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ENTERED



JAN 25 2013
CERTIFIED MAIL-RETURN RECEIPT REQUESTED

Mr. John E. Kieling
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Subject: Department of Energy/National Nuclear Security Administration Sandia National
Laboratories *Environmental Restoration Operations Consolidated Quarterly Report,*
January 2013

Dear Mr. Kieling:

Enclosed is the *Environmental Restoration Operations Consolidated Quarterly Report, January 2013* for the Department of Energy, National Nuclear Security Administration, Sandia Corporation that addresses all quarterly reporting (July through September 2012) 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,

Daniel Pellegrino
Assistant Manager for
Environment, Safety and Health

Enclosure

cc:
See Page 2

Mr. John E. Kielling

-2-

JAN 25 2019

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CERTIFICATION STATEMENT FOR APPROVAL AND FINAL RELEASE OF DOCUMENTS

Document title: Environmental Restoration Operations Consolidated Quarterly
Report, January 2013

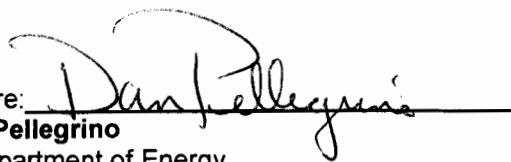
Document author: John Cochran, Department 06234

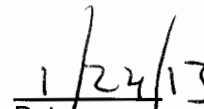
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and

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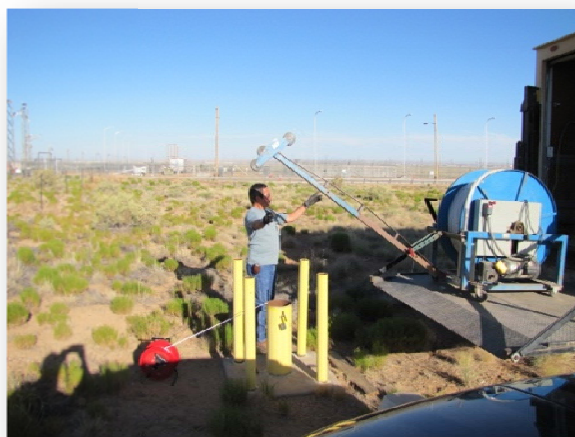
Sandia National Laboratories, New Mexico

Environmental Restoration Operations

A U.S. Department of Energy Environmental Cleanup Program

Consolidated Quarterly Report

July – September 2012



January 2013



United States Department of Energy
Sandia Site Office

CONSOLIDATED QUARTERLY REPORT

January 2013

SANDIA NATIONAL LABORATORIES, NEW MEXICO

ENVIRONMENTAL RESTORATION OPERATIONS

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

SANDIA SITE OFFICE
SANDIA CORPORATION
John Cochran

NUMBER OF POTENTIAL RELEASE SITES SUBJECT TO THIS PERMIT: 36

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

REPORTING PERIOD: July – September 2012

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 36 sites in the Corrective Action regulatory process are listed in Table I-1. The 36 sites consist of 27 Solid Waste Management Units and 9 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, July – September 2012

SECTION II: Perchlorate Screening Quarterly Groundwater Monitoring Report, July – September 2012

SECTION III: Solid Waste Management Units 149 and 154 Quarterly Groundwater Monitoring Report, July – September 2012

SECTION IV: Solid Waste Management Units 8/58 and 68 Quarterly Groundwater Monitoring Report, July – September 2012

ABBREVIATIONS AND ACRONYMS

µg/L	microgram(s) per liter
AOC	Area of Concern
AOP	Administrative Operating Procedure
ASTM	ASTM International
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 Analysis
CTF	Coyote Test Field
CWL	Chemical Waste Landfill
CY	Calendar Year
CYN	Canyons (Burn Site)
DI	deionized
DO	dissolved oxygen
DOE	U.S. Department of Energy
EB	equipment blank
EPA	U.S. Environmental Protection Agency
ER	Environmental Restoration Operations
ER Quarterly Report	Environmental Restoration Operations (ER) Consolidated Quarterly Report
ET Cover	evapotranspirative cover
FB	field blank
FOP	Field Operating Procedure
GEL	GEL Laboratories LLC
HE	high explosive(s)
LTMMMP	Long-Term Monitoring and Maintenance Plan
LTS	Long-Term Stewardship
LWDS	Liquid Waste Disposal System
MCL	maximum contaminant level
MDA	minimum detectable activity
MDL	method detection limit
mg/L	milligram(s) per liter
mL	milliliter(s)
MW	monitoring well
MWL	Mixed Waste Landfill

ND	nondetect
NMED	New Mexico Environment Department
NPDES	National Pollution Discharge Elimination System
NPN	nitrate plus nitrite
NTU	nephelometric turbidity units
OBS	Old Burn Site
ORP	oxidation-reduction potential
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

SECTION I

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SECTION I

ENVIRONMENTAL RESTORATION OPERATIONS CONSOLIDATED

QUARTERLY REPORT, JULY – SEPTEMBER 2012

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 July, August, and September 2012 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 New Mexico Environment Department (NMED) in March 2012 (SNL/NM March 2012a). NMED initiated a 60-day public comment period on the MWL LTMMP on September 14, 2012, and announced a public meeting to be held on October 16, 2012.

A final plan was completed in August 2012 for reclamation of the MWL Borrow Pit in Technical Area (TA) III (Figure I-1). It defines the scope of work required to adequately stabilize the site and close the National Pollution Discharge Elimination System (NPDES) Construction Permit. The NPDES Permit was established through a Storm Water Pollution Prevention Plan submitted to the U.S. Environmental Protection Agency (EPA) in 2006 as part of the MWL evapotranspirative cover (ET Cover) project. Restoration field work is planned for May through June 2013 and will be completed just prior to the 2013 monsoon season (July 2013).



Figure I-1
View to the North of MWL Borrow Pit,
June 2012

Groundwater monitoring activities for the MWL are discussed in Section I.2.3.4 of this ER Quarterly Report.

2.1.1 MWL Evapotranspirative Cover Supplemental Watering Activities

Supplemental watering is performed during extended periods of dry weather to help establish and maintain vegetation on the MWL evapotranspirative cover. Seven supplemental watering events were performed for the MWL ET Cover this reporting period during the month of June. For each watering event, approximately 56,000 gallons of water was applied over a three-day period to stimulate a ½-inch rainfall event. Water was applied during the morning hours to minimize evaporation.

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

2.1.2 MWL Evapotranspirative Cover Maintenance Activities

Removal of Russian thistle and other common invasive annual weed species from the MWL ET Cover and fenced perimeter was initiated on September 14, 2012. The weed removal work should be completed in October, 2012.

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

2.2 Project Management and Site Closure

ER sites currently undergoing the Corrective Action Complete (CAC) process are addressed in this section. The two permit modification requests 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 36 sites undergoing corrective action under the Permit and Compliance Order on Consent (Table I-1); of these 36 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, 196, 233, and 234
- AOCs 1090, 1094, 1095, 1114, 1115, 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). 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]). The four SWMUs and one AOC included in the January 2008 permit modification request are:

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

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

In April 2010, DOE/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 as follows:

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 are summarized as follows:

- The section titled, “SWMUs Requiring Additional Corrective Action,” specifies additional characterization requirements for:
 1. SWMU 68 - Old Burn Site
 2. SWMU 149 - Building 9930 Septic System
 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. SWMU116 - Building 9990 Septic System (Coyote Test Field [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
 2. SWMU 46 – Old Acid Waste Line Outfall
 3. SWMU 91 – Lead Firing Site
 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 – Building 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
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)

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

In a Public Notice and in a letter (both dated September 17, 2012), the NMED solicited public comments, and began a 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 includes SWMU 52. Twenty-three of these 24 SWMUs/AOCs were from the March 2006 and January 2008 requests. In the September 17, 2012, solicitation of public comments, the NMED states that persons who provided public comment by the February 8, 2008, deadline (for the 26 SWMUs/AOCs submitted in March 2006) do not need to resubmit their comments, and 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 request a hearing again.

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 Sections I.2.3.8 and I.2.3.9), 3 were granted CAC status, and 23 are still in the CAC

regulatory process (one site, not under the responsibility of ER, brings the number in the CAC process to 24). There are also ongoing 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

The NMED requested additional information on SWMU 52 (Brandwein December 2009a and 2009b, and NMED April 2010). In December 2011, SNL/NM ER personnel provided the requested information to the NMED along with a proposal to address NMED concerns about the future use of this SWMU site (SNL/NM December 2011).

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 the 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) 2012 Annual Groundwater Monitoring Report (anticipated submittal to the NMED in summer 2013).

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

Analytical results for the CWL groundwater monitoring will be presented and discussed in the CWL Annual Post-Closure Care Report for CY 2012.

Analytical results for the July 2012 groundwater sampling of monitoring wells at SWMUs 8/58 (CCBA-MW-1 and CCBA-MW-2) and SWMU 68 (OBS-MW-1, OBS-MW-2, and OBS-MW-3) are presented in Section IV of this ER Quarterly Report.

Analytical results for the September 2012 groundwater sampling of monitoring wells at SWMU 149 (CTF-MW-3) and SWMU 154 (CTF-MW-2) are presented in Section III of this ER Quarterly Report.

2.3.1 **Technical Area V Groundwater**

Groundwater sampling at TA-V was conducted in July and August 2012.

2.3.2 **Burn Site Groundwater**

No BSG monitoring activities were performed during this reporting period; semiannual sampling events will be discussed in future quarterly reports.

2.3.3 **Tijeras Arroyo Groundwater**

Groundwater sampling for the TAG investigation was conducted in August and September 2012.

2.3.4 **Mixed Waste Landfill Groundwater**

No MWL groundwater monitoring activities were performed during this reporting period; annual sampling events will be discussed in future quarterly reports.

2.3.5 **Chemical Waste Landfill Groundwater**

Groundwater sampling for the CWL was performed in July 2012.

2.3.6 **SWMUs 8/58 Groundwater**

Groundwater sampling for SWMUs 8/58 was conducted in July 2012.

2.3.7 **SWMU 68 Groundwater**

Groundwater sampling for SWMU 68 was conducted in July 2012.

2.3.8 **SWMU 49 Groundwater**

No SWMU 49 groundwater monitoring activities were performed during this reporting period; annual sampling events will be discussed in future quarterly reports.

2.3.9 **SWMU 116 Groundwater**

No SWMU 116 groundwater monitoring activities were performed during this reporting period; annual sampling events will be discussed in future quarterly reports.

2.3.10 **SWMU 149 Groundwater**

Groundwater sampling for SWMU 149 was conducted in September 2012.

2.3.11 **SWMU 154 Groundwater**

Groundwater sampling for SWMU 154 was conducted in September 2012.

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

This section lists the 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 2012a).

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 (Kielsing 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 2013).

- NMED approved the CWL Annual Post-Closure Care Report for Calendar Year 2011 (SNL/NM March 2012b) on July 18, 2012 (Kielsing July 2012).
- Quarterly inspection of the CWL ET Cover surface, storm-water diversion structures, and security fence was performed on September 14, 2012. Repair work to clear a storm water drainage channel of debris (primarily accumulated weeds) that was blocking more than 1/3 of the drainage channel, noted during the June 20 inspection, was completed on August 13, 2012. No other maintenance or repairs were required.
- The second semiannual groundwater monitoring event and groundwater monitoring well inspection were performed July 5 through 11, 2012. All wells were inspected and no maintenance or repairs were required.
- The annual Biology Inspection of the CWL ET Cover was performed September 18, 2012. No maintenance or repair issues were identified.
- Removal of weeds (dominantly Russian thistle) from the CWL ET Cover, perimeter fence, and surrounding area was performed from September 10 through 13, 2012. Because of the dry conditions, small Fourwing saltbush plants could not be removed with the roots intact, so they will be clipped later in the winter season to ensure a higher mortality rate. Approximately 32 cubic yards of compressed weeds were removed from the CWL and disposed of at the Kirtland Air Force Base Landfill.

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 (July through September 2012) include the following:

- Quarterly monitoring of the Vadose Zone Monitoring System was conducted in September 2012. 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 July 31, 2012.
- 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 September 7 and September 19, 2012, which included the containment cell cover, storm-water diversion structures, security fences, gates, signs, and benchmarks. Any findings not already dealt with will be addressed during the next reporting period. The inspection findings are as follows:
 - Excess and undesirable vegetation identified for removal between the site-boundary fence and the base of the containment cell.
 - A few plants that can develop extensive root systems and potentially damage the high-density polyethylene fabric that is part of the cover system were identified growing on the containment cell vegetative cover.
 - The bases of the five primary subliner access tubes on the north side of the containment cell need to be painted.
 - Rope boundary around the RCRA less-than-90-day accumulation area is deteriorating and needs to be replaced.

All excess and undesirable vegetation is scheduled for removal in October by contractor Sequoia Landscaping with oversight from the SNL/NM staff biologist.

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 does not exceed 10 pounds.

- Leachate waste stored on site as of July 1, 2012 – 37 gallons
- Leachate waste generated on site during the reporting period – 95 gallons
- Leachate waste removed from the site by Hazardous Waste Handling Facility personnel on August 6, 2012 – 71 gallons
- Leachate waste remaining on site at the end of this reporting period – 61 gallons

3.2.2 **CAMU Regulatory Activities**

On September 27, 2012, DOE/Sandia submitted the 2012 “Corrective Action Management Unit Vadose Zone Monitoring System Annual Monitoring Results Report,” to the NMED. It included the results for data collected from July 2011 through June 2012 (SNL/NM September 2012). CAMU Vadose Zone Monitoring System Annual Monitoring Results Report for Calendar Year 2012 was submitted to the NMED on September 27, 2012 (SNL/NM September 2012).

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

CAMU Vadose Zone Monitoring System Annual Monitoring Results Report for Calendar Year 2012 was submitted to the NMED on September 27, 2012 (SNL/NM September 2012).

4.0 **References**

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Tables

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

Solid Waste Management Units	
Site Number	Site Description
4	LWDS Surface Impoundments (TA-V)
5	LWDS Drainfield
8	Open Dump (CCBA)
28-2	Mine Shafts
46	Old Acid Waste Line Outfall
49	Building 9820 Drains (Lurance Canyon)
52	LWDS Holding Tank
58	CCBA
68	Old Burn Site
76	MWL (TA-III)
83	Long Sled Track
84	Gun Facilities
91	Lead Firing Site (Thunder Range)
101	Building 9926/9926A Septic System and Seepage Pit (CTF)
105	Mercury Building 6585
116	Building 9990 Septic System (CTF)
138	Building 6630 Septic System (TA-III)
140	Building 9965 Septic System (Thunder Range)
147	Building 9925 Septic System (CTF)
149	Building 9930 Septic System (CTF)
150	Buildings 9939/9939A Septic System and Drain Field (CTF)
154	9960 Septic System and Seepage Pits (CTF)
161	Building 6636 Septic System (TA-III)
196	Building 6597 Cistern (TA-V)
233	Storm Drain System Outfall
234	Storm Drain System Outfall
240	Short Sled Track
Total	27
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)
1115	Former Offices Septic System (Solar Tower Complex)
1116	Building 9981 Seepage Pit (Solar Tower Complex)
1117	Building 9982 Drywell (Solar Tower Complex)
Total	9

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 2012 ^a	Quarter of Sampling in CY 2012	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	Quarterly, then Semiannually	1,2, 4	AGMR	AGMR	CYN-MW4, CYN-MW6, CYN-MW7, CYN-MW8, CYN-MW9, CYN-MW10, CYN-MW11, CYN-MW12,
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-11
SWMUs 8/58 Groundwater	Quarterly	1,2,3,4	AGMR	Section II of ER Quarterly	CCBA-MW1, CCBA-MW2
SWMU 68 Groundwater	Quarterly	1,2,3,4	AGMR	Section II of ER Quarterly	OBS-MW1, OBS-MW2, OBS-MW3
SWMU 49 Groundwater	Annually	1	AGMR	AGMR	CYN-MW5
SWMU 116 Groundwater	Annually	1	AGMR	AGMR	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 IV of ER Quarterly	Section II of ER Quarterly	CTF-MW2

Notes

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

AGMR = Annual Groundwater Monitoring Report.

BSG = Burn Site Groundwater.

CWL = Chemical Waste Landfill.

CY = Calendar year.

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.

TAV = Technical Area V.

SECTION II

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

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

SECTION II

PERCHLORATE SCREENING QUARTERLY GROUNDWATER MONITORING REPORT, JULY – SEPTEMBER 2012

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), hereafter 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 Third Quarter of Calendar Year (CY) 2012 (July, August, and September) 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 twenty-seventh to be submitted since the November 2005 letter report; the previous reports were submitted for Fourth Quarter of CY 2005 through the Second Quarter of CY 2012 (SNL/NM February 2006 and October 2012).

Groundwater at Coyote Test Field (CTF) wells CTF-MW2 and CTF-MW3 have been sampled seven times; Solid Waste Management Units (SWMUs) 8/58 wells CCBA-MW1 and CCBA-MW2 have been sampled four times; and SWMU 68 wells OBS-MW1, OBS-MW2, and OBS-MW3 have been sampled four times (Table II-2). (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 Third Quarter of CY 2012 (July, August, and September) for the wells currently active in the perchlorate-screening program as shown on Figure II-1 and listed in Table II-2. In accordance with the requirements of Table XI-1 of the Order, a well with four consecutive quarters of nondetects (NDs) for perchlorate at the screening level/method detection limit (MDL) of 4 micrograms per liter ($\mu\text{g/L}$) is removed from the requirement of continued monitoring for perchlorate.

Data for numerous wells identified in the Order have satisfied this requirement; therefore, these wells have been removed from the perchlorate-screening program. The perchlorate results for these wells have been provided in previous reports and are not discussed in this current report. Wells discussed in previous perchlorate-screening reports are included in Figure II-2. CYN-MW1D and CYN-MW5 were recently reinstated and are discussed in Section II.3.0.

SNL/NM personnel performed groundwater sampling for perchlorate at seven wells on the dates listed in Table II-2. Several of the wells were installed after the Order was finalized 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 Fourth Quarter, Fiscal Year 2012” (SNL/NM June 2012a).
- “SWMU 68 Groundwater Monitoring, Mini-SAP for Fourth Quarter, Fiscal Year 2012” (SNL/NM June 2012b).
- “SWMU 149 Groundwater Monitoring, Mini-SAP for Fourth Quarter, Fiscal Year 2012” (SNL/NM August 2012a).
- “SWMU 154 Groundwater Monitoring, Mini-SAP for Fourth Quarter, Fiscal Year 2012” (SNL/NM August 2012b).

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

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

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

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

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

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. 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 these wells have been sampled for four consecutive monitoring events with no perchlorate detections and have since been removed from the perchlorate sampling list.

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/Areas of Concern (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 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, 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 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 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-4 summarizes current and historical perchlorate results for wells currently in the perchlorate-screening monitoring network. The analytical laboratory COA for the Third Quarter of CY 2012 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 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 June 2012a, June 2012b, August 2012a, August 2012b) were identified during the Third Quarter of CY 2012 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 CTF-MW1 and CYN-MW5, semiannual monitoring for CYN-MW6, and quarterly monitoring for wells CCBA-MW1, CCBA-MW2, CTF-MW2, CTF-MW3, OBS-MW1, OBS-MW2, and OBS-MW3.

6.0 References

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Sandia National Laboratories, New Mexico (SNL/NM), June 2012b. "SWMU 68 Groundwater Monitoring, Mini-SAP for Fourth Quarter, Fiscal Year 2012," Environmental Restoration Operations, Sandia National Laboratories, New Mexico.

Sandia National Laboratories, New Mexico (SNL/NM), August 2012a. "SWMU 149 Groundwater Monitoring, Mini-SAP for Fourth Quarter, Fiscal Year 2012," Environmental Restoration Operations, Sandia National Laboratories, New Mexico.

Sandia National Laboratories, New Mexico (SNL/NM), August 2012b. "SWMU 154 Groundwater Monitoring, Mini-SAP for Fourth Quarter, Fiscal Year 2012," Environmental Restoration Operations, Sandia National Laboratories, New Mexico.

Sandia National Laboratories, New Mexico (SNL/NM), October 2012. "Consolidated Quarterly Report, April through June 2012, Section II: Perchlorate Screening Quarterly Monitoring Report," Environmental Restoration Operations, Sandia National Laboratories, New Mexico.

SNL/NM, see Sandia National Laboratories, New Mexico.

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

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Figures

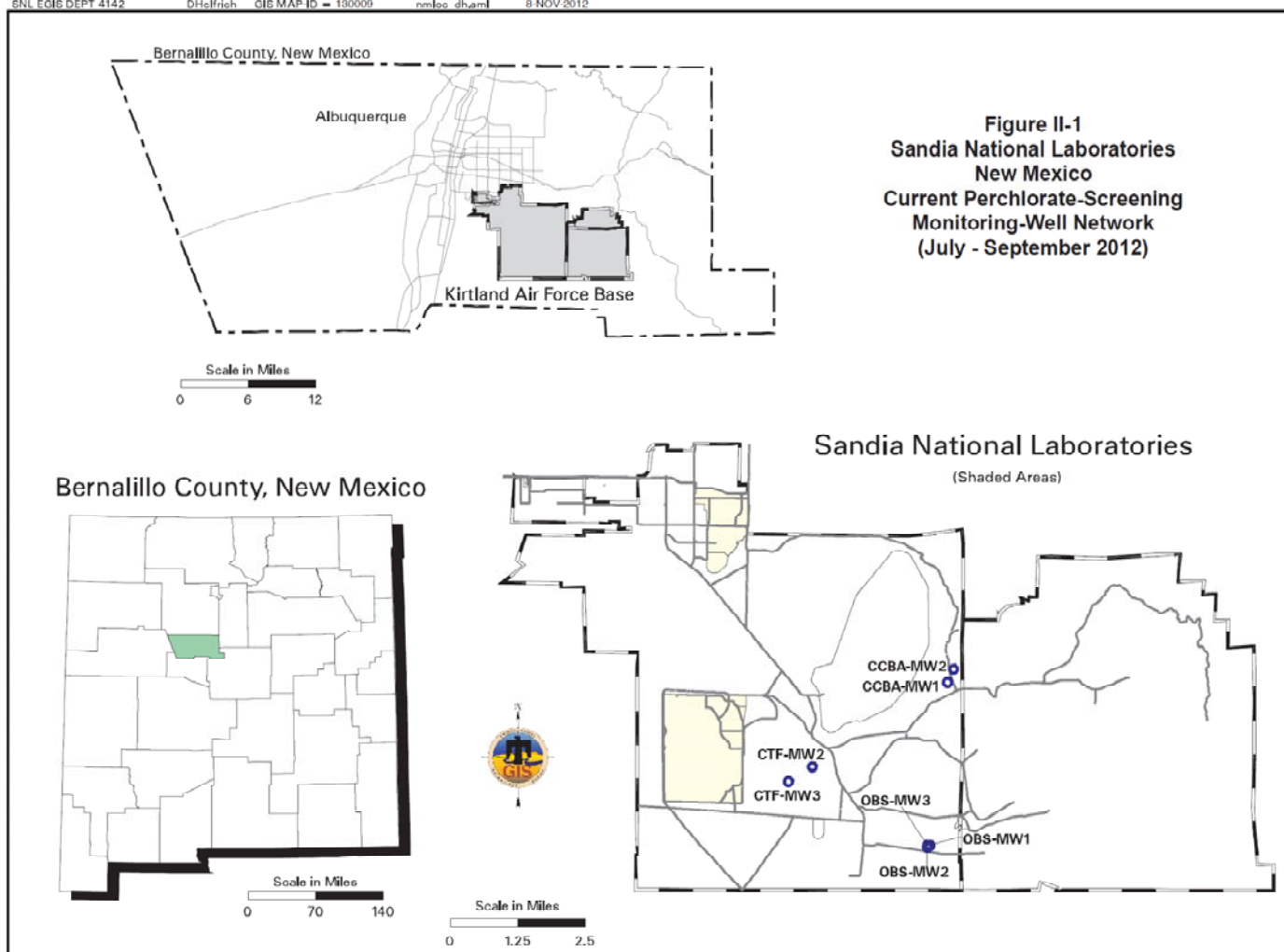


Figure II-1
Sandia National Laboratories, New Mexico
Current Perchlorate-Screening Monitoring Well Network, July – September 2012

Tables

Table II-1
Wells Discussed in Previous Perchlorate-Screening Reports

Well
CYN-MW1D
CYN-MW5
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.
 CYN = Canyons (Burn Site).
 LWDS = Liquid Waste Disposal System.
 MRN = Magazine Road North.
 MW = Monitoring well.
 NWTA = Northwest Technical Area (III).
 SWTA = Southwest Technical Area (III).
 TA = Technical Area.
 W = Well.

Table II-2
Current Perchlorate Screening Monitoring Well Network
Third Quarter, CY 2012

Well	Date Sampled	Number of Consecutive Sampling Events ^a	Remaining Number of Sampling Events ^b	Sampling Equipment
CCBA-MW1	16-Jul-12	4	4	Bennett™ Pump
CCBA-MW2	12-Jul-12	4	4	Bennett™ Pump
CTF-MW2	25-Sep-12	7	1	Bennett™ Pump
CTF-MW3	21-Sep-12	7	1	Bennett™ Pump
OBS-MW1	17-Jul-12	4	4	Bennett™ Pump
OBS-MW2	18-Jul-12	4	4	Bennett™ Pump
OBS-MW3	19-Jul-12	4	4	Bennett™ Pump

Notes

^aIncludes this sampling event.

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

µg/L = Microgram(s) per liter.

CCBA = Coyote Canyon Blast Area.

CTF = Coyote Test Field.

CY = Calendar Year.

MDL = Method detection limit.

MW = Monitoring well.

NMED = New Mexico Environment Department.

OBS = Old Burn Site.

The Order = The Compliance Order on Consent.

Table II-3
Sample Details for Third Quarter, CY 2012 Perchlorate Sampling

Well	Sample Identification	AR/COC Number	Associated Groundwater Investigation
CCBA-MW1	092615-020	614288	SWMUs 8/58
	092616-020		
CCBA-MW2	092610-020	614286	
CTF-MW2	092862-020	614391	SWMU 154
CTF-MW3	092860-020	614390	SWMU 149
OBS-MW1	092618-020	614289	SWMU 68
OBS-MW2	092620-020	614290	
OBS-MW3	092625-020	614292	
	092626-020		

Notes

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

Table II-4
Summary of Perchlorate Screening Analytical Results for the
Current Monitoring Well Network as of Third Quarter, CY 2012

Well	Sample Date	AR/COC Number	Sample Number	Perchlorate 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
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	
CTF-MW2	08-Mar-11	613448	090237-020	ND	4.0	12	NE	U		EPA 314.0	
			090238-020	ND	4.0	12	NE	U		EPA 314.0	Duplicate sample
	31-May-11	613578	090670-020	ND	4.0	12	NE	U		EPA 314.0	
	29-Sep-11	613855	091259-020	ND	4.0	12	NE	U		EPA 314.0	
	09-Dec-11	613929	091525-020	ND	4.0	12	NE	U		EPA 314.0	
			091949-020	ND	4.0	12	NE	U		EPA 314.0	
	30-Mar-12	614055	091950-020	ND	4.0	12	NE	U		EPA 314.0	Duplicate sample
			092538-020	ND	4.0	12	NE	U		EPA 314.0	
CTF-MW3	09-Mar-11	613450	090243-020	ND	4.0	12	NE	U		EPA 314.0	
			090244-020	ND	4.0	12	NE	U		EPA 314.0	Duplicate sample
	03-Jun-11	613579	090672-020	ND	4.0	12	NE	U		EPA 314.0	
	23-Sep-11	613854	091257-020	ND	4.0	12	NE	U		EPA 314.0	
	08-Dec-11	613928	091523-020	ND	4.0	12	NE	U		EPA 314.0	
	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	

Table II-4 (Continued)
Summary of Perchlorate Screening Analytical Results for the
Current Monitoring-Well Network, as of Third Quarter, CY 2012

Well	Sample Date	AR/COC Number	Sample Number	Perchlorate 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
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	
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	
OBS-MW3	24-Oct-11	613882	091342-020	ND	4.0	12	NE	U		EPA 314.0	
			091343-020	ND	4.0	12	NE	U		EPA 314.0	Duplicate sample
	11-Jan-12	613955	091607-020	ND	4.0	12	NE	U		EPA 314.0	
	17-Apr-12	614079	092018-020	ND	4.0	12	NE	U		EPA 314.0	
			092625-020	ND	4.0	12	NE	U		EPA 314.0	
	19-Jul-12	614292	092626-020	ND	4.0	12	NE	U		EPA 314.0	Duplicate sample

Notes

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.

^aResult

ND = Not detected (at MDL).
µg/L = Micrograms per liter.

^bMDL

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.

^cPQL

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

Table II-4 (Concluded)
Summary of Perchlorate Screening Analytical Results for the
Current Monitoring-Well Network, as of Third Quarter, CY 2012

Notes (continued)

^dMCL

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.

^eLaboratory Qualifier

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

^fValidation Qualifier

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

^gAnalytical Method

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

Table II-5
Perchlorate Screening Groundwater Monitoring
Field Water Quality Measurements^a, Third Quarter, CY 2012

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	16-Jul-12	18.81	482	173.9	6.46	0.33	31.6	2.92
CCBA-MW2	12-Jul-12	18.39	569	141.0	7.37	0.41	62.4	5.86
CTF-MW2	25-Sep-12	18.61	3551	58.6	5.90	0.68	2.0	0.19
CTF-MW3	21-Sep-12	22.11	1653	193.9	6.89	0.34	88.9	7.72
OBS-MW1	17-Jul-12	17.99	498	151.1	7.28	0.41	38.1	3.59
OBS-MW2	18-Jul-12	20.84	494	153.2	7.25	0.32	39.6	3.53
OBS-MW3	19-Jul-12	18.82	537	179.9	7.29	0.37	46.2	4.27

Notes

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

°C = Degrees Celsius.

% Sat = Percent saturation.

µmhos/cm = Micromhos per centimeter.

CCBA = Coyote Canyon Blast Area.

CTF = Coyote Test Field.

CY = Calendar Year.

mg/L = Milligrams per liter.

mV = Millivolt(s).

MW = Monitoring well.

NTU = Nephelometric turbidity unit.

OBS = Old Burn Site.

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

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Appendix A

Analytical Laboratory Certificates of
Analysis for the Perchlorate Data

CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY

Internal Lab

Page 1 of 2

Batch No. *NA*

SMO Use

AR/COC **614286**

Project Name: SWMU 8/58 GWM	Date Samples Shipped: 7/12/12	SMO Authorization: <i>Don Johnson</i>	<input type="checkbox"/> Waste Characterization <input type="checkbox"/> RMMA <input type="checkbox"/> Released by COC No. <input checked="" type="checkbox"/> 4° Celsius
Project/Task Manager: Clinton Lum	Carrier/Waybill No. 143746	SMO Contact Phone: See B.H. Code	
Project/Task Number: 98026 01.12	Lab Contact: Edie Kent/803.556.8171	Lorraine Herrera/505-844-3199	
Service Order: CF 262-12	Lab Destination: GEL	Send Report to SMO: Rita Kavanaugh/505.284.2553	
Contract No.: PO 691436			

Tech Area:	Operational Site:
Building:	Room:

Sample No.	Fraction	Sample Location Detail	Depth (ft)	Date/Time Collected	Sample Matrix	Container Type	Volume	Preservative	Collection Method	Sample Type	Parameter & Method Requested	Lab Sample ID
✓ 092610	-001	CCBA-MW2	117	7/12/12 9:05	✓ GW	G	3x40ml	HCL	G	SA	TCL VOC (SW846-8260B)	307745 001
✓ 092610	-002	CCBA-MW2	117	7/12/12 9:07	✓ GW	AG	4x1L	None	G	SA	TCL SVOC (SW846-8270C)	002
✓ 092610	-009	✓ CCBA-MW2	117	7/12/12 9:08	✓ GW	P	500 ml	HNO3	G	SA	TAL Metals + U (SW846-6020/7470)	003
✓ 092610	-016	CCBA-MW2	117	7/12/12 9:09	✓ GW	P	125 ml	None	G	SA	Anions (SW846-9056)	004
✓ 092610	-017	CCBA-MW2	117	7/12/12 9:11	✓ FGW	P	500 ml	HNO3	G	SA	Cations (SW846-6020)	307755 001
✓ 092610	-018	CCBA-MW2	117	7/12/12 9:12	✓ GW	P	125 ml	H2SO4	G	SA	NPN (353.2)	307745 005
✓ 092610	-020	CCBA-MW2	117	7/12/12 9:13	✓ GW	P	250 ml	None	G	SA	Perchlorate (314.0)	006
✓ 092610	-022	CCBA-MW2	117	7/12/12 9:14	✓ GW	P	500 ml	None	G	SA	Alkalinity (SM2320B)	007
✓ 092610	-024	CCBA-MW2	117	7/12/12 9:16	✓ GW	AG	4x1L	None	G	SA	HE (SW846-8321A)	008
✓ 092610	-027	✓ CCBA-MW2	117	7/12/12 9:17	✓ GW	P	250 ml	NaOH	G	SA	Total Cyanide (SW846-9012)	009

Last Chain: <input type="checkbox"/> Yes		Sample Tracking		SMO Use		Special Instructions/QC Requirements:		Conditions on Receipt
Validation Req'd: <input checked="" type="checkbox"/> Yes		Date Entered:				EDD <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		
Background: <input type="checkbox"/> Yes		Entered by:				Turnaround Time <input type="checkbox"/> 7 Day* <input type="checkbox"/> 15 Day* <input checked="" type="checkbox"/> Day		
Confirmatory: <input type="checkbox"/> Yes		QC inits.:				Negotiated TAT <input type="checkbox"/>		
Sample Team Members	Name	Signature	Init.	Company/Organization/Phone/Cell		Sample Disposal <input type="checkbox"/> Return to Client <input checked="" type="checkbox"/> Disposal by Lab		Lab Use
	Robert Lynch	<i>Robert Lynch</i>	RL	SNL/4142/844-4013/250-7090		Return Samples By:		
	Alfred Santillanes	<i>Alfred Santillanes</i>	AS	SNL/4142/844-5130/228-0710		Comments: Send report to Tim Jackson/4142/MS 0729/284-2547		
	William J. Gibson	<i>William J. Gibson</i>	WJG	SNL/4142/844-4013/239-7367		FGW (filtered in field w/40 micron filter), Anions (Br, Cl, F, SO4), Cations (Ca, Mg, K, Na) Alkalinity (total, bicarbonate, carbonate) If perchlorate detected, perform verification analysis using SW846-6850M)		

1. Relinquished by <i>Alfred Santillanes</i> Org. 4142 Date 7/12/12 Time 1057	3. Relinquished by	Org.	Date	Time
1. Received by <i>Don Johnson</i> Org. 4142 Date 7/12/12 Time 1057	3. Received by	Org.	Date	Time
2. Relinquished by <i>Don Johnson</i> Org. 4142 Date 7/12/12 Time 1130	4. Relinquished by	Org.	Date	Time
2. Received by <i>Don Johnson</i> Org. 4142 Date 7-13-12 Time 0805	4. Received by	Org.	Date	Time

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

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

Page 2 of 2

AR/COC 614286

[illegible]

GEL LABORATORIES LLC

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

Certificate of Analysis

Report Date: August 8, 2012

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: Level C, Groundwater Monitoring

Client Sample ID: 092610-020
Sample ID: 307745006
Matrix: AQUEOUS
Collect Date: 12-JUL-12 09:13
Receive Date: 13-JUL-12
Collector: Client

Project: SNLSGWater
Client ID: SNLS003

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

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Ion Chromatography											
EPA 314.0 Perchlorate by IC "As Received"											
Perchlorate	U	ND	0.004	0.012	mg/L	1	MAR1	07/19/12	0422	1229390	1

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	EPA 314.0 DOE-AL	

CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY

307912
307969

Internal Lab

Page 1 of 2

Batch No. <u>NA</u>		SMO Use		AR/COC 614288								
Project Name: SWMU 8/58 GWM		Date Samples Shipped: <u>7/16/12</u>		SMO Authorization: <u>[Signature]</u>								
Project/Task Manager: Clinton Lum		Carrier/Waybill No: <u>143821</u>		SMO Contact Phone: <u>See Bottle one</u>								
Project/Task Number: 98026 01.12		Lab Contact: Edie Kent/803.556.8171		Lorraine Herrera/505-844-3199								
Service Order: CF 262-12		Lab Destination: GEL		Send Report to SMO:								
		Contract No.: PO 691436		Rita Kavanaugh/505.284.2553								
Tech Area:				<input type="checkbox"/> Waste Characterization <input type="checkbox"/> RMMA <input type="checkbox"/> Released by COC No. <input checked="" type="checkbox"/> 4° Celsius								
Building:		Room:		Operational Site:								
				Bill to: Sandia National Laboratories (Accounts Payable), P.O. Box 5800, MS-0154 Albuquerque, NM 87185-0154 <u>307912</u>								
Sample No.	Fraction	Sample Location Detail	Depth (ft)	Date/Time Collected	Sample Matrix	Container Type	Volume	Preservative	Collection Method	Sample Type	Parameter & Method Requested	Lab Sample ID
✓ 092615	-001	CCBA-MW1	79	7/16/12 9:08	GW	G	3x40ml	HCL	G	SA	TCL VOC (SW846-8260B)	001
✓ 092615	-002	CCBA-MW1	79	7/16/12 9:11	GW	AG	4x1L	None	G	SA	TCL SVOC (SW846-8270C)	002
✓ 092615	-009	CCBA-MW1	79	7/16/12 9:12	GW	P	500 ml	HNO3	G	SA	TAL Metals + U (SW846-6020/7470)	003
✓ 092615	-016	CCBA-MW1	79	7/16/12 9:13	GW	P	125 ml	None	G	SA	Anions (SW846-9056)	004
✓ 092615	-017	CCBA-MW1	79	7/16/12 9:15	FGW	P	500 ml	HNO3	G	SA	Cations (SW846-6020)	005
✓ 092615	-018	CCBA-MW1	79	7/16/12 9:16	GW	P	125 ml	H2SO4	G	SA	NPN (353.2)	006
✓ 092615	-020	CCBA-MW1	79	7/16/12 9:17	GW	P	250 ml	None	G	SA	Perchlorate (314.0)	007
✓ 092615	-022	CCBA-MW1	79	7/16/12 9:18	GW	P	500 ml	None	G	SA	Alkalinity (SM2320B)	008
✓ 092615	-024	CCBA-MW1	79	7/16/12 9:20	GW	AG	4x1L	None	G	SA	HE (SW846-8321A)	009
✓ 092615	-027	CCBA-MW1	79	7/16/12 9:21	GW	P	250 ml	NaOH	G	SA	Total Cyanide (SW846-9012)	010
Last Chain: <input checked="" type="checkbox"/> Yes			Sample Tracking			SMO Use			Special Instructions/QC Requirements:			Conditions on Receipt
Validation Req'd: <input checked="" type="checkbox"/> Yes			Date Entered:			EDD <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No			Turnaround Time <input type="checkbox"/> 7 Day* <input type="checkbox"/> 15 Day* <input checked="" type="checkbox"/> Day			
Background: <input type="checkbox"/> Yes			Entered by:			Negotiated TAT			Sample Disposal <input type="checkbox"/> Return to Client <input checked="" type="checkbox"/> Disposal by Lab			
Confirmatory: <input type="checkbox"/> Yes			QC inits.:			Return Samples By:			Comments:			
Sample Team Members	Name	Signature	Init.	Company/Organization/Phone/Cell			Return Samples By:			Comments:		
	Robert Lynch	<u>[Signature]</u>	RL	SNL/4142/844-4013/250-7090						Send report to Tim Jackson/4142/MS 0729/284-2547		
	Alfred Santillanes	<u>[Signature]</u>	AS	SNL/4142/844-5130/228-0710						FGW (Filtered in field w/40 micron filter), Anions (Br, Cl, F, SO4),		
	William J. Gibson	<u>[Signature]</u>	WJG	SNL/4142/844-4013/239-7367						Cations (Ca, Mg, K, Na) Alkalinity (total, bicarbonate, carbonate)		
If perchlorate detected, perform verification analysis using SW846-6850M												Lab Use
1. Relinquished by <u>[Signature]</u> Org. <u>4/142</u> Date <u>7/16/12</u> Time <u>1024</u>			3. Relinquished by			Org.			Date			Time
1. Received by <u>[Signature]</u> Org. <u>4/142</u> Date <u>7/16/12</u> Time <u>1024</u>			3. Received by			Org.			Date			Time
2. Relinquished by <u>[Signature]</u> Org. <u>4/142</u> Date <u>7/16/12</u> Time <u>1130</u>			4. Relinquished by			Org.			Date			Time
2. Received by <u>[Signature]</u> Org. <u>CEL</u> Date <u>7-17-12</u> Time <u>0740</u>			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)**

307912
307969

Page 2 of 2

AR/COC **614288**

Project Name: SWMU 8/58 GWM			Project/Task Manager: Clinton Lum			Project/Task No.: 98026 01.12								
Tech Area:														
Building:		Room:											Lab use	
Sample No.	Fraction	Sample Location Detail	Depth (ft)	Date/Time Collected	Sample Matrix	Container		Preservative	Collection Method	Sample Type	Parameter & Method Requested	Lab Sample ID		
						Type	Volume							
✓ 092615	-033	CCBA-MW1	79	7/16/12 9:23 ✓	GW	P	1 L	HNO3	G	SA	Gamma Spec (short list)(901.0)	011		
✓ 092615	-034	CCBA-MW1	79	7/16/12 9:25 ✓	GW	P	1 L	HNO3	G	SA	Gross Alpha/Beta (900.0)	012		
✓ 092615	-035	CCBA-MW1	79	7/16/12 9:27 ✓	GW	P	1 L	HNO3	G	SA	Isotopic U (ASTM D3972-09M)	013		
✓ 092616	-001 ✓	CCBA-MW1	79	7/16/12 9:08 ✓	GW	G	3x40ml	HCL	G	DU	TCL VOC (SW846-8260B)	014		
✓ 092616	-002	CCBA-MW1	79	7/16/12 9:11 ✓	GW	AG	4x1L	None	G	DU	TCL SVOC (SW846-8270C)	015		
✓ 092616	-009	CCBA-MW1	79	7/16/12 9:12 ✓	GW	P	500 ml ✓	HNO3	G	DU	TAL Metals + U (SW846-6020/7470)	016		
✓ 092616	-016	CCBA-MW1	79	7/16/12 9:13 ✓	GW	P	125 ml	None	G	DU	Anions (SW846-9056) ✓	017		
✓ 092616	-017	CCBA-MW1	79	7/16/12 9:15 ✓	FGW	P	500 ml	HNO3	G	DU	Cations (SW846-6020)	307469 002		
✓ 092616	-018	CCBA-MW1	79	7/16/12 9:16 ✓	GW	P	125 ml	H2SO4	G	DU	NPN (353.2)	307912 019		
✓ 092616	-020	CCBA-MW1	79	7/16/12 9:17 ✓	GW	P	250 ml	None	G	DU	Perchlorate (314.0)	020		
✓ 092616	-022	CCBA-MW1	79	7/16/12 9:18 ✓	GW	P	500 ml	None	G	DU	Alkalinity (SM2320B)	021 022		
✓ 092616	-024	CCBA-MW1	79	7/16/12 9:20 ✓	GW	AG	4x1L	None	G	DU	HE (SW846-8321A)	022		
✓ 092616	-027	CCBA-MW1	79	7/16/12 9:21 ✓	GW	P	250 ml	NaOH	G	DU	Total Cyanide (SW846-9012)	023		
✓ 092616	-033	CCBA-MW1	79	7/16/12 9:23 ✓	GW	P	1 L	HNO3	G	DU	Gamma Spec (short list)(901.0)	024		
✓ 092616	-034	CCBA-MW1	79	7/16/12 9:25 ✓	GW	P	1 L	HNO3	G	DU	Gross Alpha/Beta (900.0)	025		
✓ 092616	-035	CCBA-MW1	79	7/16/12 9:27 ✓	GW	P	1 L	HNO3	G	DU	Isotopic U (ASTM D3972-09M)	026		
✓ 092617	-001	CCBA-TB3	N/A	7/16/12 9:08 ✓	DIW	G	3x40ml	HCL	G	TB	TCL VOC (SW846-8260B)	027		

