

Sandia National Laboratories, New Mexico

## **Environmental Restoration Operations**

A U.S. Department of Energy Environmental Cleanup Program

### **Consolidated Quarterly Report**

January – March 2012



**July 2012**



United States Department of Energy  
Sandia Site Office

# CONSOLIDATED QUARTERLY REPORT

July 2012

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: January – March 2012**

### OVERVIEW

This Sandia National Laboratories, New Mexico (SNL/NM) 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 SNL/NM Resource Conservation and Recovery Act Permit, the Compliance Order on Consent, and the Chemical Waste Landfill Post-Closure Care Permit. The 36 potential release sites that require corrective action under the Permit and Compliance Order on Consent consist of 27 Solid Waste Management Units, including the Mixed Waste Landfill. The remaining potential release sites are nine Areas of Concern (AOCs), including eight 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, January – March 2012

SECTION II: Perchlorate Screening of Groundwater Quarterly Monitoring Report, January – March 2012

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

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

## ABBREVIATIONS AND ACRONYMS

µg/L	microgram(s) per liter
AOC	Area of Concern
AOP	Administrative Operating Procedure
BSG	Burn Site Groundwater
CAC	Corrective Action Complete
CAMU	Corrective Action Management Unit
CCBA	Coyote Canyon Blast Area
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
ET	evapotranspirative
FB	field blank
FOP	Field Operating Procedure
GEL	GEL Laboratories LLC
HE	high explosive(s)
HWHF	Hazardous Waste Handling Facility
LTES	Long-Term Environmental Stewardship
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
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
PQL	practical quantitation limit
QC	quality control
RCRA	Resource Conservation and Recovery Act
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
VOC	volatile organic compound

# SECTION I

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# **SECTION I**

## **ENVIRONMENTAL RESTORATION OPERATIONS CONSOLIDATED**

### **QUARTERLY REPORT, JANUARY – MARCH 2012**

#### **1.0 Introduction**

This Environmental Restoration Operations (ER) Consolidated Quarterly Report (subsequently referred to as the ER Quarterly Report) provides the status of ongoing corrective actions being implemented by Sandia National Laboratories, New Mexico (SNL/NM) ER for the January, February, and March 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**

On March 26, 2012, the revised MWL Long-Term Monitoring and Maintenance Plan (LTMMP; SNL/NM March 2012a) was submitted to the New Mexico Environment Department (NMED), as required by the NMED in its approval letter dated October 14, 2011, for the MWL Corrective Measures Implementation Report (SNL/NM January 2010 and Kieling October 2011). During draft preparation of the plans, the NMED, SNL/NM, and Sandia Site Office finalized the discussion of LTMMP issues in January 2012, including final trigger levels, the evaluation process, monitoring parameters and frequencies, and scope of the Five-Year Reevaluation Report.

Initial soil characterization field sampling was completed at the MWL Borrow Pit in Technical Area (TA)-III to support closure of the National Pollution Discharge Elimination System Construction Permit. A closure plan is being developed to define the scope of work required to adequately stabilize the site and close the permit.

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**

No supplemental watering activities were performed for the MWL Evapotranspirative (ET) Cover during this reporting period. Future watering activities will be planned as needed to supplement natural precipitation and establish a healthy, self-sustaining native plant population.

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

### 2.1.2 **MWL Evapotranspirative Cover Maintenance Activities**

No cover maintenance activities were performed during this reporting period at the MWL. A comprehensive summary report of all cover maintenance activities is presented in the revised MWL LTMMP (SNL/NM March 2012a).

On March 29, 2012, informal approval was received from the NMED for small-scale herbicide testing at the MWL. Testing will involve pre-emergent and post-emergent herbicide application on small (less than 200-square-foot) test plots to determine its effectiveness in controlling Russian thistle and other common invasive annual weed species. The pre-emergent and post-emergent herbicides will be applied during the next reporting period.

## 2.2 **Project Management and Site Closure**

ER sites currently undergoing regulatory and administrative closure activities are addressed in this section. The two permit modification requests in progress with the NMED at this time are summarized in Sections I.2.2.1 and I.2.2.2. In April 2010, the U.S. Department of Energy (DOE) and Sandia Corporation (Sandia), hereafter referred to as DOE/Sandia, received formal written communication from the NMED regarding its decisions on these sites (NMED April 2010). The decisions, presented in the NMED letter dated April 8, 2010, are summarized in Section I.2.2.3.

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

Twenty-six sites were submitted to the NMED for the final determination of Corrective Action Complete (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 sites were submitted for the final regulatory 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 MWL is addressed in Sections I.2.1 and I.2.3.4 of this ER Quarterly Report. The groundwater investigation sites are addressed in Sections I.2.3.1, I.2.3.2, and I.2.3.3, respectively, of this ER Quarterly Report. 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,” and (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 SWMU 68 (Old Burn Site), SWMU 149 (Building 9930 Septic System), SWMU 154 (Building 9960 Septic System and Seepage Pits), and SWMUs 8/58 (Open Dump [Coyote Canyon Blast Area]/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 SWMUs 49 and 116. Groundwater monitoring results are summarized in Sections I.2.3.8 and I.2.3.9 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 (Coyote Test Field [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)
- SWMU 52, The Liquid Waste Disposal System (LWDS), was addressed in the April 2010 NMED letter as a request for additional information to aid the NMED in determining the status of SWMU 52 (Brandwein December 2009a and 2009b). 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 LWDS site (SNL/NM December 2011).

### 2.3 **Site-Wide Hydrogeologic Characterization**

The following sections present site-wide hydrogeologic characterization 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 groundwater monitoring controls as discussed in Section I.2.2.3 of this ER Quarterly Report.

Analytical results for groundwater monitoring at TA-V, BSG, TAG, the MWL, the CWL, and the seven SWMUs will be discussed in the SNL/NM Calendar Year (CY) 2012 Annual Groundwater Monitoring Report (anticipated submittal to the NMED in summer 2013).

Perchlorate analysis and results for groundwater samples collected from the seven SWMUs are 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 January 2012 groundwater sampling event conducted at SWMUs 8/58 and 68 are presented in Section IV of this ER Quarterly Report.

Analytical results for the March 2012 groundwater sampling event conducted at SWMUs 149 and 154 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 February and March 2012.

#### 2.3.2 **Burn Site Groundwater**

The groundwater monitoring well installation report for the BSG groundwater monitoring wells CYN-MW9, CYN-MW10, CYN-MW11, and CYN-MW12 and collection of subsurface soil samples at Boreholes BSG-BH001 through BSG-BH010 was submitted to the NMED in January 2012 (SNL/NM January 2012).

The groundwater monitoring well Plug and Abandonment Plan and Well Construction Plan for the BSG groundwater monitoring wells 12AUP01, CYN-MW1D, CYN-MW2S, and CYN-MW13 was submitted to the NMED in February 2012 (SNL/NM February 2012).

Groundwater sampling for the BSG investigation was conducted in January 2012.

#### 2.3.3 **Tijeras Arroyo Groundwater**

Groundwater sampling for the TAG investigation was conducted in March 2012.

#### 2.3.4 **Mixed Waste Landfill Groundwater**

Annual MWL groundwater monitoring activities were performed in February and March 2012.

#### 2.3.5 **Chemical Waste Landfill Groundwater**

Semiannual CWL groundwater monitoring activities were performed in January 2012.

#### 2.3.6 **SWMUs 8/58 Groundwater**

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

### 2.3.7 **SWMU 68 Groundwater**

Groundwater sampling for SWMU 68 was conducted in January 2012.

### 2.3.8 **SWMU 49 Groundwater**

Groundwater sampling for SWMU 49 was conducted in January 2012.

### 2.3.9 **SWMU 116 Groundwater**

Groundwater sampling for SWMU 116 was conducted in February 2012.

### 2.3.10 **SWMU 149 Groundwater**

Groundwater sampling for SWMU 149 was conducted in March 2012.

### 2.3.11 **SWMU 154 Groundwater**

Groundwater sampling for SWMU 154 was conducted in March 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).
- SWMUs 8/58 and 68 Groundwater Monitoring Well Installation Report submitted to the NMED on November 29, 2011 (SNL/NM November 2011).
- MWL Groundwater Monitoring Report for CY 2010 submitted to the NMED on September 30, 2011 (SNL/NM September 2011).
- Summary Report for BSG Characterization Field Program: Installation of Groundwater Monitoring Wells and Collection of Subsurface Soil Samples submitted to the NMED on January 30, 2012 (SNL/NM January 2012).
- Monitoring Well Plug and Abandonment Plan and Well Construction Plan for the BSG study area submitted to the NMED on February 3, 2012 (SNL/NM February 2012).
- MWL LTMMMP submitted to the NMED on March 26, 2012 (SNL/NM March 2012a).

### 3.0 **Environmental Restoration Operations/Long-Term Stewardship Work Completed**

#### 3.1 **Chemical Waste Landfill**

The CWL Post-Closure Care Permit (PCCP) (NMED October 2009) became effective on June 2, 2011, when the NMED approved the CWL Final RCRA Closure Report (Kieling June 2011), transitioning the CWL from SNL/NM ER to LTS. A summary of post-closure care activities at the CWL for this reporting period is provided as follows in this section of the 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).

- On February 20, 2012, the NMED approved the “Request for Modifications to Hazardous Waste Post-Closure Care Permit for Sandia National Laboratories,” submitted by DOE/Sandia in November 2011 (Wagner November 2011). The 37 operational and informational changes affect Attachments 1 through 6 of the CWL permit and were approved as Class 1 modifications (Kieling February 2012).

- The CWL Annual Post-Closure Care Report for CY 2011 was submitted to the NMED on March 26, 2012 (SNL/NM March 2012b).
- Quarterly inspections of the CWL ET cover surface, storm-water diversion structures, and security fence were performed in March 2012. Following the inspection, no maintenance or repairs were required.
- The first semiannual groundwater monitoring and annual soil-gas monitoring events for CY 2012 were performed in January 2012. All wells were inspected and no maintenance or repairs were required.
- In January 2012, the sampling port, at a depth of 440 feet below ground surface, in soil-gas well CWL-D2 was clogged and did not yield a sample. After discussions with the NMED on March 5, 2012, an approach to open the sampling port using pressurized nitrogen was agreed upon and implemented on March 22, 2012. The CY 2012 environmental sample for this port was collected on March 29, 2012.
- Installation of passive soil-gas venting devices (i.e., Baroballs™) on all groundwater and soil-gas monitoring wells was discussed with the NMED and completed in March 2012.
- Cover maintenance was performed on the CWL ET cover in February to remove four-wing saltbush, Russian thistle, and other undesirable weedy species. The plants were pulled by hand and clipped at the ground surface using hand pruners, followed by light raking. Vegetation caught in the perimeter fence was also removed. A total of five pickup truckloads (approximately 15 cubic yards of plant material) 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 (January through March 2012) include the following:

- Follow-up activities to the December 2011 quarterly inspection are as follows:
  - On January 19, 2012, six four-wing saltbush plants were removed.
  - On January 23, 2012, a missing warning sign on the north perimeter fence was replaced.

- Quarterly monitoring of the Vadose Zone Monitoring System was conducted in March 2012. The results will be presented in the 2012 CAMU Vadose Zone Monitoring System Annual Monitoring Results Report (anticipated submittal to the NMED in September 2012).
- Composite leachate sampling for waste characterization was conducted on January 4 and March 14, 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 of this ER Quarterly Report.
- Weekly inspections of the RCRA less-than-90-day accumulation area were conducted.
- Quarterly inspection of the site was performed on March 12 and March 29, 2012, which included the containment cell cover, storm-water diversion structures, security fences, gates, signs, and benchmarks. The inspection findings are as follows:

- Eight four-wing saltbush plants were identified growing on the containment cell vegetative cover (Figure I-1). Because these plants can develop extensive root systems that could damage the high-density polyethylene fabric that is part of the cover system, they were removed when they were identified.
- Plastic protective caps for rebar stakes marking the four benchmarks were noted as deteriorating and were replaced on March 22, 2012.



**Figure I-1**  
**Current State of Corrective Action**  
**Management Unit Vegetative Cover**

### 3.2.1 CAMU Waste Management Activities

Waste management data for the CAMU are reported in this section for the reporting period of January through March 2012. Estimated 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 January 1, 2012:
  - 74 gallons of leachate
  
- Leachate and rinsate waste generated on site during the reporting period:
  - 126 gallons of leachate
  - 5 gallons of rinsate
  
- Leachate and rinsate waste removed from the site by Hazardous Waste Handling Facility (HWHF) personnel on January 16, 2012:
  - 91 gallons of leachate
  - 2 gallons of rinsate
  
- Leachate and rinsate waste removed from the site by HWHF personnel on March 19, 2012:
  - 92 gallons of leachate
  - 3 gallons of rinsate
  
- Leachate and rinsate waste remaining on site at the end of this reporting period:
  - 17 gallons of leachate
  - 0 gallons of rinsate

### 3.2.2 **CAMU Regulatory Activities**

No regulatory activities occurred during this quarter.

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

One LTS document that has been submitted to the NMED is, as of this reporting period, still pending review and approval. The “Chemical Waste Landfill Annual Post-Closure Care Report – Calendar Year 2011” was submitted to the NMED on March 26, 2012 (SNL/NM March 2012b).

### 4.0 **References**

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

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

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

Kieling, J.E. (New Mexico Environment Department), October 2011. Letter to P. Wagner (U.S. Department of Energy NNSA/Sandia Site Office) and S.A. Orrell (Sandia National Laboratories/New Mexico), "Notice of Approval, Mixed Waste Landfill Corrective Measures Implementation Report, January 2010, Sandia National Laboratories, EPA ID# NM5890110518 HWB-SNL-10-005," October 14, 2011.

Kieling, J.E. (New Mexico Environment Department), February 2012. Letter to R. Sena (U.S. Department of Energy NNSA/Sandia Site Office) and M.W. Hazen (Sandia National Laboratories/New Mexico), "Approval, Class 1 Modification to Chemical Waste Landfill Post-Closure Care Permit for Sandia National Laboratories, November 2011, Sandia National Laboratories, EPA ID #NM5890110518 HWB-SNL-11-015," February 20, 2012.

New Mexico Environment Department (NMED), December 2007. "Notice of Public Comment Period and Intent to Approve a Class 3 Permit Modification of the RCRA Permit for Sandia National Laboratories," Hazardous Waste Bureau, New Mexico Environment Department, Santa Fe, New Mexico.

New Mexico Environment Department (NMED), October 2009. "Resource Conservation and Recovery Act, Post Closure Care Permit, EPA ID No. NM5890110518, to the U.S. Department of Energy/Sandia Corporation, for the Sandia National Laboratories Chemical Waste Landfill," New Mexico Environment Department Hazardous Waste Bureau, Santa Fe, New Mexico, October 15, 2009.

New Mexico Environment Department (NMED), April 2010. Letter to K. Davis (U.S. Department of Energy NNSA/Sandia Site Office) and M. Walck (Sandia National Laboratories, New Mexico). "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," Hazardous Waste Bureau, New Mexico Environment Department, Santa Fe, New Mexico, April 8, 2010.

NMED, see New Mexico Environment Department.

Sandia National Laboratories, New Mexico (SNL/NM), April 2004. "Corrective Measures Evaluation Work Plan, Technical Area V Groundwater," Sandia National Laboratories, Albuquerque, New Mexico.

Sandia National Laboratories, New Mexico (SNL/NM), May 2005. "Burn Site Groundwater Interim Measures Work Plan," Sandia National Laboratories, Albuquerque, New Mexico.

Sandia National Laboratories, New Mexico (SNL/NM), August 2005. "Corrective Measures Evaluation Report for Tijeras Arroyo Groundwater," Sandia National Laboratories, Albuquerque, New Mexico.

Sandia National Laboratories, New Mexico (SNL/NM), March 2008. "Current Conceptual Model of Groundwater Flow and Contaminant Transport at Sandia National Laboratories/New Mexico Burn Site," Sandia National Laboratories, Albuquerque, New Mexico.

Sandia National Laboratories, New Mexico (SNL/NM), January 2010, Revision 1. "Mixed Waste Landfill Corrective Measures Implementation Report," Sandia National Laboratories, Albuquerque, New Mexico.

Sandia National Laboratories, New Mexico (SNL/NM), November 2010. "Technical Area V Geophysical Logs and Slug Test Results," Sandia National Laboratories, Albuquerque, New Mexico.

Sandia National Laboratories, New Mexico (SNL/NM), June 2011. "Summary Report for TA-V Groundwater and Soil-Vapor Monitoring Well Installation," Sandia National Laboratories, Albuquerque, New Mexico.

Sandia National Laboratories, New Mexico (SNL/NM), September 2011. "Mixed Waste Landfill Groundwater Monitoring Report, Calendar Year 2010," Sandia National Laboratories, Albuquerque, New Mexico.

Sandia National Laboratories, New Mexico (SNL/NM), November 2011. "Groundwater Monitoring Well Installation Report for SWMU 8 (Open Dump, Coyote Canyon Blast Area)/SWMU 58 (Coyote Canyon Blast Area) and SWMU 68 (Old Burn Site); Installation of SWMU 8/58 Groundwater Monitoring Wells CCBA-MW1 and CCBA-MW2, and Installation of SWMU 68 Groundwater Monitoring Wells OBS-MW1, OBS-MW2, and OBS-MW3," Sandia National Laboratories, Albuquerque, New Mexico.

Sandia National Laboratories, New Mexico (SNL/NM), December 2011, "LWDS information and proposal submitted to the NMED," Sandia National Laboratories, Albuquerque, New Mexico, December 13, 2011.

Sandia National Laboratories, New Mexico (SNL/NM), January 2012. "Summary Report for Burn Site Groundwater Characterization Field Program: Installation of GWM Wells CYN-MW9, CYN-MW10, CYN-MW11, and CYN-MW12; Collection of Subsurface Soil Samples at Boreholes BSG-BH001 through BSG-BH010," Sandia National Laboratories, Albuquerque, New Mexico.

Sandia National Laboratories, New Mexico (SNL/NM), February 2012. “Monitoring Well Plug and Abandonment Plan and Well Construction Plan: Decommissioning of Groundwater Monitoring Wells 12AUP01, CYN-MW1D, and CYN-MW2S; Installation of Groundwater Monitoring Well CYN-MW13,” Sandia National Laboratories, Albuquerque, New Mexico.

Sandia National Laboratories, New Mexico (SNL/NM), March 2012a. “Mixed Waste Landfill Long-Term Monitoring and Maintenance Plan,” Sandia National Laboratories, Albuquerque, New Mexico.

Sandia National Laboratories, New Mexico (SNL/NM), March 2012b. “Chemical Waste Landfill Annual Post-Closure Care Report – Calendar Year 2011.” Sandia National Laboratories, Albuquerque, New Mexico.

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

Wagner, P. (U.S. Department of Energy NNSA/Sandia Site Office), March 2006. Letter to J.P. Bearzi (New Mexico Environment Department) initiating a Class 3 Modification for the Designation of Twenty-Six (26) Solid Waste Management Units (SWMUs) and Areas of Concern (AOCs) as “approved for No Further Action.”

Wagner, P. (U.S. Department of Energy NNSA/Sandia Site Office), January 2008. Letter to J.P. Bearzi (New Mexico Environment Department) initiating a Class 3 Modification for the Designation of Four (4) Solid Waste Management Units (SWMUs) and One (1) Area of Concern (AOC) as “approved for No Further Action.”

Wagner, P. (U.S. Department of Energy NNSA/Sandia Site Office), November 2011. Letter to J.E. Kieling (New Mexico Environment Department): “Request for Modification to Hazardous Waste Post-Closure Care Permit for Sandia National Laboratories/New Mexico, EPA ID NM5890110518.”

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## **SECTION II**

### **PERCHLORATE SCREENING OF GROUNDWATER QUARTERLY MONITORING REPORT, JANUARY–MARCH 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 Environmental Restoration Operations Consolidated Quarterly Report summarizes the perchlorate screening groundwater monitoring completed during the First Quarter of Calendar Year (CY) 2012 (January, February, and March) in response to the requirements of the Order. The outline of this report is based on the required elements of a “Periodic Monitoring Report” described in Section X.D. of the Order (NMED April 2004).

In November 2005, DOE/Sandia submitted a letter report on the status of perchlorate screening in groundwater at SNL/NM monitoring wells (SNL/NM November 2005). The purpose of the letter report was to summarize previous correspondence and sampling results and to outline proposed future work to comply with NMED requirements for perchlorate screening in 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 Consolidated 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-fifth to be submitted since the November 2005 letter report; the previous reports were submitted for Fourth Quarter of CY 2005 through the Fourth Quarter of CY 2011 (SNL/NM February 2006, June 2006, September 2006, December 2006, March 2007, June 2007, September 2007, December 2007, March 2008, June 2008, September 2008, December 2008, June 2009, September 2009, December 2009, March 2010, June 2010a, September 2010a, December 2010, March 2011, June 2011, October 2011, January 2012a, and April 2012).

Groundwater at BSG monitoring well CYN-MW5 has been sampled six times; Coyote Test Field (CTF) well CTF-MW1 has been sampled twice and wells CTF-MW2 and CTF-MW3 have been sampled five times; Solid Waste Management Unit (SWMU) 8/58 wells CCBA-MW1 and CCBA-MW2 have been sampled two times; and SWMU 68 wells OBS-MW1, OBS-MW2, and OBS-MW3 have been sampled two times. (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 of groundwater analytical results for the First Quarter of CY 2012 (January, February, and March) for the wells currently active in the perchlorate-screening program as shown on Figure II-1 and listed in Table II-1. In accordance with the requirements of Table XI-1 of the Order, a well with four consecutive quarters of nondetects (NDs) for perchlorate at the screening level/method detection limit (MDL) of 4 micrograms per liter ( $\mu\text{g/L}$ ) is removed from the requirement of continued monitoring for perchlorate.

Data for numerous wells identified in the Order have satisfied this requirement; therefore, these wells have been removed from the perchlorate-screening program. The perchlorate results for these wells have been provided in previous reports and are not discussed in this current report. Wells discussed in previous perchlorate-screening reports include the following: CYN-MW1D, CYN-MW5 (recently reinstated, as discussed in Section II.3.0), 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, NWT A3-MW2, SWTA3-MW4, TA1-W-03, TA1-W-06, TA1-W-08, TA2-W-01, TA2-W-27, TAV-MW11, TAV-MW12, TAV-MW13, and TAV-MW14.

SNL/NM personnel performed groundwater sampling for perchlorate at nine wells on the dates listed in Table II-1. Several of the wells were installed after the Order was finalized and were therefore required to be sampled for perchlorate as “new” wells; the other wells were sampled to meet other regulatory requirements (discussed in Section II.3.0). Groundwater sampling activities were conducted in accordance with procedures outlined in the following investigation-specific sampling and analysis plans (SAPs) entitled:

- “SWMUs 8/58 Groundwater Monitoring, Mini-SAP for Second Quarter, Fiscal Year 2012” (SNL/NM December 2011a)
- “SWMU 68 Groundwater Monitoring, Mini-SAP for Second Quarter, Fiscal Year 2012” (SNL/NM December 2011b)
- “SWMU 149 Groundwater Monitoring, Mini-SAP for Second Quarter, Fiscal Year 2012” (SNL/NM February 2012a).
- “SWMU 154 Groundwater Monitoring, Mini-SAP for Second Quarter, Fiscal Year 2012” (SNL/NM February 2012b).
- “SWMU 49 and 116 Groundwater Monitoring, Mini-SAP for Fiscal Year 2012 Annual Sampling” (SNL/NM January 2012b).

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

Field water quality measurements for turbidity, pH, temperature, specific conductance (SC), oxidation-reduction potential (ORP), and dissolved oxygen (DO) were obtained from the well prior to collecting groundwater samples. Groundwater temperature, SC, ORP, DO, and pH were measured with a YSI™ Model 6920 water quality meter. Turbidity was measured with a HACH™ Model 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 less than 5 nephelometric turbidity units (NTU) or within 10% for turbidity values greater than 5 NTU.
- pH is within 0.1 units
- Temperature is within 1.0 degree Celsius
- SC is within 5%.

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 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-2. The analytical report from GEL, including certificates of analyses (COA) (Appendix A), analytical methods, MDLs, practical quantitation limits, dates of analyses, results of quality control (QC) analyses, and data validation findings (Appendix B), has 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 or 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/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 2010b) 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 2010b) that was subsequently approved (with modification) by the NMED (January 2011).

#### 4.0 **Monitoring Results**

Table II-3 summarizes current and historical perchlorate results for wells currently in the perchlorate-screening monitoring network. The analytical laboratory COA for the First Quarter of CY 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-MW1, CTF-MW2, CTF-MW3, CYN-MW5, OBS-MW1, OBS-MW2, or OBS-MW3.

Table II-4 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 field activities or field conditions from requirements in the groundwater monitoring Mini-SAPs (SNL/NM December 2011a, December 2011b, January 2012b, February 2012a, and February 2012b) were identified during the First Quarter of CY 2012 sampling activities.

## 5.0 Summary and Conclusions

Based on the analytical data presented in Table II-3 and in previous reports, the following statements can be made:

- No perchlorate was detected in the environmental samples from groundwater monitoring wells CCBA-MW1, CCBA-MW2, CTF-MW1, CTF-MW2, CTF-MW3, CYN-MW5, OBS-MW1, OBS-MW2, or OBS-MW3 at the screening level/MDL of 4 µg/L.
- Since June 2004 (the start of sampling as required by the Order), perchlorate was detected above the screening level/MDL (4 µg/L) in groundwater samples from only one of the wells (CYN-MW6) in the perchlorate-screening monitoring well network. This monitoring well is sampled semiannually and was not scheduled for sampling during the First Quarter of CY 2012.

DOE/Sandia will continue annual monitoring for perchlorate in CTF-MW1 and CYN-MW5, semiannual monitoring in CYN-MW6, and quarterly monitoring in wells CCBA-MW1, CCBA-MW2, CTF-MW2, CTF-MW3, OBS-MW1, OBS-MW2, and OBS-MW3.

## 6.0 References

EPA, see U.S. Environmental Protection Agency.

New Mexico Environment Department (NMED), April 2004. "Compliance Order on Consent Pursuant to the New Mexico Hazardous Waste Act 74-4-10: Sandia National Laboratories Consent Order," New Mexico Environment Department. April 24, 2004.

New Mexico Environment Department (NMED), January 2006. "RE: Monitoring Groundwater for Perchlorate, Report of November 22, 2005. Sandia National Laboratories EPA ID# NM5890110518." Letter to P. Wagner (SSO/NNSA) and P. Davies (SNL/NM) from J. Bearzi (NMED/HWB), January 27, 2006.

New Mexico Environment Department (NMED), November 2008. "RE: Perchlorate Issues." E-mail correspondence to J. Cochran (Sandia National Laboratories, New Mexico) from S. Brandwein (NMED), November 7, 2008.

New Mexico Environment Department (NMED), April 2009. "RE: Perchlorate Contamination in Groundwater, Sandia National Laboratories, EPA ID# NM5890110518." Letter to K. Davis (SSO/NNSA) and F. Nimick (SNL/NM) from J. Bearzi (NMED/HWB), April 30, 2009.

New Mexico Environment Department (NMED), February 2010. "RE: Notice of Conditional Approval, Burn Site Groundwater Characterization Work Plan, November 2009, Sandia National Laboratories, EPA ID# NM5890110518, SNL-09-017." Letter to P. Wagner (SSO/NNSA) and M. Walck (SNL/NM) from J. Bearzi (NMED/HWB), February 12, 2010.

New Mexico Environment Department (NMED), April 2010. "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," April 8, 2010.

New Mexico Environment Department (NMED), December 2010. "Approval with Modifications, Response to April 8, 2010 Letter, Groundwater Monitoring Plan for SWMUs 149 and 154," December 21, 2010.

New Mexico Environment Department (NMED), January 2011. "Notice of Approval with Modification: Groundwater Monitoring Well Installation Work Plans for SWMUs 8/58 and 68, September 2010," January 28, 2011.

New Mexico Environment Department (NMED), September 2011. "RE: Request to Modify Schedule for Reporting of Activities and Groundwater Data in Consolidated Quarterly Reports for Environmental Restoration Operations, Sandia National Laboratories, EPA ID# NM5890110518," September 15, 2011.

NMED, see New Mexico Environment Department.

Sandia National Laboratories, New Mexico (SNL/NM), November 2005. Letter Report to J. Bearzi (New Mexico Environment Department), "Letter Report on the Status of Perchlorate Screening in Groundwater at Sandia Monitoring Wells," Environmental Restoration Project, Sandia National Laboratories, New Mexico, November 22, 2005.

Sandia National Laboratories, New Mexico (SNL/NM), February 2006. "Perchlorate Screening Quarterly Monitoring Report, Fourth Quarter of Calendar Year 2005 (October, November, and December 2005)," Environmental Restoration Project, Sandia National Laboratories, New Mexico.

Sandia National Laboratories, New Mexico (SNL/NM), June 2006. "Perchlorate Screening Quarterly Monitoring Report, First Quarter of Calendar Year 2006 (January, February, and March 2006)," Environmental Restoration Project, Sandia National Laboratories, New Mexico.

Sandia National Laboratories, New Mexico (SNL/NM), September 2006. "Perchlorate Screening Quarterly Monitoring Report, Second Quarter of Calendar Year 2006 (April, May, and June 2006)," Environmental Restoration Project, Sandia National Laboratories, New Mexico.

Sandia National Laboratories, New Mexico (SNL/NM), December 2006. "Consolidated Quarterly Report, Section III: Perchlorate Screening Quarterly Monitoring Report, Third Quarter of Calendar Year 2006 (July, August, and September 2006)," Environmental Restoration Project, Sandia National Laboratories, New Mexico.

Sandia National Laboratories, New Mexico (SNL/NM), March 2007. "Consolidated Quarterly Report, Section III: Perchlorate Screening Quarterly Monitoring Report, Fourth Quarter of Calendar Year 2006 (October, November, and December 2006)," Environmental Restoration Project, Sandia National Laboratories, New Mexico.

Sandia National Laboratories, New Mexico (SNL/NM), June 2007. "Consolidated Quarterly Report, Section III: Perchlorate Screening Quarterly Monitoring Report, First Quarter of Calendar Year 2007 (January, February, and March 2007)," Environmental Restoration Project, Sandia National Laboratories, New Mexico.

Sandia National Laboratories, New Mexico (SNL/NM), September 2007. "Consolidated Quarterly Report, Section III: Perchlorate Screening Quarterly Monitoring Report, Second Quarter of Calendar Year 2007 (April, May, and June 2007)," Environmental Restoration Project, Sandia National Laboratories, New Mexico.

Sandia National Laboratories, New Mexico (SNL/NM), December 2007. "Consolidated Quarterly Report, Section III: Perchlorate Screening Quarterly Monitoring Report, Third Quarter of Calendar Year 2007 (July, August, and September 2007)," Environmental Restoration Project, Sandia National Laboratories, New Mexico.

Sandia National Laboratories, New Mexico (SNL/NM), March 2008. "Consolidated Quarterly Report, Section III: Perchlorate Screening Quarterly Monitoring Report, Fourth Quarter of Calendar Year 2007 (October, November, and December 2007)," Environmental Restoration Project, Sandia National Laboratories, New Mexico.

Sandia National Laboratories, New Mexico (SNL/NM), June 2008. "Consolidated Quarterly Report, Section III: Perchlorate Screening Quarterly Monitoring Report, First Quarter of Calendar Year 2008 (January, February, and March 2008)," Environmental Restoration Project, Sandia National Laboratories, New Mexico.

Sandia National Laboratories, New Mexico (SNL/NM), September 2008. "Consolidated Quarterly Report, Section III: Perchlorate Screening Quarterly Monitoring Report, Second Quarter of Calendar Year 2008 (April, May, and June 2008)," Environmental Restoration Project, Sandia National Laboratories, New Mexico.

Sandia National Laboratories, New Mexico (SNL/NM), December 2008. "Consolidated Quarterly Report, Section III: Perchlorate Screening Quarterly Monitoring Report, Third Quarter of Calendar Year 2008 (July, August, and September 2008)," Environmental Restoration Project, Sandia National Laboratories, New Mexico.

Sandia National Laboratories, New Mexico (SNL/NM), June 2009. "Consolidated Quarterly Report, Section III: Perchlorate Screening Quarterly Monitoring Report, Fourth Quarter of Calendar Year 2008 and First Quarter of Calendar Year 2009 (October 2008 through March 2009)," Environmental Restoration Project, Sandia National Laboratories, New Mexico.

Sandia National Laboratories, New Mexico (SNL/NM), September 2009. "Consolidated Quarterly Report, Section III: Perchlorate Screening Quarterly Monitoring Report, Second Quarter of Calendar Year 2009 (April 2009 through June 2009)," Environmental Restoration Project, Sandia National Laboratories, New Mexico.

Sandia National Laboratories, New Mexico (SNL/NM), November 2009. "Burn Site Groundwater Characterization Work Plan: Installation of Groundwater Monitoring Wells CYN-MW9, CYN-MW10, CYN-MW11 and Collection of Subsurface Soil Samples, November 2009," Environmental Restoration Operations, Sandia National Laboratories, New Mexico.

Sandia National Laboratories, New Mexico (SNL/NM), December 2009. "Consolidated Quarterly Report, Section III: Perchlorate Screening Quarterly Monitoring Report, Third Quarter of Calendar Year 2009 (July through September 2009)," Environmental Restoration Operations, Sandia National Laboratories, New Mexico.

Sandia National Laboratories, New Mexico (SNL/NM), March 2010. "Consolidated Quarterly Report, Section III: Perchlorate Screening Quarterly Monitoring Report, Fourth Quarter of Calendar Year 2009 (October, November, and December 2009)," Environmental Restoration Operations, Sandia National Laboratories, New Mexico.

Sandia National Laboratories, New Mexico (SNL/NM), June 2010a. "Consolidated Quarterly Report, Section III: Perchlorate Screening Quarterly Monitoring Report, First Quarter of Calendar Year 2010 (January, February, and March 2010)," Environmental Restoration Operations, Sandia National Laboratories, New Mexico.

Sandia National Laboratories, New Mexico (SNL/NM), June 2010b. "U.S. Department of Energy/Sandia Corporation Response to the New Mexico Environment Department 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*," Sandia National Laboratories, New Mexico.

Sandia National Laboratories, New Mexico (SNL/NM), September 2010a. "Consolidated Quarterly Report, Section III: Perchlorate Screening Quarterly Monitoring Report, Second Quarter of Calendar Year 2010 (April, May, and June 2010)," Environmental Restoration Operations, Sandia National Laboratories, New Mexico.

Sandia National Laboratories, New Mexico (SNL/NM), September 2010b. "SWMU 68 and SWMUs 8/58 Groundwater Characterization Work Plans – U.S. Department of Energy/Sandia Corporation Response to the New Mexico Environment Department 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*," Sandia National Laboratories, New Mexico.

Sandia National Laboratories, New Mexico (SNL/NM), December 2010. "Consolidated Quarterly Report, August through October 2010, Section III: Perchlorate Screening Quarterly Monitoring Report, Third Quarter Calendar Year 2010 (July, August, and September 2010)," Environmental Restoration Operations, Sandia National Laboratories, New Mexico.

Sandia National Laboratories, New Mexico (SNL/NM), March 2011. "Consolidated Quarterly Report, November 2010 through January 2011, Section III: Perchlorate Screening Quarterly Monitoring Report, October through December," Environmental Restoration Operations, Sandia National Laboratories, New Mexico.

Sandia National Laboratories, New Mexico (SNL/NM), May 2011. "Data Validation Procedure for Chemical and Radiochemical Data," Administrative Operating Procedure 00-03, Revision 3, Sample Management Office, Sandia National Laboratories, New Mexico.

Sandia National Laboratories, New Mexico (SNL/NM), June 2011. "Consolidated Quarterly Report, February through April 2011, Section III: Perchlorate Screening Quarterly Monitoring Report, January through March 2011," Environmental Restoration Operations, Sandia National Laboratories, New Mexico.

Sandia National Laboratories, New Mexico (SNL/NM), September 2011. "Request to Modify Schedule for Reporting of Activities and Groundwater Data in Future Consolidated Quarterly Reports for Environmental Restoration Operations," Environmental Restoration Operations, Sandia National Laboratories, New Mexico.

Sandia National Laboratories, New Mexico (SNL/NM), October 2011. "Consolidated Quarterly Report, April through June 2011, Section III: Perchlorate Screening Quarterly Monitoring Report," Environmental Restoration Operations, Sandia National Laboratories, New Mexico.

Sandia National Laboratories, New Mexico (SNL/NM), December 2011a. "SWMUs 8/58 Groundwater Monitoring, Mini-SAP for Second Quarter, Fiscal Year 2012," Environmental Restoration Operations, Sandia National Laboratories, New Mexico.

Sandia National Laboratories, New Mexico (SNL/NM), December 2011b. "SWMU 68 Groundwater Monitoring, Mini-SAP for Second Quarter, Fiscal Year 2012," Environmental Restoration Operations, Sandia National Laboratories, New Mexico.

