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Hazardous Waste Bureau

CERTIFIED MAIL-RETURN RECEIPT REQUESTED

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

Subject: Department of Energy/National Nuclear Security Administration Sandia Corporation *Environmental Restoration Operations Consolidated Quarterly Report, October 2013*

Dear Mr. Kieling:

Enclosed is the *Environmental Restoration Operations Consolidated Quarterly Report, October 2013* for the Department of Energy, National Nuclear Security Administration, Sandia Corporation that addresses all quarterly reporting (April through June 2013) required under the *Hazardous and Solid Waste Amendments Module of the Resource Conservation and Recovery Act Permit, the Compliance Order on Consent and the Chemical Waste Landfill Closure Plan* for Sandia National Laboratories/New Mexico, Environmental Protection Agency identification number NM5890110518.

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

Sincerely,

James W. Todd
Assistant Manager for Engineering

Enclosure

cc: See Page 2

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14-035-542841

CERTIFICATION STATEMENT FOR APPROVAL AND FINAL RELEASE OF DOCUMENTS

Document title: **Environmental Restoration Operations Consolidated Quarterly Report, October 2013**

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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U.S. Department of Energy
National Nuclear Security Administration
Sandia Site Office
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Sandia National Laboratories, New Mexico

Environmental Restoration Operations

A U.S. Department of Energy Environmental Cleanup Program

Consolidated Quarterly Report

April – June 2013

October 2013

United States Department of Energy
Sandia Field Office

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CONSOLIDATED QUARTERLY REPORT

October 2013

SANDIA NATIONAL LABORATORIES, NEW MEXICO

ENVIRONMENTAL RESTORATION OPERATIONS

U.S. DEPARTMENT OF ENERGY:	SANDIA FIELD OFFICE
CONTRACTOR:	SANDIA CORPORATION
PROJECT MANAGER:	John Cochran

NUMBER OF POTENTIAL RELEASE SITES SUBJECT TO THIS PERMIT: 33

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

REPORTING PERIOD: April – June 2013

OVERVIEW

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

SECTION I:	Environmental Restoration Operations Consolidated Quarterly Report, April – June 2013
SECTION II:	Perchlorate Screening Quarterly Groundwater Monitoring Report, April – June 2013
SECTION III:	Solid Waste Management Units 149 and 154 Quarterly Groundwater Monitoring Report, April – June 2013
SECTION IV:	Solid Waste Management Units 8/58 and 68 Quarterly Groundwater Monitoring Report, April – June 2013

ABBREVIATIONS AND ACRONYMS

µg/L	microgram(s) per liter
AOC	Area of Concern
AOP	Administrative Operating Procedure
BSG	Burn Site Groundwater
CAC	Corrective Action Complete
CAMU	Corrective Action Management Unit
CCBA	Coyote Canyon Blast Area
CFR	Code of Federal Regulations
CME	Corrective Measures Evaluation
COA	certificates of analyses
CTF	Coyote Test Field
CWL	Chemical Waste Landfill
CY	Calendar Year
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
HE	high explosive(s)
HQ	hazard quotient
LTMMP	Long-Term Monitoring and Maintenance Plan
LTS	Long-Term Stewardship
MCL	maximum contaminant level
MDA	minimum detectable activity
MDL	method detection limit
mg/L	milligram(s) per liter
mL	milliliter(s)
MWL	Mixed Waste Landfill
ND	nondetect
NMED	New Mexico Environment Department
NNSA	National Nuclear Security Administration

NPN	nitrate plus nitrite
NTU	nephelometric turbidity units
OBS	Old Burn Site
ORP	oxidation-reduction potential
PAH	polycyclic aromatic hydrocarbon
PCCP	Post-Closure Care Permit
pCi/L	picocuries per liter
QC	quality control
RCRA	Resource Conservation and Recovery Act
RDX	hexahydro-1,3,5-trinitro-1,3,5-triazine
RPD	relative percent difference
Sandia	Sandia Corporation
SAP	Sampling and Analysis Plan
SC	specific conductance
SNL/NM	Sandia National Laboratories, New Mexico
SVOC	semivolatile organic compound
SWMU	Solid Waste Management Unit
TA	Technical Area
TAG	Tijeras Arroyo Groundwater
TAL	Target Analyte List
TB	trip blank
the Order	the Compliance Order on Consent
VOC	volatile organic compound

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SECTION I
ENVIRONMENTAL RESTORATION OPERATIONS CONSOLIDATED QUARTERLY REPORT, APRIL – JUNE 2013

1.0 Introduction

This Environmental Restoration Operations (ER) Consolidated Quarterly Report (ER Quarterly Report) provides the status of ongoing corrective actions being implemented by Sandia National Laboratories, New Mexico (SNL/NM) ER for the April, May, and June 2013 quarterly reporting period. The following sections outline the status of regulatory closure activities for the Mixed Waste Landfill (MWL), project management and site closure, site-wide hydrogeologic characterization, and ER/Long-Term Stewardship (LTS) activities.

2.0 Environmental Restoration Operations Work Completed

2.1 Mixed Waste Landfill

The Long-Term Monitoring and Maintenance Plan (LTMMP) was submitted to the New Mexico Environment Department (NMED) in March 2012 (SNL/NM March 2012). NMED initiated a 60-day public comment period on the MWL LTMMP on September 14, 2012, and held a public meeting on October 16, 2012.

A biology inspection of the MWL evapotranspirative cover (ET Cover) was performed on May 29, 2013 by the SNL/NM staff biologist in accordance with requirements presented in the March 2012 MWL LTMMP. The native foliar coverage was determined to meet successful revegetation criteria. Two supplemental watering events were conducted prior to the inspection. The staff biologist recommended that supplemental watering continue based on very limited 2013 precipitation (only 0.6 inches were recorded from January through May 2013).

Restoration field work at the MWL Borrow Pit in Technical Area (TA) III began in May and continued through June. The restoration field work included the following components:

- Topographic survey to fine tune the final grading plan (cut and fill requirements), which is designed to enhance the distribution of storm water throughout the site to facilitate revegetation efforts.

- Site grading to create four discrete “low areas” within the Borrow Pit to hold surface water after larger precipitation events.

- Ripping and soil amendment application to support seeding and revegetation efforts by loosening the surface soil and addressing the low total organic carbon and high alkalinity soil conditions.

- Seeding and gravel mulching the low lying areas, and seeding the surrounding areas including the side slopes and perimeter run-on control (i.e., soil berm feature).

The restoration work is scheduled for completion in early July 2013, just prior to the 2013 monsoon season, and is designed to stabilize the site and close the National Pollution Discharge Elimination System Construction Permit.

2.1.1 MWL Evapotranspirative Cover Supplemental Watering Activities

Due to the very dry 2012-2013 winter season and the lack of substantial natural precipitation during the previous reporting period (i.e., January through March 2013), supplemental watering was performed during this reporting period. Seven events were performed, with each event applying the equivalent of a 0.5-inch rainfall on the ET Cover surface. Three events were performed in May (equivalent to 1.5 inches of rain), and four events were performed in June (equivalent to 2 inches of rain). The watering system was modified on June 21, 2013 to provide improved coverage at the north and south ends of the side slopes.

A comprehensive summary report of all supplemental watering performed prior to 2012 is provided in the revised MWL LTMMP (SNL/NM March 2012).

2.1.2 MWL Evapotranspirative Cover Maintenance Activities

No MWL ET Cover maintenance activities were performed during the reporting period based upon ET Cover conditions. No significant erosion or animal burrowing was observed. Routine cover maintenance will be scheduled for the next reporting period (July through September 2013) to remove Russian thistle and other invasive annual weedy species as needed.

A comprehensive summary report of all cover maintenance activities performed prior to 2012 is presented in the revised MWL LTMMP (SNL/NM March 2012).

2.2 Project Management and Site Closure

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

2.2.1 Permit Modification Request Submitted in March 2006

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

- SWMUs 4, 5, 46, 49, 52, 68, 91, 101, 116, 138, 140, 147, 149, 150, 154, 161, 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 sites (SWMUs 83, 84, and 240), the MWL (SWMU 76), and three groundwater investigation sites (TA-V, Burn Site Groundwater [BSG], and Tijeras Arroyo Groundwater [TAG]).

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

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

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

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

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

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

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

- The section titled, "SWMUs/AOCs to be Subject to Groundwater Monitoring Controls," specifies that annual groundwater monitoring is to be conducted at:

  1. SWMU 49 - Building 9820 Drains (Lurance Canyon)
  2. SWMU 116 - Building 9990 Septic Systems (CTF)

  Groundwater monitoring results are summarized in Sections I.2.3.8 and I.2.3.9, respectively, of this ER Quarterly Report.

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

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

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

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

The SWMU 52 - Liquid Waste Disposal System (LWDS) Holding Tank was addressed separately in the April 2010 NMED letter. The NMED requested additional information to aid their determination of site status (Brandwein December 2009a and 2009b). In December 2011, SNL/NM ER personnel provided requested information to the NMED, along with a proposal to address NMED concerns about the future use of this LWDS site (SNL/NM December 2011). In October 2012, the NMED requested additional corrective action, as described in Section I.2.2.4 of this ER Quarterly Report.

In a letter dated July 27, 2012, the NMED granted CAC status to three SWMUs/AOCs, which 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, 234
- AOC 1115

Via Public Notice and letter (both dated September 17, 2012), the NMED solicited public comments and initiated the public comment period on 24 SWMUs/AOCs that the NMED intends, pending public input, to approve as CAC (NMED September 2012). The 24 SWMUs/AOCs included SWMU 52. Twenty-three of these 24 SWMUs/AOCs were from the March 2006 and January 2008 requests. The NMED stated in their September 17, 2012 solicitation of public comments that persons who previously provided public comment, in response to the "Notice of Public Comment Period and Intent to Approve a Class 3 Permit Modification of the RCRA Permit for Sandia National Laboratories" for the 26 SWMUs/ AOCs (NMED December 2007), before the public review and comment period ended on February 8, 2008, do not need to resubmit their comments. However, they may submit additional comments concerning any of the 24 SWMUs/AOCs currently being proposed for CAC status. However, those who requested a public hearing by the February 8, 2008, deadline must submit a new hearing request.

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

2.2.4 SWMU 52 Liquid Waste Disposal System

On October 10, 2012, the NMED requested additional corrective action for SWMU 52 (Kieling October 2012). Specifically, the NMED requested submittal of a schedule by December 11, 2012 that Tanks 2 and 4 be removed or filled with a permanent insoluble material to prevent releases of water by July 2013; and a written report submitted to the NMED by October 11, 2013 (Kieling October 2012). On December 10, 2012, DOE/Sandia requested a 30 day extension for providing the schedule to NMED (Beausoleil December 2012). Logistical and technical challenges required consideration prior to developing a schedule. The principle logistical challenge was the potentially large excavation area necessitated by the size and depth of the tanks. Moreover, the location of the potentially large excavation would impact access to TA-V, likely intercept buried utilities, and possibly affect TA-V operations. An additional challenge was the evaluation of the permitted confined workspace requirement to safely and effectively fill the tanks with permanent insoluble material. On December 12, 2012, NMED approved the extension request (Kieling December 2012).

The National Environmental Policy Act Checklist for "SWMU 52 – Liquid Waste Disposal Tanks 2 and 4, TA-V" was approved by DOE/SFO on February 4, 2013. The letter providing a schedule for filling Tanks 2 and 4 with a permanent insoluble material by July 31, 2013 was submitted to NMED on February 26, 2013 (Beausoleil February 2013). The letter also stated that a written report will be submitted to NMED by October 11, 2013.

2.3 Site-Wide Hydrogeologic Characterization

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

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

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

Analytical results for the June 2013 groundwater sampling of monitoring wells at SWMU 149 (CTF-MW3) and SWMU 154 (CTF-MW2) are presented in Section III of this ER Quarterly Report.

Analytical results for the April 2013 groundwater sampling of monitoring wells at SWMUs 8/58 (CCBA-MW-1 and CCBA-MW-2) and SWMU 68 (OBS-MW1, OBS-MW2, and OBS-MW3) are presented in Section IV of this ER Quarterly Report.

2.3.1 Technical Area V Groundwater

Groundwater sampling at TA-V was conducted in May and June.

2.3.2 Burn Site Groundwater

BSG groundwater sampling was conducted in April and May. A report describing the decommissioning of BSG monitoring wells 12AUP01, CYN-MW1D, and CYN-MW2S, and the installation of replacement well CYN-MW13 was approved by NMED on June 17, 2013 (NMED June 2013).

2.3.3 Tijeras Arroyo Groundwater

TAG investigation groundwater sampling was conducted in June 2013.

2.3.4 Mixed Waste Landfill Groundwater

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

2.3.5 Chemical Waste Landfill Groundwater

No CWL groundwater monitoring activities were performed during this reporting period; semi-annual sampling events are conducted in January and July.

2.3.6 SWMUs 8/58 Groundwater

SWMUS 8/58 groundwater sampling was conducted in April 2013.

2.3.7 SWMU 68 Groundwater

SWMU 68 groundwater sampling was conducted in April 2013.

2.3.8 SWMU 49 Groundwater

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

2.3.9 SWMU 116 Groundwater

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

2.3.10 SWMU 149 Groundwater

SWMU 149 groundwater sampling was conducted in June 2013.

2.3.11 SWMU 154 Groundwater

SWMU 154 groundwater sampling was conducted in June 2013.

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

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

- The TA-V Groundwater Corrective Measures Evaluation (CME) Work Plan submitted to the NMED on May 11, 2004 (SNL/NM April 2004)

- The BSG Interim Measures Work Plan submitted to the NMED on May 26, 2005 (SNL/NM May 2005)

- The CME Report for the TAG Investigation submitted to the NMED on September 1, 2005 (SNL/NM August 2005)

- The BSG Current Conceptual Model of Groundwater Flow and Contaminant Transport submitted to the NMED on April 9, 2008 (SNL/NM March 2008)

- The TA-V Geophysical Logs and Slug Test Results Report submitted to the NMED on November 24, 2010 (SNL/NM November 2010)

- Summary Report for TA-V Groundwater and Soil-Vapor Monitoring Well Installation submitted to the NMED on June 30, 2011 (SNL/NM June 2011)

- MWL Groundwater Monitoring Report for CY 2010 submitted to the NMED on September 30, 2011 (SNL/NM September 2011)

- MWL LTMMP submitted to the NMED on March 26, 2012 (SNL/NM March 2012)

3.0 Long-Term Stewardship Work Completed

3.1 Chemical Waste Landfill

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

- Quarterly inspection of the CWL ET Cover surface, storm water diversion structures, and security fence was performed on June 3, 2013. No maintenance or repairs were required.

3.2 Corrective Action Management Unit

Corrective Action Management Unit (CAMU) post-closure care operations consist of vadose zone monitoring, leachate removal, and post-closure inspections as required in the PCCP. Activities for this reporting period (April through June 2013) include the following:

- Quarterly monitoring of the Vadose Zone Monitoring System was conducted in June 2013. The results will be presented in the 2013 CAMU Vadose Zone Monitoring System Annual Monitoring Results Report (anticipated submittal to the NMED in September 2013).

- Composite leachate sampling for waste characterization was conducted on May 7, 2013.

- Weekly pumping of leachate from the leachate collection and removal system was performed. Waste management associated with the leachate collection and removal system during this reporting period is outlined in Section I.3.2.1.

- Weekly inspections of the RCRA less than 90-day accumulation area were conducted.

- Quarterly inspection of the site was performed on June 5 and June 7, 2013, which included the containment cell cover, storm-water diversion structures, security fences, gates, signs, and benchmarks. The inspection findings are as follows:

    - Weedy plant species were identified and will be removed in September 2013.

    - Deep rooting four-wing saltbush plants were identified and will be removed during the winter (2013-2014) to achieve the most effective mortality.

    - Site locks in need of lubrication. Site locks were lubricated on June 18, 2013.

3.2.1 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.

- Leachate waste stored on site as of April 1, 2013 – 30 gallons.

- Leachate and rinsate waste generated on site during the reporting period – 86 gallons of leachate and 2 gallons of rinsate.

- Leachate and rinsate waste removed from the site by Hazardous Waste Handling Facility personnel on May 16, 2013 – 73 gallons of leachate, 2 gallons of rinsate.

- Leachate and rinsate waste remaining on site at the end of this reporting period – 43 gallons of leachate, 0 gallons of rinsate.

3.2.2 CAMU Regulatory Activities

NMED conducted an audit of the CAMU on April 1 and April 2, 2013. There were no findings reported by NMED.

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

The CWL Annual Post-Closure Care Report for CY 2012 was submitted to the NMED on March 27, 2013 (SNL/NM March 2013).

4.0 References

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

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

Beausoleil, G. (U.S. Department of Energy National Nuclear Security Administration [NNSA]/Sandia Field Office), December 2012. Letter to J. Keiling (New Mexico Environment Department). "Extension Request for Providing a Schedule for Filling or Removing Tanks at Solid Waste Management Unit 52, Department of Energy/ National Nuclear Security Administration, Sandia National Laboratories, EPA ID #NM5890110518 HWB-SNL-06-007 and HWB-08-001," December 10, 2012.

Beausoleil, G. (U.S. Department of Energy (NNSA)/Sandia Field Office), February 2013. Letter to J. Keiling (New Mexico Environment Department). "Schedule for Solid Waste Management Unit 52, Tanks 2 and 4, Sandia National Laboratories, EPA ID #NM5890110518 HWB-SNL-06-007 and HWB-08-001," February 26, 2013.

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

Kieling, J.E. (New Mexico Environment Department), October 2012. Letter to G. Beausoleil (U.S. Department of Energy NNSA/Sandia Site Office) and S. Orrell (Sandia National Laboratories/New Mexico), "Solid Waste Management Unit 52, Sandia National Laboratories, EPA ID # NM5890110518 HWB-SNL-06-007 and HWB-08-001," October 10, 2012.

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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
Site-Wide Hydrogeologic Characterization

Investigation Site	Sampling Frequency in CY 2013[a]	Quarter of Sampling in CY 2013	Location of Analytical Results	Location of Perchlorate Analytical Results	Monitoring Wells in Network
TA-V Groundwater	Quarterly	1,2,3,4	AGMR	AGMR	AVN-1, LWDS-MW1, LWDS-MW2, TAV-MW2, TAV-MW3, TAV-MW4, TAV-MW5, TAV-MW6, TAV-MW7, TAV-MW8, TAV-MW9, TAV-MW10, TAV-MW11, TAV-MW12, TAV-MW13, TAV-MW14
BSG	Semiannually	1,2, 4	AGMR	AGMR	CYN-MW4, CYN-MW7, CYN-MW8, CYN-MW9, CYN-MW10, CYN-MW11, CYN-MW12, CYN-MW13
TAG	Quarterly	1,2,3,4	AGMR	N/A	PGS-2, TA1-W-01, TA1-W-02, TA1-W-03, TA1-W-04, TA1-W-05, TA1-W-06, TA1-W-08, TA2-NW1-595, TA2-SW1-320, TA2-W-01, TA2-W-19, TA2-W-26, TA2-W-27, TJA-2, TJA-3, TJA-4, TJA-6, TJA-7, WYO-3, WYO-4
MWL Groundwater	Annually	1	AGMR	N/A	MWL-BW2, MWL-MW4, MWL-MW5, MWL-MW6, MWL-MW7, MWL-MW8, MWL-MW9
CWL Groundwater	Semiannually	1,3	AGMR	N/A	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 III of ER Quarterly	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

[a]Not all wells in a particular investigation are sampled at the same frequency, this represents the maximum frequency of sampling at a site.

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

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SECTION II

PERCHLORATE SCREENING QUARTERLY GROUNDWATER MONITORING REPORT, APRIL – JUNE 2013

1.0 Introduction

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

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

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

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

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

2.0 Scope of Activities

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

Data for numerous wells identified in the Order have satisfied this requirement; therefore, these wells have been removed from the perchlorate screening program. The perchlorate results for these wells have been provided in previous reports and are not discussed in this current report. Wells discussed in previous perchlorate screening reports are included in Table II-2. Semiannual perchlorate monitoring at well CYN-MW6 was scheduled for April. However, the groundwater elevation in CYN-MW6 had been significantly decreasing in recent years, and when the well was purged on April 12th, the groundwater level never recovered sufficiently to complete the sampling. Work plans are currently underway to install a deeper, replacement well at this location. After installation, the replacement well will continue to be sampled semiannually for perchlorate.

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

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

- "SWMUs 8/58 Groundwater Monitoring, Mini-SAP for Third Quarter, Fiscal Year 2013" (SNL/NM April 2013a)

- "SWMU 68 Groundwater Monitoring, Mini-SAP for Second Quarter, Fiscal Year 2013" (SNL/NM April 2013b)

- "SWMU 149 Groundwater Monitoring, Mini-SAP for Third Quarter, Fiscal Year 2013" (SNL/NM June 2013a)

- "SWMU 154 Groundwater Monitoring, Mini-SAP for Third Quarter, Fiscal Year 2013" (SNL/NM June 2013b)

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

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

- Turbidity measurements are less than 5 nephelometric turbidity units (NTU), or within 10 percent for turbidity values greater than 5 NTU.

- pH is within 0.1 units.

- Temperature is within 1.0 degree Celsius.

- SC is within 5 percent.

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

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

3.0 Regulatory Criteria

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

3.1 Burn Site Groundwater

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

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

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

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

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

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

3.2 Tijeras Arroyo and Technical Area V Groundwater

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

3.3 March 2006 and January 2008 Permit Modification Requests

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

- SWMU 49—Annual sampling of existing monitoring well CYN-MW5. This well was sampled four times from May 2004 through February 2005. Based on four consecutive ND results, monitoring well CYN-MW5 was removed from the perchlorate monitoring network (SNL/NM November 2005).

- SWMU 116—Annual sampling of existing monitoring well CTF-MW1.

- SWMU 149—Submittal of a SAP and quarterly sampling of existing monitoring well CTF-MW3 for a minimum of eight quarters.

- SWMU 154—Submittal of a SAP and quarterly sampling of existing monitoring well CTF-MW2 for a minimum of eight quarters.

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

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

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

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

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

4.0 Monitoring Results

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

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

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

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

2013b, June 2013a, and June 2013b) were identified during the second quarter of CY 2013 sampling activities.

5.0 Summary and Conclusions

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

- No perchlorate was detected in the environmental samples from groundwater monitoring wells CCBA-MW1, CCBA-MW2, CTF-MW2, CTF-MW3, OBS-MW1, OBS-MW2, or OBS-MW3 at the screening level/MDL of 4 µg/L.

- Since June 2004 (the start of sampling as required by the Order), perchlorate was detected above the screening level/MDL (4 µg/L) in groundwater samples from only one of the wells (CYN-MW6) in the perchlorate screening monitoring well network.

DOE/Sandia will continue annual monitoring of perchlorate for monitoring wells CTF-MW1 and CYN-MW5, and quarterly monitoring for monitoring wells CCBA-MW1, CCBA-MW2, CTF-MW2, CTF-MW3, OBS-MW1, OBS-MW2, and OBS-MW3. The semiannual monitoring for the well that will replace monitoring well CYN-MW6 will begin after the well installation work plan is prepared, approved by the NMED, and implemented.

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Figures

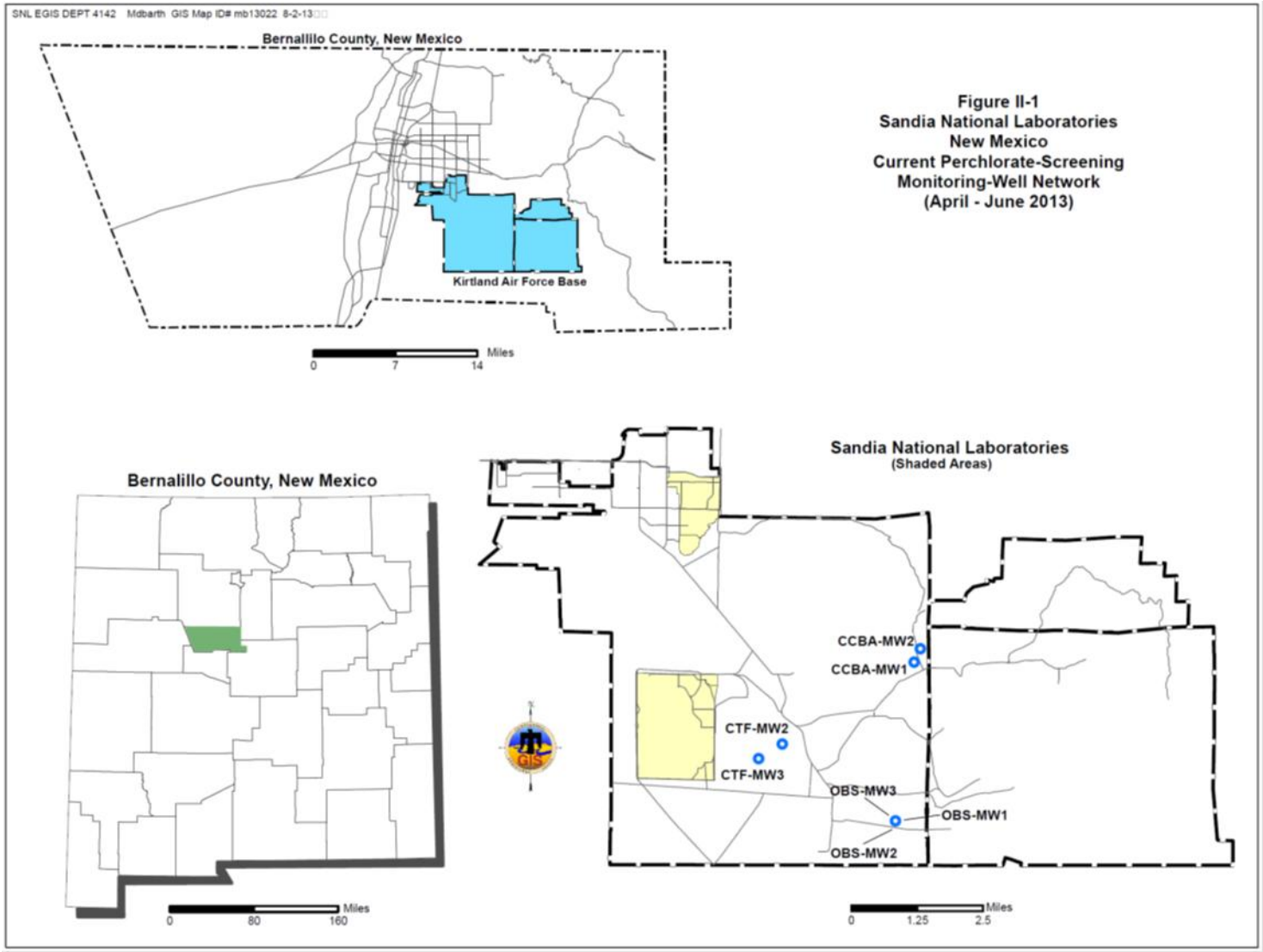

Figure II-1

Sandia National Laboratories, New Mexico

Current Perchlorate Screening Monitoring Well Network, April – June 2013

Tables

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

Well	Date Sampled	Number of Consecutive Sampling Events[a]	Remaining Number of Sampling Events[b]	Sampling Equipment
CCBA-MW1	24-Apr-13	7	1	Bennett™ Pump
CCBA-MW2	25-Apr-13	7	1	Bennett™ Pump
CTF-MW2	25-Jun-13	10	TBD[c]	Bennett™ Pump
CTF-MW3	28-Jun-13	10	TBD[c]	Bennett™ Pump
OBS-MW1	18-Apr-13	7	1	Bennett™ Pump
OBS-MW2	22-Apr-13	7	1	Bennett™ Pump
OBS-MW3	23-Apr-13	7	1	Bennett™ Pump

Notes

[a]Includes this sampling event.
[b]Per the requirements of Table XI-1 of the Order (NMED April 2004), a well will be removed from the perchlorate screening monitoring well network after four quarters unless perchlorate is detected above the screening level/MDL of 4 µg/L. However, the seven 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.

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

Table II-2
Wells Discussed in Previous Perchlorate Screening Reports

Well
CTF-MW1
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 2013 Perchlorate Sampling

Well	Sample Identification	AR/COC Number	Associated Groundwater Investigation
CCBA-MW1	093873-020	614745	SWMUs 8/58
CCBA-MW2	093878-020 093879-020	614747	SWMUs 8/58
CTF-MW2	094042-020	614827	SWMU 154
CTF-MW3	094044-020	614829	SWMU 149
OBS-MW1	093863-020	614741	SWMU 68
OBS-MW2	093866-020	614742	SWMU 68
OBS-MW3	093870-020 093871-020	614744	SWMU 68

Notes

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

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

Well	Sample Date	AR/COC Number	Sample Number	Result[a] (µg/L)	MDL[b] (µg/L)	PQL[c] (µg/L)	MCL[d] (µg/L)	Laboratory Qualifier[e]	Validation Qualifier[f]	Analytical Method[g]	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	
CCBA-MW2	01-Nov-11	613885	091349-020	ND	4.0	12	NE	U		EPA 314.0	
			091350-020	ND	4.0	12	NE	U		EPA 314.0	Duplicate sample
	12-Jan-12	613956	091610-020	ND	4.0	12	NE	U		EPA 314.0	
	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
CTF-MW2	08-Mar-11	613448	090237-020	ND	4.0	12	NE	U		EPA 314.0	
			090238-020	ND	4.0	12	NE	U		EPA 314.0	Duplicate sample
	31-May-11	613578	090670-020	ND	4.0	12	NE	U		EPA 314.0	
	29-Sep-11	613855	091259-020	ND	4.0	12	NE	U		EPA 314.0	
	09-Dec-11	613929	091525-020	ND	4.0	12	NE	U		EPA 314.0	
	30-Mar-12	614055	091949-020	ND	4.0	12	NE	U		EPA 314.0	
			091950-020	ND	4.0	12	NE	U		EPA 314.0	Duplicate sample
	19-Jun-12	614255	092538-020	ND	4.0	12	NE	U		EPA 314.0	
	25-Sep-12	614391	092862-020	ND	4.0	12	NE	U		EPA 314.0	
	18-Dec-12	614541	093251-020	ND	4.0	12	NE	U		EPA 314.0	
	26-Mar-13	614663	093723-020	ND	4.0	12	NE	U		EPA 314.0	
			093724-020	ND	4.0	12	NE	U		EPA 314.0	Duplicate sample
	25-Jun-13	614827	094042-020	ND	4.0	12	NE	U		EPA 314.0	

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

Well ID	Sample Date	AR/COC Number	Sample Number	Result (µg/L)	MDL[b] (µg/L)	PQL[c] (µg/L)	MCL[d] (µg/L)	Laboratory Qualifier[e]	Validation Qualifier[f]	Analytical Method[g]	Comments
CTF-MW3	09-Mar-11	613450	090243-020	ND	4.0	12	NE	U		EPA 314.0	
			090244-020	ND	4.0	12	NE	U		EPA 314.0	Duplicate sample
	03-Jun-11	613579	090672-020	ND	4.0	12	NE	U		EPA 314.0	
	23-Sep-11	613854	091257-020	ND	4.0	12	NE	U		EPA 314.0	
	08-Dec-11	613928	091523-020	ND	4.0	12	NE	U		EPA 314.0	
	26-Mar-12	614053	091943-020	ND	4.0	12	NE	U		EPA 314.0	
			091944-020	ND	4.0	12	NE	U		EPA 314.0	Duplicate sample
	16-Jun-12	614254	092536-020	ND	4.0	12	NE	U		EPA 314.0	
	21-Sep-12	614390	092860-020	ND	4.0	12	NE	U		EPA 314.0	
	14-Dec-12	614540	093249-020	ND	4.0	12	NE	H, U	UJ, H1	EPA 314.0	
	22-Mar-13	614661	093717-020	ND	4.0	12	NE	U		EPA 314.0	
			093718-020	ND	4.0	12	NE	U		EPA 314.0	Duplicate sample
	28-Jun-13	614829	094044-020	ND	4.0	12	NE	U		EPA 314.0	
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	
OBS-MW2	26-Oct-11	613880	091337-020	ND	4.0	12	NE	U		EPA 314.0	
	10-Jan-12	613954	091604-020	ND	4.0	12	NE	U		EPA 314.0	
			091605-020	ND	4.0	12	NE	U		EPA 314.0	Duplicate sample
	19-Apr-12	614082	092025-020	ND	4.0	12	NE	U		EPA 314.0	
	18-Jul-12	614290	092620-020	ND	4.0	12	NE	U		EPA 314.0	
	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	

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

Well ID	Sample Date	AR/COC Number	Sample Number	Result (µg/L)	MDL[b] (µg/L)	PQL[c] (µg/L)	MCL[d] (µg/L)	Laboratory Qualifier[e]	Validation Qualifier[f]	Analytical Method[g]	Comments
OBS-MW3	24-Oct-11	613882	091342-020	ND	4.0	12	NE	U		EPA 314.0	
			091343-020	ND	4.0	12	NE	U		EPA 314.0	Duplicate sample
	11-Jan-12	613955	091607-020	ND	4.0	12	NE	U		EPA 314.0	
	17-Apr-12	614079	092018-020	ND	4.0	12	NE	U		EPA 314.0	
	19-Jul-12	614292	092625-020	ND	4.0	12	NE	U		EPA 314.0	
			092626-020	ND	4.0	12	NE	U		EPA 314.0	Duplicate sample
	18-Oct-12	614465	093010-020	ND	4.0	12	NE	U		EPA 314.0	
	23-Jan-12	614571	093352-020	ND	4.0	12	NE	U		EPA 314.0	
	23-Apr-12	614744	093870-020	ND	4.0	12	NE	U		EPA 314.0	
			093871-020	ND	4.0	12	NE	U		EPA 314.0	Duplicate sample

Notes

[a]Result
Bold = Result exceeds the 4 µg/L screening level for perchlorate
ND = Not detected (at MDL)
µg/L = Micrograms per liter

[b]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.

[c]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.

[d]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.
NE = Not established

[e]Laboratory Qualifier
H = Analytical holding time was exceeded.
U = Analyte is absent or below the method detection limit.

[f]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, but not detected. The associated value is an estimate and may be inaccurate or imprecise.

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

Notes (continued)

[g]Analytical Method

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

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

AR/COC = Analysis Request and Chain of Custody.
CCBA = Coyote Canyon Blast Area.
CFR = Code of Federal Regulations.
CTF = Coyote Test Field.
CY = Calendar Year.
EPA = U.S. Environmental Protection Agency.
MW = Monitoring well.
OBS = Old Burn Site.

Table II-5
Perchlorate Screening Groundwater Monitoring
Field Water Quality Measurements[a], Second Quarter, CY 2013

Well	Sample Date	Temperature (°C)	Specific Conductivity (µmhos/cm)	Oxidation-Reduction Potential (mV)	pH	Turbidity (NTU)	Dissolved Oxygen (% Sat)	Dissolved Oxygen (mg/L)
CCBA-MW1	24-Apr-13	14.31	493	230.0	6.44	1.15	32.0	3.24
CCBA-MW2	25-Apr-13	15.53	572	252.1	7.35	0.22	62.8	6.23
CTF-MW2	25-Jun-13	20.30	3322	24.5	6.01	0.61	3.1	0.27
CTF-MW3	28-Jun-13	22.26	1799	172.2	6.83	0.78	92.7	8.04
OBS-MW1	18-Apr-13	14.54	503	252.5	7.27	0.56	36.2	3.69
OBS-MW2	22-Apr-13	18.11	501	250.3	7.14	0.25	38.0	3.58
OBS-MW3	23-Apr-13	16.74	501	240.9	7.24	0.52	45.5	4.41

Notes

[a]Field measurements obtained immediately before the groundwater sample was collected.

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

Appendix A
Analytical Laboratory Certificates of Analysis for the Perchlorate Data

SMO 2012-ARCOC (4-2012)

AOP 95-16

CONTRACT LABORATORY
ANALYSIS REQUEST AND CHAIN OF CUSTODY

Internal Lab

Batch No. N/A

AR/COC 614741

SMO Use

Project Name:	SWMU 68 GWM	Date Samples Shipped:	4/18/13	SMO Authorization:	
Project/Task Manager:	Clinton Lum	Carrier/Waybill No.	203580	SMO Contact Phone:	SEE BOTTLE ORDER SMO
Project/Task Number:	98026.01.13	Lab Contact:	Edie Kent/803-556-8171		Lorraine Herrera/505-844-3199
Service Order:	CF263-13	Lab Destination:	GEL	Send Report to SMO:	
		Contract No.:	PO 1303873		Rita Kavanaugh/505-284-2553
Tech Area:					
Building:	Room:	Operational Site:			

☐ 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 324190

Sample No.	Fraction	Sample Location Detail	Depth (ft)	Date/Time Collected	Sample Matrix	Container Type	Container Volume	Preservative	Collection Method	Sample Type	Parameter & Method Requested	Lab Sample ID
093863	-001	OBS-MW1	153	4/18/13 9:37	GW	G	3x40ml	HCL	G	SA	TCL VOC (SW846-8260B)	001
093863	-002	OBS-MW1	153	4/18/13 9:38	GW	AG	4x1L	None	G	SA	TCL SVOC (SW846-8270C)	002
093863	-009	OBS-MW1	153	4/18/13 9:40	GW	P	500 ml	HNO3	G	SA	TAL Metals+U (SW846-6010/6020/7470)	003
093863	-014	OBS-MW1	153	4/18/13 9:42	GW	P	250 ml	None	G	SA	Hexavalent Chromium (SW846-7196A)	004
093863	-016	OBS-MW1	153	4/18/13 9:43	GW	P	125 ml	None	G	SA	Anions (SW846-9056)	005
093863	-017	OBS-MW1	153	4/18/13 9:41	FGW	P	500 ml	HNO3	G	SA	Metals-Ca,Mg,K,Na (SW846-6020)	324191 001
093863	-018	OBS-MW1	153	4/18/13 9:44	GW	P	125 ml	H2SO4	G	SA	NPN (EPA 353.2)	006
093863	-020	OBS-MW1	153	4/18/13 9:45	GW	P	250 ml	None	G	SA	Perchlorate (EPA 314.0)	007
093863	-022	OBS-MW1	153	4/18/13 9:46	GW	P	500 ml	None	G	SA	Alkalinity (SM2320B)	008
093863	-024	OBS-MW1	153	4/18/13 9:47	GW	AG	4x1L	None	G	SA	High Explosives (SW846-8321A mod	009

Last Chain:	☐ Yes	Sample Tracking	SMO Use
Validation Req'd:	☑ Yes	Date Entered:	
Background:	☐ Yes	Entered by:	
Confirmatory:	☐ Yes	QC inits.:	

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:

Conditions on Receipt

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

Comments: Send report to Tim Jackson/4142/MS 0729/284-2547
Report Anions (as Br,Cl,F,SO4). Alkalinity (as total HCO3,CO3). Gamma Spectroscopy (as short list isotopes). FGW, filtered in field w/.45 micron in-line filter. If Perchlorate detected, perform verification analysis using SW846-6850M.

Lab Use

1. Relinquished by		Org. 4142	Date 4/18/13	Time 1012	3. Relinquished by	Org.	Date	Time
1. Received by		SMO Org. 4142	Date 4/18/13	Time 1017	3. Received by	Org.	Date	Time
2. Relinquished by		Org. 4142	Date 4/18/13	Time 1100	4. Relinquished by	Org.	Date	Time
2. Received by		Org. GEL	Date 4-19-13	Time 0840	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 614741

Project Name: SWMU 68 GWM
Tech Area:
Building:
Room:
Project/Task Manager: Clinton Lum
Project/Task No.: 98026.01.13

Sample No.	Fraction	Sample Location Detail	Depth (ft)	Date/Time Collected		Sample Matrix	Container Type	Container Volume	Preserv-ative	Collection Method	Sample Type	Parameter & Method Requested	Lab use Lab Sample ID
093863	-027	OBS-MW1	153	4/18/13	9:49	GW	P	250 ml	NaOH	G	SA	Total Cyanide (SW846-9012)	010
093863	-033	OBS-MW1	153	4/18/13	9:50	GW	P	1 L	HNO3	G	SA	Gamma Spectroscopy (EPA 901.0)	011
093863	-034	OBS-MW1	153	4/18/13	9:51	GW	P	1 L	HNO3	G	SA	Gross Alpha and Beta (EPA 900.0)	012
093863	-035	OBS-MW1	153	4/18/13	9:52	GW	P	1 L	HNO3	G	SA	Isotopic Uranium (HASL 300)	013
093864	-001	OBS-TB1	NA	4/18/13	9:37	DIW	G	3x40ml	HCL	G	TB	TCL VOC (SW846-8260B)	014
093865	-001	OBS-FB1	NA	4/18/13	9:19	DIW	G	3x40ml	HCL	G	FB	TCL VOC (SW846-8260B)	015

Recipient Initials MK

GEL LABORATORIES LLC

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

Certificate of Analysis

Report Date: May 20, 2013

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

Client Sample ID:	093863-020	Project:	SNLSGWater
Sample ID:	324190007	Client ID:	SNLS004
Matrix:	AQUEOUS		
Collect Date:	18-APR-13 09:45		
Receive Date:	19-APR-13	Client Desc.:	OBS-MW1
Collector:	Client	Vol. Recv.:	

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Ion Chromatography											
EPA 314.0 Perchlorate by IC "As Received"											
Perchlorate	U	ND	0.004	0.012	mg/L	1	MAR1	05/03/13	2321	1297307	1

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	EPA 314.0 DOE-AL	

Notes:

SMO 2012-ARCOC (4-2012)

CONTRACT LABORATORY
ANALYSIS REQUEST AND CHAIN OF CUSTODY

AOP 95-16

Internal Lab

Batch No. N/A

Page 1 of 2

AR/COC 614742

Project Name:	SWMU 68 GWM	SMO Use	
Project/Task Manager:	Clinton Lum	Date Samples Shipped:	4/22/13
Project/Task Number:	98026.01.13	Carrier/Waybill No.	102965
Service Order:	CF263-13	Lab Contact:	Edie Kent/803-556-8171
		Lab Destination:	GEL
		Contract No.:	PO 1303873
Tech Area:			
Building:	Room:	Operational Site:	

SMO Authorization: [signature]

SMO Contact Phone: SUBBOTTLE ORDER (SMO) Lorraine Herrera/505-844-3199

Send Report to SMO: Rita Kavanaugh/505-284-2553

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

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

Sample No.	Fraction	Sample Location Detail	Depth (ft)	Date/Time Collected		Sample Matrix	Container Type	Container Volume	Preservative	Collection Method	Sample Type	Parameter & Method Requested	Lab Sample ID
093866	-001	OBS-MW2	252	4/22/13	9:27	GW	G	3x40ml	HCL	G	SA	TCL VOC (SW846-8260B)	324365 001
093866	-002	OBS-MW2	252	4/22/13	9:28	GW	AG	4x1L	None	G	SA	TCL SVOC (SW846-8270C)	324365 002
093866	-009	OBS-MW2	252	4/22/13	9:30	GW	P	500 ml	HNO3	G	SA	TAL Metals+U (SW846-6010/6020/7470)	324365 003
093866	-014	OBS-MW2	252	4/22/13	9:31	GW	P	250 ml	None	G	SA	Hexavalent Chromium (SW846-7196A)	324365 004
093866	-016	OBS-MW2	252	4/22/13	9:32	GW	P	125 ml	None	G	SA	Anions (SW846-9056)	324365 005
093866	-017	OBS-MW2	252	4/22/13	9:33	FGW	P	500 ml	HNO3	G	SA	Metals-Ca,Mg,K,Na (SW846-6020)	324365 006
093866	-018	OBS-MW2	252	4/22/13	9:34	GW	P	125 ml	H2SO4	G	SA	NPN (EPA 353.2)	324365 006
093866	-020	OBS-MW2	252	4/22/13	9:35	GW	P	250 ml	None	G	SA	Perchlorate (EPA 314.0)	324365 007
093866	-022	OBS-MW2	252	4/22/13	9:36	GW	P	500 ml	None	G	SA	Alkalinity (SM2320B)	324365 008
093866	-024	OBS-MW2	252	4/22/13	9:37	GW	AG	4x1L	None	G	SA	High Explosives (SW846-8321A mod	324365 009

Last Chain: ☐ Yes
Validation Req'd: ☑ Yes
Background: ☐ Yes
Confirmatory: ☐ Yes

Sample Tracking — SMO Use
Date Entered:
Entered by:
QC inits.:

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:

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

Comments: Send report to Tim Jackson/4142/MS 0729/284-2547
Report Anions (as Br,Cl,F,SO4). Alkalinity (as total HCO3,CO3). Gamma Spectroscopy (as short list isotopes). FGW, filtered in field w/.45 micron in-line filter. If Perchlorate detected, perform verification analysis using SW846-6850M.

