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National Nuclear Security Administration
Sandia Field Office
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OCT 30 2014

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NOV - 4 2014

NMED
Hazardous Waste Bureau

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

Dear Mr. Kieling:

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

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

Sincerely,

James W. Todd
Assistant Manager for Engineering

Enclosure

cc: See Page 2

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CERTIFICATION STATEMENT FOR APPROVAL AND FINAL RELEASE OF DOCUMENTS

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

Document author: John Cochran, Department 06234

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

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10/16/14
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and

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U.S. Department of Energy
National Nuclear Security Administration
Sandia Site Office
Owner and Co-Operator

29 OCT 2014
Date

Sandia National Laboratories, New Mexico

Environmental Restoration Operations

A U.S. Department of Energy Environmental Cleanup Program

Consolidated Quarterly Report

April – June 2014



October 2014



United States Department of Energy
Sandia Field Office

CONSOLIDATED QUARTERLY REPORT

October 2014

SANDIA NATIONAL LABORATORIES, NEW MEXICO

ENVIRONMENTAL RESTORATION OPERATIONS

U.S. DEPARTMENT OF ENERGY:
CONTRACTOR:
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: April – June 2014

OVERVIEW

This Sandia National Laboratories, New Mexico Environmental Restoration Operations (ER) Consolidated Quarterly Report (ER Quarterly Report) fulfills all quarterly reporting requirements set forth in the Hazardous and Solid Waste Amendments (HSWA) Module of the Resource Conservation and Recovery Act Permit, the Consent Order, and the Chemical Waste Landfill Post-Closure Care Permit. The 33 sites in the Corrective Action regulatory process are listed in Table I-1. The 33 sites consist of 25 Solid Waste Management Units and 8 Areas of Concern (AOCs). The Burn Site Groundwater and Technical Area V Groundwater AOCs are not included on the current HSWA Permit, but have been added as AOCs to the revised HSWA Permit that is pending approval by the New Mexico Environment Department at this time and are included within this Consolidated Quarterly Report for completeness. This ER Quarterly Report presents activities and data in sections as follows:

SECTION I: Environmental Restoration Operations Consolidated Quarterly Report, April – June 2014

SECTION II: Perchlorate Screening Quarterly Groundwater Monitoring Report, April – June 2014

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

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

ABBREVIATIONS AND ACRONYMS

°C	degrees Celsius
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
bgs	below ground surface
BSG	Burn Site Groundwater
BW	background well
CAC	Corrective Action Complete
CAMU	Corrective Action Management Unit
CCBA	Coyote Canyon Blast Area
CFR	Code of Federal Regulations
CME	Corrective Measures Evaluation
COA	certificates of analyses
COC	Chain-of-Custody
CTF	Coyote Test Field
CWL	Chemical Waste Landfill
CY	Calendar Year
CYN	Canyons (Burn Site)
DI	deionized
DO	dissolved oxygen
DOE	U.S. Department of Energy
EB	equipment blank
EPA	U.S. Environmental Protection Agency
ER	Environmental Restoration Operations
ER Quarterly Report	Environmental Restoration Operations (ER) Consolidated Quarterly Report
ET Cover	evapotranspirative cover
FB	field blank
FOP	Field Operating Procedure
GEL	GEL Laboratories LLC
H 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
HSWA	Hazardous and Solid Waste Amendments
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
NaOH	sodium hydroxide
NA	not applicable
ND	nondetect
NE	not established
NMED	New Mexico Environment Department
NNSA	National Nuclear Security Administration
NPN	nitrate plus nitrite
NTU	nephelometric turbidity unit
NWTA	Northwest Technical Area
OBS	Old Burn Site
ORP	oxidation-reduction potential
PCCP	Post-Closure Care Permit
pCi/L	picocuries per liter
pH	potential of hydrogen
PQL	practical quantitation limit
QC	quality control
RCRA	Resource Conservation and Recovery Act
RDX	hexahydro-1,3,5-trinitro-1,3,5-triazine
RPD	relative percent difference

Sandia	Sandia Corporation
SAP	Sampling and Analysis Plan
SC	specific conductance
SM	standard method
SNL/NM	Sandia National Laboratories, New Mexico
SVOC	semivolatile organic compound
SWMU	Solid Waste Management Unit
SWTA	Southwest Technical Area
TA	Technical Area
TA-VG	Technical Area V Groundwater
TAG	Tijeras Arroyo Groundwater
TAL	Target Analyte List
TB	trip blank
Tetryl	2,4,6-trinitrophenylmethylnitramine
The Consent Order	the Compliance Order on Consent
TO	Technical Order
VOC	volatile organic compound

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SECTION I

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SECTION I

ENVIRONMENTAL RESTORATION OPERATIONS CONSOLIDATED

QUARTERLY REPORT, April – June 2014

1.0 Introduction

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

2.0 Environmental Restoration Operations Work Completed

2.1 Mixed Waste Landfill

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

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

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

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

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

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

2.2 **Project Management and Site Closure**

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

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

This Quarterly Report addresses 33 sites undergoing corrective action under the Permit and the Compliance Order on Consent (the Consent Order) (Table I-1); of these 33 sites, 26 sites were the subject of a request submitted to the NMED in March 2006 (Wagner March 2006) for final determination of CAC. The sites include 19 Solid Waste Management Units (SWMUs) and 7 Areas of Concern (AOCs). The NMED issued the “Notice of Public Comment Period and Intent to Approve a Class 3 Permit Modification of the Resource Conservation and Recovery Act (RCRA) Permit for Sandia National Laboratories” for these 26 sites in December 2007 (NMED December 2007). The NMED public review and comment period ended in February 2008.

The following SWMUs and AOCs were included in this permit modification request:

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

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

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

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

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

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

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

This letter included four main sections:

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

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

- The section titled, “SWMUs Requiring Additional Corrective Action,” specifies additional groundwater characterization requirements for:

1. SWMUs 8/58 - Open Dump/Coyote Canyon Blast Area
2. SWMU 68 - Old Burn Site
3. SWMU 149 - Building 9930 Septic System (Coyote Test Field [CTF])
4. SWMU 154 - Building 9960 Septic System and Seepage Pits

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

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

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

- The section titled, “SWMUs/AOCs to be Restricted to Industrial Land Use,” indicates that the NMED intends to restrict the future land use of the following SWMUs/AOCs to industrial:
 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 a letter dated July 27, 2012, the NMED granted CAC status to three SWMUs/AOCs that were not opposed by the public in the public comment period ending in February 2008 (NMED July 2012). The two SWMUs and one AOC granted CAC status are as follows:

- SWMUs 233 and 234
- AOC 1115

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

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

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

2.3 **Hydrogeologic Characterization**

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

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

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

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

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

2.3.1 **Technical Area V Groundwater**

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

2.3.2 **Burn Site Groundwater**

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

2.3.3 **Tijeras Arroyo Groundwater**

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

2.3.4 **Mixed Waste Landfill Groundwater**

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

2.3.5 **Chemical Waste Landfill Groundwater**

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

2.3.6 **SWMUs 8/58 Groundwater**

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

2.3.7 **SWMU 49 Groundwater**

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

2.3.8 **SWMU 68 Groundwater**

SWMU 68 groundwater sampling was conducted in April 2014.

2.3.9 **SWMU 116 Groundwater**

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

2.3.10 **SWMU 149 Groundwater**

SWMU 149 groundwater sampling was conducted in June 2014.

2.3.11 **SWMU 154 Groundwater**

SWMU 154 groundwater sampling was conducted in June 2014.

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

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

- The BSG Interim Measures Work Plan submitted to the NMED on May 26, 2005 (SNL/NM May 2005);
- The BSG Current Conceptual Model of Groundwater Flow and Contaminant Transport submitted to the NMED on April 9, 2008 (SNL/NM March 2008);
- The TA-V Geophysical Logs and Slug Test Results Report submitted to the NMED on November 24, 2010 (SNL/NM November 2010);
- MWL Groundwater Monitoring Report for CY 2010 submitted to the NMED on September 30, 2011 (SNL/NM September 2011); and
- Mixed Waste Landfill Groundwater Monitoring Report, Monitoring Well MWL-MW4 Metals Data, Calendar Year 2013.

3.0 **Long-Term Stewardship Work Completed**

3.1 **Mixed Waste Landfill**

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

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

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

3.2 **Chemical Waste Landfill**

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

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

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

3.3 **Corrective Action Management Unit**

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

Activities for this reporting period (April, May, and June 2014) include the following:

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

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

3.3.1 **CAMU Waste Management Activities**

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

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

3.3.2 **CAMU Regulatory Activities**

No regulatory activities occurred during this quarter.

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

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

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

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

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Tables

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

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

Notes

CCBA = Coyote Canyon Blast Area.
CTF = Coyote Test Field.
LWDS = Liquid Waste Disposal System.
MWL = Mixed Waste Landfill.
TA = Technical Area.
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-VG	Quarterly	1,2,3,4	AGMR	NA	AVN-1, LWDS-MW1, LWDS-MW2, TAV-MW2, TAV-MW3, TAV-MW4, TAV-MW5, TAV-MW6, TAV-MW7, TAV-MW8, TAV-MW9, TAV-MW10, TAV-MW11, TAV-MW12, TAV-MW13, TAV-MW14
BSG	Semiannually	2,4	AGMR	NA	CYN-MW4, CYN-MW7, CYN-MW8, CYN-MW9, CYN-MW10, CYN-MW11, CYN-MW12, CYN-MW13
TAG	Quarterly	1,2,3,4	AGMR	NA	PGS-2, TA1-W-01, TA1-W-02, TA1-W-03, TA1-W-04, TA1-W-05, TA1-W-06, TA1-W-08, TA2-NW1-595, TA2-SW1-320, TA2-W-01, TA2-W-19, TA2-W-26, TA2-W-27, TJA-2, TJA-3, TJA-4, TJA-6, TJA-7, WYO-3, WYO-4
MWL Groundwater	Semiannually	2,4	AGMR, Section 4 of MWL ALTMM Report	NA	MWL-BW2, MWL-MW7, MWL-MW8, MWL-MW9
CWL Groundwater	Semiannually	1,3	AGMR, Section 4 CWL PCCP Report	NA	CWL-BW5, CWL-MW9, CWL-MW10, CWL-MW11
SWMUs 8/58 Groundwater	Quarterly	1,2,3,4	AGMR, Section IV of ER Quarterly	Section II of ER Quarterly	CCBA-MW1, CCBA-MW2
SWMU 68 Groundwater	Quarterly	1,2,3,4	AGMR, Section IV of ER Quarterly	Section II of ER Quarterly	OBS-MW1, OBS-MW2, OBS-MW3
SWMU 49 Groundwater	Annually	1	AGMR	AGMR and Section II of ER Quarterly Report, First Quarter of CY13	CYN-MW5
SWMU 116 Groundwater	Annually	1	AGMR	AGMR and Section II of ER Quarterly Report, First Quarter of CY13	CTF-MW1
SWMU 149 Groundwater	Quarterly	1,2,3,4	AGMR	Section II of ER Quarterly	CTF-MW3
SWMU 154 Groundwater	Quarterly	1,2,3,4	AGMR, Section III of ER Quarterly	Section II of ER Quarterly	CTF-MW2

Notes

^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.
 BW = Background well.
 CWL = Chemical Waste Landfill.
 CY = Calendar Year.
 ER = Environmental Restoration Operations.
 MWL = Mixed Waste Landfill.
 NA = Not applicable. No wells in the site network are currently being sampled and analyzed for perchlorate.
 PCCP = Post-Closure Care Permit.
 SWMU = Solid Waste Management Unit.
 TAG = Tijeras Arroyo Groundwater.
 TA-VG = Technical Area V Groundwater.

SECTION II

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

SECTION II

PERCHLORATE SCREENING QUARTERLY GROUNDWATER MONITORING REPORT, April – June 2014

1.0 Introduction

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

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

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

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

Groundwater at Coyote Test Field (CTF) monitoring well CTF-MW2 has been sampled 14 times; monitoring well CTF-MW3 has been sampled 13 times; Solid Waste Management Units (SWMUs) 8/58 monitoring wells CCBA-MW1 and CCBA-MW2 have been sampled 11 times; and SWMU 68 monitoring wells OBS-MW1, OBS-MW2, and OBS-MW3 have been sampled 11 times (Table II-1). The Consent Order requires that new wells be sampled for perchlorate for a minimum of four quarters (NMED April 2004). Reporting will continue as long as groundwater monitoring wells remain active in the perchlorate screening monitoring well network unless otherwise negotiated with the NMED.

2.0 **Scope of Activities**

This report provides perchlorate screening groundwater monitoring analytical results for the Second Quarter of CY 2014 (April, May, and June) for the wells currently active in the perchlorate screening program as shown on Figure II-1 and listed in Table II-1. In accordance with the requirements of Table XI-1 of the Consent Order, a well with four consecutive quarters of nondetects (NDs) for perchlorate at the screening level/method detection limit (MDL) of 4 micrograms per liter ($\mu\text{g/L}$) is removed from the requirement of continued monitoring for perchlorate.

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

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

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

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

As described in the Mini-SAPs, groundwater sampling was performed in accordance with current SNL/NM Environmental Management, Long-Term Stewardship Project Field Operating Procedures (FOPs). A portable 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 Consent 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 Consent Order clarifies that the CME process will be initiated where there is a documented release to the environment, and where corrective measures are necessary to protect human health and the environment.

3.1 **Burn Site Groundwater**

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

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

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

In accordance with the requirements of Section VI.K.1.b of the Consent Order (NMED April 2004), a human health risk assessment has been performed to evaluate the potential for adverse health effects from the concentrations of perchlorate detected in monitoring well CYN-MW6 groundwater samples. The maximum perchlorate concentration to date of 8.93 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 AOC (NMED April 2009). A characterization work plan was prepared and submitted to the NMED (SNL/NM November 2009), approved by the NMED (February 2010), and implemented in July 2010.

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

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

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

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

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

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

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

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

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

4.0 **Monitoring Results**

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

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

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

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

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

5.0 **Summary and Conclusions**

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

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

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

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Figures

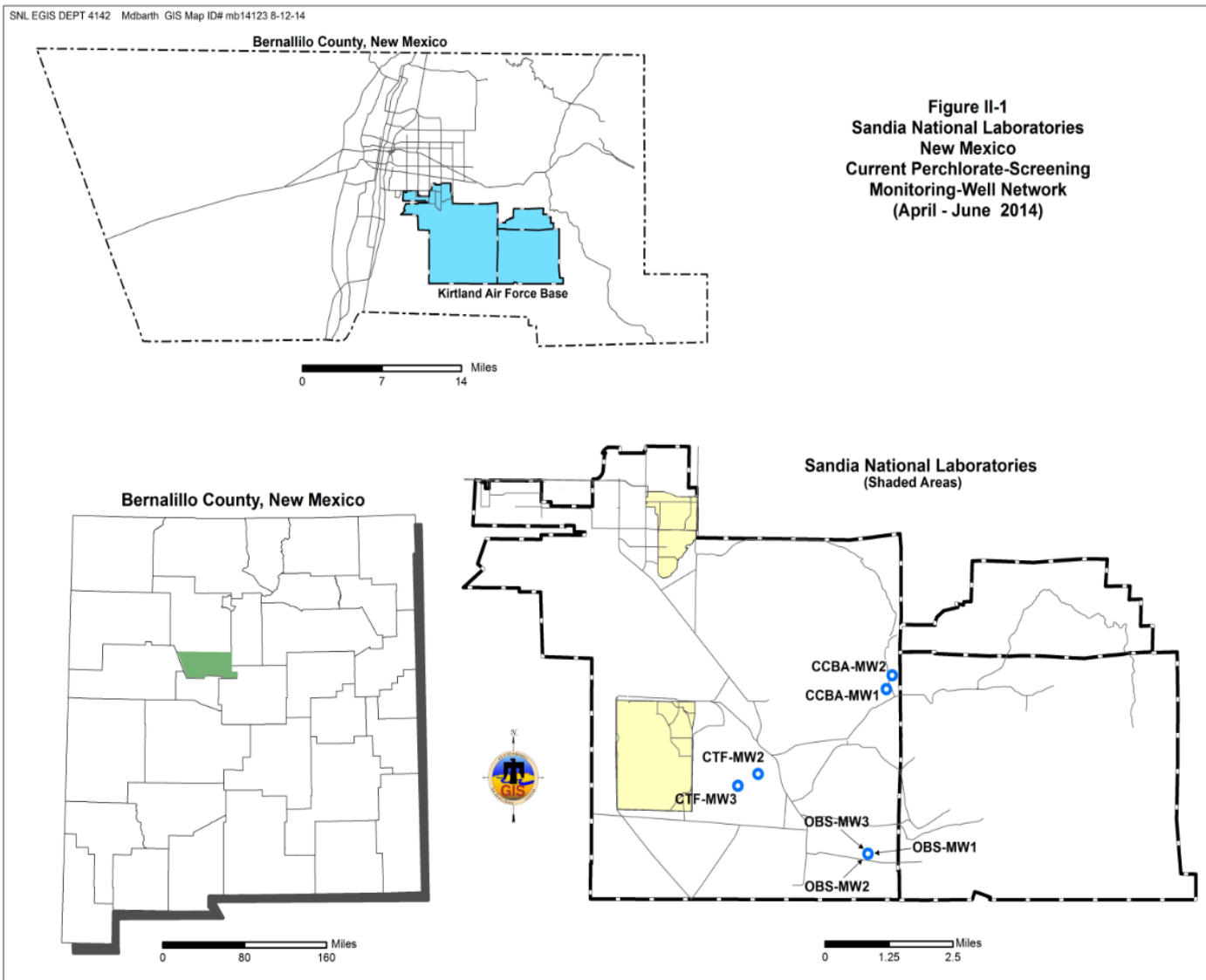


Figure II-1
Sandia National Laboratories, New Mexico
Current Perchlorate Screening Monitoring Well Network, April – June 2014

Tables

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

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

Notes

^a Includes this sampling event.

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

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

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

µg/L = Microgram(s) per liter.
CCBA = Coyote Canyon Blast Area.
CTF = Coyote Test Field.
CY = Calendar Year.
DOE/Sandia = U.S. Department of Energy/Sandia Corporation.
MDL = Method Detection Limit.
MW = Monitoring Well.
NMED = New Mexico Environment Department.
OBS = Old Burn Site.
The Consent Order = The Compliance Order on Consent.
SWMU = Solid Waste Management Unit.

Table II-2
Wells Discussed in Previous Perchlorate Screening Reports

Well
CTF-MW1
CTF-MW3
CYN-MW1D
CYN-MW5
CYN-MW6
CYN-MW7
CYN-MW8
CYN-MW9
CYN-MW10
CYN-MW11
CYN-MW12
LWDS-MW1
MRN-2
MRN-3D
MWL-BW1
MWL-BW2
MWL-MW1
MWL-MW7
MWL-MW8
MWL-MW9
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 Second Quarter, CY 2014 Perchlorate Sampling

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

Notes

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

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

Well	Sample Date	AR/COC Number	Sample Number	Result (µg/L)	MDL (µg/L)	PQL (µg/L)	MCL (µg/L)	Laboratory Qualifier ^a	Validation Qualifier ^b	Analytical Method ^c	Comments
CCBA-MW1	31-Oct-11	613883	091345-020	ND	4.0	12	NE	U		EPA 314.0	
	16-Jan-12	613958	091615-020	ND	4.0	12	NE	U		EPA 314.0	
			091616-020	ND	4.0	12	NE	U		EPA 314.0	Duplicate sample
	23-Apr-12	614155	092291-020	ND	4.0	12	NE	U		EPA 314.0	
	16-Jul-12	614288	092615-020	ND	4.0	12	NE	U		EPA 314.0	
			092616-020	ND	4.0	12	NE	U		EPA 314.0	Duplicate sample
	22-Oct-12	614466	093013-020	ND	4.0	12	NE	U		EPA 314.0	
	16-Jan-13	614567	093341-020	ND	4.0	12	NE	U		EPA 314.0	
			093342-020	ND	4.0	12	NE	U		EPA 314.0	Duplicate sample
	24-Apr-13	614745	093873-020	ND	4.0	12	NE	U		EPA 314.0	
	16-Jul-13	614939	094376-020	ND	4.0	12	NE	U		EPA 314.0	
			094377-020	ND	4.0	12	NE	U		EPA 314.0	Duplicate sample
	10-Oct-13	615095	094779-020	ND	4.0	12	NE	U		EPA 314.0	
CCBA-MW2	27-Jan-14	615211	095213-020	ND	4.0	12	NE	U		EPA 314.0	
			095214-020	ND	4.0	12	NE	U		EPA 314.0	Duplicate sample
	07-Apr-14	615424	095725-020	ND	4.0	12	NE	U		EPA 314.0	
	01-Nov-11	613885	091349-020	ND	4.0	12	NE	U		EPA 314.0	
			091350-020	ND	4.0	12	NE	U		EPA 314.0	Duplicate sample
	12-Jan-12	613956	091610-020	ND	4.0	12	NE	U		EPA 314.0	
	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	
	23-Oct-12	614468	093018-020	ND	4.0	12	NE	U		EPA 314.0	
			093019-020	ND	4.0	12	NE	U		EPA 314.0	Duplicate sample
	15-Jan-13	614565	093336-020	ND	4.0	12	NE	U		EPA 314.0	
	25-Apr-13	614747	093878-020	ND	4.0	12	NE	U		EPA 314.0	
			093879-020	ND	4.0	12	NE	U		EPA 314.0	Duplicate sample
	15-Jul-13	614937	094371-020	ND	4.0	12	NE	U		EPA 314.0	
	14-Oct-13	615095	094779-020	ND	4.0	12	NE	U		EPA 314.0	
			094780-020	ND	4.0	12	NE	U		EPA 314.0	Duplicate sample
	23-Jan-14	615209	095208-020	ND	4.0	12	NE	U		EPA 314.0	
	08-Apr-14	615426	095730-020	ND	4.0	12	NE	U		EPA 314.0	
			095731-020	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 Second Quarter, CY 2014

Well	Sample Date	AR/COC Number	Sample Number	Result (µg/L)	MDL (µg/L)	PQL (µg/L)	MCL (µg/L)	Laboratory Qualifier ^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	
			091949-020	ND	4.0	12	NE	U		EPA 314.0	
	30-Mar-12	614055	091950-020	ND	4.0	12	NE	U		EPA 314.0	Duplicate sample
	19-Jun-12	614255	092538-020	ND	4.0	12	NE	U		EPA 314.0	
	25-Sep-12	614391	092862-020	ND	4.0	12	NE	U		EPA 314.0	
	18-Dec-12	614541	093251-020	ND	4.0	12	NE	U		EPA 314.0	
			093723-020	ND	4.0	12	NE	U		EPA 314.0	
	26-Mar-13	614663	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	
			095579-020	ND	4.0	12	NE	U		EPA 314.0	
CTF-MW3	18-Mar-14	615417	095580-020	ND	4.0	12	NE	U		EPA 314.0	Duplicate sample
			096045-020	ND	4.0	12	NE	U		EPA 314.0	
	09-Mar-11	613450	090243-020	ND	4.0	12	NE	U		EPA 314.0	
			090244-020	ND	4.0	12	NE	U		EPA 314.0	Duplicate sample
	03-Jun-11	613579	090672-020	ND	4.0	12	NE	U		EPA 314.0	
	23-Sep-11	613854	091257-020	ND	4.0	12	NE	U		EPA 314.0	
	08-Dec-11	613928	091523-020	ND	4.0	12	NE	U		EPA 314.0	
			091943-020	ND	4.0	12	NE	U		EPA 314.0	
	26-Mar-12	614053	091944-020	ND	4.0	12	NE	U		EPA 314.0	Duplicate sample
			092536-020	ND	4.0	12	NE	U		EPA 314.0	
	16-Jun-12	614254	092860-020	ND	4.0	12	NE	U		EPA 314.0	
	21-Sep-12	614390	093249-020	ND	4.0	12	NE	H, U	UJ, H1	EPA 314.0	
	14-Dec-12	614540	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
	27-Jun-14	615590	096142-020	ND	4.0	12	NE	U		EPA 314.0	

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

Well	Sample Date	AR/COC Number	Sample Number	Result (µg/L)	MDL (µg/L)	PQL (µg/L)	MCL (µg/L)	Laboratory Qualifier ^a	Validation Qualifier ^b	Analytical Method ^c	Comments
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	
	18-Apr-12	614081	092022-020	ND	4.0	12	NE	U		EPA 314.0	
			092023-020	ND	4.0	12	NE	U		EPA 314.0	Duplicate sample
	17-Jul-12	614289	092618-020	ND	4.0	12	NE	U		EPA 314.0	
	16-Oct-12	614462	093003-020	ND	4.0	12	NE	U		EPA 314.0	
	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	
	08-Oct-13	615091	094767-020	ND	4.0	12	NE	U		EPA 314.0	
			094768-020	ND	4.0	12	NE	U		EPA 314.0	Duplicate sample
OBS-MW2	20-Jan-14	615205	095196-020	ND	4.0	12	NE	U		EPA 314.0	
	14-Apr-14	615427	095733-020	ND	4.0	12	NE	U		EPA 314.0	
	26-Oct-11	613880	091337-020	ND	4.0	12	NE	U		EPA 314.0	
	10-Jan-12	613954	091604-020	ND	4.0	12	NE	U		EPA 314.0	
			091605-020	ND	4.0	12	NE	U		EPA 314.0	Duplicate sample
	19-Apr-12	614082	092025-020	ND	4.0	12	NE	U		EPA 314.0	
	18-Jul-12	614290	092620-020	ND	4.0	12	NE	U		EPA 314.0	
	17-Oct-12	614464	093007-020	ND	4.0	12	NE	U		EPA 314.0	
			093008-020	ND	4.0	12	NE	U		EPA 314.0	Duplicate sample
	21-Jan-12	614568	093344-020	ND	4.0	12	NE	U		EPA 314.0	
	22-Apr-13	614742	093866-020	ND	4.0	12	NE	U		EPA 314.0	
	10-Jul-13	614935	094365-020	ND	4.0	12	NE	U		EPA 314.0	
			094366-020	ND	4.0	12	NE	U		EPA 314.0	Duplicate sample
	07-Oct-13	615089	094762-020	ND	4.0	12	NE	U		EPA 314.0	
	22-Jan-14	615207	095201-020	ND	4.0	12	NE	U		EPA 314.0	
			095202-020	ND	4.0	12	NE	U		EPA 314.0	Duplicate sample
	15-Apr-14	615428	095736-020	ND	4.0	12	NE	U		EPA 314.0	

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

Well	Sample Date	AR/COC Number	Sample Number	Result (µg/L)	MDL (µg/L)	PQL (µg/L)	MCL (µg/L)	Laboratory Qualifier ^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	
			092625-020	ND	4.0	12	NE	U		EPA 314.0	
	19-Jul-12	614292	092626-020	ND	4.0	12	NE	U		EPA 314.0	Duplicate sample
			093010-020	ND	4.0	12	NE	U		EPA 314.0	
	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	
			093870-020	ND	4.0	12	NE	U		EPA 314.0	
	23-Apr-12	614744	093871-020	ND	4.0	12	NE	U		EPA 314.0	Duplicate sample
			094368-020	ND	4.0	12	NE	U		EPA 314.0	
	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	
			095741-020	ND	4.0	12	NE	U		EPA 314.0	
	16-Apr-14	615430	095742-020	ND	4.0	12	NE	U		EPA 314.0	Duplicate sample

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.

EPA = U.S. Environmental Protection Agency.

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

Notes (continued)

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

Table II-5
Perchlorate Screening Groundwater Monitoring
Field Water Quality Measurements^a, Second 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	07-Apr-14	15.63	452.5	194.3	6.70	1.19	32.4	3.21
CCBA-MW2	08-Apr-14	16.18	531.1	184.3	7.63	0.23	64.9	6.37
CTF-MW2	06-Jun-14	19.17	3195.0	35.2	5.86	0.86	0.9	0.09
CTF-MW3	27-Jun-14	22.11	1651.1	296.9	6.96	0.51	79.6	6.92
OBS-MW1	14-Apr-14	14.56	462.2	-199.9	7.54	0.31	36.4	3.71
OBS-MW2	15-Apr-14	16.14	464.0	189.7	7.52	0.19	36.2	3.55
OBS-MW3	16-Apr-14	16.70	471.0	197.7	7.56	0.24	46.6	4.52

Notes

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

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

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Appendix A

Analytical Laboratory Certificates of
Analysis for the Perchlorate Data

CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY

Internal Lab

Batch No.

SMO Use

Page 1 of 2

AR/COC **615424**

Project Name:	SWMU 8/58 GWM	Date Samples Shipped:	4/7/14	SMO Authorization:	<i>[Signature]</i>
Project/Task Manager:	Clinton Lum	Carrier/Waybill No.	217062	SMO Contact Phone:	Lorraine Herrera/505-844-3199
Project/Task Number:	146422.10.11.01	Lab Contact:	Edie Kent/803-556-8171	Send Report to SMO:	Rita Kavanaugh/505-284-2553
Service Order:	CF262-14	Lab Destination:	GEL		
		Contract No.:	PO 1303873		

<input type="checkbox"/> Waste Characterization
<input type="checkbox"/> RMMA
<input type="checkbox"/> Released by COC No.
<input checked="" type="checkbox"/> 4° Celsius

Tech Area:	
Building:	Room: Operational Site:

Sample No.	Fraction	Sample Location Detail	Depth (ft)	Date/Time Collected	Sample Matrix	Container		Preserv-ative	Collection Method	Sample Type	Parameter & Method Requested	Lab Sample ID
						Type	Volume					
095724	-001	CCBA-FB1	NA	4/7/14 9:35	DIW	G	3x40ml	HCL	G	FB	TCL VOC (SW846-8260B)	346180 001
095725	-001	CCBA-MW1	79	4/7/14 9:35	GW	G	3x40ml	HCL	G	SA	TCL VOC (SW846-8260B)	346180 002
095725	-002	CCBA-MW1	79	4/7/14 9:36	GW	AG	4x1 L	None	G	SA	TCL SVOC (SW846-8270C)	346180 003
095725	-009	CCBA-MW1	79	4/7/14 9:37	GW	P	500 ml	HNO3	G	SA	TAL Metals+U(SW846-6010/6020/7470)	346180 004
095725	-016	CCBA-MW1	79	4/7/14 9:40	GW	P	125 ml	None	G	SA	Anions (SW846-9056)	346180 005
095725	-017	CCBA-MW1	79	4/7/14 9:39	FGW	P	500 ml	HNO3	G	SA	Metals Ca,Mg,K,Na(SW846-6020)	346180 001
095725	-018	CCBA-MW1	79	4/7/14 9:41	GW	P	125 ml	H2SO4	G	SA	Nitrate+Nitrite (EPA 353.2)	346180 006
095725	-020	CCBA-MW1	79	4/7/14 9:42	GW	P	250 ml	None	G	SA	Perchlorate (EPA 314.0)	346180 007
095725	-022	CCBA-MW1	79	4/7/14 9:43	GW	P	500 ml	None	G	SA	Alkalinity (SM2320B)	346180 008
095725	-024	CCBA-MW1	79	4/7/14 9:44	GW	AG	4x1 L	None	G	SA	High Explosives (SW846-8321A mod.)	346180 009

Last Chain:	<input type="checkbox"/> Yes	Sample Tracking	SMO Use	Special Instructions/QC Requirements:	Conditions on Receipt
Validation Req'd:	<input checked="" type="checkbox"/> Yes	Date Entered:		EDD <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	
Background:	<input type="checkbox"/> Yes	Entered by:		Turnaround Time <input type="checkbox"/> 7 Day* <input type="checkbox"/> 15 Day* <input checked="" type="checkbox"/> 30 Day	
Confirmatory:	<input type="checkbox"/> Yes	QC inits.:		Negotiated TAT <input type="checkbox"/>	
Sample Team Members	Name	Signature	Init.	Company/Organization/Phone/Cell	Sample Disposal <input type="checkbox"/> Return to Client <input checked="" type="checkbox"/> Disposal by Lab
	Robert Lynch	<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:
	William Gibson	<i>[Signature]</i>	WG	SNL/4142/505-284-3307/505-239-7367	Send report to Tim Jackson/4142/MS 0729/284-2547 If Perchlorate detected, perform verification analysis using SW846-6850M. FGW, filtered in field using a 0.45 micron in-line filter. Report Anions (as Br, Cl, F, SO4), Alkalinity (as total CaCO3, HCO3, CO3), and Gamma Spectroscopy (as short list isotopes).

1. Relinquished by <i>[Signature]</i> Org. 4/142 Date 4/7/14 Time 10:15	3. Relinquished by	Org.	Date	Time
1. Received by <i>[Signature]</i> Org. 4/142 Date 4/7/14 Time 10:15	3. Received by	Org.	Date	Time
2. Relinquished by <i>[Signature]</i> Org. 4/142 Date 4/7/14 Time 11:00	4. Relinquished by	Org.	Date	Time
2. Received by <i>[Signature]</i> Org. GEL Date 4-8-14 Time 07:25	4. Received by	Org.	Date	Time

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

Lab Use

GEL LABORATORIES LLC

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

Certificate of Analysis

Report Date: May 5, 2014

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

Client Sample ID: 095725-020
Sample ID: 346180007
Matrix: AQUEOUS
Collect Date: 07-APR-14 09:42
Receive Date: 08-APR-14
Collector: Client

Project: SNLSGWater
Client ID: SNLS004

Client Desc.: CCBA-MW1
Vol. Recv.:

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Ion Chromatography											
EPA 314.0 Perchlorate by IC "As Received"											
Perchlorate	U	ND	0.004	0.012	mg/L	1	MAR1	04/15/14	0613	1378827	1

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	EPA 314.0 DOE-AL	

Notes:

CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY

Internal Lab

Batch No.

SMO Use

Page 1 of 2

AR/COC 615426

Project Name:	SWMU 8/58 GWM	Date Samples Shipped:	4/8/14	SMO Authorization:	Don Watson
Project/Task Manager:	Clinton Lum	Carrier/Waybill No.	217098	SMO Contact Phone:	Lorraine Herrera/505-844-3199
Project/Task Number:	146422.10.11.01	Lab Contact:	Edie Kent/803-556-8171	Send Report to SMO:	Rita Kavanaugh/505-284-2553
Service Order:	CF262-14	Lab Destination:	GEL		
		Contract No.:	PO 1303873		

Tech Area:		Operational Site:	
Building:	Room:		

☐ 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

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
095730	-001	CCBA-MW2	117	4/8/14 9:27	GW	G	3x40ml	HCL	G	SA	TCL VOC (SW846-8260B)	346180 031
095730	-002	CCBA-MW2	117	4/8/14 9:28	GW	AG	4x1 L	None	G	SA	TCL SVOC (SW846-8270C)	346180 032
095730	-009	CCBA-MW2	117	4/8/14 9:32	GW	P	500 ml	HNO3	G	SA	TAL Metals+U(SW846-6010/6020/7470)	346180 033
095730	-016	CCBA-MW2	117	4/8/14 9:35	GW	P	125 ml	None	G	SA	Anions (SW846-9056)	346180 034
095730	-017	CCBA-MW2	117	4/8/14 9:34	FGW	P	500 ml	HNO3	G	SA	Metals Ca,Mg,K,Na(SW846-6020)	346180 035
095730	-018	CCBA-MW2	117	4/8/14 9:36	GW	P	125 ml	H2SO4	G	SA	Nitrate+Nitrite (EPA 353.2)	346180 036
095730	-020	CCBA-MW2	117	4/8/14 9:37	GW	P	250 ml	None	G	SA	Perchlorate (EPA 314.0)	346180 037
095730	-022	CCBA-MW2	117	4/8/14 9:38	GW	P	500 ml	None	G	SA	Alkalinity (SM2320B)	346180 038
095730	-024	CCBA-MW2	117	4/8/14 9:39	GW	AG	4x1 L	None	G	SA	High Explosives (SW846-8321A mod.)	346180 039
095730	-029	CCBA-MW2	117	4/8/14 9:43	GW	P	250 ml	NaOH	G	SA	Total Cyanide (SW846-9012)	346180 039

Last Chain:	<input checked="" type="checkbox"/> Yes	Sample Tracking	SMO Use	Special Instructions/QC Requirements:	Conditions on Receipt
Validation Req'd:	<input checked="" type="checkbox"/> Yes	Date Entered:		EDD <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	
Background:	<input type="checkbox"/> Yes	Entered by:		Turnaround Time <input type="checkbox"/> 7 Day* <input type="checkbox"/> 15 Day* <input checked="" type="checkbox"/> 30 Day	
Confirmatory:	<input type="checkbox"/> Yes	QC inits.:		Negotiated TAT <input type="checkbox"/>	
Sample Team Members	Name	Signature	Init.	Company/Organization/Phone/Cell	Sample Disposal <input type="checkbox"/> Return to Client <input checked="" type="checkbox"/> Disposal by Lab
	Robert Lynch	[Signature]	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, perform verification analysis using SW846-6850M.FGW, filtered in field using a 0.45 micron in-line filter. Report Anions (as Br, Cl, F, SO4). Alkalinity (as total CaCO3, HCO3, CO3). Gamma Spectroscopy (as short list isotopes).
	Alfred Santillanes	[Signature]	AS	SNL/4142/505-844-5130/505-228-0710	
	William Gibson	[Signature]	WG	SNL/4142/505-284-3307/505-239-7367	
1. Relinquished by [Signature] Org. 4142 Date 4/8/14 Time 10:16 1. Received by [Signature] Org. 4142 Date 4/8/14 Time 10:16 2. Relinquished by [Signature] Org. 4142 Date 4/8/14 Time 11:00 2. Received by [Signature] Org. 4142 Date 4-9-14 Time 0735					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

Lab Use

GEL LABORATORIES LLC

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

Certificate of Analysis

Report Date: May 5, 2014

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

Client Sample ID: 095730-020
Sample ID: 346180036
Matrix: AQUEOUS
Collect Date: 08-APR-14 09:37
Receive Date: 09-APR-14
Collector: Client

Project: SNLSGWater
Client ID: SNLS004

Client Desc.: CCBA-MW2
Vol. Recv.:

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Ion Chromatography											
EPA 314.0 Perchlorate by IC "As Received"											
Perchlorate	U	ND	0.004	0.012	mg/L	1	MAR1	04/15/14	0730	1378827	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: May 5, 2014

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

Client Sample ID: 095731-020
Sample ID: 346180047
Matrix: AQUEOUS
Collect Date: 08-APR-14 09:37
Receive Date: 09-APR-14
Collector: Client

Project: SNLSGWater
Client ID: SNLS004
Client Desc.: CCBA-MW2
Vol. Recv.:

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Ion Chromatography											
EPA 314.0 Perchlorate by IC "As Received"											
Perchlorate	U	ND	0.004	0.012	mg/L	1	MAR1	04/15/14	0749	1378827	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. <u>N/A</u>		SMO Use		AR/COC 615528	
Project Name: <u>SWMU 154 GWM</u>		Date Samples Shipped: <u>6/6/14</u>		SMO Authorization: <u>[Signature]</u>	
Project/Task Manager: <u>Clinton Lum</u>		Carrier/Waybill No. <u>219437</u>		SMO Contact Phone: <u>SMO</u>	
Project/Task Number: <u>146422.10.11.01</u>		Lab Contact: <u>Edie Kent/803-556-8171</u>		<input type="checkbox"/> Waste Characterization	
Service Order: <u>CF353-14</u>		Lab Destination: <u>GEL</u>		<input type="checkbox"/> RMMA	
		Contract No.: <u>PO 1303873</u>		<input type="checkbox"/> Released by COC No.	
Tech Area:		Send Report to SMO:		<input checked="" type="checkbox"/> 4° Celsius	
Building:		Rita Kavanaugh/505.284.2553		Bill to: Sandia National Laboratories (Accounts Payable),	
Room:		Operational Site:		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
096045	-001	CTF-MW2	128	6/6/14 9:03	GW	G	3 x 40 mL	HCL	G	SA	TCL VOCs (SW846-8260B)	350259 001
096045	-002	CTF-MW2	128	6/6/14 9:05	GW	AG	4 x 1 L	None	G	SA	TCL SVOCs (SW846-8270C)	350259 002
096045	-024	CTF-MW2	128	6/6/14 9:07	GW	AG	4 x 1 L	None	G	SA	High Explosives (SW846-8321A)	350259 003
096045	-009	CTF-MW2	128	6/6/14 9:08	GW	P	500 mL	HNO3	G	SA	TAL Metals+U (SW846-6010/6020/7470)	350259 004
096045	-010	CTF-MW2	128	6/6/14 9:09	FGW	P	500 mL	HNO3	G	SA	TAL Metals+U (SW846-6010/6020/7470)	350259 001
096045	-016	CTF-MW2	128	6/6/14 9:10	GW	P	125 mL	None	G	SA	Anions (SW846-9056)	350259 005
096045	-018	CTF-MW2	128	6/6/14 9:11	GW	P	125 mL	H2SO4	G	SA	Nitrate plus Nitrite (EPA 353.2)	350259 006
096045	-022	CTF-MW2	128	6/6/14 9:12	GW	P	500 mL	None	G	SA	Alkalinity as CaCO3, HCO3, CO3 (SM2320B)	350259 007
096045	-020	CTF-MW2	128	6/6/14 9:13	GW	P	250 mL	None	G	SA	Perchlorate (EPA 314.0)	350259 008
096045	-033	CTF-MW2	128	6/6/14 9:14	GW	P	1 L	HNO3	G	SA	Gamma Spectroscopy (EPA 901.0)	350259 009

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 <input type="checkbox"/> No		Date Entered:				EDD <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		
Background: <input type="checkbox"/> Yes <input type="checkbox"/> No		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 <input type="checkbox"/> No		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	[Signature]	RL	SNL/4142/505-844-4013/505-250-7090		Return Samples By:		
	Tim Jackson	[Signature]	TJ	SNL/4142/505-284-2547/505-263-6639		Comments:		
	Water has high buffering capacity, please check pH upon receipt and add preservation as needed. Report short list isotopes for gamma spec analysis. VOCs have headspace.							
1. Relinquished by <u>T. Jackson</u> Org. <u>4142</u> Date <u>6/6/14</u> Time <u>0940</u>						3. Relinquished by _____ Org. _____ Date _____ Time _____		
1. Received by <u>[Signature]</u> Org. <u>4142</u> Date <u>6/6/14</u> Time <u>0940</u>						3. Received by _____ Org. _____ Date _____ Time _____		
2. Relinquished by <u>[Signature]</u> Org. <u>4142</u> Date <u>6/6/14</u> Time <u>1030</u>						4. Relinquished by _____ Org. _____ Date _____ Time _____		
2. Received by <u>[Signature]</u> Org. <u>601</u> Date <u>6-7-14</u> Time <u>0935</u>						4. Received by _____ Org. _____ Date _____ Time _____		

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

GEL LABORATORIES LLC

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

Certificate of Analysis

Report Date: July 3, 2014

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

Client Sample ID: 096045-020
Sample ID: 350254008
Matrix: AQUEOUS
Collect Date: 06-JUN-14 09:13
Receive Date: 07-JUN-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	06/19/14	1915	1395606	1

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	EPA 314.0 DOE-AL	

Notes:

CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY

Internal Lab

Batch No.