Sandia National Laboratories, New Mexico (SNL/NM), January 2012a. "Consolidated Quarterly Report, July through September 2011, Section II: Perchlorate Screening Quarterly Monitoring Report," Environmental Restoration Operations, Sandia National Laboratories, New Mexico.

Sandia National Laboratories, New Mexico (SNL/NM), January 2012b. "SWMU 49 and 116 Groundwater Monitoring, Mini-SAP for Fiscal Year 2012 Annual Sampling," Environmental Restoration Operations, Sandia National Laboratories, New Mexico.

Sandia National Laboratories, New Mexico (SNL/NM), January 2012c. "Groundwater Monitoring Equipment Decontamination," Field Operating Procedure 05-03, Revision 04, Long-Term Environmental Stewardship, Environmental Management Department, Sandia National Laboratories, New Mexico.

Sandia National Laboratories, New Mexico (SNL/NM), January 2012d. "Groundwater Monitoring Well Sampling and Field Analytical Measurements," Field Operating Procedure 05-01, Revision 04, Long-Term Environmental Stewardship, Environmental Management Department, Sandia National Laboratories, New Mexico.

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

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

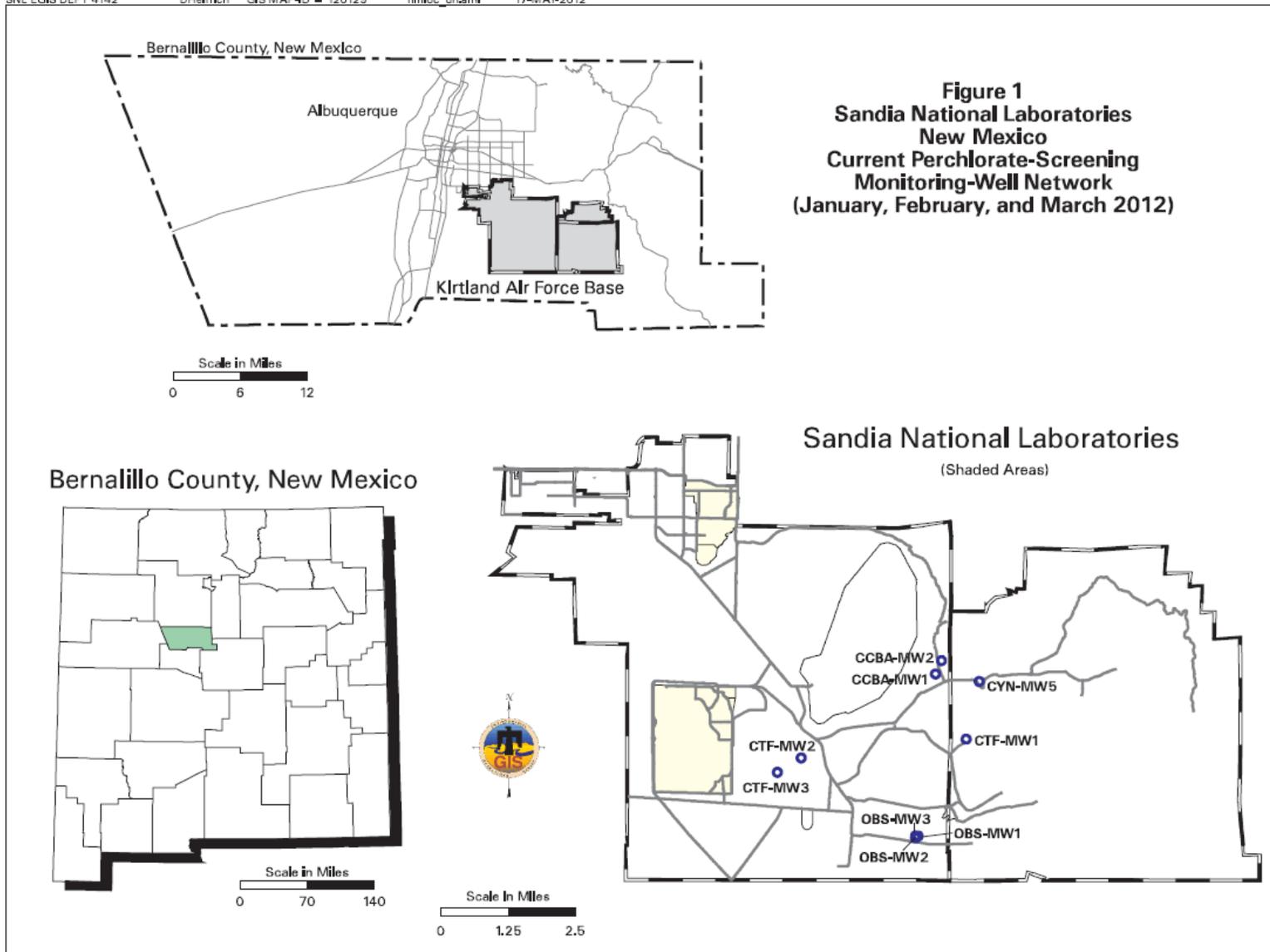
Sandia National Laboratories, New Mexico (SNL/NM), April 2012. "Consolidated Quarterly Report, October through December 2011, Section II: Perchlorate Screening Quarterly Monitoring Report," Environmental Restoration Operations, Sandia National Laboratories, New Mexico.

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.

# Figures





**Figure II-1**  
**Sandia National Laboratories, New Mexico**  
**Current Perchlorate-Screening Monitoring Well Network, January – March 2012**



# Tables



**Table II-1**  
**Current Perchlorate Screening Monitoring Well Network**  
**First Quarter, CY 2012**  
**(January – March 2012)**

Well	Date Sampled	Number of Consecutive Sampling Events <sup>a</sup>	Remaining Number of Sampling Events <sup>b</sup>	Sampling Equipment
CCBA-MW1	16-Jan-12	2	6	Bennett™ Pump
CCBA-MW2	12-Jan-12	2	6	Bennett™ Pump
CTF-MW1	01-Feb-12	2	NA <sup>c</sup>	Bennett™ Pump
CTF-MW2	30-Mar-12	5	3	Bennett™ Pump
CTF-MW3	26-Mar-12	5	3	Bennett™ Pump
CYN-MW5	31-Jan-12	6	NA <sup>c</sup>	Bennett™ Pump
OBS-MW1	09-Jan-12	2	6	Bennett™ Pump
OBS-MW2	10-Jan-12	2	6	Bennett™ Pump
OBS-MW3	11-Jan-12	2	6	Bennett™ Pump

**Notes**

<sup>a</sup>Includes this sampling event.

<sup>b</sup>Per the requirements of Table XI-1 of the Order (NMED April 2004), a well will be removed from the perchlorate-screening monitoring well network after four quarters unless perchlorate is detected above the screening level/MDL of 4 µg/L. If perchlorate is detected above the screening level/MDL in a specific well, monitoring will continue at that well at a frequency negotiated with the NMED.

<sup>c</sup>NA = Not Applicable. This well monitors a Solid Waste Management Unit that is subject to groundwater monitoring controls and will be sampled annually per NMED requirements (NMED April 2010).

µg/L = Microgram(s) per liter.

CCBA = Coyote Canyon Blast Area.

CTF = Coyote Test Field.

CY = Calendar Year.

CYN = Canyons (Burn Site).

MDL = Method detection limit.

MW = Monitoring well.

NMED = New Mexico Environment Department.

OBS = Old Burn Site.

**Table II-2**  
**Sample Details for First Quarter, CY 2012 Perchlorate Sampling**

Well	Sample Identification	AR/COC Number	Associated Groundwater Investigation
CCBA-MW1	091615-020 091616-020	613958	SWMUs 8/58
CCBA-MW2	091610-020	613956	SWMUs 8/58
CTF-MW1	091700-020 091701-020	613981	SWMU 116
CTF-MW2	091949-020 091950-020	614055	SWMU 154
CTF-MW3	091943-020 091944-020	614053	SWMU 149
CYN-MW5	091692-020	613979	SWMU 49
OBS-MW1	091600-020	613952	SWMU 68
OBS-MW2	091604-020 091605-020	613954	SWMU 68
OBS-MW3	091607-020	613955	SWMU 68

**Notes**

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

**Table II-3  
Summary of Perchlorate Screening Analytical Results for the  
Current Monitoring Well Network as of First Quarter, CY 2012**

Well ID	Sample Date	AR/COC Number	Sample Number	Perchlorate Result <sup>a</sup> (µg/L)	MDL <sup>b</sup> (µg/L)	PQL <sup>c</sup> (µg/L)	MCL <sup>d</sup> (µg/L)	Laboratory Qualifier <sup>e</sup>	Validation Qualifier <sup>f</sup>	Analytical Method <sup>g</sup>	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	
CCBA-MW2	01-Nov-11	613885	091349-020	ND	4.0	12	NE	U		EPA 314.0	
	12-Jan-12	613956	091350-020	ND	4.0	12	NE	U		EPA 314.0	Duplicate sample
091610-020			ND	4.0	12	NE	U		EPA 314.0		
CTF-MW1	07-Mar-11	613444	090227-020	ND	4.0	12	NE	U		EPA 314.0	
	01-Feb-12	613981	091700-020	ND	4.0	12	NE	U		EPA 314.0	
091701-020			ND	4.0	12	NE	U		EPA 314.0	Duplicate sample	
CTF-MW2	08-Mar-11	613448	090237-020	ND	4.0	12	NE	U		EPA 314.0	
			090238-020	ND	4.0	12	NE	U		EPA 314.0	Duplicate sample
	31-May-11	613578	090670-020	ND	4.0	12	NE	U		EPA 314.0	
	29-Sep-11	613855	091259-020	ND	4.0	12	NE	U		EPA 314.0	
	09-Dec-11	613929	091525-020	ND	4.0	12	NE	U		EPA 314.0	
			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	
CTF-MW3	09-Mar-11	613450	090243-020	ND	4.0	12	NE	U		EPA 314.0	
			090244-020	ND	4.0	12	NE	U		EPA 314.0	Duplicate sample
	03-Jun-11	613579	090672-020	ND	4.0	12	NE	U		EPA 314.0	
	23-Sep-11	613854	091257-020	ND	4.0	12	NE	U		EPA 314.0	
	08-Dec-11	613928	091523-020	ND	4.0	12	NE	U		EPA 314.0	
			091943-020	ND	4.0	12	NE	U		EPA 314.0	
26-Mar-12	614053	091944-020	ND	4.0	12	NE	U		EPA 314.0	Duplicate sample	
CYN-MW5	26-May-04	607546	065032-044	ND	4.0	12	NE	U		EPA 314.0	
	16-Sep-04	607811	065738-016	ND	4.0	12	NE	U		EPA 314.0	Duplicate sample
	16-Nov-04	608047	066427-020	ND	4.0	12	NE	U		EPA 314.0	
	22-Feb-05	608285	067442-020	ND	4.0	12	NE	U		EPA 314.0	
	10-Mar-11	613446	090232-020	ND	4.0	12	NE	U		EPA 314.0	
090232-020			ND	4.0	12	NE	U		EPA 314.0	Duplicate sample	
31-Jan-12	613979	091692-020	ND	4.0	12	NE	U		EPA 314.0		
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	
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	
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		

**Table II-3 (Concluded)**  
**Summary of Perchlorate Screening Analytical Results for the**  
**Current Monitoring-Well Network, as of First Quarter, CY 2012**

**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.  
CYN = Canyons (Burn Site).  
EPA = U.S. Environmental Protection Agency.  
ID = Identification.  
MW = Monitoring well.  
OBS = Old Burn Site.

**<sup>a</sup>Result**

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

**<sup>b</sup>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.

**<sup>c</sup>PQL**

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

**<sup>d</sup>MCL**

Maximum contaminant level. Established by the U.S. Environmental Protection Agency Primary Water Regulations (40 CFR 141.11, Subpart B) and subsequent amendments or Title 20, Chapter 7, Part 1 of the New Mexico Administrative Code, incorporating 40 CFR 141.

NE = Not established.

**<sup>e</sup>Laboratory Qualifier**

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

**<sup>f</sup>Validation Qualifier**

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

**<sup>g</sup>Analytical Method**

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

**Table II-4**  
**Perchlorate Screening Groundwater Monitoring**  
**Field Water Quality Measurements<sup>a</sup>, First Quarter, CY 2012**

Well ID	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-Jan-12	14.03	567	416.7	6.49	0.20	27.3	2.82
CCBA-MW2	12-Jan-12	14.45	686	383.1	7.39	1.24	57.6	5.88
CTF-MW1	01-Feb-12	16.25	735	396.7	7.01	0.19	72.2	7.06
CTF-MW2	30-Mar-12	17.40	3540	10.4	6.17	2.36	1.4	0.14
CTF-MW3	26-Mar-12	20.34	1632	120.0	7.21	0.32	79.3	7.14
CYN-MW5	31-Jan-12	15.23	418	460.2	5.71	0.38	49.5	4.96
OBS-MW1	09-Jan-12	15.44	597	388.0	7.23	0.37	36.8	3.68
OBS-MW2	10-Jan-12	17.01	602	386.9	7.24	0.36	41.1	3.96
OBS-MW3	11-Jan-12	16.28	600	371.9	7.26	0.86	42.9	4.20

**Notes**

<sup>a</sup>Field measurements obtained immediately before the groundwater sample was collected.

°C = Degrees Celsius.

% Sat = Percent saturation.

µmhos/cm = Micromhos per centimeter.

CCBA = Coyote Canyon Blast Area.

CTF = Coyote Test Field.

CY = Calendar Year.

CYN = Canyons (Burn Site).

ID = Identification.

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

CCBA - MW1

Internal Lab

Batch No. *N/A*

SAR/WR No.

AR/COC

**613958**

Dept. No./Mail Stop: 6234/0718	Date Samples Shipped: <i>1/16/12</i> SMO USE	Contract No: PO 691436	<input type="checkbox"/> Waste Characterization RCRA Date= _____ <input type="checkbox"/> Send: Preliminary/report to _____ <input checked="" type="checkbox"/> Validation Required <input type="checkbox"/> Released by COC No.: _____
Project/Task Manager: Alicia Aragon	Carrier/Waybill No. _____	Project/Task No.: 98026.01.13	
Project Name: <i>SWMU 88 GW Char 8/58</i>	Lab Contact: Edie Kent/803-556-8171	SMO Authorization: <i>[Signature]</i> <b>TMO</b>	
Record Center Code: ER/1267 074/DAT	Lab Destination: GEL	<i>SEE BOTTLE ORDER</i>	
Logbook Ref. No.: ER 049	SMO Contact/Phone: Lorraine Herrera /505-844-3199		
Service Order No. CFO# 0263-12	Send Report to SMO: _____	Bill To: Sandia National Labs (Accounts Payable) P.O. Box 5800, MS-0154 Albuquerque, NM., 87185-0154	

Location	Tech Area	<b>Reference LOV (available at SMO)</b>
Building	Room	

Sample No.-Fraction	ER Sample ID or Sample Location Detail	Beginning Depth (ft)	ER Site No.	Date/Time (hr) Collected	Sample Matrix	Container		Preserve All@4C	Collection Method	Sample Type	Parameter & Method Requested	Lab Sample ID
						Type	Volume					
091615 -001	SWMU 8/58-SA1	N/A	N/A	<i>1/16/12</i> 10/16/31 9:06	GW	G	3x40ml	HCL	G	SA	TCL VOC (SW846-8260B)	
091615 -002	SWMU 8/58-SA1	N/A	N/A	10/16/31 9:07	GW	AG	4x1L	4C	G	SA	TCL SVOC (SW846-8270C)	
091615 -009	SWMU 8/58-SA1	N/A	N/A	10/16/31 9:09	GW	P	500 ml	HNO3	G	SA	TAL Metals + Ur (SW846-6010/6020/7470)	
091615 -016	SWMU 8/58-SA1	N/A	N/A	10/16/31 9:10	GW	P	125 ml	4C	G	SA	Anions (SW846-9056)	
091615 -017	SWMU 8/58-SA1	N/A	N/A	10/16/31 9:11	FGW	P	250 ml	HNO3	G	SA	Cations (SW846-6020)	
091615 -018	SWMU 8/58-SA1	N/A	N/A	10/16/31 9:12	GW	P	125 ml	H2SO4	G	SA	NPN (353.2)	
091615 -020	SWMU 8/58-SA1	N/A	N/A	10/16/31 9:13	GW	P	250 ml	4C	G	SA	Perchlorate (314.0) *	
091615 -022	SWMU 8/58-SA1	N/A	N/A	10/16/31 9:14	GW	P	500 ml	4C	G	SA	Alkalinity (SM2320B)	
091615 -024	SWMU 8/58-SA1	N/A	N/A	10/16/31 9:15	GW	AG	4x1L	4C	G	SA	HE (SW846-8321A)	
091615 -027	SWMU 8/58-SA1	N/A	N/A	10/16/31 9:17	GW	P	250 ml	NaOH	G	SA	Total Cyanide (SW846-9012)	

RMMA <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Ref. No. _____	Sample Tracking SMO Use Date Entered (mm/dd/yy) _____ Entered by: _____	Special Instructions/QC Requirements: EDD <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No Raw Data Packag. <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Abnormal Conditions on Receipt
Sample Disposal <input type="checkbox"/> Return to Client <input checked="" type="checkbox"/> Disposal by lab	Turnaround Time <input type="checkbox"/> 7 Day * <input type="checkbox"/> 15 Day * <input checked="" type="checkbox"/> 30 Day	Return Samples By: <input type="checkbox"/> Negotiated TAT <input type="checkbox"/> QC inits.
*Send/e-mail report to: <b>Tim Jackson/ORG. 4142/MS.0729/ 284-2547</b>		*Please list as separate report.
FGW ( Filtered in field w/40 micron filter)		
Anions ( Br,Cl,F,SO4 )		
Cations ( Ca,Mg,K,Na )		

1. Relinquished by <i>[Signature]</i> Org. <i>4142</i> Date <i>1/16/12</i> Time <i>0950</i>	4. Relinquished by _____ Org. _____ Date _____ Time _____
1. Received by <i>[Signature]</i> Org. <i>4142</i> Date <i>1/16/12</i> Time <i>0950</i>	4. Received by _____ Org. _____ Date _____ Time _____
2. Relinquished by _____ Org. _____ Date _____ Time _____	5. Relinquished by _____ Org. _____ Date _____ Time _____
2. Received by _____ Org. _____ Date _____ Time _____	5. Received by _____ Org. _____ Date _____ Time _____
3. Relinquished by _____ Org. _____ Date _____ Time _____	6. Relinquished by _____ Org. _____ Date _____ Time _____
3. Received by _____ Org. _____ Date _____ Time _____	6. Received by _____ Org. _____ Date _____ Time _____

\*7 & 15 Day Turnaround Time: ERCL requires prior notification.



# GEL LABORATORIES LLC

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

## Certificate of Analysis

Report Date: February 7, 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: 091615-020  
Sample ID: 294178006  
Matrix: AQUEOUS  
Collect Date: 16-JAN-12 09:13  
Receive Date: 17-JAN-12  
Collector: Client

Project: SNLSGWater  
Client ID: SNLS003  
Client Desc.: SWMU 8/58-SA1  
Vol. Recv.:

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Ion Chromatography											
EPA 314.0 Perchlorate by IC "As Received"											
Perchlorate	U	ND	0.004	0.012	mg/L	1	MAR1	01/20/12	0832	1177129	1

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	EPA 314.0 DOE-AL	

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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: 091616-020 Project: SNLSGWater  
Sample ID: 294178018 Client ID: SNLS003  
Matrix: AQUEOUS  
Collect Date: 16-JAN-12 09:13  
Receive Date: 17-JAN-12 Client Desc.: SWMU 8/58-SA2  
Collector: Client Vol. Recv.:

---

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Ion Chromatography											
EPA 314.0 Perchlorate by IC "As Received"											
Perchlorate	U	ND	0.004	0.012	mg/L	1	MAR1	01/20/12	0851	1177129	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

*CCBA-mw 2*

Internal Lab

Batch No. *N/A*

SAR/WR No.

**AR/COC 613956**

Dept. No./Mail Stop: 6234/0718	Date Samples Shipped: <u>1/12/12</u> SMO USE	Contract No.: PO 691436	<input type="checkbox"/> Waste Characterization RCRA Date= _____ <input type="checkbox"/> Send: Preliminary/report to _____ <input checked="" type="checkbox"/> Validation Required <input type="checkbox"/> Released by COC No.: _____
Project/Task Manager: Alicia Aragon	Carrier/Waybill No. <u>136127</u>	Project/Task No.: 98026.01.12	
Project Name: SWMU 8/68 GW Char	Lab Contact: Edie Kent/803-556-8171	SMO Authorization: <i>[Signature]</i> SMO	
Record Center Code: ER/1267 074/DAT	Lab Destination: GEL	<b>555 BOTTLE ORDER</b>	
Logbook Ref. No.: ER 049	SMO Contact/Phone: Lorraine Herrera /505-844-3199		
Service Order No. CFO# 0262-12	Send Report to SMO:	Bill To: Sandia National Labs (Accounts Payable) P.O. Box 5800, MS-0154 Albuquerque, NM., 87185-0154	

Location	Tech Area	<b>Reference LOV(available at SMO)</b>
Building	Room	

Sample No.-Fraction	ER Sample ID or Sample Location Detail	Beginning Depth (ft)	ER Site No.	Date/Time(hr)		Sample Matrix	Container		Preserve All@4C	Collection Method	Sample Type	Parameter & Method Requested	Lab Sample ID
				Collected			Type	Volume					
091610 -001	SWMU 8/58-SA3	N/A	N/A	1/12/12	8:53	GW	G	3x40ml	HCL	G	SA	TCL VOC (SW846-8260B)	
091610 -002	SWMU 8/58-SA3	N/A	N/A	1/12/12	8:55	GW	AG	4x1L	4C	G	SA	TCL SVOC (SW846-8270C)	
091610 -009	SWMU 8/58-SA3	N/A	N/A	1/12/12	8:56	GW	P	500 ml	HNO3	G	SA	TAL Metals + Ur (SW846-6010/6020/7470)	
091610 -016	SWMU 8/58-SA3	N/A	N/A	1/12/12	8:57	GW	P	125 ml	4C	G	SA	Anions (SW846-9056)	
091610 -017	SWMU 8/58-SA3	N/A	N/A	1/12/12	8:58	FGW	P	250 ml	HNO3	G	SA	Cations (SW846-6020)	
091610 -018	SWMU 8/58-SA3	N/A	N/A	1/12/12	8:59	GW	P	125 ml	H2SO4	G	SA	NPN (353.2)	
091610 -020	SWMU 8/58-SA3	N/A	N/A	1/12/12	9:00	GW	P	250 ml	4C	G	SA	Perchlorate (314.0) *	
091610 -022	SWMU 8/58-SA3	N/A	N/A	1/12/12	9:01	GW	P	500 ml	4C	G	SA	Alkalinity (SM2320B)	
091610 -024	SWMU 8/58-SA3	N/A	N/A	1/12/12	9:03	GW	AG	4x1L	4C	G	SA	HE (SW846-8321A)	
091610 -027	SWMU 8/58-SA3	N/A	N/A	1/12/12	9:04	GW	P	250 ml	NaOH	G	SA	Total Cyanide (SW846-9012)	

RMMA <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Ref. No.	Sample Tracking SMO Use Date Entered(mm/dd/yy) Entered by:	Special Instructions/QC Requirements: EDD <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No Raw Data Packag <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No *Send/e-mail report to: <b>Tim Jackson/ORG. 4142/MS.0729/ 284-2547</b> FGW ( Filtered in field w/40 micron filter) Anions (Br,Cl,F,SO4) Cations ( Ca,Mg,K,Na ) Alkalinity (total,bicarbonate,carbonate) *Please list as separate report.	Abnormal Conditions on Receipt
Sample Disposal <input type="checkbox"/> Return to Client <input checked="" type="checkbox"/> Disposal by lab	Turnaround Time <input type="checkbox"/> 7 Day * <input type="checkbox"/> 15 Day * <input checked="" type="checkbox"/> 30 Day	Return Samples By: <input type="checkbox"/> Negotiated TAT <input type="checkbox"/> QC inits.	

1. Relinquished by	Org.	Date	Time	4. Relinquished by	Org.	Date	Time
<i>[Signature]</i>	4142	1/12/12	1040				
1. Received by <i>[Signature]</i>	4142	1/12/12	1040	4. Received by			
2. Relinquished by				5. Relinquished by			
2. Received by				5. Received by			
3. Relinquished by				6. Relinquished by			
3. Received by				6. Received by			

\*7 & 15 Day Turnaround Time: ERCL requires prior notification.

**RACT LABORATORY**

**Analysis Request And Chain Of Custody (Continuation)**

AR/COC-

**613956**

Project Name: SWMU 8/68 GW Char		Project/Task Manger: Alicia Aragon				Project/Task No.: 98026.01.12							
<b>Location</b>		Tech Area		<b>Reference LOV (available at SMO)</b>								Lab use	
Building		Room											
Sample No- Fraction	ER Sample ID or Sample Location detail	Beginning Depth (ft)	ER Site No.	Date/Time (hr) Collected	Sample Matrix	Container Type Volume		Preservative	Collection Method	Sample Type	Parameter & Method Requested	Lab Sample ID	
091610 -033	SWMU 8/58-SA3	N/A	N/A	1/12/12 9:05	GW	P	1 L	HNO3	G	SA	Gamma Spec (short list)(901.0)		
091610 -034	SWMU 8/58-SA3	N/A	N/A	1/12/12 9:07	GW	P	1 L	HNO3	G	SA	Gross Alpha/Beta (900.0)		
091610 -035	SWMU 8/58-SA3	N/A	N/A	1/12/12 9:08	GW	P	1 L	HNO3	G	SA	Isotopic Ur (ASTM D3972-09M)		
091611 -001	SWMU 68-TB1	N/A	N/A	1/12/12 8:53	DIW	G	3x40ml	HCL	G	TB	VOC (SW846-8260B)		
091612 -001	SWMU 68-FB1	N/A	N/A	1/12/12 8:46	DIW	G	3x40ml	HCL	G	FB	VOC (SW846-8260B)		
<b>Abnormal Conditions on Receipt</b>													
Recipient Initials _____													

# GEL LABORATORIES LLC

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

## Certificate of Analysis

Report Date: February 7, 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:	091610-020	Project:	SNLSGWater
Sample ID:	293951006	Client ID:	SNLS003
Matrix:	AQUEOUS		
Collect Date:	12-JAN-12 09:00		
Receive Date:	13-JAN-12	Client Desc.:	SWMU 8/58-SA3
Collector:	Client	Vol. Recv.:	

---

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Ion Chromatography											
EPA 314.0 Perchlorate by IC "As Received"											
Perchlorate	U	ND	0.004	0.012	mg/L	1	MAR1	01/20/12	0715	1177129	1

The following Analytical Methods were performed:

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Method	Description	Analyst Comments
1	EPA 314.0 DOE-AL	



## OFF-SITE LABORATORY Analysis Request And Chain Of Custody (Continuation)

AR/COC-

613981

Project Name: SWMU 49		Project/Task Manger: Don Schofield				Project/Task No.: 146422.10.11.01						
<b>Location</b>												
Tech Area												
Building Room		<b>Reference LOV (available at SMO)</b>										
												Lab use
Sample No-Fraction	ER Sample ID or Sample Location detail	Pump Depth (ft)	ER Site No.	Date/Time (hr) Collected	Sample Matrix	Container		Preserv-ative	Collection Method	Sample Type	Parameter & Method Requested	Lab Sample ID
						Type	Volume					
091701-016	CTF-MW1	261	NA	02/01/12 0927	GW	P	125ml	4C	G	DU	Anions (SW846-9056)	032
091701-017	CTF-MW1	261	NA	02/01/12 0928	FGW	P	500ml	4C	G	DU	Cations (SW846-6020/7470)	245014 034
091701-018	CTF-MW1	261	NA	02/01/12 0929	GW	P	125ml	H2SO4	G	DU	NPN (353.2)	245012 033
091701-020	CTF-MW1	261	NA	02/01/12 0930	GW	P	250ml	4C	G	DU	Perchlorate (314.0)	034
091701-022	CTF-MW1	261	NA	02/01/12 0931	GW	P	500ml	4C	G	DU	Alkalinity (SM2320B)	035
091701-024	CTF-MW1	261	NA	02/01/12 0933	GW	AG	4x1L	4C	G	DU	High Explosive (SW846-8321A) Mod.	036
091701-027	CTF-MW1	261	NA	02/01/12 0934	GW	P	250ml	NaOH	G	DU	Total Cyanide (SW846-9012)	037
091702-001	CTF-TB3	NA	NA	02/01/12 0924	DIW	G	3x40ml	HCL	G	TB	VOC (SW846-8260B)	038
Sampling complete for SWMU 49												
2nd Qtr 2012												
LAB USE												
Abnormal Conditions on Receipt												
Recipient Initials <i>AK</i>												

# GEL LABORATORIES LLC

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

## Certificate of Analysis

Report Date: February 27, 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: 091700-020 Project: SNLSGWater  
Sample ID: 295072026 Client ID: SNLS003  
Matrix: AQUEOUS  
Collect Date: 01-FEB-12 09:30  
Receive Date: 02-FEB-12 Client Desc.: CTF-MW1  
Collector: Client Vol. Recv.:

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Ion Chromatography											
EPA 314.0 Perchlorate by IC "As Received"											
Perchlorate	U	ND	0.004	0.012	mg/L	1	MARI	02/09/12	2030	1185052	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: February 27, 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: 091701-020 Project: SNLSGWater  
Sample ID: 295072034 Client ID: SNLS003  
Matrix: AQUEOUS  
Collect Date: 01-FEB-12 09:30  
Receive Date: 02-FEB-12 Client Desc.: CTF-MW1  
Collector: Client Vol. Recv.:

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Ion Chromatography											
EPA 314.0 Perchlorate by IC "As Received"											
Perchlorate	U	ND	0.004	0.012	mg/L	1	MARI	02/09/12	2050	1185052	1

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	EPA 314.0 DOE-AL	

300712

## CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY

Internal Lab

Batch No. <u>MA</u>		SMO Use /		AR/COC		<b>614055</b>					
Dept. No./Mail Stop: 6234/MS 0718		Date Samples Shipped: <u>4/3/12</u>		Project/Task No. <u>98026.01.15</u>		<input type="checkbox"/> Waste Characterization -Send preliminary/copy report to:					
Project/Task Manager: Alicia Aragon		Carrier/Waybill No. <u>139567</u>		SMO Authorization: <u>[Signature]</u>							
Project Name: SWMU 154		Lab Contact: Edie Kent/803-556-8171		Contract # PO 691436		<input type="checkbox"/> Released by COC No.: _____ <input checked="" type="checkbox"/> Validation Required					
Record Center Code: NA		Lab Destination: GEL		SMO Contact/Phone: Lorraine Herrera/505-844-3199							
Logbook Ref. No.: NA		SMO Contact/Phone: Lorraine Herrera/505-844-3199		Send Report to SMO: Lorraine Herrera /505-844-3199		Bill To: Sandia National Labs (Accounts Payable) P.O. Box 5800 MS 0154 Albuquerque, NM 87185-0154					
Service Order No. CF 251-12		Send Report to SMO: Lorraine Herrera /505-844-3199		500 BOTTLE DRAWN							
<b>Location</b>		Tech Area		<b>Reference LOV (available at SMO)</b>							
Building		Room									
Sample No.-Fraction	ER Sample ID or Sample Location Detail	Depth (ft)	ER Site No.	Date/Time (hr) Collected	Sample Matrix	Container Type Volume	Preservative	Collection Method	Sample Type	Parameter & Method Requested	Lab Sample ID
091949-001	CTF-MW2	128	NA	03/30/12 0911	GW	G 3x40ml	HCL	G	SA	TCL VOC (SW846-8260B)	001
091949-002	CTF-MW2	128	NA	03/30/12 0913	GW	AG 4x1L	4C	G	SA	TCL SVOC (SW846-8270C)	002
091949-009	CTF-MW2	128	NA	03/30/12 0914	GW	P 500 ml	HNO3	G	SA	TAL Metals+ Ur (SW846-6020/7470)	003
091949-010	CTF-MW2	128	NA	03/30/12 0915	FGW	P 500 mL	HNO3	G	SA	TAL Metals+ Ur (SW846-6020/7470)	300968 001
091949-016	CTF-MW2	128	NA	03/30/12 0916	GW	P 125ml	4C	G	SA	Anions (SW846-9056)	005
091949-018	CTF-MW2	128	NA	03/30/12 0917	GW	P 125ml	H2SO4	G	SA	NPN (353.2)	006
091949-020	CTF-MW2	128	NA	03/30/12 0918	GW	P 250ml	4C	G	SA	Perchlorate (314.0)	007
091949-022	CTF-MW2	128	NA	03/30/12 0920	GW	P 500ml	4C	G	SA	Alkalinity (SM2320B)	008
091949-024	CTF-MW2	128	NA	03/30/12 0923	GW	AG 4x1L	4C	G	SA	High Explosive (SW846-8321A) Mod.	009
091949-033	CTF-MW2	128	NA	03/30/12 0924	GW	P 1 Liter	HNO3	G	SA	Gamma Spec (short list)(901.0)	010
091949-034	CTF-MW2	128	NA	03/30/12 0926	GW	P 1 Liter	HNO3	G	SA	Gross Alpha/Beta (900.0)	011
<b>RMMA</b> <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Ref. No.		<b>Sample Tracking</b> Smo Use		<b>Special Instructions/QC Requirements</b>				<b>Abnormal Conditions on Receipt</b>			
Sample Disposal <input type="checkbox"/> Return to Client <input checked="" type="checkbox"/> Disposal by lab		Date Entered (mm/dd/yy)		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		Entered by:		Level D Package <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No				<b>Lab Use</b>			
Return Samples By: <input type="checkbox"/> Negotiated TAT QC inits.		*Send report to:		Tim Jackson/ORG.4142/MS.0729/ 284-2547							
<b>Sample Team Members</b>	Name	Signature	Init	Company/Organization/Phone/Cellular				If Perchlorate detected perform verification analysis(SW846-6850M) Alkalinity as total bicarbonate and carbonate Anions as Br, F, Cl, SO4 FGW (filtered in field with .45 micron filter) *Please list as separate report.			
	Robert Lynch	[Signature]	RL	SNL/4142/844-4013/250-7090							
	Alfred Santillanes	[Signature]	AS	SNL/4142/844-5130/228-0710							
	William Gibson	[Signature]	WG	SNL/4142/844-4013/239-7367							
1. Relinquished by	[Signature]	Org. 4142	Date 4/3/12	Time 11:42	4. Relinquished by	Org.	Date	Time			
1. Received by	[Signature]	Org. 4142	Date 4/3/12	Time 11:42	4. Received by	Org.	Date	Time			
2. Relinquished by	[Signature]	Org. 4142	Date 4/3/12	Time 07:00	5. Relinquished by	Org.	Date	Time			
2. Received by	[Signature]	Org. 4142	Date 4/3/12	Time 09:55	5. Received by	Org.	Date	Time			
3. Relinquished by	Org.	Date	Time	6. Relinquished by	Org.	Date	Time	Time			
3. Received by	Org.	Date	Time	6. Received by	Org.	Date	Time	Time			

300712

### OFF-SITE LABORATORY Analysis Request And Chain Of Custody (Continuation)

AR/COC-

614055

Project Name: SWMU 154		Project/Task Manger: Alicia Aragon			Project/Task No.: 98026.01.15							
Location		Reference LOV (available at SMO)										Lab use
Building Room												
Sample No-Fraction	ER Sample ID or Sample Location detail	Pump Depth (ft)	ER Site No.	Date/Time (hr) Collected	Sample Matrix	Container		Preservative	Collection Method	Sample Type	Parameter & Method Requested	Lab Sample ID
						Type	Volume					
091949-035	CTF-MW2	128	NA	03/30/12 0927	GW	P	1 Liter	HNO3	G	SA	Isotopic Ur (ASTM D3972-09M)	012
091950-001	CTF-MW2	128	NA	03/30/12 0911	GW	G	3x40ml	HCL	G	DU	TCL VOC (SW846-8260B)	013
091950-002	CTF-MW2	128	NA	03/30/12 0913	GW	AG	4x1L	4C	G	DU	TCL SVOC (SW846-8270C)	014
091950-009	CTF-MW2	128	NA	03/30/12 0914	GW	P	500 ml	HNO3	G	DU	TAL Metals+ Ur (SW846-6020/7470)	015
091950-010	CTF-MW2	128	NA	03/30/12 0915	FGW	P	500 ml	HNO3	G	DU	TAL Metals+ Ur (SW846-6020/7470)	200908-007
091950-016	CTF-MW2	128	NA	03/30/12 0916	GW	P	125ml	4C	G	DU	Anions (SW846-9056)	017
091950-018	CTF-MW2	128	NA	03/30/12 0917	GW	P	125ml	H2SO4	G	DU	NPN (353.2)	018
091950-020	CTF-MW2	128	NA	03/30/12 0918	GW	P	250ml	4C	G	DU	Perchlorate (314.0)	019
091950-022	CTF-MW2	128	NA	03/30/12 0920	GW	P	500ml	4C	G	DU	Alkalinity (SM2320B)	020
091950-024	CTF-MW2	128	NA	03/30/12 0923	GW	AG	4x1L	4C	G	DU	High Explosive (SW846-8321A) Mod.	021
091950-033	CTF-MW2	128	NA	03/30/12 0924	GW	P	1 Liter	HNO3	G	DU	Gamma Spec (short list)(901.0)	022
091950-034	CTF-MW2	128	NA	03/30/12 0926	GW	P	1 Liter	HNO3	G	DU	Gross Alpha/Beta (900.0)	023
091950-035	CTF-MW2	128	NA	03/30/12 0927	GW	P	1 Liter	HNO3	G	DU	Isotopic Ur (ASTM D3972-09M)	024
091951-001	SWMU-TB4	NA	NA	03/30/12 0911	DIW	G	3x40ml	HCL	G	TB	VOC (SW846-8260B)	025
091952-001	SWMU-FB2	NA	NA	03/30/12 0905	DIW	G	3x40ml	HCL	G	FB	VOC (SW846-8260B)	026
Sampling complete for SWMU 154												
2nd Qtr 2012												
Abnormal Conditions on Receipt												
LAB USE												
Recipient Initials <i>AK</i>												