Recipient Initials

MK

EM
7/16/12

GEL LABORATORIES LLC

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

Certificate of Analysis

Report Date: August 13, 2012

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: Level C, Groundwater Monitoring

Client Sample ID: 092615-020
Sample ID: 307912007
Matrix: AQUEOUS
Collect Date: 16-JUL-12 09:17
Receive Date: 17-JUL-12
Collector: Client

Project: SNLSGWater
Client ID: SNLS003

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

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Ion Chromatography											
EPA 314.0 Perchlorate by IC "As Received"											
Perchlorate	U	ND	0.004	0.012	mg/L	1	MAR1	07/19/12	0539	1229390	1

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	EPA 314.0 DOE-AL	

GEL LABORATORIES LLC

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

Certificate of Analysis

Report Date: August 13, 2012

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: Level C, Groundwater Monitoring

Client Sample ID: 092616-020
Sample ID: 307912020
Matrix: AQUEOUS
Collect Date: 16-JUL-12 09:17
Receive Date: 17-JUL-12
Collector: Client

Project: SNLSGWater
Client ID: SNLS003
Client Desc.: CCBA-MW1
Vol. Recv.:

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Ion Chromatography											
EPA 314.0 Perchlorate by IC "As Received"											
Perchlorate	U	ND	0.004	0.012	mg/L	1	MAR1	07/19/12	0558	1229390	1

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	EPA 314.0 DOE-AL	

CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY

Internal Lab

Page 1 of 2

Batch No. NA		SMO Use		AR/COC 614289								
Project Name: SWMU 68 GWM		Date Samples Shipped: 7/17/12		SMO Authorization: <i>[Signature]</i>								
Project/Task Manager: Clinton Lum		Carrier/Waybill No: 143950		SMO Contact Phone: <i>See B-716 and</i>								
Project/Task Number: 98026 01.13		Lab Contact: Edie Kent/803.556.8171		Lorraine Herrera/505-844-3199								
Service Order: CF 263-12		Lab Destination: GEL		Send Report to SMO:								
		Contract No.: PO 691436		Rita Kavanaugh/505.284.2553								
Tech Area:				<input type="checkbox"/> Waste Characterization <input type="checkbox"/> RMMA <input type="checkbox"/> Released by COC No. <input checked="" type="checkbox"/> Celsius								
Building:		Room:		Operational Site:								
				Bill to: Sandia National Laboratories (Accounts Payable), P.O. Box 5800, MS-0154 Albuquerque, NM 87185-0154 307986								
Sample No.	Fraction	Sample Location Detail	Depth (ft)	Date/Time Collected	Sample Matrix	Container Type	Volume	Preservative	Collection Method	Sample Type	Parameter & Method Requested	Lab Sample ID
✓ 092618	-001	OBS-MW1	154	7/17/12 9:27	GW	G	3x40ml	HCL	G	SA	TCL VOC (SW846-8260B)	001
✓ 092618	-002	OBS-MW1	154	7/17/12 9:29	GW	AG	4x1L	None	G	SA	TCL SVOC (SW846-8270C)	002
✓ 092618	-009	OBS-MW1	154	7/17/12 9:30	GW	P	500 ml	HNO3	G	SA	TAL Metals + U (SW846-6020/7470)	003
✓ 092618	-014	OBS-MW1	154	7/17/12 9:31	GW	P	250 ml	None	G	SA	Hexavalent Chromium (SW846-7196)	004
✓ 092618	-016	OBS-MW1	154	7/17/12 9:32	GW	P	125 ml	None	G	SA	Anions (SW846-9056)	005
✓ 092618	-017	OBS-MW1	154	7/17/12 9:34	FGW	P	500 ml	HNO3	G	SA	Cations (SW846-6020)	307994 001
✓ 092618	-018	OBS-MW1	154	7/17/12 9:35	GW	P	125 ml	H2SO4	G	SA	NPN (353.2)	307986 006
✓ 092618	-020	OBS-MW1	154	7/17/12 9:36	GW	P	250 ml	None	G	SA	Perchlorate (314.0)	007
✓ 092618	-022	OBS-MW1	154	7/17/12 9:37	GW	P	500 ml	None	G	SA	Alkalinity (SM2320B)	008
✓ 092618	-024	OBS-MW1	154	7/17/12 9:39	GW	AG	4x1L	None	G	SA	HE (SW846-8321A Mod)	009
Last Chain: <input type="checkbox"/> Yes			Sample Tracking			SMO Use			Special Instructions/QC Requirements:			Conditions on Receipt
Validation Req'd: <input checked="" type="checkbox"/> Yes			Date Entered:			EDD <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No			Turnaround Time <input type="checkbox"/> 7 Day* <input type="checkbox"/> 5 Day* 30 Day			
Background: <input type="checkbox"/> Yes			Entered by:			Negotiated TAT <input type="checkbox"/>						
Confirmatory: <input type="checkbox"/> Yes			QC inits.:			Sample Disposal <input type="checkbox"/> Return to Client <input checked="" type="checkbox"/> Disposal by Lab						
Sample Team Members	Name	Signature	Inlt.	Company/Organization/Phone/Cell			Return Samples By:			Comments: Send report to Tim Jackson/4142/MS 0729/284-2547 FGW (filtered in field w/40 micron filter), Anions (Cl, SO4), Cations (Ca, Mg, K, Na) Alkalinity (total, bicarbonate, carbonate) If perchlorate detected, perform verification analysis using SW846-6850M		
	William J. Gibson	<i>[Signature]</i>	<i>[Inlt.]</i>	SNL/4142/844-4013/250-7090								
	Robert Lynch	<i>[Signature]</i>	<i>[Inlt.]</i>	SNL/4142/844-5130/228-0710								
	Alfred Santillanes	<i>[Signature]</i>	<i>[Inlt.]</i>	SNL/4142/844-5130/228-0710								
1. Relinquished by <i>[Signature]</i> Org. 4142 Date 7/17/12 Time 10:10 1. Received by <i>[Signature]</i> Org. 4142 Date 7/17/12 Time 10:40 2. Relinquished by <i>[Signature]</i> Org. 4142 Date 7/17/12 Time 11:00 2. Received by <i>[Signature]</i> Org. GEL Date 7-18-12 Time 07:25 3. Relinquished by _____ Org. _____ Date _____ Time _____ 3. Received by _____ Org. _____ Date _____ Time _____ 4. Relinquished by _____ Org. _____ Date _____ Time _____ 4. Received by _____ Org. _____ Date _____ Time _____												

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

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

Page 2 of 2

AR/COC 614289

[illegible]

GEL LABORATORIES LLC

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

Certificate of Analysis

Report Date: August 15, 2012

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: Level C, Groundwater Monitoring

Client Sample ID: 092618-020
Sample ID: 307986007
Matrix: AQUEOUS
Collect Date: 17-JUL-12 09:36
Receive Date: 18-JUL-12
Collector: Client

Project: SNLSGWater
Client ID: SNLS003
Client Desc.: OBS-MW1
Vol. Recv.:

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Ion Chromatography											
EPA 314.0 Perchlorate by IC "As Received"											
Perchlorate	U	ND	0.004	0.012	mg/L	1	MAR1	07/19/12	0617	1229390	1

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	EPA 314.0 DOE-AL	

CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY

Internal Lab

Page 1 of 2

Batch No. N/AAR/COC **614290**

Project Name: SWMU 68 GWM	Date Samples Shipped: <u>7/18/12</u>	SMO Authorization: <u>[Signature]</u>	<input type="checkbox"/> Waste Characterization <input type="checkbox"/> RMMA <input type="checkbox"/> Released by COC No. <input checked="" type="checkbox"/> Celsius
Project/Task Manager: Clinton Lum	Carrier/Waybill No. <u>174009</u>	SMO Contact Phone: <u>505-844-3199</u>	
Project/Task Number: 98026 01.13	Lab Contact: Edie Kent/803.556.8171	Send Report to SMO: Rita Kavanaugh/505.284.2553	
Service Order: CF 263-12	Lab Destination: GEL	Contract No.: PO 691436	Bill to: Sandia National Laboratories (Accounts Payable), P.O. Box 5800, MS-0154 Albuquerque, NM 87185-0154 <u>308103</u>
Tech Area:			
Building:	Room:	Operational Site:	

Sample No.	Fraction	Sample Location Detail	Depth (ft)	Date/Time Collected	Sample Matrix	Container		Preservative	Collection Method	Sample Type	Parameter & Method Requested	Lab Sample ID
						Type	Volume					
092620	-001	OBS-MW2	253	7/18/12 9:19	GW	G	3x40ml	HCL	G	SA	TCL VOC (SW846-8260B)	001
092620	-002	OBS-MW2	253	7/18/12 9:21	GW	AG	4x1L	None	G	SA	TCL SVOC (SW846-8270C)	002
092620	-009	OBS-MW2	253	7/18/12 9:22	GW	P	500 ml	HNO3	G	SA	TAL Metals + U (SW846-6020/7470)	003
092620	-014	OBS-MW2	253	7/18/12 9:23	GW	P	250 ml	None	G	SA	Hexavalent Chromium (SW846-7196)	004
092620	-016	OBS-MW2	253	7/18/12 9:24	GW	P	125 ml	None	G	SA	Anions (SW846-9056)	005
092620	-017	OBS-MW2	253	7/18/12 9:26	FGW	P	500 ml	HNO3	G	SA	Cations (SW846-6020) <u>308104</u>	001
092620	-018	OBS-MW2	253	7/18/12 9:27	GW	P	125 ml	H2SO4	G	SA	NPN (353.2)	006
092620	-020	OBS-MW2	253	7/18/12 9:28	GW	P	250 ml	None	G	SA	Perchlorate (314.0)	007
092620	-022	OBS-MW2	253	7/18/12 9:29	GW	P	500 ml	None	G	SA	Alkalinity (SM2320B)	008
092620	-024	OBS-MW2	253	7/18/12 9:32	GW	AG	4x1L	None	G	SA	HE (SW846-8321A)	009

Last Chain: <input type="checkbox"/> Yes		Sample Tracking		SMO Use		Special Instructions/QC Requirements:		Conditions on Receipt
Validation Req'd: <input checked="" type="checkbox"/> Yes		Date Entered:		EDD <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		Turnaround Time <input type="checkbox"/> 7 Day* <input type="checkbox"/> 5 Day* <input checked="" type="checkbox"/> 3 Day		
Background: <input type="checkbox"/> Yes		Entered by:		Negotiated TAT <input type="checkbox"/>				
Confirmatory: <input type="checkbox"/> Yes		QC inits.:		Sample Disposal <input type="checkbox"/> Return to Client <input checked="" type="checkbox"/> Disposal by Lab				
Sample Team Members	Name	Signature	Init.	Company/Organization/Phone/Cell		Return Samples By:		Lab Use
	Robert Lynch	<u>[Signature]</u>	RL	SNL/4142/844-4013/250-7090				
	Alfred Santillanes	<u>[Signature]</u>	AS	SNL/4142/844-5130/228-0710		Comments: Send report to Tim Jackson/4142/MS 0729/284-2547 FGW (Filtered in field w/40 micron filter), Anions (Cl, SO4), Cations (Ca, Mg, K, Na) Alkalinity (total, bicarbonate, carbonate) If perchlorate detected, perform verification analysis using SW846-6850M		
	William J. Gibson	<u>[Signature]</u>	WJG	SNL/4142/844-4013/239-7367				
1. Relinquished by <u>[Signature]</u> Org. <u>4142</u> Date <u>7/18/12</u> Time <u>1055</u>		3. Relinquished by		Org.		Date		Time
1. Received by <u>[Signature]</u> Org. <u>4142</u> Date <u>7/18/12</u> Time <u>1055</u>		3. Received by		Org.		Date		Time
2. Relinquished by <u>[Signature]</u> Org. <u>4142</u> Date <u>7/18/12</u> Time <u>1130</u>		4. Relinquished by		Org.		Date		Time
2. Received by <u>[Signature]</u> Org. <u>4142</u> Date <u>7-19-12</u> Time <u>0730</u>		4. Received by		Org.		Date		Time

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

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

Page 2 of 2

AR/COC 614290

[illegible]

GEL LABORATORIES LLC

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

Certificate of Analysis

Report Date: August 16, 2012

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: Level C, Groundwater Monitoring

Client Sample ID: 092620-020
Sample ID: 308103007
Matrix: AQUEOUS
Collect Date: 18-JUL-12 09:28
Receive Date: 19-JUL-12
Collector: Client

Project: SNLSGWater
Client ID: SNLS003
Client Desc.: OBS-MW2
Vol. Recv.:

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Ion Chromatography											
EPA 314.0 Perchlorate by IC "As Received"											
Perchlorate	U	ND	0.004	0.012	mg/L	1	MAR1	07/19/12	1744	1230925	1

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	EPA 314.0 DOE-AL	

CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY

Internal Lab

Page 1 of 2

Batch No. NA		SMO Use		AR/COC 614292								
Project Name: SWMU 68 GWM		Date Samples Shipped: 7/19/12		SMO Authorization: <i>David W. Lynch</i>								
Project/Task Manager: Clinton Lum		Carrier/Waybill No. 144063		SMO Contact Phone: <i>See Both sides</i>								
Project/Task Number: 98026 01.13		Lab Contact: Edie Kent/803.556.8171		Lorraine Herrera/505-844-3199								
Service Order: CF 263-12		Lab Destination: GEL		Send Report to SMO:								
		Contract No.: PO 691436		Rita Kavanaugh/505.284.2553								
Tech Area:				<input type="checkbox"/> Waste Characterization <input type="checkbox"/> RMMA <input type="checkbox"/> Released by COC No. <input checked="" type="checkbox"/> Celsius								
Building:		Room:		Bill to: Sandia National Laboratories (Accounts Payable), P.O. Box 5800, MS-0154 Albuquerque, NM 87185-0154 308/84								
Operational Site:												
Sample No.	Fraction	Sample Location Detail	Depth (ft)	Date/Time Collected	Sample Matrix	Container Type	Volume	Preservative	Collection Method	Sample Type	Parameter & Method Requested	Lab Sample ID
✓ 092625	-001	OBS-MW3	209	7/19/12 9:22 ✓	GW	G	3x40ml	HCL	G	SA	TCL VOC (SW846-8260B)	001
✓ 092625	-002	OBS-MW3	209	7/19/12 9:25 ✓	GW	AG	4x1L	None	G	SA	TCL SVOC (SW846-8270C)	002
✓ 092625	-009	OBS-MW3	209	7/19/12 9:26 ✓	GW	P	500 ml	HNO3	G	SA	TAL Metals + U (SW846-6020/7470)	003
✓ 092625	-014	OBS-MW3	209	7/19/12 9:27 ✓	GW	P	250 ml	None	G	SA	Hexavalent Chromium (SW846-7196A)	004
✓ 092625	-016	OBS-MW3	209	7/19/12 9:28 ✓	GW	P	125 ml	None	G	SA	Anions (SW846-9056)	005
✓ 092625	-017	OBS-MW3	209	7/19/12 9:30 ✓	FGW	P	500 ml	HNO3	G	SA	Cations (SW846-6020)	308/84 001
✓ 092625	-018	OBS-MW3	209	7/19/12 9:31 ✓	GW	P	125 ml	H2SO4	G	SA	NPN (353.2)	308/84 006
✓ 092625	-020	OBS-MW3	209	7/19/12 9:32 ✓	GW	P	250 ml	None	G	SA	Perchlorate (314.0)	007
✓ 092625	-022	OBS-MW3	209	7/19/12 9:34 ✓	GW	P	500 ml	None	G	SA	Alkalinity (SM2320B)	008
✓ 092625	-024	OBS-MW3	209	7/19/12 9:37 ✓	GW	AG	4x1L	None	G	SA	HE (SW846-8321A)	009
Last Chain: <input checked="" type="checkbox"/> Yes		Sample Tracking		SMO Use		Special Instructions/QC Requirements:		Conditions on Receipt				
Validation Req'd: <input checked="" type="checkbox"/> Yes		Date Entered:		EDD <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		Turnaround Time <input type="checkbox"/> 7 Day* <input type="checkbox"/> 5 Day* <input checked="" type="checkbox"/> 3 Day						
Background: <input type="checkbox"/> Yes		Entered by:		Negotiated TAT <input type="checkbox"/>								
Confirmatory: <input type="checkbox"/> Yes		QC inits.:		Sample Disposal <input type="checkbox"/> Return to Client <input checked="" type="checkbox"/> Disposal by Lab								
Sample Team Members	Name	Signature	Init.	Company/Organization/Phone/Cell		Return Samples By:						
	Robert Lynch	<i>Robert Lynch</i>	RL	SNL/4142/844-4013/250-7090								
	Alfred Santillanes	<i>Alfred Santillanes</i>	AS	SNL/4142/844-5130/228-0710								
	William J. Gibson	<i>William J. Gibson</i>	WJG	SNL/4142/844-4013/239-7367								
	Jessica Salazar	<i>Jessica Salazar</i>	JS	SNL/4142/284-6517								
						Comments: Send report to Tim Jackson/4142/MS 0729/284-2547 FGW (filtered in field w/40 micron filter), Anions (Cl, SO4), Cations (Ca, Mg, K, Na) Alkalinity (total, bicarbonate, carbonate) If perchlorate detected, perform verification analysis using SW846-6850M)						
1. Relinquished by <i>Alfred Santillanes</i>		Org. 4142	Date 7/19/12	Time 1028	3. Relinquished by		Org.	Date	Time			
1. Received by <i>David W. Lynch</i>		Org. 4142	Date 7/19/12	Time 1028	3. Received by		Org.	Date	Time			
2. Relinquished by <i>David W. Lynch</i>		Org. 4142	Date 7/19/12	Time 11:00	4. Relinquished by		Org.	Date	Time			
2. Received by <i>Mike Kuhn</i>		Org. GEL	Date 7-20-12	Time 0725	4. Received by		Org.	Date	Time			

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

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

Page 2 of 2

AR/COC **614292**

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	Volume	Preservative	Collection Method	Sample Type	Parameter & Method Requested	Lab Sample ID		
✓ 092625	-027	OBS-MW3	209	7/19/12 9:38 ✓	GW	P	250 ml	NaOH	G	SA	Total Cyanide (SW846-9012)	010		
✓ 092625	-033	OBS-MW3	209	7/19/12 9:40 ✓	GW	P	1 L	HNO3	G	SA	Gamma Spec (short list)(901.0)	011		
✓ 092625	-034	OBS-MW3	209	7/19/12 9:41 ✓	GW	P	1 L	HNO3	G	SA	Gross Alpha/Beta (900.0)	012		
✓ 092625	-035	OBS-MW3	209	7/19/12 9:43 ✓	GW	P	1 L	HNO3	G	SA	Isotopic U (ASTM D3972-09M)	013		
✓ 092626	-001	OBS-MW3	209	7/19/12 9:22 ✓	GW	G	3x40ml	HCL	G	DU	TCL VOC (SW846-8260B)	014		
✓ 092626	-002	OBS-MW3	209	7/19/12 9:25 ✓	GW	AG	4x1L	None	G	DU	TCL SVOC (SW846-8270C)	015		
✓ 092626	-009	OBS-MW3	209	7/19/12 9:26 ✓	GW	P	500 ml	HNO3	G	DU	TAL Metals + U (SW846-6020/7470)	016		
✓ 092626	-014	OBS-MW3	209	7/19/12 9:27 ✓	GW	P	250 ml	None	G	DU	Hexavalent Chromium (SW846-7196A)	017		
✓ 092626	-016	OBS-MW3	209	7/19/12 9:28 ✓	GW	P	125 ml	None	G	DU	Anions (SW846-9056)	018		
✓ 092626	-017	OBS-MW3	209	7/19/12 9:30 ✓	FGW	P	500 ml	HNO3	G	DU	Cations (SW846-6020)	308186 022		
✓ 092626	-018	OBS-MW3	209	7/19/12 9:31 ✓	GW	P	125 ml	H2SO4	G	DU	NPN (353.2)	308184 019		
✓ 092626	-020	OBS-MW3	209	7/19/12 9:32 ✓	GW	P	250 ml	None	G	DU	Perchlorate (314.0)	020		
✓ 092626	-022	OBS-MW3	209	7/19/12 9:34 ✓	GW	P	500 ml	None	G	DU	Alkalinity (SM2320B)	021		
✓ 092626	-024	OBS-MW3	209	7/19/12 9:37 ✓	GW	AG	4x1L	None	G	DU	HE (SW846-8321A)	022		
✓ 092626	-027	OBS-MW3	209	7/19/12 9:38 ✓	GW	P	250 ml	NaOH	G	DU	Total Cyanide (SW846-9012)	023		
✓ 092626	-033	OBS-MW3	209	7/19/12 9:40 ✓	GW	P	1 L	HNO3	G	DU	Gamma Spec (short list)(901.0)	024		
✓ 092626	-034	OBS-MW3	209	7/19/12 9:41 ✓	GW	P	1 L	HNO3	G	DU	Gross Alpha/Beta (900.0)	025		
✓ 092626	-035	OBS-MW3	209	7/19/12 9:43 ✓	GW	P	1 L	HNO3	G	DU	Isotopic U (ASTM D3972-09M)	026		
✓ 092627	-001	OBS-TB4	N/A	7/19/12 9:22 ✓	DIW	G	3x40ml	HCL	G	TB	TCL VOC (SW846-8260B)	027		
Recipient Initials <u>MK</u>														

GEL LABORATORIES LLC

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

Certificate of Analysis

Report Date: August 17, 2012

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: Level C, Groundwater Monitoring

Client Sample ID: 092625-020
Sample ID: 308184007
Matrix: AQUEOUS
Collect Date: 19-JUL-12 09:32
Receive Date: 20-JUL-12
Collector: Client

Project: SNLSGWater
Client ID: SNLS003
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	07/26/12	1800	1232563	1

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	EPA 314.0 DOE-AL	

GEL LABORATORIES LLC

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

Certificate of Analysis

Report Date: August 17, 2012

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: Level C, Groundwater Monitoring

Client Sample ID: 092626-020
Sample ID: 308184020
Matrix: AQUEOUS
Collect Date: 19-JUL-12 09:32
Receive Date: 20-JUL-12
Collector: Client

Project: SNLSGWater
Client ID: SNLS003
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	07/26/12	1857	1232563	1

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	EPA 314.0 DOE-AL	

CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY

Internal Lab

Page 1 of 1Batch No. N4

SMO Use

AR/COC **614390**

Project Name: SWMU 149 GWM	Date Samples Shipped: <u>9/24/12</u>	SMO Authorization: <u>Don Watson</u>	<input type="checkbox"/> Waste Characterization <input type="checkbox"/> RMMA <input type="checkbox"/> Released by COC No. <input checked="" type="checkbox"/> 4° Celsius
Project/Task Manager: Clinton Lum	Carrier/Waybill No. <u>146670</u>	SMO Contact Phone: <u>see bottle on</u>	
Project/Task Number: 98026.01.14	Lab Contact: Edie Kent/803-556-8171	Lorraine Herrera/505-844-3199	
Service Order: CF0250-13	Lab Destination: GEL	Send Report to SMO:	
	Contract No.: PO 691436	Rita Kavanaugh/505-284-2553	

Tech Area:	Building:	Room:	Operational Site:	Bill to: Sandia National Laboratories (Accounts Payable), P.O. Box 5800, MS-0154 Albuquerque, NM 87185-0154
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Sample No.	Fraction	Sample Location Detail	Depth (ft)	Date/Time Collected	Sample Matrix	Container Type	Volume	Preservative	Collection Method	Sample Type	Parameter & Method Requested	Lab Sample ID
✓ 092860	-001	CTF-MW3	359	9/21/12 10:25	GW	G	3x40ml	HCL	G	SA	TCL VOC (SW846-8260B)	311781 001
✓ 092860	-009	CTF-MW3	359	9/21/12 10:26	GW	P	500 ml	HNO3	G	SA	TAL Metals (SW846-6010/6020/7470)	311781 002
✓ 092860	-010	CTF-MW3	359	9/21/12 10:28	FGW	P	500 ml	HNO3	G	SA	TAL Metals (SW846-6010/6020/7470)	311781 001
✓ 092860	-016	CTF-MW3	359	9/21/12 10:29	GW	P	125 ml	4C	G	SA	Anions (SW846-9056)	311781 003
✓ 092860	-018	CTF-MW3	359	9/21/12 10:30	GW	P	125 ml	H2SO4	G	SA	NPN (EPA 353.2)	311781 004
✓ 092860	-020	CTF-MW3	359	9/21/12 10:31	GW	P	250 ml	4C	G	SA	Perchlorate (314.0)	311781 005
✓ 092860	-022	CTF-MW3	359	9/21/12 10:32	GW	P	500 ml	4C	G	SA	Alkalinity (SM2320B)	311781 006
✓ 092861	-001	CTF-TB1	na	9/21/12 10:25	DIW	G	3x40ml	HCL	G	TB	TCL VOC (SW846-8260B)	311781 007

Last Chain: <input type="checkbox"/> Yes		Sample Tracking		SMO Use		Special Instructions/QC Requirements:		Conditions on Receipt	
Validation Req'd: <input checked="" type="checkbox"/> Yes		Date Entered:		EDD <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		Turnaround Time <input type="checkbox"/> 7 Day* <input type="checkbox"/> 15 Day* <input checked="" type="checkbox"/> 30 Day			
Background: <input type="checkbox"/> Yes		Entered by:		Negotiated TAT		Sample Disposal <input type="checkbox"/> Return to Client <input checked="" type="checkbox"/> Disposal by Lab			
Confirmatory: <input type="checkbox"/> Yes		QC initials:		Return Samples By:		Comments: Send report to Tim Jackson/4142/MS 0729/284-2547 Report alkalinity (as Total CaCO3, HCO3, CO3). Anions (as Br, Cl, F, SO4) If Perchlorate detected, perform verification analysis using SW846-6850M. FGW- Filtered in field w/ 45 micron filter.			
Sample Team Members	Name	Signature	Init.	Company/Organization/Phone/Cell		Lab Use			
	Robert Lynch	<i>Robert Lynch</i>	RL	SNL/4142/505-844-4013/505-250-7090					
	Alfred Santillanes	<i>Alfred Santillanes</i>	AS	SNL/4142/505-844-5130/505-228-0710					
	William Gibson	<i>William Gibson</i>	WG	SNL/4142/505-284-3307/505-239-7367					
1. Relinquished by <i>Alfred Santillanes</i>		Org. <u>4142</u>	Date <u>9/21/12</u>	Time <u>10:53</u>	3. Relinquished by		Org.	Date	Time
1. Received by <i>Don Watson</i>		Org. <u>4142</u>	Date <u>9/21/12</u>	Time <u>10:53</u>	3. Received by		Org.	Date	Time
2. Relinquished by <i>William Gibson</i>		Org. <u>4142</u>	Date <u>9/24/12</u>	Time <u>0800</u>	4. Relinquished by		Org.	Date	Time
2. Received by <i>Mike Jackson</i>		Org. <u>CEL</u>	Date <u>9-25-12</u>	Time <u>0740</u>	4. Received by		Org.	Date	Time

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

GEL LABORATORIES LLC

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

Certificate of Analysis

Report Date: October 22, 2012

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: Level C, Groundwater Monitoring

Client Sample ID: 092860-020 Project: SNLSGWater
Sample ID: 311781005 Client ID: SNLS003
Matrix: AQUEOUS
Collect Date: 21-SEP-12 10:31
Receive Date: 25-SEP-12 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	MARI	10/09/12	2256	1249257	1

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	EPA 314.0 DOE-AL	

CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY

Internal Lab

Page 1 of 2

Batch No. <u>NA</u>		SMO Use		AR/COC 614391								
Project Name: SWMU 154 GWM		Date Samples Shipped: <u>9/25/12</u>		SMO Authorization: <u>[Signature]</u>								
Project/Task Manager: Clinton Lum		Carrier/Waybill No. <u>146791</u>		SMO Contact Phone: <u>9MMD</u>								
Project/Task Number: 98026.01.15		Lab Contact: Edie Kent/803-556-8171		Lorraine Herrera/505-844-3199								
Service Order: CF0251-13		Lab Destination: GEL		Send Report to SMO:								
		Contract No.: PO 691436		Rita Kavanaugh/505-284-2553								
Tech Area:				<input type="checkbox"/> Waste Characterization <input type="checkbox"/> RMMA <input type="checkbox"/> Released by COC No. <input checked="" type="checkbox"/> 4° Celsius								
Building:		Room:		Operational Site:								
				Bill to: Sandia National Laboratories (Accounts Payable), P.O. Box 5800, MS-0154 Albuquerque, NM 87185-0154								
Sample No.	Fraction	Sample Location Detail	Depth (ft)	Date/Time Collected	Sample Matrix	Container Type	Volume	Preservative	Collection Method	Sample Type	Parameter & Method Requested	Lab Sample ID
092862	-001	CTF-MW2	129	9/25/12 9:37	GW	G	3x40ml	HCL	G	SA	TCL VOC (SW846-8260B)	311899 001
092862	-002	CTF-MW2	129	9/25/12 9:39	GW	AG	4x1L	4C	G	SA	TCL SVOC (SW846-8270C)	311899 002
092862	-009	CTF-MW2	129	9/25/12 9:40	GW	P	500 ml	HNO3	G	SA	TAL Metals (SW846-6010/6020/7470)	311899 003
092862	-010	CTF-MW2	129	9/25/12 9:42	FGW	P	500 ml	HNO3	G	SA	TAL Metals (SW846-6010/6020/7470)	311899 001
092862	-016	CTF-MW2	129	9/25/12 9:43	GW	P	125 ml	4C	G	SA	Anions (SW846-9056)	311899 004
092862	-018	CTF-MW2	129	9/25/12 9:44	GW	P	125 ml	H2SO4	G	SA	NPN (EPA 353.2)	311899 005
092862	-020	CTF-MW2	129	9/25/12 9:45	GW	P	250 ml	4C	G	SA	Perchlorate (314.0)	311899 006
092862	-022	CTF-MW2	129	9/25/12 9:46	GW	P	500 ml	4C	G	SA	Alkalinity (SM2320B)	311899 007
092862	-024	CTF-MW2	129	9/25/12 9:48	GW	AG	4x1L	4C	G	SA	High Explosives (SW846-8321A Mod.)	311899 008
092862	-033	CTF-MW2	129	9/25/12 9:49	GW	P	1 L	HNO3	G	SA	Gamma Spectroscopy(short list)(901.0)	311899 009
Last Chain: <input checked="" type="checkbox"/> Yes			Sample Tracking			SMO Use			Special Instructions/QC Requirements:			Conditions on Receipt
Validation Req'd: <input checked="" type="checkbox"/> Yes			Date Entered:						EDD <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No			
Background: <input type="checkbox"/> Yes			Entered by:						Turnaround Time <input type="checkbox"/> 7 Day* <input type="checkbox"/> 15 Day* <input checked="" type="checkbox"/> 30 Day			
Confirmatory: <input type="checkbox"/> Yes			QC inits.:						Negotiated TAT <input type="checkbox"/>			
Sample Team Members	Name	Signature	Init.	Company/Organization/Phone/Cell		Sample Disposal <input type="checkbox"/> Return to Client <input checked="" type="checkbox"/> Disposal by Lab			Return Samples By:			
	Robert Lynch	[Signature]	RL	SNL/4142/505-844-4013/505-250-7090					Comments: Send report to Tim Jackson/4142/MS 0729/284-2547			
	Alfred Santillanes	[Signature]	AS	SNL/4142/505-844-5130/505-228-0710					Report alkalinity (as Total CaCO3, HCO3, CO3). Anions (as Br, Cl, F, SO4) If Perchlorate detected, perform verification analysis using SW846-6850M			
	William Gibson	[Signature]	WG	SNL/4142/505-284-3307/505-239-7367								
1. Relinquished by <u>[Signature]</u>		Org. <u>4142</u>	Date <u>9/25/12</u>	Time <u>1024</u>	3. Relinquished by		Org.	Date	Time			
1. Received by <u>[Signature]</u>		Org. <u>4142</u>	Date <u>9/25/12</u>	Time <u>1024</u>	3. Received by		Org.	Date	Time			
2. Relinquished by <u>[Signature]</u>		Org. <u>4142</u>	Date <u>9/26/12</u>	Time <u>1130</u>	4. Relinquished by		Org.	Date	Time			
2. Received by <u>[Signature]</u>		Org. <u>GEL</u>	Date <u>9/26/12</u>	Time <u>0755</u>	4. Received by		Org.	Date	Time			

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

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

Page 2 of 2

AR/COC 614391

[illegible]

GEL LABORATORIES LLC

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

Certificate of Analysis

Report Date: October 18, 2012

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: Level C, Groundwater Monitoring

Client Sample ID: 092862-020
Sample ID: 311894006
Matrix: AQUEOUS
Collect Date: 25-SEP-12 09:45
Receive Date: 26-SEP-12
Collector: Client

Project: SNLSGWater
Client ID: SNLS003

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

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Ion Chromatography											
EPA 314.0 Perchlorate by IC "As Received"											
Perchlorate	U	ND	0.004	0.012	mg/L	1	MAR1	10/09/12	2354	1249257	1

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	EPA 314.0 DOE-AL	

Appendix B

Data Validation Sample Findings

Summary Sheets for the Perchlorate Data



Sample Findings Summary



AR/COC: 614286, 614287

Page 1 of 2

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
DOE EML HASL-300, U-02-RC			
	092610-035/CCBA-MW2	Uranium-235/236 (13982-70-2)	J, FR7
	092613-035/CCBA-EB1	Uranium-233/234 (N/A)	BD, FR3
	092613-035/CCBA-EB1	Uranium-235/236 (13982-70-2)	BD, FR3
	092613-035/CCBA-EB1	Uranium-238 (7440-61-1)	BD, FR3
EPA 900.0/SW846 9310			
	092610-034/CCBA-MW2	ALPHA (12587-46-1)	J, FR7
	092610-034/CCBA-MW2	BETA (12587-47-2)	J, FR7
	092613-034/CCBA-EB1	ALPHA (12587-46-1)	BD, FR3
	092613-034/CCBA-EB1	BETA (12587-47-2)	BD, FR3
EPA 901.1			
	092610-033/CCBA-MW2	Americium-241 (14596-10-2)	BD, FR3
	092610-033/CCBA-MW2	Cesium-137 (10045-97-3)	BD, FR3
	092610-033/CCBA-MW2	Cobalt-60 (10198-40-0)	BD, FR3
	092610-033/CCBA-MW2	Potassium-40 (13966-00-2)	BD, FR3
	092613-033/CCBA-EB1	Americium-241 (14596-10-2)	BD, FR3
	092613-033/CCBA-EB1	Cesium-137 (10045-97-3)	BD, FR3
	092613-033/CCBA-EB1	Cobalt-60 (10198-40-0)	BD, FR3
	092613-033/CCBA-EB1	Potassium-40 (13966-00-2)	BD, FR3
SW846 3005/6020 DOE-AL			
	092610-009/CCBA-MW2	Copper (7440-50-8)	0.00285U, B
	092610-017/CCBA-MW2	Magnesium (7439-95-4)	J, D1
	092613-009/CCBA-EB1	Copper (7440-50-8)	0.00285U, B
	092613-017/CCBA-EB1	Magnesium (7439-95-4)	UJ, D1
SW846 3535/8321A Modified			
	092610-024/CCBA-MW2	m-Nitrotoluene (99-08-1)	UJ, I4

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
	092610-024/CCBA-MW2	o-Nitrotoluene (88-72-2)	UJ, I4
	092610-024/CCBA-MW2	p-Nitrotoluene (99-99-0)	UJ, I4
	092613-024/CCBA-EB1	m-Nitrotoluene (99-08-1)	UJ, I4
	092613-024/CCBA-EB1	o-Nitrotoluene (88-72-2)	UJ, I4
	092613-024/CCBA-EB1	p-Nitrotoluene (99-99-0)	UJ, I4
SW846 8270C			
	092610-002/CCBA-MW2	2,4-Dinitrophenol (51-28-5)	UJ, C3
	092613-002/CCBA-EB1	2,4-Dinitrophenol (51-28-5)	UJ, C3
SW846 9012B			
	092610-027/CCBA-MW2	Cyanide, Total (57-12-5)	UJ, B4, I5
	092613-027/CCBA-EB1	Cyanide, Total (57-12-5)	UJ, B4, I5

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

Memorandum

Date: September 5, 2012

To: File

From: Ken Salaz

Subject: Inorganic Data Review and Validation – SNL
Site: SWMU 8/58 GW Characterization
AR/COC: 614286, 614287
SDG: 307745
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

Two samples were prepared and analyzed with accepted procedures using methods EPA9012A (total CN), EPA9056 (anions), EPA353.2 (nitrate/nitrite as nitrogen), EPA314.0 (perchlorate), and SM2320B (alkalinity). Data were reported for all required analytes. Problems were identified with the data package that result in the qualification of data.

Total CN:

1. The ICAL intercept was negative with an absolute value > the MDL but < 3X the MDL. Also, total CN was detected in the CCB at a negative concentration with an absolute value > the MDL but < the PQL. The associated sample results were all NDs and, therefore, will be **qualified UJ, I5, B4**.

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

Holding Times and Preservation

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

Calibration

The initial and continuing calibrations met QC acceptance criteria except as noted above in the Summary Section and the following.

Anions:

The ICAL intercepts for chloride, fluoride, and sulfate were > the MDL. However, the associated sample results were all either >3X the intercept or ND and, therefore, will not be qualified.

Perchlorate: The CCV %R was >110%. However, the associated sample results were all NDs and, therefore, will not be qualified.

Blanks

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

Anions:

In the EB, chloride, fluoride, and sulfate were detected. However, the EB was not associated with samples in this data package. Therefore, sample data will not be qualified.

Laboratory Control Sample (LCS)

All LCS recoveries met QC acceptance criteria.

Matrix Spike (MS)

All MS recoveries met QC acceptance criteria.

Total CN:

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

Laboratory Replicate

The replicate analyses met all QC acceptance criteria.

Total CN:

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

Detection Limits/Dilutions

All detection limits were properly reported. No samples were diluted with the following exceptions.

Anions & Nitrate/Nitrite as Nitrogen:

Sample 307745-004 was diluted 5X for chloride and sulfate and sample -005 was diluted 5X for nitrate/nitrite as nitrogen due to over-range concentrations. All associated matrix QC samples were analyzed at relative dilution factors ≤5X those of the samples.

Other QC

One EB was submitted on the AR/COCs. The EB did not apply to any samples on these COCs.

No other specific issues that affect data quality were identified.

Reviewed by: Marcia Hilchey

Date: 09/04/12

Memorandum-revised

Date: October 18, 2012

To: File

From: Marcia Hilchey

Subject: Inorganic Data Review and Validation – SNL
Site: SWMU 8/58 GWM
AR/COC: 614288
SDG: 307912
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

Two samples were prepared and analyzed with accepted procedures using methods EPA9012A (total CN), EPA9056 (anions), EPA353.2 (nitrate/nitrite as nitrogen), EPA314.0 (perchlorate), EPA7196A (CrVI), and SM2320B (alkalinity). Data were reported for all required analytes. Problems were identified with the data package that resulted in the qualification of data.

Total CN:

1. The ICAL intercept was negative with an absolute value > the MDL but < 3X the MDL. Also, total CN was detected in the CCB at a negative concentration with an absolute value > the MDL but < the PQL. The associated sample results were ND and will be **qualified UJ, I5, B4**.

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

Holding Times and Preservation

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

Calibration

The initial and continuing calibrations met QC acceptance criteria except as noted above in the Summary Section as the follows.

Anions:

The ICAL intercepts for chloride, fluoride, and sulfate were > the MDL and < 3X MDL. However, the associated sample results were all >3X the intercept and, therefore, will not be qualified.

Perchlorate: The CCV %R was >110%. However, the associated sample result was ND and, therefore, will not be qualified.

Blanks

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

Anions:

Chloride was detected in the MB at < PQL. The associated sample results were > 5X the MB concentration and will not be qualified. Chloride, fluoride, and sulfate were detected in EB sample 307745-018 from COC 614287. All associated sample results were > 5X the EB concentration and will not be qualified.

Laboratory Control Sample (LCS)

All LCS recoveries met QC acceptance criteria.

Matrix Spike (MS)

All MS recoveries met QC acceptance criteria.

Total CN, Perchlorate, Alkalinity & Nitrate/Nitrite:

It should be noted that the MS analyses were performed on SNL samples of similar matrix from other SDGs. No sample data will be qualified as a result.

Laboratory Replicate

The replicate analyses met all QC acceptance criteria.

Total CN, Perchlorate, Alkalinity & Nitrate/Nitrite:

It should be noted that the Replicate analyses were performed on SNL samples of similar matrix from other SDGs. No sample data will be qualified as a result.

Detection Limits/Dilutions

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

Anions & Nitrate/Nitrite as Nitrogen:

Both samples were diluted 5X for chloride, sulfate, and nitrate/nitrite. All associated matrix QC samples were analyzed at relative dilution factors ≤5X those of the samples.

Other QC

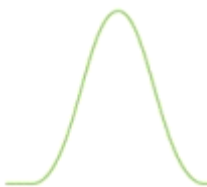
One EB was submitted on COC 614287 associated with this COC. Field duplicate pairs were submitted on the AR/COC(s). There are no “required” review criteria for field duplicate analyses comparability. No sample data will be qualified as a result.

No other specific issues that affect data quality were identified.