SMO Use

Page 1 of 2

AR/COC 615590

Project Name: SWMU 149 GWM	Date Samples Shipped: 6/27/14	SMO Authorization: [Signature]	<input type="checkbox"/> Waste Characterization
Project/Task Manager: Clinton Lum	Carrier/Waybill No. 219910	SMO Contact Phone: Lorraine Herrera/505-844-3199	<input type="checkbox"/> RMMA
Project/Task Number: 146422.10.11.01	Lab Contact: Edie Kent/803-556-8171	Send Report to SMO: Rita Kavanaugh/505-284-2553	<input type="checkbox"/> Released by COC No.
Service Order: CF352-14	Lab Destination: GEL		<input checked="" type="checkbox"/> 4° Celsius
	Contract No.: PO 1303873		

Tech Area:	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
✓ 096141	-001	CTF-FB2	NA	6/27/14 9:37	DIW	G	3x40ml	HCL	G	FB	TCL VOC (SW846-8260B)	351543 001
✓ 096142	-001	CTF-MW3	359	6/27/14 9:37	GW	G	3x40ml	HCL	G	SA	TCL VOC (SW846-8260B)	351543 002
✓ 096142	-009	CTF-MW3	359	6/27/14 9:39	GW	P	500 ml	HNO3	G	SA	TAL Metals(SW846-6010/6020/7470)	351543 003
✓ 096142	-010	CTF-MW3	359	6/27/14 9:40	FGW	P	500 ml	HNO3	G	SA	TAL Metals(SW846-6010/6020/7470)	351543 001
✓ 096142	-016	CTF-MW3	359	6/27/14 9:42	GW	P	125 ml	None	G	SA	Anions (SW846-9056)	351543 004
✓ 096142	-018	CTF-MW3	359	6/27/14 9:43	GW	P	125 ml	H2SO4	G	SA	NPN (EPA 353.2)	351543 005
✓ 096142	-020	CTF-MW3	359	6/27/14 9:44	GW	P	250 ml	None	G	SA	Perchlorate (EPA 314.0)	351543 006
✓ 096142	-022	CTF-MW3	359	6/27/14 9:45	GW	P	500 ml	None	G	SA	Alkalinity (SM2320B)	351543 007
✓ 096143	-001	CTF-MW3	359	6/27/14 9:37	GW	G	3x40ml	HCL	G	DU	TCL VOC (SW846-8260B)	351543 008
✓ 096143	-009	CTF-MW3	359	6/27/14 9:39	GW	P	500 ml	HNO3	G	DU	TAL Metals(SW846-6010/6020/7470)	351543 009

Last Chain: <input checked="" type="checkbox"/> Yes	Sample Tracking	SMO Use	Special Instructions/QC Requirements:	Conditions on Receipt	
Validation Req'd: <input checked="" type="checkbox"/> Yes	Date Entered:		EDD <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		
Background: <input type="checkbox"/> Yes	Entered by:		Turnaround Time <input type="checkbox"/> 7 Day* <input type="checkbox"/> 15 Day* <input checked="" type="checkbox"/> 30 Day		
Confirmatory: <input type="checkbox"/> Yes	QC initials:		Negotiated TAT <input type="checkbox"/>		
Sample Team Members	Name	Signature	Init.	Company/Organization/Phone/Cell	Sample Disposal <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	
	William Gibson	[Signature]	WG	SNL/4142/505-284-3307/505-239-7367	
Comments: Send report to Tim Jackson/4142/MS 0729/284-2547 If perchlorate detected, perform verification analysis using SW846-6850M. Report anions as Br, Cl, F, SO4. Report alkalinity as total CaCO3, HCO3, and CO3.					Lab Use
1. Relinquished by [Signature]	Org. 4142	Date 6/27/14	Time 10:13	3. Relinquished by	Org. Date Time
1. Received by [Signature]	Org. 4142	Date 6/27/14	Time 10:13	3. Received by	Org. Date Time
2. Relinquished by [Signature]	Org. 4142	Date 6/27/14	Time 11:00	4. Relinquished by	Org. Date Time
2. Received by [Signature]	Org. 4142	Date 6-28-14	Time 09:10	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: July 24, 2014

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

Client Sample ID: 096142-020
Sample ID: 351543006
Matrix: AQUEOUS
Collect Date: 27-JUN-14 09:44
Receive Date: 28-JUN-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	07/02/14	1729	1399523	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.		SMO Use		AR/COC		615427						
Project Name: SWMU 68 GWM		Date Samples Shipped: 4/14/14		SMO Authorization: Don Winters		<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. 217347		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/803-556-8171		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
095733	-001	OBS-MW1	153	4/14/14 9:44	GW	G	3x40ml	HCL	G	SA	TCL VOC (SW846-8260B)	346673 001
095733	-002	OBS-MW1	153	4/14/14 9:45	GW	AG	4x1 L	None	G	SA	TCL SVOC (SW846-8270C)	346673 002
095733	-009	OBS-MW1	153	4/14/14 9:47	GW	P	500 ml	HNO3	G	SA	TAL Metals+U (SW846-6010/6020/7470)	346673 003
095733	-014	OBS-MW1	153	4/14/14 9:50	GW	P	250 ml	None	G	SA	Hexavalent Chromium (SW846-7196A)	346673 004
095733	-016	OBS-MW1	153	4/14/14 9:51	GW	P	125 ml	None	G	SA	Anions (SW846-9056)	346673 005
095733	-017	OBS-MW1	153	4/14/14 9:49	FGW	P	500 ml	HNO3	G	SA	Metals-Ca,Mg,K,Na(SW846-6020)	346673 006
095733	-018	OBS-MW1	153	4/14/14 9:52	GW	P	125 ml	H2SO4	G	SA	Nitrate+Nitrite (EPA 353.2)	346673 007
095733	-020	OBS-MW1	153	4/14/14 9:53	GW	P	250 ml	None	G	SA	Perchlorate (EPA 314.0)	346673 008
095733	-022	OBS-MW1	153	4/14/14 9:54	GW	P	500 ml	None	G	SA	Alkalinity (SM2320B)	346673 009
095733	-024	OBS-MW1	153	4/14/14 9:55	GW	AG	4x1 L	None	G	SA	High Explosives (SW846-8321A mod)	346673 009
Last Chain: <input type="checkbox"/> Yes		Sample Tracking		SMO Use		Special Instructions/QC Requirements:				Conditions on Receipt		
Validation Req'd: <input checked="" type="checkbox"/> Yes		Date Entered:				EDD <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No						
Background: <input type="checkbox"/> Yes		Entered by:				Turnaround Time <input type="checkbox"/> 7 Day* <input type="checkbox"/> 15 Day* <input checked="" type="checkbox"/> 30 Day						
Confirmatory: <input type="checkbox"/> Yes		QC inits.:				Negotiated TAT <input type="checkbox"/>						
Sample Team Members	Name	Signature	Init.	Company/Organization/Phone/Cell		Sample Disposal <input type="checkbox"/> Return to Client <input checked="" type="checkbox"/> Disposal by Lab						
	Robert Lynch	<i>Robert Lynch</i>	RL	SNL/4142/505-844-4013/505-250-7090		Return Samples By:						
	Alfred Santillanes	<i>Alfred Santillanes</i>	AS	SNL/4142/505-844-5130/505-228-0710		Comments: Send report to Tim Jackson/4142/MS 0729/284-2547						
	William Gibson	<i>William Gibson</i>	WG	SNL/4142/505-284-3307/505-239-7367		If Perchlorate detected, perform verification analysis using SW846-6850M. FGW, filtered in field using a 0.45 micron in-line filter. Report Anions (as Br,Cl,F,SO4), Alkalinity (as total CaCO3,HCO3,CO3). Gamma Spectroscopy (as short list isotopes).						
1. Relinquished by <i>Alfred Santillanes</i>		Org. 4142	Date 4/14/14	Time 10:35	3. Relinquished by		Org.	Date	Time			
1. Received by <i>Don Winters</i>		Org. 4142	Date 4/14/14	Time 10:35	3. Received by		Org.	Date	Time			
2. Relinquished by <i>Don Winters</i>		Org. 4142	Date 4/14/14	Time 11:00	4. Relinquished by		Org.	Date	Time			
2. Received by <i>Don Winters</i>		Org. 4142	Date 4-15-14	Time 0745	4. Received by		Org.	Date	Time			

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

Lab Use

GEL LABORATORIES LLC

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

Certificate of Analysis

Report Date: May 14, 2014

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

Client Sample ID: 095733-020
Sample ID: 346673007
Matrix: AQUEOUS
Collect Date: 14-APR-14 09:53
Receive Date: 15-APR-14
Collector: Client

Project: SNLSGWater
Client ID: SNLS004

Client Desc.: OBS-MW1
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	05/06/14	1707	1380834	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. *N/A*

SMO Use

AR/COC **615428**

Project Name:	SWMU 68 GWM	Date Samples Shipped:	4/15/14	SMO Authorization:	<i>[Signature]</i>
Project/Task Manager:	Clinton Lum	Carrier/Waybill No.	217403	SMO Contact Phone:	Lorraine Herrera/505-844-3199
Project/Task Number:	146422.10.11.01	Lab Contact:	Edie Kent/803-556-8171	Send Report to SMO:	Rita Kavanaugh/505-284-2553
Service Order:	CF263-14	Lab Destination:	GEL		
		Contract No.:	PO 1303873		

☐ Waste Characterization
☐ RMMA
☐ Released by COC No. ☒ 4° Celsius

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

Sample No.	Fraction	Sample Location Detail	Depth (ft)	Date/Time Collected	Sample Matrix	Container		Preservative	Collection Method	Sample Type	Parameter & Method Requested	Lab Sample ID
						Type	Volume					
095735	-001	OBS-FB1	NA	4/15/14 9:13	DIW	G	3x40ml	HCL	G	FB	TCL VOC (SW846-8260B)	346673 015
095736	-001	OBS-MW2	252	4/15/14 9:13	GW	G	3x40ml	HCL	G	SA	TCL VOC (SW846-8260B)	346673 016
095736	-002	OBS-MW2	252	4/15/14 9:14	GW	AG	4x1 L	None	G	SA	TCL SVOC (SW846-8270C)	346673 017
095736	-009	OBS-MW2	252	4/15/14 9:16	GW	P	500 ml	HNO3	G	SA	TAL Metals+U (SW846-6010/6020/7470)	346673 018
095736	-014	OBS-MW2	252	4/15/14 9:19	GW	P	250 ml	None	G	SA	Hexavalent Chromium (SW846-7196A)	346673 019
095736	-016	OBS-MW2	252	4/15/14 9:20	GW	P	125 ml	None	G	SA	Anions (SW846-9056)	346673 020
095736	-017	OBS-MW2	252	4/15/14 9:18	FGW	P	500 ml	HNO3	G	SA	Metals-Ca,Mg,K,Na(SW846-6020)	346674 002
095736	-018	OBS-MW2	252	4/15/14 9:21	GW	P	125 ml	H2SO4	G	SA	Nitrate+Nitrite (EPA 353.2)	346673 021
095736	-020	OBS-MW2	252	4/15/14 9:22	GW	P	250 ml	None	G	SA	Perchlorate (EPA 314.0)	346673 022
095736	-022	OBS-MW2	252	4/15/14 9:23	GW	P	500 ml	None	G	SA	Alkalinity (SM2320B)	346673 023

Last Chain: <input type="checkbox"/> Yes		Sample Tracking		SMO Use		Special Instructions/QC Requirements:		Conditions on Receipt
Validation Req'd: <input checked="" type="checkbox"/> Yes		Date Entered:				EDD <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		
Background: <input type="checkbox"/> Yes		Entered by:				Turnaround Time <input type="checkbox"/> 7 Day* <input type="checkbox"/> 15 Day* <input checked="" type="checkbox"/> 30 Day		
Confirmatory: <input type="checkbox"/> Yes		QC inits.:				Negotiated TAT <input type="checkbox"/>		
Sample Team Members	Name	Signature	Init.	Company/Organization/Phone/Cell				
	Robert Lynch	<i>[Signature]</i>	RL	SNL/4142/505-844-4013/505-250-7090				
	Alfred Santillanes	<i>[Signature]</i>	AS	SNL/4142/505-844-5130/505-228-0710				
	William Gibson	<i>[Signature]</i>	WG	SNL/4142/505-284-3307/505-239-7367				
				Sample Disposal <input type="checkbox"/> Return to Client <input checked="" type="checkbox"/> Disposal by Lab				
				Return Samples By:				
				Comments: Send report to Tim Jackson/4142/MS 0729/284-2547 If Perchlorate detected, perform verification analysis using SW846-6850M. FGW, filtered in field using a 0.45 micron in-line filter. Report Anions (as Br, Cl, F, SO4), Alkalinity (as total CaCO3, HCO3, CO3). Gamma Spectroscopy (as short list isotopes).				

1. Relinquished by <i>[Signature]</i> Org. 4142 Date 4/15/14 Time 0950	3. Relinquished by _____ Org. _____ Date _____ Time _____
1. Received by <i>[Signature]</i> Org. 4142 Date 4/15/14 Time 0950	3. Received by _____ Org. _____ Date _____ Time _____
2. Relinquished by <i>[Signature]</i> Org. 4142 Date 4/15/14 Time 1000	4. Relinquished by _____ Org. _____ Date _____ Time _____
2. Received by <i>[Signature]</i> Org. 4142 Date 4-16-14 Time 0725	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: May 14, 2014

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

Client Sample ID: 095736-020
Sample ID: 346673022
Matrix: AQUEOUS
Collect Date: 15-APR-14 09:22
Receive Date: 16-APR-14
Collector: Client

Project: SNLSGWater
Client ID: SNLS004

Client Desc.: OBS-MW2
Vol. Recv.:

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Ion Chromatography											
EPA 314.0 Perchlorate by IC "As Received"											
Perchlorate	U	ND	0.004	0.012	mg/L	1	MARI	05/06/14	1804	1380834	1

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	EPA 314.0 DOE-AL	

Notes:

CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY

Internal Lab

Batch No.

SMO Use

Page 1 of 2

AR/COC **615430**

Project Name: SWMU 68 GWM	Date Samples Shipped: 4/16/14	SMO Authorization: Don J. [Signature]
Project/Task Manager: Clinton Lum	Carrier/Waybill No. 217464	SMO Contact Phone: Lorraine Herrera/505-844-3199
Project/Task Number: 146422.10.11.01	Lab Contact: Edie Kent/803-556-8171	Send Report to SMO: Rita Kavanaugh/505-284-2553
Service Order: CF263-14	Lab Destination: GEL	
	Contract No.: PO 1303873	

☐ Waste Characterization
☐ RMMA
☐ Released by COC No. ☒ 4° Celsius

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

Sample No.	Fraction	Sample Location Detail	Depth (ft)	Date/Time Collected	Sample Matrix	Container Type	Volume	Preservative	Collection Method	Sample Type	Parameter & Method Requested	Lab Sample ID
✓ 095741	-001	OBS-MW3	208	4/16/14 9:04	GW	G	3x40ml	HCL	G	SA	TCL VOC (SW846-8260B)	346673 847
✓ 095741	-002	OBS-MW3	208	4/16/14 9:05	GW	AG	4x1 L	None	G	SA	TCL SVOC (SW846-8270C)	346673 048
✓ 095741	-009	OBS-MW3	208	4/16/14 9:08	GW	P	500 ml	HNO3	G	SA	TAL Metals+U (SW846-6010/6020/7470)	346673 049
✓ 095741	-014	OBS-MW3	208	4/16/14 9:11	GW	P	250 ml	None	G	SA	Hexavalent Chromium (SW846-7196A)	346673 045
✓ 095741	-016	OBS-MW3	208	4/16/14 9:12	GW	P	125 ml	None	G	SA	Anions (SW846-9056)	346673 050
✓ 095741	-017	OBS-MW3	208	4/16/14 9:10	FGW	P	500 ml	HNO3	G	SA	Metals-Ca,Mg,K,Na(SW846-6020)	346673 004
✓ 095741	-018	OBS-MW3	208	4/16/14 9:13	GW	P	125 ml	H2SO4	G	SA	Nitrate+Nitrite (EPA 353.2)	346673 051
✓ 095741	-020	OBS-MW3	208	4/16/14 9:14	GW	P	250 ml	None	G	SA	Perchlorate (EPA 314.0)	346673 052
✓ 095741	-022	OBS-MW3	208	4/16/14 9:15	GW	P	500 ml	None	G	SA	Alkalinity (SM2320B)	346673 053
✓ 095741	-024	OBS-MW3	208	4/16/14 9:16	GW	AG	4x1 L	None	G	SA	High Explosives (SW846-8321A mod)	346673 054

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	[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:			
	William Gibson	[Signature]	WG	SNL/4142/505-284-3307/505-239-7367		Send report to Tim Jackson/4142/MS 0729/284-2547 If Perchlorate detected, perform verification analysis using SW846-6850M. FGW, filtered in field using a 0.45 micron in-line filter. Report Anions (as Br,Cl,F,SO4), Alkalinity (as total CaCO3,HCO3,CO3). Gamma Spectroscopy (as short list isotopes).			
1. Relinquished by [Signature]		Org. 4142	Date 4/16/14	Time 0957	3. Relinquished by		Org.	Date	Time
1. Received by [Signature]		Org. 4142	Date 4/16/14	Time 0957	3. Received by		Org.	Date	Time
2. Relinquished by [Signature]		Org. 4142	Date 4/16/14	Time 1050	4. Relinquished by		Org.	Date	Time
2. Received by [Signature]		Org.	Date 4/17/14	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 615430

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		Preservative	Collection Method	Sample Type	Parameter & Method Requested	Lab use
						Type	Volume					Lab Sample ID
✓ 095741	-029 ✓	OBS-MW3	208	4/16/14 9:19 ✓	GW	P	250 ml	NaOH	G	SA	Total Cyanide (SW846-9012)	346673 055
✓ 095741	-033 ✓	OBS-MW3	208	4/16/14 9:20 ✓	GW	P	1 L	HNO3	G	SA	Gamma Spectroscopy (EPA 901.0)	346673 056
✓ 095741	-034 ✓	OBS-MW3	208	4/16/14 9:22 ✓	GW	P	1 L	HNO3	G	SA	Gross Alpha and Beta (EPA 900.0)	346673 057
✓ 095741	-035 ✓	OBS-MW3	208	4/16/14 9:24 ✓	GW	P	1 L	HNO3	G	SA	Isotopic Uranium (HASL 300)	346673 058
✓ 095742	-001 ✓	OBS-MW3	208	4/16/14 9:04 ✓	GW	G	3x40ml	HCL	G	DU	TCL VOC (SW846-8260B)	346673 059
✓ 095742	-002 ✓	OBS-MW3	208	4/16/14 9:05 ✓	GW	AG	4x1 L	None	G	DU	TCL SVOC (SW846-8270C)	346673 060
✓ 095742	-009 ✓	OBS-MW3	208	4/16/14 9:08 ✓	GW	P	500 ml	HNO3	G	DU	TAL Metals+U (SW846-6010/6020/7470)	346673 061
✓ 095742	-014 ✓	OBS-MW3	208	4/16/14 9:11 ✓	GW	P	250 ml	None	G	DU	Hexavalent Chromium (SW846-7196A)	346673 062
✓ 095742	-016 ✓	OBS-MW3	208	4/16/14 9:12 ✓	GW	P	125 ml	None	G	DU	Anions (SW846-9056)	346673 063
✓ 095742	-017 ✓	OBS-MW3	208	4/16/14 9:10 ✓	FGW	P	500 ml	HNO3	G	DU	Metals-Ca,Mg,K,Na(SW846-6020)	346673 064
✓ 095742	-018 ✓	OBS-MW3	208	4/16/14 9:13 ✓	GW	P	125 ml	H2SO4	G	DU	Nitrate+Nitrite (EPA 353.2)	346673 065
✓ 095742	-020 ✓	OBS-MW3	208	4/16/14 9:14 ✓	GW	P	250 ml	None	G	DU	Perchlorate (EPA 314.0)	346673 066
✓ 095742	-022 ✓	OBS-MW3	208	4/16/14 9:15 ✓	GW	P	500 ml	None	G	DU	Alkalinity (SM2320B)	346673 067
✓ 095742	-024 ✓	OBS-MW3	208	4/16/14 9:16 ✓	GW	AG	4x1 L	None	G	DU	High Explosives (SW846-8321A mod)	346673 068
✓ 095742	-029 ✓	OBS-MW3	208	4/16/14 9:19 ✓	GW	P	250 ml	NaOH	G	DU	Total Cyanide (SW846-9012)	346673 069
✓ 095742	-033 ✓	OBS-MW3	208	4/16/14 9:20 ✓	GW	P	1 L	HNO3	G	DU	Gamma Spectroscopy (EPA 901.0)	346673 070
✓ 095742	-034 ✓	OBS-MW3	208	4/16/14 9:22 ✓	GW	P	1 L	HNO3	G	DU	Gross Alpha and Beta (EPA 900.0)	346673 071
✓ 095742	-035 ✓	OBS-MW3	208	4/16/14 9:24 ✓	GW	P	1 L	HNO3	G	DU	Isotopic Uranium (HASL 300)	346673 072
✓ 095743	-001 ✓	OBS-TB4 ✓	NA	4/16/14 9:04 ✓	DIW	G	3x40 ml	HCL	G	TB	TCL VOC (SW846-8260B)	346673 073

Recipient Initials <i>AN</i>

GEL LABORATORIES LLC

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

Certificate of Analysis

Report Date: May 14, 2014

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

Client Sample ID: 095741-020
Sample ID: 346673052
Matrix: AQUEOUS
Collect Date: 16-APR-14 09:14
Receive Date: 17-APR-14
Collector: Client

Project: SNLSGWater

Client ID: SNLS004

Client Desc.: OBS-MW3

Vol. Recv.:

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Ion Chromatography											
EPA 314.0 Perchlorate by IC "As Received"											
Perchlorate	U	ND	0.004	0.012	mg/L	1	MAR1	05/06/14	1843	1380834	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: May 14, 2014

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

Client Sample ID: 095742-020
Sample ID: 346673064
Matrix: AQUEOUS
Collect Date: 16-APR-14 09:14
Receive Date: 17-APR-14
Collector: Client

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

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Ion Chromatography											
EPA 314.0 Perchlorate by IC "As Received"											
Perchlorate	U	ND	0.004	0.012	mg/L	1	MAR1	05/06/14	1902	1380834	1

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	EPA 314.0 DOE-AL	

Notes:

Appendix B

Data Validation Sample Findings

Summary Sheets for the Perchlorate Data

Memorandum

Date: July 29, 2014
To: File
From: Monica Dymerski
Subject: Inorganic Data Review and Validation – SNL
Site: SWMU 149 GWM
AR/COC: 615589 and 615590
SDG: 351543
Laboratory: GEL
Project/Task: 146422.10.11.01
Analysis: General Chemistry

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

Summary

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

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

Holding Times and Preservation

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

Calibration

All initial and continuing calibration met QC acceptance criteria.

Blanks

No target analytes were detected in the blanks.

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

Laboratory Control Sample (LCS)

All LCS acceptance criteria were met.

Matrix Spike (MS)

All MS/PS recoveries met QC acceptance criteria.

Nitrate/nitrite-N

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

Laboratory Replicate

The replicate analyses met all QC acceptance criteria.

Nitrate/nitrite-N

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

Detection Limits/Dilutions

All detection limits were properly reported.

Nitrate/nitrite:

The sample was diluted 10X.

Anions:

The sample was diluted 50X for chloride and sulfate.

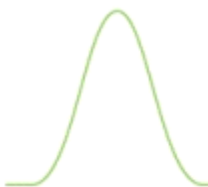
Other QC

No other specific issues that affect data quality were identified.

Reviewed by: Mary Donovan

Level: I

Date: 08/18/14



Sample Findings Summary



AR/COC: 615424, 615425, 615426

Page 1 of 3

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

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
	095725-009/CCBA-MW1	Magnesium (7439-95-4)	J, D1
	095725-009/CCBA-MW1	Potassium (7440-09-7)	J, D1
	095727-009/CCBA-FB2	Magnesium (7439-95-4)	UJ, D1
	095727-009/CCBA-FB2	Potassium (7440-09-7)	UJ, D1
	095728-009/CCBA-EB1	Magnesium (7439-95-4)	UJ, D1
	095728-009/CCBA-EB1	Potassium (7440-09-7)	UJ, D1
	095730-009/CCBA-MW2	Copper (7440-50-8)	0.0038U, B2
	095730-009/CCBA-MW2	Magnesium (7439-95-4)	J, D1
	095730-009/CCBA-MW2	Potassium (7440-09-7)	J, D1
	095731-009/CCBA-MW2	Copper (7440-50-8)	0.0038U, B2
	095731-009/CCBA-MW2	Magnesium (7439-95-4)	J, D1
	095731-009/CCBA-MW2	Potassium (7440-09-7)	J, D1
SW846 3510C/8270D			
	095725-002/CCBA-MW1	Benzo(ghi)perylene (191-24-2)	UJ, MS5
	095725-002/CCBA-MW1	Dibenzo(a,h)anthracene (53-70-3)	UJ, MS5
	095728-002/CCBA-EB1	Benzo(ghi)perylene (191-24-2)	UJ, MS5
	095728-002/CCBA-EB1	Dibenzo(a,h)anthracene (53-70-3)	UJ, MS5
	095730-002/CCBA-MW2	Benzo(ghi)perylene (191-24-2)	UJ, MS5
	095730-002/CCBA-MW2	Dibenzo(a,h)anthracene (53-70-3)	UJ, MS5
	095731-002/CCBA-MW2	Benzo(ghi)perylene (191-24-2)	UJ, MS5
	095731-002/CCBA-MW2	Dibenzo(a,h)anthracene (53-70-3)	UJ, MS5
SW846 3535/8321A Modified			
	095725-024/CCBA-MW1	m-Nitrotoluene (99-08-1)	UJ, I4
	095725-024/CCBA-MW1	p-Nitrotoluene (99-99-0)	UJ, I4
	095728-024/CCBA-EB1	m-Nitrotoluene (99-08-1)	UJ, I4
	095728-024/CCBA-EB1	p-Nitrotoluene (99-99-0)	UJ, I4
	095730-024/CCBA-MW2	m-Nitrotoluene (99-08-1)	UJ, I4
	095730-024/CCBA-MW2	p-Nitrotoluene (99-99-0)	UJ, I4
	095731-024/CCBA-MW2	m-Nitrotoluene (99-08-1)	UJ, I4

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
SW846 8260B DOE-AL	095731-024/CCBA-MW2	p-Nitrotoluene (99-99-0)	UJ, I4
	095727-001/CCBA-FB2	Dibromochloromethane (124-48-1)	J+, I3,C2
SW846 9012B	095725-029/CCBA-MW1	Cyanide, Total (57-12-5)	UJ, I5,B4
	095728-029/CCBA-EB1	Cyanide, Total (57-12-5)	UJ, I5,B4
	095730-029/CCBA-MW2	Cyanide, Total (57-12-5)	UJ, I5,B4
	095731-029/CCBA-MW2	Cyanide, Total (57-12-5)	UJ, I5,B4

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

Memorandum

Date: June 5, 2014
To: File
From: Linda Thal
Subject: Inorganic Data Review and Validation – SNL
Site: SWMU 8/58 GWM
AR/COC: 615424, 615425 and 615426
SDG: 346180
Laboratory: GEL
Project/Task: 146422.10.11.01
Analysis: General Chemistry

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

Summary

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

Total cyanide:

1. The intercept for total cyanide was negative with an absolute value $>$ the MDL but $\leq 3X$ 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**.

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

Holding Times and Preservation

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

Calibration

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

Blanks

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

Laboratory Control Sample (LCS)

All LCS acceptance criteria were met.

Matrix Spike (MS)

All MS/PS recoveries met QC acceptance criteria.

Laboratory Replicate

The replicate analyses met all QC acceptance criteria.

Detection Limits/Dilutions

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

Nitrate/Nitrite:

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

Anions:

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

Other QC

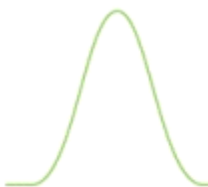
An FB was submitted with AR/COC 615425 but was not associated with any samples. An EB was submitted with AR/COC 615425 and was associated with the samples on AR/COC 615426. A field duplicate pair was submitted with AR/COC 615426. There are no “required” review criteria for field duplicate analyses comparability; no data will be qualified as a result.

No other specific issues that affect data quality were identified.

Reviewed by: Mary Donovan

Level: I

Date: 06/09/14



Sample Findings Summary



AR/COC: 615427, 615428, 615429, 615430

Page 1 of 3

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

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
	095739-033/OBS-EB1	Cesium-137 (10045-97-3)	BD, FR3
	095739-033/OBS-EB1	Cobalt-60 (10198-40-0)	BD, FR3
	095739-033/OBS-EB1	Potassium-40 (13966-00-2)	BD, FR3
	095741-033/OBS-MW3	Americium-241 (14596-10-2)	BD, FR3
	095741-033/OBS-MW3	Cesium-137 (10045-97-3)	BD, FR3
	095741-033/OBS-MW3	Cobalt-60 (10198-40-0)	BD, FR3
	095741-033/OBS-MW3	Potassium-40 (13966-00-2)	BD, FR3
	095742-033/OBS-MW3	Americium-241 (14596-10-2)	BD, FR3
	095742-033/OBS-MW3	Cesium-137 (10045-97-3)	BD, FR3
	095742-033/OBS-MW3	Cobalt-60 (10198-40-0)	BD, FR3
	095742-033/OBS-MW3	Potassium-40 (13966-00-2)	BD, FR3
SW846 3005/6020 DOE-AL			
	095741-009/OBS-MW3	Copper (7440-50-8)	0.0029U, B2
	095742-009/OBS-MW3	Copper (7440-50-8)	0.0029U, B2
SW846 3510C/8270D			
	095733-002/OBS-MW1	Carbazole (86-74-8)	UJ, I3,C3
	095736-002/OBS-MW2	Carbazole (86-74-8)	UJ, I3,C3
	095739-002/OBS-EB1	Carbazole (86-74-8)	UJ, I3,C3
	095741-002/OBS-MW3	Carbazole (86-74-8)	UJ, I3,C3
	095742-002/OBS-MW3	Carbazole (86-74-8)	UJ, I3,C3
SW846 3535/8321A Modified			
	095733-024/OBS-MW1	m-Nitrotoluene (99-08-1)	UJ, I4
	095733-024/OBS-MW1	p-Nitrotoluene (99-99-0)	UJ, I4
	095736-024/OBS-MW2	m-Nitrotoluene (99-08-1)	UJ, I4
	095736-024/OBS-MW2	p-Nitrotoluene (99-99-0)	UJ, I4
	095739-024/OBS-EB1	m-Nitrotoluene (99-08-1)	UJ, I4
	095739-024/OBS-EB1	p-Nitrotoluene (99-99-0)	UJ, I4
	095741-024/OBS-MW3	m-Nitrotoluene (99-08-1)	UJ, I4
	095741-024/OBS-MW3	p-Nitrotoluene (99-99-0)	UJ, I4

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
	095742-024/OBS-MW3	m-Nitrotoluene (99-08-1)	UJ, I4
	095742-024/OBS-MW3	p-Nitrotoluene (99-99-0)	UJ, I4
SW846 8260B DOE-AL			
	095735-001/OBS-FB1	Dibromochloromethane (124-48-1)	J+, I3,C2
	095739-001/OBS-EB1	2-Butanone (78-93-3)	UJ, I4
	095739-001/OBS-EB1	Dichlorodifluoromethane (75-71-8)	UJ, I5
	095739-001/OBS-EB1	Methyl acetate (79-20-9)	UJ, I4
	095740-001/OBS-TB3	2-Butanone (78-93-3)	UJ, I4
	095740-001/OBS-TB3	Dichlorodifluoromethane (75-71-8)	UJ, I5
	095740-001/OBS-TB3	Methyl acetate (79-20-9)	UJ, I4
	095741-001/OBS-MW3	2-Butanone (78-93-3)	UJ, I4
	095741-001/OBS-MW3	Dichlorodifluoromethane (75-71-8)	UJ, I5
	095741-001/OBS-MW3	Methyl acetate (79-20-9)	UJ, I4
	095742-001/OBS-MW3	2-Butanone (78-93-3)	UJ, I4
	095742-001/OBS-MW3	Dichlorodifluoromethane (75-71-8)	UJ, I5
	095742-001/OBS-MW3	Methyl acetate (79-20-9)	UJ, I4
	095743-001/OBS-TB4	2-Butanone (78-93-3)	UJ, I4
	095743-001/OBS-TB4	Dichlorodifluoromethane (75-71-8)	UJ, I5
	095743-001/OBS-TB4	Methyl acetate (79-20-9)	UJ, I4

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

Memorandum

Date: June 4, 2014
To: File
From: Linda Thal
Subject: Inorganic Data Review and Validation – SNL
Site: SWMU 68 GWM
AR/COC: 615427, 615428, 615429 and 615430
SDG: 346673
Laboratory: GEL
Project/Task: 146422.10.11.01
Analysis: General Chemistry

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

Summary

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

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

Holding Times and Preservation

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

Calibration

All initial and continuing calibration met QC acceptance criteria.

Blanks

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

Laboratory Control Sample (LCS)

All LCS acceptance criteria were met.

Matrix Spike (MS)

All MS/PS recoveries met QC acceptance criteria.

Laboratory Replicate

The replicate analyses met all QC acceptance criteria.

Detection Limits/Dilutions

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

Nitrate/Nitrite:

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

Anions:

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

Other QC

An EB was submitted with AR/COC 615429 and was associated with the samples on AR/COC 615430. A field duplicate pair was submitted with AR/COC 615430. There are no “required” review criteria for field duplicate analyses comparability; no data will be qualified as a result.

No other specific issues that affect data quality were identified.

Reviewed by: Mary Donovan

Level: I

Date: 06/10/14

Memorandum

Date: July 29, 2014
To: File
From: Mary Donovan
Subject: Inorganic Data Review and Validation – SNL
Site: SWMU 154 GWM
AR/COC: 615528
SDG: 350254
Laboratory: GEL
Project/Task: 146422.10.11.01
Analysis: General Chemistry

See the attached Data Validation Worksheets for supporting documentation on the data review and validation. This validation was performed according to SNL/NM ER Project AOP 00-03 Rev 4.

Summary

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

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

Holding Times and Preservation

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

Calibration

All initial and continuing calibration met QC acceptance criteria.

Blanks

No target analytes were detected in the blanks.

Laboratory Control Sample (LCS)

All LCS acceptance criteria were met.

Matrix Spike (MS)

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

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

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

Laboratory Replicate

The replicate analyses met all QC acceptance criteria.

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

Detection Limits/Dilutions

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

Nitrate/Nitrite:

Sample -006 was diluted 5X.

Anions:

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

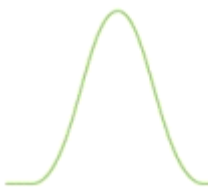
Other QC

No other specific issues that affect data quality were identified.

Reviewed by: Monica Dymerski

Level I

Date: 07/30/14



Sample Findings Summary



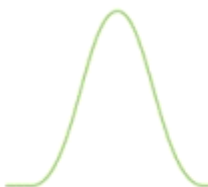
AR/COC: 615528

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Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
EPA 900.0/SW846 9310			
	096045-034/CTF-MW2	BETA (12587-47-2)	J, FR7
EPA 901.1			
	096045-033/CTF-MW2	Americium-241 (14596-10-2)	BD, FR3
	096045-033/CTF-MW2	Cesium-137 (10045-97-3)	BD, FR3
	096045-033/CTF-MW2	Cobalt-60 (10198-40-0)	BD, FR3
	096045-033/CTF-MW2	Potassium-40 (13966-00-2)	R, Z2
SW846 3005/6020 DOE-AL			
	096045-009/CTF-MW2	Copper (7440-50-8)	J-, CK3
	096045-009/CTF-MW2	Manganese (7439-96-5)	J, MS1
	096045-009/CTF-MW2	Nickel (7440-02-0)	J-, CK3
	096045-009/CTF-MW2	Potassium (7440-09-7)	J, D1
	096045-009/CTF-MW2	Thallium (7440-28-0)	2.5U, B3
	096045-010/CTF-MW2	Copper (7440-50-8)	J-, CK3
	096045-010/CTF-MW2	Manganese (7439-96-5)	J, MS1
	096045-010/CTF-MW2	Nickel (7440-02-0)	J-, CK3
	096045-010/CTF-MW2	Potassium (7440-09-7)	J, D1
SW846 3510C/8270D			
	096045-002/CTF-MW2	Phenol (108-95-2)	UJ, RP2
SW846 3535/8321A Modified			
	096045-024/CTF-MW2	m-Nitrotoluene (99-08-1)	UJ, I4
	096045-024/CTF-MW2	o-Nitrotoluene (88-72-2)	UJ, I4
	096045-024/CTF-MW2	p-Nitrotoluene (99-99-0)	UJ, I4
	096045-024/CTF-MW2	Tetryl (479-45-8)	UJ, L3,MS3
SW846 8260B DOE-AL			
	096045-001/CTF-MW2	Bromomethane (74-83-9)	UJ, I3,C3
	096046-001/SWMU154-TB1	Bromomethane (74-83-9)	UJ, I3,C3

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
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All other analyses met QC acceptance criteria; no further data should be qualified.



Sample Findings Summary



AR/COC: 615589, 615590

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

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
	096138-001/CTF-FB1	Methylene chloride (75-09-2)	UJ, I3,C3
	096139-001/CTF-EB1	Methylene chloride (75-09-2)	UJ, I3,C3
	096140-001/CTF-TB1	Methylene chloride (75-09-2)	UJ, I3,C3
	096141-001/CTF-FB2	Methylene chloride (75-09-2)	UJ, I3,C3
	096142-001/CTF-MW3	Methylene chloride (75-09-2)	UJ, I3,C3
	096143-001/CTF-MW3	Methylene chloride (75-09-2)	UJ, I3,C3
	096144-001/CTF-TB2	Methylene chloride (75-09-2)	UJ, I3,C3

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

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SECTION III

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

1.0 Introduction

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

Monitoring well CTF-MW3 is located approximately 290 feet to the west and downgradient of SWMU 149 (Figure III-1). Monitoring well CTF-MW2 is located approximately 260 feet to the southwest and downgradient of SWMU 154 (Figure III-2). Both wells are screened in Precambrian bedrock. Monitoring wells CTF-MW2 and CTF-MW3 were installed in August 2001. Prior to the June 2014 sampling event, monitoring wells CTF-MW2 and CTF-MW3 had been sampled 24 times for a variety of constituents.

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

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

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

from Monitoring Well CTF-MW3, Located Near SNL/NM SWMU 149” (SNL/NM June 2010, Attachment 1) and “Sampling and Analysis Plan for Collection and Analysis of Additional Groundwater Samples Collected from Monitoring Well CTF-MW2, Located Near SNL/NM SWMU 154” (SNL/NM June 2010, Attachment 2). These sampling and analysis plans (SAPs) were approved with modifications by NMED in December 2010 (NMED December 2010).

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

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

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

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

2.0 **Field Methods and Measurements**

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

2.1 **Equipment Decontamination**

A portable Bennett[™] 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-15. Analytical reports, including certificates of analyses, analytical methods, MDLs, minimum detectable activity (MDA), critical level, practical quantitation limits, dates of analyses, results for QC analyses, and data validation findings are filed in the SNL/NM Records Center. The analytical reports are provided in Appendix B.

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

3.1 **Field Water Quality Measurements**

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

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

3.2 **Volatile Organic Compounds**

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

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

3.3 **Semivolatile Organic Compounds**

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

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

3.4 **High Explosive Compounds**

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

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

3.5 **Nitrate Plus Nitrite**

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

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

3.6 **Anions and Alkalinity**

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

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

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

3.7 **Perchlorate**

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

SWMU 154, Monitoring Well CTF-MW2. Perchlorate was not detected above the NMED-specified screening level/MDL of 4 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. Arsenic reanalysis was requested because of the variability of results between the groundwater sample and groundwater duplicate sample. The external laboratory indicated that there may have been a small amount of arsenic carryover in equipment on the day of the original analysis. Arsenic was not detected in the reanalysis, and the original results were qualified as unusable during data validation.

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

3.9 **Gamma Spectroscopy and Radioisotopic Analyses**

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

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

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

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

3.10 **Sample Results Exceeding Maximum Contaminant Levels**

Table III-16 lists the results for all constituents that have been detected at concentrations exceeding the EPA MCLs (EPA 2009) during all quarterly sampling events. Arsenic was the only constituent exceeding MCLs detected in the June 2014 CTF-MW2 monitoring well samples. Figure III-4 shows the arsenic concentration over time for monitoring well CTF-MW2. The elevated concentrations of arsenic in the groundwater samples are most

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

4.0 **Quality Control Samples**

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

4.1 **Field Quality Control Samples**

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

4.1.1 **Duplicate Groundwater Samples**

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

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

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

4.1.2 **Equipment Blank Samples**

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

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

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

4.1.3 **Trip Blank Samples**

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

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

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

4.1.4 **Field Blank Samples**

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

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

4.2 **Laboratory Quality Control Samples**

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

Although some analytical results were qualified during the data validation process, no significant data quality problems were noted for project constituents of concern, except for the original CTF-MW3 arsenic and CTF-MW2 potassium-40 results. The original

arsenic results did not compare to historical values or associated duplicate samples. Since original results were not verified by reanalysis, they were qualified as unusable during data validation. The CTF-MW2 potassium-40 was qualified as unusable during data validation, since the result was rejected by GEL due to the peak not meeting identification criteria. The data validation sample findings summary sheets are provided in Appendix C. The data are acceptable and reported QC measures are adequate.

4.3 **Variances and Nonconformances**

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

4.4 **Project Field Notes and Comments**

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

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

5.0 **Summary**

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

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

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

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

No parameters were detected above established MCLs, except for arsenic in monitoring well CTF-MW2. Arsenic was detected above the MCL of 0.010 mg/L at concentrations of 0.0341 mg/L and 0.0261 mg/L in the unfiltered and filtered groundwater samples, respectively. These values are comparable to previous results. The elevated concentrations of arsenic in the groundwater samples are most likely attributable to background because monitoring well CTF-MW2 is screened in a fault-gouge zone in the Precambrian granite that is sourced by a mixture of shallow and upwelling endogenic (deeply derived) waters. RDX was detected at a concentration of 0.208 µg/L in the CTF-MW2 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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DOE, see U.S. Department of Energy.

