perchlorate, Nitrate/Nitrite and Alkalinity (associated with sample 344844037)

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

Detection Limits/Dilutions

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

Anions:

Samples -006 and -018 were diluted 50X for sulfate and chloride and 5X for bromide.

Other QC

An EB was submitted with AR/COC 615416 and was associated with the samples on AR/COC 615417. A field duplicate pair was submitted with AR/COC 615417. There are no “required” review criteria for field duplicate analyses comparability; no data will be qualified as a result.

No other specific issues that affect data quality were identified.

Reviewed by: Mary Donovan

Level: I

Date: 05/06/14

SECTION III

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SECTION III

SOLID WASTE MANAGEMENT UNITS 149 AND 154 QUARTERLY GROUNDWATER MONITORING REPORT, January – March 2014

1.0 Introduction

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

Monitoring well CTF-MW3 is located approximately 290 feet to the west and downgradient of SWMU 149 (Figure III-1). Monitoring well CTF-MW2 is located approximately 260 feet to the southwest and downgradient of SWMU 154 (Figure III-2). Both wells are screened in Precambrian bedrock. Monitoring wells CTF-MW2 and CTF-MW3 were installed in August 2001. Prior to the March 2014 sampling event, monitoring wells CTF-MW2 and CTF-MW3 had been sampled 23 times for a variety of constituents.

This report summarizes the thirteenth and twelfth 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 March 14 and, March 18, 2014, respectively.

Groundwater sampling was conducted in conformance with the procedure “Sampling and Analysis Plan for Collection and Analysis of Additional Groundwater Samples Collected

from Monitoring Well CTF-MW3, Located Near SNL/NM SWMU 149” (SNL/NM June 2010, Attachment 1) and “Sampling and Analysis Plan for Collection and Analysis of Additional Groundwater Samples Collected from Monitoring Well CTF-MW2, Located Near SNL/NM SWMU 154” (SNL/NM June 2010, Attachment 2). These sampling and analysis plans (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 March 2014 groundwater samples were compared with the U.S. Environmental Protection Agency (EPA) maximum contaminant levels (MCLs) for drinking water (EPA 2009). Except for arsenic, none of the analytical results for the monitoring well CTF-MW2 groundwater samples exceed the MCLs. Arsenic was detected above the MCL of 0.010 milligrams per liter (mg/L) in monitoring well CTF-MW2 groundwater samples in both unfiltered and filtered samples. Arsenic was reported at concentrations of 0.0365 mg/L and 0.0355 mg/L in the unfiltered sample and unfiltered duplicate sample, respectively. Arsenic was reported at concentrations of 0.0365 mg/L and 0.0329 mg/L in the filtered sample and filtered duplicate sample, respectively. The reported values for arsenic are comparable to historical values.

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

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

2.0 **Field Methods and Measurements**

The quarterly groundwater sampling field measurements were collected in conformance with the DOE/Sandia Response to the NMED letter of April 8, 2010 (SNL/NM June 2010). Groundwater monitoring at monitoring well CTF-MW2 was performed according to the SAPs submitted as Attachment 2 to the DOE/Sandia Response (SNL/NM June 2010) and SNL/NM Administrative Operating Procedures (AOPs) (SNL/NM May 2011) and Field Operating Procedures (FOPs) (SNL/NM January 2012a and January 2012b). Groundwater samples were analyzed for relevant parameters, listed in Table III-1. Table III-2 presents the details for the groundwater sample collected from monitoring wells CTF-MW3 and CTF-MW2 during the First Quarter of CY 2014.

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 EXO1 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 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 0.570 micrograms per liter ($\mu\text{g/L}$) in the groundwater sample and 0.590 $\mu\text{g/L}$ in the groundwater duplicate sample, chloroform at 0.760 $\mu\text{g/L}$ in the groundwater sample and 0.730 $\mu\text{g/L}$ in the groundwater duplicate sample, and dibromochloromethane at 0.490 $\mu\text{g/L}$ in the groundwater sample and 0.480 $\mu\text{g/L}$ in the groundwater duplicate sample. Table III-4 summarizes detected VOCs in groundwater samples and Table III-5 lists the VOC MDLs.

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

3.3 **Semivolatile Organic Compounds**

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

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

3.4 **High Explosive Compounds**

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

SWMU 154, Monitoring Well CTF-MW2. No HE compounds were detected in the monitoring well CTF-MW2 groundwater sample at concentrations above laboratory MDLs, except hexahydro-1, 3, 5-trinitro-1, 3, 5-triazine (RDX). RDX was detected in the groundwater sample collected from monitoring well CTF-MW2 at a concentration of 0.267 µg/L and 0.340 µg/L in the groundwater duplicate sample. RDX concentrations since March 2002 are plotted on Figure III-3. The EPA does not have an MCL for RDX. NMED does have a tap water screening level for RDX of 6.11 µg/L (NMED February 2012), which is approximately 18 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 6.35 mg/L in the groundwater sample and 6.38 mg/L in the groundwater duplicate sample.

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

3.6 **Anions and Alkalinity**

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

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

3.7 **Perchlorate**

SWMU 149, Monitoring Well CTF-MW3. Perchlorate was not detected above the NMED-specified screening level/MDL of 4 µg/L (0.004 mg/L) in the samples 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 samples from monitoring well CTF-MW2. Table III-10 presents the perchlorate results.

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

3.8 **Metals**

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

SWMU 149, Monitoring Well CTF-MW3. No metals were detected above established MCLs in any groundwater sample. Metal results for both unfiltered and filtered samples from monitoring well CTF-MW3 are summarized in Tables III-11 and III-12, respectively. Reanalysis was requested because results from several metals were reported at concentrations higher than the historical mean average, and because of the variability of results between the groundwater sample and groundwater duplicate sample. Further details are provided in Section III.4.1.1.

SWMU 154, Monitoring Well CTF-MW2. No metals were detected above established MCLs in the monitoring well CTF-MW2 groundwater sample, except for arsenic. Arsenic in the unfiltered sample was detected above the MCL of 0.010 mg/L with a concentration of 0.0365 mg/L in the groundwater sample and 0.0355 mg/L in the groundwater duplicate sample. Arsenic was detected in the filtered sample at 0.365 mg/L and 0.0329 mg/L in the groundwater duplicate 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. Gross alpha activity was measured at 6.99 picocuries per liter (pCi/L) in the groundwater sample and 7.63 pCi/L in the groundwater duplicate sample; the MCL for gross alpha activity is 15 pCi/L.

3.10 **Sample Results Exceeding Maximum Contaminant Levels**

Table III-16 lists the results for all constituents that have been detected at concentrations exceeding the EPA MCLs (EPA 2009) during all quarterly sampling events. Arsenic was the only constituent exceeding MCLs detected in the March 2014 CTF-MW2 monitoring well samples. Figure III-4 shows the arsenic concentration over time for monitoring well CTF-MW2. The elevated concentrations of arsenic in the groundwater samples are most likely attributable to background because monitoring well CTF-MW2 is screened in a fault-gouge zone in the Precambrian granite that is sourced by a mixture of shallow and deeply-derived upwelling waters.

4.0 **Quality Control Samples**

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

4.1 **Field Quality Control Samples**

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

4.1.1 **Duplicate Groundwater Samples**

Duplicate groundwater samples were collected from CTF-MW3 and CTF-MW2 and analyzed to estimate the overall reproducibility of the sampling and analytical process. The duplicate samples were collected immediately after the original groundwater samples in order to reduce variability caused by timing and/or sampling mechanics. The duplicate sample was analyzed for all analytical parameters.

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

SWMU 149, Monitoring Well CTF-MW3. The duplicate sample results show good agreement (RPD values < 20 percent for organic compounds and < 35 for inorganic analyses) for all calculated parameters, except the unfiltered metal results for CTF-MW3. The RPD for unfiltered aluminum, chromium, cobalt, iron, and zinc in the original analysis were calculated at 190, 52, 51, 51, and 62, respectively. The RPD for aluminum, chromium, cobalt, and zinc are considered an estimate value because the sample results were detected below the practical quantitation limit (PQL) for the duplicate sample. The RPD for unfiltered aluminum, barium, cobalt, iron, and nickel in the reanalysis were calculated at 194, 44, 75, 154, and 77, respectively. The RPDs for aluminum, chromium, cobalt, and nickel are considered estimated values because sample results were detected below the PQL in the reanalyzed samples. Therefore, the only elevated RPDs are for iron (initial and reanalysis) and barium (reanalysis).

Historically, iron and barium concentrations at CTF-MW3 have not had elevated values. There is no MCL for iron, but the NMED tap water screening level is 25.6 mg/L. The MCL for barium is 2 mg/L. All measured values for iron and barium fall significantly below the applicable screening levels. The source of the high RPD values was most likely due to discrepancies in sampling, analytical preparation, or laboratory analysis.

SWMU 154, Monitoring Well CTF-MW2. The duplicate sample results show good agreement (RPD values < 20 percent for organic compounds and < 35 for inorganic analyses) for all calculated parameters, except RDX for CTF-MW2. However, RDX result for the first analysis is an estimated value with a “J” laboratory qualifier because the value was above the MDL and below the effective PQL (Table III-4).

4.1.2 **Equipment Blank Samples**

EB samples were collected prior to sampling monitoring wells CTF-MW3 and CTF-MW2 and were submitted for all analyses. EB samples were collected according to procedures described in SNL/NM FOP 05-03 “Groundwater Monitoring Equipment Decontamination” (SNL/NM January 2012a).

SWMU 149, Monitoring Well CTF-MW3. Bromodichloromethane, chloroform, copper, and chloride were detected above the laboratory MDLs. Bromodichloromethane and chloroform were detected above associated laboratory MDLs, but associated sample results were not qualified based upon assessment of historical data. No corrective action was necessary for chloride because the groundwater and groundwater duplicate samples are reported at concentrations greater than five times the EB result. Copper was qualified as not detected in both the CTF-MW3 groundwater and groundwater duplicate samples

during data validation, because copper was reported in the EB sample at a concentration less than five times the associated groundwater samples.

SWMU 154, Monitoring Well CTF-MW2. Bromodichloromethane, chloroform, copper, iron, lead, manganese, nickel, and sodium were detected above the laboratory MDLs. All metals listed were detected in the unfiltered metals sample. No metals were reported above the MDL in the filtered metals sample. With the exception of copper, no corrective action was necessary because analytes were not detected in groundwater samples, or were detected in groundwater samples at concentrations greater than five times the EB result. Copper was qualified as not detected in both the CTF-MW2 groundwater and groundwater duplicate samples during data validation, because copper was reported in the EB sample at a concentration less than five times the associated groundwater samples.

4.1.3 **Trip Blank Samples**

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

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

SWMU 154, Monitoring Well CTF-MW2. Two TBs were submitted with the March 2014 samples. No VOCs were detected above associated laboratory MDLs in the TB sample.

4.1.4 **Field Blank Samples**

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

SWMU 149, Monitoring Well CTF-MW3. The VOCs bromodichloromethane, chloroform, and dibromochloromethane were detected above associated laboratory MDLs. These compounds are all breakdown products of chlorine and their most likely source is the DI water used to decontaminate the sampling system. The associated sample results were not qualified based upon assessment of historical data.

SWMU 154, Monitoring Well CTF-MW2. The VOCs bromodichloromethane and chloroform were detected above associated laboratory MDLs. These compounds are all breakdown products of chlorine and their most likely source is the DI water used to decontaminate the sampling system. No corrective action was required because these compounds were not detected in the associated CTF-MW2 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).

Although some analytical results were qualified during the data validation process, no significant data quality problems were noted for project constituents of concern. The data validation sample findings summary sheets are provided in Appendix C. The data are acceptable and reported QC measures are adequate.

4.3 **Variances and Nonconformances**

No variances or nonconformances from the requirements in the Groundwater Monitoring SAP for SWMUs 149 and 154 (SNL/NM June 2010, Attachment 1 and 2) were identified during the March 2014 sampling activities at monitoring wells CTF-MW3 and CTF-MW2.

4.4 **Project Field Notes and Comments**

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

- NMED DOE Oversight Bureau was onsite and received split samples for all analyses at monitoring wells CTF-MW3 and CTF-MW2
- Discrepancies between various unfiltered metals results for CTF-MW3 were not resolved, and review of the data did not determine the source. SNL/NM personnel requested GEL rerun metal samples and both original and reanalysis results are reported. No additional corrective action was performed because detected metals were reported at concentrations below established MCLs and sampling is performed

on a quarterly frequency. The source of the high RPD values was most likely due to discrepancies in sampling, analytical preparation, or laboratory analysis.

5.0 **Summary**

During CY 2014 first quarter, samples were collected from monitoring well CTF-MW3, located near SWMU 149, and monitoring well CTF-MW2, located near SWMU 154. The April 8, 2010 letter from NMED required eight quarters of groundwater sampling and analysis. The CY 2014 first quarter sampling event represents the twelfth and thirteenth quarterly groundwater sampling event for monitoring wells CTF-MW3 and CTF-MW2, respectively. Sampling will continue at both wells until further guidance is provided by NMED. Sampling results were compared with EPA MCL guidelines for drinking water (EPA 2009).

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

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

No parameters were detected above established MCLs, except for arsenic in monitoring well CTF-MW2. Arsenic was detected above the MCL of 0.010 mg/L at concentrations of 0.0365 mg/L and 0.0355 mg/L in the unfiltered groundwater sample and duplicate sample, respectively. In the filtered groundwater sample the arsenic concentration was 0.0365 mg/L and 0.0329 mg/L in the duplicate sample. These values are comparable to previous results. The elevated concentrations of arsenic in the groundwater samples are most likely attributable to background because monitoring well CTF-MW2 is screened in a fault-gouge zone in the Precambrian granite that is sourced by a mixture of shallow and upwelling endogenic (deeply derived) waters. RDX was detected at a concentration of 0.267 µg/L in the groundwater sample and 0.340 µg/L in the duplicate groundwater sample. These concentrations are significantly below the NMED tap water screening level for RDX of 6.03 µg/L.

6.0 References

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Figures

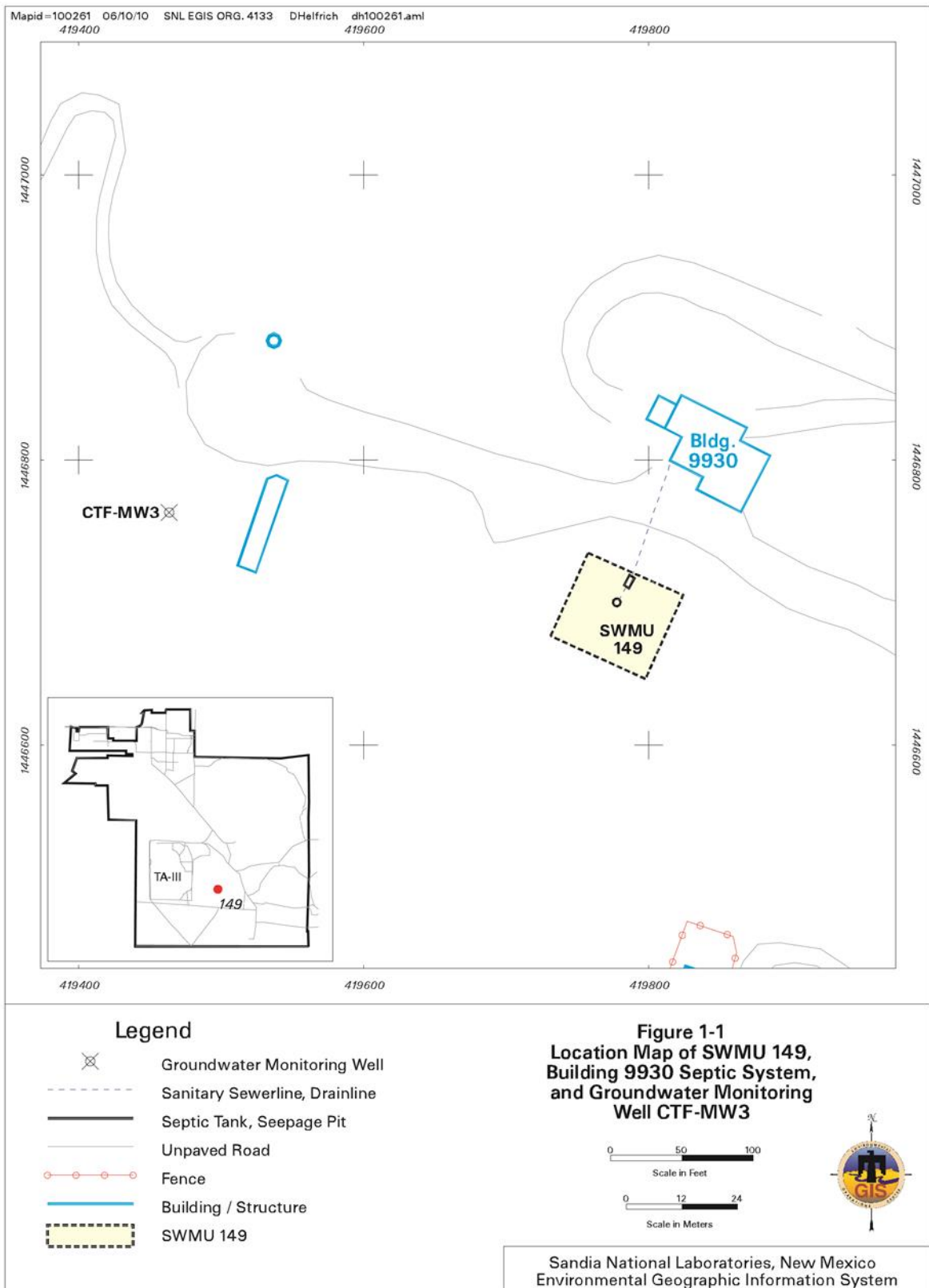


Figure III-1
Location of Monitoring Well CTF-MW3 near SWMU 149

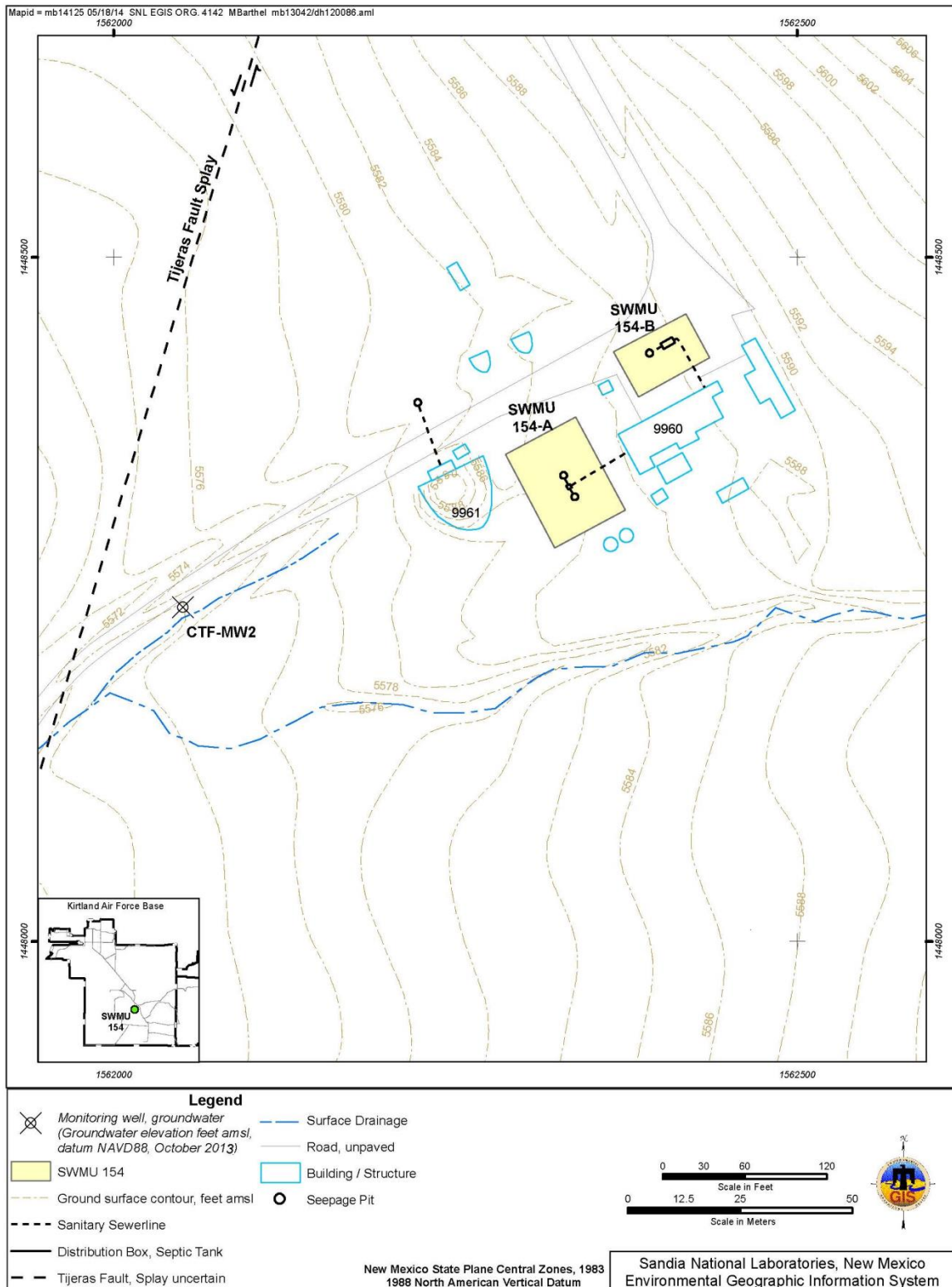


Figure III-2
Location of Monitoring Well CTF-MW2 near SWMU 154

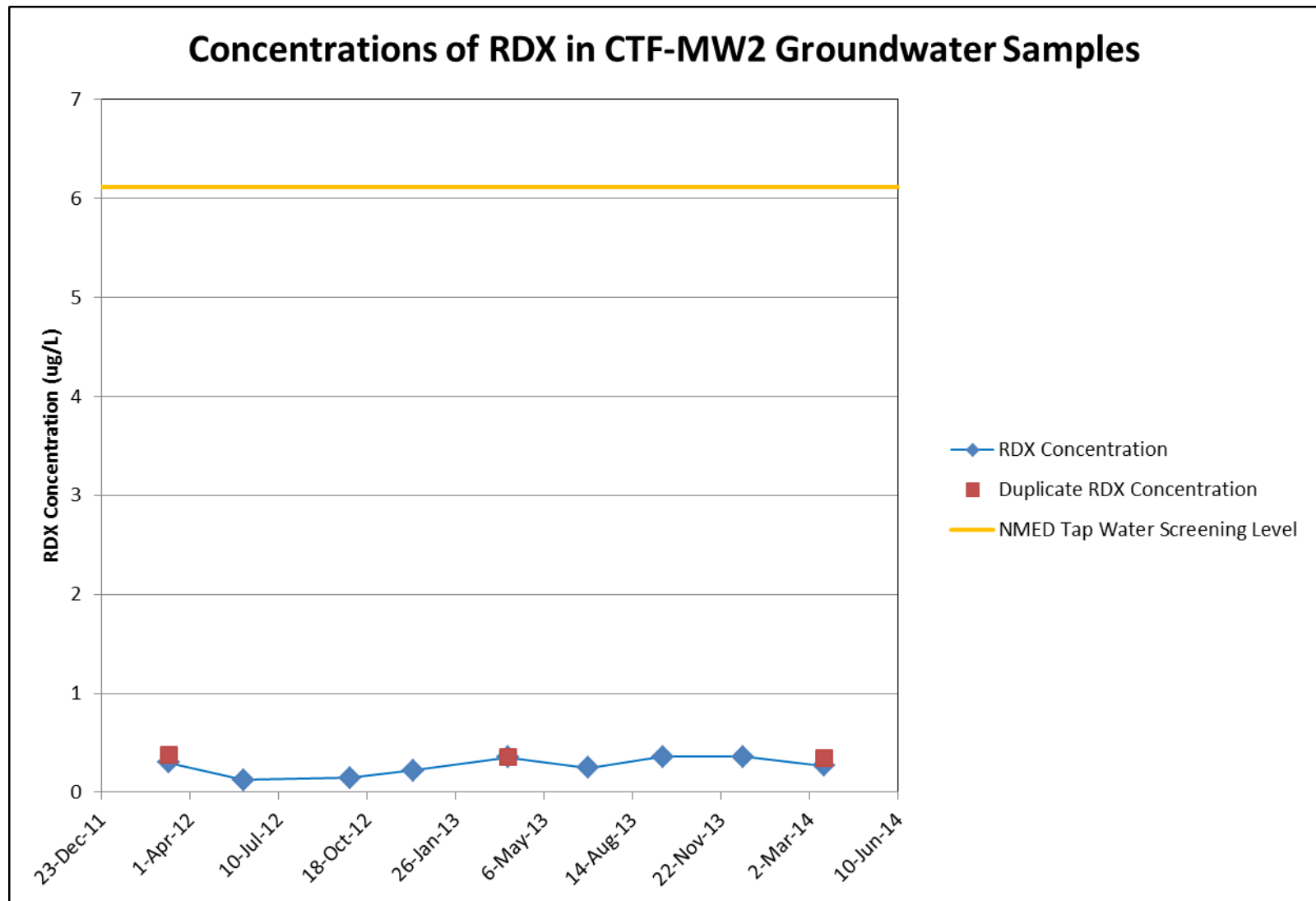


Figure III-3
Concentrations of RDX over Time in Monitoring Well CTF-MW2 near SWMU 154

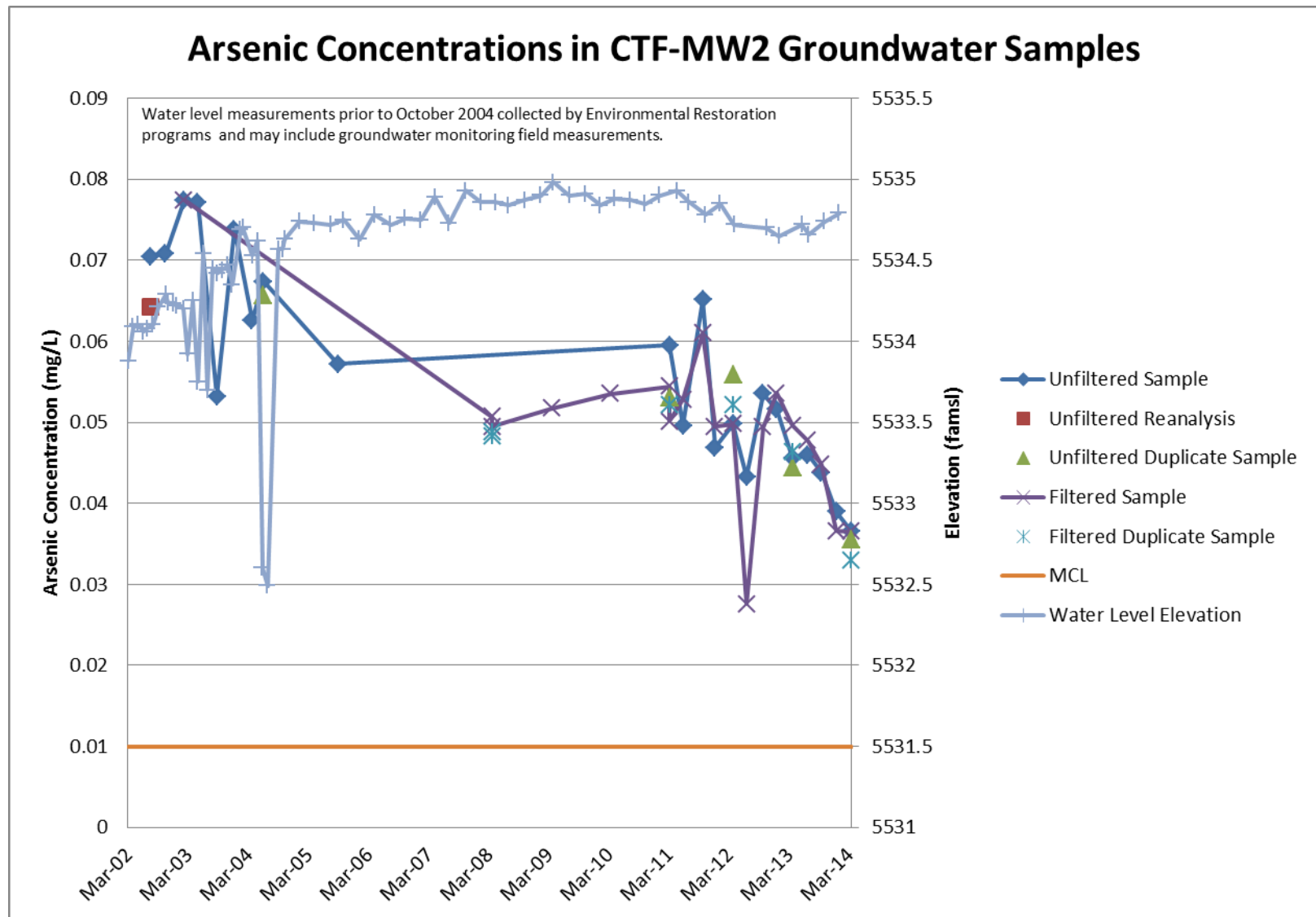


Figure III-4

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

Tables

Table III-1

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

Analysis	Analytical Method^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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^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 First Quarter, CY 2014 Groundwater Sampling
SWMUs 149 and 154 Groundwater Monitoring Quarterly Assessment,
January – March 2014

Well	Date Sampled	Sample Identification	AR/COC Number	Associated Groundwater Investigation
CTF-MW3	14-Mar-14	095572	615415	SWMU 149
CTF-MW3 (Duplicate)		095573		
CTF-MW2	18-Mar-14	095579	615417	SWMU 154
CTF-MW2 (Duplicate)		095580		

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, January – March 2014

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	14-Mar-14	18.57	1398.5	193.2	7.08	0.71	53.6	5.01
SWMU 154								
CTF-MW2	18-Mar-14	13.65	3299	-40.6	5.64	0.39	3.5	0.36

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, January – March 2014

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 14-Mar-14	Bromodichloromethane	0.570	0.300	1.00	NE	J		095572-001	EPA 8260B
	Chloroform	0.760	0.300	1.00	NE	J		095572-001	EPA 8260B
	Dibromochloromethane	0.490	0.300	1.00	NE	J		095572-001	EPA 8260B
CTF-MW3 (Duplicate) 14-Mar-14	Acetone	5.14	3.00	10.0	NE	B, J	10UJ	095573-001	EPA-8260B
	Bromodichloromethane	0.590	0.300	1.00	NE	J		095573-001	EPA-8260B
	Chloroform	0.730	0.300	1.00	NE	J		095573-001	EPA-8260B
	Dibromochloromethane	0.480	0.300	1.00	NE	J	J+	095573-001	EPA-8260B
SWMU 154									
CTF-MW2 18-Mar-14	RDX	0.267	0.087	0.272	NE	J	J+	095579-024	EPA 8321A
CTF-MW2 (Duplicate) 18-Mar-14	RDX	0.340	0.086	0.269	NE		J+	095580-024	EPA 8321A

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.

^bValidation Qualifier

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

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

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

Table III-4 (Concluded)
Summary of Detected Volatile Organic, Semivolatile Organic and High Explosive Compounds
SWMUs 149 and 154 Groundwater Monitoring
Quarterly Assessment, January – March 2014

Notes (continued)

°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, January – March 2014

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

^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-6
Method Detection Limits for Volatile and Semivolatile Organic Compounds
SWMU 154 Groundwater Monitoring
Quarterly Assessment, January – March 2014

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, January – March 2014

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

^aAnalytical 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, January – March 2014

Analyte	MDL (µg/L)
1,3,5-Trinitrobenzene	0.086 – 0.087
1,3-Dinitrobenzene	0.086 – 0.087
2,4,6-Trinitrotoluene	0.086 – 0.087
2,4-Dinitrotoluene	0.086 – 0.087
2,6-Dinitrotoluene	0.086 – 0.087
2-Amino-4,6-dinitrotoluene	0.086 – 0.087
2-Nitrotoluene	0.0882 – 0.0891
3-Nitrotoluene	0.086 – 0.087
4-Amino-2,6-dinitrotoluene	0.086 – 0.087
4-Nitrotoluene	0.161 – 0.163
HMX	0.086 – 0.087
Nitro-benzene	0.086 – 0.087
Pentaerythritol tetranitrate	0.108 – 0.109
RDX	0.086 – 0.087
Tetryl	0.086 – 0.087

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 III-8
Summary of Nitrate Plus Nitrite Results
SWMUs 149 and 154 Groundwater Monitoring
Quarterly Assessment, January – March 2014

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 14-Mar-14	Nitrate plus nitrite	6.35	0.170	0.500	10.0			095572-018	EPA 353.2
CTF-MW3 (Duplicate) 14-Mar-14	Nitrate plus nitrite	6.38	0.170	0.500	10.0			095573-018	
SWMU 154									
CTF-MW2 18-Mar-14	Nitrate plus nitrite	ND	0.017	0.050	10.0	U		095579-018	EPA 353.2
CTF-MW2 (Duplicate) 18-Mar-14	Nitrate plus nitrite	ND	0.017	0.050	10.0	U		095580-018	

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.