Reviewed by: Monica Dymerski

Level I

Date: 10/16/12



Sample Findings Summary



AR/COC: 614288

Page 1 of 2

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
DOE EML HASL-300, U-02-RC			
	092615-035/CCBA-MW1	Uranium-235/236 (13982-70-2)	BD, FR3
	092616-035/CCBA-MW1	Uranium-235/236 (13982-70-2)	BD, FR3
EPA 900.0/SW846 9310			
	092616-034/CCBA-MW1	ALPHA (12587-46-1)	J, FR7
EPA 901.1			
	092615-033/CCBA-MW1	Americium-241 (14596-10-2)	BD, FR3
	092615-033/CCBA-MW1	Cesium-137 (10045-97-3)	BD, FR3
	092615-033/CCBA-MW1	Cobalt-60 (10198-40-0)	BD, FR3
	092615-033/CCBA-MW1	Potassium-40 (13966-00-2)	R, Z2
	092616-033/CCBA-MW1	Americium-241 (14596-10-2)	BD, FR3
	092616-033/CCBA-MW1	Cesium-137 (10045-97-3)	BD, FR3
	092616-033/CCBA-MW1	Cobalt-60 (10198-40-0)	BD, FR3
	092616-033/CCBA-MW1	Potassium-40 (13966-00-2)	BD, FR3,RP1
SW846 3005/6020 DOE-AL			
	092615-009/CCBA-MW1	Magnesium (7439-95-4)	J, D1
	092616-009/CCBA-MW1	Magnesium (7439-95-4)	J, D1
SW846 7470A			
	092615-009/CCBA-MW1	Mercury (7439-97-6)	UJ, B4
	092616-009/CCBA-MW1	Mercury (7439-97-6)	UJ, B4
SW846 8260B DOE-AL			
	092615-001/CCBA-MW1	Toluene (108-88-3)	1.00U, B2
	092616-001/CCBA-MW1	Toluene (108-88-3)	1.00U, B2
SW846 8270C			
	092615-002/CCBA-MW1	2,4-Dinitrophenol (51-28-5)	UJ, C3
	092615-002/CCBA-MW1	Benzo(ghi)perylene (191-24-2)	R, I5
	092616-002/CCBA-MW1	2,4-Dinitrophenol (51-28-5)	UJ, C3

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
SW846 9012B	092616-002/CCBA-MW1	Benzo(ghi)perylene (191-24-2)	R, I5
	092615-027/CCBA-MW1	Cyanide, Total (57-12-5)	UJ, I5,B4
	092616-027/CCBA-MW1	Cyanide, Total (57-12-5)	UJ, I5,B4

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

Memorandum

Date: September 9, 2012

To: File

From: Ken Salaz

Subject: Inorganic Data Review and Validation – SNL
Site: SWMU 68 GWM
AR/COC: 614289
SDG: 307986
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 EPA9012A (total CN), EPA9056 (anions), EPA353.2 (nitrate/nitrite as nitrogen), EPA314.0 (perchlorate), EPA7196A (CrVI), and SM2320B (alkalinity). Data were reported for all required analytes. Problems were identified with the data package that result in the qualification of data.

Total CN:

1. The ICAL intercept was negative with an absolute value > the MDL but < 3X the MDL. Also, total CN was detected in the CCB at a negative concentration with an absolute value > the MDL but < the PQL. The associated sample results were all NDs and, therefore, will be **qualified UJ, I5, B4**.

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

Holding Times and Preservation

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

Calibration

The initial and continuing calibrations met QC acceptance criteria except as noted above in the Summary Section and the following.

Anions:

The ICAL intercepts for chloride and sulfate were > the MDL. However, the associated sample results were all >3X the intercept and, therefore, will not be qualified.

Perchlorate: The CCV %R was >110%. However, the associated sample result was ND and, therefore, will not be qualified.

Blanks

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

Laboratory Control Sample (LCS)

All LCS recoveries met QC acceptance criteria.

Matrix Spike (MS)

All MS recoveries met QC acceptance criteria.

Total CN, Perchlorate, & Nitrate/Nitrite:

It should be noted that the MS analyses were performed on SNL samples of similar matrix from other SDGs. No sample data will be qualified as a result.

Laboratory Replicate

The replicate analyses met all QC acceptance criteria.

Total CN, Perchlorate, & Nitrate/Nitrite:

It should be noted that the Replicate analyses were performed on SNL samples of similar matrix from other SDGs. No sample data will be qualified as a result.

Detection Limits/Dilutions

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

Anions & Nitrate/Nitrite as Nitrogen:

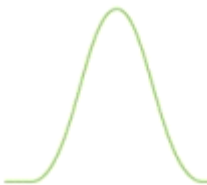
The sample was diluted 10X for chloride and sulfate and 5X for nitrate/nitrite as nitrogen due to over-range concentrations. All associated matrix QC samples were analyzed at relative dilution factors $\leq 5X$ those of the samples.

Other QC

No other specific issues that affect data quality were identified.

Reviewed by: Marcia Hilchey

Date: 09/10/12



Sample Findings Summary

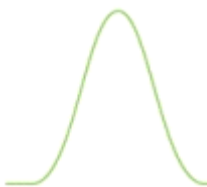


AR/COC: 614289

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Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
DOE EML HASL-300, U-02-RC			
	092618-035/OBS-MW1	Uranium-235/236 (13982-70-2)	J, FR7
EPA 901.1			
	092618-033/OBS-MW1	Americium-241 (14596-10-2)	BD, FR3
	092618-033/OBS-MW1	Cesium-137 (10045-97-3)	BD, FR3
	092618-033/OBS-MW1	Cobalt-60 (10198-40-0)	BD, FR3
	092618-033/OBS-MW1	Potassium-40 (13966-00-2)	BD, FR3
SW846 3005/6020 DOE-AL			
	092618-009/OBS-MW1	Copper (7440-50-8)	J+, DL2
	092618-009/OBS-MW1	Uranium (U)	J, D1
SW846 3535/8321A Modified			
	092618-024/OBS-MW1	m-Nitrotoluene (99-08-1)	UJ, I4
	092618-024/OBS-MW1	o-Nitrotoluene (88-72-2)	UJ, I4
	092618-024/OBS-MW1	p-Nitrotoluene (99-99-0)	UJ, I4
SW846 7470A			
	092618-009/OBS-MW1	Mercury (7439-97-6)	UJ, I5, B4
SW846 8270C			
	092618-002/OBS-MW1	2,4-Dinitrophenol (51-28-5)	UJ, C3
SW846 9012B			
	092618-027/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: 614290, 614291

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Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
DOE EML HASL-300, U-02-RC			
	092623-035/OBS-EB1	Uranium-233/234 (N/A)	BD, FR3
	092623-035/OBS-EB1	Uranium-235/236 (13982-70-2)	BD, FR3
	092623-035/OBS-EB1	Uranium-238 (7440-61-1)	BD, FR3
EPA 900.0/SW846 9310			
	092623-034/OBS-EB1	ALPHA (12587-46-1)	BD, FR3
	092623-034/OBS-EB1	BETA (12587-47-2)	J, FR7
EPA 901.1			
	092620-033/OBS-MW2	Americium-241 (14596-10-2)	BD, FR3
	092620-033/OBS-MW2	Cesium-137 (10045-97-3)	BD, FR3
	092620-033/OBS-MW2	Cobalt-60 (10198-40-0)	BD, FR3
	092620-033/OBS-MW2	Potassium-40 (13966-00-2)	BD, FR3
	092623-033/OBS-EB1	Americium-241 (14596-10-2)	BD, FR3
	092623-033/OBS-EB1	Cesium-137 (10045-97-3)	BD, FR3
	092623-033/OBS-EB1	Cobalt-60 (10198-40-0)	BD, FR3
	092623-033/OBS-EB1	Potassium-40 (13966-00-2)	BD, FR3
SW846 3005/6020 DOE-AL			
	092620-009/OBS-MW2	Calcium (7440-70-2)	J, D1
	092620-009/OBS-MW2	Cobalt (7440-48-4)	0.0005U, B3
	092620-009/OBS-MW2	Uranium (U)	J, RP2
	092623-009/OBS-EB1	Calcium (7440-70-2)	UJ, D1
	092623-009/OBS-EB1	Sodium (7440-23-5)	UJ, B4
	092623-009/OBS-EB1	Uranium (U)	UJ, RP2
SW846 3535/8321A Modified			
	092620-024/OBS-MW2	m-Nitrotoluene (99-08-1)	UJ, I4
	092620-024/OBS-MW2	o-Nitrotoluene (88-72-2)	UJ, I4

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
	092620-024/OBS-MW2	p-Nitrotoluene (99-99-0)	UJ, I4
	092623-024/OBS-EB1	m-Nitrotoluene (99-08-1)	UJ, I4
	092623-024/OBS-EB1	o-Nitrotoluene (88-72-2)	UJ, I4
	092623-024/OBS-EB1	p-Nitrotoluene (99-99-0)	UJ, I4
SW846 7470A			
	092620-009/OBS-MW2	Mercury (7439-97-6)	UJ, I5,B4
	092623-009/OBS-EB1	Mercury (7439-97-6)	UJ, I5,B4
SW846 9012B			
	092620-027/OBS-MW2	Cyanide, Total (57-12-5)	UJ, I5,B4
	092623-027/OBS-EB1	Cyanide, Total (57-12-5)	UJ, I5,B4
SW846 9056			
	092623-016/OBS-EB1	Chloride (16887-00-6)	0.995UJ, B,I5

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

Memorandum

Date: September 14, 2012

To: File

From: Ken Salaz

Subject: Inorganic Data Review and Validation – SNL
Site: SWMU 68 GWM
AR/COC: 614290, 604291
SDG: 308103
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

Two samples were prepared and analyzed with accepted procedures using methods EPA9012A (total CN), EPA9056 (anions), EPA353.2 (nitrate/nitrite as nitrogen), EPA314.0 (perchlorate), EPA7196A (CrVI), and SM2320B (alkalinity). Data were reported for all required analytes. Problems were identified with the data package that result in the qualification of data.

Anions:

1. The ICAL intercept for chloride was > the MDL. The associated result of sample 308103-020 was a detect <3X the intercept and, therefore, will be **qualified J+,I5**. It should be noted that this sample result required further qualification for MB contamination.
2. In the MB, chloride was detected but < the PQL. The associated result of sample -020 was a detect <5X the blank concentration and, therefore, will be **qualified 0.995U,B** at 5X the MB value.

Total CN:

1. The ICAL intercept was negative with an absolute value > the MDL but < 3X the MDL. Also, total CN was detected in the CCB at a negative concentration with an absolute value > the MDL but < the PQL. The associated sample results were all NDs and, therefore, will be **qualified UJ,I5,B4**.

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

Holding Times and Preservation

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

Calibration

The initial and continuing calibrations met QC acceptance criteria except as noted above in the Summary Section and the following.

Anions:

The ICAL intercepts for chloride and sulfate were > the MDL. However, the associated sample results not qualified above in the Summary section were all either >3X the intercept or ND and, therefore, will not be qualified.

Blanks

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

Anions:

In the EB, chloride was detected. However, this sample was qualified ND due to MB contamination, and it also did not apply to any samples in this data package.

Laboratory Control Sample (LCS)

All LCS recoveries met QC acceptance criteria.

Matrix Spike (MS)

All MS recoveries met QC acceptance criteria.

Anions & Nitrate/Nitrite:

It should be noted that the MS analyses were performed on SNL samples of similar matrix from other SDGs. No sample data will be qualified as a result.

Laboratory Replicate

The replicate analyses met all QC acceptance criteria.

Anions & Nitrate/Nitrite:

It should be noted that the Replicate analyses were performed on SNL samples of similar matrix from other SDGs. No sample data will be qualified as a result.

Detection Limits/Dilutions

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

Anions & Nitrate/Nitrite as Nitrogen:

Sample -005 was diluted 5X for chloride and sulfate due to over-range concentrations, and 5X for nitrate/nitrite as nitrogen due to matrix interference. All associated matrix QC samples were analyzed at relative dilution factors $\leq 5X$ those of the samples.

Other QC

One EB was submitted on the AR/COC. No other specific issues that affect data quality were identified.

Reviewed by: Marcia Hilchey **Date:** 09/17/12

Memorandum

Date: September 21, 2012

To: File

From: Ken Salaz

Subject: Inorganic Data Review and Validation – SNL
Site: SWMU 68 GWM
AR/COC: 614292
SDG: 308184
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

Two samples were prepared and analyzed with accepted procedures using methods EPA9012A (total CN), EPA9056 (anions), EPA353.2 (nitrate/nitrite as nitrogen), EPA314.0 (perchlorate), EPA7196A (CrVI), and SM2320B (alkalinity). Data were reported for all required analytes. Problems were identified with the data package that result in the qualification of data.

Total CN:

1. The ICAL intercept was negative with an absolute value > the MDL but < 3X the MDL. The associated sample results were all NDs and, therefore, will be **qualified UJ,15**.

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

The initial and continuing calibrations met QC acceptance criteria except as noted above in the Summary Section and the following.

Anions:

The ICAL intercepts for chloride and sulfate were > the MDL. However, the associated sample results were all >3X the intercept and, therefore, will not be qualified.

Blanks

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

Anions:

In the MB, chloride was detected but < the PQL. However, the associated sample results were all >5X the blank concentration and, therefore, will not be qualified. In the EB (COC 614291), chloride was detected. However, this sample was qualified ND due to MB contamination and, therefore, was not applied to associated field sample results.

Laboratory Control Sample (LCS)

All LCS recoveries met QC acceptance criteria.

Matrix Spike (MS)

All MS recoveries met QC acceptance criteria.

Alkalinity, Anions, and Nitrate/Nitrite:

It should be noted that the MS analyses were performed on SNL samples of similar matrix from other SDGs. No sample data will be qualified as a result.

Laboratory Replicate

The replicate analyses met all QC acceptance criteria.

Alkalinity, Anions, and Nitrate/Nitrite:

It should be noted that the Replicate analyses were performed on SNL samples of similar matrix from other SDGs. No sample data will be qualified as a result.

Detection Limits/Dilutions

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

Anions & Nitrate/Nitrite:

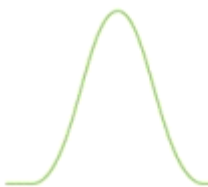
The samples were diluted 5X for chloride, sulfate, and nitrate/nitrite due to over-range concentrations. All associated matrix QC samples were analyzed at relative dilution factors $\leq 5X$ those of the samples.

Other QC

One EB was submitted on COC 614291. A field duplicate was submitted on the AR/COC. However, there are no required evaluation criteria for field duplicate analyses.

Reviewed by: Marcia Hilchey

Date: 09/24/12



Sample Findings Summary



AR/COC: 614292

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Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
EPA 900.0/SW846 9310			
	092625-034/OBS-MW3	BETA (12587-47-2)	NJ+, B7
	092626-034/OBS-MW3	BETA (12587-47-2)	NJ+, B7
EPA 901.1			
	092625-033/OBS-MW3	Americium-241 (14596-10-2)	BD, FR3
	092625-033/OBS-MW3	Cesium-137 (10045-97-3)	BD, FR3
	092625-033/OBS-MW3	Cobalt-60 (10198-40-0)	BD, FR3
	092625-033/OBS-MW3	Potassium-40 (13966-00-2)	BD, FR3
	092626-033/OBS-MW3	Americium-241 (14596-10-2)	BD, Z2
	092626-033/OBS-MW3	Cesium-137 (10045-97-3)	BD, FR3
	092626-033/OBS-MW3	Cobalt-60 (10198-40-0)	BD, FR3
	092626-033/OBS-MW3	Potassium-40 (13966-00-2)	BD, FR3
SW846 3005/6010B			
	092625-009/OBS-MW3	Vanadium (7440-62-2)	0.0059U, B
	092626-009/OBS-MW3	Vanadium (7440-62-2)	0.0059U, B
SW846 3005/6020 DOE-AL			
	092625-009/OBS-MW3	Copper (7440-50-8)	0.0061UJ, B2
	092626-009/OBS-MW3	Copper (7440-50-8)	0.0061UJ, B2
SW846 3535/8321A Modified			
	092625-024/OBS-MW3	m-Nitrotoluene (99-08-1)	UJ, I4
	092625-024/OBS-MW3	o-Nitrotoluene (88-72-2)	UJ, I4
	092625-024/OBS-MW3	p-Nitrotoluene (99-99-0)	UJ, I4
	092626-024/OBS-MW3	m-Nitrotoluene (99-08-1)	UJ, I4
	092626-024/OBS-MW3	o-Nitrotoluene (88-72-2)	UJ, I4
	092626-024/OBS-MW3	p-Nitrotoluene (99-99-0)	UJ, I4
SW846 7470A			

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
	092625-009/OBS-MW3	Mercury (7439-97-6)	UJ, I5,B4
	092626-009/OBS-MW3	Mercury (7439-97-6)	UJ, I5,B4
SW846 8260B DOE-AL			
	092625-001/OBS-MW3	Toluene (108-88-3)	1.0U, B2
	092626-001/OBS-MW3	Toluene (108-88-3)	1.0U, B2
SW846 9012B			
	092625-027/OBS-MW3	Cyanide, Total (57-12-5)	UJ, I5
	092626-027/OBS-MW3	Cyanide, Total (57-12-5)	UJ, I5

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

Memorandum

Date: November 6, 2012
To: File
From: Marcia Hilchey
Subject: Inorganic Data Review and Validation – SNL
Site: SWMU 149 GWM
AR/COC: 614390
SDG: 311781
Laboratory: GEL
Project/Task: 98026.01.14
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 by IC), 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 except as follows.

Anions:

The ICAL intercepts for chloride, fluoride and sulfate were > the MDL and < 3X MDL. All associated sample results were > 3X the intercept value and will not be qualified.

Perchlorate:

The %D for a bracketing CCV was > 10% with positive bias. The associated sample result was ND and will not be qualified.

Blanks

No target analytes were detected in the blanks.

Laboratory Control Sample (LCS)

All LCS acceptance criteria were met.

Matrix Spike (MS)

All MS/PS recoveries met QC acceptance criteria.

Anions:

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

Laboratory Replicate

The replicate analyses met all QC acceptance criteria.

Anions:

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.

Anions:

The sample was diluted 20X for chloride and sulfate.

Nitrate/nitrite:

The sample was diluted 25X.

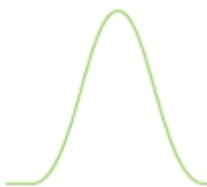
Other QC

No other specific issues that affect data quality were identified.

Reviewed by: Monica Dymerski

Level I

Date: 11/06/12



Sample Findings Summary



AR/COC: 614390

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Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
SW846 3005/6020 DOE-AL			
	092860-009/CTF-MW3	Sodium (7440-23-5)	J, D1
	092860-010/CTF-MW3	Antimony (7440-36-0)	0.0058U, B
	092860-010/CTF-MW3	Sodium (7440-23-5)	J, D1
SW846 7470A			
	092860-009/CTF-MW3	Mercury (7439-97-6)	UJ, B4
	092860-010/CTF-MW3	Mercury (7439-97-6)	UJ, B4
SW846 8260B DOE-AL			
	092860-001/CTF-MW3	2-Butanone (78-93-3)	UJ, I4
	092860-001/CTF-MW3	Vinyl acetate (108-05-4)	UJ, I4
	092861-001/CTF-TB1	2-Butanone (78-93-3)	UJ, I4
	092861-001/CTF-TB1	Vinyl acetate (108-05-4)	UJ, I4

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

Memorandum

Date: November 8, 2012
To: File
From: Marcia Hilchey
Subject: Inorganic Data Review and Validation – SNL
Site: SWMU 154 GWM
AR/COC: 614391
SDG: 311894
Laboratory: GEL
Project/Task: 98026.01.15
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 by IC), 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 except as follows.

Anions:

The ICAL intercepts for chloride, fluoride and sulfate were > the MDL and < 3X MDL. All associated sample results were > 3X the intercept value and will not be qualified.

Perchlorate:

The %D for a bracketing CCV was > 10% with positive bias. The associated sample result was ND and will not be qualified.

Blanks

No target analytes were detected in the blanks.

Laboratory Control Sample (LCS)

All LCS acceptance criteria were met.

Matrix Spike (MS)

All MS/PS recoveries met QC acceptance criteria.

Anions and Perchlorate:

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

Laboratory Replicate

The replicate analyses met all QC acceptance criteria.

Anions and 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.

Anions:

The sample was diluted 40X for chloride and sulfate.

Nitrate/nitrite:

The sample was diluted 5X.

Other QC

No other specific issues that affect data quality were identified.

Reviewed by: Monica Dymerski

Level I

Date: 11/09/12



Sample Findings Summary



AR/COC: 614391

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Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
EPA 900.0/SW846 9310			
	092862-034/CTF-MW2	ALPHA (12587-46-1)	J, FR7,MS1
	092862-034/CTF-MW2	BETA (12587-47-2)	J, MS1
EPA 901.1			
	092862-033/CTF-MW2	Americium-241 (14596-10-2)	BD, FR3
	092862-033/CTF-MW2	Cesium-137 (10045-97-3)	BD, FR3
	092862-033/CTF-MW2	Cobalt-60 (10198-40-0)	BD, FR3
	092862-033/CTF-MW2	Potassium-40 (13966-00-2)	R, Z2
SW846 3005/6020 DOE-AL			
	092862-009/CTF-MW2	Cobalt (7440-48-4)	J, D1
	092862-009/CTF-MW2	Copper (7440-50-8)	0.0019UJ, B,D1
	092862-009/CTF-MW2	Magnesium (7439-95-4)	J, D1
	092862-009/CTF-MW2	Zinc (7440-66-6)	J, MS1
	092862-010/CTF-MW2	Cobalt (7440-48-4)	J, D1
	092862-010/CTF-MW2	Copper (7440-50-8)	0.0019UJ, B,D1
	092862-010/CTF-MW2	Magnesium (7439-95-4)	J, D1
	092862-010/CTF-MW2	Zinc (7440-66-6)	J, MS1
SW846 3535/8321A Modified			
	092862-024/CTF-MW2	Tetryl (479-45-8)	UJ, MS5
SW846 7470A			
	092862-009/CTF-MW2	Mercury (7439-97-6)	UJ, B4
	092862-010/CTF-MW2	Mercury (7439-97-6)	UJ, B4

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

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APPENDICES

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

SOLID WASTE MANAGEMENT UNITS 149 AND 154 QUARTERLY GROUNDWATER MONITORING REPORT, JULY – SEPTEMBER 2012

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 September 2012 sampling event, monitoring wells CTF-MW2 and CTF-MW3 had been sampled 17 and 18 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 seventh of eight 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). The eighth and final supplemental quarterly groundwater sampling events will be conducted during the upcoming quarter (October through December 2012).

The analytical results discussed in this section correspond to the reporting period of July through September 2012. Monitoring wells CTF-MW3 and CTF-MW2 were sampled on September 21 and September 25, 2012, 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 September 2012 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 at concentrations of 0.0535 mg/L in the unfiltered sample and 0.0494 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 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 two trip blank (TB) samples were also submitted for analysis during this quarterly sampling event. The following sections provide descriptions of the field methods used and discussions of the analytical and QC sampling results.

2.0 Field Methods and Measurements

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 Third Quarter of Calendar Year (CY) 2012.

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).

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 a YSI[™] Model 6920 water quality meter. Turbidity was measured with a HACH[™] Model 2100P turbidity meter. Purging continued until four stable measurements for turbidity, pH, temperature, and SC were obtained. Groundwater stability is considered acceptable when the following parameters are achieved:

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

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

2.3 **Groundwater Sample Collection**

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

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

3.0 **Analytical Results**

Groundwater samples were submitted to GEL for chemical and radiological analyses. Samples were analyzed in accordance with applicable EPA analytical methods (EPA 1980, 1984, 1986, and 1999; Clesceri, et al. 1998; DOE 1990). Groundwater sampling results are compared with established EPA MCLs for drinking water (EPA 2009). Analytical results and method detection limits (MDLs) for samples collected from monitoring wells CTF-MW3 and CTF-MW2 are shown in tabulated form in Tables III-4 through III-15. Analytical reports, including certificates of analyses, analytical methods, MDLs, minimum detectable activity (MDA), critical level, practical quantitation limits,

dates of analyses, results for QC analyses, and data validation findings are filed in the SNL/NM Records Center.

The analytical 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). Other than the rejected results for potassium-40 in the sample from monitoring well CTF-MW2 (SWMU 154), 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, dibromochloromethane, and toluene were detected above laboratory MDLs, but below the practical quantitation limit for the analytical method. 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 detected at concentrations above established MCLs in the monitoring well CTF-MW2 environmental sample. No SVOCs were reported above laboratory MDLs. 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 RDX (hexahydro-1,3,5-trinitro-1,3,5-triazine). RDX was detected in the environmental sample collected from monitoring well CTF-MW2 at a concentration of 0.295 micrograms per liter (µg/L). 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 result for NPN was reported at a concentration of 5.90 mg/L in the monitoring well CTF-MW3 environmental sample.

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

3.6 **Anions and Alkalinity**

SWMU 149, Monitoring Well CTF-MW3. Table III-9 summarizes alkalinity and major anion (as 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 (as 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 total arsenic reported at a concentration of 0.0535 mg/L, and dissolved arsenic at 0.0494 mg/L. 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. Copper results for both unfiltered and filtered samples were qualified as not detected during data validation, since copper was reported at concentrations less than five times the associated laboratory method blank sample result.

3.9 **Gamma Spectroscopy and Radioisotopic Analyses**

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

SWMU 154, Monitoring Well CTF-MW2. The monitoring well CTF-MW2 groundwater sample was screened for gamma-emitting radionuclides and gross alpha/beta activity (EPA 1980 and DOE 1990). An additional sample for isotopic uranium was collected to support evaluation of gross alpha activity results. The 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, except for potassium-40. The potassium-40 activity was qualified as unusable during data validation since the laboratory did not meet identification criteria. The potassium-40 peak was classified as unusable because it could not be differentiated from the background.

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 corrected gross alpha activity is below the MCL of 15 picocuries per liter (pCi/L). Gross beta results do not exceed established MCLs. Isotopic uranium-233/234 was reported at 59.5 ± 7.79 pCi/L, uranium-235/236 at 0.684 ± 0.173 pCi/L, and uranium-238 at 8.51 ± 1.19 pCi/L (Table III-15). 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. The only constituent exceeding MCLs in samples collected during this quarter consists of arsenic, 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

Field QC samples included TB samples. According to the approved SAPs for SWMUs 149 and 154 (SNL/NM June 2010, Attachments 1 and 2), QC samples for environmental duplicate, field blank, and equipment blank samples were not required during this sampling event. The TB samples were submitted for analysis along with the groundwater samples in accordance with QC procedures specified in the SAPs.

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-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.

TB samples were submitted with the samples collected during the September 2012 sampling event. No VOCs were detected above associated laboratory MDLs in 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) issues were identified during the June 2012 sampling activities at monitoring wells CTF-MW3 and CTF-MW2.

A project-specific issue occurred during sampling:

- The field team added weight to the bottom of the sampling system, a second Bennett pump, to overcome buoyancy factors due to height of the water column. Upon completion of sampling the sampling system was removed from the well, and as the pump reached the surface the weight separated from the system and dropped down the well. A camera survey of the well was performed and no visible damage of the well was discovered. On October 5, 2012, the field team successfully removed the weight from the well

5.0 **Summary**

During the Third Quarter of CY 2012, samples were collected from monitoring well CTF-MW3, located near SWMU 149, and monitoring well CTF-MW2, located near SWMU 154, representing the seventh of eight required quarterly groundwater sampling events. 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

groundwater sample at concentrations of 0.0535 mg/L in the unfiltered sample and 0.0494 mg/L in the filtered samples. 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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Figures

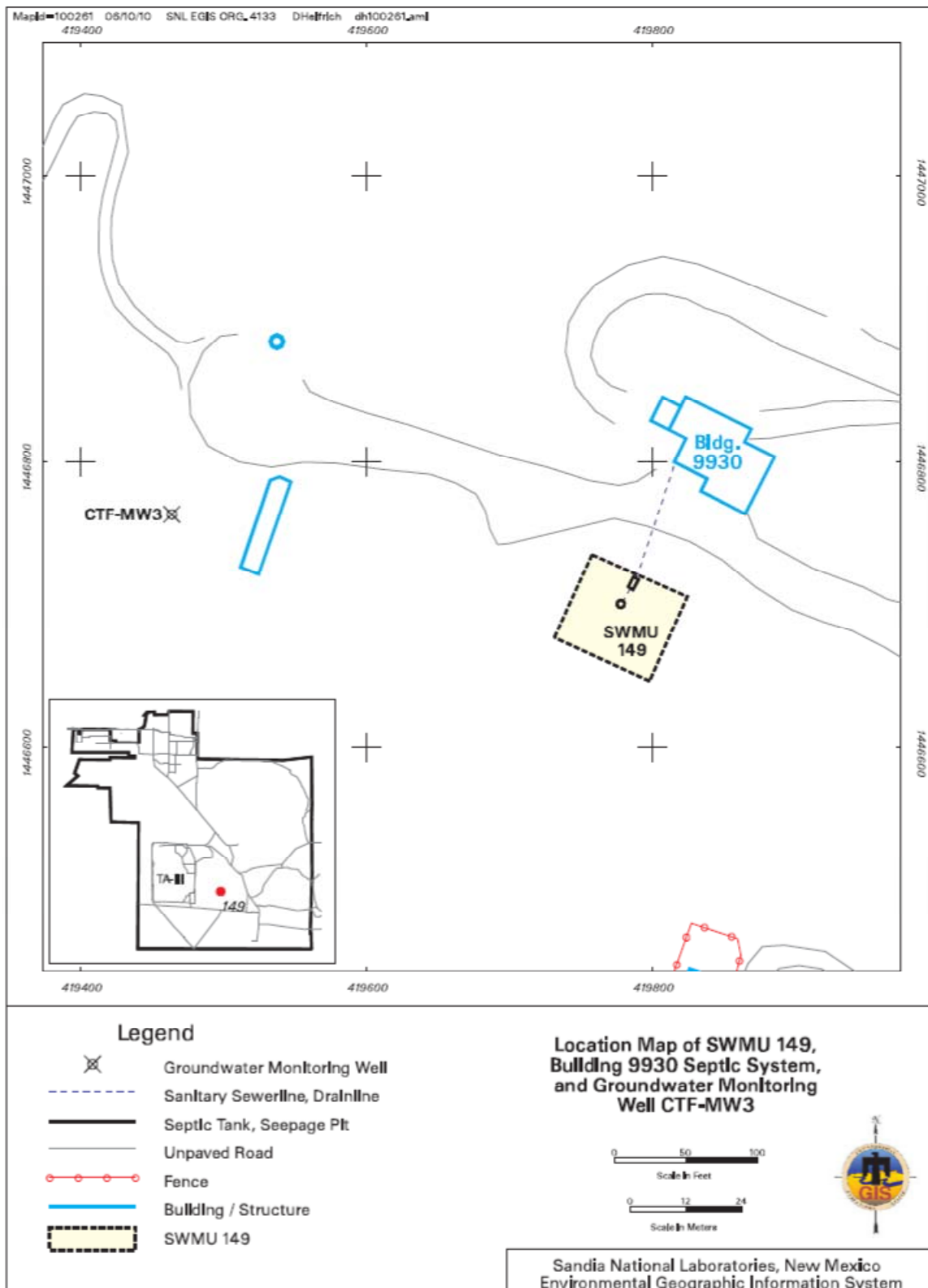


Figure III-1
Location of Monitoring Well CTF-MW3 near SWMU 149

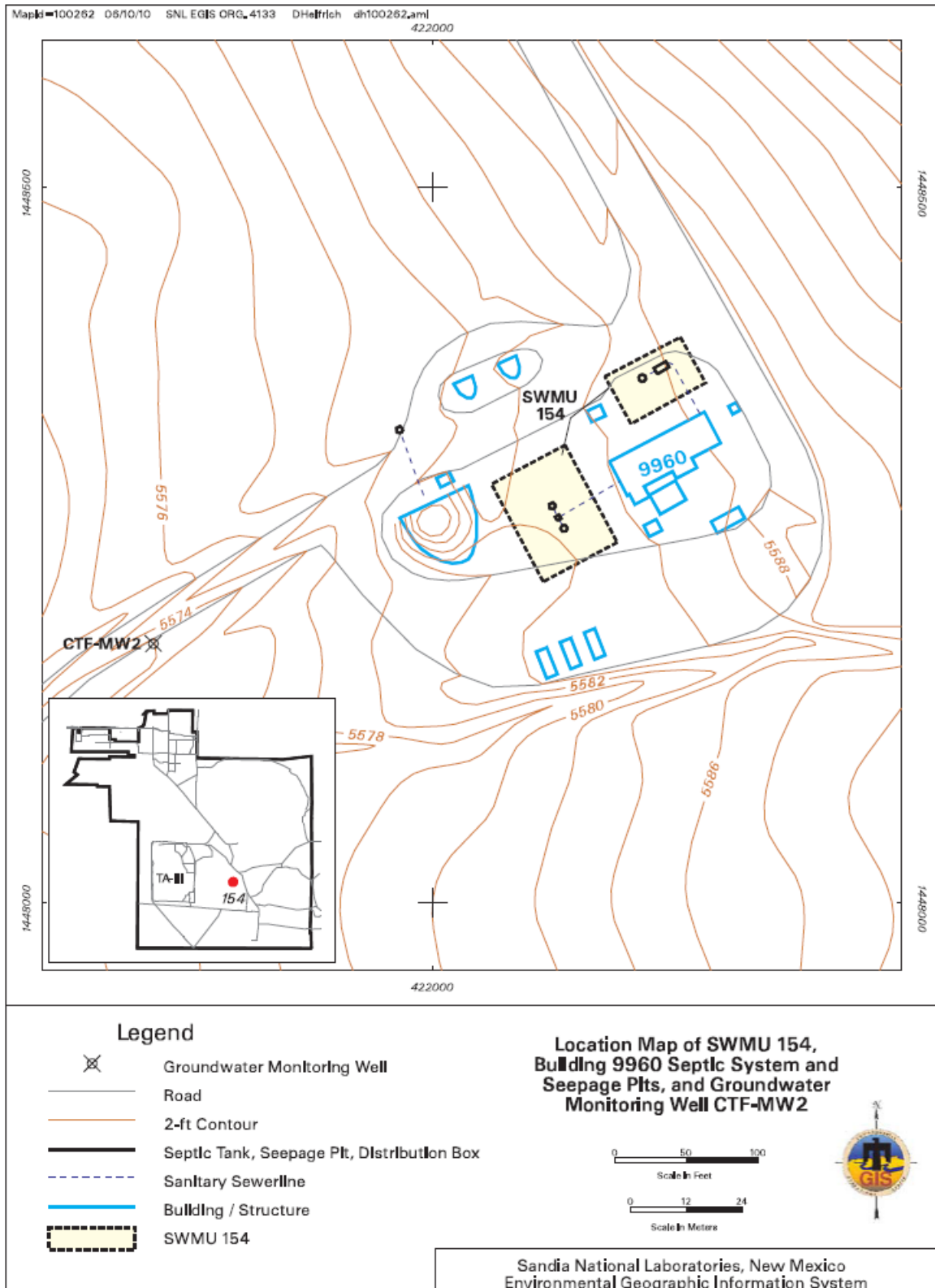


Figure III-2
Location of Monitoring Well CTF-MW2 near SWMU 154

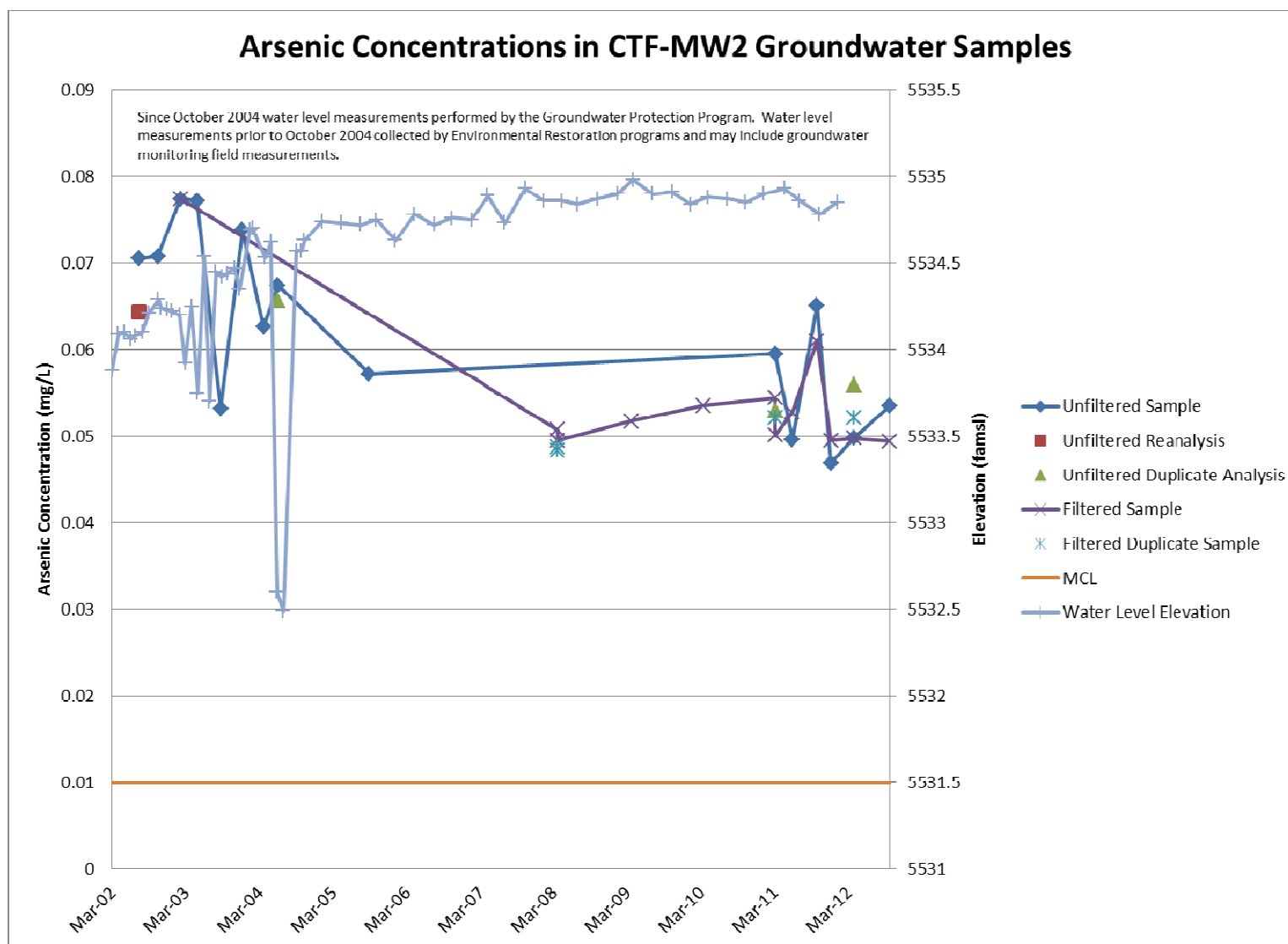


Figure III-3

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 ₂ SO ₄ , 4°C
Gross Alpha/Beta	EPA 900.0	1 x 1-L polyethylene, HNO ₃ , 4°C
Gamma Spectroscopy ^d	EPA 901.0	1 x 1-L polyethylene, HNO ₃ , 4°C
Isotopic Uranium	ASTM D3972-09	1 x 1-L polyethylene, HNO ₃ , 4°C

Notes

^aU.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.

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

^cMajor anions include bromide, chloride, fluoride, and sulfate.

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

°C = Degrees Celsius.

EPA = U.S. Environmental Protection Agency.

H₂SO₄ = Sulfuric acid.

HCl = Hydrochloric acid.

HNO₃ = Nitric acid.

L = Liter.

mL = Milliliter(s).

SM = Standard Method.

SWMU = Solid Waste Management Unit.

TAL = Target Analyte List.

Table III-2
Sample Details for Third Quarter, CY 2012 Groundwater Sampling
SWMUs 149 and 154 Groundwater Monitoring Quarterly Assessment
July – September 2012

Well	Sample Identification	AR/COC Number	Associated Groundwater Investigation
CTF-MW3	092860	614390	SWMU 149
CTF-MW2	092862	614391	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, July – September 2012

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	21-Sept-12	22.11	1653	193.9	6.89	0.34	88.9	7.72
SWMU 154								
CTF-MW2	25-Sept-12	18.61	3551	58.6	5.90	0.68	2.0	0.19

Notes

^aField measurements collected prior to sampling.

°C = Degrees Celsius.

% Sat = Percent saturation.

µmhos/cm = Micromhos per centimeter.

CTF = Coyote Test Field.

mg/L = Milligrams per liter.

mV = Millivolts.

MW = Monitoring well.

NTU = Nephelometric turbidity units.

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

SWMU = Solid Waste Management Unit.

Table III-4
Summary of Detected Volatile Organic, Semivolatile Organic, and High Explosive Compounds
SWMUs 149 and 154 Groundwater Monitoring
Quarterly Assessment, July – September 2012

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 21-Sep-12	Bromodichloromethane	0.630	0.300	1.00	NE	J		092860-001	EPA-8260B
	Chloroform	0.850	0.300	1.00	NE	J		092860-001	EPA-8260B
	Dibromochloromethane	0.430	0.300	1.00	NE	J		092860-001	EPA-8260B
	Toluene	0.310	0.300	1.00	1000	J		092860-001	EPA-8260B
SWMU 154									
CTF-MW2 25-Sep-12	RDX	0.295	0.0847	0.265	NE			092862-024	EPA-8321A

Notes

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-trinitro-triazine.

SWMU = Solid Waste Management Unit.

^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.

Table III-5
Method Detection Limits for Volatile Organic Compounds (EPA Method 8260)
SWMU 149 Groundwater Monitoring
Quarterly Assessment, July – September 2012

Analyte	MDL (µg/L)
1,1,1-Trichloroethane	0.300
1,1,2,2-Tetrachloroethane	0.300
1,1,2-Trichloroethane	0.300
1,1-Dichloroethane	0.300
1,1-Dichloroethene	0.300
1,2-Dichloroethane	0.300
1,2-Dichloropropane	0.300
2-Butanone	2.00
2-Hexanone	2.20
4-methyl-, 2-Pentanone	1.50
Acetone	3.00
Benzene	0.300
Bromodichloromethane	0.300
Bromoform	0.300
Bromomethane	0.300
Carbon disulfide	1.50
Carbon tetrachloride	0.300
Chlorobenzene	0.300
Chloroethane	0.300
Chloroform	0.300
Chloromethane	0.300
Dibromochloromethane	0.300
Ethyl benzene	0.300
Methylene chloride	3.00
Styrene	0.300
Tetrachloroethene	0.300
Toluene	0.300
Trichloroethene	0.300
Vinyl acetate	1.50
Vinyl chloride	0.300
Xylene	0.300
cis-1,2-Dichloroethene	0.300
cis-1,3-Dichloropropene	0.300
trans-1,2-Dichloroethene	0.300
trans-1,3-Dichloropropene	0.300

Notes

µg/L = Micrograms per liter.
EPA = U.S. Environmental Protection Agency.
MDL = Method detection limit. The minimum concentration that can be measured and reported with 99% confidence that the analyte is greater than zero; analyte is matrix-specific.
SWMU = Solid Waste Management Unit.