1.Relinquished by	[signature]	Org. 4142	Date 4/22/13	Time 1050	3.Relinquished by	Org.	Date	Time
1. Received by	[signature] GMO	Org. 4142	Date 4/22/13	Time 1050	3. Received by	Org.	Date	Time
2.Relinquished by	[signature]	Org. 4142	Date 4/22/13	Time 1130	4.Relinquished by	Org.	Date	Time
2. Received by	[signature]	Org.	Date 4-23-13	Time 7:45	4. Received by	Org.	Date	Time

Lab Use

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

CONTRACT LABORATORY
ANALYSIS REQUEST AND CHAIN OF CUSTODY (Continuation)

AR/COC 614742

Project Name: SWMU 68 GWM	Project/Task Manager: Clinton Lum	Project/Task No.: 98026.01.13
Tech Area:		
Building: Room:		

Sample No.	Fraction	Sample Location Detail	Depth (ft)	Date/Time Collected		Sample Matrix	Container Type	Container Volume	Preserv-ative	Collection Method	Sample Type	Parameter & Method Requested	Lab use Lab Sample ID
093866	-027	OBS-MW2	252	4/22/13	9:39	GW	P	250 ml	NaOH	G	SA	Total Cyanide (SW846-9012)	324365 010
093866	-033	OBS-MW2	252	4/22/13	9:40	GW	P	1 L	HNO3	G	SA	Gamma Spectroscopy (EPA 901.0)	324365 011
093866	-034	OBS-MW2	252	4/22/13	9:41	GW	P	1 L	HNO3	G	SA	Gross Alpha and Beta (EPA 900.0)	324365 012
093866	-035	OBS-MW2	252	4/22/13	9:42	GW	P	1 L	HNO3	G	SA	Isotopic Uranium (HASL 300)	324365 013
093867	-001	OBS-TB2	NA	4/22/13	9:27	DIW	G	3x40ml	HCL	G	TB	TCL VOC (SW846-8260B)	324365 014

Recipient Initials

GEL LABORATORIES LLC

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

Certificate of Analysis

Report Date: May 23, 2013

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

Client Sample ID:	093866-020	Project:	SNLSGWater
Sample ID:	324365007	Client ID:	SNLS004
Matrix:	AQUEOUS		
Collect Date:	22-APR-13 09:35		
Receive Date:	23-APR-13	Client Desc.:	OBS-MW2
Collector:	Client	Vol. Recv.:	

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Ion Chromatography											
EPA 314.0 Perchlorate by IC "As Received"											
Perchlorate	U	ND	0.004	0.012	mg/L	1	MAR1	05/04/13	0019	1297307	1

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	EPA 314.0 DOE-AL	

Notes:

SMO 2012-ARCOC (4-2012)

CONTRACT LABORATORY
ANALYSIS REQUEST AND CHAIN OF CUSTODY

AOP 95-16

Internal Lab Batch No. NA

Page 1 of 2

AR/COC 614744

Project Name:	SWMU 68 GWM	Date Samples Shipped: 203808	SMO Authorization: Don Winterscheid
Project/Task Manager:	Clinton Lum	Carrier/Waybill No. 4/23/13	SMO Contact Phone: See Bottle one
Project/Task Number:	98026.01.13	Lab Contact: Edie Kent/803-556-8171	Lorraine Herrera/505-844-3199
Service Order:	CF263-13	Lab Destination: GEL	Send Report to SMO:
		Contract No.: PO 1303873	Rita Kavanaugh/505-284-2553
Tech Area:			
Building:	Room:	Operational Site:	

☐ 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	Container Volume	Preservative	Collection Method	Sample Type	Parameter & Method Requested	Lab Sample ID
093870	-001	OBS-MW3	208	4/23/13	9:48	GW	G	3x40ml	HCL	G	SA	TCL VOC (SW846-8260B)	324365 024
093870	-002	OBS-MW3	208	4/23/13	9:50	GW	AG	4x1L	None	G	SA	TCL SVOC (SW846-8270C)	324365 030
093870	-009	OBS-MW3	208	4/23/13	9:53	GW	P	500 ml	HNO3	G	SA	TAL Metals+U (SW846-6010/6020/7470)	324365 031
093870	-014	OBS-MW3	208	4/23/13	9:54	GW	P	250 ml	None	G	SA	Hexavalent Chromium (SW846-7196A)	324365 032
093870	-016	OBS-MW3	208	4/23/13	9:55	GW	P	125 ml	None	G	SA	Anions (SW846-9056)	324365 033
093870	-017	OBS-MW3	208	4/23/13	9:56	FGW	P	500 ml	HNO3	G	SA	Metals-Ca,Mg,K,Na (SW846-6020)	324366 003
093870	-018	OBS-MW3	208	4/23/13	9:57	GW	P	125 ml	H2SO4	G	SA	NPN (EPA 353.2)	324365 034
093870	-020	OBS-MW3	208	4/23/13	9:58	GW	P	250 ml	None	G	SA	Perchlorate (EPA 314.0)	324365 035
093870	-022	OBS-MW3	208	4/23/13	9:59	GW	P	500 ml	None	G	SA	Alkalinity (SM2320B)	324365 036
093870	-024	OBS-MW3	208	4/23/13	10:00	GW	AG	4x1L	None	G	SA	High Explosives (SW846-8321A mod	324365 037

Last Chain:	☑ Yes	Sample Tracking	SMO Use
Validation Req'd:	☑ Yes	Date Entered:	
Background:	☐ Yes	Entered by:	
Confirmatory:	☐ Yes	QC inits.:	

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:

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		SNL/4142/505-844-5130/505-228-0710
	William Gibson	William Gibson	WG	SNL/4142/505-284-3307/505-239-7367

Comments: Send report to Tim Jackson/4142/MS 0729/284-2547
Report Anions (as Br,Cl,F,SO4). Alkalinity (as total HCO3,CO3). Gamma Spectroscopy (as short list isotopes). FGW, filtered in field w/.45 micron in-line filter. If Perchlorate detected, perform verification analysis using SW846-6850M.

Lab Use

1. Relinquished by	Alfred Santillanes	Org. 4142	Date 4/23/13	Time 10:47	3. Relinquished by	Org.	Date	Time
1. Received by	Don Winterscheid	Org. 4142	Date 4/23/13	Time 10:47	3. Received by	Org.	Date	Time
2. Relinquished by	Donald Winterscheid	Org. 4142	Date 4/23/13	Time 1130	4. Relinquished by	Org.	Date	Time
2. Received by	[illegible]	Org. GEL	Date 4-24-13	Time 0800	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 614744

Project Name: SWMU 68 GWM
Tech Area:
Building:
Room:
Project/Task Manager: Clinton Lum
Project/Task No.: 98026.01.13

Sample No.	Fraction	Sample Location Detail	Depth (ft)	Date/Time Collected		Sample Matrix	Container Type	Container Volume	Preserv-ative	Collection Method	Sample Type	Parameter & Method Requested	Lab use Lab Sample ID
093870	-027	OBS-MW3	208	4/23/13	10:03	GW	P	250 ml	NaOH	G	SA	Total Cyanide (SW846-9012)	324365 038
093870	-033	OBS-MW3	208	4/23/13	10:04	GW	P	1 L	HNO3	G	SA	Gamma Spectroscopy (EPA 901.0)	324365 039
093870	-034	OBS-MW3	208	4/23/13	10:06	GW	P	1 L	HNO3	G	SA	Gross Alpha and Beta (EPA 900.0)	324365 040
093870	-035	OBS-MW3	208	4/23/13	10:08	GW	P	1 L	HNO3	G	SA	Isotopic Uranium (HASL 300)	324365 041
093871	-001	OBS-MW3	208	4/23/13	9:48	GW	G	3x40ml	HCL	G	DU	TCL VOC (SW846-8260B)	324365 042
093871	-002	OBS-MW3	208	4/23/13	9:50	GW	AG	4x1L	None	G	DU	TCL SVOC (SW846-8270C)	324365 043
093871	-009	OBS-MW3	208	4/23/13	9:53	GW	P	500 ml	HNO3	G	DU	TAL Metals+U (SW846-6010/6020/7470)	324365 044
093871	-014	OBS-MW3	208	4/23/13	9:54	GW	P	250 ml	None	G	DU	Hexavalent Chromium (SW846-7196A)	324365 045
093871	-016	OBS-MW3	208	4/23/13	9:55	GW	P	125 ml	None	G	DU	Anions (SW846-9056)	324365 046
093871	-017	OBS-MW3	208	4/23/13	9:56	FGW	P	500 ml	HNO3	G	DU	Metals-Ca,Mg,K,Na (SW846-6020)	324366 004
093871	-018	OBS-MW3	208	4/23/13	9:57	GW	P	125 ml	H2SO4	G	DU	NPN (EPA 353.2)	324365 047
093871	-020	OBS-MW3	208	4/23/13	9:58	GW	P	250 ml	None	G	DU	Perchlorate (EPA 314.0)	324365 048
093871	-022	OBS-MW3	208	4/23/13	9:59	GW	P	500 ml	None	G	DU	Alkalinity (SM2320B)	324365 049
093871	-024	OBS-MW3	208	4/23/13	10:00	GW	AG	4x1L	None	G	DU	High Explosives (SW846-8321A mod.	324365 050
093871	-027	OBS-MW3	208	4/23/13	10:03	GW	P	250 ml	NaOH	G	DU	Total Cyanide (SW846-9012)	324365 051
093871	-033	OBS-MW3	208	4/23/13	10:04	GW	P	1 L	HNO3	G	DU	Gamma Spectroscopy (EPA 901.0)	324365 052
093871	-034	OBS-MW3	208	4/23/13	10:06	GW	P	1 L	HNO3	G	DU	Gross Alpha and Beta (EPA 900.0)	324365 053
093871	-035	OBS-MW3	208	4/23/13	10:08	GW	P	1 L	HNO3	G	DU	Isotopic Uranium (HASL 300)	324365 054
093872	-001	OBS-TB4	NA	4/23/13	9:48	DIW	G	3x40ml	HCL	G	TB	TCL VOC (SW846-8260B)	324365 055

Recipient Initials MK

GEL LABORATORIES LLC

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

Certificate of Analysis

Report Date: May 23, 2013

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

Client Sample ID:	093870-020	Project:	SNLSGWater
Sample ID:	324365035	Client ID:	SNLS004
Matrix:	AQUEOUS		
Collect Date:	23-APR-13 09:58		
Receive Date:	24-APR-13	Client Desc.:	OBS-MW3
Collector:	Client	Vol. Recv.:	

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Ion Chromatography											
EPA 314.0 Perchlorate by IC "As Received"											
Perchlorate	U	ND	0.004	0.012	mg/L	1	MAR1	05/04/13	0057	1297307	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 23, 2013

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

Client Sample ID: 093871-020
Sample ID: 324365048
Matrix: AQUEOUS
Collect Date: 23-APR-13 09:58
Receive Date: 24-APR-13
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	05/04/13	0116	1297307	1

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	EPA 314.0 DOE-AL	

Notes:

SMO 2012-ARCOC (4-2012)

AOP 95-16

CONTRACT LABORATORY
ANALYSIS REQUEST AND CHAIN OF CUSTODY

Internal Lab NA

Batch No.

AR/COC 614745

Project Name:	SWMU 8/58 GWM	Date Samples Shipped:	203850
Project/Task Manager:	Clinton Lum	Carrier/Waybill No.	4/24/13
Project/Task Number:	98026.01.12	Lab Contact:	Edie Kent/803-556-8171
Service Order:	CF262-13	Lab Destination:	GEL
		Contract No.:	PO 1303873

SMO Use

SMO Authorization: Don Walenpunk

SMO Contact Phone: See Bottleneck

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	Container Volume	Preservative	Collection Method	Sample Type	Parameter & Method Requested	Lab Sample ID
093873	-001	CCBA-MW1	79	4/24/13 9:29	GW	G	3x40ml	HCL	G	SA	TCL VOC (SW846-8260B)	324508 001
093873	-002	CCBA-MW1	79	4/24/13 9:30	GW	AG	4x1L	None	G	SA	TCL SVOC (SW846-8270C)	324508 002
093873	-009	CCBA-MW1	79	4/24/13 9:35	GW	P	500 ml	HNO3	G	SA	TAL Metals+U (SW846-6010/6020/7470)	324508 003
093873	-016	CCBA-MW1	79	4/24/13 9:36	GW	P	125 ml	None	G	SA	Anions (SW846-9056)	324508 004
093873	-017	CCBA-MW1	79	4/24/13 9:37	FGW	P	500 ml	HNO3	G	SA	Metals-Ca,Mg,K,Na (SW846-6020)	324509 001
093873	-018	CCBA-MW1	79	4/24/13 9:38	GW	P	125 ml	H2SO4	G	SA	NPN (EPA 353.2)	324508 005
093873	-020	CCBA-MW1	79	4/24/13 9:39	GW	P	250 ml	None	G	SA	Perchlorate (EPA 314.0)	324508 006
093873	-022	CCBA-MW1	79	4/24/13 9:40	GW	P	500 ml	None	G	SA	Alkalinity (SM2320B)	324508 007
093873	-024	CCBA-MW1	79	4/24/13 9:41	GW	AG	4x1L	None	G	SA	High Explosives (SW846-8321A mod	324508 008
093873	-027	CCBA-MW1	79	4/24/13 9:45	GW	P	250 ml	NaOH	G	SA	Total Cyanide (SW846-9012)	324508 009

Last Chain: ☐ Yes
Validation Req'd: ☑ Yes
Background: ☐ Yes
Confirmatory: ☐ Yes

Sample Tracking — SMO Use
Date Entered:
Entered by:
QC inits.:

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:

Conditions on Receipt

Sample Team Members	Name	Signature	Init.	Company/Organization/Phone/Cell
	Robert Lynch		RL	SNL/4142/505-844-4013/505-250-7090
	Tim Jackson		TJ	SNL/4142/505-284-2547/505-263-6639
	William Gibson			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 0.45 micron in-line filter. Report Anions (as Br,Cl,F,SO4), Alkalinity (as total,HCO3,CO3). Gamma Spectroscopy (as short list Isotopes).

1.Relinquished by		Org. 4142	Date 4-24-13	Time 1012	3.Relinquished by	Org.	Date	Time
1. Received by		Org. 4142	Date 4-24-13	Time 1012	3. Received by	Org.	Date	Time
2.Relinquished by		Org. 4142	Date 4/24/13	Time 1100	4.Relinquished by	Org.	Date	Time
2. Received by		Org.	Date 4.25.13	Time 7:35	4. Received by	Org.	Date	Time

Lab Use

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

SMO 2012-ARCOC (4-2012)

AOP 95-16

CONTRACT LABORATORY
ANALYSIS REQUEST AND CHAIN OF CUSTODY (Continuation)

AR/COC 614745

Project Name: SWMU 8/58 GWM
Tech Area:
Building:
Room:
Project/Task Manager: Clinton Lum
Project/Task No.: 98026.01.12

Sample No.	Fraction	Sample Location Detail	Depth (ft)	Date/Time Collected	Sample Matrix	Container Type	Container Volume	Preserv-ative	Collection Method	Sample Type	Parameter & Method Requested	Lab use Lab Sample ID
093873	-033	CCBA-MW1	79	4/24/13 9:46	GW	P	1 L	HNO3	G	SA	Gamma Spectroscopy (EPA 901.0)	324508 010
093873	-034	CCBA-MW1	79	4/24/13 9:47	GW	P	1 L	HNO3	G	SA	Gross Alpha and Beta (EPA 900.0)	324508 011
093873	-035	CCBA-MW1	79	4/24/13 9:48	GW	P	1 L	HNO3	G	SA	Isotopic Uranium (HASL 300)	324508 012
093874	-001	CCBA-TB1	NA	4/24/13 9:17	DIW	G	3x40ml	HCL	G	TB	TCL VOC (SW846-8260B)	324508 013
093875	-001	CCBA-FB1	NA	4/24/13 9:17	DIW	G	3x40ml	HCL	G	FB	TCL VOC (SW846-8260B)	324508 014

Recipient Initials

GEL LABORATORIES LLC

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

Certificate of Analysis

Report Date: May 23, 2013

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

Client Sample ID:	093873-020	Project:	SNLSGWater
Sample ID:	324508006	Client ID:	SNLS004
Matrix:	AQUEOUS		
Collect Date:	24-APR-13 09:39		
Receive Date:	25-APR-13	Client Desc.:	CCBA-MW1
Collector:	Client	Vol. Recv.:	

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Ion Chromatography											
EPA 314.0 Perchlorate by IC "As Received"											
Perchlorate	U	ND	0.004	0.012	mg/L	1	MAR1	05/04/13	0135	1297307	1

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	EPA 314.0 DOE-AL	

Notes:

SMO 2012-ARCOC (4-2012)

CONTRACT LABORATORY
ANALYSIS REQUEST AND CHAIN OF CUSTODY

AOP 95-16

Internal Lab

Batch No. NA

Page 1 of 2

AR/COC 614747

SMO Use

Project Name:	SWMU 8/58 GWM	Date Samples Shipped:	4/25/13
Project/Task Manager:	Clinton Lum	Carrier/Waybill No.	203935
Project/Task Number:	98026.01.12	Lab Contact:	Edie Kent/803-556-8171
Service Order:	CF262-13	Lab Destination:	GEL
		Contract No.:	PO 1303873

SMO Authorization: Don Valapaul

SMO Contact Phone: See Bottle order

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	Container Volume	Preservative	Collection Method	Sample Type	Parameter & Method Requested	Lab Sample ID
093878	-001	CCBA-MW2	117	4/25/13 9:18	GW	G	3x40ml	HCL	G	SA	TCL VOC (SW846-8260B)	324508 028
093878	-002	CCBA-MW2	117	4/25/13 9:19	GW	AG	4x1L	None	G	SA	TCL SVOC (SW846-8270C)	324508 029
093878	-009	CCBA-MW2	117	4/25/13 9:22	GW	P	500 ml	HNO3	G	SA	TAL Metals+U (SW846-6010/6020/7470)	324508 030
093878	-016	CCBA-MW2	117	4/25/13 9:23	GW	P	125 ml	None	G	SA	Anions (SW846-9056)	324508 031
093878	-017	CCBA-MW2	117	4/25/13 9:24	FGW	P	500 ml	HNO3	G	SA	Metals-Ca,Mg,K,Na (SW846-6020)	324509 003
093878	-018	CCBA-MW2	117	4/25/13 9:26	GW	P	125 ml	H2SO4	G	SA	NPN (EPA 353.2)	324508 032
093878	-020	CCBA-MW2	117	4/25/13 9:27	GW	P	250 ml	None	G	SA	Perchlorate (EPA 314.0)	324508 033
093878	-022	CCBA-MW2	117	4/25/13 9:28	GW	P	500 ml	None	G	SA	Alkalinity (SM2320B)	324508 034
093878	-024	CCBA-MW2	117	4/25/13 9:29	GW	AG	4x1L	None	G	SA	High Explosives (SW846-8321A mod	324508 035
093878	-027	CCBA-MW2	117	4/25/13 9:32	GW	P	250 ml	NaOH	G	SA	Total Cyanide (SW846-9012)	324508 036

Last Chain: ☑ Yes
Validation Req'd: ☑ Yes
Background: ☐ Yes
Confirmatory: ☐ Yes

Sample Tracking — SMO Use
Date Entered:
Entered by:
QC inits.:

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:

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

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 0.45 micron in-line filter. Report Anions (as Br,Cl,F,SO4), Alkalinity (as total HCO3,CO3). Gamma Spectroscopy (as short list Isotopes).

1. Relinquished by	Alfred Santillanes	Org. 4142	Date 4/25/13	Time 10:13	3. Relinquished by	Org.	Date	Time
1. Received by	Don Valapaul	Org. 4142	Date 4/25/13	Time 10:13	3. Received by	Org.	Date	Time
2. Relinquished by	Don Valapaul	Org. 4142	Date 4/25/13	Time 1100	4. Relinquished by	Org.	Date	Time
2. Received by	[illegible]	Org.	Date 4-26-13	Time 7:40	4. Received by	Org.	Date	Time

Lab Use

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

SMO 2012-ARCOC (4-2012)

AOP 95-16

CONTRACT LABORATORY
ANALYSIS REQUEST AND CHAIN OF CUSTODY (Continuation)

AR/COC 614747

Project Name: SWMU 8/58 GWM
Tech Area:
Building: Room:
Project/Task Manager: Clinton Lum
Project/Task No.: 98026.01.12

Sample No.	Fraction	Sample Location Detail	Depth (ft)	Date/Time Collected		Sample Matrix	Container Type	Container Volume	Preserv-ative	Collection Method	Sample Type	Parameter & Method Requested	Lab use Lab Sample ID
093878	-033	CCBA-MW2	117	4/25/13	9:33	GW	P	1 L	HNO3	G	SA	Gamma Spectroscopy (EPA 901.0)	324508 037
093878	-034	CCBA-MW2	117	4/25/13	9:35	GW	P	1 L	HNO3	G	SA	Gross Alpha and Beta (EPA 900.0)	324508 038
093878	-035	CCBA-MW2	117	4/25/13	9:37	GW	P	1 L	HNO3	G	SA	Isotopic Uranium (HASL 300)	324508 039
093879	-001	CCBA-MW2	117	4/25/13	9:18	GW	G	3x40ml	HCL	G	DU	TCL VOC (SW846-8260B)	324508 040
093879	-002	CCBA-MW2	117	4/25/13	9:19	GW	AG	4x1L	None	G	DU	TCL SVOC (SW846-8270C)	324508 041
093879	-009	CCBA-MW2	117	4/25/13	9:22	GW	P	500 ml	HNO3	G	DU	TAL Metals+U (SW846-6010/6020/7470)	324508 042
093879	-016	CCBA-MW2	117	4/25/13	9:23	GW	P	125 ml	None	G	DU	Anions (SW846-9056)	324508 043
093879	-017	CCBA-MW2	117	4/25/13	9:24	FGW	P	500 ml	HNO3	G	DU	Metals-Ca,Mg,K,Na (SW846-6020)	324509 004
093879	-018	CCBA-MW2	117	4/25/13	9:26	GW	P	125 ml	H2SO4	G	DU	NPN (EPA 353.2)	324508 044
093879	-020	CCBA-MW2	117	4/25/13	9:27	GW	P	250 ml	None	G	DU	Perchlorate (EPA 314.0)	324508 045
093879	-022	CCBA-MW2	117	4/25/13	9:28	GW	P	500 ml	None	G	DU	Alkalinity (SM2320B)	324508 046
093879	-024	CCBA-MW2	117	4/25/13	9:29	GW	AG	4x1L	None	G	DU	High Explosives (SW846-8321A mod	324508 047
093879	-027	CCBA-MW2	117	4/25/13	9:32	GW	P	250 ml	NaOH	G	DU	Total Cyanide (SW846-9012)	324508 048
093879	-033	CCBA-MW2	117	4/25/13	9:33	GW	P	1 L	HNO3	G	DU	Gamma Spectroscopy (EPA 901.0)	324508 049
093879	-034	CCBA-MW2	117	4/25/13	9:35	GW	P	1 L	HNO3	G	DU	Gross Alpha and Beta (EPA 900.0)	324508 050
093879	-035	CCBA-MW2	117	4/25/13	9:37	GW	P	1 L	HNO3	G	DU	Isotopic Uranium (HASL 300)	324509 051
093880	-001	CCBA-TB3	NA	4/25/13	9:18	DIW	G	3x40ml	HCL	G	TB	TCL VOC (SW846-8260B)	324508 052

Recipient Initials_____

GEL LABORATORIES LLC

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

Certificate of Analysis

Report Date: May 23, 2013

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

Client Sample ID:	093878-020	Project:	SNLSGWater
Sample ID:	324508033	Client ID:	SNLS004
Matrix:	AQUEOUS		
Collect Date:	25-APR-13 09:27		
Receive Date:	26-APR-13	Client Desc.:	CCBA-MW2
Collector:	Client	Vol. Recv.:	

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Ion Chromatography											
EPA 314.0 Perchlorate by IC "As Received"											
Perchlorate	U	ND	0.004	0.012	mg/L	1	MAR1	05/04/13	0252	1297307	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 23, 2013

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

Client Sample ID:	093879-020	Project:	SNLSGWater
Sample ID:	324508045	Client ID:	SNLS004
Matrix:	AQUEOUS		
Collect Date:	25-APR-13 09:27		
Receive Date:	26-APR-13	Client Desc.:	CCBA-MW2
Collector:	Client	Vol. Recv.:	

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Ion Chromatography											
EPA 314.0 Perchlorate by IC "As Received"											
Perchlorate	U	ND	0.004	0.012	mg/L	1	MAR1	05/04/13	0311	1297307	1

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	EPA 314.0 DOE-AL	

Notes:

SMO 2012-ARCOC (4-2012)

AOP 95-16

CONTRACT LABORATORY
ANALYSIS REQUEST AND CHAIN OF CUSTODY

Internal Lab

Batch No. N/A

AR/COC 614827

Project Name:	SWMU 154 GWM	Date Samples Shipped:	6/25/13	SMO Authorization:	SMO
Project/Task Manager:	Clinton Lum	Carrier/Waybill No.	205584	SMO Contact Phone:	Lorraine Herrera/505-844-3199
Project/Task Number:	146422.10.11.01	Lab Contact:	Edie Kent/803-556-8171	Send Report to SMO:	Rita Kavanaugh/505-284-2553
Service Order:	CF353-13	Lab Destination:	GEL		
		Contract No.:	PO 1303873		

SMO Use

☐ 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	Container Volume	Preservative	Collection Method	Sample Type	Parameter & Method Requested	Lab Sample ID
094042	-001	CTF-MW2	129	6/25/13	9:32	GW	G	3x40ml	HCL	G	SA	TCL VOC (SW846-8260B)	328283 001
094042	-002	CTF-MW2	129	6/25/13	9:33	GW	AG	4x1 L	None	G	SA	TCL SVOC (SW846-8270C)	328283 002
094042	-009	CTF-MW2	129	6/25/13	9:35	GW	P	500 ml	HNO3	G	SA	TAL Metals+U(SW846-6010/6020/7470)	328283 003
094042	-010	CTF-MW2	129	6/25/13	9:36	FGW	P	500 ml	HNO3	G	SA	TAL Metals+U(SW846-6010/6020/7470)	328284 001
094042	-016	CTF-MW2	129	6/25/13	9:37	GW	P	125 ml	None	G	SA	Anions (SW846-9056)	328283 004
094042	-018	CTF-MW2	129	6/25/13	9:38	GW	P	125 ml	H2SO4	G	SA	NPN (EPA 353.2)	328283 005
094042	-020	CTF-MW2	129	6/25/13	9:39	GW	P	250 ml	None	G	SA	Perchlorate (EPA 314.0)	328283 006
094042	-022	CTF-MW2	129	6/25/13	9:40	GW	P	500 ml	None	G	SA	Alkalinity (SM2320B)	328283 007
094042	-024	CTF-MW2	129	6/25/13	9:41	GW	AG	4x1 L	None	G	SA	High Explosives (SW846-8321A mod	328283 008
094042	-033	CTF-MW2	129	6/25/13	9:43	GW	P	1 L	HNO3	G	SA	Gamma Spectroscopy (EPA 901.0)	328283 009

Last Chain: ☐ Yes
Validation Req'd: ☑ Yes
Background: ☐ Yes
Confirmatory: ☐ Yes

Sample Tracking — SMO Use
Date Entered:
Entered by:
QC inits.:

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:

Conditions on Receipt

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

Comments: Send report to Tim Jackson/4142/MS 0729/284-2547
CTF-MW2 water has high buffering capacity,please check pH and add preservatives as needed.If perchlorate detected,then perform verification analysis using SW846-6850.Report Anions as Br,Cl,F,SO4.Report Alkalinity as total CaCO3,HCO3, and CO3.Report Gamma Spec for short list isotopes.FGW, filtered in field w/.40 micron filter.

1.Relinquished by		Org. 4142	Date 6/25/13	Time 1005	3.Relinquished by	Org.	Date	Time
1. Received by	SMO	Org. 4142	Date 6/25/13	Time 1005	3. Received by	Org.	Date	Time
2.Relinquished by	SMO	Org. 4142	Date 6/25/13	Time 1045	4.Relinquished by	Org.	Date	Time
2. Received by		Org. GEL	Date 6-26-13	Time 0735	4. Received by	Org.	Date	Time

Lab Use

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

SMO 2012-ARCOC (4-2012)

AOP 95-16

CONTRACT LABORATORY
ANALYSIS REQUEST AND CHAIN OF CUSTODY (Continuation)

AR/COC 614827

Project Name: SWMU 154 GWM
Tech Area:
Building:
Room:
Project/Task Manager: Clinton Lum
Project/Task No.: 146422.10.11.01

Sample No.	Fraction	Sample Location Detail	Depth (ft)	Date/Time Collected	Sample Matrix	Container Type	Container Volume	Preserv-ative	Collection Method	Sample Type	Parameter & Method Requested	Lab use Lab Sample ID
094042	-034	CTF-MW2	129	6/25/13 9:44	GW	P	1 L	HNO3	G	SA	Gross Alpha and Beta (EPA 900.0)	328283 010
094042	-035	CTF-MW2	129	6/25/13 9:45	GW	P	1 L	HNO3	G	SA	Isotopic Uranium (HASL 300)	328283 011
094043	-001	CTF-TB1	NA	6/25/13 9:32	DIW	G	3x40 ml	HCL	G	TB	TCL VOC (SW846-8260B)	328283 012

Recipient Initials MC

GEL LABORATORIES LLC

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

Certificate of Analysis

Report Date: July 24, 2013

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

Client Sample ID:	094042-020	Project:	SNLSGWater
Sample ID:	328283006	Client ID:	SNLS004
Matrix:	AQUEOUS		
Collect Date:	25-JUN-13 09:39		
Receive Date:	26-JUN-13	Client Desc.:	CTF-MW2
Collector:	Client	Vol. Recv.:	

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Ion Chromatography											
EPA 314.0 Perchlorate by IC "As Received"											
Perchlorate	U	ND	0.004	0.012	mg/L	1	MAR1	07/10/13	2254	1313036	1

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	EPA 314.0 DOE-AL	

Notes:

SMO 2012-ARCOC (4-2012)

AOP 95-16

CONTRACT LABORATORY
ANALYSIS REQUEST AND CHAIN OF CUSTODY

Internal Lab

Batch No.

Page 1 of 1

AR/COC 614829

Project Name:	SWMU 149 GWM	Date Samples Shipped:	6/28/13	SMO Authorization:	
Project/Task Manager:	Clinton Lum	Carrier/Waybill No.	206435	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:	CF352-13	Lab Destination:	GEL		
		Contract No.:	PO 1303873		

SMO Use

☐ 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

328498

Sample No.	Fraction	Sample Location Detail	Depth (ft)	Date/Time Collected	Sample Matrix	Container Type	Container Volume	Preservative	Collection Method	Sample Type	Parameter & Method Requested	Lab Sample ID
094044	-001	CTF-MW3	359	6/28/13 9:22	GW	G	3x40 ml	HCL	G	SA	TCL VOC (SW846-8260B)	328498 001
094044	-009	CTF-MW3	359	6/28/13 9:23	GW	P	500 ml	HNO3	G	SA	TAL Metals (SW846-6010/6020/7470	328498 002
094044	-010	CTF-MW3	359	6/28/13 9:24	FGW	P	500 ml	HNO3	G	SA	TAL Metals (SW846-6010/6020/7470	328499 001
094044	-016	CTF-MW3	359	6/28/13 9:25	GW	P	125 ml	None	G	SA	Anions (SW846-9056)	328498 003
094044	-018	CTF-MW3	359	6/28/13 9:26	GW	P	125 ml	H2SO4	G	SA	NPN (EPA 353.2)	328498 004
094044	-020	CTF-MW3	359	6/28/13 9:27	GW	P	250 ml	None	G	SA	Perchlorate (EPA 314.0)	328498 005
094044	-022	CTF-MW3	359	6/28/13 9:28	GW	P	500 ml	None	G	SA	Alkalinity (SM2320B)	328498 006
094045	-001	CTF-TB2	NA	6/28/13 9:22	DIW	G	3x40 ml	HCL	G	TB	TCL VOC (SW846-8260B)	328498 007

Last Chain: ☑ Yes
Validation Req'd: ☑ Yes
Background: ☐ Yes
Confirmatory: ☐ Yes

Sample Tracking — SMO Use
Date Entered:
Entered by:
QC inits.:

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,then perform verification analysis using SW846-6850M.Report anions as Br,Cl,F,SO4.Report alkalinity as total CaCO3,HCO3,and CO3. FGW, filtered in field w/.40 micron filter.

Conditions on Receipt

Sample Team Members	Name	Signature	Init.	Company/Organization/Phone/Cell
	Robert Lynch		RL	SNL/4142/505-844-4013/505-250-7090
	William Gibson		WJG	SNL/4142/505-284-3307/505-239-7367

1.Relinquished by		Org. 4142	Date 6-28-13	Time 1005	3.Relinquished by	Org.	Date	Time
1. Received by		Org. 4142	Date 6-28-13	Time 1005	3. Received by	Org.	Date	Time
2.Relinquished by		Org. 4142	Date 6/28/13	Time 1100	4.Relinquished by	Org.	Date	Time
2. Received by		Org. GEL	Date 6-29-13	Time 0920	4. Received by	Org.	Date	Time

Lab Use

*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, 2013

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

Client Sample ID:	094044-020	Project:	SNLSGWater
Sample ID:	328498005	Client ID:	SNLS004
Matrix:	AQUEOUS		
Collect Date:	28-JUN-13 09:27		
Receive Date:	29-JUN-13	Client Desc.:	CTF-MW3
Collector:	Client	Vol. Recv.:	

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Ion Chromatography											
EPA 314.0 Perchlorate by IC "As Received"											
Perchlorate	U	ND	0.004	0.012	mg/L	1	MAR1	07/10/13	2352	1313036	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

ANALYTICAL QUALITY ASSOCIATES, INC.

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

Memorandum

Date: May 28, 2013

To: File

From: Linda Thal

Subject: Inorganic Data Review and Validation – SNL
Site: SWMU 68 GWM
AR/COC: 614741
SDG: 324190
Laboratory: GEL
Project/Task: 98026.01.13
Analysis: General Chemistry

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

Summary

One sample was prepared and analyzed with accepted procedures using methods EPA 9056 (anions by IC), EPA 353.2 (nitrate/nitrite), EPA 314.0 (perchlorate), EPA 9010C/9012A (total cyanide), EPA 7196A (hexavalent chromium) and SM2320B (total alkalinity). Data were reported for all required analytes. Problems were identified with the data package that resulted in the qualification of data.

Total cyanide:

1. The ICAL intercept was negative with an absolute value > the MDL but ≤3X the MDL. The associated sample result was ND and will be **qualified UJ,I5**.

2. Total cyanide was detected in the ICB/CCB at a negative value with an absolute value < the PQL. The associated sample result was ND and will be **qualified UJ,B4**.

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

Holding Times and Preservation

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

Anions:
For chloride and sulfate, the sample was re-analyzed at a dilution 1 day past a 28 day holding time. Based on professional judgment, no sample data were qualified.

Hexavalent Chromium:
The sample was analyzed 8 minutes past a 24 hour holding time. Based on professional judgment, no sample data were qualified.

Calibration

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

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.

Anions and Nitrate/Nitrite:
The MS/PS analyses were performed on samples of similar matrix from other SNL SDGs. No sample data will be qualified as a result.

Laboratory Replicate

The replicate analyses met all QC acceptance criteria.

Anions and Nitrate/Nitrite:
The replicate analyses were performed on samples of similar matrix from other SNL SDGs. No sample data will be qualified as a result.

Detection Limits/Dilutions

All detection limits were properly reported.

Nitrate/nitrite:
The sample was diluted 5X.

Anions:
The sample was diluted 10X for chloride and sulfate.

Other QC

No other specific issues that affect data quality were identified.

Reviewed by: Marcia Hilchey **Level I** **Date:** 05/29/13

Sample Findings Summary

AR/COC: 614741

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
EPA 900.0/SW846 9310			
	093863-034/OBS-MW1	ALPHA (12587-46-1)	J, MS1
	093863-034/OBS-MW1	BETA (12587-47-2)	J, MS1
EPA 901.1			
	093863-033/OBS-MW1	Americium-241 (14596-10-2)	BD, FR3
	093863-033/OBS-MW1	Cesium-137 (10045-97-3)	BD, FR3
	093863-033/OBS-MW1	Cobalt-60 (10198-40-0)	BD, FR3
	093863-033/OBS-MW1	Potassium-40 (13966-00-2)	BD, FR3
SW846 3510C/8270D			
	093863-002/OBS-MW1	Hexachlorocyclopentadiene (77-47-4)	UJ, MS3
SW846 3535/8321A Modified			
	093863-024/OBS-MW1	m-Nitrotoluene (99-08-1)	UJ, I4
	093863-024/OBS-MW1	o-Nitrotoluene (88-72-2)	UJ, I4
	093863-024/OBS-MW1	p-Nitrotoluene (99-99-0)	UJ, I4
SW846 8260B DOE-AL			
	093863-001/OBS-MW1	Acetone (67-64-1)	UJ, I3,C3
	093864-001/OBS-TB1	Acetone (67-64-1)	UJ, I3,C3
	093865-001/OBS-FB1	Acetone (67-64-1)	UJ, I3,C3
SW846 9012B			
	093863-027/OBS-MW1	Cyanide, Total (57-12-5)	UJ, I5,B4

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

ANALYTICAL QUALITY ASSOCIATES, INC.

PO Box 21987
Albuquerque, NM 87154
1-888-678-5447
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Memorandum

Date: June 3, 2013

To: File

From: Linda Thal

Subject: Inorganic Data Review and Validation – SNL
Site: SWMU 68 GWM
AR/COC: 614742, 614743 and 614744
SDG: 324365
Laboratory: GEL
Project/Task: 98026.01.13
Analysis: General Chemistry

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

Summary

Four samples were prepared and analyzed with accepted procedures using methods EPA 9056 (anions by IC), EPA 353.2 (nitrate/nitrite), EPA 314.0 (perchlorate), EPA 9010C/9012A (total cyanide), EPA 7196A (hexavalent chromium) and SM2320B (total alkalinity). Data were reported for all required analytes. Problems were identified with the data package that resulted in the qualification of data.

Total cyanide:

1. Total cyanide was detected in the ICB/CCB at a negative value with an absolute value < the PQL. The associated sample results were NDs and will be **qualified UJ,B4**.

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

Holding Times and Preservation

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

Hexavalent Chromium:
Samples 324365004 and -032 were analyzed <5% past their 24 hour holding time. Based on professional judgment, no sample data will be 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 324365024. The associated sample results were detects >5X the EB value and will not be qualified.

Laboratory Control Sample (LCS)

All LCS acceptance criteria were met.

Matrix Spike (MS)

All MS/PS recoveries met QC acceptance criteria.

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

Laboratory Replicate

The replicate analyses met all QC acceptance criteria.

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

Detection Limits/Dilutions

All detection limits were properly reported.

Nitrate/nitrite:
All samples excluding the EB were diluted 5X.

Anions:
All samples excluding the EB were diluted 10X for chloride and sulfate.

Other QC

The EB submitted on AR/COC 614743 was applied to the samples on AR/COC 614744. A field duplicate pair was submitted on AR/COC 614744. There are no "required" review criteria for field duplicate analyses comparability; no data will be qualified as a result.

No other specific issues that affect data quality were identified.

Reviewed by: Monica Dymerski **Level I** **Date:** 06/28/13

Sample Findings Summary

AR/COC: 614742, 614743, 614744

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
DOE EML HASL-300, U-02-RC			
	093868-035/OBS-EB1	Uranium-233/234 (11-08-5)	BD, FR3
	093868-035/OBS-EB1	Uranium-235/236 (13982-70-2)	BD, FR3
	093868-035/OBS-EB1	Uranium-238 (7440-61-1)	BD, FR3
EPA 900.0/SW846 9310			
	093866-034/OBS-MW2	ALPHA (12587-46-1)	J, MS1
	093866-034/OBS-MW2	BETA (12587-47-2)	J, MS1
	093868-034/OBS-EB1	ALPHA (12587-46-1)	BD, FR3,MS1
	093868-034/OBS-EB1	BETA (12587-47-2)	BD, FR3,MS1
	093870-034/OBS-MW3	ALPHA (12587-46-1)	J, MS1
	093870-034/OBS-MW3	BETA (12587-47-2)	J, MS1
	093871-034/OBS-MW3	ALPHA (12587-46-1)	J, MS1
	093871-034/OBS-MW3	BETA (12587-47-2)	J, MS1
EPA 901.1			
	093866-033/OBS-MW2	Americium-241 (14596-10-2)	BD, FR3
	093866-033/OBS-MW2	Cesium-137 (10045-97-3)	BD, FR3
	093866-033/OBS-MW2	Cobalt-60 (10198-40-0)	BD, FR3
	093866-033/OBS-MW2	Potassium-40 (13966-00-2)	BD, FR3
	093868-033/OBS-EB1	Americium-241 (14596-10-2)	BD, FR3
	093868-033/OBS-EB1	Cesium-137 (10045-97-3)	BD, FR3
	093868-033/OBS-EB1	Cobalt-60 (10198-40-0)	BD, FR3
	093868-033/OBS-EB1	Potassium-40 (13966-00-2)	BD, FR3
	093870-033/OBS-MW3	Americium-241 (14596-10-2)	BD, FR3
	093870-033/OBS-MW3	Cesium-137 (10045-97-3)	BD, FR3
	093870-033/OBS-MW3	Cobalt-60 (10198-40-0)	BD, FR3
	093870-033/OBS-MW3	Potassium-40 (13966-00-2)	BD, FR3

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
	093871-033/OBS-MW3	Americium-241 (14596-10-2)	BD, FR3
	093871-033/OBS-MW3	Cesium-137 (10045-97-3)	BD, FR3
	093871-033/OBS-MW3	Cobalt-60 (10198-40-0)	BD, FR3
	093871-033/OBS-MW3	Potassium-40 (13966-00-2)	R, Z2
SW846 3005/6010B			
	093866-009/OBS-MW2	Vanadium (7440-62-2)	UJ, B4
	093868-009/OBS-EB1	Vanadium (7440-62-2)	UJ, B4
	093870-009/OBS-MW3	Vanadium (7440-62-2)	UJ, B4
	093871-009/OBS-MW3	Vanadium (7440-62-2)	UJ, B4
SW846 3005/6020 DOE-AL			
	093866-009/OBS-MW2	Cobalt (7440-48-4)	0.00053U, B
	093868-009/OBS-EB1	Calcium (7440-70-2)	0.45U, B
	093868-017/OBS-EB1	Calcium (7440-70-2)	0.45U, B
	093870-009/OBS-MW3	Cobalt (7440-48-4)	0.00053U, B
	093870-009/OBS-MW3	Copper (7440-50-8)	0.018UJ, B2
	093871-009/OBS-MW3	Cobalt (7440-48-4)	0.00053U, B
	093871-009/OBS-MW3	Copper (7440-50-8)	0.018UJ, B2
SW846 3510C/8270D			
	093866-002/OBS-MW2	1,1'-Biphenyl (92-52-4)	UJ, RP1
	093866-002/OBS-MW2	1,2,4-Trichlorobenzene (120-82-1)	UJ, RP1
	093866-002/OBS-MW2	1,4-Dioxane (123-91-1)	UJ, RP1
	093866-002/OBS-MW2	2,4,5-Trichlorophenol (95-95-4)	UJ, RP1
	093866-002/OBS-MW2	2,4,6-Trichlorophenol (88-06-2)	UJ, RP1
	093866-002/OBS-MW2	2,4-Dichlorophenol (120-83-2)	UJ, RP1
	093866-002/OBS-MW2	2,4-Dimethylphenol (105-67-9)	UJ, RP1
	093866-002/OBS-MW2	2,4-Dinitrophenol (51-28-5)	UJ, RP1
	093866-002/OBS-MW2	2,4-Dinitrotoluene (121-14-2)	UJ, RP1
	093866-002/OBS-MW2	2,6-Dinitrotoluene (606-20-2)	UJ, RP1
	093866-002/OBS-MW2	2-Chloronaphthalene (91-58-7)	UJ, RP1

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
	093866-002/OBS-MW2	2-Chlorophenol (95-57-8)	UJ, RP1
	093866-002/OBS-MW2	2-Methyl-4,6-dinitrophenol (534-52-1)	UJ, RP1
	093866-002/OBS-MW2	2-Methylnaphthalene (91-57-6)	UJ, RP1
	093866-002/OBS-MW2	2-Nitrophenol (88-75-5)	UJ, RP1
	093866-002/OBS-MW2	3,3'-Dichlorobenzidine (91-94-1)	UJ, RP1
	093866-002/OBS-MW2	4-Bromophenylphenylether (101-55-3)	UJ, RP1
	093866-002/OBS-MW2	4-Chloro-3-methylphenol (59-50-7)	UJ, RP1
	093866-002/OBS-MW2	4-Chloroaniline (106-47-8)	UJ, RP1
	093866-002/OBS-MW2	4-Chlorophenylphenylether (7005-72-3)	UJ, RP1
	093866-002/OBS-MW2	4-Nitrophenol (100-02-7)	UJ, RP1
	093866-002/OBS-MW2	Acenaphthene (83-32-9)	UJ, RP1
	093866-002/OBS-MW2	Acenaphthylene (208-96-8)	UJ, RP1
	093866-002/OBS-MW2	Acetophenone (98-86-2)	UJ, RP1
	093866-002/OBS-MW2	Anthracene (120-12-7)	UJ, RP1
	093866-002/OBS-MW2	Atrazine (1912-24-9)	UJ, MS3,RP1
	093866-002/OBS-MW2	Benzaldehyde (100-52-7)	UJ, RP1
	093866-002/OBS-MW2	Benzo(a)anthracene (56-55-3)	UJ, RP1
	093866-002/OBS-MW2	Benzo(a)pyrene (50-32-8)	UJ, RP1
	093866-002/OBS-MW2	Benzo(b)fluoranthene (205-99-2)	UJ, RP1
	093866-002/OBS-MW2	Benzo(ghi)perylene (191-24-2)	UJ, RP1
	093866-002/OBS-MW2	Benzo(k)fluoranthene (207-08-9)	UJ, RP1
	093866-002/OBS-MW2	bis(2-Chloroethoxy)methane (111-91-1)	UJ, RP1
	093866-002/OBS-MW2	bis(2-Chloroethyl) ether (111-44-4)	UJ, RP1
	093866-002/OBS-MW2	bis(2-Chloroisopropyl)ether (39638-32-9)	UJ, RP1
	093866-002/OBS-MW2	bis(2-Ethylhexyl)phthalate (117-81-7)	UJ, RP1

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
	093866-002/OBS-MW2	Butylbenzylphthalate (85-68-7)	UJ, RP1
	093866-002/OBS-MW2	Caprolactam (105-60-2)	UJ, RP1
	093866-002/OBS-MW2	Carbazole (86-74-8)	UJ, I3,C3,RP1
	093866-002/OBS-MW2	Chrysene (218-01-9)	UJ, RP1
	093866-002/OBS-MW2	Dibenzo(a,h)anthracene (53-70-3)	UJ, RP1
	093866-002/OBS-MW2	Dibenzofuran (132-64-9)	UJ, RP1
	093866-002/OBS-MW2	Diethylphthalate (84-66-2)	UJ, RP1
	093866-002/OBS-MW2	Dimethylphthalate (131-11-3)	UJ, RP1
	093866-002/OBS-MW2	Di-n-butylphthalate (84-74-2)	UJ, RP1
	093866-002/OBS-MW2	Di-n-octylphthalate (117-84-0)	UJ, RP1
	093866-002/OBS-MW2	Diphenylamine (122-39-4)	UJ, RP1
	093866-002/OBS-MW2	Fluoranthene (206-44-0)	UJ, RP1
	093866-002/OBS-MW2	Fluorene (86-73-7)	UJ, RP1
	093866-002/OBS-MW2	Hexachlorobenzene (118-74-1)	UJ, RP1
	093866-002/OBS-MW2	Hexachlorobutadiene (87-68-3)	UJ, RP1
	093866-002/OBS-MW2	Hexachlorocyclopentadiene (77-47-4)	UJ, RP1
	093866-002/OBS-MW2	Hexachloroethane (67-72-1)	UJ, RP1
	093866-002/OBS-MW2	Indeno(1,2,3-cd)pyrene (193-39-5)	UJ, RP1
	093866-002/OBS-MW2	Isophorone (78-59-1)	UJ, RP1
	093866-002/OBS-MW2	m,p-Cresol (N/A)	UJ, RP1
	093866-002/OBS-MW2	m-Nitroaniline (99-09-2)	UJ, RP1
	093866-002/OBS-MW2	Naphthalene (91-20-3)	UJ, RP1
	093866-002/OBS-MW2	Nitrobenzene (98-95-3)	UJ, RP1
	093866-002/OBS-MW2	N-Nitrosodipropylamine (621-64-7)	UJ, RP1
	093866-002/OBS-MW2	o-Cresol (95-48-7)	UJ, RP1
	093866-002/OBS-MW2	o-Nitroaniline (88-74-4)	UJ, RP1
	093866-002/OBS-MW2	Pentachlorophenol (87-86-5)	UJ, RP1
	093866-002/OBS-MW2	Phenanthrene (85-01-8)	UJ, RP1