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Figures

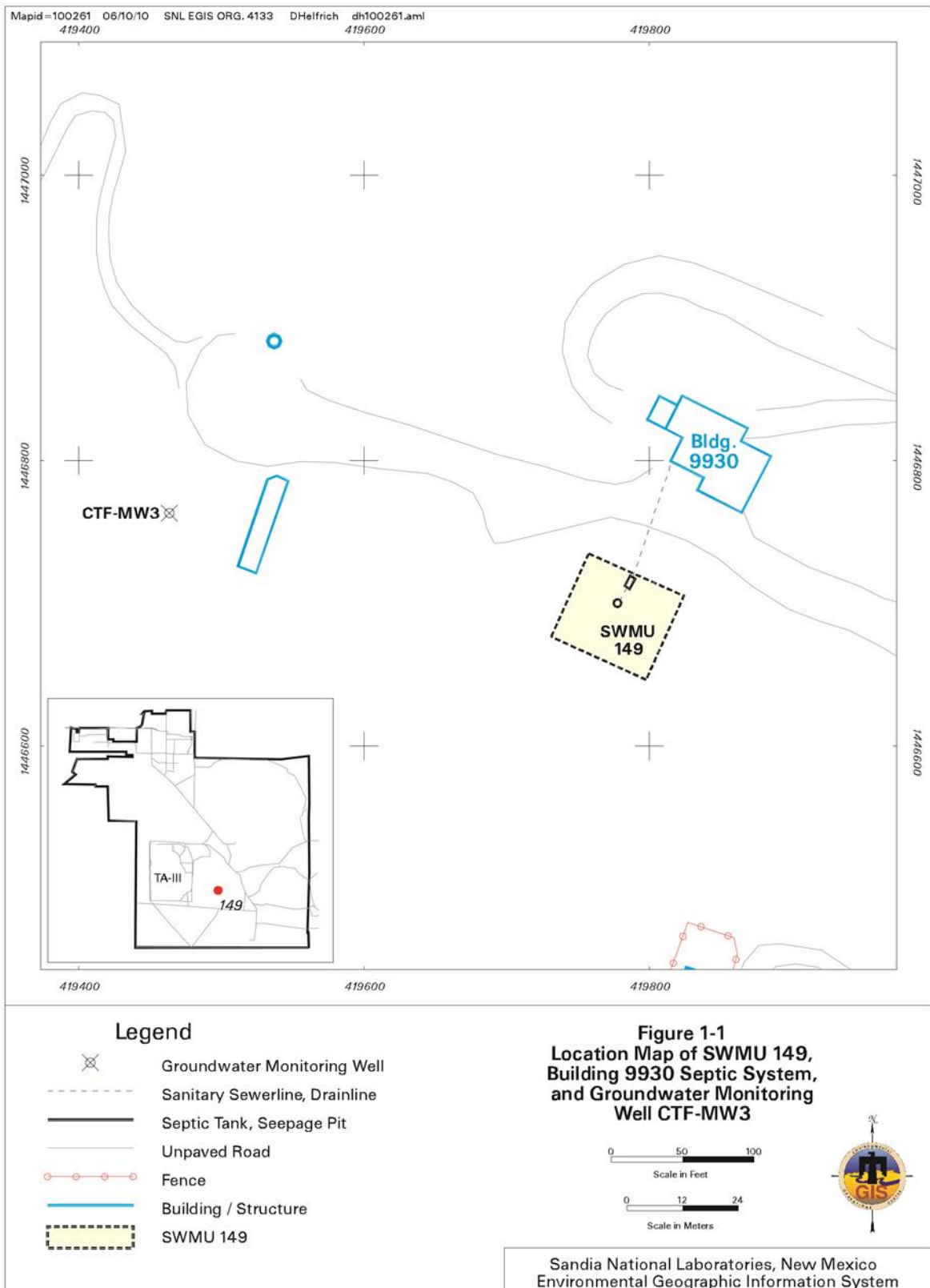


Figure III-1
Location of Monitoring Well CTF-MW3 near SWMU 149

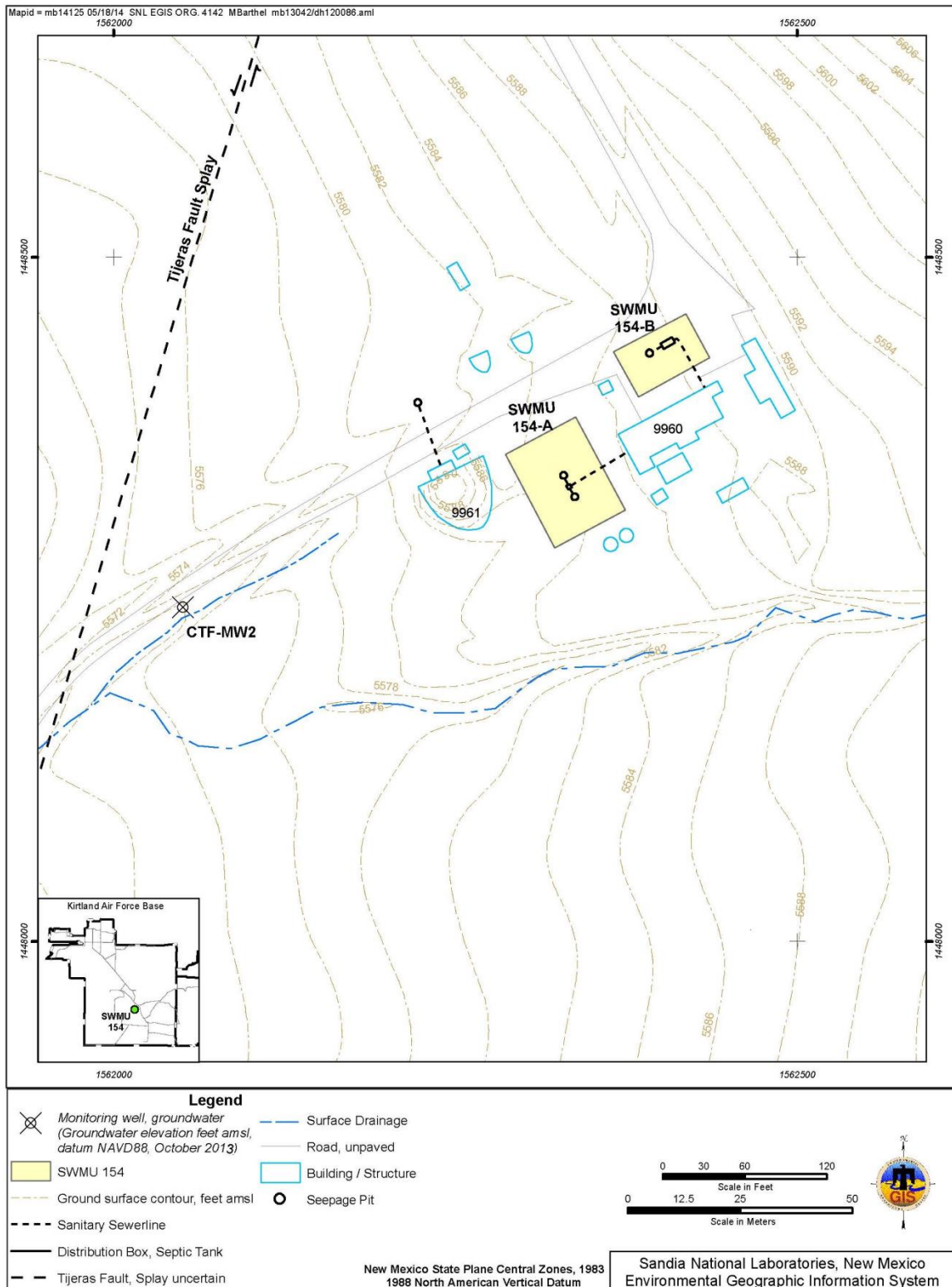


Figure III-2
Location of Monitoring Well CTF-MW2 near SWMU 154

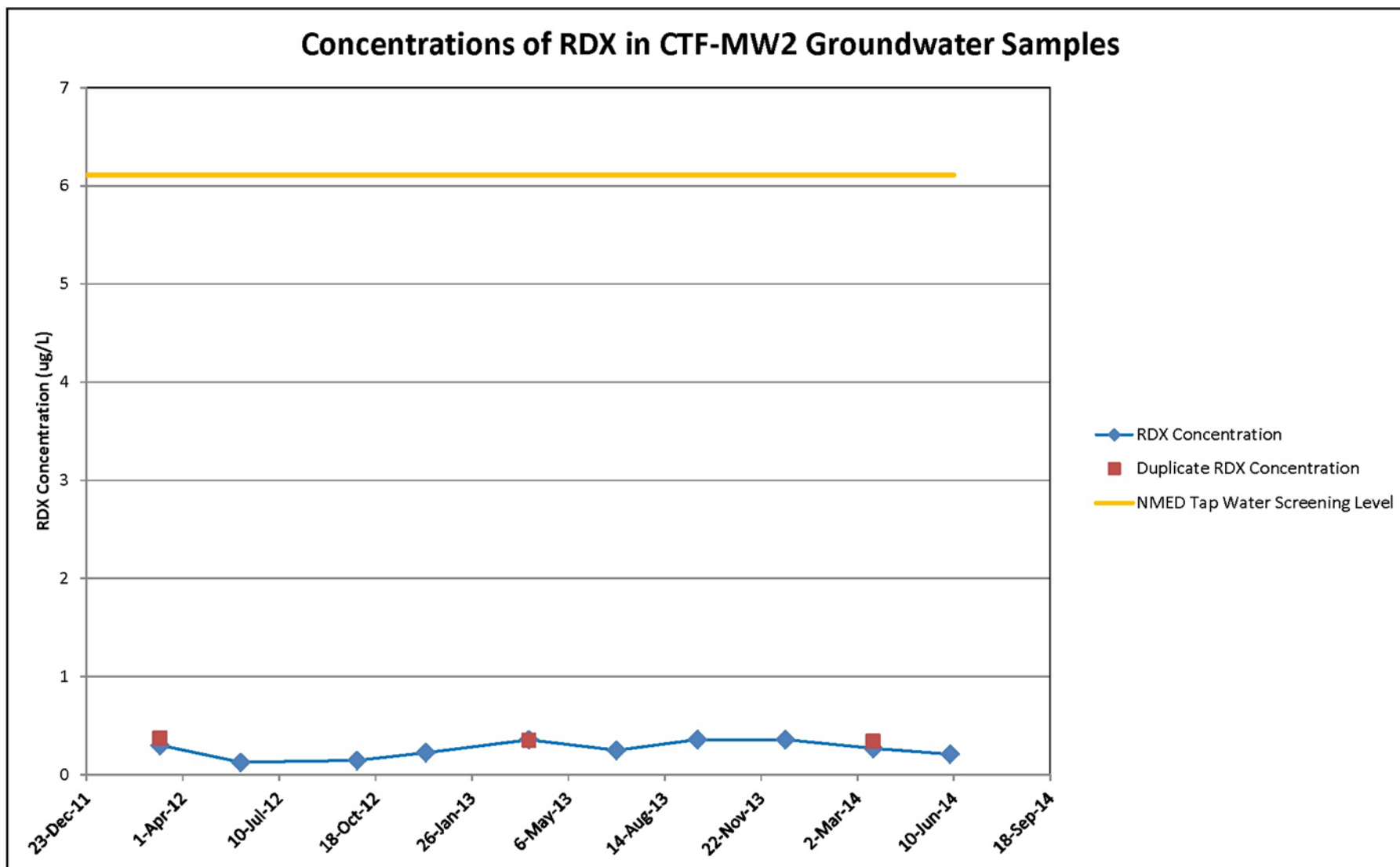


Figure III-3
Concentrations of RDX over Time in Monitoring Well CTF-MW2 near SWMU 154

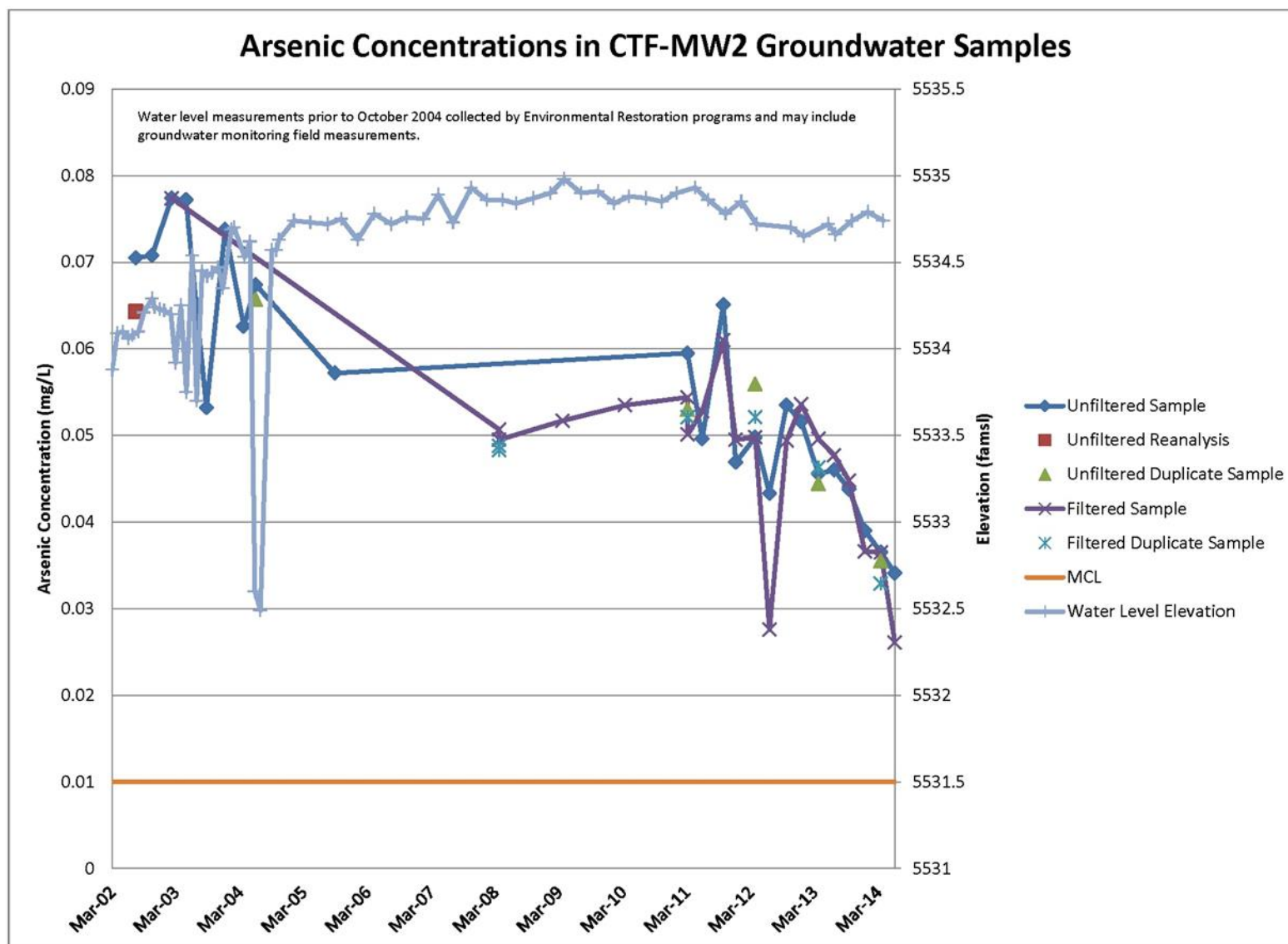


Figure III-4

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

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

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

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

°C = Degrees Celsius.

EPA = U.S. Environmental Protection Agency.

H₂SO₄ = Sulfuric Acid.

HASL = Health and Safety Laboratory.

HCl = Hydrochloric Acid.

HNO₃ = Nitric Acid.

L = Liter.

mL = Milliliter(s).

SM = Standard Method.

SWMU = Solid Waste Management Unit.

TAL = Target Analyte List.

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

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

Notes

^a The collected duplicate sample was submitted for analysis of Volatile Organic Compounds and metals. No other analyses were performed on the duplicate sample.

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, April – June 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	27-Jun-14	22.11	1651.1	296.9	6.96	0.51	79.6	6.92
SWMU 154								
CTF-MW2	06-Jun-14	19.17	3195.0	35.2	5.86	0.86	0.9	0.09

Notes

^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, April – June 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	Bromodichloromethane	0.450	0.300	1.00	NE	J		096142-001	EPA 8260B
27-Jun-14	Chloroform	0.720	0.300	1.00	NE	J		096142-001	EPA 8260B
CTF-MW3 (Duplicate)	Bromodichloromethane	0.440	0.300	1.00	NE	J		096143-001	EPA-8260B
27-Jun-14	Chloroform	0.720	0.300	1.00	NE	J		096143-001	EPA-8260B
SWMU 154									
CTF-MW2	RDX	0.208	0.0865	0.270	NE	J		096045-024	EPA 8321A
06-Jun-14									

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.

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, April – June 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	0.500	EPA 8260B	Ethyl benzene	0.300	EPA 8260B
1,2-Dibromoethane	0.300	EPA 8260B	Isopropylbenzene	0.300	EPA 8260B
1,2-Dichlorobenzene	0.300	EPA 8260B	Methyl acetate	1.50	EPA 8260B
1,2-Dichloroethane	0.300	EPA 8260B	Methylcyclohexane	0.300	EPA 8260B
1,2-Dichloropropane	0.300	EPA 8260B	Methylene chloride	1.70	EPA 8260B
1,3-Dichlorobenzene	0.300	EPA 8260B	Styrene	0.300	EPA 8260B
1,4-Dichlorobenzene	0.300	EPA 8260B	Tert-butyl methyl ether	0.300	EPA 8260B
2,2-trifluoroethane, 1,1,2-Trichloro-1	1.50	EPA 8260B	Tetrachloroethene	0.300	EPA 8260B
2-Butanone	2.00	EPA 8260B	Toluene	0.300	EPA 8260B
2-Hexanone	2.20	EPA 8260B	Trichloroethene	0.300	EPA 8260B
4-methyl-, 2-Pentanone	1.50	EPA 8260B	Trichlorofluoromethane	0.300	EPA 8260B
Acetone	2.50	EPA 8260B	Vinyl chloride	0.300	EPA 8260B
Benzene	0.300	EPA 8260B	Xylene	0.300	EPA 8260B
Bromochloromethane	0.300	EPA 8260B	cis-1,2-Dichloroethene	0.300	EPA 8260B
Bromodichloromethane	0.300	EPA 8260B	cis-1,3-Dichloropropene	0.300	EPA 8260B
Bromoform	0.300	EPA 8260B	m-, p-Xylene	0.300	EPA 8260B
Bromomethane	0.300	EPA 8260B	o-Xylene	0.300	EPA 8260B
Carbon disulfide	1.50	EPA 8260B	trans-1,2-Dichloroethene	0.300	EPA 8260B
Carbon tetrachloride	0.300	EPA 8260B	trans-1,3-Dichloropropene	0.300	EPA 8260B

Notes

^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, April – June 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	0.500	EPA 8260B	Ethyl benzene	0.300	EPA 8260B
1,2-Dibromoethane	0.300	EPA 8260B	Isopropylbenzene	0.300	EPA 8260B
1,2-Dichlorobenzene	0.300	EPA 8260B	Methyl acetate	1.50	EPA 8260B
1,2-Dichloroethane	0.300	EPA 8260B	Methylcyclohexane	0.300	EPA 8260B
1,2-Dichloropropane	0.300	EPA 8260B	Methylene chloride	1.70	EPA 8260B
1,3-Dichlorobenzene	0.300	EPA 8260B	Styrene	0.300	EPA 8260B
1,4-Dichlorobenzene	0.300	EPA 8260B	Tert-butyl methyl ether	0.300	EPA 8260B
2,2-trifluoroethane, 1,1,2-Trichloro-1	1.50	EPA 8260B	Tetrachloroethene	0.300	EPA 8260B
2-Butanone	2.00	EPA 8260B	Toluene	0.300	EPA 8260B
2-Hexanone	2.20	EPA 8260B	Trichloroethene	0.300	EPA 8260B
4-methyl-, 2-Pentanone	1.50	EPA 8260B	Trichlorofluoromethane	0.300	EPA 8260B
Acetone	2.50	EPA 8260B	Vinyl chloride	0.300	EPA 8260B
Benzene	0.300	EPA 8260B	Xylene	0.300	EPA 8260B
Bromochloromethane	0.300	EPA 8260B	cis-1,2-Dichloroethene	0.300	EPA 8260B
Bromodichloromethane	0.300	EPA 8260B	cis-1,3-Dichloropropene	0.300	EPA 8260B
Bromoform	0.300	EPA 8260B	m-, p-Xylene	0.300	EPA 8260B
Bromomethane	0.300	EPA 8260B	o-Xylene	0.300	EPA 8260B
Carbon disulfide	1.50	EPA 8260B	trans-1,2-Dichloroethene	0.300	EPA 8260B
Carbon tetrachloride	0.300	EPA 8260B	trans-1,3-Dichloropropene	0.300	EPA 8260B

Table III-6 (Concluded)
Method Detection Limits for Volatile and Semivolatile Organic Compounds
SWMU 154 Groundwater Monitoring
Quarterly Assessment, April – June 2014

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

Notes

^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, April – June 2014

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

Notes

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, April – June 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 27-Jun-14	Nitrate plus nitrite	5.97	0.170	0.500	10.0			096142-018	EPA 353.2
SWMU 154									
CTF-MW2 06-Jun-14	Nitrate plus nitrite	ND	0.085	0.250	10.0	U		096045-018	EPA 353.2

Notes

^aLaboratory Qualifier

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

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

^bValidation Qualifier

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

^cAnalytical Method

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

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

CTF = Coyote Test Field.

EPA = U.S. Environmental Protection Agency.

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

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

mg/L = Milligrams per Liter.

MW = Monitoring Well.

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

Notes

^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.

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

^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.

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

Notes (continued)

MW = Monitoring Well.
ND = Not Detected (at MDL).
NE = Not Established.
PQL = Practical Quantitation Limit. The lowest concentration of analytes in a sample that can be reliably determined within specified limits of precision and accuracy by that indicated method under routine laboratory operating conditions.
SM = Standard Method.
SWMU = Solid Waste Management Unit.

Table III-10
Summary of Perchlorate Results
SWMUs 149 and 154 Groundwater Monitoring
Quarterly Assessment, April – June 2014

Well	Perchlorate Result (mg/L)	MDL (mg/L)	PQL (mg/L)	MCL (mg/L)	Laboratory Qualifier ^a	Validation Qualifier ^b	Sample Number	Analytical Method ^c
SWMU 149								
CTF-MW3 27 Jun-14	ND	0.004	0.012	NE	U		096142-020	EPA 314.0
SWMU 154								
CTF-MW2 06-Jun-14	ND	0.004	0.012	NE	U		096045-020	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, April – June 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 27-Jun-14	Aluminum	0.0226	0.015	0.050	NE	J		096142-009	EPA 6020
	Antimony	ND	0.001	0.003	0.006	U		096142-009	EPA 6020
	Arsenic	ND	0.0017	0.005	0.010	U	R	096142-009	EPA 6020
	Arsenic (reanalysis)	ND	0.0017	0.005	0.010	U		096142-R09	EPA 6020
	Barium	0.0319	0.0006	0.002	2.00			096142-009	EPA 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		096142-009	EPA 6020
	Cadmium	ND	0.00011	0.001	0.005	U		096142-009	EPA 6020
	Calcium	197	3.00	10.0	NE	B		096142-009	EPA 6020
	Chromium	ND	0.002	0.010	0.100	U	UJ	096142-009	EPA 6020
	Cobalt	0.000396	0.0001	0.001	NE	J		096142-009	EPA 6020
	Copper	0.00243	0.00035	0.001	NE		J-	096142-009	EPA 6020
	Iron	0.322	0.033	0.100	NE			096142-009	EPA 6020
	Lead	ND	0.0005	0.002	NE	U		096142-009	EPA 6020
	Magnesium	45.1	0.010	0.030	NE			096142-009	EPA 6020
	Manganese	0.00172	0.001	0.005	NE	J	J+	096142-009	EPA 6020
	Mercury	ND	0.000067	0.0002	0.002	U		096142-009	EPA 7470
	Nickel	0.00338	0.0005	0.002	NE		J-	096142-009	EPA 6020
	Potassium	11.5	0.400	1.50	NE			096142-009	EPA 6020
	Selenium	0.0286	0.0015	0.005	0.050			096142-009	EPA 6020
	Silver	ND	0.0002	0.001	NE	U		096142-009	EPA 6020
	Sodium	163	4.00	12.5	NE			096142-009	EPA 6020
	Thallium	ND	0.00045	0.002	0.002	U		096142-009	EPA 6020
	Vanadium	ND	0.001	0.005	NE	U		096142-009	EPA 6010
	Zinc	0.00497	0.0035	0.010	NE	J		096142-009	EPA 6020

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

Well	Analyte	Result (mg/L)	MDL (mg/L)	PQL (mg/L)	MCL (mg/L)	Laboratory Qualifier ^a	Validation Qualifier ^b	Sample Number	Analytical Method ^c
CTF-MW3 (Duplicate) 27-Jun-14	Aluminum	0.018	0.015	0.050	NE	J		096143-009	EPA 6020
	Antimony	ND	0.001	0.003	0.006	U		096143-009	EPA 6020
	Arsenic	0.00292	0.0017	0.005	0.010	J	R	096143-009	EPA 6020
	Arsenic (reanalysis)	ND	0.0017	0.005	0.010	U		096143-R09	EPA 6020
	Barium	0.0317	0.0006	0.002	2.00			096143-009	EPA 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		096143-009	EPA 6020
	Cadmium	ND	0.00011	0.001	0.005	U		096143-009	EPA 6020
	Calcium	194	3.00	10.0	NE	B		096143-009	EPA 6020
	Chromium	ND	0.002	0.010	0.100	U	UJ	096143-009	EPA 6020
	Cobalt	0.000404	0.0001	0.001	NE	J		096143-009	EPA 6020
	Copper	0.00257	0.00035	0.001	NE		J-	096143-009	EPA 6020
	Iron	0.319	0.033	0.100	NE			096143-009	EPA 6020
	Lead	ND	0.0005	0.002	NE	U		096143-009	EPA 6020
	Magnesium	43.9	0.010	0.030	NE			096143-009	EPA 6020
	Manganese	0.00168	0.001	0.005	NE	J	J+	096143-009	EPA 6020
	Mercury	ND	0.000067	0.0002	0.002	U		096143-009	EPA 7470
	Nickel	0.00352	0.0005	0.002	NE		J-	096143-009	EPA 6020
	Potassium	11.3	0.400	1.50	NE			096143-009	EPA 6020
	Selenium	0.0272	0.0015	0.005	0.050			096143-009	EPA 6020
	Silver	ND	0.0002	0.001	NE	U		096143-009	EPA 6020
	Sodium	158	4.00	12.5	NE			096143-009	EPA 6020
	Thallium	ND	0.00045	0.002	0.002	U		096143-009	EPA 6020
	Vanadium	ND	0.001	0.005	NE	U		096143-009	EPA 6010
	Zinc	0.00458	0.0035	0.010	NE	J		096143-009	EPA 6020

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

Notes

^aLaboratory Qualifier

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

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

^bValidation Qualifier

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

- J- = The associated numerical value is an estimated quantity with a suspected negative bias.
- J+ = The associated numerical value is an estimated quantity with a suspected positive bias.
- R = The data are unusable (compound may or may not be present). Resampling or reanalysis are necessary for verification.
- UJ = The analyte was analyzed for, but was not detected. The associated value is an estimate and may be inaccurate or imprecise.

^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, April – June 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 27-Jun-14	Aluminum	ND	0.015	0.050	NE	U		096142-010	EPA 6020
	Antimony	ND	0.001	0.003	0.006	U		096142-010	EPA 6020
	Arsenic	0.00235	0.0017	0.005	0.010	J	R	096142-010	EPA 6020
	Arsenic (reanalysis)	ND	0.0017	0.005	0.010	U		096142-R10	EPA 6020
	Barium	0.031	0.0006	0.002	2.00			096142-010	EPA 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		096142-010	EPA 6020
	Cadmium	ND	0.00011	0.001	0.005	U		096142-010	EPA 6020
	Calcium	197	3.00	10.0	NE	B		096142-010	EPA 6020
	Chromium	ND	0.002	0.010	0.100	U	UJ	096142-010	EPA 6020
	Cobalt	0.000378	0.0001	0.001	NE	J		096142-010	EPA 6020
	Copper	0.00233	0.00035	0.001	NE		J-	096142-010	EPA 6020
	Iron	0.293	0.033	0.100	NE			096142-010	EPA 6020
	Lead	ND	0.0005	0.002	NE	U		096142-010	EPA 6020
	Magnesium	44.8	0.010	0.030	NE			096142-010	EPA 6020
	Manganese	ND	0.001	0.005	NE	U		096142-010	EPA 6020
	Mercury	ND	0.000067	0.0002	0.002	U		096142-010	EPA 7470
	Nickel	0.00347	0.0005	0.002	NE		J-	096142-010	EPA 6020
	Potassium	11.4	0.400	1.50	NE			096142-010	EPA 6020
	Selenium	0.0272	0.0015	0.005	0.050			096142-010	EPA 6020
	Silver	ND	0.0002	0.001	NE	U		096142-010	EPA 6020
	Sodium	159	4.00	12.5	NE			096142-010	EPA 6020
	Thallium	ND	0.00045	0.002	0.002	U		096142-010	EPA 6020
	Vanadium	ND	0.001	0.005	NE	U		096142-010	EPA 6010
	Zinc	0.00455	0.0035	0.010	NE	J		096142-010	EPA 6020

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

Well	Analyte	Result (mg/L)	MDL (mg/L)	PQL (mg/L)	MCL (mg/L)	Laboratory Qualifier ^a	Validation Qualifier ^b	Sample Number	Analytical Method ^c
CTF-MW3 (Duplicate) 27-Jun-14	Aluminum	ND	0.015	0.050	NE	U		096143-010	EPA 6020
	Antimony	ND	0.001	0.003	0.006	U		096143-010	EPA 6020
	Arsenic	0.00363	0.0017	0.005	0.010	J	R	096143-010	EPA 6020
	Arsenic (reanalysis)	ND	0.0017	0.005	0.010	U		096143-R10	EPA 6020
	Barium	0.0324	0.0006	0.002	2.00			096143-010	EPA 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		096143-010	EPA 6020
	Cadmium	ND	0.00011	0.001	0.005	U		096143-010	EPA 6020
	Calcium	218	3.00	10.0	NE	B		096143-010	EPA 6020
	Chromium	ND	0.002	0.010	0.100	U	UJ	096143-010	EPA 6020
	Cobalt	0.000431	0.0001	0.001	NE	J		096143-010	EPA 6020
	Copper	0.00274	0.00035	0.001	NE		J-	096143-010	EPA 6020
	Iron	0.325	0.033	0.100	NE			096143-010	EPA 6020
	Lead	ND	0.0005	0.002	NE	U		096143-010	EPA 6020
	Magnesium	44.6	0.010	0.030	NE			096143-010	EPA 6020
	Manganese	0.00103	0.001	0.005	NE	J	J+	096143-010	EPA 6020
	Mercury	ND	0.000067	0.0002	0.002	U		096143-010	EPA 7470
	Nickel	0.00355	0.0005	0.002	NE		J-	096143-010	EPA 6020
	Potassium	11.7	0.400	1.50	NE			096143-010	EPA 6020
	Selenium	0.0277	0.0015	0.005	0.050			096143-010	EPA 6020
	Silver	ND	0.0002	0.001	NE	U		096143-010	EPA 6020
	Sodium	177	4.00	12.5	NE			096143-010	EPA 6020
	Thallium	ND	0.00045	0.002	0.002	U		096143-010	EPA 6020
	Vanadium	0.00107	0.001	0.005	NE	J		096143-010	EPA 6010
	Zinc	0.00482	0.0035	0.010	NE	J		096143-010	EPA 6020

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

Notes

^aLaboratory Qualifier

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

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

^bValidation Qualifier

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

- J- = The associated numerical value is an estimated quantity with a suspected negative bias.
- J+ = The associated numerical value is an estimated quantity with a suspected positive bias.
- R = The data are unusable (compound may or may not be present). Resampling or reanalysis are necessary for verification.
- UJ = The analyte was analyzed for, but was not detected. The associated value is an estimate and may be inaccurate or imprecise.

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

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

Notes

^aLaboratory Qualifier

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

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

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

^bValidation Qualifier

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

J = The associated value is an estimated quantity.

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

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

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

Notes

^aLaboratory Qualifier

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

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

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

^bValidation Qualifier

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

J = The associated value is an estimated quantity.

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

^cAnalytical Method

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

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

Bold = Indicates that a result exceeds the MCL.

CTF = Coyote Test Field.

EPA = U.S. Environmental Protection Agency.

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

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

mg/L = Milligrams per Liter.

MW = Monitoring Well.

ND = Not Detected (at MDL).

NE = Not Established.

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

SWMU = Solid Waste Management Unit.

Table III-15
Summary of Gamma Spectroscopy, Gross Alpha, Gross Beta, and Isotopic Uranium Results
SWMU 154 Groundwater Monitoring
Quarterly Assessment, April – June 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 06-Jun-14	Americium-241	-0.726 ± 11.8	20.5	10.0	NE	U	BD	096045-033	EPA 901.1
	Cesium-137	-0.0079 ± 1.77	3.19	1.52	NE	U	BD	096045-033	EPA 901.1
	Cobalt-60	-1.16 ± 3.22	3.55	1.66	NE	U	BD	096045-033	EPA 901.1
	Potassium-40	32.1 ± 44.4	32.0	14.8	NE	X	R	096045-033	EPA 901.1
	Gross Alpha	-6.64	NA	NA	15 pCi/L	NA	None	096045-034	EPA 900.0
	Gross Beta	56.6 ± 24.5	31.3	14.2	4mrem/yr		J	096045-034	EPA 900.0
	Uranium-233/234	56.9 ± 7.24	0.132	0.0589	NE			096045-035	HASL-300
	Uranium-235/236	0.566 ± 0.138	0.110	0.0466	NE			096045-035	HASL-300
	Uranium-238	8.77 ± 1.18	0.0739	0.030	NE			096045-035	HASL-300

Notes

^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.

^dValidation Qualifier

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

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

J = The associated value is an estimated quantity.

None = No data validation for corrected gross alpha activity.

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

^eAnalytical Method

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

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

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

Notes (continued)

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

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

Well	Date	Analyte	Result	MCL	Laboratory Qualifier ^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-Jun-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	06-Jun-14	Arsenic – Filtered	0.0261 mg/L	0.010 mg/L			096045-010	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-Jun-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 June 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	06-Jun-14	Arsenic —Unfiltered	0.0341 mg/L	0.010 mg/L			096045-009	
CTF-MW2	31-May-11	Gross Alpha	23.38 pCi/L	15 pCi/L			090670-010	EPA 900.0
CTF-MW2	17-Sep-13	Gross Alpha	23.54 pCi/L	15 pCi/L	NA	None	094646-034	EPA 900.0
CTF-MW2 (Reanalysis)	17-Sep-13	Gross Alpha	26.94 pCi/L	15 pCi/L	NA	None	094646-R34	EPA 900.0
CTF-MW2	17-Dec-13	Gross Alpha	21.25 pCi/L	15 pCi/L	NA	None	095086-034	EPA 900.0
CTF-MW2	08-Mar-11	Thallium—Unfiltered	0.00249 mg/L	0.002 mg/L	J		090237-009	EPA 6020

Notes

^a**Laboratory Qualifier**

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

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

NA = Not applicable.

^b**Validation Qualifier**

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

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

None = No data validation for corrected gross alpha activity.

^c**Analytical Method**

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

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

U.S. Environmental Protection Agency, 1986 (and updates), "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods," SW-846, 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, April – June 2014

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

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

Notes

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

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

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.

Appendix A

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

Project Name: SWMU 149	Project No.: 146422.10.11.01
Well I.D.: CTF-MW 3	Date: 06/27/14
Well Condition: <i>Good</i>	Weather Condition: <i>See Tailgate Form</i>
Method: Portable pump <input checked="" type="checkbox"/> _____	Dedicated pump _____ Pump depth: <i>359'</i>

[illegible]

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GROUNDWATER SAMPLE COLLECTION FIELD EQUIPMENT CHECK LOG

Page 1 of 2

SNL/NM Project Name: <u>BGG SWMU 149</u>			SNL/NM Project No.: <u>146422.10.11.01</u>		
Calibrations done by: <u>R Lynch</u>			Date: <u>6/27/14</u>		
Make & Model: <u>YSI EXO1</u>					
YSI 6820 Sonde (S/N) with DO, Ec, pH, ORP, and temperature probes: <u>13C101167</u>					
YSI 650 MDS (S/N): <u>NA</u>					
pH Calibration					
pH Calibrated to (std): <u>7.00</u>			pH sloped to (std): <u>10.00</u>		
Reference value:	<u>4.00</u>		<u>7.00</u>		<u>10.00</u>
	Value	Temp	Value	Temp	Value Temp
1. Time: <u>0622</u>	<u>4.00</u>	<u>19.8</u>	<u>7.00</u>	<u>19.8</u>	<u>10.00 19.8</u>
2. Time: <u>1038</u>	<u>3.99</u>	<u>20.0</u>	<u>7.00</u>	<u>20.0</u>	<u>10.00 20.0</u>
3. Time:					
4. Time:					
Standard lot no.:	<u>3AD782</u>		<u>3AE725</u>		<u>3AD357</u>
Expiration date:	<u>4/15</u>		<u>5/15</u>		<u>4/15</u>
SC Calibration					
Reference Value: <u>1225 uS</u>			Standard Lot No.: <u>3AE221</u>		
	Value	Temp	Expiration Date: <u>5/15</u>		
1. Time: <u>0621</u>	<u>1224</u>	<u>19.8</u>			
2. Time: <u>1037</u>	<u>1227</u>	<u>20.1</u>			
3. Time:					
4. Time:					
ORP Calibration					
Reference Value: <u>220 mV</u>			Standard Lot No. <u>4AA010</u>		
	Value	Temp	Expiration Date: <u>7/14</u>		
1. Time: <u>0624</u>	<u>220.1</u>	<u>19.8</u>			
2. Time: <u>1040</u>	<u>220.2</u>	<u>20.0</u>			
3. Time:					
4. Time:					
DO Calibration					
Calibration Value:	<u>81% air saturation @ 5200 ft.</u>		Atmospheric Pressure in Hg		
1. Time: <u>0620</u>	<u>81.4</u>	<u>24.61</u>			
2. Time: <u>1036</u>	<u>81.6</u>	<u>24.66</u>			
3. Time:					
4. Time:					

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

SNL/NM Project Name: 88G SWMU 149		Project No.: 146422.10.11.01		
Calibration done by: R Lynch		Date: 6/27/14		
TURBIDIMETER				
Make & Model: HACH 2100P HACH 2100Q		Serial No. S/N 10060C003010		
Reference Value	2.1 10	20	100	800
Standard Lot No.	0161	0167	0168	0161
1. Time	0745	9.96	19.9	103
2. Time	0945	10.2	19.7	101
3. Time				
4. Time				
Comments:				

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

Project Name: <u>SWMU-149 GWM</u>	Monitoring Well ID #: <u>CTF-MW3</u>	Date: <u>06-27-14</u>
The following equipment was decontaminated at completion of sampling activities in accordance with FOP-05-03		
Pump and Tubing Bundle ID #: <u>1806-586</u>	Water Level Indicator ID #: <u>210269</u>	
<u>Personnel Performing Decontamination:</u> Robert Lynch Print Name: _____ Initial: <u>RL</u> Alfred Santillanes Print Name: _____ Initial: <u>[Signature]</u>		<u>Personnel Performing Decontamination:</u> Robert Lynch Print Name: _____ Initial: <u>RL</u> Alfred Santillanes Print Name: _____ Initial: <u>[Signature]</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) <u>TH 1/1/14</u> Source: <u>Gulligan SNL/NM Building 05E</u> Lot Number: <u>Pick-up on 6/25/14</u>	HNO₃ Grade: <u>Reagent</u> UN #: <u>2031</u> Manufacturer: <u>AROC</u> Lot Number: <u>A0316863</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-MW3-062714-01	SWMU-CTF-MW3-062714-02	SWMU-062714
Initial Label Type (Hazardous or Non-Regulated)	Non-Regulated	Non-Regulated	Non-Regulated
Waste Matrix (purge water, decon water, HACH Accu-Vac ampule)	Purge Water	Purge Water	Decon Water
Container Type / Volume	CHPD / 55gal.	CHPD / 55gal.	CHPD / 55gal.
Volume of Waste	~ 24 gal.	~ 18 gal.	~ 30 gal.
Total Container Weight	~ 190 lbs.	~ 140 lbs.	~ 240 lbs.
COC#: Sample#-Fraction	<u>CoC # 615590</u> <u>Sample # 096142, 096143</u>	<u>CoC # 615590</u> <u>Sample # 096142, 096143</u>	<u>CoC # 615590</u> <u>Sample # 096142, 096143</u>
Accumulation Date	Start: 06 / 27 / 14 Full: 06 / 27 / 14	Start: 06 / 27 / 14 Full: 06 / 27 / 14	Start: 06 / 27 / 14 Full: 06 / 27 / 14
Date Waste Moved to Accumulation Area	06 / 27 / 14	06 / 27 / 14	06 / 27 / 14
Accumulation Area Name	9925	9925	9925
Comments:			

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TAILGATE SAFETY MEETING FORM

Dept: 4142 Well Location: CTF-MW 3 Date: 6/27/14 Time: 0740

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: 81.3 °F Wind Speed: ~5 MPH Humidity: 24.5 % 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 SANTILLANES
Printed Name

William Gibson
Printed Name

Printed Name

Printed Name

Robert T Lynch
Signature

Alfred Santillanes
Signature

William Gibson
Signature

Signature

Signature

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Project Name: SWMU 154	Project No.: 146422.10.11.01
Well I.D.: CTF-MW 2	Date: 06/06/14
Well Condition: <i>Good</i>	Weather Condition: <i>see Tailgate Form</i>
Method: Portable pump <input checked="" type="checkbox"/> _____	Dedicated pump _____ Pump depth: <u>128'</u>

[illegible]

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GROUNDWATER SAMPLE COLLECTION FIELD EQUIPMENT CHECK LOG

Page 1 of 2

SNL/NM Project Name: SWMU 154			SNL/NM Project No.: 146422.10.11.01		
Calibrations done by: R Lynch			Date: 06/06/14		
Make & Model: YSI EXO1					
YSI 6820 Sonde (S/N) with DO, Ec, pH, ORP, and temperature probes: 13C101167					
YSI 650 MDS (S/N): NA					
pH Calibration					
pH Calibrated to (std): 7.00			pH sloped to (std): 10.00		
Reference value:	4.00		7.00		10.00
	Value	Temp	Value	Temp	Value Temp
1. Time:	0633	3.99 18.9	7.00	18.9	9.99 18.9
2. Time:	1224	4.01 19.6	7.00	19.6	10.01 19.6
3. Time:					
4. Time:					
Standard lot no.:	3AD782		3AE725		3AD357
Expiration date:	4/15		5/15		4/15
SC Calibration					
Reference Value: 1225 uS			Standard Lot No.: 3AE221		
	Value	Temp	Expiration Date: 5/15		
1. Time:	0631	1222 18.8			
2. Time:	1223	1225 19.6			
3. Time:					
4. Time:					
ORP Calibration					
Reference Value: 220 mV			Standard Lot No. 4AA101		
	Value	Temp	Expiration Date: 7/14		
1. Time:	0634	220.1 20.0			
2. Time:	1225	220.4 19.6			
3. Time:					
4. Time:					
DO Calibration					
Calibration Value:	81% air saturation @ 5200 ft.		Atmospheric Pressure in Hg		
1. Time:	0630	81.4	24.64		
2. Time:	1222	81.5	24.66		
3. Time:					
4. Time:					

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

SNL/NM Project Name: SWMU 154		Project No.: 146422.10.11.01		
Calibration done by: R Lynch		Date: 06/06/14		
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	0753	10.2	19.9	103
2. Time	0916	10.3	19.7	104
3. Time				
4. Time				
Comments:				

**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>6-6-14</u>
The following equipment was decontaminated at completion of sampling activities in accordance with FOP-05-03		
Pump and Tubing Bundle ID #: <u>1806-586</u>	Water Level Indicator ID #: <u>210269</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 Lynch</u> <u>RL</u> Print Name: Initial: <u>Tim Jackson</u> <u>TJ</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>051814</u>	HNO₃ Grade: <u>Reagent</u> UN #: <u>2031</u> Manufacturer: <u>AROC</u> Lot Number: <u>A0316863</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	SWMU154 GWM	SWMU154 GWM	SWMU154 GWM
Container ID # (site-date-sequence)	CTF-MW2-060614-01	CTF-MW2-060614-02	SWMU154-060614
Initial Label Type (Hazardous or Non-Regulated)	NON REG	NON REG	NON REG
Waste Matrix (purge water, decon water, HACH Accu-Vac ampule)	PURGE WATER	PURGE WATER	DECON WATER
Container Type / Volume	CHPD/55 GALLONS	CHPD/55 GALLONS	CHPD/55 GALLONS
Volume of Waste	24 GALLONS	24 GALLONS	30 GALLONS
Total Container Weight	192 lbs	192 lbs	240 lbs
COC#: Sample#-Fraction	<u>615528</u> <u>615529</u> <u>096045</u> <u>096047</u> 	<u>615528</u> <u>615529</u> <u>096045</u> <u>096047</u> 	<u>615528</u> <u>615529</u> <u>096045</u> <u>096047</u>
Accumulation Date	Start: 6-6-14 Full: 6-6-14	Start: 6-6-14 Full: 6-6-14	Start: 6-6-14 Full: 6-6-14
Date Waste Moved to Accumulation Area	6-6-14	6-6-14	6-6-14
Accumulation Area Name	9925	9925	9925
Comments:			

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TAILGATE SAFETY MEETING FORM

Dept: 4142 Well Location: CTF-MW 2 Date: 6/6/14 Time: 0749

Activities: Groundwater Monitoring and Sampling

(Anyone has the right to cease field activities for safety concerns. The buddy system will be used when needed.)

Weather Conditions:

Temp: 70.3°F Wind Speed: ~10 MPH Humidity: 21.8 % 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

Tom Jackson
Printed Name

Printed Name

Printed Name

Printed Name

Signature

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

Page 1 of 2

SMO Use

AR/COC 615590-

Project Name:	SWMU 149 GWM	Date Samples Shipped:	SMO Authorization: <i>[Signature]</i>	<input type="checkbox"/> Waste Characterization
Project/Task Manager:	Clinton Lum	Carrier/Waybill No.	SMO Contact Phone:	<input type="checkbox"/> RMMA
Project/Task Number:	146422.10.11.01	Lab Contact:	Lorraine Herrera/505-844-3199	<input type="checkbox"/> Released by COC No.
Service Order:	CF352-14	Lab Destination:	Send Report to SMO:	<input checked="" type="checkbox"/> 4° Celsius
		Contract No.:	Rita Kavanaugh/505-284-2553	Bill to: Sandia National Laboratories (Accounts Payable)

Building:	Room:	Operational Site:
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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					
✓ 096141	-001 ✓	CTF-FB2	NA	6/27/14 9:37 ✓	DIW	G	3x40ml	HCL	G	FB	TCL VOC (SW846-8260B)	
✓ 096142	-001 ✓	CTF-MW3	359	6/27/14 9:37 ✓	GW	G	3x40ml	HCL	G	SA	TCL VOC (SW846-8260B)	
✓ 096142	-009 ✓	CTF-MW3	359	6/27/14 9:39 ✓	GW	P	500 ml	HNO3	G	SA	TAL Metals(SW846-6010/6020/7470)	
✓ 096142	-010 ✓	CTF-MW3	359	6/27/14 9:40 ✓	FGW ✓	P	500 ml	HNO3	G	SA	TAL Metals(SW846-6010/6020/7470)	
✓ 096142	-016 ✓	CTF-MW3	359	6/27/14 9:42 ✓	GW	P	125 ml	None	G	SA	Anions (SW846-9056)	
✓ 096142 ✓	-018 ✓	CTF-MW3	359	6/27/14 9:43 ✓	GW	P	125 ml	H2SO4	G	SA	NPN (EPA 353.2)	
✓ 096142	-020 ✓	CTF-MW3	359	6/27/14 9:44 ✓	GW	P	250 ml	None	G	SA	Perchlorate (EPA 314.0)	
✓ 096142	-022 ✓	CTF-MW3	359	6/27/14 9:45 ✓	GW	P	500 ml	None	G	SA	Alkalinity (SM2320B)	
✓ 096143	-001 ✓	CTF-MW3	359	6/27/14 9:37 ✓	GW	G	3x40ml	HCL	G	DU	TCL VOC (SW846-8260B)	
✓ 096143	-009 ✓	CTF-MW3	359	6/27/14 9:39 ✓	GW	P	500 ml	HNO3	G	DU	TAL Metals(SW846-6010/6020/7470)	

Last Chain: <input checked="" type="checkbox"/> Yes		Sample Tracking		SMO Use		Special Instructions/QC Requirements:		Conditions on Receipt	
Validation Req'd: <input checked="" type="checkbox"/> Yes		Date Entered:				EDD <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No			
Background: <input type="checkbox"/> Yes		Entered by:				Turnaround Time <input type="checkbox"/> 7 Day* <input type="checkbox"/> 15 Day* <input checked="" type="checkbox"/> 30 Day			
Confirmatory: <input type="checkbox"/> Yes		QC inits.:				Negotiated TAT <input type="checkbox"/>			
Sample Team Members	Name	Signature	Init.	Company/Organization/Phone/Cell		Sample Disposal <input type="checkbox"/> Return to Client <input checked="" type="checkbox"/> Disposal by Lab			
	Robert Lynch	<i>[Signature]</i>	RL	SNL/4142/505-844-4013/505-250-7090		Return Samples By:			
	Alfred Santillanes	<i>[Signature]</i>	AS	SNL/4142/505-844-5130/505-228-0710		Comments: Send report to Tim Jackson/4142/MS 0729/284-2547			
	William Gibson	<i>[Signature]</i>	WG	SNL/4142/505-284-3307/505-239-7367		If perchlorate detected, perform verification analysis using SW846-6850M. Report anions as Br, Cl, F, SO ₄ . Report alkalinity as total CaCO ₃ , HCO ₃ , and CO ₃ .			
								Lab Use	

1. Relinquished by <i>Ally S. Allen</i>	Org. <i>442</i>	Date <i>6/27/14</i>	Time <i>10:13</i>	3. Relinquished by	Org.	Date	Time
1. Received by <i>Donna Allen</i>	Org. <i>4142</i>	Date <i>6/27/14</i>	Time <i>10:13</i>	3. Received by	Org.	Date	Time
2. Relinquished by	Org.	Date	Time	4. Relinquished by	Org.	Date	Time
2. Received by	Org.	Date	Time	4. Received by	Org.	Date	Time

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

ANALYSIS REQUEST AND CHAIN OF CUSTODY

Internal Lab

Page 1 of 1

Batch No.