Table III-6
Method Detection Limits for Volatile and Semivolatile Organic Compounds
SWMU 154 Groundwater Monitoring
Quarterly Assessment, July – September 2012

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	1,2,4-Trichlorobenzene	3.00	EPA 8270C	Di-n-butyl phthalate	3.00	EPA 8270C
1,1,2,2-Tetrachloroethane	0.300	EPA 8260B	1,2-Dichlorobenzene	3.00	EPA 8270C	Di-n-octyl phthalate	3.00	EPA 8270C
1,1,2-Trichloroethane	0.300	EPA 8260B	1,3-Dichlorobenzene	3.00	EPA 8270C	Dibenz[a,h]anthracene	0.300	EPA 8270C
1,1-Dichloroethane	0.300	EPA 8260B	1,4-Dichlorobenzene	3.00	EPA 8270C	Dibenzofuran	3.00	EPA 8270C
1,1-Dichloroethene	0.300	EPA 8260B	2,4,5-Trichlorophenol	3.00	EPA 8270C	Diethylphthalate	3.00	EPA 8270C
1,2-Dichloroethane	0.300	EPA 8260B	2,4,6-Trichlorophenol	3.00	EPA 8270C	Dimethylphthalate	3.00	EPA 8270C
1,2-Dichloropropane	0.300	EPA 8260B	2,4-Dichlorophenol	3.00	EPA 8270C	4,6-Dinitro-o-cresol	3.00	EPA 8270C
2-Butanone	2.00	EPA 8260B	2,4-Dimethylphenol	3.00	EPA 8270C	Diphenyl amine	3.00	EPA 8270C
2-Hexanone	2.20	EPA 8260B	2,4-Dinitrophenol	5.00	EPA 8270C	Fluoranthene	0.300	EPA 8270C
4-methyl-, 2-Pentanone	1.50	EPA 8260B	2,4-Dinitrotoluene	3.00	EPA 8270C	Fluorene	0.300	EPA 8270C
Acetone	3.00	EPA 8260B	2,6-Dinitrotoluene	3.00	EPA 8270C	Hexachlorobenzene	3.00	EPA 8270C
Benzene	0.300	EPA 8260B	2-Chloronaphthalene	0.300	EPA 8270C	Hexachlorobutadiene	3.00	EPA 8270C
Bromodichloromethane	0.300	EPA 8260B	2-Chlorophenol	3.00	EPA 8270C	Hexachlorocyclopentadiene	3.00	EPA 8270C
Bromoform	0.300	EPA 8260B	2-Methylnaphthalene	0.300	EPA 8270C	Hexachloroethane	3.00	EPA 8270C
Bromomethane	0.300	EPA 8260B	2-Nitroaniline	3.00	EPA 8270C	Indeno(1,2,3-c,d)pyrene	0.300	EPA 8270C
Carbon disulfide	1.50	EPA 8260B	2-Nitrophenol	3.00	EPA 8270C	Isophorone	3.00	EPA 8270C
Carbon tetrachloride	0.300	EPA 8260B	3,3'-Dichlorobenzidine	3.00	EPA 8270C	Naphthalene	0.300	EPA 8270C
Chlorobenzene	0.300	EPA 8260B	3-Nitroaniline	3.00	EPA 8270C	Nitro-benzene	3.00	EPA 8270C
Chloroethane	0.300	EPA 8260B	4-Bromophenyl phenyl ether	3.00	EPA 8270C	Pentachlorophenol	3.00	EPA 8270C
Chloroform	0.300	EPA 8260B	4-Chloro-3-methylphenol	3.00	EPA 8270C	Phenanthrene	0.300	EPA 8270C
Chloromethane	0.300	EPA 8260B	4-Chlorobenzenamine	3.30	EPA 8270C	Phenol	3.00	EPA 8270C
Dibromochloromethane	0.300	EPA 8260B	4-Chlorophenyl phenyl ether	3.00	EPA 8270C	Pyrene	0.300	EPA 8270C
Ethyl benzene	0.300	EPA 8260B	4-Nitroaniline	3.00	EPA 8270C	bis(2-Chloroethoxy)methane	3.00	EPA 8270C
Methylene chloride	3.00	EPA 8260B	4-Nitrophenol	3.00	EPA 8270C	bis(2-Chloroethyl)ether	3.00	EPA 8270C
Styrene	0.300	EPA 8260B	Acenaphthene	0.300	EPA 8270C	bis(2-Chloroisopropyl)ether	3.00	EPA 8270C
Tetrachloroethene	0.300	EPA 8260B	Acenaphthylene	0.300	EPA 8270C	bis(2-Ethylhexyl)phthalate	3.00	EPA 8270C
Toluene	0.300	EPA 8260B	Anthracene	0.300	EPA 8270C	m,p-Cresol	3.00	EPA 8270C
Trichloroethene	0.300	EPA 8260B	Benzo(a)anthracene	0.300	EPA 8270C	n-Nitrosodipropylamine	3.00	EPA 8270C
Vinyl acetate	1.50	EPA 8260B	Benzo(a)pyrene	0.440	EPA 8270C	o-Cresol	3.00	EPA 8270C
Vinyl chloride	0.300	EPA 8260B	Benzo(b)fluoranthene	0.300	EPA 8270C			
Xylene	0.300	EPA 8260B	Benzo(ghi)perylene	0.300	EPA 8270C			
cis-1,2-Dichloroethene	0.300	EPA 8260B	Benzo(k)fluoranthene	0.300	EPA 8270C			
cis-1,3-Dichloropropene	0.300	EPA 8260B	Butylbenzyl phthalate	3.00	EPA 8270C			
trans-1,2-Dichloroethene	0.300	EPA 8260B	Carbazole	0.300	EPA 8270C			
trans-1,3-Dichloropropene	0.300	EPA 8260B	Chrysene	0.300	EPA 8270C			

Table III-6 (Concluded)
Method Detection Limits for Volatile and Semivolatile Organic Compounds
SWMU 154 Groundwater Monitoring
Quarterly Assessment, July – September 2012

Notes

^aAnalytical 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.

EPA = U.S. Environmental Protection Agency.

µg/L = Micrograms per liter.

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, July – September 2012

Analyte	MDL (µg/L)
1,3,5-Trinitrobenzene	0.0847
1,3-Dinitrobenzene	0.0847
2,4,6-Trinitrotoluene	0.0847
2,4-Dinitrotoluene	0.0847
2,6-Dinitrotoluene	0.0847
2-Amino-4,6-dinitrotoluene	0.0847
2-Nitrotoluene	0.0868
3-Nitrotoluene	0.0847
4-Amino-2,6-dinitrotoluene	0.0847
4-Nitrotoluene	0.159
HMX	0.0847
Nitro-benzene	0.0847
Pentaerythritol tetranitrate	0.106
RDX	0.0847
Tetryl	0.0847

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-trinitro-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, July – September 2012

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 21-Sep-12	Nitrate plus nitrite as N	5.90	0.425	1.25	10.0			092860-018	EPA 353.2
SWMU 154									
CTF-MW2 25-Sep-12	Nitrate plus nitrite as N	ND	0.085	0.250	10.0	U		092862-018	EPA 353.2

Notes

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.

^aLaboratory Qualifier

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

^bValidation Qualifier

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

^cAnalytical Method

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

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

Table III-9
Summary of Anion and Alkalinity Results
SWMUs 149 and 154 Groundwater Monitoring
Quarterly Assessment, July – September 2012

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 21-Sep-12	Bicarbonate Alkalinity	339	0.725	1.00	NE			092860-022	SM2320B
	Carbonate Alkalinity	ND	0.725	1.00	NE	U		092860-022	SM2320B
	Bromide	1.18	0.067	0.200	NE			092860-016	EPA 9056
	Chloride	116	1.34	4.00	NE			092860-016	EPA 9056
	Fluoride	2.36	0.033	0.100	4.0			092860-016	EPA 9056
	Sulfate	493	2.66	8.00	NE			092860-016	EPA 9056
SWMU 154									
CTF-MW2 25-Sep-12	Bicarbonate Alkalinity	1560	0.725	1.00	NE			092862-022	SM2320B
	Carbonate Alkalinity	ND	0.725	1.00	NE	U		092862-022	SM2320B
	Bromide	ND	0.067	0.200	NE	U		092862-016	EPA 9056
	Chloride	468	2.68	8.00	NE			092862-016	EPA 9056
	Fluoride	2.15	0.033	0.100	4.0			092862-016	EPA 9056

Notes

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.

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.

^aLaboratory Qualifier

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

^bValidation Qualifier

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

Table III-9 (Concluded)
Summary of Anion and Alkalinity Results
SWMUs 149 and 154 Groundwater Monitoring
Quarterly Assessment, April – June 2012

Notes (continued)

°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-10
Summary of Perchlorate Results
SWMUs 149 and 154 Groundwater Monitoring
Quarterly Assessment, July – September 2012

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 21-Sep-12	ND	0.004	0.012	NE	U		092860-020	EPA 314.0
SWMU 154								
CTF-MW2 25-Sep-12	ND	0.004	0.012	NE	U		092862-020	EPA 314.0

Notes

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.

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.

^aLaboratory Qualifier

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

^bValidation Qualifier

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

^cAnalytical Method

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

Table III-11
Summary of Unfiltered Total Metal Results
SWMU 149 Groundwater Monitoring
Quarterly Assessment, July – September 2012

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 21-Sep-12	Aluminum	ND	0.015	0.050	NE	U		092860-009	EPA 6020
	Antimony	ND	0.001	0.003	0.006	U		092860-009	EPA 6020
	Arsenic	ND	0.0017	0.005	0.010	U		092860-009	EPA 6020
	Barium	0.0312	0.0006	0.002	2.00			092860-009	EPA 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		092860-009	EPA 6020
	Cadmium	ND	0.00011	0.001	0.005	U		092860-009	EPA 6020
	Calcium	193	0.600	2.00	NE	B		092860-009	EPA 6020
	Chromium	ND	0.002	0.010	0.100	U		092860-009	EPA 6020
	Cobalt	0.000342	0.0001	0.001	NE	J		092860-009	EPA 6020
	Copper	0.00247	0.00035	0.001	NE	B		092860-009	EPA 6020
	Iron	0.464	0.033	0.100	NE			092860-009	EPA 6020
	Lead	ND	0.0005	0.002	NE	U		092860-009	EPA 6020
	Magnesium	49.3	0.010	0.030	NE			092860-009	EPA 6020
	Manganese	ND	0.001	0.005	NE	U		092860-009	EPA 6020
	Mercury	ND	0.000067	0.0002	0.002	U	UJ	092860-009	EPA 7470
	Nickel	0.00471	0.0005	0.002	NE			092860-009	EPA 6020
	Potassium	10.7	0.080	0.300	NE			092860-009	EPA 6020
	Selenium	0.0257	0.0015	0.005	0.050			092860-009	EPA 6020
	Silver	ND	0.0002	0.001	NE	U		092860-009	EPA 6020
	Sodium	173	0.800	2.50	NE		J	092860-009	EPA 6020
	Thallium	ND	0.00045	0.002	0.002	U		092860-009	EPA 6020
	Vanadium	ND	0.001	0.005	NE	U		092860-009	EPA 6010
	Zinc	0.0044	0.0035	0.010	NE	J		092860-009	EPA 6020

Table III-11 (Concluded)
Summary of Unfiltered Total Metal Results
SWMU 149 Groundwater Monitoring
Quarterly Assessment, July – September 2012

Notes

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.
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.

^aLaboratory Qualifier

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

^bValidation Qualifier

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

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

^cAnalytical Method

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

Table III-12
Summary of Filtered Total Metal Results
SWMU 149 Groundwater Monitoring
Quarterly Assessment, July – September 2012

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 21-Sep-12	Aluminum	ND	0.015	0.050	NE	U		092860-010	EPA 6020
	Antimony	0.00137	0.001	0.003	0.006	B, J	0.0058U	092860-010	EPA 6020
	Arsenic	ND	0.0017	0.005	0.010	U		092860-010	EPA 6020
	Barium	0.0337	0.0006	0.002	2.00			092860-010	EPA 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		092860-010	EPA 6020
	Cadmium	ND	0.00011	0.001	0.005	U		092860-010	EPA 6020
	Calcium	207	0.600	2.00	NE	B		092860-010	EPA 6020
	Chromium	ND	0.002	0.010	0.100	U		092860-010	EPA 6020
	Cobalt	0.000409	0.0001	0.001	NE	J		092860-010	EPA 6020
	Copper	0.00282	0.00035	0.001	NE	B		092860-010	EPA 6020
	Iron	0.519	0.033	0.100	NE			092860-010	EPA 6020
	Lead	ND	0.0005	0.002	NE	U		092860-010	EPA 6020
	Magnesium	48.4	0.010	0.030	NE			092860-010	EPA 6020
	Manganese	ND	0.001	0.005	NE	U		092860-010	EPA 6020
	Mercury	ND	0.000067	0.0002	0.002	U	UJ	092860-010	EPA 7470
	Nickel	0.0051	0.0005	0.002	NE			092860-010	EPA 6020
	Potassium	11.3	0.080	0.300	NE			092860-010	EPA 6020
	Selenium	0.0252	0.0015	0.005	0.050			092860-010	EPA 6020
	Silver	ND	0.0002	0.001	NE	U		092860-010	EPA 6020
	Sodium	173	0.800	2.50	NE		J	092860-010	EPA 6020
	Thallium	ND	0.00045	0.002	0.002	U		092860-010	EPA 6020
	Vanadium	ND	0.001	0.005	NE	U		092860-010	EPA 6010
	Zinc	0.00486	0.0035	0.010	NE	J		092860-010	EPA 6020

Table III-12 (Concluded)
Summary of Filtered Total Metal Results
SWMU 149 Groundwater Monitoring
Quarterly Assessment, July – September 2012

Notes

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.
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.

^aLaboratory Qualifier

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

^bValidation Qualifier

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

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

^cAnalytical Method

U.S. Environmental Protection Agency, 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 III-13
Summary of Unfiltered Total Metal Results
SWMU 154 Groundwater Monitoring
Quarterly Assessment, July – September 2012

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 25-Sep-12	Aluminum	0.118	0.015	0.050	NE			092862-009	EPA 6020
	Antimony	ND	0.001	0.003	0.006	U		092862-009	EPA 6020
	Arsenic	0.0535	0.0017	0.005	0.010			092862-009	EPA 6020
	Barium	0.081	0.0006	0.002	2.00			092862-009	EPA 6020
	Beryllium	0.00267	0.0002	0.0005	0.004			092862-009	EPA 6020
	Cadmium	0.000274	0.00011	0.001	0.005	J		092862-009	EPA 6020
	Calcium	390	1.20	4.00	NE			092862-009	EPA 6020
	Chromium	ND	0.002	0.010	0.100	U		092862-009	EPA 6020
	Cobalt	0.00963	0.0001	0.001	NE		J	092862-009	EPA 6020
	Copper	0.00185	0.00035	0.001	NE	B	0.0019UJ	092862-009	EPA 6020
	Iron	2.78	0.033	0.100	NE			092862-009	EPA 6020
	Lead	ND	0.0005	0.002	NE	U		092862-009	EPA 6020
	Magnesium	88.7	0.200	0.600	NE		J	092862-009	EPA 6020
	Manganese	3.16	0.005	0.025	NE			092862-009	EPA 6020
	Mercury	ND	0.000067	0.0002	0.002	U	UJ	092862-009	EPA 7470
	Nickel	0.0222	0.0005	0.002	NE			092862-009	EPA 6020
	Potassium	56.6	0.400	1.50	NE			092862-009	EPA 6020
	Selenium	0.00741	0.0015	0.005	0.050			092862-009	EPA 6020
	Silver	ND	0.0002	0.001	NE	U		092862-009	EPA 6020
	Sodium	538	1.60	5.00	NE			092862-009	EPA 6020
	Thallium	0.00115	0.00045	0.002	0.002	J		092862-009	EPA 6020
	Uranium	0.0281	0.000067	0.0002	0.03	B		092862-009	EPA 6020
	Vanadium	ND	0.001	0.005	NE	U		092862-009	EPA 6010
	Zinc	0.0649	0.0035	0.010	NE		J	092862-009	EPA 6020

Table III-13 (Concluded)
Summary of Unfiltered Total Metal Results
SWMU 154 Groundwater Monitoring
Quarterly Assessment, July – September 2012

Notes

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

^aLaboratory Qualifier

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

^bValidation Qualifier

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

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

^cAnalytical Method

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

Table III-14
Summary of Filtered Total Metal Results
SWMU 154 Groundwater Monitoring
Quarterly Assessment, July – September 2012

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 25-Sep-12	Aluminum	0.088	0.015	0.050	NE			092862-010	EPA 6020
	Antimony	ND	0.001	0.003	0.006	U		092862-010	EPA 6020
	Arsenic	0.0494	0.0017	0.005	0.010			092862-010	EPA 6020
	Barium	0.0774	0.0006	0.002	2.00			092862-010	EPA 6020
	Beryllium	0.00248	0.0002	0.0005	0.004			092862-010	EPA 6020
	Cadmium	0.000415	0.00011	0.001	0.005	J		092862-010	EPA 6020
	Calcium	373	1.20	4.00	NE			092862-010	EPA 6020
	Chromium	ND	0.002	0.010	0.100	U		092862-010	EPA 6020
	Cobalt	0.00886	0.0001	0.001	NE		J	092862-010	EPA 6020
	Copper	0.00166	0.00035	0.001	NE	B	0.0019UJ	092862-010	EPA 6020
	Iron	2.58	0.033	0.100	NE			092862-010	EPA 6020
	Lead	ND	0.0005	0.002	NE	U		092862-010	EPA 6020
	Magnesium	77.4	0.200	0.600	NE		J	092862-010	EPA 6020
	Manganese	2.98	0.005	0.025	NE			092862-010	EPA 6020
	Mercury	ND	0.000067	0.0002	0.002	U	UJ	092862-010	EPA 7470
	Nickel	0.0211	0.0005	0.002	NE			092862-010	EPA 6020
	Potassium	47.6	0.080	0.300	NE			092862-010	EPA 6020
	Selenium	0.0084	0.0015	0.005	0.050			092862-010	EPA 6020
	Silver	ND	0.0002	0.001	NE	U		092862-010	EPA 6020
	Sodium	503	1.60	5.00	NE			092862-010	EPA 6020
	Thallium	0.00114	0.00045	0.002	0.002	J		092862-010	EPA 6020
	Uranium	0.0271	0.000067	0.0002	0.03	B		092862-010	EPA 6020
	Vanadium	ND	0.001	0.005	NE	U		092862-010	EPA 6010
	Zinc	0.259	0.0035	0.010	NE		J	092862-010	EPA 6020

Table III-14 (Concluded)
Summary of Filtered Total Metal Results
SWMU 154 Groundwater Monitoring
Quarterly Assessment, July – September 2012

Notes

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

^aLaboratory Qualifier

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

^bValidation Qualifier

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

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

^cAnalytical Method

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

Table III-15
Summary of Gamma Spectroscopy, Gross Alpha, Gross Beta, and Isotopic Uranium Results
SWMU 154 Groundwater Monitoring
Quarterly Assessment, July – September 2012

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 25-Sep-12	Americium-241	6.89 ± 8.26	11.9	5.84	NE	U	BD	092862-033	EPA 901.1
	Cesium-137	1.29 ± 1.83	3.07	1.48	NE	U	BD	092862-033	EPA 901.1
	Cobalt-60	0.0659 ± 1.69	2.99	1.40	NE	U	BD	092862-033	EPA 901.1
	Potassium-40	30.0 ± 44.6	29.5	13.8	NE	X	R	092862-033	EPA 901.1
	Gross Alpha	7.21	NA	NA	15	NA	None	092862-034	EPA 900.0
	Gross Beta	45.2 ± 9.90	7.78	3.73	4mrem/yr		J	092862-034	EPA 900.0
	Uranium-233/234	59.5 ± 7.79	0.112	0.0473	NE			092862-035	HASL-300
	Uranium-235/236	0.684 ± 0.173	0.0812	0.0299	NE			092862-035	HASL-300
	Uranium-238	8.51 ± 1.19	0.0761	0.0294	NE			092862-035	HASL-300

Notes

CFR = Code of Federal Regulations

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 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.

pCi/L = Picocuries per liter.

SWMU = Solid Waste Management Unit.

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

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

Table III-15 (Concluded)
Summary of Gamma Spectroscopy, Gross Alpha, Gross Beta, and Isotopic Uranium Results
SWMU 154 Groundwater Monitoring
Quarterly Assessment, July – September 2012

Notes (continued)

^cLaboratory Qualifier

NA = Not applicable.
U = Analyte is absent or below the method detection limit.
X = Data rejected due to peak not meeting identification criteria.

^dValidation Qualifier

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

BD = Below detection limit as used in radiochemistry to identify results that are not statistically different from zero.
J = The associated value is an estimated quantity.
None = No data validation for corrected gross alpha activity.
R = The data are unusable. Resampling and reanalysis are necessary for verification.

^eAnalytical Method

U.S. 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-16
Summary of Constituents Detected above Established MCLs
SWMUs 149 and 154 Groundwater Monitoring
Quarterly Assessments through September 2012

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	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	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

Notes

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.
pCi/L = Picocuries per liter.
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-16 (Concluded)
Summary of Constituents Detected above Established MCLs
SWMUs 149 and 154 Groundwater Monitoring
Quarterly Assessments through September 2012

Notes (continued)

^aLaboratory Qualifier

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

^bValidation Qualifier

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

^cAnalytical Method

U.S. Environmental Protection Agency, 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.

Appendix A

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

CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY

Internal Lab

Batch No.

SMO Use

Page 1 of 1

AR/COC 614390

Project Name: SWMU 149 GWM			Date Samples Shipped:			SMO Authorization: <i>Don Walczak</i>			<input type="checkbox"/> Waste Characterization			
Project/Task Manager: Clinton Lum			Carrier/Waybill No.			SMO Contact Phone: <i>See bottle on</i>			<input type="checkbox"/> RMMA			
Project/Task Number: 98026.01.14			Lab Contact: Edie Kent/803-556-8171			Lorraine Herrera/505-844-3199			<input type="checkbox"/> Released by COC No.			
Service Order: CF0250-13			Lab Destination: GEL			Send Report to SMO:			<input checked="" type="checkbox"/> 4° Celsius			
			Contract No.: PO 691436			Rita Kavanaugh/505-284-2553			Bill to: Sandia National Laboratories (Accounts Payable), P.O. Box 5800, MS-0154 Albuquerque, NM 87185-0154			
Tech Area:			Operational Site:									
Building:		Room:										
Sample No.	Fraction	Sample Location Detail	Depth (ft)	Date/Time Collected	Sample Matrix	Container Type	Volume	Preservative	Collection Method	Sample Type	Parameter & Method Requested	Lab Sample ID
092860	-001 ✓	CTF-MW3	359	9/21/12 10:25 ✓	GW	G	3x40ml	HCL	G	SA	TCL VOC (SW846-8260B)	
092860	-009 ✓	CTF-MW3	359	9/21/12 10:26 ✓	GW	P	500 ml	HNO3	G	SA	TAL Metals (SW846-6010/6020/7470)	
092860	-010 ✓	CTF-MW3	359	9/21/12 10:28 ✓	FGW	P	500 ml	HNO3	G	SA	TAL Metals (SW846-6010/6020/7470)	
092860	-016 ✓	CTF-MW3	359	9/21/12 10:29 ✓	GW	P	125 ml	4C	G	SA	Anions (SW846-9056)	
092860	-018 ✓	CTF-MW3	359	9/21/12 10:30 ✓	GW	P	125 ml	H2SO4	G	SA	NPN (EPA 353.2)	
092860	-020 ✓	CTF-MW3	359	9/21/12 10:31 ✓	GW	P	250 ml	4C	G	SA	Perchlorate (314.0)	
092860	-022 ✓	CTF-MW3	359	9/21/12 10:32 ✓	GW	P	500 ml	4C	G	SA	Alkalinity (SM2320B)	
092861	-001 ✓	CTF-TB1	na	9/21/12 10:25 ✓	DIW	G	3x40ml	HCL	G	TB	TCL VOC (SW846-8260B)	
Last Chain: <input type="checkbox"/> Yes			Sample Tracking			SMO Use			Special Instructions/QC Requirements:			Conditions on Receipt
Validation Req'd: <input checked="" type="checkbox"/> Yes			Date Entered:			EDD <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No						
Background: <input type="checkbox"/> Yes			Entered by:			Turnaround Time <input type="checkbox"/> 7 Day* <input type="checkbox"/> 15 Day* <input checked="" type="checkbox"/> 30 Day						
Confirmatory: <input type="checkbox"/> Yes			QC inits.:			Negotiated TAT <input type="checkbox"/>						
Sample Team Members	Name	Signature	Init.	Company/Organization/Phone/Cell			Sample Disposal <input type="checkbox"/> Return to Client <input checked="" type="checkbox"/> Disposal by Lab			Return Samples By: Comments: Send report to Tim Jackson/4142/MS 0729/284-2547 Report alkalinity (as Total CaCO3, HCO3, CO3). Anions (as Br, Cl, F, SO4) If Perchlorate detected, perform verification analysis using SW846-6850M. FGW- Filtered in field w/ .45 micron filter.		
	Robert Lynch	<i>Robert Lynch</i>	RL	SNL/4142/505-844-4013/505-250-7090								
	Alfred Santillanes	<i>Alfred Santillanes</i>	AS	SNL/4142/505-844-5130/505-228-0710								
	William Gibson	<i>William Gibson</i>	WG	SNL/4142/505-284-3307/505-239-7367								
1. Relinquished by <i>Alfred Santillanes</i>			Org. 4142	Date 9/21/12	Time 10:53	3. Relinquished by			Org.	Date	Time	
1. Received by <i>Don Walczak</i>			Org. 4142	Date 9/21/12	Time 10:53	3. Received by			Org.	Date	Time	
2. Relinquished by			Org.	Date	Time	4. Relinquished by			Org.	Date	Time	
2. Received by			Org.	Date	Time	4. Received by			Org.	Date	Time	

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

Project Name: SWMU 149 GWM	Project No.: 146422.10.11.01 / 98026.01.14
Well I.D.: CTF-MW3	Date: 9/21/12
Well Condition:	Weather Condition:
Method: Portable pump <input checked="" type="checkbox"/> Dedicated pump <input type="checkbox"/> Pump depth: 359'	

[illegible]

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GROUNDWATER SAMPLE COLLECTION FIELD EQUIPMENT CHECK LOG Page 1 of 2

SNL/NM Project Name: SWMU 149 GWM			SNL/NM Project No.: 146422.10.11.01 / 98026.01.14		
Calibrations done by: Robert Lynch			Date: 9/21/12		
Make & Model: YSI 6920 V2					
YSI 6820 Sonde (S/N) with DO, Ec, pH, ORP, and temperature probes: 08H100033					
YSI 650 MDS (S/N): N/A					
pH Calibration					
pH Calibrated to (std): 7.00			pH sloped to (std): 10.0		
Reference value:	4.00		7.00		10.00
	Value	Temp	Value	Temp	Value Temp
1. Time:	0632	4.02	21.3	7.01	21.3
2. Time:	1125	4.03	20.6	6.99	20.6
3. Time:					
4. Time:					
Standard lot no.:	2AA670		2AB299		1AK189
Expiration date:	Jan-14		Feb-14		Nov-13
SC Calibration					
Reference Value: 1278 uS			Standard Lot No.: 2AB388		
	Value	Temp	Expiration Date: Feb-13		
1. Time:	0634	1283	21.3		
2. Time:	1127	1280	20.6		
3. Time:					
4. Time:					
ORP Calibration					
Reference Value: 220 mV			Standard Lot No. 1AL131		
	Value	Temp	Expiration Date: Sep-12		
1. Time:	0633	221.4	21.3		
2. Time:	1126	220.7	20.6		
3. Time:					
4. Time:					
DO Calibration					
Calibration Value:	81% air saturation @ 5200 ft.		Atmospheric Pressure in Hg		
1. Time:	0631	81.7	24.44		
2. Time:	1124	81.8	24.45		
3. Time:					
4. Time:					

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

SNL/NM Project Name: SWMU 149 GWM		Project No.: 146422.10.11.01 / 98026.01.14		
Calibration done by: Robert Lynch		Date: 9/21/12		
TURBIDIMETER				
Make & Model: HACH 2100P 2100Q		Serial No. S/N 10050C002897		
Reference Value	$\times 10$	20	100	800
Standard Lot No.	0161	0168	0162	0161
1. Time 0833	9.96	19.7	101	794
2. Time 1034	10.1	19.6	102	791
3. Time				
4. Time				
Comments:				

Portable Pump and Tubing / Water Level Indicator
Decontamination Log Form

Project Name: <u>SWMU 149 GWM</u>	Monitoring Well ID #: <u>CTF-MW 3</u>	Date: <u>9/21/12</u>
The following equipment was decontaminated at completion of sampling activities in accordance with FOP-05-03		
Pump and Tubing Bundle ID #: <u>GWM 1806-32</u>	Water Level Indicator ID #: <u>62088</u>	
Personnel Performing Decontamination: <u>Robert Lynch</u> <u>PL</u> Print Name: Initial: <u>ALFRED SANTILLANO</u> <u>AS</u> Print Name: Initial:		Personnel Performing Decontamination: <u>Robert Lynch</u> <u>PL</u> Print Name: Initial: <u>ALFRED SANTILLANO</u> <u>AS</u> Print Name: Initial:
Condition of Equipment Pump: <u>good</u> Tubing Bundle: <u>good</u> Water Level Indicator: <u>good</u>		
List of Decontamination Materials		
Distilled or Deionized (circle one) Source: <u>Culligan</u> Lot Number: <u>090412</u>	HNO₃ Grade: <u>Reagent</u> UN #: <u>2031</u> Manufacturer: <u>Fisher Scientific</u> Lot Number: <u>002735</u>	

Groundwater Monitoring Waste Generation Log

Waste Generator : <u>Bill Gibson</u> Phone: <u>239-7367</u> project leader: <u>Clinton Lum</u>			
Project Name	SWMU 149 GWM	SWMU 149 GWM	SWMU 149 GWM
Container ID # (site-date-sequence)	CTF-MW3-092112-01	CTF-MW3-092112-02	CTF-092112
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 2/9	Purge water 2/8	Decon water
Container Type / Volume	55-gal CHPG	55-gal CHPD	55-gal CHPD
Volume of Waste	19 gals	18	30
Total Container Weight	170 lbs.	160	280
COC#: Sample#-Fraction	614390	614390	614390
	092860	092860	092860
Accumulation Date	Start: 09/21/12	Start: 09/21/12	Start: 09/21/12
	Full: 09/21/12	Full: 09/21/12	Full: 09/21/12
Date Waste Moved to Accumulation Area	09/21/12	09/21/12	09/21/12
Accumulation Area Name	9925	9925	9925
Comments:			

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TAILGATE SAFETY MEETING FORM

Dept: 4142 Well Location: CTF-MW-3 Date: 9/21/12 Time: 0830

Activities: Groundwater Monitoring (purging, sampling, decon)

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

Weather Conditions:

Temp: 58.4 °F Wind Speed: 0 MPH

Humidity: 30.7 % Wind Chill NA °F

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

Other: _____

Safety Topics Presented

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

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

Attendees

Robert T Lynch
Printed Name

Robert T Lynch
Signature

William Gibson
Printed Name

William Gibson
Signature

ALFRED SANTILLANES
Printed Name

Alfred Santillanes
Signature

Printed Name

Signature

Printed Name

Signature

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

CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY

Internal Lab

Page 1 of 2

Batch No. <u>N/A</u>		SMO Use		AR/COC 614391								
Project Name: SWMU 154 GWM		Date Samples Shipped: <u>9/25/12</u>		SMO Authorization: <u>[Signature]</u>								
Project/Task Manager: Clinton Lum		Carrier/Waybill No.		SMO Contact Phone: <u>910-284-3199</u>								
Project/Task Number: 98026.01.15		Lab Contact: Edie Kent/803-556-8171		Lorraine Herrera/505-844-3199								
Service Order: CF0251-13		Lab Destination: GEL		Send Report to SMO: <input checked="" type="checkbox"/> 4° Celsius								
		Contract No.: PO 691436		Rita Kavanaugh/505-284-2553								
Tech Area:		Bill to: Sandia National Laboratories (Accounts Payable), P.O. Box 5800, MS-0154 Albuquerque, NM 87185-0154										
Building:		Room:		Operational Site:								
Sample No.	Fraction	Sample Location Detail	Depth (ft)	Date/Time Collected	Sample Matrix	Container Type	Volume	Preservative	Collection Method	Sample Type	Parameter & Method Requested	Lab Sample ID
092862	-001	CTF-MW2	129	9/25/12 9:37	GW	G	3x40ml	HCL	G	SA	TCL VOC (SW846-8260B)	
092862	-002	CTF-MW2	129	9/25/12 9:39	GW	AG	4x1L	4C	G	SA	TCL SVOC (SW846-8270C)	
092862	-009	CTF-MW2	129	9/25/12 9:40	GW	P	500 ml	HNO3	G	SA	TAL Metals (SW846-6010/6020/7470)	
092862	-010	CTF-MW2	129	9/25/12 9:42	FGW	P	500 ml	HNO3	G	SA	TAL Metals (SW846-6010/6020/7470)	
092862	-016	CTF-MW2	129	9/25/12 9:43	GW	P	125 ml	4C	G	SA	Anions (SW846-9056)	
092862	-018	CTF-MW2	129	9/25/12 9:44	GW	P	125 ml	H2SO4	G	SA	NPN (EPA 353.2)	
092862	-020	CTF-MW2	129	9/25/12 9:45	GW	P	250 ml	4C	G	SA	Perchlorate (314.0)	
092862	-022	CTF-MW2	129	9/25/12 9:46	GW	P	500 ml	4C	G	SA	Alkalinity (SM2320B)	
092862	-024	CTF-MW2	129	9/25/12 9:48	GW	AG	4x1L	4C	G	SA	High Explosives (SW846-8321A Mod.)	
092862	-033	CTF-MW2	129	9/25/12 9:49	GW	P	1 L	HNO3	G	SA	Gamma Spectroscopy(short list)(901.0)	
Last Chain: <input checked="" type="checkbox"/> Yes		Sample Tracking		SMO Use		Special Instructions/QC Requirements:				Conditions on Receipt		
Validation Req'd: <input checked="" type="checkbox"/> Yes		Date Entered:				EDD <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No						
Background: <input type="checkbox"/> Yes		Entered by:				Turnaround Time <input type="checkbox"/> 7 Day* <input type="checkbox"/> 15 Day* <input checked="" type="checkbox"/> 30 Day						
Confirmatory: <input type="checkbox"/> Yes		QC inits.:				Negotiated TAT <input type="checkbox"/>						
Sample Team Members	Name	Signature	Init.	Company/Organization/Phone/Cell		Sample Disposal <input type="checkbox"/> Return to Client <input checked="" type="checkbox"/> Disposal by Lab						
	Robert Lynch	<u>[Signature]</u>	<u>RL</u>	SNL/4142/505-844-4013/505-250-7090		Return Samples By:						
	Alfred Santillanes	<u>[Signature]</u>	<u>AS</u>	SNL/4142/505-844-5130/505-228-0710		Comments: Send report to Tim Jackson/4142/MS 0729/284-2547						
	William Gibson	<u>[Signature]</u>	<u>WG</u>	SNL/4142/505-284-3307/505-239-7367		Report alkalinity (as Total CaCO3, HCO3, CO3). Anions (as Br, Cl, F, SO4) If Perchlorate detected, perform verification analysis using SW846-6850M						
1. Relinquished by <u>[Signature]</u> Org. <u>4142</u> Date <u>9/25/12</u> Time <u>1024</u>		3. Relinquished by		Org.		Date		Time				
1. Received by <u>[Signature]</u> Org. <u>4142</u> Date <u>9/25/12</u> Time <u>1024</u>		3. Received by		Org.		Date		Time				
2. Relinquished by		Org.		Date		Time		4. Relinquished by		Org. Date Time		
2. Received by		Org.		Date		Time		4. Received by		Org. Date Time		

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

Page 2 of 2

AR/COC 614391

[illegible]

CONTRACT LABORATORY

Page 1 of 1

SMO Use

AR/COC | 614392

Project Name: SWMU 154 GWM		Date Samples Shipped: 9/25/12		SMO Authorization: [Signature]		<input checked="" type="checkbox"/> Waste Characterization						
Project/Task Manager: Clinton Lum		Carrier/Waybill No.		SMO Contact Phone: [Signature]		<input type="checkbox"/> RMMA						
Project/Task Number: 98026.01.15		Lab Contact: Edie Kent/803-556-8171		Lorraine Herrera/505-844-3199		<input type="checkbox"/> Released by COC No.						
Service Order: CF0251-13		Lab Destination: GEL		Send Report to SMO:		<input checked="" type="checkbox"/> 4° Celsius						
		Contract No.: PO 691436		Rita Kavanaugh/505-284-2553		Bill to: Sandia National Laboratories (Accounts Payable), P.O. Box 5800, MS-0154 Albuquerque, NM 87185-0154						
Tech Area:		Operational Site:										
Building:		Room:										
Sample No.	Fraction	Sample Location Detail	Depth (ft)	Date/Time Collected	Sample Matrix	Container Type	Volume	Preservative	Collection Method	Sample Type	Parameter & Method Requested	Lab Sample ID
092864	-011	CTF-MW2 PW	NA	9/25/12 9:30	FPW	P	500 ml	HNO3	G	SA	Arsenic (SW846-6020)	
Last Chain: <input checked="" type="checkbox"/> Yes			Sample Tracking			SMO Use			Special Instructions/QC Requirements:			Conditions on Receipt
Validation Req'd: <input type="checkbox"/> Yes			Date Entered:			EDD <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No						
Background: <input type="checkbox"/> Yes			Entered by:			Turnaround Time <input type="checkbox"/> 7 Day* <input type="checkbox"/> 15 Day* <input checked="" type="checkbox"/> 30 Day						
Confirmatory: <input type="checkbox"/> Yes			QC initials:			Negotiated TAT <input type="checkbox"/>						
Sample Team Members	Name	Signature	Init.	Company/Organization/Phone/Cell		Sample Disposal <input type="checkbox"/> Return to Client <input checked="" type="checkbox"/> Disposal by Lab			Return Samples By:			Lab Use
	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												
1. Relinquished by [Signature]		Org. 4142	Date 9/25/12	Time 1028	3. Relinquished by		Org.	Date	Time			
2. Received by [Signature]		Org. 4142	Date 9/25/12	Time 1028	3. Received by		Org.	Date	Time			
1. 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

FIELD MEASUREMENT LOG FOR GROUNDWATER SAMPLE COLLECTION

Project Name: SWMU 154 GWM	Project No.: 146422.10.11.01 / 98026.01.15
Well I.D.: CTF-MW2	Date: 9/25/12
Well Condition:	Weather Condition:
Method: Portable pump <input checked="" type="checkbox"/> X Dedicated pump <input type="checkbox"/>	Pump depth: 128'

PURGE MEASUREMENTS

Depth to Water (ft)	Time 24 hr	Vol. (L gal)	Temp (°C)	SC (µS/cm)	ORP (mV)	pH	Turbidity (NTU)	DO (%)	Comments
43.90	0758	/	START						DO _{mg/L}
46.54	0815	5	17.33	3149	142.3	5.99	3.26	5.4	0.52
46.99	0826	10	17.36	3362	98.8	5.89	0.73	3.6	0.34
47.25	0837	15	17.67	3412	79.9	5.87	0.64	3.1	0.29
47.37	0849	20	17.97	3496	48.5	5.88	0.56	2.6	0.25
47.56	0900	25	18.18	3560	55.8	5.88	0.88	2.6	0.24
47.72	0911	30	18.28	3538	58.2	5.88	0.91	2.5	0.23
47.79	0917	33	18.36	3541	58.3	5.89	0.78	2.4	0.22
47.82	0921	35	18.42	3548	58.5	5.89	0.68	2.3	0.22
47.54	0926	37	18.53	3544	58.4	5.90	0.70	2.2	0.20
47.32	0931	39	18.60	3550	58.2	5.90	0.73	2.1	0.20
47.20	0936	41	18.61	3551	58.6	5.90	0.68	2.0	0.19
	0937	/	SAMPLING						
									Extra weight added to end of pump.
									~4.00 gals purged from tubing
									0804

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GROUNDWATER SAMPLE COLLECTION FIELD EQUIPMENT CHECK LOG Page 1 of 2

SNL/NM Project Name: SWMU 154 GWM			SNL/NM Project No.: 146422.10.11.01 / 98026.01.15		
Calibrations done by: Robert Lynch			Date: 9/25/12		
Make & Model: YSI 6920 V2					
YSI 6020 Sonde (S/N) with DO, Ec, pH, ORP, and temperature probes: 08H100033					
YSI 650 MDS (S/N): N/A					
pH Calibration					
pH Calibrated to (std): 7.00			pH sloped to (std): 10.0		
Reference value:	4.00		7.00		10.00
	Value	Temp	Value	Temp	Value Temp
1. Time:	0630	4.02	21.1	7.02	21.1
2. Time:	1052	4.01	20.8	7.01	20.9
3. Time:					
4. Time:					
Standard lot no.:	2AA670		2AB299		1AK189
Expiration date:	Jan-14		Feb-14		Nov-13
SC Calibration					
Reference Value: 1278 uS			Standard Lot No.: 2AB388		
	Value	Temp	Expiration Date: Feb-13		
1. Time:	0632	1282	21.1		
2. Time:	1054	1280	20.8		
3. Time:					
4. Time:					
ORP Calibration					
Reference Value: 220 mV			Standard Lot No. 1AL131		
	Value	Temp	Expiration Date: Sep-12		
1. Time:	0631	218.8	21.1		
2. Time:	1053	219.7	20.9		
3. Time:					
4. Time:					
DO Calibration					
Calibration Value:	81% air saturation @ 5200 ft.		Atmospheric Pressure in Hg		
1. Time:	0628	81.4	24.36		
2. Time:	1051	81.6	24.40		
3. Time:					
4. Time:					

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

SNL/NM Project Name: SWMU 154 GWM		Project No.: 146422.10.11.01 / 98026.01.15		
Calibration done by: Robert Lynch		Date: 9/25/12		
TURBIDIMETER				
Make & Model: HACH 2100P 2100Q		Serial No. S/N 10050C002897		
Reference Value	10	20	100	800
Standard Lot No.	0161	0168	0162	0161
1. Time 0800	9.94	19.8	101	796
2. Time 0949	10.1	20.2	106	799
3. Time				
4. Time				
Comments:				

Portable Pump and Tubing / Water Level Indicator
Decontamination Log Form

Project Name: <u>SWMU 154 GWM</u>	Monitoring Well ID #: <u>CTF-MW 2</u>	Date: <u>9/25/12</u>
The following equipment was decontaminated at completion of sampling activities in accordance with FOP-05-03		
Pump and Tubing Bundle ID #: <u>GWM 1806-32</u>	Water Level Indicator ID #: <u>62088</u>	
Personnel Performing Decontamination: <u>Robert T Lynch</u> <u>RL</u> Print Name: Initial: <u>William Gibson</u> <u>WJG</u> Print Name: Initial:	Personnel Performing Decontamination: <u>Robert T Lynch</u> <u>RL</u> Print Name: Initial: <u>William Gibson</u> <u>WJG</u> Print Name: Initial:	
Condition of Equipment Pump: <u>good</u> Tubing Bundle: <u>good</u> Water Level Indicator: <u>good</u>		
List of Decontamination Materials		
Distilled or Deionized (circle one) Source: <u>Culligan</u> Lot Number: <u>091312</u>	HNO₃ Grade: <u>Reagent</u> UN #: <u>2031</u> Manufacturer: <u>Fisher Scientific</u> Lot Number: <u>002735</u>	

Groundwater Monitoring Waste Generation Log

Waste Generator : <u>Bill Gibson</u> Phone: <u>239-7367</u> project leader: <u>Clinton Lum</u>			
Project Name	SWMU 154 GWM	SWMU 154 GWM	SWMU 154 GWM
Container ID # (site-date-sequence)	CTF-MW2-092512-01	CTF-MW2-092512-02	CTF-092512
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	55-gal CHPD	55-gal CHPD	55-gal CHPD
Volume of Waste	24 gals.	21	30
Total Container Weight	220 lbs.	190	280
COC#: Sample#-Fraction	<u>614391</u> <u>614392</u> <u>092862</u> <u>092864</u> 	<u>614391</u> <u>614392</u> <u>092862</u> <u>092864</u> 	<u>614391</u> <u>614392</u> <u>092862</u> <u>092864</u>
Accumulation Date	Start: 09/25/12 Full: 09/25/12	Start: 09/25/12 Full: 09/25/12	Start: 09/25/12 Full: 09/25/12
Date Waste Moved to Accumulation Area	09/25/12	09/25/12	09/25/12
Accumulation Area Name	9925	9925	9925
Comments:			

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TAILGATE SAFETY MEETING FORM

Dept: 4142 Well Location: CTF-MIN 2 Date: 9/25/12 Time: 0745

Activities: Groundwater Monitoring (purging, sampling, decon)
(Anyone has the right to cease field activities for safety concerns. The buddy system will be used when needed.)