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, January – March 2014

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 14-Mar-14	Bicarbonate Alkalinity	319	0.725	1.00	NE			095572-022	SM2320B
	Carbonate Alkalinity	ND	0.725	1.00	NE	U		095572-022	SM2320B
	Bromide	1.18	0.067	0.200	NE			095572-016	EPA 9056
	Chloride	124	3.35	10.0	NE			095572-016	EPA 9056
	Fluoride	2.37	0.033	0.100	4.0			095572-016	EPA 9056
	Sulfate	515	6.65	20.0	NE			095572-016	EPA 9056
CTF-MW3 (Duplicate) 14-Mar-14	Bicarbonate Alkalinity	321	0.725	1.00	NE			095573-022	SM2320B
	Carbonate Alkalinity	ND	0.725	1.00	NE	U		095573-022	SM2320B
	Bromide	1.18	0.067	0.200	NE			095573-016	EPA 9056
	Chloride	120	3.35	10.0	NE			095573-016	EPA 9056
	Fluoride	2.35	0.033	0.100	4.0			095573-016	EPA 9056
	Sulfate	495	6.65	20.0	NE			095573-016	EPA 9056
SWMU 154									
CTF-MW2 18-Mar-14	Bicarbonate Alkalinity	1440	0.725	1.00	NE			095579-022	SM2320B
	Carbonate Alkalinity	ND	0.725	1.00	NE	U		095579-022	SM2320B
	Bromide	1.76	0.335	1.00	NE			095579-016	EPA 9056
	Chloride	468	3.35	10.0	NE			095579-016	EPA 9056
	Fluoride	2.42	0.033	0.100	4.0			095579-016	EPA 9056
	Sulfate	149	6.65	20.0	NE			095579-016	EPA 9056
CTF-MW2 (Duplicate) 18-Mar-14	Bicarbonate Alkalinity	1410	0.725	1.00	NE			095580-022	SM2320B
	Carbonate Alkalinity	ND	0.725	1.00	NE	U		095580-022	SM2320B
	Bromide	1.69	0.335	1.00	NE			095580-016	EPA 9056
	Chloride	460	3.35	10.0	NE			095582-016	EPA 9056
	Fluoride	2.37	0.033	0.100	4.0			095580-016	EPA 9056
	Sulfate	148	6.65	20.0	NE			095580-016	EPA 9056

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.

Table III-9 (Concluded)
Summary of Anion and Alkalinity Results
SWMUs 149 and 154 Groundwater Monitoring
Quarterly Assessment, January – March 2014

Notes (continued)

^bValidation Qualifier

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

^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.

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, January – March 2014

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 14-Mar-14	ND	0.004	0.012	NE	U		095572-020	EPA 314.0
CTF-MW3 (Duplicate) 14-Mar-14	ND	0.004	0.012	NE	U		095573-020	EPA 314.0
SWMU 154								
CTF-MW2 18-Mar-14	ND	0.004	0.012	NE	U		095579-020	EPA 314.0
CTF-MW2 (Duplicate) 18-Mar-14	ND	0.004	0.012	NE	U		095580-020	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, January – March 2014

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 14-Mar-14	Aluminum	1.38	0.015	0.050	NE			095572-009	EPA 6020
	Antimony	ND	0.001	0.003	0.006	U		095572-009	EPA 6020
	Arsenic	ND	0.0017	0.005	0.010	U		095572-009	EPA 6020
	Barium	0.0366	0.0006	0.002	2.00			095572-009	EPA 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		095572-009	EPA 6020
	Cadmium	ND	0.00011	0.001	0.005	U		095572-009	EPA 6020
	Calcium	212	0.600	2.00	NE			095572-009	EPA 6020
	Chromium	0.00419	0.002	0.010	0.100	J		095572-009	EPA 6020
	Cobalt	0.000757	0.0001	0.001	NE	J		095572-009	EPA 6020
	Copper	0.00515	0.00035	0.001	NE		J-	095572-009	EPA 6020
	Iron	1.28	0.033	0.100	NE	B		095572-009	EPA 6020
	Lead	0.00209	0.0005	0.002	NE			095572-009	EPA 6020
	Magnesium	43.7	0.010	0.030	NE		J	095572-009	EPA 6020
	Manganese	0.134	0.001	0.005	NE	B	J	095572-009	EPA 6020
	Mercury	ND	0.000067	0.0002	0.002	U		095572-009	EPA 7470
	Nickel	0.00695	0.0005	0.002	NE			095572-009	EPA 6020
	Potassium	11.3	0.080	0.300	NE			095572-009	EPA 6020
	Selenium	0.0276	0.0015	0.005	0.050			095572-009	EPA 6020
	Silver	ND	0.0002	0.001	NE	U		095572-009	EPA 6020
	Sodium	157	0.800	2.50	NE			095572-009	EPA 6020
	Thallium	ND	0.00045	0.002	0.002	U		095572-009	EPA 6020
	Vanadium	ND	0.001	0.005	NE	U		095572-009	EPA 6010
	Zinc	0.00958	0.0035	0.010	NE	J		095572-009	EPA 6020

Table III-11 (Continued)
Summary of Unfiltered Total Metal Results
SWMU 149 Groundwater Monitoring
Quarterly Assessment, January – March 2014

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 (Reanalysis) 14-Mar-14	Aluminum	2.74	0.150	0.500	NE			095572-R09	EPA 6020
	Antimony	ND	0.010	0.030	0.006	U		095572-R09	EPA 6020
	Arsenic	ND	0.017	0.050	0.010	U		095572-R09	EPA 6020
	Barium	0.0483	0.006	0.020	2.00		J	095572-R09	EPA 6020
	Beryllium	ND	0.002	0.005	0.004	U		095572-R09	EPA 6020
	Cadmium	ND	0.0011	0.010	0.005	U		095572-R09	EPA 6020
	Calcium	182	3.00	10.0	NE	B		095572-R09	EPA 6020
	Chromium	ND	0.020	0.100	0.100	U		095572-R09	EPA 6020
	Cobalt	0.00114	0.001	0.010	NE	J		095572-R09	EPA 6020
	Copper	0.0085	0.0035	0.010	NE	J	J-	095572-R09	EPA 6020
	Iron	2.42	0.330	1.00	NE	B		095572-R09	EPA 6020
	Lead	ND	0.005	0.020	NE	U		095572-R09	EPA 6020
	Magnesium	45.2	0.100	0.300	NE			095572-R09	EPA 6020
	Manganese	0.196	0.010	0.050	NE	B		095572-R09	EPA 6020
	Nickel	0.00796	0.005	0.020	NE	J	J-	095572-R09	EPA 6020
	Potassium	11.3	0.800	3.00	NE			095572-R09	EPA 6020
	Selenium	0.0282	0.015	0.050	0.050	J		095572-R09	EPA 6020
	Silver	ND	0.002	0.010	NE	U		095572-R09	EPA 6020
	Sodium	150	4.00	12.5	NE			095572-R09	EPA 6020
	Thallium	ND	0.0045	0.020	0.002	U		095572-R09	EPA 6020
	Zinc	ND	0.035	0.100	NE	U		095572-R09	EPA 6020

Table III-11 (Continued)
Summary of Unfiltered Total Metal Results
SWMU 149 Groundwater Monitoring
Quarterly Assessment, January – March 2014

Well	Analyte	Result (mg/L)	MDL (mg/L)	PQL (mg/L)	MCL (mg/L)	Laboratory Qualifier ^a	Validation Qualifier ^b	Sample Number	Analytical Method ^c
CTF-MW3 (Duplicate) 14-Mar-14	Aluminum	0.0348	0.015	0.050	NE	J		095573-009	EPA 6020
	Antimony	ND	0.001	0.003	0.006	U		095573-009	EPA 6020
	Arsenic	ND	0.0017	0.005	0.010	U		095573-009	EPA 6020
	Barium	0.0303	0.0006	0.002	2.00			095573-009	EPA 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		095573-009	EPA 6020
	Cadmium	ND	0.00011	0.001	0.005	U		095573-009	EPA 6020
	Calcium	195	0.600	2.00	NE			095573-009	EPA 6020
	Chromium	0.00247	0.002	0.010	0.100	J		095573-009	EPA 6020
	Cobalt	0.000451	0.0001	0.001	NE	J		095573-009	EPA 6020
	Copper	0.00313	0.00035	0.001	NE		0.0045UJ	095573-009	EPA 6020
	Iron	0.759	0.033	0.100	NE	B		095573-009	EPA 6020
	Lead	ND	0.0005	0.002	NE	U		095573-009	EPA 6020
	Magnesium	45.2	0.050	0.150	NE		J	095573-009	EPA 6020
	Manganese	0.00631	0.001	0.005	NE	B	0.012UJ	095573-009	EPA 6020
	Mercury	ND	0.000067	0.0002	0.002	U		095573-009	EPA 7470
	Nickel	0.00701	0.0005	0.002	NE			095573-009	EPA 6020
	Potassium	11.2	0.080	0.300	NE			095573-009	EPA 6020
	Selenium	0.0269	0.0015	0.005	0.050			095573-009	EPA 6020
	Silver	ND	0.0002	0.001	NE	U		095573-009	EPA 6020
	Sodium	156	0.800	2.50	NE			095573-009	EPA 6020
	Thallium	ND	0.00045	0.002	0.002	U		095573-009	EPA 6020
	Vanadium	ND	0.001	0.005	NE	U		095573-009	EPA 6010
	Zinc	0.00502	0.0035	0.010	NE	J		095573-009	EPA 6020

Table III-11 (Continued)
Summary of Unfiltered Total Metal Results
SWMU 149 Groundwater Monitoring
Quarterly Assessment, January – March 2014

Well	Analyte	Result (mg/L)	MDL (mg/L)	PQL (mg/L)	MCL (mg/L)	Laboratory Qualifier ^a	Validation Qualifier ^b	Sample Number	Analytical Method ^c
CTF-MW3 (Duplicate Reanalysis) 14-Mar-14	Aluminum	0.042	0.015	0.050	NE	J		095573-R09	EPA 6020
	Antimony	ND	0.001	0.003	0.006	U		095573-R09	EPA 6020
	Arsenic	ND	0.0017	0.005	0.010	U		095573-R09	EPA 6020
	Barium	0.0309	0.0006	0.002	2.00		J	095573-R09	EPA 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		095573-R09	EPA 6020
	Cadmium	ND	0.00011	0.001	0.005	U		095573-R09	EPA 6020
	Calcium	210	0.600	2.00	NE	B		095573-R09	EPA 6020
	Chromium	ND	0.002	0.010	0.100	U		095573-R09	EPA 6020
	Cobalt	0.00251	0.0001	0.001	NE	J		095573-R09	EPA 6020
	Copper	0.00199	0.00035	0.001	NE		0.0045UJ	095573-R09	EPA 6020
	Iron	0.316	0.033	0.100	NE	B		095573-R09	EPA 6020
	Lead	ND	0.0005	0.002	NE	U		095573-R09	EPA 6020
	Magnesium	55.8	0.100	0.300	NE			095573-R09	EPA 6020
	Manganese	0.00527	0.001	0.005	NE	B	0.0065U	095573-R09	EPA 6020
	Nickel	0.00353	0.0005	0.002	NE		J-	095573-R09	EPA 6020
	Potassium	13.0	0.800	3.00	NE			095573-R09	EPA 6020
	Selenium	0.0272	0.0015	0.005	0.050			095573-R09	EPA 6020
	Silver	ND	0.0002	0.001	NE	U		095573-R09	EPA 6020
	Sodium	186	0.800	2.50	NE			095573-R09	EPA 6020
	Thallium	ND	0.00045	0.002	0.002	U		095573-R09	EPA 6020
	Zinc	0.0055	0.0035	0.010	NE	J		095573-R09	EPA 6020

Table III-11 (Concluded)
Summary of Unfiltered Total Metal Results
SWMU 149 Groundwater Monitoring
Quarterly Assessment, January – March 2014

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 value is an estimated quantity.
- J- = The associated numerical value is an estimated quantity with a suspected negative bias.
- U = The analyte was analyzed for, but was not detected. The associated numerical value is the sample quantitation limit.
- UJ = The analyte was analyzed for, but was not detected. The associated value is an estimate and may be inaccurate or imprecise.

^cAnalytical Method

U.S. Environmental Protection Agency, 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, January – March 2014

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 14-Mar-14	Aluminum	ND	0.015	0.050	NE	U		095572-010	EPA 6020
	Antimony	ND	0.001	0.003	0.006	U		095572-010	EPA 6020
	Arsenic	ND	0.0017	0.005	0.010	U		095572-010	EPA 6020
	Barium	0.0313	0.0006	0.002	2.00			095572-010	EPA 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		095572-010	EPA 6020
	Cadmium	ND	0.00011	0.001	0.005	U		095572-010	EPA 6020
	Calcium	200	0.600	2.00	NE			095572-010	EPA 6020
	Chromium	ND	0.002	0.010	0.100	U		095572-010	EPA 6020
	Cobalt	0.000416	0.0001	0.001	NE	J		095572-010	EPA 6020
	Copper	0.00247	0.00035	0.001	NE		0.0035UJ	095572-010	EPA 6020
	Iron	0.599	0.033	0.100	NE	B		095572-010	EPA 6020
	Lead	ND	0.0005	0.002	NE	U		095572-010	EPA 6020
	Magnesium	48.8	0.050	0.150	NE		J	095572-010	EPA 6020
	Manganese	0.0016	0.001	0.005	NE	B, J	0.012UJ	095572-010	EPA 6020
	Mercury	ND	0.000067	0.0002	0.002	U		095572-010	EPA 7470
	Nickel	0.00579	0.0005	0.002	NE			095572-010	EPA 6020
	Potassium	11.9	0.080	0.300	NE			095572-010	EPA 6020
	Selenium	0.0269	0.0015	0.005	0.050			095572-010	EPA 6020
	Silver	ND	0.0002	0.001	NE	U		095572-010	EPA 6020
	Sodium	171	0.800	2.50	NE			095572-010	EPA 6020
	Thallium	ND	0.00045	0.002	0.002	U		095572-010	EPA 6020
	Vanadium	ND	0.001	0.005	NE	U		095572-010	EPA 6010
	Zinc	0.00466	0.0035	0.010	NE	J		095572-010	EPA 6020

Table III-12 (Continued)
Summary of Filtered Total Metal Results
SWMU 149 Groundwater Monitoring
Quarterly Assessment, January – March 2014

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 (Reanalysis) 14-Mar-14	Aluminum	ND	0.015	0.050	NE	U		095572-R10	EPA 6020
	Antimony	ND	0.001	0.003	0.006	U		095572-R10	EPA 6020
	Arsenic	ND	0.0017	0.005	0.010	U		095572-R10	EPA 6020
	Barium	0.0301	0.0006	0.002	2.00		J	095572-R10	EPA 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		095572-R10	EPA 6020
	Cadmium	ND	0.00011	0.001	0.005	U		095572-R10	EPA 6020
	Calcium	201	0.600	2.00	NE	B		095572-R10	EPA 6020
	Chromium	ND	0.002	0.010	0.100	U		095572-R10	EPA 6020
	Cobalt	0.000236	0.0001	0.001	NE	J		095572-R10	EPA 6020
	Copper	0.00172	0.00035	0.001	NE		0.0035UJ	095572-R10	EPA 6020
	Iron	0.260	0.033	0.100	NE	B		095572-R10	EPA 6020
	Lead	ND	0.0005	0.002	NE	U		095572-R10	EPA 6020
	Magnesium	52.1	0.100	0.300	NE			095572-R10	EPA 6020
	Manganese	0.00169	0.001	0.005	NE	B, J	0.0065U	095572-R10	EPA 6020
	Nickel	0.00302	0.0005	0.002	NE		J-	095572-R10	EPA 6020
	Potassium	12.2	0.800	3.00	NE			095572-R10	EPA 6020
	Selenium	0.0273	0.0015	0.005	0.050			095572-R10	EPA 6020
	Silver	ND	0.0002	0.001	NE	U		095572-R10	EPA 6020
	Sodium	174	0.800	2.50	NE			095572-R10	EPA 6020
	Thallium	ND	0.00045	0.002	0.002	U		095572-R10	EPA 6020
	Zinc	0.00529	0.0035	0.010	NE	J		095572-R10	EPA 6020

Table III-12 (Continued)
Summary of Filtered Total Metal Results
SWMU 149 Groundwater Monitoring
Quarterly Assessment, January – March 2014

Well	Analyte	Result (mg/L)	MDL (mg/L)	PQL (mg/L)	MCL (mg/L)	Laboratory Qualifier ^a	Validation Qualifier ^b	Sample Number	Analytical Method ^c
CTF-MW3 (Duplicate) 14-Mar-14	Aluminum	ND	0.015	0.050	NE	U		095573-010	EPA 6020
	Antimony	ND	0.001	0.003	0.006	U		095573-010	EPA 6020
	Arsenic	ND	0.0017	0.005	0.010	U		095573-010	EPA 6020
	Barium	0.0305	0.0006	0.002	2.00			095573-010	EPA 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		095573-010	EPA 6020
	Cadmium	ND	0.00011	0.001	0.005	U		095573-010	EPA 6020
	Calcium	207	0.600	2.00	NE			095573-010	EPA 6020
	Chromium	ND	0.002	0.010	0.100	U		095573-010	EPA 6020
	Cobalt	0.000462	0.0001	0.001	NE	J		095573-010	EPA 6020
	Copper	0.00313	0.00035	0.001	NE		0.0035UJ	095573-010	EPA 6020
	Iron	0.799	0.033	0.100	NE	B		095573-010	EPA 6020
	Lead	ND	0.0005	0.002	NE	U		095573-010	EPA 6020
	Magnesium	51.0	0.050	0.150	NE		J	095573-010	EPA 6020
	Manganese	0.00357	0.001	0.005	NE	B, J	0.012UJ	095573-010	EPA 6020
	Mercury	ND	0.000067	0.0002	0.002	U		095573-010	EPA 7470
	Nickel	0.0069	0.0005	0.002	NE			095573-010	EPA 6020
	Potassium	11.6	0.080	0.300	NE			095573-010	EPA 6020
	Selenium	0.0285	0.0015	0.005	0.050			095573-010	EPA 6020
	Silver	ND	0.0002	0.001	NE	U		095573-010	EPA 6020
	Sodium	169	0.800	2.50	NE			095573-010	EPA 6020
	Thallium	ND	0.00045	0.002	0.002	U		095573-010	EPA 6020
	Vanadium	ND	0.001	0.005	NE	U		095573-010	EPA 6010
	Zinc	0.00465	0.0035	0.010	NE	J		095573-010	EPA 6020

Table III-12 (Continued)
Summary of Filtered Total Metal Results
SWMU 149 Groundwater Monitoring
Quarterly Assessment, January – March 2014

Well	Analyte	Result (mg/L)	MDL (mg/L)	PQL (mg/L)	MCL (mg/L)	Laboratory Qualifier ^a	Validation Qualifier ^b	Sample Number	Analytical Method ^c
CTF-MW3 (Duplicate Reanalysis) 14-Mar-14	Aluminum	ND	0.015	0.050	NE	U		095573-R10	EPA 6020
	Antimony	ND	0.001	0.003	0.006	U	UJ	095573-R10	EPA 6020
	Arsenic	ND	0.0017	0.005	0.010	U		095573-R10	EPA 6020
	Barium	0.0304	0.0006	0.002	2.00		J	095573-R10	EPA 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		095573-R10	EPA 6020
	Cadmium	ND	0.00011	0.001	0.005	U		095573-R10	EPA 6020
	Calcium	219	0.600	2.00	NE	B		095573-R10	EPA 6020
	Chromium	ND	0.002	0.010	0.100	U		095573-R10	EPA 6020
	Cobalt	0.000230	0.0001	0.001	NE	J		095573-R10	EPA 6020
	Copper	0.00175	0.00035	0.001	NE		0.0035UJ	095573-R10	EPA 6020
	Iron	0.253	0.033	0.100	NE	B		095573-R10	EPA 6020
	Lead	ND	0.0005	0.002	NE	U		095573-R10	EPA 6020
	Magnesium	58.3	0.100	0.300	NE			095573-R10	EPA 6020
	Manganese	0.00138	0.001	0.005	NE	B, J	0.0065U	095573-R10	EPA 6020
	Nickel	0.003	0.0005	0.002	NE		J-	095573-R10	EPA 6020
	Potassium	13.5	0.800	3.00	NE			095573-R10	EPA 6020
	Selenium	0.0271	0.0015	0.005	0.050			095573-R10	EPA 6020
	Silver	ND	0.0002	0.001	NE	U		095573-R10	EPA 6020
	Sodium	194	0.800	2.50	NE			095573-R10	EPA 6020
	Thallium	ND	0.00045	0.002	0.002	U		095573-R10	EPA 6020
	Zinc	0.00531	0.0035	0.010	NE	J		095573-R10	EPA 6020

Table III-12 (Concluded)
Summary of Filtered Total Metal Results
SWMU 149 Groundwater Monitoring
Quarterly Assessment, January – March 2014

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 value is an estimated quantity.
- J- = The associated numerical value is an estimated quantity with a suspected negative bias.
- U = The analyte was analyzed for, but was not detected. The associated numerical value is the sample quantitation limit.
- UJ = The analyte was analyzed for, but was not detected. The associated value is an estimate and may be inaccurate or imprecise.

^cAnalytical Method

U.S. Environmental Protection Agency, 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, January – March 2014

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 18-Mar-14	Aluminum	0.108	0.015	0.050	NE			095579-009	EPA 6020
	Antimony	ND	0.001	0.003	0.006	U		095579-009	EPA 6020
	Arsenic	0.0365	0.0017	0.005	0.010			095579-009	EPA 6020
	Barium	0.0768	0.0006	0.002	2.00	B		095579-009	EPA 6020
	Beryllium	0.00212	0.0002	0.0005	0.004			095579-009	EPA 6020
	Cadmium	ND	0.00011	0.001	0.005	U		095579-009	EPA 6020
	Calcium	335	0.600	2.00	NE			095579-009	EPA 6020
	Chromium	ND	0.002	0.010	0.100	U		095579-009	EPA 6020
	Cobalt	0.00871	0.0001	0.001	NE			095579-009	EPA 6020
	Copper	0.00121	0.00035	0.001	NE		0.0040UJ	095579-009	EPA 6020
	Iron	2.68	0.033	0.100	NE			095579-009	EPA 6020
	Lead	ND	0.0005	0.002	NE	U		095579-009	EPA 6020
	Magnesium	77.4	0.100	0.300	NE			095579-009	EPA 6020
	Manganese	2.85	0.050	0.250	NE		J	095579-009	EPA 6020
	Mercury	ND	0.000067	0.0002	0.002	U		095579-009	EPA 7470
	Nickel	0.0179	0.0005	0.002	NE			095579-009	EPA 6020
	Potassium	43.6	0.080	0.300	NE			095579-009	EPA 6020
	Selenium	ND	0.0015	0.005	0.050	U		095579-009	EPA 6020
	Silver	ND	0.0002	0.001	NE	U		095579-009	EPA 6020
	Sodium	465	4.00	12.5	NE			095579-009	EPA 6020
	Thallium	0.00154	0.00045	0.002	0.002	J		095579-009	EPA 6020
	Uranium	0.0257	0.000067	0.0002	0.03			095579-009	EPA 6020
	Vanadium	ND	0.001	0.005	NE	U		095579-009	EPA 6010B
	Zinc	0.230	0.0175	0.050	NE			095579-009	EPA 6020

Table III-13 (Continued)
Summary of Unfiltered Total Metal Results
SWMU 154 Groundwater Monitoring
Quarterly Assessment, January – March 2014

Well	Analyte	Result (mg/L)	MDL (mg/L)	PQL (mg/L)	MCL (mg/L)	Laboratory Qualifier ^a	Validation Qualifier ^b	Sample Number	Analytical Method ^c
CTF-MW2 (Duplicate) 18-Mar-14	Aluminum	0.114	0.015	0.050	NE			095580-009	EPA 6020
	Antimony	ND	0.001	0.003	0.006	U		095580-009	EPA 6020
	Arsenic	0.0355	0.0017	0.005	0.010			095580-009	EPA 6020
	Barium	0.0825	0.0006	0.002	2.00	B		095580-009	EPA 6020
	Beryllium	0.00217	0.0002	0.0005	0.004			095580-009	EPA 6020
	Cadmium	ND	0.00011	0.001	0.005	U		095580-009	EPA 6020
	Calcium	354	0.600	2.00	NE			095580-009	EPA 6020
	Chromium	ND	0.002	0.010	0.100	U		095580-009	EPA 6020
	Cobalt	0.00872	0.0001	0.001	NE			095580-009	EPA 6020
	Copper	0.00139	0.00035	0.001	NE		0.0040UJ	095580-009	EPA 6020
	Iron	2.67	0.033	0.100	NE			095580-009	EPA 6020
	Lead	ND	0.0005	0.002	NE	U		095580-009	EPA 6020
	Magnesium	83.6	0.100	0.300	NE			095580-009	EPA 6020
	Manganese	2.84	0.050	0.250	NE		J	095580-009	EPA 6020
	Mercury	ND	0.000067	0.0002	0.002	U		095580-009	EPA 7470
	Nickel	0.0171	0.0005	0.002	NE			095580-009	EPA 6020
	Potassium	42.4	0.080	0.300	NE			095580-009	EPA 6020
	Selenium	ND	0.0015	0.005	0.050	U		095580-009	EPA 6020
	Silver	ND	0.0002	0.001	NE	U		095580-009	EPA 6020
	Sodium	475	4.00	12.5	NE			095580-009	EPA 6020
	Thallium	0.00131	0.00045	0.002	0.002	J		095580-009	EPA 6020
	Uranium	0.0254	0.000067	0.0002	0.03			095580-009	EPA 6020
	Vanadium	ND	0.001	0.005	NE	U		095580-009	EPA 6010B
	Zinc	0.227	0.0175	0.050	NE			095580-009	EPA 6020

Table III-13 (Concluded)
Summary of Unfiltered Total Metal Results
SWMU 154 Groundwater Monitoring
Quarterly Assessment, January – March 2014

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 value is an estimated quantity.

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, January – March 2014

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 18-Mar-14	Aluminum	0.103	0.015	0.050	NE			095579-010	EPA 6020
	Antimony	ND	0.001	0.003	0.006	U		095579-010	EPA 6020
	Arsenic	0.0365	0.0017	0.005	0.010			095579-010	EPA 6020
	Barium	0.0813	0.0006	0.002	2.00	B		095579-010	EPA 6020
	Beryllium	0.00215	0.0002	0.0005	0.004			095579-010	EPA 6020
	Cadmium	ND	0.00011	0.001	0.005	U		095579-010	EPA 6020
	Calcium	357	0.600	2.00	NE			095579-010	EPA 6020
	Chromium	ND	0.002	0.010	0.100	U		095579-010	EPA 6020
	Cobalt	0.00892	0.0001	0.001	NE			095579-010	EPA 6020
	Copper	0.00108	0.00035	0.001	NE		J-	095579-010	EPA 6020
	Iron	2.71	0.033	0.100	NE			095579-010	EPA 6020
	Lead	ND	0.0005	0.002	NE	U		095579-010	EPA 6020
	Magnesium	84.4	0.100	0.300	NE			095579-010	EPA 6020
	Manganese	2.91	0.050	0.250	NE		J	095579-010	EPA 6020
	Mercury	ND	0.000067	0.0002	0.002	U		095579-010	EPA 7470
	Nickel	0.018	0.0005	0.002	NE			095579-010	EPA 6020
	Potassium	43.3	0.080	0.300	NE			095579-010	EPA 6020
	Selenium	ND	0.0015	0.005	0.050	U		095579-010	EPA 6020
	Silver	ND	0.0002	0.001	NE	U		095579-010	EPA 6020
	Sodium	518	4.00	12.5	NE			095579-010	EPA 6020
	Thallium	0.0014	0.00045	0.002	0.002	J		095579-010	EPA 6020
	Uranium	0.0264	0.000067	0.0002	0.03			095579-010	EPA 6020
	Vanadium	ND	0.001	0.005	NE	U		095579-010	EPA 6010B
	Zinc	0.221	0.0175	0.050	NE			095579-010	EPA 6020

Table III-14 (Continued)
Summary of Filtered Total Metal Results
SWMU 154 Groundwater Monitoring
Quarterly Assessment, January – March 2014

Well	Analyte	Result (mg/L)	MDL (mg/L)	PQL (mg/L)	MCL (mg/L)	Laboratory Qualifier ^a	Validation Qualifier ^b	Sample Number	Analytical Method ^c
CTF-MW2 (Duplicate) 18-Mar-14	Aluminum	0.104	0.015	0.050	NE			095580-010	EPA 6020
	Antimony	ND	0.001	0.003	0.006	U		095580-010	EPA 6020
	Arsenic	0.0329	0.0017	0.005	0.010			095580-010	EPA 6020
	Barium	0.0814	0.0006	0.002	2.00	B		095580-010	EPA 6020
	Beryllium	0.00201	0.0002	0.0005	0.004			095580-010	EPA 6020
	Cadmium	ND	0.00011	0.001	0.005	U		095580-010	EPA 6020
	Calcium	349	0.600	2.00	NE			095580-010	EPA 6020
	Chromium	ND	0.002	0.010	0.100	U		095580-010	EPA 6020
	Cobalt	0.00828	0.0001	0.001	NE			095580-010	EPA 6020
	Copper	0.00132	0.00035	0.001	NE		J-	095580-010	EPA 6020
	Iron	2.64	0.033	0.100	NE			095580-010	EPA 6020
	Lead	ND	0.0005	0.002	NE	U		095580-010	EPA 6020
	Magnesium	84.6	0.100	0.300	NE			095580-010	EPA 6020
	Manganese	2.84	0.050	0.250	NE		J	095580-010	EPA 6020
	Mercury	ND	0.000067	0.0002	0.002	U		095580-010	EPA 7470
	Nickel	0.0171	0.0005	0.002	NE			095580-010	EPA 6020
	Potassium	43.9	0.080	0.300	NE			095580-010	EPA 6020
	Selenium	ND	0.0015	0.005	0.050	U		095580-010	EPA 6020
	Silver	ND	0.0002	0.001	NE	U		095580-010	EPA 6020
	Sodium	498	4.00	12.5	NE			095580-010	EPA 6020
	Thallium	0.00128	0.00045	0.002	0.002	J		095580-010	EPA 6020
	Uranium	0.0248	0.000067	0.0002	0.03			095580-010	EPA 6020
	Vanadium	ND	0.001	0.005	NE	U		095580-010	EPA 6010B
	Zinc	0.215	0.0175	0.050	NE			095580-010	EPA 6020

Table III-14 (Concluded)
Summary of Filtered Total Metal Results
SWMU 154 Groundwater Monitoring
Quarterly Assessment, January – March 2014

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 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, January – March 2014

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 18-Mar-14	Americium-241	2.46 ± 10.3	16.1	7.87	NE	U	BD	095579-033	EPA 901.1
	Cesium-137	-1.43 ± 4.28	3.89	1.88	NE	U	BD	095579-033	EPA 901.1
	Cobalt-60	-1.53 ± 2.00	3.09	1.45	NE	U	BD	095579-033	EPA 901.1
	Potassium-40	39.4 ± 43.6	32.6	15.4	NE	X	R	095579-033	EPA 901.1
	Gross Alpha	6.99	NA	NA	15 pCi/L	NA	None	095579-034	EPA 900.0
	Gross Beta	65.2 ± 13.2	9.39	4.53	4mrem/yr			095579-034	EPA 900.0
	Uranium-233/234	57.2 ± 7.12	0.0701	0.0293	NE			095579-035	HASL-300
	Uranium-235/236	0.633 ± 0.139	0.0669	0.0264	NE			095579-035	HASL-300
	Uranium-238	8.38 ± 1.10	0.0655	0.027	NE			095579-035	HASL-300
CTF-MW2 (Duplicate) 18-Mar-14	Americium-241	4.19 ± 6.53	9.54	4.67	NE	U	BD	095580-033	EPA 901.1
	Cesium-137	-2.25 ± 2.77	2.87	1.38	NE	U	BD	095580-033	EPA 901.1
	Cobalt-60	1.09 ± 1.70	3.05	1.44	NE	U	BD	095580-033	EPA 901.1
	Potassium-40	39.2 ± 41.7	27.1	12.7	NE	X	R	095580-033	EPA 901.1
	Gross Alpha	7.63	NA	NA	15 pCi/L	NA	None	095580-034	EPA 900.0
	Gross Beta	63.2 ± 12.9	9.32	4.49	4mrem/yr			095580-034	EPA 900.0
	Uranium-233/234	60.5 ± 8.55	0.105	0.0437	NE			095580-035	HASL-300
	Uranium-235/236	0.585 ± 0.159	0.0998	0.0393	NE			095580-035	HASL-300
	Uranium-238	8.69 ± 1.30	0.0977	0.0403	NE			095580-035	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.

^cLaboratory Qualifier

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

NA = Not applicable.

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

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

Table III-15 (Concluded)
Summary of Gamma Spectroscopy, Gross Alpha, Gross Beta, and Isotopic Uranium Results
SWMU 154 Groundwater Monitoring
Quarterly Assessment, January – March 2014

Notes (continued)

^dValidation Qualifier

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

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

None = No data validation for corrected gross alpha activity.

R = The data are unusable. Resampling and reanalysis are necessary for verification.

^eAnalytical Method

U.S. 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.

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 March 2014

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	18-Mar-14	Arsenic—Filtered	0.0365 mg/L	0.010 mg/L			095579-010	EPA 6020
CTF-MW2 (Duplicate)	18-Mar-14	Arsenic—Filtered	0.0329 mg/L	0.010 mg/L			095580-010	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 March 2014

Well	Date	Analyte	Result	MCL	Laboratory Qualifier ^a	Validation Qualifier ^b	Sample Number	Analytical Method ^c
SWMU 154								
CTF-MW2	18-Mar-14	Arsenic—Unfiltered	0.0365 mg/L	0.010 mg/L			095579-009	EPA 6020
CTF-MW2 (Duplicate)	18-Mar-14	Arsenic—Unfiltered	0.0355 mg/L	0.010 mg/L			095580-009	EPA 6020
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.