SMO Use

AR/COC

615589 -

Project Name: SWMU 149 GWM		Date Samples Shipped:		SMO Authorization: <i>Don't stop</i>		<input type="checkbox"/> Waste Characterization						
Project/Task Manager: Clinton Lum		Carrier/Waybill No.		SMO Contact Phone:		<input type="checkbox"/> RMMA						
Project/Task Number: 146422.10.11.01		Lab Contact: Edie Kent/803-556-8171		Lorraine Herrera/505-844-3199		<input type="checkbox"/> Released by COC No.						
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		Bill to: Sandia National Laboratories (Accounts Payable),						
Tech Area:						P.O. Box 5800, MS-0154						
Building:		Room:		Operational Site:		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
096138	-001	CTF-FB1	NA	6/26/14 13:20	DIW	G	3x40ml	HCL	G	FB	TCL VOC (SW846-8260B)	
096139	-001	CTF-EB1	NA	6/26/14 13:20	DIW	G	3x40ml	HCL	G	EB	TCL VOC (SW846-8260B)	
096139	-009	CTF-EB1	NA	6/26/14 13:21	DIW	P	500 ml	HNO3	G	EB	TAL Metals (SW846-6010/6020/7470)	
096139	-010	CTF-EB1	NA	6/26/14 13:23	FDIW	P	500 ml	HNO3	G	EB	TAL Metals (SW846-6010/6020/7470)	
096140	-001	CTF-TB1	NA	6/26/14 13:20	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			Comments: Send report to Tim Jackson/4142/MS 0729/284-2547			
	Robert Lynch	<i>Robert Lynch</i>	RL	SNL/4142/505-844-4013/505-250-7090								
	Alfred Santillanes	<i>Alfred Santillanes</i>	AS	SNL/4142/505-844-5130/505-228-0710								
	William Gibson	<i>William Gibson</i>	WG	SNL/4142/505-284-3307/505-239-7367								
1. Relinquished by <i>Alfred Santillanes</i> Org. 4142 Date 6/26/14 Time 1420						3. Relinquished by Org. Date Time						
1. Received by <i>Don Jackson</i> Org. 4142 Date 6/26/14 Time 1420						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 2Batch No. N/A

SMO Use

AR/COC **615528**

Project Name: <u>SWMU 154 GWM</u>	Date Samples Shipped: <u>6/6/14</u>	SMO Authorization: <u>[Signature]</u>	<input type="checkbox"/> Waste Characterization
Project/Task Manager: <u>Clinton Lum</u>	Carrier/Waybill No.:	SMO Contact Phone:	<input type="checkbox"/> RMMA
Project/Task Number: <u>146422.10.11.01</u>	Lab Contact: <u>Edie Kent/803-556-8171</u>		<input type="checkbox"/> Released by COC No. <input checked="" type="checkbox"/> 4° Celsius
Service Order: <u>CF353-14</u>	Lab Destination: <u>GEL</u>	Send Report to SMO: <u>Rita Kavanaugh/505.284.2553</u>	
	Contract No.: <u>PO 1303873</u>		Bill to: Sandia National Laboratories (Accounts Payable), P.O. Box 5800, MS-0154 Albuquerque, NM 87185-0154

Tech Area:	Operational Site:	
Building:	Room:	

Sample No.	Fraction	Sample Location Detail	Depth (ft)	Date/Time Collected	Sample Matrix	Container		Preservative	Collection Method	Sample Type	Parameter & Method Requested	Lab Sample ID
						Type	Volume					
096045	-001	CTF-MW2	128	6/6/14 9:03	GW	G	3 x 40 mL	HCL	G	SA	TCL VOCs (SW846-8260B)	
096045	-002	CTF-MW2	128	6/6/14 9:05	GW	AG	4 x 1 L	None	G	SA	TCL SVOCs (SW846-8270C)	
096045	-024	CTF-MW2	128	6/6/14 9:07	GW	AG	4 x 1 L	None	G	SA	High Explosives (SW846-8321A)	
096045	-009	CTF-MW2	128	6/6/14 9:08	GW	P	500 mL	HNO3	G	SA	TAL Metals+U (SW846-6010/6020/7470)	
096045	-010	CTF-MW2	128	6/6/14 9:09	FGW	P	500 mL	HNO3	G	SA	TAL Metals+U (SW846-6010/6020/7470)	
096045	-016	CTF-MW2	128	6/6/14 9:10	GW	P	125 mL	None	G	SA	Anions (SW846-9056)	
096045	-018	CTF-MW2	128	6/6/14 9:11	GW	P	125 mL	H2SO4	G	SA	Nitrate plus Nitrite (EPA 353.2)	
096045	-022	CTF-MW2	128	6/6/14 9:12	GW	P	500 mL	None	G	SA	Alkalinity as CaCO3, HCO3, CO3 (SM2320B)	
096045	-020	CTF-MW2	128	6/6/14 9:13	GW	P	250 mL	None	G	SA	Perchlorate (EPA 314.0)	
096045	-033	CTF-MW2	128	6/6/14 9:14	GW	P	1 L	HNO3	G	SA	Gamma Spectroscopy (EPA 901.0)	

Last Chain: <input checked="" type="checkbox"/> Yes	Sample Tracking	SMO Use	Special Instructions/QC Requirements:	Conditions on Receipt	
Validation Req'd: <input checked="" type="checkbox"/> Yes	Date Entered:		EDD <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		
Background: <input type="checkbox"/> Yes	Entered by:		Turnaround Time <input type="checkbox"/> 7 Day* <input type="checkbox"/> 15 Day* <input checked="" type="checkbox"/> 30 Day		
Confirmatory: <input type="checkbox"/> Yes	QC inits.:		Negotiated TAT <input type="checkbox"/>		
Sample Team Members	Name	Signature	Init.	Company/Organization/Phone/Cell	Sample Disposal <input type="checkbox"/> Return to Client <input checked="" type="checkbox"/> Disposal by Lab
	Robert Lynch	<u>[Signature]</u>	<u>RL</u>	SNL/4142/505-844-4013/505-250-7090	Return Samples By:
	Tim Jackson	<u>[Signature]</u>	<u>TJ</u>	SNL/4142/505-284-2547/505-263-6639	Comments:
					Water has high buffering capacity, please check pH upon receipt and add preservation as needed. Report short list isotopes for gamma spec analysis. VOCs have headspace. If perchlorate detected, then perform verification analysis using method SW846-6850.

1. Relinquished by <u>T. Jackson</u> Org. <u>4142</u> Date <u>6/6/14</u> Time <u>0940</u>	3. Relinquished by _____ Org. _____ Date _____ Time _____
1. Received by <u>[Signature]</u> Org. <u>4142</u> Date <u>6/6/14</u> Time <u>0940</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

ANALYSIS REQUEST AND CHAIN OF CUSTODY (Continuation)

[illegible]

CONTRACT LABORATORY

ANALYSIS REQUEST AND CHAIN OF CUSTODY

Page 1 of 1

SMO Use

AR/COC | 615529

Project Name:	SWMU 154 GWM	Date Samples Shipped:	6/6/14	SMO Authorization:	<i>[Signature]</i>	<input checked="" 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			<input type="checkbox"/> Released by COC No.
Service Order:	CF353-14	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)

Tech Area:		Operational Site:	P.O. Box 5800, MS-0154
Building:	Room:		Albuquerque, NM 87185-0154

[illegible]

Last Chain: <input checked="" type="checkbox"/> Yes			Sample Tracking		SMO Use		Special Instructions/QC Requirements:			Conditions on Receipt	
Validation Req'd: <input type="checkbox"/> Yes			Date Entered:				EDD <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No				
Background: <input type="checkbox"/> Yes			Entered by:				Turnaround Time <input type="checkbox"/> 7 Day* <input type="checkbox"/> 15 Day* <input checked="" type="checkbox"/> 30 Day				
Confirmatory: <input type="checkbox"/> Yes			QC inits.:				Negotiated TAT <input type="checkbox"/>				
Sample Team Members	Name		Signature		Init.		Company/Organization/Phone/Cell		Sample Disposal <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:		
	Tim Jackson		<i>T Jackson</i>		TJ		SNL/4142/505-284-2547/505-263-6639		Comments:		
									Water has high buffering capacity, please check pH upon receipt and add preservation as needed.		
								Lab Use			

1. Relinquished by <i>TC Justice</i>	Org. <i>4142</i>	Date <i>6/6/14</i>	Time <i>0935</i>	3. Relinquished by	Org.	Date	Time
1. Received by <i>D. P. L. SMO</i>	Org. <i>4142</i>	Date <i>6/6/14</i>	Time <i>0935</i>	3. Received by	Org.	Date	Time
2. Relinquished by	Org.	Date	Time	4. Relinquished by	Org.	Date	Time
2. Received by	Org.	Date	Time	4. Received by	Org.	Date	Time

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

Appendix C

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



Sample Findings Summary



AR/COC: 615589, 615590

Page 1 of 2

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

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
	096138-001/CTF-FB1	Methylene chloride (75-09-2)	UJ, I3,C3
	096139-001/CTF-EB1	Methylene chloride (75-09-2)	UJ, I3,C3
	096140-001/CTF-TB1	Methylene chloride (75-09-2)	UJ, I3,C3
	096141-001/CTF-FB2	Methylene chloride (75-09-2)	UJ, I3,C3
	096142-001/CTF-MW3	Methylene chloride (75-09-2)	UJ, I3,C3
	096143-001/CTF-MW3	Methylene chloride (75-09-2)	UJ, I3,C3
	096144-001/CTF-TB2	Methylene chloride (75-09-2)	UJ, I3,C3

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

Memorandum

Date: July 29, 2014
To: File
From: Monica Dymerski
Subject: Inorganic Data Review and Validation – SNL
Site: SWMU 149 GWM
AR/COC: 615589 and 615590
SDG: 351543
Laboratory: GEL
Project/Task: 146422.10.11.01
Analysis: General Chemistry

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

Summary

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

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

Holding Times and Preservation

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

Calibration

All initial and continuing calibration met QC acceptance criteria.

Blanks

No target analytes were detected in the blanks.

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

Laboratory Control Sample (LCS)

All LCS acceptance criteria were met.

Matrix Spike (MS)

All MS/PS recoveries met QC acceptance criteria.

Nitrate/nitrite-N

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

Laboratory Replicate

The replicate analyses met all QC acceptance criteria.

Nitrate/nitrite-N

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

Detection Limits/Dilutions

All detection limits were properly reported.

Nitrate/nitrite:

The sample was diluted 10X.

Anions:

The sample was diluted 50X for chloride and sulfate.

Other QC

No other specific issues that affect data quality were identified.

Reviewed by: Mary Donovan

Level: I

Date: 08/18/14

Memorandum

Date: July 29, 2014
To: File
From: Monica Dymerski
Subject: Inorganic Data Review and Validation – SNL
Site: SWMU 149 GWM
AR/COC: 615589 and 615590
SDG: 351543, 351544, 353817, and 353818
Laboratory: GEL
Project/Task: 146422.10.11.01
Analysis: Metals

See the attached Data Validation Worksheets for supporting documentation on the data review and validation. This validation was performed according to SNL/NM ER Project AOP 00-03 Rev 4.

Summary

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

ICP-MS:

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

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

Holding Times and Preservation

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

ICP-MS Instrument Tune

The ICP-MS tunes met QC acceptance criteria.

Calibration

All initial and continuing calibrations met QC acceptance criteria.

Reporting Limit Verification

All CRA/CRI recoveries met QC acceptance criteria.

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

Blanks

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

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

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

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

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

ICP -MS Internal Standards

The ICP-MS internal standards met QC acceptance criteria.

Matrix Spike (MS)

The MS met all QC acceptance criteria except as follows.

ICP-MS:

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

Laboratory Replicate

The replicates met all QC acceptance criteria.

Laboratory Control Sample (LCS)

The LCS met all QC acceptance criteria.

Detection Limits/Dilutions

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

ICP Interference Check Sample (ICS A and AB)

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

ICP-MS

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

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

ICP-AES

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

ICP Serial Dilution

The serial dilutions met all QC acceptance criteria.

Other QC

No other specific issues that affect data quality were identified.

Reviewed by: Mary Donovan

Level: I

Date: 08/18/14

Memorandum

Date: July 29, 2014
To: File
From: Monica Dymerski
Subject: GC/MS Organic Data Review and Validation – SNL
Site: SWMU 149 GWM
AR/COC: 615589 and 615590
SDG: 351543
Laboratory: GEL
Project/Task: 146422.10.11.01
Analysis: VOCs

See the attached Data Validation Worksheets for supporting documentation on the data review and validation. Data are evaluated using SNL/NM SMO AOP 00-03 Rev 4.

Summary

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

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

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

Holding Times

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

Instrument Tune

All instrument tune requirements were met.

Calibration

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

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

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

Blanks

No target analytes were detected in the blanks.

Surrogates

All surrogate recoveries met QC acceptance criteria.

Internal Standards

All internal standards met QC acceptance criteria.

Matrix Spike/Matrix Spike Duplicate (MS/MSD)

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

Laboratory Control Sample (LCS)

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

Detection Limits/Dilutions

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

Tentatively Identified Compounds (TICs)

TIC reports were not required.

Other QC

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

No other specific issues that affect data quality were identified.

Reviewed by: Mary Donovan

Level: I

Date: 08/18/14

Data Validation Summary Worksheet

AR/COC #: 615589 and 615590

Site/Project: SWMU 149 GWM

Validation Date: 07/29/14

SDG #: 351543 and 351544

Laboratory: GEL Laboratories LLC

Validator: Monica Dymerski

Matrix: Aqueous

of Samples: 17

CVR present yes

Analysis Type: X Organic X Metals

AR/COC(s) present: yes

Sample Container Integrity: intact

Rad X Gen Chem

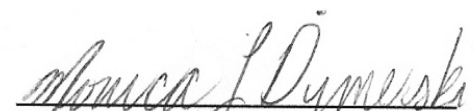
Requested Analyses Not Reported						
Sample Number	Laboratory ID	organic	genchem	metals	rad	Comments
None						

Hold Time/Preservation Outliers								
Sample Number	Laboratory ID	Analysis	Pres.	Coll. Date	Prep. Date	Anal. Date	Anal. within 2X HT	Anal. beyond 2X HT
None								

Comments: Sampled 06/26/14 and 06/27/14

Revised 7/2007

Validated By:



Organic Worksheet (GC/MS)

AR/COC #: 615589 and 615590

SDG #:351543

Matrix: Aqueous

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

Method/Batch #s: 1401816

Tuning (pass/fail): pass

TICs Required? (yes/no) no

[illegible]

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

Inorganic Metals Worksheet

AR/COC #: 615589 and 615590

SDG #:351543, 351544, 353817, and 353818

Matrix: Aqueous

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

Method/Batch #: 3005A/**6010B (ICP-AES)**: 1399466(prepare)/1399467 **3005A/6020 (ICP-MS)**: 1399468(prepare)/1399469 As Reanalysis: 1408279(prepare)/1408280 **7470A (Hg)**: 1401645(prepare)/1401647

ICPMS Mass Cal (pass/fail) pass

ICPMS Resolution (pass/fail) pass

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

IS Outliers				IS Outliers			
Sample ID	%Recovery	%Recovery	%Recovery	CCV/CCB ID	%Recovery	%Recovery	%Recovery
None				None			

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

Dilutions: Samples 351543003 and -009, and 351544001 and -002 were diluted 5X for K and 50X for Ca and Na.

General Chemistry Worksheet

AR/COC #: 615589 and 615590

SDG #: 351543

Matrix: Aqueous

Laboratory Sample IDs: 351543- See below

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

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

Method/Batch #s: EPA 353.2 (NO₃/NO₂ – N): Batch 1399488 Sample -005

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

[illegible]

Comments: HTs OK. **Matrix QC: 314.0:** Performed on sample -006. **9056:** performed on sample -004; **353.2:** performed on SNL sample from another SDG; **SM2320B:** performed on sample -007 – parent sample concentration >4X the spike concentration. MS%R within limits.
diluted 50X for Cl and SO4. diluted 10X for NO₃/NO₂ – N.

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

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

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

Laboratory Replicate

The replicate analyses met all QC acceptance criteria.

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

Detection Limits/Dilutions

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

Nitrate/Nitrite:

Sample -006 was diluted 5X.

Anions:

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

Other QC

No other specific issues that affect data quality were identified.

Reviewed by: Monica Dymerski

Level I

Date: 07/30/14

Memorandum

Date: July 29, 2014
To: File
From: Mary Donovan
Subject: LC/MS/MS Organic Data Review and Validation – SNL
Site: SWMU 154 GWM
AR/COC: 615528
SDG: 350254
Laboratory: GEL
Project/Task: 146422.10.11.01
Analysis: High Explosives (HE)

See the attached Data Validation Worksheets for supporting documentation on the data review and validation. Data are evaluated using SNL/NM SMO AOP 00-03 Rev 4.

Summary

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

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

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

Holding Times

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

Instrument Tune

The instrument tune was not reported or evaluated.

Calibration

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

Reporting Limit Verification

All CRI recoveries met QC acceptance criteria.

Blanks

No target analytes were detected in the blanks.

Surrogates

All surrogate recoveries met QC acceptance criteria.

Internal Standards

All internal standards met QC acceptance criteria.

Matrix Spike/Matrix Spike Duplicate (MS/MSD)

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

Laboratory Control Sample (LCS)

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

Detection Limits/Dilutions

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

Other QC

No other specific issues that affect data quality were identified.

Reviewed by: Monica Dymerski

Level I

Date: 07/30/14

Memorandum

Date: July 29, 2014
To: File
From: Mary Donovan
Subject: Inorganic Data Review and Validation – SNL
Site: SWMU 154 GWM
AR/COC: 615528
SDG: 350254 and 350255
Laboratory: GEL
Project/Task: 146422.10.11.01
Analysis: Metals

See the attached Data Validation Worksheets for supporting documentation on the data review and validation. This validation was performed according to SNL/NM ER Project AOP 00-03 Rev 4.

Summary

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

ICP-MS:

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

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

Holding Times and Preservation

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

ICP-MS Instrument Tune

The ICP-MS tunes met QC acceptance criteria.

Calibration

All initial and continuing calibration met QC acceptance criteria.

Reporting Limit Verification

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

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

Blanks

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

ICP -MS Internal Standards

The ICP-MS internal standards met QC acceptance criteria.

Matrix Spike (MS)

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

ICP-MS:

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

Laboratory Replicate

The replicate met all QC acceptance criteria.

Laboratory Control Sample (LCS)

The LCS met all QC acceptance criteria.

Detection Limits/Dilutions

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

ICP Interference Check Sample (ICS A and AB)

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

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

ICP Serial Dilution

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

Other QC

No other specific issues that affect data quality were identified.

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

Memorandum

Date: July 30, 2014
To: File
From: Mary Donovan
Subject: Radiochemical Data Review and Validation – SNL
Site: SWMU 154 GWM
AR/COC: 615528
SDG: 350254
Laboratory: GEL
Project/Task: 146422.10.11.01
Analysis: RAD

See the attached Data Validation Worksheets for supporting documentation on the data review and validation. This validation was performed according to SNL/NM ER Project AOP 00-03 Rev 4.

Summary

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

Gross Alpha/Beta:

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

Gammaspect:

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

Holding Times and Preservation

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

Quantification

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

Calibration

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

Blanks

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

Tracer/Carrier Recovery

The sample tracer recoveries met QC acceptance criteria.

Matrix Spike/Matrix Spike Duplicate (MS/MSD)

The MS/MSD met all QC acceptance criteria.

Laboratory Replicate

All replicate error ratio acceptance criteria were met.

Laboratory Control Sample (LCS)

All LCS recoveries met QC acceptance criteria.

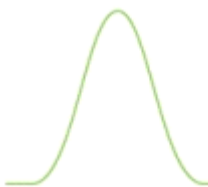
Detection Limits/Dilutions

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

Other QC

No other specific issues that affect data quality were identified.

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



Sample Findings Summary



AR/COC: 615528

Page 1 of 2

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
EPA 900.0/SW846 9310			
	096045-034/CTF-MW2	BETA (12587-47-2)	J, FR7
EPA 901.1			
	096045-033/CTF-MW2	Americium-241 (14596-10-2)	BD, FR3
	096045-033/CTF-MW2	Cesium-137 (10045-97-3)	BD, FR3
	096045-033/CTF-MW2	Cobalt-60 (10198-40-0)	BD, FR3
	096045-033/CTF-MW2	Potassium-40 (13966-00-2)	R, Z2
SW846 3005/6020 DOE-AL			
	096045-009/CTF-MW2	Copper (7440-50-8)	J-, CK3
	096045-009/CTF-MW2	Manganese (7439-96-5)	J, MS1
	096045-009/CTF-MW2	Nickel (7440-02-0)	J-, CK3
	096045-009/CTF-MW2	Potassium (7440-09-7)	J, D1
	096045-009/CTF-MW2	Thallium (7440-28-0)	2.5U, B3
	096045-010/CTF-MW2	Copper (7440-50-8)	J-, CK3
	096045-010/CTF-MW2	Manganese (7439-96-5)	J, MS1
	096045-010/CTF-MW2	Nickel (7440-02-0)	J-, CK3
	096045-010/CTF-MW2	Potassium (7440-09-7)	J, D1
SW846 3510C/8270D			
	096045-002/CTF-MW2	Phenol (108-95-2)	UJ, RP2
SW846 3535/8321A Modified			
	096045-024/CTF-MW2	m-Nitrotoluene (99-08-1)	UJ, I4
	096045-024/CTF-MW2	o-Nitrotoluene (88-72-2)	UJ, I4
	096045-024/CTF-MW2	p-Nitrotoluene (99-99-0)	UJ, I4
	096045-024/CTF-MW2	Tetryl (479-45-8)	UJ, L3,MS3
SW846 8260B DOE-AL			
	096045-001/CTF-MW2	Bromomethane (74-83-9)	UJ, I3,C3
	096046-001/SWMU154-TB1	Bromomethane (74-83-9)	UJ, I3,C3

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
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All other analyses met QC acceptance criteria; no further data should be qualified.

Memorandum

Date: July 29, 2014
To: File
From: Mary Donovan
Subject: GC/MS Organic Data Review and Validation – SNL
Site: SWMU 154 GWM
AR/COC: 615528
SDG: 350254
Laboratory: GEL
Project/Task: 146422.10.11.01
Analysis: SVOCs

See the attached Data Validation Worksheets for supporting documentation on the data review and validation. Data are evaluated using SNL/NM SMO AOP 00-03 Rev 4.

Summary

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

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

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

Holding Times

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

Instrument Tune

All instrument tune requirements were met.

Calibration

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

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

Blanks

No target analytes were detected in the blanks.

Surrogates

All surrogate recoveries met QC acceptance criteria.

Internal Standards

All internal standards met QC acceptance criteria.

Matrix Spike/Matrix Spike Duplicate (MS/MSD)

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

Laboratory Control Sample (LCS)

All LCS acceptance criteria were met.

Detection Limits/Dilutions

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

Tentatively Identified Compounds (TICs)

TIC reports were not required.

Other QC

No other specific issues that affect data quality were identified.

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

Memorandum

Date: July 29, 2014
To: File
From: Mary Donovan
Subject: GC/MS Organic Data Review and Validation – SNL
Site: SWMU 154 GWM
AR/COC: 615528
SDG: 350254
Laboratory: GEL
Project/Task: 146422.10.11.01
Analysis: VOCs

See the attached Data Validation Worksheets for supporting documentation on the data review and validation. Data are evaluated using SNL/NM SMO AOP 00-03 Rev 4.

Summary

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

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

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

Holding Times

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

Instrument Tune

All instrument tune requirements were met.

Calibration

The initial calibration and continuing calibration data met QC acceptance criteria except as noted above in the Summary section and as follows. The ICAL %RSD was $>15\%$ but $\leq 40\%$ for dibromochloromethane. The associated sample results were NDs and since no other calibration infractions occurred, will not be qualified.

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

Blanks

No target analytes were detected in the blanks.

Surrogates

All surrogate recoveries met QC acceptance criteria.

Internal Standards

All internal standards met QC acceptance criteria.

Matrix Spike/Matrix Spike Duplicate (MS/MSD)

All MS/MSD acceptance criteria were met.

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

Laboratory Control Sample (LCS)

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

Detection Limits/Dilutions

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

Tentatively Identified Compounds (TICs)

TIC reports were not required.

Other QC

One TB was submitted with the AR/COC.

No other specific issues that affect data quality were identified.

Reviewed by: Monica Dymerski

Level I

Date: 07/30/14

Data Validation Summary Worksheet

AR/COC #: 615528

Site/Project: SWMU 154 GWM

Validation Date: 07/29/2014

SDG #: 350254 and 350255

Laboratory: GEL Laboratories LLC

Validator: Mary Donovan

Matrix: Aqueous

of Samples: 13 CVR present: Yes

Analysis Type: X Organic X Metals

AR/COC(s) present: Yes Sample Container Integrity: OK

X Rad X Gen Chem

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

Hold Time/Preservation Outliers								
Sample Number	Laboratory ID	Analysis	Pres.	Coll. Date	Prep. Date	Anal. Date	Anal. within 2X HT	Anal. beyond 2X HT
None								

Comments: Samples collected 06/06/2014

Samples 350254004, -009, -010, -011 and 350255001 were received at pH 7, per instructions on COC samples were acidified to pH <2 upon receipt

Revised 7/2007

Validated By: Mary A. Donovan

Organic Worksheet (GC/MS)

AR/COC #: 615528

SDG #:350254

Matrix: Aqueous

Laboratory Sample IDs: 350254001 and -012

Method/Batch #s: 8260B 1397331

Tuning (pass/fail): pass

TICs Required? (yes/no) no

[illegible]

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

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

Revised

Organic Worksheet (GC/MS)

AR/COC #: 615528

SDG #:350254

Matrix: Aqueous

Laboratory Sample IDs: 350254002

Method/Batch #s: 3510C/8270D **1394325/1394333**

Tuning (pass/fail): pass

TICs Required? (yes/no) no

[illegible]

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

MS/MSD -002

High Explosives Worksheet (LC/MS/MS)

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

Laboratory Sample IDs 350254003

Method/Batch #s: 8535/8321A **1395268/1395269**

Analyte (Outliers)	Initial Calibration			Continuing Calibration				Method Blank	5X (10X) Blank	LCS %R	MS %R	MSD %R	MS/MSD RPD	CRI			
	Int.	RF	COD RSD/R ²	ICV	CCV	ICB	CCB										
m-nitrotoluene	✓	0.022	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓			
o-nitrotoluene	✓	0.029	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓			
p-nitrotoluene	✓	0.014	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓			
tetryl	✓	✓	✓	✓	✓	✓	✓	✓	✓	39.8	43.4	✓	✓	✓			
Surrogate Recovery Outliers																	
Sample ID																	
None																	
Internal Standard Outliers																	
Sample ID	Area	RT	Sample ID				Area	RT	Sample ID				Area	RT			
None																	

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

ICAL LCMSMS3 7/9/2014

Inorganic Metals Worksheet

AR/COC #: 615528 SDG #: 350254 and 352525 Matrix: Aqueous

Laboratory Sample IDs: 350254004 (UF) 350255001 (F)

Method/Batch #s: **3005/6010B:** 1394927/1394928 **3005/6020:** 1394898/1394899 **7470A** 1396350/1396363

ICPMS Mass Cal (pass/fail) Pass ICPMS Resolution (pass/fail) Pass

[illegible]

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

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

Revised 7/2007

General Chemistry Worksheet

AR/COC #: 615528

SDG #: 350254

Matrix: Aqueous

Laboratory Sample IDs: 350254 – see below

Method/Batch #s: EPA 314.0 (perchlorate): Batch 1395606, -008

Method/Batch #s: SW846 9056 (anions): Batch 1395539, -005

Method/Batch #s: EPA 353.2 (NO₃/NO₂ – N): Batch 1394301, -006

Method/Batch #s: SM 2320B(total alkalinity): Batch 1396657, -007

Analyte (outliers)	Calibration						Method Blank	5X Blank or 5X MDL	LCS %R	MS/ PS %R	Lab Rep. RPD					
	Int.	R ²	ICV	CCV	ICB mg/L	CCB mg/L										
bromide	✓	✓	✓	✓	✓	✓	✓	NA	✓	429	✓					

Comments: HTs OK, Matrix QC from this SDG except for NO₃/NO₂ – N; alkalinity >4X spike amount

Sample -005 diluted 50X for Cl and SO₄; sample -006 was diluted 5X for NO₃/NO₂ – N

Radiochemistry Worksheet

AR/COC #:	615528	SDG #:	350254	Matrix:	Aqueous
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Laboratory Sample IDs: 350254 – see below

Method/Batch#s: DOE EML HASL-300 (Alphaspec U) **1394438** 350254011

Method/Batch#s: EPA 901.1 (Gammascpec) **1394543** 350254009

Method/Batch#s: EPA 900.0 (Gross alpha/beta) **1395961** 350254010

Analyte (outliers)	Control Freq.	Control Eval.	Method Blank	5X Blank or 5X MDC	LCS %R	MS %R	MSD %R	MS/ MSD RER	Lab Rep. RER				
None													
Tracer/Carrier Recovery Outliers													
Sample ID	Tracer/Carrier	%R	Sample ID			Tracer/Carrier	%R	Sample ID		Tracer/Carrier	%R		
None													

Comments: HTs OK; Matrix QC: alphaspec U (-011), gammaspec (-009) and gross alpha/beta (-010)

Data rejected by the lab due to peaks not meeting identification criteria -009 K-40

Sample -009 was recounted for gammaspec due to peak shift, recounts were reported.

Gross alpha/beta parent and dup = 20 ml, MS/MSD=10 ml – no qual

SECTION IV

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SECTION IV

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

1.0 Introduction

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

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

The supplemental groundwater monitoring at these monitoring wells is designed to meet the requirements of Section VII.D.6 of the Compliance Order on Consent (the Consent Order) (NMED April 2004) and the letter dated April 8, 2010, from the NMED Hazardous Waste Bureau (NMED April 2010). The analytical results discussed in this report correspond to the Second Quarter, Calendar Year (CY) 2014 reporting period (April – June 2014).

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

Monitoring wells CCBA-MW1 and CCBA-MW2 were sampled on April 7 and April 8, 2014, respectively. The samples were analyzed for the required constituents, consisting of volatile organic compounds (VOCs), semivolatile organic compounds (SVOCs), high explosive (HE) compounds, nitrate plus nitrite (NPN), major anions (i.e., bromide, chloride, fluoride, and sulfate), major cations (i.e., calcium, magnesium, potassium, and sodium), alkalinity, Target Analyte List (TAL) metals plus uranium, perchlorate, total cyanide, radionuclides by gamma spectroscopy, and gross alpha/beta activity.

Monitoring wells OBS-MW1, OBS-MW2, and OBS-MW3 were sampled from April 14 to April 16, 2014. The samples were analyzed for the required constituents, consisting of VOCs, SVOCs, HE compounds, NPN, major anions, major cations, alkalinity, TAL metals plus uranium, hexavalent chromium, perchlorate, total cyanide, radionuclides by gamma spectroscopy, gross alpha/beta activity, and isotopic uranium.

Analytical results for the groundwater samples were compared with the U.S. Environmental Protection Agency (EPA) maximum contaminant levels (MCLs) for drinking water (EPA 2009). Except for fluoride, none of the analytical results for the groundwater samples from SWMUs 8/58 exceed the MCLs. Fluoride was detected above the established MCL of 4.0 milligrams per liter (mg/L) in the CCBA-MW1 groundwater sample at a concentration of 4.97 mg/L. Fluoride in the CCBA-MW2 groundwater sample and groundwater duplicate sample was above the method detection limit (MDL) with values of 1.59 mg/L and 1.63 mg/L, respectively.

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

2.0 **Field Methods and Measurements**

Groundwater monitoring at SWMUs 8/58 and 68 was performed according to work plans submitted as Attachments A and B to the DOE/Sandia Response (SNL/NM September 2010) and SNL/NM Administrative Operating Procedures (AOPs) (SNL/NM May 2011) and Field Operating Procedures (FOPs) (SNL/NM January 2012a and January 2012b). Groundwater samples were analyzed for relevant parameters listed in Table IV-1. Table IV-2 presents the details for groundwater samples collected from all five monitoring wells during the Second Quarter, CY 2014.

2.1 **Equipment Decontamination**

A portable Bennett[™] 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. Table IV-1 also lists the sample containers and preservation requirements. Section IV.3.0 summarizes the analytical results.

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

3.0 **Analytical Results**

Groundwater samples were submitted to GEL and Test America Laboratories for chemical and radiological analyses. Samples were analyzed in accordance with applicable EPA analytical methods (EPA 1980, 1984, 1986, and 1999; Clesceri et al. 1998; DOE 1990). Table IV-4 lists the MDLs for VOCs and SVOCs and Table IV-5 lists the MDLs for HE compounds. Groundwater sampling results are compared with

established EPA MCLs for drinking water (EPA 2009). Analytical results for samples collected from all five monitoring wells are shown in tabulated form in Tables IV-6 through IV-13. Analytical reports, including certificates of analyses, analytical methods, MDLs, minimum detectable activity (MDA), critical level, practical quantitation limits, dates of analyses, results of QC analyses, and data validation findings are filed in the SNL/NM Records Center.

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

3.1 **Field Water Quality Measurements**

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

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

3.2 **Volatile Organic Compounds**

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

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

3.3 **Semivolatile Organic Compounds**

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

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

3.4 **High Explosive Compounds**

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

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

3.5 **Nitrate Plus Nitrite**

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

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

3.6 **Anions and Alkalinity**

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

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

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

3.7 **Perchlorate**

SWMUs 8/58, Monitoring Wells CCBA-MW1 and CCBA-MW2. Perchlorate was not detected above the NMED-specified screening level/MDL of 4.0 micrograms per liter ($\mu\text{g/L}$) (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. Gross alpha activity is measured as a screening tool. The results for gamma spectroscopy, gross alpha/beta activity, and isotopic uranium are presented in Table IV-13.

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

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

3.12 **Sample Results Exceeding Maximum Contaminant Levels**

Table IV-14 lists the results for all constituents that have been detected at concentrations exceeding the EPA MCLs (EPA 2009) during the quarterly sampling events at SWMUs 8/58 and 68. The only constituent that is exceeding the MCLs in samples collected during this quarter is fluoride, detected in the CCBA-MW1 groundwater sample. Fluoride detected in the CCBA-MW1 sample is most likely from the mineralized fluorite-bearing unconsolidated alluvium and possible quartzite bedrock in which the well is completed and not associated with SNL/NM testing activities.

4.0 **Quality Control Samples**

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

4.1 **Field Quality Control Samples**

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

4.1.1 **Duplicate Groundwater Samples**

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

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

4.1.2 **Equipment Blank Samples**

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

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

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

4.1.3 **Trip Blank Samples**

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

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

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

4.1.4 **Field Blank Samples**

FB samples were collected for VOC analysis to assess whether contamination of the samples resulted from ambient field conditions.

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

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

4.2 **Laboratory Quality Control Samples**

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

All data are determined to be acceptable and reported QC measures are adequate, except for the americium-241 activity in the CCBA-MW2 groundwater sample. Americium-241 was qualified as unusable during data validation since the reported value was a negative with an absolute value greater than two times the associated MDA. Americium-241 was reported below the detection limit in the associated duplicate sample. No other significant data quality problems were noted. The data validation sample findings summary sheets are provided in Appendix C.

4.3 **Variances and Nonconformances**

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

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

5.0 **Summary**

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

Analytical parameters for monitoring wells CCBA-MW1 and CCBA-MW2 consist of VOCs, SVOCs, HE compounds, NPN, major anions, major cations, alkalinity, TAL metals plus uranium, perchlorate, total cyanide, radionuclides by gamma spectroscopy, gross alpha/beta activity, and isotopic uranium. No parameters were detected above established MCLs, except for fluoride in CCBA-MW1. Fluoride was detected above the established MCL of 4.0 mg/L in the monitoring well CCBA-MW1 groundwater sample at a concentration of 4.97 mg/L. This detection is similar to historical concentrations and is most likely attributable to the fluorite-bearing minerals in the unconsolidated alluvium and possible quartzite bedrock in which the well is completed (Skelly August 2013). Fluoride is not a site contaminant of concern and is not associated with SNL/NM testing activities.

Analytical parameters for monitoring wells OBS-MW1, OBS-MW2, and OBS-MW3 consist of VOCs, SVOCs, HE compounds, NPN, major anions, major cations, alkalinity, TAL metals plus uranium, hexavalent chromium, perchlorate, total cyanide, radionuclides by gamma spectroscopy, gross alpha/beta activity, and isotopic uranium. No parameters were detected above established MCLs in groundwater samples collected from SWMU 68 monitoring wells.

6.0 **References**

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Figures

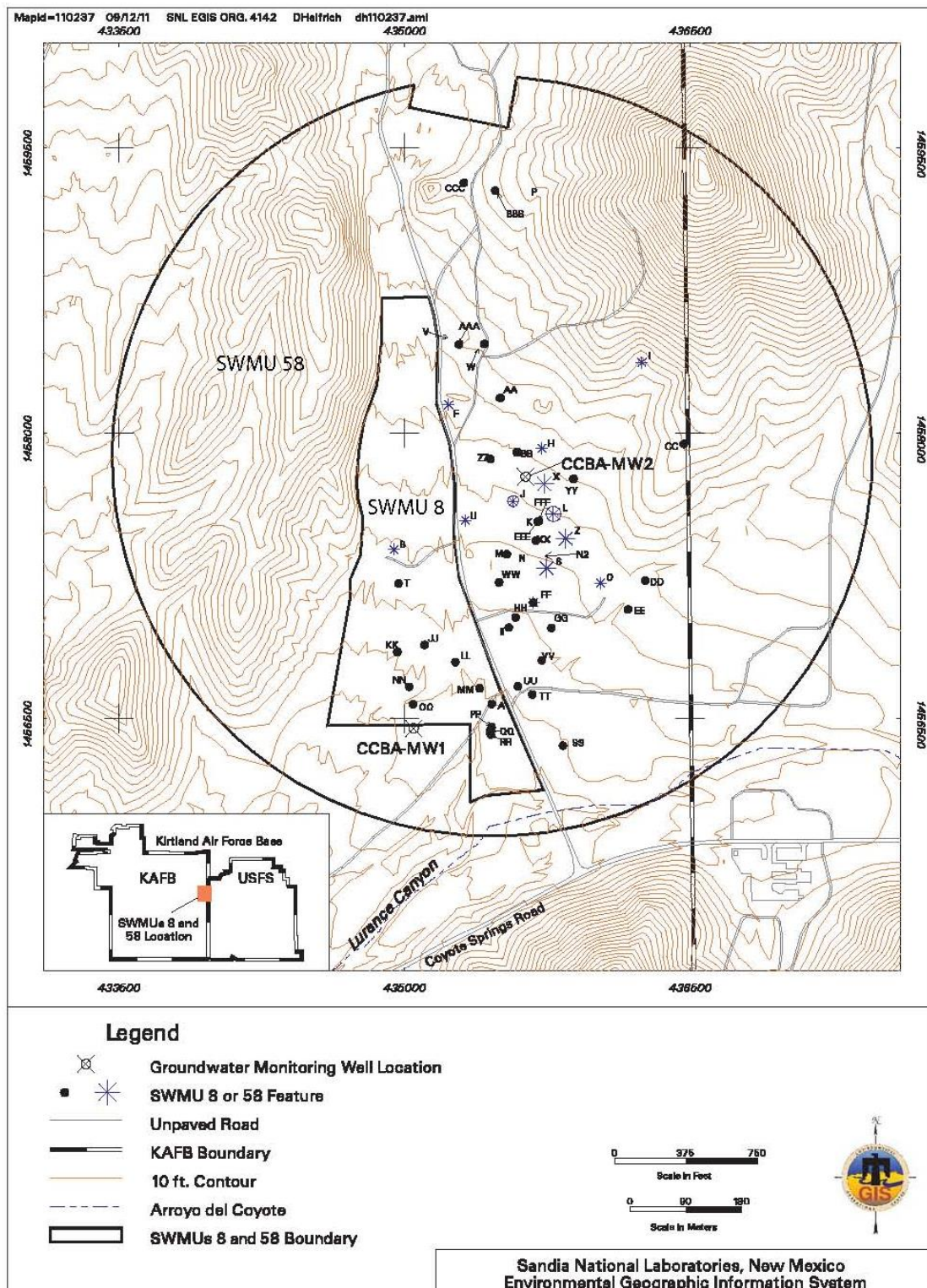


Figure IV-1

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

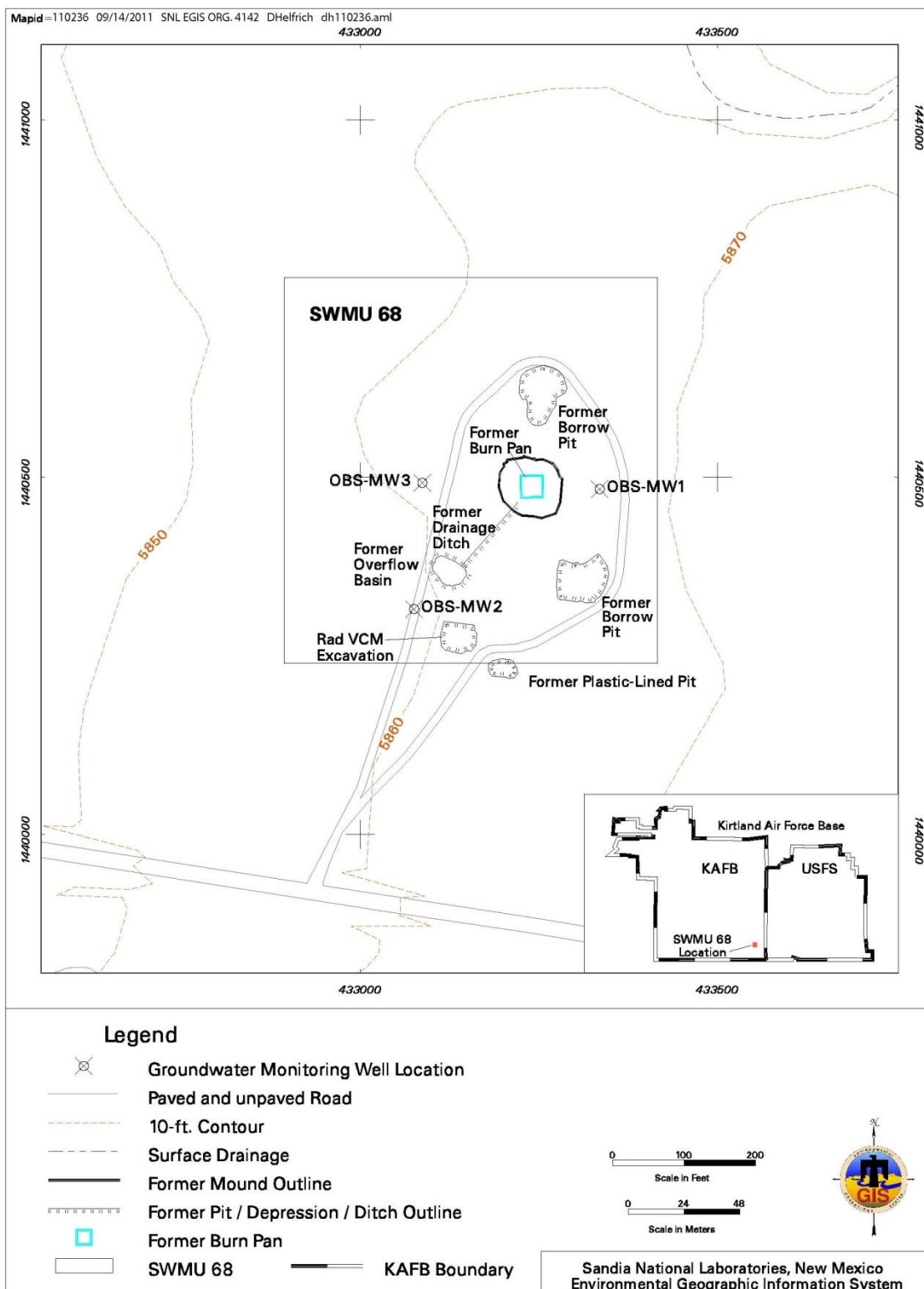


Figure IV-2

Location of Monitoring Wells OBS-MW1, OBS-MW2, and OBS-MW3 within SWMU 68

Tables

Table IV-1

Laboratory Analytical Methods, Container Types, and Preservation Requirements for SWMUs 8/58 and 68 Groundwater Samples

Analysis	Analytical Method^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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^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 Second Quarter, CY 2014 Groundwater Sampling
SWMUs 8/58 and 68 Groundwater Monitoring Quarterly Assessment
April – June 2014

Well	Sample Identification	AR/COC Number	Associated Groundwater Investigation
CCBA-MW1	095725	615424	SWMUs 8/58
CCBA-MW2	095730	615426	
CCBA-MW2 (duplicate)	095731		
OBS-MW1	095733	615427	SWMU 68
OBS-MW2	095736	615428	
OBS-MW3	095741	615430	
OBS-MW3 (duplicate)	095742		

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, April – June 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	07-Apr-14	15.68	452.5	194.3	6.70	1.19	32.4	3.21
CCBA-MW2	08-Apr-14	16.18	531.1	184.3	7.63	0.23	64.9	6.37
SWMU 68								
OBS-MW1	14-Apr-14	14.56	462.2	-199.9	7.54	0.31	36.4	3.71
OBS-MW2	15-Apr-14	16.14	464.0	189.7	7.52	0.19	36.2	3.55
OBS-MW3	16-Apr-14	16.7	471.0	197.7	7.56	0.24	46.6	4.52

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, April – June 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, April – June 2014

SWMU 8/58					
Analyte	MDL (µg/L)	Analytical Method ^a	Analyte	MDL (µg/L)	Analytical Method ^a
1'-Biphenyl 1	3.00 – 3.16	EPA 8270C	Butylbenzyl phthalate	3.00 – 3.16	EPA 8270C
1,2,4-Trichlorobenzene	3.00 – 3.16	EPA 8270C	Caprolactam	3.00 – 3.16	EPA 8270C
1,4-Dioxane	3.00 – 3.16	EPA 8270C	Carbazole	0.300 – 0.316	EPA 8270C
2,4,5-Trichlorophenol	3.00 – 3.16	EPA 8270C	Chrysene	0.300 – 0.316	EPA 8270C
2,4,6-Trichlorophenol	3.00 – 3.16	EPA 8270C	Di-n-butyl phthalate	3.00 – 3.16	EPA 8270C
2,4-Dichlorophenol	3.00 – 3.16	EPA 8270C	Di-n-octyl phthalate	3.00 – 3.16	EPA 8270C
2,4-Dimethylphenol	3.00 – 3.16	EPA 8270C	Dibenz[a,h]anthracene	0.300 – 0.316	EPA 8270C
2,4-Dinitrophenol	5.00 – 5.26	EPA 8270C	Dibenzofuran	3.00 – 3.16	EPA 8270C
2,4-Dinitrotoluene	3.00 – 3.16	EPA 8270C	Diethylphthalate	3.00 – 3.16	EPA 8270C
2,6-Dinitrotoluene	3.00 – 3.16	EPA 8270C	Dimethylphthalate	3.00 – 3.16	EPA 8270C
2-Chloronaphthalene	0.410 – 0.432	EPA 8270C	Dinitro-o-cresol	3.00 – 3.16	EPA 8270C
2-Chlorophenol	3.00 – 3.16	EPA 8270C	Diphenyl amine	3.00 – 3.16	EPA 8270C
2-Methylnaphthalene	0.300 – 0.316	EPA 8270C	Fluoranthene	0.300 – 0.316	EPA 8270C
2-Nitroaniline	3.00 – 3.16	EPA 8270C	Fluorene	0.300 – 0.316	EPA 8270C
2-Nitrophenol	3.00 – 3.16	EPA 8270C	Hexachlorobenzene	3.00 – 3.16	EPA 8270C
3,3'-Dichlorobenzidine	3.00 – 3.16	EPA 8270C	Hexachlorobutadiene	3.00 – 3.16	EPA 8270C
3-Nitroaniline	3.00 – 3.16	EPA 8270C	Hexachlorocyclopentadiene	3.00 – 3.16	EPA 8270C
4-Bromophenyl phenyl ether	3.00 – 3.16	EPA 8270C	Hexachloroethane	3.00 – 3.16	EPA 8270C
4-Chloro-3-methylphenol	3.00 – 3.16	EPA 8270C	Indeno(1,2,3-c,d)pyrene	0.300 – 0.316	EPA 8270C
4-Chlorobenzenamine	3.30 – 3.47	EPA 8270C	Isophorone	3.50 – 3.68	EPA 8270C
4-Chlorophenyl phenyl ether	3.00 – 3.16	EPA 8270C	Naphthalene	0.300 – 0.316	EPA 8270C
4-Nitroaniline	3.00 – 3.16	EPA 8270C	Nitrobenzene	3.00 – 3.16	EPA 8270C
4-Nitrophenol	3.00 – 3.16	EPA 8270C	Pentachlorophenol	3.00 – 3.16	EPA 8270C
Acenaphthene	0.300 – 0.316	EPA 8270C	Phenanthrene	0.300 – 0.316	EPA 8270C
Acenaphthylene	0.300 – 0.316	EPA 8270C	Phenol	3.00 – 3.16	EPA 8270C
Acetophenone	3.00 – 3.16	EPA 8270C	Pyrene	0.300 – 0.316	EPA 8270C
Anthracene	0.300 – 0.316	EPA 8270C	bis(2-Chloroethoxy)methane	3.00 – 3.16	EPA 8270C
Atrazine	3.00 – 3.16	EPA 8270C	bis(2-Chloroethyl)ether	3.00 – 3.16	EPA 8270C
Benzaldehyde	3.00 – 3.16	EPA 8270C	bis(2-Chloroisopropyl)ether	3.00 – 3.16	EPA 8270C
Benzo(a)anthracene	0.300 – 0.316	EPA 8270C	bis(2-Ethylhexyl)phthalate	3.00 – 3.16	EPA 8270C
Benzo(a)pyrene	0.300 – 0.316	EPA 8270C	m,p-Cresol	3.70 – 3.89	EPA 8270C
Benzo(b)fluoranthene	0.300 – 0.316	EPA 8270C	n-Nitrosodipropylamine	3.00 – 3.16	EPA 8270C
Benzo(ghi)perylene	0.300 – 0.316	EPA 8270C	o-Cresol	3.00 – 3.16	EPA 8270C
Benzo(k)fluoranthene	0.300 – 0.316	EPA 8270C			