# GEL LABORATORIES LLC

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

## Certificate of Analysis

Report Date: April 27, 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:	091949-020	Project:	SNLSGWater
Sample ID:	300712007	Client ID:	SNLS003
Matrix:	AQUEOUS		
Collect Date:	30-MAR-12 09:18		
Receive Date:	04-APR-12	Client Desc.:	CTF-MW2
Collector:	Client	Vol. Recv.:	

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Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Ion Chromatography											
EPA 314.0 Perchlorate by IC "As Received"											
Perchlorate	U	ND	0.004	0.012	mg/L	1	MAR1	04/13/12	0255	1199385	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: April 27, 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: 091950-020	Project: SNLSGWater
Sample ID: 300712019	Client ID: SNLS003
Matrix: AQUEOUS	
Collect Date: 30-MAR-12 09:18	
Receive Date: 04-APR-12	Client Desc.: CTF-MW2
Collector: Client	Vol. Recv.:

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Ion Chromatography											
EPA 314.0 Perchlorate by IC "As Received"											
Perchlorate	U	ND	0.004	0.012	mg/L	1	MAR1	04/13/12	0314	1199385	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

Batch No. *NA*

SMO Use

AR/COC

614053

Dept. No./Mail Stop: 6234/MS 0718	Date Samples Shipped: <i>3/26/12</i>	Project/Task No. 98026.01.14
Project/Task Manager: Alicia Aragon	Carrier/Waybill No. <i>139136</i>	SMO Authorization: <i>[Signature]</i>
Project Name: SWMU-149	Lab Contact: Edie Kent/803-556-8171	Contract # PO 691436
Record Center Code: NA	Lab Destination: GEL	
Logbook Ref. No.: NA	SMO Contact/Phone: Lorraine Herrera/505-844-3199	<i>see bottle order</i>
Service Order No. CF 250-12	Send Report to SMO: Lorraine Herrera /505-844-3199	

Waste Characterization  
-Send preliminary/copy report to:

Released by COC No.: \_\_\_\_\_  
 Validation Required

Bill To: Sandia National Labs (Accounts Payable)  
P.O. Box 5800 MS 0154  
Albuquerque, NM 87185-0154 *298265*

Sample No.-Fraction	ER Sample ID or Sample Location Detail	Depth (ft)	ER Site No.	Date/Time(hr) Collected	Sample Matrix	Container		Preservative	Collection Method	Sample Type	Parameter & Method Requested	Lab Sample ID
						Type	Volume					
091943-001	CTF-MW3	360	NA	03/26/12 0957	GW	G	3x40ml	HCL	G	SA	TCL VOC (SW846-8260B)	001
091943-009	CTF-MW3	360	NA	03/26/12 0958	GW	P	500 ml	HNO3	G	SA	TAL Metals (SW846-6020/7470)	002
091943-010	CTF-MW3	360	NA	03/26/12 0959	FGW	P	500 ml	HNO3	G	SA	TAL Metals (SW846-6020/7470)	<i>298275</i> 001
091943-016	CTF-MW3	360	NA	03/26/12 1001	GW	P	125 ml	4C	G	SA	Anions (SW846-9056)	<i>298265</i> 003
091943-018	CTF-MW3	360	NA	03/26/12 1002	GW	P	125 ml	H2SO4	G	SA	NPN (353.2)	004
091943-020	CTF-MW3	360	NA	03/26/12 1003	GW	P	250 ml	4C	G	SA	Perchlorate (314.0)	005
091943-022	CTF-MW3	360	NA	03/26/12 1004	GW	P	500 ml	4C	G	SA	Alkalinity (SM2320B)	006
091944-001	CTF-MW3	360	NA	03/26/12 0957	GW	G	3x40ml	HCL	G	DU	TCL VOC (SW846-8260B)	007
091944-009	CTF-MW3	360	NA	03/26/12 0958	GW	P	500 ml	HNO3	G	DU	TAL Metals (SW846-6020/7470)	008
091944-010	CTF-MW3	360	NA	03/26/12 0959	FGW	P	500 ml	HNO3	G	DU	TAL Metals (SW846-6020/7470)	<i>298275</i> 002
091944-016	CTF-MW3	360	NA	03/26/12 1001	GW	P	125 ml	4C	G	DU	Anions (SW846-9056)	<i>298265</i> 009

RMMA  Yes  No Ref. No. Sample Tracking Smo Use Special Instructions/QC Requirements

Sample Disposal  Return to Client  Disposal by lab Date Entered (mm/dd/yy) EDD  Yes  No

Turnaround Time  7 Day  15 Day  30 Day Entered by: Level D Package  Yes  No

Return Samples By:	<input type="checkbox"/> Negotiated TAT	QC inits.	*Send report to:
Sample Team Members	Name	Signature	Init
	Robert Lynch	<i>[Signature]</i>	RL
	Alfred Santillanes	<i>[Signature]</i>	AS
	William Gibson	<i>[Signature]</i>	WG

1. Relinquished by <i>[Signature]</i> Org. 4142 Date 3/26/12 Time 10:44	4. Relinquished by	Org.	Date	Time
1. Received by <i>[Signature]</i> Org. 4142 Date 3/26/12 Time 10:44	4. Received by	Org.	Date	Time
2. Relinquished by <i>[Signature]</i> Org. 4142 Date 3/26/12 Time 1200	5. Relinquished by	Org.	Date	Time
2. Received by <i>[Signature]</i> Org. GEL Date 3-27-12 Time 0735	5. Received by	Org.	Date	Time
3. Relinquished by	6. Relinquished by	Org.	Date	Time
3. Received by	6. Received by	Org.	Date	Time

Tim Jackson/ORG.4142/MS.0729/ 284-2547  
If perchlorate detected perform verification analysis(SW846-6850M)  
Alkalinity as total bicarbonate and carbonate  
Anions as Br, F, Cl, SO4  
FGW (filtered in field with .45 micron filter)  
\*Please list as separate report.

Lab Use



# GEL LABORATORIES LLC

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

## Certificate of Analysis

Report Date: April 20, 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: 091943-020	Project: SNLSGWater
Sample ID: 298265005	Client ID: SNLS003
Matrix: AQUEOUS	
Collect Date: 26-MAR-12 10:03	
Receive Date: 27-MAR-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	MAR1	04/13/12	0100	1199385	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: April 20, 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: 091944-020	Project: SNLSGWater
Sample ID: 298265011	Client ID: SNLS003
Matrix: AQUEOUS	
Collect Date: 26-MAR-12 10:03	
Receive Date: 27-MAR-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	MAR1	04/13/12	0157	1199385	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: February 27, 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: 091692-020  
Sample ID: 295072005  
Matrix: AQUEOUS  
Collect Date: 31-JAN-12 09:38  
Receive Date: 01-FEB-12  
Collector: Client

Project: SNLSGWater  
Client ID: SNLS003  
Client Desc.: CYN-MW5  
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	02/09/12	1914	1185052	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

*OBS - mm1*

Internal Lab

Batch No. N/A SAR/WR No. \_\_\_\_\_ AR/COC **613952**

Dept. No./Mail Stop: 6234/0718	Date Samples Shipped: <u>1/9/12</u> SMO USE	Contract No: PO 691436	<input type="checkbox"/> Waste Characterization RCRA Date= _____ <input type="checkbox"/> Send: Preliminary/report to _____ <input checked="" type="checkbox"/> Validation Required <input type="checkbox"/> Released by COC No.: _____
Project/Task Manager: Alicia Aragon	Carrier/Waybill No. _____	Project/Task No.: 98026.01.13	
Project Name: SWMU 68 GWC	Lab Contact: Edie Kent/803-556-8171	SMO Authorization: <u>[Signature]</u> <i>SMO</i>	
Record Center Code: ER/1267 074/DAT	Lab Destination: GEL		
Logbook Ref. No.: ER 049	SMO Contact/Phone: Lorraine Herrera /505-844-3199		
Service Order No. CFO 263-12	Send Report to SMO: _____		Bill To: Sandia National Labs (Accounts Payable) P.O. Box 5800, MS-0154 Albuquerque, NM., 87185-0154

Location	Tech Area	<b>Reference LOV (available at SMO)</b>
Building	Room	

Sample No.-Fraction	ER Sample ID or Sample Location Detail	Beginning Depth (ft)	ER Site No.	Date/Time (hr) Collected		Sample Matrix	Container		Preserve All@4C	Collection Method	Sample Type	Parameter & Method Requested	Lab Sample ID
							Type	Volume					
091600- -001	SWMU 68-SA1	N/A	N/A	1/9/12	9:02	GW	G	3x40ml	HCL	G	SA	TCL VOC (SW846-8260B)	
091600- -002	SWMU 68-SA1	N/A	N/A	1/9/12	9:05	GW	AG	4x1L	4C	G	SA	TCL SVOC (SW846-8270C)	
091600- -009	SWMU 68-SA1	N/A	N/A	1/9/12	9:06	GW	P	500 ml	HNO3	G	SA	TAL Metals + Ur (SW846-6010/6020/7470)	
091600- -014	SWMU 68-SA1	N/A	N/A	1/9/12	9:07	GW	P	250 ml	4C	G	SA	Hexavalent Chromium (SW846-719) <i>(6A)</i>	
091600- -016	SWMU 68-SA1	N/A	N/A	1/9/12	9:08	GW	P	125 ml	4C	G	SA	Anions (SW846-9056)	
091600- -017	SWMU 68-SA1	N/A	N/A	1/9/12	9:09	FGW	P	250 ml	HNO3	G	SA	Cations (SW846-6020)	
091600- -018	SWMU 68-SA1	N/A	N/A	1/9/12	9:10	GW	P	125 ml	H2SO4	G	SA	NPN (353.2)	
091600- -020	SWMU 68-SA1	N/A	N/A	1/9/12	9:11	GW	P	250 ml	4C	G	SA	Perchlorate (314.0)	
091600- -022	SWMU 68-SA1	N/A	N/A	1/9/12	9:12	GW	P	500 ml	4C	G	SA	Alkalinity (SM2320B)	
091600- -024	SWMU 68-SA1	N/A	N/A	1/9/12	9:14	GW	AG	4x1L	4C	G	SA	HE (SW846-8321A)	

RMMA <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Ref. No. _____ Sample Disposal <input type="checkbox"/> Return to Client <input checked="" type="checkbox"/> Disposal by lab Turnaround Time <input type="checkbox"/> 7 Day * <input type="checkbox"/> 15 Day * <input checked="" type="checkbox"/> 30 Day	Sample Tracking SMO Use Date Entered (mm/dd/yy) _____ Entered by: _____	Special Instructions/QC Requirements: EDD <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No Raw Data Package <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Abnormal Conditions on Receipt																				
Return Samples By: _____ <input type="checkbox"/> Negotiated TAT	QC inits. _____	*Send/e-mail report to: Tim Jackson/ORG. 4142/MS.0729/ 284-2547 If Perchlorate detected, perform verification analysis SW846-6850M Anions ( Cl,SO4) Cations ( Ca,Mg,K,Na ) Alkalinity (total,bicarbonate,carbonate) *Please list as separate report.																					
<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>Sample</th> <th>Name</th> <th>Signature</th> <th>Init</th> <th>Company/Organization/Phone</th> </tr> </thead> <tbody> <tr> <td></td> <td>Robert Lynch</td> <td><i>[Signature]</i></td> <td><i>RL</i></td> <td>SNL/4142/844-4013/250-7090</td> </tr> <tr> <td></td> <td>Alfred Santillanes</td> <td><i>[Signature]</i></td> <td><i>AS</i></td> <td>SNL/4142/844-5130/228-0710</td> </tr> <tr> <td></td> <td>William J. Gibson</td> <td><i>[Signature]</i></td> <td><i>WJG</i></td> <td>SNL/4142/844-4013/239-7367</td> </tr> </tbody> </table>	Sample	Name	Signature	Init	Company/Organization/Phone		Robert Lynch	<i>[Signature]</i>	<i>RL</i>	SNL/4142/844-4013/250-7090		Alfred Santillanes	<i>[Signature]</i>	<i>AS</i>	SNL/4142/844-5130/228-0710		William J. Gibson	<i>[Signature]</i>	<i>WJG</i>	SNL/4142/844-4013/239-7367			
Sample	Name	Signature	Init	Company/Organization/Phone																			
	Robert Lynch	<i>[Signature]</i>	<i>RL</i>	SNL/4142/844-4013/250-7090																			
	Alfred Santillanes	<i>[Signature]</i>	<i>AS</i>	SNL/4142/844-5130/228-0710																			
	William J. Gibson	<i>[Signature]</i>	<i>WJG</i>	SNL/4142/844-4013/239-7367																			

1. Relinquished by <u>Alfred Santillanes</u> Org. <u>4142</u> Date <u>1/9/12</u> Time <u>1100</u>	4. Relinquished by _____ Org. _____ Date _____ Time _____
1. Received by <u>Edie Kent</u> Org. <u>4142</u> Date <u>1/9/12</u> Time <u>1100</u>	4. Received by _____ Org. _____ Date _____ Time _____
2. Relinquished by _____ Org. _____ Date _____ Time _____	5. Relinquished by _____ Org. _____ Date _____ Time _____
2. Received by _____ Org. _____ Date _____ Time _____	5. Received by _____ Org. _____ Date _____ Time _____
3. Relinquished by _____ Org. _____ Date _____ Time _____	6. Relinquished by _____ Org. _____ Date _____ Time _____
3. Received by _____ Org. _____ Date _____ Time _____	6. Received by _____ Org. _____ Date _____ Time _____

\*7 & 15 Day Turnaround Time: ERCL requires prior notification.





## TRACT LABORATORY

## Analysis Request And Chain Of Custody (Continuation)

AR/COC-

613954

Project Name: SWMU 68 GW Char		Project/Task Manger: Alicia Aragon				Project/Task No.: 98026.01.13							
Location		Tech Area		Reference LOV (available at SMO)									Lab use
Building		Room											Lab Sample ID
Sample No- Fraction	ER Sample ID or Sample Location detail	Beginning Depth (ft)	ER Site No.	Date/Time (hr) Collected	Sample Matrix	Container		Preservative	Collection Method	Sample Type	Parameter & Method Requested	Lab Sample ID	
						Type	Volume						
091604 -027	SWMU 68-SA2	N/A	N/A	1/10/12 9:11	GW	P	250 ml	NaOH	G	SA	Total Cyanide (SW846-9012)		
091604 -033	SWMU 68-SA2	N/A	N/A	1/10/12 9:13	GW	P	1L	HNO3	G	SA	Gamma spec (short list)(901.0)		
091604 -034	SWMU 68-SA2	N/A	N/A	1/10/12 9:14	GW	P	1L	HNO4	G	SA	Gross Alpha/Beta (900.0)		
091604 -035	SWMU 68-SA2	N/A	N/A	1/10/12 9:16	GW	P	1L	HNO5	G	SA	Isotopic Ur (ASTM D3972-09M)		
091605 -001	SWMU 68-SA3	N/A	N/A	1/10/12 8:57	GW	G	3x40ml	HCL	G	DU	TCL VOC (SW846-8260B)		
091605 -002	SWMU 68-SA3	N/A	N/A	1/10/12 9:00	GW	AG	4x1L	4C	G	DU	TCL SVOC (SW846-8270C)		
091605 -009	SWMU 68-SA3	N/A	N/A	1/10/12 9:02	GW	P	500 ml	HNO3	G	DU	TAL Metals + Ur (SW846-6020/7470)		
091605 -014	SWMU 68-SA3	N/A	N/A	1/10/12 9:03	GW	P	250 ml	4C	G	DU	Hexavalent Chromium (SW846-719)		
091605 -016	SWMU 68-SA3	N/A	N/A	1/10/12 9:04	GW	P	125 ml	4C	G	DU	Anions (SW846-9056)		
091605 -017	SWMU 68-SA3	N/A	N/A	1/10/12 9:05	FGW	P	250 ml	HNO3	G	DU	Cations (SW846-6020)		
091605 -018	SWMU 68-SA3	N/A	N/A	1/10/12 9:06	GW	P	125 ml	H2SO4	G	DU	NPN (353.2)		
091605 -020	SWMU 68-SA3	N/A	N/A	1/10/12 9:07	GW	P	250 ml	4C	G	DU	Perchlorate (314.0)		
091605 -022	SWMU 68-SA3	N/A	N/A	1/10/12 9:08	GW	P	500 ml	4C	G	DU	Alkalinity (SM2320B)		
091605 -024	SWMU 68-SA3	N/A	N/A	1/10/12 9:10	GW	AG	4x1L	4C	G	DU	HE (SW846-8321A)		
091605 -027	SWMU 68-SA3	N/A	N/A	1/10/12 9:11	GW	P	250 ml	NaOH	G	DU	Total Cyanide (SW846-9012)		
091605 -033	SWMU 68-SA3	N/A	N/A	1/10/12 9:13	GW	P	1L	HNO3	G	DU	Gamma spec (short list)(901.0)		
091605 -034	SWMU 68-SA3	N/A	N/A	1/10/12 9:14	GW	P	1L	HNO3	G	DU	Gross Alpha/Beta (900.0)		
091605 -035	SWMU 68-SA3	N/A	N/A	1/10/12 9:16	GW	P	1L	HNO3	G	DU	Isotopic Ur (ASTM D3972-09M)		
091606 -001	SWMU 68-TB3	N/A	N/A	1/10/12 8:57	DIW	G	3x40ml	HCL	G	TB	VOC (SW846-8260B)		
Abnormal Conditions on Receipt													
Recipient Initials _____													

# CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY

085-mwz

Internal Lab

Batch No. <i>N/A</i>	SAR/WR No.	AR/COC	<b>613954</b>
Dept. No./Mail Stop: 6234/0718	Date Samples Shipped: <i>1/10/12</i> SMO USE	Contract No: PO 691436	<input type="checkbox"/> Waste Characterization RCRA Date= _____ <input type="checkbox"/> Send: Preliminary/report to _____ <input checked="" type="checkbox"/> Validation Required <input type="checkbox"/> Released by COC No.: _____
Project/Task Manager: Alicia Aragon	Carrier/Waybill No.	Project/Task No.: 98026.01.13	
Project Name: SWMU 68 GW Char	Lab Contact: Edie Kent/803-556-8171	SMO Authorization: <i>[Signature]</i>	
Record Center Code: ER/1267 074/DAT	Lab Destination: GEL	SEE BOTTLE ORDER SMO	
Logbook Ref. No.: ER 049	SMO Contact/Phone: Lorraine Herrera /505-844-3199		
Service Order No. CFO# 0263-12	Send Report to SMO:		

Location	Tech Area	Reference LOV (available at SMO)	Bill To: Sandia National Labs (Accounts Payable) P.O. Box 5800, MS-0154 Albuquerque, NM., 87185-0154
Building	Room		Parameter & Method Requested

Sample No.-Fraction	ER Sample ID or Sample Location Detail	Beginning Depth (ft)	ER Site No.	Date/Time (hr) Collected		Sample Matrix	Container		Preserve All@4C	Collection Method	Sample Type	Parameter & Method Requested	Lab Sample ID
				Type	Volume								
091604 -001	SWMU 68-SA2	N/A	N/A	1/10/12	8:57	GW	G	3x40ml	HCL	G	SA	TCL VOC (SW846-8260B)	
091604 -002	SWMU 68-SA2	N/A	N/A	1/10/12	9:00	GW	AG	4x1L	4C	G	SA	TCL SVOC (SW846-8270C)	
091604 -009	SWMU 68-SA2	N/A	N/A	1/10/12	9:02	GW	P	500 ml	HNO3	G	SA	TAL Metals + Ur (SW846-6010/6020/7470)	
091604 -014	SWMU 68-SA2	N/A	N/A	1/10/12	10:03	GW	P	250 ml	4C	G	SA	Hexavalent Chromium (SW846-7196A)	
091604 -016	SWMU 68-SA2	N/A	N/A	1/10/12	9:04	GW	P	125 ml	4C	G	SA	Anions (SW846-9056)	
091604 -017	SWMU 68-SA2	N/A	N/A	1/10/12	9:05	FGW	P	250 ml	HNO3	G	SA	Cations (SW846-6020)	
091604 -018	SWMU 68-SA2	N/A	N/A	1/10/12	9:06	GW	P	125 ml	H2SO4	G	SA	NPN (353.2)	
091604 -020	SWMU 68-SA2	N/A	N/A	1/10/12	9:07	GW	P	250 ml	4C	G	SA	Perchlorate (314.0)	
091604 -022	SWMU 68-SA2	N/A	N/A	1/10/12	9:08	GW	P	500 ml	4C	G	SA	Alkalinity (SM2320B)	
091604 -024	SWMU 68-SA2	N/A	N/A	1/10/12	9:10	GW	AG	4x1L	4C	G	SA	HE (SW846-8321A)	

RMMA <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Ref. No.	Sample Tracking SMO Use Date Entered (mm/dd/yy)	Special Instructions/QC Requirements: EDD <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No Raw Data Packag: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Abnormal Conditions on Receipt
Sample Disposal <input type="checkbox"/> Return to Client <input checked="" type="checkbox"/> Disposal by lab	Entered by:	*Send/e-mail report to: Tim Jackson/ORG. 4142/MS.0729/ 284-2547	

Return Samples By:	<input type="checkbox"/> Negotiated TAT	QC inits.
Sample	Name	Signature
	Robert Lynch	<i>[Signature]</i>
	Alfred Santillanes	<i>[Signature]</i>
	William J. Gibson	<i>[Signature]</i>
	Init	Company/Organization/Phone
	RL	SNL/4142/844-4013/250-7090
	[Signature]	SNL/4142/844-5130/228-0710
	[Signature]	SNL/4142/844-4013/239-7367

1. Relinquished by <i>[Signature]</i> Org. <i>4/42</i> Date <i>1/10/12</i> Time <i>1:00P</i>	4. Relinquished by _____ Org. _____ Date _____ Time _____
1. Received by <i>[Signature]</i> Org. <i>4/42</i> Date <i>1/10/12</i> Time <i>1:00P</i>	4. Received by _____ Org. _____ Date _____ Time _____
2. Relinquished by _____ Org. _____ Date _____ Time _____	5. Relinquished by _____ Org. _____ Date _____ Time _____
2. Received by _____ Org. _____ Date _____ Time _____	5. Received by _____ Org. _____ Date _____ Time _____
3. Relinquished by _____ Org. _____ Date _____ Time _____	6. Relinquished by _____ Org. _____ Date _____ Time _____
3. Received by _____ Org. _____ Date _____ Time _____	6. Received by _____ Org. _____ Date _____ Time _____

\*7 & 15 Day Turnaround Time: ERCL requires prior notification.

# GEL LABORATORIES LLC

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

## Certificate of Analysis

Report Date: February 6, 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:	091604-020	Project:	SNLSGWater
Sample ID:	293716007	Client ID:	SNLS003
Matrix:	AQUEOUS		
Collect Date:	10-JAN-12 09:07		
Receive Date:	11-JAN-12	Client Desc.:	SWMU 68-SA2
Collector:	Client	Vol. Recv.:	

---

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Ion Chromatography											
EPA 314.0 Perchlorate by IC "As Received"											
Perchlorate	U	ND	0.004	0.012	mg/L	1	MAR1	01/20/12	0618	1177129	1

The following Analytical Methods were performed:

---

Method	Description	Analyst Comments
1	EPA 314.0 DOE-AL	

# GEL LABORATORIES LLC

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## Certificate of Analysis

Report Date: February 6, 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: 091605-020 Project: SNLSGWater  
Sample ID: 293716020 Client ID: SNLS003  
Matrix: AQUEOUS  
Collect Date: 10-JAN-12 09:07  
Receive Date: 11-JAN-12 Client Desc.: SWMU 68-SA3  
Collector: Client Vol. Recv.:

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Ion Chromatography											
EPA 314.0 Perchlorate by IC "As Received"											
Perchlorate	U	ND	0.004	0.012	mg/L	1	MAR1	01/20/12	0637	1177129	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

*085-mw3*

Internal Lab

Batch No. *N/A*

SAR/WR No.

**AR/COC 613955**

Dept. No./Mail Stop: 6234/0718	Date Samples Shipped: <i>1/11/12</i> SMO USE	Contract No.: PO 691436	<input type="checkbox"/> Waste Characterization RCRA Date= _____ <input type="checkbox"/> Send: Preliminary/report to _____ <input checked="" type="checkbox"/> Validation Required <input type="checkbox"/> Released by COC No.: _____ Bill To: Sandia National Labs (Accounts Payable) P.O. Box 5800, MS-0154 Albuquerque, NM., 87185-0154
Project/Task Manager: Alicia Aragon	Carrier/Waybill No.: <i>136030</i>	Project/Task No.: 98026.01.13	
Project Name: SWMU 68 GW Char	Lab Contact: Edie Kent/803-556-8171	SMO Authorization: <i>[Signature]</i>	
Record Center Code: ER/1267 074/DAT	Lab Destination: GEL	<i>9 MO</i>	
Logbook Ref. No.: ER 049	SMO Contact/Phone: Lorraine Herrera /505-844-3199	<i>505 BOTTLES ORDER</i>	
Service Order No.: CFO# 0263-12	Send Report to SMO:		

Location	Tech Area	<b>Reference LOV (available at SMO)</b>
Building	Room	

Sample No.-Fraction	ER Sample ID or Sample Location Detail	Beginning Depth (ft)	ER Site No.	Date/Time (hr) Collected		Sample Matrix	Container		Preserve All@4C	Collection Method	Sample Type	Parameter & Method Requested	Lab Sample ID
							Type	Volume					
091607 -001	SWMU 68-SA4	N/A	N/A	1/11/12	8:54	GW	G	3x40ml	HCL	G	SA	TCL VOC (SW846-8260B)	
091607 -002	SWMU 68-SA4	N/A	N/A	1/11/12	8:56	GW	AG	4x1L	4C	G	SA	TCL SVOC (SW846-8270C)	
091607 -009	SWMU 68-SA4	N/A	N/A	1/11/12	8:58	GW	P	500 ml	HNO3	G	SA	TAL Metals + Ur (SW846-6010/6020/7470)	
091607 -014	SWMU 68-SA4	N/A	N/A	1/11/12	8:59	GW	P	250 ml	4C	G	SA	Hexavalent Chromium (SW846-7196A)	
091607 -016	SWMU 68-SA4	N/A	N/A	1/11/12	9:00	GW	P	125 ml	4C	G	SA	Anions (SW846-9056)	
091607 -017	SWMU 68-SA4	N/A	N/A	1/11/12	9:01	FGW	P	250 ml	HNO3	G	SA	Cations (SW846-6020)	
091607 -018	SWMU 68-SA4	N/A	N/A	1/11/12	9:03	GW	P	125 ml	H2SO4	G	SA	NPN (353.2)	
091607 -020	SWMU 68-SA4	N/A	N/A	1/11/12	9:04	GW	P	250 ml	4C	G	SA	Perchlorate (314.0) *	
091607 -022	SWMU 68-SA4	N/A	N/A	1/11/12	9:05	GW	P	500 ml	4C	G	SA	Alkalinity (SM2320B)	
091607 -024	SWMU 68-SA4	N/A	N/A	1/11/12	9:06	GW	AG	4x1L	4C	G	SA	HE (SW846-8321A)	

RMMA <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Ref. No. _____ Sample Disposal <input type="checkbox"/> Return to Client <input checked="" type="checkbox"/> Disposal by lab Turnaround Time <input type="checkbox"/> 7 Day * <input type="checkbox"/> 15 Day * <input checked="" type="checkbox"/> 30 Day Return Samples By: <input type="checkbox"/> Negotiated TAT	Sample Tracking SMO Use Date Entered (mm/dd/yy) _____ Entered by: _____ QC inits. _____	Special Instructions/QC Requirements: EDD <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No Raw Data Packag <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No *Send/e-mail report to: Tim Jackson/ORG. 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) *Please list as separate report.	Abnormal Conditions on Receipt
---	--	--	--------------------------------

1. Relinquished by <i>A. H. S. Adelle</i> Org. <i>4142</i> Date <i>1/11/12</i> Time <i>1:00</i>	4. Relinquished by _____ Org. _____ Date _____ Time _____
1. Received by <i>[Signature]</i> Org. <i>4142</i> Date <i>1/11/12</i> Time <i>1:00</i>	4. Received by _____ Org. _____ Date _____ Time _____
2. Relinquished by _____ Org. _____ Date _____ Time _____	5. Relinquished by _____ Org. _____ Date _____ Time _____
2. Received by _____ Org. _____ Date _____ Time _____	5. Received by _____ Org. _____ Date _____ Time _____
3. Relinquished by _____ Org. _____ Date _____ Time _____	6. Relinquished by _____ Org. _____ Date _____ Time _____
3. Received by _____ Org. _____ Date _____ Time _____	6. Received by _____ Org. _____ Date _____ Time _____

\*7 & 15 Day Turnaround Time: ERCL requires prior notification.



# GEL LABORATORIES LLC

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

## Certificate of Analysis

Report Date: February 6, 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:	091607-020	Project:	SNLSGWater
Sample ID:	293838007	Client ID:	SNLS003
Matrix:	AQUEOUS		
Collect Date:	11-JAN-12 09:04		
Receive Date:	12-JAN-12	Client Desc.:	SWMU 68-SA4
Collector:	Client	Vol. Recv.:	

---

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Ion Chromatography											
EPA 314.0 Perchlorate by IC "As Received"											
Perchlorate	U	ND	0.004	0.012	mg/L	1	MAR1	01/20/12	0656	1177129	1

The following Analytical Methods were performed:

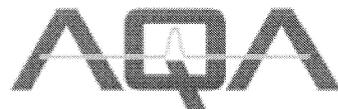
Method	Description	Analyst Comments
1	EPA 314.0 DOE-AL	

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





## Sample Findings Summary



AR/COC: 613958

Page 1 of 1

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
<b>DOE EML HASL-300, U-02-RC</b>			
	091615-035/SWMU 8/58-SA1	Uranium-235/236 (13982-70-2)	BD, FR3
	091616-035/SWMU 8/58-SA2	Uranium-233/234 (N/A)	J+, IS2
	091616-035/SWMU 8/58-SA2	Uranium-235/236 (13982-70-2)	BD, FR3
	091616-035/SWMU 8/58-SA2	Uranium-238 (7440-61-1)	J+, IS2
<b>EPA 901.1</b>			
	091615-033/SWMU 8/58-SA1	Americium-241 (14596-10-2)	BD, FR3
	091615-033/SWMU 8/58-SA1	Cesium-137 (10045-97-3)	BD, FR3
	091615-033/SWMU 8/58-SA1	Cobalt-60 (10198-40-0)	BD, FR3
	091615-033/SWMU 8/58-SA1	Potassium-40 (13966-00-2)	BD, FR3
	091616-033/SWMU 8/58-SA2	Americium-241 (14596-10-2)	BD, FR3
	091616-033/SWMU 8/58-SA2	Cesium-137 (10045-97-3)	BD, FR3
	091616-033/SWMU 8/58-SA2	Cobalt-60 (10198-40-0)	BD, FR3
	091616-033/SWMU 8/58-SA2	Potassium-40 (13966-00-2)	BD, FR3
<b>SW846 3005/6020 DOE-AL</b>			
	091615-009/SWMU 8/58-SA1	Nickel (7440-02-0)	UJ, B4
	091615-009/SWMU 8/58-SA1	Thallium (7440-28-0)	0.0032U, B3
	091616-009/SWMU 8/58-SA2	Nickel (7440-02-0)	UJ, B4
<b>SW846 3535/8321A Modified</b>			
	091615-024/SWMU 8/58-SA1	Tetryl (479-45-8)	UJ, MS3,MS5,L3
	091616-024/SWMU 8/58-SA2	Tetryl (479-45-8)	UJ, MS3,MS5,L3
<b>SW846 9012B</b>			
	091615-027/SWMU 8/58-SA1	Cyanide, Total (57-12-5)	UJ, B4
	091616-027/SWMU 8/58-SA2	Cyanide, Total (57-12-5)	UJ, B4

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



## Memorandum

Date: February 21, 2012

To: File

From: Kevin Lambert

Subject: Inorganic Data Review and Validation – SNL  
Site: SWMU 8 and 58 GW Characterization  
AR/COC: 613958  
SDG: 294178  
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 EPA 9056 (anions by ion chromatography), EPA 353.2 (nitrate/nitrite by Cd reduction), EPA 314.0 (perchlorate), SM 2320B (alkalinity), and EPA 9012B (total cyanide). Data were reported for all required analytes. Problems were identified with the data package that results in the qualification of data.

1. Total Cyanide:

Total cyanide was detected in the ICB/CCB at negative concentrations with an absolute value > the MDL but ≤ the PQL. The associated sample results were NDs and will be **qualified “UJ,B4.”**

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

### Holding Times and Preservation

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

### Calibration

All initial and continuing calibration met QC acceptance criteria.

## **Blanks**

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

### Nitrate/Nitrite:

Nitrate/Nitrite was detected in the MB at a concentration  $>$  the MDL but  $\leq$  the PQL. The associated sample results were detects  $>5X$  the MB and will not be qualified.

### Anions:

In the EB, sample 293963-006 from another SNL SDG, associated with samples 294178-004 and -016 chloride was detected at a concentration  $>$  the PQL. The associated sample results were detects  $>5X$  the EB and will not be qualified.

### Alkalinity:

In the EB, sample 293963-007 from another SNL SDG, associated with samples 294178-007 and -019 total and bicarbonate alkalinity were detected at concentrations  $>$  the PQL. However, blanks are not applicable for alkalinity and are not assessed for data validation. No sample data will be qualified as a result.

## **Laboratory Control Sample (LCS)**

All LCS recoveries met QC acceptance criteria.

## **Matrix Spike (MS)**

All MS recoveries met QC acceptance criteria.

### Anions, Nitrate/Nitrite, Perchlorate, and Alkalinity:

It should be noted that the MS analyses were performed on a SNL sample from another SDG. No sample data will be qualified as a result.

## **Laboratory Replicate**

The replicate met all QC acceptance criteria.

### Anions, Nitrate/Nitrite, Perchlorate, and Alkalinity:

It should be noted that the replicate analyses were performed on a SNL sample 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 except as follows.

### Nitrate/Nitrite:

The samples were diluted 5X due to matrix interference.

### Anions:

The samples were diluted 2X for chloride and sulfate due to high concentration for this analysis.

All associated batch QC samples were analyzed at dilution factors that resulted in relative dilution factors to the sample that were  $\leq 5X$ . No sample data will be qualified as a result.

**Other QC**

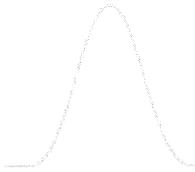
Field duplicate pairs were submitted on the AR/COC(s). There are no “required” review criteria for field duplicate analyses comparability; no data will be qualified as a result. It should be noted that the EBs are from another SNL SDG on AR/COC# 613957.

No other specific issues that affect data quality were identified.