Weather Conditions:

Temp: _____ °F Wind Speed: _____ MPH Humidity: _____ % Wind Chill _____ °F

Chemicals Used: Acids in sample containers, standard solutions, ~~High ACCU VAC ampules~~
Other: _____

Safety Topics Presented

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

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

Attendees

Robert T Lynch
Printed Name

ALFRED SANTILLANA
Printed Name

William Gibson
Printed Name

Printed Name

Printed Name

Robert T Lynch
Signature

Alfred Santillana
Signature

William Gibson
Signature

Signature

Signature

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Appendix C
Data Validation Sample Findings
Summary Sheets for Monitoring Wells
CTF-MW3 and CTF-MW2
Groundwater Data

Memorandum

Date: November 6, 2012

To: File

From: Marcia Hilchey

Subject: Inorganic Data Review and Validation – SNL
Site: SWMU 149 GWM
AR/COC: 614390
SDG: 311781
Laboratory: GEL
Project/Task: 98026.01.14
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 by IC), 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 except as follows.

Anions:

The ICAL intercepts for chloride, fluoride and sulfate were > the MDL and < 3X MDL. All associated sample results were > 3X the intercept value and will not be qualified.

Perchlorate:

The %D for a bracketing CCV was > 10% with positive bias. The associated sample result was ND and will not be qualified.

Blanks

No target analytes were detected in the blanks.

Laboratory Control Sample (LCS)

All LCS acceptance criteria were met.

Matrix Spike (MS)

All MS/PS recoveries met QC acceptance criteria.

Anions:

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

Laboratory Replicate

The replicate analyses met all QC acceptance criteria.

Anions:

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.

Anions:

The sample was diluted 20X for chloride and sulfate.

Nitrate/nitrite:

The sample was diluted 25X.

Other QC

No other specific issues that affect data quality were identified.

Reviewed by: Monica Dymerski

Level I

Date: 11/06/12

Memorandum

Date: November 6, 2012
To: File
From: Marcia Hilchey
Subject: Inorganic Data Review and Validation – SNL
Site: SWMU 149 GWM
AR/COC: 614390
SDG: 311781 and 311783
Laboratory: GEL
Project/Task: 98026.01.14
Analysis: Metals

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

Summary

Two samples were prepared and analyzed with approved procedures using methods EPA 6020 (ICP-MS), EPA 6010B (ICP-AES), 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.

CVAA:

1. Hg was reported in the ICB and CCBs at negative values, with absolute value > the MDL and < the PQL. All associated sample results were ND and will be **qualified UJ,B4**.

ICPMS:

1. Sb was detected in the MB at > the MDL but < the PQL. The associated result for sample 311783-001 was > MDL and < 5X the MB concentration and will be **qualified 0.0058U,B** at 5X the MB value.
2. The serial dilution %D for Na was > 10% and the parent sample result was > 50X the MDL. All associated sample results were detects and will be **qualified J,D1**.

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

Holding Times and Preservation

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

ICP-MS Instrument Tune

All instrument tune requirements were met.

Calibration

All initial and continuing calibration met QC acceptance criteria.

Reporting Limit Verification

All CRA/CRI recoveries met QC acceptance criteria.

Blanks

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

ICP-MS:

Sb and Cu were detected in the MB at > the MDL and < the PQL. All associated sample results that were ND or > 5X the MB concentration will not be qualified.

ICP -MS Internal Standards

All internal standards met QC acceptance criteria.

Matrix Spike (MS)

All MS recoveries met QC acceptance criteria except as follows.

ICP-MS:

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

CVAA and ICP-MS:

The MS analysis associated with sample 311783-001 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 associated with sample 311781-002 was performed on a sample of similar matrix from another SNL SDG. No sample data will be qualified as a result.

Laboratory Replicate

All replicates met QC acceptance criteria.

CVAA and ICP-MS:

The replicate analysis associated with sample 311783-001 was performed on a sample of similar matrix from another SNL SDG. No sample data will be qualified as a result.

ICP-AES:

The replicate analysis associated with sample 311781-002 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 QC acceptance criteria were met.

Detection Limits/Dilutions

All detection limits were properly reported. No samples were diluted except as follows.

ICP-MS:

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

ICP Serial Dilution

The serial dilution analyses met all QC acceptance criteria.

ICP-MS:

The serial dilution analysis associated with sample 311783-001 was performed on a sample of similar matrix from another SNL SDG. No sample data will be qualified as a result.

ICP-AES:

The serial dilution analysis associated with sample 311781-002 was performed on a sample of similar matrix from another SNL SDG. No sample data will be qualified as a result.

Other QC

No other specific issues that affect data quality were identified.

Reviewed by: Monica Dymerski

Level I

Date: 11/06/12

Memorandum

Date: November 6, 2012

To: File

From: Marcia Hilchey

Subject: GC/MS Organic Data Review and Validation – SNL
Site: SWMU 149 GWM
AR/COC: 614390
SDG: 311781
Laboratory: GEL
Project/Task: 98026.01.14
Analysis: VOCs

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

Summary

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

1. The RFs for vinyl acetate and 2-butanone were < 0.05 but > 0.01 . All associated sample results were ND 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 analyzed within the prescribed holding times and properly preserved.

Instrument Tune

All instrument tune requirements were met.

Calibration

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

The initial calibration %RSD for bromoform was >15% but < 40% and no other calibration infractions occurred for this analyte. All associated sample results were ND and will not be qualified.

The ICV %D for vinyl acetate was > 20% with positive bias. The CCV %D for carbon disulfide was > 20% and < 40% with negative bias, with no other associated calibration infractions. All associated sample results were ND and will not be qualified.

Blanks

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

Surrogates

All surrogate recoveries met QC acceptance criteria.

Internal Standards

All internal standards met QC acceptance criteria.

Matrix Spike/Matrix Spike Duplicate (MS/MSD)

All MS/MSD acceptance criteria were met with the following exceptions. The MS and/or MSD %Rs for bromoform and dibromochloromethane were > the UAL. All associated sample results were ND and will not be qualified.

Laboratory Control Sample (LCS)

All LCS acceptance criteria were met.

Detection Limits/Dilutions

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

Tentatively Identified Compounds (TICs)

TIC reports were not required.

Other QC

One TB was submitted on the AR/COC.

No other specific issues that affect data quality were identified.

Reviewed by: Monica Dymerski

Level I

Date: 11/06/12

Memorandum

Date: November 8, 2012
To: File
From: Marcia Hilchey
Subject: Inorganic Data Review and Validation – SNL
Site: SWMU 154 GWM
AR/COC: 614391
SDG: 311894
Laboratory: GEL
Project/Task: 98026.01.15
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 by IC), 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 except as follows.

Anions:

The ICAL intercepts for chloride, fluoride and sulfate were > the MDL and < 3X MDL. All associated sample results were > 3X the intercept value and will not be qualified.

Perchlorate:

The %D for a bracketing CCV was > 10% with positive bias. The associated sample result was ND and will not be qualified.

Blanks

No target analytes were detected in the blanks.

Laboratory Control Sample (LCS)

All LCS acceptance criteria were met.

Matrix Spike (MS)

All MS/PS recoveries met QC acceptance criteria.

Anions and Perchlorate:

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

Laboratory Replicate

The replicate analyses met all QC acceptance criteria.

Anions and 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.

Anions:

The sample was diluted 40X for chloride and sulfate.

Nitrate/nitrite:

The sample was diluted 5X.

Other QC

No other specific issues that affect data quality were identified.

Reviewed by: Monica Dymerski

Level I

Date: 11/09/12

Memorandum

Date: November 7, 2012

To: File

From: Marcia Hilchey

Subject: LC/MS/MS Organic Data Review and Validation – SNL
Site: SWMU 154 GWM
AR/COC: 614391
SDG: 311894
Laboratory: GEL
Project/Task: 98026.01.15
Analysis: High Explosives (HE) by LCMSMS

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. One problem was identified with the data package that resulted in the qualification of data.

- 1) The MS/MSD RPD for tetryl was > UAL. The associated sample result was a ND and will be **qualified UJ,MS5**.

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

Holding Times

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

Calibration

All initial and continuing calibration met QC acceptance criteria.

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)

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

Laboratory Control Sample (LCS)

All LCS QC acceptance criteria were met.

Detection Limits/Dilutions

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

Other QC

No other specific issues that affect data quality were identified.

Reviewed by: Monica Dymerski

Level I

Date: 11/09/12

Memorandum

Date: November 8, 2012

To: File

From: Marcia Hilchey

Subject: Inorganic Data Review and Validation – SNL
Site: SWMU 154 GWM
AR/COC: 614391
SDG: 311894 and 311899
Laboratory: GEL
Project/Task: 98026.01.15
Analysis: Metals

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

Summary

Two samples were prepared and analyzed with approved procedures using methods EPA 6020 (ICP-MS), EPA 6010B (ICP-AES), 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. Cu was detected in the MB at > MDL and < PQL. The associated sample results were detects < 5X the MB concentration and will be **qualified 0.0019U,B** at 5X the MB value.
2. The MS %R for Zn was > UAL, and the parent sample result was > 4X the spike concentration. The associated sample results were detects and will be **qualified J,MS1**.
3. The SD %Ds for Cu, Mg, and Co were > 10% and the parent sample results were > 50X MDL. The associated sample results were detects and will be **qualified J,D1**.

CVAA:

1. Hg was reported in the ICB and CCBs at negative values, with absolute values > MDL. The associated sample results were ND and will be **qualified UJ,B4**.

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

Holding Times and Preservation

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

ICP-MS Instrument Tune

All instrument tune requirements were met.

Calibration

All initial and continuing calibration met QC acceptance criteria.

Reporting Limit Verification

All CRA/CRI recoveries met QC acceptance criteria with the following exception.

ICP-MS:

The CRI %R for Ba was > UAL. The associated sample results were detects > 5X PQL and will not be qualified.

Blanks

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

ICP-MS:

Pb and U were detected in the MB at > MDL and < PQL. The associated sample results were ND or were > 5X the MB concentration and will not be qualified.

ICP -MS Internal Standards

All internal standards met QC acceptance criteria.

Matrix Spike (MS)

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

ICP-MS:

The parent sample concentration for Mn was >4X the spike concentration, but the %R for this analyte met QC acceptance criteria. No sample data were qualified as a result.

The parent sample concentrations for Ca, Mg, K, and/or 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 for both SDGs 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 for SDG 311894 was performed on a sample of similar matrix from another SNL SDG. No sample data will be qualified as a result.

CVAA:

The MS analysis for SDG 311899 was performed on a sample of similar matrix from another SNL SDG. No sample data will be qualified as a result.

Laboratory Replicate

All replicates met QC acceptance criteria.

ICP-MS:

The MS analysis for both SDGs 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 for SDG 311894 was performed on a sample of similar matrix from another SNL SDG. No sample data will be qualified as a result.

CVAA:

The MS analysis for SDG 311899 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 QC acceptance criteria were met.

Detection Limits/Dilutions

All detection limits were properly reported.

ICP-MS:

Both samples were diluted 20X for Ca, Mg, and Na; and 5X for Mn. Sample 311894-003 was also diluted 5X for K.

ICP Interference Check Sample (ICS A and AB)

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

ICP Serial Dilution

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

Other QC

No other specific issues that affect data quality were identified.

Reviewed by: Monica Dymerski

Level I

Date: 11/09/12

Memorandum

Date: November 8, 2012

To: File

From: Marcia Hilchey

Subject: Radiochemical Data Review and Validation – SNL
Site: SWMU 154 GWM
AR/COC: 614391
SDG: 311894
Laboratory: GEL
Project/Task: 98026.01.15
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), HASL 300 (isotopic U), and EPA 900.0 (gross alpha/beta). Problems were identified with the data package that resulted in the qualification of data.

Gamma Spec:

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

Gross Alpha/Beta:

1. All sample results which were > but <3X the MDA will be **qualified J,FR7**.
2. The relative dilution factor between the sample and the gross alpha/beta MS/MSD QC samples was >5X 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** due to lack of matrix-specific accuracy data.

Gamma Spec:

1. The K-40 result was “X” flagged by the laboratory due to peak not meeting identification criteria, and will be **qualified R,Z2**.

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 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

Tracer/carrier acceptance criteria were met.

Matrix Spike (MS)

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

Laboratory Replicate

All replicate error ratio acceptance criteria were met.

Laboratory Control Sample (LCS)

All LCS recoveries met QC acceptance criteria.

Detection Limits/Dilutions

No samples were diluted. All required detection limits were met.

Other QC

No other specific issues that affect data quality were identified.

Reviewed by: Monica Dymerski

Level I

Date: 11/09/12

Memorandum

Date: November 7, 2012

To: File

From: Marcia Hilchey

Subject: GC/MS Organic Data Review and Validation – SNL
Site: SWMU 154 GWM
AR/COC: 614391
SDG: 311894
Laboratory: GEL
Project/Task: 98026.01.15
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 8270C (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 extracted and 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 y-intercept value for hexachlorocyclopentadiene was > the MDL but < 3X the MDL. The associated sample result was ND and will not be qualified.

The ICV and/or CCV %Ds for six target compounds were > 20% and < 40% with negative bias. All associated sample results were ND, with no other associated calibration infractions, and will not be qualified.

Blanks

No target analytes were detected in the blanks.

Surrogates

All surrogate recoveries met QC acceptance criteria.

Internal Standards

All internal standards met QC acceptance criteria.

Matrix Spike/Matrix Spike Duplicate (MS/MSD)

All MS/MSD acceptance criteria were met.

Laboratory Control Sample (LCS)

All LCS acceptance criteria were met.

Detection Limits/Dilutions

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

Tentatively Identified Compounds (TICs)

TIC reports were not required.

Other QC

No other specific issues that affect data quality were identified.

Reviewed by: Monica Dymerski

Level I

Date: 11/09/12

Memorandum

Date: November 7, 2012

To: File

From: Marcia Hilchey

Subject: GC/MS Organic Data Review and Validation – SNL
Site: SWMU 154 GWM
AR/COC: 614391
SDG: 311894
Laboratory: GEL
Project/Task: 98026.01.15
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 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 CCV %D for carbon tetrachloride was > 20% with positive bias. All associated sample results were 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.

Detection Limits/Dilutions

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

Tentatively Identified Compounds (TICs)

TIC reports were not required.

Other QC

One TB was submitted on the AR/COC.

No other specific issues that affect data quality were identified.

Reviewed by: Monica Dymerski

Level I

Date: 11/09/12

SECTION IV

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SECTION IV

SOLID WASTE MANAGEMENT UNITS 8/58 AND 68 QUARTERLY GROUNDWATER MONITORING REPORT, JULY – SEPTEMBER 2012

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 fourth of eight quarterly groundwater sampling events occurred in July 2012 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. Monitoring wells CCBA-MW1, CCBA-MW2, OBS-MW1, OBS-MW2, and OBS-MW3 were installed in August 2011 (SNL/NM November 2011). Monitoring well CCBA-MW1 is located at the southwestern corner of SWMU 8, approximately 0.2 miles north of the ephemeral channel in Lurance Canyon and approximately 0.7 miles east of Coyote Springs (Figure IV-1). Monitoring well CCBA-MW2 is located near the center of SWMU 58, approximately 0.4 miles north of the ephemeral channel in Lurance Canyon and approximately 1 mile northeast of Coyote Springs (Figure IV-1). Monitoring wells OBS-MW1, OBS-MW2, and OBS-MW3 are located at SWMU 68 in the Coyote Test Field, approximately 0.6 miles southwest of the Starfire Optical Range (Figure IV-2).

The supplemental groundwater monitoring at the five newly installed 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 Third Quarter, Calendar Year (CY) 2012 reporting period (July through September 2012).

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 the NMED in January 2011 (NMED January 2011).

Monitoring wells CCBA-MW1 and CCBA-MW2 were sampled on July 16 and July 12, 2012, 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 (as bromide, chloride, fluoride, and sulfate), major cations (as 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 July 17 to July 19, 2012, respectively. The samples were analyzed for the required constituents, consisting of VOCs, SVOCs, HE compounds, NPN, major anions (as bromide, chloride, fluoride, and sulfate), major cations (as calcium, magnesium, potassium, and sodium), 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 both the monitoring well CCBA-MW1 environmental sample and the duplicate environmental sample with concentrations of 5.03 mg/L and 5.00 mg/L, respectively. Fluoride in the monitoring well CCBA-MW2 environmental sample exceeds the method detection limit (MDL) at a concentration of 1.48 mg/L. No analytical results for the SWMU 68 groundwater samples exceed the corresponding MCLs.

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 fourth of eight supplemental quarterly events for the five monitoring wells. The fifth of the eight supplemental quarterly groundwater sampling events will be conducted during the upcoming quarter (October through December 2012).

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 the 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 2012.

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, if applicable.

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 a 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 3.27 mg/L in the 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 1.86 mg/L in the monitoring well OBS-MW1 duplicate environmental sample.

3.6 **Anions and Alkalinity**

SWMUs 8/58, Monitoring Wells CCBA-MW1 and CCBA-MW2. Table IV-7 summarizes alkalinity, major anion (as 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 and duplicate from monitoring well CCBA-MW1 at concentrations of 5.03 mg/L and 5.00 mg/L, respectively. 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 at a concentration of 1.48 mg/L, which is below the MCL. 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 (as 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 micrograms per liter ($\mu\text{g/L}$) (0.004 mg/L) in any groundwater sample from SWMUs 8/58. Table IV-8 presents perchlorate results.

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

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

3.8 **Hexavalent Chromium**

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

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

3.9 **Metals**

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

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

3.10 **Cations**

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

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

3.11 **Gamma Spectroscopy and Radioisotopic Analyses**

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

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 result for potassium-40 activity was qualified as unusable during data validation in the CCBA-MW1 environmental sample because the laboratory was unable to meet peak identification criteria. The potassium-40 peak was classified as unusable because it could not be differentiated from the background.

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 less than the MDA for uranium 235/236 to 7.33 ± 0.996 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 0.169 ± 0.0741 pCi/L for uranium-235/236 to 21.7 ± 2.93 pCi/L for uranium-233/234. In this region, groundwater contacts bedrock, which contains material 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 exceeding the MCL in samples collected during this quarter consists of fluoride, which was detected in both the monitoring well CCBA-MW1 environmental sample and the environmental sample duplicate from SWMUs 8/58. 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.

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-MW1 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-MW1 and OBS-MW3. RPD values were calculated only for detected 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.

4.1.2 Equipment Blank Samples

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

outside of the pump tubing was rinsed with DI water. EB samples are collected to verify the effectiveness of the equipment decontamination process. EB samples were collected prior to sampling monitoring wells CCBA-MW2 and OBS-MW1 and were submitted for all analyses.

SWMUs 8/58, Monitoring Well CCBA-MW1. Bromodichloromethane, chloroform, chloride, chromium, fluoride, sulfate, and toluene were detected above the laboratory MDLs. Toluene in monitoring well CCBA-MW1 samples were detected at concentrations less than ten times the associated equipment blank result, and qualified as not detected during data validation. No corrective action was necessary for bromodichloromethane, chloroform, chloride, chromium, fluoride, or sulfate since these analytes were not detected in environmental samples or were detected in environmental samples at concentrations greater than five times the blank result.

SWMU 68, Monitoring Well OBS-MW3. Alkalinity, bromodichloromethane, chloroform, copper, dibromochloromethane, and toluene were detected above laboratory MDLs. No corrective action was necessary for alkalinity, bromodichloromethane, chloroform, or dibromochloromethane since these analytes were not detected in environmental samples or were detected in environmental samples at concentrations greater than five times the blank result. Copper and toluene in monitoring well OBS-MW3 environmental samples were detected at concentrations less than five times and ten times, respectively, the associated equipment blank result; therefore, qualified as not detected during data validation.

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 TB samples were submitted with the samples collected during the July 2012 sampling event. No VOCs were detected above associated laboratory MDLs.

SWMU 68. A total of four TB samples were submitted with the samples collected during the July 2012 sampling event. 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-MW2 and OBS-MW3) to simulate the transfer of environmental samples from the sampling system to the sample container.

SWMUs 8/58, Monitoring Well CCBA-MW2. The VOC compounds bromodichloromethane, carbon disulfide, chloroform, and dibromochloromethane were detected above associated laboratory MDLs. No corrective action was required as these compounds were not detected in the associated environmental sample.

SWMU 68, Monitoring Well OBS-MW2. The VOC compounds bromodichloromethane, chloroform, and dibromochloromethane were detected above the laboratory MDLs. No corrective action was necessary as 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 SWMUs 8/58 and 68 (SNL/NM September 2010) occurred during the July 2012 sampling activities. Project specific issues during sampling activities are identified below.

SWMUs 8/58. Toluene was detected at low level concentrations in all groundwater samples. Toluene has not been detected in previous groundwater samples, but has been commonly detected since operation of a new sample truck and equipment. Modifications to the water truck and equipment have been completed and additional decontaminations have been performed since this sampling event. The modifications include a more direct sampling output collection point, removal of the flow meter to the discharge line, changes to the decontamination process, and collection of more quality control samples. These modifications appear to be working as the trace toluene concentrations detected are decreasing over time.

SWMUs 68. Toluene was detected at low level concentrations in all groundwater samples. Toluene has not been detected in previous groundwater samples, but has been commonly detected since operation of a new sample truck and equipment. Modifications to the water truck and equipment have been completed and additional decontaminations have been performed since this sampling event.

The field team did not request analysis for bromide or fluoride due to oversight. The SNL/NM project leader was notified. No corrective action was performed since historical results are below established MCLs and these parameters are not constituents of concern.

5.0 **Summary**

During the Third Quarter of CY 2012, 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. Fluoride was detected above the established MCL of 4.0 mg/L in the monitoring well CCBA-MW1 environmental sample and environmental duplicate sample at concentrations of 5.03 mg/L and 5.00 mg/L, respectively. 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.

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

6.0 References

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Figures

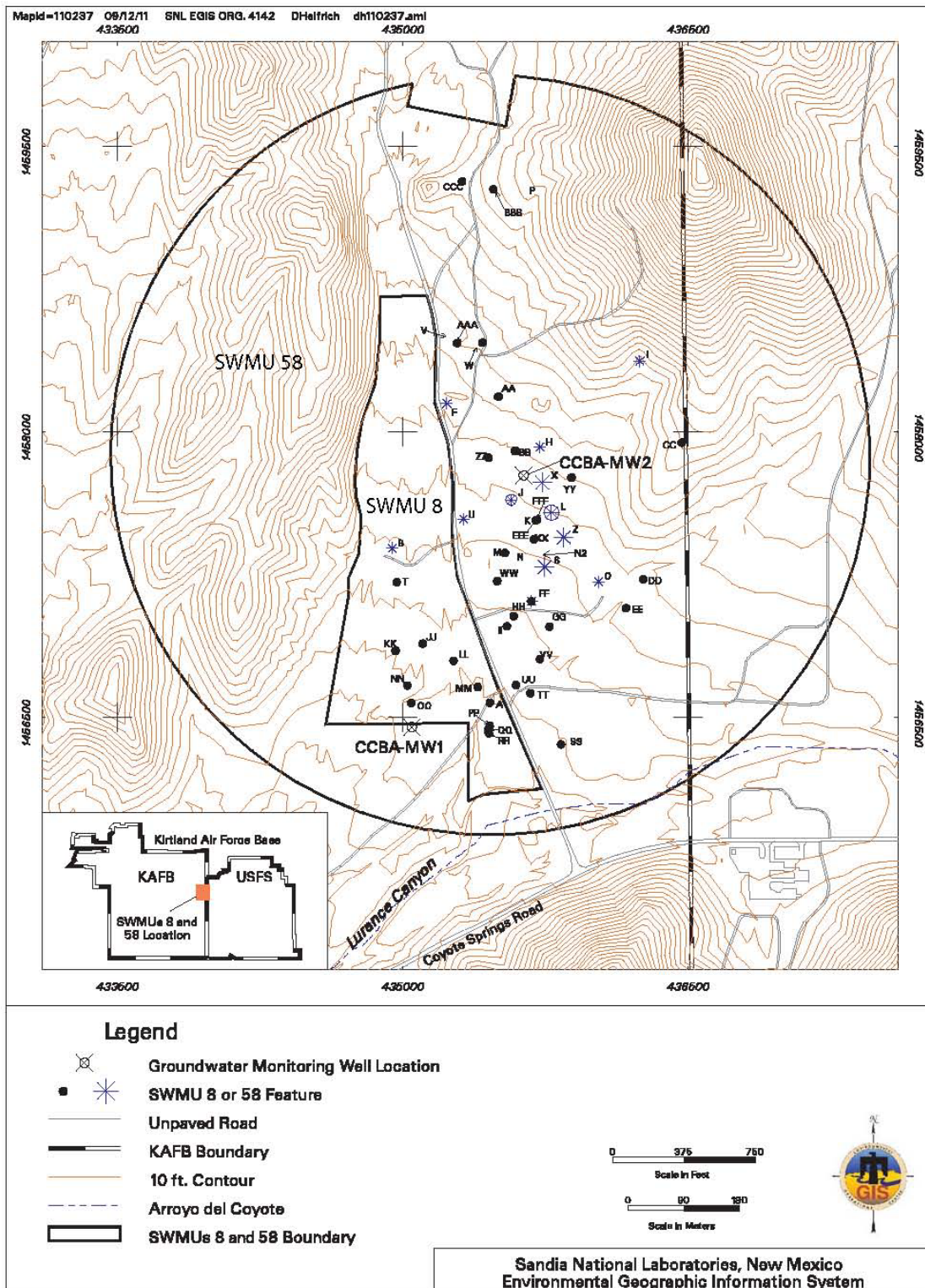


Figure IV-1

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

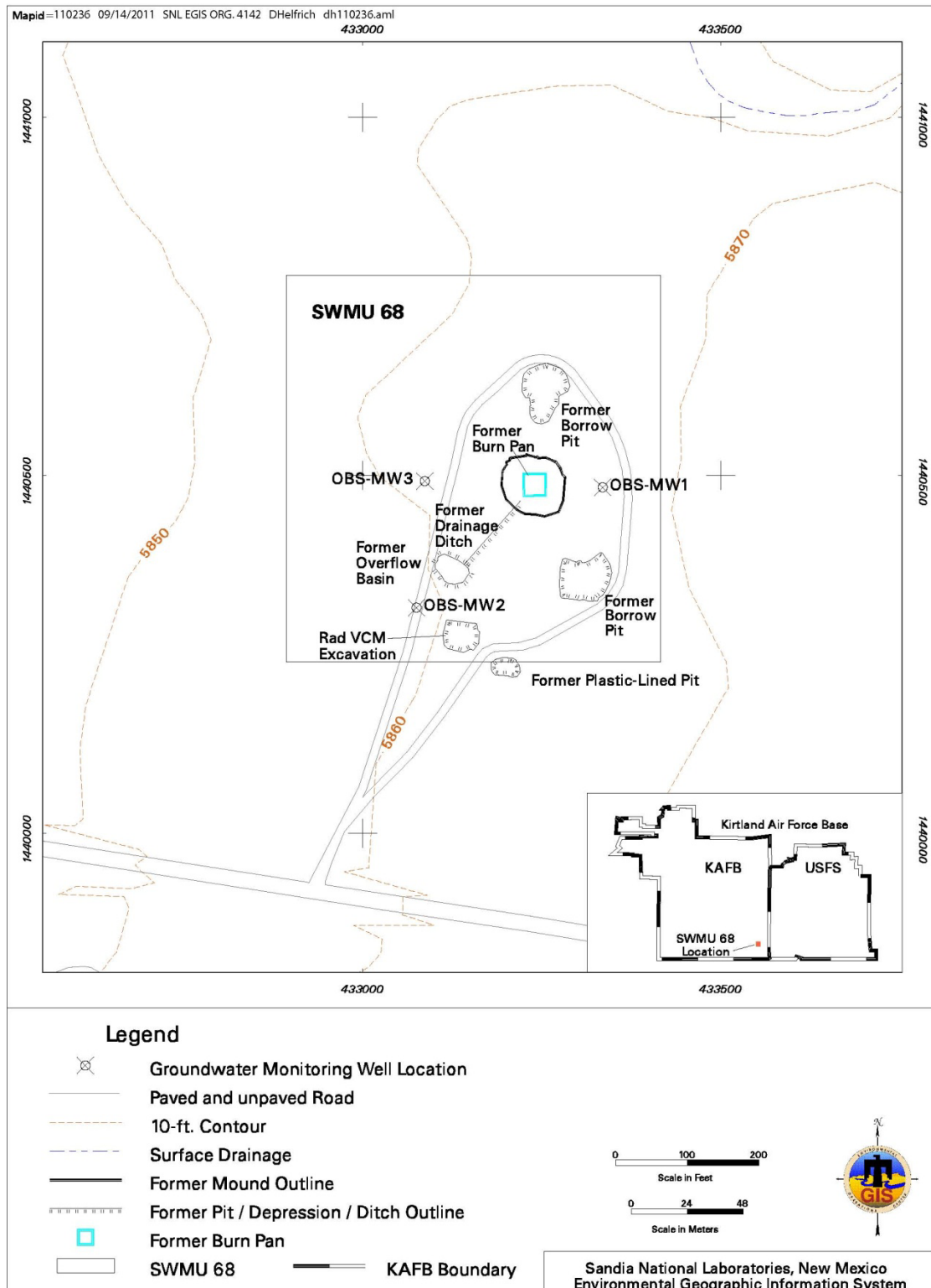


Figure IV-2

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

Tables

Table IV-1

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

Analysis	Analytical Method^a	Volume and Container Type/Preservation Requirements
Volatile Organic Compounds	EPA 8260B	3 x 40-mL glass, HCL, 4°C
Semivolatile Organic Compounds	EPA 8270C	3 x 1-L Amber Glass, 4°C
High Explosives	EPA 8321A	4 x 1-L Amber Glass, 4°C
Metals ^b	EPA 6010/6020/7470	1 x 500-mL polyethylene, HNO ₃ , 4°C
Hexavalent Chromium	EPA 7196A	1 x 250-mL polyethylene, 4°C
Perchlorate	EPA 314.0	1 x 250-mL polyethylene, 4°C
Major Anions and Cations ^c	EPA 6020/9056	1 x 500-mL polyethylene, 4°C
Alkalinity as Total, Carbonate, and Bicarbonate	SM 2320B	1 x 500-mL polyethylene, 4°C
Total Cyanide	EPA SW-846 9012	1 x 250-mL polyethylene, NaOH, 4°C
Nitrate plus Nitrite	EPA 353.2	1 x 250-mL polyethylene, H ₂ SO ₄ , 4°C
Gross Alpha/Beta	EPA 900.0	1 x 1-L polyethylene, HNO ₃ , 4°C
Gamma Spectroscopy ^d	EPA 901.0	1 x 1-L polyethylene, HNO ₃ , 4°C
Isotopic Uranium	HASL-300	1 x 1-L polyethylene, HNO ₃ , 4°C

Notes

^aU.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.

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

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

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

°C = Degrees Celsius.

EPA = U.S. Environmental Protection Agency.

H₂SO₄ = Sulfuric acid.

HASL = Health and Safety Laboratory.

HCL = Hydrochloric acid.

HNO₃ = Nitric acid.

L = Liter.

mL = Milliliter(s).

NaOH = Sodium Hydroxide.

SM = Standard Method.

SWMU = Solid Waste Management Unit.

TAL = Target Analyte List.

Table IV-2
Sample Details for Third Quarter, CY 2012 Groundwater Sampling
SWMUs 8/58 and 68 Groundwater Monitoring Quarterly Assessment
July – September 2012

Well	Sample Identification	AR/COC Number	Associated Groundwater Investigation
CCBA-MW1	092615	614288	SWMUs 8/58
CCBA-MW1 (duplicate)	092616	614287	
CCBA-MW2	092610	614286	
OBS-MW1	092618	614289	SWMU 68
OBS-MW2	092620	614290	
OBS-MW3	092625	614292	
OBS-MW3 (duplicate)	092626	614291	

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, July – September 2012

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	16-Jul-12	18.81	482	173.9	6.46	0.33	31.6	2.92
CCBA-MW2	12-Jul-12	18.39	569	141.0	7.37	0.41	62.4	5.86
SWMU 68								
OBS-MW1	17-Jul-12	17.99	498	151.1	7.28	0.41	38.1	3.59
OBS-MW2	18-Jul-12	20.84	494	153.2	7.25	0.32	39.6	3.53
OBS-MW3	19-Jul-12	18.82	537	179.9	7.29	0.37	46.2	4.27

Notes

^aField measurements collected prior to sampling.

°C = Degrees Celsius.

% Sat = Percent saturation.

μmhos/cm = Micromhos per centimeter.

CCBA = Coyote Canyon Blast Area.

mg/L = Milligrams per liter.

mV = Millivolts.

MW = Monitoring well.

NTU = Nephelometric turbidity units.

OBS = Old Burn Site.

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

SWMU = Solid Waste Management Unit.

Table IV-4
Method Detection Limits for Volatile and Semivolatile Organic Compounds
SWMUs 8/58 and 68 Groundwater Monitoring
Quarterly Assessment, July – September 2012

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	1,2,4-Trichlorobenzene	3.00	EPA 8270C	Di-n-butyl phthalate	3.00	EPA 8270C
1,1,2,2-Tetrachloroethane	0.300	EPA 8260B	1,2-Dichlorobenzene	3.00	EPA 8270C	Di-n-octyl phthalate	3.00	EPA 8270C
1,1,2-Trichloroethane	0.300	EPA 8260B	1,3-Dichlorobenzene	3.00	EPA 8270C	Dibenz[a,h]anthracene	0.300	EPA 8270C
1,1-Dichloroethane	0.300	EPA 8260B	1,4-Dichlorobenzene	3.00	EPA 8270C	Dibenzofuran	3.00	EPA 8270C
1,1-Dichloroethene	0.300	EPA 8260B	2,4,5-Trichlorophenol	3.00	EPA 8270C	Diethylphthalate	3.00	EPA 8270C
1,2-Dichloroethane	0.300	EPA 8260B	2,4,6-Trichlorophenol	3.00	EPA 8270C	Dimethylphthalate	3.00	EPA 8270C
1,2-Dichloropropane	0.300	EPA 8260B	2,4-Dichlorophenol	3.00	EPA 8270C	Dinitro-o-cresol	3.00	EPA 8270C
2-Butanone	2.00	EPA 8260B	2,4-Dimethylphenol	3.00	EPA 8270C	Diphenyl amine	3.00	EPA 8270C
2-Hexanone	2.20	EPA 8260B	2,4-Dinitrophenol	5.00	EPA 8270C	Fluoranthene	0.300	EPA 8270C
4-methyl-, 2-Pentanone	1.50	EPA 8260B	2,4-Dinitrotoluene	3.00	EPA 8270C	Fluorene	0.300	EPA 8270C
Acetone	3.00	EPA 8260B	2,6-Dinitrotoluene	3.00	EPA 8270C	Hexachlorobenzene	3.00	EPA 8270C
Benzene	0.300	EPA 8260B	2-Chloronaphthalene	0.300	EPA 8270C	Hexachlorobutadiene	3.00	EPA 8270C
Bromodichloromethane	0.300	EPA 8260B	2-Chlorophenol	3.00	EPA 8270C	Hexachlorocyclopentadiene	3.00	EPA 8270C
Bromoform	0.300	EPA 8260B	2-Methylnaphthalene	0.300	EPA 8270C	Hexachloroethane	3.00	EPA 8270C
Bromomethane	0.300	EPA 8260B	2-Nitroaniline	3.00	EPA 8270C	Indeno(1,2,3-c,d)pyrene	0.300	EPA 8270C
Carbon disulfide	1.50	EPA 8260B	2-Nitrophenol	3.00	EPA 8270C	Isophorone	3.00	EPA 8270C
Carbon tetrachloride	0.300	EPA 8260B	3,3'-Dichlorobenzidine	3.00	EPA 8270C	Naphthalene	0.300	EPA 8270C
Chlorobenzene	0.300	EPA 8260B	3-Nitroaniline	3.00	EPA 8270C	Nitro-benzene	3.00	EPA 8270C
Chloroethane	0.300	EPA 8260B	4-Bromophenyl phenyl ether	3.00	EPA 8270C	Pentachlorophenol	3.00	EPA 8270C
Chloroform	0.300	EPA 8260B	4-Chloro-3-methylphenol	3.00	EPA 8270C	Phenanthrene	0.300	EPA 8270C
Chloromethane	0.300	EPA 8260B	4-Chlorobenzenamine	3.30	EPA 8270C	Phenol	3.00	EPA 8270C
Dibromochloromethane	0.300	EPA 8260B	4-Chlorophenyl phenyl ether	3.00	EPA 8270C	Pyrene	0.300	EPA 8270C
Ethyl benzene	0.300	EPA 8260B	4-Nitroaniline	3.00	EPA 8270C	bis(1-Chloroisopropyl)ether	3.00	EPA 8270C
Methylene chloride	3.00	EPA 8260B	4-Nitrophenol	3.00	EPA 8270C	bis(2-Chloroethoxy)methane	3.00	EPA 8270C
Styrene	0.300	EPA 8260B	Acenaphthene	0.300	EPA 8270C	bis(2-Chloroethyl)ether	3.00	EPA 8270C
Tetrachloroethene	0.300	EPA 8260B	Acenaphthylene	0.300	EPA 8270C	bis(2-Ethylhexyl)phthalate	3.00	EPA 8270C
Toluene	0.300	EPA 8260B	Anthracene	0.300	EPA 8270C	m,p-Cresol	3.00	EPA 8270C
Trichloroethene	0.300	EPA 8260B	Benzo(a)anthracene	0.300	EPA 8270C	n-Nitrosodipropylamine	3.00	EPA 8270C
Vinyl acetate	1.50	EPA 8260B	Benzo(a)pyrene	0.440	EPA 8270C	o-Cresol	3.00	EPA 8270C
Vinyl chloride	0.300	EPA 8260B	Benzo(b)fluoranthene	0.300	EPA 8270C			
Xylene	0.300	EPA 8260B	Benzo(ghi)perylene	0.300	EPA 8270C			
cis-1,2-Dichloroethene	0.300	EPA 8260B	Benzo(k)fluoranthene	0.300	EPA 8270C			
cis-1,3-Dichloropropene	0.300	EPA 8260B	Butylbenzyl phthalate	3.00	EPA 8270C			
trans-1,2-Dichloroethene	0.300	EPA 8260B	Carbazole	0.300	EPA 8270C			
trans-1,3-Dichloropropene	0.300	EPA 8260B	Chrysene	0.300	EPA 8270C			

Table IV-4 (Continued)
Method Detection Limits for Volatile and Semivolatile Organic Compounds
SWMUs 8/58 and 68 Groundwater Monitoring
Quarterly Assessment, July – September 2012

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	1,2,4-Trichlorobenzene	3.00	EPA 8270C	Di-n-butyl phthalate	3.00	EPA 8270C
1,1,2,2-Tetrachloroethane	0.300	EPA 8260B	1,2-Dichlorobenzene	3.00	EPA 8270C	Di-n-octyl phthalate	3.00	EPA 8270C
1,1,2-Trichloroethane	0.300	EPA 8260B	1,3-Dichlorobenzene	3.00	EPA 8270C	Dibenz[a,h]anthracene	0.300	EPA 8270C
1,1-Dichloroethane	0.300	EPA 8260B	1,4-Dichlorobenzene	3.00	EPA 8270C	Dibenzofuran	3.00	EPA 8270C
1,1-Dichloroethene	0.300	EPA 8260B	2,4,5-Trichlorophenol	3.00	EPA 8270C	Diethylphthalate	3.00	EPA 8270C
1,2-Dichloroethane	0.300	EPA 8260B	2,4,6-Trichlorophenol	3.00	EPA 8270C	Dimethylphthalate	3.00	EPA 8270C
1,2-Dichloropropane	0.300	EPA 8260B	2,4-Dichlorophenol	3.00	EPA 8270C	Dinitro-o-cresol	3.00	EPA 8270C
2-Butanone	2.00	EPA 8260B	2,4-Dimethylphenol	3.00	EPA 8270C	Diphenyl amine	3.00	EPA 8270C
2-Hexanone	2.22	EPA 8260B	2,4-Dinitrophenol	5.00	EPA 8270C	Fluoranthene	0.300	EPA 8270C
4-methyl-, 2-Pentanone	1.50	EPA 8260B	2,4-Dinitrotoluene	3.00	EPA 8270C	Fluorene	0.300	EPA 8270C
Acetone	3.00	EPA 8260B	2,6-Dinitrotoluene	3.00	EPA 8270C	Hexachlorobenzene	3.00	EPA 8270C
Benzene	0.300	EPA 8260B	2-Chloronaphthalene	0.300	EPA 8270C	Hexachlorobutadiene	3.00	EPA 8270C
Bromodichloromethane	0.300	EPA 8260B	2-Chlorophenol	3.00	EPA 8270C	Hexachlorocyclopentadiene	3.00	EPA 8270C
Bromoform	0.300	EPA 8260B	2-Methylnaphthalene	0.300	EPA 8270C	Hexachloroethane	3.00	EPA 8270C
Bromomethane	0.300	EPA 8260B	2-Nitroaniline	3.00	EPA 8270C	Indeno(1,2,3-c,d)pyrene	0.300	EPA 8270C
Carbon disulfide	1.50	EPA 8260B	2-Nitrophenol	3.00	EPA 8270C	Isophorone	3.00	EPA 8270C
Carbon tetrachloride	0.300	EPA 8260B	3,3'-Dichlorobenzidine	3.00	EPA 8270C	Naphthalene	0.300	EPA 8270C
Chlorobenzene	0.300	EPA 8260B	3-Nitroaniline	3.00	EPA 8270C	Nitro-benzene	3.00	EPA 8270C
Chloroethane	0.300	EPA 8260B	4-Bromophenyl phenyl ether	3.00	EPA 8270C	Pentachlorophenol	3.00	EPA 8270C
Chloroform	0.300	EPA 8260B	4-Chloro-3-methylphenol	3.00	EPA 8270C	Phenanthrene	0.300	EPA 8270C
Chloromethane	0.300	EPA 8260B	4-Chlorobenzenamine	3.30	EPA 8270C	Phenol	3.00	EPA 8270C
Dibromochloromethane	0.300	EPA 8260B	4-Chlorophenyl phenyl ether	3.00	EPA 8270C	Pyrene	0.300	EPA 8270C
Ethyl benzene	0.300	EPA 8260B	4-Nitroaniline	3.00	EPA 8270C	bis(2-Chloroethoxy)methane	3.00	EPA 8270C
Methylene chloride	3.00	EPA 8260B	4-Nitrophenol	3.00	EPA 8270C	bis(1-Chloroisopropyl)ether	3.00	EPA 8270C
Styrene	0.300	EPA 8260B	Acenaphthene	0.300	EPA 8270C	bis(2-Chloroethyl)ether	3.00	EPA 8270C
Tetrachloroethene	0.300	EPA 8260B	Acenaphthylene	0.300	EPA 8270C	bis(2-Ethylhexyl)phthalate	3.00	EPA 8270C
Toluene	0.300	EPA 8260B	Anthracene	0.300	EPA 8270C	m,p-Cresol	3.00	EPA 8270C
Trichloroethene	0.300	EPA 8260B	Benzo(a)anthracene	0.300	EPA 8270C	n-Nitrosodipropylamine	3.00	EPA 8270C
Vinyl acetate	1.50	EPA 8260B	Benzo(a)pyrene	0.440	EPA 8270C	o-Cresol	3.00	EPA 8270C
Vinyl chloride	0.300	EPA 8260B	Benzo(b)fluoranthene	0.300	EPA 8270C			
Xylene	0.300	EPA 8260B	Benzo(ghi)perylene	0.300	EPA 8270C			
cis-1,2-Dichloroethene	0.300	EPA 8260B	Benzo(k)fluoranthene	0.300	EPA 8270C			
cis-1,3-Dichloropropene	0.300	EPA 8260B	Butylbenzyl phthalate	3.00	EPA 8270C			
trans-1,2-Dichloroethene	0.300	EPA 8260B	Carbazole	0.300	EPA 8270C			
trans-1,3-Dichloropropene	0.300	EPA 8260B	Chrysene	0.300	EPA 8270C			

Table IV-4 (Concluded)
Method Detection Limits for Volatile and Semivolatile Organic Compounds
SWMUs 8/58 and 68 Groundwater Monitoring
Quarterly Assessment, July – September 2012

Notes

^aU.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.