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

SWMU 68					
Analyte	MDL (µg/L)	Analytical Method ^a	Analyte	MDL (µg/L)	Analytical Method ^a
1,1,1-Trichloroethane	0.300	EPA 8260B	Chlorobenzene	0.300	EPA 8260B
1,1,1,2-Tetrachloroethane	0.300	EPA 8260B	Chloroethane	0.300	EPA 8260B
1,1,2-Trichloroethane	0.300	EPA 8260B	Chloroform	0.300	EPA 8260B
1,1-Dichloroethane	0.300	EPA 8260B	Chloromethane	0.300	EPA 8260B
1,1-Dichloroethene	0.300	EPA 8260B	Cyclohexane	0.300	EPA 8260B
1,2,3-Trichlorobenzene	0.300	EPA 8260B	Dibromochloromethane	0.300	EPA 8260B
1,2,4-Trichlorobenzene	0.300	EPA 8260B	Dichlorodifluoromethane	0.300	EPA 8260B
1,2-Dibromo-3-chloropropane	0.300	EPA 8260B	Ethyl benzene	0.300	EPA 8260B
1,2-Dibromoethane	0.300	EPA 8260B	Isopropylbenzene	0.300	EPA 8260B
1,2-Dichlorobenzene	0.300	EPA 8260B	Methyl acetate	1.50	EPA 8260B
1,2-Dichloroethane	0.300	EPA 8260B	Methylcyclohexane	3.00	EPA 8260B
1,2-Dichloropropane	0.300	EPA 8260B	Methylene chloride	3.00	EPA 8260B
1,3-Dichlorobenzene	0.300	EPA 8260B	Styrene	0.300	EPA 8260B
1,4-Dichlorobenzene	0.300	EPA 8260B	Tert-butyl methyl ether	0.300	EPA 8260B
2,2-trifluoroethane, 1,1,2-Trichloro-1	1.50	EPA 8260B	Tetrachloroethene	0.300	EPA 8260B
2-Butanone	2.00	EPA 8260B	Toluene	0.300	EPA 8260B
2-Hexanone	2.20	EPA 8260B	Trichloroethene	0.300	EPA 8260B
4-methyl-, 2-Pentanone	1.50	EPA 8260B	Trichlorofluoromethane	0.300	EPA 8260B
Acetone	3.00	EPA 8260B	Vinyl chloride	0.300	EPA 8260B
Benzene	0.300	EPA 8260B	Xylene	0.300	EPA 8260B
Bromochloromethane	0.300	EPA 8260B	cis-1,2-Dichloroethene	0.300	EPA 8260B
Bromodichloromethane	0.300	EPA 8260B	cis-1,3-Dichloropropene	0.300	EPA 8260B
Bromoform	0.300	EPA 8260B	m-, p-Xylene	0.300	EPA 8260B
Bromomethane	0.300	EPA 8260B	o-Xylene	0.300	EPA 8260B
Carbon disulfide	1.50	EPA 8260B	trans-1,2-Dichloroethene	0.300	EPA 8260B
Carbon tetrachloride	0.300	EPA 8260B	trans-1,3-Dichloropropene	0.300	EPA 8260B

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

SWMU 68					
Analyte	MDL (µg/L)	Analytical Method ^a	Analyte	MDL (µg/L)	Analytical Method ^a
1'-Biphenyl 1	3.00 - 3.03	EPA 8270C	Butylbenzyl phthalate	3.00 - 3.03	EPA 8270C
1,2,4-Trichlorobenzene	3.00 - 3.03	EPA 8270C	Caprolactam	3.00 - 3.03	EPA 8270C
2,4,5-Trichlorophenol	3.00 - 3.03	EPA 8270C	Carbazole	0.300 - 0.303	EPA 8270C
1,4-Dioxane	3.00 - 3.03	EPA 8270C	Chrysene	0.300 - 0.303	EPA 8270C
2,4,6-Trichlorophenol	3.00 - 3.03	EPA 8270C	Di-n-butyl phthalate	3.00 - 3.03	EPA 8270C
2,4-Dichlorophenol	3.00 - 3.03	EPA 8270C	Di-n-octyl phthalate	3.00 - 3.03	EPA 8270C
2,4-Dimethylphenol	3.00 - 3.03	EPA 8270C	Dibenz[a,h]anthracene	0.300 - 0.303	EPA 8270C
2,4-Dinitrophenol	5.00 - 5.05	EPA 8270C	Dibenzofuran	3.00 - 3.03	EPA 8270C
2,4-Dinitrotoluene	3.00 - 3.03	EPA 8270C	Diethylphthalate	3.00 - 3.03	EPA 8270C
2,6-Dinitrotoluene	3.00 - 3.03	EPA 8270C	Dimethylphthalate	3.00 - 3.03	EPA 8270C
2-Chloronaphthalene	0.410 - 0.414	EPA 8270C	Dinitro-o-cresol	3.00 - 3.03	EPA 8270C
2-Chlorophenol	3.00 - 3.03	EPA 8270C	Diphenyl amine	3.00 - 3.03	EPA 8270C
2-Methylnaphthalene	0.300 - 0.303	EPA 8270C	Fluoranthene	0.300 - 0.303	EPA 8270C
2-Nitroaniline	3.00 - 3.03	EPA 8270C	Fluorene	0.300 - 0.303	EPA 8270C
2-Nitrophenol	3.00 - 3.03	EPA 8270C	Hexachlorobenzene	3.00 - 3.03	EPA 8270C
3,3'-Dichlorobenzidine	3.00 - 3.03	EPA 8270C	Hexachlorobutadiene	3.00 - 3.03	EPA 8270C
3-Nitroaniline	3.00 - 3.03	EPA 8270C	Hexachlorocyclopentadiene	3.00 - 3.03	EPA 8270C
4-Bromophenyl phenyl ether	3.00 - 3.03	EPA 8270C	Hexachloroethane	3.00 - 3.03	EPA 8270C
4-Chloro-3-methylphenol	3.00 - 3.03	EPA 8270C	Indeno(1,2,3-c,d)pyrene	0.300 - 0.303	EPA 8270C
4-Chlorobenzenamine	3.30 - 3.33	EPA 8270C	Isophorone	3.50 - 3.54	EPA 8270C
4-Chlorophenyl phenyl ether	3.00 - 3.03	EPA 8270C	Naphthalene	0.300 - 0.303	EPA 8270C
4-Nitroaniline	3.00 - 3.03	EPA 8270C	Nitro-benzene	3.00 - 3.03	EPA 8270C
4-Nitrophenol	3.00 - 3.03	EPA 8270C	Pentachlorophenol	3.00 - 3.03	EPA 8270C
Acenaphthene	0.300 - 0.303	EPA 8270C	Phenanthrene	0.300 - 0.303	EPA 8270C
Acenaphthylene	0.300 - 0.303	EPA 8270C	Phenol	3.00 - 3.03	EPA 8270C
Acetophenone	3.00 - 3.03	EPA 8270C	Pyrene	0.300 - 0.303	EPA 8270C
Anthracene	0.300 - 0.303	EPA 8270C	bis(2-Chloroethoxy)methane	3.00 - 3.03	EPA 8270C
Atrazine	3.00 - 3.03	EPA 8270C	bis(2-Chloroethyl)ether	3.00 - 3.03	EPA 8270C
Benzaldehyde	3.00 - 3.03	EPA 8270C	bis(2-Chloroisopropyl)ether	3.00 - 3.03	EPA 8270C
Benzo(a)anthracene	0.300 - 0.303	EPA 8270C	bis(2-Ethylhexyl)phthalate	3.00 - 3.03	EPA 8270C
Benzo(a)pyrene	0.300 - 0.303	EPA 8270C	m,p-Cresol	3.70 - 3.74	EPA 8270C
Benzo(b)fluoranthene	0.300 - 0.303	EPA 8270C	n-Nitrosodipropylamine	3.00 - 3.03	EPA 8270C
Benzo(ghi)perylene	0.300 - 0.303	EPA 8270C	o-Cresol	3.00 - 3.03	EPA 8270C
Benzo(k)fluoranthene	0.300 - 0.303	EPA 8270C			

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

Notes

^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, April – June 2014

Analyte	MDL (µg/L)	
	SWMUs 8/58	SWMU 68
1,3,5-Trinitrobenzene	0.0851 – 0.0870	0.0833 - 0.0860
1,3-Dinitrobenzene	0.0851 – 0.0870	0.0833 - 0.0860
2,4,6-Trinitrotoluene	0.0851 – 0.0870	0.0833 - 0.0860
2,4-Dinitrotoluene	0.0851 – 0.0870	0.0833 - 0.0860
2,6-Dinitrotoluene	0.0851 – 0.0870	0.0833 - 0.0860
2-Amino-4,6-dinitrotoluene	0.0851 – 0.0870	0.0833 - 0.0860
2-Nitrotoluene	0.0872 – 0.0891	0.0854 - 0.0882
3-Nitrotoluene	0.0851 – 0.0870	0.0833 - 0.0860
4-Amino-2,6-dinitrotoluene	0.0851 – 0.0870	0.0833 - 0.0860
4-Nitrotoluene	0.160 – 0.163	0.156 - 0.161
HMX	0.0851 – 0.0870	0.0833 - 0.0860
Nitrobenzene	0.0851 – 0.0870	0.0833 - 0.0860
Pentaerythritol tetranitrate	0.106 – 0.109	0.104 - 0.108
RDX	0.0851 – 0.0870	0.0833 - 0.0860
Tetryl	0.0851 – 0.0870	0.0833 - 0.0860

Notes

µg/L = 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, April – June 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 07-Apr-14	Nitrate plus nitrite	1.80	0.085	0.250	10.0			095725-018	EPA 353.2
CCBA-MW2 08-Apr-14	Nitrate plus nitrite	3.62	0.170	0.500	10.0			095730-018	EPA 353.2
CCBA-MW2 (Duplicate) 08-Apr-14	Nitrate plus nitrite	3.89	0.170	0.500	10.0			095731-018	EPA 353.2
SWMU 68									
OBS-MW1 14-Apr-14	Nitrate plus nitrite	1.91	0.085	0.250	10.0			095733-018	EPA 353.2
OBS-MW2 15-Apr-14	Nitrate plus nitrite	1.68	0.085	0.250	10.0			095736-018	EPA 353.2
OBS-MW3 16-Apr-14	Nitrate plus nitrite	1.92	0.170	0.500	10.0			095741-018	EPA 353.2
OBS-MW3 (Duplicate) 16-Apr-14	Nitrate plus nitrite	1.89	0.170	0.500	10.0			095742-018	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, April – June 2014

Notes (continued)

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

Table IV-7
Summary of Alkalinity, Anion, and Total Cyanide Results
SWMUs 8/58 and 68 Groundwater Monitoring
Quarterly Assessment, April – June 2014

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 07-Apr-14	Bicarbonate Alkalinity	181	0.725	1.00	NE			095725-022	SM 2320B
	Carbonate Alkalinity	ND	0.725	1.00	NE	U		095725-022	SM 2320B
	Bromide	0.334	0.067	0.200	NE			095725-016	EPA 9056
	Chloride	29.2	0.335	1.00	NE			095725-016	EPA 9056
	Fluoride	4.97	0.165	0.500	4.0			095725-016	EPA 9056
	Sulfate	58.0	0.665	2.00	NE			095725-016	EPA 9056
	Total Cyanide	ND	0.00167	0.005	0.200	U	UJ	095725-029	EPA 9012
CCBA-MW2 08-Apr-14	Bicarbonate Alkalinity	178	0.725	1.00	NE			095730-022	SM 2320B
	Carbonate Alkalinity	ND	0.725	1.00	NE	U		095730-022	SM 2320B
	Bromide	0.554	0.067	0.200	NE			095730-016	EPA 9056
	Chloride	38.6	0.670	2.00	NE			095730-016	EPA 9056
	Fluoride	1.59	0.033	0.100	4.0			095730-016	EPA 9056
	Sulfate	97.7	1.33	4.00	NE			095730-016	EPA 9056
	Total Cyanide	ND	0.00167	0.005	0.200	U	UJ	095730-029	EPA 9012
CCBA-MW2 (Duplicate) 08-Apr-14	Bicarbonate Alkalinity	178	0.725	1.00	NE			095731-022	SM 2320B
	Carbonate Alkalinity	ND	0.725	1.00	NE	U		095731-022	SM 2320B
	Bromide	0.569	0.067	0.200	NE			095731-016	EPA 9056
	Chloride	37.8	0.670	2.00	NE			095731-016	EPA 9056
	Fluoride	1.63	0.033	0.100	4.0			095731-016	EPA 9056
	Sulfate	95.8	1.33	4.00	NE			095731-016	EPA 9056
	Total Cyanide	ND	0.00167	0.005	0.200	U	UJ	095731-029	EPA 9012

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

Well	Analyte	Result (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 14-Apr-14	Bicarbonate Alkalinity	183	0.725	1.00	NE			095733-022	SM 2320B
	Carbonate Alkalinity	ND	0.725	1.00	NE	U		095733-022	SM 2320B
	Bromide	0.383	0.067	0.200	NE			095733-016	EPA 9056
	Chloride	24.3	0.670	2.00	NE			095733-016	EPA 9056
	Fluoride	2.24	0.033	0.100	4.00			095733-016	EPA 9056
	Sulfate	83.0	1.33	4.00	NE			095733-016	EPA 9056
	Total Cyanide	ND	0.00167	0.005	0.200	U		095733-029	EPA 9012
OBS-MW2 15-Apr-14	Bicarbonate Alkalinity	179	0.725	1.00	NE			095736-022	SM 2320B
	Carbonate Alkalinity	ND	0.725	1.00	NE	U		095736-022	SM 2320B
	Bromide	0.347	0.067	0.200	NE			095736-016	EPA 9056
	Chloride	23.0	0.670	2.00	NE			095736-016	EPA 9056
	Fluoride	2.36	0.033	0.100	4.00			095736-016	EPA 9056
	Sulfate	85.9	1.33	4.00	NE			095736-016	EPA 9056
	Total Cyanide	ND	0.00167	0.005	0.200	U		095736-029	EPA 9056
OBS-MW3 16-Apr-14	Bicarbonate Alkalinity	181	0.725	1.00	NE			095741-022	SM 2320B
	Carbonate Alkalinity	ND	0.725	1.00	NE	U		095741-022	SM 2320B
	Bromide	0.370	0.067	0.200	NE			095741-016	EPA 9056
	Chloride	23.6	0.670	2.00	NE			095741-016	EPA 9056
	Fluoride	2.39	0.033	0.100	4.00			095741-016	EPA 9056
	Sulfate	86.1	1.33	4.00	NE			095741-016	EPA 9056
	Total Cyanide	ND	0.00167	0.005	0.200	U		095741-029	EPA 9012
OBS-MW3 (Duplicate) 16-Apr-14	Bicarbonate Alkalinity	182	0.725	1.00	NE			095742-022	SM 2320B
	Carbonate Alkalinity	ND	0.725	1.00	NE	U		095742-022	SM 2320B
	Bromide	0.344	0.067	0.200	NE			095742-016	EPA 9056
	Chloride	23.9	0.670	2.00	NE			095742-016	EPA 9056
	Fluoride	2.39	0.033	0.100	4.00			095742-016	EPA 9056
	Sulfate	86.9	1.33	4.00	NE			095742-016	EPA 9056
	Total Cyanide	ND	0.00167	0.005	0.200	U		095742-029	EPA 9012

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

Notes

^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, April – June 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 07-Apr-14	ND	0.004	0.012	NE	U		095725-020	EPA 314.0
CCBA-MW2 08-Apr-14	ND	0.004	0.012	NE	U		095730-020	EPA 314.0
CCBA-MW2 (Duplicate) 08-Apr-14	ND	0.004	0.012	NE	U		095731-020	EPA 314.0
SWMU 68								
OBS-MW1 14-Apr-14	ND	0.004	0.012	NE	U		095733-020	EPA 314.0
OBS-MW2 15-Apr-14	ND	0.004	0.012	NE	U		095736-020	EPA 314.0
OBS-MW3 16-Apr-14	ND	0.004	0.012	NE	U		095741-020	EPA 314.0
OBS-MW3 (Duplicate) 16-Apr-14	ND	0.004	0.012	NE	U		095742-020	EPA 314.0

Notes

^a**Laboratory Qualifier**

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

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

^b**Validation Qualifier**

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

^c**Analytical Method**

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

Table IV-8 (Concluded)
Summary of Perchlorate Results
SWMUs 8/58 and 68 Groundwater Monitoring
Quarterly Assessment, April – June 2014

Notes (continued)

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

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

Well	Result (mg/L)	MDL (mg/L)	PQL (mg/L)	MCL (mg/L)	Laboratory Qualifier ^a	Validation Qualifier ^b	Sample Number	Analytical Method ^c
OBS-MW1 14-Apr-14	ND	0.003	0.010	NE	U		095733-014	EPA 7196A
OBS-MW2 15-Apr-14	ND	0.003	0.010	NE	U		095736-014	EPA 7196A
OBS-MW3 16-Apr-14	ND	0.003	0.010	NE	U		095741-014	EPA 7196A
OBS-MW3 (Duplicate) 16-Apr-14	ND	0.003	0.010	NE	U		095742-014	EPA 7196A

Notes

^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, April – June 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 07-Apr-14	Aluminum	0.0733	0.015	0.050	NE			095725-009	EPA 6020
	Antimony	ND	0.001	0.003	0.006	U		095725-009	EPA 6020
	Arsenic	0.00179	0.0017	0.005	0.010	J		095725-009	EPA 6020
	Barium	0.00242	0.0006	0.002	2.00			095725-009	EPA 6020
	Beryllium	0.000414	0.0002	0.0005	0.004	J		095725-009	EPA 6020
	Cadmium	ND	0.00011	0.001	0.005	U		095725-009	EPA 6020
	Calcium	48.5	0.060	0.200	NE			095725-009	EPA 6020
	Chromium	ND	0.002	0.010	0.100	U		095725-009	EPA 6020
	Cobalt	0.000158	0.0001	0.001	NE	J		095725-009	EPA 6020
	Copper	0.000442	0.00035	0.001	NE	J		095725-009	EPA 6020
	Iron	0.147	0.033	0.100	NE			095725-009	EPA 6020
	Lead	ND	0.0005	0.002	NE	U		095725-009	EPA 6020
	Magnesium	9.57	0.010	0.030	NE		J	095725-009	EPA 6020
	Manganese	0.0044	0.001	0.005	NE	J		095725-009	EPA 6020
	Mercury	ND	0.000067	0.0002	0.002	U		095725-009	EPA 7470
	Nickel	0.00165	0.0005	0.002	NE	J		095725-009	EPA 6020
	Potassium	4.35	0.080	0.300	NE		J	095725-009	EPA 6020
	Selenium	0.00227	0.0015	0.005	0.050	J		095725-009	EPA 6020
	Silver	ND	0.0002	0.001	NE	U		095725-009	EPA 6020
	Sodium	65.4	0.400	1.25	NE			095725-009	EPA 6020
	Thallium	ND	0.00045	0.002	0.002	U		095725-009	EPA 6020
	Uranium	0.00236	0.000067	0.0002	0.03			095725-009	EPA 6020
	Vanadium	ND	0.001	0.005	NE	U		095725-009	EPA 6010
	Zinc	ND	0.0035	0.010	NE	U		095725-009	EPA 6020

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

Well	Analyte	Result (mg/L)	MDL (mg/L)	PQL (mg/L)	MCL (mg/L)	Laboratory Qualifier ^a	Validation Qualifier ^b	Sample Number	Analytical Method ^c
CCBA-MW2 08-Apr-14	Aluminum	ND	0.015	0.050	NE	U		095730-009	EPA 6020
	Antimony	ND	0.001	0.003	0.006	U		095730-009	EPA 6020
	Arsenic	ND	0.0017	0.005	0.010	U		095730-009	EPA 6020
	Barium	0.0429	0.0006	0.002	2.00			095730-009	EPA 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		095730-009	EPA 6020
	Cadmium	ND	0.00011	0.001	0.005	U		095730-009	EPA 6020
	Calcium	80.1	0.300	1.00	NE			095730-009	EPA 6020
	Chromium	ND	0.002	0.010	0.100	U		095730-009	EPA 6020
	Cobalt	ND	0.0001	0.001	NE	U		095730-009	EPA 6020
	Copper	0.000586	0.00035	0.001	NE	J	0.0038U	095730-009	EPA 6020
	Iron	0.132	0.033	0.100	NE			095730-009	EPA 6020
	Lead	ND	0.0005	0.002	NE	U		095730-009	EPA 6020
	Magnesium	14.1	0.010	0.030	NE		J	095730-009	EPA 6020
	Manganese	ND	0.001	0.005	NE	U		095730-009	EPA 6020
	Mercury	ND	0.000067	0.0002	0.002	U		095730-009	EPA 7470
	Nickel	0.00156	0.0005	0.002	NE	J		095730-009	EPA 6020
	Potassium	1.19	0.080	0.300	NE		J	095730-009	EPA 6020
	Selenium	0.00409	0.0015	0.005	0.050	J		095730-009	EPA 6020
	Silver	ND	0.0002	0.001	NE	U		095730-009	EPA 6020
	Sodium	46.1	0.080	0.250	NE			095730-009	EPA 6020
	Thallium	ND	0.00045	0.002	0.002	U		095730-009	EPA 6020
	Uranium	0.00534	0.000067	0.0002	0.03			095730-009	EPA 6020
	Vanadium	0.00997	0.001	0.005	NE			095730-009	EPA 6010
	Zinc	ND	0.0035	0.010	NE	U		095730-009	EPA 6020

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

Well	Analyte	Result (mg/L)	MDL (mg/L)	PQL (mg/L)	MCL (mg/L)	Laboratory Qualifier ^a	Validation Qualifier ^b	Sample Number	Analytical Method ^c
CCBA-MW2 (Duplicate) 08-Apr-14	Aluminum	ND	0.015	0.050	NE	U		095731-009	EPA 6020
	Antimony	ND	0.001	0.003	0.006	U		095731-009	EPA 6020
	Arsenic	ND	0.0017	0.005	0.010	U		095731-009	EPA 6020
	Barium	0.0435	0.0006	0.002	2.00			095731-009	EPA 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		095731-009	EPA 6020
	Cadmium	ND	0.00011	0.001	0.005	U		095731-009	EPA 6020
	Calcium	75.5	0.300	1.00	NE			095731-009	EPA 6020
	Chromium	ND	0.002	0.010	0.100	U		095731-009	EPA 6020
	Cobalt	ND	0.0001	0.001	NE	U		095731-009	EPA 6020
	Copper	0.000483	0.00035	0.001	NE	J	0.0038U	095731-009	EPA 6020
	Iron	0.130	0.033	0.100	NE			095731-009	EPA 6020
	Lead	ND	0.0005	0.002	NE	U		095731-009	EPA 6020
	Magnesium	14.7	0.010	0.030	NE		J	095731-009	EPA 6020
	Manganese	ND	0.001	0.005	NE	U		095731-009	EPA 6020
	Mercury	ND	0.000067	0.0002	0.002	U		095731-009	EPA 7470
	Nickel	0.00169	0.0005	0.002	NE	J		095731-009	EPA 6020
	Potassium	1.22	0.080	0.300	NE		J	095731-009	EPA 6020
	Selenium	0.00414	0.0015	0.005	0.050	J		095731-009	EPA 6020
	Silver	ND	0.0002	0.001	NE	U		095731-009	EPA 6020
	Sodium	43.1	0.080	0.250	NE			095731-009	EPA 6020
	Thallium	ND	0.00045	0.002	0.002	U		095731-009	EPA 6020
	Uranium	0.00535	0.000067	0.0002	0.03			095731-009	EPA 6020
	Vanadium	0.00977	0.001	0.005	NE			095731-009	EPA 6010
	Zinc	ND	0.0035	0.010	NE	U		095731-009	EPA 6020

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

Notes

^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 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, April – June 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 14-Apr-14	Aluminum	ND	0.015	0.050	NE	U		095733-009	EPA 6020
	Antimony	ND	0.001	0.003	0.006	U		095733-009	EPA 6020
	Arsenic	ND	0.0017	0.005	0.010	U		095733-009	EPA 6020
	Barium	0.0178	0.0006	0.002	2.00			095733-009	EPA 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		095733-009	EPA 6020
	Cadmium	ND	0.00011	0.001	0.005	U		095733-009	EPA 6020
	Calcium	83.4	0.300	1.00	NE			095733-009	EPA 6020
	Chromium	ND	0.002	0.010	0.100	U		095733-009	EPA 6020
	Cobalt	0.000108	0.0001	0.001	NE	J		095733-009	EPA 6020
	Copper	0.000853	0.00035	0.001	NE	J		095733-009	EPA 6020
	Iron	0.170	0.033	0.100	NE			095733-009	EPA 6020
	Lead	ND	0.0005	0.002	NE	U		095733-009	EPA 6020
	Magnesium	17.0	0.010	0.030	NE			095733-009	EPA 6020
	Manganese	0.00101	0.001	0.005	NE	J		095733-009	EPA 6020
	Mercury	ND	0.000067	0.0002	0.002	U		095733-009	EPA 7470
	Nickel	0.00178	0.0005	0.002	NE	J		095733-009	EPA 6020
	Potassium	1.71	0.080	0.300	NE			095733-009	EPA 6020
	Selenium	0.00315	0.0015	0.005	0.050	J		095733-009	EPA 6020
	Silver	ND	0.0002	0.001	NE	U		095733-009	EPA 6020
	Sodium	21.6	0.080	0.250	NE			095733-009	EPA 6020
	Thallium	ND	0.00045	0.002	0.002	U		095733-009	EPA 6020
	Uranium	0.0107	0.000067	0.0002	0.03			095733-009	EPA 6020
	Vanadium	ND	0.001	0.005	NE	U		095733-009	EPA 6010
	Zinc	ND	0.0035	0.010	NE	U		095733-009	EPA 6020

Table IV-11 (Continued)
Summary of Unfiltered Total Metal Results
SWMU 68 Groundwater Monitoring
Quarterly Assessment, April – June 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 15-Apr-14	Aluminum	ND	0.015	0.050	NE	U		095736-009	EPA 6020
	Antimony	ND	0.001	0.003	0.006	U		095736-009	EPA 6020
	Arsenic	ND	0.0017	0.005	0.010	U		095736-009	EPA 6020
	Barium	0.0191	0.0006	0.002	2.00			095736-009	EPA 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		095736-009	EPA 6020
	Cadmium	ND	0.00011	0.001	0.005	U		095736-009	EPA 6020
	Calcium	78.2	0.300	1.00	NE			095736-009	EPA 6020
	Chromium	ND	0.002	0.010	0.100	U		095736-009	EPA 6020
	Cobalt	ND	0.0001	0.001	NE	U		095736-009	EPA 6020
	Copper	0.000351	0.00035	0.001	NE	J		095736-009	EPA 6020
	Iron	0.161	0.033	0.100	NE			095736-009	EPA 6020
	Lead	ND	0.0005	0.002	NE	U		095736-009	EPA 6020
	Magnesium	16.4	0.010	0.030	NE			095736-009	EPA 6020
	Manganese	ND	0.001	0.005	NE	U		095736-009	EPA 6020
	Mercury	ND	0.000067	0.0002	0.002	U		095736-009	EPA 7470
	Nickel	0.00162	0.0005	0.002	NE	J		095736-009	EPA 6020
	Potassium	1.65	0.080	0.300	NE			095736-009	EPA 6020
	Selenium	0.0031	0.0015	0.005	0.050	J		095736-009	EPA 6020
	Silver	ND	0.0002	0.001	NE	U		095736-009	EPA 6020
	Sodium	22.2	0.080	0.250	NE			095736-009	EPA 6020
	Thallium	ND	0.00045	0.002	0.002	U		095736-009	EPA 6020
	Uranium	0.0141	0.000067	0.0002	0.03			095736-009	EPA 6020
	Vanadium	ND	0.001	0.005	NE	U		095736-009	EPA 6010
	Zinc	ND	0.0035	0.010	NE	U		095736-009	EPA 6020

Table IV-11 (Continued)
Summary of Unfiltered Total Metal Results
SWMU 68 Groundwater Monitoring
Quarterly Assessment, April – June 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 16-Apr-14	Aluminum	ND	0.015	0.050	NE	U		095741-009	EPA 6020
	Antimony	ND	0.001	0.003	0.006	U		095741-009	EPA 6020
	Arsenic	ND	0.0017	0.005	0.010	U		095741-009	EPA 6020
	Barium	0.0265	0.0006	0.002	2.00			095741-009	EPA 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		095741-009	EPA 6020
	Cadmium	ND	0.00011	0.001	0.005	U		095741-009	EPA 6020
	Calcium	76.9	0.300	1.00	NE			095741-009	EPA 6020
	Chromium	ND	0.002	0.010	0.100	U		095741-009	EPA 6020
	Cobalt	ND	0.0001	0.001	NE	U		095741-009	EPA 6020
	Copper	0.000375	0.00035	0.001	NE	J	0.0029U	095741-009	EPA 6020
	Iron	0.156	0.033	0.100	NE			095741-009	EPA 6020
	Lead	ND	0.0005	0.002	NE	U		095741-009	EPA 6020
	Magnesium	15.5	0.010	0.030	NE			095741-009	EPA 6020
	Manganese	ND	0.001	0.005	NE	U		095741-009	EPA 6020
	Mercury	ND	0.000067	0.0002	0.002	U		095741-009	EPA 7470
	Nickel	0.00164	0.0005	0.002	NE	J		095741-009	EPA 6020
	Potassium	1.71	0.080	0.300	NE			095741-009	EPA 6020
	Selenium	0.00316	0.0015	0.005	0.050	J		095741-009	EPA 6020
	Silver	ND	0.0002	0.001	NE	U		095741-009	EPA 6020
	Sodium	21.5	0.080	0.250	NE			095741-009	EPA 6020
	Thallium	ND	0.00045	0.002	0.002	U		095741-009	EPA 6020
	Uranium	0.0129	0.000067	0.0002	0.03			095741-009	EPA 6020
	Vanadium	ND	0.001	0.005	NE	U		095741-009	EPA 6010
	Zinc	ND	0.0035	0.010	NE	U		095741-009	EPA 6020

Table IV-11 (Continued)
Summary of Unfiltered Total Metal Results
SWMU 68 Groundwater Monitoring
Quarterly Assessment, April – June 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 (Duplicate) 16-Apr-14	Aluminum	ND	0.015	0.050	NE	U		095742-009	EPA 6020
	Antimony	ND	0.001	0.003	0.006	U		095742-009	EPA 6020
	Arsenic	ND	0.0017	0.005	0.010	U		095742-009	EPA 6020
	Barium	0.0264	0.0006	0.002	2.00			095742-009	EPA 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		095742-009	EPA 6020
	Cadmium	ND	0.00011	0.001	0.005	U		095742-009	EPA 6020
	Calcium	75.2	0.300	1.00	NE			095742-009	EPA 6020
	Chromium	ND	0.002	0.010	0.100	U		095742-009	EPA 6020
	Cobalt	ND	0.0001	0.001	NE	U		095742-009	EPA 6020
	Copper	0.000384	0.00035	0.001	NE	J	0.0029U	095742-009	EPA 6020
	Iron	0.157	0.033	0.100	NE			095742-009	EPA 6020
	Lead	ND	0.0005	0.002	NE	U		095742-009	EPA 6020
	Magnesium	16.8	0.010	0.030	NE			095742-009	EPA 6020
	Manganese	ND	0.001	0.005	NE	U		095742-009	EPA 6020
	Mercury	ND	0.000067	0.0002	0.002	U		095742-009	EPA 7470
	Nickel	0.00157	0.0005	0.002	NE	J		095742-009	EPA 6020
	Potassium	1.67	0.080	0.300	NE			095742-009	EPA 6020
	Selenium	0.00334	0.0015	0.005	0.050	J		095742-009	EPA 6020
	Silver	ND	0.0002	0.001	NE	U		095742-009	EPA 6020
	Sodium	22.3	0.080	0.250	NE			095742-009	EPA 6020
	Thallium	ND	0.00045	0.002	0.002	U		095742-009	EPA 6020
	Uranium	0.0129	0.000067	0.0002	0.03			095742-009	EPA 6020
	Vanadium	ND	0.001	0.005	NE	U		095742-009	EPA 6010
	Zinc	ND	0.0035	0.010	NE	U		095742-009	EPA 6020

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

Notes

^aLaboratory Qualifier

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

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

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

^bValidation Qualifier

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

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

^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, April – June 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 07-Apr-14	Calcium	48.2	0.060	0.200	NE			095725-017	EPA 6020
	Magnesium	10.5	0.050	0.150	NE			095725-017	EPA 6020
	Potassium	4.34	0.080	0.300	NE	N		095725-017	EPA 6020
	Sodium	61.1	0.400	1.25	NE			095725-017	EPA 6020
CCBA-MW2 08-Apr-14	Calcium	75.5	0.300	1.00	NE			095730-017	EPA 6020
	Magnesium	15.5	0.050	0.150	NE			095730-017	EPA 6020
	Potassium	1.22	0.080	0.300	NE	N		095730-017	EPA 6020
	Sodium	48.2	0.080	0.250	NE			095730-017	EPA 6020
CCBA-MW2 (Duplicate) 08-Apr-14	Calcium	78.4	0.300	1.00	NE			095731-017	EPA 6020
	Magnesium	16.5	0.050	0.150	NE			095731-017	EPA 6020
	Potassium	1.29	0.080	0.300	NE	N		095731-017	EPA 6020
	Sodium	49.2	0.080	0.250	NE			095731-017	EPA 6020
SWMU 68									
OBS-MW1 14-Apr-14	Calcium	78.2	0.300	1.00	NE			095733-017	EPA 6020
	Magnesium	16.3	0.010	0.030	NE			095733-017	EPA 6020
	Potassium	1.89	0.080	0.300	NE			095733-017	EPA 6020
	Sodium	21.5	0.080	0.250	NE			095733-017	EPA 6020
OBS-MW2 15-Apr-14	Calcium	77.5	0.300	1.00	NE			095736-017	EPA 6020
	Magnesium	15.0	0.010	0.030	NE			095736-017	EPA 6020
	Potassium	1.82	0.080	0.300	NE			095736-017	EPA 6020
	Sodium	21.5	0.080	0.250	NE			095736-017	EPA 6020
OBS-MW3 16-Apr-14	Calcium	76.9	0.300	1.00	NE			095741-017	EPA 6020
	Magnesium	16.2	0.010	0.030	NE			095741-017	EPA 6020
	Potassium	1.82	0.080	0.300	NE			095741-017	EPA 6020
	Sodium	21.3	0.080	0.250	NE			095741-017	EPA 6020
OBS-MW3 (Duplicate) 16-Apr-14	Calcium	80.7	0.300	1.00	NE			095742-017	EPA 6020
	Magnesium	16.1	0.010	0.030	NE			095742-017	EPA 6020
	Potassium	1.91	0.080	0.300	NE			095742-017	EPA 6020
	Sodium	22.6	0.080	0.250	NE			095742-017	EPA 6020

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

Notes

^aLaboratory Qualifier

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

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

^bValidation Qualifier

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

^cAnalytical Method

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

CCBA = Coyote Canyon Blast Area.

EPA = U.S. Environmental Protection Agency.

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

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

mg/L = Milligrams per liter.

MW = Monitoring Well.

NE = Not established.

OBS = Old Burn Site.

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

SWMU = Solid Waste Management Unit.

Table IV-13

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

SWMUs 8/58 and 68 Groundwater Monitoring

Quarterly Assessment, April – June 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 07-Apr-14	Americium-241	7.72 ± 15.7	24.5	12.0	NE	U	BD	095725-033	EPA 901.1
	Cesium-137	2.57 ± 2.51	3.52	1.70	NE	U	BD	095725-033	EPA 901.1
	Cobalt-60	-1.22 ± 2.11	3.54	1.68	NE	U	BD	095725-033	EPA 901.1
	Potassium-40	-6.16 ± 36.7	51.3	24.7	NE	U	BD	095725-033	EPA 901.1
	Gross Alpha	3.48	NA	NA	15 pCi/L	NA	None	095725-034	EPA 900.0
	Gross Beta	5.06 ± 1.12	1.01	0.488	4mrem/yr		J	095725-034	EPA 900.0
CCBA-MW2 08-Apr-14	Americium-241	-57.8 ± 27.4	8.01	3.95	NE	U	R	095730-033	EPA 901.1
	Cesium-137	-2.73 ± 3.65	4.80	2.32	NE	U	BD	095730-033	EPA 901.1
	Cobalt-60	0.494 ± 2.99	5.25	2.50	NE	U	BD	095730-033	EPA 901.1
	Potassium-40	-18.5 ± 52.6	59.1	28.3	NE	U	BD	095730-033	EPA 901.1
	Gross Alpha	4.55	NA	NA	15 pCi/L	NA	None	095730-034	EPA 900.0
	Gross Beta	3.17 ± 0.927	0.992	0.468	4mrem/yr			095730-034	EPA 900.0
CCBA-MW2 (Duplicate) 08-Apr-14	Americium-241	0.491 ± 18.4	29.4	14.4	NE	U	BD	095731-033	EPA 901.1
	Cesium-137	-0.13 ± 2.43	3.69	1.77	NE	U	BD	095731-033	EPA 901.1
	Cobalt-60	0.956 ± 2.48	4.40	2.08	NE	U	BD	095731-033	EPA 901.1
	Potassium-40	-37.7 ± 46.9	49.5	23.5	NE	U	BD	095731-033	EPA 901.1
	Gross Alpha	8.82	NA	NA	15 pCi/L	NA	None	095731-034	EPA 900.0
	Gross Beta	2.60 ± 0.882	0.993	0.464	4mrem/yr		J	095731-034	EPA 900.0

Table IV-13 (Continued)
Summary of Gamma Spectroscopy, Gross Alpha, Gross Beta, and Isotopic Uranium Results
SWMUs 8/58 and 68 Groundwater Monitoring
Quarterly Assessment, April – June 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 14-Apr-14	Americium-241	14.7 ± 11.2	14.8	4.77	NE	U	BD	095733-033	EPA 901.1
	Cesium-137	-2.74 ± 4.03	5.38	2.61	NE	U	BD	095733-033	EPA 901.1
	Cobalt-60	0.336 ± 3.31	5.78	2.76	NE	U	BD	095733-033	EPA 901.1
	Potassium-40	23.8 ± 60.1	71.8	34.6	NE	U	BD	095733-033	EPA 901.1
	Gross Alpha	-2.77	NA	NA	15 pCi/L	NA	None	095733-034	EPA 900.0
	Gross Beta	1.52 ± 0.931	0.954	0.453	4 mrem/yr		J	095733-034	EPA 900.0
	Uranium-233/234	16.9 ± 2.19	0.0959	0.0415	NE			095733-035	HASL-300
	Uranium-235/236	0.366 ± 0.105	0.0686	0.0263	NE			095733-035	HASL-300
	Uranium-238	3.50 ± 0.507	0.0796	0.0333	NE			095733-035	HASL-300
OBS-MW2 15-Apr-14	Americium-241	1.54 ± 12.9	22.2	10.9	NE	U	BD	095736-033	EPA 901.1
	Cesium-137	0.653 ± 3.89	5.93	2.86	NE	U	BD	095736-033	EPA 901.1
	Cobalt-60	-0.197 ± 4.24	6.39	3.02	NE	U	BD	095736-033	EPA 901.1
	Potassium-40	-42.4 ± 55.5	72.8	34.6	NE	U	BD	095736-033	EPA 901.1
	Gross Alpha	13.74	NA	NA	15 pCi/L	NA	None	095736-034	EPA 900.0
	Gross Beta	6.05 ± 1.41	1.14	0.546	4 mrem/yr		J	095736-034	EPA 900.0
	Uranium-233/234	21.3 ± 2.63	0.0487	0.0211	NE			095736-035	HASL-300
	Uranium-235/236	0.381 ± 0.0813	0.0349	0.0134	NE			095736-035	HASL-300
	Uranium-238	4.28 ± 0.558	0.0404	0.0169	NE			095736-035	HASL-300
OBS-MW3 16-Apr-14	Americium-241	-1.77 ± 19.5	29.2	14.3	NE	U	BD	095741-033	EPA 901.1
	Cesium-137	1.22 ± 2.91	4.35	2.10	NE	U	BD	095741-033	EPA 901.1
	Cobalt-60	0.0547 ± 2.69	4.68	2.23	NE	U	BD	095741-033	EPA 901.1
	Potassium-40	13.2 ± 46.5	59.1	28.4	NE	U	BD	095741-033	EPA 901.1
	Gross Alpha	10.16	NA	NA	15 pCi/L	NA	None	095741-034	EPA 900.0
	Gross Beta	4.07 ± 1.33	0.986	0.469	4 mrem/yr		J	095741-034	EPA 900.0
	Uranium-233/234	20.5 ± 2.56	0.0549	0.0237	NE			095741-035	HASL-300
	Uranium-235/236	0.371 ± 0.0841	0.0393	0.0151	NE			095741-035	HASL-300
	Uranium-238	4.07 ± 0.541	0.0455	0.0191	NE			095741-035	HASL-300

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

Well	Analyte	Activity ^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 (Duplicate) 16-Apr-14	Americium-241	6.06 ± 15.1	24.2	11.9	NE	U	BD	095742-033	EPA 901.1
	Cesium-137	-0.369 ± 2.37	3.45	1.66	NE	U	BD	095742-033	EPA 901.1
	Cobalt-60	-0.252 ± 2.62	4.01	1.91	NE	U	BD	095742-033	EPA 901.1
	Potassium-40	-40 ± 39.4	45.4	21.7	NE	U	BD	095742-033	EPA 901.1
	Gross Alpha	7.03	NA	NA	15 pCi/L	NA	None	095742-034	EPA 900.0
	Gross Beta	5.16 ± 1.29	1.32	0.639	4 mrem/yr		J	095742-034	EPA 900.0
	Uranium-233/234	20.7 ± 2.62	0.0607	0.0263	NE			095742-035	HASL-300
	Uranium-235/236	0.355 ± 0.0858	0.0434	0.0167	NE			095742-035	HASL-300
	Uranium-238	4.02 ± 0.545	0.0504	0.0211	NE			095742-035	HASL-300

Notes

^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.

R = The data are unusable, and resampling or reanalysis are necessary for verification.