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
	093866-002/OBS-MW2	Phenol (108-95-2)	UJ, RP1
	093866-002/OBS-MW2	p-Nitroaniline (100-01-6)	UJ, RP1
	093866-002/OBS-MW2	Pyrene (129-00-0)	UJ, RP1
	093868-002/OBS-EB1	1,1'-Biphenyl (92-52-4)	UJ, RP1
	093868-002/OBS-EB1	1,2,4-Trichlorobenzene (120-82-1)	UJ, RP1
	093868-002/OBS-EB1	1,4-Dioxane (123-91-1)	UJ, RP1
	093868-002/OBS-EB1	2,4,5-Trichlorophenol (95-95-4)	UJ, RP1
	093868-002/OBS-EB1	2,4,6-Trichlorophenol (88-06-2)	UJ, RP1
	093868-002/OBS-EB1	2,4-Dichlorophenol (120-83-2)	UJ, RP1
	093868-002/OBS-EB1	2,4-Dimethylphenol (105-67-9)	UJ, RP1
	093868-002/OBS-EB1	2,4-Dinitrophenol (51-28-5)	UJ, RP1
	093868-002/OBS-EB1	2,4-Dinitrotoluene (121-14-2)	UJ, RP1
	093868-002/OBS-EB1	2,6-Dinitrotoluene (606-20-2)	UJ, RP1
	093868-002/OBS-EB1	2-Chloronaphthalene (91-58-7)	UJ, RP1
	093868-002/OBS-EB1	2-Chlorophenol (95-57-8)	UJ, RP1
	093868-002/OBS-EB1	2-Methyl-4,6-dinitrophenol (534-52-1)	UJ, RP1
	093868-002/OBS-EB1	2-Methylnaphthalene (91-57-6)	UJ, RP1
	093868-002/OBS-EB1	2-Nitrophenol (88-75-5)	UJ, RP1
	093868-002/OBS-EB1	3,3'-Dichlorobenzidine (91-94-1)	UJ, RP1
	093868-002/OBS-EB1	4-Bromophenylphenylether (101-55-3)	UJ, RP1
	093868-002/OBS-EB1	4-Chloro-3-methylphenol (59-50-7)	UJ, RP1
	093868-002/OBS-EB1	4-Chloroaniline (106-47-8)	UJ, RP1
	093868-002/OBS-EB1	4-Chlorophenylphenylether (7005-72-3)	UJ, RP1
	093868-002/OBS-EB1	4-Nitrophenol (100-02-7)	UJ, RP1
	093868-002/OBS-EB1	Acenaphthene (83-32-9)	UJ, RP1
	093868-002/OBS-EB1	Acenaphthylene (208-96-8)	UJ, RP1
	093868-002/OBS-EB1	Acetophenone (98-86-2)	UJ, RP1

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
	093868-002/OBS-EB1	Anthracene (120-12-7)	UJ, RP1
	093868-002/OBS-EB1	Atrazine (1912-24-9)	UJ, MS3,RP1
	093868-002/OBS-EB1	Benzaldehyde (100-52-7)	UJ, RP1
	093868-002/OBS-EB1	Benzo(a)anthracene (56-55-3)	UJ, RP1
	093868-002/OBS-EB1	Benzo(a)pyrene (50-32-8)	UJ, RP1
	093868-002/OBS-EB1	Benzo(b)fluoranthene (205-99-2)	UJ, RP1
	093868-002/OBS-EB1	Benzo(ghi)perylene (191-24-2)	UJ, RP1
	093868-002/OBS-EB1	Benzo(k)fluoranthene (207-08-9)	UJ, RP1
	093868-002/OBS-EB1	bis(2-Chloroethoxy)methane (111-91-1)	UJ, RP1
	093868-002/OBS-EB1	bis(2-Chloroethyl) ether (111-44-4)	UJ, RP1
	093868-002/OBS-EB1	bis(2-Chloroisopropyl)ether (39638-32-9)	UJ, RP1
	093868-002/OBS-EB1	bis(2-Ethylhexyl)phthalate (117-81-7)	UJ, RP1
	093868-002/OBS-EB1	Butylbenzylphthalate (85-68-7)	UJ, RP1
	093868-002/OBS-EB1	Caprolactam (105-60-2)	UJ, RP1
	093868-002/OBS-EB1	Carbazole (86-74-8)	UJ, I3,C3,RP1
	093868-002/OBS-EB1	Chrysene (218-01-9)	UJ, RP1
	093868-002/OBS-EB1	Dibenzo(a,h)anthracene (53-70-3)	UJ, RP1
	093868-002/OBS-EB1	Dibenzofuran (132-64-9)	UJ, RP1
	093868-002/OBS-EB1	Diethylphthalate (84-66-2)	UJ, RP1
	093868-002/OBS-EB1	Dimethylphthalate (131-11-3)	UJ, RP1
	093868-002/OBS-EB1	Di-n-butylphthalate (84-74-2)	UJ, RP1
	093868-002/OBS-EB1	Di-n-octylphthalate (117-84-0)	UJ, RP1
	093868-002/OBS-EB1	Diphenylamine (122-39-4)	UJ, RP1
	093868-002/OBS-EB1	Fluoranthene (206-44-0)	UJ, RP1
	093868-002/OBS-EB1	Fluorene (86-73-7)	UJ, RP1
	093868-002/OBS-EB1	Hexachlorobenzene (118-74-1)	UJ, RP1
	093868-002/OBS-EB1	Hexachlorobutadiene (87-68-3)	UJ, RP1

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
	093868-002/OBS-EB1	Hexachlorocyclopentadiene (77-47-4)	UJ, RP1
	093868-002/OBS-EB1	Hexachloroethane (67-72-1)	UJ, RP1
	093868-002/OBS-EB1	Indeno(1,2,3-cd)pyrene (193-39-5)	UJ, RP1
	093868-002/OBS-EB1	Isophorone (78-59-1)	UJ, RP1
	093868-002/OBS-EB1	m,p-Cresol (N/A)	UJ, RP1
	093868-002/OBS-EB1	m-Nitroaniline (99-09-2)	UJ, RP1
	093868-002/OBS-EB1	Naphthalene (91-20-3)	UJ, RP1
	093868-002/OBS-EB1	Nitrobenzene (98-95-3)	UJ, RP1
	093868-002/OBS-EB1	N-Nitrosodipropylamine (621-64-7)	UJ, RP1
	093868-002/OBS-EB1	o-Cresol (95-48-7)	UJ, RP1
	093868-002/OBS-EB1	o-Nitroaniline (88-74-4)	UJ, RP1
	093868-002/OBS-EB1	Pentachlorophenol (87-86-5)	UJ, RP1
	093868-002/OBS-EB1	Phenanthrene (85-01-8)	UJ, RP1
	093868-002/OBS-EB1	Phenol (108-95-2)	UJ, RP1
	093868-002/OBS-EB1	p-Nitroaniline (100-01-6)	UJ, RP1
	093868-002/OBS-EB1	Pyrene (129-00-0)	UJ, RP1
	093870-002/OBS-MW3	1,1'-Biphenyl (92-52-4)	UJ, RP1
	093870-002/OBS-MW3	1,2,4-Trichlorobenzene (120-82-1)	UJ, RP1
	093870-002/OBS-MW3	1,4-Dioxane (123-91-1)	UJ, RP1
	093870-002/OBS-MW3	2,4,5-Trichlorophenol (95-95-4)	UJ, RP1
	093870-002/OBS-MW3	2,4,6-Trichlorophenol (88-06-2)	UJ, RP1
	093870-002/OBS-MW3	2,4-Dichlorophenol (120-83-2)	UJ, RP1
	093870-002/OBS-MW3	2,4-Dimethylphenol (105-67-9)	UJ, RP1
	093870-002/OBS-MW3	2,4-Dinitrophenol (51-28-5)	UJ, RP1
	093870-002/OBS-MW3	2,4-Dinitrotoluene (121-14-2)	UJ, RP1
	093870-002/OBS-MW3	2,6-Dinitrotoluene (606-20-2)	UJ, RP1
	093870-002/OBS-MW3	2-Chloronaphthalene (91-58-7)	UJ, RP1
	093870-002/OBS-MW3	2-Chlorophenol (95-57-8)	UJ, RP1

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
	093870-002/OBS-MW3	2-Methyl-4,6-dinitrophenol (534-52-1)	UJ, RP1
	093870-002/OBS-MW3	2-Methylnaphthalene (91-57-6)	UJ, RP1
	093870-002/OBS-MW3	2-Nitrophenol (88-75-5)	UJ, RP1
	093870-002/OBS-MW3	3,3'-Dichlorobenzidine (91-94-1)	UJ, RP1
	093870-002/OBS-MW3	4-Bromophenylphenylether (101-55-3)	UJ, RP1
	093870-002/OBS-MW3	4-Chloro-3-methylphenol (59-50-7)	UJ, RP1
	093870-002/OBS-MW3	4-Chloroaniline (106-47-8)	UJ, RP1
	093870-002/OBS-MW3	4-Chlorophenylphenylether (7005-72-3)	UJ, RP1
	093870-002/OBS-MW3	4-Nitrophenol (100-02-7)	UJ, RP1
	093870-002/OBS-MW3	Acenaphthene (83-32-9)	UJ, RP1
	093870-002/OBS-MW3	Acenaphthylene (208-96-8)	UJ, RP1
	093870-002/OBS-MW3	Acetophenone (98-86-2)	UJ, RP1
	093870-002/OBS-MW3	Anthracene (120-12-7)	UJ, RP1
	093870-002/OBS-MW3	Atrazine (1912-24-9)	UJ, MS3,RP1
	093870-002/OBS-MW3	Benzaldehyde (100-52-7)	UJ, RP1
	093870-002/OBS-MW3	Benzo(a)anthracene (56-55-3)	UJ, RP1
	093870-002/OBS-MW3	Benzo(a)pyrene (50-32-8)	UJ, RP1
	093870-002/OBS-MW3	Benzo(b)fluoranthene (205-99-2)	UJ, RP1
	093870-002/OBS-MW3	Benzo(ghi)perylene (191-24-2)	UJ, RP1
	093870-002/OBS-MW3	Benzo(k)fluoranthene (207-08-9)	UJ, RP1
	093870-002/OBS-MW3	bis(2-Chloroethoxy)methane (111-91-1)	UJ, RP1
	093870-002/OBS-MW3	bis(2-Chloroethyl) ether (111-44-4)	UJ, RP1
	093870-002/OBS-MW3	bis(2-Chloroisopropyl)ether (39638-32-9)	UJ, RP1
	093870-002/OBS-MW3	bis(2-Ethylhexyl)phthalate (117-81-7)	UJ, RP1
	093870-002/OBS-MW3	Butylbenzylphthalate (85-68-7)	UJ, RP1

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
	093870-002/OBS-MW3	Caprolactam (105-60-2)	UJ, RP1
	093870-002/OBS-MW3	Carbazole (86-74-8)	UJ, I3,C3,RP1
	093870-002/OBS-MW3	Chrysene (218-01-9)	UJ, RP1
	093870-002/OBS-MW3	Dibenzo(a,h)anthracene (53-70-3)	UJ, RP1
	093870-002/OBS-MW3	Dibenzofuran (132-64-9)	UJ, RP1
	093870-002/OBS-MW3	Diethylphthalate (84-66-2)	UJ, RP1
	093870-002/OBS-MW3	Dimethylphthalate (131-11-3)	UJ, RP1
	093870-002/OBS-MW3	Di-n-butylphthalate (84-74-2)	UJ, RP1
	093870-002/OBS-MW3	Di-n-octylphthalate (117-84-0)	UJ, RP1
	093870-002/OBS-MW3	Diphenylamine (122-39-4)	UJ, RP1
	093870-002/OBS-MW3	Fluoranthene (206-44-0)	UJ, RP1
	093870-002/OBS-MW3	Fluorene (86-73-7)	UJ, RP1
	093870-002/OBS-MW3	Hexachlorobenzene (118-74-1)	UJ, RP1
	093870-002/OBS-MW3	Hexachlorobutadiene (87-68-3)	UJ, RP1
	093870-002/OBS-MW3	Hexachlorocyclopentadiene (77-47-4)	UJ, RP1
	093870-002/OBS-MW3	Hexachloroethane (67-72-1)	UJ, RP1
	093870-002/OBS-MW3	Indeno(1,2,3-cd)pyrene (193-39-5)	UJ, RP1
	093870-002/OBS-MW3	Isophorone (78-59-1)	UJ, RP1
	093870-002/OBS-MW3	m,p-Cresol (N/A)	UJ, RP1
	093870-002/OBS-MW3	m-Nitroaniline (99-09-2)	UJ, RP1
	093870-002/OBS-MW3	Naphthalene (91-20-3)	UJ, RP1
	093870-002/OBS-MW3	Nitrobenzene (98-95-3)	UJ, RP1
	093870-002/OBS-MW3	N-Nitrosodipropylamine (621-64-7)	UJ, RP1
	093870-002/OBS-MW3	o-Cresol (95-48-7)	UJ, RP1
	093870-002/OBS-MW3	o-Nitroaniline (88-74-4)	UJ, RP1
	093870-002/OBS-MW3	Pentachlorophenol (87-86-5)	UJ, RP1
	093870-002/OBS-MW3	Phenanthrene (85-01-8)	UJ, RP1
	093870-002/OBS-MW3	Phenol (108-95-2)	UJ, RP1

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
	093870-002/OBS-MW3	p-Nitroaniline (100-01-6)	UJ, RP1
	093870-002/OBS-MW3	Pyrene (129-00-0)	UJ, RP1
	093871-002/OBS-MW3	1,1'-Biphenyl (92-52-4)	UJ, RP1
	093871-002/OBS-MW3	1,2,4-Trichlorobenzene (120-82-1)	UJ, RP1
	093871-002/OBS-MW3	1,4-Dioxane (123-91-1)	UJ, RP1
	093871-002/OBS-MW3	2,4,5-Trichlorophenol (95-95-4)	UJ, RP1
	093871-002/OBS-MW3	2,4,6-Trichlorophenol (88-06-2)	UJ, RP1
	093871-002/OBS-MW3	2,4-Dichlorophenol (120-83-2)	UJ, RP1
	093871-002/OBS-MW3	2,4-Dimethylphenol (105-67-9)	UJ, RP1
	093871-002/OBS-MW3	2,4-Dinitrophenol (51-28-5)	UJ, RP1
	093871-002/OBS-MW3	2,4-Dinitrotoluene (121-14-2)	UJ, RP1
	093871-002/OBS-MW3	2,6-Dinitrotoluene (606-20-2)	UJ, RP1
	093871-002/OBS-MW3	2-Chloronaphthalene (91-58-7)	UJ, RP1
	093871-002/OBS-MW3	2-Chlorophenol (95-57-8)	UJ, RP1
	093871-002/OBS-MW3	2-Methyl-4,6-dinitrophenol (534-52-1)	UJ, RP1
	093871-002/OBS-MW3	2-Methylnaphthalene (91-57-6)	UJ, RP1
	093871-002/OBS-MW3	2-Nitrophenol (88-75-5)	UJ, RP1
	093871-002/OBS-MW3	3,3'-Dichlorobenzidine (91-94-1)	UJ, RP1
	093871-002/OBS-MW3	4-Bromophenylphenylether (101-55-3)	UJ, RP1
	093871-002/OBS-MW3	4-Chloro-3-methylphenol (59-50-7)	UJ, RP1
	093871-002/OBS-MW3	4-Chloroaniline (106-47-8)	UJ, RP1
	093871-002/OBS-MW3	4-Chlorophenylphenylether (7005-72-3)	UJ, RP1
	093871-002/OBS-MW3	4-Nitrophenol (100-02-7)	UJ, RP1
	093871-002/OBS-MW3	Acenaphthene (83-32-9)	UJ, RP1
	093871-002/OBS-MW3	Acenaphthylene (208-96-8)	UJ, RP1
	093871-002/OBS-MW3	Acetophenone (98-86-2)	UJ, RP1
	093871-002/OBS-MW3	Anthracene (120-12-7)	UJ, RP1

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
	093871-002/OBS-MW3	Atrazine (1912-24-9)	UJ, MS3,RP1
	093871-002/OBS-MW3	Benzaldehyde (100-52-7)	UJ, RP1
	093871-002/OBS-MW3	Benzo(a)anthracene (56-55-3)	UJ, RP1
	093871-002/OBS-MW3	Benzo(a)pyrene (50-32-8)	UJ, RP1
	093871-002/OBS-MW3	Benzo(b)fluoranthene (205-99-2)	UJ, RP1
	093871-002/OBS-MW3	Benzo(ghi)perylene (191-24-2)	UJ, RP1
	093871-002/OBS-MW3	Benzo(k)fluoranthene (207-08-9)	UJ, RP1
	093871-002/OBS-MW3	bis(2-Chloroethoxy)methane (111-91-1)	UJ, RP1
	093871-002/OBS-MW3	bis(2-Chloroethyl) ether (111-44-4)	UJ, RP1
	093871-002/OBS-MW3	bis(2-Chloroisopropyl)ether (39638-32-9)	UJ, RP1
	093871-002/OBS-MW3	bis(2-Ethylhexyl)phthalate (117-81-7)	UJ, RP1
	093871-002/OBS-MW3	Butylbenzylphthalate (85-68-7)	UJ, RP1
	093871-002/OBS-MW3	Caprolactam (105-60-2)	UJ, RP1
	093871-002/OBS-MW3	Carbazole (86-74-8)	UJ, I3,C3,RP1
	093871-002/OBS-MW3	Chrysene (218-01-9)	UJ, RP1
	093871-002/OBS-MW3	Dibenzo(a,h)anthracene (53-70-3)	UJ, RP1
	093871-002/OBS-MW3	Dibenzofuran (132-64-9)	UJ, RP1
	093871-002/OBS-MW3	Diethylphthalate (84-66-2)	UJ, RP1
	093871-002/OBS-MW3	Dimethylphthalate (131-11-3)	UJ, RP1
	093871-002/OBS-MW3	Di-n-butylphthalate (84-74-2)	UJ, RP1
	093871-002/OBS-MW3	Di-n-octylphthalate (117-84-0)	UJ, RP1
	093871-002/OBS-MW3	Diphenylamine (122-39-4)	UJ, RP1
	093871-002/OBS-MW3	Fluoranthene (206-44-0)	UJ, RP1
	093871-002/OBS-MW3	Fluorene (86-73-7)	UJ, RP1
	093871-002/OBS-MW3	Hexachlorobenzene (118-74-1)	UJ, RP1
	093871-002/OBS-MW3	Hexachlorobutadiene (87-68-3)	UJ, RP1

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
	093871-002/OBS-MW3	Hexachlorocyclopentadiene (77-47-4)	UJ, RP1
	093871-002/OBS-MW3	Hexachloroethane (67-72-1)	UJ, RP1
	093871-002/OBS-MW3	Indeno(1,2,3-cd)pyrene (193-39-5)	UJ, RP1
	093871-002/OBS-MW3	Isophorone (78-59-1)	UJ, RP1
	093871-002/OBS-MW3	m,p-Cresol (N/A)	UJ, RP1
	093871-002/OBS-MW3	m-Nitroaniline (99-09-2)	UJ, RP1
	093871-002/OBS-MW3	Naphthalene (91-20-3)	UJ, RP1
	093871-002/OBS-MW3	Nitrobenzene (98-95-3)	UJ, RP1
	093871-002/OBS-MW3	N-Nitrosodipropylamine (621-64-7)	UJ, RP1
	093871-002/OBS-MW3	o-Cresol (95-48-7)	UJ, RP1
	093871-002/OBS-MW3	o-Nitroaniline (88-74-4)	UJ, RP1
	093871-002/OBS-MW3	Pentachlorophenol (87-86-5)	UJ, RP1
	093871-002/OBS-MW3	Phenanthrene (85-01-8)	UJ, RP1
	093871-002/OBS-MW3	Phenol (108-95-2)	UJ, RP1
	093871-002/OBS-MW3	p-Nitroaniline (100-01-6)	UJ, RP1
	093871-002/OBS-MW3	Pyrene (129-00-0)	UJ, RP1
SW846 3535/8321A Modified			
	093866-024/OBS-MW2	m-Nitrotoluene (99-08-1)	UJ, I4
	093866-024/OBS-MW2	o-Nitrotoluene (88-72-2)	UJ, I4
	093866-024/OBS-MW2	p-Nitrotoluene (99-99-0)	UJ, I4
	093868-024/OBS-EB1	m-Nitrotoluene (99-08-1)	UJ, I4
	093868-024/OBS-EB1	o-Nitrotoluene (88-72-2)	UJ, I4
	093868-024/OBS-EB1	p-Nitrotoluene (99-99-0)	UJ, I4
	093870-024/OBS-MW3	m-Nitrotoluene (99-08-1)	UJ, I4
	093870-024/OBS-MW3	o-Nitrotoluene (88-72-2)	UJ, I4
	093870-024/OBS-MW3	p-Nitrotoluene (99-99-0)	UJ, I4
	093871-024/OBS-MW3	m-Nitrotoluene (99-08-1)	UJ, I4
	093871-024/OBS-MW3	o-Nitrotoluene (88-72-2)	UJ, I4

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
	093871-024/OBS-MW3	p-Nitrotoluene (99-99-0)	UJ, I4
SW846 8260B DOE-AL			
	093866-001/OBS-MW2	Acetone (67-64-1)	UJ, I3,C3
	093867-001/OBS-TB2	Acetone (67-64-1)	UJ, I3,C3
	093868-001/OBS-EB1	Acetone (67-64-1)	UJ, I3,C3
	093869-001/OBS-TB3	Acetone (67-64-1)	UJ, I3,C3
	093870-001/OBS-MW3	Acetone (67-64-1)	UJ, I3,C3
	093871-001/OBS-MW3	Acetone (67-64-1)	UJ, I3,C3
	093872-001/OBS-TB4	Acetone (67-64-1)	UJ, I3,C3
SW846 9012B			
	093866-027/OBS-MW2	Cyanide, Total (57-12-5)	UJ, B4
	093868-027/OBS-EB1	Cyanide, Total (57-12-5)	UJ, B4
	093870-027/OBS-MW3	Cyanide, Total (57-12-5)	UJ, B4
	093871-027/OBS-MW3	Cyanide, Total (57-12-5)	UJ, B4

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

ANALYTICAL QUALITY ASSOCIATES, INC.

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Memorandum

Date: June 5, 2013

To: File

From: Linda Thal

Subject: Inorganic Data Review and Validation – SNL
Site: SWMU 8/58 GWM
AR/COC: 614745, 614746 and 614747
SDG: 324508
Laboratory: GEL
Project/Task: 98026.01.12
Analysis: General Chemistry

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

Summary

Four samples were prepared and analyzed with accepted procedures using methods EPA 9056 (anions by IC), EPA 353.2 (nitrate/nitrite), EPA 314.0 (perchlorate), EPA 9010C/9012A (total cyanide) and SM2320B (total alkalinity). Data were reported for all required analytes. Problems were identified with the data package that resulted in the qualification of data.

Total cyanide:

1. Total cyanide was detected in the ICB/CCB at a negative value with an absolute value < the PQL. The associated sample results were NDs and will be **qualified UJ,B4**.

2. The ICAL intercept was negative with an absolute value > the MDL but ≤3X the MDL. The associated sample results were NDs and will be **qualified UJ,I5**.

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

Holding Times and Preservation

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

Calibration

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 was detected at < the PQL in the EB, sample 324508018. The associated sample results were detects >5X the EB value and will not be qualified.

Laboratory Control Sample (LCS)

All LCS acceptance criteria were met.

Matrix Spike (MS)

All MS/PS recoveries met QC acceptance criteria.

Perchlorate, anions and nitrate/nitrite:
The PS analysis was performed on a sample of similar matrix from another SNL SDG. No sample data will be qualified as a result.

Laboratory Replicate

The replicate analyses met all QC acceptance criteria.

Perchlorate, anions and nitrate/nitrite:
The replicate analysis was performed on a sample of similar matrix from another SNL SDG. No sample data will be qualified as a result.

Detection Limits/Dilutions

All detection limits were properly reported.

Nitrate/nitrite:
Sample -005 was diluted 5X and samples -032 and -044 were diluted 10X.

Anions:
Samples -031 and -043 were diluted 10X for chloride and sulfate and sample -004 was diluted 10X for chloride, sulfate and fluoride.

Other QC

The EB submitted on AR/COC 614746 was applied to the samples on AR/COC 614747. A field duplicate pair was submitted on AR/COC 614747. There are no "required" review criteria for field duplicate analyses comparability; no data will be qualified as a result.

No other specific issues that affect data quality were identified.

Reviewed by: Monica Dymerski **Level I** **Date:** 06/06/13

Sample Findings Summary

AR/COC: 614745, 614746, 614747

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
DOE EML HASL-300, U-02-RC			
	093873-035/CCBA-MW1	Uranium-235/236 (13982-70-2)	BD, FR3
	093876-035/CCBA-EB1	Uranium-233/234 (11-08-5)	BD, FR3
	093876-035/CCBA-EB1	Uranium-235/236 (13982-70-2)	BD, FR3
	093876-035/CCBA-EB1	Uranium-238 (7440-61-1)	BD, FR3
	093878-035/CCBA-MW2	Uranium-235/236 (13982-70-2)	J, FR7
	093879-035/CCBA-MW2	Uranium-235/236 (13982-70-2)	J, FR7
EPA 900.0/SW846 9310			
	093873-034/CCBA-MW1	ALPHA (12587-46-1)	J, MS1
	093873-034/CCBA-MW1	BETA (12587-47-2)	J, FR7,MS1
	093876-034/CCBA-EB1	ALPHA (12587-46-1)	BD, FR3,MS1
	093876-034/CCBA-EB1	BETA (12587-47-2)	BD, FR3,MS1
	093878-034/CCBA-MW2	ALPHA (12587-46-1)	J, MS1
	093878-034/CCBA-MW2	BETA (12587-47-2)	J, MS1
	093879-034/CCBA-MW2	ALPHA (12587-46-1)	J, MS1
	093879-034/CCBA-MW2	BETA (12587-47-2)	J, FR7,MS1
EPA 901.1			
	093873-033/CCBA-MW1	Americium-241 (14596-10-2)	BD, FR3
	093873-033/CCBA-MW1	Cesium-137 (10045-97-3)	BD, FR3
	093873-033/CCBA-MW1	Cobalt-60 (10198-40-0)	BD, FR3
	093873-033/CCBA-MW1	Potassium-40 (13966-00-2)	BD, FR3
	093876-033/CCBA-EB1	Americium-241 (14596-10-2)	BD, FR3
	093876-033/CCBA-EB1	Cesium-137 (10045-97-3)	BD, FR3
	093876-033/CCBA-EB1	Cobalt-60 (10198-40-0)	BD, FR3
	093876-033/CCBA-EB1	Potassium-40 (13966-00-2)	BD, FR3
	093878-033/CCBA-MW2	Americium-241 (14596-10-2)	BD, FR3

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
	093878-033/CCBA-MW2	Cesium-137 (10045-97-3)	BD, FR3
	093878-033/CCBA-MW2	Cobalt-60 (10198-40-0)	BD, FR3
	093878-033/CCBA-MW2	Potassium-40 (13966-00-2)	BD, FR3
	093879-033/CCBA-MW2	Americium-241 (14596-10-2)	BD, FR3
	093879-033/CCBA-MW2	Cesium-137 (10045-97-3)	BD, FR3
	093879-033/CCBA-MW2	Cobalt-60 (10198-40-0)	BD, FR3
	093879-033/CCBA-MW2	Potassium-40 (13966-00-2)	BD, FR3
SW846 3005/6010B			
	093873-009/CCBA-MW1	Vanadium (7440-62-2)	UJ, B4
	093876-009/CCBA-EB1	Vanadium (7440-62-2)	UJ, B4
SW846 3005/6020 DOE-AL			
	093873-009/CCBA-MW1	Cobalt (7440-48-4)	0.00053U, B
	093876-009/CCBA-EB1	Calcium (7440-70-2)	0.45U, B
	093876-017/CCBA-EB1	Calcium (7440-70-2)	0.45U, B
	093878-009/CCBA-MW2	Cobalt (7440-48-4)	0.00053U, B
	093878-009/CCBA-MW2	Copper (7440-50-8)	0.0097UJ, B2
	093879-009/CCBA-MW2	Cobalt (7440-48-4)	0.00053U, B
	093879-009/CCBA-MW2	Copper (7440-50-8)	0.0097UJ, B2
SW846 3535/8321A Modified			
	093873-024/CCBA-MW1	m-Nitrotoluene (99-08-1)	UJ, I4
	093873-024/CCBA-MW1	o-Nitrotoluene (88-72-2)	UJ, I4
	093873-024/CCBA-MW1	p-Nitrotoluene (99-99-0)	UJ, I4
	093876-024/CCBA-EB1	m-Nitrotoluene (99-08-1)	UJ, I4
	093876-024/CCBA-EB1	o-Nitrotoluene (88-72-2)	UJ, I4
	093876-024/CCBA-EB1	p-Nitrotoluene (99-99-0)	UJ, I4
	093878-024/CCBA-MW2	m-Nitrotoluene (99-08-1)	UJ, I4
	093878-024/CCBA-MW2	o-Nitrotoluene (88-72-2)	UJ, I4
	093878-024/CCBA-MW2	p-Nitrotoluene (99-99-0)	UJ, I4
	093879-024/CCBA-MW2	m-Nitrotoluene (99-08-1)	UJ, I4

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
	093879-024/CCBA-MW2	o-Nitrotoluene (88-72-2)	UJ, I4
	093879-024/CCBA-MW2	p-Nitrotoluene (99-99-0)	UJ, I4
SW846 7470A			
	093873-009/CCBA-MW1	Mercury (7439-97-6)	UJ, B4
	093876-009/CCBA-EB1	Mercury (7439-97-6)	UJ, B4
	093878-009/CCBA-MW2	Mercury (7439-97-6)	UJ, B4
	093879-009/CCBA-MW2	Mercury (7439-97-6)	UJ, B4
SW846 9012B			
	093873-027/CCBA-MW1	Cyanide, Total (57-12-5)	UJ, I5,B4
	093876-027/CCBA-EB1	Cyanide, Total (57-12-5)	UJ, I5,B4
	093878-027/CCBA-MW2	Cyanide, Total (57-12-5)	UJ, I5,B4
	093879-027/CCBA-MW2	Cyanide, Total (57-12-5)	UJ, I5,B4

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

ANALYTICAL QUALITY ASSOCIATES, INC.

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

Memorandum

Date: July 30, 2013

To: File

From: Linda Thal

Subject: Inorganic Data Review and Validation – SNL
Site: SWMU 154 GWM
AR/COC: 614827
SDG: 328283
Laboratory: GEL
Project/Task: 146422.10.11.01
Analysis: General Chemistry

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

Summary

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

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

Holding Times and Preservation

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

Calibration

All initial and continuing calibration met QC acceptance criteria.

Blanks

No target analytes were detected in the blanks.

Laboratory Control Sample (LCS)

All LCS acceptance criteria were met.

Matrix Spike (MS)

All MS/PS recoveries met QC acceptance criteria.

Alkalinity and nitrate/nitrite:
The MS/PS analysis was performed on a sample of similar matrix from another SNL SDG. No sample data will be qualified as a result.

Laboratory Replicate

The replicate analyses met all QC acceptance criteria.

Alkalinity and nitrate/nitrite:
The replicate analysis was performed on a sample of similar matrix from another SNL SDG. No sample data will be qualified as a result.

Detection Limits/Dilutions

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

Anions:
The sample was diluted 100X for sulfate and chloride and 2X for bromide.

Other QC

No other specific issues that affect data quality were identified.

Reviewed by: Monica Dymerski **Level I** **Date:** 07/31/13

Sample Findings Summary

AR/COC: 614827

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
EPA 900.0/SW846 9310			
	094042-034/CTF-MW2	ALPHA (12587-46-1)	J, FR7
EPA 901.1			
	094042-033/CTF-MW2	Americium-241 (14596-10-2)	BD, FR3
	094042-033/CTF-MW2	Cesium-137 (10045-97-3)	BD, FR3
	094042-033/CTF-MW2	Cobalt-60 (10198-40-0)	BD, FR3
	094042-033/CTF-MW2	Potassium-40 (13966-00-2)	BD, FR3
SW846 3005/6010B			
	094042-009/CTF-MW2	Vanadium (7440-62-2)	UJ, B4
	094042-010/CTF-MW2	Vanadium (7440-62-2)	UJ, B4
SW846 3005/6020 DOE-AL			
	094042-009/CTF-MW2	Cadmium (7440-43-9)	J+, CK2
	094042-009/CTF-MW2	Copper (7440-50-8)	J-, CK3
	094042-009/CTF-MW2	Iron (7439-89-6)	J, D1
	094042-009/CTF-MW2	Manganese (7439-96-5)	J, MS1
	094042-009/CTF-MW2	Potassium (7440-09-7)	J, D1
	094042-009/CTF-MW2	Zinc (7440-66-6)	J, MS1
	094042-010/CTF-MW2	Cadmium (7440-43-9)	J+, CK2
	094042-010/CTF-MW2	Copper (7440-50-8)	J-, CK3
	094042-010/CTF-MW2	Iron (7439-89-6)	J, D1
	094042-010/CTF-MW2	Manganese (7439-96-5)	J, MS1
	094042-010/CTF-MW2	Potassium (7440-09-7)	J, D1
	094042-010/CTF-MW2	Zinc (7440-66-6)	J, MS1
SW846 3535/8321A Modified			
	094042-024/CTF-MW2	m-Nitrotoluene (99-08-1)	UJ, I4
	094042-024/CTF-MW2	o-Nitrotoluene (88-72-2)	UJ, I4

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
	094042-024/CTF-MW2	p-Nitrotoluene (99-99-0)	UJ, I4

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

ANALYTICAL QUALITY ASSOCIATES, INC.

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Albuquerque, NM 87154
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Memorandum

Date: July 31, 2013

To: File

From: Linda Thal

Subject: Inorganic Data Review and Validation – SNL
Site: SWMU 149 GWM
AR/COC: 614829
SDG: 328498
Laboratory: GEL
Project/Task: 146422.10.11.01
Analysis: General Chemistry

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

Summary

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

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

Holding Times and Preservation

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

Calibration

All initial and continuing calibration met QC acceptance criteria.

Blanks

No target analytes were detected in the blanks.

Laboratory Control Sample (LCS)

All LCS acceptance criteria were met.

Matrix Spike (MS)

All MS/PS recoveries met QC acceptance criteria.

Anions, Perchlorate and Nitrate/Nitrite:
The MS/PS analysis was performed on a sample of similar matrix from another SNL SDG. No sample data will be qualified as a result.

Laboratory Replicate

The replicate analyses met all QC acceptance criteria.

Anions, Perchlorate and Nitrate/Nitrite:
The replicate analysis was performed on a sample of similar matrix from another SNL SDG. No sample data will be qualified as a result.

Detection Limits/Dilutions

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

Anions:
The sample was diluted 50X for sulfate and chloride.

Nitrate/Nitrite:
The sample was diluted 10X.

Other QC

No other specific issues that affect data quality were identified.

Reviewed by: Monica Dymerski **Level I** **Date:** 08/01/13

Sample Findings Summary

AR/COC: 614829

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
SW846 3005/6010B			
	094044-009/CTF-MW3	Vanadium (7440-62-2)	UJ, B4
	094044-010/CTF-MW3	Vanadium (7440-62-2)	UJ, B4
SW846 3005/6020 DOE-AL			
	094044-009/CTF-MW3	Copper (7440-50-8)	J-, CK3
	094044-009/CTF-MW3	Nickel (7440-02-0)	J+, CK2
	094044-010/CTF-MW3	Copper (7440-50-8)	J-, CK3
	094044-010/CTF-MW3	Nickel (7440-02-0)	J+, CK2

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 2013

1.0 Introduction

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

Monitoring wells CTF-MW2 and CTF-MW3 were installed in August 2001. Prior to the June 2013 sampling event, monitoring wells CTF-MW2 and CTF-MW3 had been sampled 20 and 21 times, respectively, for a variety of constituents. Monitoring well CTF-MW3 is located approximately 290 feet to the west and downgradient of SWMU 149 (Figure III-1). Monitoring well CTF-MW2 is located approximately 260 feet to the southwest and downgradient of SWMU 154 (Figure III-2). Both wells are screened in Precambrian bedrock.

This report summarizes the tenth quarterly groundwater sampling events for Coyote Test Field (CTF) monitoring well CTF-MW3, located near SWMU 149 (Building 9930 Septic System), and monitoring well CTF-MW2, located near SWMU 154 (Building 9960 Septic System and Seepage Pits). This groundwater characterization at the two SWMUs is designed to address the requirements of Section VII.D.6 of the Compliance Order on Consent (the Order) (NMED April 2004) and the letter dated April 8, 2010, from the NMED Hazardous Waste Bureau (NMED April 2010). This is the second additional quarterly groundwater sampling event following the eight required by the April 8, 2010 letter from NMED.

The analytical results discussed in this section correspond to the reporting period of April through June 2013. Monitoring wells CTF-MW3 and CTF-MW2 were sampled on June 28 and June 25, 2013, respectively.

This groundwater sampling event was conducted in conformance with procedures outlined in the "Sampling and Analysis Plan for Collection and Analysis of Additional Groundwater Samples Collected from Monitoring Well CTF-MW3, Located Near SNL/NM SWMU 149" (SNL/NM June 2010, Attachment 1) and "Sampling and Analysis Plan for Collection and Analysis of Additional Groundwater Samples Collected from Monitoring Well CTF-MW2, Located Near SNL/NM SWMU 154" (SNL/NM June 2010, Attachment 2). These sampling and analysis plans (SAPs) were approved by the NMED in December 2010 (NMED December 2010).

The samples from 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, NPN, gross alpha/beta activity, radionuclides by gamma spectroscopy, and uranium.

Analytical results for the June 2013 groundwater samples were compared with the U.S. Environmental Protection Agency (EPA) maximum contaminant levels (MCLs) for drinking water (EPA 2009). No analytical results for the monitoring well CTF-MW3 groundwater samples exceed the corresponding MCLs. Except for arsenic, none of the analytical results for the monitoring well CTF-MW2 groundwater samples exceed the MCLs. Arsenic was detected above the MCL of 0.010 milligrams per liter (mg/L) in monitoring well CTF-MW2 groundwater samples in both unfiltered and filtered samples. Arsenic was reported at concentrations of 0.046 mg/L in the unfiltered sample and 0.0477 mg/L in the filtered sample. These values are comparable to previous sampling results for this monitoring well. The elevated concentrations of arsenic in the groundwater samples are most likely attributable to background conditions because monitoring well CTF-MW2 is screened in a fault-gouge zone in the Precambrian granite. Because of the fine-grained nature and disrupted texture of the rock surrounding monitoring well CTF-MW2, naturally occurring arsenic may be more likely to be present in the local groundwater.

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

2.0 Field Methods and Measurements

The quarterly groundwater sampling field measurements were collected in conformance with the DOE/Sandia Response to the NMED letter of April 8, 2010 (SNL/NM June 2010). Groundwater monitoring at monitoring wells CTF-MW3 and CTF-MW2 was performed according to the SAPs submitted as Attachments 1 and 2 to the DOE/Sandia Response (SNL/NM June 2010) and SNL/NM Administrative Operating Procedures (AOPs) (SNL/NM May 2011) and Field Operating Procedures (FOPs) (SNL/NM January 2012a and January 2012b). Groundwater samples were analyzed for relevant parameters, listed in Table III-1. Table III-2 presents the details for groundwater samples collected from monitoring wells CTF-MW3 and CTF-MW2 during the Second Quarter of Calendar Year (CY) 2013.

2.1 Equipment Decontamination

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

2.2 Well Evacuation

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

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

until four stable measurements for turbidity, pH, temperature, and SC were obtained. Groundwater stability is considered acceptable when the following parameters are achieved:

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

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

2.3 Groundwater Sample Collection

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

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

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. 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 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 monitoring well CTF-MW2.

3.2 Volatile Organic Compounds

SWMU 149, Monitoring Well CTF-MW3. No VOCs were detected at concentrations above established MCLs. The compounds bromodichloromethane, chloroform, and dibromochloromethane were detected above laboratory MDLs at concentrations comparable to historical values. Bromodichloromethane was detected at 0.580 micrograms per liter (µg/L), chloroform at 0.830 µg/L, and dibromochloromethane at 0.380 µg/L. Table III-4 summarizes detected VOCs in environmental groundwater samples and Table III-5 lists the VOC MDLs.

SWMU 154, Monitoring Well CTF-MW2. No VOCs were detected at concentrations above established MCLs in the monitoring well CTF-MW2 environmental sample. No VOCs were reported above laboratory MDLs. 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 environmental 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 environmental sample collected from monitoring well CTF-MW2 at a concentration of 0.248 μg/L. The EPA does not have an MCL of RDX. NMED does have a tap water screening level for RDX of 6.11 μg/L (NMED February 2012), which is approximately 25 times greater than CTF-MW2 analytical concentration. Table III-4 summarizes the HE compounds detected in the environmental groundwater sample and Table III-7 lists the HE compound MDLs.

3.5 Nitrate Plus Nitrite

SWMU 149, 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 5.94 mg/L in the CTF-MW3 environmental sample.

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

3.6 Anions and Alkalinity

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

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

3.7 Perchlorate

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

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

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

3.8 Metals

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

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

SWMU 154, Monitoring Well CTF-MW2. No metals were detected above established MCLs in the monitoring well CTF-MW2 groundwater sample, except for arsenic. Arsenic was detected above the MCL of 0.010 mg/L with a concentration of 0.046 mg/L

in the unfiltered sample and 0.0477 mg/L in the filtered sample. The elevated concentrations of arsenic in the groundwater sample are most likely attributable to background because monitoring well CTF-MW2 is screened in a fault-gouge zone in the Precambrian granite, as noted in Section III.1.0. Arsenic concentrations since March 2002 are plotted on Figure III-3. Unfiltered and filtered metal results for monitoring well CTF-MW2 are summarized in Tables III-13 and III-14, respectively.

3.9 Gamma Spectroscopy and Radioisotopic Analyses

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

SWMU 154, Monitoring Well CTF-MW2. The monitoring well CTF-MW2 groundwater sample was screened for gamma-emitting radionuclides and gross alpha/beta activity (EPA 1980 and DOE 1990). An additional sample for isotopic uranium was collected to support evaluation of gross alpha activity results. All radiological results were reviewed by Mark Miller, 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.

The gross alpha and gross beta results do not exceed established MCLs. In the environmental sample, isotopic uranium-233/234 was reported at 56.8 ± 7.56 picocuries per liter (pCi/L), uranium-235/236 at 0.625 ± 0.167 pCi/L, and uranium-238 at 7.97 ± 1.15 pCi/L. In this region, naturally occurring uranium in groundwater is elevated due to contact with bedrock, which contains minerals high in uranium.

3.10 Sample Results Exceeding Maximum Contaminant Levels

Table III-16 lists the results for all constituents that have been detected at concentrations exceeding the EPA MCLs (EPA 2009) during all quarterly sampling events. Arsenic was

the only constituent exceeding MCLs in samples collected during this quarter, which was detected in the monitoring well CTF-MW2 samples. Figure III-3 shows the concentrations of arsenic and groundwater elevations 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.

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) environmental duplicate, field blank, and equipment blank samples were not required for this reporting period. The TB samples were submitted for analysis along with the groundwater samples in accordance with QC procedures specified in the SAPs.

4.1.1 Trip Blank Samples

A TB sample is submitted whenever an environmental or duplicate sample is collected for VOC analyses to assess whether contamination of the sample has occurred during shipment and storage. TB samples consist of laboratory reagent-grade water with hydrochloric acid preservative contained in 40-milliliter volatile organic analysis vials prepared by the analytical laboratory, which accompany the empty sample containers supplied by the laboratory. The TB samples were brought to the field and accompanied each sample shipment.

SWMU 149, Monitoring Well CTF-MW3. A total of two TBs were submitted with the June 2013 samples. No VOCs were detected above associated laboratory MDLs in any of the TB samples.

SWMU 154, Monitoring Well CTF-MW2. One TB was were submitted with the June 2013 samples. No VOCs were detected above associated laboratory MDLs in any of the TB samples.

4.2 Laboratory Quality Control Samples

Internal laboratory QC samples, including method blanks and duplicate laboratory control samples, were analyzed concurrently with all groundwater samples. All chemical data were reviewed and qualified in accordance with AOP 00-03, "Data Validation Procedure for Chemical and Radiochemical Data" (SNL/NM May 2011).
Although some analytical results were qualified during the data validation process, no significant data quality problems were noted for project constituents of concern. The data validation sample findings summary sheets are provided in Appendix C. The data are acceptable and reported QC measures are adequate.

4.3 Variances and Nonconformances

No variances or nonconformances from the requirements in the Groundwater Monitoring SAPs for SWMUs 149 and 154 (SNL/NM June 2010, Attachments 1 and 2) were identified during the June 2013 sampling activities at monitoring wells CTF-MW3 and CTF-MW2.

5.0 Summary

During CY 2013 second quarter, samples were collected from monitoring well CTF-MW3, located near SWMU 149, and monitoring well CTF-MW2, located near SWMU 154. This sampling event represents the tenth quarterly groundwater sampling events for both monitoring wells, as well as the second additional sampling event following the eight quarterly groundwater sampling events required by the April 8, 2010 letter from the NMED. 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. Arsenic detections exceed the MCL of 0.010 mg/L in the monitoring well CTF-MW2. In the groundwater samples, arsenic concentrations were 0.046 mg/L in the unfiltered sample and -0.477 mg/L in the filtered sample. The elevated concentrations of arsenic in the groundwater samples are most likely attributable to background because monitoring well CTF-MW2 is screened in a fault-gouge zone in the Precambrian granite. These values are comparable to previous results.