**Reviewed by:** Marcia Hilchey

**Date:** 02/21/12





## Sample Findings Summary



AR/COC: 613956

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Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
<b>DOE EML HASL-300, U-02-RC</b>			
	091610-035/SWMU 8/58-SA3	Uranium-235/236 (13982-70-2)	J, FR7
<b>EPA 900.0/SW846 9310</b>			
	091610-034/SWMU 8/58-SA3	BETA (12587-47-2)	J, FR7
<b>EPA 901.1</b>			
	091610-033/SWMU 8/58-SA3	Americium-241 (14596-10-2)	BD, FR3
	091610-033/SWMU 8/58-SA3	Cesium-137 (10045-97-3)	BD, FR3
	091610-033/SWMU 8/58-SA3	Cobalt-60 (10198-40-0)	BD, FR3
	091610-033/SWMU 8/58-SA3	Potassium-40 (13966-00-2)	BD, FR3
<b>SW846 3005/6020 DOE-AL</b>			
	091610-009/SWMU 8/58-SA3	Aluminum (7429-90-5)	0.29UJ, B
	091610-009/SWMU 8/58-SA3	Nickel (7440-02-0)	UJ, B4
	091610-009/SWMU 8/58-SA3	Sodium (7440-23-5)	J, D1
	091610-009/SWMU 8/58-SA3	Thallium (7440-28-0)	0.0030U, B3
	091610-017/SWMU 8/58-SA3	Sodium (7440-23-5)	J, D1
<b>SW846 3535/8321A Modified</b>			
	091610-024/SWMU 8/58-SA3	Tetryl (479-45-8)	UJ, L3
<b>SW846 8270C</b>			
	091610-002/SWMU 8/58-SA3	4-Nitrophenol (100-02-7)	UJ, MS3,MS5,L3
	091610-002/SWMU 8/58-SA3	bis(1-Chloroisopropyl)ether (108-60-1)	UJ, C3
	091610-002/SWMU 8/58-SA3	p-Nitroaniline (100-01-6)	UJ, MS5
	091610-002/SWMU 8/58-SA3	Pyrene (129-00-0)	UJ, MS5

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



## Memorandum

Date: February 23, 2012  
To: File  
From: Kevin Lambert  
Subject: Inorganic Data Review and Validation – SNL  
Site: SWMU 8 and 58 GW Characterization  
AR/COC: 613956  
SDG: 293951  
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**

One sample was prepared and analyzed with accepted procedures using methods EPA 9056 (anions by ion chromatography), EPA 353.2 (nitrate/nitrite by Cd reduction), EPA 314.0 (perchlorate), SM 2320B (alkalinity), and EPA 9012B (total cyanide). Data were reported for all required analytes. No problems were identified with the data package that results 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 analyzed within the prescribed holding times and properly preserved.

### **Calibration**

All initial and continuing calibration met QC acceptance criteria.

### **Blanks**

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

Nitrate/Nitrite:

Nitrate/Nitrite was detected in the MB at a concentration > the MDL but ≤ the PQL. The associated sample result was an ND 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.

Nitrate/Nitrite, Perchlorate, and Total Cyanide:

It should be noted that the MS analyses were performed on a SNL sample from another SDG. No sample data will be qualified as a result.

**Laboratory Replicate**

The replicate met all QC acceptance criteria.

Nitrate/Nitrite, Perchlorate, and Total Cyanide:

It should be noted that the replicate analyses were performed on a SNL sample 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 except as follows.

Anions:

Sample 293951-004 was diluted 5X due to high concentration for this analysis.

Nitrate/Nitrite:

Sample -005 was diluted 5X for chloride and sulfate due to high concentrations for this analysis.

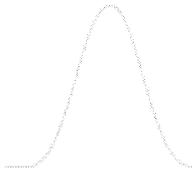
All associated batch QC samples were analyzed at dilution factors that resulted in relative dilution factors to the sample that were ≤5X. No sample data will be qualified as a result.

**Other QC**

No other specific issues that affect data quality were identified.

**Reviewed by:** Marcia Hilchey

**Date:** 02/23/12



## Sample Findings Summary



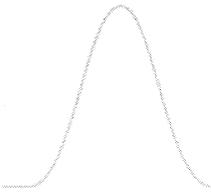
AR/COC: 614055

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Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
<b>EPA 901.1</b>			
	091949-033/CTF-MW2	Americium-241 (14596-10-2)	BD, FR3
	091949-033/CTF-MW2	Cesium-137 (10045-97-3)	BD, FR3
	091949-033/CTF-MW2	Cobalt-60 (10198-40-0)	BD, FR3
	091949-033/CTF-MW2	Potassium-40 (13966-00-2)	BD, FR3
	091950-033/CTF-MW2	Americium-241 (14596-10-2)	BD, FR3
	091950-033/CTF-MW2	Cesium-137 (10045-97-3)	BD, FR3
	091950-033/CTF-MW2	Cobalt-60 (10198-40-0)	BD, FR3
	091950-033/CTF-MW2	Potassium-40 (13966-00-2)	J, FR7
<b>SW846 3005/6020 DOE-AL</b>			
	091949-009/CTF-MW2	Aluminum (7429-90-5)	J-, DL2
	091949-009/CTF-MW2	Copper (7440-50-8)	0.00316U, B2
	091949-010/CTF-MW2	Aluminum (7429-90-5)	J-, DL2
	091950-009/CTF-MW2	Aluminum (7429-90-5)	J-, DL2
	091950-009/CTF-MW2	Copper (7440-50-8)	0.00316U, B2
	091950-010/CTF-MW2	Aluminum (7429-90-5)	J-, DL2
<b>SW846 7470A</b>			
	091949-009/CTF-MW2	Mercury (7439-97-6)	UJ, B4
	091949-010/CTF-MW2	Mercury (7439-97-6)	UJ, B4
	091950-009/CTF-MW2	Mercury (7439-97-6)	UJ, B4
	091950-010/CTF-MW2	Mercury (7439-97-6)	UJ, B4
<b>SW846 8260B DOE-AL</b>			
	091952-001/SWMU-FB2	Bromodichloromethane (75-27-4)	3.75U, B2
	091952-001/SWMU-FB2	Chloroform (67-66-3)	10.20U, B2
	091952-001/SWMU-FB2	Dibromochloromethane (124-48-1)	0.300U, B2

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





## Memorandum

Date: May 16, 2012  
To: File  
From: Marcia Hilchey  
Subject: Inorganic Data Review and Validation – SNL  
Site: SWMU 154 GWM  
AR/COC: 614055  
SDG: 300712  
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

Two samples were prepared and analyzed with accepted procedures using methods EPA 9056 (anions by ion chromatography), EPA 353.2 (nitrate/nitrite by Cd reduction), EPA 314.0 (perchlorate by IC), and SM 2320B (alkalinity). Data were reported for all required analytes. No problems were identified with the data package that results in the qualification of data.

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

### Holding Times and Preservation

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

### Calibration

All initial and continuing calibration met QC acceptance criteria.

### Blanks

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

#### Anions:

Chloride was detected in the EB from COC 614054 associated with this COC. The chloride result was U qualified due to MB contamination, and will not be applied to associated results in this COC.

**Laboratory Control Sample (LCS):**

All LCS acceptance criteria were met.

**Matrix Spike (MS)**

All MS/PS recoveries met QC acceptance criteria.

Perchlorate:

It should be noted that the sample used for MS analyses was from another SNL SDG. No sample results will be qualified as a result.

**Laboratory Replicate**

The replicate analyses met all QC acceptance criteria.

Perchlorate:

It should be noted that the sample used for replicate analysis was from another SNL SDG. No sample results will be qualified as a result.

**Detection Limits/Dilutions**

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

Anions:

Both samples were diluted 10X for bromide and 100X for chloride and sulfate.

Nitrate/Nitrite:

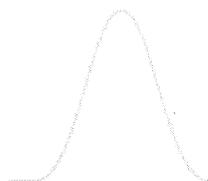
Sample -006 was diluted 25X, and sample -018 was diluted 5X.

All associated batch QC samples were analyzed at dilution factors that resulted in relative dilution factors to the sample that were  $\leq 5X$ . No sample data will be qualified as a result.

**Other QC**

EBs associated with this COC was submitted on COC 614054. Field duplicates were submitted on this COC. There are no "required" review criteria for field duplicate analyses comparability; no data will be qualified as a result.

No other specific issues that affect data quality were identified.



## Sample Findings Summary



AR/COC: 614052, 614053

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Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
<b>SW846 3005/6020 DOE-AL</b>			
	091941-009/SWMU-EB1	Iron (7439-89-6)	0.1745U, B
	091941-010/SWMU-EB1	Cobalt (7440-48-4)	0.00051U, B
	091941-010/SWMU-EB1	Iron (7439-89-6)	0.1745U, B
	091943-009/CTF-MW3	Cobalt (7440-48-4)	0.00061U, B, B3
	091943-009/CTF-MW3	Copper (7440-50-8)	0.0041U, B2
	091943-009/CTF-MW3	Zinc (7440-66-6)	0.0182U, B2
	091943-010/CTF-MW3	Cobalt (7440-48-4)	0.00051U, B
	091943-010/CTF-MW3	Copper (7440-50-8)	0.00351U, B2
	091944-009/CTF-MW3	Cobalt (7440-48-4)	0.00061U, B, B3
	091944-009/CTF-MW3	Copper (7440-50-8)	0.0041U, B2
	091944-009/CTF-MW3	Zinc (7440-66-6)	0.0182U, B2
	091944-010/CTF-MW3	Cobalt (7440-48-4)	0.00051U, B
	091944-010/CTF-MW3	Copper (7440-50-8)	0.00351U, B2
<b>SW846 7470A</b>			
	091941-009/SWMU-EB1	Mercury (7439-97-6)	UJ, B4
	091941-010/SWMU-EB1	Mercury (7439-97-6)	UJ, B4
	091943-009/CTF-MW3	Mercury (7439-97-6)	UJ, B4
	091943-010/CTF-MW3	Mercury (7439-97-6)	UJ, B4
	091944-009/CTF-MW3	Mercury (7439-97-6)	UJ, B4
	091944-010/CTF-MW3	Mercury (7439-97-6)	UJ, B4
<b>SW846 8260B DOE-AL</b>			
	091941-001/SWMU-EB1	Acetone (67-64-1)	J+, C2
	091941-001/SWMU-EB1	Bromoform (75-25-2)	UJ, MS3
	091941-001/SWMU-EB1	Methylene chloride (75-09-2)	UJ, I3, L3

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
	091942-001/SWMU-TB1	Bromoform (75-25-2)	UJ, MS3
	091942-001/SWMU-TB1	Methylene chloride (75-09-2)	UJ, I3, L3
	091943-001/CTF-MW3	Bromodichloromethane (75-27-4)	1.00U, B2
	091943-001/CTF-MW3	Bromoform (75-25-2)	UJ, MS3
	091943-001/CTF-MW3	Chloroform (67-66-3)	1.00U, B2
	091943-001/CTF-MW3	Dibromochloromethane (124-48-1)	1.00U, B2
	091943-001/CTF-MW3	Methylene chloride (75-09-2)	UJ, I3, L3
	091944-001/CTF-MW3	Bromodichloromethane (75-27-4)	1.00U, B2
	091944-001/CTF-MW3	Bromoform (75-25-2)	UJ, MS3
	091944-001/CTF-MW3	Chloroform (67-66-3)	1.00U, B2
	091944-001/CTF-MW3	Dibromochloromethane (124-48-1)	1.00U, B2
	091944-001/CTF-MW3	Methylene chloride (75-09-2)	UJ, I3, L3
	091945-001/SWMU-TB2	Bromoform (75-25-2)	UJ, MS3
	091945-001/SWMU-TB2	Methylene chloride (75-09-2)	UJ, I3, L3
	091946-001/SWMU-FB1	Bromodichloromethane (75-27-4)	4.05U, B2
	091946-001/SWMU-FB1	Bromoform (75-25-2)	UJ, MS3
	091946-001/SWMU-FB1	Chloroform (67-66-3)	16.7U, B2
	091946-001/SWMU-FB1	Dibromochloromethane (124-48-1)	1.00U, B2
	091946-001/SWMU-FB1	Methylene chloride (75-09-2)	UJ, I3, L3

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

## Memorandum

Date: May 2, 2012  
To: File  
From: Marcia Hilchey  
Subject: Inorganic Data Review and Validation – SNL  
Site: SWMU 149 GWM  
AR/COC: 614052, -053  
SDG: 298650  
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

Three samples were prepared and analyzed with accepted procedures using methods EPA 9056 (anions by ion chromatography), EPA 353.2 (nitrate/nitrite by Cd reduction), EPA 314.0 (perchlorate by IC), and SM 2320B (alkalinity). Data were reported for all required analytes. No problems were identified with the data package that results in the qualification of data.

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

### Holding Times and Preservation

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

### Calibration

All initial and continuing calibration met QC acceptance criteria.

### Blanks

No target analytes were detected in the blanks with the following exceptions.

#### Anions:

Chloride was reported in the EB at a concentration  $> \text{MDL}$  and  $d < \text{PQL}$ . All associated sample results were ND and will not be qualified.

Nitrate/Nitrite:

Nitrate/nitrite was reported in the MB at a concentration > MDL and < PQL. All associated sample results were ND or > 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/PS recoveries met QC acceptance criteria.

**Laboratory Replicate**

The replicate analyses met all QC acceptance criteria.

**Detection Limits/Dilutions**

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

Anions:

Samples -003 and -009 were diluted 50X for chloride and sulfate.

Nitrate/Nitrite:

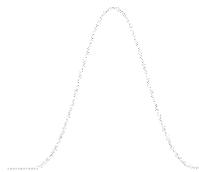
Samples -004 and -010 were diluted 25X. Sample -018 was diluted 5X.

All associated batch QC samples were analyzed at dilution factors that resulted in relative dilution factors to the sample that were  $\leq 5X$ . No sample data will be qualified as a result.

**Other QC**

EBs and field duplicate samples were submitted with AR/COC. There are no “required” review criteria for field duplicate analyses comparability; no data will be qualified as a result.

No other specific issues that affect data quality were identified.



## Sample Findings Summary



AR/COC: 613979, 613980, 613981

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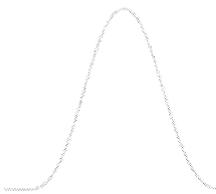
Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
<b>EPA 900.0/SW846 9310</b>	091692-034/CYN-MW5	ALPHA (12587-46-1)	J, FR7
<b>EPA 901.1</b>	091692-033/CYN-MW5	Americium-241 (14596-10-2)	BD, FR3
	091692-033/CYN-MW5	Cesium-137 (10045-97-3)	BD, FR3
	091692-033/CYN-MW5	Cobalt-60 (10198-40-0)	BD, FR3
	091692-033/CYN-MW5	Potassium-40 (13966-00-2)	BD, FR3
<b>SW846 3005/6020 DOE-AL</b>	091692-009/CYN-MW5	Barium (7440-39-3)	J, MS3
	091692-009/CYN-MW5	Iron (7439-89-6)	0.17U, B
	091692-009/CYN-MW5	Sodium (7440-23-5)	J, D1
	091692-017/CYN-MW5	Sodium (7440-23-5)	J, D1
	091695-009/CTF-EB1	Barium (7440-39-3)	UJ, MS3
	091695-009/CTF-EB1	Calcium (7440-70-2)	0.70U, B
	091695-009/CTF-EB1	Sodium (7440-23-5)	UJ, D1
	091695-017/CTF-EB1	Calcium (7440-70-2)	0.70U, B
	091695-017/CTF-EB1	Sodium (7440-23-5)	UJ, D1
	091700-009/CTF-MW1	Barium (7440-39-3)	J, MS3
	091700-009/CTF-MW1	Copper (7440-50-8)	0.0040U, B2
	091700-009/CTF-MW1	Sodium (7440-23-5)	J, D1
	091700-017/CTF-MW1	Sodium (7440-23-5)	J, D1
	091701-009/CTF-MW1	Barium (7440-39-3)	J, MS3
	091701-009/CTF-MW1	Copper (7440-50-8)	0.0040U, B2
	091701-009/CTF-MW1	Sodium (7440-23-5)	J, D1
	091701-017/CTF-MW1	Sodium (7440-23-5)	J, D1
<b>SW846 9012B</b>			

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Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
	091692-027/CYN-MW5	Cyanide, Total (57-12-5)	UJ, B4
	091695-027/CTF-EB1	Cyanide, Total (57-12-5)	UJ, B4
	091700-027/CTF-MW1	Cyanide, Total (57-12-5)	UJ, B4
	091701-027/CTF-MW1	Cyanide, Total (57-12-5)	UJ, B4

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

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## Memorandum

Date: March 9, 2012  
To: File  
From: Kevin Lambert  
Subject: Inorganic Data Review and Validation – SNL  
Site: SWMU 49 and 116 GWM  
AR/COC: 613979, 613980, and 613981  
SDG: 295072  
Laboratory: GEL  
Project/Task: 146422.10.11.01  
Analysis: General Chemistry

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

### Summary

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

1. Total Cyanide:  
Total cyanide was detected in the CCB at a negative concentrations with an absolute value > the MDL but ≤ the PQL. The associated sample results were NDs and will be **qualified “UJ,B4.”**

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

### Holding Times and Preservation

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

### Calibration

All initial and continuing calibration met QC acceptance criteria.

### **Blanks**

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

#### Anions:

In the CCB, associated with sample 295072-003, chloride was detected at a concentration > the PQL. The associated sample result was a detect >5X the CCB and will not be qualified.

In the EB, sample -015, associated with samples -024 and -032 chloride was detected at a concentration > the PQL. The associated sample results were detects >5X the EB 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.

#### Alkalinity:

It should be noted that the MS analyses were performed on a SNL sample from another SDG. No sample data will be qualified as a result.

### **Laboratory Replicate**

The replicate met all QC acceptance criteria.

#### Alkalinity:

It should be noted that the replicate analyses were performed on a SNL sample 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 except as follows.

#### Nitrate/Nitrite:

Samples were diluted 10X due to high concentrations for this analysis or due to matrix interference.

#### Anions:

Samples -024 and -032 were diluted 5X for chloride and sulfate due to high concentration for this analysis.

All associated batch QC samples were analyzed at dilution factors that resulted in relative dilution factors to the sample that were  $\leq 5X$ . No sample data will be qualified as a result.

**Other QC**

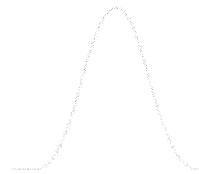
EBs and field duplicate pairs were submitted on the AR/COC(s). There are no “required” review criteria for field duplicate analyses comparability; no data will be qualified as a result. It should be noted that the EBs on AR/COC# 613980 are associated with the samples on AR/COC# 613981.

No other specific issues that affect data quality were identified.

**Reviewed by:** Marcia Hilchey

**Date:** 03/12/12





## Sample Findings Summary



AR/COC: 613952, 613953

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Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
<b>DOE EML HASL-300, U-02-RC</b>			
	091600-035/SWMU 68-SA1	Uranium-235/236 (13982-70-2)	J, FR7
	091602-035/SWMU 68-EB1	Uranium-233/234 (N/A)	BD, FR3
	091602-035/SWMU 68-EB1	Uranium-235/236 (13982-70-2)	BD, FR3
	091602-035/SWMU 68-EB1	Uranium-238 (7440-61-1)	BD, FR3
<b>EPA 353.2</b>			
	091600-018/SWMU 68-SA1	Nitrogen, Nitrate/Nitrite (N/A)	J, MS1,RP1
	091602-018/SWMU 68-EB1	Nitrogen, Nitrate/Nitrite (N/A)	UJ, MS1,RP1
<b>EPA 900.0/SW846 9310</b>			
	091602-034/SWMU 68-EB1	ALPHA (12587-46-1)	BD, FR3
	091602-034/SWMU 68-EB1	BETA (12587-47-2)	BD, FR3
<b>EPA 901.1</b>			
	091600-033/SWMU 68-SA1	Americium-241 (14596-10-2)	BD, FR3
	091600-033/SWMU 68-SA1	Cesium-137 (10045-97-3)	BD, FR3
	091600-033/SWMU 68-SA1	Cobalt-60 (10198-40-0)	BD, FR3
	091600-033/SWMU 68-SA1	Potassium-40 (13966-00-2)	BD, FR3
	091602-033/SWMU 68-EB1	Americium-241 (14596-10-2)	BD, FR3
	091602-033/SWMU 68-EB1	Cesium-137 (10045-97-3)	BD, FR3
	091602-033/SWMU 68-EB1	Cobalt-60 (10198-40-0)	BD, FR3
	091602-033/SWMU 68-EB1	Potassium-40 (13966-00-2)	BD, FR3
<b>SW846 3005/6020 DOE-AL</b>			
	091602-009/SWMU 68-EB1	Calcium (7440-70-2)	0.68U, B
	091602-017/SWMU 68-EB1	Calcium (7440-70-2)	0.68U, B
<b>SW846 3535/8321A Modified</b>			
	091600-024/SWMU 68-SA1	HMX (2691-41-0)	UJ, MS5
	091600-024/SWMU 68-SA1	Tetryl (479-45-8)	UJ, L3
	091602-024/SWMU 68-EB1	HMX (2691-41-0)	UJ, MS5

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Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
	091602-024/SWMU 68-EB1	Tetryl (479-45-8)	UJ, L3

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

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## Memorandum

Date: February 24, 2012

To: File

From: Kevin Lambert

Subject: Inorganic Data Review and Validation – SNL  
Site: SWMU 68 GW Characterization  
AR/COC: 613952 and 613953  
SDG: 293626  
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 EPA 7196A (hexavalent chromium), EPA 9056 (anions by ion chromatography), EPA 353.2 (nitrate/nitrite by Cd reduction), EPA 314.0 (perchlorate), SM 2320B (alkalinity), and EPA 9012B (total cyanide). Data were reported for all required analytes. Problems were identified with the data package that results in the qualification of data.

#### 1. Nitrate/Nitrite:

The relative dilution factor between samples 293626-006 and -010 and the QC sample was >5. The nitrate/nitrite result for sample -006 was a detect and will be **qualified “J,MS1,RP1”** due to lack of matrix-specific accuracy and precision data. The nitrate/nitrite result for sample -010 was an ND and will be **qualified “UJ,MS1,RP1”** due to lack of matrix-specific accuracy and precision data.

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

### Holding Times and Preservation

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

### Calibration

All initial and continuing calibration met QC acceptance criteria.

## **Blanks**

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

### Alkalinity:

In the MB, total and bicarbonate alkalinity were detected at concentrations > the PQL. However, blanks are not applicable for alkalinity and are not assessed for data validation. No sample data will be qualified as a result.

## **Laboratory Control Sample (LCS)**

All LCS recoveries met QC acceptance criteria.

## **Matrix Spike (MS)**

All MS recoveries met QC acceptance criteria.

### Nitrate/Nitrite:

It should be noted that the MS analyses were performed on a SNL sample from another SDG. No sample data will be qualified as a result.

## **Laboratory Replicate**

The replicate met all QC acceptance criteria.

### Nitrate/Nitrite:

It should be noted that the replicate analyses were performed on a SNL sample 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 except as follows.

### Anions:

Sample -005 was diluted 5X for chloride and sulfate due to high concentrations for this analysis.

### Nitrate/Nitrite:

Sample -006 was diluted 5X due to high concentration for this analysis and sample -020 was diluted 5X due to matrix interference.

All associated batch QC samples, except as noted above in the summary section, were analyzed at dilution factors that resulted in relative dilution factors to the sample that were  $\leq 5X$ . No sample data will be qualified as a result.

## **Other QC**

EBs were submitted on the AR/COC(s). It should be noted that the EBs on AR/COC# 613953 are associated with the samples on AR/COC# 613954 in another SDG.

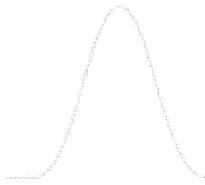
No other specific issues that affect data quality were identified.

**Reviewed by:** Marcia Hilchey

**Date:** 02/24/12

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## Sample Findings Summary



AR/COC: 613954

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Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
EPA 353.2	091604-018/SWMU 68-SA2	Nitrogen, Nitrate/Nitrite (N/A)	J, MS1,RP1
	091605-018/SWMU 68-SA3	Nitrogen, Nitrate/Nitrite (N/A)	J, MS1,RP1
EPA 901.1	091604-033/SWMU 68-SA2	Americium-241 (14596-10-2)	BD, FR3
	091604-033/SWMU 68-SA2	Cesium-137 (10045-97-3)	BD, FR3
	091604-033/SWMU 68-SA2	Cobalt-60 (10198-40-0)	BD, FR3
	091604-033/SWMU 68-SA2	Potassium-40 (13966-00-2)	BD, FR3
	091605-033/SWMU 68-SA3	Americium-241 (14596-10-2)	BD, FR3
	091605-033/SWMU 68-SA3	Cesium-137 (10045-97-3)	BD, FR3
	091605-033/SWMU 68-SA3	Cobalt-60 (10198-40-0)	BD, FR3
	091605-033/SWMU 68-SA3	Potassium-40 (13966-00-2)	BD, FR3
SW846 3005/6020 DOE-AL	091604-009/SWMU 68-SA2	Copper (7440-50-8)	0.0028U, B2
	091605-009/SWMU 68-SA3	Copper (7440-50-8)	0.0028U, B2
SW846 3535/8321A Modified	091604-024/SWMU 68-SA2	Tetryl (479-45-8)	UJ, MS3,MS5,L3
	091605-024/SWMU 68-SA3	Tetryl (479-45-8)	UJ, MS3,MS5,L3

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



## Memorandum

Date: February 24, 2012  
To: File  
From: Kevin Lambert  
Subject: Inorganic Data Review and Validation – SNL  
Site: SWMU 68 GW Characterization  
AR/COC: 613954  
SDG: 293716  
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 EPA 7196A (hexavalent chromium), EPA 9056 (anions by ion chromatography), EPA 353.2 (nitrate/nitrite by Cd reduction), EPA 314.0 (perchlorate), SM 2320B (alkalinity), and EPA 9012B (total cyanide). Data were reported for all required analytes. Problems were identified with the data package that results in the qualification of data.

1. Nitrate/Nitrite:

The relative dilution factor between samples 293716-006 and -019 and the QC sample was >5. The associated sample results were detects and will be **qualified “J,MS1,RP1”** due to lack of matrix-specific accuracy and precision data.

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

### Holding Times and Preservation

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

### Calibration

All initial and continuing calibration met QC acceptance criteria.

### **Blanks**

No target analytes were detected in the blanks.

### **Laboratory Control Sample (LCS)**

All LCS recoveries met QC acceptance criteria.

### **Matrix Spike (MS)**

All MS recoveries met QC acceptance criteria.

#### Anions, Nitrate/Nitrite, Perchlorate, Total Cyanide:

It should be noted that the MS analyses were performed on a SNL sample from another SDG. No sample data will be qualified as a result.

### **Laboratory Replicate**

The replicate met all QC acceptance criteria.

#### Anions, Nitrate/Nitrite, Perchlorate, Total Cyanide:

It should be noted that the replicate analyses were performed on a SNL sample 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 except as follows.

#### Anions:

Samples were diluted 5X for chloride and sulfate due to high concentrations for this analysis.

#### Nitrate/Nitrite:

Samples were diluted 5X due to matrix interference.

All associated batch QC samples, except as noted above in the summary section, were analyzed at dilution factors that resulted in relative dilution factors to the sample that were  $\leq 5X$ . No sample data will be qualified as a result.

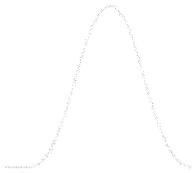
### **Other QC**

A field duplicate pair was submitted on the AR/COC(s). There are no "required" review criteria for field duplicate analyses comparability; no data will be qualified as a result. It should be noted that the EBs are from another SNL SDG on AR/COC# 613953.

No other specific issues that affect data quality were identified.

**Reviewed by:** Marcia Hilchey

**Date:** 02/25/12



## Sample Findings Summary



AR/COC: 613955

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Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
<b>EPA 901.1</b>			
	091607-033/SWMU 68-SA4	Americium-241 (14596-10-2)	BD, Z2
	091607-033/SWMU 68-SA4	Cesium-137 (10045-97-3)	R, FR4
	091607-033/SWMU 68-SA4	Cobalt-60 (10198-40-0)	BD, FR3
	091607-033/SWMU 68-SA4	Potassium-40 (13966-00-2)	J, FR7
<b>SW846 3535/8321A Modified</b>			
	091607-024/SWMU 68-SA4	Tetryl (479-45-8)	UJ, L3
<b>SW846 8270C</b>			
	091607-002/SWMU 68-SA4	4-Nitrophenol (100-02-7)	UJ, MS3,L3
	091607-002/SWMU 68-SA4	bis(1-Chloroisopropyl)ether (108-60-1)	UJ, C3
<b>SW846 9012B</b>			
	091607-027/SWMU 68-SA4	Cyanide, Total (57-12-5)	UJ, B4

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



## Memorandum

Date: February 17, 2012  
To: File  
From: Kevin Lambert  
Subject: Inorganic Data Review and Validation – SNL  
Site: SWMU 68 GW Characterization  
AR/COC: 613955  
SDG: 293838  
Laboratory: GEL  
Project/Task: 98026.01.13  
Analysis: General Chemistry

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

### Summary

One sample was prepared and analyzed with accepted procedures using methods EPA 7196A (hexavalent chromium), EPA 9056 (anions by ion chromatography), EPA 353.2 (nitrate/nitrite by Cd reduction), EPA 314.0 (perchlorate), SM 2320B (alkalinity), and EPA 9012B (total cyanide). Data were reported for all required analytes. Problems were identified with the data package that results in the qualification of data.

1. Total Cyanide:

Total cyanide was detected in the CCB at a negative concentration with an absolute value > the MDL but ≤ the PQL. The associated sample result was an ND and will be **qualified “UJ,B4.”**

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

### Holding Times and Preservation

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

### Calibration

All initial and continuing calibration met QC acceptance criteria.

## **Blanks**

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

### Nitrate/Nitrite:

Nitrate/Nitrite was detected in the MB at a concentration  $>$  the MDL but  $\leq$  the PQL. The associated sample result was a detect  $>5X$  the MB 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.

### Anions and Perchlorate:

It should be noted that the MS analyses were performed on a SNL sample from another SDG. No sample data will be qualified as a result.

## **Laboratory Replicate**

The replicate met all QC acceptance criteria.

### Anions and Perchlorate:

It should be noted that the replicate analyses were performed on a SNL sample 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 except as follows.

### Anions:

The sample was diluted 5X for chloride and sulfate due to high concentrations for this analysis.

### Nitrate/Nitrite:

The sample was diluted 5X due to matrix interference.

All associated batch QC samples were analyzed at dilution factors that resulted in relative dilution factors to the sample that were  $\leq 5X$ . No sample data will be qualified as a result.

## **Other QC**

No other specific issues that affect data quality were identified.

**Reviewed by:** Marcia Hilchey

**Date:** 02/20/12

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- 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, JANUARY – MARCH 2012

#### 1.0 Introduction

This Quarterly Groundwater Monitoring 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 below.

Monitoring wells CTF-MW2 and CTF-MW3 were installed in August 2001. Prior to this sampling event, CTF-MW2 and CTF-MW3 had been sampled 16 and 15 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 fifth 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 analytical results discussed in this report correspond to the reporting period of January through March 2012. Monitoring wells CTF-MW3 and CTF-MW2 were sampled on March 26 and March 30, 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 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 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, and radionuclides by gamma spectroscopy.

Analytical results for the March 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 CTF-MW3 groundwater samples exceed the corresponding MCLs. Except for arsenic, none of the analytical results for the CTF-MW2 groundwater samples exceed the MCLs. Arsenic was detected above the MCL of 0.010 milligrams per liter (mg/L) in CTF-MW2 groundwater samples at concentrations of 0.0498 mg/L in the unfiltered sample and 0.0498 mg/L in the filtered sample. The concentrations reported for arsenic in the CTF-MW2 duplicate groundwater sample are 0.0559 mg/L in the unfiltered sample and 0.0521 mg/L in the filtered sample. These values are comparable to historical values. The elevated concentrations of arsenic in the groundwater samples is most likely attributable to background because monitoring well CTF-MW2 is screened in a fault-gouge zone in the Precambrian granite.

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.

This groundwater sampling event represents the fifth of eight supplemental quarterly events for monitoring wells CTF-MW3 and CTF-MW2. The sixth of the eight supplemental quarterly groundwater sampling events will be conducted during the upcoming quarter (April to June 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 June 2010). Groundwater monitoring at 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 CTF-MW3 and CTF-MW2 during the First 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, “Long-Term Environmental Stewardship (LTES) Groundwater Monitoring Equipment Decontamination” (SNL/NM January 2012a).

### 2.2 **Well Evacuation**

In accordance with procedures described in SNL/NM FOP 05-01, “LTES 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%, or less than 5 nephelometric turbidity units
- pH is within 0.1 units
- Temperature is within 1.0 degree Celsius
- SC is within 5% 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 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 (PQLs), 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). 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, CTF-MW3.** Table III-3 summarizes field water quality measurements (turbidity, pH, temperature, SC, ORP, and DO) collected prior to sampling well CTF-MW3.

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

### 3.2 **Volatile Organic Compounds**

**SWMU 149, CTF-MW3.** No VOCs were detected at concentrations above laboratory MDLs, except bromodichloromethane, chloroform, and dibromochloromethane. These compounds were detected below the laboratory PQL in the sample, with concentrations of 0.540, 0.720, and 0.360 micrograms per liter ( $\mu\text{g/L}$ ), respectively. The duplicate environmental sample also contained concentrations below the laboratory PQL, with values of 0.520, 0.700, and 0.330  $\mu\text{g/L}$ , respectively. No MCLs are established for these compounds. Table III-4 summarizes detected VOCs in environmental groundwater samples, and Table III-5 lists the MDLs for associated VOCs analyzed.

**SWMU 154, CTF-MW2.** No VOCs were detected at concentrations above established MCLs in the CTF-MW2 environmental sample. Table III-4 summarizes VOCs detected in environmental groundwater samples from well CTF-MW2, and Table III-6 lists the MDLs for associated VOCs analyzed.

### 3.3 **Semivolatile Organic Compounds**

**SWMU 149, CTF-MW3.** Analysis of SVOCs is not required for CTF-MW3.

**SWMU 154, CTF-MW2.** No SVOCs were detected at concentrations above established MCLs in the CTF-MW2 environmental sample. No SVOCs were reported above laboratory MDLs. Table III-6 lists the MDLs for associated SVOCs analyzed.

### 3.4 High Explosive Compounds

**SWMU 149, CTF-MW3.** Analysis of HE compounds is not required for CTF-MW3.

**SWMU 154, CTF-MW2.** No HE compounds were detected in CTF-MW2 groundwater samples at concentrations above laboratory MDLs, except RDX [hexahydro-trinitro-triazine]. RDX was detected in the primary and duplicate environmental samples collected from CTF-MW2 at concentrations of 0.147 and 0.179 µg/L, respectively. Table III-4 summarizes HE compounds detected in environmental groundwater samples, and Table III-7 lists the MDLs for the associated HE compounds analyzed.

### 3.5 Nitrate Plus Nitrite

**SWMU 149, CTF-MW3.** Table III-8 summarizes NPN results. NPN values were compared with the nitrate MCL of 10 mg/L. NPN was not detected above the nitrate MCL. The result for NPN was reported at a concentration of 6.03 mg/L in the CTF-MW3 environmental sample and 6.05 mg/L in the duplicate environmental sample.

**SWMU 154, CTF-MW2.** Table III-8 summarizes NPN results for CTF-MW2. No detections of NPN above the laboratory MDL were reported for the CTF-MW2 sample.

### 3.6 Anions and Alkalinity

**SWMU 149, CTF-MW3.** Table III-9 summarizes alkalinity and major anion (as bromide, chloride, fluoride, and sulfate) results for CTF-MW3. No parameters were detected above established MCLs.

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

### 3.7 Perchlorate

**SWMU 149, 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 CTF-MW3. Table III-10 presents the perchlorate results.

**SWMU 154, 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 CTF-MW2. Table III-10 presents the perchlorate results.

Perchlorate results are discussed in more detail in Section II of this Environmental Restoration Operations Consolidated 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 CTF-MW2 also included analysis of uranium in both the unfiltered and filtered fractions.

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

**SWMU 154, CTF-MW2.** No metals were detected above established MCLs in the 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 0.0498 mg/L, and dissolved arsenic at 0.0498 mg/L. The elevated concentrations of arsenic in the groundwater sample is most likely attributable to background because monitoring well CTF-MW2 is screened in a fault-gouge zone in the Precambrian granite. Unfiltered and filtered metal results for CTF-MW2 are summarized in Tables III-13 and III-14, respectively. In addition, arsenic concentrations since July 2002 are plotted on Figure III-3.

### 3.9 **Gamma Spectroscopy and Radioisotopic Analyses**

**SWMU 149, CTF-MW3.** Gamma spectroscopy analysis is not required for CTF-MW3.

**SWMU 154, CTF-MW2.** The CTF-MW2 groundwater sample was 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 III-15.

Gamma spectroscopy activities for short-list radionuclides are less than the associated MDAs, except for the duplicate environmental sample that contained potassium-40 values of  $48.5 \pm 41.6$  picocuries per liter (pCi/L); the result was qualified as an estimated value during data validation because the result is less than three times the associated MDA.