EPA = U.S. Environmental Protection Agency.

µg/L = Micrograms per liter.

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, July – September 2012

Analyte	MDL (µg/L)	
	SWMUs 8/58	SWMU 68
1,3,5-Trinitrobenzene	0.0860 – 0.0879	0.0851 – 0.086
1,3-Dinitrobenzene	0.0860 – 0.0879	0.0851 – 0.086
2,4,6-Trinitrotoluene	0.0860 – 0.0879	0.0851 – 0.086
2,4-Dinitrotoluene	0.0860 – 0.0879	0.0851 – 0.086
2,6-Dinitrotoluene	0.0860 – 0.0879	0.0851 – 0.086
2-Amino-4,6-dinitrotoluene	0.0860 – 0.0879	0.0851 – 0.086
2-Nitrotoluene	0.0882 – 0.0901	0.0871 – 0.0882
3-Nitrotoluene	0.0860 – 0.0879	0.0851 – 0.086
4-Amino-2,6-dinitrotoluene	0.0860 – 0.0879	0.0851 – 0.086
4-Nitrotoluene	0.161 – 0.165	0.160 – 0.161
HMX	0.0860 – 0.0879	0.0851 – 0.086
Nitro-benzene	0.0860 – 0.0879	0.0851 – 0.086
Pentaerythritol tetranitrate	0.108 – 0.110	0.106 – 0.108
RDX	0.0860 – 0.0879	0.0851 – 0.086
Tetryl	0.0860 – 0.0879	0.0851 – 0.086

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-trinitro-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, July – September 2012

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 16-Jul-12	Nitrate plus nitrite as N	1.41	0.085	0.250	10.0			092615-018	EPA 353.2
CCBA-MW1 (Duplicate) 16-Jul-12	Nitrate plus nitrite as N	1.35	0.085	0.250	10.0			092616-018	EPA 353.2
CCBA-MW2 12-Jul-12	Nitrate plus nitrite as N	3.27	0.085	0.250	10.0			092610-018	EPA 353.2
SWMU 68									
OBS-MW1 17-Jul-12	Nitrate plus nitrite as N	1.86	0.085	0.250	10.0			092618-018	EPA 353.2
OBS-MW2 18-Jul-12	Nitrate plus nitrite as N	1.47	0.085	0.250	10.0			092620-018	EPA 353.2
OBS-MW3 19-Jul-12	Nitrate plus nitrite as N	1.56	0.085	0.250	10.0			092625-018	EPA 353.2
OBS-MW3 (Duplicate) 19-Jul-12	Nitrate plus nitrite as N	1.59	0.085	0.250	10.0			092626-018	EPA 353.2

Notes

CCBA = Coyote Canyon Blast Area.

CFR = Code of Federal Regulations.

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.

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-6 (Concluded)
Summary of Nitrate Plus Nitrite Results
SWMUs 8/58 and 68 Groundwater Monitoring
Quarterly Assessment, July – September 2012

Notes (continued)

^aLaboratory Qualifier

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

^bValidation Qualifier

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

^cAnalytical Method

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

Table IV-7
Summary of Alkalinity, Anion, and Total Cyanide Results
SWMUs 8/58 and 68 Groundwater Monitoring
Quarterly Assessment, July – September 2012

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 16-Jul-12	Bicarbonate Alkalinity	192	0.725	1.00	NE			092615-022	SM2320B
	Carbonate Alkalinity	ND	0.725	1.00	NE	U		092615-022	SM2320B
	Bromide	0.344	0.067	0.200	NE			092615-016	EPA 9056
	Chloride	27.9	0.134	0.400	NE	B		092615-016	EPA 9056
	Fluoride	5.03	0.033	0.100	4.0			092615-016	EPA 9056
	Sulfate	53.8	0.266	0.800	NE			092615-016	EPA 9056
	Total Cyanide	ND	0.00167	0.005	0.200	U	UJ	092615-027	EPA 9012
CCBA-MW1 (Duplicate) 16-Jul-12	Bicarbonate Alkalinity	188	0.725	1.00	NE			092616-022	SM2320B
	Carbonate Alkalinity	ND	0.725	1.00	NE	U		092616-022	SM2320B
	Bromide	0.310	0.067	0.200	NE			092616-016	EPA 9056
	Chloride	28.2	0.134	0.400	NE	B		092616-016	EPA 9056
	Fluoride	5.00	0.033	0.100	4.0			092616-016	EPA 9056
	Sulfate	54.2	0.266	0.800	NE			092616-016	EPA 9056
	Total Cyanide	ND	0.00167	0.005	0.200	U	UJ	092616-027	EPA 9012
CCBA-MW2 12-Jul-12	Bicarbonate Alkalinity	182	0.725	1.00	NE			092610-022	SM2320B
	Carbonate Alkalinity	ND	0.725	1.00	NE	U		092610-022	SM2320B
	Bromide	0.539	0.067	0.200	NE			092610-016	EPA 9056
	Chloride	36.0	0.335	1.00	NE			092610-016	EPA 9056
	Fluoride	1.48	0.033	0.100	4.0			092610-016	EPA 9056
	Sulfate	92.0	0.665	2.00	NE			092610-016	EPA 9056
	Total Cyanide	ND	0.00167	0.005	0.200	U	UJ	092610-027	EPA 9012

Table IV-7 (Continued)
Summary of Alkalinity, Anion, and Total Cyanide Results
SWMUs 8/58 and 68 Groundwater Monitoring
Quarterly Assessment, July – September 2012

Well ID	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 17-Jul-12	Bicarbonate Alkalinity	189	0.725	1.00	NE			092618-022	SM2320B
	Carbonate Alkalinity	ND	0.725	1.00	NE	U		092618-022	SM2320B
	Chloride	22.4	0.670	2.00	NE			092618-016	EPA 9056
	Sulfate	74.6	1.33	4.00	NE			092618-016	EPA 9056
	Total Cyanide	ND	0.00167	0.005	0.200	U	UJ	092618-027	EPA 9012
OBS-MW2 18-Jul-12	Bicarbonate Alkalinity	183	0.725	1.00	NE			092620-022	SM2320B
	Carbonate Alkalinity	ND	0.725	1.00	NE	U		092620-022	SM2320B
	Chloride	20.9	0.335	1.00	NE	B		092620-016	EPA 9056
	Sulfate	81.8	0.665	2.00	NE			092620-016	EPA 9056
	Total Cyanide	ND	0.00167	0.005	0.200	U	UJ	092620-027	EPA 9012
OBS-MW3 19-Jul-12	Bicarbonate Alkalinity	181	0.725	1.00	NE			092625-022	SM2320B
	Carbonate Alkalinity	ND	0.725	1.00	NE	U		092625-022	SM2320B
	Chloride	21.7	0.335	1.00	NE	B		092625-016	EPA 9056
	Sulfate	81.8	0.665	2.00	NE			092625-016	EPA 9056
	Total Cyanide	ND	0.00167	0.005	0.200	U	UJ	092625-027	EPA 9012
OBS-MW3 (Duplicate) 19-Jul-12	Bicarbonate Alkalinity	181	0.725	1.00	NE			092626-022	SM2320B
	Carbonate Alkalinity	ND	0.725	1.00	NE	U		092626-022	SM2320B
	Chloride	21.7	0.335	1.00	NE	B		092626-016	EPA 9056
	Sulfate	81.8	0.665	2.00	NE			092626-016	EPA 9056
	Total Cyanide	ND	0.00167	0.005	0.200	U	UJ	092626-027	EPA 9012

Table IV-7 (Concluded)
Summary of Alkalinity, Anion, and Total Cyanide Results
SWMUs 8/58 and 68 Groundwater Monitoring
Quarterly Assessment, July – September 2012

Notes

Bold = Indicates that a results exceeds the MCL.
 CCBA = Coyote Canyon Blast Area.
 CFR = Code of Federal Regulations.
 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.
 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.

^aLaboratory Qualifier

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

B = The analyte was detected in the blank above the effective method detection limit (MDL).
 U = Analyte is absent or below the method detection limit.

^bValidation Qualifier

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

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

^cAnalytical Method

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

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 IV-8
Summary of Perchlorate Results
SWMUs 8/58 and 68 Groundwater Monitoring
Quarterly Assessment, July – September 2012

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
SWMUs 8/58								
CCBA-MW1 16-Jul-12	ND	0.004	0.012	NE	U		092615-020	EPA 314.0
CCBA-MW1 (Duplicate) 16-Jul-12	ND	0.004	0.012	NE	U		092616-020	EPA 314.0
CCBA-MW2 12-Jul-12	ND	0.004	0.012	NE	U		092610-020	EPA 314.0
SWMU 68								
OBS-MW1 17-Jul-12	ND	0.004	0.012	NE	U		092618-020	EPA 314.0
OBS-MW2 18-Jul-12	ND	0.004	0.012	NE	U		092620-020	EPA 314.0
OBS-MW3 19-Jul-12	ND	0.004	0.012	NE	U		092625-020	EPA 314.0
OBS-MW3 (Duplicate) 19-Jul-12	ND	0.004	0.012	NE	U		092626-020	EPA 314.0

Notes

CCBA = Coyote Canyon Blast Area.
CFR = Code of Federal Regulations.
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.
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-8 (Concluded)
Summary of Perchlorate Results
SWMUs 8/58 and 68 Groundwater Monitoring
Quarterly Assessment, July – September 2012

Notes (continued)

^aLaboratory Qualifier

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

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

^bValidation Qualifier

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

^cAnalytical Method

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

Table IV-9
Summary of Hexavalent Chromium Results
SWMU 68 Groundwater Monitoring
Quarterly Assessment, July – September 2012

Well	Hexavalent Chromium 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 17-Jul-12	ND	0.0033	0.010	NE	U		092618-014	EPA 7196A
OBS-MW2 18-Jul-12	ND	0.0033	0.010	NE	U		092620-014	EPA 7196A
OBS-MW3 19-Jul-12	ND	0.0033	0.010	NE	U		092625-014	EPA 7196A
OBS-MW3 (Duplicate) 19-Jul-12	ND	0.0033	0.010	NE	U		092626-014	EPA 7196A

Notes

CFR = Code of Federal Regulations.
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.
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.

^aLaboratory Qualifier

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

^bValidation Qualifier

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

^cAnalytical Method

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

Table IV-10
Summary of Unfiltered Total Metal Results
SWMUs 8/58 Groundwater Monitoring
Quarterly Assessment, July – September 2012

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 16-Jul-12	Aluminum	0.0314	0.015	0.050	NE	J		092615-009	EPA 6020
	Antimony	ND	0.001	0.003	0.006	U		092615-009	EPA 6020
	Arsenic	0.0022	0.0017	0.005	0.010	J		092615-009	EPA 6020
	Barium	0.00335	0.0006	0.002	2.00			092615-009	EPA 6020
	Beryllium	0.000394	0.0002	0.0005	0.004	J		092615-009	EPA 6020
	Cadmium	ND	0.00011	0.001	0.005	U		092615-009	EPA 6020
	Calcium	43.7	0.060	0.200	NE			092615-009	EPA 6020
	Chromium	ND	0.002	0.010	0.100	U		092615-009	EPA 6020
	Cobalt	0.000101	0.0001	0.001	NE	J		092615-009	EPA 6020
	Copper	0.000437	0.00035	0.001	NE	J		092615-009	EPA 6020
	Iron	0.143	0.033	0.100	NE			092615-009	EPA 6020
	Lead	ND	0.0005	0.002	NE	U		092615-009	EPA 6020
	Magnesium	9.50	0.010	0.030	NE		J	092615-009	EPA 6020
	Manganese	0.00568	0.001	0.005	NE			092615-009	EPA 6020
	Mercury	ND	0.000067	0.0002	0.002	U	UJ	092615-009	EPA 7470
	Nickel	0.000847	0.0005	0.002	NE	J		092615-009	EPA 6020
	Potassium	4.34	0.080	0.300	NE			092615-009	EPA 6020
	Selenium	0.00242	0.0015	0.005	0.050	J		092615-009	EPA 6020
	Silver	ND	0.0002	0.001	NE	U		092615-009	EPA 6020
	Sodium	69.9	0.400	1.25	NE			092615-009	EPA 6020
	Thallium	ND	0.00045	0.002	0.002	U		092615-009	EPA 6020
	Uranium	0.00181	0.000067	0.0002	0.03			092615-009	EPA 6020
	Vanadium	ND	0.001	0.005	NE	U		092615-009	EPA 6010
	Zinc	ND	0.0035	0.010	NE	U		092615-009	EPA 6020

Table IV-10 (Continued)
Summary of Unfiltered Total Metal Results
SWMUs 8/58 Groundwater Monitoring
Quarterly Assessment, July – September 2012

Well	Analyte	Result (mg/L)	MDL (mg/L)	PQL (mg/L)	MCL (mg/L)	Laboratory Qualifier ^a	Validation Qualifier ^b	Sample Number	Analytical Method ^c
CCBA-MW1 (Duplicate) 16-Jul-12	Aluminum	0.0305	0.015	0.050	NE	J		092616-009	EPA 6020
	Antimony	ND	0.001	0.003	0.006	U		092616-009	EPA 6020
	Arsenic	0.0027	0.0017	0.005	0.010	J		092616-009	EPA 6020
	Barium	0.0035	0.0006	0.002	2.00			092616-009	EPA 6020
	Beryllium	0.000443	0.0002	0.0005	0.004	J		092616-009	EPA 6020
	Cadmium	ND	0.00011	0.001	0.005	U		092616-009	EPA 6020
	Calcium	44.2	0.060	0.200	NE			092616-009	EPA 6020
	Chromium	ND	0.002	0.010	0.100	U		092616-009	EPA 6020
	Cobalt	0.000104	0.0001	0.001	NE	J		092616-009	EPA 6020
	Copper	0.000486	0.00035	0.001	NE	J		092616-009	EPA 6020
	Iron	0.146	0.033	0.100	NE			092616-009	EPA 6020
	Lead	ND	0.0005	0.002	NE	U		092616-009	EPA 6020
	Magnesium	9.73	0.010	0.030	NE		J	092616-009	EPA 6020
	Manganese	0.00568	0.001	0.005	NE			092616-009	EPA 6020
	Mercury	ND	0.000067	0.0002	0.002	U	UJ	092616-009	EPA 7470
	Nickel	0.00104	0.0005	0.002	NE	J		092616-009	EPA 6020
	Potassium	4.38	0.080	0.300	NE			092616-009	EPA 6020
	Selenium	0.00241	0.0015	0.005	0.050	J		092616-009	EPA 6020
	Silver	ND	0.0002	0.001	NE	U		092616-009	EPA 6020
	Sodium	63.8	0.400	1.25	NE			092616-009	EPA 6020
	Thallium	ND	0.00045	0.002	0.002	U		092616-009	EPA 6020
	Uranium	0.00182	0.000067	0.0002	0.03			092616-009	EPA 6020
	Vanadium	ND	0.001	0.005	NE	U		092616-009	EPA 6010
	Zinc	ND	0.0035	0.010	NE	U		092616-009	EPA 6020

Table IV-10 (Continued)
Summary of Unfiltered Total Metal Results
SWMUs 8/58 Groundwater Monitoring
Quarterly Assessment, July – September 2012

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 12-Jul-12	Aluminum	ND	0.015	0.050	NE	U		092610-009	EPA 6020
	Antimony	ND	0.001	0.003	0.006	U		092610-009	EPA 6020
	Arsenic	ND	0.0017	0.005	0.010	U		092610-009	EPA 6020
	Barium	0.0472	0.0006	0.002	2.00			092610-009	EPA 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		092610-009	EPA 6020
	Cadmium	ND	0.00011	0.001	0.005	U		092610-009	EPA 6020
	Calcium	77.8	0.300	1.00	NE			092610-009	EPA 6020
	Chromium	ND	0.002	0.010	0.100	U		092610-009	EPA 6020
	Cobalt	0.000139	0.0001	0.001	NE	J		092610-009	EPA 6020
	Copper	0.000808	0.00035	0.001	NE	B, J	0.00285U	092610-009	EPA 6020
	Iron	0.166	0.033	0.100	NE			092610-009	EPA 6020
	Lead	ND	0.0005	0.002	NE	U		092610-009	EPA 6020
	Magnesium	16.0	0.010	0.030	NE			092610-009	EPA 6020
	Manganese	ND	0.001	0.005	NE	U		092610-009	EPA 6020
	Mercury	ND	0.000067	0.0002	0.002	U		092610-009	EPA 7470
	Nickel	0.00147	0.0005	0.002	NE	J		092610-009	EPA 6020
	Potassium	1.43	0.080	0.300	NE			092610-009	EPA 6020
	Selenium	0.00394	0.0015	0.005	0.050	J		092610-009	EPA 6020
	Silver	ND	0.0002	0.001	NE	U		092610-009	EPA 6020
	Sodium	49.3	0.400	1.25	NE			092610-009	EPA 6020
	Thallium	ND	0.00045	0.002	0.002	U		092610-009	EPA 6020
	Uranium	0.0054	0.000067	0.0002	0.03			092610-009	EPA 6020
	Vanadium	0.00953	0.001	0.005	NE			092610-009	EPA 6010
	Zinc	0.00535	0.0035	0.010	NE	J		092610-009	EPA 6020

Table IV-10 (Concluded)
Summary of Unfiltered Total Metal Results
SWMUs 8/58 Groundwater Monitoring
Quarterly Assessment, July – September 2012

Notes

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

^aLaboratory Qualifier

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

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

^bValidation Qualifier

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

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

^cAnalytical Method

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

Table IV-11
Summary of Unfiltered Total Metal Results
SWMU 68 Groundwater Monitoring
Quarterly Assessment, July – September 2012

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 17-Jul-12	Aluminum	ND	0.015	0.050	NE	U		092618-009	EPA 6020
	Antimony	ND	0.001	0.003	0.006	U		092618-009	EPA 6020
	Arsenic	ND	0.0017	0.005	0.010	U		092618-009	EPA 6020
	Barium	0.020	0.0006	0.002	2.00			092618-009	EPA 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		092618-009	EPA 6020
	Cadmium	ND	0.00011	0.001	0.005	U		092618-009	EPA 6020
	Calcium	75.3	0.300	1.00	NE			092618-009	EPA 6020
	Chromium	ND	0.002	0.010	0.100	U		092618-009	EPA 6020
	Cobalt	0.00014	0.0001	0.001	NE	J		092618-009	EPA 6020
	Copper	0.000646	0.00035	0.001	NE	J	J+	092618-009	EPA 6020
	Iron	0.317	0.033	0.100	NE			092618-009	EPA 6020
	Lead	ND	0.0005	0.002	NE	U		092618-009	EPA 6020
	Magnesium	17.4	0.010	0.030	NE			092618-009	EPA 6020
	Manganese	0.00136	0.001	0.005	NE	J		092618-009	EPA 6020
	Mercury	ND	0.000067	0.0002	0.002	U	UJ	092618-009	EPA 7470
	Nickel	0.00178	0.0005	0.002	NE	J		092618-009	EPA 6020
	Potassium	1.65	0.080	0.300	NE			092618-009	EPA 6020
	Selenium	0.00361	0.0015	0.005	0.050	J		092618-009	EPA 6020
	Silver	ND	0.0002	0.001	NE	U		092618-009	EPA 6020
	Sodium	20.3	0.400	1.25	NE			092618-009	EPA 6020
	Thallium	ND	0.00045	0.002	0.002	U		092618-009	EPA 6020
	Uranium	0.0107	0.000067	0.0002	0.03	B	J	092618-009	EPA 6020
	Vanadium	0.00111	0.001	0.005	NE	J		092618-009	EPA 6010
	Zinc	ND	0.0035	0.010	NE	U		092618-009	EPA 6020

Table IV-11 (Continued)
Summary of Unfiltered Total Metal Results
SWMU 68 Groundwater Monitoring
Quarterly Assessment, July – September 2012

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 18-Jul-12	Aluminum	0.0323	0.015	0.050	NE	J		092620-009	EPA 6020
	Antimony	ND	0.001	0.003	0.006	U		092620-009	EPA 6020
	Arsenic	ND	0.0017	0.005	0.010	U		092620-009	EPA 6020
	Barium	0.0227	0.0006	0.002	2.00			092620-009	EPA 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		092620-009	EPA 6020
	Cadmium	ND	0.00011	0.001	0.005	U		092620-009	EPA 6020
	Calcium	84.5	0.300	1.00	NE		J	092620-009	EPA 6020
	Chromium	ND	0.002	0.010	0.100	U		092620-009	EPA 6020
	Cobalt	0.000185	0.0001	0.001	NE	J	0.0005U	092620-009	EPA 6020
	Copper	0.00102	0.00035	0.001	NE			092620-009	EPA 6020
	Iron	0.208	0.033	0.100	NE			092620-009	EPA 6020
	Lead	ND	0.0005	0.002	NE	U		092620-009	EPA 6020
	Magnesium	16.9	0.010	0.030	NE			092620-009	EPA 6020
	Manganese	ND	0.001	0.005	NE	U		092620-009	EPA 6020
	Mercury	ND	0.000067	0.0002	0.002	U	UJ	092620-009	EPA 7470
	Nickel	0.00171	0.0005	0.002	NE	J		092620-009	EPA 6020
	Potassium	1.67	0.080	0.300	NE			092620-009	EPA 6020
	Selenium	0.00305	0.0015	0.005	0.050	J		092620-009	EPA 6020
	Silver	ND	0.0002	0.001	NE	U		092620-009	EPA 6020
	Sodium	23.2	0.080	0.250	NE			092620-009	EPA 6020
	Thallium	ND	0.00045	0.002	0.002	U		092620-009	EPA 6020
	Uranium	0.0136	0.000067	0.0002	0.03		J	092620-009	EPA 6020
	Vanadium	0.00124	0.001	0.005	NE	J		092620-009	EPA 6010
	Zinc	ND	0.0035	0.010	NE	U		092620-009	EPA 6020

Table IV-11 (Continued)
Summary of Unfiltered Total Metal Results
SWMU 68 Groundwater Monitoring
Quarterly Assessment, July – September 2012

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 19-Jul-12	Aluminum	ND	0.015	0.050	NE	U		092625-009	EPA 6020
	Antimony	ND	0.001	0.003	0.006	U		092625-009	EPA 6020
	Arsenic	ND	0.0017	0.005	0.010	U		092625-009	EPA 6020
	Barium	0.0249	0.0006	0.002	2.00			092625-009	EPA 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		092625-009	EPA 6020
	Cadmium	ND	0.00011	0.001	0.005	U		092625-009	EPA 6020
	Calcium	77.4	0.300	1.00	NE			092625-009	EPA 6020
	Chromium	ND	0.002	0.010	0.100	U		092625-009	EPA 6020
	Cobalt	0.000111	0.0001	0.001	NE	J		092625-009	EPA 6020
	Copper	0.000749	0.00035	0.001	NE	J	0.0061UJ	092625-009	EPA 6020
	Iron	0.224	0.033	0.100	NE			092625-009	EPA 6020
	Lead	ND	0.0005	0.002	NE	U		092625-009	EPA 6020
	Magnesium	16.3	0.010	0.030	NE			092625-009	EPA 6020
	Manganese	ND	0.001	0.005	NE	U		092625-009	EPA 6020
	Mercury	ND	0.000067	0.0002	0.002	U	UJ	092625-009	EPA 7470
	Nickel	0.00112	0.0005	0.002	NE	J		092625-009	EPA 6020
	Potassium	1.51	0.080	0.300	NE			092625-009	EPA 6020
	Selenium	0.0037	0.0015	0.005	0.050	J		092625-009	EPA 6020
	Silver	ND	0.0002	0.001	NE	U		092625-009	EPA 6020
	Sodium	22.4	0.400	1.25	NE			092625-009	EPA 6020
	Thallium	ND	0.00045	0.002	0.002	U		092625-009	EPA 6020
	Uranium	0.012	0.000067	0.0002	0.03			092625-009	EPA 6020
	Vanadium	0.00187	0.001	0.005	NE	B, J	0.0059U	092625-009	EPA 6010
	Zinc	ND	0.0035	0.010	NE	U		092625-009	EPA 6020

Table IV-11 (Continued)
Summary of Unfiltered Total Metal Results
SWMU 68 Groundwater Monitoring
Quarterly Assessment, July – September 2012

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) 19-Jul-12	Aluminum	ND	0.015	0.050	NE	U		092626-009	EPA 6020
	Antimony	ND	0.001	0.003	0.006	U		092626-009	EPA 6020
	Arsenic	ND	0.0017	0.005	0.010	U		092626-009	EPA 6020
	Barium	0.0282	0.0006	0.002	2.00			092626-009	EPA 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		092626-009	EPA 6020
	Cadmium	ND	0.00011	0.001	0.005	U		092626-009	EPA 6020
	Calcium	79.6	0.300	1.00	NE			092626-009	EPA 6020
	Chromium	ND	0.002	0.010	0.100	U		092626-009	EPA 6020
	Cobalt	0.000105	0.0001	0.001	NE	J		092626-009	EPA 6020
	Copper	0.000844	0.00035	0.001	NE	J	0.0061UJ	092626-009	EPA 6020
	Iron	0.223	0.033	0.100	NE			092626-009	EPA 6020
	Lead	ND	0.0005	0.002	NE	U		092626-009	EPA 6020
	Magnesium	15.3	0.010	0.030	NE			092626-009	EPA 6020
	Manganese	ND	0.001	0.005	NE	U		092626-009	EPA 6020
	Mercury	ND	0.000067	0.0002	0.002	U	UJ	092626-009	EPA 7470
	Nickel	0.00122	0.0005	0.002	NE	J		092626-009	EPA 6020
	Potassium	1.56	0.080	0.300	NE			092626-009	EPA 6020
	Selenium	0.00353	0.0015	0.005	0.050	J		092626-009	EPA 6020
	Silver	ND	0.0002	0.001	NE	U		092626-009	EPA 6020
	Sodium	21.3	0.400	1.25	NE			092626-009	EPA 6020
	Thallium	ND	0.00045	0.002	0.002	U		092626-009	EPA 6020
	Uranium	0.0124	0.000067	0.0002	0.03			092626-009	EPA 6020
	Vanadium	0.00156	0.001	0.005	NE	B, J	0.0059U	092626-009	EPA 6010
	Zinc	ND	0.0035	0.010	NE	U		092626-009	EPA 6020

Table IV-11 (Concluded)
Summary of Unfiltered Total Metal Results
SWMU 68 Groundwater Monitoring
Quarterly Assessment, July – September 2012

Notes

CFR	= Code of Federal Regulations.
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.
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.

^aLaboratory Qualifier

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

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

^bValidation Qualifier

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

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

^cAnalytical Method

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

Table IV-12
Summary of Filtered Cation Results
SWMUs 8/58 and 68 Groundwater Monitoring
Quarterly Assessment, July – September 2012

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 16-Jul-12	Calcium	40.7	0.060	0.200	NE			092615-017	EPA 6020
	Magnesium	9.61	0.010	0.030	NE			092615-017	EPA 6020
	Potassium	4.12	0.080	0.300	NE			092615-017	EPA 6020
	Sodium	64.9	0.800	2.50	NE			092615-017	EPA 6020
CCBA-MW1 (Duplicate) 16-Jul-12	Calcium	41.5	0.060	0.200	NE			092616-017	EPA 6020
	Magnesium	9.88	0.010	0.030	NE			092616-017	EPA 6020
	Potassium	4.27	0.080	0.300	NE			092616-017	EPA 6020
	Sodium	59.5	0.800	2.50	NE			092616-017	EPA 6020
CCBA-MW2 12-Jul-12	Calcium	72.8	0.300	1.00	NE			092610-017	EPA 6020
	Magnesium	12.7	0.010	0.030	NE		J	092610-017	EPA 6020
	Potassium	1.28	0.080	0.300	NE			092610-017	EPA 6020
	Sodium	46.3	0.080	0.250	NE			092610-017	EPA 6020
SWMU 68									
OBS-MW1 17-Jul-12	Calcium	79.0	0.300	1.00	NE			092618-017	EPA 6020
	Magnesium	17.1	0.010	0.030	NE			092618-017	EPA 6020
	Potassium	1.67	0.080	0.300	NE			092618-017	EPA 6020
	Sodium	26.3	0.080	0.250	NE			092618-017	EPA 6020
OBS-MW2 18-Jul-12	Calcium	67.5	0.600	2.00	NE			092620-017	EPA 6020
	Magnesium	16.3	0.010	0.030	NE			092620-017	EPA 6020
	Potassium	1.67	0.080	0.300	NE			092620-017	EPA 6020
	Sodium	22.8	0.080	0.250	NE			092620-017	EPA 6020
OBS-MW3 19-Jul-12	Calcium	76.7	0.300	1.00	NE			092625-017	EPA 6020
	Magnesium	16.2	0.010	0.030	NE			092625-017	EPA 6020
	Potassium	1.63	0.080	0.300	NE			092625-017	EPA 6020
	Sodium	21.8	0.400	1.25	NE			092625-017	EPA 6020
OBS-MW3 (Duplicate) 19-Jul-12	Calcium	81.7	0.300	1.00	NE			092626-017	EPA 6020
	Magnesium	16.0	0.010	0.030	NE			092626-017	EPA 6020
	Potassium	1.62	0.080	0.300	NE			092626-017	EPA 6020
	Sodium	22.6	0.400	1.25	NE			092626-017	EPA 6020

Table IV-12 (Concluded)
Summary of Filtered Cation Results
SWMUs 8/58 and 68 Groundwater Monitoring
Quarterly Assessment, July – September 2012

Notes

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

^aLaboratory Qualifier

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

^bValidation Qualifier

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

J = The associated value is an estimated quantity.

^cAnalytical Method

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

Table IV-13

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

SWMUs 8/58 and 68 Groundwater Monitoring

Quarterly Assessment, July – September 2012

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 16-Jul-12	Americium-241	-0.0219 ± 24.3	39.8	19.6	NE	U	BD	092615-033	EPA 901.1
	Cesium-137	-0.296 ± 2.85	4.28	2.08	NE	U	BD	092615-033	EPA 901.1
	Cobalt-60	0.516 ± 2.60	4.60	2.20	NE	U	BD	092615-033	EPA 901.1
	Potassium-40	63.6 ± 33.2	45.2	21.6	NE	X	R	092615-033	EPA 901.1
	Gross Alpha	6.08	NA	NA	15	NA	None	092615-034	EPA 900.0
	Gross Beta	5.70 ± 1.41	1.52	0.735	4mrem/yr			092615-034	EPA 900.0
	Uranium-233/234	2.00 ± 0.337	0.146	0.0657	NE			092615-035	HASL-300
	Uranium-235/236	0.0393 ± 0.0448	0.0524	0.0173	NE	U	BD	092615-035	HASL-300
	Uranium-238	0.657 ± 0.146	0.092	0.0388	NE			092615-035	HASL-300
CCBA-MW1 (Duplicate) 16-Jul-12	Americium-241	4.69 ± 17.1	29.1	14.3	NE	U	BD	092616-033	EPA 901.1
	Cesium-137	1.67 ± 2.66	4.01	1.94	NE	U	BD	092616-033	EPA 901.1
	Cobalt-60	-1.16 ± 2.67	4.49	2.15	NE	U	BD	092616-033	EPA 901.1
	Potassium-40	16.8 ± 54.9	41.4	19.7	NE	U	BD	092616-033	EPA 901.1
	Gross Alpha	-0.49	NA	NA	15	NA	None	092616-034	EPA 900.0
	Gross Beta	5.01 ± 1.23	1.31	0.635	4mrem/yr			092616-034	EPA 900.0
	Uranium-233/234	1.75 ± 0.277	0.105	0.0473	NE			092616-035	HASL-300
	Uranium-235/236	0.00 ± 0.0185	0.0377	0.0125	NE	U	BD	092616-035	HASL-300
	Uranium-238	0.591 ± 0.120	0.0662	0.028	NE			092616-035	HASL-300
CCBA-MW2 12-Jul-12	Americium-241	7.99 ± 8.40	11.3	5.57	NE	U	BD	092610-033	EPA 901.1
	Cesium-137	-0.29 ± 1.97	3.32	1.61	NE	U	BD	092610-033	EPA 901.1
	Cobalt-60	-1.4 ± 1.88	3.03	1.44	NE	U	BD	092610-033	EPA 901.1
	Potassium-40	2.98 ± 50.4	32.0	15.2	NE	U	BD	092610-033	EPA 901.1
	Gross Alpha	-6.55	NA	NA	15	NA	None	092610-034	EPA 900.0
	Gross Beta	3.86 ± 1.15	1.44	0.696	4mrem/yr		J	092610-034	EPA 900.0
	Uranium-233/234	7.33 ± 0.996	0.140	0.0633	NE			092610-035	HASL-300
	Uranium-235/236	0.107 ± 0.0556	0.0505	0.0167	NE		J	092610-035	HASL-300
	Uranium-238	1.60 ± 0.268	0.0886	0.0374	NE			092610-035	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, July – September 2012

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 17-Jul-12	Americium-241	0.201 ± 9.97	15.3	7.51	NE	U	BD	092618-033	EPA 901.1
	Cesium-137	-0.393 ± 1.77	2.96	1.43	NE	U	BD	092618-033	EPA 901.1
	Cobalt-60	0.931 ± 1.81	3.18	1.51	NE	U	BD	092618-033	EPA 901.1
	Potassium-40	8.23 ± 38.3	30.8	14.6	NE	U	BD	092618-033	EPA 901.1
	Gross Alpha	4.52	NA	NA	15 pCi/L	NA	None	092618-034	EPA 900.0
	Gross Beta	4.60 ± 1.15	1.19	0.577	4 mrem/yr			092618-034	EPA 900.0
	Uranium-233/234	16.5 ± 2.22	0.160	0.0717	NE			092618-035	HASL-300
	Uranium-235/236	0.169 ± 0.0741	0.0586	0.0189	NE		J	092618-035	HASL-300
OBS-MW2 18-Jul-12	Uranium-238	3.11 ± 0.484	0.102	0.0423	NE			092618-035	HASL-300
	Americium-241	6.20 ± 8.72	13.0	6.37	NE	U	BD	092620-033	EPA 901.1
	Cesium-137	2.76 ± 2.19	3.05	1.47	NE	U	BD	092620-033	EPA 901.1
	Cobalt-60	0.676 ± 1.94	3.39	1.61	NE	U	BD	092620-033	EPA 901.1
	Potassium-40	22.9 ± 40.6	31.5	14.9	NE	U	BD	092620-033	EPA 901.1
	Gross Alpha	2.46	NA	NA	15 pCi/L	NA	None	092620-034	EPA 900.0
	Gross Beta	6.85 ± 1.50	1.18	0.568	4 mrem/yr			092620-034	EPA 900.0
	Uranium-233/234	21.7 ± 2.93	0.126	0.0562	NE			092620-035	HASL-300
OBS-MW3 19-Jul-12	Uranium-235/236	0.267 ± 0.0872	0.046	0.0148	NE			092620-035	HASL-300
	Uranium-238	4.17 ± 0.616	0.0796	0.0332	NE			092620-035	HASL-300
	Americium-241	-1.18 ± 10.3	18.2	8.89	NE	U	BD	092625-033	EPA 901.1
	Cesium-137	1.83 ± 2.21	3.70	1.79	NE	U	BD	092625-033	EPA 901.1
	Cobalt-60	-0.0387 ± 2.15	3.76	1.78	NE	U	BD	092625-033	EPA 901.1
	Potassium-40	25.5 ± 61.8	33.9	15.9	NE	U	BD	092625-033	EPA 901.1
	Gross Alpha	-2.66	NA	NA	15 pCi/L	NA	None	092625-034	EPA 900.0
	Gross Beta	5.65 ± 1.39	1.47	0.712	4 mrem/yr		NJ+	092625-034	EPA 900.0
	Uranium-233/234	21.1 ± 3.05	0.180	0.0806	NE			092625-035	HASL-300
	Uranium-235/236	0.297 ± 0.109	0.0659	0.0212	NE			092625-035	HASL-300
	Uranium-238	3.66 ± 0.601	0.114	0.0476	NE			092625-035	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, July – September 2012

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) 19-Jul-12	Americium-241	13.8 ± 9.71	13.8	5.80	NE	U	BD	092626-033	EPA 901.1
	Cesium-137	1.96 ± 2.03	3.28	1.58	NE	U	BD	092626-033	EPA 901.1
	Cobalt-60	2.35 ± 2.25	3.73	1.77	NE	U	BD	092626-033	EPA 901.1
	Potassium-40	-17.2 ± 32.4	38.8	18.5	NE	U	BD	092626-033	EPA 901.1
	Gross Alpha	2.49	NA	NA	15 pCi/L	NA	None	092626-034	EPA 900.0
	Gross Beta	4.94 ± 1.39	1.62	0.789	4 mrem/yr		NJ+	092626-034	EPA 900.0
	Uranium-233/234	19.8 ± 2.70	0.135	0.0604	NE			092626-035	HASL-300
	Uranium-235/236	0.272 ± 0.090	0.0494	0.0159	NE			092626-035	HASL-300
	Uranium-238	3.64 ± 0.555	0.0855	0.0357	NE			092626-035	HASL-300

Notes

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.

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

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

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, July – September 2012

Notes (continued)

^cLaboratory Qualifier

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

NA = Not applicable.

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

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

^dValidation Qualifier

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

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

J = The associated value is an estimated quantity.

NJ+ = Presumptive evidence of the presence of the material at an estimated quantity with a suspected positive bias.

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

None = No data validation for corrected gross alpha activity.

^eAnalytical 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-14
Summary of Constituents Detected above Established MCLs
SWMUs 8/58 and 68 Groundwater Monitoring
Quarterly Assessments through September 2012

Well	Date	Analyte	Result (mg/L)	MCL (mg/L)	Laboratory Qualifier ^a	Validation Qualifier ^b	Sample Number	Analytical Method ^c
SWMUs 8/58								
CCBA-MW1	31-Oct-11	Fluoride	5.36	4.0			091345-016	EPA 9056
CCBA-MW1	16-Jan-12	Fluoride	4.94	4.0			091615-016	EPA 9056
CCBA-MW1 (Duplicate)	16-Jan-12	Fluoride	4.94	4.0			091616-016	EPA 9056
CCBA-MW1	23-Apr-12	Fluoride	4.93	4.0			092291-016	EPA 9056
CCBA-MW1	16-Jul-12	Fluoride	5.03	4.0			092615-016	EPA 9056
CCBA-MW1 (Duplicate)	16-Jul-12	Fluoride	5.00	4.0			092616-016	EPA 9056

Notes

CCBA = Coyote Canyon Blast Area.

CFR = Code of Federal Regulations.

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).

mg/L = Milligrams per liter.

MW = Monitoring well.

SWMU = Solid Waste Management Unit.