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

Well/Parameter	Groundwater Sample (R1)	Duplicate Sample (R2)	RPD ⁱ
	mg/L unless otherwise noted		
CTF-MW3			
Bromodichloromethane	0.570	0.590	3
Chloroform	0.760	0.730	4
Dibromochloromethane	0.490	0.480	2
Nitrate plus Nitrite	6.35	6.38	< 1
Bicarbonate Alkalinity	319	321	1
Bromide	1.18	1.18	< 1
Chloride	124	120	3
Fluoride	2.37	2.35	1
Sulfate	515	495	4
Aluminum	1.38	0.0348	190
Barium	0.366	0.0303	19
Calcium	212	195	8
Chromium	0.00419	0.00247	52
Cobalt	0.000757	0.000451	51
Iron	1.28	0.759	51
Magnesium	43.7	45.2	3
Nickel	0.00695	0.00701	1
Potassium	11.3	11.2	1
Selenium	0.0276	0.0269	3
Sodium	157	156	1
Zinc	0.00958	0.00502	62
Filtered Barium	0.0313	0.0305	3
Filtered Calcium	200	207	3
Filtered Cobalt	0.000416	0.000462	10
Filtered Iron	0.599	0.799	29
Filtered Magnesium	48.8	51.0	4
Filtered Nickel	0.00579	0.0069	17
Filtered Potassium	11.9	11.6	3
Filtered Selenium	0.0269	0.0285	6
Filtered Sodium	171	169	1
Filtered Zinc	0.00466	0.00465	< 1

Table III-17 (Continued)
Summary of Duplicate Samples
SWMUs 149 and 154 Groundwater Monitoring
Quarterly Assessments, January – March 2014

Well/Parameter	Environmental Sample (R1)	Duplicate Sample (R2)	RPD ⁱ
	mg/L unless otherwise noted		
CTF-MW2 – Reanalysis			
Aluminum	2.74	0.042	194
Barium	0.0483	0.0309	44
Calcium	182	210	14
Cobalt	0.00114	0.00251	75
Iron	2.42	0.316	154
Magnesium	45.2	55.8	21
Nickel	0.00796	0.00353	77
Potassium	11.3	13.0	14
Selenium	0.0282	0.0272	4
Sodium	150	186	21
Filtered Barium	0.0301	0.0304	1
Filtered Calcium	201	219	9
Filtered Cobalt	0.000236	0.000230	3
Filtered Iron	0.260	0.253	3
Filtered Magnesium	52.1	58.3	11
Filtered Nickel	0.00302	0.003	1
Filtered Potassium	12.2	13.5	10
Filtered Selenium	0.0273	0.0271	1
Filtered Sodium	174	194	11
Filtered Zinc	0.00529	0.00531	< 1

Table III-17 (Continued)
Summary of Duplicate Samples
SWMUs 149 and 154 Groundwater Monitoring
Quarterly Assessments, January – March 2014

Well/Parameter	Environmental Sample (R1)	Duplicate Sample (R2)	RPD ⁱ
	mg/L unless otherwise noted		
CTF-MW2			
RDX (µg/L)	0.267	0.340	24
Bicarbonate Alkalinity	1440	1410	2
Bromide	1.76	1.69	4
Chloride	468	460	2
Fluoride	2.42	2.37	2
Sulfate	149	148	1
Aluminum	0.108	0.114	5
Arsenic	0.0365	0.0355	3
Barium	0.0768	0.0825	7
Beryllium	0.00212	0.00217	2
Calcium	335	354	6
Cobalt	0.00871	0.00872	< 1
Iron	2.68	2.67	< 1
Magnesium	77.4	83.6	8
Manganese	2.85	2.84	< 1
Nickel	0.0179	0.0171	5
Potassium	43.6	42.4	3
Sodium	465	475	2
Thallium	0.00154	0.00131	16
Uranium	0.0257	0.0254	1
Zinc	0.230	0.227	1
Filtered Aluminum	0.103	0.104	1
Filtered Arsenic	0.0365	0.0329	10
Filtered Barium	0.0813	0.0814	< 1
Filtered Beryllium	0.00215	0.00201	7
Filtered Calcium	357	349	2
Filtered Cobalt	0.00892	0.00828	7
Filtered Copper	0.00108	0.00132	20
Filtered Iron	2.71	2.64	3
Filtered Magnesium	84.4	84.6	< 1
Filtered Manganese	2.91	2.84	2
Filtered Nickel	0.018	0.0171	5
Filtered Potassium	43.3	43.9	1
Filtered Sodium	518	498	4
Filtered Thallium	0.0014	0.00128	9
Filtered Uranium	0.0264	0.0248	6
Filtered Zinc	0.221	0.215	3

Table III-17 (Concluded)
Summary of Duplicate Samples
SWMUs 149 and 154 Groundwater Monitoring
Quarterly Assessments, January – March 2014

Notes

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

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

where: R_1 = analysis result.
 R_2 = duplicate analysis result.

$\mu\text{g/L}$ = Micrograms per liter.
CTF = Coyote Test Field.
 mg/L = Milligrams per liter.
MW = Monitoring well.
RDX = Hexahydro-1,3,5-trinitro-1,3,5-triazine.
SWMU = Solid Waste Management Unit.

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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: TAG SWMU			SNL/NM Project No.: 146422.10.11.01		
Calibrations done by: R Lynch			Date: 3/14/14		
Make & Model: YSI EXO 1					
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:	0641	3.99	18.6	7.00	18.6
2. Time:	1105	4.01	18.8	7.00	18.7
3. Time:					
4. Time:					
Standard lot no.:	3AD782		3AE725		3AD357
Expiration date:	4/15		5/15		4/15
SC Calibration					
Reference Value: 1225 uS			Standard Lot No.: 3AE221		
	Value	Temp	Expiration Date: 5/15		
1. Time:	0643	1221			
2. Time:	1107	1224			
3. Time:					
4. Time:					
ORP Calibration					
Reference Value: 220 mV			Standard Lot No. 4AA010		
	Value	Temp	Expiration Date: 7/14		
1. Time:	0642	219.8			
2. Time:	1106	220.1			
3. Time:					
4. Time:					
DO Calibration					
Calibration Value:	81% air saturation @ 5200 ft.		Atmospheric Pressure in Hg		
1. Time:	0640	81.9	24.51		
2. Time:	1104	81.6	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: FAO SWM4		Project No.: 146422.10.11.01		
Calibration done by: R Lynch		Date: 3/14/14		
TURBIDIMETER				
Make & Model: HACH 2100P HACH 2100Q		Serial No. S/N 10060C003010		
Reference Value	25.1 10	20	100	800
Standard Lot No.	0161	0167	0168	0161
1. Time 0800	10.2	19.7	103	799
2. Time 0956	9.98	19.4	101	803
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>3-14-14</u>
The following equipment was decontaminated at completion of sampling activities in accordance with FOP-05-03		
Pump and Tubing Bundle ID #: <u>1807-70</u>	Water Level Indicator ID #: <u>210269</u>	
Personnel Performing Decontamination:		
<u>William Gibson</u> Print Name: <u>WJG</u> Initial:	<u>William Gibson</u> Print Name: <u>WJG</u> Initial:	
<u>Alfred Santillanes</u> Print Name: <u>AS</u> Initial:	<u>Alfred Santillanes</u> 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		
Distilled or Deionized (circle one)	HNO₃	
Source: <u>Culligan</u>	Grade: <u>Reagent</u>	
Lot Number: _____	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-MW3-031414-01	SWMU- CTF-MW3-031414-02	SWMU- 031414
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	~ 29 gal.	~ 13 gal.	~ 30 gal.
Total Container Weight	~ 230 lbs.	~ 100 lbs.	~ 240 lbs.
COC#: Sample#-Fraction	<u>CoC# 615415</u> <u>Sample # 095572, 095573</u>	<u>CoC# 615415</u> <u>Sample # 095572, 095573</u>	<u>CoC# 615415</u> <u>Sample # 095572, 095573</u>
Accumulation Date	Start: 03/14/14 Full: 03/14/14	Start: 03/14/14 Full: 03/14/14	Start: 03/14/14 Full: 03/14/14
Date Waste Moved to Accumulation Area	03/14/14	03/14/14	03/14/14
Accumulation Area Name	9925	9925	9925
Comments:			

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TAILGATE SAFETY MEETING FORM

Dept: 4142 Well Location: CTF-MW3 Date: 3/14/14 Time: 0756

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: 57.7 °F Wind Speed: 0 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 T Lynch
Printed Name

William Gibson
Printed Name

ALFRED SANTILLANES
Printed Name

Printed Name

Printed Name

Robert Lynch
Signature

William Gibson
Signature

Alfred Santillanes
Signature

Signature

Signature

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GROUNDWATER SAMPLE COLLECTION FIELD EQUIPMENT CHECK LOG

Page 1 of 2

SNL/NM Project Name: TAO Swmu 154			SNL/NM Project No.: 146422.10.11.01		
Calibrations done by: R Lynch			Date: 3/18/14		
Make & Model: YSI EXO 1					
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:	0633	4.02	19.4	7.00	19.4
2. Time:	1320	4.01	19.2	7.00	19.2
3. Time:					
4. Time:					
Standard lot no.:	3AD782		3AE725		3AD357
Expiration date:	4/15		5/15		4/15
SC Calibration					
Reference Value: 1225 uS			Standard Lot No.: 3AE221		
	Value	Temp	Expiration Date: 5/15		
1. Time:	0635	1224	19.4		
2. Time:	1322	1220	19.3		
3. Time:					
4. Time:					
ORP Calibration					
Reference Value: 220 mV			Standard Lot No. 4AA010		
	Value	Temp	Expiration Date: 7/14		
1. Time:	0634	220.2	19.4		
2. Time:	1321	219.8	19.2		
3. Time:					
4. Time:					
DO Calibration					
Calibration Value:	81% air saturation @ 5200 ft.		Atmospheric Pressure in Hg		
1. Time:	0632	81.7	24.50		
2. Time:	1319	81.8	24.54		
3. Time:					
4. Time:					

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

SNL/NM Project Name: TAG SWmu 154		Project No.: 146422.10.11.01		
Calibration done by: R Lynch		Date: 3/18/14		
TURBIDIMETER				
Make & Model: HACH 2100P HACH 2100Q		Serial No. S/N 10060C003010		
Reference Value	10 10	20	100	800
Standard Lot No.	0161	0167	0168	0161
1. Time 0750	9.96	19.9	104	802
2. Time 1015	9.94	19.7	103	806
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>03-17-14</u>
The following equipment was decontaminated at completion of sampling activities in accordance with FOP-05-03		
Pump and Tubing Bundle ID #: <u>1807-32</u>	Water Level Indicator ID #: <u>N/A</u>	
<u>Personnel Performing Decontamination:</u> <u>Alfred Santillanes</u> Print Name: Initial: <u>AS</u> <u>Robert Lynch</u> Print Name: Initial: <u>RL</u>		<u>Personnel Performing Decontamination:</u> <u>N/A</u> Print Name: Initial: <u> </u> <u>N/A</u> Print Name: Initial: <u> </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 Deionized (circle one) Source: <u>Culligan</u> Lot Number: <u>03/03/14</u>	HNO₃ 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 154 GWM</u>	Monitoring Well ID #: <u>CTF-MW2</u>	Date: <u>03-18-14</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>62197</u>	
<u>Personnel Performing Decontamination:</u> <u>Robert Lynch</u> <u>RL</u> Print Name: Initial: <u>Tim Jackson</u> <u>TJ</u> Print Name: Initial:		<u>Personnel Performing Decontamination:</u> <u>Robert T Lynch</u> <u>RL</u> Print Name: Initial: _____ 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 Deionized (circle one) Source: <u>Culligan</u> Lot Number: <u>031714</u>	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>Robert Lynch</u> Phone: <u>250-7090</u> project leader: <u>Clinton Lum</u>			
Project Name	SWMU-154		
Container ID # (site-date-sequence)	SWMU-031714		
Initial Label Type (Hazardous or Non-Regulated)	Non- Regulated		
Waste Matrix (purge water, decon water, HACH Accu-Vac ampule)	Decon Water		
Container Type / Volume	CHPD/ 55 gal.		
Volume of Waste	~ 30 gal.		
Total Container Weight	~ 240 lbs.		
COC#: Sample#-Fraction	<u>COC# 615416</u> <u>Sample # 095575</u>		
Accumulation Date	Start: 03/17/14 Full: 03/17/14	Start: Full:	Start: Full:
Date Waste Moved to Accumulation Area	03/17/14		
Accumulation Area Name	9925		
Comments:	EB prior to CTF-MW2		

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Groundwater Monitoring Waste Generation Log

Waste Generator : <u>Robert Lynch</u> Phone: <u>250-7090</u> project leader: <u>Clinton Lum</u>			
Project Name	SWMU 154	SWMU 154	SWMU 154
Container ID # (site-date-sequence)	CTF-MW2-031814-01	CTF-MW2-031814-02	SWMU154-031814
Initial Label Type (Hazardous or Non-Regulated)	non-Hazardous	non-Hazardous	non-Hazardous
Waste Matrix (purge water, decon water, HACH Accu-Vac ampule)	Purge Water	Purge Water	Decon Water
Container Type / Volume	55 gal CHPD	55 gal CHPD	55 gal CHPD
Volume of Waste	24	24	30
Total Container Weight	190 ILBS	190 ILBS	240 ILBS
COC#: Sample#-Fraction	615417/615419 095579, 095580 _____ _____ _____ _____ _____	615417/615419 095579, 095580 _____ _____ _____ _____ _____	615417/615419 095579, 095580 _____ _____ _____ _____ _____
Accumulation Date	Start: 03-18-14 Full: 03-18-14	Start: 03-18-14 Full: 03-18-14	Start: 03-18-14 Full: 03-18-14
Date Waste Moved to Accumulation Area	03-18-14	03-18-14	03-18-14
Accumulation Area Name	9925	9925	9925
Comments:			

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TAILGATE SAFETY MEETING FORM

Dept: 4142 Well Location: CTF-MW 2 Date: 3/18/14 Time: 0745

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: 44.1 °F Wind Speed: 20 MPH Humidity: 29.1 % Wind Chill 30 °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 T Lynch
Printed Name

Tim Jackson
Printed Name

Printed Name

Printed Name

Printed Name

Robert T Lynch
Signature

T. Jackson
Signature

Signature

Signature

Signature

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Appendix B

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

CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY

Internal Lab

Page 1 of 2

Batch No. <i>N/A</i>		SMO Use <i>3/14/14</i>		AR/COC 615415								
Project Name: SWMU 149 GWM		Date Samples Shipped: <i>3/14/14</i>		SMO Authorization: <i>[Signature]</i>								
Project/Task Manager: Clinton Lum		Carrier/Waybill No.		SMO Contact Phone: <i>910</i>								
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								
Tech Area:				<input type="checkbox"/> Waste Characterization <input type="checkbox"/> RMMA <input type="checkbox"/> Released by COC No. <input checked="" type="checkbox"/> 4° Celsius								
Building:		Room:		Bill to: Sandia National Laboratories (Accounts Payable), P.O. Box 5800, MS-0154 Albuquerque, NM 87185-0154								
Operational Site:												
Sample No.	Fraction	Sample Location Detail	Depth (ft)	Date/Time Collected	Sample Matrix	Container Type	Volume	Preservative	Collection Method	Sample Type	Parameter & Method Requested	Lab Sample ID
095571	-001	CTF-FB2	NA	3/14/14 9:48	DIW	G	3x40ml	HCL	G	FB	TCL VOC (SW846-8260B)	
095571	-009	CTF-FB2	NA	3/14/14 9:48	DIW	P	500 ml	HNO3	G	FB	TAL Metals (SW846-6010/6020/7470)	
095571	-010	CTF-FB2	NA	3/14/14 9:48	FDIW	P	500 ml	HNO3	G	FB	TAL Metals (SW846-6010/6020/7470)	
095572	-001	CTF-MW3	359	3/14/14 9:48	GW	G	3x40ml	HCL	G	SA	TCL VOC (SW846-8260B)	
095572	-009	CTF-MW3	359	3/14/14 9:50	GW	P	500 ml	HNO3	G	SA	TAL Metals (SW846-6010/6020/7470)	
095572	-010	CTF-MW3	359	3/14/14 9:53	FGW	P	500 ml	HNO3	G	SA	TAL Metals (SW846-6010/6020/7470)	
095572	-016	CTF-MW3	359	3/14/14 9:54	GW	P	125 ml	None	G	SA	Anions (SW846-9056)	
095572	-018	CTF-MW3	359	3/14/14 9:55	GW	P	125 ml	H2SO4	G	SA	Nitrate + Nitrite (EPA 353.2)	
095572	-020	CTF-MW3	359	3/14/14 9:56	GW	P	250 ml	None	G	SA	Perchlorate (EPA 314.0)	
095572	-022	CTF-MW3	359	3/14/14 9:57	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			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 If Perchlorate detected, then perform verification analysis using SW846-6850M. Report Anions as Br, Cl, F, SO4. Report Alkalinity as total CaCO3, HCO3, CO3.			
Sample Team Members	Name	Signature	Init.	Company/Organization/Phone/Cell								
	Robert Lynch	<i>[Signature]</i>	RL	SNL/4142/505-844-4013/505-250-7090								
	Alfred Santillanes	<i>[Signature]</i>		SNL/4142/505-844-5130/505-228-0710								
	William Gibson	<i>[Signature]</i>		SNL/4142/505-284-3307/505-239-7367								
1. Relinquished by <i>[Signature]</i> Org. <i>9142</i> Date <i>3/14/14</i> Time <i>1050</i>												
1. Received by <i>[Signature]</i> Org. <i>4142</i> Date <i>3/14/14</i> Time <i>1050</i>												
2. Relinquished by Org. Date Time												
2. Received by Org. Date Time												
3. Relinquished by Org. Date Time												
3. Received by Org. Date Time												
4. Relinquished by Org. Date Time												
4. Received by Org. Date Time												

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

[illegible]

CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY

Page 1 of 1

Internal Lab

Batch No. *NA*

SMO Use

AR/COC **615414**

Project Name: SWMU 149 GWM	Date Samples Shipped: 3/14/14	SMO Authorization: <i>[Signature]</i>	<input type="checkbox"/> Waste Characterization
Project/Task Manager: Clinton Lum	Carrier/Waybill No.	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.
Service Order: CF352-14	Lab Destination: GEL	Send Report to SMO:	<input checked="" type="checkbox"/> 4° Celsius
	Contract No.: PO 1303873	Rita Kavanaugh/505-284-2553	

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

Sample No.	Fraction	Sample Location Detail	Depth (ft)	Date/Time Collected	Sample Matrix	Container Type	Volume	Preservative	Collection Method	Sample Type	Parameter & Method Requested	Lab Sample ID
095568	-001	CTF-FB1	NA	3/13/14 13:05	DIW	G	3x40ml	HCL	G	FB	TCL VOC (SW846-8260B)	
065569	-001	CTF-EB1	NA	3/13/14 13:05	DIW	G	3x40ml	HCL	G	EB	TCL VOC (SW846-8260B)	
065569	-009	CTF-EB1	NA	3/13/14 13:06	DIW	P	500 ml	HNO3	G	EB	TAL Metals (SW846-6010/6020/7470)	
065569	-010	CTF-EB1	NA	3/13/14 13:08	FDIW	P	500 ml	HNO3	G	EB	TAL Metals (SW846-6010/6020/7470)	
065569	-016	CTF-EB1	NA	3/13/14 13:09	DIW	P	125 ml	None	G	EB	Anions (SW846-9056)	
065569	-018	CTF-EB1	NA	3/13/14 13:10	DIW	P	125 ml	H2SO4	G	EB	Nitrate + Nitrite (EPA 353.2)	
065569	-020	CTF-EB1	NA	3/13/14 13:11	DIW	P	250 ml	None	G	EB	Perchlorate (EPA 314.0)	
065569	-022	CTF-EB1	NA	3/13/14 13:12	DIW	P	500 ml	None	G	EB	Alkalinity (SM2320B)	
095570	-001	CTF-TB1	NA	3/13/14 13:05	DIW	G	3x40ml	HCL	G	TB	TCL VOC (SW846-8260B)	

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 initials:	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
	William Gibson	<i>[Signature]</i>	WG	SNL/4142/505-284-3367/505-233-7367	*Perchlorate detected, then perform verification analysis using SW846-6850M. Report Anions as Br, Cl, F, SO4. Report Alkalinity as total CaCO3, HCO3, CO3.

1. Relinquished by <i>[Signature]</i> Org. 4142	Date 3/14/14	Time 1044	3. Relinquished by	Org.	Date	Time
1. Received by <i>[Signature]</i> SMO Org. 4142	Date 3/14/14	Time 1044	3. Received by	Org.	Date	Time
2. Relinquished by	Org.	Date	Time	4. Relinquished by	Org.	Date
2. Received by	Org.	Date	Time	4. Received by	Org.	Date

*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. N/A

SMO Use

AR/COC **615417**

Project Name: SWMU 154 GWM	Date Samples Shipped: 3/18/14	SMO Authorization: <i>[Signature]</i>	<input type="checkbox"/> Waste Characterization
Project/Task Manager: Clinton Lum	Carrier/Waybill No.	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: CF353-14	Lab Destination: GEL	Send Report to SMO: Rita Kavanaugh/505-284-2553	
	Contract No.: PO 1303873		

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 Type	Volume	Preservative	Collection Method	Sample Type	Parameter & Method Requested	Lab Sample ID
095578	-001	CTF-FB4	NA	3/18/14 9:37	DIW	G	3x40ml	HCL	G	FB	TCL VOC (SW846-8260B)	
095579	-001	CTF-MW2	129	3/18/14 9:47	GW	G	3x40ml	HCL	G	SA	TCL VOC (SW846-8260B)	
095579	-002	CTF-MW2	129	3/18/14 9:50	GW	AG	4x1 L	None	G	SA	TCL SVOC (SW846-8270C)	
095579	-009	CTF-MW2	129	3/18/14 9:54	GW	P	500 ml	HNO3	G	SA	TAL Metals+U(SW846-6010/6020/7470)	
095579	-010	CTF-MW2	129	3/18/14 9:56	FGW	P	500 ml	HNO3	G	SA	TAL Metals+U(SW846-6010/6020/7470)	
095579	-016	CTF-MW2	129	3/18/14 9:58	GW	P	125 ml	None	G	SA	Anions (SW846-9056)	
095579	-018	CTF-MW2	129	3/18/14 10:00	GW	P	125 ml	H2SO4	G	SA	NPN (EPA 353.2)	
095579	-020	CTF-MW2	129	3/18/14 10:02	GW	P	250 ml	None	G	SA	Perchlorate (EPA 314.0)	
095579	-022	CTF-MW2	129	3/18/14 10:04	GW	P	500 ml	None	G	SA	Alkalinity (SM2320B)	
095579	-024	CTF-MW2	129	3/18/14 10:08	GW	AG	4x1 L	None	G	SA	High Explosives (SW846-8321A mod.)	

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 <input type="checkbox"/> Return to Client <input checked="" type="checkbox"/> Disposal by Lab		Lab Use
	Robert Lynch	<i>[Signature]</i>	RL	SNL/4142/505-844-4013/505-250-7090		Return Samples By:		
	Tim Jackson	<i>[Signature]</i>	TJ	SNL/4142/505-284-2547/505-263-6639		Comments: Send report to Tim Jackson/4142/MS 0729/284-2547		
						CTF-MW2 water has a 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>TJ Jackson</i>	Org. 4142	Date 3/18/14	Time 1055	3. Relinquished by	Org.	Date	Time
1. Received by <i>[Signature]</i>	Org. 4142	Date 3/18/14	Time 1055	3. Received by	Org.	Date	Time
2. Relinquished by <i>[Signature]</i>	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 **615417**

Project Name: SWMU 154 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
095579	-033	CTF-MW2	129	3/18/14 10:14	GW	P	1 L	HNO3	G	SA	Gamma Spectroscopy (EPA 901.0)	
095579	-034	CTF-MW2	129	3/18/14 10:16	GW	P	1 L	HNO3	G	SA	Gross Alpha and Beta (EPA 900.0)	
095579	-035	CTF-MW2	129	3/18/14 10:18	GW	P	1 L	HNO3	G	SA	Isotopic Uranium (HASL 300)	
095580	-001	CTF-MW2	129	3/18/14 9:48	GW	G	3x40ml	HCL	G	DU	TCL VOC (SW846-8260B)	
095580	-002	CTF-MW2	129	3/18/14 9:53	GW	AG	4x1 L	None	G	DU	TCL SVOC (SW846-8270C)	
095580	-009	CTF-MW2	129	3/18/14 9:55	GW	P	500 ml	HNO3	G	DU	TAL Metals+U(SW846-6010/6020/7470)	
095580	-010	CTF-MW2	129	3/18/14 9:57	FGW	P	500 ml	HNO3	G	DU	TAL Metals+U(SW846-6010/6020/7470)	
095580	-016	CTF-MW2	129	3/18/14 9:59	GW	P	125 ml	None	G	DU	Anions (SW846-9056)	
095580	-018	CTF-MW2	129	3/18/14 10:01	GW	P	125 ml	H2SO4	G	DU	NPN (EPA 353.2)	
095580	-020	CTF-MW2	129	3/18/14 10:03	GW	P	250 ml	None	G	DU	Perchlorate (EPA 314.0)	
095580	-022	CTF-MW2	129	3/18/14 10:05	GW	P	500 ml	None	G	DU	Alkalinity (SM2320B)	
095580	-024	CTF-MW2	129	3/18/14 10:11	GW	AG	4x1 L	None	G	DU	High Explosives (SW846-8321A mod.)	
095580	-033	CTF-MW2	129	3/18/14 10:15	GW	P	1 L	HNO3	G	DU	Gamma Spectroscopy (EPA 901.0)	
095580	-034	CTF-MW2	129	3/18/14 10:17	GW	P	1 L	HNO3	G	DU	Gross Alpha and Beta (EPA 900.0)	
095580	-035	CTF-MW2	129	3/18/14 10:19	GW	P	1 L	HNO3	G	DU	Isotopic Uranium (HASL 300)	
095581	-001	CTF-TB4	NA	3/18/14 9:37	DIW	G	3x40 ml	HCL	G	TB	TCL VOC (SW846-8260B)	

Recipient Initials _____

CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY

Internal Lab

Page 1 of 1Batch No. 116A

SMO Use

AR/COC **615419**

Project Name: SWMU 154 GWM	Date Samples Shipped: <u>3/18/14</u>	SMO Authorization: <u>[Signature]</u>	<input checked="" 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: <u>910</u>	
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: _____
 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					
095579	-011	CTF-MW2	NA	3/18/14 9:30	FPW	P	500 ml	HNO3	G	WC	Arsenic (SW846-6020)	

Last Chain: <input checked="" type="checkbox"/> Yes Validation Req'd: <input type="checkbox"/> Yes Background: <input type="checkbox"/> Yes Confirmatory: <input type="checkbox"/> Yes	Sample Tracking Date Entered: Entered by: QC initials:	SMO Use Special Instructions/QC Requirements: 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 Negotiated TAT Sample Disposal <input type="checkbox"/> Return to Client <input checked="" type="checkbox"/> Disposal by Lab	Conditions on Receipt Lab Use																							
Sample Team Members <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th>Name</th> <th>Signature</th> <th>Init.</th> <th>Company/Organization/Phone/Cell</th> </tr> <tr> <td>Robert Lynch</td> <td><u>[Signature]</u></td> <td>RL</td> <td>SNL/4142/505-844-4013/505-250-7090</td> </tr> <tr> <td>Tim Jackson</td> <td><u>[Signature]</u></td> <td>TJ</td> <td>SNL/4142/505-284-2547/505-263-6639</td> </tr> <tr><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td></tr> </table>	Name	Signature		Init.	Company/Organization/Phone/Cell	Robert Lynch	<u>[Signature]</u>	RL	SNL/4142/505-844-4013/505-250-7090	Tim Jackson	<u>[Signature]</u>	TJ	SNL/4142/505-284-2547/505-263-6639													Return Samples By: Comments: Send report to Tim Jackson/4142/MS 0729/284-2547 CTF-MW2 water has a high buffering capacity, please check pH and add preservatives as needed.
Name	Signature	Init.		Company/Organization/Phone/Cell																						
Robert Lynch	<u>[Signature]</u>	RL		SNL/4142/505-844-4013/505-250-7090																						
Tim Jackson	<u>[Signature]</u>	TJ	SNL/4142/505-284-2547/505-263-6639																							

1. Relinquished by <u>[Signature]</u>	Org. <u>4142</u> Date <u>3/18/14</u> Time <u>1100</u>	3. Relinquished by	Org. _____ Date _____ Time _____
1. Received by <u>[Signature]</u>	Org. <u>4142</u> Date <u>3/18/14</u> Time <u>1100</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

Page 1 of 2

Batch No.

SMO Use

AR/COC **615416**

Project Name: SWMU 154 GWM	Date Samples Shipped:	SMO Authorization: <i>Donalton</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					
095575	-001	CTF-FB3	NA	3/17/14 13:43	DIW	G	3x40ml	HCL	G	FB	TCL VOC (SW846-8260B)	
095575	-009	CTF-FB3	NA	3/17/14 13:44	DIW	P	500 ml	HNO3	G	FB	TAL Metals+U(SW846-6010/6020/7470)	
095575	-010	CTF-FB3	NA	3/17/14 13:46	FDIW	P	500 ml	HNO3	G	FB	TAL Metals+U(SW846-6010/6020/7470)	
095576	-001	CTF-EB2	NA	3/17/14 13:43	DIW	G	3x40ml	HCL	G	EB	TCL VOC (SW846-8260B)	
095576	-002	CTF-EB2	NA	3/17/14 13:48	DIW	AG	4x1 L	None	G	EB	TCL SVOC (SW846-8270D)	
095576	-009	CTF-EB2	NA	3/17/14 13:44	DIW	P	500 ml	HNO3	G	EB	TAL Metals+U(SW846-6010/6020/7470)	
095576	-010	CTF-EB2	NA	3/17/14 13:46	FDIW	P	500 ml	HNO3	G	EB	TAL Metals+U(SW846-6010/6020/7470)	
095576	-016	CTF-EB2	NA	3/17/14 13:49	DIW	P	125 ml	None	G	EB	Anions (SW846-9056)	
095576	-018	CTF-EB2	NA	3/17/14 13:50	DIW	P	125 ml	H2SO4	G	EB	NPN (EPA 353.2)	
095576	-020	CTF-EB2	NA	3/17/14 13:51	DIW	P	250 ml	None	G	EB	Perchlorate (EPA 314.0)	

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 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>Alfred Santillanes</i>	Org. 4142	Date 3/17/14	Time 14:18	3. Relinquished by	Org.	Date	Time
1. Received by <i>Donalton</i>	Org. 4142	Date 3/17/14	Time 14:18	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

[illegible]

Appendix C

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

Memorandum

Date: April 23, 2014
To: File
From: Linda Thal
Subject: Inorganic Data Review and Validation – SNL
Site: SWMU 149 GWM
AR/COC: 615414
SDG: 344709
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. It should be noted that the MS for all target analytes 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. It should be noted that the replicate for all target analytes 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 615414 is associated with samples submitted with AR/COC 615415.

No other specific issues that affect data quality were identified.

Reviewed by: Mary Donovan

Level: I

Date: 04/24/14

Date: April 23, 2014
To: File
From: Linda Thal
Subject: Inorganic Data Review and Validation – SNL
Site: SWMU 149 GWM
AR/COC: 615414
SDG: 344709
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 samples were prepared and analyzed with approved procedures using methods EPA 6010B (ICP-AES), EPA 6020 (ICP-MS) and EPA 7470A (CVAA). Data were reported for all required analytes. Problems were identified with the data package that resulted in the qualification of data.

ICP-MS:

1. Fe and Mn were detected at < the PQL in the MB. The associated results for sample -004 were detects <5X the MB values and will be **qualified 0.46U,B** and **0.012U,B** respectively at 5X the MB values.
2. The original Mn and Mg results for the serial dilution parent sample were >50X the MDL and the serial dilution %Ds were >10%. The Mn result for sample -004 was a detect and will be **qualified J,D1**. All remaining associated sample results were NDs and will be **qualified UJ,D1**.

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

Holding Times and Preservation

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

ICP-MS Instrument Tune

The ICP-MS tunes met QC acceptance criteria.

Calibration

All initial and continuing calibration met QC acceptance criteria.

Reporting Limit Verification

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

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

Blanks

No target analytes were detected in the blanks except as noted above in the Summary section and as follows. Fe and Mn were detected at < the PQL in the MB. The associated results for sample -003 were NDs 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. It should be noted that the MS was performed on an SNL sample of similar matrix from another SDG.

ICP-MS:

The parent sample concentrations for K, 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. It should be noted that the replicate was performed on an SNL sample of similar matrix from another SDG.

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

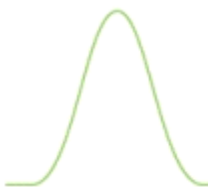
The serial dilutions met all QC acceptance criteria except as noted above in the Summary section. It should be noted that the serial dilution was performed on an SNL sample of similar matrix from another SDG.

Other QC

The EB submitted with AR/COC 615414 is associated with samples submitted with AR/COC 615415.

No other specific issues that affect data quality were identified.