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 reported is below the MCL of 15 pCi/L at 6.73 pCi/L. The results reported for isotopic uranium are as follows: uranium-233/234 at  $60.7 \pm 8.48$  pCi/L; uranium-235/236 at  $0.502 \pm 0.169$  pCi/L; and uranium-238 at  $9.37 \pm 1.42$  pCi/L. The results for the duplicate environmental sample are as follows: uranium-233/234 at  $61.3 \pm 8.72$  pCi/L; uranium-235/236 at  $0.686 \pm 0.183$  pCi/L; and uranium-238 at  $8.62 \pm 1.31$  pCi/L. In this region, groundwater contacts the Precambrian bedrock, which contains naturally occurring 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 CTF-MW2 samples. Figure III-3 shows the concentrations of arsenic and groundwater elevations over time for 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 duplicate environmental, TB, field blank (FB), and equipment blank (EB) samples. The field QC samples were submitted for analysis along with the groundwater samples in accordance with QC procedures specified in the SAPs for SWMUs 149 and 154 (SNL/NM June 2010, Attachments 1 and 2).

##### 4.1.1 **Duplicate Environmental Samples**

Duplicate environmental samples were collected 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. The duplicate environmental samples were analyzed for all analytical parameters.

Relative percent difference (RPD) calculations between duplicate environmental samples were performed for detected analytes. Table III-17 summarizes the results for duplicate environmental sample analyses and calculated RPD values. The duplicate environmental sampling results show good correlation (low RPD values of less than 20 for organic compounds and less than 35 for inorganic analytes) for all calculated parameters.

##### 4.1.2 **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-milliliter (mL) volatile organic analysis vials prepared by the analytical laboratory, which accompany the empty sample containers supplied by the laboratory. TB samples were brought to the field and accompanied each sample shipment.

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

##### 4.1.3 **Field Blank Samples**

FB samples were collected for VOCs to assess whether contamination of the samples had resulted from ambient field conditions. The FB samples were prepared by pouring deionized (DI) water into sample containers at the sampling point to simulate the transfer of environmental samples from the sampling system to the sample container. The compounds detected in the FB samples include bromodichloromethane, chloroform, and

dibromochloromethane. No corrective action was applied during data validation for CTF-MW3 sample results, as these compounds were also reported in the EB sample. These compounds are common by-products of water disinfection associated with the DI water process. No corrective action was applied during data validation for CTF-MW2 sample results, as these compounds were not detected in the environmental samples.

#### 4.1.4 **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 “LTES Groundwater Monitoring Equipment Decontamination,” (SNL/NM January 2012a). In accordance with SNL/NM FOP 05-03 (SNL/NM January 2012a), the following solutions were pumped through the sampling system: 5 gallons of DI water mixed with 20 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 and submitted for all analyses.

**SWMU 149, CTF-MW3.** Acetone, aluminum, bromodichloromethane, calcium, chloride, chloroform, copper, dibromochloromethane, magnesium, and zinc were detected in the EB sample. No corrective action was required for acetone, aluminum, calcium, chloride, magnesium, or zinc as these parameters either were not detected in environmental samples or the reported values are greater than five times the EB concentration. The results for bromodichloromethane, chloroform, copper, and dibromochloromethane were qualified as not detected during data validation because the associated sample results are less than five times the EB value.

**SWMU 154, CTF-MW2.** Bromodichloromethane, chloride, chloroform, copper, and dibromochloromethane were detected in the EB sample. No corrective action was required for bromodichloromethane, chloride, chloroform, or dibromochloromethane as these parameters either were not detected in the environmental samples or the reported values are greater than five times the EB concentration. The result for copper was qualified as not detected during data validation because the sample results are less than five times the EB value.

## 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). The data are acceptable, and reported QC measures are adequate. No significant data quality problems were noted during the data validation process. The data validation sample findings summary sheets are provided in Appendix C.

## 4.3 **Variations and Nonconformances**

No variations or nonconformances from the requirements in the Groundwater Monitoring SAPs for SWMUs 149 and 154 (SNL/NM June 2010) or project-specific issues were identified during the March 2012 sampling activities at CTF-MW3 and CTF-MW2.

## 5.0 **Summary**

During the First Quarter of CY 2012, samples were collected from monitoring well CTF-MW3, located near SWMU 149, and CTF-MW2, located near SWMU 154. Sampling results were compared with EPA MCL guidelines for drinking water (EPA 2009).

Analytical parameters for 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 CTF-MW3 are comparable to historical values.

Analytical parameters for 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 CTF-MW2 groundwater samples at concentrations of 0.0498 mg/L in the unfiltered and 0.0498 mg/L in the filtered samples and at concentrations of 0.0559 mg/L in the unfiltered and 0.0521 mg/L in the filtered duplicate environmental 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 historical values.

## 6.0 References

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

DOE, see U.S. Department of Energy.

EPA, see U.S. Environmental Protection Agency.

New Mexico Environment Department (NMED), April 2004. "Compliance Order on Consent, Pursuant to the New Mexico Hazardous Waste Act, § 74-4-10," New Mexico Environment Department, Santa Fe, New Mexico.

New Mexico Environment Department (NMED), April 2010. "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," New Mexico Environment Department Hazardous Waste Bureau, Santa Fe, New Mexico, April 8, 2010.

New Mexico Environment Department (NMED), December 2010. "Approval with Modifications, Response to April 8, 2010 Letter, Groundwater Monitoring Plan for SWMUs 149 and 154," New Mexico Environment Department Hazardous Waste Bureau, Santa Fe, New Mexico.

NMED, see New Mexico Environment Department.

Sandia National Laboratories, New Mexico (SNL/NM), June 2010. "U.S. Department of Energy/Sandia Corporation Response to the New Mexico Environment Department 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*," Sandia National Laboratories, Albuquerque, New Mexico.

Sandia National Laboratories, New Mexico (SNL/NM), May 2011. "Data Validation Procedure for Chemical and Radiochemical Data," Administrative Operating Procedure 00-03, Revision 3, Sample Management Office, Sandia National Laboratories, New Mexico.

Sandia National Laboratories, New Mexico (SNL/NM), January 2012a. "Groundwater Monitoring Equipment Decontamination," Field Operating Procedure 05-03, Revision 04, Long-Term Environmental Stewardship, Environmental Management Department, Sandia National Laboratories, New Mexico.

Sandia National Laboratories, New Mexico (SNL/NM), January 2012b. "Groundwater Monitoring Well Sampling and Field Analytical Measurements," Field Operating Procedure 05-01, Revision 04, Long-Term Environmental Stewardship, Environmental Management Department, Sandia National Laboratories, New Mexico.

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

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

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

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

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

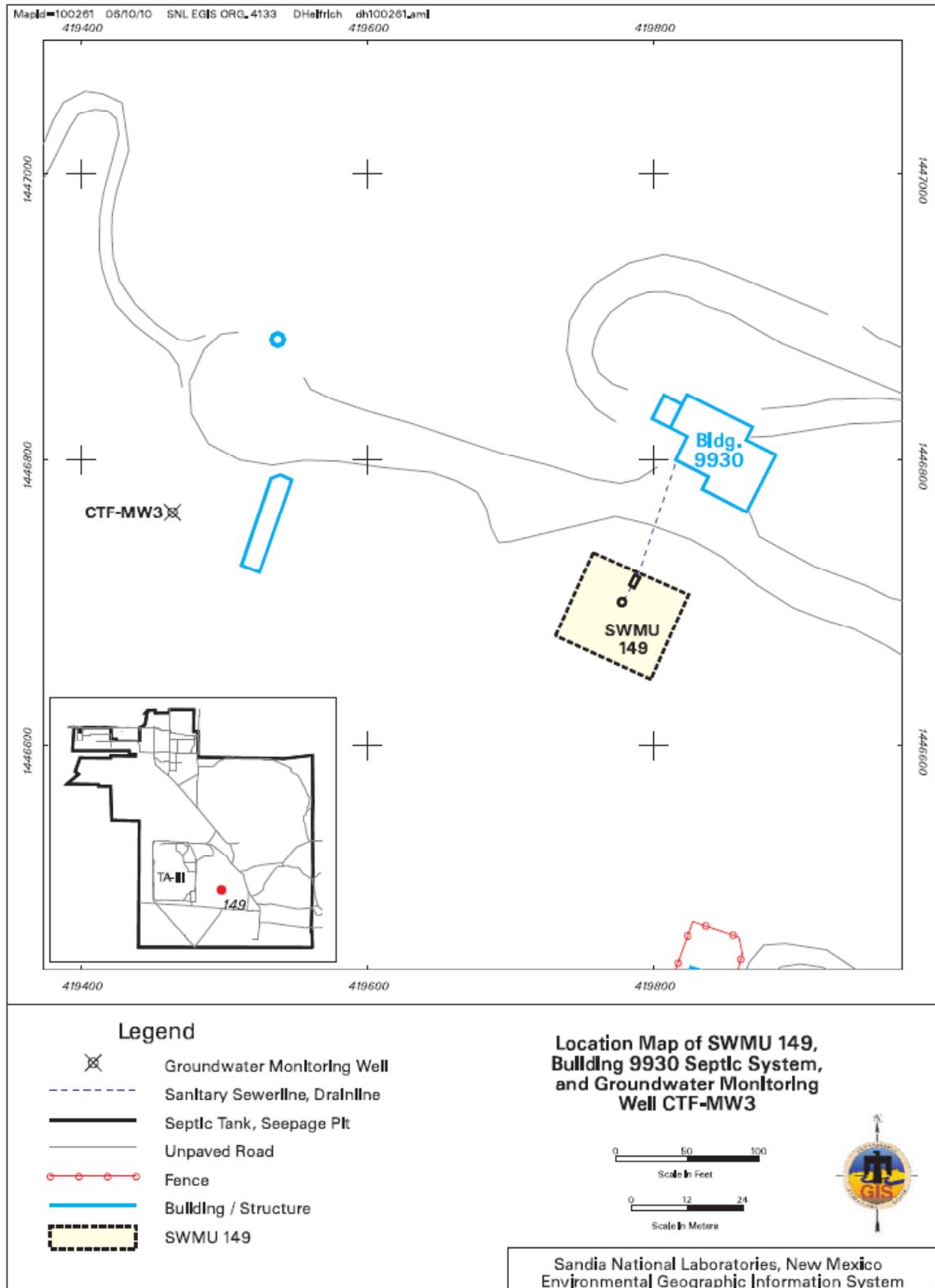
U.S. Environmental Protection Agency (EPA), 1999, "Perchlorate in Drinking Water Using Ion Chromatography," EPA 815/R-00-014, U.S. Environmental Protection Agency, Washington, D.C.

U.S. Environmental Protection Agency (EPA), 2009, "National Primary Drinking Water Standards," 40 CFR 141.11, Subpart B, EPA 816-F-09-0004, U.S. Environmental Protection Agency, Washington, D.C.

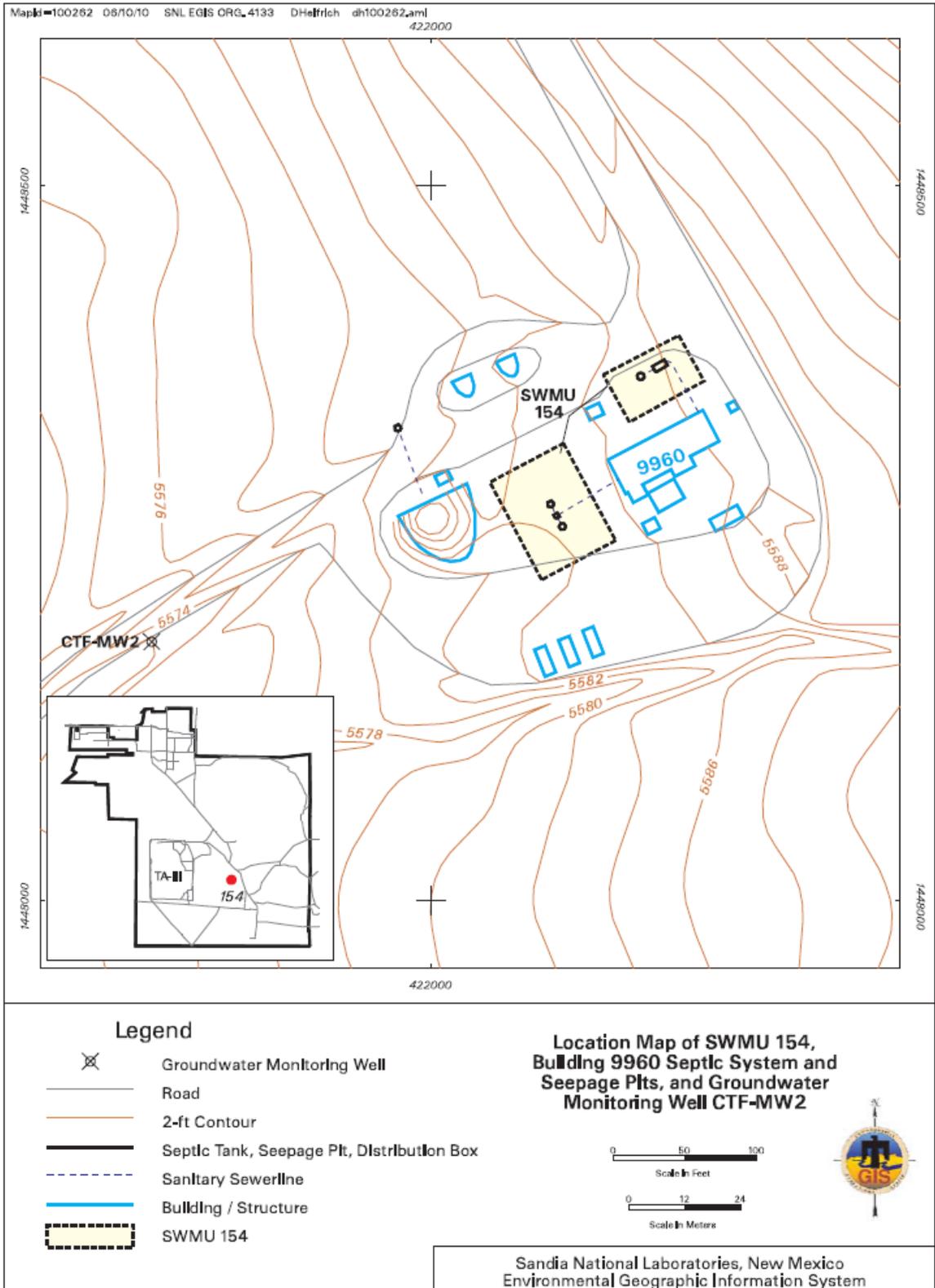
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# Figures

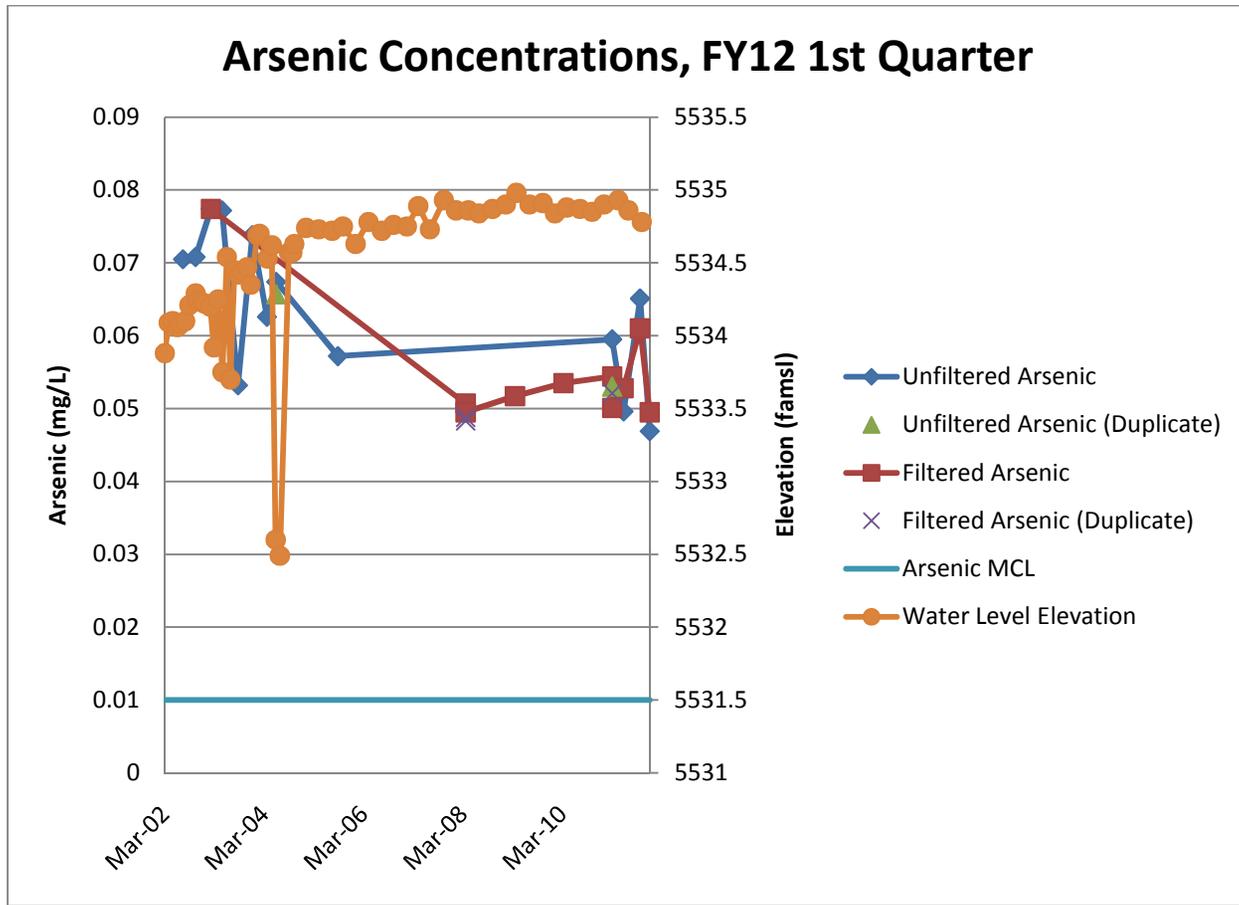




**Figure III-1**  
**Location of Monitoring Well CTF-MW3 near SWMU 149**



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



**Figure III-3**

**Concentrations of Arsenic and Groundwater Elevations over Time in 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 <sup>a</sup>	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 <sup>b</sup>	EPA 6020/7470	1 x 500-mL polyethylene, HNO <sub>3</sub> , 4°C
Perchlorate	EPA 314.0	1 x 250-mL polyethylene, 4°C
Major Anions and Cations <sup>c</sup>	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 <sub>2</sub> SO <sub>4</sub> , 4°C
Gross Alpha/Beta	EPA 900.0	1 x 1-L polyethylene, HNO <sub>3</sub> , 4°C
Gamma Spectroscopy <sup>d</sup>	EPA 901.0	1 x 1-L polyethylene, HNO <sub>3</sub> , 4°C

Notes

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

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

Clesceri, L.S., A.E. Greenburg, and A.D. Eaton, 1998. *Standard Methods for the Examination of Water and Wastewater*, 20<sup>th</sup> 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.

<sup>b</sup>Metals = filtered and unfiltered samples, TAL metals including barium, calcium, magnesium, potassium, and sodium, plus uranium.

<sup>c</sup>Major anions include bromide, chloride, fluoride, and sulfate.

<sup>d</sup>Gamma spectroscopy = Americium-241, Cesium-137, Cobalt-60, and Potassium-40.

°C = Degrees Celsius.

EPA = U.S. Environmental Protection Agency.

H<sub>2</sub>SO<sub>4</sub> = Sulfuric acid.

HCl = Hydrochloric acid.

HNO<sub>3</sub> = Nitric acid.

L = Liter

mL = Milliliter(s).

SM = Standard Method.

SWMU = Solid Waste Management Unit.

TAL = Target Analyte List.

**Table III-2**

**Sample Details for First Quarter, CY 2012 Groundwater Sampling  
Solid Waste Management Units 149 and 154 Groundwater Monitoring Quarterly Assessment  
January – March 2012**

<b>Well</b>	<b>Sample Identification</b>	<b>AR/COC Number</b>	<b>Associated Groundwater Investigation</b>
<b>CTF-MW3</b>	091943	614053	SWMU 149
<b>CTF-MW3 (Duplicate)</b>	091944	614053	SWMU 149
<b>CTF-MW2</b>	091949	614055	SWMU 154
<b>CTF-MW2 (Duplicate)</b>	091950	614055	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<sup>a</sup>**  
**Solid Waste Management Units 149 and 154 Groundwater Monitoring**  
**Quarterly Assessment, January– March 2012**

Well ID	Sample Date	Temperature (°C)	Specific Conductivity (µmhos/cm)	Oxidation Reduction Potential (mV)	pH	Turbidity (NTU)	Dissolved Oxygen (% Sat)	Dissolved Oxygen (mg/L)
<b>SWMU 149</b>								
CTF-MW3	26-Mar-12	20.34	1632	120.0	7.21	0.32	79.3	7.14
<b>SWMU 154</b>								
CTF-MW2	30-Mar-12	17.40	3540	10.4	6.17	2.36	1.4	0.14

**Notes**

<sup>a</sup>Field measurements collected prior to sampling.

°C = Degrees Celsius.

% Sat = Percent saturation.

µmhos/cm = Micromhos per centimeter.

CTF = Coyote Test Field.

ID = Identification.

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**  
**Solid Waste Management Units 149 and 154 Groundwater Monitoring**  
**Quarterly Assessment, January – March 2012**

Well ID	Analyte	Result (µg/L)	MDL (µg/L)	PQL (µg/L)	MCL (µg/L)	Laboratory Qualifier <sup>a</sup>	Validation Qualifier <sup>b</sup>	Sample Number	Analytical Method <sup>c</sup>
<b>SWMU 149</b>									
<b>CTF-MW3</b> 26-Mar-12	Bromodichloromethane	0.540	0.300	1.00	NE	J	1.00U	091943-001	SW846-8260B
	Chloroform	0.720	0.300	1.00	NE	J	1.00U	091943-001	SW846-8260B
	Dibromochloromethane	0.360	0.300	1.00	NE	J	1.00U	091943-001	SW846-8260B
<b>CTF-MW3 (Duplicate)</b> 26-Mar-12	Bromodichloromethane	0.520	0.300	1.00	NE	J	1.00U	091944-001	SW846-8260B
	Chloroform	0.700	0.300	1.00	NE	J	1.00U	091944-001	SW846-8260B
	Dibromochloromethane	0.330	0.300	1.00	NE	J	1.00U	091944-001	SW846-8260B
<b>SWMU 154</b>									
<b>CTF-MW2</b> 30-Mar-12	RDX	0.147	0.087	0.272	NE	J		091949-024	SW846-8321A
<b>CTF-MW2 (Duplicate)</b> 30-Mar-12	RDX	0.179	0.0874	0.273	NE	J		091950-024	SW846-8321A

**Notes**

µg/L = Micrograms per liter.

CFR = Code of Federal Regulations.

CTF = Coyote Test Field.

EPA = U.S. Environmental Protection Agency.

ID = Identification.

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.

<sup>a</sup>**Laboratory Qualifier**

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

<sup>b</sup>**Validation Qualifier**

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

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

<sup>c</sup>**Analytical Method**

U.S. Environmental Protection Agency, 1986 (and updates), "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods," SW-846, 3<sup>rd</sup> 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)**  
**Solid Waste Management Unit 149 Groundwater Monitoring**  
**Quarterly Assessment, January – March 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.

**Table III-6**  
**Method Detection Limits for Volatile and Semivolatile Organic Compounds**  
**Solid Waste Management Unit 154 Groundwater Monitoring**  
**Quarterly Assessment, January – March 2012**

Analyte	MDL (µg/L)	Analytical Method <sup>a</sup>	Analyte	MDL (µg/L)	Analytical Method <sup>a</sup>	Analyte	MDL (µg/L)	Analytical Method <sup>a</sup>
1,1,1-Trichloroethane	0.300	8260B	1,2,4-Trichlorobenzene	6.00 – 6.38	8270C	Di-n-butyl phthalate	6.00 – 6.38	8270C
1,1,2,2-Tetrachloroethane	0.300	8260B	1,2-Dichlorobenzene	6.00 – 6.38	8270C	Di-n-octyl phthalate	6.00 – 6.38	8270C
1,1,2-Trichloroethane	0.300	8260B	1,3-Dichlorobenzene	6.00 – 6.38	8270C	Dibenz[a,h]anthracene	0.600 – 0.638	8270C
1,1-Dichloroethane	0.300	8260B	1,4-Dichlorobenzene	6.00 – 6.38	8270C	Dibenzofuran	6.00 – 6.38	8270C
1,1-Dichloroethene	0.300	8260B	2,4,5-Trichlorophenol	6.00 – 6.38	8270C	Diethylphthalate	6.00 – 6.38	8270C
1,2-Dichloroethane	0.300	8260B	2,4,6-Trichlorophenol	6.00 – 6.38	8270C	Dimethylphthalate	6.00 – 6.38	8270C
1,2-Dichloropropane	0.300	8260B	2,4-Dichlorophenol	6.00 – 6.38	8270C	Dinitro-o-cresol	6.00 – 6.38	8270C
2-Butanone	2.00	8260B	2,4-Dimethylphenol	6.00 – 6.38	8270C	Diphenyl amine	6.00 – 6.38	8270C
2-Hexanone	2.20	8260B	2,4-Dinitrophenol	10.0 – 10.6	8270C	Fluoranthene	0.600 – 0.638	8270C
4-methyl-, 2-Pentanone	1.50	8260B	2,4-Dinitrotoluene	6.00 – 6.38	8270C	Fluorene	0.600 – 0.638	8270C
Acetone	3.00	8260B	2,6-Dinitrotoluene	6.00 – 6.38	8270C	Hexachlorobenzene	6.00 – 6.38	8270C
Benzene	0.300	8260B	2-Chloronaphthalene	0.600 – 0.638	8270C	Hexachlorobutadiene	6.00 – 6.38	8270C
Bromodichloromethane	0.300	8260B	2-Chlorophenol	6.00 – 6.38	8270C	Hexachlorocyclopentadiene	6.00 – 6.38	8270C
Bromoform	0.300	8260B	2-Methylnaphthalene	0.600 – 0.638	8270C	Hexachloroethane	6.00 – 6.38	8270C
Bromomethane	0.300	8260B	2-Nitroaniline	6.00 – 6.38	8270C	Indeno(1,2,3-c,d)pyrene	0.600 – 0.638	8270C
Carbon disulfide	1.50	8260B	2-Nitrophenol	6.00 – 6.38	8270C	Isophorone	6.00 – 6.38	8270C
Carbon tetrachloride	0.300	8260B	3,3'-Dichlorobenzidine	6.00 – 6.38	8270C	Naphthalene	0.600 – 0.638	8270C
Chlorobenzene	0.300	8260B	3-Nitroaniline	6.00 – 6.38	8270C	Nitro-benzene	6.00 – 6.38	8270C
Chloroethane	0.300	8260B	4-Bromophenyl phenyl ether	6.00 – 6.38	8270C	Pentachlorophenol	6.00 – 6.38	8270C
Chloroform	0.300	8260B	4-Chloro-3-methylphenol	6.00 – 6.38	8270C	Phenanthrene	0.600 – 0.638	8270C
Chloromethane	0.300	8260B	4-Chlorobenzeneamine	6.00 – 6.38	8270C	Phenol	6.00 – 6.38	8270C
Dibromochloromethane	0.300	8260B	4-Chlorophenyl phenyl ether	6.00 – 6.38	8270C	Pyrene	0.600 – 0.638	8270C
Ethyl benzene	0.300	8260B	4-Nitroaniline	6.00 – 6.38	8270C	bis(2-Chloroethoxy)methane	6.00 – 6.38	8270C
Methylene chloride	3.00	8260B	4-Nitrophenol	6.00 – 6.38	8270C	bis(2-Chloroethyl)ether	6.00 – 6.38	8270C
Styrene	0.300	8260B	Acenaphthene	0.600 – 0.638	8270C	bis(2-Chloroisopropyl)ether	6.00 – 6.38	8270C
Tetrachloroethene	0.300	8260B	Acenaphthylene	0.600 – 0.638	8270C	bis(2-Ethylhexyl)phthalate	6.00 – 6.38	8270C
Toluene	0.300	8260B	Anthracene	0.600 – 0.638	8270C	m,p-Cresol	6.00 – 6.38	8270C
Trichloroethene	0.300	8260B	Benzo(a)anthracene	0.600 – 0.638	8270C	n-Nitrosodipropylamine	6.00 – 6.38	8270C
Vinyl acetate	1.50	8260B	Benzo(a)pyrene	0.600 – 0.638	8270C	o-Cresol	6.00 – 6.38	8270C
Vinyl chloride	0.300	8260B	Benzo(b)fluoranthene	0.600 – 0.638	8270C			
Xylene	0.300	8260B	Benzo(ghi)perylene	0.600 – 0.638	8270C			
cis-1,2-Dichloroethene	0.300	8260B	Benzo(k)fluoranthene	0.600 – 0.638	8270C			
cis-1,3-Dichloropropene	0.300	8260B	Butylbenzyl phthalate	6.00 – 6.38	8270C			
trans-1,2-Dichloroethene	0.300	8260B	Carbazole	0.600 – 0.638	8270C			
trans-1,3-Dichloropropene	0.300	8260B	Chrysene	0.600 – 0.638	8270C			

**Notes**

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

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

µg/L = Micrograms per liter.

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.

**Table III-7**  
**Method Detection Limits for High Explosive Compounds (EPA Method 8321A)**  
**Solid Waste Management Unit 154 Groundwater Monitoring**  
**Quarterly Assessment, January – March 2012**

Analyte	MDL ( $\mu\text{g/L}$ )
1,3,5-Trinitrobenzene	0.0870 – 0.0874
1,3-Dinitrobenzene	0.0870 – 0.0874
2,4,6-Trinitrotoluene	0.0870 – 0.0874
2,4-Dinitrotoluene	0.0870 – 0.0874
2,6-Dinitrotoluene	0.0870 – 0.0874
2-Amino-4,6-dinitrotoluene	0.0870 – 0.0874
2-Nitrotoluene	0.0891 – 0.0896
3-Nitrotoluene	0.0870 – 0.0874
4-Amino-2,6-dinitrotoluene	0.0870 – 0.0874
4-Nitrotoluene	0.163 – 0.164
HMX	0.0870 – 0.0874
Nitro-benzene	0.0870 – 0.0874
Pentaerythritol tetranitrate	0.109
RDX	0.147 – 0.179
Tetryl	0.0870 – 0.0874

**Notes**

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

**Table III-8**  
**Summary of Nitrate Plus Nitrite Results**  
**Solid Waste Management Units 149 and 154 Groundwater Monitoring**  
**Quarterly Assessment, January – March 2012**

Well ID	Analyte	Result (mg/L)	MDL (mg/L)	PQL (mg/L)	MCL (mg/L)	Laboratory Qualifier <sup>a</sup>	Validation Qualifier <sup>b</sup>	Sample Number	Analytical Method <sup>c</sup>
<b>SWMU 149</b>									
CTF-MW3 26-Mar-12	Nitrate plus nitrite as N	6.03	0.250	1.25	10.0	B		091943-018	EPA 353.2
CTF-MW3 (Duplicate) 26-Mar-12	Nitrate plus nitrite as N	6.05	0.250	1.25	10.0	B		091944-018	EPA 353.2
<b>SWMU 154</b>									
CTF-MW2 30-Mar-12	Nitrate plus nitrite as N	ND	0.425	1.25	10.0	U		091949-018	EPA 353.2
CTF-MW2 (Duplicate) 30-Mar-12	Nitrate plus nitrite as N	ND	0.085	0.250	10.0	U		091950-018	EPA 353.2

**Notes**

CFR = Code of Federal Regulations.

CTF = Coyote Test Field.

EPA = U.S. Environmental Protection Agency.

ID = Identification.

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.

**<sup>a</sup>Laboratory Qualifier**

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.

**<sup>b</sup>Validation Qualifier**

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

**<sup>c</sup>Analytical Method**

U.S. Environmental Protection Agency, 1986 (and updates), "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods," SW-846, 3<sup>rd</sup> 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**  
**Solid Waste Management Units 149 and 154 Groundwater Monitoring**  
**Quarterly Assessment, January – March 2012**

Well ID	Analyte	Result (mg/L)	MDL (mg/L)	PQL (mg/L)	MCL (mg/L)	Laboratory Qualifier <sup>a</sup>	Validation Qualifier <sup>b</sup>	Sample Number	Analytical Method <sup>c</sup>
<b>SWMU 149</b>									
CTF-MW3 26-Mar-12	Bicarbonate Alkalinity	336	0.725	1.00	NE	B		091943-022	SM2320B
	Carbonate Alkalinity	ND	0.725	1.00	NE	U		091943-022	SM2320B
	Bromide	1.15	0.066	0.200	NE			091943-016	SW846 9056
	Chloride	112	3.30	10.0	NE			091943-016	SW846 9056
	Fluoride	2.37	0.033	0.100	4.0			091943-016	SW846 9056
	Sulfate	448	5.00	20.0	NE			091943-016	SW846 9056
CTF-MW3 (Duplicate) 26-Mar-12	Bicarbonate Alkalinity	334	0.725	1.00	NE	B		091944-022	SM2320B
	Carbonate Alkalinity	ND	0.725	1.00	NE	U		091944-022	SM2320B
	Bromide	1.18	0.066	0.200	NE			091944-016	SW846 9056
	Chloride	115	3.30	10.0	NE			091944-016	SW846 9056
	Fluoride	2.37	0.033	0.100	4.0			091944-016	SW846 9056
	Sulfate	462	5.00	20.0	NE			091944-016	SW846 9056
<b>SWMU 154</b>									
CTF-MW2 30-Mar-12	Total Alkalinity	1580	0.725	1.00	NE			091949-022	SM2320B
	Bromide	1.77	0.670	2.00	NE	J		091949-016	SW846 9056
	Chloride	435	6.70	20.0	NE			091949-016	SW846 9056
	Fluoride	2.27	0.033	0.100	4.0			091949-016	SW846 9056
	Sulfate	162	13.3	40.0	NE			091949-016	SW846 9056
	CTF-MW2 (Duplicate) 30-Mar-12	Total Alkalinity	1600	0.725	1.00	NE			091950-022
Bromide		1.75	0.670	2.00	NE	J		091950-016	SW846 9056
Chloride		433	6.70	20.0	NE			091950-016	SW846 9056
Fluoride		2.25	0.033	0.100	4.0			091950-016	SW846 9056
Sulfate		162	13.3	40.0	NE			091950-016	SW846 9056

**Notes**

- CFR = Code of Federal Regulations.
- CTF = Coyote Test Field.
- EPA = U.S. Environmental Protection Agency.
- ID = Identification.
- 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.

**Table III-9 (Concluded)**  
**Summary of Anion and Alkalinity Results**  
**Solid Waste Management Units 149 and 154 Groundwater Monitoring**  
**Quarterly Assessment, January 2012 – March 2012**

**Notes (continued)**

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.

**<sup>a</sup>Laboratory Qualifier**

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

**<sup>b</sup>Validation Qualifier**

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

**<sup>c</sup>Analytical Method**

U.S. Environmental Protection Agency, 1986 (and updates), "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods," SW-846, 3<sup>rd</sup> 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*, 20<sup>th</sup> ed., Method 2320B.

**Table III-10**  
**Summary of Perchlorate Results**  
**Solid Waste Management Units 149 and 154 Groundwater Monitoring**  
**Quarterly Assessment, January – March 2012**

Well ID	Perchlorate Result (mg/L)	MDL (mg/L)	PQL (mg/L)	MCL (mg/L)	Laboratory Qualifier <sup>a</sup>	Validation Qualifier <sup>b</sup>	Sample Number	Analytical Method <sup>c</sup>
<b>SWMU 149</b>								
CTF-MW3 26-Mar-12	ND	0.004	0.012	NE	U		091943-020	EPA 314.0
CTF-MW3 (Duplicate) 26-Mar-12	ND	0.004	0.012	NE	U		091944-020	EPA 314.0
<b>SWMU 154</b>								
CTF-MW2 30-Mar-12	ND	0.004	0.012	NE	U		091949-020	EPA 314.0
CTF-MW2 (Duplicate) 30-Mar-12	ND	0.004	0.012	NE	U		091950-020	EPA 314.0

**Notes**

- CFR = Code of Federal Regulations.
- CTF = Coyote Test Field.
- EPA = U.S. Environmental Protection Agency.
- ID = Identification.
- 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.