^aLaboratory Qualifier

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

^bValidation Qualifier

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

^cAnalytical Method

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

Table IV-15
Summary of Duplicate Samples
SWMUs 8/58 and 68 Groundwater Monitoring
Quarterly Assessment, July – September 2012

Well /Parameter	Environmental Sample (R1)	Duplicate Sample (R2)	RPD ^a
	mg/L unless otherwise noted		
CCBA-MW1			
Nitrate plus Nitrite	1.41	1.35	4
Bicarbonate Alkalinity	192	188	2
Bromide	0.344	0.310	10
Chloride	27.9	28.2	1
Fluoride	5.03	5.00	1
Sulfate	53.8	54.2	1
Aluminum	0.0314	0.0305	3
Arsenic	0.0022	0.0027	20
Barium	0.00335	0.0035	4
Beryllium	0.000394	0.000443	12
Calcium	43.7	44.2	1
Cobalt	0.000101	0.000104	3
Copper	0.000437	0.000486	11
Iron	0.143	0.146	2
Magnesium	9.50	9.73	2
Manganese	0.00568	0.00568	< 1
Nickel	0.000847	0.00104	20
Potassium	4.34	4.38	1
Selenium	0.00242	0.00241	< 1
Sodium	69.9	63.8	9
Uranium	0.00181	0.00182	1
Filtered Calcium	40.7	41.5	2
Filtered Magnesium	9.61	9.88	3
Filtered Potassium	4.12	4.27	4
Filtered Sodium	64.9	59.5	9
Gross Alpha (pCi/L)	6.08	-0.49	NC
Gross Beta (pCi/L)	5.70 ± 1.41	5.01 ± 1.23	NC
Uranium-233/234 (pCi/L)	2.00 ± 0.337	1.75 ± 0.277	NC
Uranium-238 (pCi/L)	0.657 ± 0.146	0.591 ± 0.120	NC
OBS-MW3			
Nitrate plus Nitrite	1.56	1.59	2
Bicarbonate Alkalinity	181	181	< 1
Chloride	21.7	21.7	< 1
Sulfate	81.8	81.8	< 1
Barium	0.0249	0.0282	12
Calcium	77.4	79.6	3
Cobalt	0.000111	0.000105	6
Iron	0.224	0.223	< 1
Magnesium	16.3	15.3	6
Nickel	0.00112	0.00122	9
Potassium	1.51	1.56	3
Selenium	0.0037	0.00353	5
Sodium	22.4	21.3	5

Table IV-15 (Concluded)
Summary of Duplicate Samples
SWMUs 8/58 and 68 Groundwater Monitoring
Quarterly Assessment, July – September 2012

Well /Parameter	Environmental Sample (R1)	Duplicate Sample (R2)	RPD ^a
	mg/L unless otherwise noted		
OBS-MW3			
Uranium	0.012	0.0124	3
Filtered Calcium	76.7	81.7	6
Filtered Magnesium	16.2	16.0	1
Filtered Potassium	1.63	1.62	1
Filtered Sodium	21.8	22.6	4
Gross Alpha	-2.66 pCi/L	2.49 pCi/L	NC
Gross Beta	5.65 ± 1.39 pCi/L	4.94 ± 1.39 pCi/L	NC
Uranium-233/234	21.1 ± 3.05 pCi/L	19.8 ± 2.70 pCi/L	NC
Uranium-235/236	0.297 ± 0.109 pCi/L	0.272 ± 0.090 pCi/L	NC
Uranium-238	3.66 ± 0.601 pCi/L	3.64 ± 0.555 pCi/L	NC
Nitrate plus Nitrite	1.56	1.59	2
Bicarbonate Alkalinity	181	181	< 1
Chloride	21.7	21.7	< 1

Notes

CCBA = Coyote Canyon Blast Area.
mg/L = Milligrams per liter.
MW = Monitoring well.
NC = Not calculated.
OBS = Old Burn Site.
pCi/L = Picocuries per liter.

^aRPD

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

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

where: R₁ = analysis result
R₂ = duplicate analysis result

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

Project Name: SWMU 8 and 58 GWM	Project No.: 146422.10.11.01 / 98026.01.12
Well I.D.: CCBA-mw 1	Date: 07/16/12
Well Condition:	Weather Condition:
Method: Portable pump <input checked="" type="checkbox"/> Dedicated pump <input type="checkbox"/> Pump depth: 79'	

[illegible]

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Project Name: SWMU 8 and 58 GWM	Project No.: 146422.10.11.01 / 98026.01.12
Well I.D.: CCBA-MW2	Date: 07/12/12
Well Condition:	Weather Condition:
Method: Portable pump <input checked="" type="checkbox"/> Dedicated pump <input type="checkbox"/> Pump depth: 117'	

[illegible]

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GROUNDWATER SAMPLE COLLECTION FIELD EQUIPMENT CHECK LOG Page 1 of 2

SNL/NM Project Name: SWMU 8 and 58 GWM			SNL/NM Project No.: 146422.10.11.01 / 98026.01.12		
Calibrations done by: Robert Lynch			Date: 07/12/12		
Make & Model: YSI 6920 V2					
YSI 6020 Sonde (S/N) with DO, Ec, pH, ORP, and temperature probes: 08H100033					
YSI 650 MDS (S/N): N/A					
pH Calibration					
pH Calibrated to (std): 7.00			pH sloped to (std): 10.0		
Reference value:	4.00		7.00		10.00
	Value	Temp	Value	Temp	Value Temp
1. Time:	0630	4.02 20.3	7.00	20.3	10.00 20.3
2. Time:	1048	4.01 20.5	7.01	20.5	9.98 20.5
3. Time:					
4. Time:					
Standard lot no.:	2AA670		2AB299		1AK189
Expiration date:	Jan-14		Feb-14		Nov-13
SC Calibration					
Reference Value: 1278 uS			Standard Lot No.: 2AB388		
	Value	Temp	Expiration Date: Feb-13		
1. Time:	0632	1276 20.3			
2. Time:	1050	1279 20.5			
3. Time:					
4. Time:					
ORP Calibration					
Reference Value: 220 mV			Standard Lot No. 1AL131		
	Value	Temp	Expiration Date: Sep-12		
1. Time:	0631	219.6 20.3			
2. Time:	1049	220.7 20.5			
3. Time:					
4. Time:					
DO Calibration					
Calibration Value:	81% air saturation @ 5200 ft.		Atmospheric Pressure in Hg		
1. Time:	0629	81.7	24.47		
2. Time:	1047	81.6	24.50		
3. Time:					
4. Time:					

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

SNL/NM Project Name: SWMU 8 and 58 GWM		Project No.: 146422.10.11.01 / 98026.01.12		
Calibration done by: Robert Lynch		Date: 07/12/12		
TURBIDIMETER				
Make & Model: HACH 2100P 2100Q		Serial No. S/N 10050C002897		
Reference Value	$\times 10$	20	100	800
Standard Lot No.	0161	0168	0162	0161
1. Time 0744	10.1	20.4	101	798
2. Time 0916	9.95	20.2	102	795
3. Time				
4. Time				
Comments:				

GROUNDWATER SAMPLE COLLECTION FIELD EQUIPMENT CHECK LOG Page 1 of 2

SNL/NM Project Name: SWMU 8 and 58 GWM			SNL/NM Project No.: 146422.10.11.01 / 98026.01.12		
Calibrations done by: Robert Lynch			Date: 07/16/12		
Make & Model: YSI 6920 V2					
YSI 6020 Sonde (S/N) with DO, Ec, pH, ORP, and temperature probes: 08H100033					
YSI 650 MDS (S/N): N/A					
pH Calibration					
pH Calibrated to (std): 7.00			pH sloped to (std): 10.0		
Reference value:	4.00		7.00		10.00
	Value	Temp	Value	Temp	Value Temp
1. Time:	0625	3.99 19.3	7.00	19.3	9.99 19.3
2. Time:	1041	4.01 20.2	7.00	20.2	10.00 20.2
3. Time:					
4. Time:					
Standard lot no.:	2AA670		2AB299		1AK189
Expiration date:	Jan-14		Feb-14		Nov-13
SC Calibration					
Reference Value: 1278 uS			Standard Lot No.: 2AB388		
	Value	Temp	Expiration Date: Feb-13		
1. Time:	0627	1272 19.3			
2. Time:	1043	1281 20.2			
3. Time:					
4. Time:					
ORP Calibration					
Reference Value: 220 mV			Standard Lot No. 1AL131		
	Value	Temp	Expiration Date: Sep-12		
1. Time:	0626	218.9 19.3			
2. Time:	1042	219.6 20.2			
3. Time:					
4. Time:					
DO Calibration					
Calibration Value:	81% air saturation @ 5200 ft.		Atmospheric Pressure in Hg		
1. Time:	0624	81.4	24.39		
2. Time:	1040	81.5	24.41		
3. Time:					
4. Time:					

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

SNL/NM Project Name: SWMU 8 and 58 GWM		Project No.: 146422.10.11.01 / 98026.01.12		
Calibration done by: Robert Lynch		Date: 07/16/12		
TURBIDIMETER				
Make & Model: HACH 2100P 2100Q		Serial No. S/N 10050C002897		
Reference Value	10	20	100	800
Standard Lot No.	0161	0168	0162	0161
1. Time 0744	9.94	20.2	104	802
2. Time 0917	9.89	20.1	103	805
3. Time				
4. Time				
Comments:				

Portable Pump and Tubing / Water Level Indicator
Decontamination Log Form

Project Name: <u>SWMU 8 and 58 GWM</u>		Monitoring Well ID #: <u>CCBA-MW2</u>		Date: <u>07/12/12</u>	
The following equipment was decontaminated at completion of sampling activities in accordance with FOP-05-03					
Pump and Tubing Bundle ID #: <u>GWM 1806-32</u>			Water Level Indicator ID #: <u>62088</u>		
<u>Personnel Performing Decontamination:</u> <u>Robert Lynch</u> <u>PL</u> Print Name: Initial: Print Name: Initial:			<u>Personnel Performing Decontamination:</u> <u>Robert Lynch</u> <u>PL</u> Print Name: Initial: Print Name: Initial:		
Condition of Equipment					
Pump: <u>good</u> Tubing Bundle: <u>good</u> Water Level Indicator: <u>good</u>					
List of Decontamination Materials					
Distilled or Deionized (circle one) Source: <u>Culligan</u> Lot Number: <u>070612</u>			<u>HNO₃</u> Grade: <u>Reagent</u> UN #: <u>2031</u> Manufacturer: <u>Fisher Scientific</u> Lot Number: <u>002735</u>		

Portable Pump and Tubing / Water Level Indicator
Decontamination Log Form

Project Name: <u>SWMU 8 and 58 GWM</u>	Monitoring Well ID #: <u>CCBA MW 1</u>	Date: <u>07/16/12</u>
The following equipment was decontaminated at completion of sampling activities in accordance with FOP-05-03		
Pump and Tubing Bundle ID #: <u>GWM 1806-32</u>	Water Level Indicator ID #: <u>62088</u>	
<u>Personnel Performing Decontamination:</u> <u>Robert Lynch</u> <u>RL</u> Print Name: Initial: <u>ALFRED SANTILLANOS</u> <u>AS</u> Print Name: Initial:	<u>Personnel Performing Decontamination:</u> <u>Robert Lynch</u> <u>RL</u> Print Name: Initial: <u>ALFRED SANTILLANOS</u> <u>AS</u> Print Name: Initial:	
Condition of Equipment Pump: <u>good</u> Tubing Bundle: <u>good</u> Water Level Indicator: <u>good</u>		
List of Decontamination Materials		
Distilled or Deionized (circle one) Source: <u>Culligan</u> Lot Number: <u>070612</u>	<u>HNO₃</u> Grade: <u>Reagent</u> UN #: <u>2031</u> Manufacturer: <u>Fisher Scientific</u> Lot Number: <u>002735</u>	

Groundwater Monitoring Waste Generation Log

Waste Generator : <u>Bill Gibson</u> Phone: <u>239-7367</u> project leader: <u>Clinton Lum</u>			
Project Name	SWMU 8 and 58 GWM	SWMU 8 and 58 GWM	SWMU 8 and 58 GWM
Container ID # (site-date-sequence)	CCBA-MW2-071212-01	CCBA-MW2-071212-02	CCBA-071212
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	55-gallon CHPD	55-gallon CHPD	55-gallon CHPD
Volume of Waste	19 gals	18	30
Total Container Weight	170 lbs.	160	280
COC#: Sample#-Fraction	614286	614286	614286
	092610	092610	092610
Accumulation Date	Start: 07/12/12	Start: 07/12/12	Start: 07/12/12
	Full: 07/12/12	Full: 07/12/12	Full: 07/12/12
Date Waste Moved to Accumulation Area	07/12/12	07/12/12	07/12/12
Accumulation Area Name	9925	9925	9925
Comments:			

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Groundwater Monitoring Waste Generation Log

Waste Generator : <u>Bill Gibson</u> Phone: <u>239-7367</u> project leader: <u>Clinton Lum</u>			
Project Name	SWMU 8 and 58 GWM	SWMU 8 and 58 GWM	SWMU 8 and 58 GWM
Container ID # (site-date-sequence)	CCBA-mw1-071612	CCBA-071612	
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	Decon water	
Container Type / Volume	55-gallon CHPD	55-gallon CHPD	55-gallon CHPD
Volume of Waste	37 gals	30	
Total Container Weight	350 lbs	280	
COC#: Sample#-Fraction	614288	614288	
	092615	092615	
	092616	092616	
Accumulation Date	Start: 07/16/12 Full: 07/16/12	Start: 07/16/12 Full: 07/16/12	Start: Full:
Date Waste Moved to Accumulation Area	07/16/12	07/16/12	
Accumulation Area Name	9925	9925	9925
Comments:			

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TAILGATE SAFETY MEETING FORM

Dept: 4142 Well Location: CCBA-MW 2 Date: 07/12/12 Time: 0740

Activities: Groundwater Monitoring (purging, sampling, decon)
(Anyone has the right to cease field activities for safety concerns. The buddy system will be used when needed.)

Weather Conditions:

Temp: _____ °F Wind Speed: _____ MPH Humidity: _____ % Wind Chill _____ °F

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

Other: _____

Safety Topics Presented

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

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

Attendees

Robert T Lynch

Printed Name

ALFRED SANTILLANES

Printed Name

William Gibson

Printed Name

Printed Name

Printed Name

[Signature]

Signature

[Signature]

Signature

[Signature]

Signature

Signature

Signature

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TAILGATE SAFETY MEETING FORM

Dept: 4142 Well Location: CCBA-MW 1 Date: 07/16/12 Time: 0739

Activities: Groundwater Monitoring (purging, sampling, decon)
(Anyone has the right to cease field activities for safety concerns. The buddy system will be used when needed.)

Weather Conditions:

Temp: _____ °F Wind Speed: _____ MPH Humidity: _____ % Wind Chill _____ °F

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

Other: _____

Safety Topics Presented

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

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

Attendees

Robert T Lynch
Printed Name
ALFRED SANTILLANOS
Printed Name
William Gibson
Printed Name

Robert Lynch
Signature
Alfred Santillanos
Signature
William Gibson
Signature

Printed Name

Signature

Printed Name

Signature

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Project Name: SWMU 68 GWM	Project No.: 146422.10.11.01 / 98026.01.13
Well I.D.: OBS-MW1	Date: 07/17/12
Well Condition:	Weather Condition:
Method: Portable pump <input checked="" type="checkbox"/> Dedicated pump <input type="checkbox"/> Pump depth: 154'	

[illegible]

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Project Name: SWMU 68 GWM	Project No.: 146422.10.11.01 / 98026.01.13
Well I.D.: <i>OBS-MW 2</i>	Date: <i>07/18/12</i>
Well Condition:	Weather Condition:
Method: Portable pump <input checked="" type="checkbox"/> Dedicated pump <input type="checkbox"/> Pump depth: <i>253'</i>	

[illegible]

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Project Name: SWMU 68 GWM	Project No.: 146422.10.11.01 / 98026.01.13
Well I.D.: 035-MW3	Date: 6/19/12
Well Condition:	Weather Condition:
Method: Portable pump <input checked="" type="checkbox"/> Dedicated pump <input type="checkbox"/> Pump depth: 209'	

[illegible]

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GROUNDWATER SAMPLE COLLECTION FIELD EQUIPMENT CHECK LOG Page 1 of 2

SNL/NM Project Name: SWMU 68 GWM			SNL/NM Project No.: 146422.10.11.01 / 98026.01.13		
Calibrations done by: Robert Lynch			Date: 07/17/12		
Make & Model: YSI 6920 V2					
YSI 6020 Sonde (S/N) with DO, Ec, pH, ORP, and temperature probes: 08H100033					
YSI 650 MDS (S/N): N/A					
pH Calibration					
pH Calibrated to (std): 7.00			pH sloped to (std): 10.0		
Reference value:	4.00		7.00		10.00
	Value	Temp	Value	Temp	Value Temp
1. Time:	0626	4.01	20.6	7.03	20.6
2. Time:	1044	3.99	20.9	7.01	20.9
3. Time:					
4. Time:					
Standard lot no.:	2AA670		2AB299		1AK189
Expiration date:	Jan-14		Feb-14		Nov-13
SC Calibration					
Reference Value: 1278 uS			Standard Lot No.: 2AB388		
	Value	Temp	Expiration Date: Feb-13		
1. Time:	0628	1288	20.2		
2. Time:	1046	1284	20.9		
3. Time:					
4. Time:					
ORP Calibration					
Reference Value: 220 mV			Standard Lot No. 1AAL131		
	Value	Temp	Expiration Date: Sep-12		
1. Time:	0627	218.7	20.6		
2. Time:	1045	219.2	20.7		
3. Time:					
4. Time:					
DO Calibration					
Calibration Value:	81% air saturation @ 5200 ft.		Atmospheric Pressure in Hg		
1. Time:	0625	81.4	24.38		
2. Time:	1043	81.6	24.41		
3. Time:					
4. Time:					

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

SNL/NM Project Name: SWMU 68 GWM		Project No.: 146422.10.11.01 / 98026.01.13		
Calibration done by: Robert Lynch		Date: 07/17/12		
TURBIDIMETER				
Make & Model: HACH 2100P 2100Q		Serial No. S/N 10050C002897		
Reference Value	± 10	20	100	800
Standard Lot No.	0161	0168	0162	0161
1. Time 0815	9.83	19.1	101	802
2. Time 0930	9.91	19.6	103	799
3. Time				
4. Time				
Comments:				

GROUNDWATER SAMPLE COLLECTION FIELD EQUIPMENT CHECK LOG Page 1 of 2

SNL/NM Project Name: SWMU 68 GWM			SNL/NM Project No.: 146422.10.11.01 / 98026.01.13		
Calibrations done by: Robert Lynch			Date: 07/18/12		
Make & Model: YSI 6920 V2					
YSI 6020 Sonde (S/N) with DO, Ec, pH, ORP, and temperature probes: 08H100033					
YSI 650 MDS (S/N): N/A					
pH Calibration					
pH Calibrated to (std): 7.00			pH sloped to (std): 10.0		
Reference value:	4.00		7.00		10.00
	Value	Temp	Value	Temp	Value Temp
1. Time:	0625	4.03 21.2	7.01	21.2	10.02 21.2
2. Time:	1049	4.02 20.6	7.00	20.6	10.00 20.6
3. Time:					
4. Time:					
Standard lot no.:	2AA670		2AB299		1AK189
Expiration date:	Jan-14		Feb-14		Nov-13
SC Calibration					
Reference Value: 1278 uS			Standard Lot No.: 2AB388		
	Value	Temp	Expiration Date: Feb-13		
1. Time:	0627	1284 21.2			
2. Time:	1051	1282 20.6			
3. Time:					
4. Time:					
ORP Calibration					
Reference Value: 220 mV			Standard Lot No. 1AAL131		
	Value	Temp	Expiration Date: Sep-12		
1. Time:	0626	222.4 21.2			
2. Time:	1050	220.8 20.6			
3. Time:					
4. Time:					
DO Calibration					
Calibration Value:	81% air saturation @ 5200 ft.		Atmospheric Pressure in Hg		
1. Time:	0624	81.5	24.39		
2. Time:	1048	81.6	24.40		
3. Time:					
4. Time:					

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

SNL/NM Project Name: SWMU 68 GWM		Project No.: 146422,10.11.01 / 98026.01.13		
Calibration done by: Robert Lynch		Date: 07/18/12		
TURBIDIMETER				
Make & Model: HACH 2100P 2100Q		Serial No. S/N 10050C002897		
Reference Value	± 10	20	100	800
Standard Lot No.	0161	0168	0162	0161
1. Time 0758	9.89	19.8	99.7	801
2. Time 0933	9.96	19.6	99.8	803
3. Time				
4. Time				
Comments:				

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GROUNDWATER SAMPLE COLLECTION FIELD EQUIPMENT CHECK LOG Page 1 of 2

SNL/NM Project Name: SWMU 68 GWM			SNL/NM Project No.: 146422.10.11.01 / 98026.01.13		
Calibrations done by: Robert Lynch			Date: 07/19/12		
Make & Model: YSI 6920 V2					
YSI 6020 Sonde (S/N) with DO, Ec, pH, ORP, and temperature probes: 08H100033					
YSI 650 MDS (S/N): N/A					
pH Calibration					
pH Calibrated to (std): 7.00			pH sloped to (std): 10.0		
Reference value:	4.00		7.00		10.00
	Value	Temp	Value	Temp	Value Temp
1. Time:	0730	3.99 23.2	6.96	23.5	9.99 23.5
2. Time:	1051	4.00 22.7	6.99	22.7	10.01 22.7
3. Time:					
4. Time:					
Standard lot no.:		2AA670	2AB299		1AK189
Expiration date:		Jan-14	Feb-14		Nov-13
SC Calibration					
Reference Value: 1278 uS			Standard Lot No.: 2AB388		
	Value	Temp	Expiration Date: Feb-13		
1. Time:	0737	1279 23.6			
2. Time:	1053	1281 22.7			
3. Time:					
4. Time:					
ORP Calibration					
Reference Value: 220 mV			Standard Lot No. 1AAL131		
	Value	Temp	Expiration Date: Sep-12		
1. Time:	0737	220.5 23.2			
2. Time:	1052	220.7 22.7			
3. Time:					
4. Time:					
DO Calibration					
Calibration Value:	81% air saturation @ 5200 ft.		Atmospheric Pressure in Hg		
1. Time:	0730	81.9	24.51		
2. Time:	1050	81.8	24.49		
3. Time:					
4. Time:					

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

SNL/NM Project Name: SWMU 68 GWM		Project No.: 146422.10.11.01 / 98026.01.13		
Calibration done by: Robert Lynch		Date: 07/19/12		
TURBIDIMETER				
Make & Model: HACH 2100P 2100Q		Serial No. S/N 10050C002897		
Reference Value	\pm 10	20	100	800
Standard Lot No.	0161	0168	0162	0161
1. Time 0802	10.1	21.1	102	783
2. Time 0942	10.0	20.7	101	796
3. Time				
4. Time				
Comments:				

Portable Pump and Tubing / Water Level Indicator
Decontamination Log Form

Project Name: <u>SWMU 68 GWM</u>	Monitoring Well ID #: <u>085 - mwi</u>	Date: <u>7-17-12</u>
The following equipment was decontaminated at completion of sampling activities in accordance with FOP-05-03		
Pump and Tubing Bundle ID #: <u>GWM 1806-32</u>	Water Level Indicator ID #: <u>62088</u>	
<u>Personnel Performing Decontamination:</u> <u>William Gibson</u> <u>WJG</u> Print Name: Initial: <u>Robert Lynch</u> <u>RL</u> Print Name: Initial:		<u>Personnel Performing Decontamination:</u> <u>William Gibson</u> <u>WJG</u> Print Name: Initial: <u>Robert Lynch</u> <u>RL</u> Print Name: Initial:
Condition of Equipment Pump: <u>Good</u> Tubing Bundle: <u>Good</u> Water Level Indicator: <u>Good</u>		
List of Decontamination Materials		
Distilled or Deionized (circle one) Source: <u>Culligan</u> Lot Number: <u>070612</u>	<u>HNO₃</u> Grade: <u>Reagent</u> UN #: <u>2031</u> Manufacturer: <u>Fisher Scientific</u> Lot Number: <u>002735</u>	

Portable Pump and Tubing / Water Level Indicator
Decontamination Log Form

Project Name: <u>SWMU 68 GWM</u>	Monitoring Well ID #: <u>0BS-mw2</u>	Date: <u>7-18-2012</u>
The following equipment was decontaminated at completion of sampling activities in accordance with FOP-05-03		
Pump and Tubing Bundle ID #: <u>GWM 1806-32</u>	Water Level Indicator ID #: <u>62088</u>	
<u>Personnel Performing Decontamination:</u> <u>William Gibson</u> <u>WJG</u> Print Name: Initial: <u>Robert Lynch</u> <u>RL</u> Print Name: Initial:	<u>Personnel Performing Decontamination:</u> <u>William Gibson</u> <u>WJG</u> Print Name: Initial: <u>Robert Lynch</u> <u>RL</u> Print Name: Initial:	
Condition of Equipment Pump: <u>Good</u> Tubing Bundle: <u>Good</u> Water Level Indicator: <u>Good</u>		
List of Decontamination Materials		
Distilled or Deionized (circle one) Source: <u>Culligan</u> Lot Number: <u>070612</u>	<u>HNO₃</u> Grade: <u>Reagent</u> UN #: <u>2031</u> Manufacturer: <u>Fisher Scientific</u> Lot Number: <u>002735</u>	

Portable Pump and Tubing / Water Level Indicator
Decontamination Log Form

Project Name: <u>SWMU 68 GWM</u>	Monitoring Well ID #: <u>OB5-mw3</u>	Date: <u>7/19/12</u>
The following equipment was decontaminated at completion of sampling activities in accordance with FOP-05-03		
Pump and Tubing Bundle ID #: <u>GWM 1806-32</u>	Water Level Indicator ID #: <u>62088</u>	
<u>Personnel Performing Decontamination:</u> <u>Robert Lynch</u> <u>PL</u> Print Name: Initial: Print Name: Initial:		<u>Personnel Performing Decontamination:</u> <u>Robert Lynch</u> <u>PL</u> Print Name: Initial: Print Name: Initial:
Condition of Equipment Pump: <u>good</u> Tubing Bundle: <u>good</u> Water Level Indicator: <u>good</u>		
List of Decontamination Materials		
Distilled or Deionized (circle one) Source: <u>Culligan</u> Lot Number: <u>070612</u>	<u>HNO₃</u> Grade: <u>Reagent</u> UN #: <u>2031</u> Manufacturer: <u>Fisher Scientific</u> Lot Number: <u>002735</u>	

Groundwater Monitoring Waste Generation Log

Waste Generator : <u>Bill Gibson</u> Phone: <u>239-7367</u> project leader: <u>Clinton Lum</u>			
Project Name	SWMU 68 GWM	SWMU 68 GWM	SWMU 68 GWM
Container ID # (site-date-sequence)	085-mw1-071712	085-071712	
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	Decon water	
Container Type / Volume	55-gallon CHPD	55-gallon CHPD	55-gallon CHPD
Volume of Waste	37 gals.	30	
Total Container Weight	350 lbs.	280	
COC#: Sample#-Fraction	614289	614289	
	092618	092618	
Accumulation Date	Start: 07/17/12 Full: 07/17/12	Start: 07/17/12 Full: 07/17/12	Start: Full:
Date Waste Moved to Accumulation Area	07/17/12	07/17/12	
Accumulation Area Name	9925	9925	9925
Comments:			

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

Groundwater Monitoring Waste Generation Log

Waste Generator : <u>Bill Gibson</u> Phone: <u>239-7367</u> project leader: <u>Clinton Lum</u>			
Project Name	SWMU 68 GWM	SWMU 68 GWM	SWMU 68 GWM
Container ID # (site-date-sequence)	<u>0B5-MW2-071812</u>	<u>0B5-071812</u>	
Initial Label Type (Hazardous or Non-Regulated)	<u>non-Regulated</u>	<u>non-Regulated</u>	<u>non-Regulated</u>
Waste Matrix (purge water, decon water, HACH Accu-Vac ampule)	<u>Purge Water</u>	<u>Decon Water</u>	
Container Type / Volume	<u>55-gallon CHPD</u>	<u>55-gallon CHPD</u>	<u>55-gallon CHPD</u>
Volume of Waste	<u>37 gals.</u>	<u>35</u>	
Total Container Weight	<u>350 lbs.</u>	<u>330</u>	
COC#: Sample#-Fraction	<u>614290</u> <u>092620</u>	<u>614290</u> <u>092620</u>	
Accumulation Date	Start: <u>07/18/12</u> Full: <u>07/18/12</u>	Start: <u>07/18/12</u> Full: <u>07/18/12</u>	Start: Full:
Date Waste Moved to Accumulation Area	<u>07/18/12</u>	<u>07/18/12</u>	
Accumulation Area Name	<u>9925</u>	<u>9925</u>	<u>9925</u>
Comments:			

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Groundwater Monitoring Waste Generation Log

Waste Generator : <u>Bill Gibson</u> Phone: <u>239-7367</u> project leader: <u>Clinton Lum</u>			
Project Name	SWMU 68 GWM	SWMU 68 GWM	SWMU 68 GWM
Container ID # (site-date-sequence)	<u>0BS-MW3-071912</u>	<u>0BS-071912</u>	
Initial Label Type (Hazardous or Non-Regulated)	<u>non-Regulated</u>	<u>non-Regulated</u>	<u>non-Regulated</u>
Waste Matrix (purge water, decon water, HACH Accu-Vac ampule)	<u>Purge water</u>	<u>Decon Water</u>	
Container Type / Volume	<u>55-gallon CHPD</u>	<u>55-gallon CHPD</u>	<u>55-gallon CHPD</u>
Volume of Waste	<u>37 gals</u>	<u>30</u>	
Total Container Weight	<u>35 gal lbs</u>	<u>280</u>	
COC#: Sample#-Fraction	<u>614292</u>	<u>614292</u>	
	<u>092625</u>	<u>092625</u>	
	<u>092626</u>	<u>092626</u>	
Accumulation Date	Start: <u>07/19/12</u> Full: <u>07/19/12</u>	Start: <u>07/19/12</u> Full: <u>07/19/12</u>	Start: Full:
Date Waste Moved to Accumulation Area	<u>07/19/12</u>	<u>07/19/12</u>	
Accumulation Area Name	<u>9925</u>	<u>9925</u>	<u>9925</u>
Comments:			

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TAILGATE SAFETY MEETING FORM

Dept: 4142 Well Location: OBS-MW1 Date: 07/17/12 Time: 0806

Activities: Groundwater Monitoring (purging, sampling, decontamination)
(Anyone has the right to cease field activities for safety concerns. The buddy system will be used when needed.)

Weather Conditions:

Temp: 69.8°F Wind Speed: 0 MPH Humidity: 45.6% Wind Chill 69.8°F

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

Other: _____

Safety Topics Presented

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

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

Attendees

Robert Lynch
Printed Name

William Gibson
Printed Name

ALFRED SANTILLANOS
Printed Name

Printed Name

Printed Name

Robert Lynch
Signature

William Gibson
Signature

Alfred Santillanos
Signature

Signature

Signature

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TAILGATE SAFETY MEETING FORM

Dept: 4142 Well Location: OBS-MW 2 Date: 07/18/12 Time: 0743

Activities: Groundwater Monitoring (purging, sampling, decontamination)
(Anyone has the right to cease field activities for safety concerns. The buddy system will be used when needed.)

Weather Conditions:

Temp: 75.5 °F Wind Speed: 4.3 MPH Humidity: 40.4 % Wind Chill 73.1 °F

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

Other: _____

Safety Topics Presented

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

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

Attendees

Robert T Lynch
Printed Name

William Gibson
Printed Name

ALFRED SANTILLANES
Printed Name

Printed Name

Printed Name

[Signature]
Signature

[Signature]
Signature

[Signature]
Signature

Signature

Signature

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TAILGATE SAFETY MEETING FORM

Dept: 4142 Well Location: DBS-MW 3 Date: 07/19/12 Time: 0751

Activities: Groundwater Monitoring (purging, sampling, decontamination)
(Anyone has the right to cease field activities for safety concerns. The buddy system will be used when needed.)

Weather Conditions:

Temp: 69.2 °F Wind Speed: 0 MPH Humidity: 53.0 % Wind Chill 69.2 °F

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

Other: _____

Safety Topics Presented

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

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

Attendees

Robert Lynch
Printed Name

William Gibson
Printed Name

Jessica Salazar
Printed Name

ALFRED SANTILLANOS
Printed Name

Printed Name

Robert Lynch
Signature

William Gibson
Signature

Jessica Salazar
Signature

Alfred Santillanos
Signature

Signature

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Appendix B

Analytical Laboratory Certificates of
Analysis for SWMUs 8/58 and 68
Groundwater Monitoring Data

CONTRACT LABORATORY
ANALYSIS REQUEST AND CHAIN OF CUSTODY

Internal Lab

Batch No. NA

SMO Use

AR/COCC614288

Page 1 of 2

Project Name: SWMU 8/58 GWM

Project/Task Manager: Clinton Lum

Project/Task Number: 98026 01.12

Service Order: CF 262-12

Date Samples Shipped:

Carrier/Waybill No.

Lab Contact: Edie Kent/803.556.8171

Lab Destination: GEL

Contract No.: PO 691436

SMO Authorization: [Signature]

SMO Contact Phone: See Bottle on

Lorraine Herrera/505-844-3199

Send Report to SMO: Rita Kavanaugh/505.284.2553

☐ Waste Characterization

☐ RMMA

☐ Released by COC No.

☒ 4° Celsius

Bill to: Sandia National Laboratories (Accounts Payable),

P.O. Box 5800, MS-0154

Albuquerque, NM 87185-0154

Tech Area:

Building: Room: Operational Site:

Sample No.	Fraction	Sample Location Detail	Depth (ft)	Date/Time Collected	Sample Matrix	Container Type	Volume	Preservative	Collection Method	Sample Type	Parameter & Method Requested	Lab Sample ID
092615	-001	CCBA-MW1	79	7/16/12 9:08	GW	G	3x40ml	HCL	G	SA	TCL VOC (SW846-8260B)	
092615	-002	CCBA-MW1	79	7/16/12 9:11	GW	AG	4x1L	None	G	SA	TCL SVOC (SW846-8270C)	
092615	-009	CCBA-MW1	79	7/16/12 9:12	GW	P	500 ml	HNO3	G	SA	TAL Metals + U (SW846-6020/7470)	
092615	-016	CCBA-MW1	79	7/16/12 9:13	GW	P	125 ml	None	G	SA	Anions (SW846-9056)	
092615	-017	CCBA-MW1	79	7/16/12 9:15	FGW	P	500 ml	HNO3	G	SA	Cations (SW846-6020)	
092615	-018	CCBA-MW1	79	7/16/12 9:16	GW	P	125 ml	H2SO4	G	SA	NPN (353.2)	
092615	-020	CCBA-MW1	79	7/16/12 9:17	GW	P	250 ml	None	G	SA	Perchlorate (314.0)	
092615	-022	CCBA-MW1	79	7/16/12 9:18	GW	P	500 ml	None	G	SA	Alkalinity (SM2320B)	
092615	-024	CCBA-MW1	79	7/16/12 9:20	GW	AG	4x1L	None	G	SA	HE (SW846-8321A)	
092615	-027	CCBA-MW1	79	7/16/12 9:21	GW	P	250 ml	NaOH	G	SA	Total Cyanide (SW846-9012)	

Last Chain: ☒ Yes

Validation Req'd: ☒ Yes

Background: ☐ Yes

Confirmatory: ☐ Yes

Sample Tracking

Date Entered:

Entered by:

QC inits.:

SMO Use

Special Instructions/QC Requirements:

EDD ☒ Yes ☐ No

Turnaround Time ☐ 7 Day* ☐ 15 Day* ☒ 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
FGW (Filtered in field w/40 micron filter), Anions (Br,Cl,F,SO4),
Cations (Ca,Mg,K,Na) Alkalinity (total, bicarbonate, carbonate)
If perchlorate detected, perform verification analysis using SW846-6850M

Conditions on Receipt

Lab Use

Sample Team Members

Name

Signature

Init.

Company/Organization/Phone/Cell

Robert Lynch

[Signature]

RL

SNL/4142/844-4013/250-7090

Alfred Santillanes

[Signature]

AS

SNL/4142/844-5130/228-0710

William J. Gibson

[Signature]

WJG

SNL/4142/844-4013/239-7367

1. Relinquished by [Signature] Org. 4142 Date 7/16/12 Time 1024

1. Received by [Signature] Org. 4142 Date 7/16/12 Time 1024

2. Relinquished by Org. Date Time

2. Received by Org. Date Time

3. Relinquished by Org. Date Time

3. Received by Org. Date Time

4. Relinquished by Org. Date Time

4. Received by Org. Date Time

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

CONTRACT LABORATORY
ANALYSIS REQUEST AND CHAIN OF CUSTODY (Continuation)

AR/COC 614288

Project Name: SWMU 8/58 GWM			Project/Task Manager: Clinton Lum			Project/Task No.: 98026 01.12								
Tech Area:														
Building:		Room:											Lab use	
Sample No.	Fraction	Sample Location Detail	Depth (ft)	Date/Time Collected	Sample Matrix	Container		Preservative	Collection Method	Sample Type	Parameter & Method Requested	Lab Sample ID		
✓ 092615	-033	CCBA-MW1	79	7/16/12 9:23 ✓	GW	P	1 L	HNO3	G	SA	Gamma Spec (short list)(901.0)			
✓ 092615	-034	CCBA-MW1	79	7/16/12 9:25 ✓	GW	P	1 L	HNO3	G	SA	Gross Alpha/Beta (900.0)			
✓ 092615	-035	CCBA-MW1	79	7/16/12 9:27 ✓	GW	P	1 L	HNO3	G	SA	Isotopic U (ASTM D3972-09M)			
✓ 092616	-001 ✓	CCBA-MW1	79	7/16/12 9:08 ✓	GW	G	3x40ml	HCL	G	DU	TCL VOC (SW846-8260B)			
✓ 092616	-002	CCBA-MW1	79	7/16/12 9:11 ✓	GW	AG	4x1L	None	G	DU	TCL SVOC (SW846-8270C)			
✓ 092616	-009	CCBA-MW1	79	7/16/12 9:12 ✓	GW	P	500 ml	HNO3	G	DU	TAL Metals + U (SW846-6020/7470)			
✓ 092616	-016	CCBA-MW1	79	7/16/12 9:13 ✓	GW	P	125 ml	None	G	DU	Anions (SW846-9056) ✓			
✓ 092616	-017	CCBA-MW1	79	7/16/12 9:15 ✓	FGW	P	500 ml	HNO3	G	DU	Cations (SW846-6020)			
✓ 092616	-018	CCBA-MW1	79	7/16/12 9:16 ✓	GW	P	125 ml	H2SO4	G	DU	NPN (353.2)			
✓ 092616	-020	CCBA-MW1	79	7/16/12 9:17 ✓	GW	P	250 ml	None	G	DU	Perchlorate (314.0)			
✓ 092616	-022	CCBA-MW1	79	7/16/12 9:18 ✓	GW	P	500 ml	None	G	DU	Alkalinity (SM2320B)			
✓ 092616	-024	CCBA-MW1	79	7/16/12 9:20 ✓	GW	AG	4x1L	None	G	DU	HE (SW846-8321A)			
✓ 092616	-027	CCBA-MW1	79	7/16/12 9:21 ✓	GW	P	250 ml	NaOH	G	DU	Total Cyanide (SW846-9012)			
✓ 092616	-033	CCBA-MW1	79	7/16/12 9:23 ✓	GW	P	1 L	HNO3	G	DU	Gamma Spec (short list)(901.0)			
✓ 092616	-034	CCBA-MW1	79	7/16/12 9:25 ✓	GW	P	1 L	HNO3	G	DU	Gross Alpha/Beta (900.0)			
✓ 092616	-035	CCBA-MW1	79	7/16/12 9:27 ✓	GW	P	1 L	HNO3	G	DU	Isotopic U (ASTM D3972-09M)			
✓ 092617	-001	CCBA-TB3	N/A	7/16/12 9:08 ✓	DIW	G	3x40ml	HCL	G	TB	TCL VOC (SW846-8260B)			
Recipient Initials _____														

CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY

Internal Lab

Page 1 of 2Batch No. N4

SMO Use

AR/COC **614286**

Project Name: <u>SWMU 8/58 GWM</u>	Date Samples Shipped: <u>7/12/12</u>	SMO Authorization: <u>[Signature]</u>	<input type="checkbox"/> Waste Characterization <input type="checkbox"/> RMMA <input type="checkbox"/> Released by COC No. <input checked="" type="checkbox"/> 4° Celsius
Project/Task Manager: <u>Clinton Lum</u>	Carrier/Waybill No. <u>143746</u>	SMO Contact Phone: <u>See Btk order</u>	
Project/Task Number: <u>98026 01.12</u>	Lab Contact: <u>Eddie Kent/803.556.8171</u>	Lorraine Herrera/505-844-3199	
Service Order: <u>CF 262-12</u>	Lab Destination: <u>GEL</u>	Send Report to SMO: <u>Rita Kavanaugh/505.284.2553</u>	
Contract No.: <u>PO 691436</u>			

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

Sample No.	Fraction	Sample Location Detail	Depth (ft)	Date/Time Collected	Sample Matrix	Container		Preservative	Collection Method	Sample Type	Parameter & Method Requested	Lab Sample ID
						Type	Volume					
✓ 092610	-001	CCBA-MW2	117	7/12/12 9:05	GW	G	3x40ml	HCL	G	SA	TCL VOC (SW846-8260B)	
✓ 092610	-002	CCBA-MW2	117	7/12/12 9:07	GW	AG	4x1L	None	G	SA	TCL SVOC (SW846-8270C)	
✓ 092610	-009	CCBA-MW2	117	7/12/12 9:08	GW	P	500 ml	HNO3	G	SA	TAL Metals + U (SW846-6020/7470)	
✓ 092610	-016	CCBA-MW2	117	7/12/12 9:09	GW	P	125 ml	None	G	SA	Anions (SW846-9056)	
✓ 092610	-017	CCBA-MW2	117	7/12/12 9:11	FGW	P	500 ml	HNO3	G	SA	Cations (SW846-6020)	
✓ 092610	-018	CCBA-MW2	117	7/12/12 9:12	GW	P	125 ml	H2SO4	G	SA	NPN (353.2)	
✓ 092610	-020	CCBA-MW2	117	7/12/12 9:13	GW	P	250 ml	None	G	SA	Perchlorate (314.0)	
✓ 092610	-022	CCBA-MW2	117	7/12/12 9:14	GW	P	500 ml	None	G	SA	Alkalinity (SM2320B)	
✓ 092610	-024	CCBA-MW2	117	7/12/12 9:16	GW	AG	4x1L	None	G	SA	HE (SW846-8321A)	
✓ 092610	-027	CCBA-MW2	117	7/12/12 9:17	GW	P	250 ml	NaOH	G	SA	Total Cyanide (SW846-9012)	

Last Chain: <input type="checkbox"/> Yes	Sample Tracking	SMO Use	Special Instructions/QC Requirements:	Conditions on Receipt	
Validation Req'd: <input checked="" type="checkbox"/> Yes	Date Entered:		EDD <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		
Background: <input type="checkbox"/> Yes	Entered by:		Turnaround Time <input type="checkbox"/> 7 Day* <input type="checkbox"/> 15 Day* <input checked="" type="checkbox"/> Day		
Confirmatory: <input type="checkbox"/> Yes	QC initials:		Negotiated TAT <input type="checkbox"/>		
Sample Team Members	Name	Signature	Init.	Company/Organization/Phone/Cell	Sample Disposal <input type="checkbox"/> Return to Client <input checked="" type="checkbox"/> Disposal by Lab
	Robert Lynch	[Signature]	RL	SNL/4142/844-4013/250-7090	Return Samples By:
	Alfred Santillanes	[Signature]	AS	SNL/4142/844-5130/228-0710	
	William J. Gibson	[Signature]	WJG	SNL/4142/844-4013/239-7367	
					Comments: Send report to Tim Jackson/4142/MS 0729/284-2547 FGW (Filtered in field w/40 micron filter), Anions (B, Cl, F, SO4), Cations (Ca, Mg, K, Na) Alkalinity (total, bicarbonate, carbonate) If perchlorate detected, perform verification analysis using SW846-6850M)

1. Relinquished by <u>[Signature]</u> Org. <u>4142</u> Date <u>7/12/12</u> Time <u>1057</u>	3. Relinquished by _____ Org. _____ Date _____ Time _____
1. Received by <u>[Signature]</u> Org. <u>4142</u> Date <u>7/12/12</u> Time <u>1057</u>	3. Received by _____ Org. _____ Date _____ Time _____
2. Relinquished by _____ Org. _____ Date _____ Time _____	4. Relinquished by _____ Org. _____ Date _____ Time _____
2. Received by _____ Org. _____ Date _____ Time _____	4. Received by _____ Org. _____ Date _____ Time _____

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

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

Page 2 of 2

AR/COC 614286

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

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

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AR/COC 614287

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CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY

Internal Lab

Batch No.