Reviewed by: Mary Donovan **Level:** I **Date:** 04/24/14



Sample Findings Summary



AR/COC: 615416, 615417

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Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
DOE EML HASL-300, U-02-RC			
	095576-035/CTF-EB2	Uranium-233/234 (13968-55-3/13966-29-)	BD, FR3
	095576-035/CTF-EB2	Uranium-235/236 (15117-96-1/13982-70-)	BD, FR3
	095576-035/CTF-EB2	Uranium-238 (7440-61-1)	BD, FR3
EPA 900.0/SW846 9310			
	095576-034/CTF-EB2	ALPHA (12587-46-1)	BD, FR3
	095576-034/CTF-EB2	BETA (12587-47-2)	BD, FR3
	095579-034/CTF-MW2	ALPHA (12587-46-1)	J, FR7
EPA 901.1			
	095576-033/CTF-EB2	Americium-241 (14596-10-2)	BD, FR3
	095576-033/CTF-EB2	Cesium-137 (10045-97-3)	BD, FR3
	095576-033/CTF-EB2	Cobalt-60 (10198-40-0)	BD, FR3
	095576-033/CTF-EB2	Potassium-40 (13966-00-2)	BD, FR3
	095579-033/CTF-MW2	Americium-241 (14596-10-2)	BD, FR3
	095579-033/CTF-MW2	Cesium-137 (10045-97-3)	BD, FR3
	095579-033/CTF-MW2	Cobalt-60 (10198-40-0)	BD, FR3
	095579-033/CTF-MW2	Potassium-40 (13966-00-2)	R, Z2
	095580-033/CTF-MW2	Americium-241 (14596-10-2)	BD, FR3
	095580-033/CTF-MW2	Cesium-137 (10045-97-3)	BD, FR3
	095580-033/CTF-MW2	Cobalt-60 (10198-40-0)	BD, FR3
	095580-033/CTF-MW2	Potassium-40 (13966-00-2)	R, Z2
SW846 3005/6020 DOE-AL			
	095575-009/CTF-FB3	Manganese (7439-96-5)	J, MS1
	095575-010/CTF-FB3	Manganese (7439-96-5)	J, MS1
	095576-009/CTF-EB2	Manganese (7439-96-5)	J, MS1

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
	095576-010/CTF-EB2	Manganese (7439-96-5)	UJ, MS1
	095579-009/CTF-MW2	Copper (7440-50-8)	0.0040UJ, B2,CK3
	095579-009/CTF-MW2	Manganese (7439-96-5)	J, MS1
	095579-010/CTF-MW2	Copper (7440-50-8)	J-, CK3
	095579-010/CTF-MW2	Manganese (7439-96-5)	J, MS1
	095580-009/CTF-MW2	Copper (7440-50-8)	0.0040UJ, B2,CK3
	095580-009/CTF-MW2	Manganese (7439-96-5)	J, MS1
	095580-010/CTF-MW2	Copper (7440-50-8)	J-, CK3
	095580-010/CTF-MW2	Manganese (7439-96-5)	J, MS1
SW846 3510C/8270D			
	095576-002/CTF-EB2	Indeno(1,2,3-cd)pyrene (193-39-5)	UJ, MS5
	095579-002/CTF-MW2	Indeno(1,2,3-cd)pyrene (193-39-5)	UJ, MS5
	095580-002/CTF-MW2	Indeno(1,2,3-cd)pyrene (193-39-5)	UJ, MS5
SW846 3535/8321A Modified			
	095576-024/CTF-EB2	m-Nitrotoluene (99-08-1)	UJ, I4
	095576-024/CTF-EB2	o-Nitrotoluene (88-72-2)	UJ, I4
	095576-024/CTF-EB2	p-Nitrotoluene (99-99-0)	UJ, I4
	095579-024/CTF-MW2	m-Nitrotoluene (99-08-1)	UJ, I4
	095579-024/CTF-MW2	o-Nitrotoluene (88-72-2)	UJ, I4
	095579-024/CTF-MW2	p-Nitrotoluene (99-99-0)	UJ, I4
	095579-024/CTF-MW2	RDX (121-82-4)	J+, C2
	095580-024/CTF-MW2	m-Nitrotoluene (99-08-1)	UJ, I4
	095580-024/CTF-MW2	o-Nitrotoluene (88-72-2)	UJ, I4
	095580-024/CTF-MW2	p-Nitrotoluene (99-99-0)	UJ, I4
	095580-024/CTF-MW2	RDX (121-82-4)	J+, C2

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

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SECTION IV

SOLID WASTE MANAGEMENT UNITS 8/58 AND 68 QUARTERLY GROUNDWATER MONITORING REPORT, January – March 2014

1.0 Introduction

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

This is the tenth 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 First Quarter, Calendar Year (CY) 2014 reporting period (January – March 2014).

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

Monitoring wells CCBA-MW1 and CCBA-MW2 were sampled on January 27 and January 23, 2014, respectively. The samples were analyzed for the required constituents, consisting of volatile organic compounds (VOCs), semivolatile organic compounds (SVOCs), high explosive (HE) compounds, nitrate plus nitrite (NPN), major anions (i.e., bromide, chloride, fluoride, and sulfate), major cations (i.e., calcium, magnesium, potassium, and sodium), alkalinity, Target Analyte List (TAL) metals plus uranium, perchlorate, total cyanide, radionuclides by gamma spectroscopy, and gross alpha/beta activity.

Monitoring wells OBS-MW1, OBS-MW2, and OBS-MW3 were sampled from January 20 to January 22, 2014. The samples were analyzed for the required constituents, consisting of VOCs, SVOCs, HE compounds, NPN, major anions, major cations, alkalinity, TAL metals plus uranium, hexavalent chromium, perchlorate, total cyanide, radionuclides by gamma spectroscopy, gross alpha/beta activity, and isotopic uranium.

Analytical results for the groundwater samples were compared with the U.S. Environmental Protection Agency (EPA) maximum contaminant levels (MCLs) for drinking water (EPA 2009). Except for fluoride, none of the analytical results for the groundwater samples from SWMUs 8/58 exceed the MCLs. Fluoride was detected above the established MCL of 4.0 milligrams per liter (mg/L) in the CCBA-MW1 groundwater and groundwater duplicate sample at concentrations of 4.68 mg/L and 4.74 mg/L, respectively. Fluoride in the CCBA-MW2 groundwater sample was above the method detection limit (MDL) with a value of 1.46 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 First Quarter, CY 2014.

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 EXO1 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 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, except perchlorate. GEL experienced instrument problems with their perchlorate equipment and sent the samples to Test America Laboratories in St. Louis Missouri for analysis. Table IV-1 also lists the sample containers and preservation requirements. Section IV.3.0 summarizes the analytical results.

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

3.0 **Analytical Results**

Groundwater samples were submitted to GEL and Test America Laboratories for chemical and radiological analyses. Samples were analyzed in accordance with applicable EPA analytical methods (EPA 1980, 1984, 1986, and 1999; Clesceri et al.

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

The analytical data were reviewed and qualified in accordance with AOP 00-03, "Data Validation Procedure for Chemical and Radiochemical Data," Revision 3 (SNL/NM May 2011). The data are acceptable, and reported QC measures are adequate. The data validation summary sheets are provided in Appendix C.

3.1 **Field Water Quality Measurements**

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

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

3.2 **Volatile Organic Compounds**

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

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

3.3 **Semivolatile Organic Compounds**

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

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

3.4 **High Explosive Compounds**

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

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

3.5 **Nitrate Plus Nitrite**

SWMUs 8/58, Monitoring Wells CCBA-MW1 and CCBA-MW2. Table IV-6 summarizes NPN results. NPN was not detected above the MCL of 10 mg/L in any groundwater sample. NPN was reported at a maximum concentration of 3.62 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 1.95 mg/L in the OBS-MW1 groundwater sample.

3.6 **Anions and Alkalinity**

SWMUs 8/58, Monitoring Wells CCBA-MW1 and CCBA-MW2. Table IV-7 summarizes alkalinity, major anion (i.e., bromide, chloride, fluoride, and sulfate), and total cyanide results. Fluoride was detected above the established MCL of 4.0 mg/L in the CCBA-MW1 groundwater and duplicate groundwater samples with concentrations of 4.68 mg/L and 4.74 mg/L, respectively. 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 the CCBA-MW2 groundwater was reported at a concentration of 1.46 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 the evaluation of gross alpha activity results from SWMU 68. Uranium isotopic analysis for SWMUs 8/58 monitoring wells was discontinued because the uncorrected gross alpha activities have consistently been below the MCL of 15 picocuries per liter (pCi/L). Gross alpha activity is measured as a screening tool. The results for gamma spectroscopy, gross alpha/beta activity, and isotopic uranium are presented in Table IV-13.

SWMUs 8/58, Monitoring Wells CCBA-MW1 and CCBA-MW2. All radiological results were reviewed by a SNL/NM Certified Health Physicist and determined as nonradioactive. The corrected gross alpha activity was below the MCL of 15 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 and groundwater duplicate samples. Fluoride detected in the CCBA-MW1 samples are 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-MW1 and OBS-MW2 and analyzed to estimate the overall reproducibility of the sampling and analytical process. The duplicate groundwater samples were collected immediately after the original groundwater sample to reduce variability caused by time and/or sampling mechanics. Duplicate groundwater samples were analyzed for all parameters.

Table IV-15 summarizes the results for duplicate sample analyses and calculated relative percent difference (RPD) values for monitoring wells CCBA-MW1 and OBS-MW2. RPD values were calculated only for detected chemical parameters. The work plans for SWMUs 8/58 and 68 do not specify QC acceptance criteria for duplicate groundwater sample data; however, duplicate sample results show good correlation (RPD values of less than 20 for organic compounds and less than 35 for inorganic analytes) for all

calculated parameters, except zinc in CCBA-MW1. The RPD for zinc in CCBA-MW1 was calculated at 44, but is considered an estimated value since zinc was detected below the PQL in both the groundwater and duplicate groundwater samples.

4.1.2 **Equipment Blank Samples**

EB samples are collected to verify the effectiveness of the equipment decontamination process. EB samples were collected prior to sampling monitoring wells CCBA-MW2 and OBS-MW1 and were submitted for all analyses. EB samples were collected according to procedures described in SNL/NM FOP 05-03 “Groundwater Monitoring Equipment Decontamination” (SNL/NM January 2012a).

SWMUs 8/58, Monitoring Well CCBA-MW1. Bromodichloromethane, bromoform, chloroform, dibromochloromethane, chloride, copper, and sodium were detected above the laboratory MDLs. With the exception of copper, no corrective action was necessary, since these analytes were not detected in groundwater samples, or were detected in groundwater samples at concentrations greater than five times the EB result. Copper was qualified as not detected in both the CCBA-MW1 groundwater and duplicate groundwater samples during data validation, since copper was reported in the EB sample at a concentration greater than the associated groundwater sample.

SWMU 68, Monitoring Well OBS-MW2. Bromodichloromethane, bromoform, chloroform, dibromochloromethane, chloride, and copper were detected above laboratory MDLs. With the exception of copper, no corrective action was necessary since these compounds were not detected in groundwater samples, or were detected in groundwater samples at concentrations greater than five times the EB result. Copper was qualified as not detected in both the OBS-MW2 groundwater and duplicate groundwater samples during data validation, since copper was reported in the EB sample at concentrations greater than the associated groundwater sample.

4.1.3 **Trip Blank Samples**

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

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

SWMU 68. A total of four trip blanks were submitted with the January 2014 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.

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

SWMU 68, Monitoring Well OBS-MW3. The VOCs bromodichloromethane, bromoform, chloroform, and dibromochloromethane were detected above laboratory MDLs and are common byproducts 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 **Variances and Nonconformances**

No variances or nonconformances from requirements in the Groundwater Characterization Work Plan for SWMU 8/58 (SNL/NM September 2010) occurred during the January 2014 sampling activities.

No variances or nonconformances from requirements in the Groundwater Characterization Work Plan for SWMU 68 (SNL/NM September 2010) occurred during the January 2014 sampling activities.

5.0 **Summary**

During the First Quarter of CY 2014, samples were collected from SWMUs 8/58 monitoring wells CCBA-MW1 and CCBA-MW2, and SWMU 68 monitoring wells OBS-MW1, OBS-MW2, and OBS-MW3. Sampling results were compared with EPA MCL guidelines for drinking water (EPA 2009).

Analytical parameters for monitoring wells CCBA-MW1 and CCBA-MW2 consist of VOCs, SVOCs, HE compounds, NPN, major anions, major cations, alkalinity, TAL metals plus uranium, perchlorate, total cyanide, radionuclides by gamma spectroscopy, gross alpha/beta activity, and isotopic uranium. No parameters were detected above established MCLs, except for fluoride in CCBA-MW1. Fluoride was detected above the established MCL of 4.0 mg/L in the monitoring well CCBA-MW1 groundwater and duplicate groundwater samples at concentrations of 4.68 mg/L and 4.74 mg/L. These detections are similar to historical concentrations and are 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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DOE, see U.S. Department of Energy.

EPA, see U.S. Environmental Protection Agency.

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Figures

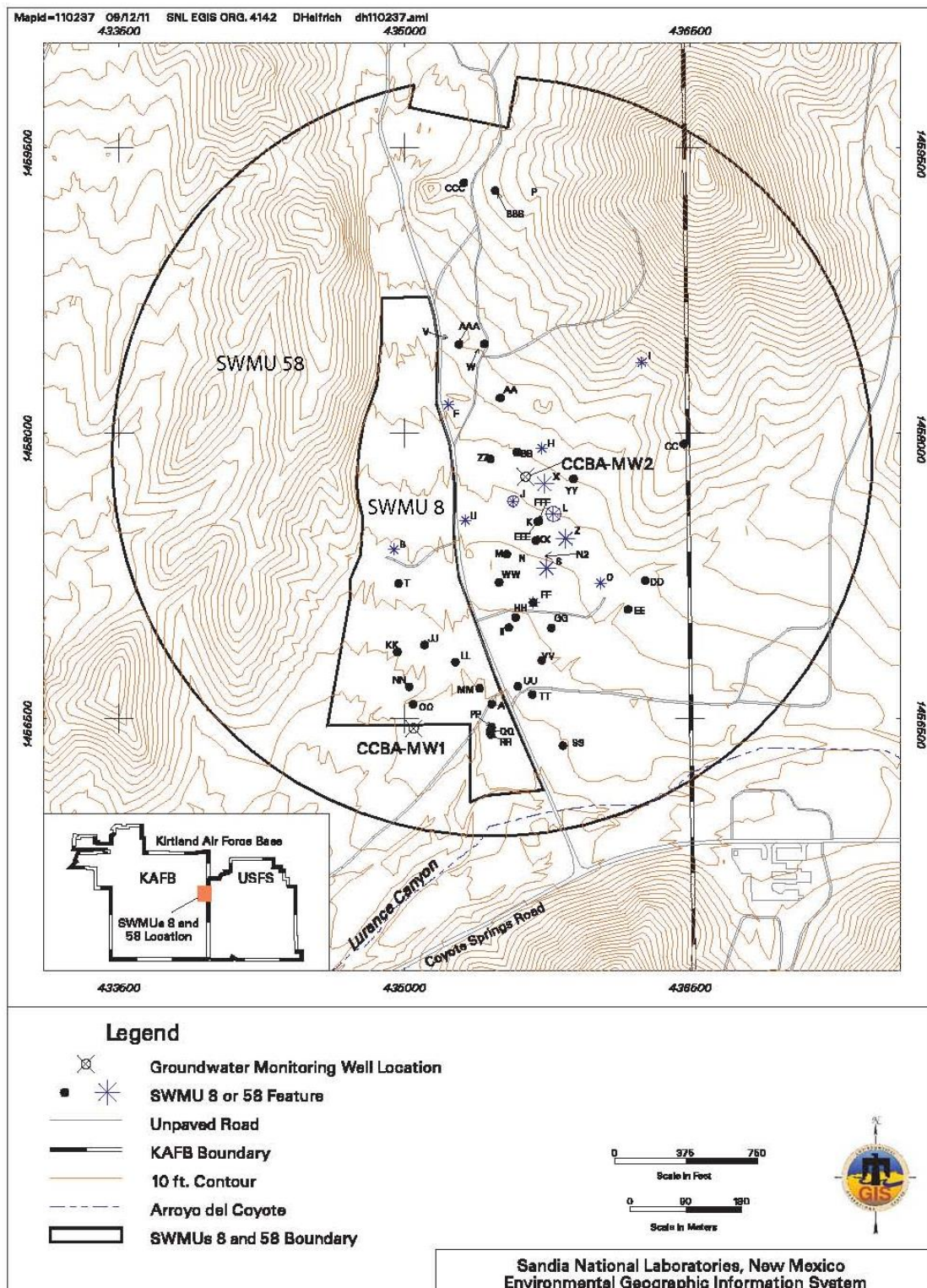


Figure IV-1

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

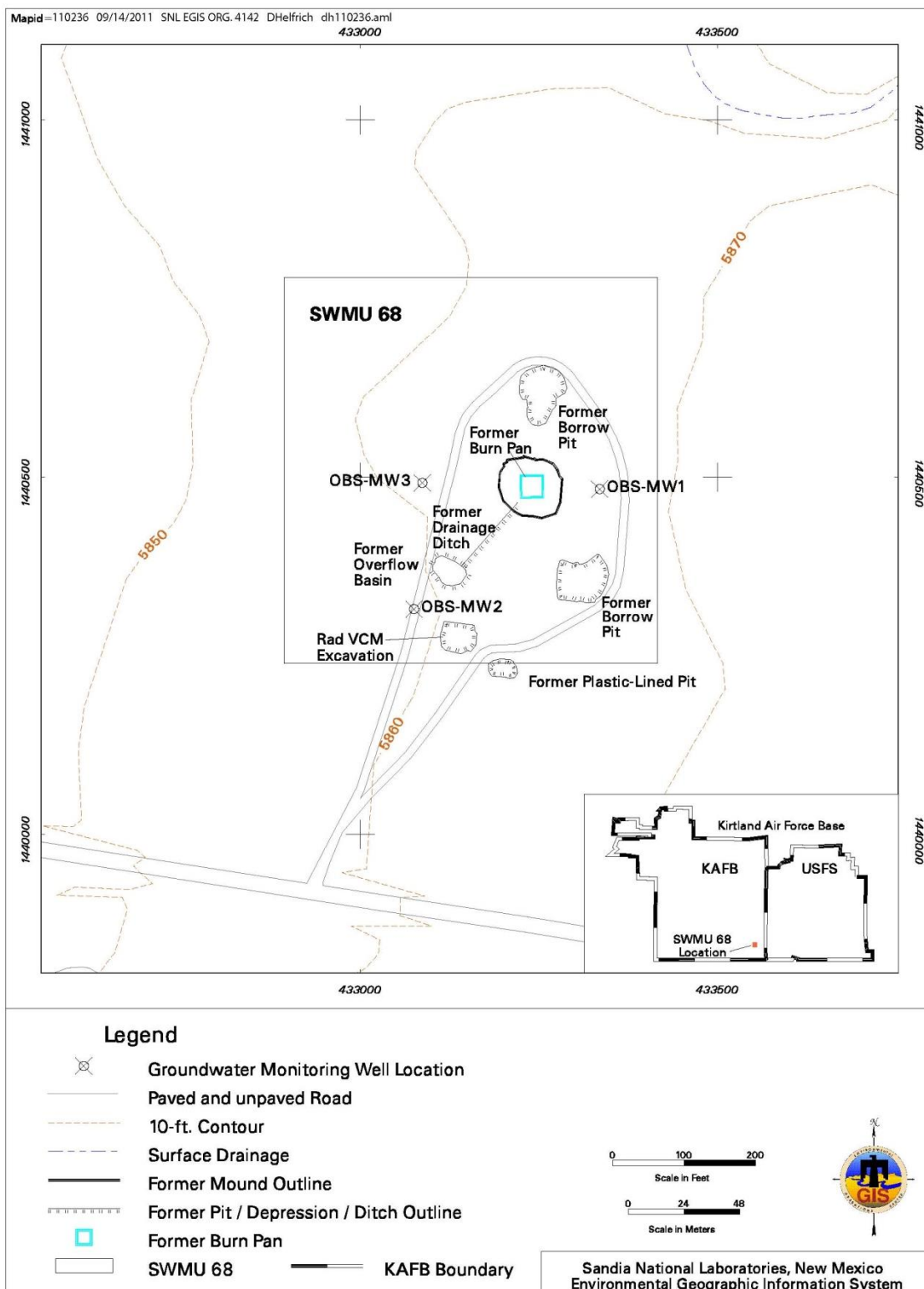


Figure IV-2

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, 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.

^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 First Quarter, CY 2014 Groundwater Sampling
SWMUs 8/58 and 68 Groundwater Monitoring Quarterly Assessment
January – March 2014

Well	Sample Identification	AR/COC Number	Associated Groundwater Investigation
CCBA-MW1	095213	615211	SWMUs 8/58
CCBA-MW1 (duplicate)	095214		
CCBA-MW2	095208		
OBS-MW1	095196	615205	SWMU 68
OBS-MW2	095201	615207	
OBS-MW2 (duplicate)	095202		
OBS-MW3	095205	615208	

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, January – March 2014

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	27-Jan-14	13.53	395.0	324.6	6.76	0.49	32.3	3.45
CCBA-MW2	23-Jan-14	12.09	439.4	299.0	7.69	0.29	58.2	6.26
SWMU 68								
OBS-MW1	20-Jan-14	15.81	427.6	270.1	7.51	0.52	36.2	3.58
OBS-MW2	22-Jan-14	15.61	420.1	301.2	7.51	0.12	34.6	3.44
OBS-MW3	21-Jan-14	16.30	427.6	290.8	7.51	0.46	44.8	4.47

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, January – March 2014

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
1,1,2,2-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, January – March 2014

SWMU 8/58					
Analyte	MDL (µg/L)	Analytical Method ^a	Analyte	MDL (µg/L)	Analytical Method ^a
1'-Biphenyl 1	3.00 – 3.09	EPA 8270C	Butylbenzyl phthalate	3.00 – 3.09	EPA 8270C
1,2,4-Trichlorobenzene	3.00 – 3.09	EPA 8270C	Caprolactam	3.00 – 3.09	EPA 8270C
1,4-Dioxane	3.00 – 3.09	EPA 8270C	Carbazole	0.300 – 0.309	EPA 8270C
2,4,5-Trichlorophenol	3.00 – 3.09	EPA 8270C	Chrysene	0.300 – 0.309	EPA 8270C
2,4,6-Trichlorophenol	3.00 – 3.09	EPA 8270C	Di-n-butyl phthalate	3.00 – 3.09	EPA 8270C
2,4-Dichlorophenol	3.00 – 3.09	EPA 8270C	Di-n-octyl phthalate	3.00 – 3.09	EPA 8270C
2,4-Dimethylphenol	3.00 – 3.09	EPA 8270C	Dibenz[a,h]anthracene	0.300 – 0.309	EPA 8270C
2,4-Dinitrophenol	5.00 – 5.15	EPA 8270C	Dibenzofuran	3.00 – 3.09	EPA 8270C
2,4-Dinitrotoluene	3.00 – 3.09	EPA 8270C	Diethylphthalate	3.00 – 3.09	EPA 8270C
2,6-Dinitrotoluene	3.00 – 3.09	EPA 8270C	Dimethylphthalate	3.00 – 3.09	EPA 8270C
2-Chloronaphthalene	0.410 – 0.423	EPA 8270C	Dinitro-o-cresol	3.00 – 3.09	EPA 8270C
2-Chlorophenol	3.00 – 3.09	EPA 8270C	Diphenyl amine	3.00 – 3.09	EPA 8270C
2-Methylnaphthalene	0.300 – 0.309	EPA 8270C	Fluoranthene	0.300 – 0.309	EPA 8270C
2-Nitroaniline	3.00 – 3.09	EPA 8270C	Fluorene	0.300 – 0.309	EPA 8270C
2-Nitrophenol	3.00 – 3.09	EPA 8270C	Hexachlorobenzene	3.00 – 3.09	EPA 8270C
3,3'-Dichlorobenzidine	3.00 – 3.09	EPA 8270C	Hexachlorobutadiene	3.00 – 3.09	EPA 8270C
3-Nitroaniline	3.00 – 3.09	EPA 8270C	Hexachlorocyclopentadiene	3.00 – 3.09	EPA 8270C
4-Bromophenyl phenyl ether	3.00 – 3.09	EPA 8270C	Hexachloroethane	3.00 – 3.09	EPA 8270C
4-Chloro-3-methylphenol	3.00 – 3.09	EPA 8270C	Indeno(1,2,3-c,d)pyrene	0.300 – 0.309	EPA 8270C
4-Chlorobenzenamine	3.30 – 3.40	EPA 8270C	Isophorone	3.50 – 3.61	EPA 8270C
4-Chlorophenyl phenyl ether	3.00 – 3.09	EPA 8270C	Naphthalene	0.300 – 0.309	EPA 8270C
4-Nitroaniline	3.00 – 3.09	EPA 8270C	Nitro-benzene	3.00 – 3.09	EPA 8270C
4-Nitrophenol	3.00 – 3.09	EPA 8270C	Pentachlorophenol	3.00 – 3.09	EPA 8270C
Acenaphthene	0.300 – 0.309	EPA 8270C	Phenanthrene	0.300 – 0.309	EPA 8270C
Acenaphthylene	0.300 – 0.309	EPA 8270C	Phenol	3.00 – 3.09	EPA 8270C
Acetophenone	3.00 – 3.09	EPA 8270C	Pyrene	0.300 – 0.309	EPA 8270C
Anthracene	0.300 – 0.309	EPA 8270C	bis(2-Chloroethoxy)methane	3.00 – 3.09	EPA 8270C
Atrazine	3.00 – 3.09	EPA 8270C	bis(2-Chloroethyl)ether	3.00 – 3.09	EPA 8270C
Benzaldehyde	3.00 – 3.09	EPA 8270C	bis(2-Chloroisopropyl)ether	3.00 – 3.09	EPA 8270C
Benzo(a)anthracene	0.300 – 0.309	EPA 8270C	bis(2-Ethylhexyl)phthalate	3.00 – 3.09	EPA 8270C
Benzo(a)pyrene	0.300 – 0.309	EPA 8270C	m,p-Cresol	3.70 – 3.81	EPA 8270C
Benzo(b)fluoranthene	0.300 – 0.309	EPA 8270C	n-Nitrosodipropylamine	3.00 – 3.09	EPA 8270C
Benzo(ghi)perylene	0.300 – 0.309	EPA 8270C	o-Cresol	3.00 – 3.09	EPA 8270C
Benzo(k)fluoranthene	0.300 – 0.309	EPA 8270C			

Table IV-4 (Continued)
Method Detection Limits for Volatile and Semivolatile Organic Compounds
SWMUs 8/58 and 68 Groundwater Monitoring
Quarterly Assessment, January – March 2014

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, January – March 2014

SWMU 68					
Analyte	MDL (µg/L)	Analytical Method ^a	Analyte	MDL (µg/L)	Analytical Method ^a
1'-Biphenyl 1	3.00 – 3.26	EPA 8270C	Butylbenzyl phthalate	3.00 – 3.26	EPA 8270C
1,2,4-Trichlorobenzene	3.00 – 3.26	EPA 8270C	Caprolactam	3.00 – 3.26	EPA 8270C
2,4,5-Trichlorophenol	3.00 – 3.26	EPA 8270C	Carbazole	0.300 – 0.326	EPA 8270C
1,4-Dioxane	3.00 – 3.26	EPA 8270C	Chrysene	0.300 – 0.326	EPA 8270C
2,4,6-Trichlorophenol	3.00 – 3.26	EPA 8270C	Di-n-butyl phthalate	3.00 – 3.26	EPA 8270C
2,4-Dichlorophenol	3.00 – 3.26	EPA 8270C	Di-n-octyl phthalate	3.00 – 3.26	EPA 8270C
2,4-Dimethylphenol	3.00 – 3.26	EPA 8270C	Dibenz[a,h]anthracene	0.300 – 0.326	EPA 8270C
2,4-Dinitrophenol	5.00 – 5.43	EPA 8270C	Dibenzofuran	3.00 – 3.26	EPA 8270C
2,4-Dinitrotoluene	3.00 – 3.26	EPA 8270C	Diethylphthalate	3.00 – 3.26	EPA 8270C
2,6-Dinitrotoluene	3.00 – 3.26	EPA 8270C	Dimethylphthalate	3.00 – 3.26	EPA 8270C
2-Chloronaphthalene	0.410 – 0.446	EPA 8270C	Dinitro-o-cresol	3.00 – 3.26	EPA 8270C
2-Chlorophenol	3.00 – 3.26	EPA 8270C	Diphenyl amine	3.00 – 3.26	EPA 8270C
2-Methylnaphthalene	0.300 – 0.326	EPA 8270C	Fluoranthene	0.300 – 0.326	EPA 8270C
2-Nitroaniline	3.00 – 3.26	EPA 8270C	Fluorene	0.300 – 0.326	EPA 8270C
2-Nitrophenol	3.00 – 3.26	EPA 8270C	Hexachlorobenzene	3.00 – 3.26	EPA 8270C
3,3'-Dichlorobenzidine	3.00 – 3.26	EPA 8270C	Hexachlorobutadiene	3.00 – 3.26	EPA 8270C
3-Nitroaniline	3.00 – 3.26	EPA 8270C	Hexachlorocyclopentadiene	3.00 – 3.26	EPA 8270C
4-Bromophenyl phenyl ether	3.00 – 3.26	EPA 8270C	Hexachloroethane	3.00 – 3.26	EPA 8270C
4-Chloro-3-methylphenol	3.00 – 3.26	EPA 8270C	Indeno(1,2,3-c,d)pyrene	0.300 – 0.326	EPA 8270C
4-Chlorobenzenamine	3.30 – 3.59	EPA 8270C	Isophorone	3.50 – 3.80	EPA 8270C
4-Chlorophenyl phenyl ether	3.00 – 3.26	EPA 8270C	Naphthalene	0.300 – 0.326	EPA 8270C
4-Nitroaniline	3.00 – 3.26	EPA 8270C	Nitro-benzene	3.00 – 3.26	EPA 8270C
4-Nitrophenol	3.00 – 3.26	EPA 8270C	Pentachlorophenol	3.00 – 3.26	EPA 8270C
Acenaphthene	0.300 – 0.326	EPA 8270C	Phenanthrene	0.300 – 0.326	EPA 8270C
Acenaphthylene	0.300 – 0.326	EPA 8270C	Phenol	3.00 – 3.26	EPA 8270C
Acetophenone	3.00 – 3.26	EPA 8270C	Pyrene	0.300 – 0.326	EPA 8270C
Anthracene	0.300 – 0.326	EPA 8270C	bis(2-Chloroethoxy)methane	3.00 – 3.26	EPA 8270C
Atrazine	3.00 – 3.26	EPA 8270C	bis(2-Chloroethyl)ether	3.00 – 3.26	EPA 8270C
Benzaldehyde	3.00 – 3.26	EPA 8270C	bis(2-Chloroisopropyl)ether	3.00 – 3.26	EPA 8270C
Benzo(a)anthracene	0.300 – 0.326	EPA 8270C	bis(2-Ethylhexyl)phthalate	3.00 – 3.26	EPA 8270C
Benzo(a)pyrene	0.300 – 0.326	EPA 8270C	m,p-Cresol	3.70 – 4.02	EPA 8270C
Benzo(b)fluoranthene	0.300 – 0.326	EPA 8270C	n-Nitrosodipropylamine	3.00 – 3.26	EPA 8270C
Benzo(ghi)perylene	0.300 – 0.326	EPA 8270C	o-Cresol	3.00 – 3.26	EPA 8270C
Benzo(k)fluoranthene	0.300 – 0.326	EPA 8270C			

Table IV-4 (Concluded)
Method Detection Limits for Volatile and Semivolatile Organic Compounds
SWMUs 8/58 and 68 Groundwater Monitoring
Quarterly Assessment, January – March 2014

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, January – March 2014

Analyte	MDL (µg/L)	
	SWMUs 8/58	SWMU 68
1,3,5-Trinitrobenzene	0.0833 – 0.0870	0.0816 – 0.0838
1,3-Dinitrobenzene	0.0833 – 0.0870	0.0816 – 0.0838
2,4,6-Trinitrotoluene	0.0833 – 0.0870	0.0816 – 0.0838
2,4-Dinitrotoluene	0.0833 – 0.0870	0.0816 – 0.0838
2,6-Dinitrotoluene	0.0833 – 0.0870	0.0816 – 0.0838
2-Amino-4,6-dinitrotoluene	0.0833 – 0.0870	0.0816 – 0.0838
2-Nitrotoluene	0.0854 – 0.0891	0.0837 – 0.0859
3-Nitrotoluene	0.0833 – 0.0870	0.0816 – 0.0838
4-Amino-2,6-dinitrotoluene	0.0833 – 0.0870	0.0816 – 0.0838
4-Nitrotoluene	0.156 – 0.163	0.153 – 0.157
HMX	0.0833 – 0.0870	0.0816 – 0.0838
Nitro-benzene	0.0833 – 0.0870	0.0816 – 0.0838
Pentaerythritol tetranitrate	0.104 – 0.109	0.102 – 0.105
RDX	0.0833 – 0.0870	0.0816 – 0.0838
Tetryl	0.0833 – 0.0870	0.0816 – 0.0838

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, January – March 2014

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 27-Jan-14	Nitrate plus nitrite	2.07	0.170	0.500	10.0			095213-018	EPA 353.2
CCBA-MW1 (Duplicate) 27-Jan-14	Nitrate plus nitrite	1.99	0.085	0.250	10.0			095214-018	EPA 353.2
CCBA-MW2 23-Jan-14	Nitrate plus nitrite	3.62	0.170	0.500	10.0			095208-018	EPA 353.2
SWMU 68									
OBS-MW1 20-Jan-14	Nitrate plus nitrite	1.95	0.085	0.250	10.0			095196-018	EPA 353.2
OBS-MW2 22-Jan-14	Nitrate plus nitrite	1.58	0.085	0.250	10.0			095201-018	EPA 353.2
OBS-MW2 (Duplicate) 22-Jan-14	Nitrate plus nitrite	1.54	0.085	0.250	10.0			095202-018	EPA 353.2
OBS-MW3 21-Jan-14	Nitrate plus nitrite	1.85	0.085	0.250	10.0			095205-018	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, January – March 2014

Notes (continued)

CCBA = Coyote Canyon Blast Area.
EPA = U.S. Environmental Protection Agency.
MCL = Maximum contaminant level. Established by the EPA Primary Water Regulations (40 Code of Federal Regulations 141.11, Subpart B), National Primary Drinking Water Standards (EPA, 2009).
MDL = Method detection limit. The minimum concentration that can be measured and reported with 99% confidence that the analyte is greater than zero; analyte is matrix-specific.
mg/L = Milligrams per liter.
MW = Monitoring well.
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, January – March 2014