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, April – June 2014

Notes (continued)

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

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

Well	Date	Analyte	Result	MCL	Laboratory Qualifier ^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
CCBA-MW1	07-Apr-14	Fluoride	4.97 mg/L	4.0 mg/L			095725-016	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 June 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, April – June 2014

Well/Parameter	Environmental Sample (R1)	Duplicate Sample (R2)	RPD ^a
	mg/L unless otherwise noted		
CCBA-MW1			
Nitrate plus Nitrite	3.62	3.89	7
Bicarbonate Alkalinity	178	178	< 1
Bromide	0.554	0.569	3
Chloride	38.6	37.8	2
Fluoride	1.59	1.63	2
Sulfate	97.7	95.8	2
Barium	0.0429	0.0435	1
Calcium	80.1	75.5	6
Iron	0.132	0.130	2
Magnesium	14.1	14.7	4
Nickel	0.00156	0.00169	8
Potassium	1.19	1.22	2
Selenium	0.00409	0.00414	1
Sodium	46.1	43.1	7
Uranium	0.00534	0.00535	< 1
Vanadium	0.00997	0.00977	2
Filtered Calcium	75.5	78.4	4
Filtered Magnesium	15.5	16.5	6
Filtered Potassium	1.22	1.29	6
Filtered Sodium	48.2	49.2	2
OBS-MW1			
Nitrate plus Nitrite	1.92	1.89	2
Bicarbonate Alkalinity	181	182	1
Bromide	0.370	0.344	7
Chloride	23.6	23.9	1
Fluoride	2.39	2.39	< 1
Sulfate	86.1	86.9	1
Barium	0.0265	0.0264	< 1
Calcium	76.9	75.2	2
Iron	0.156	0.157	1
Magnesium	15.5	16.8	8
Nickel	0.00164	0.00157	4
Potassium	1.71	1.67	2
Selenium	0.00316	0.00334	6

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

Well/Parameter	Environmental Sample (R1)	Duplicate Sample (R2)	RPD ^a
	mg/L unless otherwise noted		
OBS-MW1			
Sodium	21.5	22.3	4
Uranium	0.0129	0.0129	< 1
Filtered Calcium	76.9	80.7	5
Filtered Magnesium	16.2	16.1	1
Filtered Potassium	1.82	1.91	5
Filtered Sodium	21.3	22.6	6

Notes

^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

Project Name: SWMU 8/58	Project No.: 146422.10.11.01
Well I.D.: CCBA-MW 2	Date: 04/08/14
Well Condition:	Weather Condition:
Method: Portable pump <input checked="" type="checkbox"/> Dedicated pump <input type="checkbox"/> Pump depth: 117'	

[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: 4/7/14		
Make & Model: YSI EXO1					
YSI 6820 Sonde (S/N) with DO, Ec, pH, ORP, and temperature probes: 13C101167					
YSI 650 MDS (S/N): NA					
pH Calibration					
pH Calibrated to (std): 7.00			pH sloped to (std): 10.00		
Reference value:	4.00		7.00		10.00
	Value	Temp	Value	Temp	Value Temp
1. Time:	0701	4.01	16.0	7.00	16.0 10.00 16.1
2. Time:	1107	4.02	16.7	7.00	16.7 10.01 16.7
3. Time:					
4. Time:					
Standard lot no.:	3AD782		3AE725		3AD357
Expiration date:	4/15		5/15		4/15
SC Calibration					
Reference Value: 1225 uS			Standard Lot No.: 3AE221		
	Value	Temp	Expiration Date: 5/15		
1. Time:	0703	1225	16.5		
2. Time:	1109	1224	16.7		
3. Time:					
4. Time:					
ORP Calibration					
Reference Value: 220 mV			Standard Lot No. 4AA010		
	Value	Temp	Expiration Date: 7/14		
1. Time:	0702	220.0	16.1		
2. Time:	1108	200.1	16.4		
3. Time:					
4. Time:					
DO Calibration					
Calibration Value:	81% air saturation @ 5200 ft.		Atmospheric Pressure in Hg		
1. Time:	0658	81.6	24.37		
2. Time:	1106	81.5	24.39		
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 Lynvh		Date: 4/7/14		
TURBIDIMETER				
Make & Model: HACH 2100P HACH 2100Q		Serial No. S/N 10060C003010		
Reference Value	25 ± 10	20	100	800
Standard Lot No.	0161	0167	0168	0161
1. Time 0812	10.3	19.8	102	794
2. Time 0950	10.1	19.6	104	797
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: 4/8/14		
Make & Model: YSI EXO1					
YSI 6820 Sonde (S/N) with DO, Ec, pH, ORP, and temperature probes: 13C101167					
YSI 650 MDS (S/N): NA					
pH Calibration					
pH Calibrated to (std): 7.00			pH sloped to (std): 10.00		
Reference value:	4.00		7.00		10.00
	Value	Temp	Value	Temp	Value Temp
1. Time: 0634	4.01	17.8	7.00	17.8	10.00 17.8
2. Time: 1052	4.03	18.1	7.00	18.1	9.99 18.1
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: 0636	1224	17.8			
2. Time: 1054	1227	18.0			
3. Time:					
4. Time:					
ORP Calibration					
Reference Value: 220 mV			Standard Lot No. 4AA010		
	Value	Temp	Expiration Date: 7/14		
1. Time: 0635	220.1	17.7			
2. Time: 1053	220.2	18.1			
3. Time:					
4. Time:					
DO Calibration					
Calibration Value:	81% air saturation @ 5200 ft.		Atmospheric Pressure in Hg		
1. Time: 0633	81.6	24.38			
2. Time: 1051	81.5	24.41			
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 Lynvh		Date: 4/8/14		
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 0805	10.2	19.6	99.7	801
2. Time 0944	10.4	19.9	98.9	805
3. Time				
4. Time				
Comments:				

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

Project Name: <u>SWMU 8/58</u>	Monitoring Well ID #: <u>CCBA-MW1</u>	Date: <u>4-7-14</u>
The following equipment was decontaminated at completion of sampling activities in accordance with FOP-05-03		
Pump and Tubing Bundle ID #: <u>1806-586</u>	Water Level Indicator ID #: <u>210269</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>Excellent</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>040314</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 8/58</u>	Monitoring Well ID #: <u>CCBA-MW2</u>	Date: <u>4/8/14</u>
The following equipment was decontaminated at completion of sampling activities in accordance with FOP-05-03		
Pump and Tubing Bundle ID #: <u>1806-586</u>	Water Level Indicator ID #: <u>210269</u>	
Personnel Performing Decontamination: Robert Lynch <u>RL</u> Print Name: Initial: Alfred Santillanes <u>AS</u> Print Name: Initial:		Personnel Performing Decontamination: Robert Lynch <u>RL</u> Print Name: Initial: Alfred Santillanes <u>AS</u> Print Name: Initial:
Condition of Equipment Pump: <u>Excellent</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>040314</u>	HNO₃ Grade: <u>Reagent</u> UN #: <u>2031</u> Manufacturer: <u>AROC</u> Lot Number: <u>A0305629</u>	

Waste Generator : William Gibson Phone: 239-7367 project leader: Clinton Lum			
Project Name	SWMU 8/58	SWMU 8/58	SWMU 8/58
Container ID # (site-date-sequence)	SWMU-CCBA-MW1-040714-01	SWMU-CCBA-MW1-040714-02	SWMU-040714
Initial Label Type (Hazardous or Non-Regulated)	Non- Regulated	Non- Regulated	Non- Regulated
Waste Matrix (purge water, decon water, HACH Accu-Vac ampule)	Purge Water	Purge Water	Decon Water
Container Type / Volume	CHPD/ 55 gal.	CHPD/ 55 gal.	CHPD/ 55 gal.
Volume of Waste	~ 19 gal.	~ 21 gal.	~ 30 gal.
Total Container Weight	~ 150 lbs.	~ 170 lbs.	~ 240 lbs.
COC#: Sample#-Fraction	CoC # 615424	CoC # 615424	CoC # 615424
	Sample # 095725	Sample # 095725	Sample # 095725
Accumulation Date	Start: 04-07-14	Start: 04-07-14	Start: 04-07-14
	Full: 04-07-14	Full: 04-07-14	Full: 04-07-14
Date Waste Moved to Accumulation Area	04-07-14	04-07-14	04-07-14
Accumulation Area Name	9925	9925	9925
Comments:			

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Groundwater Monitoring Waste Generation Log

Waste Generator : <u>William Gibson</u> Phone: <u>239-7367</u> project leader: <u>Clinton Lum</u>			
Project Name	SWMU 8/58	SWMU 8/58	SWMU 8/58
Container ID # (site-date-sequence)	SWMU-CCBA-MW2-040814-01	SWMU-CCBA-MW2-040814-02	SWMU-040814
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	~ 160 lbs.	~ 170 lbs.	~ 240 lbs.
COC#: Sample#-Fraction	<u>CoC # 615426</u> <u>Sample # 095730, 095731</u>	<u>CoC # 615426</u> <u>Sample # 095730, 095731</u>	<u>CoC # 615426</u> <u>Sample # 095730, 095731</u>
Accumulation Date	Start: 04/08/14 Full: 04/08/14	Start: 04/08/14 Full: 04/08/14	Start: 04/08/14 Full: 04/08/14
Date Waste Moved to Accumulation Area	04/08/14	04/08/14	04/08/14
Accumulation Area Name	9925	9925	9925
Comments:			

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TAILGATE SAFETY MEETING FORM

Dept: 4142 Well Location: CCBA-MW1 Date: 4/7/14 Time: 0810

Activities: GROUNDWATER MONITORING AND SAMPLING

(Anyone has the right to cease field activities for safety concerns. The buddy system will be used when needed.)

Weather Conditions:

Temp: 56.8 °F Wind Speed: 0 MPH Humidity: 27.1 % 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 SANTILLANES
Printed Name

William Gibson
Printed Name

Printed Name

Printed Name

[Signature]
Signature

[Signature]
Signature

[Signature]
Signature

Signature

Signature

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TAILGATE SAFETY MEETING FORM

Dept: 4142 Well Location: CCBA-mw 2 Date: 4/8/14 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: 62.0 °F Wind Speed: 0 MPH Humidity: 21.8 % 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 SANTILLANES
Printed Name

William Gibson
Printed Name

Printed Name

Printed Name

[Signature]
Signature

[Signature]
Signature

[Signature]
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: 04/16/14
Well Condition:	Weather Condition:
Method: Portable pump <input checked="" type="checkbox"/> Dedicated pump <input type="checkbox"/> Pump depth: 208'	

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: 4/14/14		
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:	0755	4.01	19.1	7.00	19.3
2. Time:	1121	4.01	19.3	7.00	19.4
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:	0751	1225	19.2		
2. Time:	1123	1227	19.5		
3. Time:					
4. Time:					
ORP Calibration					
Reference Value: 220 mV			Standard Lot No. 4AA010		
	Value	Temp	Expiration Date: 7/14		
1. Time:	0753	219.9	19.3		
2. Time:	1122	220.1	19.5		
3. Time:					
4. Time:					
DO Calibration					
Calibration Value:	81% air saturation @ 5200 ft.		Atmospheric Pressure in Hg		
1. Time:	07:44	81.7	24.44		
2. Time:	1120	81.6	24.50		
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: 4/14/14		
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	0817	10.1	19.7	99.8
2. Time	0955	10.3	19.8	102
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: 4/15/14		
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: 0651	4.01	20.0	7.00	20.0	10.00 20.0
2. Time: 1058	4.02	19.9	7.00	20.1	10.00 20.1
3. Time:					
4. Time:					
Standard lot no.:	3AD782		3AE725		3AD357
Expiration date:	4/15		5/15		4/15
SC Calibration					
Reference Value: 1225 uS			Standard Lot No.: 3AE221		
	Value	Temp	Expiration Date: 5/15		
1. Time: 0653	1225	20.0			
2. Time: 1059	1227	20.2			
3. Time:					
4. Time:					
ORP Calibration					
Reference Value: 220 mV			Standard Lot No. 4AA010		
	Value	Temp	Expiration Date: 7/14		
1. Time: 0652	219.9	20.0			
2. Time: 1100	220.1	20.1			
3. Time:					
4. Time:					
DO Calibration					
Calibration Value:	81% air saturation @ 5200 ft.		Atmospheric Pressure in Hg		
1. Time: 0650	81.7	24.48			
2. Time: 1059	81.8	24.49			
3. Time:					
4. Time:					

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

SNL/NM Project Name: SWMU 68		Project No.: 146422.10.11.01		
Calibration done by: R Lynch		Date: 4/15/14		
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 0755	9.98	20.3	101	795
2. Time 0925	9.94	19.9	104	798
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: 4/16/14			
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:	0640	4.00	19.6	7.00	19.6	10.01
2. Time:	1057	3.99	19.8	7.00	19.9	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:	0642	1223				
2. Time:	1053	1226				
3. Time:						
4. Time:						
ORP Calibration						
Reference Value: 220 mV			Standard Lot No. 4AA010			
	Value	Temp	Expiration Date: 7/14			
1. Time:	0641	219.9				
2. Time:	1052	220.2				
3. Time:						
4. Time:						
DO Calibration						
Calibration Value:	81% air saturation @ 5200 ft.		Atmospheric Pressure in Hg			
1. Time:	0639	81.7	24.10			
2. Time:	1050	81.8	24.14			
3. Time:						
4. Time:						

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

SNL/NM Project Name: SWMU 68		Project No.: 146422.10.11.01		
Calibration done by: R Lynch		Date: 4/16/14		
TURBIDIMETER				
Make & Model: HACH 2100P HACH 2100Q		Serial No. S/N 10060C003010		
Reference Value	25 10	20	100	800
Standard Lot No.	0161	0167	0168	0161
1. Time 0750	10.3	19.7	104	796
2. Time 0922	10.1	19.8	101	794
3. Time				
4. Time				
Comments:				

Portable Pump and Tubing / Water Level Indicator
Decontamination Log Form

Project Name: <u>SWMU 68</u>	Monitoring Well ID #: <u>OBS-MW1</u>	Date: <u>4-14-14</u>
The following equipment was decontaminated at completion of sampling activities in accordance with FOP-05-03		
Pump and Tubing Bundle ID #: <u>1806-586</u>	Water Level Indicator ID #: <u>210269</u>	
Personnel Performing Decontamination: Robert Lynch Print Name: _____ Initial: <u>RL</u> Alfred Santillanes Print Name: _____ Initial: <u>AS</u>		Personnel Performing Decontamination: Robert Lynch Print Name: _____ Initial: <u>RL</u> Alfred Santillanes Print Name: _____ Initial: <u>AS</u>
Condition of Equipment Pump: <u>Excellent</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>4-3-14</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 68</u>	Monitoring Well ID #: <u>OBS-MW2</u>	Date: <u>04-15-14</u>
The following equipment was decontaminated at completion of sampling activities in accordance with FOP-05-03		
Pump and Tubing Bundle ID #: <u>1806-586</u>	Water Level Indicator ID #: <u>210269</u>	
<u>Personnel Performing Decontamination:</u> <u>Robert Lynch</u> <u>RL</u> Print Name: Initial: <u>Alfred Santillanes</u> <u>AS</u> Print Name: Initial:		<u>Personnel Performing Decontamination:</u> <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>Excellent</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>4-2-14</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 68</u>	Monitoring Well ID #: <u>OBS-MW3</u>	Date: <u>4/16/14</u>
The following equipment was decontaminated at completion of sampling activities in accordance with FOP-05-03		
Pump and Tubing Bundle ID #: <u>1806-586</u>	Water Level Indicator ID #: <u>210269</u>	
<u>Personnel Performing Decontamination:</u>		
<u>William Gibson</u> Print Name: <u>WJG</u> Initial:	<u>William Gibson</u> Print Name: <u>WJG</u> Initial:	
<u>Robert Lynch</u> Print Name: <u>RL</u> Initial:	<u>Robert Lynch</u> Print Name: <u>RL</u> Initial:	
Condition of Equipment		
Pump: <u>Excellent</u>	Tubing Bundle: <u>Good</u>	Water Level Indicator: <u>Good</u>
List of Decontamination Materials		
Distilled or Deonized (circle one)	HNO₃	
Source: <u>Culligan</u>	Grade: <u>Reagent</u>	
Lot Number: <u>4-3-14</u>	UN #: <u>2031</u>	
	Manufacturer: <u>AROC</u>	
	Lot Number: <u>A0305629</u>	

Groundwater Monitoring Waste Generation Log

Waste Generator : <u>William Gibson</u> Phone: <u>239-7367</u> project leader: <u>Clinton Lum</u>			
Project Name	SWMU-68	SWMU-68	SWMU-68
Container ID # (site-date-sequence)	SWMU-OBS-MW1-041414-01	SWMU-OBS-MW1-041414-02	SWMU-041414
Initial Label Type (Hazardous or Non-Regulated)	Non-Regulated	Non-Regulated	Non-Regulated
Waste Matrix (purge water, decon water, HACH Accu-Vac ampule)	Purge water	Purge Water	Decon Water
Container Type / Volume	CHPD / 55	CHPD / 55	CHPD / 55
Volume of Waste	~ 19 gal.	~ 21 gal.	~30 gal.
Total Container Weight	~ 150 lbs.	~ 170 lbs.	~ 240 lbs.
COC#: Sample#-Fraction	<u>CoC# 615427</u> <u>Sample # 095733</u> 	<u>CoC# 615427</u> <u>Sample # 095733</u> 	<u>CoC# 615427</u> <u>Sample # 095733</u>
Accumulation Date	Start: 04/14/14 Full: 04/14/14	Start: 04/14/14 Full: 04/14/14	Start: 04/14/14 Full: 04/14/14
Date Waste Moved to Accumulation Area	04/14/14	04/14/14	04/14/14
Accumulation Area Name	9925	9925	9925
Comments:			

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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-MW2-041514-01	SWMU-OBS-MW2-041514-02	SWMU-041514
Initial Label Type (Hazardous or Non-Regulated)	Non-Regulated	Non-Regulated	Non-Regulated
Waste Matrix (purge water, decon water, HACH Accu-Vac ampule)	Purge Water	Purge Water	Decon Water
Container Type / Volume	CHPD / 55 gal.	CHPD / 55 gal.	CHPD / 55 gal.
Volume of Waste	~ 19 gal.	~ 21 gal.	~ 30 gal.
Total Container Weight	~ 150 lbs.	~ 170 lbs.	~ 180 lbs.
COC#: Sample#-Fraction	<div style="border-bottom: 1px solid black; margin-bottom: 2px;"></div> <div style="border-bottom: 1px solid black; margin-bottom: 2px;">CoC # 615428</div> <div style="border-bottom: 1px solid black; margin-bottom: 2px;"></div> <div style="border-bottom: 1px solid black; margin-bottom: 2px;">Sample # 095736</div> <div style="border-bottom: 1px solid black; margin-bottom: 2px;"></div>	<div style="border-bottom: 1px solid black; margin-bottom: 2px;"></div> <div style="border-bottom: 1px solid black; margin-bottom: 2px;">CoC # 615428</div> <div style="border-bottom: 1px solid black; margin-bottom: 2px;"></div> <div style="border-bottom: 1px solid black; margin-bottom: 2px;">Sample # 095736</div> <div style="border-bottom: 1px solid black; margin-bottom: 2px;"></div>	<div style="border-bottom: 1px solid black; margin-bottom: 2px;"></div> <div style="border-bottom: 1px solid black; margin-bottom: 2px;">CoC # 615428</div> <div style="border-bottom: 1px solid black; margin-bottom: 2px;"></div> <div style="border-bottom: 1px solid black; margin-bottom: 2px;">Sample # 095736</div> <div style="border-bottom: 1px solid black; margin-bottom: 2px;"></div>
Accumulation Date	Start: 04-15-14 Full: 04-15-14	Start: 04-15-14 Full: 04-15-14	Start: 04-15-14 Full: 04-15-14
Date Waste Moved to Accumulation Area	04-15-14	04-15-14	04-15-14
Accumulation Area Name	9925	9925	9925
Comments:			

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Groundwater Monitoring Waste Generation Log

Waste Generator : <u>William Gibson</u> Phone: <u>239-7367</u> project leader: <u>Clinton Lum</u>			
Project Name	SWMU-68	SWMU-68	SWMU-68
Container ID # (site-date-sequence)	SWMU-OBS-MW3-041614-01	SWMU-OBS-MW3-041614-02	SWMU-041614
Initial Label Type (Hazardous or Non-Regulated)	Non-Regulated	Non-Regulated	Non-Regulated
Waste Matrix (purge water, decon water, HACH Accu-Vac ampule)	Purge Water	Purge Water	Decon Water
Container Type / Volume	CHPD / 55 gal.	CHPD / 55 gal.	CHPD / 55 gal.
Volume of Waste	~ 19 gal.	~ 21 gal.	~ 30 gal.
Total Container Weight	~ 150 lbs.	170 lbs.	~ 240 lbs.
COC#: Sample#-Fraction	<u>CoC # 615430</u> <u>Sample # 095741, 095742</u>	<u>CoC # 615430</u> <u>Sample # 095741, 095742</u>	<u>CoC # 615430</u> <u>Sample # 095741, 095742</u>
Accumulation Date	Start: 4/16/14 Full: 4/16/14	Start: 4/16/14 Full: 4/16/14	Start: 4/16/14 Full: 4/16/14
Date Waste Moved to Accumulation Area	4/16/14	4/16/14	4/16/14
Accumulation Area Name	9925	9925	9925
Comments:			

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TAILGATE SAFETY MEETING FORM

Dept: 4142 Well Location: OBS-MW 1Date: 04/14/14Time: 0813Activities: GROUNDWATER MONITORING AND SAMPLING

(Anyone has the right to cease field activities for safety concerns. The buddy system will be used when needed.)

Weather Conditions:

Temp: 50.3 °F Wind Speed: 0 MPHHumidity: 25.3 % Wind Chill NA °FChemicals 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

[Signature]
Signature

William Gibson
Signature

[Signature]
Signature

Signature

Signature

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TAILGATE SAFETY MEETING FORM

Dept: 4142 Well Location: OBS-MW 2 Date: 04/15/14 Time: 0753

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: 49.9 °F Wind Speed: 0 MPH Humidity: 22.7% Wind Chill NA °F

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

Other: _____

Safety Topics Presented

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

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

Attendees

Robert Lynch
Printed Name

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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TAILGATE SAFETY MEETING FORM

Dept: 4142 Well Location: OBS-MW 3Date: 04/16/14Time: 0745Activities: 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: 57.0 °F Wind Speed: ~5 MPHHumidity: 17.1 % Wind Chill 56.0 °FChemicals 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

William Gibson
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

615424

Project Name: SWMU 8/58 GWM	Date Samples Shipped:	SMO Authorization: <i>[Signature]</i>	<input type="checkbox"/> Waste Characterization <input type="checkbox"/> RMMA <input type="checkbox"/> Released by COC No. <input checked="" type="checkbox"/> 4° Celsius
Project/Task Manager: Clinton Lum	Carrier/Waybill No.	SMO Contact Phone:	
Project/Task Number: 146422.10.11.01	Lab Contact: Edie Kent/803-556-8171	Lorraine Herrera/505-844-3199	
Service Order: CF262-14	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
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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
✓ 095724	-001	CCBA-FB1	NA	4/7/14 9:35	DIW	G	3x40ml	HCL	G	FB	TCL VOC (SW846-8260B)	
✓ 095725	-001	CCBA-MW1	79	4/7/14 9:35	GW	G	3x40ml	HCL	G	SA	TCL VOC (SW846-8260B)	
✓ 095725	-002	CCBA-MW1	79	4/7/14 9:36	GW	AG	4x1 L	None	G	SA	TCL SVOC (SW846-8270C)	
✓ 095725	-009	CCBA-MW1	79	4/7/14 9:37	GW	P	500 ml	HNO3	G	SA	TAL Metals+U(SW846-6010/6020/7470)	
✓ 095725	-016	CCBA-MW1	79	4/7/14 9:40	GW	P	125 ml	None	G	SA	Anions (SW846-9056)	
✓ 095725	-017	CCBA-MW1	79	4/7/14 9:39	FGW	P	500 ml	HNO3	G	SA	Metals Ca,Mg,K,Na(SW846-6020)	
✓ 095725	-018	CCBA-MW1	79	4/7/14 9:41	GW	P	125 ml	H2SO4	G	SA	Nitrate+Nitrite (EPA 353.2)	
✓ 095725	-020	CCBA-MW1	79	4/7/14 9:42	GW	P	250 ml	None	G	SA	Perchlorate (EPA 314.0)	
✓ 095725	-022	CCBA-MW1	79	4/7/14 9:43	GW	P	500 ml	None	G	SA	Alkalinity (SM2320B)	
✓ 095725	-024	CCBA-MW1	79	4/7/14 9:44	GW	AG	4x1 L	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	Return Samples By:	Comments:	Lab Use
	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, perform verification analysis using SW846-6850M. FGW, filtered in field using a 0.45 micron in-line filter. Report Anions (as Br, Cl, F, SO4), Alkalinity (as total CaCO3, HCO3, CO3), and Gamma Spectroscopy (as short list isotopes).	
	William Gibson	<i>[Signature]</i>	WG	SNL/4142/505-284-3307/505-239-7367				

1. Relinquished by <i>[Signature]</i> Org. 4/142 Date 4/7/14 Time 10:15	3. Relinquished by	Org.	Date	Time
1. Received by <i>[Signature]</i> Org. 4/142 Date 4/7/14 Time 10:15	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

Page 2 of 2[illegible]

CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY

Internal Lab

Page 1 of 2

Batch No.		SMO Use		AR/CO		615426	
Project Name: SWMU 8/58 GWM		Date Samples Shipped: 4/8/14		SMO Authorization: Don Watson		<input type="checkbox"/> Waste Characterization <input type="checkbox"/> RMMA <input type="checkbox"/> Released by COC No.	
Project/Task Manager: Clinton Lum		Carrier/Waybill No.		SMO Contact Phone:		<input checked="" type="checkbox"/> 4° Celsius	
Project/Task Number: 146422.10.11.01		Lab Contact: Edie Kent/803-556-8171		Lorraine Herrera/505-844-3199			
Service Order: CF262-14		Lab Destination: GEL		Send Report to SMO:			
		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					
095730	-001	CCBA-MW2	117	4/8/14 9:27	GW	G	3x40ml	HCL	G	SA	TCL VOC (SW846-8260B)	
095730	-002	CCBA-MW2	117	4/8/14 9:28	GW	AG	4x1 L	None	G	SA	TCL SVOC (SW846-8270C)	
095730	-009	CCBA-MW2	117	4/8/14 9:32	GW	P	500 ml	HNO3	G	SA	TAL Metals+U(SW846-6010/6020/7470)	
095730	-016	CCBA-MW2	117	4/8/14 9:35	GW	P	125 ml	None	G	SA	Anions (SW846-9056)	
095730	-017	CCBA-MW2	117	4/8/14 9:34	FGW	P	500 ml	HNO3	G	SA	Metals Ca,Mg,K,Na(SW846-6020)	
095730	-018	CCBA-MW2	117	4/8/14 9:36	GW	P	125 ml	H2SO4	G	SA	Nitrate+Nitrite (EPA 353.2)	
095730	-020	CCBA-MW2	117	4/8/14 9:37	GW	P	250 ml	None	G	SA	Perchlorate (EPA 314.0)	
095730	-022	CCBA-MW2	117	4/8/14 9:38	GW	P	500 ml	None	G	SA	Alkalinity (SM2320B)	
095730	-024	CCBA-MW2	117	4/8/14 9:39	GW	AG	4x1 L	None	G	SA	High Explosives (SW846-8321A mod.)	
095730	-029	CCBA-MW2	117	4/8/14 9:43	GW	P	250 ml	NaOH	G	SA	Total Cyanide (SW846-9012)	

Last Chain: <input checked="" type="checkbox"/> Yes Validation Req'd: <input checked="" type="checkbox"/> Yes Background: <input type="checkbox"/> Yes Confirmatory: <input type="checkbox"/> Yes		Sample Tracking Date Entered: Entered by: QC inits.:		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		Conditions on Receipt	
Sample Team Members		Sample Disposal <input type="checkbox"/> Return to Client <input checked="" type="checkbox"/> Disposal by Lab		Return Samples By:			
Name: Robert Lynch, Alfred Santillanes, William Gibson Signature: [Signatures] Init.: [Initials] Company/Organization/Phone/Cell: SNL/4142/505-844-4013/505-250-7090, SNL/4142/505-844-5130/505-228-0710, SNL/4142/505-284-3307/505-239-7367		Comments: Send report to Tim Jackson/4142/MS 0729/284-2547 If Perchlorate detected, perform verification analysis using SW846-6850M.FGW, filtered in field using a 0.45 micron in-line filter. Report Anions (as Br, Cl, F, SO4). Alkalinity (as total CaCO3, HCO3, CO3). Gamma Spectroscopy (as short list isotopes).				Lab Use	

1. Relinquished by: [Signature]	Org. 4142	Date 4/8/14	Time 10:16	3. Relinquished by:	Org.	Date	Time
1. Received by: [Signature]	Org. 4142	Date 4/8/14	Time 10:16	3. Received by:	Org.	Date	Time
2. Relinquished by:	Org.	Date	Time	4. Relinquished by:	Org.	Date	Time
2. Received by:	Org.	Date	Time	4. Received by:	Org.	Date	Time

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

CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY (Continuation)

Page 2 of 2AR/COC **615426**

Project Name: SWMU 8/58 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		Preservative	Collection Method	Sample Type	Parameter & Method Requested	Lab Sample ID	
						Type	Volume						
✓ 095730	-033	CCBA-MW2	117	4/8/14 9:44 ✓	GW	P	1 L	HNO3	G	SA	Gamma Spectroscopy (EPA 901.0)		
✓ 095730	-034	CCBA-MW2	117	4/8/14 9:46 ✓	GW	P	1 L	HNO3	G	SA	Gross Alpha and Beta (EPA 900.0)		
✓ 095731	-001	CCBA-MW2	117	4/8/14 9:27 ✓	GW	G	3x40ml	HCL	G	DU	TCL VOC (SW846-8260B)		
✓ 095731	-002	CCBA-MW2	117	4/8/14 9:28	GW	AG	4x1 L	None	G	DU	TCL SVOC (SW846-8270C)		
✓ 095731	-009	CCBA-MW2	117	4/8/14 9:32 ✓	GW	P	500 ml	HNO3	G	DU	TAL Metals+U(SW846-6010/6020/7470)		
✓ 095731	-016	CCBA-MW2	117	4/8/14 9:35 ✓	GW	P	125 ml	None	G	DU	Anions (SW846-9056)		
✓ 095731	-017	CCBA-MW2	117	4/8/14 9:34 ✓	FGW	P	500 ml	HNO3	G	DU	Metals Ca,Mg,K,Na(SW846-6020)		
✓ 095731	-018	CCBA-MW2	117	4/8/14 9:36 ✓	GW	P	125 ml	H2SO4	G	DU	Nitrate+Nitrite (EPA 353.2)		
✓ 095731	-020	CCBA-MW2	117	4/8/14 9:37 ✓	GW	P	250 ml	None	G	DU	Perchlorate (EPA 314.0)		
✓ 095731	-022	CCBA-MW2	117	4/8/14 9:38 ✓	GW	P	500 ml	None	G	DU	Alkalinity (SM2320B)		
✓ 095731	-024	CCBA-MW2	117	4/8/14 9:39 ✓	GW	AG	4x1 L	None	G	DU	High Explosives (SW846-8321A mod.)		
✓ 095731	-029	CCBA-MW2	117	4/8/14 9:43 ✓	GW	P	250 ml	NaOH	G	DU	Total Cyanide (SW846-9012)		
✓ 095731	-033	CCBA-MW2	117	4/8/14 9:44 ✓	GW	P	1 L	HNO3	G	DU	Gamma Spectroscopy (EPA 901.0)		
✓ 095731	-034	CCBA-MW2	117	4/8/14 9:46 ✓	GW	P	1 L	HNO3	G	DU	Gross Alpha and Beta (EPA 900.0)		
✓ 095732	-001 ✓	CCBA-TB3	NA	4/8/14 9:27 ✓	DIW	G	3x40ml	HCL	G	TB	TCL VOC (SW846-8260B)		
Recipient Initials _____													

CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY

Internal Lab

Prior to CCBA - MW 2 Page 1 of 2

Batch No.

SMO Use

AR/COC

615425

Project Name: SWMU 8/58 GWM	Date Samples Shipped:	SMO Authorization:	<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: CF262-14	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
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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
095727	-001	CCBA-FB2	NA	4/7/14 13:19	DIW	G	3x40ml	HCL	G	FB	TCL VOC (SW846-8260B)	
095727	-009	CCBA-FB2	NA	4/7/14 13:19	DIW	P	500 ml	HNO3	G	FB	TAL Metals+U(SW846-6010/6020/7470)	
095727	-016	CCBA-FB2	NA	4/7/14 13:19	DIW	P	125 ml	None	G	FB	Anions (SW846-9056)	
095727	-018	CCBA-FB2	NA	4/7/14 13:19	DIW	P	125 ml	H2SO4	G	FB	Nitrate+Nitrite (EPA 353.2)	
095727	-022	CCBA-FB2	NA	4/7/14 13:19	DIW	P	500 ml	None	G	FB	Alkalinity (SM2320B)	
095728	-001	CCBA-EB1	NA	4/7/14 13:19	DIW	G	3x40ml	HCL	G	EB	TCL VOC (SW846-8260B)	
095728	-002	CCBA-EB1	NA	4/7/14 13:20	DIW	AG	4x1 L	None	G	EB	TCL SVOC (SW846-8270C)	
095728	-009	CCBA-EB1	NA	4/7/14 13:22	DIW	P	500 ml	HNO3	G	EB	TAL Metals+U(SW846-6010/6020/7470)	
095728	-016	CCBA-EB1	NA	4/7/14 13:25	DIW	P	125 ml	None	G	EB	Anions (SW846-9056)	
095728	-017	CCBA-EB1	NA	4/7/14 13:24	FDIW	P	500 ml	HNO3	G	EB	Metals Ca,Mg,K,Na(SW846-6020)	

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>Robert Lynch</i>	RL	SNL/4142/505-844-4013/505-250-7090	Return Samples By:
	Alfred Santillanes	<i>Alfred Santillanes</i>	AS	SNL/4142/505-844-5130/505-228-0710	
	William Gibson	<i>William Gibson</i>	WG	SNL/4142/505-284-3307/505-239-7367	
					Comments: Send report to Tim Jackson/4142/MS 0729/284-2547 If Perchlorate detected, perform verification analysis using SW846-6850M. FDIW, filtered in field using a 0.45 micron in-line filter. Report anions (as Br, Cl, F, SO4), alkalinity (as total CaCO3, HCO3, CO3), and gamma spectroscopy (as short list isotopes).

1. Relinquished by <i>Alfred Santillanes</i> Org. 4142 Date 4/7/14 Time 14:03	3. Relinquished by	Org.	Date	Time
1. Received by <i>Robert Lynch</i> Org. 4142 Date 4/7/14 Time 14:03	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

AR/COC	615425
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[illegible]

CONTRACT LABORATORY
ANALYSIS REQUEST AND CHAIN OF CUSTODY

Internal Lab

Page 1 of 2

Batch No.

SMO Use

AR/COC 615427

Project Name: SWMU 68 GWM

Project/Task Manager: Clinton Lum

Project/Task Number: 146422.10.11.01

Service Order: CF263-14

Date Samples Shipped:

Carrier/Waybill No.

Lab Contact: Edie Kent/803-556-8171

Lab Destination: GEL

Contract No.: PO 1303873

SMO Authorization: *Don W. Stanger*

SMO Contact Phone: 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:

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
✓ 095733	-001	OBS-MW1	153	4/14/14 9:44	GW	G	3x40ml	HCL	G	SA	TCL VOC (SW846-8260B)	
✓ 095733	-002	OBS-MW1	153	4/14/14 9:45	GW	AG	4x1 L	None	G	SA	TCL SVOC (SW846-8270C)	
✓ 095733	-009	OBS-MW1	153	4/14/14 9:47	GW	P	500 ml	HNO3	G	SA	TAL Metals+U (SW846-6010/6020/7470)	
✓ 095733	-014	OBS-MW1	153	4/14/14 9:50	GW	P	250 ml	None	G	SA	Hexavalent Chromium (SW846-7196A)	
✓ 095733	-016	OBS-MW1	153	4/14/14 9:51	GW	P	125 ml	None	G	SA	Anions (SW846-9056)	
✓ 095733	-017	OBS-MW1	153	4/14/14 9:49	FGW	P	500 ml	HNO3	G	SA	Metals-Ca,Mg,K,Na(SW846-6020)	
✓ 095733	-018	OBS-MW1	153	4/14/14 9:52	GW	P	125 ml	H2SO4	G	SA	Nitrate+Nitrite (EPA 353.2)	
✓ 095733	-020	OBS-MW1	153	4/14/14 9:53	GW	P	250 ml	None	G	SA	Perchlorate (EPA 314.0)	
✓ 095733	-022	OBS-MW1	153	4/14/14 9:54	GW	P	500 ml	None	G	SA	Alkalinity (SM2320B)	
✓ 095733	-024	OBS-MW1	153	4/14/14 9:55	GW	AG	4x1 L	None	G	SA	High Explosives (SW846-8321A mod)	

Last Chain: ☐ Yes

Validation Req'd: ☒ Yes

Background: ☐ Yes

Confirmatory: ☐ Yes

Sample Tracking

Date Entered:

Entered by:

QC inits.:

SMO Use

Special Instructions/QC Requirements:

EDD ☒ Yes ☐ No

Turnaround Time ☐ 7 Day* ☐ 15 Day* ☒ 30 Day

Negotiated TAT ☐

Sample Disposal ☐ Return to Client ☒ Disposal by Lab

Return Samples By:

Comments: Send report to Tim Jackson/4142/MS 0729/284-2547
If Perchlorate detected,perform verification analysis using SW846-6850M. FGW, filtered in field using a 0.45 micron in-line filter. Report Anions (as Br,Cl,F,SO4), Alkalinity (as total CaCO3,HCO3,CO3). Gamma Spectroscopy (as short list isotopes).

Conditions on Receipt

Sample Team Members

Name

Signature

Init.

Company/Organization/Phone/Cell

Robert Lynch

Robert Lynch

RL

SNL/4142/505-844-4013/505-250-7090

Alfred Santillanes

Alfred Santillanes

AS

SNL/4142/505-844-5130/505-228-0710

William Gibson

William Gibson

WG

SNL/4142/505-284-3307/505-239-7367

1. Relinquished by *Alfred Santillanes* Org. 4142 Date 4/14/14 Time 10:35

1. Received by *Don W. Stanger* Org. 4142 Date 4/14/14 Time 1035

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

Lab Use

Page 2 of 2

Recipient Initials _____

CONTRACT LABORATORY

ANALYSIS REQUEST AND CHAIN OF CUSTODY

Internal Lab

Page 1 of 2

Batch No. *N/A*

SMO Use

AR/COC

615428

Project Name: SWMU 68 GWM	Date Samples Shipped: 4/15/14	SMO Authorization: <i>[Signature]</i>	<input type="checkbox"/> Waste Characterization
Project/Task Manager: Clinton Lum	Carrier/Waybill No. 217403	SMO Contact Phone: Lorraine Herrera/505-844-3199	<input type="checkbox"/> RMMA
Project/Task Number: 146422.10.11.01	Lab Contact: Edie Kent/803-556-8171	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:	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
095735	-001	OBS-FB1	NA	4/15/14 9:13	DIW	G	3x40ml	HCL	G	FB	TCL VOC (SW846-8260B)	
095736	-001	OBS-MW2	252	4/15/14 9:13	GW	G	3x40ml	HCL	G	SA	TCL VOC (SW846-8260B)	
095736	-002	OBS-MW2	252	4/15/14 9:14	GW	AG	4x1 L	None	G	SA	TCL SVOC (SW846-8270C)	
095736	-009	OBS-MW2	252	4/15/14 9:16	GW	P	500 ml	HNO3	G	SA	TAL Metals+U (SW846-6010/6020/7470)	
095736	-014	OBS-MW2	252	4/15/14 9:19	GW	P	250 ml	None	G	SA	Hexavalent Chromium (SW846-7196A)	
095736	-016	OBS-MW2	252	4/15/14 9:20	GW	P	125 ml	None	G	SA	Anions (SW846-9056)	
095736	-017	OBS-MW2	252	4/15/14 9:18	FGW	P	500 ml	HNO3	G	SA	Metals-Ca,Mg,K,Na(SW846-6020)	
095736	-018	OBS-MW2	252	4/15/14 9:21	GW	P	125 ml	H2SO4	G	SA	Nitrate+Nitrite (EPA 353.2)	
095736	-020	OBS-MW2	252	4/15/14 9:22	GW	P	250 ml	None	G	SA	Perchlorate (EPA 314.0)	
095736	-022	OBS-MW2	252	4/15/14 9:23	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: 4-15-14		EDD <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		
Background: <input type="checkbox"/> Yes	Entered by: RK		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		
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/4142/505-284-3307/505-239-7367	If Perchlorate detected, perform verification analysis using SW846-6850M. FGW, filtered in field using a 0.45 micron in-line filter. Report Anions (as Br, Cl, F, SO4), Alkalinity (as total CaCO3, HCO3, CO3). Gamma Spectroscopy (as short list isotopes).

1. Relinquished by <i>[Signature]</i> Org. 4142 Date 4/15/14 Time 0950	3. Relinquished by	Org.	Date	Time
1. Received by <i>[Signature]</i> Org. 4142 Date 4/15/14 Time 0950	3. Received by	Org.	Date	Time
2. Relinquished by <i>[Signature]</i> Org. 4142 Date 4/15/14 Time 1000	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

AR/COC

615428

[illegible]

CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY

Internal Lab

Page 1 of 2

Batch No.

SMO Use

AR/COC **615430**

Project Name: SWMU 68 GWM		Date Samples Shipped: 4/16/14		SMO Authorization: <i>Don J. Jackson</i>		<input type="checkbox"/> Waste Characterization <input type="checkbox"/> RMMA <input type="checkbox"/> Released by COC No. <input checked="" type="checkbox"/> 4° Celsius	
Project/Task Manager: Clinton Lum		Carrier/Waybill No.		SMO Contact Phone:			
Project/Task Number: 146422.10.11.01		Lab Contact: Edie Kent/803-556-8171		Lorraine Herrera/505-844-3199			
Service Order: CF263-14		Lab Destination: GEL		Send Report to SMO: Rita Kavanaugh/505-284-2553			
Contract No.: PO 1303873		Bill to: Sandia National Laboratories (Accounts Payable), P.O. Box 5800, MS-0154 Albuquerque, NM 87185-0154					
Tech Area:							
Building:		Room:		Operational Site:			

Sample No.	Fraction	Sample Location Detail	Depth (ft)	Date/Time Collected	Sample Matrix	Container		Preservative	Collection Method	Sample Type	Parameter & Method Requested	Lab Sample ID
						Type	Volume					
✓ 095741	-001 ✓	OBS-MW3	208	4/16/14 9:04 ✓	GW	G	3x40ml	HCL	G	SA	TCL VOC (SW846-8260B)	
✓ 095741	-002	OBS-MW3	208	4/16/14 9:05 ✓	GW	AG	4x1 L ✓	None	G	SA	TCL SVOC (SW846-8270C)	
✓ 095741	-009 ✓	OBS-MW3	208	4/16/14 9:08 ✓	GW	P	500 ml	HNO3	G	SA	TAL Metals+U (SW846-6010/6020/7470)	
095741	-014 ✓	OBS-MW3	208	4/16/14 9:11 ✓	GW	P	250 ml	None	G	SA	Hexavalent Chromium (SW846-7196A)	
✓ 095741	-016 ✓	OBS-MW3	208	4/16/14 9:12 ✓	GW	P	125 ml	None	G	SA	Anions (SW846-9056)	
✓ 095741	-017 ✓	OBS-MW3	208	4/16/14 9:10 ✓	FGW ✓	P	500 ml	HNO3	G	SA	Metals-Ca,Mg,K,Na(SW846-6020)	
✓ 095741	-018 ✓	OBS-MW3	208	4/16/14 9:13 ✓	GW	P	125 ml	H2SO4	G	SA	Nitrate+Nitrite (EPA 353.2)	
✓ 095741	-020 ✓	OBS-MW3	208	4/16/14 9:14 ✓	GW	P	250 ml	None	G	SA	Perchlorate (EPA 314.0)	
✓ 095741	-022 ✓	OBS-MW3	208	4/16/14 9:15 ✓	GW	P	500 ml	None	G	SA	Alkalinity (SM2320B)	
✓ 095741	-024	OBS-MW3	208	4/16/14 9:16 ✓	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		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,perform verification analysis using SW846-6850M. FGW, filtered in field using a 0.45 micron in-line filter. Report Anions (as Br,Cl,F,SO4), Alkalinity (as total CaCO3,HCO3,CO3). Gamma Spectroscopy (as short list isotopes).		