**<sup>a</sup>Laboratory Qualifier**

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

**<sup>b</sup>Validation Qualifier**

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

**<sup>c</sup>Analytical 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**  
**Solid Waste Management Unit 149 Groundwater Monitoring**  
**Quarterly Assessment, January – March 2012**

Well ID	Analyte	Result (mg/L)	MDL (mg/L)	PQL (mg/L)	MCL (mg/L)	Laboratory Qualifier <sup>a</sup>	Validation Qualifier <sup>b</sup>	Sample Number	Analytical Method <sup>c</sup>
CTF-MW3 26-Mar-12	Aluminum	ND	0.015	0.050	NE	U		091943-009	SW846 6020
	Antimony	ND	0.001	0.003	0.006	U		091943-009	SW846 6020
	Arsenic	ND	0.0017	0.005	0.010	U		091943-009	SW846 6020
	Barium	0.0326	0.0006	0.002	2.00			091943-009	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		091943-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		091943-009	SW846 6020
	Calcium	187	0.300	1.00	NE			091943-009	SW846 6020
	Chromium	ND	0.002	0.010	0.100	U		091943-009	SW846 6020
	Cobalt	0.000367	0.0001	0.001	NE	B, J	0.00061U	091943-009	SW846 6020
	Copper	0.00223	0.00035	0.001	NE		0.0041U	091943-009	SW846 6020
	Iron	0.761	0.033	0.100	NE	B		091943-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		091943-009	SW846 6020
	Magnesium	49.1	0.050	0.150	NE			091943-009	SW846 6020
	Manganese	0.00109	0.001	0.005	NE	J		091943-009	SW846 6020
	Mercury	ND	0.000066	0.0002	0.002	U	UJ	091943-009	SW846 7470
	Nickel	0.00297	0.0005	0.002	NE			091943-009	SW846 6020
	Potassium	11.5	0.080	0.300	NE			091943-009	SW846 6020
	Selenium	0.0282	0.0015	0.005	0.050			091943-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		091943-009	SW846 6020
	Sodium	171	0.400	1.25	NE			091943-009	SW846 6020
Thallium	ND	0.00045	0.002	0.002	U		091943-009	SW846 6020	
Vanadium	ND	0.001	0.005	NE	U		091943-009	SW846 6010	
Zinc	0.00654	0.0035	0.010	NE	J	0.0182U	091943-009	SW846 6020	

**Table III-11 (Continued)**  
**Summary of Unfiltered Total Metal Results**  
**Solid Waste Management Unit 149 Groundwater Monitoring**  
**Quarterly Assessment, January – March 2012**

Well ID	Analyte	Result (mg/L)	MDL (mg/L)	PQL (mg/L)	MCL (mg/L)	Laboratory Qualifier <sup>a</sup>	Validation Qualifier <sup>b</sup>	Sample Number	Analytical Method <sup>c</sup>
CTF-MW3 (Duplicate) 26-Mar-12	Aluminum	ND	0.015	0.050	NE	U		091944-009	SW846 6020
	Antimony	ND	0.001	0.003	0.006	U		091944-009	SW846 6020
	Arsenic	ND	0.0017	0.005	0.010	U		091944-009	SW846 6020
	Barium	0.0321	0.0006	0.002	2.00			091944-009	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		091944-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		091944-009	SW846 6020
	Calcium	192	0.300	1.00	NE			091944-009	SW846 6020
	Chromium	ND	0.002	0.010	0.100	U		091944-009	SW846 6020
	Cobalt	0.000354	0.0001	0.001	NE	B, J	0.00061U	091944-009	SW846 6020
	Copper	0.00233	0.00035	0.001	NE		0.0041U	091944-009	SW846 6020
	Iron	0.769	0.033	0.100	NE	B		091944-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		091944-009	SW846 6020
	Magnesium	52.1	0.050	0.150	NE			091944-009	SW846 6020
	Manganese	ND	0.001	0.005	NE	U		091944-009	SW846 6020
	Mercury	ND	0.000066	0.0002	0.002	U	UJ	091944-009	SW846 7470
	Nickel	0.003	0.0005	0.002	NE			091944-009	SW846 6020
	Potassium	10.7	0.080	0.300	NE			091944-009	SW846 6020
	Selenium	0.0289	0.0015	0.005	0.050			091944-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		091944-009	SW846 6020
	Sodium	165	0.400	1.25	NE			091944-009	SW846 6020
Thallium	ND	0.00045	0.002	0.002	U		091944-009	SW846 6020	
Vanadium	ND	0.001	0.005	NE	U		091944-009	SW846 6010	
Zinc	0.00535	0.0035	0.010	NE	J	0.0182U	091944-009	SW846 6020	

**Table III-11 (Concluded)**  
**Summary of Unfiltered Total Metal Results**  
**Solid Waste Management Unit 149 Groundwater Monitoring**  
**Quarterly Assessment, January – March 2012**

**Notes**

<b>Bold</b>	= Indicates that a result exceeds the MCL.
CFR	= Code of Federal Regulations.
CTF	= Coyote Test Field.
EPA	= U.S. Environmental Protection Agency.
ID	= Identification.
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.
MVW	= 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.

**<sup>a</sup>Laboratory Qualifier**

B	= Analyte is detected in associated laboratory method blank.
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.

**<sup>b</sup>Validation Qualifier**

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

U	= The analyte was analyzed for but 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.

**<sup>c</sup>Analytical Method**

U.S. Environmental Protection Agency, 1986 (and updates), *“Test Methods for Evaluating Solid Waste, Physical/Chemical Methods,”* SW-846, 3<sup>rd</sup> 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**  
**Solid Waste Management Unit 149 Groundwater Monitoring**  
**Quarterly Assessment, January – March 2012**

Well ID	Analyte	Result (mg/L)	MDL (mg/L)	PQL (mg/L)	MCL (mg/L)	Laboratory Qualifier <sup>a</sup>	Validation Qualifier <sup>b</sup>	Sample Number	Analytical Method <sup>c</sup>
CTF-MW3	Aluminum	ND	0.015	0.050	NE	U		091943-010	SW846 6020
26-Mar-12	Antimony	ND	0.001	0.003	0.006	U		091943-010	SW846 6020
	Arsenic	ND	0.0017	0.005	0.010	U		091943-010	SW846 6020
	Barium	0.0324	0.0006	0.002	2.00			091943-010	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		091943-010	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		091943-010	SW846 6020
	Calcium	179	0.300	1.00	NE			091943-010	SW846 6020
	Chromium	ND	0.002	0.010	0.100	U		091943-010	SW846 6020
	Cobalt	0.000387	0.0001	0.001	NE	B, J	0.00051U	091943-010	SW846 6020
	Copper	0.00222	0.00035	0.001	NE		0.00351U	091943-010	SW846 6020
	Iron	0.776	0.033	0.100	NE	B		091943-010	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		091943-010	SW846 6020
	Magnesium	46.9	0.050	0.150	NE			091943-010	SW846 6020
	Manganese	ND	0.001	0.005	NE	U		091943-010	SW846 6020
	Mercury	ND	0.000066	0.0002	0.002	U	UJ	091943-010	SW846 7470
	Nickel	0.00293	0.0005	0.002	NE			091943-010	SW846 6020
	Potassium	11.5	0.080	0.300	NE			091943-010	SW846 6020
	Selenium	0.0288	0.0015	0.005	0.050			091943-010	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		091943-010	SW846 6020
	Sodium	157	0.400	1.25	NE			091943-010	SW846 6020
	Thallium	ND	0.00045	0.002	0.002	U		091943-010	SW846 6020
	Vanadium	ND	0.001	0.005	NE	U		091943-010	SW846 6010
	Zinc	0.00572	0.0035	0.010	NE	J		091943-010	SW846 6020

**Table III-12 (Continued)**  
**Summary of Filtered Total Metal Results**  
**Solid Waste Management Unit 149 Groundwater Monitoring**  
**Quarterly Assessment, January – March 2012**

Well ID	Analyte	Result <sup>a</sup> (mg/L)	MDL <sup>b</sup> (mg/L)	PQL <sup>c</sup> (mg/L)	MCL <sup>d</sup> (mg/L)	Laboratory Qualifier <sup>e</sup>	Validation Qualifier <sup>f</sup>	Sample Number	Analytical Method <sup>g</sup>
CTF-MW3 (Duplicate) 26-Mar-12	Aluminum	ND	0.015	0.050	NE	U		091944-010	SW846 6020
	Antimony	ND	0.001	0.003	0.006	U		091944-010	SW846 6020
	Arsenic	ND	0.0017	0.005	0.010	U		091944-010	SW846 6020
	Barium	0.0322	0.0006	0.002	2.00			091944-010	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		091944-010	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		091944-010	SW846 6020
	Calcium	182	0.300	1.00	NE			091944-010	SW846 6020
	Chromium	ND	0.002	0.010	0.100	U		091944-010	SW846 6020
	Cobalt	0.000405	0.0001	0.001	NE	B, J	0.00051U	091944-010	SW846 6020
	Copper	0.00224	0.00035	0.001	NE		0.00351U	091944-010	SW846 6020
	Iron	0.827	0.033	0.100	NE	B		091944-010	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		091944-010	SW846 6020
	Magnesium	45.5	0.010	0.030	NE			091944-010	SW846 6020
	Manganese	ND	0.001	0.005	NE	U		091944-010	SW846 6020
	Mercury	ND	0.000066	0.0002	0.002	U	UJ	091944-010	SW846 7470
	Nickel	0.00308	0.0005	0.002	NE			091944-010	SW846 6020
	Potassium	11.3	0.080	0.300	NE			091944-010	SW846 6020
	Selenium	0.0293	0.0015	0.005	0.050			091944-010	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		091944-010	SW846 6020
	Sodium	155	0.400	1.25	NE			091944-010	SW846 6020
Thallium	ND	0.00045	0.002	0.002	U		091944-010	SW846 6020	
Vanadium	ND	0.001	0.005	NE	U		091944-010	SW846 6010	
Zinc	0.00509	0.0035	0.010	NE	J		091944-010	SW846 6020	

**Table III-12 (Concluded)**  
**Summary of Filtered Total Metal Results**  
**Solid Waste Management Unit 149 Groundwater Monitoring**  
**Quarterly Assessment, January – March 2012**

**Notes**

<b>Bold</b>	= Indicates that a result exceeds the MCL.
CFR	= Code of Federal Regulations.
CTF	= Coyote Test Field.
EPA	= U.S. Environmental Protection Agency.
ID	= Identification.
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.

**<sup>a</sup>Laboratory 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.

**<sup>b</sup>Validation Qualifier**

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

U	= The analyte was analyzed for but 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.

**<sup>c</sup>Analytical Method**

U.S. Environmental Protection Agency, 1986 (and updates), *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods*, SW-846, 3<sup>rd</sup> 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**  
**Solid Waste Management Unit 154 Groundwater Monitoring**  
**Quarterly Assessment, January – March 2012**

Well ID	Analyte	Result (mg/L)	MDL (mg/L)	PQL (mg/L)	MCL (mg/L)	Laboratory Qualifier <sup>a</sup>	Validation Qualifier <sup>b</sup>	Sample Number	Analytical Method <sup>c</sup>
CTF-MW2	Aluminum	0.108	0.015	0.050	NE		J-	091949-009	SW846 6020
30-Mar-12	Antimony	ND	0.001	0.003	0.006	U		091949-009	SW846 6020
	Arsenic	<b>0.0498</b>	0.0017	0.005	0.010			091949-009	SW846 6020
	Barium	0.0805	0.0006	0.002	2.00			091949-009	SW846 6020
	Beryllium	0.00294	0.0002	0.0005	0.004			091949-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		091949-009	SW846 6020
	Calcium	384	1.20	4.00	NE			091949-009	SW846 6020
	Chromium	ND	0.002	0.010	0.100	U		091949-009	SW846 6020
	Cobalt	0.00954	0.0001	0.001	NE			091949-009	SW846 6020
	Copper	0.00189	0.00035	0.001	NE		0.00316U	091949-009	SW846 6020
	Iron	2.63	0.033	0.100	NE			091949-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		091949-009	SW846 6020
	Magnesium	84.4	0.200	0.600	NE			091949-009	SW846 6020
	Manganese	3.07	0.020	0.100	NE			091949-009	SW846 6020
	Mercury	ND	0.000066	0.0002	0.002	U	UJ	091949-009	SW846 7470
	Nickel	0.0175	0.0005	0.002	NE			091949-009	SW846 6020
	Potassium	51.4	1.60	6.00	NE			091949-009	SW846 6020
	Selenium	ND	0.0015	0.005	0.050	U		091949-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		091949-009	SW846 6020
	Sodium	479	1.60	5.00	NE			091949-009	SW846 6020
	Thallium	0.00123	0.00045	0.002	0.002	J		091949-009	SW846 6020
	Uranium	0.0257	0.000067	0.0002	0.03			091949-009	SW846 6020
	Vanadium	ND	0.001	0.005	NE	U		091949-009	SW846 6010
	Zinc	0.267	0.0035	0.010	NE	B		091949-009	SW846 6020

**Table III-13 (Continued)**  
**Summary of Unfiltered Total Metal Results**  
**Solid Waste Management Unit 154 Groundwater Monitoring**  
**Quarterly Assessment, January – March 2012**

Well ID	Analyte	Result (mg/L)	MDL (mg/L)	PQL (mg/L)	MCL (mg/L)	Laboratory Qualifier <sup>a</sup>	Validation Qualifier <sup>b</sup>	Sample Number	Analytical Method <sup>c</sup>
CTF-MW2 (Duplicate) 30-Mar-12	Aluminum	0.120	0.015	0.050	NE		J-	091950-009	SW846 6020
	Antimony	ND	0.001	0.003	0.006	U		091950-009	SW846 6020
	Arsenic	<b>0.0559</b>	0.0017	0.005	0.010			091950-009	SW846 6020
	Barium	0.0811	0.0006	0.002	2.00			091950-009	SW846 6020
	Beryllium	0.0031	0.0002	0.0005	0.004			091950-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		091950-009	SW846 6020
	Calcium	391	1.20	4.00	NE			091950-009	SW846 6020
	Chromium	ND	0.002	0.010	0.100	U		091950-009	SW846 6020
	Cobalt	0.00986	0.0001	0.001	NE			091950-009	SW846 6020
	Copper	0.0017	0.00035	0.001	NE		0.00316U	091950-009	SW846 6020
	Iron	2.71	0.033	0.100	NE			091950-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		091950-009	SW846 6020
	Magnesium	86.0	0.200	0.600	NE			091950-009	SW846 6020
	Manganese	3.10	0.020	0.100	NE			091950-009	SW846 6020
	Mercury	ND	0.000066	0.0002	0.002	U	UJ	091950-009	SW846 7470
	Nickel	0.0183	0.0005	0.002	NE			091950-009	SW846 6020
	Potassium	52.3	1.60	6.00	NE			091950-009	SW846 6020
	Selenium	ND	0.0015	0.005	0.050	U		091950-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		091950-009	SW846 6020
	Sodium	487	1.60	5.00	NE			091950-009	SW846 6020
Thallium	0.00126	0.00045	0.002	0.002	J		091950-009	SW846 6020	
Uranium	0.0257	0.00067	0.0002	0.03			091950-009	SW846 6020	
Vanadium	0.00109	0.001	0.005	NE	J		091950-009	SW846 6010	
Zinc	0.268	0.0035	0.010	NE	B		091950-009	SW846 6020	

**Table III-13 (Concluded)**  
**Summary of Unfiltered Total Metal Results**  
**Solid Waste Management Unit 154 Groundwater Monitoring**  
**Quarterly Assessment, January – March 2012**

**Notes**

<b>Bold</b>	= Indicates that a result exceeds the MCL.
CFR	= Code of Federal Regulations.
CTF	= Coyote Test Field.
EPA	= U.S. Environmental Protection Agency.
ID	= Identification.
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.

**<sup>a</sup>Laboratory 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.

**<sup>b</sup>Validation Qualifier**

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

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

**<sup>c</sup>Analytical Method**

U.S. Environmental Protection Agency, 1986 (and updates), *“Test Methods for Evaluating Solid Waste, Physical/Chemical Methods,”* SW-846, 3<sup>rd</sup> 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**  
**Solid Waste Management Unit 154 Groundwater Monitoring**  
**Quarterly Assessment, January – March 2012**

Well ID	Analyte	Result (mg/L)	MDL (mg/L)	PQL (mg/L)	MCL (mg/L)	Laboratory Qualifier <sup>a</sup>	Validation Qualifier <sup>b</sup>	Sample Number	Analytical Method <sup>c</sup>
CTF-MW2 30-Mar-12	Aluminum	0.115	0.015	0.050	NE		J-	091949-010	SW846 6020
	Antimony	ND	0.001	0.003	0.006	U		091949-010	SW846 6020
	Arsenic	<b>0.0498</b>	0.0017	0.005	0.010			091949-010	SW846 6020
	Barium	0.0818	0.0006	0.002	2.00			091949-010	SW846 6020
	Beryllium	0.00327	0.0002	0.0005	0.004			091949-010	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		091949-010	SW846 6020
	Calcium	385	1.20	4.00	NE			091949-010	SW846 6020
	Chromium	ND	0.002	0.010	0.100	U		091949-010	SW846 6020
	Cobalt	0.00989	0.0001	0.001	NE			091949-010	SW846 6020
	Copper	0.00176	0.00035	0.001	NE			091949-010	SW846 6020
	Iron	2.70	0.033	0.100	NE			091949-010	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		091949-010	SW846 6020
	Magnesium	84.6	0.200	0.600	NE			091949-010	SW846 6020
	Manganese	3.05	0.020	0.100	NE			091949-010	SW846 6020
	Mercury	ND	0.000066	0.0002	0.002	U	UJ	091949-010	SW846 7470
	Nickel	0.0185	0.0005	0.002	NE			091949-010	SW846 6020
	Potassium	51.8	1.60	6.00	NE			091949-010	SW846 6020
	Selenium	ND	0.0015	0.005	0.050	U		091949-010	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		091949-010	SW846 6020
	Sodium	482	1.60	5.00	NE			091949-010	SW846 6020
Thallium	0.00124	0.00045	0.002	0.002	J		091949-010	SW846 6020	
Uranium	0.0262	0.000067	0.0002	0.03			091949-010	SW846 6020	
Vanadium	ND	0.001	0.005	NE	U		091949-010	SW846 6010	
Zinc	0.317	0.0035	0.010	NE	B		091949-010	SW846 6020	

**Table III-14 (Continued)**  
**Summary of Filtered Total Metal Results**  
**Solid Waste Management Unit 154 Groundwater Monitoring**  
**Quarterly Assessment, January – March 2012**

Well ID	Analyte	Result (mg/L)	MDL (mg/L)	PQL (mg/L)	MCL (mg/L)	Laboratory Qualifier <sup>a</sup>	Validation Qualifier <sup>b</sup>	Sample Number	Analytical Method <sup>c</sup>
CTF-MW2 (Duplicate) 30-Mar-12	Aluminum	0.103	0.015	0.050	NE		J-	091950-010	SW846 6020
	Antimony	ND	0.001	0.003	0.006	U		091950-010	SW846 6020
	Arsenic	<b>0.0521</b>	0.0017	0.005	0.010			091950-010	SW846 6020
	Barium	0.0843	0.0006	0.002	2.00			091950-010	SW846 6020
	Beryllium	0.00321	0.0002	0.0005	0.004			091950-010	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		091950-010	SW846 6020
	Calcium	396	1.20	4.00	NE			091950-010	SW846 6020
	Chromium	ND	0.002	0.010	0.100	U		091950-010	SW846 6020
	Cobalt	0.010	0.0001	0.001	NE			091950-010	SW846 6020
	Copper	0.00213	0.00035	0.001	NE			091950-010	SW846 6020
	Iron	2.78	0.033	0.100	NE			091950-010	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		091950-010	SW846 6020
	Magnesium	87.6	0.200	0.600	NE			091950-010	SW846 6020
	Manganese	3.14	0.020	0.100	NE			091950-010	SW846 6020
	Mercury	ND	0.000066	0.0002	0.002	U	UJ	091950-010	SW846 7470
	Nickel	0.0187	0.0005	0.002	NE			091950-010	SW846 6020
	Potassium	53.2	1.60	6.00	NE			091950-010	SW846 6020
	Selenium	ND	0.0015	0.005	0.050	U		091950-010	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		091950-010	SW846 6020
	Sodium	495	1.60	5.00	NE			091950-010	SW846 6020
Thallium	0.00123	0.00045	0.002	0.002	J		091950-010	SW846 6020	
Uranium	0.0266	0.000067	0.0002	0.03			091950-010	SW846 6020	
Vanadium	ND	0.001	0.005	NE	U		091950-010	SW846 6010	
Zinc	0.348	0.0035	0.010	NE	B		091950-010	SW846 6020	

**Table III-14 (Concluded)**  
**Summary of Filtered Total Metal Results**  
**Solid Waste Management Unit 154 Groundwater Monitoring**  
**Quarterly Assessment, January – March 2012**

**Notes**

<b>Bold</b>	= Indicates that a result exceeds the MCL.
CFR	= Code of Federal Regulations.
CTF	= Coyote Test Field.
EPA	= U.S. Environmental Protection Agency.
ID	= Identification.
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).
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.

**<sup>a</sup>Laboratory 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.

**<sup>b</sup>Validation Qualifier**

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

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

**<sup>c</sup>Analytical Method**

U.S. Environmental Protection Agency, 1986 (and updates), *“Test Methods for Evaluating Solid Waste, Physical/Chemical Methods,”* SW-846, 3<sup>rd</sup> 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**  
**Solid Waste Management Unit 154 Groundwater Monitoring**  
**Quarterly Assessment, January – March 2012**

Well ID	Analyte	Activity <sup>a</sup> (pCi/L)	MDA (pCi/L)	Critical Level <sup>b</sup> (pCi/L)	MCL (pCi/L)	Laboratory Qualifier <sup>c</sup>	Validation Qualifier <sup>d</sup>	Sample Number	Analytical Method <sup>e</sup>
<b>CTF-MW2</b>	Americium-241	-21.7 ± 14.6	16.7	8.19	NE	U	BD	091949-033	EPA 901.1
30-Mar-12	Cesium-137	0.00687 ± 1.90	3.26	1.58	NE	U	BD	091949-033	EPA 901.1
	Cobalt-60	0.274 ± 1.80	3.19	1.51	NE	U	BD	091949-033	EPA 901.1
	Potassium-40	27.8 ± 41.6	29.5	13.9	NE	U	BD	091949-033	EPA 901.1
	Gross Alpha	6.73	NA	NA	15	NA	None	091949-034	EPA 900.0
	Gross Beta	60.3 ± 20.1	17.8	7.54	4mrem/yr			091949-034	EPA 900.0
	Uranium-233/234	60.7 ± 8.48	0.205	0.0896	NE			091949-035	HASL-300
	Uranium-235/236	0.502 ± 0.169	0.121	0.0443	NE			091949-035	HASL-300
	Uranium-238	9.37 ± 1.42	0.133	0.0536	NE			091949-035	HASL-300
<b>CTF-MW2 (Duplicate)</b>	Americium-241	2.39 ± 6.50	10.1	4.95	NE	U	BD	091950-033	EPA 901.1
30-Mar-12	Cesium-137	-0.892 ± 1.67	2.68	1.29	NE	U	BD	091950-033	EPA 901.1
	Cobalt-60	-3.41 ± 3.08	2.99	1.41	NE	U	BD	091950-033	EPA 901.1
	Potassium-40	48.5 ± 41.6	27.1	12.7	NE		J	091950-033	EPA 901.1
	Gross Alpha	1.49	NA	NA	15	NA	None	091950-034	EPA 900.0
	Gross Beta	59.5 ± 11.9	8.16	3.95	4mrem/yr			091950-034	EPA 900.0
	Uranium-233/234	61.3 ± 8.72	0.154	0.0672	NE			091950-035	HASL-300
	Uranium-235/236	0.686 ± 0.183	0.0905	0.0333	NE			091950-035	HASL-300
	Uranium-238	8.62 ± 1.31	0.0998	0.0402	NE			091950-035	HASL-300

**Table III-15 (Concluded)**  
**Summary of Gamma Spectroscopy, Gross Alpha, Gross Beta, and Isotopic Uranium Results**  
**Solid Waste Management Unit 154 Groundwater Monitoring**  
**Quarterly Assessment, January – March 2012**

**Notes**

CFR	= Code of Federal Regulations
CTF	= Coyote Test Field.
EPA	= U.S. Environmental Protection Agency.
HASL	= Health and Safety Laboratory.
ID	= Identification.
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.

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

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

<sup>c</sup>**Laboratory Qualifier**

NA	= Not applicable.
U	= Analyte is absent or below the method detection limit.

<sup>d</sup>**Validation Qualifier**

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

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

<sup>e</sup>**Analytical Method**

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

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

**Table III-16**  
**Summary of Constituents Detected above Established MCLs**  
**Solid Waste Management Units 149 and 154 Groundwater Monitoring**  
**Quarterly Assessments through March 2012**

Well ID	Date	Analyte	Result	MCL	Laboratory Qualifier <sup>a</sup>	Validation Qualifier <sup>b</sup>	Sample Number	Analytical Method <sup>c</sup>
<b>SWMU 154</b>								
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	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	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.
- ID = Identification.
- 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.

**<sup>a</sup>Laboratory Qualifier**

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

**Table III-16 (Concluded)**  
**Summary of Constituents Detected above Established MCLs**  
**Solid Waste Management Units 149 and 154 Groundwater Monitoring**  
**Quarterly Assessments through March 2012**

**Notes (continued)**

**<sup>b</sup>Validation Qualifier**

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

**<sup>c</sup>Analytical Method**

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

**Table III-17**  
**Summary of Detected Duplicate Parameters**  
**Solid Waste Management Units 149 and 154 Groundwater Monitoring**  
**Quarterly Assessment, January – March 2012**

Well ID/Parameter	Environmental Sample (R1)	Duplicate Sample (R2)	RPD
	mg/L unless otherwise noted		
<b>SWMU 149, CTF-MW3</b>			
Nitrate plus Nitrite	6.03	6.05	< 1
Bicarbonate Alkalinity	336	334	1
Bromide	1.15	1.18	3
Chloride	112	115	3
Fluoride	2.37	2.37	< 1
Sulfate	448	462	3
Barium	0.0326	0.0321	2
Calcium	187	192	3
Iron	0.761	0.769	1
Magnesium	49.1	52.1	6
Manganese	0.00109	ND	NC
Nickel	0.00297	0.003	1
Potassium	11.5	10.7	7
Selenium	0.0282	0.0289	2
Sodium	171	165	4
Filtered Barium	0.0324	0.0322	1
Filtered Calcium	179	182	2
Filtered Iron	0.776	0.827	6
Filtered Magnesium	46.9	45.5	3
Filtered Nickel	0.00293	0.00308	5
Filtered Potassium	11.5	11.3	2
Filtered Selenium	0.0288	0.0293	2
Filtered Sodium	157	155	1
Filtered Zinc	0.00572	0.00509	12

**Table III-17 (Continued)**  
**Summary of Detected Duplicate Parameters**  
**Solid Waste Management Units 149 and 154 Groundwater Monitoring**  
**Quarterly Assessment, January – March 2012**

Well ID/Parameter	Environmental Sample (R1)	Duplicate Sample (R2)	RPD
	mg/L unless otherwise noted		
<b>SWMU 154, CTF-MW2</b>			
RDX (µg/L)	0.147	0.179	20
Total Alkalinity	1580	1600	1
Bromide	1.77	1.75	1
Chloride	435	433	< 1
Fluoride	2.27	2.25	1
Sulfate	162	162	< 1
Aluminum	0.108	0.120	11
Arsenic	0.0498	0.0559	12
Barium	0.0805	0.0811	1
Beryllium	0.00294	0.00310	5
Calcium	384	391	2
Cobalt	0.00954	0.00986	3
Iron	2.63	2.71	3
Magnesium	84.4	86.0	2
Manganese	3.07	3.10	1
Nickel	0.0175	0.0183	4
Potassium	51.4	52.3	2
Sodium	479	487	2
Thallium	0.00123	0.00126	2
Uranium	0.0257	0.0257	< 1
Vanadium	ND	0.00109	NC
Zinc	0.267	0.268	< 1
Filtered Aluminum	0.115	0.103	11
Filtered Arsenic	0.0498	0.0521	5
Filtered Barium	0.0818	0.0843	3
Filtered Beryllium	0.00327	0.00321	2
Filtered Calcium	385	396	3
Filtered Cobalt	0.00989	0.010	1
Filtered Copper	0.00176	0.00213	19
Filtered Iron	2.70	2.78	3
Filtered Magnesium	84.6	87.6	3
Filtered Manganese	3.05	3.14	3
Filtered Nickel	0.0185	0.0187	1
Filtered Potassium	51.8	53.2	3
Filtered Sodium	482	495	3
Filtered Thallium	0.00124	0.00123	1
Filtered Uranium	0.0262	0.0266	2
Filtered Zinc	0.317	0.348	9
Potassium-40 (pCi/L)	ND	48.5 ± 41.6	NC
Gross Alpha (pCi/L)	6.73	1.49	NC
Gross Beta (pCi/L)	60.3 ± 20.1	59.5 ± 11.9	NC
Uranium-233/234 (pCi/L)	60.7 ± 8.48	61.3 ± 8.72	NC
Uranium-235/236 (pCi/L)	0.502 ± 0.169	0.686 ± 0.183	NC
Uranium-238 (pCi/L)	9.37 ± 1.42	8.62 ± 1.31	NC

**Table III-17 (Concluded)**  
**Summary of Detected Duplicate Parameters**  
**Solid Waste Management Units 149 and 154 Groundwater Monitoring**  
**Quarterly Assessment, January – March 2012**

**Notes**

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

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

where: R<sub>1</sub> = analysis result  
R<sub>2</sub> = duplicate analysis result  
NC = not calculated

< = Less than.  
µg/L = Micrograms per liter.  
CTF = Coyote Test Field.  
ID = Identification.  
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).  
pCi/L = Picocuries per liter.  
RDX = Hexahydro-trinitro-triazine.  
SWMU = Solid Waste Management Unit.

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







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

Batch No. <i>N/A</i>	SMO Use	AR/COC	<b>614054</b>
Dept. No./Mail Stop: 6234/MS 0718	Date Samples Shipped: <i>3/29/12</i>	Project/Task No. 98026.01.15	
Project/Task Manager: Alicia Aragon	Carrier/Waybill No.	SMO Authorization: <i>[Signature]</i>	
Project Name: SWMU 154	Lab Contact: Edie Kent/803-556-8171	Contract # PO 691436	
Record Center Code: NA	Lab Destination: GEL	<i>SBB BOTTLE ORDER</i>	
Logbook Ref. No.: NA	SMO Contact/Phone: Lorraine Herrera/505-844-3199		
Service Order No. CF 251-12	Send Report to SMO: Lorraine Herrera /505-844-3199		

Location	Tech Area	<b>Reference LOV (available at SMO)</b>	<input type="checkbox"/> Waste Characterization -Send preliminary/copy report to:
Building	Room		<input type="checkbox"/> Released by COC No.: _____ <input checked="" type="checkbox"/> Validation Required

Sample No.-Fraction	ER Sample ID or Sample Location Detail	Depth (ft)	ER Site No.	Date/Time(hr) Collected	Sample Matrix	Container		Preservative	Collection Method	Sample Type	Parameter & Method Requested	Lab Sample ID
						Type	Volume					
091947-001	SWMU-EB2	NA	NA	03/28/12 1030	DIW	G	3x40ml	HCL	G	EB	TCL VOC (SW846-8260B)	
091947-002	SWMU-EB2	NA	NA	03/28/12 1031	DIW	AG	4x1L	4C	G	EB	TCL SVOC (SW846-8270C)	
091947-009	SWMU-EB2	NA	NA	03/28/12 1033	DIW	P	500 ml	HNO3	G	EB	TAL Metals+ Ur (SW846-6020/7470)	
091947-010	SWMU-EB2	NA	NA	03/28/12 1034	FDIW	P	500 ml	HNO3	G	EB	TAL Metals+ Ur (SW846-6020/7470)	
091947-016	SWMU-EB2	NA	NA	03/28/12 1035	DIW	P	125 ml	4C	G	EB	Anions (SW846-9056)	
091947-018	SWMU-EB2	NA	NA	03/28/12 1036	DIW	P	125 ml	H2SO4	G	EB	NPN (353.2)	
091947-020	SWMU-EB2	NA	NA	03/28/12 1037	DIW	P	250 ml	4C	G	EB	Perchlorate (314.0)	
091947-022	SWMU-EB2	NA	NA	03/28/12 1038	DIW	P	500 ml	4C	G	EB	Alkalinity (SM2320B)	
091947-024	SWMU-EB2	NA	NA	03/28/12 1039	DIW	AG	4x1L	4C	G	EB	High Explosive (SW846-8321A) Mod.	
091947-033	SWMU-EB2	NA	NA	03/28/12 1041	DIW	P	1 Liter	HNO3	G	EB	Gamma Spec (short list)(901.0)	
091947-034	SWMU-EB2	NA	NA	03/28/12 1042	DIW	P	1 Liter	HNO3	G	EB	Gross Alpha/Beta (900.0)	

<b>RMMA</b> <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Ref. No.	<b>Sample Tracking</b> Smo Use Date Entered(mm/dd/yy)	<b>Special Instructions/QC Requirements</b> EDD <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No Level D Package <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	<b>Abnormal Conditions on Receipt</b>															
<b>Sample Disposal</b> <input type="checkbox"/> Return to Client <input checked="" type="checkbox"/> Disposal by lab <b>Turnaround Time</b> <input type="checkbox"/> 7 Day <input type="checkbox"/> 15 Day <input checked="" type="checkbox"/> 30 Day	Entered by:	<b>*Send report to:</b> Tim Jackson/ORG.4142/MS.0729/ 284-2547	<b>Lab Use</b>															
<b>Return Samples By:</b> <input type="checkbox"/> Negotiated TAT <input type="checkbox"/> QC inits.	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>Name</th> <th>Signature</th> <th>Init</th> <th>Company/Organization/Phone/Cellular</th> </tr> </thead> <tbody> <tr> <td>Robert Lynch</td> <td><i>[Signature]</i></td> <td>RL</td> <td>SNL/4142/844-4013/250-7090</td> </tr> <tr> <td>Alfred Santillanes</td> <td><i>[Signature]</i></td> <td>AS</td> <td>SNL/4142/844-5130/228-0710</td> </tr> <tr> <td>William Gibson</td> <td><i>[Signature]</i></td> <td>WG</td> <td>SNL/4142/844-4013/239-7367</td> </tr> </tbody> </table>	Name		Signature	Init	Company/Organization/Phone/Cellular	Robert Lynch	<i>[Signature]</i>	RL	SNL/4142/844-4013/250-7090	Alfred Santillanes	<i>[Signature]</i>	AS	SNL/4142/844-5130/228-0710	William Gibson	<i>[Signature]</i>	WG	SNL/4142/844-4013/239-7367
Name	Signature	Init	Company/Organization/Phone/Cellular															
Robert Lynch	<i>[Signature]</i>	RL	SNL/4142/844-4013/250-7090															
Alfred Santillanes	<i>[Signature]</i>	AS	SNL/4142/844-5130/228-0710															
William Gibson	<i>[Signature]</i>	WG	SNL/4142/844-4013/239-7367															

1. Relinquished by <i>[Signature]</i> Org. <i>4142</i> Date <i>3/29/12</i> Time <i>1004</i>	4. Relinquished by _____ Org. _____ Date _____ Time _____
1. Received by <i>[Signature]</i> Org. <i>4142</i> Date <i>3/29/12</i> Time <i>1004</i>	4. Received by _____ Org. _____ Date _____ Time _____
2. Relinquished by _____ Org. _____ Date _____ Time _____	5. Relinquished by _____ Org. _____ Date _____ Time _____
2. Received by _____ Org. _____ Date _____ Time _____	5. Received by _____ Org. _____ Date _____ Time _____
3. Relinquished by _____ Org. _____ Date _____ Time _____	6. Relinquished by _____ Org. _____ Date _____ Time _____
3. Received by _____ Org. _____ Date _____ Time _____	6. Received by _____ Org. _____ Date _____ Time _____









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





## Sample Findings Summary



AR/COC: 614052, 614053

Page 1 of 2

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
<b>SW846 3005/6020 DOE-AL</b>			
	091941-009/SWMU-EB1	Iron (7439-89-6)	0.1745U, B
	091941-010/SWMU-EB1	Cobalt (7440-48-4)	0.00051U, B
	091941-010/SWMU-EB1	Iron (7439-89-6)	0.1745U, B
	091943-009/CTF-MW3	Cobalt (7440-48-4)	0.00061U, B, B3
	091943-009/CTF-MW3	Copper (7440-50-8)	0.0041U, B2
	091943-009/CTF-MW3	Zinc (7440-66-6)	0.0182U, B2
	091943-010/CTF-MW3	Cobalt (7440-48-4)	0.00051U, B
	091943-010/CTF-MW3	Copper (7440-50-8)	0.00351U, B2
	091944-009/CTF-MW3	Cobalt (7440-48-4)	0.00061U, B, B3
	091944-009/CTF-MW3	Copper (7440-50-8)	0.0041U, B2
	091944-009/CTF-MW3	Zinc (7440-66-6)	0.0182U, B2
	091944-010/CTF-MW3	Cobalt (7440-48-4)	0.00051U, B
	091944-010/CTF-MW3	Copper (7440-50-8)	0.00351U, B2
<b>SW846 7470A</b>			
	091941-009/SWMU-EB1	Mercury (7439-97-6)	UJ, B4
	091941-010/SWMU-EB1	Mercury (7439-97-6)	UJ, B4
	091943-009/CTF-MW3	Mercury (7439-97-6)	UJ, B4
	091943-010/CTF-MW3	Mercury (7439-97-6)	UJ, B4
	091944-009/CTF-MW3	Mercury (7439-97-6)	UJ, B4
	091944-010/CTF-MW3	Mercury (7439-97-6)	UJ, B4
<b>SW846 8260B DOE-AL</b>			
	091941-001/SWMU-EB1	Acetone (67-64-1)	J+, C2
	091941-001/SWMU-EB1	Bromoform (75-25-2)	UJ, MS3
	091941-001/SWMU-EB1	Methylene chloride (75-09-2)	UJ, I3, L3

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
	091942-001/SWMU-TB1	Bromoform (75-25-2)	UJ, MS3
	091942-001/SWMU-TB1	Methylene chloride (75-09-2)	UJ, I3, L3
	091943-001/CTF-MW3	Bromodichloromethane (75-27-4)	1.00U, B2
	091943-001/CTF-MW3	Bromoform (75-25-2)	UJ, MS3
	091943-001/CTF-MW3	Chloroform (67-66-3)	1.00U, B2
	091943-001/CTF-MW3	Dibromochloromethane (124-48-1)	1.00U, B2
	091943-001/CTF-MW3	Methylene chloride (75-09-2)	UJ, I3, L3
	091944-001/CTF-MW3	Bromodichloromethane (75-27-4)	1.00U, B2
	091944-001/CTF-MW3	Bromoform (75-25-2)	UJ, MS3
	091944-001/CTF-MW3	Chloroform (67-66-3)	1.00U, B2
	091944-001/CTF-MW3	Dibromochloromethane (124-48-1)	1.00U, B2
	091944-001/CTF-MW3	Methylene chloride (75-09-2)	UJ, I3, L3
	091945-001/SWMU-TB2	Bromoform (75-25-2)	UJ, MS3
	091945-001/SWMU-TB2	Methylene chloride (75-09-2)	UJ, I3, L3
	091946-001/SWMU-FB1	Bromodichloromethane (75-27-4)	4.05U, B2
	091946-001/SWMU-FB1	Bromoform (75-25-2)	UJ, MS3
	091946-001/SWMU-FB1	Chloroform (67-66-3)	16.7U, B2
	091946-001/SWMU-FB1	Dibromochloromethane (124-48-1)	1.00U, B2
	091946-001/SWMU-FB1	Methylene chloride (75-09-2)	UJ, I3, L3

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

## Memorandum

Date: May 2, 2012  
To: File  
From: Marcia Hilchey  
Subject: Inorganic Data Review and Validation – SNL  
Site: SWMU 149 GWM  
AR/COC: 614052, -053  
SDG: 298265 and 298275  
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

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

### ICPMS:

- 1) Co was detected in the MB associated with all samples, and in the CCB associated with samples 298265-002, -008, and -016 at concentrations > the MDL but < the PQL. The associated result of samples 298265-002 and -008 were detects <5X the MB concentration and <5X the CCB concentration and will be **qualified “0.000605U, B, B3”** at 5X the value of the CCB. The associated results for samples 298275-001, -002, and -003 were detects < 5X the MB concentration and will be **qualified “0.00051U, B”** at 5X the value of the MB.
- 2) Fe was detected in the MB associated with all samples at > MDL and < PQL. Associated results for samples 298265-016 and 298275-003 were > MDL and < 5X the MB concentration and will be **qualified “0.1745U,B.”**
- 3) Cu was detected in EB sample 298275-003 associated with samples -001 and -002. The associated sample results were detects < 5X the EB concentration and will be **qualified “0.00351U, B2.”**
- 4) Cu and Zn were detected in EB sample 298265-016 associated with samples -002 and -008. The associated sample results were detects < 5X the EB concentration and will be **qualified “U, B2” at 5X the EB value.**
- 5) Zn was detected in EB sample 298265-016 associated with samples -002 and -008. The associated sample results were detects < 5X the EB concentration and will be **qualified “0.00406U, B2.”**

CVAA:

- 1) Hg was detected in ICB/CCBs associated with all samples at negative concentrations > MDL and < PQL. All 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 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:**

Co was detected in the MB associated with all samples, and in the CCB associated with samples 298265-002, -008, and -016. All associated ND and qualified ND sample results will not be qualified.