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 27-Jan-14	Bicarbonate Alkalinity	180	0.725	1.00	NE			095213-022	SM 2320B
	Carbonate Alkalinity	ND	0.725	1.00	NE	U		095213-022	SM 2320B
	Bromide	0.323	0.067	0.200	NE			095213-016	EPA 9056
	Chloride	28.3	0.335	1.00	NE			095213-016	EPA 9056
	Fluoride	4.68	0.165	0.500	4.0			095213-016	EPA 9056
	Sulfate	57.6	0.665	2.00	NE			095213-016	EPA 9056
	Total Cyanide	ND	0.00167	0.005	0.200	U	UJ	095213-027	EPA 9012
CCBA-MW1 (Duplicate) 27-Jan-14	Bicarbonate Alkalinity	177	0.725	1.00	NE			095214-022	SM 2320B
	Carbonate Alkalinity	ND	0.725	1.00	NE	U		095214-022	SM 2320B
	Bromide	0.325	0.067	0.200	NE			095214-016	EPA 9056
	Chloride	28.4	0.335	1.00	NE			095214-016	EPA 9056
	Fluoride	4.74	0.165	0.500	4.0			095214-016	EPA 9056
	Sulfate	57.9	0.665	2.00	NE			095214-016	EPA 9056
	Total Cyanide	ND	0.00167	0.005	0.200	U	UJ	095214-027	EPA 9012
CCBA-MW2 23-Jan-14	Bicarbonate Alkalinity	178	0.725	1.00	NE			095208-022	SM 2320B
	Carbonate Alkalinity	ND	0.725	1.00	NE	U		095208-022	SM 2320B
	Bromide	0.517	0.067	0.200	NE			095208-016	EPA 9056
	Chloride	36.8	0.670	2.00	NE			095208-016	EPA 9056
	Fluoride	1.46	0.033	0.100	4.0			095208-016	EPA 9056
	Sulfate	92.9	1.33	4.00	NE			095208-016	EPA 9056
	Total Cyanide	ND	0.00167	0.005	0.200	U	UJ	095208-027	EPA 9012

Table IV-7 (Continued)
Summary of Alkalinity, Anion, and Total Cyanide Results
SWMUs 8/58 and 68 Groundwater Monitoring
Quarterly Assessment, January – March 2014

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 20-Jan-14	Bicarbonate Alkalinity	177	0.725	1.00	NE			095196-022	SM 2320B
	Carbonate Alkalinity	ND	0.725	1.00	NE	U		095196-022	SM 2320B
	Bromide	0.317	0.067	0.200	NE			095196-016	EPA 9056
	Chloride	23.6	0.670	2.00	NE			095196-016	EPA 9056
	Fluoride	2.04	0.033	0.100	4.00			095196-016	EPA 9056
	Sulfate	79.1	1.33	4.00	NE			095196-016	EPA 9056
	Total Cyanide	ND	0.00167	0.005	0.200	U	UJ	095196-027	EPA 9012
OBS-MW2 22-Jan-14	Bicarbonate Alkalinity	178	0.725	1.00	NE			095201-022	SM 2320B
	Carbonate Alkalinity	ND	0.725	1.00	NE	U		095201-022	SM 2320B
	Bromide	0.332	0.067	0.200	NE			095201-016	EPA 9056
	Chloride	22.7	0.670	2.00	NE			095201-016	EPA 9056
	Fluoride	2.16	0.033	0.100	4.00			095201-016	EPA 9056
	Sulfate	83.0	1.33	4.00	NE			095201-016	EPA 9056
	Total Cyanide	ND	0.00167	0.005	0.200	U	UJ	095201-027	EPA 9056
OBS-MW2 (Duplicate) 22-Jan-14	Bicarbonate Alkalinity	176	0.725	1.00	NE			095202-022	SM 2320B
	Carbonate Alkalinity	ND	0.725	1.00	NE	U		095202-022	SM 2320B
	Bromide	0.361	0.067	0.200	NE			095202-016	EPA 9056
	Chloride	22.1	0.670	2.00	NE			095202-016	EPA 9056
	Fluoride	2.17	0.033	0.100	4.00			095202-016	EPA 9056
	Sulfate	82.7	1.33	4.00	NE			095202-016	EPA 9056
	Total Cyanide	ND	0.00167	0.005	0.200	U	UJ	095202-027	EPA 9012
OBS-MW3 21-Jan-14	Bicarbonate Alkalinity	173	0.725	1.00	NE			095205-022	SM 2320B
	Carbonate Alkalinity	ND	0.725	1.00	NE	U		095205-022	SM 2320B
	Bromide	0.311	0.067	0.200	NE			095205-016	EPA 9056
	Chloride	22.5	0.670	2.00	NE			095205-016	EPA 9056
	Fluoride	2.20	0.033	0.100	4.00			095205-016	EPA 9056
	Sulfate	81.5	1.33	4.00	NE			095205-016	EPA 9056
	Total Cyanide	ND	0.00167	0.005	0.200	U	UJ	095205-027	EPA 9012

Table IV-7 (Concluded)
Summary of Alkalinity, Anion, and Total Cyanide Results
SWMUs 8/58 and 68 Groundwater Monitoring
Quarterly Assessment, January – March 2014

Notes

^aLaboratory Qualifier

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

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

^bValidation Qualifier

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

UJ = The analyte was analyzed for, but 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, January – March 2014

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 27-Jan-14	ND	0.004	0.012	NE	U	UJ	095213-020	EPA 314.0
CCBA-MW1 (Duplicate) 27-Jan-14	ND	0.004	0.012	NE	U	UJ	095214-020	EPA 314.0
CCBA-MW2 23-Jan-14	ND	0.004	0.012	NE	U	UJ	095208-020	EPA 314.0
SWMU 68								
OBS-MW1 20-Jan-14	ND	0.004	0.012	NE	U	UJ	095196-020	EPA 314.0
OBS-MW2 22-Jan-14	ND	0.004	0.012	NE	U	UJ	095201-020	EPA 314.0
OBS-MW2 (Duplicate) 22-Jan-14	ND	0.004	0.012	NE	U	UJ	095202-020	EPA 314.0
OBS-MW3 21-Jan-14	ND	0.004	0.012	NE	U	UJ	095205-020	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.

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

^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, January – March 2014

Notes (continued)

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

Table IV-9
Summary of Hexavalent Chromium Results
SWMU 68 Groundwater Monitoring
Quarterly Assessment, January – March 2014

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 20-Jan-14	ND	0.0033	0.010	NE	U		095196-014	EPA 7196A
OBS-MW2 22-Jan-14	ND	0.0033	0.010	NE	U		095201-014	EPA 7196A
OBS-MW2 (Duplicate) 22-Jan-14	ND	0.0033	0.010	NE	U		095202-014	EPA 7196A
OBS-MW3 21-Jan-14	ND	0.0033	0.010	NE	U		095205-014	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, January – March 2014

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 27-Jan-14	Aluminum	0.0368	0.015	0.050	NE	J		095213-009	EPA 6020
	Antimony	ND	0.001	0.003	0.006	U		095213-009	EPA 6020
	Arsenic	ND	0.0017	0.005	0.010	U		095213-009	EPA 6020
	Barium	0.00226	0.0006	0.002	2.00	B	0.0059U	095213-009	EPA 6020
	Beryllium	0.000471	0.0002	0.0005	0.004	J		095213-009	EPA 6020
	Cadmium	ND	0.00011	0.001	0.005	U		095213-009	EPA 6020
	Calcium	46.3	0.060	0.200	NE			095213-009	EPA 6020
	Chromium	ND	0.002	0.010	0.100	U		095213-009	EPA 6020
	Cobalt	0.0001	0.0001	0.001	NE	J		095213-009	EPA 6020
	Copper	0.000545	0.00035	0.001	NE	J	0.0063U	095213-009	EPA 6020
	Iron	0.117	0.033	0.100	NE			095213-009	EPA 6020
	Lead	ND	0.0005	0.002	NE	U		095213-009	EPA 6020
	Magnesium	11.1	0.010	0.030	NE			095213-009	EPA 6020
	Manganese	0.00331	0.001	0.005	NE	J		095213-009	EPA 6020
	Mercury	ND	0.000067	0.0002	0.002	U		095213-009	EPA 7470
	Nickel	0.000838	0.0005	0.002	NE	J		095213-009	EPA 6020
	Potassium	4.03	0.080	0.300	NE		J	095213-009	EPA 6020
	Selenium	0.00219	0.0015	0.005	0.050	J		095213-009	EPA 6020
	Silver	ND	0.0002	0.001	NE	U		095213-009	EPA 6020
	Sodium	65.4	0.400	1.25	NE			095213-009	EPA 6020
	Thallium	ND	0.00045	0.002	0.002	U		095213-009	EPA 6020
	Uranium	0.00222	0.000067	0.0002	0.03			095213-009	EPA 6020
	Vanadium	0.00129	0.001	0.005	NE	J	0.0053U	095213-009	EPA 6010
	Zinc	0.00681	0.0035	0.010	NE	J		095213-009	EPA 6020

Table IV-10 (Continued)
Summary of Unfiltered Total Metal Results
SWMUs 8/58 Groundwater Monitoring
Quarterly Assessment, January – March 2014

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 (Duplicate) 27-Jan-14	Aluminum	0.0298	0.015	0.050	NE	J		095214-009	EPA 6020
	Antimony	ND	0.001	0.003	0.006	U		095214-009	EPA 6020
	Arsenic	ND	0.0017	0.005	0.010	U		095214-009	EPA 6020
	Barium	0.0022	0.0006	0.002	2.00	B	0.0059U	095214-009	EPA 6020
	Beryllium	0.000473	0.0002	0.0005	0.004	J		095214-009	EPA 6020
	Cadmium	ND	0.00011	0.001	0.005	U		095214-009	EPA 6020
	Calcium	47.2	0.060	0.200	NE			095214-009	EPA 6020
	Chromium	ND	0.002	0.010	0.100	U		095214-009	EPA 6020
	Cobalt	ND	0.0001	0.001	NE	U		095214-009	EPA 6020
	Copper	0.000508	0.00035	0.001	NE	J	0.0063U	095214-009	EPA 6020
	Iron	0.113	0.033	0.100	NE			095214-009	EPA 6020
	Lead	ND	0.0005	0.002	NE	U		095214-009	EPA 6020
	Magnesium	10.7	0.010	0.030	NE			095214-009	EPA 6020
	Manganese	0.00327	0.001	0.005	NE	J		095214-009	EPA 6020
	Mercury	ND	0.000067	0.0002	0.002	U		095214-009	EPA 7470
	Nickel	0.000876	0.0005	0.002	NE	J		095214-009	EPA 6020
	Potassium	4.19	0.080	0.300	NE		J	095214-009	EPA 6020
	Selenium	0.00225	0.0015	0.005	0.050	J		095214-009	EPA 6020
	Silver	ND	0.0002	0.001	NE	U		095214-009	EPA 6020
	Sodium	60.7	0.400	1.25	NE			095214-009	EPA 6020
	Thallium	ND	0.00045	0.002	0.002	U		095214-009	EPA 6020
	Uranium	0.00226	0.000067	0.0002	0.03			095214-009	EPA 6020
	Vanadium	ND	0.001	0.005	NE	U		095214-009	EPA 6010
	Zinc	0.00437	0.0035	0.010	NE	J		095214-009	EPA 6020

Table IV-10 (Continued)
Summary of Unfiltered Total Metal Results
SWMUs 8/58 Groundwater Monitoring
Quarterly Assessment, January – March 2014

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 23-Jan-14	Aluminum	ND	0.015	0.050	NE	U		095208-009	EPA 6020
	Antimony	ND	0.001	0.003	0.006	U		095208-009	EPA 6020
	Arsenic	0.0018	0.0017	0.005	0.010	J		095208-009	EPA 6020
	Barium	0.0474	0.0006	0.002	2.00			095208-009	EPA 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		095208-009	EPA 6020
	Cadmium	ND	0.00011	0.001	0.005	U		095208-009	EPA 6020
	Calcium	77.9	0.600	2.00	NE			095208-009	EPA 6020
	Chromium	ND	0.002	0.010	0.100	U		095208-009	EPA 6020
	Cobalt	ND	0.0001	0.001	NE	U		095208-009	EPA 6020
	Copper	0.000645	0.00035	0.001	NE	J		095208-009	EPA 6020
	Iron	0.0936	0.033	0.100	NE	J		095208-009	EPA 6020
	Lead	ND	0.0005	0.002	NE	U		095208-009	EPA 6020
	Magnesium	15.5	0.010	0.030	NE			095208-009	EPA 6020
	Manganese	ND	0.001	0.005	NE	U		095208-009	EPA 6020
	Mercury	ND	0.000067	0.0002	0.002	U		095208-009	EPA 7470
	Nickel	0.00119	0.0005	0.002	NE	J		095208-009	EPA 6020
	Potassium	1.42	0.080	0.300	NE			095208-009	EPA 6020
	Selenium	0.00363	0.0015	0.005	0.050	J		095208-009	EPA 6020
	Silver	ND	0.0002	0.001	NE	U		095208-009	EPA 6020
	Sodium	47.5	0.080	0.250	NE			095208-009	EPA 6020
	Thallium	ND	0.00045	0.002	0.002	U		095208-009	EPA 6020
	Uranium	0.00485	0.000067	0.0002	0.03			095208-009	EPA 6020
	Vanadium	0.0105	0.001	0.005	NE			095208-009	EPA 6010
	Zinc	ND	0.0035	0.010	NE	U		095208-009	EPA 6020

Table IV-10 (Concluded)
Summary of Unfiltered Total Metal Results
SWMUs 8/58 Groundwater Monitoring
Quarterly Assessment, January – March 2014

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

^cAnalytical Method

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

- 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, January – March 2014

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 20-Jan-14	Aluminum	0.0189	0.015	0.050	NE	J		095196-009	EPA 6020
	Antimony	ND	0.001	0.003	0.006	U		095196-009	EPA 6020
	Arsenic	ND	0.0017	0.005	0.010	U		095196-009	EPA 6020
	Barium	0.0176	0.0006	0.002	2.00			095196-009	EPA 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		095196-009	EPA 6020
	Cadmium	ND	0.00011	0.001	0.005	U		095196-009	EPA 6020
	Calcium	83.8	0.600	2.00	NE			095196-009	EPA 6020
	Chromium	ND	0.002	0.010	0.100	U		095196-009	EPA 6020
	Cobalt	0.000157	0.0001	0.001	NE	J		095196-009	EPA 6020
	Copper	0.000571	0.00035	0.001	NE	J		095196-009	EPA 6020
	Iron	0.154	0.033	0.100	NE			095196-009	EPA 6020
	Lead	ND	0.0005	0.002	NE	U		095196-009	EPA 6020
	Magnesium	16.0	0.010	0.030	NE			095196-009	EPA 6020
	Manganese	0.00242	0.001	0.005	NE	J		095196-009	EPA 6020
	Mercury	ND	0.000067	0.0002	0.002	U		095196-009	EPA 7470
	Nickel	0.00173	0.0005	0.002	NE	J		095196-009	EPA 6020
	Potassium	1.79	0.080	0.300	NE			095196-009	EPA 6020
	Selenium	0.00302	0.0015	0.005	0.050	J		095196-009	EPA 6020
	Silver	ND	0.0002	0.001	NE	U		095196-009	EPA 6020
	Sodium	20.9	0.080	0.250	NE		J	095196-009	EPA 6020
	Thallium	ND	0.00045	0.002	0.002	U		095196-009	EPA 6020
	Uranium	0.0107	0.000067	0.0002	0.03			095196-009	EPA 6020
	Vanadium	ND	0.001	0.005	NE	U		095196-009	EPA 6010
	Zinc	ND	0.0035	0.010	NE	U		095196-009	EPA 6020

Table IV-11 (Continued)
Summary of Unfiltered Total Metal Results
SWMU 68 Groundwater Monitoring
Quarterly Assessment, January – March 2014

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 22-Jan-14	Aluminum	ND	0.015	0.050	NE	U		095201-009	EPA 6020
	Antimony	ND	0.001	0.003	0.006	U		095201-009	EPA 6020
	Arsenic	ND	0.0017	0.005	0.010	U		095201-009	EPA 6020
	Barium	0.0191	0.0006	0.002	2.00			095201-009	EPA 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		095201-009	EPA 6020
	Cadmium	ND	0.00011	0.001	0.005	U		095201-009	EPA 6020
	Calcium	82.9	0.600	2.00	NE			095201-009	EPA 6020
	Chromium	ND	0.002	0.010	0.100	U		095201-009	EPA 6020
	Cobalt	0.000123	0.0001	0.001	NE	J		095201-009	EPA 6020
	Copper	0.000505	0.00035	0.001	NE	J	0.0044U	095201-009	EPA 6020
	Iron	0.150	0.033	0.100	NE			095201-009	EPA 6020
	Lead	ND	0.0005	0.002	NE	U		095201-009	EPA 6020
	Magnesium	15.4	0.010	0.030	NE			095201-009	EPA 6020
	Manganese	ND	0.001	0.005	NE	U		095201-009	EPA 6020
	Mercury	ND	0.000067	0.0002	0.002	U		095201-009	EPA 7470
	Nickel	0.00169	0.0005	0.002	NE	J		095201-009	EPA 6020
	Potassium	1.83	0.080	0.300	NE			095201-009	EPA 6020
	Selenium	0.00348	0.0015	0.005	0.050	J		095201-009	EPA 6020
	Silver	ND	0.0002	0.001	NE	U		095201-009	EPA 6020
	Sodium	21.3	0.080	0.250	NE		J	095201-009	EPA 6020
	Thallium	ND	0.00045	0.002	0.002	U		095201-009	EPA 6020
	Uranium	0.0141	0.000067	0.0002	0.03			095201-009	EPA 6020
	Vanadium	ND	0.001	0.005	NE	U		095201-009	EPA 6010
	Zinc	ND	0.0035	0.010	NE	U		095201-009	EPA 6020

Table IV-11 (Continued)
Summary of Unfiltered Total Metal Results
SWMU 68 Groundwater Monitoring
Quarterly Assessment, January – March 2014

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 (Duplicate) 22-Jan-14	Aluminum	ND	0.015	0.050	NE	U		095202-009	EPA 6020
	Antimony	ND	0.001	0.003	0.006	U		095202-009	EPA 6020
	Arsenic	ND	0.0017	0.005	0.010	U		095202-009	EPA 6020
	Barium	0.0195	0.0006	0.002	2.00			095202-009	EPA 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		095202-009	EPA 6020
	Cadmium	ND	0.00011	0.001	0.005	U		095202-009	EPA 6020
	Calcium	83.6	0.600	2.00	NE			095202-009	EPA 6020
	Chromium	ND	0.002	0.010	0.100	U		095202-009	EPA 6020
	Cobalt	0.000132	0.0001	0.001	NE	J		095202-009	EPA 6020
	Copper	0.00065	0.00035	0.001	NE	J	0.0044U	095202-009	EPA 6020
	Iron	0.154	0.033	0.100	NE			095202-009	EPA 6020
	Lead	ND	0.0005	0.002	NE	U		095202-009	EPA 6020
	Magnesium	16.3	0.010	0.030	NE			095202-009	EPA 6020
	Manganese	ND	0.001	0.005	NE	U		095202-009	EPA 6020
	Mercury	ND	0.000067	0.0002	0.002	U		095202-009	EPA 7470
	Nickel	0.00204	0.0005	0.002	NE			095202-009	EPA 6020
	Potassium	1.75	0.080	0.300	NE			095202-009	EPA 6020
	Selenium	0.00342	0.0015	0.005	0.050	J		095202-009	EPA 6020
	Silver	ND	0.0002	0.001	NE	U		095202-009	EPA 6020
	Sodium	23.0	0.080	0.250	NE		J	095202-009	EPA 6020
	Thallium	ND	0.00045	0.002	0.002	U		095202-009	EPA 6020
	Uranium	0.0144	0.000067	0.0002	0.03			095202-009	EPA 6020
	Vanadium	ND	0.001	0.005	NE	U		095202-009	EPA 6010
	Zinc	ND	0.0035	0.010	NE	U		095202-009	EPA 6020

Table IV-11 (Continued)
Summary of Unfiltered Total Metal Results
SWMU 68 Groundwater Monitoring
Quarterly Assessment, January – March 2014

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 21-Jan-14	Aluminum	ND	0.015	0.050	NE	U		095205-009	EPA 6020
	Antimony	ND	0.001	0.003	0.006	U		095205-009	EPA 6020
	Arsenic	ND	0.0017	0.005	0.010	U		095205-009	EPA 6020
	Barium	0.0253	0.0006	0.002	2.00			095205-009	EPA 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		095205-009	EPA 6020
	Cadmium	ND	0.00011	0.001	0.005	U		095205-009	EPA 6020
	Calcium	77.4	0.600	2.00	NE			095205-009	EPA 6020
	Chromium	ND	0.002	0.010	0.100	U		095205-009	EPA 6020
	Cobalt	0.000152	0.0001	0.001	NE	J		095205-009	EPA 6020
	Copper	0.000777	0.00035	0.001	NE	J		095205-009	EPA 6020
	Iron	0.148	0.033	0.100	NE			095205-009	EPA 6020
	Lead	ND	0.0005	0.002	NE	U		095205-009	EPA 6020
	Magnesium	16.4	0.010	0.030	NE			095205-009	EPA 6020
	Manganese	ND	0.001	0.005	NE	U		095205-009	EPA 6020
	Mercury	ND	0.000067	0.0002	0.002	U		095205-009	EPA 7470
	Nickel	0.00173	0.0005	0.002	NE	J		095205-009	EPA 6020
	Potassium	1.84	0.080	0.300	NE			095205-009	EPA 6020
	Selenium	0.0031	0.0015	0.005	0.050	J		095205-009	EPA 6020
	Silver	ND	0.0002	0.001	NE	U		095205-009	EPA 6020
	Sodium	20.2	0.080	0.250	NE		J	095205-009	EPA 6020
	Thallium	ND	0.00045	0.002	0.002	U		095205-009	EPA 6020
	Uranium	0.0125	0.000067	0.0002	0.03			095205-009	EPA 6020
	Vanadium	0.00124	0.001	0.005	NE	J		095205-009	EPA 6010
	Zinc	ND	0.0035	0.010	NE	U		095205-009	EPA 6020

Table IV-11 (Concluded)
Summary of Unfiltered Total Metal Results
SWMU 68 Groundwater Monitoring
Quarterly Assessment, January – March 2014

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.

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

^cAnalytical Method

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

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, January – March 2014

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 27-Jan-14	Calcium	46.8	0.060	0.200	NE			095213-017	EPA 6020
	Magnesium	10.9	0.010	0.030	NE			095213-017	EPA 6020
	Potassium	4.12	0.080	0.300	NE		J	095213-017	EPA 6020
	Sodium	65.2	0.400	1.25	NE			095213-017	EPA 6020
CCBA-MW1 (Duplicate) 27-Jan-14	Calcium	46.9	0.060	0.200	NE			095214-017	EPA 6020
	Magnesium	11.3	0.010	0.030	NE			095214-017	EPA 6020
	Potassium	4.26	0.080	0.300	NE		J	095214-017	EPA 6020
	Sodium	62.3	0.400	1.25	NE			095214-017	EPA 6020
CCBA-MW2 23-Jan-14	Calcium	79.8	0.600	2.00	NE			095208-017	EPA 6020
	Magnesium	15.8	0.010	0.030	NE			095208-017	EPA 6020
	Potassium	1.48	0.080	0.300	NE			095208-017	EPA 6020
	Sodium	48.3	0.080	0.250	NE			095208-017	EPA 6020
SWMU 68									
OBS-MW1 20-Jan-14	Calcium	83.7	0.600	2.00	NE			095196-017	EPA 6020
	Magnesium	16.6	0.010	0.030	NE			095196-017	EPA 6020
	Potassium	1.79	0.080	0.300	NE			095196-017	EPA 6020
	Sodium	22.9	0.080	0.250	NE		J	095196-017	EPA 6020
OBS-MW2 22-Jan-14	Calcium	81.2	0.600	2.00	NE			095201-017	EPA 6020
	Magnesium	16.9	0.010	0.030	NE			095201-017	EPA 6020
	Potassium	1.76	0.080	0.300	NE			095201-017	EPA 6020
	Sodium	21.4	0.080	0.250	NE		J	095201-017	EPA 6020
OBS-MW2 (Duplicate) 22-Jan-14	Calcium	81.3	0.600	2.00	NE			095202-017	EPA 6020
	Magnesium	15.0	0.010	0.030	NE			095202-017	EPA 6020
	Potassium	1.67	0.080	0.300	NE			095202-017	EPA 6020
	Sodium	21.9	0.080	0.250	NE		J	095202-017	EPA 6020
OBS-MW3 21-Jan-14	Calcium	82.1	0.600	2.00	NE			095205-017	EPA 6020
	Magnesium	16.3	0.010	0.030	NE			095205-017	EPA 6020
	Potassium	1.75	0.080	0.300	NE			095205-017	EPA 6020
	Sodium	22.3	0.080	0.250	NE		J	095205-017	EPA 6020

Table IV-12 (Concluded)
Summary of Filtered Cation Results
SWMUs 8/58 and 68 Groundwater Monitoring
Quarterly Assessment, January – March 2014

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.

J = The associated value is an estimated quantity.

^cAnalytical Method

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

CCBA = Coyote Canyon Blast Area.

EPA = U.S. Environmental Protection Agency.

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

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

mg/L = Milligrams per liter.

MW = Monitoring well.

NE = Not established.

OBS = Old Burn Site.

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

SWMU = Solid Waste Management Unit.

Table IV-13

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

SWMUs 8/58 and 68 Groundwater Monitoring

Quarterly Assessment, January – March 2014

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 27-Jan-14	Americium-241	5.62 ± 9.02	12.9	6.36	NE	U	BD	095213-033	EPA 901.1
	Cesium-137	3.01 ± 2.47	3.75	1.82	NE	U	BD	095213-033	EPA 901.1
	Cobalt-60	0.932 ± 3.25	4.17	2.00	NE	U	BD	095213-033	EPA 901.1
	Potassium-40	-26.2 ± 36.4	46.5	22.5	NE	U	BD	095213-033	EPA 901.1
	Gross Alpha	2.26	NA	NA	15 pCi/L	NA	None	095213-034	EPA 900.0
	Gross Beta	3.71 ± 0.996	0.998	0.472	4mrem/yr		J	095213-034	EPA 900.0
CCBA-MW1 (Duplicate) 27-Jan-14	Americium-241	14.5 ± 16.6	23.5	11.6	NE	U	BD	095214-033	EPA 901.1
	Cesium-137	0.440 ± 3.99	3.53	1.71	NE	U	BD	095214-033	EPA 901.1
	Cobalt-60	-0.767 ± 2.12	3.58	1.71	NE	U	BD	095214-033	EPA 901.1
	Potassium-40	0.575 ± 39.0	46.4	22.3	NE	U	BD	095214-033	EPA 901.1
	Gross Alpha	0.74	NA	NA	15 pCi/L	NA	None	095214-034	EPA 900.0
	Gross Beta	2.65 ± 0.898	0.993	0.464	4mrem/yr		J	095214-034	EPA 900.0
CCBA-MW2 23-Jan-14	Americium-241	0.728 ± 11.4	17.6	8.66	NE	U	BD	095208-033	EPA 901.1
	Cesium-137	0.523 ± 3.10	4.00	1.94	NE	U	BD	095208-033	EPA 901.1
	Cobalt-60	0.374 ± 2.05	3.62	1.72	NE	U	BD	095208-033	EPA 901.1
	Potassium-40	17.5 ± 48.8	34.6	16.3	NE	U	BD	095208-033	EPA 901.1
	Gross Alpha	5.17	NA	NA	15 pCi/L	NA	None	095208-034	EPA 900.0
	Gross Beta	1.88 ± 0.793	0.994	0.469	4mrem/yr		J	095208-034	EPA 900.0

Table IV-13 (Continued)
Summary of Gamma Spectroscopy, Gross Alpha, Gross Beta, and Isotopic Uranium Results
SWMUs 8/58 and 68 Groundwater Monitoring
Quarterly Assessment, January – March 2014

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 20-Jan-14	Americium-241	-2.94 ± 14.0	21.6	10.6	NE	U	BD	095196-033	EPA 901.1
	Cesium-137	-1.08 ± 1.84	3.09	1.47	NE	U	BD	095196-033	EPA 901.1
	Cobalt-60	-0.623 ± 2.05	3.61	1.69	NE	U	BD	095196-033	EPA 901.1
	Potassium-40	0.586 ± 45.6	31.3	14.4	NE	U	BD	095196-033	EPA 901.1
	Gross Alpha	-1.95	NA	NA	15 pCi/L	NA	None	095196-034	EPA 900.0
	Gross Beta	4.14 ± 1.10	0.997	0.475	4 mrem/yr		J	095196-034	EPA 900.0
	Uranium-233/234	18.5 ± 2.39	0.0607	0.0237	NE			095196-035	HASL-300
	Uranium-235/236	0.169 ± 0.0683	0.0547	0.0192	NE			095196-035	HASL-300
	Uranium-238	3.38 ± 0.493	0.0381	0.0124	NE			095196-035	HASL-300
OBS-MW2 22-Jan-14	Americium-241	11.3 ± 12.1	18.3	8.93	NE	U	BD	095201-033	EPA 901.1
	Cesium-137	0.346 ± 4.85	3.89	1.87	NE	U	BD	095201-033	EPA 901.1
	Cobalt-60	0.773 ± 2.29	4.10	1.93	NE	U	BD	095201-033	EPA 901.1
	Potassium-40	-0.611 ± 44.8	51.5	24.6	NE	U	BD	095201-033	EPA 901.1
	Gross Alpha	4.93	NA	NA	15 pCi/L	NA	None	095201-034	EPA 900.0
	Gross Beta	3.95 ± 1.16	1.06	0.507	4 mrem/yr		J	095201-034	EPA 900.0
	Uranium-233/234	23.2 ± 2.96	0.0585	0.0229	NE			095201-035	HASL-300
	Uranium-235/236	0.187 ± 0.0841	0.0527	0.0185	NE			095201-035	HASL-300
	Uranium-238	4.28 ± 0.605	0.0367	0.0119	NE			095201-035	HASL-300
OBS-MW2 (Duplicate) 22-Jan-14	Americium-241	-3.86 ± 8.21	9.44	4.62	NE	U	BD	095202-033	EPA 901.1
	Cesium-137	2.67 ± 2.25	3.33	1.60	NE	U	BD	095202-033	EPA 901.1
	Cobalt-60	1.00 ± 2.02	3.66	1.73	NE	U	BD	095202-033	EPA 901.1
	Potassium-40	8.54 ± 37.5	46.3	22.2	NE	U	BD	095202-033	EPA 901.1
	Gross Alpha	3.77	NA	NA	15 pCi/L	NA	None	095202-034	EPA 900.0
	Gross Beta	2.89 ± 1.31	0.999	0.471	4 mrem/yr		J	095202-034	EPA 900.0
	Uranium-233/234	22.1 ± 2.82	0.0582	0.0227	NE			095202-035	HASL-300
	Uranium-235/236	0.388 ± 0.107	0.0524	0.0184	NE			095202-035	HASL-300
	Uranium-238	4.54 ± 0.634	0.0365	0.0119	NE			095202-035	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, January – March 2014

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 21-Jan-14	Americium-241	-0.657 ± 13.8	24.2	11.7	NE	U	BD	095205-033	EPA 901.1
	Cesium-137	-0.509 ± 1.77	3.11	1.48	NE	U	BD	095205-033	EPA 901.1
	Cobalt-60	3.22 ± 3.69	3.75	1.76	NE	U	BD	095205-033	EPA 901.1
	Potassium-40	10.3 ± 36.5	28.4	13.0	NE	U	BD	095205-033	EPA 901.1
	Gross Alpha	5.18	NA	NA	15 pCi/L	NA	None	095205-034	EPA 900.0
	Gross Beta	3.24 ± 1.32	0.993	0.463	4 mrem/yr		J	095205-034	EPA 900.0
	Uranium-233/234	20.5 ± 2.72	0.0745	0.0291	NE			095205-035	HASL-300
	Uranium-235/236	0.260 ± 0.0968	0.0671	0.0235	NE			095205-035	HASL-300
	Uranium-238	3.86 ± 0.580	0.0467	0.0152	NE			095205-035	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, January – March 2014

Notes (continued)

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

Table IV-14
Summary of Constituents Detected above Established MCLs
SWMUs 8/58 and 68 Groundwater Monitoring
Quarterly Assessments through March 2014

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
CCBA-MW1	27-Jan-14	Fluoride	4.68 mg/L	4.0 mg/L			095213-016	EPA 9056
CCBA-MW1 (Duplicate)	27-Jan-14	Fluoride	4.74 mg/L	4.0 mg/L			095214-016	EPA 9056

Notes

^aLaboratory Qualifier

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

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

^bValidation Qualifier

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

^cAnalytical Method

U.S. Environmental Protection Agency, 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-14 (Concluded)
Summary of Constituents Detected above Established MCLs
SWMUs 8/58 and 68 Groundwater Monitoring
Quarterly Assessments through March 2014

Notes (continued)

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, January – March 2014

Well/Parameter	Environmental Sample (R1)	Duplicate Sample (R2)	RPD ^a
	mg/L unless otherwise noted		
CCBA-MW1			
Nitrate plus Nitrite	2.07	1.99	4
Bicarbonate Alkalinity	180	177	2
Bromide	0.323	0.325	1
Chloride	28.3	28.4	< 1
Fluoride	4.68	4.74	1
Sulfate	57.6	57.9	1
Aluminum	0.0368	0.0298	21
Beryllium	0.000471	0.000473	< 1
Calcium	46.3	47.2	2
Iron	0.117	0.113	3
Magnesium	11.1	10.7	4
Manganese	0.00331	0.00327	1
Nickel	0.000838	0.000876	4
Potassium	4.03	4.19	4
Selenium	0.00219	0.00225	3
Sodium	65.4	60.7	7
Uranium	0.00222	0.00226	2
Zinc	0.00681	0.00437	44
Filtered Calcium	46.8	46.9	< 1
Filtered Magnesium	10.9	11.3	4
Filtered Potassium	4.12	4.26	3
Filtered Sodium	65.2	62.3	5
OBS-MW1			
Nitrate plus Nitrite	1.58	1.54	3
Bicarbonate Alkalinity	178	176	1
Bromide	0.332	0.361	8
Chloride	22.7	22.1	3
Fluoride	2.16	2.17	< 1
Sulfate	83.0	82.7	< 1
Barium	0.0191	0.0195	2
Calcium	82.9	83.6	1
Cobalt	0.000123	0.000132	7
Iron	0.150	0.154	3
Magnesium	15.4	16.3	6
Nickel	0.00169	0.00204	19
Potassium	1.83	1.75	4

Table IV-15 (Concluded)
Summary of Duplicate Samples
SWMUs 8/58 and 68 Groundwater Monitoring
Quarterly Assessment, January – March 2014

Well/Parameter	Environmental Sample (R1)	Duplicate Sample (R2)	RPD ^a
	mg/L unless otherwise noted		
OBS-MW1			
Selenium	0.00348	0.00342	2
Sodium	21.3	23.0	8
Uranium	0.0141	0.0144	2
Filtered Calcium	81.2	81.3	< 1
Filtered Magnesium	16.9	15.0	12
Filtered Potassium	1.76	1.67	5
Filtered Sodium	21.4	21.9	2

Notes

^aRPD

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

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

where: R₁ = analysis result.
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.