NA

SMO Use

AR/COC

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614289

Project Name: SWMU 68 GWM	Date Samples Shipped:	SMO Authorization: <i>Don Williams</i>	<input type="checkbox"/> Waste Characterization
Project/Task Manager: Clinton Lum	Carrier/Waybill No.	SMO Contact Phone: <i>See B.716 and</i>	<input type="checkbox"/> RMMA
Project/Task Number: 98026 01.13	Lab Contact: Edie Kent/803.556.8171	Lorraine Herrera/505-844-3199	<input type="checkbox"/> Released by COC No.
Service Order: CF 263-12	Lab Destination: GEL	Send Report to SMO:	<input checked="" type="checkbox"/> Celsius
	Contract No.: PO 691436	Rita Kavanaugh/505.284.2553	

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

Sample No.	Fraction	Sample Location Detail	Depth (ft)	Date/Time Collected	Sample Matrix	Container		Preservative	Collection Method	Sample Type	Parameter & Method Requested	Lab Sample ID
						Type	Volume					
✓ 092618	-001	OBS-MW1	154	7/17/12 9:27	GW	G	3x40ml	HCL	G	SA	TCL VOC (SW846-8260B)	
✓ 092618	-002	OBS-MW1	154	7/17/12 9:29	GW	AG	4x1L	None	G	SA	TCL SVOC (SW846-8270C)	
✓ 092618	-009	OBS-MW1	154	7/17/12 9:30	GW	P	500 ml	HNO3	G	SA	TAL-Metals + U (SW846-6020/7470)	
✓ 092618	-014	OBS-MW1	154	7/17/12 9:31	GW	P	250 ml	None	G	SA	Hexavalent Chromium (SW846-7196)	
✓ 092618	-016	OBS-MW1	154	7/17/12 9:32	GW	P	125 ml	None	G	SA	Anions (SW846-9056)	
✓ 092618	-017	OBS-MW1	154	7/17/12 9:34	FGW	P	500 ml	HNO3	G	SA	Cations (SW846-6020)	
✓ 092618	-018	OBS-MW1	154	7/17/12 9:35	GW	P	125 ml	H2SO4	G	SA	NPN (353.2)	
✓ 092618	-020	OBS-MW1	154	7/17/12 9:36	GW	P	250 ml	None	G	SA	Perchlorate (314.0)	
✓ 092618	-022	OBS-MW1	154	7/17/12 9:37	GW	P	500 ml	None	G	SA	Alkalinity (SM2320B)	
✓ 092618	-024	OBS-MW1	154	7/17/12 9:39	GW	AG	4x1L	None	G	SA	HE (SW846-8321A Mod)	

Last Chain: <input type="checkbox"/> Yes	Sample Tracking	SMO Use	Special Instructions/QC Requirements:	Conditions on Receipt
Validation Req'd: <input checked="" type="checkbox"/> Yes	Date Entered:		EDD <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	
Background: <input type="checkbox"/> Yes	Entered by:		Turnaround Time <input type="checkbox"/> 7 Day* <input type="checkbox"/> 5 Day* 3 <input checked="" type="checkbox"/> Day	
Confirmatory: <input type="checkbox"/> Yes	QC inits.:		Negotiated TAT <input type="checkbox"/>	
Sample Team Members	Name	Signature	Init.	Company/Organization/Phone/Cell
	William J. Gibson	<i>William J. Gibson</i>	<i>WJG</i>	SNL/4142/844-4013/250-7090
	Robert Lynch	<i>Robert Lynch</i>	<i>RL</i>	SNL/4142/844-5130/228-0710
	Alfred Santillanes	<i>Alfred Santillanes</i>	<i>AS</i>	SNL/4142/844-5130/228-0710
Sample Disposal <input type="checkbox"/> Return to Client <input checked="" type="checkbox"/> Disposal by Lab				
Return Samples By:				
Comments: Send report to Tim Jackson/4142/MS 0729/284-2547 FGW (filtered in field w/40 micron filter), Anions (Cl, SO4), Cations (Ca, Mg, K, Na) Alkalinity (total, bicarbonate, carbonate) If perchlorate detected, perform verification analysis using SW846-6850M				

1. Relinquished by <i>Alfred Santillanes</i>	Org. 4142	Date 7/17/12	Time 10:10
1. Received by <i>Don Williams</i>	Org. 4142	Date 7/17/12	Time 10:40
2. Relinquished by	Org.	Date	Time
2. Received by	Org.	Date	Time
3. Relinquished by	Org.	Date	Time
3. Received by	Org.	Date	Time
4. Relinquished by	Org.	Date	Time
4. Received by	Org.	Date	Time

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

CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY

Internal Lab

Page 1 of 2Batch No. N/AAR/COC **614290**

Project Name: SWMU 68 GWM		Date Samples Shipped: <u>7/18/12</u>		SMO Authorization: <u>[Signature]</u>		<input type="checkbox"/> Waste Characterization <input type="checkbox"/> RMMA <input type="checkbox"/> Released by COC No. <input checked="" type="checkbox"/> ° Celsius	
Project/Task Manager: Clinton Lum		Carrier/Waybill No. <u>144009</u>		SMO Contact Phone: <u>[Signature]</u> SMO			
Project/Task Number: 98026 01.13		Lab Contact: Edie Kent/803.556.8171		Lorraine Herrera/505-844-3199			
Service Order: CF 263-12		Lab Destination: GEL		Send Report to SMO: Rita Kavanaugh/505.284.2553			
Tech Area:		Contract No.: PO 691436		Bill to: Sandia National Laboratories (Accounts Payable), P.O. Box 5800, MS-0154 Albuquerque, NM 87185-0154			
Building:		Room:		Operational Site:			

Sample No.	Fraction	Sample Location Detail	Depth (ft)	Date/Time Collected	Sample Matrix	Container Type	Volume	Preservative	Collection Method	Sample Type	Parameter & Method Requested	Lab Sample ID
092620	-001	OBS-MW2	253	7/18/12 9:19	GW	G	3x40ml	HCL	G	SA	TCL VOC (SW846-8260B)	
092620	-002	OBS-MW2	253	7/18/12 9:21	GW	AG	4x1L	None	G	SA	TCL SVOC (SW846-8270C)	
092620	-009	OBS-MW2	253	7/18/12 9:22	GW	P	500 ml	HNO3	G	SA	TAL Metals + U (SW846-6020/7470)	
092620	-014	OBS-MW2	253	7/18/12 9:23	GW	P	250 ml	None	G	SA	Hexavalent Chromium (SW846-7196)	
092620	-016	OBS-MW2	253	7/18/12 9:24	GW	P	125 ml	None	G	SA	Anions (SW846-9056)	
092620	-017	OBS-MW2	253	7/18/12 9:26	FGW	P	500 ml	HNO3	G	SA	Cations (SW846-6020)	
092620	-018	OBS-MW2	253	7/18/12 9:27	GW	P	125 ml	H2SO4	G	SA	NPN (353.2)	
092620	-020	OBS-MW2	253	7/18/12 9:28	GW	P	250 ml	None	G	SA	Perchlorate (314.0)	
092620	-022	OBS-MW2	253	7/18/12 9:29	GW	P	500 ml	None	G	SA	Alkalinity (SM2320B)	
092620	-024	OBS-MW2	253	7/18/12 9:32	GW	AG	4x1L	None	G	SA	HE (SW846-8321A)	

Last Chain: <input type="checkbox"/> Yes		Sample Tracking		SMO Use		Special Instructions/QC Requirements:		Conditions on Receipt
Validation Req'd: <input checked="" type="checkbox"/> Yes		Date Entered:		EDD		<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		
Background: <input type="checkbox"/> Yes		Entered by:		Turnaround Time		<input type="checkbox"/> 7 Day* <input type="checkbox"/> 5 Day* <input checked="" type="checkbox"/> 3 Day		
Confirmatory: <input type="checkbox"/> Yes		QC inits.:		Negotiated TAT				

Sample Team Members	Name	Signature	Init.	Company/Organization/Phone/Cell	Sample Disposal	Return to Client	Disposal by Lab
	Robert Lynch	<u>[Signature]</u>	RL	SNL/4142/844-4013/250-7090		<input type="checkbox"/>	<input checked="" type="checkbox"/>
	Alfred Santillanes	<u>[Signature]</u>	AS	SNL/4142/844-5130/228-0710			
	William J. Gibson	<u>[Signature]</u>	WJG	SNL/4142/844-4013/239-7367			

Comments: Send report to Tim Jackson/4142/MS 0729/284-2547 FGW (Filtered in field w/40 micron filter), Anions (Cl, SO4), Cations (Ca, Mg, K, Na) Alkalinity (total, bicarbonate, carbonate) If perchlorate detected, perform verification analysis using SW846-6850M			
--	--	--	--

1. Relinquished by <u>[Signature]</u> Org. <u>4142</u> Date <u>7/18/12</u> Time <u>1055</u>	3. Relinquished by _____ Org. _____ Date _____ Time _____
1. Received by <u>[Signature]</u> Org. <u>4142</u> Date <u>7/18/12</u> Time <u>1055</u>	3. Received by _____ Org. _____ Date _____ Time _____
2. Relinquished by _____ Org. _____ Date _____ Time _____	4. Relinquished by _____ Org. _____ Date _____ Time _____
2. Received by _____ Org. _____ Date _____ Time _____	4. Received by _____ Org. _____ Date _____ Time _____

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

CONTRACT LABORATORY

AOP 95-1

AR/COC	614290
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CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY

Internal Lab

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Batch No. NA		SMO Use		AR/COC 614292								
Project Name: SWMU 68 GWM		Date Samples Shipped: 7/19/12		SMO Authorization: Don Williams								
Project/Task Manager: Clinton Lum		Carrier/Waybill No.		SMO Contact Phone: See Both orders								
Project/Task Number: 98026 01.13		Lab Contact: Edie Kent/803.556.8171		Lorraine Herrera/505-844-3199								
Service Order: CF 263-12		Lab Destination: GEL		Send Report to SMO:								
		Contract No.: PO 691436		Rita Kavanaugh/505.284.2553								
Tech Area:				<input type="checkbox"/> Waste Characterization <input type="checkbox"/> RMMA <input type="checkbox"/> Released by COC No. <input checked="" type="checkbox"/> Celsius								
Building:		Room:		Operational Site:								
				Bill to: Sandia National Laboratories (Accounts Payable), P.O. Box 5800, MS-0154 Albuquerque, NM 87185-0154								
Sample No.	Fraction	Sample Location Detail	Depth (ft)	Date/Time Collected	Sample Matrix	Container Type	Volume	Preservative	Collection Method	Sample Type	Parameter & Method Requested	Lab Sample ID
✓ 092625	-001	OBS-MW3	209	7/19/12 9:22 ✓	GW	G	3x40ml	HCL	G	SA	TCL VOC (SW846-8260B)	
✓ 092625	-002	OBS-MW3	209	7/19/12 9:25 ✓	GW	AG	4x1L	None	G	SA	TCL SVOC (SW846-8270C)	
✓ 092625	-009	OBS-MW3	209	7/19/12 9:26 ✓	GW	P	500 ml	HNO3	G	SA	TAL Metals + U (SW846-6020/7470)	
✓ 092625	-014	OBS-MW3	209	7/19/12 9:27 ✓	GW	P	250 ml	None	G	SA	Hexavalent Chromium (SW846-7196A)	
✓ 092625	-016	OBS-MW3	209	7/19/12 9:28 ✓	GW	P	125 ml	None	G	SA	Anions (SW846-9056)	
✓ 092625	-017	OBS-MW3	209	7/19/12 9:30 ✓	FGW	P	500 ml	HNO3	G	SA	Cations (SW846-6020)	
✓ 092625	-018	OBS-MW3	209	7/19/12 9:31 ✓	GW	P	125 ml	H2SO4	G	SA	NPN (353.2)	
✓ 092625	-020	OBS-MW3	209	7/19/12 9:32 ✓	GW	P	250 ml	None	G	SA	Perchlorate (314.0)	
✓ 092625	-022	OBS-MW3	209	7/19/12 9:34 ✓	GW	P	500 ml	None	G	SA	Alkalinity (SM2320B)	
✓ 092625	-024	OBS-MW3	209	7/19/12 9:37 ✓	GW	AG	4x1L	None	G	SA	HE (SW846-8321A)	
Last Chain: <input checked="" type="checkbox"/> Yes		Sample Tracking		SMO Use		Special Instructions/QC Requirements:				Conditions on Receipt		
Validation Req'd: <input checked="" type="checkbox"/> Yes		Date Entered:				EDD <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No						
Background: <input type="checkbox"/> Yes		Entered by:				Turnaround Time <input type="checkbox"/> 7 Day* <input type="checkbox"/> 5 Day* <input checked="" type="checkbox"/> 3 Day						
Confirmatory: <input type="checkbox"/> Yes		QC initials:				Negotiated TAT <input type="checkbox"/>						
Sample Team Members	Name	Signature	Init.	Company/Organization/Phone/Cell		Sample Disposal <input type="checkbox"/> Return to Client <input checked="" type="checkbox"/> Disposal by Lab				Lab Use		
	Robert Lynch	<i>Robert Lynch</i>	RL	SNL/4142/844-4013/250-7090		Return Samples By:						
	Alfred Santillanes	<i>Alfred Santillanes</i>	AS	SNL/4142/844-5130/228-0710		Comments: Send report to Tim Jackson/4142/MS 0729/284-2547						
	William J. Gibson	<i>William J. Gibson</i>	WJG	SNL/4142/844-4013/239-7367		FGV (Filtered in field w/40 micron filter), Anions (Cl, SO4), Cations (Ca, Mg, K, Na) Alkalinity (total, bicarbonate, carbonate)						
	Jessica Salazar	<i>Jessica Salazar</i>	JS	SNL/4142/284-6517		If perchlorate detected, perform verification analysis using SW846-6850M)						
1. Relinquished by <i>Alfred Santillanes</i>		Org. 4142	Date 7/19/12	Time 1028	3. Relinquished by		Org.	Date	Time			
1. Received by <i>Don Williams</i>		Org. 4142	Date 7/19/12	Time 1028	3. Received by		Org.	Date	Time			
2. Relinquished by		Org.	Date	Time	4. Relinquished by		Org.	Date	Time			
2. Received by		Org.	Date	Time	4. Received by		Org.	Date	Time			

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

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

Page 2 of 2

AR/COC **614292**

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		Preservative	Collection Method	Sample Type	Parameter & Method Requested	Lab Sample ID		
						Type	Volume							
✓ 092625	-027	OBS-MW3	209	7/19/12 9:38 ✓	GW	P	250 ml	NaOH	G	SA	Total Cyanide (SW846-9012)			
✓ 092625	-033	OBS-MW3	209	7/19/12 9:40 ✓	GW	P	1 L	HNO3	G	SA	Gamma Spec (short list)(901.0)			
✓ 092625	-034	OBS-MW3	209	7/19/12 9:41 ✓	GW	P	1 L	HNO3	G	SA	Gross Alpha/Beta (900.0)			
✓ 092625	-035	OBS-MW3	209	7/19/12 9:43 ✓	GW	P	1 L ✓	HNO3	G	SA	Isotopic U (ASTM D3972-09M)			
✓ 092626	-001	OBS-MW3	209	7/19/12 9:22 ✓	GW	G	3x40ml	HCL	G	DU	TCL VOC (SW846-8260B)			
✓ 092626	-002	OBS-MW3	209	7/19/12 9:25 ✓	GW	AG	4x1L	None	G	DU	TCL SVOC (SW846-8270C)			
✓ 092626	-009	OBS-MW3	209	7/19/12 9:26 ✓	GW	P	500 ml	HNO3	G	DU	TAL Metals + U (SW846-6020/7470)			
✓ 092626	-014	OBS-MW3	209	7/19/12 9:27 ✓	GW	P	250 ml	None	G	DU	Hexavalent Chromium (SW846-7196A)			
✓ 092626	-016	OBS-MW3	209	7/19/12 9:28 ✓	GW	P	125 ml	None	G	DU	Anions (SW846-9056)			
✓ 092626	-017	OBS-MW3	209	7/19/12 9:30 ✓	FGW	P	500 ml	HNO3	G	DU	Cations (SW846-6020)			
✓ 092626	-018	OBS-MW3	209	7/19/12 9:31 ✓	GW	P	125 ml	H2SO4	G	DU	NPN (353.2)			
✓ 092626	-020	OBS-MW3	209	7/19/12 9:32 ✓	GW	P	250 ml	None	G	DU	Perchlorate (314.0)			
✓ 092626	-022	OBS-MW3	209	7/19/12 9:34 ✓	GW	P	500 ml	None	G	DU	Alkalinity (SM2320B)			
✓ 092626	-024	OBS-MW3	209	7/19/12 9:37 ✓	GW	AG	4x1L	None	G	DU	HE (SW846-8321A)			
✓ 092626	-027	OBS-MW3	209	7/19/12 9:38 ✓	GW	P	250 ml	NaOH	G	DU	Total Cyanide (SW846-9012)			
✓ 092626	-033	OBS-MW3	209	7/19/12 9:40 ✓	GW	P	1 L ✓	HNO3	G	DU	Gamma Spec (short list)(901.0)			
✓ 092626	-034	OBS-MW3	209	7/19/12 9:41 ✓	GW	P	1 L	HNO3	G	DU	Gross Alpha/Beta (900.0)			
✓ 092626	-035	OBS-MW3	209	7/19/12 9:43 ✓	GW	P	1 L	HNO3	G	DU	Isotopic U (ASTM D3972-09M)			
✓ 092627	-001	OBS-TB4	N/A	7/19/12 9:22 ✓	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

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Batch No. *N/A*

SMO Use

AR/COC

614291

Project Name: SWMU 68 GWM	Date Samples Shipped: 7/18/12	SMO Authorization: <i>[Signature]</i>	<input type="checkbox"/> Waste Characterization <input type="checkbox"/> RMMA <input type="checkbox"/> Released by COC No. <input checked="" type="checkbox"/> 4° Celsius
Project/Task Manager: Clinton Lum	Carrier/Waybill No. 194009	SMO Contact Phone: 505-844-3199	
Project/Task Number: 98026 01.13	Lab Contact: Edie Kent/803.556.8171	Lorraine Herrera/505-844-3199	
Service Order: CF 263-12	Lab Destination: GEL	Send Report to SMO: Rita Kavanaugh/505.284.2553	
Contract No.: PO 691436			

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

Sample No.	Fraction	Sample Location Detail	Depth (ft)	Date/Time Collected	Sample Matrix	Container Type	Volume	Preservative	Collection Method	Sample Type	Parameter & Method Requested	Lab Sample ID
092623	-001	OBS-EB1	NA	7/18/12 10:23	DIW	G	3x40ml	HCL	G	EB	TCL VOC (SW846-8260B)	
092623	-002	OBS-EB1	NA	7/18/12 10:25	DIW	AG	4x1L	None	G	EB	TCL SVOC (SW846-8270C)	
092623	-009	OBS-EB1	NA	7/18/12 10:26	DIW	P	500 ml	HNO3	G	EB	TAL Metals + U (SW846-6020/7470)	
092623	-014	OBS-EB1	NA	7/18/12 10:27	DIW	P	250 ml	None	G	EB	Hexavalent Chromium (SW846-7196A)	
092623	-016	OBS-EB1	NA	7/18/12 10:28	DIW	P	125 ml	None	G	EB	Anions (SW846-9056)	
092623	-017	OBS-EB1	NA	7/18/12 10:29	FDIW	P	500 ml	HNO3	G	EB	Cations (SW846-6020)	
092623	-018	OBS-EB1	NA	7/18/12 10:30	DIW	P	125 ml	H2SO4	G	EB	NPN (353.2)	
092623	-020	OBS-EB1	NA	7/18/12 10:31	DIW	P	250 ml	None	G	EB	Perchlorate (314.0)	
092623	-022	OBS-EB1	NA	7/18/12 10:32	DIW	P	500 ml	None	G	EB	Alkalinity (SM2320B)	
092623	-024	OBS-EB1	NA	7/18/12 10:34	DIW	AG	4x1L	None	G	EB	HE (SW846-8321A)	

Last Chain: <input type="checkbox"/> Yes		Sample Tracking		SMO Use		Special Instructions/QC Requirements:		Conditions on Receipt
Validation Req'd: <input checked="" type="checkbox"/> Yes		Date Entered:		EDD <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		Turnaround Time <input type="checkbox"/> 7 Day* <input type="checkbox"/> 5 Day* <input checked="" type="checkbox"/> 3 Day		
Background: <input type="checkbox"/> Yes		Entered by:		Negotiated TAT				
Confirmatory: <input type="checkbox"/> Yes		QC initials:						
Sample Team Members	Name	Signature	Init.	Company/Organization/Phone/Cell		Sample Disposal <input type="checkbox"/> Return to Client <input checked="" type="checkbox"/> Disposal by Lab		Lab Use
	Robert Lynch	<i>[Signature]</i>	RL	SNL/4142/844-4013/250-7090		Return Samples By:		
	Alfred Santillanes	<i>[Signature]</i>	AS	SNL/4142/844-5130/228-0710		Comments: Send report to Tim Jackson/4142/MS 0729/284-2547 FGV (Filtered in field w/40 micron filter), Anions (Cl, SO4), Cations (Ca, Mg, K, Na) Alkalinity (total, bicarbonate, carbonate) If perchlorate detected, perform verification analysis using SW846-6850M		
	William J. Gibson	<i>[Signature]</i>	WJG	SNL/4142/844-4013/239-7367				

1. Relinquished by <i>[Signature]</i> Org. 4142 Date 7/18/12 Time 1102	3. Relinquished by	Org.	Date	Time
1. Received by <i>[Signature]</i> Org. 4142 Date 7/18/12 Time 1102	3. Received by	Org.	Date	Time
2. Relinquished by	4. Relinquished by	Org.	Date	Time
2. Received by	4. Received by	Org.	Date	Time

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

4

AR/COC 614291

[illegible]

Appendix C

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

Memorandum

Date: October 3, 2012

To: File

From: Marcia Hilchey

Subject: Inorganic Data Review and Validation – SNL
Site: SWMU 8/58 GWM
AR/COC: 614288
SDG: 307912
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

Two samples were prepared and analyzed with accepted procedures using methods EPA9012A (total CN), EPA9056 (anions), EPA353.2 (nitrate/nitrite as nitrogen), EPA314.0 (perchlorate), EPA7196A (CrVI), and SM2320B (alkalinity). Data were reported for all required analytes. Problems were identified with the data package that resulted in the qualification of data.

Total CN:

1. The ICAL intercept was negative with an absolute value > the MDL but < 3X the MDL. Also, total CN was detected in the CCB at a negative concentration with an absolute value > the MDL but < the PQL. The associated sample results were ND and will be **qualified UJ, I5, B4**.

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

Holding Times and Preservation

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

Calibration

The initial and continuing calibrations met QC acceptance criteria except as noted above in the Summary Section as the follows.

Anions:

The ICAL intercepts for chloride, fluoride, and sulfate were > the MDL and < 3X MDL. However, the associated sample results were all >3X the intercept and, therefore, will not be qualified.

Perchlorate: The CCV %R was >110%. However, the associated sample result was ND and, therefore, will not be qualified.

Blanks

No target analytes were detected in the blanks except as noted above in the Summary section and as follows. Chloride was detected in the MB at < PQL. The associated sample results were > 5X the MB concentration and will not be qualified.

Laboratory Control Sample (LCS)

All LCS recoveries met QC acceptance criteria.

Matrix Spike (MS)

All MS recoveries met QC acceptance criteria.

Total CN, Perchlorate, Alkalinity & Nitrate/Nitrite:

It should be noted that the MS analyses were performed on SNL samples of similar matrix from other SDGs. No sample data will be qualified as a result.

Laboratory Replicate

The replicate analyses met all QC acceptance criteria.

Total CN, Perchlorate, Alkalinity & Nitrate/Nitrite:

It should be noted that the Replicate analyses were performed on SNL samples of similar matrix from other SDGs. No sample data will be qualified as a result.

Detection Limits/Dilutions

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

Anions & Nitrate/Nitrite as Nitrogen:

Both samples were diluted 5X for chloride, sulfate, and nitrate/nitrite. All associated matrix QC samples were analyzed at relative dilution factors ≤5X those of the samples.

Other QC

Field duplicate pairs were submitted on the AR/COC(s). There are no “required” review criteria for field duplicate analyses comparability. No sample data will be qualified as a result.

No other specific issues that affect data quality were identified.

Reviewed by: Monica Dymerski

Level I

Date: 10/16/12

Memorandum

Date: October 2, 2012

To: File

From: Marcia Hilchey

Subject: LC/MS/MS Organic Data Review and Validation – SNL
Site: SWMU 8/58 GWM
AR/COC: 614288
SDG: 307912
Laboratory: GEL
Project/Task: 98026.01.12
Analysis: High Explosives (HE) by LCMSMS

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

Summary

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

- 1) M-nitrotoluene, o-nitrotoluene, and p-nitrotoluene had initial calibration response factors of < 0.05 but > 0.01. All associated sample results were ND 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 time and properly preserved.

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)

All MS/MSD QC acceptance criteria were met with the following exception. The MS and MSD %Rs for 1,3,5-trinitrobenzene were > UAL. All associated sample results were ND and will not be qualified.

Laboratory Control Sample (LCS)

All LCS QC acceptance criteria were met.

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

A field duplicate pair was submitted on the AR/COC(s). There are no “required” review criteria for field duplicate analyses comparability. No sample data will be qualified as a result.

No other specific issues that affect data quality were identified.

Reviewed by: Monica Dymerski

Level I

Date: 10/16/12

Memorandum

Date: October 2, 2012
To: File
From: Marcia Hilchey
Subject: Inorganic Data Review and Validation – SNL
Site: SWMU 8/58 GWM
AR/COC: 614288
SDG: 307912 and 307969
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

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

ICP-MS:

SDG 307912

The SD %D for Mg was > 10% and the parent sample result was > 50X MDL. The associated sample results were detects and will be **qualified J,D1**.

CVAA:

Hg was reported in the ICB and CCBs at negative values, with absolute value > MDL. The associated sample results were ND and will be **qualified UJ,B4**.

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

Holding Times and Preservation

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

ICP-MS Instrument Tune

All instrument tune requirements were met.

Calibration

All initial and continuing calibration met QC acceptance criteria.

Reporting Limit Verification

All CRA/CRI recoveries met QC acceptance criteria.

Blanks

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

ICP -MS Internal Standards

All internal standards met QC acceptance criteria.

Matrix Spike (MS)

All MS recoveries met QC acceptance criteria except as follows.

ICP-MS:

Both SDGs:

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

SDG 307969:

The MS %R for K was > UAL. However, an MS analysis is not required for this analyte. Therefore, no sample data will be qualified.

CVAA:

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

All replicates met QC acceptance criteria.

CVAA:

Both SDGs: 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 QC acceptance criteria were met.

Detection Limits/Dilutions

All detection limits were properly reported. Samples 307912-003 and -016 were diluted 5X for Na. Samples 307969-001 and -002 were diluted 10X for Na.

ICP Interference Check Sample (ICS A and AB)

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

ICP Serial Dilution

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

Other QC

Field duplicate pairs were submitted on the AR/COC(s). There are no “required” review criteria for field duplicate analyses comparability. No sample data will be qualified as a result.

No other specific issues that affect data quality were identified.

Reviewed by: Monica Dymerski **Level I** **Date:** 10/16/12

Memorandum

Date: October 3, 2012

To: File

From: Marcia Hilchey

Subject: Radiochemical Data Review and Validation – SNL
Site: SWMU 8/58 GWM
AR/COC: 614288
SDG: 307912
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

Two samples were prepared and analyzed with approved procedures using methods EPA 901.1 (gamma spec), EPA 900.0 (gross alpha/beta), and HASL300 (Iso-U). Problems were identified with the data package that resulted in the qualification of data.

All analyses:

1. All sample results that were either < the associated 2-sigma TPU or < the associated MDA will be **qualified BD, FR3**.
2. All sample results that were > but <3X the MDA will be **qualified J, FR7**.

Gamma Spec:

1. The K-40 result for sample 307912-011 was “X” flagged by the laboratory due to peak not meeting identification criteria. This result will be **qualified R,Z2**.
2. The replicate RER for K-40 was > 1 and < 3. The associated result for the parent sample was rejected (see above). The K-40 result for sample -024 will be **qualified J,RP1** due to lack of applicable measure of precision.

Data are acceptable except as noted above, 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

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 any of the blanks at concentrations > the MDA and 2-sigma TPU.

Tracer/Carrier Recovery

All tracer recoveries met QC acceptance criteria.

Matrix Spike (MS)

All MS recoveries met QC acceptance criteria.

Gross Alpha/Beta:

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

Laboratory Replicate

All replicate error ratios met QC acceptance criteria except as noted above in the Summary section and as follows.

Gamma Spec:

The duplicate RER for K-40 was > 1 and < 3. However, the parent sample (-011) result was rejected (see Summary section) and will not be further qualified due to the RER infraction.

Iso-U & Gross Alpha/Beta:

It should be noted that the Replicate analyses were performed on SNL samples of similar matrix from other SDGs. No sample data will be qualified as a result.

Laboratory Control Sample (LCS)

All LCS recoveries met QC acceptance criteria.

Detection Limits/Dilutions

All required detection limits were met. The samples were not diluted.

Other QC

Field duplicate pairs were submitted on the AR/COC(s). There are no “required” review criteria for field duplicate analyses comparability. No sample data will be qualified as a result.

No other specific issues that affect data quality were identified except as noted above in the Summary section.

Reviewed by: Monica Dymerski **Level I** **Date:** 10/16/12

Memorandum

Date: October 16, 2012

To: File

From: Marcia Hilchey

Subject: GC/MS Organic Data Review and Validation – SNL
Site: SWMU 8/58 GWM
AR/COC: 614288
SDG: 307912
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

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

- 1) The ICAL %RSD for benzo(ghi)perylene was $> 15\%$ and $< 40\%$, and the associated CCV was $> 20\%$ with negative bias. The associated sample results were ND and will be **qualified UJ,I3,C3**.
- 2) The CCV %D for 2,4-dinitrophenol was $> 40\%$ with negative bias. The associated sample results were ND and will be **qualified UJ,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 extracted and analyzed within the prescribed holding times and properly preserved.

Instrument Tune

All instrument tune requirements were met.

Calibration

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

The ICV and/or CCV %Ds for 4-nitrophenol and hexachlorocyclopentadiene were > 20% and < 40% with negative bias. All associated sample results were ND, with no other associated calibration infractions, 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 with the following exceptions. The LCS %Rs for 2,4-dinitrophenol, 4-nitrophenol, and hexachlorocyclopentadiene were < the LAL but $\geq 10\%$. However, this is within the allowable number of marginal LCS %R outliers for the number of reported analytes and, therefore, sample data 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 field duplicate pair was submitted on the AR/COC(s). There are no “required” review criteria for field duplicate analyses comparability. No sample data will be qualified as a result.

No other specific issues that affect data quality were identified.

Reviewed by: Monica Dymerski

Level I

Date: 10/16/12

Memorandum

Date: October 2, 2012
To: File
From: Marcia Hilchey
Subject: GC/MS Organic Data Review and Validation – SNL
Site: SWMU 8/58 GWM
AR/COC: 614288
SDG: 307912
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

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

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

Holding Times

The samples were analyzed within the prescribed holding 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.

CCV %Ds for vinyl acetate, acetone, 2-butanone, and 2-hexanone were > 20% with positive bias. A CCV %D for acetone was > 20% and < 40% with negative bias. All associated sample results were ND, with no other associated calibration infractions, and will not be qualified.

Blanks

No target analytes were detected in the blanks.

Surrogates

All surrogate recoveries met QC acceptance criteria.

Internal Standards

All internal standards met QC acceptance criteria.

Matrix Spike/Matrix Spike Duplicate (MS/MSD)

All MS/MSD acceptance criteria were met.

Laboratory Control Sample (LCS)

All LCS acceptance criteria were met.

Detection Limits/Dilutions

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

Tentatively Identified Compounds (TICs)

TIC reports were not required.

Other QC

One TB and one field duplicate pair were submitted on the AR/COC(s). There are no “required” review criteria for field duplicate analyses comparability. No sample data will be qualified as a result.

No other specific issues that affect data quality were identified.

Reviewed by: Monica Dymerski

Level I

Date: 10/16/12

Memorandum

Date: September 9, 2012

To: File

From: Ken Salaz

Subject: Inorganic Data Review and Validation – SNL
Site: SWMU 68 GWM
AR/COC: 614289
SDG: 307986
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 EPA9012A (total CN), EPA9056 (anions), EPA353.2 (nitrate/nitrite as nitrogen), EPA314.0 (perchlorate), EPA7196A (CrVI), and SM2320B (alkalinity). Data were reported for all required analytes. Problems were identified with the data package that result in the qualification of data.

Total CN:

1. The ICAL intercept was negative with an absolute value > the MDL but < 3X the MDL. Also, total CN was detected in the CCB at a negative concentration with an absolute value > the MDL but < the PQL. The associated sample results were all NDs and, therefore, will be **qualified UJ, I5, B4**.

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

Holding Times and Preservation

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

Calibration

The initial and continuing calibrations met QC acceptance criteria except as noted above in the Summary Section and the following.

Anions:

The ICAL intercepts for chloride and sulfate were > the MDL. However, the associated sample results were all >3X the intercept and, therefore, will not be qualified.

Perchlorate: The CCV %R was >110%. However, the associated sample result was ND and, therefore, will not be qualified.

Blanks

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

Laboratory Control Sample (LCS)

All LCS recoveries met QC acceptance criteria.

Matrix Spike (MS)

All MS recoveries met QC acceptance criteria.

Total CN, Perchlorate, & Nitrate/Nitrite:

It should be noted that the MS analyses were performed on SNL samples of similar matrix from other SDGs. No sample data will be qualified as a result.

Laboratory Replicate

The replicate analyses met all QC acceptance criteria.

Total CN, Perchlorate, & Nitrate/Nitrite:

It should be noted that the Replicate analyses were performed on SNL samples of similar matrix from other SDGs. No sample data will be qualified as a result.

Detection Limits/Dilutions

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

Anions & Nitrate/Nitrite as Nitrogen:

The sample was diluted 10X for chloride and sulfate and 5X for nitrate/nitrite as nitrogen due to over-range concentrations. All associated matrix QC samples were analyzed at relative dilution factors ≤5X those of the samples.

Other QC

No other specific issues that affect data quality were identified.

Reviewed by: Marcia Hilchey

Date: 09/10/12

Memorandum

Date: September 9, 2012
To: File
From: Ken Salaz
Subject: Organic Data Review and Validation – SNL
Site: SWMU 68 GWM
AR/COC: 614289
SDG: 307986
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

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 result in the qualification of data.

1. The ICAL RFs for p-nitrotoluene, o-nitrotoluene, and m-nitrotoluene were <0.05 but >0.01 . The associated sample results were all NDs and, therefore, 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

All instrument tune requirements were met.

Calibration

All initial and continuing calibrations 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 any of the blanks.

Surrogates

All surrogate recoveries met QC acceptance criteria.

Internal Standards

The internal standards met all QC acceptance criteria.

Matrix Spike/Matrix Spike Duplicate (MS/MSD)

The MS/MSD analyses met all QC acceptance criteria except for the following. The MS/MSD %Rs were > the laboratory QC acceptance limit for 1,3,5-trinitrobenzene. However, the associated sample result was an ND and, therefore, will not be qualified.

Laboratory Control Sample (LCS)

All LCS recoveries met QC acceptance criteria.

Detection Limits/Dilutions

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

Other QC

No other specific issues that affect data quality were identified.

Reviewed by: Marcia Hilchey

Date: 09/10/12

Memorandum

Date: September 9, 2012
To: File
From: Ken Salaz
Subject: Inorganic Data Review and Validation – SNL
Site: SWMU 68 GWM
AR/COC: 614289
SDG: 307986 & 307994
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

One sample was prepared and analyzed with approved procedures using methods EPA 6010B (ICP-AES), EPA6020 (ICP-MS), and EPA 7470A (CVAA mercury). Another fraction of the sample was prepared and analyzed with approved procedures using method EPA 6020A (ICP-MS). Data were reported for all required analytes. Problems were identified with the data package that results in the qualification of data.

CVAA:

1. The initial calibration curve intercept was negative with an absolute value > the MDL. The associated sample result was an ND and, therefore, will be **qualified UJ, I5**.
2. In the CCB, the Hg concentration was negative with an absolute value > the MDL but < the PQL. The associated sample result was ND < and, therefore, will be **qualified UJ, B4**.

ICP-MS SDG 307986:

1. The CRI %R for Cu was >130%. The associated sample result was a detect <5X the PQL and, therefore, will be **qualified J+, DL2**.
2. The serial dilution %D for U was >10%, and the parent sample result was >50X the MDL. The associated sample result was a detect and, therefore, will be **qualified J, D1**.

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

Holding Times and Preservation

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

ICP-MS Instrument Tune

The instrument tunes met all QC requirements.

Calibration

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

Reporting Limit Verification

The CRA/CRI recoveries 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 the following.

ICP-MS SDG 307986:

In the CCB, the U was detected at a concentration > the PQL, and it was detected in the MB at > the MDL but < the PQL. In the CCB, Sb was also detected at > the MDL but < the PQL. However, the associated sample results were a detect >5X the blank concentration and ND, respectively, and, therefore, will not be qualified.

ICP-MS SDG 307994:

In the CCB, the Na concentration was negative with an absolute value > the MDL but < the PQL. However, the associated sample result was >5X the MDL and, therefore, will not be qualified.

ICP -MS Internal Standards

All internal standards met QC acceptance criteria.

Matrix Spike (MS)

The MS recoveries met QC acceptance criteria except for the following.

ICP-MS SDG 307986:

The MS %R for K was >125%. However, K is not a required MS analyte. Therefore, no sample data will be qualified.

CVAA:

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

Laboratory Replicate

The replicate analyses met all QC acceptance criteria.

CVAA:

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

Laboratory Control Sample (LCS)

All LCS recoveries met QC acceptance criteria.

Detection Limits/Dilutions

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

ICP-MS SDG 307986:

The sample was diluted 5X for Ca and Na due to over-range concentrations. All associated matrix QC samples were analyzed at relative dilution factors $\leq 5X$ those of the samples.

ICP-MS SDG 307994:

The sample was diluted 5X for Ca due to an over-range concentration. All associated matrix QC samples were analyzed at relative dilution factors $\leq 5X$ those of the samples.

ICP Interference Check Sample (ICS A and AB)

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

ICP Serial Dilution

The serial dilution %Ds met QC acceptance criteria except as noted above in the Summary section.

Other QC

No other specific issues that affect data quality were identified.

Reviewed by: Marcia Hilchey

Date: 09/10/12

Memorandum

Date: September 9, 2012

To: File

From: Ken Salaz

Subject: Radiochemical Data Review and Validation – SNL
Site: SWMU 68 GWM
AR/COC: 614289
SDG: 3079865
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

One sample was prepared and analyzed with approved procedures using methods EPA 901.1 (gamma spec), EPA 900.0 (gross alpha/beta), and HASL300 (Iso-U). Problems were identified with the data package that result in the qualification of data.

Gamma Spec:

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

Iso-U:

1. The U-235/236 sample result was > but <3X the MDA and, therefore, 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 analyzed within the prescribed holding times and properly preserved.

Quantification

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 any of the blanks at concentrations > the MDA and 2-sigma TPU.

Tracer/Carrier Recovery

All tracer recoveries met QC acceptance criteria.

Matrix Spike (MS)

All MS recoveries met QC acceptance criteria.

Gross Alpha/Beta:

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

Laboratory Replicate

All replicate error ratios met QC acceptance criteria.

Gamma Spec & Gross Alpha/Beta:

It should be noted that the Replicate analyses were performed on SNL samples of similar matrix from other SDGs. No sample data will be qualified as a result.

Laboratory Control Sample (LCS)

All LCS recoveries met QC acceptance criteria.

Detection Limits/Dilutions

All required detection limits were met. The sample was not diluted.

Other QC

No other specific issues that affect data quality were identified except as noted above in the Summary section.

Reviewed by: Marcia Hilchey

Date: 09/10/12

Memorandum

Date: September 9, 2012

To: File

From: Ken Salaz

Subject: GC/MS Organic Data Review and Validation – SNL
Site: SWMU 68 GWM
AR/COC: 614289
SDG: 307986
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

One sample was prepared and analyzed with accepted procedures using method EPA 8270B (SVOCs). All compounds were successfully analyzed. Problems were identified with the data package that result in the qualification of data.

1. The ICV %D for 2,4-dinitrophenol was >20% but <40%, and the CCV %D was >40% but <60%, both with negative bias. The associated sample result was ND and, therefore, will be **qualified UJ, C3**.

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 prepared and analyzed within the prescribed holding time and properly preserved.

Instrument Tune

All instrument tune requirements were met.

Calibration

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

The CCV %Ds for hexachlorocyclopentadiene and 4-nitrophenol were >20% but <40% with negative bias. However, the associated sample results were NDs, and no other calibration infractions occurred for these analytes. Therefore, sample data will not be qualified.

Blanks

No target analytes were detected in the blanks.

Surrogates

All surrogate recoveries met QC acceptance criteria.

Internal Standards

The internal standards met all QC acceptance criteria.

Matrix Spike/Matrix Spike Duplicate (MS/MSD)

The MS/MSD analyses met QC acceptance criteria.

Laboratory Control Sample (LCS)

The LCS recoveries met QC acceptance criteria except for the following. The LCS %Rs for 2,4-dinitrophenol, 4-nitrophenol, and hexachlorocyclopentadiene were < the laboratory acceptance limit but $\geq 10\%$. However, this is within the allowable number of marginal LCS %R outliers for the number of reported analytes and, therefore, sample data 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: Marcia Hilchey

Date: 09/10/12

Memorandum

Date: September 9, 2012

To: File

From: Ken Salaz

Subject: GC/MS Organic Data Review and Validation – SNL
Site: SWMU 68 GWM
AR/COC: 614289
SDG: 307986
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

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 result 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

All initial and continuing calibration QC acceptance criteria were met with the following exceptions.

The initial calibration RSDs for bromodichloromethane and bromoform were >15% but <40%. Also, the CCV %D for 2-butanone was >20% but <40% with negative bias. However, the associated sample results were all NDs, and there were no other calibration outliers. Therefore, no sample results were qualified.

Blanks

No target analytes were detected in the blanks.

Surrogates

All surrogate recoveries met QC acceptance criteria.

Internal Standards

The internal standards met all 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. The samples were not diluted.

Tentatively Identified Compounds (TICs)

TIC reports were not required.

Other QC

One TB was submitted on the AR/COC.

No other specific issues that affect data quality were identified.

Reviewed by: Marcia Hilchey

Date: 09/10/12