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

1. Relinquished by <i>Alfred Santillanes</i> Org. 4142 Date 4/16/14 Time 0957	3. Relinquished by _____ Org. _____ Date _____ Time _____
1. Received by <i>Don Walcott</i> Org. 4142 Date 4/16/14 Time 0957	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 615430**

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			
✓ 095741	-029 ✓	OBS-MW3	208	4/16/14 9:19 ✓	GW	P	250 ml	NaOH	G	SA	Total Cyanide (SW846-9012)				
✓ 095741	-033 ✓	OBS-MW3	208	4/16/14 9:20 ✓	GW	P	1 L	HNO3	G	SA	Gamma Spectroscopy (EPA 901.0)				
✓ 095741	-034 ✓	OBS-MW3	208	4/16/14 9:22 ✓	GW	P	1 L	HNO3	G	SA	Gross Alpha and Beta (EPA 900.0)				
✓ 095741	-035 ✓	OBS-MW3	208	4/16/14 9:24 ✓	GW	P	1 L	HNO3	G	SA	Isotopic Uranium (HASL 300)				
✓ 095742	-001 ✓	OBS-MW3	208	4/16/14 9:04 ✓	GW	G	3x40ml	HCL	G	DU	TCL VOC (SW846-8260B)				
✓ 095742	-002 ✓	OBS-MW3	208	4/16/14 9:05 ✓	GW	AG	4x1 L	None	G	DU	TCL SVOC (SW846-8270C)				
✓ 095742	-009 ✓	OBS-MW3	208	4/16/14 9:08 ✓	GW	P	500 ml	HNO3	G	DU	TAL Metals+U (SW846-6010/6020/7470)				
✓ 095742	-014 ✓	OBS-MW3	208	4/16/14 9:11 ✓	GW	P	250 ml	None	G	DU	Hexavalent Chromium (SW846-7196A)				
✓ 095742	-016 ✓	OBS-MW3	208	4/16/14 9:12 ✓	GW	P	125 ml	None	G	DU	Anions (SW846-9056)				
✓ 095742	-017 ✓	OBS-MW3	208	4/16/14 9:10 ✓	FGW	P	500 ml	HNO3	G	DU	Metals-Ca,Mg,K,Na(SW846-6020)				
✓ 095742	-018 ✓	OBS-MW3	208	4/16/14 9:13 ✓	GW	P	125 ml	H2SO4	G	DU	Nitrate+Nitrite (EPA 353.2)				
✓ 095742	-020 ✓	OBS-MW3	208	4/16/14 9:14 ✓	GW	P	250 ml	None	G	DU	Perchlorate (EPA 314.0)				
✓ 095742	-022 ✓	OBS-MW3	208	4/16/14 9:15 ✓	GW	P	500 ml	None	G	DU	Alkalinity (SM2320B)				
✓ 095742	-024 ✓	OBS-MW3	208	4/16/14 9:16 ✓	GW	AG	4x1 L	None	G	DU	High Explosives (SW846-8321A mod)				
✓ 095742	-029 ✓	OBS-MW3	208	4/16/14 9:19 ✓	GW	P	250 ml	NaOH	G	DU	Total Cyanide (SW846-9012)				
✓ 095742	-033 ✓	OBS-MW3	208	4/16/14 9:20 ✓	GW	P	1 L	HNO3	G	DU	Gamma Spectroscopy (EPA 901.0)				
✓ 095742	-034 ✓	OBS-MW3	208	4/16/14 9:22 ✓	GW	P	1 L	HNO3	G	DU	Gross Alpha and Beta (EPA 900.0)				
✓ 095742	-035 ✓	OBS-MW3	208	4/16/14 9:24 ✓	GW	P	1 L	HNO3	G	DU	Isotopic Uranium (HASL 300)				
✓ 095743	-001 ✓	OBS-TB4 ✓	NA	4/16/14 9:04 ✓	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.		SMO Use		AR/COC 615429	
Project Name: SWMU 68 GWM		Date Samples Shipped:		SMO Authorization: <i>Don Watson</i>	
Project/Task Manager: Clinton Lum		Carrier/Waybill No.		SMO Contact Phone:	
Project/Task Number: 146422.10.11.01		Lab Contact: Edie Kent/803-556-8171		Lorraine Herrera/505-844-3199	
Service Order: CF263-14		Lab Destination: GEL		Send Report to SMO:	
		Contract No.: PO 1303873		Rita Kavanaugh/505-284-2553	
Tech Area:		Operational Site:		<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	

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
✓ 095738	-001	OBS-FB2	NA	4/15/14 10:25	DIW	G	3x40ml	HCL	G	FB	TCL VOC (SW846-8260B)	
✓ 095739	-001	OBS-EB1	NA	4/15/14 10:25	DIW	G	3x40ml	HCL	G	EB	TCL VOC (SW846-8260B)	
✓ 095739	-002	OBS-EB1	NA	4/15/14 10:26	DIW	AG	4x1 L	None	G	EB	TCL SVOC (SW846-8270C)	
✓ 095739	-009	OBS-EB1	NA	4/15/14 10:28	DIW	P	500 ml	HNO3	G	EB	TAL Metals+U (SW846-6010/6020/7470)	
✓ 095739	-014	OBS-EB1	NA	4/15/14 10:31	DIW	P	250 ml	None	G	EB	Hexavalent Chromium (SW846-7196A)	
✓ 095739	-016	OBS-EB1	NA	4/15/14 10:32	DIW	P	125 ml	None	G	EB	Anions (SW846-9056)	
✓ 095739	-017	OBS-EB1	NA	4/15/14 10:30	FDIW	P	500 ml	HNO3	G	EB	Metals-Ca,Mg,K,Na(SW846-6020)	
✓ 095739	-018	OBS-EB1	NA	4/15/14 10:33	DIW	P	125 ml	H2SO4	G	EB	Nitrate+Nitrite (EPA 353.2)	
✓ 095739	-020	OBS-EB1	NA	4/15/14 10:34	DIW	P	250 ml	None	G	EB	Perchlorate (EPA 314.0)	
✓ 095739	-022	OBS-EB1	NA	4/15/14 10:35	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		Lab Use
	Robert Lynch	<i>Robert Lynch</i>	<i>RL</i>	SNL/4142/505-844-4013/505-250-7090		Return Samples By:		
	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 0729/284-2547		
	William Gibson	<i>William Gibson</i>	<i>WG</i>	SNL/4142/505-284-3307/505-239-7367		If Perchlorate detected, perform verification analysis using SW846-6850M. FDIW, filtered in field using a 0.45 micron in-line filter. Report Anions (as Br,Cl,F,SO4), Alkalinity (as total CaCO3,HCO3,CO3). Gamma Spectroscopy (as short list isotopes).		

1. Relinquished by <i>Alfred Santillanes</i> Org. <i>4142</i> Date <i>4/15/14</i> Time <i>11:00</i>	3. Relinquished by _____ Org. _____ Date _____ Time _____
1. Received by <i>Don Watson</i> Org. <i>4142</i> Date <i>4/15/14</i> Time <i>11:00</i>	3. Received by _____ Org. _____ Date _____ Time _____
2. Relinquished by _____ Org. _____ Date _____ Time _____	4. Relinquished by _____ Org. _____ Date _____ Time _____
2. Received by _____ Org. _____ Date _____ Time _____	4. Received by _____ Org. _____ Date _____ Time _____

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

ANALYSIS REQUEST AND CHAIN OF CUSTODY (Continuation)

AR/COC

615429

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		Preservative	Collection Method	Sample Type	Parameter & Method Requested	Lab Sample ID	
✓ 095739	-024	✓ OBS-EB1	NA	4/15/14	10:36	✓ DIW	AG	4x1 L	None	G	EB	High Explosives (SW846-8321A mod.)		
✓ 095739	-029	✓ OBS-EB1	NA	4/15/14	10:38	✓ DIW	P	250 ml	NaOH	G	EB	Total Cyanide (SW846-9012)		
✓ 095739	-033	✓ OBS-EB1	NA	4/15/14	10:39	✓ DIW	P	1 L	HNO3	G	EB	Gamma Spectroscopy (EPA 901.0)		
✓ 095739	-034	✓ OBS-EB1	NA	4/15/14	10:40	✓ DIW	P	1 L	HNO3	G	EB	Gross Alpha and Beta (EPA 900.0)		
✓ 095739	-035	OBS-EB1	NA	4/15/14	10:41	✓ DIW	P	1 L	HNO3	G	EB	Isotopic Uranium (HASL 300)		
✓ 095740	-001	✓ OBS-TB3	NA	4/15/14	10:25	✓ DIW	G	3x40 ml	HCL	G	TB	TCL VOC (SW846-8260B)		
Recipient Initials_____														

Appendix C

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

Memorandum

Date: June 5, 2014
To: File
From: Linda Thal
Subject: Inorganic Data Review and Validation – SNL
Site: SWMU 8/58 GWM
AR/COC: 615424, 615425 and 615426
SDG: 346180
Laboratory: GEL
Project/Task: 146422.10.11.01
Analysis: General Chemistry

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

Summary

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

Total cyanide:

1. The intercept for total cyanide was negative with an absolute value $>$ the MDL but $\leq 3X$ 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**.

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

Holding Times and Preservation

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

Calibration

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

Blanks

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

Laboratory Control Sample (LCS)

All LCS acceptance criteria were met.

Matrix Spike (MS)

All MS/PS recoveries met QC acceptance criteria.

Laboratory Replicate

The replicate analyses met all QC acceptance criteria.

Detection Limits/Dilutions

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

Nitrate/Nitrite:

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

Anions:

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

Other QC

An FB was submitted with AR/COC 615425 but was not associated with any samples. An EB was submitted with AR/COC 615425 and was associated with the samples on AR/COC 615426. A field duplicate pair was submitted with AR/COC 615426. There are no “required” review criteria for field duplicate analyses comparability; no data will be qualified as a result.

No other specific issues that affect data quality were identified.

Reviewed by: Mary Donovan

Level: I

Date: 06/09/14

Memorandum

Date: June 4, 2014
To: File
From: Linda Thal
Subject: GC/MS Organic Data Review and Validation – SNL
Site: SWMU 8/58 GWM
AR/COC: 615424, 615425 and 615426
SDG: 346180
Laboratory: GEL
Project/Task: 146422.10.11.01
Analysis: High Explosives (HE)

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

Summary

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

1. The ICAL RFs for m-nitrotoluene and p-nitrotoluene were <0.05 but ≥ 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 615425 and was associated with the samples on AR/COC 615426. A field duplicate pair was submitted with AR/COC 615426. There are no “required” review criteria for field duplicate analyses comparability; no data will be qualified as a result.

No other specific issues that affect data quality were identified.

Reviewed by: Mary Donovan

Level: I

Date: 06/09/14

Memorandum

Date: June 5, 2014
To: File
From: Linda Thal
Subject: Inorganic Data Review and Validation – SNL
Site: SWMU 8/58 GWM
AR/COC: 615424, 615425 and 615426
SDG: 346180 and 346183
Laboratory: GEL
Project/Task: 146422.10.11.01
Analysis: Metals

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

Summary

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

ICP-MS:

1. Cu was detected at < the PQL in the unfiltered EB, sample 346180021. The associated sample results were detects <5X the EB value and will be **qualified 0.0038U,B2** at 5X the EB value.
2. The original Mg and K results for the unfiltered serial dilution parent sample were >50X the MDL and the serial dilution %Ds were >10%. The associated results for samples 346180015 and -021 were NDs and will be **qualified UJ,D1**. The remaining associated sample results were detects and will be **qualified J,D1**.

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

Holding Times and Preservation

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

ICP-MS Instrument Tune

The ICP-MS tunes met QC acceptance criteria.

Calibration

All initial and continuing calibration met QC acceptance criteria.

Reporting Limit Verification

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

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

Blanks

No target analytes were detected in the blanks except as noted above in the Summary section and as follows. Na was detected at < the PQL in the filtered EB, sample 346183002 and the unfiltered EB, sample 346180021. All associated sample results were detects >5X the EB concentrations and will not be qualified.

ICP -MS Internal Standards

The ICP-MS internal standards met QC acceptance criteria.

Matrix Spike (MS)

The MS met all QC acceptance criteria.

ICP-MS:

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

Laboratory Replicate

The replicate met all QC acceptance criteria.

Laboratory Control Sample (LCS)

The LCS met all QC acceptance criteria.

Detection Limits/Dilutions

All detection limits were properly reported. Sample 346180004 was diluted 5X for Na and samples -033 and -044 were diluted 5X for Ca. Samples 346183001 was diluted 5X for Na and Mg and samples -003 and -004 were diluted 5X for Ca and Mg.

ICP Interference Check Sample (ICS A and AB)

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

ICP Serial Dilution

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

Other QC

An unfiltered FB was submitted with AR/COC 615425 but was not associated with any samples. An EB was submitted with AR/COC 615425 and was associated with the samples on AR/COC 615426. A field duplicate pair was submitted with AR/COC 615426. There are no “required” review criteria for field duplicate analyses comparability; no data will be qualified as a result.

No other specific issues that affect data quality were identified.

Reviewed by: Mary Donovan

Level: I

Date: 06/09/14

Memorandum

Date: June 5, 2014

To: File

From: Linda Thal

Subject: Radiochemical Data Review and Validation – SNL
Site: SWMU 8/58 GWM
AR/COC: 615424, 615425 and 615426
SDG: 346180
Laboratory: GEL
Project/Task: 146422.10.11.01
Analysis: RAD

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

Summary

Four samples were prepared and analyzed with approved procedures using methods EPA 901.1 (gamma spec – short list) and EPA 900.0 (gross alpha/beta). Problems were identified with the data package that resulted in the qualification of data.

All analyses:

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

Gross Alpha/Beta:

1. For batch 1380009, the relative dilution factor between the parent sample and the gross alpha/beta MS/MSD QC sample was >5 and, as a result, the MS/MSD analyses were not used to evaluate the gross alpha and gross beta sample data. The associated sample results will be **qualified J,MS1**.
2. All sample results that were > the MDA but ≤3X the MDA will be **qualified J,FR7**.

Gammascpec:

1. The Am-241 result for sample -040 was negative with an absolute value >2X the MDA. The associated sample result will be **qualified R,FR4**.

Holding Times and Preservation

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

Quantification

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

Calibration

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

Blanks

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

Tracer/Carrier Recovery

No tracers or carriers were required for these methods.

Matrix Spike/Matrix Spike Duplicate (MS/MSD)

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

Laboratory Replicate

All replicate error ratio acceptance criteria were met.

Laboratory Control Sample (LCS)

All LCS recoveries met QC acceptance criteria.

Detection Limits/Dilutions

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

Other QC

An EB was submitted with AR/COC 615425 and was associated with the samples on AR/COC 615426. A field duplicate pair was submitted with AR/COC 615426. There are no “required” review criteria for field duplicate analyses comparability; no data will be qualified as a result.

No other specific issues that affect data quality were identified.

Reviewed by: Mary Donovan

Level: I

Date: 06/09/14

Memorandum

Date: June 4, 2014
To: File
From: Linda Thal
Subject: GC/MS Organic Data Review and Validation – SNL
Site: SWMU 8/58 GWM
AR/COC: 615424, 615425 and 615426
SDG: 346180
Laboratory: GEL
Project/Task: 146422.10.11.01
Analysis: SVOCs

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

Summary

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

1. The MS/MSD RPDs were > acceptance criteria for benzo(g,h,i)perylene and dibenzo(a,h)anthracene. The associated sample results were NDs and will be **qualified UJ,MS5**.

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

Holding Times

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

Instrument Tune

All instrument tune requirements were met.

Calibration

The initial calibration and continuing calibration data met QC acceptance criteria except as follows. The ICAL %RSDs were >15% but ≤40% for atrazine and 2-methyl-4,6-dinitrophenol. The associated sample results were NDs and since no other calibration infraction occurred, will not be qualified.

Blanks

No target analytes were detected in the blanks.

Surrogates

All surrogate recoveries met QC acceptance criteria.

Internal Standards

All internal standards met QC acceptance criteria.

Matrix Spike/Matrix Spike Duplicate (MS/MSD)

All MS/MSD acceptance criteria were met except as noted above in the Summary section and as follows. The MS/MSD recoveries were > the UAL for hexachlorocyclopentadiene. The associated sample results were NDs and will not be qualified.

Laboratory Control Sample (LCS)

All LCS acceptance criteria were met.

Detection Limits/Dilutions

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

Tentatively Identified Compounds (TICs)

TIC reports were not required.

Other QC

An EB was submitted with AR/COC 615425 and was associated with the samples on AR/COC 615426. A field duplicate pair was submitted with AR/COC 615426. There are no “required” review criteria for field duplicate analyses comparability; no data will be qualified as a result.

No other specific issues that affect data quality were identified.

Reviewed by: Mary Donovan

Level: I

Date: 06/09/14

Memorandum

Date: June 4, 2014
To: File
From: Linda Thal
Subject: GC/MS Organic Data Review and Validation – SNL
Site: SWMU 8/58 GWM
AR/COC: 615424, 615425 and 615426
SDG: 346180
Laboratory: GEL
Project/Task: 146422.10.11.01
Analysis: VOCs

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

Summary

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

1. The ICAL %RSD was $>15\%$ but $\leq 40\%$ for dibromochloromethane. The associated result for sample 346180014 was a detect and will be **qualified J,I3**.
2. The ICV %D was $>20\%$ with positive bias for dibromochloromethane. The associated result for sample -014 was a detect and will be **qualified J+,C2**.

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

Holding Times

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

Instrument Tune

All instrument tune requirements were met.

Calibration

The initial calibration and continuing calibration data met QC acceptance criteria except as noted above in the Summary section and as follows. The ICAL %RSDs were >15% but ≤40% for dibromochloromethane; bromoform; 1,2-dibromo-3-chloropropane; 1,2,4-trichlorobenzene and 1,2,3-trichlorobenzene. All remaining associated sample results were NDs and since a positive ICV/CCV is not considered a second infraction, will not be qualified.

The ICV and/or CCV %Ds for nine target compounds (see worksheet) were >20% with positive bias. The remaining associated sample results were NDs and will not be qualified.

The CCV %Ds for seven target compounds (see worksheet) were >20% but ≤40% with negative bias. The associated sample results were NDs and since no other calibration infraction occurred, will not be qualified.

Blanks

No target analytes were detected in the blanks except as follows. Bromodichloromethane was detected at < the PQL and chloroform at > the PQL in the EB, sample -019 and the FBs, samples -001 and -014. Dibromochloromethane was detected at < the PQL in the FB, sample -014. All associated sample results were NDs and will not be qualified.

Surrogates

All surrogate recoveries met QC acceptance criteria.

Internal Standards

All internal standards met QC acceptance criteria.

Matrix Spike/Matrix Spike Duplicate (MS/MSD)

All MS/MSD acceptance criteria were met except as follows. The MSD recovery for 4-methyl-2-pentanone was slightly < the LAL. The LCS and MS recoveries and MS/MSD RPDs were in criteria and, therefore, no data were qualified based on professional judgment.

Laboratory Control Sample (LCS)

All LCS acceptance criteria were met.

Detection Limits/Dilutions

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

Tentatively Identified Compounds (TICs)

TIC reports were not required.

Other QC

Three TBs were submitted, one for each AR/COC. FBs were submitted with AR/COC 615424 and 615425. The FB submitted with AR/COC 615425 was not associated with any samples. An EB was submitted with AR/COC 615425 and was associated with the samples on AR/COC 615426. A field

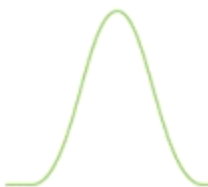
duplicate pair was submitted with AR/COC 615426. There are no “required” review criteria for field duplicate analyses comparability; no data will be qualified as a result.

No other specific issues that affect data quality were identified.

Reviewed by: Mary Donovan

Level: I

Date: 06/09/14



Sample Findings Summary



AR/COC: 615424, 615425, 615426

Page 1 of 3

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

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
	095725-009/CCBA-MW1	Magnesium (7439-95-4)	J, D1
	095725-009/CCBA-MW1	Potassium (7440-09-7)	J, D1
	095727-009/CCBA-FB2	Magnesium (7439-95-4)	UJ, D1
	095727-009/CCBA-FB2	Potassium (7440-09-7)	UJ, D1
	095728-009/CCBA-EB1	Magnesium (7439-95-4)	UJ, D1
	095728-009/CCBA-EB1	Potassium (7440-09-7)	UJ, D1
	095730-009/CCBA-MW2	Copper (7440-50-8)	0.0038U, B2
	095730-009/CCBA-MW2	Magnesium (7439-95-4)	J, D1
	095730-009/CCBA-MW2	Potassium (7440-09-7)	J, D1
	095731-009/CCBA-MW2	Copper (7440-50-8)	0.0038U, B2
	095731-009/CCBA-MW2	Magnesium (7439-95-4)	J, D1
	095731-009/CCBA-MW2	Potassium (7440-09-7)	J, D1
SW846 3510C/8270D			
	095725-002/CCBA-MW1	Benzo(ghi)perylene (191-24-2)	UJ, MS5
	095725-002/CCBA-MW1	Dibenzo(a,h)anthracene (53-70-3)	UJ, MS5
	095728-002/CCBA-EB1	Benzo(ghi)perylene (191-24-2)	UJ, MS5
	095728-002/CCBA-EB1	Dibenzo(a,h)anthracene (53-70-3)	UJ, MS5
	095730-002/CCBA-MW2	Benzo(ghi)perylene (191-24-2)	UJ, MS5
	095730-002/CCBA-MW2	Dibenzo(a,h)anthracene (53-70-3)	UJ, MS5
	095731-002/CCBA-MW2	Benzo(ghi)perylene (191-24-2)	UJ, MS5
	095731-002/CCBA-MW2	Dibenzo(a,h)anthracene (53-70-3)	UJ, MS5
SW846 3535/8321A Modified			
	095725-024/CCBA-MW1	m-Nitrotoluene (99-08-1)	UJ, I4
	095725-024/CCBA-MW1	p-Nitrotoluene (99-99-0)	UJ, I4
	095728-024/CCBA-EB1	m-Nitrotoluene (99-08-1)	UJ, I4
	095728-024/CCBA-EB1	p-Nitrotoluene (99-99-0)	UJ, I4
	095730-024/CCBA-MW2	m-Nitrotoluene (99-08-1)	UJ, I4
	095730-024/CCBA-MW2	p-Nitrotoluene (99-99-0)	UJ, I4
	095731-024/CCBA-MW2	m-Nitrotoluene (99-08-1)	UJ, I4

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
SW846 8260B DOE-AL	095731-024/CCBA-MW2	p-Nitrotoluene (99-99-0)	UJ, I4
	095727-001/CCBA-FB2	Dibromochloromethane (124-48-1)	J+, I3,C2
SW846 9012B	095725-029/CCBA-MW1	Cyanide, Total (57-12-5)	UJ, I5,B4
	095728-029/CCBA-EB1	Cyanide, Total (57-12-5)	UJ, I5,B4
	095730-029/CCBA-MW2	Cyanide, Total (57-12-5)	UJ, I5,B4
	095731-029/CCBA-MW2	Cyanide, Total (57-12-5)	UJ, I5,B4

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

Data Validation Summary Worksheet

AR/COC #: 615424, 615425 and 615426

Site/Project: SWMU 8/58 GWM

Validation Date: 06/04/2014

SDG #: 346180 and 346183

Laboratory: GEL

Validator: Linda Thal

Matrix: Aqueous

of Samples: 57 CVR present: Yes

Analysis Type: ☒ Organic ☒ Metals

AR/COC(s) present: Yes

Sample Container Integrity: OK

☐ Rad ☐ Gen Chem

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

Hold Time/Preservation Outliers								
Sample Number	Laboratory ID	Analysis	Pres.	Coll. Date	Prep. Date	Anal. Date	Anal. within 2X HT	Anal. beyond 2X HT
None								

Comments: Sampled 04/7 and 04/8/2014

Validated by: 

Organic Worksheet (GC/MS)

AR/COC #: 615424, 615425 and 615426

SDG #: 346180

Matrix: Aqueous

Laboratory Sample IDs: 346180001, -002, -013, -014, -019, -030, -031, -042 and -053

Method/Batch #s: 8260B: 1381208

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

Analyte (outliers)	Calibration				MB	5X (10X) MB	LCS %R	MS %R	MSD %R	MS/ MSD RPD	EB -019	FB- 014 Di water	FB -001	TBs
	Int.	RF	RSD/ R ²	(ICV) CCV %D										
Bromodichloromethane	NA	✓	✓	✓	✓	NA	✓	✓	✓	✓	.49J	.52J	.52J	✓
Trichlorotrifluoroethane	NA	✓	✓	-28	✓	NA	✓	✓	✓	✓	✓	✓	✓	✓
Chloroform	NA	✓	✓	✓	✓	NA	✓	✓	✓	✓	3.01	3.43	3.33	✓
Dibromochloromethane	NA	✓	18.5	(+24)	✓	NA	✓	✓	✓	✓	✓	.31J	✓	✓
Acetone	✓	NA	✓	-36	✓	NA		✓	✓	✓	✓	✓	✓	✓
Bromoform	NA	✓	23.7	(+34)	✓	NA	✓	✓	✓	✓	✓	✓	✓	✓
1,2-Dibromo-3-chloropropane	NA	✓	29.0	(+30)	✓	NA	✓	✓	✓	✓	✓	✓	✓	✓
1,2,4-Trichlorobenzene	NA	✓	20.4	(+42) +22	✓	NA	✓	✓	✓	✓	✓	✓	✓	✓
1,2,3-Trichlorobenzene	NA	✓	23.5	(+46)	✓	NA	✓	✓	✓	✓	✓	✓	✓	✓
Methyl acetate	NA	✓	✓	-39	✓	NA	✓	✓	✓	✓	✓	✓	✓	✓
2-Butanone	NA	✓	✓	-38	✓	NA	✓	✓	✓	✓	✓	✓	✓	✓
Carbon disulfide	NA	✓	✓	(+21)	✓	NA	✓	✓	✓	✓	✓	✓	✓	✓
Carbon tetrachloride	NA	✓	✓	(+23)	✓	NA	✓	✓	✓	✓	✓	✓	✓	✓
Styrene	NA	✓	✓	(+23)	✓	NA	✓	✓	✓	✓	✓	✓	✓	✓
Isopropylbenzene	NA	✓	✓	(+23)	✓	NA	✓	✓	✓	✓	✓	✓	✓	✓
4-Methyl-2-pentanone	NA	✓	✓	-26	✓	NA	✓	✓	69.4	✓	✓	✓	✓	✓
2-Hexanone	NA	✓	✓	-24	✓	NA	✓	✓	✓	✓	✓	✓	✓	✓
1,1,2,2-Tetrachloroethane	NA	✓	✓	-21	✓	NA	✓	✓	✓	✓	✓	✓	✓	✓
Surrogate Recovery Outliers														
Sample ID														
None														
IS Outliers														
Sample ID	Area	RT	Area	RT	Area	RT	Area	RT	Area	RT	Area	RT	Area	RT
None														

Comments: HTs OK. ICAL VOA6.I 03/28/2014; Acetone, methylene chloride linear. MS/MSD performed on -002 spiked with trichlorotrifluoroethane;

Organic Worksheet (GC/MS)

AR/COC #: 615424, 615425 and 615426

SDG #: 346180

Matrix: Aqueous

Laboratory Sample IDs: 346180003, -020, -032 and -043

Method/Batch #s: 3510C/8270D: 1379059(prepare)/1379060

Tuning (pass/fail): Pass

TICs Required? (yes/no): No

[illegible]

Comments: HTs OK; MS/MSD on sample -003; ICAL MSD2.I 04/02/2014

High Explosives Worksheet (LC/MS/MS)

AR/COC #: 615424, 615425 and 615426

SDG #: 346180

Matrix: Aqueous

Laboratory Sample IDs: 346180009, -026, -038 and -049

Method/Batch #s: 3535/8321A: 1379002(prepare)/1379003

Analyte (Outliers)	Initial Calibration			Continuing Calibration				Method Blank	5X (10X) Blank	LCS %R	MS %R	MSD %R	MS/MSD RPD	CRI	EB -026		
	Int.	RF	COD RSD/R²	ICV	CCV %D	ICB	CCB										
m-Nitrotoluene	NA	.0395	✓	✓	✓	✓	✓	✓	NA	✓	✓	✓	✓	✓	✓		
p-Nitrotoluene	NA	.025	✓	✓	✓	✓	✓	✓	NA	✓	✓	✓	✓	✓	✓		
Surrogate Recovery Outliers																	
Sample ID																	
None																	
Internal Standard Outliers																	
Sample ID	Area	RT	Sample ID				Area	RT	Sample ID				Area	RT			
None																	

Comments: HTs OK. MS/MSD on -009. primary analytes only; LCMSMS#3. all sample and QC extracts diluted 1:1 with HPLC grade water

Inorganic Metals Worksheet

AR/COC #: 615424, 615425 and 615426

SDG #: 346180 and 346183

Matrix: Aqueous

Laboratory Sample IDs: 346180004, -015, -021, -033 and -044 (UF); 346183001 thru -004 (F – Na, K, Mg and Ca only)

Method/Batch #s: **3005/6010B**: 1378897/1378898 (UF); **3005/6020**: 1385683/1385684 (UF); 1385685/1385686 (F) **7470A**:1382563/1382564 (UF)

ICPMS Mass Cal (pass/fail): Pass

ICPMS Resolution (pass/fail): Pass

Analyte (outliers)	Calibration						MB mg/L	5X Blank or (5X MDL) mg/L	LCS %R	MS %R	Lab Rep RPD	Serial Dil. %D	ICS AB %R	ICS A ± MDL ug/L x50 (mg/L)	CRA CRI %R	EB -021 UF (X5)	FB -015 DI water	EB -002 (F)	X5
	Int. mg/L	R ²	ICV	CCV	ICB ug/L	CCB ug/L													
UF																			
Cu	✓	✓	✓	✓	✓	✓	✓	NA	✓	✓	✓	✓	NA	NA	✓	.000751J (.0038)	.000628J		
Mg	✓	✓	✓	✓	✓	✓	✓	NA	✓	NA	✓	12.6	NA	NA	✓	✓	✓		
Na	✓	✓	✓	✓	✓	✓	✓	NA	✓	NA	✓	✓	NA	NA	✓	.121J (.605)	.107J		
K	✓	✓	✓	✓	✓	✓	✓	NA	✓	✓	✓	14	NA	NA	✓	✓	✓		
F																			
Na	✓	✓	✓	✓	✓	✓	✓	NA	✓	NA	✓	✓	NA	NA	✓			.15J	.75

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

Comments: HTs OK; matrix QC on samples 346180004 (UF - All); 346183001 (F); Ca, Mg, Na >4X spike amount;

Ca diluted 5X for samples 346180033, -044 Na diluted 5X for sample 346180004 346183001 diluted 5X Na and Mg 346183003, -004 diluted 5X Ca, Mg

General Chemistry Worksheet

AR/COC #: 615424, 615425 and 615426

SDG #: 346180

Matrix: Aqueous

Laboratory Sample IDs: 346180 - see below

Method/Batch #s: SW846 9010C/9012A (Total Cyanide): 1378230/1378231; -010, -027, -039, -050

Method/Batch #s: EPA 314.0 (Perchlorate): 1378827; -007, -024, -036, -047

Method/Batch #s: SW846 9056 (Anions): 1379342; -005, -016, -022, -034, -045

Method/Batch #s: EPA 353.2 (NO₃/NO₂):1379711; -006, -017, -023, -035, -046

Method/Batch #s: SM 2320B (Alkalinity): 1379161; -008, -018, -025, -037, -048

[illegible]

Comments: HTs OK. FB for Anions, N/N and alkalinity only

Matrix QC from this SDG for TCN (-010), perchlorate (-007), anions (-005), NO₃/NO₂ (-006), alkalinity (-008)

Fl, Cl and SO4: 5X -005; Cl and SO4 10X -034 and -045

NO₃/NO₂: 5X -006; 10X -035 and -046

Radiochemistry Worksheet

AR/COC #: 615424, 615425 and 615426

SDG #: 346180

Matrix: Aqueous

Laboratory Sample IDs: 346180-see below

Method/Batch#s: EPA 901.1 Gammaspec: 1378843; -011, -028, -040, -051

Method/Batch#s: EPA 900.0 Gross alpha/beta: ¹1380009; -012, -029 -041, -052 ²1385543; -041, -052 (beta only)

Analyte (outliers)	Control Freq.	Control Eval.	Method Blank	5X Blank or 5X MDC	LCS %R	MS %R	MSD %R	MS/ MSD RER	Lab Rep. RER	EB			
None													
Tracer/Carrier Recovery Outliers													
Sample ID	Tracer/Carrier	%R	Sample ID			Tracer/Carrier	%R	Sample ID			Tracer/Carrier	%R	
None													

Comments: Matrix QC GS -011, gross alpha/beta DUP and MS/MSD performed on -012 and -041

¹Gross A and gross B parent and DUP=200ml, MS/MSD = 25ml (8X dilution) –qual.

²Gross B parent and DUP = 150ml, MS/MSD = 50ml (3X dilution) –no qual.

Data rejected by the lab: Am-241 in the duplicate.

CONTRACT LABORATORY
ANALYSIS REQUEST AND CHAIN OF CUSTODY

Internal Lab

Batch No.

SMO Use

AR/COC 615424

Project Name: SWMU 8/58 GWM

Project/Task Manager: Clinton Lum

Project/Task Number: 146422.10.11.01

Service Order: CF262-14

Date Samples Shipped: 4/7/14

Carrier/Waybill No: 217062

Lab Contact: Edie Kent/803-556-8171

Lab Destination: GEL

Contract No.: PO 1303873

SMO Authorization: [Signature]

SMO Contact Phone: 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:

Building: Room: Operational Site:

Sample No.	Fraction	Sample Location Detail	Depth (ft)	Date/Time Collected	Sample Matrix	Container		Preserv-ative	Collection Method	Sample Type	Parameter & Method Requested	Lab Sample ID
						Type	Volume					
095724	-001	CCBA-FB1	NA	4/7/14 9:35	DIW	G	3x40ml	HCL	G	FB	TCL VOC (SW846-8260B)	346180 001
095725	-001	CCBA-MW1	79	4/7/14 9:35	GW	G	3x40ml	HCL	G	SA	TCL VOC (SW846-8260B)	346180 002
095725	-002	CCBA-MW1	79	4/7/14 9:36	GW	AG	4x1 L	None	G	SA	TCL SVOC (SW846-8270C)	346180 003
095725	-009	CCBA-MW1	79	4/7/14 9:37	GW	P	500 ml	HNO3	G	SA	TAL Metals+U(SW846-6010/6020/7470)	346180 004
095725	-016	CCBA-MW1	79	4/7/14 9:40	GW	P	125 ml	None	G	SA	Anions (SW846-9056)	346180 005
095725	-017	CCBA-MW1	79	4/7/14 9:39	FGW	P	500 ml	HNO3	G	SA	Metals Ca,Mg,K,Na(SW846-6020)	346183 001
095725	-018	CCBA-MW1	79	4/7/14 9:41	GW	P	125 ml	H2SO4	G	SA	Nitrate+Nitrite (EPA 353.2)	346180 006
095725	-020	CCBA-MW1	79	4/7/14 9:42	GW	P	250 ml	None	G	SA	Perchlorate (EPA 314.0)	346180 007
095725	-022	CCBA-MW1	79	4/7/14 9:43	GW	P	500 ml	None	G	SA	Alkalinity (SM2320B)	346180 008
095725	-024	CCBA-MW1	79	4/7/14 9:44	GW	AG	4x1 L	None	G	SA	High Explosives (SW846-8321A mod.)	346180 009

Last Chain: ☐ Yes

Validation Req'd: ☒ Yes

Background: ☐ Yes

Confirmatory: ☐ Yes

Sample Tracking

Date Entered:

Entered by:

QC inits.:

SMO Use

Special Instructions/QC Requirements:

EDD ☒ Yes ☐ No

Turnaround Time ☐ 7 Day* ☐ 15 Day* ☒ 30 Day

Negotiated TAT

Sample Disposal ☐ Return to Client ☒ Disposal by Lab

Return Samples By:

Comments: Send report to Tim Jackson/4142/MS 0729/284-2547
If Perchlorate detected,perform verification analysis using SW846-6850M. FGW, filtered in field using a 0.45 micron in-line filter. Report Anions (as Br,Cl,F,SO4), Alkalinity (as total CaCO3,HCO3,CO3), and Gamma Spectroscopy (as short list isotopes).

Conditions on Receipt

Lab Use

Sample Team Members

Name

Signature

Init.

Company/Organization/Phone/Cell

Robert Lynch

[Signature]

RL

SNL/4142/505-844-4013/505-250-7090

Alfred Santillanes

[Signature]

AS

SNL/4142/505-844-5130/505-228-0710

William Gibson

[Signature]

WG

SNL/4142/505-284-3307/505-239-7367

1. Relinquished by [Signature] Org. 4142 Date 4/7/14 Time 10:15

1. Received by [Signature] Org. 4142 Date 4/7/14 Time 10:15

2. Relinquished by [Signature] Org. 4142 Date 4/7/14 Time 11:00

2. Received by [Signature] Org. 662 Date 4-8-14 Time 07:25

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

CONTRACT LABORATORY
ANALYSIS REQUEST AND CHAIN OF CUSTODY (Continuation)

AR/COC 615424

Project Name:		SWMU 8/58 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		
✓ 095725	-029 ✓	CCBA-MW1	79	4/7/14 9:46 ✓	GW	P	250 ml	NaOH	G	SA	Total Cyanide (SW846-9012)	346180 010		
✓ 095725	-033 ✓	CCBA-MW1	79	4/7/14 9:47 ✓	GW	P	1 L	HNO3	G	SA	Gamma Spectroscopy (EPA 901.0)	346180 011		
✓ 095725	-034 ✓	CCBA-MW1	79	4/7/14 9:48 ✓	GW	P	1 L	HNO3	G	SA	Gross Alpha and Beta (EPA 900.0)	346180 012		
✓ 095726	-001 ✓	CCBA-TB1	NA	4/7/14 9:35 ✓	DIW	G	3x40ml	HCL	G	TB	TCL VOC (SW846-8260B)	346180 013		
Recipient Initials <u>mk</u>														

CONTRACT LABORATORY
ANALYSIS REQUEST AND CHAIN OF CUSTODY

Internal Lab

Batch No. *MA*

SMO Use

AR/COC **615425**

Project Name: SWMU 8/58 GWM	Date Samples Shipped: <i>4/8/14</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>217096</i>	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: CF262-14	Lab Destination: GEL	Send Report to SMO: Rita Kavanaugh/505-284-2553	
Contract No.: PO 1303873			

Tech Area:	Operational Site:
Building:	Room:

Sample No.	Fraction	Sample Location Detail	Depth (ft)	Date/Time Collected	Sample Matrix	Container Type	Volume	Preservative	Collection Method	Sample Type	Parameter & Method Requested	Lab Sample ID
✓ 095727	-001	CCBA-FB2	NA	4/7/14 13:19	DIW	G	3x40ml	HCL	G	FB	TCL VOC (SW846-8260B)	346180 014
✓ 095727	-009	CCBA-FB2	NA	4/7/14 13:19	DIW	P	500 ml	HNO3	G	FB	TAL Metals+U(SW846-6010/6020/7470)	346180 015
✓ 095727	-016	CCBA-FB2	NA	4/7/14 13:19	DIW	P	125 ml	None	G	FB	Anions (SW846-9056)	346180 016
✓ 095727	-018	CCBA-FB2	NA	4/7/14 13:19	DIW	P	125 ml	H2SO4	G	FB	Nitrate+Nitrite (EPA 353.2)	346180 017
✓ 095727	-022	CCBA-FB2	NA	4/7/14 13:19	DIW	P	500 ml	None	G	FB	Alkalinity (SM2320B)	346180 018
✓ 095728	-001	CCBA-EB1	NA	4/7/14 13:19	DIW	G	3x40ml	HCL	G	EB	TCL VOC (SW846-8260B)	346180 019
✓ 095728	-002	CCBA-EB1	NA	4/7/14 13:20	DIW	AG	4x1 L	None	G	EB	TCL SVOC (SW846-8270C)	346180 020
✓ 095728	-009	CCBA-EB1	NA	4/7/14 13:22	DIW	P	500 ml	HNO3	G	EB	TAL Metals+U(SW846-6010/6020/7470)	346180 021
✓ 095728	-016	CCBA-EB1	NA	4/7/14 13:25	DIW	P	125 ml	None	G	EB	Anions (SW846-9056)	346180 022
✓ 095728	-017	CCBA-EB1	NA	4/7/14 13:24	FDIW	P	500 ml	HNO3	G	EB	Metals Ca,Mg,K,Na(SW846-6020)	346180 002

Last Chain: <input type="checkbox"/> Yes	Sample Tracking	SMO Use	Special Instructions/QC Requirements:	Conditions on Receipt	
Validation Req'd: <input checked="" type="checkbox"/> Yes	Date Entered:		EDD <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		
Background: <input type="checkbox"/> Yes	Entered by:		Turnaround Time <input type="checkbox"/> 7 Day* <input type="checkbox"/> 15 Day* <input checked="" type="checkbox"/> 30 Day		
Confirmatory: <input type="checkbox"/> Yes	QC inits.:		Negotiated TAT <input type="checkbox"/>		
Sample Team Members	Name	Signature	Init.	Company/Organization/Phone/Cell	Sample Disposal <input type="checkbox"/> Return to Client <input checked="" type="checkbox"/> Disposal by Lab
	Robert Lynch	<i>[Signature]</i>	<i>[Init]</i>	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,perform verification analysis using SW846-6850M. FDIW, filtered in field using a 0.45 micron in-line filter. Report anions (as Br,Cl,F,SO4), alkalinity (as total CaCO3,HCO3,CO3), and gamma spectroscopy (as short list isotopes).
	Alfred Santillanes	<i>[Signature]</i>	<i>[Init]</i>	SNL/4142/505-844-5130/505-228-0710	
	William Gibson	<i>[Signature]</i>	<i>[Init]</i>	SNL/4142/505-284-3307/505-239-7367	

1. Relinquished by <i>Alfred Santillanes</i> Org. 4142 Date <i>4/7/14</i> Time <i>14:03</i>	3. Relinquished by	Org.	Date	Time
1. Received by <i>[Signature]</i> Org. 4192 Date <i>4/7/14</i> Time <i>1403</i>	3. Received by	Org.	Date	Time
2. Relinquished by <i>[Signature]</i> Org. 4142 Date <i>4/8/14</i> Time <i>1000</i>	4. Relinquished by	Org.	Date	Time
2. Received by <i>[Signature]</i> Org. <i>CEL</i> Date <i>4/9/14</i> Time <i>0725</i>	4. Received by	Org.	Date	Time

*Prior confirmation with SMO required for 7 and 15 day TAT
2. Relinquished - 4/8/14 am

CONTRACT LABORATORY
ANALYSIS REQUEST AND CHAIN OF CUSTODY (Continuation)

AR/COC 615425

Project Name:		SWMU 8/58 GWM		Project/Task Manager:		Clinton Lum		Project/Task No.:		146422.10.11.01				Lab use
Tech Area:														
Building:		Room:												
Sample No.	Fraction	Sample Location Detail	Depth (ft)	Date/Time Collected	Sample Matrix	Container		Preservative	Collection Method	Sample Type	Parameter & Method Requested		Lab Sample ID	
						Type	Volume							
✓ 095728	-018	CCBA-EB1	NA	4/7/14 13:26	DIW	P	125 ml	H2SO4	G	EB	Nitrate+Nitrite (EPA 353.2)		346180 023	
✓ 095728	-020	CCBA-EB1	NA	4/7/14 13:27	DIW	P	250 ml	None	G	EB	Perchlorate (EPA 314.0)		346180 024	
✓ 095728	-022	CCBA-EB1	NA	4/7/14 13:28	DIW	P	500 ml	None	G	EB	Alkalinity (SM2320B)		346180 025	
✓ 095728	-024	CCBA-EB1	NA	4/7/14 13:29	DIW	AG	4x1 L	None	G	EB	High Explosives (SW846-8321A mod.)		346180 026	
✓ 095728	-029	CCBA-EB1	NA	4/7/14 13:31	DIW	P	250 ml	NaOH	G	EB	Total Cyanide (SW846-9012)		346180 027	
✓ 095728	-033	CCBA-EB1	NA	4/7/14 13:32	DIW	P	1 L	HNO3	G	EB	Gamma Spectroscopy (EPA 901.0)		346180 028	
✓ 095728	-034	CCBA-EB1	NA	4/7/14 13:33	DIW	P	1 L	HNO3	G	EB	Gross Alpha and Beta (EPA 900.0)		346180 029	
✓ 095729	-001	CCBA-TB2	NA	4/7/14 13:19	DIW	G	3x40ml	HCL	G	TB	TCL VOC (SW846-8260B)		346180 030	
Recipient Initials <i>mk</i>														

CONTRACT LABORATORY
ANALYSIS REQUEST AND CHAIN OF CUSTODY

Internal Lab

Batch No.

SMO Use

AR/COC 615426

Project Name: SWMU 8/58 GWM

Project/Task Manager: Clinton Lum

Project/Task Number: 146422.10.11.01

Service Order: CF262-14

Date Samples Shipped: 4/8/14

Carrier/Waybill No. 217098

Lab Contact: Edie Kent/803-556-8171

Lab Destination: GEL

Contract No.: PO 1303873

SMO Authorization: Don Watson

SMO Contact Phone: 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:

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					
095730	-001	CCBA-MW2	117	4/8/14 9:27	GW	G	3x40ml	HCL	G	SA	TCL VOC (SW846-8260B)	346180 031
095730	-002	CCBA-MW2	117	4/8/14 9:28	GW	AG	4x1 L	None	G	SA	TCL SVOC (SW846-8270C)	346180 032
095730	-009	CCBA-MW2	117	4/8/14 9:32	GW	P	500 ml	HNO3	G	SA	TAL Metals+U(SW846-6010/6020/7470)	346180 033
095730	-016	CCBA-MW2	117	4/8/14 9:35	GW	P	125 ml	None	G	SA	Anions (SW846-9056)	346180 034
095730	-017	CCBA-MW2	117	4/8/14 9:34	FGW	P	500 ml	HNO3	G	SA	Metals Ca,Mg,K,Na(SW846-6020)	346180 035
095730	-018	CCBA-MW2	117	4/8/14 9:36	GW	P	125 ml	H2SO4	G	SA	Nitrate+Nitrite (EPA 353.2)	346180 036
095730	-020	CCBA-MW2	117	4/8/14 9:37	GW	P	250 ml	None	G	SA	Perchlorate (EPA 314.0)	346180 037
095730	-022	CCBA-MW2	117	4/8/14 9:38	GW	P	500 ml	None	G	SA	Alkalinity (SM2320B)	346180 038
095730	-024	CCBA-MW2	117	4/8/14 9:39	GW	AG	4x1 L	None	G	SA	High Explosives (SW846-8321A mod.)	346180 039
095730	-029	CCBA-MW2	117	4/8/14 9:43	GW	P	250 ml	NaOH	G	SA	Total Cyanide (SW846-9012)	

Last Chain: ☒ Yes

Validation Req'd: ☒ Yes

Background: ☐ Yes

Confirmatory: ☐ Yes

Sample Tracking

Date Entered:

Entered by:

QC inits.:

SMO Use

Special Instructions/QC Requirements:

EDD ☒ Yes ☐ No

Turnaround Time ☐ 7 Day* ☐ 15 Day* ☒ 30 Day

Negotiated TAT

Sample Disposal ☐ Return to Client ☒ Disposal by Lab

Return Samples By:

Comments: Send report to Tim Jackson/4142/MS 0729/284-2547
If Perchlorate detected, perform verification analysis using SW846-6850M.FGW,filtered in field using a 0.45 micron in-line filter. Report Anions (as Br,Cl,F,SO4). Alkalinity (as total CaCO3,HCO3,CO3). Gamma Spectroscopy (as short list isotopes).

Conditions on Receipt

Sample Team Members

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

1. Relinquished by [Signature] Org. 4142 Date 4/8/14 Time 10:16

1. Received by [Signature] Org. 4142 Date 4/8/14 Time 10:16

2. Relinquished by [Signature] Org. 4142 Date 4/8/14 Time 11:00

2. Received by [Signature] Org. GEL Date 4-9-14 Time 0735

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

Lab Use

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

Page 2 of 2

AR/COC 615426

[illegible]

Memorandum

Date: June 4, 2014
To: File
From: Linda Thal
Subject: Inorganic Data Review and Validation – SNL
Site: SWMU 68 GWM
AR/COC: 615427, 615428, 615429 and 615430
SDG: 346673
Laboratory: GEL
Project/Task: 146422.10.11.01
Analysis: General Chemistry

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

Summary

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

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

Holding Times and Preservation

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

Calibration

All initial and continuing calibration met QC acceptance criteria.

Blanks

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

Laboratory Control Sample (LCS)

All LCS acceptance criteria were met.

Matrix Spike (MS)

All MS/PS recoveries met QC acceptance criteria.

Laboratory Replicate

The replicate analyses met all QC acceptance criteria.