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

FIELD MEASUREMENT LOG FOR GROUNDWATER SAMPLE COLLECTION

Project Name: SWMU 8/58	Project No.: 146422.10.11.01
Well I.D.: CCBA-MW 1	Date: 01/27/14
Well Condition:	Weather Condition:
Method: Portable pump <u>X</u> Dedicated pump _____ Pump depth: <u>79'</u>	

PURGE MEASUREMENTS

[illegible]

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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: 1/23/14		
Make & Model: YSI EXO 1					
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: 0628	4.01	19.2	7.00	19.2	9.99 19.2
2. Time: 1051	4.00	19.0	7.01	19.0	10.00 19.1
3. Time:					
4. Time:					
Standard lot no.:	3AD782		3AE725		3AD357
Expiration date:	4/15		5/15		4/15
SC Calibration					
Reference Value: 1225 uS			Standard Lot No.: 3AE221		
	Value	Temp	Expiration Date: 5/15		
1. Time: 0630	1222	19.2			
2. Time: 1053	1220	19.1			
3. Time:					
4. Time:					
ORP Calibration					
Reference Value: 200 mV			Standard Lot No. 1305755		
	Value	Temp	Expiration Date: 1/14		
1. Time: 0629	200.2	19.2			
2. Time: 1052	200.4	19.0			
3. Time:					
4. Time:					
DO Calibration					
Calibration Value:	81% air saturation @ 5200 ft.		Atmospheric Pressure in Hg		
1. Time: 0627	81.8		24.40		
2. Time: 1050	81.6		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: 1/23/14		
TURBIDIMETER				
Make & Model: HACH 2100P HACH 2100Q		Serial No. S/N 10060C003010		
Reference Value	25.1 10	20	100	800
Standard Lot No.	0161	0167	0168	0161
1. Time 0758	9.97	19.4	102	795
2. Time 0947	9.94	19.6	99.7	792
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: 1/27/14			
Make & Model: YSI EXO 1						
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: 0641	3.99	19.0	7.01	19.0	10.01	19.0
2. Time: 1052	4.00	19.2	7.01	19.2	9.99	19.2
3. Time:						
4. Time:						
Standard lot no.:	3AD782		3AE725		3AD357	
Expiration date:	4/15		5/15		4/15	
SC Calibration						
Reference Value: 1225 uS			Standard Lot No.: 3AE221			
	Value	Temp	Expiration Date: 5/15			
1. Time: 0643	1227	19.0				
2. Time: 1054	1225	19.1				
3. Time:						
4. Time:						
ORP Calibration						
Reference Value: 200 mV			Standard Lot No. 1305755			
	Value	Temp	Expiration Date: 1/14			
1. Time: 0642	201.0	19.0				
2. Time: 1053	200.7	19.3				
3. Time:						
4. Time:						
DO Calibration						
Calibration Value:	81% air saturation @ 5200 ft.		Atmospheric Pressure in Hg			
1. Time: 0640	81.7		24.20			
2. Time: 1051	81.8		24.24			
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: 1/27/14		
TURBIDIMETER				
Make & Model: HACH 2100P HACH 2100Q		Serial No. S/N 10060C003010		
Reference Value		20	100	800
Standard Lot No.	0161	0167	0168	0161
1. Time 0804	9.93	19.9	102	796
2. Time 0940	9.95	19.6	99.7	795
3. Time				
4. Time				
Comments:				

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

Project Name: <u>SWMU 8/58 GWM</u>	Monitoring Well ID #: <u>CCBA-MW2</u>	Date: <u>1/23/2014</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> <u>Robert Lynch</u> Print Name: <u>RL</u> Initial: <u>Alfred Santillanes</u> Print Name: <u>AS</u> Initial:	<u>Personnel Performing Decontamination:</u> <u>Robert Lynch</u> Print Name: <u>RL</u> Initial: <u>Alfred Santillanes</u> 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		
Distilled or Deionized (circle one) Source: <u>Culligan</u> Lot Number: <u>121813</u>	HNO₃ Grade: <u>Reagent</u> UN #: <u>2031</u> Manufacturer: <u>Fisher Scientific</u> Lot Number: <u>A0305629</u>	

**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>1/27/14</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>WJG</u> Robert Lynch Print Name: <u>RL</u> Initial: <u>RL</u>		<u>Personnel Performing Decontamination:</u> William Gibson Print Name: <u>WJG</u> Initial: <u>WJG</u> Robert Lynch Print Name: <u>RL</u> Initial: <u>RL</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 Deionized (circle one) Source: <u>Culligan</u> Lot Number: <u>121813</u>	HNO₃ Grade: <u>Reagent</u> UN #: <u>2031</u> Manufacturer: <u>AROC</u> Lot Number: <u>A0305629</u>	

Waste Generator : <u>Alfred Santillanes</u> Phone: <u>844-5130</u> project leader: <u>Clinton Lum</u>			
Project Name	SWMU 8/58 GWM	SWMU 8/58 GWM	SWMU 8/58 GWM
Container ID # (site-date-sequence)	SWMU-CCBA-MW2-012314-01	SWMU-CCBA-MW2-012314	SWMU-012314
Initial Label Type (Hazardous or Non-Regulated)	Non-Hazardous	Non-Hazardous	Non-Hazardous
Waste Matrix (purge water, decon water, HACH Accu-Vac ampule)	Purge Water	Purge Water	Decon Water
Container Type / Volume	55 gal CHPD	55 gal CHPD	55 gal CHPD
Volume of Waste	19 gallons	21 gallons	30 gallons
Total Container Weight	170 lbs	180 lbs	250 lbs
COC#: Sample#-Fraction	<div>_____</div> <div>_____</div> <div>615209</div> <div>_____</div> <div>095207 <i>ETJ</i></div> <div>095208</div> <div>_____</div>	<div>_____</div> <div>_____</div> <div>615209</div> <div>_____</div> <div>095207 <i>ETJ</i></div> <div>095208</div> <div>_____</div>	<div>_____</div> <div>_____</div> <div>615209</div> <div>_____</div> <div>095207 <i>ETJ</i></div> <div>095208</div> <div>_____</div>
Accumulation Date	Start: 01/23/2014 Full: 01/23/2014	Start: 01/23/2014 Full: 01/23/2014	Start: 01/23/2014 Full: 01/23/2014
Date Waste Moved to Accumulation Area	01/23/2014	01/23/2014	01/23/2014
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-MW1-012714-01	SWMU-CCBA-MW1-012714-02	SWMU-012714
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.	~ 16 gal.	~ 30 gal.
Total Container Weight	~150 lbs.	~ 120 lbs.	~ 240 gal.
COC#: Sample#-Fraction	<u>CoC # 615211</u> <u>Sample # 095213, 095214</u>	<u>CoC # 615211</u> <u>Sample # 095213, 095214</u>	<u>CoC # 615211</u> <u>Sample # 095213, 095214</u>
Accumulation Date	Start: 1-27-14 Full: 1-27-14	Start: 1-27-14 Full: 1-27-14	Start: 1-27-14 Full: 1-27-14
Date Waste Moved to Accumulation Area	1-27-14	1-27-14	1-27-14
Accumulation Area Name	9925	9925	9925
Comments:			

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TAILGATE SAFETY MEETING FORM

Dept: 4142 Well Location: CCBA-mw2 Date: 1/23/14 Time: 0755

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: 39.7 °F Wind Speed: ~30 MPH Humidity: 29.6 % Wind Chill 28 °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 T Lynch
Printed Name

ALFRED SANTILLANES
Printed Name

Gilbert L. Quintana
Printed Name

Printed Name

Printed Name

Robert T Lynch
Signature

Alfred Santillanes
Signature

Gilbert L. Quintana
Signature

Signature

Signature

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TAILGATE SAFETY MEETING FORM

Dept: 4142 Well Location: CCBA-mw1 Date: 1/27/14 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: 39 °F Wind Speed: ~10 MPH Humidity: 19.4 % Wind Chill 32 °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

ALFRED SANTILLANES
Printed Name

William Gibson
Printed Name

Printed Name

Printed Name

Robert Lynch
Signature

Alfred Santillanes
Signature

William Gibson
Signature

Signature

Signature

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FIELD MEASUREMENT LOG FOR GROUNDWATER SAMPLE COLLECTION

Project Name: SWMU 68	Project No.: 146422.10.11.01
Well I.D.: OBS-MW 3	Date: 01/21/14
Well Condition:	Weather Condition:
Method: Portable pump <u>X</u> Dedicated pump _____ Pump depth: <u>208'</u>	

PURGE MEASUREMENTS

[illegible]

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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: 1/20/14			
Make & Model: YSI EXO 1						
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:	0628	3.99	18.7	7.01	18.7	10.00
2. Time:	1035	4.01	18.9	7.00	19.0	10.00
3. Time:						
4. Time:						
Standard lot no.:	3AD782		3AE725		3AD357	
Expiration date:	4/15		5/15		4/15	
SC Calibration						
Reference Value: 1225 uS			Standard Lot No.: 3AE221			
	Value	Temp	Expiration Date: 5/15			
1. Time:	0630	1222	18.8			
2. Time:	1037	1227	19.0			
3. Time:						
4. Time:						
ORP Calibration						
Reference Value: 200 mV			Standard Lot No. 1305755			
	Value	Temp	Expiration Date: 1/14			
1. Time:	0629	201.0	18.8			
2. Time:	1036	200.7	19.0			
3. Time:						
4. Time:						
DO Calibration						
Calibration Value:	81% air saturation @ 5200 ft.		Atmospheric Pressure in Hg			
1. Time:	0627	81.7	24.42			
2. Time:	1034	81.8	24.40			
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: 1/20/14		
TURBIDIMETER				
Make & Model: HACH 2100P HACH 2100Q		Serial No. S/N 10060C003010		
Reference Value	PL + 10	20	100	800
Standard Lot No.	0161	0167	0168	0161
1. Time 0755	9.95	19.7	103	794
2. Time 0939	9.93	19.6	101	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: 1/21/14		
Make & Model: YSI EXO 1					
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: 0641	3.98	18.0	7.00	18.2	10.01 18.2
2. Time: 1051	3.99	18.3	7.01	18.3	10.01 18.3
3. Time:					
4. Time:					
Standard lot no.:	3AD782		3AE725		3AD357
Expiration date:	4/15		5/15		4/15
SC Calibration					
Reference Value: 1225 uS			Standard Lot No.: 3AE221		
	Value	Temp	Expiration Date: 5/15		
1. Time: 0643	1220	18.0			
2. Time: 1053	1223	18.2			
3. Time:					
4. Time:					
ORP Calibration					
Reference Value: 200 mV			Standard Lot No. 1305755		
	Value	Temp	Expiration Date: 1/14		
1. Time: 0642	199.8	18.1			
2. Time: 1052	200.4	18.2			
3. Time:					
4. Time:					
DO Calibration					
Calibration Value:	81% air saturation @ 5200 ft.		Atmospheric Pressure in Hg		
1. Time: 0640	81.5	24.57			
2. Time: 1050	81.6	24.55			
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: 1/21/14		
TURBIDIMETER				
Make & Model: HACH 2100P HACH 2100Q		Serial No. S/N 10060C003010		
Reference Value	PL 10	20	100	800
Standard Lot No.	0161	0167	0168	0161
1. Time 0754	9.94	19.8	99.5	796
2. Time 0936	9.93	19.6	99.2	795
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: 1/22/14		
Make & Model: YSI EXO 1					
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:	0620	4.02	18.6	7.00	18.6
2. Time:	1046	3.99	18.8	7.00	18.8
3. Time:					
4. Time:					
Standard lot no.:	3AD782		3AE725		3AD357
Expiration date:	4/15		5/15		4/15
SC Calibration					
Reference Value: 1225 uS			Standard Lot No.: 3AE221		
	Value	Temp	Expiration Date: 5/15		
1. Time:	0622	1227			
2. Time:	1048	1225			
3. Time:					
4. Time:					
ORP Calibration					
Reference Value: 200 mV			Standard Lot No. 1305755		
	Value	Temp	Expiration Date: 1/14		
1. Time:	0621	200.7			
2. Time:	1047	200.1			
3. Time:					
4. Time:					
DO Calibration					
Calibration Value:	81% air saturation @ 5200 ft.		Atmospheric Pressure in Hg		
1. Time:	0619	81.7	24.38		
2. Time:	1045	81.5	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 68		Project No.: 146422.10.11.01		
Calibration done by: R Lynch		Date: 1/22/14		
TURBIDIMETER				
Make & Model: HACH 2100P HACH 2100Q		Serial No. S/N 10060C003010		
Reference Value	22 \pm 10	20	100	800
Standard Lot No.	0161	0167	0168	0161
1. Time 0800	9.95	19.7	99.5	801
2. Time 0950	9.93	19.8	99.3	796
3. Time				
4. Time				
Comments:				

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

Project Name: <u>SWMU 68 GWM</u>	Monitoring Well ID #: <u>OBS-MW1</u>	Date: <u>1/20/2014</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>	
Personnel Performing Decontamination: <u>Robert Lynch</u> <u>RL</u> Print Name: Initial: <u>Alfred Santillanes</u> <u>AS</u> Print Name: Initial:		Personnel Performing Decontamination: <u>Robert Lynch</u> <u>RL</u> Print Name: Initial: <u>Alfred Santillanes</u> <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 Deionized (circle one) Source: <u>Culligan</u> Lot Number: <u>121813</u>	HNO₃ Grade: <u>Reagent</u> UN #: <u>2031</u> Manufacturer: <u>fisher Scientific</u> Lot Number: <u>A0305629</u>	

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

Project Name: <u>SWMU 68 GWM</u>	Monitoring Well ID #: <u>OBS-MW3</u>	Date: <u>01/21/2014</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> <u>Alfred Santillanes</u> Print Name: <u>AS</u> Initial: <u>Robert Lynch</u> Print Name: <u>RL</u> Initial:		<u>Personnel Performing Decontamination:</u> <u>Alfred Santillanes</u> Print Name: <u>AS</u> Initial: <u>Robert Lynch</u> Print Name: <u>RL</u> 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 Deionized (circle one) Source: <u>Culligan</u> Lot Number: <u>121813</u>	HNO₃ Grade: <u>Reagent</u> UN #: <u>2031</u> Manufacturer: <u>Fisher Scientific</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-MW2</u>	Date: <u>01-22-14</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>	
Personnel Performing Decontamination: William Gibson Print Name: <u>WJG</u> Initial: <u>WJG</u> Robert Lynch Print Name: <u>RL</u> Initial: <u>RL</u>	Personnel Performing Decontamination: William Gibson Print Name: <u>WJG</u> Initial: <u>WJG</u> Robert Lynch Print Name: <u>RL</u> Initial: <u>RL</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 Deionized (circle one) Source: <u>Culligan</u> Lot Number: <u>121813</u>	HNO₃ Grade: <u>Reagent</u> UN #: <u>2031</u> Manufacturer: <u>AROC</u> Lot Number: <u>A0305629</u>	

Groundwater Monitoring Waste Generator Log			
Waste Generator : <u>Alfred Santillanes</u>		Phone: <u>844-5130</u>	project leader: <u>Clinton Lum</u>
Project Name	SWMU 68 GWM	SWMU 68 GWM	SWMU 68 GWM
Container ID # (site-date-sequence)	SWMU-OBS-MW1-012014-01	SWMU-OBS-MW1-012014-02	SWMU-012014
Initial Label Type (Hazardous or Non-Regulated)	Non-Hazardous	Non-Hazardous	Non-Hazardous
Waste Matrix (purge water, decon water, HACH Accu-Vac ampule)	Purge Water	Purge Water	Decon Water
Container Type / Volume	55 gal CHPD	55 gal CHPD	55 gal CHPD
Volume of Waste	20 gallon	20 gallon	30 gallon
Total Container Weight	170 lbs	170 lbs	250 lbs
COC#: Sample#-Fraction	<div>_____</div> <div>_____</div> <div>615205</div> <div>_____</div> <div>095196</div> <div>095197 <i>TL</i></div>	<div>_____</div> <div>_____</div> <div>615205</div> <div>_____</div> <div>095196</div> <div>095197 <i>TL</i></div>	<div>_____</div> <div>_____</div> <div>615205</div> <div>_____</div> <div>095196</div> <div>095197 <i>TL</i></div>
Accumulation Date	Start: 01/20/2014 Full: 01/20/2014	Start: 01/20/2014 Full: 01/20/2014	Start: 01/20/2014 Full: 01/20/2014
Date Waste Moved to Accumulation Area	01/20/2014	01/20/2014	01/20/2014
Accumulation Area Name	9925	9925	9925
Comments:			

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Groundwater Monitoring Waste Generation Log

Waste Generator : <u>Alfred Santillanes</u> Phone: <u>844-5130</u> project leader: <u>Clinton Lum</u>			
Project Name	SWMU 68 GWM	SWMU 68 GWM	SWMU 68 GWM
Container ID # (site-date-sequence)	SWMU-OBS-MW3-012114-01	SWMU-OBS-MW3-012114-01	SWMU 012114
Initial Label Type (Hazardous or Non-Regulated)	Non-Hazardous	Non-Hazardous	Non-Hazardous
Waste Matrix (purge water, decon water, HACH Accu-Vac ampule)	Purge Water	Purge Water	Decon Water
Container Type / Volume	55 gal CHPD	55 gal CHPD	55 gal CHPD
Volume of Waste	19 gallons	21 gallons	30 gallons
Total Container Weight	170 lbs	185 lbs	250 lbs
COC#: Sample#-Fraction	<u>615208</u> <u>095205</u> <u>095206</u> <i>TJ</i> 	<u>615208</u> <u>095205</u> <u>095206</u> <i>TJ</i> 	<u>615208</u> <u>095205</u> <u>095206</u> <i>TJ</i>
Accumulation Date	Start: <u>1/21/2014</u> Full: <u>1/21/2014</u>	Start: <u>1/21/2014</u> Full: <u>1/21/2014</u>	Start: <u>1/21/2014</u> Full: <u>1/21/2014</u>
Date Waste Moved to Accumulation Area	<u>1/21/2014</u>	<u>1/21/2014</u>	<u>1/21/2014</u>
Accumulation Area Name	<u>9925</u>	<u>9925</u>	<u>9925</u>
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-MW2-012214-01	SWMU-OBS-MW2-012214-02	SWMU-012214
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	<u>CoC# 615207</u> <u>Sample # 095201, 095202</u>	<u>CoC# 615207</u> <u>Sample # 095201, 095202</u>	<u>CoC# 615207</u> <u>Sample # 095201, 095202</u>
Accumulation Date	Start: 01-22-14 Full: 01-22-14	Start: 01-22-14 Full: 01-22-14	Start: 01-22-14 Full: 01-22-14
Date Waste Moved to Accumulation Area	01-22-14	01-22-14	01-22-14
Accumulation Area Name	9925	9925	9925
Comments:			

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TAILGATE SAFETY MEETING FORM

Dept: 4142 Well Location: OBS-MWI Date: 1/20/14 Time: 0750

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: 63.8 °F Wind Speed: 8 MPH Humidity: 16.9 % 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 T Lynch
Printed Name

ALFRED SANTILLANOS
Printed Name

Printed Name

Printed Name

Printed Name

Robert T Lynch
Signature

Alfred Santillanos
Signature

Signature

Signature

Signature

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TAILGATE SAFETY MEETING FORM

Dept: 4142 Well Location: OBS-MW3 Date: 1/21/14 Time: 0750

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: 51.4 °F Wind Speed: 0 MPH Humidity: 20.4 % 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 T Lynch
Printed Name

ALFRED SANTILLANOS
Printed Name

Printed Name

Printed Name

Printed Name

[Signature]
Signature

[Signature]
Signature

Signature

Signature

Signature

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TAILGATE SAFETY MEETING FORM

Dept: 4142 Well Location: OBS- MW 2 Date: 1/22/14 Time: 0755

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: 47.6 °F Wind Speed: 8 MPH Humidity: 21.6 % 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 T Lynch
Printed Name

William Gibson
Printed Name

ALFRED SANTILLANOS
Printed Name

Printed Name

Printed Name

[Signature]
Signature

[Signature]
Signature

[Signature]
Signature

Signature

Signature

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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

Page 1 of 2

Batch No.		SMO Use		AR/COC 615211								
Project Name: SWMU 8/58 GWM		Date Samples Shipped:		SMO Authorization: <i>Don J. Stangor</i>								
Project/Task Manager: Clinton Lum		Carrier/Waybill No.		SMO Contact Phone:								
Project/Task Number: 146422.10.11.01		Lab Contact: Edie Kent/808-556-8171		Lorraine Herrera/505-844-3199								
Service Order: CF262-14		Lab Destination: GEL		Send Report to SMO:								
		Contract No.: PO 1303873		Rita Kavanaugh/505-284-2553								
Tech Area:				<input type="checkbox"/> Waste Characterization <input type="checkbox"/> RMMA <input type="checkbox"/> Released by COC No. <input checked="" type="checkbox"/> 4° Celsius								
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 Type	Volume	Preservative	Collection Method	Sample Type	Parameter & Method Requested	Lab Sample ID
✓ 095213	-001 ✓	CCBA-MW1	79	1/27/14 9:18 ✓	GW	G	3x40 ml	HCL	G	SA	TCL VOC (SW846-8260B)	
✓ 095213	-002 ✓	CCBA-MW1	79	1/27/14 9:20 ✓	GW	AG	4x1L	None	G	SA	TCL SVOC (SW846-8270C)	
✓ 095213	-009 ✓	CCBA-MW1	79	1/27/14 9:24 ✓	GW	P	500 ml	HNO3	G	SA	TAL Metals+U(SW846-6010/6020/7470)	
✓ 095213	-016 ✓	CCBA-MW1	79	1/27/14 9:25 ✓	GW	P	125 ml	None	G	SA	Anions-Br,Cl,F,SO4 (SW846-9056)	
✓ 095213	-017 ✓	CCBA-MW1	79	1/27/14 9:26 ✓	FGW	P	500 ml	HNO3	G	SA	Metals-Ca,Mg,K,Na (SW846-6020)	
✓ 095213	-018 ✓	CCBA-MW1	79	1/27/14 9:28 ✓	GW	P	125 ml	H2SO4	G	SA	NPN (EPA 353.2)	
✓ 095213	-020 ✓	CCBA-MW1	79	1/27/14 9:29 ✓	GW	P	250 ml	None	G	SA	Perchlorate (EPA 314.0)	
✓ 095213	-022 ✓	CCBA-MW1	79	1/27/14 9:30 ✓	GW	P	500 ml	None	G	SA	Alkalinity (SM2320B)	
✓ 095213	-024 ✓	CCBA-MW1	79	1/27/14 9:31 ✓	GW	AG	4x1L	None	G	SA	High Explosives (SW846-8321A Mod.)	
✓ 095213	-027 ✓	CCBA-MW1	79	1/27/14 9:35 ✓	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						
	William Gibson	<i>William Gibson</i>	WG	SNL/4142/505-284-3307/505-239-7367		Return Samples By:						
	Robert Lynch	<i>Robert Lynch</i>	RL	SNL/4142/505-844-4013/505-250-7090		Comments: Send Report to Tim Jackson/4142/MS 0729/505-284-2547 FGW (filtered in field w/45 micron filter). Alkalinity (as 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								
1. Relinquished by <i>Alfred Santillanes</i>		Org. 4142	Date 1/27/14	Time 10:15	3. Relinquished by		Org.	Date	Time			
1. Received by <i>Don J. Stangor</i>		Org. 4142	Date 1/27/14	Time 10:15	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

Project Name:			SWMU 8/58			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 Sample ID			
✓ 095213	-033	CCBA-MW1		79	1/27/14	9:36 ✓	GW	P	1 L ✓	HNO3	G	SA	Gamma Spectroscopy (EPA 901.0)				
✓ 095213	-034 ✓	CCBA-MW1		79	1/27/14	9:38 ✓	GW	P	1 L	HNO3	G	SA	Gross Alpha and Beta (EPA 900.0)				
✓ 095214	-001 ✓	CCBA-MW1		79	1/27/14	9:18 ✓	GW	G	3x40 ml	HCL	G	DU	TCL VOC (SW846-8260B)				
✓ 095214	-002 ✓	CCBA-MW1		79	1/27/14	9:20 ✓	GW	AG	4x1L	None	G	DU	TCL SVOC (SW846-8270C)				
✓ 095214	-009 ✓	CCBA-MW1		79	1/27/14	9:24 ✓	GW	P	500 ml	HNO3	G	DU	TAL Metals+U(SW846-6010/6020/7470)				
✓ 095214	-016 ✓	CCBA-MW1		79	1/27/14	9:25 ✓	GW	P	125 ml	None	G	DU	Anions-Br,Cl,F,SO4 (SW846-9056)				
✓ 095214	-017 ✓	CCBA-MW1		79	1/27/14	9:26 ✓	FGW	P	500 ml	HNO3	G	DU	Metals-Ca,Mg,K,Na (SW846-6020)				
✓ 095214	-018 ✓	CCBA-MW1		79	1/27/14	9:28 ✓	GW	P	125 ml	H2SO4	G	DU	NPN (EPA 353.2)				
✓ 095214	-020 ✓	CCBA-MW1		79	1/27/14	9:29 ✓	GW	P	250 ml	None	G	DU	Perchlorate (EPA 314.0)				
✓ 095214	-022 ✓	CCBA-MW1		79	1/27/14	9:30 ✓	GW	P	500 ml	None	G	DU	Alkalinity (SM2320B)				
✓ 095214	-024 ✓	CCBA-MW1		79	1/27/14	9:31 ✓	GW	AG	4x1L	None	G	DU	High Explosives (SW846-8321A Mod.)				
✓ 095214	-027 ✓	CCBA-MW1		79	1/27/14	9:35 ✓	GW	P	250 ml	NaOH	G	DU	Total Cyanide (SW846-9012)				
✓ 095214	-033 ✓	CCBA-MW1		79	1/27/14	9:36 ✓	GW	P	1 L	HNO3	G	DU	Gamma Spectroscopy (EPA 901.0)				
✓ 095214	-034 ✓	CCBA-MW1		79	1/27/14	9:38 ✓	GW	P	1 L	HNO3	G	DU	Gross Alpha and Beta (EPA 900.0)				
✓ 095215	-001 ✓	CCBA-TB3		NA	1/27/14	9:18 ✓	DIW	G	3x40 ml	HCL	G	TB	TCL VOC (SW846-8260B)				

Recipient Initials _____

CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY

Internal Lab

Page 1 of 2

Batch No. <u>N/A</u>		SMO Use		AR/COC 615209	
Project Name: <u>SWMU 8/58 GWM</u>		Date Samples Shipped: <u>1/23/14</u>		SMO Authorization: <u>[Signature]</u>	
Project/Task Manager: <u>Clinton Lum</u>		Carrier/Waybill No.:		SMO Contact Phone: <u>[Signature]</u>	
Project/Task Number: <u>146422.10.11.01</u>		Lab Contact: <u>Edie Kent/808-556-8171</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"/> 4° Celsius	
		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 Type	Volume	Preservative	Collection Method	Sample Type	Parameter & Method Requested	Lab Sample ID
095207	-001	CCBA-FB1	NA	1/23/14 9:25	DIW	G	3x40 ml	HCL	G	FB	TCL VOC (SW846-8260B)	
095208	-001	CCBA-MW2	117	1/23/14 9:25	GW	G	3x40 ml	HCL	G	SA	TCL VOC (SW846-8260B)	
095208	-002	CCBA-MW2	117	1/23/14 9:27	GW	AG	4x1L	None	G	SA	TCL SVOC (SW846-8270C)	
095208	-009	CCBA-MW2	117	1/23/14 9:28	GW	P	500 ml	HNO3	G	SA	TAL Metals+U(SW846-6010/6020/7470)	
095208	-016	CCBA-MW2	117	1/23/14 9:29	GW	P	125 ml	None	G	SA	Anions-Br,Cl,F,SO4 (SW846-9056)	
095208	-017	CCBA-MW2	117	1/23/14 9:30	FGW	P	500 ml	HNO3	G	SA	Metals-Ca,Mg,K,Na (SW846-6020)	
095208	-018	CCBA-MW2	117	1/23/14 9:31	GW	P	125 ml	H2SO4	G	SA	NPN (EPA 353.2)	
095208	-020	CCBA-MW2	117	1/23/14 9:32	GW	P	250 ml	None	G	SA	Perchlorate (EPA 314.0)	
095208	-022	CCBA-MW2	117	1/23/14 9:33	GW	P	500 ml	None	G	SA	Alkalinity (SM2320B)	
095208	-024	CCBA-MW2	117	1/23/14 9:35	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		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		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 0729/505-284-2547 FGW (filtered in field w/.45 micron filter). Alkalinity (as CaCO3,HCO3,CO3). If Perchlorate detected, perform verification analysis using SW846-6850M. Gamma Spectroscopy as short list isotopes.																		
Sample Team Members <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th>Name</th> <th>Signature</th> <th>Init.</th> <th>Company/Organization/Phone/Cell</th> </tr> <tr> <td>Gilbert Quintana</td> <td><u>[Signature]</u></td> <td><u>GS</u></td> <td>SNL/4143/505-844-2507/505-228-0826</td> </tr> <tr> <td>Robert Lynch</td> <td><u>[Signature]</u></td> <td><u>RL</u></td> <td>SNL/4142/505-844-4013/505-250-7090</td> </tr> <tr> <td>Alfred Santillanes</td> <td><u>[Signature]</u></td> <td><u>AS</u></td> <td>SNL/4142/505-844-5130/505-228-0710</td> </tr> </table>		Name	Signature	Init.	Company/Organization/Phone/Cell	Gilbert Quintana	<u>[Signature]</u>	<u>GS</u>	SNL/4143/505-844-2507/505-228-0826	Robert Lynch	<u>[Signature]</u>	<u>RL</u>	SNL/4142/505-844-4013/505-250-7090	Alfred Santillanes	<u>[Signature]</u>	<u>AS</u>	SNL/4142/505-844-5130/505-228-0710							Lab Use
Name	Signature	Init.	Company/Organization/Phone/Cell																					
Gilbert Quintana	<u>[Signature]</u>	<u>GS</u>	SNL/4143/505-844-2507/505-228-0826																					
Robert Lynch	<u>[Signature]</u>	<u>RL</u>	SNL/4142/505-844-4013/505-250-7090																					
Alfred Santillanes	<u>[Signature]</u>	<u>AS</u>	SNL/4142/505-844-5130/505-228-0710																					
1. Relinquished by <u>[Signature]</u> Org. <u>4142</u> Date <u>1/23/14</u> Time <u>1020</u>		3. Relinquished by		Org.		Date		Time																
1. Received by <u>[Signature]</u> Org. <u>4142</u> Date <u>1/23/14</u> Time <u>1020</u>		3. Received by		Org.		Date		Time																
2. Relinquished by		Org.		Date		Time		Time																
2. Received by		Org.		Date		Time		Time																

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

[illegible]

CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY

Internal Lab

Prior to CCBA-m #

Page 1 of 2

Batch No.

SMO Use

AR/COC 615210

Project Name: SWMU 8/58 GWM	Date Samples Shipped:	SMO Authorization: <i>One</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/808-556-8171	Lorraine Herrera/505-844-3199	
Service Order: CF262-14	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 Type	Volume	Preservative	Collection Method	Sample Type	Parameter & Method Requested	Lab Sample ID
✓ 095210	-001	✓ CCBA-FB2	NA	1/23/14 13:05	✓ DIW	G	3x40 ml	HCL	G	FB	TCL VOC (SW846-8260B)	
✓ 095210	-009	✓ CCBA-FB2	NA	1/23/14 13:06	✓ DIW	P	500 ml	HNO3	G	FB	TAL Metals+U(SW846-6010/6020/7470)	
✓ 095211	-001	✓ CCBA-EB1	NA	1/23/14 13:05	✓ DIW	G	3x40 ml	HCL	G	EB	TCL VOC (SW846-8260B)	
✓ 095211	-002	✓ CCBA-EB1	NA	1/23/14 13:08	✓ DIW	AG	4x1L	None	G	EB	TCL SVOC (SW846-8270C)	
✓ 095211	-009	✓ CCBA-EB1	NA	1/23/14 13:06	✓ DIW	P	500 ml	HNO3	G	EB	TAL Metals+U(SW846-6010/6020/7470)	
✓ 095211	-016	✓ CCBA-EB1	NA	1/23/14 13:09	✓ DIW	P	125 ml	None	G	EB	Anions-Br,Cl,F,SO4 (SW846-9056)	
✓ 095211	-017	✓ CCBA-EB1	NA	1/23/14 13:10	✓ FDIW	P	500 ml	HNO3	G	EB	Metals-Ca,Mg,K,Na (SW846-6020)	
✓ 095211	-018	✓ CCBA-EB1	NA	1/23/14 13:11	✓ DIW	P	125 ml	H2SO4	G	EB	NPN (EPA 353.2)	
✓ 095211	-020	✓ CCBA-EB1	NA	1/23/14 13:12	✓ DIW	P	250 ml	None	G	EB	Perchlorate (EPA 314.0)	
✓ 095211	-022	✓ CCBA-EB1	NA	1/23/14 13:13	✓ 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	Return Samples By:
	Gilbert Quintana	<i>Gilbert Quintana</i>	<i>RS</i>	SNL/4142/505-284-3307/505-239-7367		
	Robert Lynch	<i>Robert Lynch</i>	<i>RL</i>	SNL/4142/505-844-4013/505-250-7090		
	Alfred Santillanes	<i>Alfred Santillanes</i>	<i>AS</i>	SNL/4142/505-844-5130/505-228-0710		
					Comments: Send Report to Tim Jackson/4142/MS 0729/505-284-2547 FDIW (filtered in field w/45 micron filter). Alkalinity (as CaCO3,HCO3,CO3). If Perchlorate detected, perform verification analysis using SW846-6850M. Gamma Spectroscopy as short list isotopes.	