Tl was detected in a CCB associated with samples 298265-002, -008, and -016 at > MDL and < PQL. All associated sample results were ND and will not be qualified.

Fe was detected in the MB associated with all samples at > MDL and < PQL. All associated sample results > 5X the MB concentration and all qualified NDs will not be qualified.

Co, Fe, and Cu were detected in EB sample 298275-003 associated with samples -001 and -002. EB results for Co and Fe were qualified U due to associated MB and CCB results (see Summary section) and therefore did not affect associated field sample results.

Fe, Al, Ca, and Mg were detected in EB sample 298265-016 associated with samples -002 and -008. All associated sample results that were ND or detects > 5X the EB concentrations will not be qualified. The EB result for Fe was qualified U due to associated MB result (see Summary section) and therefore did not affect associated field sample results.

**ICP -MS Internal Standards**

All internal standards met QC acceptance criteria.

### **Matrix Spike (MS)**

All MS recoveries met QC acceptance criteria.

#### **ICP-MS:**

It should be noted that MS analysis associated with samples 298265-002, -008, and -016 was performed on a SNL sample from another SDG. No sample data will be qualified as a result.

#### **ICP-AES and CVAA:**

It should be noted that MS analysis associated with samples 298275-001, -002, and -003 was performed on a SNL sample from another SDG. No sample data will be qualified as a result.

### **Laboratory Replicate**

All replicates met QC acceptance criteria.

#### **ICP-MS:**

It should be noted that replicate analysis associated with samples 298265-002, -008, and -016 was performed on a SNL sample from another SDG. No sample data will be qualified as a result.

#### **ICP-AES and CVAA:**

It should be noted that replicate analysis associated with samples 298275-001, -002, and -003 was performed on a SNL sample from another 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 298265-002 and -008, and sample 298275-001, were diluted 5X for Ca, Mg, and Na. Sample 298275-002 was diluted 5X 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 instrument 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:**

It should be noted that serial dilution analysis associated with samples 298265-002, -008, and -016 was performed on a SNL sample from another SDG. No sample data will be qualified as a result.

**ICP-AES:**

It should be noted that serial dilution analysis associated with samples 298275-001, -002, and -003 was performed on a SNL sample from another SDG. No sample data will be qualified as a result.

**Other QC**

EBs and field duplicate pairs were submitted on this COC(s). There are no “required” review criteria for field duplicate analyses comparability; no data will be qualified as a result.

No other specific issues that affect data quality were identified.

## Memorandum

Date: May 2, 2012  
To: File  
From: Marcia Hilchey  
Subject: Inorganic Data Review and Validation – SNL  
Site: SWMU 149 GWM  
AR/COC: 614052, -053  
SDG: 298650  
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**

Three samples were prepared and analyzed with accepted procedures using methods EPA 9056 (anions by ion chromatography), EPA 353.2 (nitrate/nitrite by Cd reduction), EPA 314.0 (perchlorate by IC), and SM 2320B (alkalinity). Data were reported for all required analytes. No problems were identified with the data package that results in the qualification of data.

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

### **Holding Times and Preservation**

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

### **Calibration**

All initial and continuing calibration met QC acceptance criteria.

### **Blanks**

No target analytes were detected in the blanks with the following exceptions.

#### **Anions:**

Chloride was reported in the EB at a concentration > MDL and < PQL. All associated sample results were ND and will not be qualified.

Nitrate/Nitrite:

Nitrate/nitrite was reported in the MB at a concentration > MDL and < PQL. All associated sample results were ND or > 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/PS recoveries met QC acceptance criteria.

**Laboratory Replicate**

The replicate analyses met all QC acceptance criteria.

**Detection Limits/Dilutions**

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

Anions:

Samples -003 and -009 were diluted 50X for chloride and sulfate.

Nitrate/Nitrite:

Samples -004 and -010 were diluted 25X. Sample -018 was diluted 5X.

All associated batch QC samples were analyzed at dilution factors that resulted in relative dilution factors to the sample that were  $\leq 5X$ . No sample data will be qualified as a result.

**Other QC**

EBs and field duplicate samples were submitted with AR/COC. There are no “required” review criteria for field duplicate analyses comparability; no data will be qualified as a result.

No other specific issues that affect data quality were identified.

## Memorandum

Date: May 2, 2012  
To: File  
From: Marcia Hilchey  
Subject: Inorganic Data Review and Validation – SNL  
Site: SWMU 149 GWM  
AR/COC: 614052, -053  
SDG: 298265 and 298275  
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

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

### ICPMS:

- 1) Co was detected in the MB associated with all samples, and in the CCB associated with samples 298265-002, -008, and -016 at concentrations > the MDL but < the PQL. The associated result of samples 298265-002 and -008 were detects <5X the MB concentration and <5X the CCB concentration and will be **qualified “0.000605U, B, B3”** at 5X the value of the CCB. The associated results for samples 298275-001, -002, and -003 were detects < 5X the MB concentration and will be **qualified “0.00051U, B”** at 5X the value of the MB.
- 2) Fe was detected in the MB associated with all samples at > MDL and < PQL. Associated results for samples 298265-016 and 298275-003 were > MDL and < 5X the MB concentration and will be **qualified “0.1745U,B.”**
- 3) Cu was detected in EB sample 298275-003 associated with samples -001 and -002. The associated sample results were detects < 5X the EB concentration and will be **qualified “0.00351U, B2.”**
- 4) Cu and Zn were detected in EB sample 298265-016 associated with samples -002 and -008. The associated sample results were detects < 5X the EB concentration and will be **qualified “U, B2” at 5X the EB value.**
- 5) Zn was detected in EB sample 298265-016 associated with samples -002 and -008. The associated sample results were detects < 5X the EB concentration and will be **qualified “0.00406U, B2.”**

CVAA:

- 1) Hg was detected in ICB/CCBs associated with all samples at negative concentrations > MDL and < PQL. All 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 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:**

Co was detected in the MB associated with all samples, and in the CCB associated with samples 298265-002, -008, and -016. All associated ND and qualified ND sample results will not be qualified.

Tl was detected in a CCB associated with samples 298265-002, -008, and -016 at > MDL and < PQL. All associated sample results were ND and will not be qualified.

Fe was detected in the MB associated with all samples at > MDL and < PQL. All associated sample results > 5X the MB concentration and all qualified NDs will not be qualified.

Co, Fe, and Cu were detected in EB sample 298275-003 associated with samples -001 and -002. EB results for Co and Fe were qualified U due to associated MB and CCB results (see Summary section) and therefore did not affect associated field sample results.

Fe, Al, Ca, and Mg were detected in EB sample 298265-016 associated with samples -002 and -008. All associated sample results that were ND or detects > 5X the EB concentrations will not be qualified. The EB result for Fe was qualified U due to associated MB result (see Summary section) and therefore did not affect associated field sample results.

**ICP -MS Internal Standards**

All internal standards met QC acceptance criteria.

### **Matrix Spike (MS)**

All MS recoveries met QC acceptance criteria.

#### **ICP-MS:**

It should be noted that MS analysis associated with samples 298265-002, -008, and -016 was performed on a SNL sample from another SDG. No sample data will be qualified as a result.

#### **ICP-AES and CVAA:**

It should be noted that MS analysis associated with samples 298275-001, -002, and -003 was performed on a SNL sample from another SDG. No sample data will be qualified as a result.

### **Laboratory Replicate**

All replicates met QC acceptance criteria.

#### **ICP-MS:**

It should be noted that replicate analysis associated with samples 298265-002, -008, and -016 was performed on a SNL sample from another SDG. No sample data will be qualified as a result.

#### **ICP-AES and CVAA:**

It should be noted that replicate analysis associated with samples 298275-001, -002, and -003 was performed on a SNL sample from another 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 298265-002 and -008, and sample 298275-001, were diluted 5X for Ca, Mg, and Na. Sample 298275-002 was diluted 5X 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 instrument 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:**

It should be noted that serial dilution analysis associated with samples 298265-002, -008, and -016 was performed on a SNL sample from another SDG. No sample data will be qualified as a result.

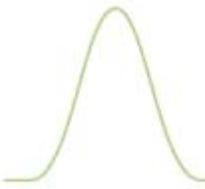
**ICP-AES:**

It should be noted that serial dilution analysis associated with samples 298275-001, -002, and -003 was performed on a SNL sample from another SDG. No sample data will be qualified as a result.

**Other QC**

EBs and field duplicate pairs were submitted on this COC(s). There are no “required” review criteria for field duplicate analyses comparability; no data will be qualified as a result.

No other specific issues that affect data quality were identified.



## Sample Findings Summary



AR/COC: 614055

Page 1 of 1

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
<b>EPA 901.1</b>			
	091949-033/CTF-MW2	Americium-241 (14596-10-2)	BD, FR3
	091949-033/CTF-MW2	Cesium-137 (10045-97-3)	BD, FR3
	091949-033/CTF-MW2	Cobalt-60 (10198-40-0)	BD, FR3
	091949-033/CTF-MW2	Potassium-40 (13966-00-2)	BD, FR3
	091950-033/CTF-MW2	Americium-241 (14596-10-2)	BD, FR3
	091950-033/CTF-MW2	Cesium-137 (10045-97-3)	BD, FR3
	091950-033/CTF-MW2	Cobalt-60 (10198-40-0)	BD, FR3
	091950-033/CTF-MW2	Potassium-40 (13966-00-2)	J, FR7
<b>SW846 3005/6020 DOE-AL</b>			
	091949-009/CTF-MW2	Aluminum (7429-90-5)	J-, DL2
	091949-009/CTF-MW2	Copper (7440-50-8)	0.00316U, B2
	091949-010/CTF-MW2	Aluminum (7429-90-5)	J-, DL2
	091950-009/CTF-MW2	Aluminum (7429-90-5)	J-, DL2
	091950-009/CTF-MW2	Copper (7440-50-8)	0.00316U, B2
	091950-010/CTF-MW2	Aluminum (7429-90-5)	J-, DL2
<b>SW846 7470A</b>			
	091949-009/CTF-MW2	Mercury (7439-97-6)	UJ, B4
	091949-010/CTF-MW2	Mercury (7439-97-6)	UJ, B4
	091950-009/CTF-MW2	Mercury (7439-97-6)	UJ, B4
	091950-010/CTF-MW2	Mercury (7439-97-6)	UJ, B4
<b>SW846 8260B DOE-AL</b>			
	091952-001/SWMU-FB2	Bromodichloromethane (75-27-4)	3.75U, B2
	091952-001/SWMU-FB2	Chloroform (67-66-3)	10.20U, B2
	091952-001/SWMU-FB2	Dibromochloromethane (124-48-1)	0.300U, B2

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



## Memorandum

Date: May 3, 2012  
To: File  
From: Marcia Hilchey  
Subject: Inorganic Data Review and Validation – SNL  
Site: SWMU 154 GWM  
AR/COC: 614054  
SDG: 298481  
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 ion chromatography), EPA 353.2 (nitrate/nitrite by Cd reduction), EPA 314.0 (perchlorate by IC), and SM 2320B (alkalinity). Data were reported for all required analytes. Problems were identified with the data package that results in the qualification of data.

### Anions:

- 1) Chloride was detected in the MB at > PQL. The associated sample result was > MDL and < 5X the MB concentration and will be **qualified “1.015UJ, B.”**
- 2) A MS or replicate was not analyzed with this SDG. All associated ND and qualified ND sample results will be **qualified “UJ, MS1.”**

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

### Holding Times and Preservation

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

### Calibration

All initial and continuing calibration met QC acceptance criteria.

## **Blanks**

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

### Anions:

Fluoride was reported in the MB at a concentration > MDL and < PQL. The associated sample result was ND and will not be qualified.

## **Laboratory Control Sample (LCS)/Laboratory Control Sample Duplicate (LCSD):**

All LCS/LCSD acceptance criteria were met.

## **Matrix Spike (MS)**

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

### Nitrate/Nitrite, Perchlorate, Alkalinity:

It should be noted that the sample used for MS analyses was from another SNL SDG. No sample results will be qualified as a result.

## **Laboratory Replicate**

The replicate analyses met all QC acceptance criteria.

### Nitrate/Nitrite, Perchlorate, Alkalinity:

It should be noted that the sample used for replicate analysis was from another SNL SDG. No sample results will be qualified as a result.

### Anions:

Since an MSD was not analyzed, precision was evaluated based on LCS/LCSD RPD.

## **Detection Limits/Dilutions**

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

### Nitrate/Nitrite:

The sample was diluted 5X.

All associated batch QC samples were analyzed at dilution factors that resulted in relative dilution factors to the sample that were  $\leq 5X$ . No sample data will be qualified as a result.

## **Other QC**

No other specific issues that affect data quality were identified.

## Memorandum

Date: May 3, 2012

To: File

From: Marcia Hilchey

Subject: LC/MS/MS Organic Data Review and Validation – SNL  
Site: SWMU 154 GWM  
AR/COC: 614054  
SDG: 298481  
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. Problems were identified with the data package that result in the qualification of data.

- 1) A MS or MSD was not analyzed with this SDG. All associated sample results were ND and will be **qualified “UJ, MS1.”**

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

### Holding Times

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

### Calibration

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

The CCV %D for 2,4-dinitrotoluene was >20% with a positive bias. The associated sample result was ND and will not be qualified.

**Reporting Limit Verification**

All CRI recoveries met QC acceptance criteria.

**Blanks**

No target analytes were detected in the blanks.

**Surrogates**

All surrogate recoveries met QC acceptance criteria.

**Internal Standards**

All internal standards met QC acceptance criteria.

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

The MS/MSD analyses met QC acceptance criteria except as noted above in the Summary section. Since an MSD was not analyzed, precision was evaluated based on LCS/LCSD RPDs.

**Laboratory Control Sample (LCS)/Laboratory Control Sample Duplicate (LCSD)**

All LCS/LCSD QC acceptance criteria were met with the following exception. The LCSD %R for m-nitrotoluene and o-nitrotoluene were > acceptance criteria. All associated sample results were ND and will not be qualified.

**Detection Limits/Dilutions**

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

**Other QC**

No other specific issues that affect data quality were identified.

## Memorandum

Date: May 3, 2012  
To: File  
From: Marcia Hilchey  
Subject: Inorganic Data Review and Validation – SNL  
Site: SWMU 154 GWM  
AR/COC: 614054  
SDG: 298481 and 298483  
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 metals), 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.

#### ICPMS and ICP-AES:

- 1) A MS or MSD was not analyzed with this SDG. All associated ND sample results will be **qualified “UJ, MS1”**; all associated detected results will be **qualified “J, MS1.”**

#### CVAA:

- 1) Hg was detected in ICB/CCBs associated with sample 298483-001 at negative concentrations > MDL and < PQL. The associated sample result was ND and will be **qualified “UJ, B4.”**
- 2) A MS, MSD, or replicate was not analyzed with this SDG. All associated ND sample results will be **qualified “UJ, MS1.”**

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

### Holding Times and Preservation

The samples were 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 noted above in the Summary section. Since an MSD was not analyzed, precision was evaluated based on LCS/LCSD RPDs.

### **Laboratory Replicate**

All replicates met QC acceptance criteria. Since a laboratory replicate was not analyzed, precision was evaluated based on LCS/LCSD RPDs.

### **Laboratory Control Sample (LCS)**

All LCS QC acceptance criteria were met.

### **Detection Limits/Dilutions**

All detection limits were properly reported. No samples were diluted.

### **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.

### **Other QC**

No other specific issues that affect data quality were identified.

## Memorandum

Date: May 3, 2012

To: File

From: Marcia Hilchey

Subject: Radiochemical Data Review and Validation – SNL  
Site: SWMU 154 GWM  
AR/COC: 614054  
SDG: 298481  
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), EPA 900.0 (gross alpha/beta), and HASL 300, U-02-RC Mod (Alpha Spec U). Problems were identified with the data package that result in the qualification of data.

#### Gamma Spec, Iso-U, Gross Alpha/Beta:

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

#### Iso-U:

A MS or replicate was not analyzed with this SDG. All associated sample results will be **qualified “J, MS1.”**

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

### Holding Times and Preservation

The sample was 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**

All tracer/carrier recoveries met QC acceptance criteria.

### **Matrix Spike (MS)**

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

#### **Gross Alpha/Beta:**

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

### **Laboratory Replicate**

All replicate error ratio acceptance criteria were met except as noted above in the Summary section.

#### **Gross Alpha/Beta:**

It should be noted that the replicate analyses were performed on a SNL sample 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 required detection limits were met. No dilutions were required.

### **Other QC**

No other specific issues that affect data quality were identified.

## Memorandum

Date: May 3, 2012  
To: File  
From: Marcia Hilchey  
Subject: GC/MS Organic Data Review and Validation – SNL  
Site: SWMU 154 GWM  
AR/COC: 614054  
SDG: 298481  
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. Problems were identified with the data package that resulted in the qualification of data.

- 1) A MS or MSD was not analyzed with this SDG. All associated sample results were ND and will be **qualified “UJ, MS1.”**

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

### Holding Times

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

### Instrument Tune

All instrument tune requirements were met.

### Calibration

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

The CCV %D for hexachlorocyclopentadiene was > acceptance limits with positive bias. The associated sample result was ND and will not be qualified.

**Blanks**

No target analytes were detected in the MB.

**Surrogates**

All surrogate recoveries met QC acceptance criteria.

**Internal Standards**

All internal standards met QC acceptance criteria.

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

All MS/MSD acceptance criteria were met except as noted above in the Summary section. Since an MSD was not analyzed, precision was evaluated based on LCS/LCSD RPDs.

**Laboratory Control Sample (LCS)/Laboratory Control Sample Duplicate (LCS/LCSD)**

All LCS/LCSD 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.

## Memorandum

Date: May 3, 2012  
To: File  
From: Marcia Hilchey  
Subject: GC/MS Organic Data Review and Validation – SNL  
Site: SWMU 154 GWM  
AR/COC: 614054  
SDG: 298481  
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. Problems were identified with the data package that resulted in the qualification of data.

- 1) The initial calibration RSD for methylene chloride was > 15% and < 40%, and the CCV %D was >20% with negative bias. All associated sample results were ND and will be **qualified “UJ, I3.”**
- 2) The initial calibration RSD for dibromochloromethane was > 15% and < 40%. The associated result for sample 298481-001 was a detect and will be **qualified “J, I3”**.
- 3) LCS %R for methylene chloride was < the acceptance limit. All associated ND sample results will be qualified **“UJ, L3.”**
- 4) MSD %R for methylene chloride was < acceptance criteria. All associated sample results were ND and will be **qualified “UJ, MS3.”**

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

### Holding Times

The 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 RSDs for dibromochloromethane; bromoform; and trans-1,3-dichloropropylene were > 15% and < 40%. There were no other associated calibration infractions. Associated ND sample results will not be qualified.

The ICV and/or CCV %Ds for eight target compounds (see GC/MS VOC worksheet) were > acceptance limits 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 except as noted above in the Summary section and as follows.

MS %R for bromoform was > acceptance criteria. All associated sample results were ND and will not be qualified.

It should be noted that MS/MSD analyses were performed on a SNL sample from another SDG. No sample data will be qualified as a result.

### **Laboratory Control Sample (LCS)**

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

### **Detection Limits/Dilutions**

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

### **Tentatively Identified Compounds (TICs)**

TIC reports were not required.

**Other QC**

A TB was submitted on the AR/COC(s).

No other specific issues that affect data quality were identified.



## Memorandum

Date: May 16, 2012  
To: File  
From: Marcia Hilchey  
Subject: Inorganic Data Review and Validation – SNL  
Site: SWMU 154 GWM  
AR/COC: 614055  
SDG: 300712  
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**

Two samples were prepared and analyzed with accepted procedures using methods EPA 9056 (anions by ion chromatography), EPA 353.2 (nitrate/nitrite by Cd reduction), EPA 314.0 (perchlorate by IC), and SM 2320B (alkalinity). Data were reported for all required analytes. No problems were identified with the data package that results in the qualification of data.

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

### **Holding Times and Preservation**

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

### **Calibration**

All initial and continuing calibration met QC acceptance criteria.

### **Blanks**

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

#### **Anions:**

Chloride was detected in the EB from COC 614054 associated with this COC. The chloride result was U qualified due to MB contamination, and will not be applied to associated results in this COC.

**Laboratory Control Sample (LCS):**

All LCS acceptance criteria were met.

**Matrix Spike (MS)**

All MS/PS recoveries met QC acceptance criteria.

**Perchlorate:**

It should be noted that the sample used for MS analyses was from another SNL SDG. No sample results will be qualified as a result.

**Laboratory Replicate**

The replicate analyses met all QC acceptance criteria.

**Perchlorate:**

It should be noted that the sample used for replicate analysis was from another SNL SDG. No sample results will be qualified as a result.

**Detection Limits/Dilutions**

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

**Anions:**

Both samples were diluted 10X for bromide and 100X for chloride and sulfate.

**Nitrate/Nitrite:**

Sample -006 was diluted 25X, and sample -018 was diluted 5X.

All associated batch QC samples were analyzed at dilution factors that resulted in relative dilution factors to the sample that were  $\leq 5X$ . No sample data will be qualified as a result.

**Other QC**

EBs associated with this COC was submitted on COC 614054. Field duplicates were submitted on this COC. There are no "required" review criteria for field duplicate analyses comparability; no data will be qualified as a result.

No other specific issues that affect data quality were identified.

## Memorandum

Date: May 16, 2012

To: File

From: Marcia Hilchey

Subject: LC/MS/MS Organic Data Review and Validation – SNL  
Site: SWMU 154 GWM  
AR/COC: 614055  
SDG: 300712  
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**

Two samples were prepared and analyzed with accepted procedures using method EPA 8321A Mod (HE by LCMSMS). 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 extracted and analyzed within the prescribed holding times 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)**

The MS/MSD analyses met QC acceptance criteria with the following exception.

The MSD %R for o-nitrotoluene was > the upper acceptance limit. All associated sample results were ND and will not be qualified.

### **Laboratory Control Sample (LCS)/Laboratory Control Sample Duplicate (LCSD)**

All LCS/LCSD 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**

An EB associated with this COC was submitted on COC 614054. A field duplicate was submitted on this COC. There are no "required" review criteria for field duplicate analyses comparability; no data will be qualified as a result.

No other specific issues that affect data quality were identified.

## Memorandum

Date: May 16, 2012  
To: File  
From: Marcia Hilchey  
Subject: Inorganic Data Review and Validation – SNL  
Site: SWMU 154 GWM  
AR/COC: 614055  
SDG: 300712 and 300698  
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

Four samples were prepared and analyzed with approved procedures using methods EPA 6020 (ICP-MS metals), 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.

#### ICPMS:

- 1) The CRI %R for Al was > 130%. All associated sample results were detects < 5X the PQL and will be **qualified “J+, DL.”**
- 2) Cu was detected in the EB sample from SDG 614054, which was associated with samples 300712-003 and -015. The associated sample results were > MDL and < 5X the EB concentration and will be **qualified “0.00316U, B2”** at 5X the EB value.

#### CVAA:

- 1) Hg was detected in CCBs associated with all samples at negative concentrations > MDL and < PQL. 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 analyzed within the prescribed holding times and properly preserved with the following exception.

Samples 300968-001 and -002, and 300712-015 were received without proper acid preservation. The samples were preserved at the laboratory, per client request. The package included no documentation regarding the length of time the samples were allowed to equilibrate after preservation. No sample results will be qualified as a result.

### **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 except as noted above in the Summary section.

### **Blanks**

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

Zn was detected in the MB at < PQL. All associated sample results 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.

#### **ICP-AES, ICP-MS, and CVAA:**

SDG 300698 - It should be noted that MS analysis was performed on a SNL sample from another SDG. No sample data will be qualified as a result.

#### **CVAA:**

SDG 300712 - It should be noted that MS analysis was performed on a SNL sample from another SDG. No sample data will be qualified as a result.

### **Laboratory Replicate**

All replicates met QC acceptance criteria.

#### **ICP-AES, ICP-MS, and CVAA:**

SDG 300698 - It should be noted that replicate analysis was performed on a SNL sample from another SDG. No sample data will be qualified as a result.

CVAA:

SDG 300712 - It should be noted that replicate analysis was performed on a SNL sample from another 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. All samples were diluted 20X for Na, Ca, Mg, Mn, and K.

**ICP Interference Check Sample (ICS A and AB)**

The ICS A and AB results met all QC acceptance criteria.

**ICP Serial Dilution**

The serial dilution analyses met all QC acceptance criteria.

ICP-AES and ICP-MS:

SDG 300698 - It should be noted that serial dilution analysis was performed on a SNL sample from another SDG. No sample data will be qualified as a result.

**Other QC**

EBs associated with this COC was submitted on COC 614054. Field duplicates were submitted on this COC. There are no "required" review criteria for field duplicate analyses comparability; no data will be qualified as a result.

No other specific issues that affect data quality were identified.



## Memorandum

Date: May 16, 2012

To: File

From: Marcia Hilchey

Subject: Radiochemical Data Review and Validation – SNL  
Site: SWMU 154 GWM  
AR/COC: 614055  
SDG: 300712  
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

Two samples were prepared and analyzed with approved procedures using methods EPA 901.1 (gamma spec – short list), EPA 900.0 (gross alpha/beta), and HASL 300, U-02-RC Mod (Alpha Spec U). Problems were identified with the data package that result in the qualification of data.

#### Gamma Spec, Iso-U, Gross Alpha/Beta:

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

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

### Holding Times and Preservation

The samples were 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.

#### Gamma Spec:

It should be noted that the result for K-40 in the MB was flagged “X” by the laboratory because the peak did not meet identification criteria. No sample results will be qualified as a result.

### **Tracer/Carrier Recovery**

All tracer/carrier recoveries met QC acceptance criteria.

### **Matrix Spike (MS)**

A MS met all QC acceptance criteria.

#### Gamma spec:

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

### **Laboratory Replicate**

All replicate error ratio acceptance criteria were met except as noted above in the Summary section.

#### Gamma spec:

It should be noted that the replicate analyses were performed on a SNL sample 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 required detection limits were met. No dilutions were required.

### **Other QC**

EBs associated with this COC was submitted on COC 614054. Field duplicates were submitted on this COC. There are no “required” review criteria for field duplicate analyses comparability; no data will be qualified as a result.

No other specific issues that affect data quality were identified.

## Memorandum

Date: May 20, 2012  
To: File  
From: Marcia Hilchey  
Subject: GC/MS Organic Data Review and Validation – SNL  
Site: SWMU 154 GWM  
AR/COC: 614055  
SDG: 300712  
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**

Two samples were 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 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 %Ds for hexachlorocyclopentadiene; m-nitroaniline; and 2,4-dinitrophenol were > acceptance limits with positive and negative bias. The associated sample results were ND, with no other associated calibration infractions. Therefore sample results will not be qualified.

**Blanks**

No target analytes were detected in the blanks.

**Surrogates**

All surrogate recoveries met QC acceptance criteria.

**Internal Standards**

All internal standards met QC acceptance criteria.

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

All MS/MSD acceptance criteria were met.

**Laboratory Control Sample (LCS)**

All LCS acceptance criteria were met.

**Detection Limits/Dilutions**

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

**Tentatively Identified Compounds (TICs)**

TIC reports were not required.

**Other QC**

An EB sample from COC 614054 in SDG 698481 was associated with samples in this COC. A field duplicate were submitted on the AR/COC(s). There are no “required” review criteria for field duplicate analyses comparability; no data will be qualified as a result.

No other specific issues that affect data quality were identified.

## Memorandum

Date: May 15, 2012  
To: File  
From: Marcia Hilchey  
Subject: GC/MS Organic Data Review and Validation – SNL  
Site: SWMU 154 GWM  
AR/COC: 614055  
SDG: 300712  
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

Four 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) Bromodichloromethane, chloroform, and dibromochloromethane were detected in the EB from SDG 614054. The sample results for bromodichloromethane and chloroform in associated FB sample 300712-026 were detects > PQL and < 5X the EB concentration and will be **qualified “U, B2” at 5X the EB value**. The result for dibromochloromethane in the FB was > MDL, < PQL, and < 5X the EB concentration and will be **qualified “U, B2” at the PQL**.

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

### Holding Times

The samples were analyzed within the prescribed holding 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 initial calibration RSDs for acetone and bromoform were > 15% and < 40%. There were no other associated calibration infractions. Associated ND sample results will not be qualified.

The ICV %Ds for chloromethane and bromomethane were > acceptance limits 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 except as noted above in the Summary section and as follows.

Bromodichloromethane, chloromethane, and dibromochloromethane were detected in the FB. The associated results in the FB were U qualified due to EB contamination (see Summary section), therefore associated sample results will not be qualified due to FB contamination

### **Surrogates**

All surrogate recoveries met QC acceptance criteria.

### **Internal Standards**

All internal standards met QC acceptance criteria.

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

All MS/MSD acceptance criteria were met.

It should be noted that MS/MSD analyses were performed on a SNL sample from another SDG. No sample data will be qualified as a result.

### **Laboratory Control Sample (LCS)**

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

### **Detection Limits/Dilutions**

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

### **Tentatively Identified Compounds (TICs)**

TIC reports were not required.

**Other QC**

A TB, a FB, and a field duplicate were submitted on the AR/COC(s). There are no “required” review criteria for field duplicate analyses comparability; no data will be qualified as a result.

No other specific issues that affect data quality were identified.



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## SECTION IV

### SOLID WASTE MANAGEMENT UNITS 8/58 AND 68 QUARTERLY GROUNDWATER MONITORING REPORT, JANUARY – MARCH 2012

#### 1.0 Introduction

This Quarterly Groundwater Monitoring 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 as follows.

The second of eight quarterly groundwater sampling events for Coyote Canyon Blast Area (CCBA) 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 (Old Burn Site), occurred in January 2012. Monitoring wells CCBA-MW1, CCBA-MW2, OBS-MW1, OBS-MW2, and OBS-MW3 were installed in August 2011. 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). 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). 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 First Quarter, Calendar Year (CY) 2012 reporting period (January – March 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” (SNL/NM September 2010, Attachment B) and “Groundwater Characterization Work Plan for SWMU 68, Old Burn Site” (SNL/NM September 2010, Attachment A). These Work Plans were approved by the NMED in January 2011 (NMED January 2011).

Monitoring wells CCBA-MW1 and CCBA-MW2 were sampled on January 12 and January 16, 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 January 9 to January 11, 2012. 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 the CCBA-MW1 primary and duplicate environmental samples; both contained a fluoride concentration of 4.94 mg/L. Fluoride in the CCBA-MW2 sample was reported above the method detection limit (MDL) at a concentration of 1.49 mg/L. No analytical results for the SWMU 68 groundwater samples exceed the corresponding MCLs.

Quality control (QC) samples consisting of environmental duplicate, 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 second of eight supplemental quarterly events for the five monitoring wells. The third of the eight supplemental quarterly groundwater sampling events will be conducted during the upcoming quarter (April to June 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 November 2009a and November 2009b). 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 First Quarter, CY 2012.

### 2.1 **Equipment Decontamination**

A portable Bennett<sup>™</sup> groundwater sampling system was used to collect the groundwater samples from both wells. The Bennett<sup>™</sup> 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, “Long-Term Environmental Stewardship (LTES) Groundwater Monitoring Equipment Decontamination” (SNL/NM November 2009a). 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, “LTES Groundwater Monitoring Well Sampling and Field Analytical Measurements” (SNL/NM November 2009b), 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%, or less than 5 nephelometric turbidity units
- pH is within 0.1 units
- Temperature is within 1.0 degree Celsius
- SC is within 5% 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 (PQLs), 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, 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, 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, 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, OBS-MW1, OBS-MW2, and OBS-MW3.** No VOCs were detected above laboratory MDLs in any SWMU 68 groundwater sample. Table IV-4 lists MDLs for associated VOCs analyzed.

### 3.3 Semivolatile Organic Compounds

**SWMUs 8/58, 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, OBS-MW1, OBS-MW2, and OBS-MW3.** No SVOCs were detected above laboratory MDLs in any SWMU 68 groundwater sample. Table IV-4 lists MDLs for associated SVOCs analyzed.

### 3.4 High Explosive Compounds

**SWMUs 8/58, 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, OBS-MW1, OBS-MW2, and OBS-MW3.** No HE compounds were detected above laboratory MDLs in any SWMU 68 groundwater sample. Table IV-5 lists MDLs for associated HE compounds analyzed.

### 3.5 Nitrate Plus Nitrite

**SWMUs 8/58, 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 2.98 mg/L in the CCBA-MW2 sample.

**SWMU 68, 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 1.70 mg/L in the OBS-MW1 sample.

### 3.6 Anions and Alkalinity

**SWMUs 8/58, 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 primary and duplicate environmental samples from CCBA-MW1 at a concentration of 4.94 mg/L. This detection is most likely attributable to the quartzite bedrock in which the well is completed and not associated with SNL/NM testing activities. Fluoride was reported in

the CCBA-MW2 sample at a concentration of 1.49 mg/L, which is below the MCL. No other anions or total cyanide were detected above established MCLs.