Detection Limits/Dilutions

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

Nitrate/Nitrite:

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

Anions:

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

Other QC

An EB was submitted with AR/COC 615429 and was associated with the samples on AR/COC 615430. A field duplicate pair was submitted with AR/COC 615430. There are no “required” review criteria for field duplicate analyses comparability; no data will be qualified as a result.

No other specific issues that affect data quality were identified.

Reviewed by: Mary Donovan

Level: I

Date: 06/10/14

Memorandum

Date: June 3, 2014
To: File
From: Linda Thal
Subject: LC/MS/MS Organic Data Review and Validation – SNL
Site: SWMU 68 GWM
AR/COC: 615427, 615428, 615429 and 615430
SDG: 346673
Laboratory: GEL
Project/Task: 146422.10.11.01
Analysis: High Explosives (HE)

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

Summary

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

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

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

Holding Times

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

Instrument Tune

The instrument tune was not reported or evaluated.

Calibration

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

Reporting Limit Verification

All CRI recoveries met QC acceptance criteria.

Blanks

No target analytes were detected in the blanks.

Surrogates

All surrogate recoveries met QC acceptance criteria.

Internal Standards

All internal standards met QC acceptance criteria.

Matrix Spike/Matrix Spike Duplicate (MS/MSD)

The MS/MSD analyses met all QC acceptance criteria.

Laboratory Control Sample (LCS)

All LCS recoveries met QC acceptance criteria.

Detection Limits/Dilutions

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

Other QC

An EB was submitted with AR/COC 615429 and was associated with the samples on AR/COC 615430. A field duplicate pair was submitted with AR/COC 615430. There are no “required” review criteria for field duplicate analyses comparability; no data will be qualified as a result.

No other specific issues that affect data quality were identified.

Reviewed by: Mary Donovan

Level: I

Date: 06/10/14

Memorandum

Date: June 3, 2014
To: File
From: Linda Thal
Subject: Inorganic Data Review and Validation – SNL
Site: SWMU 68 GWM
AR/COC: 615427, 615428, 615429 and 615430
SDG: 346673 and 346674
Laboratory: GEL
Project/Task: 146422.10.11.01
Analysis: Metals

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

Summary

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

ICP-MS:

1. Cu was detected at < the PQL in the unfiltered EB, sample 346673033. The associated sample results were detects <5X the EB value and will be **qualified 0.0029U,B2** at 5X the EB value.

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

Holding Times and Preservation

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

ICP-MS Instrument Tune

The ICP-MS tunes met QC acceptance criteria.

Calibration

All initial and continuing calibration met QC acceptance criteria.

Reporting Limit Verification

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

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

Blanks

No target analytes were detected in the blanks except as noted above in the Summary section and as follows. Na was detected at < the PQL in the filtered EB, sample 346674003. Mg was detected at < the PQL in the unfiltered EB, sample 346673049. All associated sample results were detected >5X the EB concentrations and will not be qualified.

ICP -MS Internal Standards

The ICP-MS internal standards met QC acceptance criteria.

Matrix Spike (MS)

The MS met all QC acceptance criteria.

ICP-MS:

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

Laboratory Replicate

The replicate met all QC acceptance criteria.

Laboratory Control Sample (LCS)

The LCS met all QC acceptance criteria.

Detection Limits/Dilutions

All detection limits were properly reported. All samples excluding the EBs were diluted 5X for Ca.

ICP Interference Check Sample (ICS A and AB)

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

ICP Serial Dilution

The serial dilutions met all QC acceptance criteria.

Other QC

An EB was submitted with AR/COC 615429 and was associated with the samples on AR/COC 615430. A field duplicate pair was submitted with AR/COC 615430. There are no “required” review criteria for field duplicate analyses comparability; no data will be qualified as a result.

No other specific issues that affect data quality were identified.

Reviewed by: Mary Donovan

Level: I

Date: 06/10/14

Memorandum

Date: June 4, 2014

To: File

From: Linda Thal

Subject: Radiochemical Data Review and Validation – SNL
Site: SWMU 68 GWM
AR/COC: 615427, 615428, 615429 and 615430
SDG: 346673
Laboratory: GEL
Project/Task: 146422.10.11.01
Analysis: RAD

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

Summary

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

All analyses:

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

Gross Alpha/Beta:

1. The relative dilution factor between the parent sample and the gross alpha/beta MS/MSD QC samples was >5 and, as a result, the MS/MSD analyses were not used to evaluate gross alpha and gross beta sample data. The associated sample results will be **qualified J,MS1**.
2. All sample results that were > the MDA but ≤3X the MDA will be **qualified J,FR7**.

Gammaspec:

1. No peaks were identified for Am-241 for sample 346673011. The associated sample result will be **qualified BD,Z2**.

Holding Times and Preservation

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

Quantification

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

Calibration

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

Blanks

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

Tracer/Carrier Recovery

The sample tracer recoveries met QC acceptance criteria.

Matrix Spike/Matrix Spike Duplicate (MS/MSD)

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

Gross Alpha/Beta:

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

Laboratory Replicate

All replicate error ratio acceptance criteria were met.

Gross Alpha/Beta:

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

Laboratory Control Sample (LCS)

All LCS recoveries met QC acceptance criteria.

Detection Limits/Dilutions

The samples were not diluted. All required detection limits were met except as follows. The Am-241 RDL was < the MDA for the duplicate performed on sample 346673011.

Other QC

An EB was submitted with AR/COC 615429 and was associated with the samples on AR/COC 615430. A field duplicate pair was submitted with AR/COC 615430. There are no “required” review criteria for field duplicate analyses comparability; no data will be qualified as a result.

No other specific issues that affect data quality were identified.

Reviewed by: Mary Donovan

Level: I

Date: 06/10/14

Memorandum

Date: June 3, 2014
To: File
From: Linda Thal
Subject: GC/MS Organic Data Review and Validation – SNL
Site: SWMU 68 GWM
AR/COC: 615427, 615428, 615429 and 615430
SDG: 346673
Laboratory: GEL
Project/Task: 146422.10.11.01
Analysis: SVOCs

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

Summary

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

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

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

Holding Times

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

Instrument Tune

All instrument tune requirements were met.

Calibration

The initial calibration and continuing calibration data met QC acceptance criteria except as noted above in the Summary section and as follows. The ICAL intercept was positive and $>$ the MDL for p-nitroaniline. The associated sample results were NDs and will not be qualified.

The ICAL %RSD was $>15\%$ but $\leq 40\%$ for atrazine. The associated sample results were NDs and since no other calibration infraction occurred, will not be qualified.

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

Blanks

No target analytes were detected in the blanks.

Surrogates

All surrogate recoveries met QC acceptance criteria.

Internal Standards

All internal standards met QC acceptance criteria.

Matrix Spike/Matrix Spike Duplicate (MS/MSD)

All MS/MSD acceptance criteria were met.

Laboratory Control Sample (LCS)

All LCS acceptance criteria were met.

Detection Limits/Dilutions

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

Tentatively Identified Compounds (TICs)

TIC reports were not required.

Other QC

An EB was submitted with AR/COC 615429 and was associated with the samples on AR/COC 615430. A field duplicate pair was submitted with AR/COC 615430. There are no “required” review criteria for field duplicate analyses comparability; no data will be qualified as a result.

No other specific issues that affect data quality were identified.

Reviewed by: Mary Donovan

Level: I

Date: 06/10/14

Memorandum

Date: June 3, 2014
To: File
From: Linda Thal
Subject: GC/MS Organic Data Review and Validation – SNL
Site: SWMU 68 GWM
AR/COC: 615427, 615428, 615429 and 615430
SDG: 346673
Laboratory: GEL
Project/Task: 146422.10.11.01
Analysis: VOCs

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

Summary

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

1. The dichlorodifluoromethane intercept was negative and $>$ the MDL but $\leq 3X$ the MDL for the ICAL associated with samples 346673031, -044, -047, -059 and -071. The associated sample results were NDs and will be **qualified UJ,I5**.
2. The methyl acetate and 2-butanone RFs were <0.05 but ≥ 0.01 for the ICAL and/or ICV/CCVs associated with samples -031, -044, -047, -059 and -071. The associated sample results were NDs and will be **qualified UJ,I4**.
3. The dibromochloromethane %RSD was $>15\%$ but $\leq 40\%$ for the ICAL associated with samples -001, -014, -015, -016, -029 and -030. The associated result for sample -015 was a detect and will be **qualified J,I3**.
4. The dibromochloromethane %D was $>20\%$ with positive bias for the ICV associated with samples -001, -014, -015, -016, -029 and -030. The associated result for sample -015 was a detect and will be **qualified J+,C2**.

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

Holding Times

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

Instrument Tune

All instrument tune requirements were met.

Calibration

The initial calibration and continuing calibration data met QC acceptance criteria except as noted above in the Summary section and as follows. For one or more of the ICALs, the %RSDs were >15% but ≤40% for dibromochloromethane; bromoform; 1,2-dibromo-3-chloropropane; 1,2,4-trichlorobenzene and 1,2,3-trichlorobenzene. All remaining associated sample results were NDs and since a positive CCV is not considered a second infraction, will not be qualified.

The %Ds for nine target compounds (see worksheet) were >20% with positive bias for the ICV and/or CCV associated with samples -001, -014, -015, -016, -029 and -030. The remaining associated sample results were NDs and will not be qualified.

The %Ds for eight target compounds (see worksheet) were >20% but ≤40% with negative bias for the CCV associated with samples -001, -014, -015, -016, -029 and -030. The associated sample results were NDs and since no other calibration infraction occurred, will not be qualified.

The dichlorodifluoromethane and acetone %Ds were >20% with positive bias for the ICV/CCV associated with samples -031, -044, -047, -059 and -071. The associated sample results were NDs and will not be qualified.

Blanks

No target analytes were detected in the blanks except as follows. Bromodichloromethane was detected at < the PQL and chloroform at > the PQL in the EB, sample -031 and the FBs, samples -015 and -030. Dibromochloromethane was detected at < the PQL in the FB, sample -015. Toluene was detected at < the PQL in the TB, sample -029. All associated sample results were NDs and will not be qualified.

Surrogates

All surrogate recoveries met QC acceptance criteria.

Internal Standards

All internal standards met QC acceptance criteria.

Matrix Spike/Matrix Spike Duplicate (MS/MSD)

All MS/MSD acceptance criteria were met.

Laboratory Control Sample (LCS)

All LCS acceptance criteria were met except as follows. The acetone %R was > UAL for the LCS associated with samples -031, -044, -047, -059 and -071. The associated sample results were NDs and will not be qualified.

Detection Limits/Dilutions

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

Tentatively Identified Compounds (TICs)

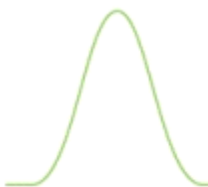
TIC reports were not required.

Other QC

Four TBs were submitted, one for each AR/COC. FBs were submitted with AR/COC 615428 and 615429. The FB submitted with AR/COC 615429 was not associated with any samples. An EB was submitted with AR/COC 615429 and was associated with the samples on AR/COC 615430. A field duplicate pair was submitted with AR/COC 615430. There are no “required” review criteria for field duplicate analyses comparability; no data will be qualified as a result.

No other specific issues that affect data quality were identified.

Reviewed by: Mary Donovan **Level:** I **Date:** 06/10/14



Sample Findings Summary



AR/COC: 615427, 615428, 615429, 615430

Page 1 of 3

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

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
	095739-033/OBS-EB1	Cesium-137 (10045-97-3)	BD, FR3
	095739-033/OBS-EB1	Cobalt-60 (10198-40-0)	BD, FR3
	095739-033/OBS-EB1	Potassium-40 (13966-00-2)	BD, FR3
	095741-033/OBS-MW3	Americium-241 (14596-10-2)	BD, FR3
	095741-033/OBS-MW3	Cesium-137 (10045-97-3)	BD, FR3
	095741-033/OBS-MW3	Cobalt-60 (10198-40-0)	BD, FR3
	095741-033/OBS-MW3	Potassium-40 (13966-00-2)	BD, FR3
	095742-033/OBS-MW3	Americium-241 (14596-10-2)	BD, FR3
	095742-033/OBS-MW3	Cesium-137 (10045-97-3)	BD, FR3
	095742-033/OBS-MW3	Cobalt-60 (10198-40-0)	BD, FR3
	095742-033/OBS-MW3	Potassium-40 (13966-00-2)	BD, FR3
SW846 3005/6020 DOE-AL			
	095741-009/OBS-MW3	Copper (7440-50-8)	0.0029U, B2
	095742-009/OBS-MW3	Copper (7440-50-8)	0.0029U, B2
SW846 3510C/8270D			
	095733-002/OBS-MW1	Carbazole (86-74-8)	UJ, I3,C3
	095736-002/OBS-MW2	Carbazole (86-74-8)	UJ, I3,C3
	095739-002/OBS-EB1	Carbazole (86-74-8)	UJ, I3,C3
	095741-002/OBS-MW3	Carbazole (86-74-8)	UJ, I3,C3
	095742-002/OBS-MW3	Carbazole (86-74-8)	UJ, I3,C3
SW846 3535/8321A Modified			
	095733-024/OBS-MW1	m-Nitrotoluene (99-08-1)	UJ, I4
	095733-024/OBS-MW1	p-Nitrotoluene (99-99-0)	UJ, I4
	095736-024/OBS-MW2	m-Nitrotoluene (99-08-1)	UJ, I4
	095736-024/OBS-MW2	p-Nitrotoluene (99-99-0)	UJ, I4
	095739-024/OBS-EB1	m-Nitrotoluene (99-08-1)	UJ, I4
	095739-024/OBS-EB1	p-Nitrotoluene (99-99-0)	UJ, I4
	095741-024/OBS-MW3	m-Nitrotoluene (99-08-1)	UJ, I4
	095741-024/OBS-MW3	p-Nitrotoluene (99-99-0)	UJ, I4

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
	095742-024/OBS-MW3	m-Nitrotoluene (99-08-1)	UJ, I4
	095742-024/OBS-MW3	p-Nitrotoluene (99-99-0)	UJ, I4
SW846 8260B DOE-AL			
	095735-001/OBS-FB1	Dibromochloromethane (124-48-1)	J+, I3,C2
	095739-001/OBS-EB1	2-Butanone (78-93-3)	UJ, I4
	095739-001/OBS-EB1	Dichlorodifluoromethane (75-71-8)	UJ, I5
	095739-001/OBS-EB1	Methyl acetate (79-20-9)	UJ, I4
	095740-001/OBS-TB3	2-Butanone (78-93-3)	UJ, I4
	095740-001/OBS-TB3	Dichlorodifluoromethane (75-71-8)	UJ, I5
	095740-001/OBS-TB3	Methyl acetate (79-20-9)	UJ, I4
	095741-001/OBS-MW3	2-Butanone (78-93-3)	UJ, I4
	095741-001/OBS-MW3	Dichlorodifluoromethane (75-71-8)	UJ, I5
	095741-001/OBS-MW3	Methyl acetate (79-20-9)	UJ, I4
	095742-001/OBS-MW3	2-Butanone (78-93-3)	UJ, I4
	095742-001/OBS-MW3	Dichlorodifluoromethane (75-71-8)	UJ, I5
	095742-001/OBS-MW3	Methyl acetate (79-20-9)	UJ, I4
	095743-001/OBS-TB4	2-Butanone (78-93-3)	UJ, I4
	095743-001/OBS-TB4	Dichlorodifluoromethane (75-71-8)	UJ, I5
	095743-001/OBS-TB4	Methyl acetate (79-20-9)	UJ, I4

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

Data Validation Summary Worksheet

AR/COC #: 615427, 615428, 615429 and 615430

Site/Project: SWMU 68 GWM

Validation Date: 06/03/2014

SDG #: 346673 and 346674

Laboratory: GEL

Validator: Linda Thal

Matrix: Aqueous

of Samples: 76 CVR present: Yes

Analysis Type: ☒ Organic ☒ Metals

AR/COC(s) present: Yes

Sample Container Integrity: OK

☐ Rad ☐ Gen Chem

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

Hold Time/Preservation Outliers								
Sample Number	Laboratory ID	Analysis	Pres.	Coll. Date	Prep. Date	Anal. Date	Anal. within 2X HT	Anal. beyond 2X HT
None								

Comments: Sampled 04/14 through 04/16/2014

Validated by: 

Organic Worksheet (GC/MS)

AR/COC #: 615427, 615428, 615429 and 615430

SDG #: 346673

Matrix: Aqueous

Laboratory Sample IDs: 346673001, -014, -015, -016, -029, -030, -031, -044, -047, -059 and -071

Method/Batch #s: 8260B: 1383154

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

Analyte (outliers)	Calibration				MB	5X (10X) MB	LCS %R	MS %R	MSD %R	MS/ MSD RPD	EB -031	FB- 030 Di water	FB -015	TB -029
	Int.	RF	RSD/R 2	(ICV) CCV %D										
Bromodichloromethane	NA	✓	✓	✓	✓	NA	✓	✓	✓	✓	.57J	.51J	.5J	✓
Toluene	NA	✓	✓	✓	✓	NA	✓	✓	✓	✓	✓	✓	✓	.58J
Chloroform	NA	✓	✓	✓	✓	NA	✓	✓	✓	✓	3.37	3.25	3.33	✓
Dibromochloromethane	NA	✓	18.5 ¹	(+24) ¹	✓	NA	✓	✓	✓	✓	✓	✓	.3J	✓
Acetone	✓ ^{1, 2}	NA ^{1, 2}	✓	-35 ¹ +23 ²	✓	NA	156 ²	✓	✓	✓	✓	✓	✓	✓
Bromoform	NA	✓	23.7 ¹ 22.1 ²	(+34) ¹	✓	NA	✓	✓	✓	✓	✓	✓	✓	✓
1,2-Dibromo-3-chloropropane	NA	✓	29.0 ¹ 18.5 ²	(+30) ¹	✓	NA	✓	✓	✓	✓	✓	✓	✓	✓
1,2,4-Trichlorobenzene	NA	✓	20.4 ¹	(+42) ¹	✓	NA	✓	✓	✓	✓	✓	✓	✓	✓
1,2,3-Trichlorobenzene	NA	✓	23.5 ¹	(+46) ¹	✓	NA	✓	✓	✓	✓	✓	✓	✓	✓
Dichlorodifluoromethane	-.54 ²	NA	✓	(+36) ² +39 ²	✓	NA	✓	✓	✓	✓	✓	✓	✓	✓
Methyl acetate	NA	.044 ² .046 ² .042 ²	✓	-33 ¹	✓	NA	✓	✓	✓	✓	✓	✓	✓	✓
2-Butanone	NA	.036 ² .035 ² .037 ²	✓	-39 ¹	✓	NA	✓	✓	✓	✓	✓	✓	✓	✓
Carbon disulfide	NA	✓	✓	(+21) ¹	✓	NA	✓	✓	✓	✓	✓	✓	✓	✓
Carbon tetrachloride	NA	✓	✓	(+23) ¹	✓	NA	✓	✓	✓	✓	✓	✓	✓	✓
Styrene	NA	✓	✓	(+23) ¹	✓	NA	✓	✓	✓	✓	✓	✓	✓	✓
Isopropylbenzene	NA	✓	✓	(+23) ¹	✓	NA	✓	✓	✓	✓	✓	✓	✓	✓
1,2-Dichloroethane-d4 (surr) ^{LT 06/10/2014}	NA	✓	✓	-21 ¹ -22 ¹	LT ✓	NA	✓	✓	✓	✓	✓	✓	✓	✓
tert-Butyl-methyl-ether	NA	✓	✓	-22 ¹	✓	NA	✓	✓	✓	✓	✓	✓	✓	✓
1,2-Dichlorethane	NA	✓	✓	-21 ¹	✓	NA	✓	✓	✓	✓	✓	✓	✓	✓
4-Methyl-2-pentanone	NA	✓	✓	-28 ¹	✓	NA	✓	✓	✓	✓	✓	✓	✓	✓
2-Hexanone	NA	✓	✓	-27 ¹	✓	NA	✓	✓	✓	✓	✓	✓	✓	✓
1,1,2,2-Tetrachloroethane	NA	✓	✓	-23 ¹	✓	NA	✓	✓	✓	✓	✓	✓	✓	✓

Surrogate Recovery Outliers												
Sample ID												
None												
IS Outliers												
Sample ID	Area	RT	Area	RT	Area	RT	Area	RT	Area	RT	Area	RT
None												

Comments: HTs OK.

¹ICAL VOA6.I 03/28/2014 Samples 346673001, -014, -015, -016, -029, -030; Acetone, methylene chloride linear

²ICAL VOA2.I 03/17/2014 Samples -031, -044, -047, -059 and -071; Acetone, dichlorodifluoromethane, methylene chloride linear

MS/MSD performed on -047 spiked with trichlorotrifluoroethane;

Revised 7/2007

Organic Worksheet (GC/MS)

AR/COC #: 615427, 615428, 615429 and 615430

SDG #: 346673

Matrix: Aqueous

Laboratory Sample IDs: 346673002, -017, -032, -048 and -060

Method/Batch #s: 3510C/8270D: 1380691(prepare)/1380692

Tuning (pass/fail): Pass

TICs Required? (yes/no): No

[illegible]

Comments: HTs OK; MS/MSD on sample -002; ICAL MSD5.I 04/02/2014

High Explosives Worksheet (LC/MS/MS)

AR/COC #: 615427, 615428, 615429 and 615430

SDG #: 346673

Matrix: Aqueous

Laboratory Sample IDs: 346673009, -024, -039, -054 and -066

Method/Batch #s: 3535/8321A: 1380884(prep)/1380885

Analyte (Outliers)	Initial Calibration			Continuing Calibration				Method Blank	5X (10X) Blank	LCS %R	MS %R	MSD %R	MS/MSD RPD	CRI	EB -039		
	Int.	RF	COD RSD/R²	ICV	CCV %D	ICB	CCB										
m-Nitrotoluene	NA	.026	✓	✓	✓	✓	✓	✓	NA	✓	✓	✓	✓	✓	✓		
p-Nitrotoluene	NA	.014	✓	✓	✓	✓	✓	✓	NA	✓	✓	✓	✓	✓	✓		
Surrogate Recovery Outliers																	
Sample ID																	
None																	
Internal Standard Outliers																	
Sample ID	Area	RT	Sample ID				Area	RT	Sample ID				Area	RT			
None																	

Comments: HTs OK; MS/MSD on -009; primary analytes only; LCMSMS#3 – o-nitrotoluene quadratic intercept = 0; all sample and QC extracts diluted 1:1 with HPLC grade water

Inorganic Metals Worksheet

AR/COC #: 615427, 615428, 615429 and 615430

SDG #: 346673 and 346674

Matrix: Aqueous

Laboratory Sample IDs: 346673003, -018, -033, -049 and -061 (UF); 346674001 thru -005 (F – Na, K, Mg and Ca only)

Method/Batch #s: **3005/6010B**: 1381070/1381071 (UF); **3005/6020**: 1381411/1381412 (F&UF) & 1387444/1387446 (Ag) **7470A**:1385133/1385137 (UF)

ICPMS Mass Cal (pass/fail): Pass

ICPMS Resolution (pass/fail): Pass

[illegible]

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

Comments: HTs OK; matrix QC on samples 346673003 (All – ICPMS Ag only) and 346674001 (ICPMS); Ca, Mg, Na >4X spike amount;

Ca diluted 5X for samples 346673003, -018, -049 and -061 and 346674001 thru -005 (excl -003)

General Chemistry Worksheet

AR/COC #: 615427, 615428, 615429 and 615430

SDG #: 346673

Matrix: Aqueous

Laboratory Sample IDs: 346673 - see below

Method/Batch #s: SW846 9010C/9012A (Total Cyanide): 1380670/1380673; -010, -025, -040, -055, -067

Method/Batch #s: EPA 314.0 (Perchlorate): 1380834; -007, -022, -037, -052, -064

Method/Batch #s: SW846 9056 (Anions): 1381359; -005, -020, -035, -050, -062

Method/Batch #s: EPA 353.2 (NO₃/NO₂):1381374; -006, -021, -036, -051, -063

Method/Batch #s: SW846 7196A (Hexavalent Chromium); 1380152; -004 1380402; -019, -034 1380686; -045, -046

Method/Batch #s: SM 2320B (Alkalinity): 1382034; -008, -023, -038, -053, -065

Analyte (outliers)	Calibration						Method Blank	5X Blank or (5X MDL)	LCS %R	MS %R	MSD %R	MS/ MSD RPD	Lab Rep. RPD	Partial/ Total RPD	EB -035	EB X5
	Int.	R ²	ICV	CCV	ICB mg/L	CCB mg/L										
Chloride	✓	✓	✓	✓	✓	✓	✓	NA	✓	✓	NA	NA	✓	NA	.0687J	.3435

Comments: HTs OK except Hex Cr -004, -019, -045, -046 (±5%)

Matrix QC from this SDG for TCN (-010), perchlorate (-007), anions (-005), NO₃/NO₂ (-006), Hex Cr (-004/-019/-045), alkalinity (-008)

Cl and SO₄: 10X -005, -020, -050, -062

NO₃/NO₂: 5X -006, -021; 10X -051, -063

Radiochemistry Worksheet

AR/COC #: 615427, 615428, 615429 and 615430

SDG #: 346673

Matrix: Aqueous

Laboratory Sample IDs: 346673-see below

Method/Batch#: DOE EML HASL 300 Alphaspec U: 1380684; -013, -028, -043, -058, -070

Method/Batch#s: EPA 901.1 Gammaspec: 1380786; -011, -026, -041, -056, -068

Method/Batch#s: EPA 900.0 Gross alpha/beta: 1380009; -012, -027, -042, -057, -069

Analyte (outliers)	Control Freq.	Control Eval.	Method Blank	5X Blank or 5X MDC	LCS %R	MS %R	MSD %R	MS/ MSD RER	Lab Rep. RER	EB			
None													
Tracer/Carrier Recovery Outliers													
Sample ID	Tracer/Carrier	%R	Sample ID			Tracer/Carrier	%R	Sample ID			Tracer/Carrier	%R	
None													

Comments: Matrix QC alphaspec U (-013), GS (-011), gross alpha/beta DUP and MS/MSD performed on SNL sample from another SDG

DUP did not meet required DL for Am-241 (RDL < MDA)

-011 no peaks for Am-241

-042 neg >3X TPU < MDA

Gross A and gross B parent and DUP =200ml, MS/MSD = 25ml (8X dilution) –qual.

Data rejected by the lab: None.

CONTRACT LABORATORY
ANALYSIS REQUEST AND CHAIN OF CUSTODY

Internal Lab

Batch No.

SMO Use

AR/COC 615427

Project Name: SWMU 68 GWM

Project/Task Manager: Clinton Lum

Project/Task Number: 146422.10.11.01

Service Order: CF263-14

Date Samples Shipped: 4/14/14

Carrier/Waybill No. 217347

Lab Contact: Edie Kent/803-556-8171

Lab Destination: GEL

Contract No.: PO 1303873

SMO Authorization: Don W. Clarys

SMO Contact Phone: 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:

Building: Room: Operational Site:

Sample No.	Fraction	Sample Location Detail	Depth (ft)	Date/Time Collected	Sample Matrix	Container		Preserv-ative	Collection Method	Sample Type	Parameter & Method Requested	Lab Sample ID
						Type	Volume					
✓ 095733	-001 ✓	OBS-MW1	153	4/14/14 9:44 ✓	GW	G	3x40ml	HCL	G	SA	TCL VOC (SW846-8260B)	346673 001
✓ 095733	-002 ✓	OBS-MW1	153	4/14/14 9:45 ✓	GW	AG	4x1 L	None	G	SA	TCL SVOC (SW846-8270C) ✓	346673 002
✓ 095733	-009 ✓	OBS-MW1	153	4/14/14 9:47 ✓	GW	P	500 ml	HNO3	G	SA	TAL Metals+U (SW846-6010/6020/7470)	346673 003
✓ 095733	-014 ✓	OBS-MW1	153	4/14/14 9:50 ✓	GW	P	250 ml	None	G	SA	Hexavalent Chromium (SW846-7196A)	346673 004
✓ 095733	-016 ✓	OBS-MW1	153	4/14/14 9:51 ✓	GW	P	125 ml	None	G	SA	Anions (SW846-9056)	346673 005
✓ 095733	-017 ✓	OBS-MW1	153	4/14/14 9:49 ✓	FGW	P	500 ml	HNO3	G	SA	Metals-Ca,Mg,K,Na(SW846-6020)	346673 001
✓ 095733	-018 ✓	OBS-MW1	153	4/14/14 9:52 ✓	GW	P	125 ml	H2SO4	G	SA	Nitrate+Nitrite (EPA 353.2)	346673 006
✓ 095733	-020 ✓	OBS-MW1	153	4/14/14 9:53 ✓	GW	P	250 ml	None	G	SA	Perchlorate (EPA 314.0)	346673 007
✓ 095733	-022 ✓	OBS-MW1	153	4/14/14 9:54 ✓	GW	P	500 ml	None	G	SA	Alkalinity (SM2320B)	346673 008
✓ 095733	-024 ✓	OBS-MW1	153	4/14/14 9:55 ✓	GW	AG	4x1 L	None	G	SA	High Explosives (SW846-8321A mod)	346673 009

Last Chain: ☐ Yes

Validation Req'd: ☒ Yes

Background: ☐ Yes

Confirmatory: ☐ Yes

Sample Tracking

Date Entered:

Entered by:

QC inits.:

SMO Use

Special Instructions/QC Requirements:

EDD ☒ Yes ☐ No

Turnaround Time ☐ 7 Day* ☐ 15 Day* ☒ 30 Day

Negotiated TAT ☐

Sample Disposal ☐ Return to Client ☒ Disposal by Lab

Return Samples By:

Comments: Send report to Tim Jackson/4142/MS 0729/284-2547
If Perchlorate detected,perform verification analysis using SW846-6850M. FGW, filtered in field using a 0.45 micron in-line filter. Report Anions (as Br,Cl,F,SO4), Alkalinity (as total CaCO3,HCO3,CO3). Gamma Spectroscopy (as short list isotopes).

Conditions on Receipt

Lab Use

Sample Team Members

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

1. Relinquished by *Alfred Santillanes* Org. 4142 Date 4/14/14 Time 10:35

1. Received by *Don W. Clarys* Org. 4142 Date 4/14/14 Time 10:35

2. Relinquished by *Don W. Clarys* Org. 4142 Date 4/14/14 Time 11:00

2. Received by *William Gibson* Org. GEL Date 4-15-14 Time 0745

3. Relinquished by

3. Received by

4. Relinquished by

4. Received by

Org.

Date

Time

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

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

Page 2 of 2

AR/COC 615427

[illegible]

CONTRACT LABORATORY
ANALYSIS REQUEST AND CHAIN OF CUSTODY

Internal Lab

Batch No. *N/A*

SMO Use

AR/COC

615428

Project Name:	SWMU 68 GWM	Date Samples Shipped:	4/15/14	SMO Authorization:	<i>[Signature]</i>
Project/Task Manager:	Clinton Lum	Carrier/Waybill No.	217403	SMO Contact Phone:	
Project/Task Number:	146422.10.11.01	Lab Contact:	Edie Kent/803-556-8171	Lorraine Herrera/505-844-3199	
Service Order:	CF263-14	Lab Destination:	GEL	Send Report to SMO:	
		Contract No.:	PO 1303873	Rita Kavanaugh/505-284-2553	

☐ 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

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					
095735	-001	OBS-FB1	NA	4/15/14 9:13	DIW	G	3x40ml	HCL	G	FB	TCL VOC (SW846-8260B)	346673 015
095736	-001	OBS-MW2	252	4/15/14 9:13	GW	G	3x40ml	HCL	G	SA	TCL VOC (SW846-8260B)	346673 016
095736	-002	OBS-MW2	252	4/15/14 9:14	GW	AG	4x1 L	None	G	SA	TCL SVOC (SW846-8270C)	346673 017
095736	-009	OBS-MW2	252	4/15/14 9:16	GW	P	500 ml	HNO3	G	SA	TAL Metals+U (SW846-6010/6020/7470)	346673 018
095736	-014	OBS-MW2	252	4/15/14 9:19	GW	P	250 ml	None	G	SA	Hexavalent Chromium (SW846-7196A)	346673 019
095736	-016	OBS-MW2	252	4/15/14 9:20	GW	P	125 ml	None	G	SA	Anions (SW846-9056)	346673 020
095736	-017	OBS-MW2	252	4/15/14 9:18	FGW	P	500 ml	HNO3	G	SA	Metals-Ca,Mg,K,Na(SW846-6020)	346673 002
095736	-018	OBS-MW2	252	4/15/14 9:21	GW	P	125 ml	H2SO4	G	SA	Nitrate+Nitrite (EPA 353.2)	346673 021
095736	-020	OBS-MW2	252	4/15/14 9:22	GW	P	250 ml	None	G	SA	Perchlorate (EPA 314.0)	346673 022
095736	-022	OBS-MW2	252	4/15/14 9:23	GW	P	500 ml	None	G	SA	Alkalinity (SM2320B)	346673 023

Last Chain:	<input type="checkbox"/> Yes	Sample Tracking	SMO Use	Special Instructions/QC Requirements:	Conditions on Receipt
Validation Req'd:	<input checked="" type="checkbox"/> Yes	Date Entered:		EDD <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	
Background:	<input type="checkbox"/> Yes	Entered by:		Turnaround Time <input type="checkbox"/> 7 Day* <input type="checkbox"/> 15 Day* <input checked="" type="checkbox"/> 30 Day	
Confirmatory:	<input type="checkbox"/> Yes	QC inits.:		Negotiated TAT <input type="checkbox"/>	
Sample Team Members	Name	Signature	Init.	Company/Organization/Phone/Cell	Sample Disposal <input type="checkbox"/> Return to Client <input checked="" type="checkbox"/> Disposal by Lab
	Robert Lynch	<i>[Signature]</i>	RL	SNL/4142/505-844-4013/505-250-7090	Return Samples By:
	Alfred Santillanes	<i>[Signature]</i>	AS	SNL/4142/505-844-5130/505-228-0710	
	William Gibson	<i>[Signature]</i>	WG	SNL/4142/505-284-3307/505-239-7367	
Comments: Send report to Tim Jackson/4142/MS 0729/284-2547 If Perchlorate detected, perform verification analysis using SW846-6850M. FGW, filtered in field using a 0.45 micron in-line filter. Report Anions (as Br,Cl,F,SO4), Alkalinity (as total CaCO3,HCO3,CO3). Gamma Spectroscopy (as short list isotopes).					Lab Use

1. Relinquished by <i>[Signature]</i> Org. 4142 Date 4/15/14 Time 0950	3. Relinquished by _____ Org. _____ Date _____ Time _____
1. Received by <i>[Signature]</i> Org. 4142 Date 4/15/14 Time 0950	3. Received by _____ Org. _____ Date _____ Time _____
2. Relinquished by <i>[Signature]</i> Org. 4142 Date 4/15/14 Time 1000	4. Relinquished by _____ Org. _____ Date _____ Time _____
2. Received by <i>[Signature]</i> Org. 4142 Date 4-16-14 Time 0725	4. Received by _____ Org. _____ Date _____ Time _____

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

ANALYSIS REQUEST AND CHAIN OF CUSTODY (Continuation)

Page 2 of 2

AR/COC 615428

[illegible]

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CONTRACT LABORATORY
ANALYSIS REQUEST AND CHAIN OF CUSTODY

Internal Lab

Batch No.

SMO Use

AR/COC 615429

Project Name: SWMU 68 GWM

Project/Task Manager: Clinton Lum

Project/Task Number: 146422.10.11.01

Service Order: CF263-14

Date Samples Shipped: 4/15/14

Carrier/Waybill No: 217411

Lab Contact: Edie Kent/803-556-8171

Lab Destination: GEL

Contract No.: PO 1303873

SMO Authorization: [Signature]

SMO Contact Phone: Lorraine Herrera/505-844-3199

Send Report to SMO: Rita Kavanaugh/505-284-2553

☐ Waste Characterization

☐ RMMA

☐ Released by COC No.

☒ 4° Celsius

Tech Area:

Building: Room: Operational Site:

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

Sample No.	Fraction	Sample Location Detail	Depth (ft)	Date/Time Collected	Sample Matrix	Container Type	Volume	Preservative	Collection Method	Sample Type	Parameter & Method Requested	Lab Sample ID
095738	-001	OBS-FB2	NA	4/15/14 10:25	DIW	G	3x40ml	HCL	G	FB	TCL VOC (SW846-8260B)	346673 030
095739	-001	OBS-EB1	NA	4/15/14 10:25	DIW	G	3x40ml	HCL	G	EB	TCL VOC (SW846-8260B)	346673 031
095739	-002	OBS-EB1	NA	4/15/14 10:26	DIW	AG	4x1 L	None	G	EB	TCL SVOC (SW846-8270C)	346673 032
095739	-009	OBS-EB1	NA	4/15/14 10:28	DIW	P	500 ml	HNO3	G	EB	TAL Metals+U (SW846-6010/6020/7470)	346673 033
095739	-014	OBS-EB1	NA	4/15/14 10:31	DIW	P	250 ml	None	G	EB	Hexavalent Chromium (SW846-7196A)	346673 034
095739	-016	OBS-EB1	NA	4/15/14 10:32	DIW	P	125 ml	None	G	EB	Anions (SW846-9056)	346673 035
095739	-017	OBS-EB1	NA	4/15/14 10:30	FDIW	P	500 ml	HNO3	G	EB	Metals-Ca,Mg,K,Na(SW846-6020)	346673 003
095739	-018	OBS-EB1	NA	4/15/14 10:33	DIW	P	125 ml	H2SO4	G	EB	Nitrate+Nitrite (EPA 353.2)	346673 036
095739	-020	OBS-EB1	NA	4/15/14 10:34	DIW	P	250 ml	None	G	EB	Perchlorate (EPA 314.0)	346673 037
095739	-022	OBS-EB1	NA	4/15/14 10:35	DIW	P	500 ml	None	G	EB	Alkalinity (SM2320B)	346673 038

Last Chain: ☐ Yes

Validation Req'd: ☒ Yes

Background: ☐ Yes

Confirmatory: ☐ Yes

Sample Team Members

Sample Tracking

SMO Use

Special Instructions/QC Requirements:

Conditions on Receipt

Lab Use

1. Relinquished by [Signature]	Org. 4142	Date 4/15/14	Time 11:00	3. Relinquished by	Org.	Date	Time
1. Received by [Signature]	Org. 4142	Date 4/15/14	Time 11:00	3. Received by	Org.	Date	Time
2. Relinquished by [Signature]	Org. 4142	Date 4/15/14	Time 11:30	4. Relinquished by	Org.	Date	Time
2. Received by [Signature]	Org. 4142	Date 4-16-14	Time 0725	4. Received by	Org.	Date	Time

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

CONTRACT LABORATORY
ANALYSIS REQUEST AND CHAIN OF CUSTODY

Internal Lab

Batch No.

SMO Use

AR/COC 615430

Project Name: SWMU 68 GWM

Project/Task Manager: Clinton Lum

Project/Task Number: 146422.10.11.01

Service Order: CF263-14

Date Samples Shipped: 4/16/14

Carrier/Waybill No. 217464

Lab Contact: Edie Kent/803-556-8171

Lab Destination: GEL

Contract No.: PO 1303873

SMO Authorization: Don J. Stephens

SMO Contact Phone: 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:

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
095741	-001	OBS-MW3	208	4/16/14 9:04	GW	G	3x40ml	HCL	G	SA	TCL VOC (SW846-8260B)	346673 047
095741	-002	OBS-MW3	208	4/16/14 9:05	GW	AG	4x1 L	None	G	SA	TCL SVOC (SW846-8270C)	346673 048
095741	-009	OBS-MW3	208	4/16/14 9:08	GW	P	500 ml	HNO3	G	SA	TAL Metals+U (SW846-6010/6020/7470)	346673 049
095741	-014	OBS-MW3	208	4/16/14 9:11	GW	P	250 ml	None	G	SA	Hexavalent Chromium (SW846-7196A)	346673 045
095741	-016	OBS-MW3	208	4/16/14 9:12	GW	P	125 ml	None	G	SA	Anions (SW846-9056)	346673 050
095741	-017	OBS-MW3	208	4/16/14 9:10	FGW	P	500 ml	HNO3	G	SA	Metals-Ca,Mg,K,Na(SW846-6020)	346674 004
095741	-018	OBS-MW3	208	4/16/14 9:13	GW	P	125 ml	H2SO4	G	SA	Nitrate+Nitrite (EPA 353.2)	346673 051
095741	-020	OBS-MW3	208	4/16/14 9:14	GW	P	250 ml	None	G	SA	Perchlorate (EPA 314.0)	346673 052
095741	-022	OBS-MW3	208	4/16/14 9:15	GW	P	500 ml	None	G	SA	Alkalinity (SM2320B)	346673 053
095741	-024	OBS-MW3	208	4/16/14 9:16	GW	AG	4x1 L	None	G	SA	High Explosives (SW846-8321A mod)	346673 054

Last Chain: ☒ Yes

Validation Req'd: ☒ Yes

Background: ☐ Yes

Confirmatory: ☐ Yes

Sample Tracking

Date Entered:

Entered by:

QC inits.:

SMO Use

Special Instructions/QC Requirements:

EDD ☒ Yes ☐ No

Turnaround Time ☐ 7 Day* ☐ 15 Day* ☒ 30 Day

Negotiated TAT

Sample Disposal ☐ Return to Client ☒ Disposal by Lab

Return Samples By:

Comments: Send report to Tim Jackson/4142/MS 0729/284-2547
If Perchlorate detected,perform verification analysis using SW846-6850M. FGW, filtered in field using a 0.45 micron in-line filter. Report Anions (as Br,Cl,F,SO4), Alkalinity (as total CaCO3,HCO3,CO3). Gamma Spectroscopy (as short list isotopes).

Conditions on Receipt

Lab Use

Sample Team Members

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

1. Relinquished by

1. Received by

2. Relinquished by

2. Received by

Org. 4142

Date 4/16/14

Time 0957

Org. 4142

Date 4/16/14

Time 0957

Org. 4142

Date 4/16/14

Time 1030

Org. 4142

Date 4/17/14

Time 0735

3. Relinquished by

3. Received by

4. Relinquished by

4. Received by

Org.

Org.

Org.

Org.

Date

Date

Date

Date

Time

Time

Time

Time

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

CONTRACT LABORATORY
ANALYSIS REQUEST AND CHAIN OF CUSTODY (Continuation)

AR/COC 615430

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 use	Lab Sample ID		
✓ 095741	-029 ✓	OBS-MW3	208	4/16/14 9:19 ✓	GW	P	250 ml	NaOH	G	SA	Total Cyanide (SW846-9012)		346673 055		
✓ 095741	-033 ✓	OBS-MW3	208	4/16/14 9:20 ✓	GW	P	1 L	HNO3	G	SA	Gamma Spectroscopy (EPA 901.0)		346673 056		
✓ 095741	-034 ✓	OBS-MW3	208	4/16/14 9:22 ✓	GW	P	1 L	HNO3	G	SA	Gross Alpha and Beta (EPA 900.0)		346673 057		
✓ 095741	-035 ✓	OBS-MW3	208	4/16/14 9:24 ✓	GW	P	1 L	HNO3	G	SA	Isotopic Uranium (HASL 300)		346673 058		
✓ 095742	-001 ✓	OBS-MW3	208	4/16/14 9:04 ✓	GW	G	3x40ml	HCL	G	DU	TCL VOC (SW846-8260B)		346673 059		
✓ 095742	-002 ✓	OBS-MW3	208	4/16/14 9:05 ✓	GW	AG	4x1 L	None	G	DU	TCL SVOC (SW846-8270C)		346673 060		
✓ 095742	-009 ✓	OBS-MW3	208	4/16/14 9:08 ✓	GW	P	500 ml	HNO3	G	DU	TAL Metals+U (SW846-6010/6020/7470)		346673 061		
✓ 095742	-014 ✓	OBS-MW3	208	4/16/14 9:11 ✓	GW	P	250 ml	None	G	DU	Hexavalent Chromium (SW846-7196A)		346673 046		
✓ 095742	-016 ✓	OBS-MW3	208	4/16/14 9:12 ✓	GW	P	125 ml	None	G	DU	Anions (SW846-9056)		346673 062		
✓ 095742	-017 ✓	OBS-MW3	208	4/16/14 9:10 ✓	FGW	P	500 ml	HNO3	G	DU	Metals-Ca,Mg,K,Na(SW846-6020)		346673 005		
✓ 095742	-018 ✓	OBS-MW3	208	4/16/14 9:13 ✓	GW	P	125 ml	H2SO4	G	DU	Nitrate+Nitrite (EPA 353.2)		346673 063		
✓ 095742	-020 ✓	OBS-MW3	208	4/16/14 9:14 ✓	GW	P	250 ml	None	G	DU	Perchlorate (EPA 314.0)		346673 064		
✓ 095742	-022 ✓	OBS-MW3	208	4/16/14 9:15 ✓	GW	P	500 ml	None	G	DU	Alkalinity (SM2320B)		346673 065		
✓ 095742	-024 ✓	OBS-MW3	208	4/16/14 9:16 ✓	GW	AG	4x1 L	None	G	DU	High Explosives (SW846-8321A mod)		346673 066		
✓ 095742	-029 ✓	OBS-MW3	208	4/16/14 9:19 ✓	GW	P	250 ml	NaOH	G	DU	Total Cyanide (SW846-9012)		346673 067		
✓ 095742	-033 ✓	OBS-MW3	208	4/16/14 9:20 ✓	GW	P	1 L	HNO3	G	DU	Gamma Spectroscopy (EPA 901.0)		346673 068		
✓ 095742	-034 ✓	OBS-MW3	208	4/16/14 9:22 ✓	GW	P	1 L	HNO3	G	DU	Gross Alpha and Beta (EPA 900.0)		346673 069		
✓ 095742	-035 ✓	OBS-MW3	208	4/16/14 9:24 ✓	GW	P	1 L	HNO3	G	DU	Isotopic Uranium (HASL 300)		346673 070		
✓ 095743	-001 ✓	OBS-TB4 ✓	NA	4/16/14 9:04 ✓	DIW	G	3x40 ml	HCL	G	TB	TCL VOC (SW846-8260B)		346673 071		
Recipient Initials 