1. Relinquished by <i>Alfred Santillanes</i> Org. 4142 Date 1/23/14 Time 13:45	3. Relinquished by	Org.	Date	Time
1. Received by <i>One</i> Org. 4142 Date 1/23/14 Time 13:45	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

[illegible]

CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY

Internal Lab

Page 1 of 2

Batch No.

SMO Use

AR/COC

615205

Project Name: SWMU 68 GWM	Date Samples Shipped:	SMO Authorization: <i>Don Watson</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/808-556-8171	Lorraine Herrera/505-844-3199	<input type="checkbox"/> Released by COC No. <input checked="" type="checkbox"/> 4° Celsius
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					
✓ 095196	-001	OBS-SA1		1/20/14 9:29	GW	G	3x40 ml	HCL	G	SA	TCL VOC (SW846-8260B)	
✓ 095196	-002	OBS-SA1		1/20/14 9:31	GW	AG	4x1L	None	G	SA	TCL SVOC (SW846-8270C)	
✓ 095196	-009	OBS-SA1		1/20/14 9:32	GW	P	500 ml	HNO3	G	SA	TAL Metals+U (SW846-6010/6020/7470)	
✓ 095196	-014	OBS-SA1		1/20/14 9:33	GW	P	250 ml	None	G	SA	Hexavalent Chromium (SW846-7196A)	
✓ 095196	-016	OBS-SA1		1/20/14 9:34	GW	P	125 ml	None	G	SA	Anions-Br, Cl, F, SO4 (SW846-9056)	
✓ 095196	-017	OBS-SA1		1/20/14 9:35	FGW	P	500 ml	HNO3	G	SA	Metals-Ca, Mg, K, Na (SW846-6020)	
✓ 095196	-018	OBS-SA1		1/20/14 9:36	GW	P	125 ml	H2SO4	G	SA	NPN (EPA 353.2)	
✓ 095196	-020	OBS-SA1		1/20/14 9:37	GW	P	250 ml	None	G	SA	Perchlorate (EPA 314.0)	
✓ 095196	-022	OBS-SA1		1/20/14 9:38	GW	P	500 ml	None	G	SA	Alkalinity (SM2320B)	
✓ 095196	-024	OBS-SA1		1/20/14 9:40	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 0729/505-284-2547 FGW (filtered in field w/45 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	

1. Relinquished by <i>Alfred Santillanes</i>	Org. 4142	Date 1/20/14	Time 10:15	3. Relinquished by	Org.	Date	Time
1. Received by <i>Don Watson</i>	Org. 4142	Date 1/20/14	Time 10:15	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

[illegible]

CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY

035-mw2

Page 1 of 2

Internal Lab

Batch No. *N/A*

SMO Use

AR/COC **615207**

Project Name: SWMU 68 GWM	Date Samples Shipped: 1/22/14	SMO Authorization: <i>[Signature]</i>	<input type="checkbox"/> Waste Characterization
Project/Task Manager: Clinton Lum	Carrier/Waybill No.	SMO Contact Phone: <i>[Signature]</i>	<input type="checkbox"/> RMMA
Project/Task Number: 146422.10.11.01	Lab Contact: Edie Kent/808-556-8171	Lorraine Herrera/505-844-3199	<input type="checkbox"/> Released by COC No. <input checked="" type="checkbox"/> 4° Celsius
Service Order: CF263-14	Lab Destination: GEL	Send Report to SMO: Rita Kavanaugh/505-284-2553	
	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 Type	Volume	Preservative	Collection Method	Sample Type	Parameter & Method Requested	Lab Sample ID
095201	-001	OBS-SA2		1/22/14 9:30	GW	G	3x40 ml	HCL	G	SA	TCL VOC (SW846-8260B)	
095201	-002	OBS-SA2		1/22/14 9:32	GW	AG	4x1L	None	G	SA	TCL SVOC (SW846-8270C)	
095201	-009	OBS-SA2		1/22/14 9:36	GW	P	500 ml	HNO3	G	SA	TAL Metals+U(SW846-6010/6020/7470)	
095201	-014	OBS-SA2		1/22/14 9:37	GW	P	250 ml	None	G	SA	Hexavalent Chromium(SW846-7196A)	
095201	-016	OBS-SA2		1/22/14 9:38	GW	P	125 ml	None	G	SA	Anions-Br,Cl,F,SO4 (SW846-9056)	
095201	-017	OBS-SA2		1/22/14 9:39	FGW	P	500 ml	HNO3	G	SA	Metals-Ca,Mg,K,Na (SW846-6020)	
095201	-018	OBS-SA2		1/22/14 9:40	GW	P	125 ml	H2SO4	G	SA	NPN (EPA 353.2)	
095201	-020	OBS-SA2		1/22/14 9:41	GW	P	250 ml	None	G	SA	Perchlorate (EPA 314.0)	
095201	-022	OBS-SA2		1/22/14 9:42	GW	P	500 ml	None	G	SA	Alkalinity (SM2320B)	
095201	-024	OBS-SA2		1/22/14 9:43	GW	AG	4x1L	None	G	SA	High Explosives (SW846-8321A Mod.)	

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		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 0729/505-284-2547 FGW (filtered in field w/45 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				
	William Gibson	<i>[Signature]</i>	<i>[Init.]</i>	SNL/4142/505-284-3307/505-239-7367				
	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				

1. Relinquished by <i>[Signature]</i> Org. 4142 Date 1/22/14 Time 1015	3. Relinquished by Org. Date Time
1. Received by <i>[Signature]</i> SMO Org. 4142 Date 1/22/14 Time 1015	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 615207

Project Name: SWMU 68 GWM			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 Type	Volume	Preservative	Collection Method	Sample Type	Parameter & Method Requested	Lab Sample ID	
095201	-027	OBS-SA2		1/22/14 9:47 ✓	GW	P	250 ml	NaOH	G	SA	Total Cyanide (SW846-9012)		
095201	-033	OBS-SA2		1/22/14 9:48 ✓	GW	P	1 L	HNO3	G	SA	Gamma Spectroscopy (EPA 901.0)		
095201	-034	OBS-SA2		1/22/14 9:50 ✓	GW	P	1 L	HNO3	G	SA	Gross Alpha and Beta (EPA 900.0)		
095201	-035	OBS-SA2		1/22/14 9:52 ✓	GW	P	1 L	HNO3	G	SA	Isotopic Uranium (HASL 300)		
095202	-001	OBS-SA3		1/22/14 9:30 ✓	GW	G	3x40 ml	HCL	G	DU	TCL VOC (SW846-8260B)		
095202	-002	OBS-SA3		1/22/14 9:32 ✓	GW	AG	4x1L	None	G	DU	TCL SVOC (SW846-8270C)		
095202	-009	OBS-SA3		1/22/14 9:36 ✓	GW	P	500 ml	HNO3	G	DU	TAL Metals+U(SW846-6010/6020/7470)		
095202	-014	OBS-SA3		1/22/14 9:37 ✓	GW	P	250 ml	None	G	DU	Hexavalent Chromium(SW846-7196A)		
095202	-016	OBS-SA3		1/22/14 9:38 ✓	GW	P	125 ml	None	G	DU	Anions-Br,Cl,F,SO4 (SW846-9056)		
095202	-017	OBS-SA3		1/22/14 9:39 ✓	FGW	P	500 ml	HNO3	G	DU	Metals-Ca,Mg,K,Na (SW846-6020)		
095202	-018	OBS-SA3		1/22/14 9:40 ✓	GW	P	125 ml	H2SO4	G	DU	NPN (EPA 353.2)		
095202	-020	OBS-SA3		1/22/14 9:41 ✓	GW	P	250 ml	None	G	DU	Perchlorate (EPA 314.0)		
095202	-022	OBS-SA3		1/22/14 9:42 ✓	GW	P	500 ml	None	G	DU	Alkalinity (SM2320B)		
095202	-024	OBS-SA3		1/22/14 9:43 ✓	GW	AG	4x1L	None	G	DU	High Explosives (SW846-8321A Mod.)		
095202	-027	OBS-SA3		1/22/14 9:47 ✓	GW	P	250 ml	NaOH	G	DU	Total Cyanide (SW846-9012)		
095202	-033	OBS-SA3		1/22/14 9:48 ✓	GW	P	1 L	HNO3	G	DU	Gamma Spectroscopy (EPA 901.0)		
095202	-034	OBS-SA3		1/22/14 9:50 ✓	GW	P	1 L	HNO3	G	DU	Gross Alpha and Beta (EPA 900.0)		
095202	-035	OBS-SA3		1/22/14 9:52 ✓	GW	P	1 L	HNO3	G	DU	Isotopic Uranium (HASL 300)		
095203	-001	OBS-TB3	NA	1/22/14 9:30 ✓	DIW	G	3x40 ml	HCL	G	TB	TCL VOC (SW846-8260B)		
Recipient Initials _____													

CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY

Internal Lab

OBS-mw3
Page 1 of 2Batch No. *N/A*

SMO Use

AR/COC **615208**

Project Name: SWMU 68 GWM	Date Samples Shipped: 1/21/14	SMO Authorization: <i>[Signature]</i>	<input type="checkbox"/> Waste Characterization
Project/Task Manager: Clinton Lum	Carrier/Waybill No. 213933	SMO Contact Phone: Lorraine Herrera/505-844-3199	<input type="checkbox"/> RMMA
Project/Task Number: 146422.10.11.01	Lab Contact: Edie Kent/808-556-8171	Send Report to SMO: Rita Kavanaugh/505-284-2553	<input type="checkbox"/> Released by COC No. <input checked="" type="checkbox"/> 4° Celsius
Service Order: CF263-14	Lab Destination: GEL		
	Contract No.: PO 1303873		

Tech Area:	Building:	Room:	Operational Site:	Bill to: Sandia National Laboratories (Accounts Payable), P.O. Box 5800, MS-0154 Albuquerque, NM 87185-0154
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Sample No.	Fraction	Sample Location Detail	Depth (ft)	Date/Time Collected	Sample Matrix	Container Type	Volume	Preservative	Collection Method	Sample Type	Parameter & Method Requested	Lab Sample ID
095204	-001	OBS-FB2		1/21/14 9:20	DIW	G	3x40 ml	HCL	G	FB	TCL VOC (SW846-8260B)	
095205	-001	OBS-SA4		1/21/14 9:20	GW	G	3x40 ml	HCL	G	SA	TCL VOC (SW846-8260B)	
095205	-002	OBS-SA4		1/21/14 9:22	GW	AG	4x1L	None	G	SA	TCL SVOC (SW846-8270C)	
095205	-009	OBS-SA4		1/21/14 9:23	GW	P	500 ml	HNO3	G	SA	TAL Metals+U(SW846-6010/6020/7470)	
095205	-014	OBS-SA4		1/21/14 9:24	GW	P	250 ml	None	G	SA	Hexavalent Chromium(SW846-7196A)	
095205	-016	OBS-SA4		1/21/14 9:25	GW	P	125 ml	None	G	SA	Anions-Br,Cl,F,SO4 (SW846-9056)	
095205	-017	OBS-SA4		1/21/14 9:26	FGW	P	500 ml	HNO3	G	SA	Metals-Ca,Mg,K,Na (SW846-6020)	
095205	-018	OBS-SA4		1/21/14 9:27	GW	P	125 ml	H2SO4	G	SA	NPN (EPA 353.2)	
095205	-020	OBS-SA4		1/21/14 9:28	GW	P	250 ml	None	G	SA	Perchlorate (EPA 314.0)	
095205	-022	OBS-SA4		1/21/14 9:29	GW	P	500 ml	None	G	SA	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 initials:				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
	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 0729/505-284-2547 FGW (filtered in field w/45 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 1/21/14	Time 11:15	3. Relinquished by	Org.	Date	Time
1. Received by <i>[Signature]</i>	Org. 4142	Date 1/21/14	Time 11:15	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

[illegible]

CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY

Internal Lab

Prior to OBS-mu 2

Page 1 of 2

Batch No. *N/A*

SMO Use

AR/COC 615206

Project Name: SWMU 68 GWM
 Project/Task Manager: Clinton Lum
 Project/Task Number: 146422.10.11.01
 Service Order: CF263-14

Date Samples Shipped: 1/21/14
 Carrier/Waybill No.: 213933
 Lab Contact: Edie Kent/808-556-8171
 Lab Destination: GEL
 Contract No.: PO 1303873

SMO Authorization: *Edie Kent*
 SMO Contact Phone: *SMO*
 Lorraine Herrera/505-844-3199
 Send Report to SMO:
 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:												P.O. Box 5800, MS-0154	
Building:		Room:		Operational Site:				1/21/14				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						
095198	-001	OBS-FB1	NA	1/21/14 10:38	DIW	G	3x40 ml	HCL	G	FB	TCL VOC (SW846-8260B)		
095198	-009	OBS-FB1	NA	1/21/14 10:41	DIW	P AG	500 ml 4x1L	HNO3 None	G	FB	TAL Metals+U(SW846-6010/6020/7470)		
095199	-001	OBS-EB1	NA	1/21/14 10:38	DIW	G	3x40 ml	HCL	G	EB	TCL VOC (SW846-8260B)		
095199	-002	OBS-EB1	NA	1/21/14 10:40	DIW	AG	4x1L	None	G	EB	TCL SVOC (SW846-8270C)		
095199	-009	OBS-EB1	NA	1/21/14 10:41	DIW	P	500 ml	HNO3	G	EB	TAL Metals+U(SW846-6010/6020/7470)		
095199	-014	OBS-EB1	NA	1/21/14 10:42	DIW	P	250 ml	None	G	EB	Hexavalent Chromium(SW846-7196A)	*	
095199	-016	OBS-EB1	NA	1/21/14 10:43	DIW	P	125 ml	None	G	EB	Anions-Br,Cl,F,SO4 (SW846-9056)		
095199	-017	OBS-EB1	NA	1/21/14 10:44	FDIW	P	500 ml	HNO3	G	EB	Metals-Ca,Mg,K,Na (SW846-6020)		
095199	-018	OBS-EB1	NA	1/21/14 10:45	DIW	P	125 ml	H2SO4	G	EB	NPN (EPA 353.2)		
095199	-020	OBS-EB1	NA	1/21/14 10:46	DIW	P	250 ml	None	G	EB	Perchlorate (EPA 314.0)		

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 initials:				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: Send Report to Tim Jackson/4142/MS 0729/505-284-2547 FDIW (filtered in field w/45 micron filter). Alkalinity (as total CaCO3, HCO3, CO3). If Perchlorate detected, perform verification analysis using SW846-6850M. Gamma Spectroscopy as short list isotopes.	
	Robert Lynch	<i>Robert Lynch</i>	<i>RL</i>	SNL/4142/505-844-4013/505-250-7090					
	Alfred Santillanes	<i>Alfred Santillanes</i>	<i>AS</i>	SNL/4142/505-844-5130/505-228-0710					

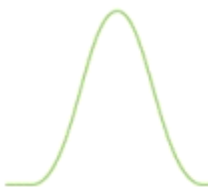
1. Relinquished by <i>Alfred Santillanes</i>	Org. 4142	Date 1/21/14	Time 1120	3. Relinquished by	Org.	Date	Time
1. Received by <i>Edie Kent</i>	Org. 4142	Date 1/21/14	Time 1120	3. Received by	Org.	Date	Time
2. Relinquished by	Org.	Date	Time	4. Relinquished by	Org.	Date	Time
2. Received by	Org.	Date	Time	4. Received by	Org.	Date	Time

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

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Appendix C

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



Sample Findings Summary



AR/COC: 615209, 615210

Page 1 of 2

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
EPA 900.0/SW846 9310			
	095208-034/CCBA-MW2	ALPHA (12587-46-1)	J, MS1
	095208-034/CCBA-MW2	BETA (12587-47-2)	J, FR7,MS1
	095211-034/CCBA-EB1	ALPHA (12587-46-1)	J, FR7,MS1
	095211-034/CCBA-EB1	BETA (12587-47-2)	BD, FR3,MS1
EPA 901.1			
	095208-033/CCBA-MW2	Americium-241 (14596-10-2)	BD, FR3
	095208-033/CCBA-MW2	Cesium-137 (10045-97-3)	BD, FR3
	095208-033/CCBA-MW2	Cobalt-60 (10198-40-0)	BD, FR3
	095208-033/CCBA-MW2	Potassium-40 (13966-00-2)	BD, FR3
	095211-033/CCBA-EB1	Americium-241 (14596-10-2)	BD, FR3
	095211-033/CCBA-EB1	Cesium-137 (10045-97-3)	BD, FR3
	095211-033/CCBA-EB1	Cobalt-60 (10198-40-0)	BD, FR3
	095211-033/CCBA-EB1	Potassium-40 (13966-00-2)	BD, FR3
SW846 3510C/8270D			
	095208-002/CCBA-MW2	2,4-Dinitrophenol (51-28-5)	UJ, I3,C3
	095211-002/CCBA-EB1	2,4-Dinitrophenol (51-28-5)	UJ, I3,C3
SW846 3535/8321A Modified			
	095208-024/CCBA-MW2	HMX (2691-41-0)	UJ, MS5
	095208-024/CCBA-MW2	m-Dinitrobenzene (99-65-0)	UJ, MS5
	095208-024/CCBA-MW2	m-Nitrotoluene (99-08-1)	UJ, I4
	095208-024/CCBA-MW2	p-Nitrotoluene (99-99-0)	UJ, I4
	095211-024/CCBA-EB1	HMX (2691-41-0)	UJ, MS5
	095211-024/CCBA-EB1	m-Dinitrobenzene (99-65-0)	UJ, MS5
	095211-024/CCBA-EB1	m-Nitrotoluene (99-08-1)	UJ, I4
	095211-024/CCBA-EB1	p-Nitrotoluene (99-99-0)	UJ, I4

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
SW846 8260B DOE-AL			
	095207-001/CCBA-FB1	Acetone (67-64-1)	UJ, I5
	095207-001/CCBA-FB1	Bromoform (75-25-2)	J, I3
	095208-001/CCBA-MW2	Acetone (67-64-1)	UJ, I5
	095209-001/CCBA-TB1	Acetone (67-64-1)	UJ, I5
	095210-001/CCBA-FB2	Acetone (67-64-1)	UJ, I5
	095211-001/CCBA-EB1	Acetone (67-64-1)	UJ, I5
	095211-001/CCBA-EB1	Bromoform (75-25-2)	J, I3
	095212-001/CCBA-TB2	Acetone (67-64-1)	UJ, I5
SW846 9012B			
	095208-027/CCBA-MW2	Cyanide, Total (57-12-5)	UJ, I5,B4
	095211-027/CCBA-EB1	Cyanide, Total (57-12-5)	UJ, I5,B4
SW846 9056			
	095211-016/CCBA-EB1	Chloride (16887-00-6)	J+, I5,X1

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

Memorandum

Date: March 4, 2014
To: File
From: Linda Thal
Subject: Inorganic Data Review and Validation – SNL
Site: SWMU 8/58 GWM
AR/COC: 615209 and 615210
SDG: 341902
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) and SM 2320B (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 and CCB at negative values with absolute values \leq the PQL. The associated sample results were NDs and will be **qualified UJ,B4**.

Anions:

1. The intercept for chloride was positive and $>$ the MDL. The associated result for sample 341902019 was a detect $< 3X$ the value of the intercept and will be **qualified J+,I5**.
2. Sample -019 was analyzed immediately after the undiluted analysis of sample -005. The chloride result for sample -019 was a detect $<$ the PQL and will be **qualified J,X1** due to suspected carry-over.

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

Holding Times and Preservation

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

Calibration

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

The intercept for chloride was positive and > the MDL. The associated result for sample -005 was a detect >3X the intercept value and will not be qualified.

Blanks

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

Chloride was detected at < the PQL in the EB, sample -019. No sample results from this SDG will be qualified.

Laboratory Control Sample (LCS)

All LCS acceptance criteria were met.

Matrix Spike (MS)

All MS/PS recoveries met QC acceptance criteria.

Anions:

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

Laboratory Replicate

The replicate analyses met all QC acceptance criteria.

Anions:

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.

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 615210 and is associated with samples submitted with AR/COC 615211 from another SDG.

No other specific issues that affect data quality were identified.

Reviewed by: Mary Donovan

Level: I

Date: 03/04/14

Memorandum

Date: March 3, 2014

To: File

From: Linda Thal

Subject: LC/MS/MS Organic Data Review and Validation – SNL
Site: SWMU 8/58 GWM
AR/COC: 615209 and 615210
SDG: 341902
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 ICAL RFs for m-nitrotoluene and p-nitrotoluene were <0.05 but ≥ 0.01 . All associated sample results were NDs and will be **qualified UJ,I4**.
2. The MS/MSD RPDs were $> 20\%$ for HMX and m-dinitrobenzene. 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 extracted and analyzed within the prescribed holding times and properly preserved.

Instrument Tune

The instrument tune was not reported or evaluated.

Calibration

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

The nitrobenzene %D was >20% but ≤40% with negative bias for the CCV associated with sample 341902009. The associated sample result was ND and since no other calibration infraction occurred, will not be qualified.

Reporting Limit Verification

All CRI recoveries met QC acceptance criteria.

Blanks

No target analytes were detected in the blanks.

Surrogates

All surrogate recoveries met QC acceptance criteria.

Internal Standards

All internal standards met QC acceptance criteria.

Matrix Spike/Matrix Spike Duplicate (MS/MSD)

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

Laboratory Control Sample (LCS)

All LCS recoveries met QC acceptance criteria except as follows.

The LCS recovery was > the UCL for HMX. The associated sample results were NDs and will not be qualified.

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 615210 and was associated with samples on AR/COC 615211 in another SDG.

No other specific issues that affect data quality were identified.

Reviewed by: Mary Donovan

Level: I

Date: 03/04/14

Memorandum

Date: March 4, 2014
To: File
From: Linda Thal
Subject: Inorganic Data Review and Validation – SNL
Site: SWMU 8/58 GWM
AR/COC: 615209 and 615210
SDG: 341902 and 341904
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

Three 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.

Cu was detected at > the PQL and Zn at < the PQL in the FB, sample 341902015. No sample data were qualified as a result.

Cu was detected at > the PQL and Na and V at < the PQL in the unfiltered EB, sample 341902018. No sample data from this SDG were qualified as a result.

Tl was detected at < the PQL in a CCB associated with sample 341902004. The associated sample result was ND and will not be qualified.

ICP -MS Internal Standards

The ICP-MS internal standards met QC acceptance criteria.

Matrix Spike (MS)

The MS met all QC acceptance criteria.

ICP-MS:

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

Laboratory Replicate

The replicate met all QC acceptance criteria.

Laboratory Control Sample (LCS)

The LCS met all QC acceptance criteria.

Detection Limits/Dilutions

All detection limits were properly reported. All samples excluding the EB and FB 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

A FB was submitted with AR/COC 615210 but was not associated with any samples. An EB was submitted with AR/COC 615210 and was associated with samples on AR/COC 615211 in another SDG.

No other specific issues that affect data quality were identified.

Reviewed by: Mary Donovan

Level: I

Date: 03/04/14

Memorandum

Date: March 3, 2014
To: File
From: Linda Thal
Subject: GC/MS Organic Data Review and Validation – SNL
Site: SWMU 8/58 GWM
AR/COC: 615209 and 615210
SDG: 341902
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 3510C/8270D (SVOCs). All compounds were successfully analyzed. Problems were identified with the data package that resulted in the qualification of data.

1. The ICAL %RSD was $>15\%$ but $\leq 40\%$ and the CCV %D was $>20\%$ but $\leq 40\%$ with negative bias for 2,4-dinitrophenol. The associated sample results were NDs and will be **qualified UJ, I3,C3**.

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

Holding Times

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

Instrument Tune

All instrument tune requirements were met.

Calibration

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

The ICAL intercept was positive and > the MDL for 2-methyl-4,6-dinitrophenol. The associated sample results were ND and will not be qualified.

The ICAL %RSDs were >15% but ≤40% for naphthalene, dibenzofuran, pentachlorophenol, phenanthrene and 1,1-biphenyl. The associated sample results were NDs and since no other calibration infractions occurred, will not be qualified.

The ICAL %RSDs were >15% but ≤40% and the CCV %Ds were >20% and positive for acenaphthylene, 4-nitrophenol and pyrene. The associated sample results were NDs and since a positive CCV is not considered another infraction, no data will be qualified.

The CCV %Ds were >20% with positive bias for diethylphthalate, di-n-butylphthalate, butylbenzylphthalate and bis(2-ethylhexyl)phthalate. The associated sample results were NDs and will not be qualified.

The CCV %Ds were >20% but ≤40% with negative bias for p-nitroaniline, dibenzo(a,h)anthracene and 3,3'-dichlorobenzidine. The associated sample results were NDs and since no other calibration infractions occurred, will not be qualified.

Blanks

No target analytes were detected in the blanks.

Surrogates

All surrogate recoveries met QC acceptance criteria.

Internal Standards

All internal standards met QC acceptance criteria.

Matrix Spike/Matrix Spike Duplicate (MS/MSD)

All MS/MSD acceptance criteria were met.

Laboratory Control Sample (LCS)

All LCS acceptance criteria were met.

Detection Limits/Dilutions

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

Tentatively Identified Compounds (TICs)

TIC reports were not required.

Other QC

An EB was submitted with AR/COC 615210 and was associated with samples on AR/COC 615211 in another SDG.

No other specific issues that affect data quality were identified.

Reviewed by: Mary Donovan

Level: I

Date: 03/04/14

Memorandum

Date: March 4, 2014

To: File

From: Linda Thal

Subject: Radiochemical Data Review and Validation – SNL
Site: SWMU 8/58 GWM
AR/COC: 615209 and 615210
SDG: 341902
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) 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 ≤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 with the following exception.

Gross alpha was detected at > the MDA but $\leq 3X$ the MDA in the EB, sample 341902026. No sample results in this SDG were qualified.

Tracer/Carrier Recovery

Tracer/carriers were not required.

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:

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:

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 615210 and is associated with samples submitted with AR/COC 615211 from another SDG.

No other specific issues that affect data quality were identified.

Reviewed by: Mary Donovan

Level: I

Date: 03/04/14

Memorandum

Date: March 3, 2014
To: File
From: Linda Thal
Subject: GC/MS Organic Data Review and Validation – SNL
Site: SWMU 8/58 GWM
AR/COC: 615209 and 615210
SDG: 341902
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

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

1. The ICAL intercept was negative and $>$ the MDL but $\leq 3X$ the MDL for acetone. The associated sample results were NDs and will be **qualified UJ,I5**.
2. The ICAL %RSD was $>15\%$ but $\leq 40\%$ for bromoform. The associated results for samples 341902016 and -001 were detects and will be **qualified J,I3**.

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 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% for bromoform. The remaining associated sample results were NDs and since no other calibration infraction occurred, will not be qualified.

The ICV %D was >20% with positive bias for dichlorodifluoromethane. The associated sample results were NDs and will not be qualified.

The CCV %D was >20% but ≤40% with negative bias for methyl acetate, 2-butanone, 4-methyl-2-pentanone and 2-hexanone. The associated sample results were NDs and since no other calibration infraction occurred, will not be qualified.

Blanks

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

Chloroform, bromoform, bromodichloromethane and dibromochloromethane were detected at > the PQL in the EB, sample -016. The EB was associated with samples submitted with AR/COC 615211. No samples from this SDG were qualified.

Chloroform, bromodichloromethane and dibromochloromethane were detected at > the PQL and bromoform was detected at < the PQL in the FB, sample -001. The associated sample results were NDs and will not be qualified.

Chloroform, bromodichloromethane and dibromochloromethane were detected at > the PQL in the FB, sample -014. No field samples were associated with this FB and no data were qualified.

Surrogates

All surrogate recoveries met QC acceptance criteria.

Internal Standards

All internal standards met QC acceptance criteria.

Matrix Spike/Matrix Spike Duplicate (MS/MSD)

All MS/MSD acceptance criteria were met except as follows.

The MS recovery for dichlorodifluoromethane was > the UCL. The associated sample results were NDs and will not be qualified.

Laboratory Control Sample (LCS)

All LCS acceptance criteria were met except as follows.

The LCS recovery for dichlorodifluoromethane was > the UCL. The associated sample results were NDs and will not be qualified.

Detection Limits/Dilutions

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

Tentatively Identified Compounds (TICs)

TIC reports were not required.

Other QC

Two TBs and were submitted, one with each AR/COC. Two FBs were submitted, one with each AR/COC. The FB submitted with AR/COC 615210 was not associated with any samples. An EB was submitted with AR/COC 615210 and was associated with samples on AR/COC 615211 in another SDG.

No other specific issues that affect data quality were identified.

Reviewed by: Mary Donovan **Level:** I **Date:** 03/04/14

Memorandum

Date: March 12, 2014
To: File
From: Linda Thal
Subject: Inorganic Data Review and Validation – SNL
Site: SWMU 8/58 GWM
AR/COC: 615211
SDG: 160-5474
Laboratory: TestAmerica Laboratories, Inc. –St Louis
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 method EPA 314.0 (perchlorate). Data were reported for all required analytes. Problems were identified with the data package that resulted in the qualification of data.

1. The MS/MSD was performed on an EB, sample 160-5469-A-1 from AR/COC 615206. The associated sample results were NDs and will be **qualified UJ,MS1**.

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

Holding Times and Preservation

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

Calibration

All initial and continuing calibration met QC acceptance criteria.

Blanks

No target analytes were detected in the blanks.

Laboratory Control Sample (LCS)

All LCS acceptance criteria were met.

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

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

Laboratory Replicate

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

Detection Limits/Dilutions

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

Other QC

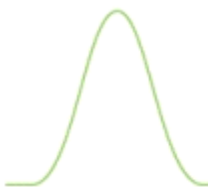
An EB was submitted with AR/COC 615210 and was applied to the samples on AR/COC 615211. A field duplicate pair was submitted with AR/COC 615211. There are no “required” review criteria for field duplicate analyses comparability; no data will be qualified as a result.

No other specific issues that affect data quality were identified.

Reviewed by: Mary Donovan

Level: I

Date: 03/13/14



Sample Findings Summary



AR/COC: 615209, 615210

Page 1 of 2

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
EPA 900.0/SW846 9310			
	095208-034/CCBA-MW2	ALPHA (12587-46-1)	J, MS1
	095208-034/CCBA-MW2	BETA (12587-47-2)	J, FR7,MS1
	095211-034/CCBA-EB1	ALPHA (12587-46-1)	J, FR7,MS1
	095211-034/CCBA-EB1	BETA (12587-47-2)	BD, FR3,MS1
EPA 901.1			
	095208-033/CCBA-MW2	Americium-241 (14596-10-2)	BD, FR3
	095208-033/CCBA-MW2	Cesium-137 (10045-97-3)	BD, FR3
	095208-033/CCBA-MW2	Cobalt-60 (10198-40-0)	BD, FR3
	095208-033/CCBA-MW2	Potassium-40 (13966-00-2)	BD, FR3
	095211-033/CCBA-EB1	Americium-241 (14596-10-2)	BD, FR3
	095211-033/CCBA-EB1	Cesium-137 (10045-97-3)	BD, FR3
	095211-033/CCBA-EB1	Cobalt-60 (10198-40-0)	BD, FR3
	095211-033/CCBA-EB1	Potassium-40 (13966-00-2)	BD, FR3
SW846 3510C/8270D			
	095208-002/CCBA-MW2	2,4-Dinitrophenol (51-28-5)	UJ, I3,C3
	095211-002/CCBA-EB1	2,4-Dinitrophenol (51-28-5)	UJ, I3,C3
SW846 3535/8321A Modified			
	095208-024/CCBA-MW2	HMX (2691-41-0)	UJ, MS5
	095208-024/CCBA-MW2	m-Dinitrobenzene (99-65-0)	UJ, MS5
	095208-024/CCBA-MW2	m-Nitrotoluene (99-08-1)	UJ, I4
	095208-024/CCBA-MW2	p-Nitrotoluene (99-99-0)	UJ, I4
	095211-024/CCBA-EB1	HMX (2691-41-0)	UJ, MS5
	095211-024/CCBA-EB1	m-Dinitrobenzene (99-65-0)	UJ, MS5
	095211-024/CCBA-EB1	m-Nitrotoluene (99-08-1)	UJ, I4
	095211-024/CCBA-EB1	p-Nitrotoluene (99-99-0)	UJ, I4

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
SW846 8260B DOE-AL			
	095207-001/CCBA-FB1	Acetone (67-64-1)	UJ, I5
	095207-001/CCBA-FB1	Bromoform (75-25-2)	J, I3
	095208-001/CCBA-MW2	Acetone (67-64-1)	UJ, I5
	095209-001/CCBA-TB1	Acetone (67-64-1)	UJ, I5
	095210-001/CCBA-FB2	Acetone (67-64-1)	UJ, I5
	095211-001/CCBA-EB1	Acetone (67-64-1)	UJ, I5
	095211-001/CCBA-EB1	Bromoform (75-25-2)	J, I3
	095212-001/CCBA-TB2	Acetone (67-64-1)	UJ, I5
SW846 9012B			
	095208-027/CCBA-MW2	Cyanide, Total (57-12-5)	UJ, I5,B4
	095211-027/CCBA-EB1	Cyanide, Total (57-12-5)	UJ, I5,B4
SW846 9056			
	095211-016/CCBA-EB1	Chloride (16887-00-6)	J+, I5,X1

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

Memorandum

Date: March 4, 2014
To: File
From: Linda Thal
Subject: Inorganic Data Review and Validation – SNL
Site: SWMU 8/58 GWM
AR/COC: 615209 and 615210
SDG: 341902
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) and SM 2320B (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 and CCB at negative values with absolute values \leq the PQL. The associated sample results were NDs and will be **qualified UJ,B4**.