6.0 References

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

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Figures

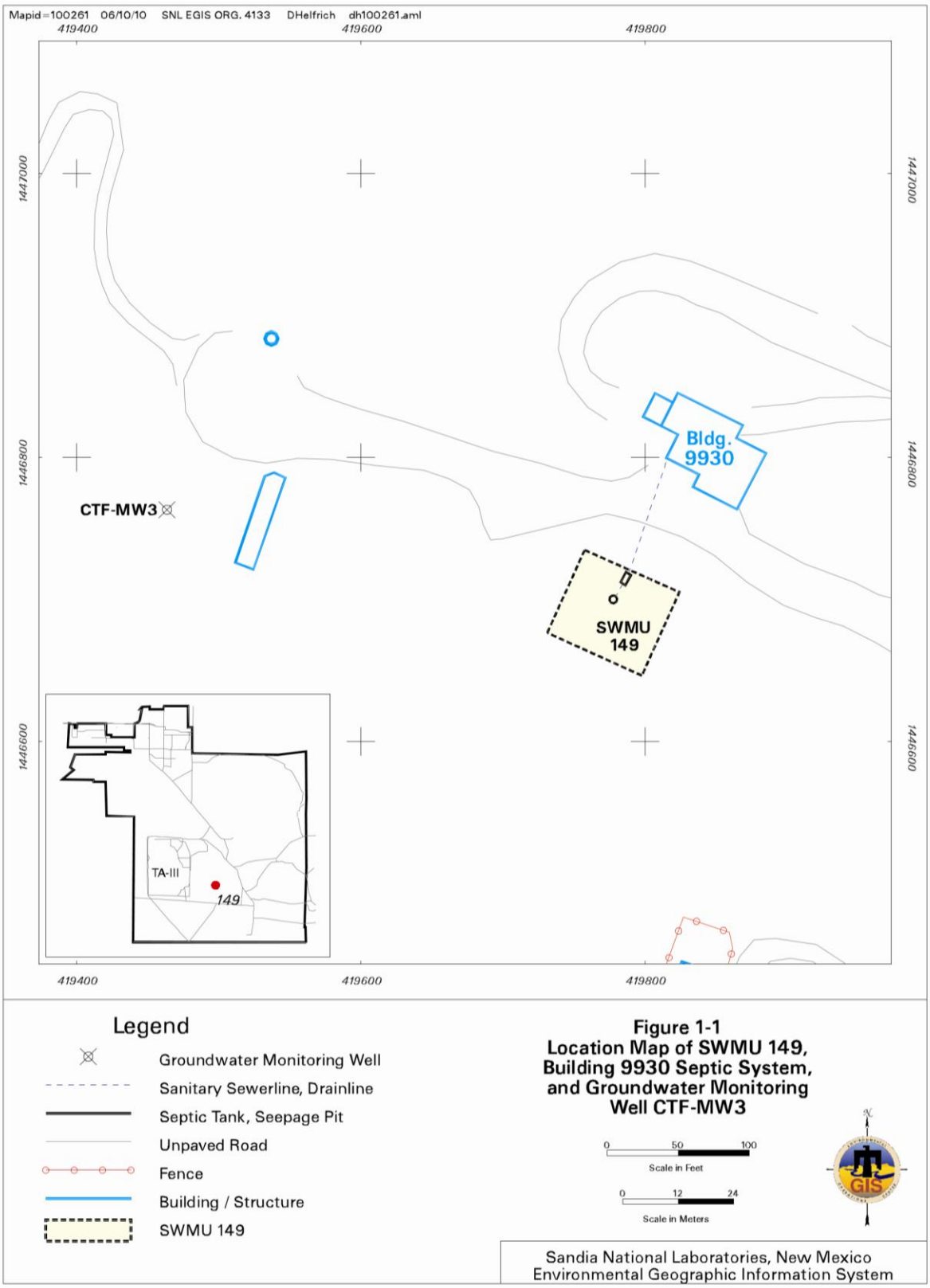

Figure III-1

Location of Monitoring Well CTF-MW3 near SWMU 149

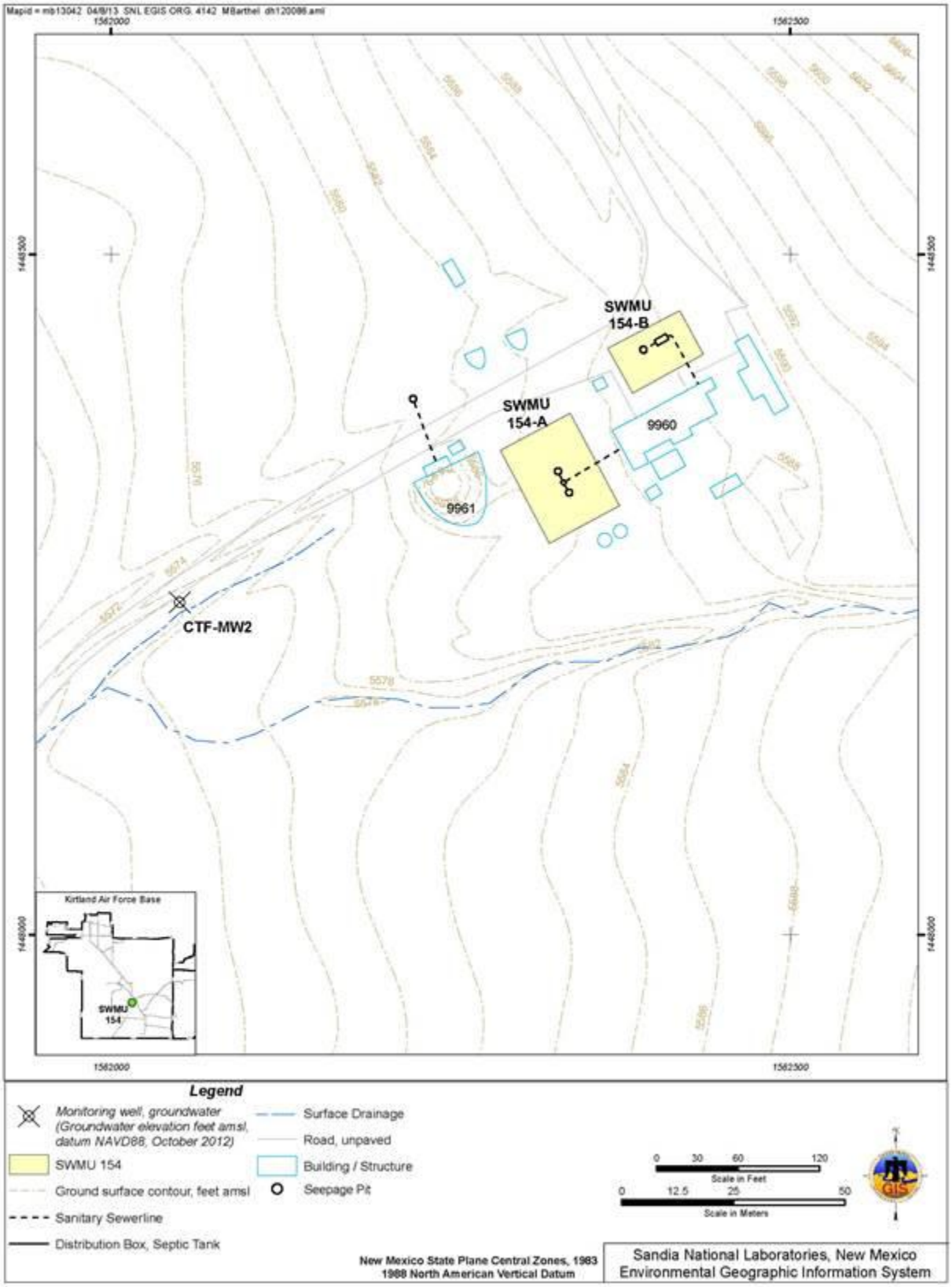

Figure III-2

Location of Monitoring Well CTF-MW2 near SWMU 154

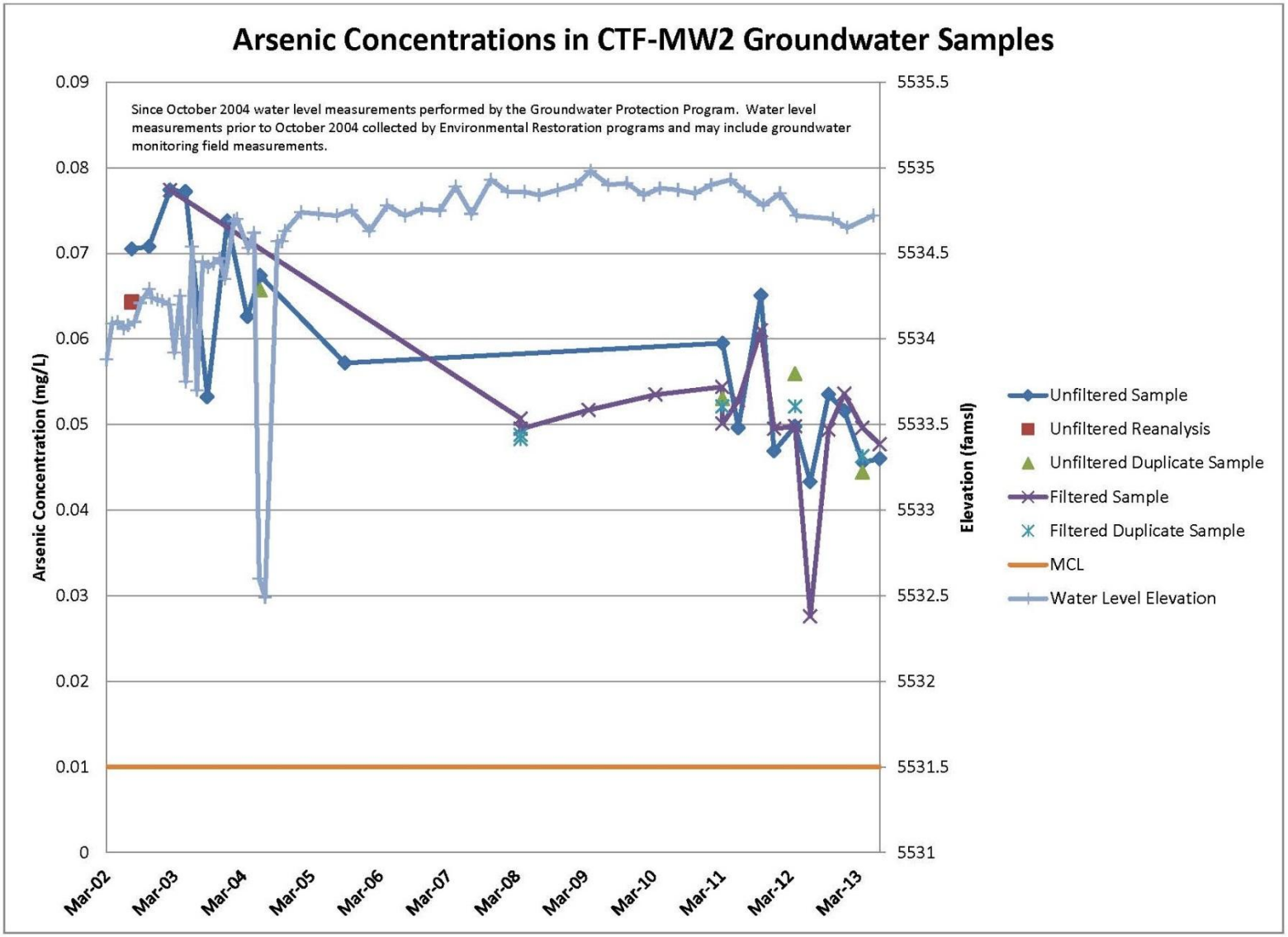

Figure III-3

Concentrations of 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_2SO_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	ASTM D3972-09	1 x 1-L polyethylene, HNO_3, 4°C

Notes

[a]U.S. Environmental Protection Agency, 1986 (and updates), "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods," SW-846, 3rd ed., U.S. Environmental Protection Agency, Washington, D.C.
U.S. Environmental Protection Agency, 1999, "Perchlorate in Drinking Water Using Ion Chromatography," EPA 815/R-00-014, U.S. Environmental Protection Agency, Washington, D.C.
Clesceri, L.S., A.E. Greenburg, and A.D. Eaton, 1998. *Standard Methods for the Examination of Water and Wastewater,* 20th ed., Standard Method 2320B, published jointly by American Public Health Association, American Water Works Association, and Water Environment Federation, Washington, D.C.
U.S. Environmental Protection Agency, 1980, "Prescribed Procedures for Measurement of Radioactivity in Drinking Water," EPA-600/4-80-032, U.S. Environmental Protection Agency, Cincinnati, Ohio.
ASTM International (ASTM), 2009. "Standard Test Method for Isotopic Uranium in Water by Radiochemistry," ASTM D3972-09, ASTM, West Conshohocken, Pennsylvania.
[b]Metals = filtered and unfiltered samples, TAL metals including barium, calcium, magnesium, potassium, and sodium, plus uranium.
[c]Major anions include bromide, chloride, fluoride, and sulfate.
[d]Gamma spectroscopy = Americium-241, Cesium-137, Cobalt-60, and Potassium-40.

°C = Degrees Celsius.
EPA = U.S. Environmental Protection Agency.
H_2SO_4 = Sulfuric acid.
HCl = Hydrochloric acid.
HNO_3 = 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 2013 Groundwater Sampling

SWMUs 149 and 154 Groundwater Monitoring Quarterly Assessment

April – June 2013

Well	Date Sampled	Sample Identification	AR/COC Number	Associated Groundwater Investigation
CTF-MW3	28-June-13	094044	614829	SWMU 149
CTF-MW2	25-June-13	094042	614827	SWMU 154

Notes

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

Table III-3

Summary of Field Water Quality Measurements[a]

SWMUs 149 and 154 Groundwater Monitoring

Quarterly Assessment, April – June 2013

Well	Sample Date	Temperature (°C)	Specific Conductivity (µmhos/cm)	Oxidation Reduction Potential (mV)	pH	Turbidity (NTU)	Dissolved Oxygen (% Sat)	Dissolved Oxygen (mg/L)
SWMU 149								
CTF-MW3	28-Jun-13	22.26	1799	172.2	6.83	0.78	92.7	8.04
SWMU 154								
CTF-MW2	25-Jun-13	20.30	3322	24.5	6.01	0.61	3.1	0.27

Notes

[a]Field 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 2013

Well	Analyte	Result (µg/L)	MDL (µg/L)	PQL (µg/L)	MCL (µg/L)	Laboratory Qualifier[a]	Validation Qualifier[b]	Sample Number	Analytical Method[c]
SWMU 149									
CTF-MW3 28-Jun-13	Bromodichloromethane	0.580	0.300	1.00	NE	J		094044-001	EPA 8260B
	Chloroform	0.830	0.300	1.00	NE	J		094044-001	EPA 8260B
	Dibromochloromethane	0.380	0.300	1.00	NE	J		094044-001	EPA 8260B
SWMU 154									
CTF-MW2 25-Jun-13	RDX	0.248	0.087	0.272	NE	J		094042-024	EPA 8321A

Notes

[a]Laboratory Qualifier
J = Estimated value, the analyte concentration fell above the effective MDL and below the effective PQL.

[b]Validation Qualifier
If cell is blank, then all quality control samples met acceptance criteria with respect to submitted samples.

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

µg/L = Micrograms per liter.
CFR = Code of Federal Regulations.
CTF = Coyote Test Field.
EPA = U.S. Environmental Protection Agency.
MCL = Maximum contaminant level. Established by the EPA Primary Water Regulations (40 CFR 141.11, Subpart B), National Primary Drinking Water Standards (EPA 2009).
MDL = Method detection limit. The minimum concentration that can be measured and reported with 99% confidence that the analyte is greater than zero; analyte is matrix-specific.
MW = Monitoring well.
NE = Not established.
PQL = Practical quantitation limit. The lowest concentration of analytes in a sample that can be reliably determined within specified limits of precision and accuracy by that indicated method under routine laboratory operating conditions.
RDX = Hexahydro-1,3,5-trinitro-1,3,5-triazine.
SWMU = Solid Waste Management Unit.

Table III-5

Method Detection Limits for Volatile Organic Compounds (EPA Method 8260B[a])

SWMU 149 Groundwater Monitoring

Quarterly Assessment, April – June 2013

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

Notes

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

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 2013

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

Table III-6 (Concluded)

Method Detection Limits for Volatile and Semivolatile Organic Compounds

SWMU 154 Groundwater Monitoring

Quarterly Assessment, April – June 2013

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

Notes

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

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 2013

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

Notes

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

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

Well	Analyte	Result (mg/L)	MDL (mg/L)	PQL (mg/L)	MCL (mg/L)	Laboratory Qualifier[a]	Validation Qualifier[b]	Sample Number	Analytical Method[c]
SWMU 149									
CTF-MW3 28-Jun-13	Nitrate plus nitrite as N	5.94	0.170	0.500	10.0			094044-018	EPA 353.2
SWMU 154									
CTF-MW2 25-Jun-13	Nitrate plus nitrite as N	ND	0.017	0.050	10.0	U		094042-018	EPA 353.2

Notes

[a]Laboratory Qualifier
If cell is blank, then all quality control samples met acceptance criteria with respect to submitted samples.
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, 1986 (and updates), "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods," SW-846, 3rd ed.
U.S. Environmental Protection Agency, 1984, "Methods for Chemical Analysis of Water and Wastes," EPA 600-4-79-020.

CFR = Code of Federal Regulations.
CTF = Coyote Test Field.
EPA = U.S. Environmental Protection Agency.
MCL = Maximum contaminant level. Established by the EPA Primary Water Regulations (40 CFR 141.11, Subpart B), National Primary Drinking Water Standards (EPA 2009).
MDL = Method detection limit. The minimum concentration that can be measured and reported with 99% confidence that the analyte is greater than zero; analyte is matrix-specific.
mg/L = Milligrams per liter.
MW = Monitoring well.
N = Nitrogen.
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 2013

Well	Analyte	Result (mg/L)	MDL (mg/L)	PQL (mg/L)	MCL (mg/L)	Laboratory Qualifier[a]	Validation Qualifier[b]	Sample Number	Analytical Method[c]
SWMU 149									
CTF-MW3	Bicarbonate Alkalinity	322	0.725	1.00	NE			094044-022	SM2320B
28-Jun-13	Carbonate Alkalinity	ND	0.725	1.00	NE	U		094044-022	SM2320B
	Bromide	1.17	0.067	0.200	NE			094044-016	EPA 9056
	Chloride	115	3.35	10.0	NE			094044-016	EPA 9056
	Fluoride	2.49	0.033	0.100	4.0			094044-016	EPA 9056
	Sulfate	497	6.65	20.0	NE			094044-016	EPA 9056
SWMU 154									
CTF-MW2	Bicarbonate Alkalinity	1560	0.725	1.00	NE			094042-022	SM2320B
25-Jun-13	Carbonate Alkalinity	ND	0.725	1.00	NE	U		094042-022	SM2320B
	Bromide	1.69	0.134	0.400	NE			094042-016	EPA 9056
	Chloride	437	6.70	20.0	NE			094042-016	EPA 9056
	Fluoride	2.37	0.033	0.100	4.0			094042-016	EPA 9056
	Sulfate	152	13.3	40.0	NE			094042-016	EPA 9056

Notes

[a]Laboratory Qualifier
If cell is blank, then all quality control samples met acceptance criteria with respect to submitted samples.
U = Analyte is absent or below the method detection limit.

[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, 1986 (and updates), "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods," SW-846, 3rd ed.
U.S. Environmental Protection Agency, 1984, "Methods for Chemical Analysis of Water and Wastes," EPA 600-4-79-020, U.S. Environmental Protection Agency, Washington, D.C. or
Clesceri, Greenburg, and Eaton, 1998, *Standard Methods for the Examination of Water and Wastewater*, 20th ed., Method 2320B.

Table III-9 (Concluded)

Summary of Anion and Alkalinity Results

SWMUs 149 and 154 Groundwater Monitoring

Quarterly Assessment, April – June 2013

Notes (continued)

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

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

Well	Perchlorate Result (mg/L)	MDL (mg/L)	PQL (mg/L)	MCL (mg/L)	Laboratory Qualifier[a]	Validation Qualifier[b]	Sample Number	Analytical Method[c]
SWMU 149								
CTF-MW3 28-Jun-13	ND	0.004	0.012	NE	U		094044-020	EPA 314.0
CTF-MW2 25-Jun-13	ND	0.004	0.012	NE	U		094042-020	EPA 314.0

Notes

[a]**Laboratory Qualifier**
U = Analyte is absent or below the method detection limit.

[b]**Validation Qualifier**
If cell is blank, then all quality control samples 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.

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 2013

Well	Analyte	Result (mg/L)	MDL (mg/L)	PQL (mg/L)	MCL (mg/L)	Laboratory Qualifier[a]	Validation Qualifier[b]	Sample Number	Analytical Method[c]
CTF-MW3	Aluminum	ND	0.015	0.050	NE	U		094044-009	EPA 6020
28-Jun-13	Antimony	ND	0.001	0.003	0.006	U		094044-009	EPA 6020
	Arsenic	ND	0.0017	0.005	0.010	U		094044-009	EPA 6020
	Barium	0.0284	0.0006	0.002	2.00			094044-009	EPA 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		094044-009	EPA 6020
	Cadmium	ND	0.00011	0.001	0.005	U		094044-009	EPA 6020
	Calcium	189	0.600	2.00	NE			094044-009	EPA 6020
	Chromium	ND	0.002	0.010	0.100	U		094044-009	EPA 6020
	Cobalt	0.000344	0.0001	0.001	NE	J		094044-009	EPA 6020
	Copper	0.00194	0.00035	0.001	NE		J-	094044-009	EPA 6020
	Iron	0.351	0.033	0.100	NE			094044-009	EPA 6020
	Lead	ND	0.0005	0.002	NE	U		094044-009	EPA 6020
	Magnesium	47.9	0.010	0.030	NE			094044-009	EPA 6020
	Manganese	0.00117	0.001	0.005	NE	J		094044-009	EPA 6020
	Mercury	ND	0.000067	0.0002	0.002	U		094044-009	EPA 7470
	Nickel	0.0055	0.0005	0.002	NE		J+	094044-009	EPA 6020
	Potassium	11.3	0.080	0.300	NE			094044-009	EPA 6020
	Selenium	0.0308	0.0015	0.005	0.050			094044-009	EPA 6020
	Silver	ND	0.0002	0.001	NE	U		094044-009	EPA 6020
	Sodium	160	0.800	2.50	NE			094044-009	EPA 6020
	Thallium	ND	0.00045	0.002	0.002	U		094044-009	EPA 6020
	Vanadium	ND	0.001	0.005	NE	U	UJ	094044-009	EPA 6010
	Zinc	0.00553	0.0035	0.010	NE	J		094044-009	EPA 6020

Table III-11 (Concluded)

Summary of Unfiltered Total Metal Results

SWMU 149 Groundwater Monitoring

Quarterly Assessment, April – June 2013

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

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

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 2013

Well	Analyte	Result (mg/L)	MDL (mg/L)	PQL (mg/L)	MCL (mg/L)	Laboratory Qualifier[a]	Validation Qualifier[b]	Sample Number	Analytical Method[c]
CTF-MW3	Aluminum	ND	0.015	0.050	NE	U		094044-010	EPA 6020
28-Jun-13	Antimony	ND	0.001	0.003	0.006	U		094044-010	EPA 6020
	Arsenic	ND	0.0017	0.005	0.010	U		094044-010	EPA 6020
	Barium	0.0311	0.0006	0.002	2.00			094044-010	EPA 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		094044-010	EPA 6020
	Cadmium	ND	0.00011	0.001	0.005	U		094044-010	EPA 6020
	Calcium	193	0.600	2.00	NE			094044-010	EPA 6020
	Chromium	ND	0.002	0.010	0.100	U		094044-010	EPA 6020
	Cobalt	0.000351	0.0001	0.001	NE	J		094044-010	EPA 6020
	Copper	0.00193	0.00035	0.001	NE		J-	094044-010	EPA 6020
	Iron	0.327	0.033	0.100	NE			094044-010	EPA 6020
	Lead	ND	0.0005	0.002	NE	U		094044-010	EPA 6020
	Magnesium	47.5	0.010	0.030	NE			094044-010	EPA 6020
	Manganese	ND	0.001	0.005	NE	U		094044-010	EPA 6020
	Mercury	ND	0.000067	0.0002	0.002	U		094044-010	EPA 7470
	Nickel	0.00527	0.0005	0.002	NE		J+	094044-010	EPA 6020
	Potassium	11.1	0.080	0.300	NE			094044-010	EPA 6020
	Selenium	0.0299	0.0015	0.005	0.050			094044-010	EPA 6020
	Silver	ND	0.0002	0.001	NE	U		094044-010	EPA 6020
	Sodium	165	0.800	2.50	NE			094044-010	EPA 6020
	Thallium	ND	0.00045	0.002	0.002	U		094044-010	EPA 6020
	Vanadium	ND	0.001	0.005	NE	U	UJ	094044-010	EPA 6010
	Zinc	0.00524	0.0035	0.010	NE	J		094044-010	EPA 6020

Table III-12 (Concluded)

Summary of Filtered Total Metal Results

SWMU 149 Groundwater Monitoring

Quarterly Assessment, April – June 2013

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

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

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 2013

Well	Analyte	Result (mg/L)	MDL (mg/L)	PQL (mg/L)	MCL (mg/L)	Laboratory Qualifier[a]	Validation Qualifier[b]	Sample Number	Analytical Method[c]
CTF-MW2	Aluminum	0.111	0.015	0.050	NE			094042-009	EPA 6020
25-Jun-13	Antimony	ND	0.001	0.003	0.006	U		094042-009	EPA 6020
	Arsenic	**0.046**	0.0017	0.005	0.010			094042-009	EPA 6020
	Barium	0.0766	0.0006	0.002	2.00			094042-009	EPA 6020
	Beryllium	0.00292	0.0002	0.0005	0.004			094042-009	EPA 6020
	Cadmium	0.000535	0.00011	0.001	0.005	J	J+	094042-009	EPA 6020
	Calcium	355	0.600	2.00	NE			094042-009	EPA 6020
	Chromium	ND	0.002	0.010	0.100	U		094042-009	EPA 6020
	Cobalt	0.0104	0.0001	0.001	NE			094042-009	EPA 6020
	Copper	0.00149	0.00035	0.001	NE		J-	094042-009	EPA 6020
	Iron	2.41	0.033	0.100	NE		J	094042-009	EPA 6020
	Lead	ND	0.0005	0.002	NE	U		094042-009	EPA 6020
	Magnesium	83.0	0.100	0.300	NE			094042-009	EPA 6020
	Manganese	2.81	0.010	0.050	NE		J	094042-009	EPA 6020
	Mercury	ND	0.000067	0.0002	0.002	U		094042-009	EPA 7470
	Nickel	0.0228	0.0005	0.002	NE			094042-009	EPA 6020
	Potassium	44.1	0.080	0.300	NE		J	094042-009	EPA 6020
	Selenium	0.00191	0.0015	0.005	0.050	J		094042-009	EPA 6020
	Silver	ND	0.0002	0.001	NE	U		094042-009	EPA 6020
	Sodium	449	0.800	2.50	NE			094042-009	EPA 6020
	Thallium	0.00133	0.00045	0.002	0.002	J		094042-009	EPA 6020
	Uranium	0.0276	0.000067	0.0002	0.03			094042-009	EPA 6020
	Vanadium	ND	0.001	0.005	NE	U	UJ	094042-009	EPA 6010
	Zinc	0.280	0.0175	0.050	NE		J	094042-009	EPA 6020

Table III-13 (Concluded)

Summary of Unfiltered Total Metal Results

SWMU 154 Groundwater Monitoring

Quarterly Assessment, April – June 2013

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

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

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 2013

Well	Analyte	Result (mg/L)	MDL (mg/L)	PQL (mg/L)	MCL (mg/L)	Laboratory Qualifier[a]	Validation Qualifier[b]	Sample Number	Analytical Method[c]
CTF-MW2	Aluminum	0.111	0.015	0.050	NE			094042-010	EPA 6020
25-Jun-13	Antimony	ND	0.001	0.003	0.006	U		094042-010	EPA 6020
	Arsenic	**0.0477**	0.0017	0.005	0.010			094042-010	EPA 6020
	Barium	0.0776	0.0006	0.002	2.00			094042-010	EPA 6020
	Beryllium	0.0029	0.0002	0.0005	0.004			094042-010	EPA 6020
	Cadmium	0.000191	0.00011	0.001	0.005	J	J+	094042-010	EPA 6020
	Calcium	359	0.600	2.00	NE			094042-010	EPA 6020
	Chromium	ND	0.002	0.010	0.100	U		094042-010	EPA 6020
	Cobalt	0.0103	0.0001	0.001	NE			094042-010	EPA 6020
	Copper	0.00144	0.00035	0.001	NE		J-	094042-010	EPA 6020
	Iron	2.39	0.033	0.100	NE		J	094042-010	EPA 6020
	Lead	ND	0.0005	0.002	NE	U		094042-010	EPA 6020
	Magnesium	83.6	0.100	0.300	NE			094042-010	EPA 6020
	Manganese	2.81	0.010	0.050	NE		J	094042-010	EPA 6020
	Mercury	ND	0.000067	0.0002	0.002	U		094042-010	EPA 7470
	Nickel	0.0229	0.0005	0.002	NE			094042-010	EPA 6020
	Potassium	43.7	0.080	0.300	NE		J	094042-010	EPA 6020
	Selenium	0.00183	0.0015	0.005	0.050	J		094042-010	EPA 6020
	Silver	ND	0.0002	0.001	NE	U		094042-010	EPA 6020
	Sodium	471	1.60	5.00	NE			094042-010	EPA 6020
	Thallium	0.00116	0.00045	0.002	0.002	J		094042-010	EPA 6020
	Uranium	0.0265	0.000067	0.0002	0.03			094042-010	EPA 6020
	Vanadium	ND	0.001	0.005	NE	U	UJ	094042-010	EPA 6010
	Zinc	0.302	0.0175	0.050	NE		J	094042-010	EPA 6020

Table III-14 (Concluded)

Summary of Filtered Total Metal Results

SWMU 154 Groundwater Monitoring

Quarterly Assessment, April – June 2013

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

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

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 2013

Well	Analyte	Activity[a] (pCi/L)	MDA (pCi/L)	Critical Level[b] (pCi/L)	MCL (pCi/L)	Laboratory Qualifier[c]	Validation Qualifier[d]	Sample Number	Analytical Method[e]
CTF-MW2	Americium-241	7.09 ± 6.88	9.46	4.63	NE	U	BD	094042-033	EPA 901.1
25-Jun-13	Cesium-137	0.547 ± 1.58	2.79	1.34	NE	U	BD	094042-033	EPA 901.1
	Cobalt-60	1.01 ± 3.20	3.00	1.41	NE	U	BD	094042-033	EPA 901.1
	Potassium-40	29.7 ± 30.0	30.2	14.2	NE	U	BD	094042-033	EPA 901.1
	Gross Alpha	-32.6	NA	NA	15 pCi/L	NA	None	094042-034	EPA 900.0
	Gross Beta	51.1 ± 11.1	9.11	4.39	4mrem/yr			094042-034	EPA 900.0
	Uranium-233/234	56.8 ± 7.56	0.152	0.0667	NE			094042-035	HASL-300
	Uranium-235/236	0.625 ± 0.167	0.118	0.0476	NE			094042-035	HASL-300
	Uranium-238	7.97 ± 1.15	0.0972	0.0392	NE			094042-035	HASL-300

Notes

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

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

[c]**Laboratory Qualifier**
If cell is blank, then all quality control samples met acceptance criteria with respect to submitted samples.
NA = Not applicable.
U = Analyte is absent or below the method detection limit.

[d]**Validation Qualifier**
If cell is blank, then all quality control samples met acceptance criteria with respect to submitted samples.
BD = Below detection limit as used in radiochemistry to identify results that are not statistically different from zero.
None = No data validation for corrected gross alpha activity.

[e]**Analytical Method**
U.S. Environmental Protection Agency, 1980, "Prescribed Procedures for Measurement of Radioactivity in Drinking Water," EPA-600/4-80-032, U.S. Environmental Protection Agency, Cincinnati, Ohio.
U.S. Department of Energy, 1990, "EML Procedures Manual," 27th ed., Vol. 1, Rev. 1992, Environmental Measurements Laboratory HASL-300.

Table III-15 (Concluded)

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

SWMU 154 Groundwater Monitoring

Quarterly Assessment, April – June 2013

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 2013

Well	Date	Analyte	Result	MCL	Laboratory Qualifier[a]	Validation Qualifier[b]	Sample Number	Analytical Method[c]
SWMU 154								
CTF-MW2	08-Mar-11	Arsenic—Filtered	**0.0544 mg/L**	0.010 mg/L			090237-010	EPA 6020
CTF-MW2 (Duplicate)	08-Mar-11	Arsenic—Filtered	**0.0521 mg/L**	0.010 mg/L			090238-010	EPA 6020
CTF-MW2	31-May-11	Arsenic—Filtered	**0.0528 mg/L**	0.010 mg/L			090670-010	EPA 6020
CTF-MW2	29-Sep-11	Arsenic—Filtered	**0.0610 mg/L**	0.010 mg/L			090670-010	EPA 6020
CTF-MW2	09-Dec-11	Arsenic—Filtered	**0.0495 mg/L**	0.010 mg/L			091525-010	EPA 6020
CTF-MW2	30-Mar-12	Arsenic—Filtered	**0.0498 mg/L**	0.010 mg/L			091949-010	EPA 6020
CTF-MW2 (Duplicate)	30-Mar-12	Arsenic—Filtered	**0.0521 mg/L**	0.010 mg/L			091950-010	EPA 6020
CTF-MW2	19-June-12	Arsenic—Filtered	**0.0276 mg/L**	0.010 mg/L			092538-010	EPA 6020
CTF-MW2	25-Sept-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	08-Mar-11	Arsenic—Unfiltered	**0.0595 mg/L**	0.010 mg/L			090237-009	EPA 6020
CTF-MW2	31-May-11	Arsenic—Unfiltered	**0.0496 mg/L**	0.010 mg/L			090670-009	EPA 6020
CTF-MW2	29-Sep-11	Arsenic—Unfiltered	**0.0651 mg/L**	0.010 mg/L			091259-009	EPA 6020
CTF-MW2	09-Dec-11	Arsenic—Unfiltered	**0.0469 mg/L**	0.010 mg/L			091525-009	EPA 6020
CTF-MW2	30-Mar-12	Arsenic—Unfiltered	**0.0498 mg/L**	0.010 mg/L			091949-009	EPA 6020
CTF-MW2 (Duplicate)	30-Mar-12	Arsenic—Unfiltered	**0.0559 mg/L**	0.010 mg/L			091950-009	EPA 6020
CTF-MW2	19-June-12	Arsenic—Unfiltered	**0.0433 mg/L**	0.010 mg/L			092538-009	EPA 6020
CTF-MW2	25-Sept-12	Arsenic—Unfiltered	**0.0535 mg/L**	0.010 mg/L			092862-009	EPA 6020
CTF-MW2	18-Dec-12	Arsenic—Unfiltered	**0.0516 mg/L**	0.010 mg/L		J-	093251-009	EPA 6020
CTF-MW2	26-Mar-13	Arsenic—Unfiltered	**0.0456 mg/L**	0.010 mg/L			093723-009	EPA 6020
CTF-MW2 (Duplicate)	26-Mar-13	Arsenic—Unfiltered	**0.0444 mg/L**	0.010 mg/L			093724-009	EPA 6020
CTF-MW2	25-Jun-13	Arsenic-Unfiltered	**0.046 mg/L**	0.010 mg/L			094042-009	EPA 6020
CTF-MW2	31-May-11	Gross Alpha	**23.38 pCi/L**	15 pCi/L			090670-010	EPA 900.0
CTF-MW2	08-Mar-11	Thallium—Unfiltered	**0.00249 mg/L**	0.002 mg/L	J		090237-009	EPA 6020

Table III-16 (Concluded)

Summary of Constituents Detected above Established MCLs

SWMUs 149 and 154 Groundwater Monitoring

Quarterly Assessments through June 2013

Notes

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

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

[c]Analytical Method
U.S. Environmental Protection Agency, 1986 (and updates), "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods," SW-846, 3rd ed.
U.S. Environmental Protection Agency, 1984, "Methods for Chemical Analysis of Water and Wastes," EPA 600-4-79-020.
U.S. Environmental Protection Agency, 1980, "Prescribed Procedures for Measurement of Radioactivity in Drinking Water," EPA-600/4-80-032, U.S. Environmental Protection Agency, Cincinnati, Ohio.

Bold = Indicates that a result exceeds the MCL.
CTF = Coyote Test Field.
EPA = U.S. Environmental Protection Agency.
MCL = Maximum contaminant level. Established by the EPA Primary Water Regulations (40 Code of Federal Regulations 141.11, Subpart B), National Primary Drinking Water Standards (EPA 2009).
mg/L = Milligrams per liter.
MW = Monitoring well.
pCi/L = Picocuries per liter.
SWMU = Solid Waste Management Unit.

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

GROUNDWATER SAMPLE COLLECTION FIELD EQUIPMENT CHECK LOG

SNL/NM Project Name: SWMU 149	SNL/NM Project No.: 146422.10.11.01
Calibrations done by: R Lynch	Date: 06/28/13

Make & Model: YSI 6920V2

YSI 6820 Sonde (S/N) with DO, Ec, pH, ORP, and temperature probes: 08H100033

YSI 650 MDS (S/N): NA

pH Calibration

pH Calibrated to (std): 7.00 | pH sloped to (std): 10.00

Reference value:	4.00		7.00		10.00	
	Value	Temp	Value	Temp	Value	Temp
1. Time: 0636	4.03	23.8	7.02	23.8	10.03	23.8
2. Time: 1030	4.02	22.9	7.02	22.9	10.01	22.9
3. Time:						
4. Time:						
Standard lot no.:	2AG653		2AH113		2AF557	
Expiration date:	JUL-14		AUG-14		JUL-14	

SC Calibration

Reference Value: 1413 uS | Standard Lot No.: 2AH086

Expiration Date: JUL-13

	Value	Temp
1. Time: 0640	1419	23.9
2. Time: 1033	1421	23.0
3. Time:		
4. Time:		

ORP Calibration

Reference Value: 200 mV | Standard Lot No. 1301187

Expiration Date: OCT-13

	Value	Temp
1. Time: 0638	200	23.8
2. Time: 1032	202.0	22.9
3. Time:		
4. Time:		

DO Calibration

Calibration Value:	81% air saturation @ 5200 ft.	Atmospheric Pressure in Hg
1. Time: 0635	81.9	24.53
2. Time: 1029	81.8	24.50
3. Time:		
4. Time:		

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

SNL/NM Project Name: SWMU 149	Project No.: 146422.10.11.01
Calibration done by: R Lynch	Date: 06/28/13
TURBIDIMETER	
Make & Model: HACH 2100P HACH 2100Q	Serial No. S/N 10050C002897

Reference Value	RL ~~1~~ 10	20	100	800
Standard Lot No.	0161	0168	0162	0161
1. Time 0758	10.2	20.1	99.8	795
2. Time 0931	10.3	20.4	101	798
3. Time				
4. Time				

Comments:

Portable Pump and Tubing / Water Level Indicator
Decontamination Log Form

Project Name: SWMU 149	**Monitoring Well ID # :** CTF-MW3	**Date:** 6/28/13

The following equipment was decontaminated at completion of sampling activities in accordance with FOP-05-03

Pump and Tubing Bundle ID #: 1806-792	**Water Level Indicator ID #:** 62187
Personnel Performing Decontamination: Robert Lynch — Print Name: — Initial: RL William Gibson — Print Name: — Initial: WJG	**Personnel Performing Decontamination:** Robert Lynch — Print Name: — Initial: RL William Gibson — Print Name: — Initial: WJG

Condition of Equipment

Pump: Good **Tubing Bundle:** Excellent **Water Level Indicator:** Good

List of Decontamination Materials

Distilled or **Deonized** (circle one) **Source:** Culligan **Lot Number:** 6-17-13	**HNO_3** **Grade:** Reagent **UN #:** 2031 **Manufacturer:** AROC **Lot Number:** A0305629

Groundwater Monitoring Waste Generation Log

Waste Generator : William Gibson **Phone:** 239-7367 project leader: Clinton Lum

Project Name	SWMU 149	SWNU 149	SWNU 149
Container ID # (site-date-sequence)	CTF-MW3-062813-01	CTF-MW3-062813-02	CTF-062813
Initial Label Type (Hazardous or Non-Regulated)	Non- Regulated	Non- Regulated	Non- Regulated
Waste Matrix (purge water, decon water, HACH Accu-Vac ampule)	Purge Water	Purge Water	Decon Water
Container Type / Volume	CHPD/ 55 gal.	CHPD/ 55 gal.	CHPD/ 55 gal.
Volume of Waste	~ 24 gal.	~ 18 gal.	~ 30 gal.
Total Container Weight	~ 190 lbs.	~ 180 lbs.	~ 240 lbs.
COC#: Sample#-Fraction	CoC# 614829 Sample # 094044	CoC# 614829 Sample # 094044	CoC# 614829 Sample # 094044
Accumulation Date	Start: 6-28-13 Full: 6-28-13	Start: 6-28-13 Full: 6-28-13	Start: 6-28-13 Full: 6-28-13
Date Waste Moved to Accumulation Area	6-28-13	6-28-13	6-28-13
Accumulation Area Name	9925	9925	9925
Comments:			

TAILGATE SAFETY MEETING FORM

Dept: 4142 Well Location: CTF-MW 3 Date: 06/28/13 Time: 0744

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

Weather Conditions:
Temp: 82.8 °F Wind Speed: ~10 MPH Humidity: 33.1 % Wind Chill N/A °F

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

Safety Topics Presented

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

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

Attendees

Printed Name	Signature
Robert Lynch	Robert Lynch
William Gibson	William Gibson

IMPORTANT NOTICE: A printed copy of this document may not be the document currently in effect. The official version is located on the Sandia Restricted Network (SRN), department home page

FIELD MEASUREMENT LOG FOR GROUNDWATER SAMPLE COLLECTION

Project Name: SWMU 154	Project No.: 146422.10.11.01
Well I.D.: CTF-MW 2	Date: 06/25/13
Well Condition:	Weather Condition:
Method: Portable pump X Dedicated pump _____ Pump depth: 129'	

PURGE MEASUREMENTS

Depth to Water (ft)	Time 24 hr	Vol. (L/gal)	Temp (°C)	SC (µS/cm)	ORP (mV)	pH	Turbidity (NTU)	DO (%)	Comments DO mg/L
43.94	0748		START						
46.89	0803	5	18.98	3248	36.4	5.86	8.51	4.9	0.45
47.45	0812	10	18.68	3270	32.6	5.86	2.76	4.0	0.37
47.61	0822	15	18.67	3306	31.8	5.89	1.59	3.6	0.33
47.61	0832	20	18.95	3287	32.8	5.91	1.46	3.4	0.31
47.43	0844	25	19.25	3306	29.4	5.95	1.69	3.2	0.29
47.21	0857	30	19.53	3310	28.7	5.97	0.90	3.1	0.28
47.06	0905	33	19.77	3310	28.0	5.98	0.84	3.1	0.28
46.98	0911	35	19.97	3315	27.2	5.99	0.68	3.1	0.28
46.90	0918	37	20.22	3323	26.2	6.00	0.61	3.1	0.28
46.81	0924	39	20.24	3323	25.1	6.01	0.57	3.1	0.28
46.68	0931	44	20.30	3322	24.5	6.01	0.61	3.1	0.27
	0932		SAMPLING						
									~400 gals purged from tubing
									0755

GROUNDWATER SAMPLE COLLECTION FIELD EQUIPMENT CHECK LOG

SNL/NM Project Name: SWMU 154	SNL/NM Project No.: 146422.10.11.01
Calibrations done by: R Lynch	Date: 06/25/13

Make & Model: YSI 6920V

YSI 6820 Sonde (S/N) with DO, Ec, pH, ORP, and temperature probes: 08H100033

YSI 650 MDS (S/N): NA

pH Calibration

pH Calibrated to (std): 7.00			pH sloped to (std): 10.00			
Reference value:	4.00		7.00		10.00	
	Value	Temp	Value	Temp	Value	Temp
1. Time: 0653	4.03	22.0	7.01	22.0	10.02	20.0
2. Time: 1042	4.02	21.6	7.01	21.6	10.03	21.6
3. Time:						
4. Time:						
Standard lot no.:	2AG653		2AH113		2AF557	
Expiration date:	JUL-14		AUG-14		JUL-14	

SC Calibration

Reference Value: 1278 uS			Standard Lot No.: 2AG086	
	Value	Temp	Expiration Date:	JUL13
1. Time: 0656	1282	22.0		
2. Time: 1045	1280	21.6		
3. Time:				
4. Time:				

ORP Calibration

Reference Value:	200 mV		Standard Lot No. 1301187	
	Value	Temp	Expiration Date:	OCT-13
1. Time: 0655	199.9	22.0		
2. Time: 1044	201.0	21.6		
3. Time:				
4. Time:				

DO Calibration

Calibration Value:	81% air saturation @ 5200 ft.	Atmospheric Pressure in Hg
1. Time: 0652	81.5	24.38
2. Time: 1041	81.6	24.39
3. Time:		
4. Time:		

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: 06/25/13

TURBIDIMETER

Make & Model: HACH 2100P HACH 2100Q	Serial No. S/N 10050C002897

Reference Value	~10	20	100	800
Standard Lot No.	0161	0168	0162	0161
1. Time 0745	10.2	19.8	102	797
2. Time 0943	10.1	19.6	99.8	796
3. Time				
4. Time				

Comments:

Portable Pump and Tubing / Water Level Indicator
Decontamination Log Form

Project Name: SWMU 154	**Monitoring Well ID # :** CTF-MW2	**Date:** 6-25-13

The following equipment was decontaminated at completion of sampling activities in accordance with FOP-05-03

Pump and Tubing Bundle ID #: 1806-792	**Water Level Indicator ID #:** 62187
Personnel Performing Decontamination: William Gibson — Print Name: — Initial: WJG Robert Lynch — Print Name: — Initial: RL	**Personnel Performing Decontamination:** William Gibson — Print Name: — Initial: WJG Robert Lynch — Print Name: — Initial: RL

Condition of Equipment

Pump: Good **Tubing Bundle:** Excellent **Water Level Indicator:** Good

List of Decontamination Materials

Distilled or **Deonized** (circle one) **Source:** Culligan **Lot Number:** 6-17-13	**HNO_3** **Grade:** Reagent **UN #:** 2031 **Manufacturer:** AROC **Lot Number:** A0305629

Groundwater Monitoring Waste Generation Log

Waste Generator : William Gibson **Phone:** 239-7367 project leader: Clinton Lum

Project Name	SWMU 154	SWMU 154	SWMU 154
Container ID # (site-date-sequence)	CTF-MW2-062513-01	C2F-MW2-062513-02	CTF-062513
Initial Label Type (Hazardous or Non-Regulated)	Non- Regulated	Non- Regulated	Non- Regulated
Waste Matrix (purge water, decon water, HACH Accu-Vac ampule)	Purge Water	Purge Water	Decon Water
Container Type / Volume	CHPD/ 55 gal.	CHPD/ 55 gal.	CHPD/ 55 gal.
Volume of Waste	~ 24 gal.	~ 21 gal.	~ 30 gal.
Total Container Weight	~ 190 lbs.	~ 170 lbs.	~ 240 lbs.
COC#: Sample#-Fraction	CoC# 614827 614828 Sample # 094042 004	CoC# 614827 614828 Sample # 094042	CoC# 614827 614828 Sample # 094042
Accumulation Date	Start: 06-25-13 Full: 06-25-13	Start: 06-25-13 Full: 06-25-13	Start: 06-25-13 Full: 06-25-13
Date Waste Moved to Accumulation Area	06-25-13	06-25-13	06-25-13
Accumulation Area Name	9925	9925	9925
Comments:			

TAILGATE SAFETY MEETING FORM

Dept: 4142 Well Location: CTF-MW 2 Date: 06/25/13 Time: 0739

Activities: GROUND WATER 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: 83.2 °F Wind Speed: 0 MPH Humidity: 10.1 % Wind Chill NA °F

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

Safety Topics Presented

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

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

Attendees

Printed Name	Signature
Robert Lynch	
William Gibson	
ALFRED SANTILLANES	

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

SMO 2012-ARCOC (4-2012)

AOP 95-16

CONTRACT LABORATORY
ANALYSIS REQUEST AND CHAIN OF CUSTODY

Internal Lab

Batch No.