Anions:

1. The intercept for chloride was positive and $>$ the MDL. The associated result for sample 341902019 was a detect $< 3X$ the value of the intercept and will be **qualified J+,I5**.
2. Sample -019 was analyzed immediately after the undiluted analysis of sample -005. The chloride result for sample -019 was a detect $<$ the PQL and will be **qualified J,X1** due to suspected carry-over.

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

Holding Times and Preservation

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

Calibration

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

The intercept for chloride was positive and > the MDL. The associated result for sample -005 was a detect >3X the intercept value and will not be qualified.

Blanks

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

Chloride was detected at < the PQL in the EB, sample -019. No sample results from this SDG will be qualified.

Laboratory Control Sample (LCS)

All LCS acceptance criteria were met.

Matrix Spike (MS)

All MS/PS recoveries met QC acceptance criteria.

Anions:

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

Laboratory Replicate

The replicate analyses met all QC acceptance criteria.

Anions:

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.

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 615210 and is associated with samples submitted with AR/COC 615211 from another SDG.

No other specific issues that affect data quality were identified.

Reviewed by: Mary Donovan

Level: I

Date: 03/04/14

Memorandum

Date: March 3, 2014

To: File

From: Linda Thal

Subject: LC/MS/MS Organic Data Review and Validation – SNL
Site: SWMU 8/58 GWM
AR/COC: 615209 and 615210
SDG: 341902
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 ICAL RFs for m-nitrotoluene and p-nitrotoluene were <0.05 but ≥ 0.01 . All associated sample results were NDs and will be **qualified UJ,I4**.
2. The MS/MSD RPDs were $> 20\%$ for HMX and m-dinitrobenzene. 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 extracted and analyzed within the prescribed holding times and properly preserved.

Instrument Tune

The instrument tune was not reported or evaluated.

Calibration

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

The nitrobenzene %D was >20% but ≤40% with negative bias for the CCV associated with sample 341902009. The associated sample result was ND and since no other calibration infraction occurred, will not be qualified.

Reporting Limit Verification

All CRI recoveries met QC acceptance criteria.

Blanks

No target analytes were detected in the blanks.

Surrogates

All surrogate recoveries met QC acceptance criteria.

Internal Standards

All internal standards met QC acceptance criteria.

Matrix Spike/Matrix Spike Duplicate (MS/MSD)

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

Laboratory Control Sample (LCS)

All LCS recoveries met QC acceptance criteria except as follows.

The LCS recovery was > the UCL for HMX. The associated sample results were NDs and will not be qualified.

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 615210 and was associated with samples on AR/COC 615211 in another SDG.

No other specific issues that affect data quality were identified.

Reviewed by: Mary Donovan

Level: I

Date: 03/04/14

Memorandum

Date: March 4, 2014
To: File
From: Linda Thal
Subject: Inorganic Data Review and Validation – SNL
Site: SWMU 8/58 GWM
AR/COC: 615209 and 615210
SDG: 341902 and 341904
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

Three 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.

Cu was detected at > the PQL and Zn at < the PQL in the FB, sample 341902015. No sample data were qualified as a result.

Cu was detected at > the PQL and Na and V at < the PQL in the unfiltered EB, sample 341902018. No sample data from this SDG were qualified as a result.

Tl was detected at < the PQL in a CCB associated with sample 341902004. The associated sample result was ND and will not be qualified.

ICP -MS Internal Standards

The ICP-MS internal standards met QC acceptance criteria.

Matrix Spike (MS)

The MS met all QC acceptance criteria.

ICP-MS:

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

Laboratory Replicate

The replicate met all QC acceptance criteria.

Laboratory Control Sample (LCS)

The LCS met all QC acceptance criteria.

Detection Limits/Dilutions

All detection limits were properly reported. All samples excluding the EB and FB 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

A FB was submitted with AR/COC 615210 but was not associated with any samples. An EB was submitted with AR/COC 615210 and was associated with samples on AR/COC 615211 in another SDG.

No other specific issues that affect data quality were identified.

Reviewed by: Mary Donovan

Level: I

Date: 03/04/14

Memorandum

Date: March 4, 2014

To: File

From: Linda Thal

Subject: Radiochemical Data Review and Validation – SNL
Site: SWMU 8/58 GWM
AR/COC: 615209 and 615210
SDG: 341902
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) 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 ≤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 with the following exception.

Gross alpha was detected at > the MDA but $\leq 3X$ the MDA in the EB, sample 341902026. No sample results in this SDG were qualified.

Tracer/Carrier Recovery

Tracer/carriers were not required.

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:

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:

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 615210 and is associated with samples submitted with AR/COC 615211 from another SDG.

No other specific issues that affect data quality were identified.

Reviewed by: Mary Donovan

Level: I

Date: 03/04/14

Memorandum

Date: March 3, 2014
To: File
From: Linda Thal
Subject: GC/MS Organic Data Review and Validation – SNL
Site: SWMU 8/58 GWM
AR/COC: 615209 and 615210
SDG: 341902
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 3510C/8270D (SVOCs). All compounds were successfully analyzed. Problems were identified with the data package that resulted in the qualification of data.

1. The ICAL %RSD was $>15\%$ but $\leq 40\%$ and the CCV %D was $>20\%$ but $\leq 40\%$ with negative bias for 2,4-dinitrophenol. The associated sample results were NDs and will be **qualified UJ, I3,C3**.

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

Holding Times

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

Instrument Tune

All instrument tune requirements were met.

Calibration

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

The ICAL intercept was positive and > the MDL for 2-methyl-4,6-dinitrophenol. The associated sample results were ND and will not be qualified.

The ICAL %RSDs were >15% but ≤40% for naphthalene, dibenzofuran, pentachlorophenol, phenanthrene and 1,1-biphenyl. The associated sample results were NDs and since no other calibration infractions occurred, will not be qualified.

The ICAL %RSDs were >15% but ≤40% and the CCV %Ds were >20% and positive for acenaphthylene, 4-nitrophenol and pyrene. The associated sample results were NDs and since a positive CCV is not considered another infraction, no data will be qualified.

The CCV %Ds were >20% with positive bias for diethylphthalate, di-n-butylphthalate, butylbenzylphthalate and bis(2-ethylhexyl)phthalate. The associated sample results were NDs and will not be qualified.

The CCV %Ds were >20% but ≤40% with negative bias for p-nitroaniline, dibenzo(a,h)anthracene and 3,3'-dichlorobenzidine. The associated sample results were NDs and since no other calibration infractions occurred, will not be qualified.

Blanks

No target analytes were detected in the blanks.

Surrogates

All surrogate recoveries met QC acceptance criteria.

Internal Standards

All internal standards met QC acceptance criteria.

Matrix Spike/Matrix Spike Duplicate (MS/MSD)

All MS/MSD acceptance criteria were met.

Laboratory Control Sample (LCS)

All LCS acceptance criteria were met.

Detection Limits/Dilutions

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

Tentatively Identified Compounds (TICs)

TIC reports were not required.

Other QC

An EB was submitted with AR/COC 615210 and was associated with samples on AR/COC 615211 in another SDG.

No other specific issues that affect data quality were identified.

Reviewed by: Mary Donovan

Level: I

Date: 03/04/14

Memorandum

Date: March 3, 2014
To: File
From: Linda Thal
Subject: GC/MS Organic Data Review and Validation – SNL
Site: SWMU 8/58 GWM
AR/COC: 615209 and 615210
SDG: 341902
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

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

1. The ICAL intercept was negative and $>$ the MDL but $\leq 3X$ the MDL for acetone. The associated sample results were NDs and will be **qualified UJ,I5**.
2. The ICAL %RSD was $>15\%$ but $\leq 40\%$ for bromoform. The associated results for samples 341902016 and -001 were detects and will be **qualified J,I3**.

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 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 $\leq 40\%$ for bromoform. The remaining associated sample results were NDs and since no other calibration infraction occurred, will not be qualified.

The ICV %D was $>20\%$ with positive bias for dichlorodifluoromethane. The associated sample results were NDs and will not be qualified.

The CCV %D was $>20\%$ but $\leq 40\%$ with negative bias for methyl acetate, 2-butanone, 4-methyl-2-pentanone and 2-hexanone. The associated sample results were NDs and since no other calibration infraction occurred, will not be qualified.

Blanks

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

Chloroform, bromoform, bromodichloromethane and dibromochloromethane were detected at $>$ the PQL in the EB, sample -016. The EB was associated with samples submitted with AR/COC 615211. No samples from this SDG were qualified.

Chloroform, bromodichloromethane and dibromochloromethane were detected at $>$ the PQL and bromoform was detected at $<$ the PQL in the FB, sample -001. The associated sample results were NDs and will not be qualified.

Chloroform, bromodichloromethane and dibromochloromethane were detected at $>$ the PQL in the FB, sample -014. No field samples were associated with this FB and no data were qualified.

Surrogates

All surrogate recoveries met QC acceptance criteria.

Internal Standards

All internal standards met QC acceptance criteria.

Matrix Spike/Matrix Spike Duplicate (MS/MSD)

All MS/MSD acceptance criteria were met except as follows.

The MS recovery for dichlorodifluoromethane was $>$ the UCL. The associated sample results were NDs and will not be qualified.

Laboratory Control Sample (LCS)

All LCS acceptance criteria were met except as follows.

The LCS recovery for dichlorodifluoromethane was > the UCL. The associated sample results were NDs and will not be qualified.

Detection Limits/Dilutions

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

Tentatively Identified Compounds (TICs)

TIC reports were not required.

Other QC

Two TBs and were submitted, one with each AR/COC. Two FBs were submitted, one with each AR/COC. The FB submitted with AR/COC 615210 was not associated with any samples. An EB was submitted with AR/COC 615210 and was associated with samples on AR/COC 615211 in another SDG.

No other specific issues that affect data quality were identified.

Reviewed by: Mary Donovan **Level:** I **Date:** 03/04/14

Memorandum

Date: March 12, 2014

To: File

From: Linda Thal

Subject: Inorganic Data Review and Validation – SNL
Site: SWMU 8/58 GWM
AR/COC: 615211
SDG: 160-5474
Laboratory: TestAmerica Laboratories, Inc. –St Louis
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 method EPA 314.0 (perchlorate). Data were reported for all required analytes. Problems were identified with the data package that resulted in the qualification of data.

1. The MS/MSD was performed on an EB, sample 160-5469-A-1 from AR/COC 615206. The associated sample results were NDs and will be **qualified UJ,MS1**.

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

Holding Times and Preservation

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

Calibration

All initial and continuing calibration met QC acceptance criteria.

Blanks

No target analytes were detected in the blanks.

Laboratory Control Sample (LCS)

All LCS acceptance criteria were met.

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

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

Laboratory Replicate

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

Detection Limits/Dilutions

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

Other QC

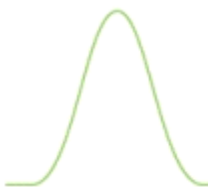
An EB was submitted with AR/COC 615210 and was applied to the samples on AR/COC 615211. A field duplicate pair was submitted with AR/COC 615211. There are no “required” review criteria for field duplicate analyses comparability; no data will be qualified as a result.

No other specific issues that affect data quality were identified.

Reviewed by: Mary Donovan

Level: I

Date: 03/13/14



Sample Findings Summary



AR/COC: 615205, 615206, 615207, 615208

Page 1 of 4

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
DOE EML HASL-300, U-02-RC			
	095199-035/OBS-EB1	Uranium-233/234 (13968-55-3/13966-29-)	BD, FR3
	095199-035/OBS-EB1	Uranium-235/236 (15117-96-1/13982-70-)	BD, FR3
	095199-035/OBS-EB1	Uranium-238 (7440-61-1)	BD, FR3
EPA 900.0/SW846 9310			
	095196-034/OBS-SA1	ALPHA (12587-46-1)	J, MS1
	095196-034/OBS-SA1	BETA (12587-47-2)	J, MS1
	095199-034/OBS-EB1	ALPHA (12587-46-1)	BD, FR3, MS1
	095199-034/OBS-EB1	BETA (12587-47-2)	BD, FR3, MS1
	095201-034/OBS-SA2	ALPHA (12587-46-1)	J, MS1
	095201-034/OBS-SA2	BETA (12587-47-2)	J, MS1
	095202-034/OBS-SA3	ALPHA (12587-46-1)	J, MS1
	095202-034/OBS-SA3	BETA (12587-47-2)	J, FR7, MS1
	095205-034/OBS-SA4	ALPHA (12587-46-1)	J, MS1
	095205-034/OBS-SA4	BETA (12587-47-2)	J, MS1
EPA 901.1			
	095196-033/OBS-SA1	Americium-241 (14596-10-2)	BD, FR3
	095196-033/OBS-SA1	Cesium-137 (10045-97-3)	BD, FR3
	095196-033/OBS-SA1	Cobalt-60 (10198-40-0)	BD, FR3
	095196-033/OBS-SA1	Potassium-40 (13966-00-2)	BD, FR3
	095199-033/OBS-EB1	Americium-241 (14596-10-2)	BD, FR3
	095199-033/OBS-EB1	Cesium-137 (10045-97-3)	BD, FR3
	095199-033/OBS-EB1	Cobalt-60 (10198-40-0)	BD, FR3
	095199-033/OBS-EB1	Potassium-40 (13966-00-2)	BD, FR3
	095201-033/OBS-SA2	Americium-241 (14596-10-2)	BD, FR3

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
	095201-033/OBS-SA2	Cesium-137 (10045-97-3)	BD, FR3
	095201-033/OBS-SA2	Cobalt-60 (10198-40-0)	BD, FR3
	095201-033/OBS-SA2	Potassium-40 (13966-00-2)	BD, FR3
	095202-033/OBS-SA3	Americium-241 (14596-10-2)	BD, FR3
	095202-033/OBS-SA3	Cesium-137 (10045-97-3)	BD, FR3
	095202-033/OBS-SA3	Cobalt-60 (10198-40-0)	BD, FR3
	095202-033/OBS-SA3	Potassium-40 (13966-00-2)	BD, FR3
	095205-033/OBS-SA4	Americium-241 (14596-10-2)	BD, FR3
	095205-033/OBS-SA4	Cesium-137 (10045-97-3)	BD, FR3
	095205-033/OBS-SA4	Cobalt-60 (10198-40-0)	BD, FR3
	095205-033/OBS-SA4	Potassium-40 (13966-00-2)	BD, FR3
SW846 3005/6020 DOE-AL			
	095196-009/OBS-SA1	Sodium (7440-23-5)	J, D1
	095196-017/OBS-SA1	Sodium (7440-23-5)	J, D1
	095198-009/OBS-FB1	Sodium (7440-23-5)	UJ, D1
	095199-009/OBS-EB1	Sodium (7440-23-5)	UJ, D1
	095199-017/OBS-EB1	Sodium (7440-23-5)	J, D1
	095201-009/OBS-SA2	Copper (7440-50-8)	0.0044U, B2
	095201-009/OBS-SA2	Sodium (7440-23-5)	J, D1
	095201-017/OBS-SA2	Sodium (7440-23-5)	J, D1
	095202-009/OBS-SA3	Copper (7440-50-8)	0.0044U, B2
	095202-009/OBS-SA3	Sodium (7440-23-5)	J, D1
	095202-017/OBS-SA3	Sodium (7440-23-5)	J, D1
	095205-009/OBS-SA4	Sodium (7440-23-5)	J, D1
	095205-017/OBS-SA4	Sodium (7440-23-5)	J, D1
SW846 3510C/8270D			
	095196-002/OBS-SA1	2,4-Dinitrotoluene (121-14-2)	UJ, MS5
	095196-002/OBS-SA1	Benzo(ghi)perylene (191-24-2)	UJ, MS5
	095196-002/OBS-SA1	Dibenzo(a,h)anthracene (53-70-3)	UJ, MS5

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
	095196-002/OBS-SA1	Indeno(1,2,3-cd)pyrene (193-39-5)	UJ, MS5
	095196-002/OBS-SA1	p-Nitroaniline (100-01-6)	UJ, MS5
	095199-002/OBS-EB1	2,4-Dinitrotoluene (121-14-2)	UJ, MS5
	095199-002/OBS-EB1	Benzo(ghi)perylene (191-24-2)	UJ, MS5
	095199-002/OBS-EB1	Dibenzo(a,h)anthracene (53-70-3)	UJ, MS5
	095199-002/OBS-EB1	Indeno(1,2,3-cd)pyrene (193-39-5)	UJ, MS5
	095199-002/OBS-EB1	p-Nitroaniline (100-01-6)	UJ, MS5
	095201-002/OBS-SA2	2,4-Dinitrotoluene (121-14-2)	UJ, MS5
	095201-002/OBS-SA2	Benzo(ghi)perylene (191-24-2)	UJ, MS5
	095201-002/OBS-SA2	Dibenzo(a,h)anthracene (53-70-3)	UJ, MS5
	095201-002/OBS-SA2	Indeno(1,2,3-cd)pyrene (193-39-5)	UJ, MS5
	095201-002/OBS-SA2	p-Nitroaniline (100-01-6)	UJ, MS5
	095202-002/OBS-SA3	2,4-Dinitrotoluene (121-14-2)	UJ, MS5
	095202-002/OBS-SA3	Benzo(ghi)perylene (191-24-2)	UJ, MS5
	095202-002/OBS-SA3	Dibenzo(a,h)anthracene (53-70-3)	UJ, MS5
	095202-002/OBS-SA3	Indeno(1,2,3-cd)pyrene (193-39-5)	UJ, MS5
	095202-002/OBS-SA3	p-Nitroaniline (100-01-6)	UJ, MS5
	095205-002/OBS-SA4	2,4-Dinitrotoluene (121-14-2)	UJ, MS5
	095205-002/OBS-SA4	Benzo(ghi)perylene (191-24-2)	UJ, MS5
	095205-002/OBS-SA4	Dibenzo(a,h)anthracene (53-70-3)	UJ, MS5
	095205-002/OBS-SA4	Indeno(1,2,3-cd)pyrene (193-39-5)	UJ, MS5
	095205-002/OBS-SA4	p-Nitroaniline (100-01-6)	UJ, MS5
SW846 3535/8321A Modified			
	095196-024/OBS-SA1	m-Nitrotoluene (99-08-1)	UJ, I4
	095196-024/OBS-SA1	p-Nitrotoluene (99-99-0)	UJ, I4
	095199-024/OBS-EB1	m-Nitrotoluene (99-08-1)	UJ, I4
	095199-024/OBS-EB1	p-Nitrotoluene (99-99-0)	UJ, I4
	095201-024/OBS-SA2	m-Nitrotoluene (99-08-1)	UJ, I4
	095201-024/OBS-SA2	p-Nitrotoluene (99-99-0)	UJ, I4

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
	095202-024/OBS-SA3	m-Nitrotoluene (99-08-1)	UJ, I4
	095202-024/OBS-SA3	p-Nitrotoluene (99-99-0)	UJ, I4
	095205-024/OBS-SA4	m-Nitrotoluene (99-08-1)	UJ, I4
	095205-024/OBS-SA4	p-Nitrotoluene (99-99-0)	UJ, I4
SW846 8260B DOE-AL			
	095196-001/OBS-SA1	Acetone (67-64-1)	UJ, I5
	095197-001/OBS-TB1	Acetone (67-64-1)	UJ, I5
	095198-001/OBS-FB1	Acetone (67-64-1)	UJ, I5
	095198-001/OBS-FB1	Bromoform (75-25-2)	J, I3
	095199-001/OBS-EB1	Acetone (67-64-1)	UJ, I5
	095199-001/OBS-EB1	Bromoform (75-25-2)	J, I3
	095200-001/OBS-TB2	Acetone (67-64-1)	UJ, I5
	095201-001/OBS-SA2	Acetone (67-64-1)	UJ, I5
	095202-001/OBS-SA3	Acetone (67-64-1)	UJ, I5
	095203-001/OBS-TB3	Acetone (67-64-1)	UJ, I5
	095204-001/OBS-FB2	Acetone (67-64-1)	UJ, I5
	095204-001/OBS-FB2	Bromoform (75-25-2)	J, I3
	095205-001/OBS-SA4	Acetone (67-64-1)	UJ, I5
	095206-001/OBS-TB4	Acetone (67-64-1)	UJ, I5
SW846 9012B			
	095196-027/OBS-SA1	Cyanide, Total (57-12-5)	UJ, I5
	095199-027/OBS-EB1	Cyanide, Total (57-12-5)	UJ, I5
	095201-027/OBS-SA2	Cyanide, Total (57-12-5)	UJ, I5
	095202-027/OBS-SA3	Cyanide, Total (57-12-5)	UJ, I5
	095205-027/OBS-SA4	Cyanide, Total (57-12-5)	UJ, I5
SW846 9056			
	095199-016/OBS-EB1	Chloride (16887-00-6)	J+, I5

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

Memorandum

Date: February 26, 2014

To: File

From: Linda Thal

Subject: Inorganic Data Review and Validation – SNL
Site: SWMU 68 GWM
AR/COC: 615205, 615206, 615207 and 615208
SDG: 341691
Laboratory: GEL
Project/Task: 146422.10.11.01
Analysis: General Chemistry

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

Summary

Five samples were prepared and analyzed with accepted procedures using methods EPA 7196A (hexavalent chromium), EPA 9056 (anions by IC), EPA 353.2 (nitrate/nitrite), EPA 9012A (total cyanide) and SM 2320B (total alkalinity). Data were reported for all required analytes. 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**.

Anions:

1. The intercept for chloride was positive and > the MDL. The associated result for sample 341691021 was a detect <3X the value of the intercept and will be **qualified J+,I5**.

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

Holding Times and Preservation

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

Samples -004, -049 and -062 were prepared and analyzed very slightly beyond the 24 hour method specified holding time for hexavalent chromium. Based on professional judgment, no data were qualified.

Calibration

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

The intercept for chloride was positive and > the MDL. All remaining associated sample results were detects >3X the intercept value and will not be qualified.

Blanks

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

Chloride was detected at < the PQL in the EB, sample 341691-021. The associated sample results were detects >5X the EB value and will not be qualified.

Laboratory Control Sample (LCS)

All LCS acceptance criteria were met.

Matrix Spike (MS)

All MS/PS recoveries met QC acceptance criteria.

Laboratory Replicate

The replicate analyses met all QC acceptance criteria.

Detection Limits/Dilutions

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

Nitrate/Nitrite:

All samples except the EB were diluted 5X.

Anions:

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

Other QC

An EB was submitted with AR/COC 615206 and was applied to the samples on AR/COC 615207. A field duplicate pair was submitted with AR/COC 615207. 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: 02/27/14

Memorandum

Date: February 26, 2014

To: File

From: Linda Thal

Subject: LC/MS/MS Organic Data Review and Validation – SNL
Site: SWMU 68 GWM
AR/COC: 615205, 615206, 615207 and 615208
SDG: 341691
Laboratory: GEL
Project/Task: 146422.10.11.01
Analysis: High Explosives (HE)

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

Summary

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

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

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

Holding Times

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

Instrument Tune

The instrument tune was not reported or evaluated.

Calibration

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

Reporting Limit Verification

All CRI recoveries met QC acceptance criteria.

Blanks

No target analytes were detected in the blanks.

Surrogates

All surrogate recoveries met QC acceptance criteria.

Internal Standards

All internal standards met QC acceptance criteria.

Matrix Spike/Matrix Spike Duplicate (MS/MSD)

The MS/MSD analyses met all QC acceptance criteria.

Laboratory Control Sample (LCS)

All LCS recoveries met QC acceptance criteria.

Detection Limits/Dilutions

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

Other QC

An EB was submitted with AR/COC 615206 and was applied to the samples on AR/COC 615207. A field duplicate pair was submitted with AR/COC 615207. 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: 02/27/14

Memorandum

Date: February 26, 2014
To: File
From: Linda Thal
Subject: Inorganic Data Review and Validation – SNL
Site: SWMU 68 GWM
AR/COC: 615205, 615206, 615207 and 615208
SDG: 341691
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

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

ICP-MS:

1. The original Na result for the serial dilution parent sample was >50X the MDL and the serial dilution %D was >10%. The associated results for samples 341691-016 and -019 were NDs and will be **qualified UJ,D1**. All remaining associated sample results were detects and will be **qualified J,D1**.
2. Cu was detected at < the PQL in the unfiltered EB, sample 341691-019. The associated results for samples 341691048 and -061 were detects <5X the EB value and will be **qualified 0.0044U,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 FB, sample 341691016. No sample data were qualified as a result.

Na was detected in the filtered EB, sample 341692002. The associated sample results were detects >5X the EB concentration and will not be qualified.

ICP -MS Internal Standards

The ICP-MS internal standards met QC acceptance criteria.

Matrix Spike (MS)

The MS met all QC acceptance criteria.

ICP-MS:

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

Laboratory Replicate

The replicate met all QC acceptance criteria.

Laboratory Control Sample (LCS)

The LCS met all QC acceptance criteria.

Detection Limits/Dilutions

All detection limits were properly reported. All samples excluding the EB and FBs 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 except as noted above in the Summary section.

Other QC

A FB was submitted with AR/COC 615206 but was not associated with any samples. An EB was submitted with AR/COC 615206 and was applied to the samples on AR/COC 615207. A field duplicate pair was submitted with AR/COC 615207. 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: 02/27/14

Memorandum

Date: February 26, 2014

To: File

From: Linda Thal

Subject: Radiochemical Data Review and Validation – SNL
Site: SWMU 68 GWM
AR/COC: 615205, 615206, 615207 and 615208
SDG: 341691
Laboratory: GEL
Project/Task: 146422.10.11.01
Analysis: RAD

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

Summary

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

All analyses:

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

Gross Alpha/Beta:

1. The relative dilution factor between the parent sample and the gross alpha/beta MS/MSD QC samples was >5 and, as a result, the MS/MSD analyses were not used to evaluate gross alpha and gross beta sample data. The associated sample results will be **qualified J,MS1**.
2. All sample results that were > the MDA but ≤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.

Gross 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 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 615206 and was applied to the samples on AR/COC 615207. A field duplicate pair was submitted with AR/COC 615207. 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: 02/27/14

Memorandum

Date: February 26, 2014

To: File

From: Linda Thal

Subject: GC/MS Organic Data Review and Validation – SNL
Site: SWMU 68 GWM
AR/COC: 615205, 615206, 615207 and 615208
SDG: 341691
Laboratory: GEL
Project/Task: 146422.10.11.01
Analysis: SVOCs

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

Summary

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

1. The MS/MSD RPDs were > laboratory acceptance criteria for 2,4-dinitrotoluene; benzo(g,h,i)perylene; dibenzo(a,h)anthracene; indeno(1,2,3-cd)pyrene and p-nitroaniline. 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 %RSD was $>15\%$ but $\leq 40\%$ for atrazine. The associated sample results were NDs and since no other calibration infraction occurred, will not be qualified.

The CCV %Ds were $>20\%$ with positive bias for hexachlorocyclopentadiene and di-n-octylphthalate. 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 except as noted above in the Summary section.

Laboratory Control Sample (LCS)

All LCS acceptance criteria were met.

Detection Limits/Dilutions

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

Tentatively Identified Compounds (TICs)

TIC reports were not required.

Other QC

An EB was submitted with AR/COC 615206 and was applied to the samples on AR/COC 615207. A field duplicate pair was submitted with AR/COC 615207. 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: 02/27/14

Memorandum

Date: February 25, 2014
To: File
From: Linda Thal
Subject: GC/MS Organic Data Review and Validation – SNL
Site: SWMU 68 GWM
AR/COC: 615205, 615206, 615207 and 615208
SDG: 341691
Laboratory: GEL
Project/Task: 146422.10.11.01
Analysis: VOCs

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

Summary

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

1. The ICAL intercept was negative and $>$ the MDL but $\leq 3X$ the MDL for acetone. The associated sample results were NDs and will be **qualified UJ,I5**.
2. The ICAL %RSD was $>15\%$ but $\leq 40\%$ for bromoform. The associated results for samples 341691015, -017 and -031 were detects and will be **qualified J,I3**.

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 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% for bromoform. The remaining 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 CCV %D was >20% but ≤40% with negative bias for methyl acetate. The associated sample results were NDs and since no other calibration infraction occurred, will not be qualified.

Blanks

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

Chloroform, bromoform, bromodichloromethane and dibromochloromethane were detected at > the PQL in the EB, sample -17 and the FBs, samples -015 and -031. 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

Four TBs were submitted, one for each AR/COC. An FB was submitted with AR/COC 615206 and 615208. The FB submitted with AR/COC 615206 was not associated with any samples. An EB was submitted with AR/COC 615206 and was applied to the samples on AR/COC 615207. A field duplicate

pair was submitted with AR/COC 615207. 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:** 02/27/14

Memorandum - Revised

Date: March 12, 2014

To: File

From: Linda Thal

Subject: Inorganic Data Review and Validation – SNL
Site: SWMU 68 GWM
AR/COC: 615205
SDG: 160-5467
Laboratory: TestAmerica Laboratories, Inc. –St Louis
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 method EPA 314.0 (perchlorate). Data were reported for all required analytes. Problems were identified with the data package that resulted in the qualification of data.

1. The MS/MSD was performed on an EB, sample 160-5469-A-1 from AR/COC 615206. The associated sample result was ND and will be **qualified UJ,MS1**.

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)/Matrix Spike Duplicate (MSD)

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

Laboratory Replicate

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

Detection Limits/Dilutions

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

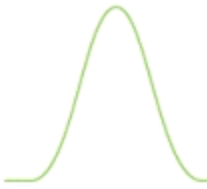
Other QC

No other specific issues that affect data quality were identified.

Reviewed by: Mary Donovan

Level: I

Date: 03/12/14



Sample Findings Summary



AR/COC: 615205

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Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
314.0_WC	095196-020/OBS-SA1	PERCHLORATE (14797-73-0)	UJ, MS1

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

Memorandum

Date: March 4, 2014
To: File
From: Linda Thal
Subject: Inorganic Data Review and Validation – SNL
Site: SWMU 68 GWM
AR/COC: 615206
SDG: 160-5469
Laboratory: TestAmerica Laboratories, Inc. –St Louis
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 method EPA 314.0 (perchlorate). 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)/Matrix Spike Duplicate (MSD)

All MS/MSD recoveries met QC acceptance criteria.

Laboratory Replicate

The replicate analyses met all QC acceptance criteria.

Detection Limits/Dilutions

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

Other QC

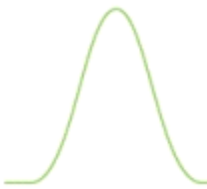
An EB was submitted with AR/COC 615206 and was applied to the samples on AR/COC 615207.

No other specific issues that affect data quality were identified.

Reviewed by: Mary Donovan

Level: I

Date: 03/06/14



Sample Findings Summary



AR/COC: 615206

Page 1 of 1

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

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

Memorandum

Date: March 12, 2014

To: File

From: Linda Thal

Subject: Inorganic Data Review and Validation – SNL
Site: SWMU 68 GWM
AR/COC: 615207
SDG: 160-5470
Laboratory: TestAmerica Laboratories, Inc. –St Louis
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 method EPA 314.0 (perchlorate). Data were reported for all required analytes. Problems were identified with the data package that resulted in the qualification of data.

1. The MS/MSD was performed on an EB, sample 160-5469-A-1 from AR/COC 615206. The associated sample results were NDs and will be **qualified UJ,MS1**.

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

Holding Times and Preservation

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

Calibration

All initial and continuing calibration met QC acceptance criteria.

Blanks

No target analytes were detected in the blanks.

Laboratory Control Sample (LCS)

All LCS acceptance criteria were met.

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

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

Laboratory Replicate

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

Detection Limits/Dilutions

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

Other QC

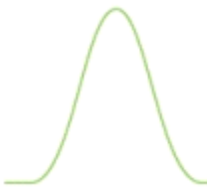
An EB was submitted with AR/COC 615206 and was applied to the samples on AR/COC 615207. A field duplicate pair was submitted with AR/COC 615207. There are no “required” review criteria for field duplicate analyses comparability; no data will be qualified as a result.

No other specific issues that affect data quality were identified.

Reviewed by: Mary Donovan

Level: I

Date: 03/12/14



Sample Findings Summary



AR/COC: 615207

Page 1 of 1

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
314.0_WC			
	095201-020/OBS-SA2	PERCHLORATE (14797-73-0)	UJ, MS1
	095202-020/OBS-SA3	PERCHLORATE (14797-73-0)	UJ, MS1

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

Memorandum

Date: March 12, 2014

To: File

From: Linda Thal

Subject: Inorganic Data Review and Validation – SNL
Site: SWMU 68 GWM
AR/COC: 615208
SDG: 160-5471
Laboratory: TestAmerica Laboratories, Inc. –St Louis
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 method EPA 314.0 (perchlorate). Data were reported for all required analytes. Problems were identified with the data package that resulted in the qualification of data.

1. The MS/MSD was performed on an EB, sample 160-5469-A-1 from AR/COC 615206. The associated sample result was ND and will be **qualified UJ,MS1**.

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)/Matrix Spike Duplicate (MSD)

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

Laboratory Replicate

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

Detection Limits/Dilutions

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

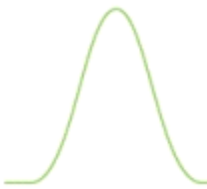
Other QC

No other specific issues that affect data quality were identified.

Reviewed by: Mary Donovan

Level: I

Date: 03/12/14



Sample Findings Summary



AR/COC: 615208

Page 1 of 1

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
314.0_WC	095205-020/OBS-SA4	PERCHLORATE (14797-73-0)	UJ, MS1

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