SMO Use

AR/COC 614829

Project Name:	SWMU 149 GWM	Date Samples Shipped:		SMO Authorization:	☐ Waste Characterization
Project/Task Manager:	Clinton Lum	Carrier/Waybill No.		SMO Contact Phone:	☐ RMMA
Project/Task Number:	146422.10.11.01	Lab Contact:	Edie Kent/803-556-8171	Lorraine Herrera/505-844-3199	☐ Released by COC No.
Service Order:	CF352-13	Lab Destination:	GEL	Send Report to SMO:	☑ 4° Celsius
		Contract No.:	PO 1303873	Rita Kavanaugh/505-284-2553	Bill to:Sandia National Laboratories (Accounts Payable), P.O. Box 5800, MS-0154 Albuquerque, NM 87185-0154
Tech Area:					
Building:	Room:	Operational Site:			

Sample No.	Fraction	Sample Location Detail	Depth (ft)	Date/Time Collected		Sample Matrix	Container Type	Container Volume	Preservative	Collection Method	Sample Type	Parameter & Method Requested	Lab Sample ID
094044	-001	CTF-MW3	359	6/28/13	9:22	GW	G	3x40 ml	HCL	G	SA	TCL VOC (SW846-8260B)	
094044	-009	CTF-MW3	359	6/28/13	9:23	GW	P	500 ml	HNO3	G	SA	TAL Metals (SW846-6010/6020/7470	
094044	-010	CTF-MW3	359	6/28/13	9:24	FGW	P	500 ml	HNO3	G	SA	TAL Metals (SW846-6010/6020/7470	
094044	-016	CTF-MW3	359	6/28/13	9:25	GW	P	125 ml	None	G	SA	Anions (SW846-9056)	
094044	-018	CTF-MW3	359	6/28/13	9:26	GW	P	125 ml	H2SO4	G	SA	NPN (EPA 353.2)	
094044	-020	CTF-MW3	359	6/28/13	9:27	GW	P	250 ml	None	G	SA	Perchlorate (EPA 314.0)	
094044	-022	CTF-MW3	359	6/28/13	9:28	GW	P	500 ml	None	G	SA	Alkalinity (SM2320B)	
094045	-001	CTF-TB2	NA	6/28/13	9:22	DIW	G	3x40 ml	HCL	G	TB	TCL VOC (SW846-8260B)	

Last Chain:	☑ Yes	Sample Tracking	SMO Use
Validation Req'd:	☑ Yes	Date Entered:	
Background:	☐ Yes	Entered by:	
Confirmatory:	☐ Yes	QC inits.:	

Sample Team Members	Name	Signature	Init.	Company/Organization/Phone/Cell
	Robert Lynch		RL	SNL/4142/505-844-4013/505-250-7090
	William Gibson		WJG	SNL/4142/505-284-3307/505-239-7367

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,then perform verification analysis using SW846-6850M.Report anions as Br,Cl,F,SO4.Report alkalinity as total CaCO3,HCO3,and CO3. FGW, filtered in field w/.40 micron filter.

Conditions on Receipt

Lab Use

1.Relinquished by		Org. 4142	Date 6-28-13	Time 1005	3.Relinquished by	Org.	Date	Time
1. Received by		Org. 4142	Date 6-28-13	Time 1005	3. Received by	Org.	Date	Time
2.Relinquished by		Org.	Date	Time	4.Relinquished by	Org.	Date	Time
2. Received by		Org.	Date	Time	4. Received by	Org.	Date	Time

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

CONTRACT LABORATORY
ANALYSIS REQUEST AND CHAIN OF CUSTODY

Internal Lab

Batch No. N/A

SMO Use

AR/COC 614827

Project Name:	SWMU 154 GWM	Date Samples Shipped:	6/25/13	SMO Authorization:	☐ Waste Characterization
Project/Task Manager:	Clinton Lum	Carrier/Waybill No.		SMO Contact Phone:	☐ RMMA
Project/Task Number:	146422.10.11.01	Lab Contact:	Edie Kent/803-556-8171	Lorraine Herrera/505-844-3199	☐ Released by COC No.
Service Order:	CF353-13	Lab Destination:	GEL	Send Report to SMO:	☑ 4° Celsius
		Contract No.:	PO 1303873	Rita Kavanaugh/505-284-2553	Bill to:Sandia National Laboratories (Accounts Payable), P.O. Box 5800, MS-0154 Albuquerque, NM 87185-0154
Tech Area:					
Building:	Room:	Operational Site:			

Sample No.	Fraction	Sample Location Detail	Depth (ft)	Date/Time Collected		Sample Matrix	Container Type	Container Volume	Preserv-ative	Collection Method	Sample Type	Parameter & Method Requested	Lab Sample ID
094042	-001	CTF-MW2	129	6/25/13	9:32	GW	G	3x40ml	HCL	G	SA	TCL VOC (SW846-8260B)	
094042	-002	CTF-MW2	129	6/25/13	9:33	GW	AG	4x1 L	None	G	SA	TCL SVOC (SW846-8270C)	
094042	-009	CTF-MW2	129	6/25/13	9:35	GW	P	500 ml	HNO3	G	SA	TAL Metals+U(SW846-6010/6020/7470)	
094042	-010	CTF-MW2	129	6/25/13	9:36	FGW	P	500 ml	HNO3	G	SA	TAL Metals+U(SW846-6010/6020/7470)	
094042	-016	CTF-MW2	129	6/25/13	9:37	GW	P	125 ml	None	G	SA	Anions (SW846-9056)	
094042	-018	CTF-MW2	129	6/25/13	9:38	GW	P	125 ml	H2SO4	G	SA	NPN (EPA 353.2)	
094042	-020	CTF-MW2	129	6/25/13	9:39	GW	P	250 ml	None	G	SA	Perchlorate (EPA 314.0)	
094042	-022	CTF-MW2	129	6/25/13	9:40	GW	P	500 ml	None	G	SA	Alkalinity (SM2320B)	
094042	-024	CTF-MW2	129	6/25/13	9:41	GW	AG	4x1 L	None	G	SA	High Explosives (SW846-8321A mod	
094042	-033	CTF-MW2	129	6/25/13	9:43	GW	P	1 L	HNO3	G	SA	Gamma Spectroscopy (EPA 901.0)	

Last Chain:	☐ Yes	Sample Tracking	SMO Use
Validation Req'd:	☑ Yes	Date Entered:	
Background:	☐ Yes	Entered by:	
Confirmatory:	☐ Yes	QC inits.:	

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

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

CTF-MW2 water has high buffering capacity,please check pH and add preservatives as needed.If perchlorate detected,then perform verification analysis using SW846-6850.Report Anions as Br,Cl,F,SO4.Report Alkalinity as total CaCO3,HCO3, and CO3.Report Gamma Spec for short list isotopes.FGW, filtered in field w/.40 micron filter.

Conditions on Receipt

Lab Use

1.Relinquished by	Alfred Santillanes	Org. 4142	Date 6/25/13	Time 1005	3.Relinquished by	Org.	Date	Time
1. Received by	SMO	Org. 4142	Date 6/25/13	Time 1005	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)

AR/COC 614827

Project Name: SWMU 154 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	Container Volume	Preserv-ative	Collection Method	Sample Type	Parameter & Method Requested	Lab Sample ID
094042	-034	CTF-MW2	129	6/25/13	9:44	GW	P	1 L	HNO3	G	SA	Gross Alpha and Beta (EPA 900.0)	
094042	-035	CTF-MW2	129	6/25/13	9:45	GW	P	1 L	HNO3	G	SA	Isotopic Uranium (HASL 300)	
094043	-001	CTF-TB1	NA	6/25/13	9:32	DIW	G	3x40 ml	HCL	G	TB	TCL VOC (SW846-8260B)	

Recipient Initials_____

SMO 2012-ARCOC (4-2012)

AOP 95-16

CONTRACT LABORATORY
ANALYSIS REQUEST AND CHAIN OF CUSTODY

Internal Lab

Batch No. N/A

AR/COC 614828

Project Name:	SWMU 154 GWM	Date Samples Shipped:	6/25/13	SMO Authorization:	☑ Waste Characterization
Project/Task Manager:	Clinton Lum	Carrier/Waybill No.	205584	SMO Contact Phone: SMO	☐ RMMA
Project/Task Number:	146422.10.11.01	Lab Contact:	Edie Kent/803-556-8171	Lorraine Herrera/505-844-3199	☐ Released by COC No.
Service Order:	CF353-13	Lab Destination:	GEL	Send Report to SMO:	☑ 4° Celsius
		Contract No.:	PO 1303873	Rita Kavanaugh/505-284-2553	Bill to:Sandia National Laboratories (Accounts Payable), P.O. Box 5800, MS-0154 Albuquerque, NM 87185-0154
Tech Area:					
Building:	Room:	Operational Site:			

SMO Use

Sample No.	Fraction	Sample Location Detail	Depth (ft)	Date/Time Collected	Sample Matrix	Container Type	Container Volume	Preserv-ative	Collection Method	Sample Type	Parameter & Method Requested	Lab Sample ID
094042	-011	CTF-MW2	NA	6/25/13 9:04	FPW	P	500 ml	HNO3	G	WS SA	Arsenic (SW846-6020)	
				RL 6-25-13						RK 6-25-13		

Last Chain:	☑ Yes	Sample Tracking	SMO Use	Special Instructions/QC Requirements:	Conditions on Receipt
Validation Req'd:	☐ Yes	Date Entered:		EDD ☑ Yes ☐ No	
Background:	☐ Yes	Entered by:		Turnaround Time ☐ 7 Day* ☐ 15 Day* ☑ 30 Day	
Confirmatory:	☐ Yes	QC inits.:		Negotiated TAT ☐	

Sample Team Members	Name	Signature	Init.	Company/Organization/Phone/Cell
	Robert Lynch	Rob 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

Sample Disposal ☐ Return to Client ☑ Disposal by Lab

Return Samples By:

Comments: Send report to Tim Jackson/4142/MS 0729/284-2547

CTF-MW2 water has high buffering capacity, please check pH and add preservative as needed. FPW, filtered in field w/.40 micron filter.

Lab Use

1.Relinquished by	Alfred Santillanes	Org. 4142	Date 6/25/13	Time 1008	3.Relinquished by	Org.	Date	Time
1. Received by	SMO	Org. 4142	Date 6/25/13	Time 1008	3. Received by	Org.	Date	Time
2.Relinquished by	SMO	Org. 4142	Date 6/25/13	Time 1040	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 Wells CTF-MW3 and CTF-MW2 Groundwater Data

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

Memorandum

Date: July 31, 2013

To: File

From: Linda Thal

Subject: Inorganic Data Review and Validation – SNL
Site: SWMU 149 GWM
AR/COC: 614829
SDG: 328498
Laboratory: GEL
Project/Task: 146422.10.11.01
Analysis: General Chemistry

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

Summary

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

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

Holding Times and Preservation

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

Calibration

All initial and continuing calibration met QC acceptance criteria.

Blanks

No target analytes were detected in the blanks.

Laboratory Control Sample (LCS)

All LCS acceptance criteria were met.

Matrix Spike (MS)

All MS/PS recoveries met QC acceptance criteria.

Anions, Perchlorate and Nitrate/Nitrite:
The MS/PS analysis was performed on a sample of similar matrix from another SNL SDG. No sample data will be qualified as a result.

Laboratory Replicate

The replicate analyses met all QC acceptance criteria.

Anions, Perchlorate and Nitrate/Nitrite:
The replicate analysis was performed on a sample of similar matrix from another SNL SDG. No sample data will be qualified as a result.

Detection Limits/Dilutions

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

Anions:
The sample was diluted 50X for sulfate and chloride.

Nitrate/Nitrite:
The sample was diluted 10X.

Other QC

No other specific issues that affect data quality were identified.

Reviewed by: Monica Dymerski **Level I** **Date:** 08/01/13

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

Memorandum

Date: July 31, 2013

To: File

From: Linda Thal

Subject: Inorganic Data Review and Validation – SNL
Site: SWMU 149 GWM
AR/COC: 614829
SDG: 328498 and 328499
Laboratory: GEL
Project/Task: 146422.10.11.01
Analysis: Metals

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

Summary

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

ICP-MS:

1. Ni was detected in the ICS A at a positive value. The associated sample results were detects <50X the ICS A result and will be **qualified J+,CK2**.

2. Cu was detected in the ICS A at a negative value with an absolute value >2X the MDL. The associated sample results were detects <50X the absolute value of the ICS A result and will be **qualified J-,CK3**.

ICP-AES:

1. V was detected at a negative value with an absolute value < the PQL in a CCB bracketing the samples**.** The associated sample results were NDs and will be **qualified UJ,B4.**

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

Holding Times and Preservation

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

ICP-MS Instrument Tune

The ICP-MS tunes met QC acceptance criteria.

Calibration

All initial and continuing calibration met QC acceptance criteria.

Reporting Limit Verification

All CRA/CRI recoveries met QC acceptance criteria.

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

Blanks

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

ICP -MS Internal Standards

The ICP-MS internal standards met QC acceptance criteria.

Matrix Spike (MS)

The MS met all QC acceptance criteria except as follows.

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

Laboratory Replicate

The 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. Both samples were diluted 10X for Ca and Na.

ICP Interference Check Sample (ICS A and AB)

Results of the ICS A and AB analyses were evaluated because the concentrations of Ca were > those in the ICS solutions. All QC acceptance criteria were met except as noted above in the Summary section and as follows.

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

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: Monica Dymerski **Level I** **Date:** 08/01/13

Sample Findings Summary

AR/COC: 614829

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
SW846 3005/6010B			
	094044-009/CTF-MW3	Vanadium (7440-62-2)	UJ, B4
	094044-010/CTF-MW3	Vanadium (7440-62-2)	UJ, B4
SW846 3005/6020 DOE-AL			
	094044-009/CTF-MW3	Copper (7440-50-8)	J-, CK3
	094044-009/CTF-MW3	Nickel (7440-02-0)	J+, CK2
	094044-010/CTF-MW3	Copper (7440-50-8)	J-, CK3
	094044-010/CTF-MW3	Nickel (7440-02-0)	J+, CK2

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

PO Box 21987
Albuquerque, NM 87154
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Memorandum

Date: July 31, 2013

To: File

From: Linda Thal

Subject: GC/MS Organic Data Review and Validation – SNL
Site: SWMU 149 GWM
AR/COC: 614829
SDG: 328498
Laboratory: GEL
Project/Task: 146422.10.11.01
Analysis: VOCs

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

Summary

Two samples were prepared and analyzed with accepted procedures using method EPA 8260B (VOCs). All compounds were successfully analyzed. No problems were identified with the data package that resulted in the qualification of data.

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

Holding Times

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

Instrument Tune

All instrument tune requirements were met.

Calibration

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

The ICAL %RSDs were >15% but ≤40% for bromoform and 1,2-dibromo-3-chloropropane. The associated sample results were NDs, and since no other calibration infractions occurred, will not be qualified.

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

Blanks

No target analytes were detected in the blanks.

Surrogates

All surrogate recoveries met QC acceptance criteria.

Internal Standards

All internal standards met QC acceptance criteria.

Matrix Spike/Matrix Spike Duplicate (MS/MSD)

All MS/MSD acceptance criteria were met.

Laboratory Control Sample (LCS)

All LCS acceptance criteria were met.

Detection Limits/Dilutions

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

Tentatively Identified Compounds (TICs)

TIC reports were not required.

Other QC

A TB was submitted with the AR/COC.

No other specific issues that affect data quality were identified.

Reviewed by: Monica Dymerski **Level I** **Date:** 08/01/13

PO Box 21987
Albuquerque, NM 87154
1-888-678-5447
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Memorandum

Date: July 30, 2013

To: File

From: Linda Thal

Subject: Inorganic Data Review and Validation – SNL
Site: SWMU 154 GWM
AR/COC: 614827
SDG: 328283
Laboratory: GEL
Project/Task: 146422.10.11.01
Analysis: General Chemistry

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

Summary

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

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

Holding Times and Preservation

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

Calibration

All initial and continuing calibration met QC acceptance criteria.

Blanks

No target analytes were detected in the blanks.

Laboratory Control Sample (LCS)

All LCS acceptance criteria were met.

Matrix Spike (MS)

All MS/PS recoveries met QC acceptance criteria.

Alkalinity and nitrate/nitrite:
The MS/PS analysis was performed on a sample of similar matrix from another SNL SDG. No sample data will be qualified as a result.

Laboratory Replicate

The replicate analyses met all QC acceptance criteria.

Alkalinity and nitrate/nitrite:
The replicate analysis was performed on a sample of similar matrix from another SNL SDG. No sample data will be qualified as a result.

Detection Limits/Dilutions

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

Anions:
The sample was diluted 100X for sulfate and chloride and 2X for bromide.

Other QC

No other specific issues that affect data quality were identified.

Reviewed by: Monica Dymerski **Level I** **Date:** 07/31/13

PO Box 21987
Albuquerque, NM 87154
1-888-678-5447
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Memorandum

Date: July 30, 2013

To: File

From: Linda Thal

Subject: LC/MS/MS Organic Data Review and Validation – SNL
Site: SWMU 154 GWM
AR/COC: 614827
SDG: 328283
Laboratory: GEL
Project/Task: 146422.10.11.01
Analysis: High Explosives (HE)

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

Summary

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

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

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

Holding Times

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

Instrument Tune

The instrument tune was not reported or evaluated.

Calibration

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

Reporting Limit Verification

All CRI recoveries met QC acceptance criteria.

Blanks

No target analytes were detected in the blanks.

Surrogates

All surrogate recoveries met QC acceptance criteria.

Internal Standards

All internal standards met QC acceptance criteria.

Matrix Spike/Matrix Spike Duplicate (MS/MSD)

The MS/MSD analyses met all QC acceptance criteria.

Laboratory Control Sample (LCS)

All LCS recoveries met QC acceptance criteria.

Detection Limits/Dilutions

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

Other QC

No other specific issues that affect data quality were identified.

Reviewed by: Monica Dymerski **Level I** **Date:** 07/31/13

ANALYTICAL QUALITY ASSOCIATES, INC.

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

Memorandum

Date: July 30, 2013

To: File

From: Linda Thal

Subject: Inorganic Data Review and Validation – SNL
Site: SWMU 154 GWM
AR/COC: 614827
SDG: 328283 and 328284
Laboratory: GEL
Project/Task: 146422.10.11.01
Analysis: Metals

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

Summary

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

ICP-MS:

1. The MS %R for Zn was >UAL; the MS %R for Mn was < the LAL and the parent sample results were >4X the spike amounts. The associated sample results were detects and will be q**ualified J,MS1** due to lack of matrix specific accuracy information.

2. The serial dilution %Ds were >10% for Fe and K and the parent sample result was >50X the MDL. The associated sample results were detects and will be **qualified J,D1**.

3. Cd was detected in the ICS A at a positive value. The associated sample results were detects <50X the ICS A result and will be **qualified J+,CK2**.

4. Cu was detected in the ICS A at a negative value with an absolute value >2X the MDL. The associated sample results were detects <50X the absolute value of the ICS A result and will be **qualified J-,CK3**.

ICP-AES:

1. V was detected at a negative value with an absolute value < the PQL in a CCB bracketing the samples**.** The associated sample results were NDs and will be **qualified UJ,B4.**

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

Holding Times and Preservation

The samples were prepared and analyzed within the prescribed holding times. The samples were received at the laboratory with a pH >2 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 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.

U was detected at < the PQL in the ICB/CCB. The associated sample results were detects > 5X the highest blank value and will not be qualified

ICP -MS Internal Standards

The ICP-MS internal standards met QC acceptance criteria.

Matrix Spike (MS)

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

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

It should be noted that the MS for all target analytes except Al and Sb was performed on a sample of similar matrix from another SNL SDG.

CVAA:
It should be noted that the MS was performed on a sample of similar matrix from another SNL SDG.

Laboratory Replicate

The replicates met all QC acceptance criteria.

ICP-MS:

It should be noted that the replicate for all target analytes except Al and Sb was performed on a sample of similar matrix from another SNL SDG.

CVAA:
It should be noted that the replicate was performed on a sample of similar matrix from another SNL SDG.

Laboratory Control Sample (LCS)

The LCS met all QC acceptance criteria.

Detection Limits/Dilutions

All detection limits were properly reported. Both samples were diluted 10X for Ca, Mg and Mn and 5X for Zn. Sample 328283003 was diluted 10X for Na and sample 328284001 was diluted 20X for Na.

ICP Interference Check Sample (ICS A and AB)

Results of the ICS A and AB analyses were evaluated because the concentrations of Ca were > those in the ICS solutions. All QC acceptance criteria were met 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.

ICPMS:
It should be noted that serial dilution for all target analytes except Al and Sb were performed on a sample of similar matrix from another SNL SDG.

Other QC

No other specific issues that affect data quality were identified.

Reviewed by: Monica Dymerski **Level I** **Date:** 07/31/13

Sample Findings Summary

AR/COC: 614827

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
EPA 900.0/SW846 9310			
	094042-034/CTF-MW2	ALPHA (12587-46-1)	J, FR7
EPA 901.1			
	094042-033/CTF-MW2	Americium-241 (14596-10-2)	BD, FR3
	094042-033/CTF-MW2	Cesium-137 (10045-97-3)	BD, FR3
	094042-033/CTF-MW2	Cobalt-60 (10198-40-0)	BD, FR3
	094042-033/CTF-MW2	Potassium-40 (13966-00-2)	BD, FR3
SW846 3005/6010B			
	094042-009/CTF-MW2	Vanadium (7440-62-2)	UJ, B4
	094042-010/CTF-MW2	Vanadium (7440-62-2)	UJ, B4
SW846 3005/6020 DOE-AL			
	094042-009/CTF-MW2	Cadmium (7440-43-9)	J+, CK2
	094042-009/CTF-MW2	Copper (7440-50-8)	J-, CK3
	094042-009/CTF-MW2	Iron (7439-89-6)	J, D1
	094042-009/CTF-MW2	Manganese (7439-96-5)	J, MS1
	094042-009/CTF-MW2	Potassium (7440-09-7)	J, D1
	094042-009/CTF-MW2	Zinc (7440-66-6)	J, MS1
	094042-010/CTF-MW2	Cadmium (7440-43-9)	J+, CK2
	094042-010/CTF-MW2	Copper (7440-50-8)	J-, CK3
	094042-010/CTF-MW2	Iron (7439-89-6)	J, D1
	094042-010/CTF-MW2	Manganese (7439-96-5)	J, MS1
	094042-010/CTF-MW2	Potassium (7440-09-7)	J, D1
	094042-010/CTF-MW2	Zinc (7440-66-6)	J, MS1
SW846 3535/8321A Modified			
	094042-024/CTF-MW2	m-Nitrotoluene (99-08-1)	UJ, I4
	094042-024/CTF-MW2	o-Nitrotoluene (88-72-2)	UJ, I4

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
	094042-024/CTF-MW2	p-Nitrotoluene (99-99-0)	UJ, I4

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

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Memorandum

Date: July 30, 2013

To: File

From: Linda Thal

Subject: Radiochemical Data Review and Validation – SNL
Site: SWMU 154 GWM
AR/COC: 614827
SDG: 328283
Laboratory: GEL
Project/Task: 146422.10.11.01
Analysis: RAD

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

Summary

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

Gammaspec:

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

Gross alpha/beta:

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

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

Holding Times and Preservation

The sample was prepared and analyzed within the prescribed holding times. The sample was received at the laboratory with a pH >2 and was 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 tracer/carrier 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.

Other QC

No other specific issues that affect data quality were identified.

Reviewed by: Monica Dymerski **Level I** **Date:** 07/31/13

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Memorandum

Date: July 30, 2013

To: File

From: Linda Thal

Subject: GC/MS Organic Data Review and Validation – SNL
Site: SWMU 154 GWM
AR/COC: 614827
SDG: 328283
Laboratory: GEL
Project/Task: 146422.10.11.01
Analysis: SVOCs

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

Summary

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

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

Holding Times

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

Instrument Tune

All instrument tune requirements were met.

Calibration

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

The ICAL %RSDs were >15% but ≤40% for naphthalene, acenaphthene and phenanthrene. The associated sample results were NDs and since no other calibration infractions occurred for these analytes, will not be qualified.

The CCV %Ds were >20% but ≤40% with negative bias for bis(2-chloroisopropyl)ether; hexachlorocyclopentadiene; 2,4-dinitrophenol; carbazole and pyrene. The associated sample results were NDs and since no other calibration infractions occurred for these analytes, will not be qualified.

The CCV %D was >20% with positive bias for di-n-octylphthalate. The associated sample result was ND and will not be qualified.

Blanks

No target analytes were detected in the blanks.

Surrogates

All surrogate recoveries met QC acceptance criteria.

Internal Standards

All internal 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 LCS %R was < the LAL but ≥10% for atrazine. Up to four LCS recovery infractions are allowed since 67 LCS analytes were reported, therefore, the associated sample results will not be qualified.

Detection Limits/Dilutions

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

Tentatively Identified Compounds (TICs)

TIC reports were not required.

Other QC

No other specific issues that affect data quality were identified.

Reviewed by: Monica Dymerski **Level I** **Date:** 07/31/13

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Memorandum

Date: July 30, 2013

To: File

From: Linda Thal

Subject: GC/MS Organic Data Review and Validation – SNL
Site: SWMU 154 GWM
AR/COC: 614827
SDG: 328283
Laboratory: GEL
Project/Task: 146422.10.11.01
Analysis: VOCs

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

Summary

Two samples were prepared and analyzed with accepted procedures using method EPA 8260B (VOCs). All compounds were successfully analyzed. No problems were identified with the data package that resulted in the qualification of data.

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

Holding Times

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

Instrument Tune

All instrument tune requirements were met.

Calibration

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

The ICAL %RSD was >15% but ≤40% and the CCV %Ds were >20% with positive bias for bromoform and 1,2-dibromo-3-chloropropane. The associated sample results were NDs, and since the CCVs were positive and not considered an additional infraction, will not be qualified.

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

The CCV %D was >20% but ≤40% with negative bias for trichlorotrifluoroethane. The CCV was associated with QC samples only and, therefore, no field sample results will be qualified.

Blanks

No target analytes were detected in the blanks.

Surrogates

All surrogate recoveries met QC acceptance criteria.

Internal Standards

All internal standards met QC acceptance criteria.

Matrix Spike/Matrix Spike Duplicate (MS/MSD)

All MS/MSD acceptance criteria were met.

Laboratory Control Sample (LCS)

All LCS acceptance criteria were met with the following exception.

The LCS %R for bromoform was > the UAL. 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

A TB was submitted with the AR/COC.

No other specific issues that affect data quality were identified.

Reviewed by: Monica Dymerski **Level I** **Date:** 07/31/13

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SECTION IV
SOLID WASTE MANAGEMENT UNITS 8/58 AND 68 QUARTERLY GROUNDWATER MONITORING REPORT, APRIL – JUNE 2013

1.0 Introduction

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

The seventh of eight quarterly groundwater sampling events occurred in April 2013 for Coyote Canyon Blast Area (CCBA) monitoring wells CCBA-MW1 and CCBA-MW2, located within SWMUs 8/58, and monitoring wells at the Old Burn Site (OBS), OBS-MW1, OBS-MW2, and OBS-MW3, located within SWMU 68. These monitoring wells were installed in August 2011 (SNL/NM November 2011). Monitoring well CCBA-MW1 is located at the southwestern corner of SWMU 8 (Figure IV-1). Monitoring well CCBA-MW2 is located near the center of SWMU 58 (Figure IV-1). Monitoring wells OBS-MW1, OBS-MW2, and OBS-MW3 are located at SWMU 68 in the Coyote Test Field (CTF) (Figure IV-2).

The supplemental groundwater monitoring at these monitoring wells is designed to address the requirements of Section VII.D.6 of the Compliance Order on Consent (the Order) (NMED April 2004) and the letter dated April 8, 2010, from the NMED Hazardous Waste Bureau (NMED April 2010). The analytical results discussed in this report correspond to the Second Quarter, Calendar Year (CY) 2013 reporting period (April – June 2013).

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

Monitoring wells CCBA-MW1 and CCBA-MW2 were sampled on April 24 and April 25, 2013, respectively. The samples were analyzed for the required constituents, consisting of volatile organic compounds (VOCs), semivolatile organic compounds (SVOCs), high explosive (HE) compounds, nitrate plus nitrite (NPN), major anions (i.e., bromide, chloride, fluoride, and sulfate), major cations (i.e., calcium, magnesium, potassium, and sodium), alkalinity, Target Analyte List (TAL) metals plus uranium, perchlorate, total cyanide, radionuclides by gamma spectroscopy, gross alpha/beta activity, and isotopic uranium.

Monitoring wells OBS-MW1, OBS-MW2, and OBS-MW3 were sampled from April 18 to April 23, 2013. The samples were analyzed for the required constituents, consisting of VOCs, SVOCs, HE compounds, NPN, major anions, major cations, alkalinity, TAL metals plus uranium, hexavalent chromium, perchlorate, total cyanide, radionuclides by gamma spectroscopy, gross alpha/beta activity, and isotopic uranium.

Analytical results for the groundwater samples were compared with the U.S. Environmental Protection Agency (EPA) maximum contaminant levels (MCLs) for drinking water (EPA 2009). Except for fluoride, none of the analytical results for the groundwater samples from SWMUs 8/58 exceed the MCLs. Fluoride was detected above the established MCL of 4.0 milligrams per liter (mg/L) in the monitoring well CCBA-MW1 environmental sample with a concentration of 4.57 mg/L. Fluoride in the monitoring well CCBA-MW2 environmental sample and duplicate environmental sample were both measured above the method detection limit (MDL) and both samples had a concentration of 1.60 mg/L.

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

This groundwater sampling event represents the seventh of eight supplemental quarterly events for the five monitoring wells. The eighth of the eight supplemental quarterly

groundwater sampling events will be conducted during the upcoming quarter (July through September 2013).

2.0 Field Methods and Measurements

The quarterly groundwater sampling field measurements were collected in conformance with the DOE/Sandia Response to the NMED letter of April 8, 2010 (SNL/NM September 2010). Groundwater monitoring at SWMUs 8/58 and 68 was performed according to work plans submitted as Attachments A and B to the DOE/Sandia Response (SNL/NM September 2010) and SNL/NM Administrative Operating Procedures (AOPs) (SNL/NM May 2011) and Field Operating Procedures (FOPs) (SNL/NM January 2012a and January 2012b). Groundwater samples were analyzed for relevant parameters, listed in Table IV-1. Table IV-2 presents the details for groundwater samples collected from all five monitoring wells during Second Quarter, CY 2013.

2.1 Equipment Decontamination

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

2.2 Well Evacuation

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

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

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

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

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

2.3 Groundwater Sample Collection

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

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

3.0 Analytical Results

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

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

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

3.1 Field Water Quality Measurements

SWMUs 8/58, 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 values were compared with the nitrate MCL of 10 mg/L. NPN was not detected above the MCL in any groundwater sample. NPN was reported at a maximum concentration of 3.47 mg/L in the monitoring well CCBA-MW2 environmental sample.

SWMU 68, Monitoring Wells OBS-MW1, OBS-MW2, and OBS-MW3. Table IV-6 summarizes NPN results. NPN values were compared with the nitrate MCL of 10 mg/L. NPN was not detected above the MCL in any groundwater sample. NPN was reported at a maximum concentration of 1.78 mg/L in the monitoring well OBS-MW3 environmental 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 environmental sample from monitoring well CCBA-MW1 at a concentration of 4.57 mg/L. This detection is most likely attributable to the mineralization of the Precambrian bedrock in which the well is completed and not associated with SNL/NM testing activities. Fluoride was reported in the monitoring well CCBA-MW2 environmental sample and the environmental duplicate at a concentration of 1.60 mg/L.

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

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

3.7 Perchlorate

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

SWMU 68, Monitoring Wells OBS-MW1, OBS-MW2, and OBS-MW3. Perchlorate was not detected above the NMED-specified screening level/MDL of 4 µg/L (0.004 mg/L) in any groundwater sample from SWMU 68. Table IV-8 presents perchlorate results.

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

3.8 Hexavalent Chromium

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

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

3.9 Metals

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

SWMU 68, Monitoring Wells OBS-MW1, OBS-MW2, and OBS-MW3. TAL metals plus uranium were analyzed in samples from all SWMU 68 monitoring wells. No metal

parameters were detected above established MCLs in any groundwater sample. Metal results for SWMU 68 are summarized on Table IV-11.

3.10 Cations

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

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

3.11 Gamma Spectroscopy and Radioisotopic Analyses

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

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

SWMUs 8/58, Monitoring Wells CCBA-MW1 and CCBA-MW2. Gamma spectroscopy activity results for short-list radionuclides are less than the associated MDAs for all groundwater samples.

The corrected gross alpha activity was reported below the MCL of 15 picocuries per liter (pCi/L) in all samples. Gross beta activity results do not exceed established MCLs. Isotopic uranium activities ranged from 0.0721 ± 0.0566 for uranium-235/236 to 7.87 ± 1.07 pCi/L of uranium-233/234.

SWMU 68, Monitoring Wells OBS-MW1, OBS-MW2, and OBS-MW3. Gamma spectroscopy activity results for short-list radionuclides are less than or equal to the associated MDAs.

The corrected gross alpha activity reported is below the MCL of 15 pCi/L in all samples. Gross beta activity results do not exceed established MCLs. Isotopic uranium activities range from 0.262 ± 0.0876 pCi/L for uranium-235/236 to 23.9 ± 3.12 pCi/L for uranium-233/234. In this region, groundwater contacts bedrock, which contains minerals high in naturally occurring uranium.

3.12 Sample Results Exceeding Maximum Contaminant Levels

Table IV-14 lists the results for all constituents that have been detected at concentrations exceeding the EPA MCLs (EPA 2009) during the quarterly sampling events at SWMUs 8/58 and 68. The only constituent that is exceeding the MCLs in samples collected during this quarter is fluoride detected in the CCBA-MW1environmental sample. Fluoride detected in CCBA-MW1 is most likely from to the mineralized Precambrian bedrock in which the well is completed and not associated with SNL/NM testing activities. In the previous sampling event benzo(a)pyrene was detected above the MCL of 0.440 µg/L in CCBA-MW2 with a concentration of 0.640 µg/L. This was the first detection of any SVOC from these monitoring wells. No SVOCs, including benzo(a)pyrene, were detected in the most recent groundwater samples from CCBA-MW1 or CCBA-MW2. This indicates the source of the SVOCs in the previous sampling event was the fuel source heater in the sampling vehicles.

4.0 Quality Control Samples

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

4.1 Field Quality Control Samples

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

4.1.1 Duplicate Environmental Samples

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

Table IV-15 summarizes the results for duplicate sample analyses and calculated relative percent difference (RPD) values for monitoring wells CCBA-MW2 and OBS-MW1. RPD values were calculated only for detected chemical parameters. The Work Plans for SWMUs 8/58 and 68 do not specify QC acceptance criteria for duplicate environmental sample data; however, duplicate sample results show good correlation (RPD values of less than 20 for organic compounds and less than 35 for inorganic analytes) for all calculated parameters, except aluminum for OBS-MW3. The RPD for aluminum was calculated at 53 and is an estimated value, as aluminum was reported below the PQL in both the environmental and environmental duplicate.

4.1.2 Equipment Blank Samples

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

SWMUs 8/58, Monitoring Well CCBA-MW2. Bromodichloromethane, bromoform, chloroform, chloride, copper, dibromochloromethane, and sodium were detected above the laboratory MDLs. No corrective action was necessary, except for copper, since these analytes were not detected in environmental samples, or were detected in environmental samples at concentrations greater than five times the EB result. The copper values reported in environmental samples were qualified as not detected during data validation,

since copper was reported in the EB sample at a concentration greater than reported environmental samples.

SWMU 68, Monitoring Well OBS-MW2. Barium, bromodichloromethane, bromoform, chloroform, chloride, copper, dibromochloromethane, and sodium were detected above laboratory MDLs. No corrective action was necessary, for parameters except copper, since these analytes were not detected in environmental samples or were detected in environmental samples at concentrations greater than five times the EB result. Copper was detected in the EB sample at concentration higher than values reported for the associated environmental samples. Therefore, copper was qualified as not detected during data validation in both environmental and duplicate environmental samples.

4.1.3 Trip Blank Samples

TB samples are submitted whenever samples are collected for VOC analyses to assess whether contamination of the samples has occurred during shipment and storage. TB samples consist of laboratory reagent-grade water with hydrochloric acid preservative contained in 40-mL volatile organic analysis vials prepared by the analytical laboratory, which accompany the empty sample containers supplied by the laboratory. TBs were brought to the field and accompanied each sample shipment.

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

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

4.1.4 Field Blank Samples

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

SWMUs 8/58, Monitoring Well CCBA-MW1. The VOCs bromodichloromethane, bromoform, chloroform, and dibromochloromethane were detected above associated laboratory MDLs. No corrective action was required, since these compounds were not detected in the associated environmental sample.

SWMU 68, Monitoring Well OBS-MW3. The VOCs bromodichloromethane, bromoform, chloroform, and dibromochloromethane were detected above laboratory MDLs. No corrective action was necessary, since these compounds were not detected in the associated environmental samples.

4.2 Laboratory Quality Control Samples

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

Some analytical results were qualified during the data validation process; however, no significant data quality problems were noted. The data validation sample findings summary sheets are provided in Appendix C.

4.3 Variances and Nonconformances

No variances or nonconformances from requirements in the Groundwater Characterization Work Plans for SWMU 8 and 58 (SNL/NM September 2010) occurred during the April 2013 sampling activities.

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

5.0 Summary

During the Second Quarter of CY 2013, samples were collected from monitoring wells CCBA-MW1 and CCBA-MW2, located within SWMUs 8/58; and monitoring wells OBS-MW1, OBS-MW2, and OBS-MW3, located within SWMU 68. 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 environmental sample at a concentration of 4.57 mg/L. This detection is similar to historical concentrations and is most likely attributable to the mineralization of the Precambrian bedrock in which the well is completed and not associated with SNL/NM testing activities.

Analytical parameters for 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

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.

DOE, see U.S. Department of Energy.

EPA, see U.S. Environmental Protection Agency.

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Figures

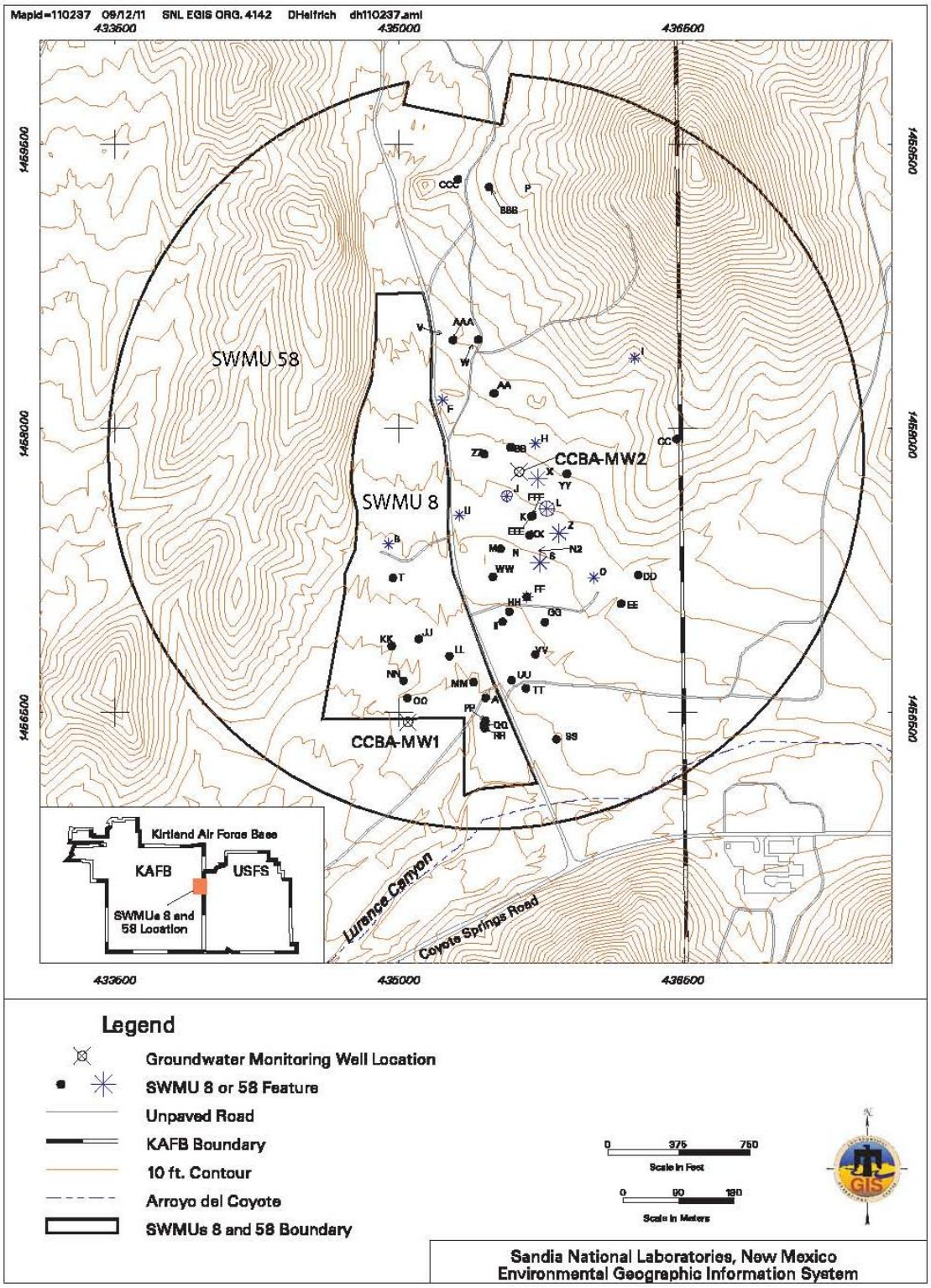

Figure IV-1

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

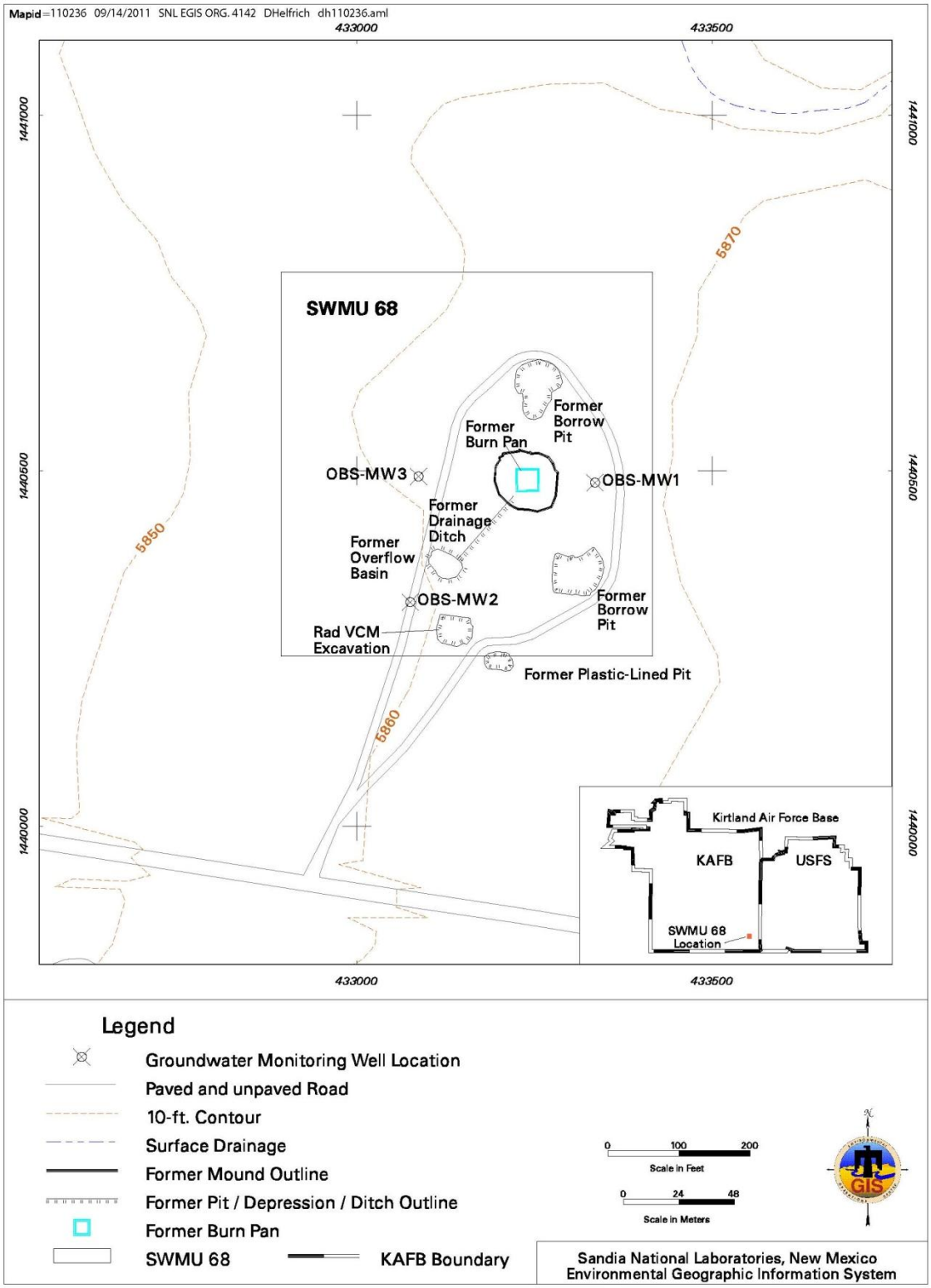

Figure IV-2

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

Tables

Table IV-1

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

Analysis	Analytical Method[a]	Volume and Container Type/ Preservation Requirements
Volatile Organic Compounds	EPA 8260B	3 x 40-mL glass, HCL, 4°C
Semivolatile Organic Compounds	EPA 8270C	3 x 1-L Amber Glass, 4°C
High Explosives	EPA 8321A	4 x 1-L Amber Glass, 4°C
Metals[b]	EPA 6010/6020/7470	1 x 500-mL polyethylene, HNO_3, 4°C
Hexavalent Chromium	EPA 7196A	1 x 250-mL polyethylene, 4°C
Perchlorate	EPA 314.0	1 x 250-mL polyethylene, 4°C
Major Anions and Cations[c]	EPA 6020/9056	1 x 500-mL polyethylene, 4°C
Alkalinity as Total, Carbonate, and Bicarbonate	SM 2320B	1 x 500-mL polyethylene, 4°C
Total Cyanide	EPA 9012	1 x 250-mL polyethylene, NaOH, 4°C
Nitrate plus Nitrite as Nitrogen	EPA 353.2	1 x 250-mL polyethylene, H_2SO_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]U.S. Environmental Protection Agency, 1986 (and updates), "*Test Methods for Evaluating Solid Waste, Physical/Chemical Methods*," SW-846, 3rd ed., U.S. Environmental Protection Agency, Washington, D.C.
U.S. Environmental Protection Agency, 1999, "*Perchlorate in Drinking Water Using Ion Chromatography*," EPA 815/R-00-014, U.S. Environmental Protection Agency, Washington, D.C.
Clesceri, L.S., A.E. Greenburg, and A.D. Eaton, 1998. *Standard Methods for the Examination of Water and Wastewater,* 20th ed., Standard Method 2320B, published jointly by American Public Health Association, American Water Works Association, and Water Environment Federation, Washington, D.C.
U.S. Environmental Protection Agency, 1980, "*Prescribed Procedures for Measurement of Radioactivity in Drinking Water,"* EPA-600/4-80-032, U.S. Environmental Protection Agency, Cincinnati, Ohio.
U.S. Department of Energy, 1990, *"EML Procedures Manual,"* 27th ed., Vol. 1, Rev. 1992, Environmental Measurements Laboratory HASL-300.
[b]Metals = TAL metals including barium, calcium, magnesium, potassium, and sodium, plus uranium.
[c]Major anions include bromide, chloride, fluoride, and sulfate; major cations include calcium, magnesium, potassium, and sodium.
[d]Gamma spectroscopy = Americium-241, Cesium-137, Cobalt-60, and Potassium-40.

°C = Degrees Celsius.
EPA = U.S. Environmental Protection Agency.
H_2SO_4 = Sulfuric acid.
HASL = Health and Safety Laboratory.
HCL = Hydrochloric acid.
HNO_3 = Nitric acid.
L = Liter.
mL = Milliliter(s).
NaOH = Sodium Hydroxide.
SM = Standard Method.
SWMU = Solid Waste Management Unit.
TAL = Target Analyte List.

Table IV-2

Sample Details for Second Quarter, CY 2013 Groundwater Sampling

SWMUs 8/58 and 68 Groundwater Monitoring Quarterly Assessment

April – June 2013

Well	Sample Identification	AR/COC Number	Associated Groundwater Investigation
CCBA-MW1	093873	614745	SWMUs 8/58
CCBA-MW2	093878	614747	
CCBA-MW2 (duplicate)	093879		
OBS-MW1	093863	614741	SWMU 68
OBS-MW2	093866	614742	
OBS-MW3	093870	614744	
OBS-MW3 (duplicate)	093871		

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 2013

Well	Sample Date	Temperature (°C)	Specific Conductivity (µmhos/cm)	Oxidation Reduction Potential (mV)	pH	Turbidity (NTU)	Dissolved Oxygen (% Sat)	Dissolved Oxygen (mg/L)
SWMUs 8/58								
CCBA-MW1	24-Apr-13	14.31	493	230.0	6.44	1.15	32.0	3.24
CCBA-MW2	25-Apr-13	15.53	572	252.1	7.35	0.22	62.8	6.23
SWMU 68								
OBS-MW1	18-Apr-13	14.54	503	252.5	7.27	0.56	36.2	3.69
OBS-MW2	22-Apr-13	18.11	501	250.3	7.14	0.25	38.0	3.58
OBS-MW3	23-Apr-13	16.74	501	240.9	7.24	0.52	45.5	4.41

Notes

[a]Field 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 2013

SWMU 8/58								
Analyte	**MDL (µg/L)**	**Analytical Method[a]**	**Analyte**	**MDL (µg/L)**	**Analytical Method[a]**	**Analyte**	**MDL (µg/L)**	**Analytical Method[a]**
1,1,1-Trichloroethane	0.300	EPA 8260B	Acetone	3.00	EPA 8260B	Methylcyclohexane	3.00	EPA 8260B
1,1,2,2-Tetrachloroethane	0.300	EPA 8260B	Benzene	0.300	EPA 8260B	Methylene chloride	3.00	EPA 8260B
1,1,2-Trichloroethane	0.300	EPA 8260B	Bromochloromethane	0.300	EPA 8260B	Styrene	0.300	EPA 8260B
1,1-Dichloroethane	0.300	EPA 8260B	Bromodichloromethane	0.300	EPA 8260B	Tert-butyl methyl ether	0.300	EPA 8260B
1,1-Dichloroethene	0.300	EPA 8260B	Bromoform	0.300	EPA 8260B	Tetrachloroethene	0.300	EPA 8260B
1,2,3-Trichlorobenzene	0.300	EPA 8260B	Bromomethane	0.300	EPA 8260B	Toluene	0.300	EPA 8260B
1,2,4-Trichlorobenzene	0.300	EPA 8260B	Carbon disulfide	1.50	EPA 8260B	Trichloroethene	0.300	EPA 8260B
1,2-Dibromo-3-chloropropane	0.300	EPA 8260B	Carbon tetrachloride	0.300	EPA 8260B	Trichlorofluoromethane	0.300	EPA 8260B
1,2-Dibromoethane	0.300	EPA 8260B	Chlorobenzene	0.300	EPA 8260B	Vinyl chloride	0.300	EPA 8260B
1,2-Dichlorobenzene	0.300	EPA 8260B	Chloroethane	0.300	EPA 8260B	Xylene	0.300	EPA 8260B
1,2-Dichloroethane	0.300	EPA 8260B	Chloroform	0.300	EPA 8260B	cis-1,2-Dichloroethene	0.300	EPA 8260B
1,2-Dichloropropane	0.300	EPA 8260B	Chloromethane	0.300	EPA 8260B	cis-1,3-Dichloropropene	0.300	EPA 8260B
1,3-Dichlorobenzene	0.300	EPA 8260B	Cyclohexane	0.300	EPA 8260B	m-, p-Xylene	0.300	EPA 8260B
1,4-Dichlorobenzene	0.300	EPA 8260B	Dibromochloromethane	0.300	EPA 8260B	o-Xylene	0.300	EPA 8260B
2,2-trifluoroethane, 1,1,2-Trichloro-1	1.50	EPA 8260B	Dichlorodifluoromethane	0.300	EPA 8260B	trans-1,2-Dichloroethene	0.300	EPA 8260B
2-Butanone	2.00	EPA 8260B	Ethyl benzene	0.300	EPA 8260B	trans-1,3-Dichloropropene	0.300	EPA 8260B
2-Hexanone	2.20	EPA 8260B	Isopropylbenzene	0.300	EPA 8260B			
4-methyl-, 2-Pentanone	1.50	EPA 8260B	Methyl acetate	1.50	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 2013

SWMU 8/58					
Analyte	**MDL (µg/L)**	**Analytical Method[a]**	**Analyte**	**MDL (µg/L)**	**Analytical Method[a]**
1'-Biphenyl 1	3.00 – 3.16	EPA 8270C	Butylbenzyl phthalate	3.00 – 3.16	EPA 8270C
1,2,4-Trichlorobenzene	3.00 – 3.16	EPA 8270C	Caprolactam	3.00 – 3.16	EPA 8270C
1,4-Dioxane	3.00 – 3.16	EPA 8270C	Carbazole	0.300 – 0.316	EPA 8270C
2,4,5-Trichlorophenol	3.00 – 3.16	EPA 8270C	Chrysene	0.300 – 0.316	EPA 8270C
2,4,6-Trichlorophenol	3.00 – 3.16	EPA 8270C	Di-n-butyl phthalate	3.00 – 3.16	EPA 8270C
2,4-Dichlorophenol	3.00 – 3.16	EPA 8270C	Di-n-octyl phthalate	3.00 – 3.16	EPA 8270C
2,4-Dimethylphenol	3.00 – 3.16	EPA 8270C	Dibenz[a,h]anthracene	0.300 – 0.316	EPA 8270C
2,4-Dinitrophenol	5.00 – 5.26	EPA 8270C	Dibenzofuran	3.00 – 3.16	EPA 8270C
2,4-Dinitrotoluene	3.00 – 3.16	EPA 8270C	Diethylphthalate	3.00 – 3.16	EPA 8270C
2,6-Dinitrotoluene	3.00 – 3.16	EPA 8270C	Dimethylphthalate	3.00 – 3.16	EPA 8270C
2-Chloronaphthalene	0.300 – 0.316	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	3.00 – 3.16	EPA 8270C
4-Chlorophenyl phenyl ether	3.00 – 3.16	EPA 8270C	Naphthalene	0.300 – 0.316	EPA 8270C
4-Nitroaniline	3.00 – 3.16	EPA 8270C	Nitro-benzene	3.00 – 3.16	EPA 8270C
4-Nitrophenol	3.00 – 3.16	EPA 8270C	Pentachlorophenol	3.00 – 3.16	EPA 8270C
Acenaphthene	0.300 – 0.316	EPA 8270C	Phenanthrene	0.300 – 0.316	EPA 8270C
Acenaphthylene	0.300 – 0.316	EPA 8270C	Phenol	3.00 – 3.16	EPA 8270C
Acetophenone	3.00 – 3.16	EPA 8270C	Pyrene	0.300 – 0.316	EPA 8270C
Anthracene	0.300 – 0.316	EPA 8270C	bis(2-Chloroethoxy)methane	3.00 – 3.16	EPA 8270C
Atrazine	3.00 – 3.16	EPA 8270C	bis(2-Chloroethyl)ether	3.00 – 3.16	EPA 8270C
Benzaldehyde	5.00 – 5.26	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	0.440 – 0.463	EPA 8270C	m,p-Cresol	3.00 – 3.16	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 2013

SWMU 68								
Analyte	**MDL (µg/L)**	**Analytical Method[a]**	**Analyte**	**MDL (µg/L)**	**Analytical Method[a]**	**Analyte**	**MDL (µg/L)**	**Analytical Method[a]**
1,1,1-Trichloroethane	0.300	EPA 8260B	Acetone	3.00	EPA 8260B	Methylcyclohexane	3.00	EPA 8260B
1,1,2,2-Tetrachloroethane	0.300	EPA 8260B	Benzene	0.300	EPA 8260B	Methylene chloride	3.00	EPA 8260B
1,1,2-Trichloroethane	0.300	EPA 8260B	Bromochloromethane	0.300	EPA 8260B	Styrene	0.300	EPA 8260B
1,1-Dichloroethane	0.300	EPA 8260B	Bromodichloromethane	0.300	EPA 8260B	Tert-butyl methyl ether	0.300	EPA 8260B
1,1-Dichloroethene	0.300	EPA 8260B	Bromoform	0.300	EPA 8260B	Tetrachloroethene	0.300	EPA 8260B
1,2,3-Trichlorobenzene	0.300	EPA 8260B	Bromomethane	0.300	EPA 8260B	Toluene	0.300	EPA 8260B
1,2,4-Trichlorobenzene	0.300	EPA 8260B	Carbon disulfide	1.50	EPA 8260B	Trichloroethene	0.300	EPA 8260B
1,2-Dibromo-3-chloropropane	0.300	EPA 8260B	Carbon tetrachloride	0.300	EPA 8260B	Trichlorofluoromethane	0.300	EPA 8260B
1,2-Dibromoethane	0.300	EPA 8260B	Chlorobenzene	0.300	EPA 8260B	Vinyl chloride	0.300	EPA 8260B
1,2-Dichlorobenzene	0.300	EPA 8260B	Chloroethane	0.300	EPA 8260B	Xylene	0.300	EPA 8260B
1,2-Dichloroethane	0.300	EPA 8260B	Chloroform	0.300	EPA 8260B	cis-1,2-Dichloroethene	0.300	EPA 8260B
1,2-Dichloropropane	0.300	EPA 8260B	Chloromethane	0.300	EPA 8260B	cis-1,3-Dichloropropene	0.300	EPA 8260B
1,3-Dichlorobenzene	0.300	EPA 8260B	Cyclohexane	0.300	EPA 8260B	m-, p-Xylene	0.300	EPA 8260B
1,4-Dichlorobenzene	0.300	EPA 8260B	Dibromochloromethane	0.300	EPA 8260B	o-Xylene	0.300	EPA 8260B
2,2-trifluoroethane, 1,1,2-Trichloro-1	1.50	EPA 8260B	Dichlorodifluoromethane	0.300	EPA 8260B	trans-1,2-Dichloroethene	0.300	EPA 8260B
2-Butanone	2.00	EPA 8260B	Ethyl benzene	0.300	EPA 8260B	trans-1,3-Dichloropropene	0.300	EPA 8260B
2-Hexanone	2.20	EPA 8260B	Isopropylbenzene	0.300	EPA 8260B			
4-methyl-, 2-Pentanone	1.50	EPA 8260B	Methyl acetate	1.50	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 2013

SWMU 68					
Analyte	**MDL (µg/L)**	**Analytical Method[a]**	**Analyte**	**MDL (µg/L)**	**Analytical Method[a]**
1'-Biphenyl 1	3.00 – 3.23	EPA 8270C	Butylbenzyl phthalate	3.00 – 3.23	EPA 8270C
1,2,4-Trichlorobenzene	3.00 – 3.23	EPA 8270C	Caprolactam	3.00 – 3.23	EPA 8270C
2,4,5-Trichlorophenol	3.00 – 3.23	EPA 8270C	Carbazole	0.300 – 0.323	EPA 8270C
1,4-Dioxane	3.00 – 3.23	EPA 8270C	Chrysene	0.300 – 0.323	EPA 8270C
2,4,6-Trichlorophenol	3.00 – 3.23	EPA 8270C	Di-n-butyl phthalate	3.00 – 3.23	EPA 8270C
2,4-Dichlorophenol	3.00 – 3.23	EPA 8270C	Di-n-octyl phthalate	3.00 – 3.23	EPA 8270C
2,4-Dimethylphenol	3.00 – 3.23	EPA 8270C	Dibenz[a,h]anthracene	0.300 – 0.323	EPA 8270C
2,4-Dinitrophenol	5.00 – 5.38	EPA 8270C	Dibenzofuran	3.00 – 3.23	EPA 8270C
2,4-Dinitrotoluene	3.00 – 3.23	EPA 8270C	Diethylphthalate	3.00 – 3.23	EPA 8270C
2,6-Dinitrotoluene	3.00 – 3.23	EPA 8270C	Dimethylphthalate	3.00 – 3.23	EPA 8270C
2-Chloronaphthalene	0.300 – 0.323	EPA 8270C	Dinitro-o-cresol	3.00 – 3.23	EPA 8270C
2-Chlorophenol	3.00 – 3.23	EPA 8270C	Diphenyl amine	3.00 – 3.23	EPA 8270C
2-Methylnaphthalene	0.300 – 0.323	EPA 8270C	Fluoranthene	0.300 – 0.323	EPA 8270C
2-Nitroaniline	3.00 – 3.23	EPA 8270C	Fluorene	0.300 – 0.323	EPA 8270C
2-Nitrophenol	3.00 – 3.23	EPA 8270C	Hexachlorobenzene	3.00 – 3.23	EPA 8270C
3,3'-Dichlorobenzidine	3.00 – 3.23	EPA 8270C	Hexachlorobutadiene	3.00 – 3.23	EPA 8270C
3-Nitroaniline	3.00 – 3.23	EPA 8270C	Hexachlorocyclopentadiene	3.00 – 3.23	EPA 8270C
4-Bromophenyl phenyl ether	3.00 – 3.23	EPA 8270C	Hexachloroethane	3.00 – 3.23	EPA 8270C
4-Chloro-3-methylphenol	3.00 – 3.23	EPA 8270C	Indeno(1,2,3-c,d)pyrene	0.300 – 0.323	EPA 8270C
4-Chlorobenzenamine	3.00 – 3.55	EPA 8270C	Isophorone	3.00 – 3.23	EPA 8270C
4-Chlorophenyl phenyl ether	3.00 – 3.23	EPA 8270C	Naphthalene	0.300 – 0.323	EPA 8270C
4-Nitroaniline	3.00 – 3.23	EPA 8270C	Nitro-benzene	3.00 – 3.23	EPA 8270C
4-Nitrophenol	3.00 – 3.23	EPA 8270C	Pentachlorophenol	3.00 – 3.23	EPA 8270C
Acenaphthene	0.300 – 0.323	EPA 8270C	Phenanthrene	0.300 – 0.323	EPA 8270C
Acenaphthylene	0.300 – 0.323	EPA 8270C	Phenol	3.00 – 3.23	EPA 8270C
Acetophenone	3.00 – 3.23	EPA 8270C	Pyrene	0.300 – 0.323	EPA 8270C
Anthracene	0.300 – 0.323	EPA 8270C	bis(2-Chloroethoxy)methane	3.00 – 3.23	EPA 8270C
Atrazine	3.00 – 3.23	EPA 8270C	bis(2-Chloroethyl)ether	3.00 – 3.23	EPA 8270C
Benzaldehyde	5.00 – 5.38	EPA 8270C	bis(2-Chloroisopropyl)ether	3.00 – 3.23	EPA 8270C
Benzo(a)anthracene	0.300 – 0.323	EPA 8270C	bis(2-Ethylhexyl)phthalate	3.00 – 3.23	EPA 8270C
Benzo(a)pyrene	0.400 – 0.473	EPA 8270C	m,p-Cresol	3.00 – 3.23	EPA 8270C
Benzo(b)fluoranthene	0.300 – 0.323	EPA 8270C	n-Nitrosodipropylamine	3.00 – 3.23	EPA 8270C
Benzo(ghi)perylene	0.300 – 0.323	EPA 8270C	o-Cresol	3.00 – 3.23	EPA 8270C
Benzo(k)fluoranthene	0.300 – 0.323	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 2013

Notes

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

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 2013

Analyte	MDL (µg/L)	
	SWMUs 8/58	SWMU 68
1,3,5-Trinitrobenzene	0.0851 – 0.0860	0.0838 – 0.0851
1,3-Dinitrobenzene	0.0851 – 0.0860	0.0838 – 0.0851
2,4,6-Trinitrotoluene	0.0851 – 0.0860	0.0838 – 0.0851
2,4-Dinitrotoluene	0.0851 – 0.0860	0.0838 – 0.0851
2,6-Dinitrotoluene	0.0851 – 0.0860	0.0838 – 0.0851
2-Amino-4,6-dinitrotoluene	0.0851 – 0.0860	0.0838 – 0.0851
2-Nitrotoluene	0.0872 – 0.0882	0.0859 – 0.0872
3-Nitrotoluene	0.0851 – 0.0860	0.0838 – 0.0851
4-Amino-2,6-dinitrotoluene	0.0851 – 0.0860	0.0838 – 0.0851
4-Nitrotoluene	0.160 – 0.161	0.157 – 0.1640
HMX	0.0851 – 0.0860	0.0838 – 0.0851
Nitro-benzene	0.0851 – 0.0860	0.0838 – 0.0851
Pentaerythritol tetranitrate	0.106 – 0.108	0.105 – 0.106
RDX	0.0851 – 0.0860	0.0838 – 0.0851
Tetryl	0.0851 – 0.0860	0.0838 – 0.0851

Notes

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

Table IV-6

Summary of Nitrate Plus Nitrite Results

SWMUs 8/58 and 68 Groundwater Monitoring

Quarterly Assessment, April – June 2013

Well	Analyte	Result (mg/L)	MDL (mg/L)	PQL (mg/L)	MCL (mg/L)	Laboratory Qualifier[a]	Validation Qualifier[b]	Sample Number	Analytical Method[c]
SWMUs 8/58									
CCBA-MW1 24-Apr-13	Nitrate plus nitrite as N	1.43	0.085	0.250	10.0			093873-018	EPA 353.2
CCBA-MW2 25-Apr-13	Nitrate plus nitrite as N	3.47	0.170	0.500	10.0			093878-018	EPA 353.2
CCBA-MW2 (Duplicate) 25-Apr-13	Nitrate plus nitrite as N	3.28	0.170	0.500	10.0			093879-018	EPA 353.2
SWMU 68									
OBS-MW1 18-Apr-13	Nitrate plus nitrite as N	1.21	0.085	0.250	10.0			093863-018	EPA 353.2
OBS-MW2 22-Apr-13	Nitrate plus nitrite as N	1.57	0.085	0.250	10.0			093866-018	EPA 353.2
OBS-MW3 23-Apr-13	Nitrate plus nitrite as N	1.78	0.085	0.250	10.0			093870-018	EPA 353.2
OBS-MW3 (Duplicate) 23-Apr-13	Nitrate plus nitrite as N	1.72	0.085	0.250	10.0			093871-018	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, 1986 (and updates), "*Test Methods for Evaluating Solid Waste, Physical/Chemical Methods*," SW-846, 3rd ed.
U.S. Environmental Protection Agency, 1984, "Methods for Chemical Analysis of Water and Wastes," EPA 600-4-79-020.

Table IV-6 (Concluded)

Summary of Nitrate Plus Nitrite Results

SWMUs 8/58 and 68 Groundwater Monitoring

Quarterly Assessment, April – June 2013

Notes (continued)

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

Table IV-7

Summary of Alkalinity, Anion, and Total Cyanide Results

SWMUs 8/58 and 68 Groundwater Monitoring

Quarterly Assessment, April – June 2013

Well	Analyte	Result (mg/L)	MDL (mg/L)	PQL (mg/L)	MCL (mg/L)	Laboratory Qualifier[a]	Validation Qualifier[b]	Sample Number	Analytical Method[c]
SWMUs 8/58									
CCBA-MW1	Bicarbonate Alkalinity	200	0.725	1.00	NE			093873-022	SM 2320B
24-Apr-13	Carbonate Alkalinity	ND	0.725	1.00	NE	U		093873-022	SM 2320B
	Bromide	0.350	0.067	0.200	NE			093873-016	EPA 9056
	Chloride	28.1	0.670	2.00	NE			093873-016	EPA 9056
	Fluoride	**4.57**	0.330	1.00	4.0			093873-016	EPA 9056
	Sulfate	56.7	1.33	4.00	NE			093873-016	EPA 9056
	Total Cyanide	ND	0.00167	0.005	0.200	U	UJ	093873-027	EPA 9012
CCBA-MW2	Bicarbonate Alkalinity	179	0.725	1.00	NE			093878-022	SM 2320B
25-Apr-13	Carbonate Alkalinity	ND	0.725	1.00	NE	U		093878-022	SM 2320B
	Bromide	0.582	0.067	0.200	NE			093878-016	EPA 9056
	Chloride	38.3	0.670	2.00	NE			093878-016	EPA 9056
	Fluoride	1.60	0.033	0.100	4.0			093878-016	EPA 9056
	Sulfate	99.5	1.33	4.00	NE			093878-016	EPA 9056
	Total Cyanide	ND	0.00167	0.005	0.200	U	UJ	093878-027	EPA 9012
CCBA-MW2 (Duplicate)	Bicarbonate Alkalinity	193	0.725	1.00	NE			093879-022	SM 2320B
25-Apr-13	Carbonate Alkalinity	ND	0.725	1.00	NE	U		093879-022	SM 2320B
	Bromide	0.573	0.067	0.200	NE			093879-016	EPA 9056
	Chloride	39.0	0.670	2.00	NE			093879-016	EPA 9056
	Fluoride	1.60	0.033	0.100	4.0			093879-016	EPA 9056
	Sulfate	98.6	1.33	4.00	NE			093879-016	EPA 9056
	Total Cyanide	ND	0.00167	0.005	0.200	U	UJ	093879-027	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 2013

Well	Analyte	Result (mg/L)	MDL (mg/L)	PQL (mg/L)	MCL (mg/L)	Laboratory Qualifier[a]	Validation Qualifier[b]	Sample Number	Analytical Method[c]
SWMU 68									
OBS-MW1 18-Apr-13	Bicarbonate Alkalinity	184	0.725	1.00	NE			093863-022	SM 2320B
	Carbonate Alkalinity	ND	0.725	1.00	NE	U		093863-022	SM 2320B
	Bromide	0.324	0.067	0.200	NE			093863-016	EPA 9056
	Chloride	21.4	0.670	2.00	NE	H		093863-016	EPA 9056
	Fluoride	2.04	0.033	0.100	4.00			093863-016	EPA 9056
	Sulfate	74.5	1.33	4.00	NE	H		093863-016	EPA 9056
	Total Cyanide	ND	0.00167	0.005	0.200	U	UJ	093863-027	EPA 9012
OBS-MW2 22-Apr-13	Bicarbonate Alkalinity	180	0.725	1.00	NE	B		093866-022	SM 2320B
	Carbonate Alkalinity	ND	0.725	1.00	NE	U		093866-022	SM 2320B
	Bromide	0.370	0.067	0.200	NE			093866-016	EPA 9056
	Chloride	23.2	0.670	2.00	NE			093866-016	EPA 9056
	Fluoride	2.32	0.033	0.100	4.00			093866-016	EPA 9056
	Sulfate	86.0	1.33	4.00	NE			093866-016	EPA 9056
	Total Cyanide	ND	0.00167	0.005	0.200	U	UJ	093866-027	EPA 9012
OBS-MW3 23-Apr-13	Bicarbonate Alkalinity	178	0.725	1.00	NE	B		093870-022	SM 2320B
	Carbonate Alkalinity	ND	0.725	1.00	NE	U		093870-022	SM 2320B
	Bromide	0.359	0.067	0.200	NE			093870-016	EPA 9056
	Chloride	23.9	0.670	2.00	NE			093870-016	SEPA 9056
	Fluoride	2.32	0.033	0.100	4.00			093870-016	EPA 9056
	Sulfate	87.2	1.33	4.00	NE			093870-016	EPA 9056
	Total Cyanide	ND	0.00167	0.005	0.200	U	UJ	093870-027	EPA 9012
OBS-MW3 (Duplicate) 23-Apr-13	Bicarbonate Alkalinity	180	0.725	1.00	NE	B		093871-022	SM 2320B
	Carbonate Alkalinity	ND	0.725	1.00	NE	U		093871-022	SM 2320B
	Bromide	0.372	0.067	0.200	NE			093871-016	EPA 9056
	Chloride	24.5	0.670	2.00	NE			093871-016	EPA 9056
	Fluoride	2.37	0.033	0.100	4.00			093871-016	EPA 9056
	Sulfate	87.5	1.33	4.00	NE			093871-016	EPA 9056
	Total Cyanide	ND	0.00167	0.005	0.200	U	UJ	093871-027	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 2013

Notes

[a]Laboratory Qualifier
If cell is blank, then all quality control samples met acceptance criteria with respect to submitted samples.
B = The analyte was detected in the blank above the effective method detection limit (MDL).
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 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.

[c]Analytical Method
U.S. Environmental Protection Agency, 1986 (and updates), "*Test Methods for Evaluating Solid Waste, Physical/Chemical Methods*," SW-846, 3rd ed.
U.S. Environmental Protection Agency, 1984, "Methods for Chemical Analysis of Water and Wastes," EPA 600-4-79-020, U.S. Environmental Protection Agency, Washington, D.C. or
Clesceri, Greenburg, and Eaton, 1998, *Standard Methods for the Examination of Water and Wastewater*, 20th ed., Method 2320B.

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 2013

Well	Result (mg/L)	MDL (mg/L)	PQL (mg/L)	MCL (mg/L)	Laboratory Qualifier[a]	Validation Qualifier[b]	Sample Number	Analytical Method[c]
SWMUs 8/58								
CCBA-MW1 24-Apr-13	ND	0.004	0.012	NE	U		093873-020	EPA 314.0
CCBA-MW2 25-Apr-13	ND	0.004	0.012	NE	U		093878-020	EPA 314.0
CCBA-MW2 (Duplicate) 25-Apr-13	ND	0.004	0.012	NE	U		093879-020	EPA 314.0
SWMU 68								
OBS-MW1 18-Apr-13	ND	0.004	0.012	NE	U		093863-020	EPA 314.0
OBS-MW2 22-Apr-13	ND	0.004	0.012	NE	U		093866-020	EPA 314.0
OBS-MW3 23-Apr-13	ND	0.004	0.012	NE	U		093870-020	EPA 314.0
OBS-MW3 (Duplicate) 23-Apr-13	ND	0.004	0.012	NE	U		093871-020	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 2013

Notes (continued)

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

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

Well	Result (mg/L)	MDL (mg/L)	PQL (mg/L)	MCL (mg/L)	Laboratory Qualifier[a]	Validation Qualifier[b]	Sample Number	Analytical Method[c]
OBS-MW1 18-Apr-13	ND	0.0033	0.010	NE	U		093863-014	EPA 7196A
OBS-MW2 22-Apr-13	ND	0.0033	0.010	NE	U		093866-014	EPA 7196A
OBS-MW3 23-Apr-13	ND	0.0033	0.010	NE	U		093870-014	EPA 7196A
OBS-MW3 (Duplicate) 23-Apr-13	ND	0.0033	0.010	NE	U		093871-014	EPA 7196A

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, 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 2013

Well	Analyte	Result (mg/L)	MDL (mg/L)	PQL (mg/L)	MCL (mg/L)	Laboratory Qualifier[a]	Validation Qualifier[b]	Sample Number	Analytical Method[c]
CCBA-MW1	Aluminum	0.0609	0.015	0.050	NE			093873-009	EPA 6020
24-Apr-13	Antimony	ND	0.001	0.003	0.006	U		093873-009	EPA 6020
	Arsenic	0.00183	0.0017	0.005	0.010	J		093873-009	EPA 6020
	Barium	0.00253	0.0006	0.002	2.00			093873-009	EPA 6020
	Beryllium	0.000506	0.0002	0.0005	0.004			093873-009	EPA 6020
	Cadmium	ND	0.00011	0.001	0.005	U		093873-009	EPA 6020
	Calcium	48.0	0.600	2.00	NE	B, N		093873-009	EPA 6020
	Chromium	ND	0.002	0.010	0.100	U		093873-009	EPA 6020
	Cobalt	0.000142	0.0001	0.001	NE	B, J	0.00053U	093873-009	EPA 6020
	Copper	0.000771	0.00035	0.001	NE	J		093873-009	EPA 6020
	Iron	0.123	0.033	0.100	NE			093873-009	EPA 6020
	Lead	ND	0.0005	0.002	NE	U		093873-009	EPA 6020
	Magnesium	11.4	0.010	0.030	NE			093873-009	EPA 6020
	Manganese	0.00454	0.001	0.005	NE	J		093873-009	EPA 6020
	Mercury	ND	0.000067	0.0002	0.002	U	UJ	093873-009	EPA 7470
	Nickel	0.00143	0.0005	0.002	NE	J		093873-009	EPA 6020
	Potassium	4.43	0.080	0.300	NE			093873-009	EPA 6020
	Selenium	0.00252	0.0015	0.005	0.050	J		093873-009	EPA 6020
	Silver	ND	0.0002	0.001	NE	U		093873-009	EPA 6020
	Sodium	66.2	0.800	2.50	NE	N		093873-009	EPA 6020
	Thallium	ND	0.00045	0.002	0.002	U		093873-009	EPA 6020
	Uranium	0.0024	0.000067	0.0002	0.03	B		093873-009	EPA 6020
	Vanadium	ND	0.001	0.005	NE	U	UJ	093873-009	EPA 6010
	Zinc	ND	0.0035	0.010	NE	U		093873-009	EPA 6020

Table IV-10 (Continued)

Summary of Unfiltered Total Metal Results

SWMUs 8/58 Groundwater Monitoring

Quarterly Assessment, April – June 2013

Well	Analyte	Result (mg/L)	MDL (mg/L)	PQL (mg/L)	MCL (mg/L)	Laboratory Qualifier[a]	Validation Qualifier[b]	Sample Number	Analytical Method[c]
CCBA-MW2	Aluminum	ND	0.015	0.050	NE	U		093878-009	EPA 6020
25-Apr-13	Antimony	ND	0.001	0.003	0.006	U		093878-009	EPA 6020
	Arsenic	ND	0.0017	0.005	0.010	U		093878-009	EPA 6020
	Barium	0.0445	0.0006	0.002	2.00			093878-009	EPA 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		093878-009	EPA 6020
	Cadmium	ND	0.00011	0.001	0.005	U		093878-009	EPA 6020
	Calcium	79.8	0.600	2.00	NE	B, N		093878-009	EPA 6020
	Chromium	ND	0.002	0.010	0.100	U		093878-009	EPA 6020
	Cobalt	0.000124	0.0001	0.001	NE	B, J	0.00053U	093878-009	EPA 6020
	Copper	0.000652	0.00035	0.001	NE	J	0.0097UJ	093878-009	EPA 6020
	Iron	0.137	0.033	0.100	NE			093878-009	EPA 6020
	Lead	ND	0.0005	0.002	NE	U		093878-009	EPA 6020
	Magnesium	15.9	0.010	0.030	NE			093878-009	EPA 6020
	Manganese	ND	0.001	0.005	NE	U		093878-009	EPA 6020
	Mercury	ND	0.000067	0.0002	0.002	U	UJ	093878-009	EPA 7470
	Nickel	0.00192	0.0005	0.002	NE	J		093878-009	EPA 6020
	Potassium	1.43	0.080	0.300	NE			093878-009	EPA 6020
	Selenium	0.00436	0.0015	0.005	0.050	J		093878-009	EPA 6020
	Silver	ND	0.0002	0.001	NE	U		093878-009	EPA 6020
	Sodium	52.0	0.800	2.50	NE	N		093878-009	EPA 6020
	Thallium	ND	0.00045	0.002	0.002	U		093878-009	EPA 6020
	Uranium	0.00571	0.000067	0.0002	0.03	B		093878-009	EPA 6020
	Vanadium	0.00846	0.001	0.005	NE			093878-009	EPA 6010
	Zinc	ND	0.0035	0.010	NE	U		093878-009	EPA 6020

Table IV-10 (Continued)

Summary of Unfiltered Total Metal Results

SWMUs 8/58 Groundwater Monitoring

Quarterly Assessment, April – June 2013

Well	Analyte	Result (mg/L)	MDL (mg/L)	PQL (mg/L)	MCL (mg/L)	Laboratory Qualifier[a]	Validation Qualifier[b]	Sample Number	Analytical Method[c]
CCBA-MW2 (Duplicate) 25-Apr-13	Aluminum	ND	0.015	0.050	NE	U		093879-009	EPA 6020
	Antimony	ND	0.001	0.003	0.006	U		093879-009	EPA 6020
	Arsenic	ND	0.0017	0.005	0.010	U		093879-009	EPA 6020
	Barium	0.0452	0.0006	0.002	2.00			093879-009	EPA 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		093879-009	EPA 6020
	Cadmium	ND	0.00011	0.001	0.005	U		093879-009	EPA 6020
	Calcium	76.2	0.600	2.00	NE	B, N		093879-009	EPA 6020
	Chromium	ND	0.002	0.010	0.100	U		093879-009	EPA 6020
	Cobalt	0.000126	0.0001	0.001	NE	B, J	0.00053U	093879-009	EPA 6020
	Copper	0.000663	0.00035	0.001	NE	J	0.0097UJ	093879-009	EPA 6020
	Iron	0.139	0.033	0.100	NE			093879-009	EPA 6020
	Lead	ND	0.0005	0.002	NE	U		093879-009	EPA 6020
	Magnesium	16.7	0.010	0.030	NE			093879-009	EPA 6020
	Manganese	ND	0.001	0.005	NE	U		093879-009	EPA 6020
	Mercury	ND	0.000067	0.0002	0.002	U	UJ	093879-009	EPA 7470
	Nickel	0.00198	0.0005	0.002	NE	J		093879-009	EPA 6020
	Potassium	1.44	0.080	0.300	NE			093879-009	EPA 6020
	Selenium	0.00445	0.0015	0.005	0.050	J		093879-009	EPA 6020
	Silver	ND	0.0002	0.001	NE	U		093879-009	EPA 6020
	Sodium	48.5	0.800	2.50	NE	N		093879-009	EPA 6020
	Thallium	ND	0.00045	0.002	0.002	U		093879-009	EPA 6020
	Uranium	0.0057	0.000067	0.0002	0.03	B		093879-009	EPA 6020
	Vanadium	0.00892	0.001	0.005	NE			093879-009	EPA 6010
	Zinc	ND	0.0035	0.010	NE	U		093879-009	EPA 6020

Table IV-10 (Concluded)

Summary of Unfiltered Total Metal Results

SWMUs 8/58 Groundwater Monitoring

Quarterly Assessment, April – June 2013

Notes

[a]Laboratory Qualifier
If cell is blank, then all quality control samples met acceptance criteria with respect to submitted samples.
B = The analyte was detected in the blank above the effective method detection limit (MDL).
J = Estimated value, the analyte concentration fell above the effective MDL and below the effective PQL.
N = Results associated with a spike analysis that was outside control limits.
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.
U = The analyte was analyzed for, but not detected. The associated numerical value is the sample quantitation limit.
UJ = The analyte was analyzed for, but not detected. The associated value is an estimate and may be inaccurate or imprecise.

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

CCBA = Coyote Canyon Blast Area.
EPA = U.S. Environmental Protection Agency.
MCL = Maximum contaminant level. Established by the EPA Primary Water Regulations (40 Code of Federal Regulations 141.11, Subpart B), National Primary Drinking Water Standards (EPA, 2009).
MDL = Method detection limit. The minimum concentration that can be measured and reported with 99% confidence that the analyte is greater than zero; analyte is matrix-specific.
mg/L = Milligrams per liter.
MW = Monitoring well.
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 2013

Well	Analyte	Result (mg/L)	MDL (mg/L)	PQL (mg/L)	MCL (mg/L)	Laboratory Qualifier[a]	Validation Qualifier[b]	Sample Number	Analytical Method[c]
OBS-MW1	Aluminum	0.279	0.015	0.050	NE			093863-009	EPA 6020
18-Apr-13	Antimony	ND	0.001	0.003	0.006	U		093863-009	EPA 6020
	Arsenic	ND	0.0017	0.005	0.010	U		093863-009	EPA 6020
	Barium	0.0236	0.0006	0.002	2.00			093863-009	EPA 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		093863-009	EPA 6020
	Cadmium	ND	0.00011	0.001	0.005	U		093863-009	EPA 6020
	Calcium	81.3	0.300	1.00	NE	B		093863-009	EPA 6020
	Chromium	ND	0.002	0.010	0.100	U		093863-009	EPA 6020
	Cobalt	0.000296	0.0001	0.001	NE	J		093863-009	EPA 6020
	Copper	0.00102	0.00035	0.001	NE			093863-009	EPA 6020
	Iron	0.268	0.033	0.100	NE			093863-009	EPA 6020
	Lead	ND	0.0005	0.002	NE	U		093863-009	EPA 6020
	Magnesium	17.8	0.050	0.015	NE			093863-009	EPA 6020
	Manganese	0.0646	0.001	0.005	NE			093863-009	EPA 6020
	Mercury	ND	0.000067	0.0002	0.002	U		093863-009	EPA 7470
	Nickel	0.0025	0.0005	0.002	NE	B		093863-009	EPA 6020
	Potassium	1.97	0.080	0.300	NE			093863-009	EPA 6020
	Selenium	0.00269	0.0015	0.005	0.050	J		093863-009	EPA 6020
	Silver	ND	0.0002	0.001	NE	U		093863-009	EPA 6020
	Sodium	21.4	0.080	0.250	NE			093863-009	EPA 6020
	Thallium	ND	0.00045	0.002	0.002	U		093863-009	EPA 6020
	Uranium	0.0107	0.000067	0.0002	0.03			093863-009	EPA 6020
	Vanadium	0.00116	0.001	0.005	NE	J		093863-009	EPA 6010
	Zinc	ND	0.0035	0.010	NE	U		093863-009	EPA 6020

Table IV-11 (Continued)

Summary of Unfiltered Total Metal Results

SWMU 68 Groundwater Monitoring

Quarterly Assessment, April – June 2013

Well	Analyte	Result (mg/L)	MDL (mg/L)	PQL (mg/L)	MCL (mg/L)	Laboratory Qualifier[a]	Validation Qualifier[b]	Sample Number	Analytical Method[c]
OBS-MW2	Aluminum	ND	0.015	0.050	NE	U		093866-009	EPA 6020
22-Apr-13	Antimony	ND	0.001	0.003	0.006	U		093866-009	EPA 6020
	Arsenic	ND	0.0017	0.005	0.010	U		093866-009	EPA 6020
	Barium	0.019	0.0006	0.002	2.00			093866-009	EPA 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		093866-009	EPA 6020
	Cadmium	ND	0.00011	0.001	0.005	U		093866-009	EPA 6020
	Calcium	80.5	0.600	2.00	NE	B, N		093866-009	EPA 6020
	Chromium	ND	0.002	0.010	0.100	U		093866-009	EPA 6020
	Cobalt	0.000103	0.0001	0.001	NE	B, J	0.00053U	093866-009	EPA 6020
	Copper	0.000506	0.00035	0.001	NE	J		093866-009	EPA 6020
	Iron	0.151	0.033	0.100	NE			093866-009	EPA 6020
	Lead	ND	0.0005	0.002	NE	U		093866-009	EPA 6020
	Magnesium	18.3	0.010	0.030	NE			093866-009	EPA 6020
	Manganese	ND	0.001	0.005	NE	U		093866-009	EPA 6020
	Mercury	ND	0.000067	0.0002	0.002	U		093866-009	EPA 7470
	Nickel	0.00152	0.0005	0.002	NE	J		093866-009	EPA 6020
	Potassium	1.76	0.080	0.300	NE			093866-009	EPA 6020
	Selenium	0.00328	0.0015	0.005	0.050	J		093866-009	EPA 6020
	Silver	ND	0.0002	0.001	NE	U		093866-009	EPA 6020
	Sodium	24.0	0.800	2.50	NE	N		093866-009	EPA 6020
	Thallium	ND	0.00045	0.002	0.002	U		093866-009	EPA 6020
	Uranium	0.0146	0.000067	0.0002	0.03	B		093866-009	EPA 6020
	Vanadium	ND	0.001	0.005	NE	U	UJ	093866-009	EPA 6010
	Zinc	ND	0.0035	0.010	NE	U		093866-009	EPA 6020

Table IV-11 (Continued)

Summary of Unfiltered Total Metal Results

SWMU 68 Groundwater Monitoring

Quarterly Assessment, April – June 2013

Well	Analyte	Result (mg/L)	MDL (mg/L)	PQL (mg/L)	MCL (mg/L)	Laboratory Qualifier[a]	Validation Qualifier[b]	Sample Number	Analytical Method[c]
OBS-MW3	Aluminum	0.028	0.015	0.050	NE	J		093870-009	EPA 6020
23-Apr-13	Antimony	ND	0.001	0.003	0.006	U		093870-009	EPA 6020
	Arsenic	ND	0.0017	0.005	0.010	U		093870-009	EPA 6020
	Barium	0.0253	0.0006	0.002	2.00			093870-009	EPA 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		093870-009	EPA 6020
	Cadmium	ND	0.00011	0.001	0.005	U		093870-009	EPA 6020
	Calcium	76.5	0.600	2.00	NE	B, N		093870-009	EPA 6020
	Chromium	ND	0.002	0.010	0.100	U		093870-009	EPA 6020
	Cobalt	0.000275	0.0001	0.001	NE	B, J	0.00053U	093870-009	EPA 6020
	Copper	0.000694	0.00035	0.001	NE	J	0.018UJ	093870-009	EPA 6020
	Iron	0.165	0.033	0.100	NE			093870-009	EPA 6020
	Lead	ND	0.0005	0.002	NE	U		093870-009	EPA 6020
	Magnesium	17.5	0.010	0.030	NE			093870-009	EPA 6020
	Manganese	ND	0.001	0.005	NE	U		093870-009	EPA 6020
	Mercury	ND	0.000067	0.0002	0.002	U		093870-009	EPA 7470
	Nickel	0.00199	0.0005	0.002	NE	J		093870-009	EPA 6020
	Potassium	1.70	0.080	0.300	NE			093870-009	EPA 6020
	Selenium	0.0033	0.0015	0.005	0.050	J		093870-009	EPA 6020
	Silver	ND	0.0002	0.001	NE	U		093870-009	EPA 6020
	Sodium	23.6	0.800	2.50	NE	N		093870-009	EPA 6020
	Thallium	ND	0.00045	0.002	0.002	U		093870-009	EPA 6020
	Uranium	0.013	0.000067	0.0002	0.03	B		093870-009	EPA 6020
	Vanadium	ND	0.001	0.005	NE	U	UJ	093870-009	EPA 6010
	Zinc	ND	0.0035	0.010	NE	U		093870-009	EPA 6020

Table IV-11 (Continued)

Summary of Unfiltered Total Metal Results

SWMU 68 Groundwater Monitoring

Quarterly Assessment, April – June 2013

Well	Analyte	Result (mg/L)	MDL (mg/L)	PQL (mg/L)	MCL (mg/L)	Laboratory Qualifier[a]	Validation Qualifier[b]	Sample Number	Analytical Method[c]
OBS-MW3 (Duplicate) 23-Apr-13	Aluminum	0.0162	0.015	0.050	NE	J		093871-009	EPA 6020
	Antimony	ND	0.001	0.003	0.006	U		093871-009	EPA 6020
	Arsenic	ND	0.0017	0.005	0.010	U		093871-009	EPA 6020
	Barium	0.025	0.0006	0.002	2.00			093871-009	EPA 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		093871-009	EPA 6020
	Cadmium	ND	0.00011	0.001	0.005	U		093871-009	EPA 6020
	Calcium	79.9	0.600	2.00	NE	B, N		093871-009	EPA 6020
	Chromium	ND	0.002	0.010	0.100	U		093871-009	EPA 6020
	Cobalt	0.000151	0.0001	0.001	NE	B, J	0.00053U	093871-009	EPA 6020
	Copper	0.000712	0.00035	0.001	NE	J	0.018UJ	093871-009	EPA 6020
	Iron	0.159	0.033	0.100	NE			093871-009	EPA 6020
	Lead	ND	0.0005	0.002	NE	U		093871-009	EPA 6020
	Magnesium	18.0	0.010	0.030	NE			093871-009	EPA 6020
	Manganese	ND	0.001	0.005	NE	U		093871-009	EPA 6020
	Mercury	ND	0.000067	0.0002	0.002	U		093871-009	EPA 7470
	Nickel	0.00203	0.0005	0.002	NE			093871-009	EPA 6020
	Potassium	1.85	0.080	0.300	NE			093871-009	EPA 6020
	Selenium	0.00318	0.0015	0.005	0.050	J		093871-009	EPA 6020
	Silver	ND	0.0002	0.001	NE	U		093871-009	EPA 6020
	Sodium	24.6	0.800	2.50	NE	N		093871-009	EPA 6020
	Thallium	ND	0.00045	0.002	0.002	U		093871-009	EPA 6020
	Uranium	0.0135	0.000067	0.0002	0.03	B		093871-009	EPA 6020
	Vanadium	ND	0.001	0.005	NE	U	UJ	093871-009	EPA 6010
	Zinc	ND	0.0035	0.010	NE	U		093871-009	EPA 6020

Table IV-11 (Concluded)

Summary of Unfiltered Total Metal Results

SWMU 68 Groundwater Monitoring

Quarterly Assessment, April – June 2013

Notes

[a]Laboratory Qualifier
If cell is blank, then all quality control samples met acceptance criteria with respect to submitted samples.
B = The analyte was detected in the blank above the effective method detection limit (MDL).
J = Estimated value, the analyte concentration fell above the effective MDL and below the effective PQL.
N = Results associated with a spike analysis that was outside control limits.
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.
U = The analyte was analyzed for, but not detected. The associated numerical value is the sample quantitation limit.
UJ = The analyte was analyzed for, but not detected. The associated value is an estimate and may be inaccurate or imprecise.

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

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

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

Well	Analyte	Result (mg/L)	MDL (mg/L)	PQL (mg/L)	MCL (mg/L)	Laboratory Qualifier[a]	Validation Qualifier[b]	Sample Number	Analytical Method[c]
SWMUs 8/58									
CCBA-MW1	Calcium	50.1	0.600	2.00	NE	B, N		093873-017	SW846 6020
24-Apr-13	Magnesium	10.6	0.010	0.030	NE			093873-017	SW846 6020
	Potassium	4.32	0.080	0.300	NE			093873-017	SW846 6020
	Sodium	66.4	0.800	2.50	NE	N		093873-017	SW846 6020
CCBA-MW2	Calcium	77.8	0.600	2.00	NE	B, N		093878-017	SW846 6020
25-Apr-13	Magnesium	15.1	0.010	0.030	NE			093878-017	SW846 6020
	Potassium	1.42	0.080	0.300	NE			093878-017	SW846 6020
	Sodium	50.0	0.800	2.50	NE	N		093878-017	SW846 6020
CCBA-MW2 (Duplicate)	Calcium	76.2	0.600	2.00	NE	B, N		093879-017	SW846 6020
25-Apr-13	Magnesium	16.3	0.010	0.030	NE			093879-017	SW846 6020
	Potassium	1.44	0.080	0.300	NE			093879-017	SW846 6020
	Sodium	49.4	0.800	2.50	NE	N		093879-017	SW846 6020
SWMU 68									
OBS-MW1	Calcium	79.6	0.300	1.00	NE	B		093863-017	SW846 6020
18-Apr-13	Magnesium	17.6	0.050	0.150	NE			093863-017	SW846 6020
	Potassium	1.77	0.080	0.300	NE			093863-017	SW846 6020
	Sodium	21.5	0.080	0.250	NE			093863-017	SW846 6020
OBS-MW2	Calcium	80.9	0.600	2.00	NE	B, N		093866-017	SW846 6020
22-Apr-13	Magnesium	17.9	0.010	0.030	NE			093866-017	SW846 6020
	Potassium	1.77	0.080	0.300	NE			093866-017	SW846 6020
	Sodium	24.5	0.800	2.50	NE	N		093866-017	SW846 6020
OBS-MW3	Calcium	78.5	0.600	2.00	NE	B, N		093870-017	SW846 6020
23-Apr-13	Magnesium	18.1	0.010	0.030	NE			093870-017	SW846 6020
	Potassium	1.82	0.080	0.300	NE			093870-017	SW846 6020
	Sodium	24.2	0.800	2.50	NE	N		093870-017	SW846 6020
OBS-MW3 (Duplicate)	Calcium	76.7	0.600	2.00	NE	B, N		093871-017	SW846 6020
23-Apr-13	Magnesium	18.6	0.010	0.030	NE			093871-017	SW846 6020
	Potassium	1.89	0.080	0.300	NE			093871-017	SW846 6020
	Sodium	23.9	0.800	2.50	NE	N		093871-017	SW846 6020

Table IV-12 (Concluded)

Summary of Filtered Cation Results

SWMUs 8/58 and 68 Groundwater Monitoring

Quarterly Assessment, April – June 2013

Notes

[a]Laboratory Qualifier
If cell is blank, then all quality control samples met acceptance criteria with respect to submitted samples.
B = The analyte was detected in the blank above the effective method detection limit (MDL).
N = Results associated with a spike analysis that was outside control limits.

[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, 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 2013

Well	Analyte	Activity[a] (pCi/L)	MDA (pCi/L)	Critical Level[b] (pCi/L)	MCL	Laboratory Qualifier[c]	Validation Qualifier[d]	Sample Number	Analytical Method[e]
SWMUs 8/58									
CCBA-MW1	Americium-241	9.60 ± 11.3	16.3	8.03	NE	U	BD	093873-033	EPA 901.1
24-Apr-13	Cesium-137	1.10 ± 2.09	3.11	1.50	NE	U	BD	093873-033	EPA 901.1
	Cobalt-60	-1.13 ± 2.90	3.43	1.63	NE	U	BD	093873-033	EPA 901.1
	Potassium-40	-8.14 ± 33.2	42.7	20.3	NE	U	BD	093873-033	EPA 901.1
	Gross Alpha	2.11	NA	NA	15 pCi/L	NA	None	093873-034	EPA 900.0
	Gross Beta	4.68 ± 1.33	1.62	0.788	4 mrem/yr		J	093873-034	EPA 900.0
	Uranium-233/234	2.21 ± 0.385	0.179	0.0794	NE			093873-035	HASL-300
	Uranium-235/236	0.0721 ± 0.0566	0.110	0.0426	NE	U	BD	093873-035	HASL-300
	Uranium-238	0.663 ± 0.166	0.100	0.0402	NE			093873-035	HASL-300
CCBA-MW2	Americium-241	-1.55 ± 17.3	26.2	12.8	NE	U	BD	093878-033	EPA 901.1
25-Apr-13	Cesium-137	0.876 ± 1.99	3.13	1.50	NE	U	BD	093878-033	EPA 901.1
	Cobalt-60	-0.74 ± 2.87	3.20	1.50	NE	U	BD	093878-033	EPA 901.1
	Potassium-40	-22.7 ± 33.0	42.0	20.0	NE	U	BD	093878-033	EPA 901.1
	Gross Alpha	1.44	NA	NA	15 pCi/L	NA	None	093878-034	EPA 900.0
	Gross Beta	4.72 ± 1.24	1.37	0.663	4 mrem/yr		J	093878-034	EPA 900.0
	Uranium-233/234	7.73 ± 1.03	0.0849	0.0377	NE			093878-035	HASL-300
	Uranium-235/236	0.124 ± 0.0507	0.0521	0.0203	NE		J	093878-035	HASL-300
	Uranium-238	1.91 ± 0.290	0.0476	0.0191	NE			093878-035	HASL-300
CCBA-MW2 (Duplicate)	Americium-241	4.70 ± 11.7	18.6	9.09	NE	U	BD	093879-033	EPA 901.1
25-Apr-13	Cesium-137	-2.28 ± 2.14	2.97	1.42	NE	U	BD	093879-033	EPA 901.1
	Cobalt-60	-0.803 ± 1.84	3.03	1.42	NE	U	BD	093879-033	EPA 901.1
	Potassium-40	-25.5 ± 38.8	43.2	20.6	NE	U	BD	093879-033	EPA 901.1
	Gross Alpha	6.70	NA	NA	15 pCi/L	NA	None	093879-034	EPA 900.0
	Gross Beta	2.80 ± 1.03	1.40	0.679	4 mrem/yr		J	093879-034	EPA 900.0
	Uranium-233/234	7.87 ± 1.07	0.0964	0.0429	NE			093879-035	HASL-300
	Uranium-235/236	0.151 ± 0.0581	0.0592	0.023	NE		J	093879-035	HASL-300
	Uranium-238	1.78 ± 0.282	0.0541	0.0217	NE			093879-035	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 2013

Well	Analyte	Activity[a] (pCi/L)	MDA (pCi/L)	Critical Level[b] (pCi/L)	MCL	Laboratory Qualifier[c]	Validation Qualifier[d]	Sample Number	Analytical Method[e]
SWMU 68									
OBS-MW1	Americium-241	-2.64 ± 11.2	19.1	9.32	NE	U	BD	093863-033	EPA 901.1
18-Apr-13	Cesium-137	-0.971 ± 2.17	3.61	1.73	NE	U	BD	093863-033	EPA 901.1
	Cobalt-60	1.97 ± 2.67	4.10	1.94	NE	U	BD	093863-033	EPA 901.1
	Potassium-40	-1.48 ± 50.5	47.7	22.7	NE	U	BD	093863-033	EPA 901.1
	Gross Alpha	7.44	NA	NA	15 pCi/L	NA	None	093863-034	EPA 900.0
	Gross Beta	5.43 ± 1.32	1.24	0.599	4 mrem/yr		J	093863-034	EPA 900.0
	Uranium-233/234	17.5 ± 2.29	0.124	0.055	NE			093863-035	HASL-300
	Uranium-235/236	0.262 ± 0.0876	0.0759	0.0295	NE			093863-035	HASL-300
	Uranium-238	3.30 ± 0.489	0.0694	0.0278	NE			093863-035	HASL-300
OBS-MW2	Americium-241	-17.7 ± 11.0	12.3	6.04	NE	U	BD	093866-033	EPA 901.1
22-Apr-13	Cesium-137	1.63 ± 2.47	3.63	1.75	NE	U	BD	093866-033	EPA 901.1
	Cobalt-60	0.0269 ± 2.25	3.92	1.87	NE	U	BD	093866-033	EPA 901.1
	Potassium-40	-59.9 ± 56.6	49.2	23.7	NE	U	BD	093866-033	EPA 901.1
	Gross Alpha	9.60	NA	NA	15 pCi/L	NA	None	093866-034	EPA 900.0
	Gross Beta	5.63 ± 1.29	1.04	0.497	4 mrem/yr		J	093866-034	EPA 900.0
	Uranium-233/234	23.9 ± 3.12	0.0936	0.0416	NE			093866-035	HASL-300
	Uranium-235/236	0.288 ± 0.0822	0.0575	0.0223	NE			093866-035	HASL-300
	Uranium-238	4.51 ± 0.632	0.0525	0.0211	NE			093866-035	HASL-300
OBS-MW3	Americium-241	17.1 ± 18.4	26.4	12.9	NE	U	BD	093870-033	EPA 901.1
23-Apr-13	Cesium-137	-1.25 ± 2.25	3.25	1.56	NE	U	BD	093870-033	EPA 901.1
	Cobalt-60	-0.787 ± 1.96	3.40	1.60	NE	U	BD	093870-033	EPA 901.1
	Potassium-40	-17.3 ± 50.0	46.4	22.1	NE	U	BD	093870-033	EPA 901.1
	Gross Alpha	8.88	NA	NA	15 pCi/L	NA	None	093870-034	EPA 900.0
	Gross Beta	9.49 ± 1.96	1.34	0.649	4 mrem/yr		J	093870-034	EPA 900.0
	Uranium-233/234	21.3 ± 2.74	0.0847	0.0377	NE			093870-035	HASL-300
	Uranium-235/236	0.355 ± 0.0893	0.052	0.0202	NE			093870-035	HASL-300
	Uranium-238	3.87 ± 0.540	0.0475	0.0191	NE			093870-035	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 2013

Well	Analyte	Activity[a] (pCi/L)	MDA (pCi/L)	Critical Level[b] (pCi/L)	MCL	Laboratory Qualifier[c]	Validation Qualifier[d]	Sample Number	Analytical Method[e]
SWMU 68									
OBS-MW3 (Duplicate) 23-Apr-13	Americium-241	-1.03 ± 10.2	15.7	7.69	NE	U	BD	093871-033	EPA 901.1
	Cesium-137	0.889 ± 3.21	3.43	1.65	NE	U	BD	093871-033	EPA 901.1
	Cobalt-60	-1.35 ± 2.09	3.33	1.57	NE	U	BD	093871-033	EPA 901.1
	Potassium-40	35.6 ± 40.9	34.8	16.5	NE	X	R	093871-033	EPA 901.1
	Gross Alpha	11.60	NA	NA	15 pCi/L	NA	None	093871-034	EPA 900.0
	Gross Beta	6.38 ± 1.40	0.978	0.466	4 mrem/yr		J	093871-034	EPA 900.0
	Uranium-233/234	19.5 ± 2.48	0.0758	0.0337	NE			093871-035	HASL-300
	Uranium-235/236	0.287 ± 0.0763	0.0465	0.0181	NE			093871-035	HASL-300
	Uranium-238	3.81 ± 0.522	0.0425	0.0171	NE			093871-035	HASL-300

Notes

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

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

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

[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. Environmental Protection Agency, 1980, "*Prescribed Procedures for Measurement of Radioactivity in Drinking Water,"* EPA-600/4-80-032, U.S. Environmental Protection Agency, Cincinnati, Ohio
U.S. Department of Energy, 1990, *"EML Procedures Manual,"* 27th ed., Vol. 1, Rev. 1992, Environmental Measurements Laboratory HASL-300.

Table IV-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 2013

Notes (continued)

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

Table IV-14

Summary of Constituents Detected above Established MCLs

SWMUs 8/58 and 68 Groundwater Monitoring

Quarterly Assessments through June 2013

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

Notes

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

[b]Validation Qualifier
If cell is blank, then all quality control samples met acceptance criteria with respect to submitted samples.

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

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 2013

Well /Parameter	Environmental Sample (R1)	Duplicate Sample (R2)	RPD[a]
	mg/L unless otherwise noted		
CCBA-MW2			
Nitrate plus Nitrite	3.47	3.28	6
Bicarbonate Alkalinity	179	193	8
Bromide	0.582	0.573	2
Chloride	38.3	39.0	2
Fluoride	1.60	1.60	< 1
Sulfate	99.5	98.6	1
Barium	0.0445	0.0452	2
Calcium	79.8	76.2	5
Iron	0.137	0.139	1
Magnesium	15.9	16.7	5
Nickel	0.00192	0.00198	3
Potassium	1.43	1.44	1
Selenium	0.00436	0.00445	2
Sodium	52.0	48.5	7
Uranium	0.00571	0.0057	< 1
Vanadium	0.00846	0.00892	5
Filtered Calcium	77.8	76.2	2
Filtered Magnesium	15.1	16.3	8
Filtered Potassium	1.42	1.44	1
Filtered Sodium	50.0	49.4	1
OBS-MW1			
Nitrate plus Nitrite	1.78	1.72	3
Bicarbonate Alkalinity	178	180	1
Bromide	0.359	0.372	4
Chloride	23.9	24.5	2
Fluoride	2.32	2.37	2
Sulfate	87.2	87.5	< 1
Aluminum	0.028	0.0162	53
Barium	0.0253	0.025	1
Calcium	76.5	79.9	4
Iron	0.165	0.159	4
Magnesium	17.5	18.0	3
Nickel	0.00199	0.00203	2
Potassium	1.70	1.85	8

Table IV-15 (Concluded)

Summary of Duplicate Samples

SWMUs 8/58 and 68 Groundwater Monitoring

Quarterly Assessment, April – June 2013

Well /Parameter	Environmental Sample (R1)	Duplicate Sample (R2)	RPD[a]
	mg/L unless otherwise noted		
OBS-MW1			
Selenium	0.0033	0.00318	4
Sodium	23.6	24.6	4
Uranium	0.013	0.0135	4
Filtered Calcium	78.5	76.7	2
Filtered Magnesium	18.1	18.6	3
Filtered Potassium	1.82	1.89	4
Filtered Sodium	24.2	23.9	1

Notes

[a]RPD

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

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

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

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

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

FIELD MEASUREMENT LOG FOR GROUNDWATER SAMPLE COLLECTION

Project Name: SWMU 8/58 GWM	Project No.: 146422.10.11.01
Well I.D.: CCBA-MW 1	Date: 04/24/13
Well Condition:	Weather Condition:
Method: Portable pump X Dedicated pump _____ Pump depth: 79'	

PURGE MEASUREMENTS

Depth to Water (ft)	Time 24 hr	Vol. (L/gal)	Temp (°C)	SC (µS/cm)	ORP (mV)	pH	Turbidity (NTU)	DO (%)	Comments DO mg/L
48.13	0809		START						
49.15	0828	5	12.61	541	249.7	6.43	0.62	18.2	1.93
49.32	0837	10	12.72	518	241.5	6.42	1.31	22.5	2.38
49.45	0847	15	12.88	497	237.7	6.46	1.65	29.1	3.07
49.50	0857	20	13.26	492	235.6	6.47	1.57	30.7	3.22
49.53	0906	25	13.70	492	233.2	6.46	1.21	31.4	3.26
49.54	0912	28	13.90	492	232.5	6.45	1.19	31.4	3.23
49.56	0916	30	14.09	489	231.5	6.44	1.18	31.6	3.25
49.57	0920	32	14.30	492	230.5	6.44	0.97	31.7	3.24
49.58	0924	34	14.37	492	230.1	6.43	1.01	32.2	3.28
49.58	0928	36	14.31	493	230.0	6.44	1.15	32.0	3.24
	0929		SAMPLING						
									~4.00 gals purged from tubing 0818

FIELD MEASUREMENT LOG FOR GROUNDWATER SAMPLE COLLECTION

Project Name: SWMU 8/58 GWM	Project No.: 146422.10.11.01
Well I.D.: CCBA-MW 2	Date: 04/25/13
Well Condition:	Weather Condition:
Method: Portable pump X Dedicated pump _____ Pump depth: 117'	

PURGE MEASUREMENTS

Depth to Water (ft)	Time 24 hr	Vol (L/gal)	Temp (°C)	SC (µS/cm)	ORP (mV)	pH	Turbidity (NTU)	DO (%)	Comments DO mg/L
71.71 ~~72.71~~	0801		START						
72.17	0818	5	15.62	566	253.7	7.03	1.42	52.6	5.23
72.18	0828	10	15.52	567	249.9	7.25	0.94	53.9	5.36
72.20	0837	15	15.52	569	249.2	7.31	0.58	58.6	5.83
72.21	0847	20	15.52	571	249.5	7.34	0.34	60.5	6.02
72.21	0856	25	15.49	571	250.2	7.34	0.31	61.5	6.13
72.22	0902	28	15.49	572	250.7	7.35	0.25	61.8	6.16
72.22	0906	30	15.52	572	251.1	7.35	0.26	62.2	6.20
72.23	0910	32	15.55	572	251.5	7.35	0.26	62.4	6.21
72.23	0913	34	15.57	572	251.8	7.35	0.22	62.6	6.23
72.23	0917	36	15.53	572	252.1	7.35	0.22	62.8	6.23
	0918		Sampling						
									~4.00 gals purged from tubing 0808

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FIELD MEASUREMENT LOG FOR GROUNDWATER SAMPLE COLLECTION

Project Name: SWMU 68 GW	Project No.: 146422.10.11.01
Well I.D.: OBS-MW 1	Date: 04/18/13
Well Condition:	Weather Condition:
Method: Portable pump X	Dedicated pump _____ Pump depth: 153'

PURGE MEASUREMENTS

Depth to Water (ft)	Time 24 hr	Vol. (L/gal)	Temp (°C)	SC (µS/cm)	ORP (mV)	pH	Turbidity (NTU)	DO (%)	Comments DO mg/L
72.67	0805		START						
72.72	0826	5	14.58	504	257.8	7.14	2.94	37.1	3.78
72.72	0836	10	14.39	504	254.0	7.24	2.08	36.4	3.72
72.73	0846	15	14.31	503	252.1	7.27	1.14	36.2	3.70
72.73	0855	20	14.52	503	251.1	7.28	0.90	36.2	3.69
72.73	0908	25	14.30	503	251.6	7.28	0.71	36.2	3.70
72.72	0916	28	14.22	503	251.9	7.27	0.54	36.1	3.70
72.72	0921	30	14.26	503	252.2	7.27	0.61	36.1	3.69
72.72	0926	32	14.32	503	252.4	7.27	0.57	36.1	3.69
72.72	0931	34	14.40	503	252.5	7.27	0.51	36.2	3.69
72.72	0936	36	14.54	503	252.5	7.27	0.56	36.2	3.69
	0937		sampling						
									~400 gals purged from tubing
									0815

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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 2	Date: 04/22/13
Well Condition:	Weather Condition:
Method: Portable pump X	Dedicated pump _____ Pump depth: 252'

PURGE MEASUREMENTS

Depth to Water (ft)	Time 24 hr	Vol. (L/gal)	Temp (°C)	SC (µS/cm)	ORP (mV)	pH	Turbidity (NTU)	DO (%)	Comments DO mg/L
173.72	0801		START						
174.84	0822	5	17.07	500	257.6	7.00	0.32	38.5	3.71
174.85	0832	10	17.48	501	252.5	7.12	0.38	38.1	3.64
174.84	0842	15	17.73	501	251.4	7.14	0.30	38.0	3.62
174.83	0852	20	17.82	501	251.0	7.14	0.23	37.9	3.60
174.82	0902	25	17.91	501	250.6	7.14	0.22	37.8	3.58
174.82	0909	28	17.95	501	250.6	7.14	0.22	37.9	3.59
174.81	0913	30	17.99	501	250.5	7.14	0.22	37.8	3.57
174.82	0918	32	18.02	501	250.5	7.14	0.25	37.9	3.58
174.82	0922	34	18.08	501	250.4	7.14	0.25	37.9	3.58
174.82	0926	36	18.11	501	250.3	7.14	0.25	38.0	3.58
	0927		Sampling						
									~4.00 gals purged from tubing 0811

FIELD MEASUREMENT LOG FOR GROUNDWATER SAMPLE COLLECTION

Project Name: SWMU 68	Project No.: 146422.10.11.01
Well I.D.: OBS-MW 3	Date: 04/23/13
Well Condition:	Weather Condition:
Method: Portable pump X Dedicated pump _____ Pump depth: 208'	

PURGE MEASUREMENTS

Depth to Water (ft)	Time 24 hr	Vol. (L/gal)	Temp (°C)	SC (µS/cm)	ORP (mV)	pH	Turbidity (NTU)	DO (%)	Comments DO mg/L
69.74	0758		START						
73.11	0821	5	17.00	501	238.2	7.15	0.91	47.0	4.54
74.06	0835	10	16.68	501	236.5	7.23	0.98	46.2	4.49
74.44	0849	15	16.61	501	236.2	7.25	0.64	45.8	4.46
74.58	0902	20	16.55	501	236.8	7.25	0.44	45.6	4.44
74.64	0915	25	16.59	501	237.9	7.25	0.42	45.5	4.43
74.65	0923	28	16.59	501	238.6	7.24	0.38	45.4	4.42
74.63	0929	30	16.60	501	239.2	7.24	0.33	45.4	4.42
74.58	0935	32	16.68	501	239.7	7.24	0.34	45.5	4.42
74.52	0941	34	16.70	501	240.3	7.24	0.37	45.5	4.42
74.46	0947	36	16.74	501	240.9	7.24	0.52	45.5	4.41
	0948		SAMPLING						
									~4.00 gals purged from tubing
									0808

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 NA

Batch No.

AR/COC 614745

SMO Use

Project Name:	SWMU 8/58 GWM	Date Samples Shipped:		SMO Authorization: Don Watenpaugh	☐ Waste Characterization
Project/Task Manager:	Clinton Lum	Carrier/Waybill No.		SMO Contact Phone: See Bottleworth	☐ RMMA
Project/Task Number:	98026.01.12	Lab Contact:	Edie Kent/803-556-8171	Lorraine Herrera/505-844-3199	☐ Released by COC No.
Service Order:	CF262-13	Lab Destination:	GEL	Send Report to SMO:	☑ 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	Container Volume	Preservative	Collection Method	Sample Type	Parameter & Method Requested	Lab Sample ID
093873	-001	CCBA-MW1	79	4/24/13	9:29	GW	G	3x40ml	HCL	G	SA	TCL VOC (SW846-8260B)	
093873	-002	CCBA-MW1	79	4/24/13	9:30	GW	AG	4x1L	None	G	SA	TCL SVOC (SW846-8270C)	
093873	-009	CCBA-MW1	79	4/24/13	9:35	GW	P	500 ml	HNO3	G	SA	TAL Metals+U (SW846-6010/6020/7470)	
093873	-016	CCBA-MW1	79	4/24/13	9:36	GW	P	125 ml	None	G	SA	Anions (SW846-9056)	
093873	-017	CCBA-MW1	79	4/24/13	9:37	FGW	P	500 ml	HNO3	G	SA	Metals-Ca,Mg,K,Na (SW846-6020)	
093873	-018	CCBA-MW1	79	4/24/13	9:38	GW	P	125 ml	H2SO4	G	SA	NPN (EPA 353.2)	
093873	-020	CCBA-MW1	79	4/24/13	9:39	GW	P	250 ml	None	G	SA	Perchlorate (EPA 314.0)	
093873	-022	CCBA-MW1	79	4/24/13	9:40	GW	P	500 ml	None	G	SA	Alkalinity (SM2320B)	
093873	-024	CCBA-MW1	79	4/24/13	9:41	GW	AG	4x1L	None	G	SA	High Explosives (SW846-8321A mod	
093873	-027	CCBA-MW1	79	4/24/13	9:45	GW	P	250 ml	NaOH	G	SA	Total Cyanide (SW846-9012)	

Last Chain:	☐ Yes	Sample Tracking	SMO Use
Validation Req'd:	☑ Yes	Date Entered:	
Background:	☐ Yes	Entered by:	
Confirmatory:	☐ Yes	QC inits.:	

Sample Team Members	Name	Signature	Init.	Company/Organization/Phone/Cell
	Robert Lynch	Robert Lynch	RL	SNL/4142/505-844-4013/505-250-7090
	Tim Jackson	Tim Jackson	TJ	SNL/4142/505-284-2547/505-263-6639
	William Gibson	William Gibson	WG	SNL/4142/505-284-3307/505-239-7367

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 0.45 micron in-line filter. Report Anions (as Br,Cl,F,SO4), Alkalinity (as total,HCO3,CO3). Gamma Spectroscopy (as short list Isotopes).

Conditions on Receipt

Lab Use

1.Relinquished by	William Gibson	Org. 4142	Date 4-24-13	Time 1012	3.Relinquished by	Org.	Date	Time
1. Received by	Don Watenpaugh	Org. 4142	Date 4-24-13	Time 1012	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)

AR/COC 614745

Project Name: SWMU 8/58 GWM	**Project/Task Manager:** Clinton Lum	**Project/Task No.:** 98026.01.12
Tech Area:		
Building:	**Room:**	

Sample No.	Fraction	Sample Location Detail	Depth (ft)	Date/Time Collected		Sample Matrix	Container Type	Container Volume	Preserv-ative	Collection Method	Sample Type	Parameter & Method Requested	Lab use Lab Sample ID
093873	-033	CCBA-MW1	79	4/24/13	9:46	GW	P	1 L	HNO3	G	SA	Gamma Spectroscopy (EPA 901.0)	
093873	-034	CCBA-MW1	79	4/24/13	9:47	GW	P	1 L	HNO3	G	SA	Gross Alpha and Beta (EPA 900.0)	
093873	-035	CCBA-MW1	79	4/24/13	9:48	GW	P	1 L	HNO3	G	SA	Isotopic Uranium (HASL 300)	
093874	-001	CCBA-TB1	NA	4/24/13	9:17	DIW	G	3x40ml	HCL	G	TB	TCL VOC (SW846-8260B)	
093875	-001	CCBA-FB1	NA	4/24/13	9:17	DIW	G	3x40ml	HCL	G	FB	TCL VOC (SW846-8260B)	

Recipient Initials_____

SMO 2012-ARCOC (4-2012)

AOP 95-1

CONTRACT LABORATORY
ANALYSIS REQUEST AND CHAIN OF CUSTODY

Internal Lab

Batch No. NA

SMO Use

AR/COC 614747

Project Name:	SWMU 8/58 GWM	Date Samples Shipped:		SMO Authorization: Don Salazar	☐ Waste Characterization
Project/Task Manager:	Clinton Lum	Carrier/Waybill No.		SMO Contact Phone: See Bottle order	☐ RMMA
Project/Task Number:	98026.01.12	Lab Contact:	Edie Kent/803-556-8171	Lorraine Herrera/505-844-3199	☐ Released by COC No.
Service Order:	CF262-13	Lab Destination:	GEL	Send Report to SMO:	☑ 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	Container Volume	Preservative	Collection Method	Sample Type	Parameter & Method Requested	Lab Sample ID
093878	-001	CCBA-MW2	117	4/25/13 9:18	GW	G	3x40ml	HCL	G	SA	TCL VOC (SW846-8260B)	
093878	-002	CCBA-MW2	117	4/25/13 9:19	GW	AG	4x1L	None	G	SA	TCL SVOC (SW846-8270C)	
093878	-009	CCBA-MW2	117	4/25/13 9:22	GW	P	500 ml	HNO3	G	SA	TAL Metals+U (SW846-6010/6020/7470)	
093878	-016	CCBA-MW2	117	4/25/13 9:23	GW	P	125 ml	None	G	SA	Anions (SW846-9056)	
093878	-017	CCBA-MW2	117	4/25/13 9:24	FGW	P	500 ml	HNO3	G	SA	Metals-Ca,Mg,K,Na (SW846-6020)	
093878	-018	CCBA-MW2	117	4/25/13 9:26	GW	P	125 ml	H2SO4	G	SA	NPN (EPA 353.2)	
093878	-020	CCBA-MW2	117	4/25/13 9:27	GW	P	250 ml	None	G	SA	Perchlorate (EPA 314.0)	
093878	-022	CCBA-MW2	117	4/25/13 9:28	GW	P	500 ml	None	G	SA	Alkalinity (SM2320B)	
093878	-024	CCBA-MW2	117	4/25/13 9:29	GW	AG	4x1L	None	G	SA	High Explosives (SW846-8321A mod	
093878	-027	CCBA-MW2	117	4/25/13 9:32	GW	P	250 ml	NaOH	G	SA	Total Cyanide (SW846-9012)	

Last Chain:	☑ Yes	Sample Tracking	SMO Use
Validation Req'd:	☑ Yes	Date Entered:	
Background:	☐ Yes	Entered by:	
Confirmatory:	☐ Yes	QC inits.:	

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

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 0.45 micron in-line filter. Report Anions (as Br,Cl,F,SO4), Alkalinity (as total HCO3,CO3). Gamma Spectroscopy (as short list Isotopes).

Conditions on Receipt

Lab Use

1.Relinquished by Alfred Santillanes	Org. 4142	Date 4/25/13	Time 10:13	3.Relinquished by	Org.	Date	Time
1. Received by Don Salazar	Org. 4142	Date 4/25/13	Time 10:13	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)

AR/COC 614747

Project Name: SWMU 8/58 GWM	**Project/Task Manager:** Clinton Lum	**Project/Task No.:** 98026.01.12
Tech Area:		
Building:	**Room:**	

Sample No.	Fraction	Sample Location Detail	Depth (ft)	Date/Time Collected		Sample Matrix	Container Type	Container Volume	Preserv-ative	Collection Method	Sample Type	Parameter & Method Requested	Lab use: Lab Sample ID
093878	-033	CCBA-MW2	117	4/25/13	9:33	GW	P	1 L	HNO3	G	SA	Gamma Spectroscopy (EPA 901.0)	
093878	-034	CCBA-MW2	117	4/25/13	9:35	GW	P	1 L	HNO3	G	SA	Gross Alpha and Beta (EPA 900.0)	
093878	-035	CCBA-MW2	117	4/25/13	9:37	GW	P	1 L	HNO3	G	SA	Isotopic Uranium (HASL 300)	
093879	-001	CCBA-MW2	117	4/25/13	9:18	GW	G	3x40ml	HCL	G	DU	TCL VOC (SW846-8260B)	
093879	-002	CCBA-MW2	117	4/25/13	9:19	GW	AG	4x1L	None	G	DU	TCL SVOC (SW846-8270C)	
093879	-009	CCBA-MW2	117	4/25/13	9:22	GW	P	500 ml	HNO3	G	DU	TAL Metals+U (SW846-6010/6020/7470)	
093879	-016	CCBA-MW2	117	4/25/13	9:23	GW	P	125 ml	None	G	DU	Anions (SW846-9056)	
093879	-017	CCBA-MW2	117	4/25/13	9:24	FGW	P	500 ml	HNO3	G	DU	Metals-Ca,Mg,K,Na (SW846-6020)	
093879	-018	CCBA-MW2	117	4/25/13	9:26	GW	P	125 ml	H2SO4	G	DU	NPN (EPA 353.2)	
093879	-020	CCBA-MW2	117	4/25/13	9:27	GW	P	250 ml	None	G	DU	Perchlorate (EPA 314.0)	
093879	-022	CCBA-MW2	117	4/25/13	9:28	GW	P	500 ml	None	G	DU	Alkalinity (SM2320B)	
093879	-024	CCBA-MW2	117	4/25/13	9:29	GW	AG	4x1L	None	G	DU	High Explosives (SW846-8321A mod	
093879	-027	CCBA-MW2	117	4/25/13	9:32	GW	P	250 ml	NaOH	G	DU	Total Cyanide (SW846-9012)	
093879	-033	CCBA-MW2	117	4/25/13	9:33	GW	P	1 L	HNO3	G	DU	Gamma Spectroscopy (EPA 901.0)	
093879	-034	CCBA-MW2	117	4/25/13	9:35	GW	P	1 L	HNO3	G	DU	Gross Alpha and Beta (EPA 900.0)	
093879	-035	CCBA-MW2	117	4/25/13	9:37	GW	P	1 L	HNO3	G	DU	Isotopic Uranium (HASL 300)	
093880	-001	CCBA-TB3	NA	4/25/13	9:18	DIW	G	3x40ml	HCL	G	TB	TCL VOC (SW846-8260B)	

Recipient Initials_____

CONTRACT LABORATORY
ANALYSIS REQUEST AND CHAIN OF CUSTODY

Prior to CCB4-MW2

Internal Lab

Batch No.

SMO Use

AR/COC 614746

Project Name:	SWMU 8/58 GWM	Date Samples Shipped:		SMO Authorization:	☐ Waste Characterization
Project/Task Manager:	Clinton Lum	Carrier/Waybill No.		SMO Contact Phone:	☐ RMMA
Project/Task Number:	98026.01.12	Lab Contact:	Edie Kent/803-556-8171	Lorraine Herrera/505-844-3199	☐ Released by COC No.
Service Order:	CF262-13	Lab Destination:	GEL	Send Report to SMO:	☑ 4° Celsius
		Contract No.:	PO 1303873	Rita Kavanaugh/505-284-2553	Bill to:Sandia National Laboratories (Accounts Payable), P.O. Box 5800, MS-0154 Albuquerque, NM 87185-0154
Tech Area:					
Building:	Room:	Operational Site:			

Sample No.	Fraction	Sample Location Detail	Depth (ft)	Date/Time Collected	Sample Matrix	Container Type	Container Volume	Preserv-ative	Collection Method	Sample Type	Parameter & Method Requested	Lab Sample ID
093876	-001	CCBA-EB1	NA	4/24/13 13:47	DIW	G	3x40ml	HCL	G	EB	TCL VOC (SW846-8260B)	
093876	-002	CCBA-EB1	NA	4/24/13 13:48	DIW	AG	4x1L	None	G	EB	TCL SVOC (SW846-8270C)	
093876	-009	CCBA-EB1	NA	4/24/13 13:50	DIW	P	500 ml	HNO3	G	EB	TAL Metals+U (SW846-6010/6020/7470)	
093876	-016	CCBA-EB1	NA	4/24/13 13:51	DIW	P	125 ml	None	G	EB	Anions (SW846-9056)	
093876	-017	CCBA-EB1	NA	4/24/13 13:52	FDIW	P	500 ml	HNO3	G	EB	Metals-Ca,Mg,K,Na (SW846-6020)	
093876	-018	CCBA-EB1	NA	4/24/13 13:53	DIW	P	125 ml	H2SO4	G	EB	NPN (EPA 353.2)	
093876	-020	CCBA-EB1	NA	4/24/13 13:54	DIW	P	250 ml	None	G	EB	Perchlorate (EPA 314.0)	
093876	-022	CCBA-EB1	NA	4/24/13 13:55	DIW	P	500 ml	None	G	EB	Alkalinity (SM2320B)	
093876	-024	CCBA-EB1	NA	4/24/13 13:56	DIW	AG	4x1L	None	G	EB	High Explosives (SW846-8321A mod	
093876	-027	CCBA-EB1	NA	4/24/13 13:58	DIW	P	250 ml	NaOH	G	EB	Total Cyanide (SW846-9012)	

Last Chain:	☐ Yes	Sample Tracking	SMO Use
Validation Req'd:	☑ Yes	Date Entered:	
Background:	☐ Yes	Entered by:	
Confirmatory:	☐ Yes	QC inits.:	

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

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. FDIW, filtered in field using 0.45 micron in-line filter. Report Anions (as Br,Cl,F,SO4), Alkalinity (as total HCO3,CO3). Gamma Spectroscopy (as short list Isotopes).

Conditions on Receipt

Lab Use

1.Relinquished by	Org. 4142	Date 4-24-13	Time 1406	3.Relinquished by	Org.	Date	Time
1. Received by	Org. 4142	Date 4-24-13	Time 1406	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)

AR/COC 614746

Project Name: SWMU 8/58 GWM	**Project/Task Manager:** Clinton Lum	**Project/Task No.:** 98026.01.12	
Tech Area:			
Building:	**Room:**		

Sample No.	Fraction	Sample Location Detail	Depth (ft)	Date/Time Collected	Sample Matrix	Container Type	Container Volume	Preserv-ative	Collection Method	Sample Type	Parameter & Method Requested	Lab use: Lab Sample ID
093876	-033	CCBA-EB1	NA	4/24/13 13:59	DIW	P	1 L	HNO3	G	EB	Gamma Spectroscopy (EPA 901.0)	
093876	-034	CCBA-EB1	NA	4/24/13 14:00	DIW	P	1 L	HNO3	G	EB	Gross Alpha and Beta (EPA 900.0)	
093876	-035	CCBA-EB1	NA	4/24/13 14:01	DIW	P	1 L	HNO3	G	EB	Isotopic Uranium (HASL 300)	
093877	-001	CCBA-TB2	NA	4/24/13 13:47	DIW	G	3x40ml	HCL	G	TB	TCL VOC (SW846-8260B)	

Recipient Initials_____

CONTRACT LABORATORY
ANALYSIS REQUEST AND CHAIN OF CUSTODY

Internal Lab

Batch No. N/A

SMO Use

AR/COC 614741

Project Name:	SWMU 68 GWM	Date Samples Shipped:	4/18/13	SMO Authorization:	☐ Waste Characterization
Project/Task Manager:	Clinton Lum	Carrier/Waybill No.		SMO Contact Phone: SEE BOTTLE ORDER SHEET	☐ RMMA
Project/Task Number:	98026.01.13	Lab Contact:	Edie Kent/803-556-8171	Lorraine Herrera/505-844-3199	☐ Released by COC No.
Service Order:	CF263-13	Lab Destination:	GEL	Send Report to SMO:	☑ 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	Container Volume	Preservative	Collection Method	Sample Type	Parameter & Method Requested	Lab Sample ID
093863	-001	OBS-MW1	153	4/18/13	9:37	GW	G	3x40ml	HCL	G	SA	TCL VOC (SW846-8260B)	
093863	-002	OBS-MW1	153	4/18/13	9:38	GW	AG	4x1L	None	G	SA	TCL SVOC (SW846-8270C)	
093863	-009	OBS-MW1	153	4/18/13	9:40	GW	P	500 ml	HNO3	G	SA	TAL Metals+U (SW846-6010/6020/7470)	
093863	-014	OBS-MW1	153	4/18/13	9:42	GW	P	250 ml	None	G	SA	Hexavalent Chromium (SW846-7196A)	
093863	-016	OBS-MW1	153	4/18/13	9:43	GW	P	125 ml	None	G	SA	Anions (SW846-9056)	
093863	-017	OBS-MW1	153	4/18/13	9:41	FGW	P	500 ml	HNO3	G	SA	Metals-Ca,Mg,K,Na (SW846-6020)	
093863	-018	OBS-MW1	153	4/18/13	9:44	GW	P	125 ml	H2SO4	G	SA	NPN (EPA 353.2)	
093863	-020	OBS-MW1	153	4/18/13	9:45	GW	P	250 ml	None	G	SA	Perchlorate (EPA 314.0)	
093863	-022	OBS-MW1	153	4/18/13	9:46	GW	P	500 ml	None	G	SA	Alkalinity (SM2320B)	
093863	-024	OBS-MW1	153	4/18/13	9:47	GW	AG	4x1L	None	G	SA	High Explosives (SW846-8321A mod	

Last Chain:	☐ Yes	Sample Tracking	SMO Use
Validation Req'd:	☑ Yes	Date Entered:	
Background:	☐ Yes	Entered by:	
Confirmatory:	☐ Yes	QC inits.:	

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

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

Report Anions (as Br,Cl,F,SO4). Alkalinity (as total HCO3,CO3). Gamma Spectroscopy (as short list isotopes). FGW, filtered in field w/.45 micron in-line filter. If Perchlorate detected, perform verification analysis using SW846-6850M.

Conditions on Receipt

Lab Use

1.Relinquished by		Org. 4142	Date 4/18/13	Time 1012	3.Relinquished by	Org.	Date	Time
1. Received by		Org. 4142	Date 4/18/13	Time 1012	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)

AR/COC 614741

Project Name: SWMU 68 GWM	**Project/Task Manager:** Clinton Lum	**Project/Task No.:** 98026.01.13	
Tech Area:			
Building:	**Room:**		**Lab use**

Sample No.	Fraction	Sample Location Detail	Depth (ft)	Date/Time Collected		Sample Matrix	Container Type	Container Volume	Preserv-ative	Collection Method	Sample Type	Parameter & Method Requested	Lab Sample ID
093863	-027	OBS-MW1	153	4/18/13	9:49	GW	P	250 ml	NaOH	G	SA	Total Cyanide (SW846-9012)	
093863	-033	OBS-MW1	153	4/18/13	9:50	GW	P	1 L	HNO3	G	SA	Gamma Spectroscopy (EPA 901.0)	
093863	-034	OBS-MW1	153	4/18/13	9:51	GW	P	1 L	HNO3	G	SA	Gross Alpha and Beta (EPA 900.0)	
093863	-035	OBS-MW1	153	4/18/13	9:52	GW	P	1 L	HNO3	G	SA	Isotopic Uranium (HASL 300)	
093864	-001	OBS-TB1	NA	4/18/13	9:37	DIW	G	3x40ml	HCL	G	TB	TCL VOC (SW846-8260B)	
093865	-001	OBS-FB1	NA	4/18/13	9:19	DIW	G	3x40ml	HCL	G	FB	TCL VOC (SW846-8260B)	

Recipient Initials_____

CONTRACT LABORATORY
ANALYSIS REQUEST AND CHAIN OF CUSTODY

Internal Lab

Batch No. N/A

SMO Use

AR/COC 614742

Project Name:	SWMU 68 GWM	Date Samples Shipped:	4/22/13	SMO Authorization:	☐ Waste Characterization
Project/Task Manager:	Clinton Lum	Carrier/Waybill No.	202965	SMO Contact Phone: Sub Bottle order (SMO)	☐ RMMA
Project/Task Number:	98026.01.13	Lab Contact:	Edie Kent/803-556-8171	Lorraine Herrera/505-844-3199	☐ Released by COC No.
Service Order:	CF263-13	Lab Destination:	GEL	Send Report to SMO:	☑ 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	Container Volume	Preserv-ative	Collection Method	Sample Type	Parameter & Method Requested	Lab Sample ID
093866	-001	OBS-MW2	252	4/22/13	9:27	GW	G	3x40ml	HCL	G	SA	TCL VOC (SW846-8260B)	
093866	-002	OBS-MW2	252	4/22/13	9:28	GW	AG	4x1L	None	G	SA	TCL SVOC (SW846-8270C)	
093866	-009	OBS-MW2	252	4/22/13	9:30	GW	P	500 ml	HNO3	G	SA	TAL Metals+U (SW846-6010/6020/7470)	
093866	-014	OBS-MW2	252	4/22/13	9:31	GW	P	250 ml	None	G	SA	Hexavalent Chromium (SW846-7196A)	
093866	-016	OBS-MW2	252	4/22/13	9:32	GW	P	125 ml	None	G	SA	Anions (SW846-9056)	
093866	-017	OBS-MW2	252	4/22/13	9:33	FGW	P	500 ml	HNO3	G	SA	Metals-Ca,Mg,K,Na (SW846-6020)	
093866	-018	OBS-MW2	252	4/22/13	9:34	GW	P	125 ml	H2SO4	G	SA	NPN (EPA 353.2)	
093866	-020	OBS-MW2	252	4/22/13	9:35	GW	P	250 ml	None	G	SA	Perchlorate (EPA 314.0)	
093866	-022	OBS-MW2	252	4/22/13	9:36	GW	P	500 ml	None	G	SA	Alkalinity (SM2320B)	
093866	-024	OBS-MW2	252	4/22/13	9:37	GW	AG	4x1L	None	G	SA	High Explosives (SW846-8321A mod	

Last Chain:	☐ Yes	Sample Tracking / SMO Use	Special Instructions/QC Requirements:
Validation Req'd:	☑ Yes	Date Entered:	EDD ☑ Yes ☐ No
Background:	☐ Yes	Entered by:	Turnaround Time ☐ 7 Day* ☐ 15 Day* ☑ 30 Day
Confirmatory:	☐ Yes	QC inits.:	Negotiated TAT ☐

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	[illegible]		SNL/4142/505-844-5130/505-228-0710
	William Gibson	[illegible]	WG	SNL/4142/505-284-3307/505-239-7367

Sample Disposal ☐ Return to Client ☑ Disposal by Lab

Return Samples By:

Comments: Send report to Tim Jackson/4142/MS 0729/284-2547

Report Anions (as Br,Cl,F,SO4). Alkalinity (as total HCO3,CO3). Gamma Spectroscopy (as short list isotopes). FGW, filtered in field w/.45 micron in-line filter. If Perchlorate detected, perform verification analysis using SW846-6850M.

Conditions on Receipt

Lab Use

1.Relinquished by [signature]	Org. 4142	Date 4/22/13	Time 1050	3.Relinquished by	Org.	Date	Time
1. Received by [signature] SMO	Org. 4142	Date 4/22/13	Time 1050	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)

AR/COC 614742

Project Name: SWMU 68 GWM	**Project/Task Manager:** Clinton Lum	**Project/Task No.:** 98026.01.13	
Tech Area:			
Building:	**Room:**		**Lab use**

Sample No.	Fraction	Sample Location Detail	Depth (ft)	Date/Time Collected		Sample Matrix	Container Type	Container Volume	Preserv-ative	Collection Method	Sample Type	Parameter & Method Requested	Lab Sample ID
093866	-027	OBS-MW2	252	4/22/13	9:39	GW	P	250 ml	NaOH	G	SA	Total Cyanide (SW846-9012)	
093866	-033	OBS-MW2	252	4/22/13	9:40	GW	P	1 L	HNO3	G	SA	Gamma Spectroscopy (EPA 901.0)	
093866	-034	OBS-MW2	252	4/22/13	9:41	GW	P	1 L	HNO3	G	SA	Gross Alpha and Beta (EPA 900.0)	
093866	-035	OBS-MW2	252	4/22/13	9:42	GW	P	1 L	HNO3	G	SA	Isotopic Uranium (HASL 300)	
093867	-001	OBS-TB2	NA	4/22/13	9:27	DIW	G	3x40ml	HCL	G	TB	TCL VOC (SW846-8260B)	

Recipient Initials_____

CONTRACT LABORATORY
ANALYSIS REQUEST AND CHAIN OF CUSTODY

Internal Lab

Batch No. NA

SMO Use

AR/COC 614744

Project Name:	SWMU 68 GWM	Date Samples Shipped:		SMO Authorization: Don Watenpaugh	☐ Waste Characterization
Project/Task Manager:	Clinton Lum	Carrier/Waybill No.		SMO Contact Phone: See Bottle order	☐ RMMA
Project/Task Number:	98026.01.13	Lab Contact:	Edie Kent/803-556-8171	Lorraine Herrera/505-844-3199	☐ Released by COC No.
Service Order:	CF263-13	Lab Destination:	GEL	Send Report to SMO:	☑ 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	Container Volume	Preservative	Collection Method	Sample Type	Parameter & Method Requested	Lab Sample ID
093870	-001	OBS-MW3	208	4/23/13	9:48	GW	G	3x40ml	HCL	G	SA	TCL VOC (SW846-8260B)	
093870	-002	OBS-MW3	208	4/23/13	9:50	GW	AG	4x1L	None	G	SA	TCL SVOC (SW846-8270C)	
093870	-009	OBS-MW3	208	4/23/13	9:53	GW	P	500 ml	HNO3	G	SA	TAL Metals+U (SW846-6010/6020/7470)	
093870	-014	OBS-MW3	208	4/23/13	9:54	GW	P	250 ml	None	G	SA	Hexavalent Chromium (SW846-7196A)	
093870	-016	OBS-MW3	208	4/23/13	9:55	GW	P	125 ml	None	G	SA	Anions (SW846-9056)	
093870	-017	OBS-MW3	208	4/23/13	9:56	FGW	P	500 ml	HNO3	G	SA	Metals-Ca,Mg,K,Na (SW846-6020)	
093870	-018	OBS-MW3	208	4/23/13	9:57	GW	P	125 ml	H2SO4	G	SA	NPN (EPA 353.2)	
093870	-020	OBS-MW3	208	4/23/13	9:58	GW	P	250 ml	None	G	SA	Perchlorate (EPA 314.0)	
093870	-022	OBS-MW3	208	4/23/13	9:59	GW	P	500 ml	None	G	SA	Alkalinity (SM2320B)	
093870	-024	OBS-MW3	208	4/23/13	10:00	GW	AG	4x1L	None	G	SA	High Explosives (SW846-8321A mod	

Last Chain:	☑ Yes	Sample Tracking SMO Use	Special Instructions/QC Requirements:
Validation Req'd:	☑ Yes	Date Entered:	EDD ☑ Yes ☐ No
Background:	☐ Yes	Entered by:	Turnaround Time ☐ 7 Day* ☐ 15 Day* ☑ 30 Day
Confirmatory:	☐ Yes	QC inits.:	Negotiated TAT ☐
			Sample Disposal ☐ Return to Client ☑ Disposal by Lab
			Return Samples By:

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		SNL/4142/505-844-5130/505-228-0710
	William Gibson	William Gibson	WJG	SNL/4142/505-284-3307/505-239-7367

Comments: Send report to Tim Jackson/4142/MS 0729/284-2547
Report Anions (as Br,Cl,F,SO4). Alkalinity (as total HCO3,CO3). Gamma Spectroscopy (as short list isotopes). FGW, filtered in field w/.45 micron in-line filter. If Perchlorate detected, perform verification analysis using SW846-6850M.

Lab Use

1.Relinquished by Alfred Santillanes	Org. 4142	Date 4/23/13	Time 10:47	3.Relinquished by	Org.	Date	Time
1. Received by Don Watenpaugh	Org. 4142	Date 4/23/13	Time 10:47	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)

AR/COC 614744

Project Name: SWMU 68 GWM	**Project/Task Manager:** Clinton Lum	**Project/Task No.:** 98026.01.13	
Tech Area:			
Building:	**Room:**		**Lab use**

Sample No.	Fraction	Sample Location Detail	Depth (ft)	Date/Time Collected		Sample Matrix	Container Type	Container Volume	Preserv-ative	Collection Method	Sample Type	Parameter & Method Requested	Lab Sample ID
093870	-027	OBS-MW3	208	4/23/13	10:03	GW	P	250 ml	NaOH	G	SA	Total Cyanide (SW846-9012)	
093870	-033	OBS-MW3	208	4/23/13	10:04	GW	P	1 L	HNO3	G	SA	Gamma Spectroscopy (EPA 901.0)	
093870	-034	OBS-MW3	208	4/23/13	10:06	GW	P	1 L	HNO3	G	SA	Gross Alpha and Beta (EPA 900.0)	
093870	-035	OBS-MW3	208	4/23/13	10:08	GW	P	1 L	HNO3	G	SA	Isotopic Uranium (HASL 300)	
093871	-001	OBS-MW3	208	4/23/13	9:48	GW	G	3x40ml	HCL	G	DU	TCL VOC (SW846-8260B)	
093871	-002	OBS-MW3	208	4/23/13	9:50	GW	AG	4x1L	None	G	DU	TCL SVOC (SW846-8270C)	
093871	-009	OBS-MW3	208	4/23/13	9:53	GW	P	500 ml	HNO3	G	DU	TAL Metals+U (SW846-6010/6020/7470)	
093871	-014	OBS-MW3	208	4/23/13	9:54	GW	P	250 ml	None	G	DU	Hexavalent Chromium (SW846-7196A)	
093871	-016	OBS-MW3	208	4/23/13	9:55	GW	P	125 ml	None	G	DU	Anions (SW846-9056)	
093871	-017	OBS-MW3	208	4/23/13	9:56	FGW	P	500 ml	HNO3	G	DU	Metals-Ca,Mg,K,Na (SW846-6020)	
093871	-018	OBS-MW3	208	4/23/13	9:57	GW	P	125 ml	H2SO4	G	DU	NPN (EPA 353.2)	
093871	-020	OBS-MW3	208	4/23/13	9:58	GW	P	250 ml	None	G	DU	Perchlorate (EPA 314.0)	
093871	-022	OBS-MW3	208	4/23/13	9:59	GW	P	500 ml	None	G	DU	Alkalinity (SM2320B)	
093871	-024	OBS-MW3	208	4/23/13	10:00	GW	AG	4x1L	None	G	DU	High Explosives (SW846-8321A mod	
093871	-027	OBS-MW3	208	4/23/13	10:03	GW	P	250 ml	NaOH	G	DU	Total Cyanide (SW846-9012)	
093871	-033	OBS-MW3	208	4/23/13	10:04	GW	P	1 L	HNO3	G	DU	Gamma Spectroscopy (EPA 901.0)	
093871	-034	OBS-MW3	208	4/23/13	10:06	GW	P	1 L	HNO3	G	DU	Gross Alpha and Beta (EPA 900.0)	
093871	-035	OBS-MW3	208	4/23/13	10:08	GW	P	1 L	HNO3	G	DU	Isotopic Uranium (HASL 300)	
093872	-001	OBS-TB4	NA	4/23/13	9:48	DIW	G	3x40ml	HCL	G	TB	TCL VOC (SW846-8260B)	

Recipient Initials_____

CONTRACT LABORATORY
ANALYSIS REQUEST AND CHAIN OF CUSTODY

Prior to OBS-MW3

Internal Lab

Batch No. N/A

SMO Use

AR/COC 614743

Project Name:	SWMU 68 GWM	Date Samples Shipped:	4/22/13	SMO Authorization:	☐ Waste Characterization
Project/Task Manager:	Clinton Lum	Carrier/Waybill No.		SMO Contact Phone: SEE BOTTLE ORDER	☐ RMMA
Project/Task Number:	98026.01.13	Lab Contact:	Edie Kent/803-556-8171	Lorraine Herrera/505-844-3199	☐ Released by COC No.
Service Order:	CF263-13	Lab Destination:	GEL	Send Report to SMO:	☑ 4° Celsius
		Contract No.:	PO 1303873	Rita Kavanaugh/505-284-2553	Bill to:Sandia National Laboratories (Accounts Payable), P.O. Box 5800, MS-0154 Albuquerque, NM 87185-0154
Tech Area:					
Building:	Room:	Operational Site:			

Sample No.	Fraction	Sample Location Detail	Depth (ft)	Date/Time Collected		Sample Matrix	Container Type	Container Volume	Preserv-ative	Collection Method	Sample Type	Parameter & Method Requested	Lab Sample ID
093868	-001	OBS-EB1	NA	4/22/13	10:27	DIW	G	3x40ml	HCL	G	EB	TCL VOC (SW846-8260B)	
093868	-002	OBS-EB1	NA	4/22/13	10:28	DIW	AG	4x1L	None	G	EB	TCL SVOC (SW846-8270C)	
093868	-009	OBS-EB1	NA	4/22/13	10:30	DIW	P	500 ml	HNO3	G	EB	TAL Metals+U (SW846-6010/6020/7470)	
093868	-014	OBS-EB1	NA	4/22/13	10:31	DIW	P	250 ml	None	G	EB	Hexavalent Chromium (SW846-7196A)	
093868	-016	OBS-EB1	NA	4/22/13	10:32	DIW	P	125 ml	None	G	EB	Anions (SW846-9056)	
093868	-017	OBS-EB1	NA	4/22/13	10:33	FDIW	P	500 ml	HNO3	G	EB	Metals-Ca,Mg,K,Na (SW846-6020)	
093868	-018	OBS-EB1	NA	4/22/13	10:34	DIW	P	125 ml	H2SO4	G	EB	NPN (EPA 353.2)	
093868	-020	OBS-EB1	NA	4/22/13	10:35	DIW	P	250 ml	None	G	EB	Perchlorate (EPA 314.0)	
093868	-022	OBS-EB1	NA	4/22/13	10:36	DIW	P	500 ml	None	G	EB	Alkalinity (SM2320B)	
093868	-024	OBS-EB1	NA	4/22/13	10:37	DIW	AG	4x1L	None	G	EB	High Explosives (SW846-8321A mod	

Last Chain:	☐ Yes	Sample Tracking / SMO Use	Special Instructions/QC Requirements:
Validation Req'd:	☑ Yes	Date Entered:	EDD ☑ Yes ☐ No
Background:	☐ Yes	Entered by:	Turnaround Time ☐ 7 Day* ☐ 15 Day* ☑ 30 Day
Confirmatory:	☐ Yes	QC inits.:	Negotiated TAT ☐
			Sample Disposal ☐ Return to Client ☑ Disposal by Lab
			Return Samples By:

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

Comments: Send report to Tim Jackson/4142/MS 0729/284-2547
Report Anions (as Br,Cl,F,SO4). Alkalinity (as total HCO3,CO3). Gamma Spectroscopy (as short list isotopes). FDIW, filtered in field w/.45 micron in-line filter. If Perchlorate detected, perform verification analysis using SW846-6850M.

Lab Use

1.Relinquished by Alfred Santillanes	Org. 4142	Date 4/22/13	Time 1055	3.Relinquished by	Org.	Date	Time
1. Received by Lorraine Herrera SMO	Org. 4142	Date 4/22/13	Time 1055	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)

AR/COC 614743

Project Name: SWMU 68 GWM	**Project/Task Manager:** Clinton Lum	**Project/Task No.:** 98026.01.13	
Tech Area:			
Building:	**Room:**		**Lab use**

Sample No.	Fraction	Sample Location Detail	Depth (ft)	Date/Time Collected		Sample Matrix	Container Type	Container Volume	Preserv-ative	Collection Method	Sample Type	Parameter & Method Requested	Lab Sample ID
093868	-027	OBS-EB1	NA	4/22/13	10:39	DIW	P	250 ml	NaOH	G	EB	Total Cyanide (SW846-9012)	
093868	-033	OBS-EB1	NA	4/22/13	10:40	DIW	P	1 L	HNO3	G	EB	Gamma Spectroscopy (EPA 901.0)	
093868	-034	OBS-EB1	NA	4/22/13	10:41	DIW	P	1 L	HNO3	G	EB	Gross Alpha and Beta (EPA 900.0)	
093868	-035	OBS-EB1	NA	4/22/13	10:42	DIW	P	1 L	HNO3	G	EB	Isotopic Uranium (HASL 300)	
093869	-001	OBS-TB3	NA	4/22/13	10:27	DIW	G	3x40ml	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

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

Memorandum

Date: June 5, 2013

To: File

From: Linda Thal

Subject: Inorganic Data Review and Validation – SNL
Site: SWMU 8/58 GWM
AR/COC: 614745, 614746 and 614747
SDG: 324508
Laboratory: GEL
Project/Task: 98026.01.12
Analysis: General Chemistry

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

Summary

Four samples were prepared and analyzed with accepted procedures using methods EPA 9056 (anions by IC), EPA 353.2 (nitrate/nitrite), EPA 314.0 (perchlorate), EPA 9010C/9012A (total cyanide) and SM2320B (total alkalinity). Data were reported for all required analytes. Problems were identified with the data package that resulted in the qualification of data.

Total cyanide:

1. Total cyanide was detected in the ICB/CCB at a negative value with an absolute value < the PQL. The associated sample results were NDs and will be **qualified UJ,B4**.

2. The ICAL intercept was negative with an absolute value > the MDL but ≤3X the MDL. The associated sample results were NDs and will be **qualified UJ,I5**.

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

Holding Times and Preservation

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

Calibration

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 was detected at < the PQL in the EB, sample 324508018. The associated sample results were detects >5X the EB value and will not be qualified.

Laboratory Control Sample (LCS)

All LCS acceptance criteria were met.

Matrix Spike (MS)

All MS/PS recoveries met QC acceptance criteria.

Perchlorate, anions and nitrate/nitrite:
The PS analysis was performed on a sample of similar matrix from another SNL SDG. No sample data will be qualified as a result.

Laboratory Replicate

The replicate analyses met all QC acceptance criteria.

Perchlorate, anions and nitrate/nitrite:
The replicate analysis was performed on a sample of similar matrix from another SNL SDG. No sample data will be qualified as a result.

Detection Limits/Dilutions

All detection limits were properly reported.

Nitrate/nitrite:
Sample -005 was diluted 5X and samples -032 and -044 were diluted 10X.

Anions:
Samples -031 and -043 were diluted 10X for chloride and sulfate and sample -004 was diluted 10X for chloride, sulfate and fluoride.

Other QC

The EB submitted on AR/COC 614746 was applied to the samples on AR/COC 614747. A field duplicate pair was submitted on AR/COC 614747. There are no "required" review criteria for field duplicate analyses comparability; no data will be qualified as a result.

No other specific issues that affect data quality were identified.

Reviewed by: Monica Dymerski **Level I** **Date:** 06/06/13

ANALYTICAL QUALITY ASSOCIATES, INC.

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

Memorandum

Date: June 5, 2013

To: File

From: Linda Thal

Subject: LC/MS/MS Organic Data Review and Validation – SNL
Site: SWMU 8/58 GWM
AR/COC: 614745, 614746 and 614747
SDG: 324508
Laboratory: GEL
Project/Task: 98026.01.12
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 initial calibration RFs for m-nitrotoluene, o-nitrotoluene and p-nitrotoluene were <0.05 but ≥0.01. All associated sample results were NDs and will be **qualified UJ,I4.**

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

Holding Times

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

Instrument Tune

The instrument tune was not reported or evaluated.

Calibration

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

Reporting Limit Verification

All CRI recoveries met QC acceptance criteria.

Blanks

No target analytes were detected in the blanks.

Surrogates

All surrogate recoveries met QC acceptance criteria.

Internal Standards

All internal standards met QC acceptance criteria.

Matrix Spike/Matrix Spike Duplicate (MS/MSD)

The MS/MSD analyses met all QC acceptance criteria.

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

Laboratory Control Sample (LCS)

All LCS recoveries met QC acceptance criteria.

Detection Limits/Dilutions

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

Other QC

The EB submitted on AR/COC 614746 was applied to the samples on AR/COC 614747. A field duplicate pair was submitted on AR/COC 614747. There are no "required" review criteria for field duplicate analyses comparability; no data will be qualified as a result.

No other specific issues that affect data quality were identified.

Reviewed by: Monica Dymerski **Level I** **Date:** 06/06/13

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

Memorandum

Date: June 5, 2013

To: File

From: Linda Thal

Subject: Inorganic Data Review and Validation – SNL
Site: SWMU 8/58 GWM
AR/COC: 614745, 614746 and 614747
SDG: 324508 and 324509
Laboratory: GEL
Project/Task: 98026.01.12
Analysis: Metals

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

Summary

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

ICP-MS:

1. Ca was detected at < the PQL in the MB. The associated results for samples 324508017 and 324509002 were detects <5X the MB value and will be **qualified 0.45U,B** at 5X the MB value.

2. Co was detected at < the PQL in the MB. The associated results for all samples except sample -017 were detects <5X the MB value and will be **qualified 0.00053U,B** at 5X the method blank value.

3. Cu was detected at > the PQL in the unfiltered EB, sample -017**.** The associated results for samples -030 and -042 were detects <5X the EB value and will be **qualified 0.0097UJ,B2** at 5X the EB value.

ICP-AES:

1. V was detected at a negative value with an absolute value < the PQL in the ICB**.** The associated results for samples -003 and -017 were NDs and will be **qualified UJ,B4.**

CVAA:

1. Hg was detected at a negative value with an absolute value < the PQL in the ICB**.** The associated sample results were NDs and will be **qualified UJ,B4.**

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

Holding Times and Preservation

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

ICP-MS Instrument Tune

The ICP-MS tunes met QC acceptance criteria.

Calibration

All initial and continuing calibration met QC acceptance criteria.

Reporting Limit Verification

All CRA/CRI recoveries 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 at < the PQL in the MB. All associated sample results excluding samples -017 and -002 were detects >5X the MB value and will not be qualified.

Co was detected at < the PQL in the MB. The associated result for sample -017 was ND and will not be qualified.

U was detected at < the PQL in the MB and ICB/CCB. All associated sample results were either detects > 5X the MB value or ND and will not be qualified

V was detected in the ICB at a negative value with an absolute value < the PQL. The associated results for samples -030 and -042 were detects >5X the MDL and will not be qualified.

Ca was detected at < the PQL in both EBs, samples 324508017 and 324509002. The results were qualified ND due to MB contamination and, therefore, were not applied to the sample results.

Na was detected at < the PQL in the unfiltered EB, sample 324508017. The associated results for samples -030 and -042 were detects >5X the EB value and will not be qualified.

ICP -MS Internal Standards

The ICP-MS internal standards met QC acceptance criteria.

Matrix Spike (MS)

The MS met all QC acceptance criteria except as follows.

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 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. All samples excluding the EBs were diluted 10X for Ca and Na.

ICP Interference Check Sample (ICS A and AB)

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

ICP Serial Dilution

The serial dilutions met all QC acceptance criteria.

Other QC

The EBs submitted on AR/COC 614746 were applied to the samples on AR/COC 614747. A field duplicate pair was submitted on AR/COC 614747. There are no "required" review criteria for field duplicate analyses comparability; no data will be qualified as a result.

No other specific issues that affect data quality were identified.

Reviewed by: Monica Dymerski **Level I** **Date:** 06/06/13

Sample Findings Summary

AR/COC: 614741

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
EPA 900.0/SW846 9310			
	093863-034/OBS-MW1	ALPHA (12587-46-1)	J, MS1
	093863-034/OBS-MW1	BETA (12587-47-2)	J, MS1
EPA 901.1			
	093863-033/OBS-MW1	Americium-241 (14596-10-2)	BD, FR3
	093863-033/OBS-MW1	Cesium-137 (10045-97-3)	BD, FR3
	093863-033/OBS-MW1	Cobalt-60 (10198-40-0)	BD, FR3
	093863-033/OBS-MW1	Potassium-40 (13966-00-2)	BD, FR3
SW846 3510C/8270D			
	093863-002/OBS-MW1	Hexachlorocyclopentadiene (77-47-4)	UJ, MS3
SW846 3535/8321A Modified			
	093863-024/OBS-MW1	m-Nitrotoluene (99-08-1)	UJ, I4
	093863-024/OBS-MW1	o-Nitrotoluene (88-72-2)	UJ, I4
	093863-024/OBS-MW1	p-Nitrotoluene (99-99-0)	UJ, I4
SW846 8260B DOE-AL			
	093863-001/OBS-MW1	Acetone (67-64-1)	UJ, I3,C3
	093864-001/OBS-TB1	Acetone (67-64-1)	UJ, I3,C3
	093865-001/OBS-FB1	Acetone (67-64-1)	UJ, I3,C3
SW846 9012B			
	093863-027/OBS-MW1	Cyanide, Total (57-12-5)	UJ, I5,B4

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

Sample Findings Summary

AR/COC: 614745, 614746, 614747

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
DOE EML HASL-300, U-02-RC			
	093873-035/CCBA-MW1	Uranium-235/236 (13982-70-2)	BD, FR3
	093876-035/CCBA-EB1	Uranium-233/234 (11-08-5)	BD, FR3
	093876-035/CCBA-EB1	Uranium-235/236 (13982-70-2)	BD, FR3
	093876-035/CCBA-EB1	Uranium-238 (7440-61-1)	BD, FR3
	093878-035/CCBA-MW2	Uranium-235/236 (13982-70-2)	J, FR7
	093879-035/CCBA-MW2	Uranium-235/236 (13982-70-2)	J, FR7
EPA 900.0/SW846 9310			
	093873-034/CCBA-MW1	ALPHA (12587-46-1)	J, MS1
	093873-034/CCBA-MW1	BETA (12587-47-2)	J, FR7,MS1
	093876-034/CCBA-EB1	ALPHA (12587-46-1)	BD, FR3,MS1
	093876-034/CCBA-EB1	BETA (12587-47-2)	BD, FR3,MS1
	093878-034/CCBA-MW2	ALPHA (12587-46-1)	J, MS1
	093878-034/CCBA-MW2	BETA (12587-47-2)	J, MS1
	093879-034/CCBA-MW2	ALPHA (12587-46-1)	J, MS1
	093879-034/CCBA-MW2	BETA (12587-47-2)	J, FR7,MS1
EPA 901.1			
	093873-033/CCBA-MW1	Americium-241 (14596-10-2)	BD, FR3
	093873-033/CCBA-MW1	Cesium-137 (10045-97-3)	BD, FR3
	093873-033/CCBA-MW1	Cobalt-60 (10198-40-0)	BD, FR3
	093873-033/CCBA-MW1	Potassium-40 (13966-00-2)	BD, FR3
	093876-033/CCBA-EB1	Americium-241 (14596-10-2)	BD, FR3
	093876-033/CCBA-EB1	Cesium-137 (10045-97-3)	BD, FR3
	093876-033/CCBA-EB1	Cobalt-60 (10198-40-0)	BD, FR3
	093876-033/CCBA-EB1	Potassium-40 (13966-00-2)	BD, FR3
	093878-033/CCBA-MW2	Americium-241 (14596-10-2)	BD, FR3

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
	093878-033/CCBA-MW2	Cesium-137 (10045-97-3)	BD, FR3
	093878-033/CCBA-MW2	Cobalt-60 (10198-40-0)	BD, FR3
	093878-033/CCBA-MW2	Potassium-40 (13966-00-2)	BD, FR3
	093879-033/CCBA-MW2	Americium-241 (14596-10-2)	BD, FR3
	093879-033/CCBA-MW2	Cesium-137 (10045-97-3)	BD, FR3
	093879-033/CCBA-MW2	Cobalt-60 (10198-40-0)	BD, FR3
	093879-033/CCBA-MW2	Potassium-40 (13966-00-2)	BD, FR3
SW846 3005/6010B			
	093873-009/CCBA-MW1	Vanadium (7440-62-2)	UJ, B4
	093876-009/CCBA-EB1	Vanadium (7440-62-2)	UJ, B4
SW846 3005/6020 DOE-AL			
	093873-009/CCBA-MW1	Cobalt (7440-48-4)	0.00053U, B
	093876-009/CCBA-EB1	Calcium (7440-70-2)	0.45U, B
	093876-017/CCBA-EB1	Calcium (7440-70-2)	0.45U, B
	093878-009/CCBA-MW2	Cobalt (7440-48-4)	0.00053U, B
	093878-009/CCBA-MW2	Copper (7440-50-8)	0.0097UJ, B2
	093879-009/CCBA-MW2	Cobalt (7440-48-4)	0.00053U, B
	093879-009/CCBA-MW2	Copper (7440-50-8)	0.0097UJ, B2
SW846 3535/8321A Modified			
	093873-024/CCBA-MW1	m-Nitrotoluene (99-08-1)	UJ, I4
	093873-024/CCBA-MW1	o-Nitrotoluene (88-72-2)	UJ, I4
	093873-024/CCBA-MW1	p-Nitrotoluene (99-99-0)	UJ, I4
	093876-024/CCBA-EB1	m-Nitrotoluene (99-08-1)	UJ, I4
	093876-024/CCBA-EB1	o-Nitrotoluene (88-72-2)	UJ, I4
	093876-024/CCBA-EB1	p-Nitrotoluene (99-99-0)	UJ, I4
	093878-024/CCBA-MW2	m-Nitrotoluene (99-08-1)	UJ, I4
	093878-024/CCBA-MW2	o-Nitrotoluene (88-72-2)	UJ, I4
	093878-024/CCBA-MW2	p-Nitrotoluene (99-99-0)	UJ, I4
	093879-024/CCBA-MW2	m-Nitrotoluene (99-08-1)	UJ, I4

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
	093879-024/CCBA-MW2	o-Nitrotoluene (88-72-2)	UJ, I4
	093879-024/CCBA-MW2	p-Nitrotoluene (99-99-0)	UJ, I4
SW846 7470A			
	093873-009/CCBA-MW1	Mercury (7439-97-6)	UJ, B4
	093876-009/CCBA-EB1	Mercury (7439-97-6)	UJ, B4
	093878-009/CCBA-MW2	Mercury (7439-97-6)	UJ, B4
	093879-009/CCBA-MW2	Mercury (7439-97-6)	UJ, B4
SW846 9012B			
	093873-027/CCBA-MW1	Cyanide, Total (57-12-5)	UJ, I5,B4
	093876-027/CCBA-EB1	Cyanide, Total (57-12-5)	UJ, I5,B4
	093878-027/CCBA-MW2	Cyanide, Total (57-12-5)	UJ, I5,B4
	093879-027/CCBA-MW2	Cyanide, Total (57-12-5)	UJ, I5,B4

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

ANALYTICAL QUALITY ASSOCIATES, INC.

PO Box 21987
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Memorandum

Date: June 5, 2013

To: File

From: Linda Thal

Subject: Radiochemical Data Review and Validation – SNL
Site: SWMU 8/58 GWM
AR/COC: 614745, 614746 and 614747
SDG: 324508
Laboratory: GEL
Project/Task: 98026.01.12
Analysis: RAD

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

Summary

Four samples were prepared and analyzed with approved procedures using methods EPA 901.1 (gamma spec – short list), 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 relative dilution factor between the parent sample and the gross alpha/beta MS/MSD QC samples was >5 and, as a result, the MS/MSD analyses were not used to evaluate gross alpha and gross beta sample data. The associated sample results will be **qualified J,MS1.**

Gross Alpha/Beta and Alphaspec U:

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

All Analyses:

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

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

Holding Times and Preservation

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

Quantification

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

Calibration

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

Blanks

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

Tracer/Carrier Recovery

The tracer/carrier recoveries met QC acceptance criteria.

Matrix Spike/Matrix Spike Duplicate (MS/MSD)

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

Laboratory Replicate

All replicate error ratio acceptance criteria were met.

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

Laboratory Control Sample (LCS)

All LCS recoveries met QC acceptance criteria.

Detection Limits/Dilutions

The samples were not diluted. All required detection limits were met.

Other QC

The EB submitted on AR/COC 614746 was applied to the samples on AR/COC 614747. A field duplicate pair was submitted on AR/COC 614747. There are no "required" review criteria for field duplicate analyses comparability; no data will be qualified as a result.

No other specific issues that affect data quality were identified.

Reviewed by: Monica Dymerski **Level I** **Date:** 06/06/13

PO Box 21987
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www.aqainc.net

Memorandum

Date: June 5, 2013

To: File

From: Linda Thal

Subject: GC/MS Organic Data Review and Validation – SNL
Site: SWMU 8/58 GWM
AR/COC: 614745, 614746 and 614747
SDG: 324508
Laboratory: GEL
Project/Task: 98026.01.12
Analysis: SVOCs

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

Summary

Four samples were prepared and analyzed with accepted procedures using method EPA 8270D (SVOCs). All compounds were successfully analyzed. No problems were identified with the data package that resulted in the qualification of data.

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

Holding Times

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

Instrument Tune

All instrument tune requirements were met.

Calibration

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

The ICAL intercepts for 2-methyl-4,6-dinitrophenol and p-nitroaniline were > the MDL and positive. The associated sample results were NDs and will not be qualified.

The CCV %D for 4-nitrophenol was >20% but ≤40% with negative bias. The associated sample results were NDs and since no other calibration infractions occurred for this analyte, will not be qualified.

The ICV %Ds for 2,4-dinitrotoluene; 2,6-dinitrotoluene and dibenzo(a,h)anthracene were >20% with positive bias. The associated sample results were NDs and will not be qualified.

Blanks

No target analytes were detected in the blanks.

Surrogates

All surrogate recoveries met QC acceptance criteria.

Internal Standards

All internal standards met QC acceptance criteria.

Matrix Spike/Matrix Spike Duplicate (MS/MSD)

All MS/MSD acceptance criteria were met.

Laboratory Control Sample (LCS)

All LCS acceptance criteria were met except as follows.

The LCS %R for 4-nitrophenol was < the LAL but ≥10%. Up to four LCS recovery infractions are allowed since 67 LCS 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

The EB submitted on AR/COC 614746 was applied to the samples on AR/COC 614747. A field duplicate pair was submitted on AR/COC 614747. There are no "required" review criteria for field duplicate analyses comparability; no data will be qualified as a result.

No other specific issues that affect data quality were identified.

Reviewed by: Monica Dymerski **Level I** **Date:** 06/06/13

PO Box 21987
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Memorandum

Date: June 5, 2013

To: File

From: Linda Thal

Subject: GC/MS Organic Data Review and Validation – SNL
Site: SWMU 8/58 GWM
AR/COC: 614745, 614746 and 614747
SDG: 324508
Laboratory: GEL
Project/Task: 98026.01.12
Analysis: VOCs

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

Summary

Eight samples were prepared and analyzed with accepted procedures using method EPA 8260B (VOCs). All compounds were successfully analyzed. No problems were identified with the data package that resulted in the qualification of data.

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

Holding Times

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

Instrument Tune

All instrument tune requirements were met.

Calibration

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

The CCV %Ds for bromomethane, carbon disulfide and 2-hexanone were >20% with positive bias. The associated sample results were NDs and will not be qualified.

Blanks

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

Bromodichloromethane, bromoform, chloroform and dibromochloromethane were detected in the EB, sample 324508015, and the FB, sample -014, at > the PQL. The associated sample results were NDs and will not be qualified.

Surrogates

All surrogate recoveries met QC acceptance criteria.

Internal Standards

All internal standards met QC acceptance criteria.

Matrix Spike/Matrix Spike Duplicate (MS/MSD)

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

It should be noted that trichlorotrifluoroethane was not included in the MS/MSD spiking solution. No sample data will be qualified as a result.

Laboratory Control Sample (LCS)

All LCS acceptance criteria were met.

Detection Limits/Dilutions

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

Tentatively Identified Compounds (TICs)

TIC reports were not required.

Other QC

Three TBs were submitted, one for each AR/COC. A FB was submitted with AR/COC 614745. The EB submitted on AR/COC 614746 was applied to the samples on AR/COC 614747. A field duplicate pair was submitted on AR/COC 614747. There are no "required" review criteria for field duplicate analyses comparability; no data will be qualified as a result.

No other specific issues that affect data quality were identified.

Reviewed by: Monica Dymerski **Level I** **Date:** 06/06/13

PO Box 21987
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Memorandum

Date: June 3, 2013

To: File

From: Linda Thal

Subject: Inorganic Data Review and Validation – SNL
Site: SWMU 68 GWM
AR/COC: 614742, 614743 and 614744
SDG: 324365
Laboratory: GEL
Project/Task: 98026.01.13
Analysis: General Chemistry

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

Summary

Four samples were prepared and analyzed with accepted procedures using methods EPA 9056 (anions by IC), EPA 353.2 (nitrate/nitrite), EPA 314.0 (perchlorate), EPA 9010C/9012A (total cyanide), EPA 7196A (hexavalent chromium) and SM2320B (total alkalinity). Data were reported for all required analytes. Problems were identified with the data package that resulted in the qualification of data.

Total cyanide:

1. Total cyanide was detected in the ICB/CCB at a negative value with an absolute value < the PQL. The associated sample results were NDs and will be **qualified UJ,B4**.

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

Holding Times and Preservation

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

Hexavalent Chromium:
Samples 324365004 and -032 were analyzed <5% past their 24 hour holding time. Based on professional judgment, no sample data will be 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 324365024. The associated sample results were detects >5X the EB value and will not be qualified.

Laboratory Control Sample (LCS)

All LCS acceptance criteria were met.

Matrix Spike (MS)

All MS/PS recoveries met QC acceptance criteria.

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

Laboratory Replicate

The replicate analyses met all QC acceptance criteria.

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

Detection Limits/Dilutions

All detection limits were properly reported.

Nitrate/nitrite:
All samples excluding the EB were diluted 5X.

Anions:
All samples excluding the EB were diluted 10X for chloride and sulfate.

Other QC

The EB submitted on AR/COC 614743 was applied to the samples on AR/COC 614744. A field duplicate pair was submitted on AR/COC 614744. There are no "required" review criteria for field duplicate analyses comparability; no data will be qualified as a result.

No other specific issues that affect data quality were identified.

Reviewed by: Monica Dymerski **Level I** **Date:** 06/28/13

PO Box 21987
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Memorandum

Date: May 31, 2013

To: File

From: Linda Thal

Subject: LC/MS/MS Organic Data Review and Validation – SNL
Site: SWMU 68 GWM
AR/COC: 614742, 614743 and 614744
SDG: 324365
Laboratory: GEL
Project/Task: 98026.01.13
Analysis: High Explosives (HE)

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

Summary

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

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

Holding Times

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

Instrument Tune

The instrument tune was not reported or evaluated.

Calibration

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

Reporting Limit Verification

All CRI recoveries met QC acceptance criteria.

Blanks

No target analytes were detected in the blanks.

Surrogates

All surrogate recoveries met QC acceptance criteria.

Internal Standards

All internal standards met QC acceptance criteria.

Matrix Spike/Matrix Spike Duplicate (MS/MSD)

The MS/MSD analyses met all QC acceptance criteria.

Laboratory Control Sample (LCS)

All LCS recoveries met QC acceptance criteria.

Detection Limits/Dilutions

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

Other QC

The EB submitted on AR/COC 614743 was applied to the samples on AR/COC 614744. A field duplicate pair was submitted on AR/COC 614744. There are no "required" review criteria for field duplicate analyses comparability; no data will be qualified as a result.

No other specific issues that affect data quality were identified.

Reviewed by: Monica Dymerski **Level I** **Date:** 06/28/13

PO Box 21987
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www.aqainc.net

Memorandum

Date: June 3, 2013

To: File

From: Linda Thal

Subject: Inorganic Data Review and Validation – SNL
Site: SWMU 68 GWM
AR/COC: 614742, 614743 and 614744
SDG: 324365 and 324366
Laboratory: GEL
Project/Task: 98026.01.13
Analysis: Metals

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

Summary

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

ICP-MS:

1. Ca was detected at < the PQL in the MB. The associated results for samples 324365017 and 324366002 were detects < the PQL and <5X the MB value and will be **qualified 0.45U,B** at 5X the MB value.

2. Co was detected at < the PQL in the MB. The associated results for samples 324365003, -031 and -044 were detects < the PQL and <5X the MB value and will be **qualified 0.00053U,B** at 5X the MB value.

3. Cu was detected at > the PQL in the unfiltered EB, sample 324365017**.** The associated sample results were detects <5X the EB value and will be **qualified 0.018UJ,B2** at 5X the EB value.

ICP-AES:

1. V was detected at a negative value with an absolute value < the PQL in a CCB bracketing all samples**.** The associated sample results were NDs and will be **qualified UJ,B4.**

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

Holding Times and Preservation

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

ICP-MS Instrument Tune

The ICP-MS tunes met QC acceptance criteria.

Calibration

All initial and continuing calibration met QC acceptance criteria.

Reporting Limit Verification

All CRA/CRI recoveries 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 at < the PQL in the MB. All associated sample results excluding samples 324365017 and 324366002 were detects > the PQL and >5X the MB concentration and will not be qualified.

Co was detected at < the PQL in the MB. The associated result for sample -017 was ND and will not be qualified.

U was detected at < the PQL in the MB and ICB/CCB. The associated results for samples -003, -031 and -044 were detects > the PQL and >5X the highest blank value and will not be qualified. The associated result for sample -017 was ND and will not be qualified.

Ba was detected at < the PQL in the unfiltered EB, sample -017. The associated sample results were detects > the PQL and >5X the EB value and will not be qualified.

Na was detected at < the PQL in both EBs, sample 324365017 and 324366002. All associated sample results were >5X the EB value and will not be qualified.

Ca was detected at < the PQL in both EBs. The results were qualified ND due to MB contamination and, therefore, were not applied to the 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, and Na were >4X the spike. However, an MS analysis is not required for these analytes. Therefore, no sample data will be qualified.

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

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

Laboratory Replicate

The replicates met all QC acceptance criteria.

ICP-MS and ICP-AES:
The replicate analyses were performed on samples of similar matrix from other SNL SDGs. No sample data will be qualified as a result.

Laboratory Control Sample (LCS)

The LCS met all QC acceptance criteria.

Detection Limits/Dilutions

All detection limits were properly reported. All samples excluding the EBs were diluted 10X for Ca and Na.

ICP Interference Check Sample (ICS A and AB)

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

ICP Serial Dilution

The serial dilutions met all QC acceptance criteria.

ICP-MS and ICP-AES:
The serial dilution analyses were performed on samples of similar matrix from other SNL SDGs. No sample data will be qualified as a result.

Other QC

The EBs submitted on AR/COC 614743 were applied to the samples on AR/COC 614744. A field duplicate pair was submitted on AR/COC 614744. There are no "required" review criteria for field duplicate analyses comparability; no data will be qualified as a result.

No other specific issues that affect data quality were identified.

Reviewed by: Monica Dymerski **Level I** **Date:** 06/28/13

ANALYTICAL QUALITY ASSOCIATES, INC.

PO Box 21987
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Memorandum

Date: June 3, 2013

To: File

From: Linda Thal

Subject: Radiochemical Data Review and Validation – SNL
Site: SWMU 68 GWM
AR/COC: 614742, 614743 and 614744
SDG: 324365
Laboratory: GEL
Project/Task: 98026.01.13
Analysis: RAD

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

Summary

Four 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.

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.**

Gamma Spec:

1. The K-40 result for sample 324365052 was X-flagged by the laboratory due to the peak not meeting identification criteria and will be **qualified R,Z2.**

All Analyses:

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

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

Holding Times and Preservation

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

Quantification

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

Calibration

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

Blanks

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

Tracer/Carrier Recovery

The tracer/carrier 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 and as follows.

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

Laboratory Replicate

All replicate error ratio acceptance criteria were met.

Gross Alpha/Beta, Alphaspec U and Gamma Spec:
The replicate analyses were performed on samples of similar matrix from other SNL SDGs. No sample data were qualified as a result.

Laboratory Control Sample (LCS)

All LCS recoveries met QC acceptance criteria.

Detection Limits/Dilutions

The samples were not diluted. All required detection limits were met.

Other QC

The EB submitted on AR/COC 614743 was applied to the samples on AR/COC 614744. A field duplicate pair was submitted on AR/COC 614744. There are no "required" review criteria for field duplicate analyses comparability; no data will be qualified as a result.

No other specific issues that affect data quality were identified.

Reviewed by: Monica Dymerski **Level I** **Date:** 06/28/13

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Memorandum

Date: June 27, 2013

To: File

From: Linda Thal

Subject: GC/MS Organic Data Review and Validation – SNL
Site: SWMU 68 GWM
AR/COC: 614742, 614743 and 614744
SDG: 324365
Laboratory: GEL
Project/Task: 98026.01.13
Analysis: SVOCs

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

Summary

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

1. There were no surrogate or target analyte recoveries for the MSD due to an obvious extraction issue**.** Based on professional judgment, no sample data were qualified for the lack of recovery observed in the MSD. All associated sample results were NDs and will be **qualified UJ,RP1** due to lack of batch precision data.

2. The MS %R was < the LAL but ≥10% for atrazine. The associated sample results were NDs and will be **qualified UJ,MS3**.

3. The ICAL RSD was >15% but ≤40% for carbazole and the CCV %D was >20% but ≤40% with negative bias. 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 follows.

The ICAL intercepts for 2-methyl-4,6-dinitrophenol and p-nitroaniline were > the MDL and positive. The associated sample results were NDs and will not be qualified.

The CCV %D was >20% but ≤40% with negative bias for bis(2-chloroisopropyl)ether. The associated sample results were NDs and since no other calibration infractions occurred for this analyte, will not be qualified.

The ICV %Ds for 2,4-dinitrotoluene; 2,6-dinitrotoluene and dibenzo(a,h)anthracene were >20% with positive bias. The associated sample results were NDs and will not be qualified.

Blanks

No target analytes were detected in the blanks.

Surrogates

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

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 except as follows.

The LCS %R was < the LAL but ≥10% for atrazine. Up to four LCS recovery infractions are allowed since 67 LCS 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

The EB submitted on AR/COC 614743 was applied to the samples on AR/COC 614744. A field duplicate pair was submitted on AR/COC 614744. There are no “required” review criteria for field duplicate analyses comparability; no data will be qualified as a result.

No other specific issues that affect data quality were identified.

Reviewed by: Monica Dymerski **Level I** **Date:** 06/28/13

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Memorandum

Date: May 31, 2013

To: File

From: Linda Thal

Subject: GC/MS Organic Data Review and Validation – SNL
Site: SWMU 68 GWM
AR/COC: 614742, 614743 and 614744
SDG: 324365
Laboratory: GEL
Project/Task: 98026.01.13
Analysis: VOCs

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

Summary

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 for acetone was >15% but ≤40% and the ICV/CCV %Ds were >20% with negative bias. All 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 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 CCV %Ds for carbon tetrachloride and cis-1,3-dichloropropylene were >20% with positive bias. The associated sample results were NDs and will not be qualified.

Blanks

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

Bromodichloromethane, bromoform, chloroform and dibromochloromethane were detected in the EB, sample 324365015, at > the PQL. The associated sample results were NDs and will not be qualified.

Surrogates

All surrogate recoveries met QC acceptance criteria.

Internal Standards

All internal standards met QC acceptance criteria.

Matrix Spike/Matrix Spike Duplicate (MS/MSD)

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

It should be noted that trichlorotrifluoroethane was not included in the MS/MSD spiking solution. No sample data will be qualified as a result.

Laboratory Control Sample (LCS)

All LCS acceptance criteria were met.

Detection Limits/Dilutions

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

Tentatively Identified Compounds (TICs)

TIC reports were not required.

Other QC

Three TBs were submitted, one for each AR/COC. The EB submitted on AR/COC 614743 was applied to the samples on AR/COC 614744. A field duplicate pair was submitted on AR/COC 614744. There are no "required" review criteria for field duplicate analyses comparability; no data will be qualified as a result.

No other specific issues that affect data quality were identified.

Reviewed by: Monica Dymerski **Level I** **Date:** 06/28/13