**SWMU 68, 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, 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, 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 SWMU 68 groundwater sample. Table IV-8 presents perchlorate results.

Perchlorate results are discussed in more detail in Section II of this Environmental Restoration Operations Consolidated Quarterly Report.

### 3.8 **Hexavalent Chromium**

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

**SWMU 68, 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, CCBA-MW1 and CCBA-MW2.** TAL metals plus uranium were analyzed in samples from both monitoring wells at SWMUs 8/58. No metal parameters were detected above established MCLs in any groundwater sample. Metal results for SWMUs 8/58 are summarized in Table IV-10.

**SWMU 68, 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, 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. The results are presented in Table IV-12.

**SWMU 68, 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. 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). 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 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, CCBA-MW1 and CCBA-MW2.** Gamma spectroscopy activity results for short-list radionuclides are less than the associated MDAs for all groundwater samples.

The corrected gross alpha activity was reported below the MCL of 15 picocuries per liter (pCi/L) in all samples. Gross beta activity results do not exceed established MCLs. Isotopic uranium activities range from  $0.0341 \pm 0.0391$  pCi/L for uranium-235/236 to  $6.92 \pm 0.947$  pCi/L for uranium-233/234.

**SWMU 68, OBS-MW1, OBS-MW2, and OBS-MW3.** Gamma spectroscopy activity results for short-list radionuclides are less than the associated MDAs, except for potassium-40. Potassium-40 in the sample from OBS-MW3 was reported at  $92.0 \pm$

42.7 pCi/L. The result for cesium-137 activity in the sample from OBS-MW3 was qualified as unusable during data validation because the result was negative with an absolute value greater than twice the MDA.

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  $0.171 \pm 0.0822$  pCi/L for uranium-235/236 to  $22.3 \pm 2.93$  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 the samples from SWMUs 8/58. This detection is most likely attributable to the quartzite bedrock in which the well is completed and not associated with SNL/NM testing activities.

## 4.0 **Quality Control Samples**

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

### 4.1 **Field Quality Control Samples**

Field QC samples for this sampling event included duplicate 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, Attachments A and B).

#### 4.1.1 **Duplicate Environmental Samples**

Duplicate environmental samples were collected from CCBA-MW1 and OBS-MW2 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 CCBA-MW1 and OBS-MW2. 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 most calculated parameters, with exceptions noted as follows.

**SWMUs 8/58, CCBA-MW1.** The RPD for beryllium was calculated at 59, but this is an estimated value as the results reported are less than the PQL.

**SWMU 68, OBS-MW2.** The RPD for NPN was calculated at 94, but this is an estimated value as the samples were diluted greater than five times and matrix-specific accuracy and precision data were not provided by the analytical laboratory.

#### 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 “LTES Groundwater Monitoring Equipment Decontamination,” (SNL/NM November 2009a). In accordance with SNL/NM FOP 05-03, the following solutions were pumped through the sampling system: 5 gallons of deionized (DI) water mixed with 20 milliliters (mL) nonphosphate laboratory detergent; 5 gallons of DI water; 5 gallons of DI water mixed with 20 mL reagent-grade nitric acid; and 15 gallons of DI water. In addition, the outside of the pump tubing was rinsed with DI water. EB samples are collected to verify the effectiveness of the equipment decontamination process. EB samples were collected prior to sampling monitoring wells CCBA-MW1 and OBS-MW2 and were submitted for all analyses.

**SWMUs 8/58, CCBA-MW1.** Acetone, bicarbonate alkalinity, bromodichloromethane, chloroform, chloride, copper, and dibromochloromethane were detected above the laboratory MDLs. No corrective action was necessary for any detected parameter as these analytes were either not detected in environmental samples or detected at concentrations greater than five times the blank result.

**SWMU 68, OBS-MW2.** Bromodichloromethane, chloroform, and copper were detected above the laboratory MDLs. No corrective action was necessary for bromodichloromethane or chloroform as these compounds were not detected in the environmental samples. Copper was detected in the OBS-MW2 environmental samples at concentrations less than five times the associated EB result, and the result for copper was 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 January 2012 sampling event. No VOCs were detected above associated laboratory MDLs, except bromodichloromethane and chloroform. No corrective action was necessary, as these compounds were not detected in the associated environmental sample.

**SWMU 68.** A total of three TB samples were submitted with the samples collected during the January 2012 sampling event. No VOCs were detected above associated laboratory MDLs.

#### 4.1.4 Field Blank Samples

An FB sample was collected for VOCs to assess whether contamination of the samples resulted from ambient field conditions. The FB sample was prepared by pouring DI water into sample containers at the sampling point (CCBA-MW2 and OBS-MW3) to simulate the transfer of environmental samples from the sampling system to the sample container.

**SWMUs 8/58, CCBA-MW2.** No VOCs were detected above associated laboratory MDLs.

**SWMU 68, OBS-MW3.** The VOC compounds bromodichloromethane, chloroform, and dibromochloromethane were detected above 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).

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

#### 4.3 **Variations and Nonconformances**

No variations or nonconformances from requirements in the Groundwater Characterization Work Plans for SWMUs 8/58 and 68 (SNL/NM September 2010) occurred during the January 2012 sampling activities, with the exception of the following project-specific issue.

The sample pump did not operate smoothly at low pressure; therefore, flow rates during purging and sampling activities for the First Quarter, CY 2012 event are higher than those reported for the previous sampling event.

#### 5.0 **Summary**

During the First Quarter of CY 2012, samples were collected from monitoring wells CCBA-MW1 and CCBA-MW2, located within SWMUs 8/58, and 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 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 CCBA-MW1 primary and duplicate environmental samples at a concentration of

4.94 mg/L. This detection is most likely attributable to the quartzite bedrock in which the well is completed and not associated with SNL/NM testing activities.

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

## 6.0 References

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

DOE, see U.S. Department of Energy.

EPA, see U.S. Environmental Protection Agency.

New Mexico Environment Department (NMED), April 2004. "Compliance Order on Consent, Pursuant to the New Mexico Hazardous Waste Act, § 74-4-10," New Mexico Environment Department, Santa Fe, New Mexico.

New Mexico Environment Department (NMED), April 2010. "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," New Mexico Environment Department Hazardous Waste Bureau, Santa Fe, New Mexico, April 8, 2010.

New Mexico Environment Department (NMED), January 2011. "Notice of Approval with Modification: Groundwater Monitoring Well Installation Workplans for SWMUs 8/58 and 68, September 2010, Sandia National Laboratories, EPA ID# NM589011 0518, HWB-SNL-10-017," New Mexico Environment Department Hazardous Waste Bureau, Santa Fe, New Mexico.

New Mexico Environment Department (NMED), June 2011. "Approval: Solid Waste Management Units 8 and 58 Proposed Groundwater Monitoring Well Location Adjustment," New Mexico Environment Department Hazardous Waste Bureau, Santa Fe, New Mexico.

NMED, see New Mexico Environment Department.

Sandia National Laboratories, New Mexico (SNL/NM), November 2009a. “Long-Term Environmental Stewardship (LTES) Groundwater Monitoring Equipment Decontamination,” Field Operating Procedure 05-03, Revision 02, Long-Term Environmental Stewardship, Environmental Management Department, Sandia National Laboratories, New Mexico.

Sandia National Laboratories, New Mexico (SNL/NM), November 2009b. “LTES Groundwater Monitoring Well Sampling and Field Analytical Measurements,” Field Operating Procedure 05-01, Revision 02, Long-Term Environmental Stewardship, Environmental Management Department, Sandia National Laboratories, New Mexico.

Sandia National Laboratories, New Mexico (SNL/NM), September 2010. “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,” Sandia National Laboratories, Albuquerque, New Mexico.

Sandia National Laboratories, New Mexico (SNL/NM), May 2011. “Data Validation Procedure for Chemical and Radiochemical Data,” Administrative Operating Procedure 00-03, Revision 3, Sample Management Office, Sandia National Laboratories, New Mexico.

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

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

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

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

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

U.S. Environmental Protection Agency (EPA), 2009, "National Primary Drinking Water Standards," 40 CFR 141.11, Subpart B, EPA 816-F-09-0004, U.S. Environmental Protection Agency, Washington, D.C.

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# Figures



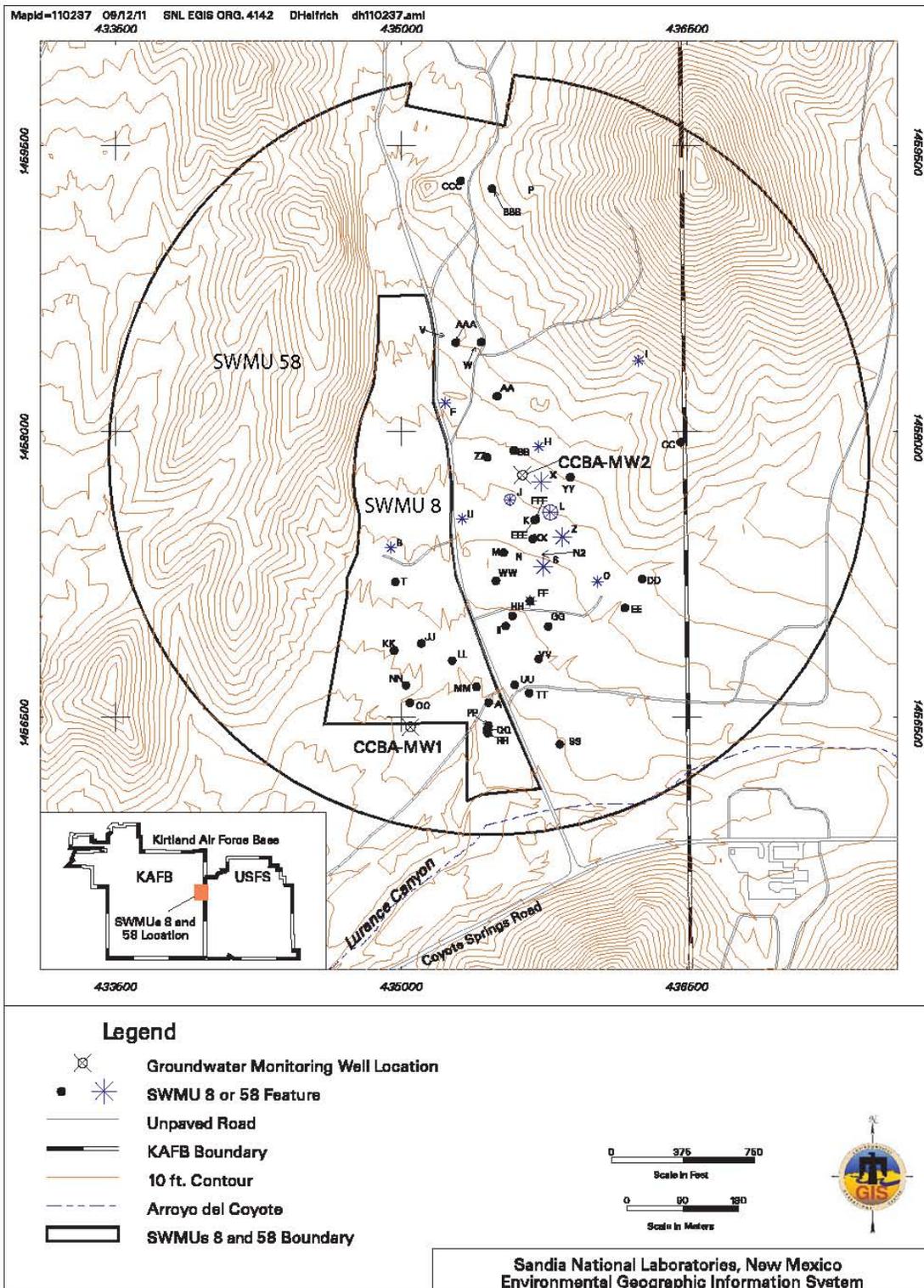
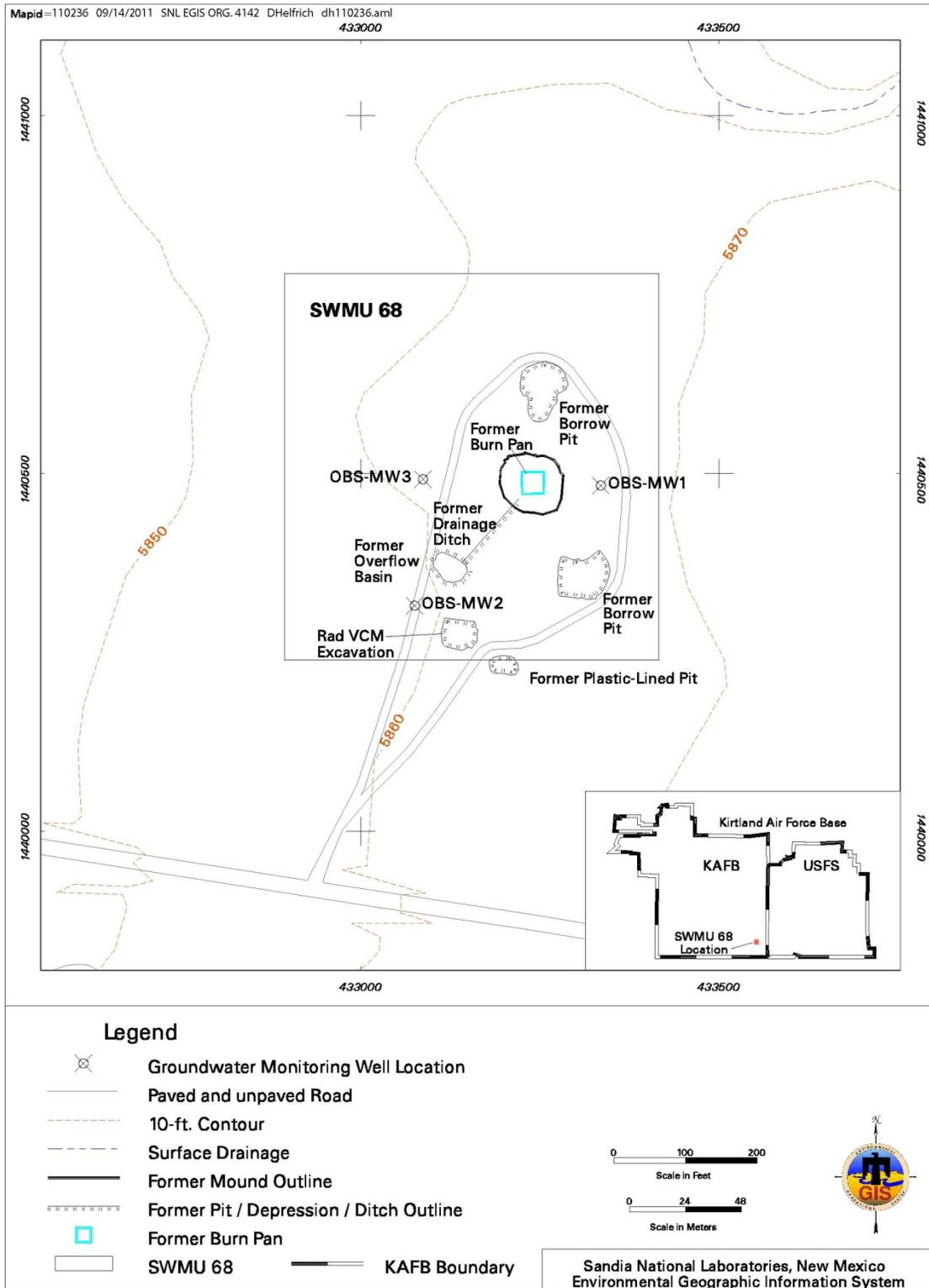


Figure IV-1

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**

<b>Analysis</b>	<b>Analytical Method<sup>a</sup></b>	<b>Volume and Container Type/Preservation Requirements</b>
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 <sup>b</sup>	EPA 6020/7470	1 x 500-mL polyethylene, HNO <sub>3</sub> , 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 <sup>c</sup>	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
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 <sub>2</sub> SO <sub>4</sub> , 4°C
Gross Alpha/Beta	EPA 900.0	1 x 1-L polyethylene, HNO <sub>3</sub> , 4°C
Gamma Spectroscopy <sup>d</sup>	EPA 901.0	1 x 1-L polyethylene, HNO <sub>3</sub> , 4°C
Isotopic Uranium	HASL-300	1 x 1-L polyethylene, HNO <sub>3</sub> , 4°C

**Notes**

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

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

Clesceri, L.S., A.E. Greenburg, and A.D. Eaton, 1998. *Standard Methods for the Examination of Water and Wastewater*, 20<sup>th</sup> 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.

<sup>b</sup>Metals = TAL metals including barium, calcium, magnesium, potassium, and sodium, plus uranium.

<sup>c</sup>Major anions include bromide, chloride, fluoride, and sulfate.

<sup>d</sup>Gamma spectroscopy = Americium-241, Cesium-137, Cobalt-60, and Potassium-40.

°C = Degrees Celsius.

EPA = U.S. Environmental Protection Agency.

H<sub>2</sub>SO<sub>4</sub> = Sulfuric acid.

HASL = Health and Safety Laboratory.

HCL = Hydrochloric acid.

HNO<sub>3</sub> = Nitric acid.

L = Liter

mL = Milliliter(s).

NaOH = Sodium Hydroxide.

SM = Standard Method.

SWMU = Solid Waste Management Unit.

TAL = Target Analyte List.

**Table IV-2**

**Sample Details for First Quarter, CY 2012 Groundwater Sampling  
Solid Waste Management Units 8/58 and 68 Groundwater Monitoring Quarterly Assessment  
January – March 2012**

<b>Well</b>	<b>Sample Identification</b>	<b>AR/COC Number</b>	<b>Associated Groundwater Investigation</b>
CCBA-MW1	091615	613958	SWMUs 8/58
CCBA-MW1 (dup)	091616	613958	SWMUs 8/58
CCBA-MW2	091610	613956	SWMUs 8/58
OBS-MW1	091600	613952	SWMU 68
OBS-MW2	091604	613954	SWMU 68
OBS-MW2 (dup)	091605	613954	SWMU 68
OBS-MW3	091607	613955	SWMU 68

**Notes**

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

**Table IV-3**  
**Summary of Field Water Quality Measurements<sup>a</sup>**  
**Solid Waste Management Units 8/58 and 68 Groundwater Monitoring**  
**Quarterly Assessment, January – March 2012**

Well ID	Sample Date	Temperature (°C)	Specific Conductivity (µmhos/cm)	Oxidation Reduction Potential (mV)	pH	Turbidity (NTU)	Dissolved Oxygen (% Sat)	Dissolved Oxygen (mg/L)
<b>SWMUs 8/58</b>								
CCBA-MW1	16-Jan-12	14.03	567	416.7	6.49	0.20	27.3	2.84
CCBA-MW2	12-Jan-12	14.45	686	383.1	7.39	1.24	57.6	5.88
<b>SWMU 68</b>								
OBS-MW1	09-Jan-12	15.44	597	388.0	7.23	0.37	36.8	3.68
OBS-MW2	10-Jan-12	17.01	602	386.9	7.24	0.36	41.1	3.96
OBS-MW3	11-Jan-12	16.28	600	371.9	7.26	0.86	42.9	4.20

**Notes**

<sup>a</sup>Field measurements collected prior to sampling.

°C = Degrees Celsius.

% Sat = Percent saturation.

µmhos/cm = Micromhos per centimeter.

CCBA = Coyote Canyon Blast Area.

ID = Identification.

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**  
**Solid Waste Management Units 8/58 and 68 Groundwater Monitoring**  
**Quarterly Assessment, January – March 2012**

Analyte	MDL (µg/L)	Analytical Method <sup>a</sup>	Analyte	MDL (µg/L)	Analytical Method <sup>a</sup>	Analyte	MDL (µg/L)	Analytical Method <sup>a</sup>
1,1,1-Trichloroethane	0.325	8260B	1,2,4-Trichlorobenzene	2.83 – 3.00	8270C	Di-n-butyl phthalate	2.83 – 3.00	8270C
1,1,2,2-Tetrachloroethane	0.250	8260B	1,2-Dichlorobenzene	2.83 – 3.00	8270C	Di-n-octyl phthalate	2.83 – 3.00	8270C
1,1,2-Trichloroethane	0.250	8260B	1,3-Dichlorobenzene	2.83 – 3.00	8270C	Dibenz[a,h]anthracene	0.283 – 0.300	8270C
1,1-Dichloroethane	0.300	8260B	1,4-Dichlorobenzene	2.83 – 3.00	8270C	Dibenzofuran	2.83 – 3.00	8270C
1,1-Dichloroethene	0.300	8260B	2,4,5-Trichlorophenol	2.83 – 3.00	8270C	Diethylphthalate	2.83 – 3.00	8270C
1,2-Dichloroethane	0.250	8260B	2,4,6-Trichlorophenol	2.83 – 3.00	8270C	Dimethylphthalate	2.83 – 3.00	8270C
1,2-Dichloropropane	0.250	8260B	2,4-Dichlorophenol	2.83 – 3.00	8270C	Dinitro-o-cresol	2.83 – 3.00	8270C
2-Butanone	1.25	8260B	2,4-Dimethylphenol	2.83 – 3.00	8270C	Diphenyl amine	2.83 – 3.00	8270C
2-Hexanone	1.25	8260B	2,4-Dinitrophenol	4.72 – 5.00	8270C	Fluoranthene	0.283 – 0.300	8270C
4-methyl-, 2-Pentanone	1.25	8260B	2,4-Dinitrotoluene	2.83 – 3.00	8270C	Fluorene	0.283 – 0.300	8270C
Acetone	3.50	8260B	2,6-Dinitrotoluene	2.83 – 3.00	8270C	Hexachlorobenzene	2.83 – 3.00	8270C
Benzene	0.300	8260B	2-Chloronaphthalene	0.283 – 0.300	8270C	Hexachlorobutadiene	2.83 – 3.00	8270C
Bromodichloromethane	0.250	8260B	2-Chlorophenol	2.83 – 3.00	8270C	Hexachlorocyclopentadiene	2.83 – 3.00	8270C
Bromoform	0.250	8260B	2-Methylnaphthalene	0.283 – 0.300	8270C	Hexachloroethane	2.83 – 3.00	8270C
Bromomethane	0.300	8260B	2-Nitroaniline	2.83 – 3.00	8270C	Indeno(1,2,3-c,d)pyrene	0.283 – 0.300	8270C
Carbon disulfide	1.25	8260B	2-Nitrophenol	2.83 – 3.00	8270C	Isophorone	2.83 – 3.00	8270C
Carbon tetrachloride	0.300	8260B	3,3'-Dichlorobenzidine	2.83 – 3.00	8270C	Naphthalene	0.283 – 0.300	8270C
Chlorobenzene	0.250	8260B	3-Nitroaniline	2.83 – 3.00	8270C	Nitro-benzene	2.83 – 3.00	8270C
Chloroethane	0.300	8260B	4-Bromophenyl phenyl ether	2.83 – 3.00	8270C	Pentachlorophenol	2.83 – 3.00	8270C
Chloroform	0.250	8260B	4-Chloro-3-methylphenol	2.83 – 3.00	8270C	Phenanthrene	0.283 – 0.300	8270C
Chloromethane	0.300	8260B	4-Chlorobenzeneamine	2.83 – 3.00	8270C	Phenol	2.83 – 3.00	8270C
Dibromochloromethane	0.300	8260B	4-Chlorophenyl phenyl ether	2.83 – 3.00	8270C	Pyrene	0.283 – 0.300	8270C
Ethyl benzene	0.250	8260B	4-Nitroaniline	2.83 – 3.00	8270C	bis(2-Chloroethoxy)methane	2.83 – 3.00	8270C
Methylene chloride	3.00	8260B	4-Nitrophenol	2.83 – 3.00	8270C	bis(2-Chloroethyl)ether	2.83 – 3.00	8270C
Styrene	0.250	8260B	Acenaphthene	0.283 – 0.300	8270C	bis(2-Ethylhexyl)phthalate	2.83 – 3.00	8270C
Tetrachloroethene	0.300	8260B	Acenaphthylene	0.283 – 0.300	8270C	bis-Chloroisopropyl ether	2.83 – 3.00	8270C
Toluene	0.250	8260B	Anthracene	0.283 – 0.300	8270C	m,p-Cresol	2.83 – 3.00	8270C
Trichloroethene	0.250	8260B	Benzo(a)anthracene	0.283 – 0.300	8270C	n-Nitrosodipropylamine	2.83 – 3.00	8270C
Vinyl acetate	1.50	8260B	Benzo(a)pyrene	0.283 – 0.300	8270C	o-Cresol	2.83 – 3.00	8270C
Vinyl chloride	0.500	8260B	Benzo(b)fluoranthene	0.283 – 0.300	8270C			
Xylene	0.300	8260B	Benzo(ghi)perylene	0.283 – 0.300	8270C			
cis-1,2-Dichloroethene	0.300	8260B	Benzo(k)fluoranthene	0.283 – 0.300	8270C			
cis-1,3-Dichloropropene	0.250	8260B	Butylbenzyl phthalate	2.83 – 3.00	8270C			
trans-1,2-Dichloroethene	0.300	8260B	Carbazole	0.283 – 0.300	8270C			
trans-1,3-Dichloropropene	0.250	8260B	Chrysene	0.283 – 0.300	8270C			

**Notes**

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

µg/L = Micrograms per liter.

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.

Table IV-5

**Method Detection Limits for High Explosive Compounds (EPA Method 8321A)  
Solid Waste Management Units 8/58 and 68 Groundwater Monitoring  
Quarterly Assessment, January – March 2012**

Analyte	MDL ( $\mu\text{g/L}$ )
1,3,5-Trinitrobenzene	0.104
1,3-Dinitrobenzene	0.104
2,4,6-Trinitrotoluene	0.104
2,4-Dinitrotoluene	0.104
2,6-Dinitrotoluene	0.104
2-Amino-4,6-dinitrotoluene	0.104
2-Nitrotoluene	0.106
3-Nitrotoluene	0.104
4-Amino-2,6-dinitrotoluene	0.104
4-Nitrotoluene	0.195
HMX	0.104
Nitrobenzene	0.104
PETN	0.130
RDX	0.104
Tetryl	0.104

**Notes**

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.  
 $\mu\text{g/L}$  = Micrograms per liter.  
PETN = Pentaerythritol tetranitrate.  
RDX = Hexahydro-trinitro-triazine.  
Tetryl = 2,4,6-trinitrophenylmethylnitramine.

**Table IV-6**  
**Summary of Nitrate Plus Nitrite Results**  
**Solid Waste Management Units 8/58 and 68 Groundwater Monitoring**  
**Quarterly Assessment, January – March 2012**

Well ID	Analyte	Result (mg/L)	MDL (mg/L)	PQL (mg/L)	MCL (mg/L)	Laboratory Qualifier <sup>a</sup>	Validation Qualifier <sup>b</sup>	Sample Number	Analytical Method <sup>c</sup>
<b>SWMUs 8/58</b>									
CCBA-MW1 16-Jan-12	Nitrate plus nitrite as N	1.23	0.050	0.250	10.0	B		091615-018	EPA 353.2
CCBA-MW1 (Duplicate) 16-Jan-12	Nitrate plus nitrite as N	1.20	0.050	0.250	10.0	B		091616-018	EPA 353.2
CCBA-MW2 12-Jan-12	Nitrate plus nitrite as N	2.98	0.050	0.250	10.0	B		091610-018	EPA 353.2
<b>SWMU 68</b>									
OBS-MW1 09-Jan-12	Nitrate plus nitrite as N	1.70	0.050	0.250	10.0		J	091600-018	EPA 353.2
OBS-MW2 10-Jan-12	Nitrate plus nitrite as N	1.49	0.050	0.250	10.0		J	091604-018	EPA 353.2
OBS-MW2 (Duplicate) 10-Jan-12	Nitrate plus nitrite as N	0.540	0.050	0.250	10.0		J	091605-018	EPA 353.2
OBS-MW3 11-Jan-12	Nitrate plus nitrite as N	1.33	0.050	0.250	10.0	B		091607-018	EPA 353.2

**Notes**

- CCBA = Coyote Canyon Blast Area.
- CFR = Code of Federal Regulations.
- EPA = U.S. Environmental Protection Agency.
- ID = Identification.
- 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**  
**Solid Waste Management Units 8/58 and 68 Groundwater Monitoring**  
**Quarterly Assessment, January – March 2012**

**Notes (continued)**

**<sup>a</sup>Laboratory Qualifier**

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

**<sup>b</sup>Validation Qualifier**

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

J = The associated value is an estimated quantity.

**<sup>c</sup>Analytical Method**

U.S. Environmental Protection Agency, 1986 (and updates), "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods," SW-846, 3<sup>rd</sup> 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**  
**Solid Waste Management Units 8/58 and 68 Groundwater Monitoring**  
**Quarterly Assessment, January – March 2012**

Well ID	Analyte	Result (mg/L)	MDL (mg/L)	PQL (mg/L)	MCL (mg/L)	Laboratory Qualifier <sup>a</sup>	Validation Qualifier <sup>b</sup>	Sample Number	Analytical Method <sup>c</sup>
<b>SWMUs 8/58</b>									
<b>CCBA-MW1</b> 16-Jan-12	Bicarbonate Alkalinity	178	0.725	1.00	NE			091615-022	SM2320B
	Carbonate Alkalinity	ND	0.725	1.00	NE	U		091615-022	SM2320B
	Bromide	0.320	0.066	0.200	NE			091615-016	SW846 9056
	Chloride	27.4	0.132	0.400	NE			091615-016	SW846 9056
	Fluoride	<b>4.94</b>	0.033	0.100	4.0			091615-016	SW846 9056
	Sulfate	53.6	0.200	0.800	NE			091615-016	SW846 9056
	Total Cyanide	ND	0.0015	0.005	0.200	U	UJ	091615-027	SW846 9012
<b>CCBA-MW1 (Duplicate)</b> 16-Jan-12	Bicarbonate Alkalinity	179	0.725	1.00	NE			091616-022	SM2320B
	Carbonate Alkalinity	ND	0.725	1.00	NE	U		091616-022	SM2320B
	Bromide	0.372	0.066	0.200	NE			091616-016	SW846 9056
	Chloride	27.0	0.132	0.400	NE			091616-016	SW846 9056
	Fluoride	<b>4.94</b>	0.033	0.100	4.0			091616-016	SW846 9056
	Sulfate	52.5	0.200	0.800	NE			091616-016	SW846 9056
	Total Cyanide	ND	0.0015	0.005	0.200	U	UJ	091616-027	SW846 9012
<b>CCBA-MW2</b> 12-Jan-12	Bicarbonate Alkalinity	183	0.725	1.00	NE			091610-022	SM2320B
	Carbonate Alkalinity	ND	0.725	1.00	NE	U		091610-022	SM2320B
	Bromide	0.580	0.066	0.200	NE			091610-016	SW846 9056
	Chloride	36.6	0.330	1.00	NE			091610-016	SW846 9056
	Fluoride	1.49	0.033	0.100	4.0			091610-016	SW846 9056
	Sulfate	94.0	0.500	2.00	NE			091610-016	SW846 9056
	Total Cyanide	ND	0.0015	0.005	0.200	U		091610-027	SW846 9012

**Table IV-7 (Continued)**  
**Summary of Alkalinity, Anion, and Total Cyanide Results**  
**Solid Waste Management Units 8/58 and 68 Groundwater Monitoring**  
**Quarterly Assessment, January – March 2012**

Well ID	Analyte	Result (mg/L)	MDL (mg/L)	PQL (mg/L)	MCL (mg/L)	Laboratory Qualifier <sup>a</sup>	Validation Qualifier <sup>b</sup>	Sample Number	Analytical Method <sup>c</sup>
<b>SWMU 68</b>									
<b>OBS-MW1</b> 09-Jan-12	Bicarbonate Alkalinity	186	0.725	1.00	NE	B		091600-022	SM2320B
	Carbonate Alkalinity	ND	0.725	1.00	NE	U		091600-022	SM2320B
	Bromide	0.372	0.066	0.200	NE			091600-016	SW846 9056
	Chloride	21.8	0.330	1.00	NE			091600-016	SW846 9056
	Fluoride	2.04	0.033	0.100	4.0			091600-016	SW846 9056
	Sulfate	75.8	0.500	2.00	NE			091600-016	SW846 9056
	Total Cyanide	ND	0.0015	0.005	0.200	U		091600-027	SW846 9012
<b>OBS-MW2</b> 10-Jan-12	Bicarbonate Alkalinity	176	0.725	1.00	NE			091604-022	SM2320B
	Carbonate Alkalinity	ND	0.725	1.00	NE	U		091604-022	SM2320B
	Bromide	0.406	0.066	0.200	NE			091604-016	SW846 9056
	Chloride	21.5	0.330	1.00	NE			091604-016	SW846 9056
	Fluoride	2.11	0.033	0.100	4.0			091604-016	SW846 9056
	Sulfate	87.2	0.500	2.00	NE			091604-016	SW846 9056
	Total Cyanide	ND	0.0015	0.005	0.200	U		091604-027	SW846 9012
<b>OBS-MW2 (Duplicate)</b> 10-Jan-12	Bicarbonate Alkalinity	175	0.725	1.00	NE			091605-022	SM2320B
	Carbonate Alkalinity	ND	0.725	1.00	NE	U		091605-022	SM2320B
	Bromide	0.349	0.066	0.200	NE			091605-016	SW846 9056
	Chloride	21.4	0.330	1.00	NE			091605-016	SW846 9056
	Fluoride	2.12	0.033	0.100	4.0			091605-016	SW846 9056
	Sulfate	87.0	0.500	2.00	NE			091605-016	SW846 9056
	Total Cyanide	ND	0.0015	0.005	0.200	U		091605-027	SW846 9012
<b>OBS-MW3</b> 11-Jan-12	Bicarbonate Alkalinity	174	0.725	1.00	NE			091607-022	SM2320B
	Carbonate Alkalinity	ND	0.725	1.00	NE	U		091607-022	SM2320B
	Bromide	0.363	0.066	0.200	NE			091607-016	SW846 9056
	Chloride	22.4	0.330	1.00	NE			091607-016	SW846 9056
	Fluoride	2.16	0.033	0.100	4.0			091607-016	SW846 9056
	Sulfate	86.8	0.500	2.00	NE			091607-016	SW846 9056
	Total Cyanide	ND	0.0015	0.005	0.200	U	UJ	091607-027	SW846 9012

**Table IV-7 (Concluded)**  
**Summary of Alkalinity, Anion, and Total Cyanide Results**  
**Solid Waste Management Units 8/58 and 68 Groundwater Monitoring**  
**Quarterly Assessment, January – March 2012**

**Notes**

CCBA = Coyote Canyon Blast Area.  
CFR = Code of Federal Regulations.  
EPA = U.S. Environmental Protection Agency.  
ID = Identification.  
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.  
SW = Solid Waste.  
SWMU = Solid Waste Management Unit.

**<sup>a</sup>Laboratory Qualifier**

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

**<sup>b</sup>Validation Qualifier**

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

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

**<sup>c</sup>Analytical Method**

U.S. Environmental Protection Agency, 1986 (and updates), "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods," SW-846, 3<sup>rd</sup> 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*, 20<sup>th</sup> ed., Method 2320B.

**Table IV-8**  
**Summary of Perchlorate Results**  
**Solid Waste Management Units 8/58 and 68 Groundwater Monitoring**  
**Quarterly Assessment, January – March 2012**

Well ID	Perchlorate Result (mg/L)	MDL (mg/L)	PQL (mg/L)	MCL (mg/L)	Laboratory Qualifier <sup>a</sup>	Validation Qualifier <sup>b</sup>	Sample Number	Analytical Method <sup>c</sup>
<b>SWMUs 8/58</b>								
CCBA-MW1 16-Jan-12	ND	0.004	0.012	NE	U		091615-020	EPA 314.0
CCBA-MW1 (Duplicate) 16-Jan-12	ND	0.004	0.012	NE	U		091616-020	EPA 314.0
CCBA-MW2 12-Jan-12	ND	0.004	0.012	NE	U		091610-020	EPA 314.0
<b>SWMU 68</b>								
OBS-MW1 09-Jan-12	ND	0.004	0.012	NE	U		091600-020	EPA 314.0
OBS-MW2 10-Jan-12	ND	0.004	0.012	NE	U		091604-020	EPA 314.0
OBS-MW2 (Duplicate) 10-Jan-12	ND	0.004	0.012	NE	U		091605-020	EPA 314.0
OBS-MW3 11-Jan-12	ND	0.004	0.012	NE	U		091607-020	EPA 314.0

**Notes**

CCBA = Coyote Canyon Blast Area.  
CFR = Code of Federal Regulations.  
EPA = U.S. Environmental Protection Agency.  
ID = Identification.  
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**  
**Solid Waste Management Units 8/58 and 68 Groundwater Monitoring**  
**Quarterly Assessment, January – March 2012**

**Notes (continued)**

**<sup>a</sup>Laboratory Qualifier**

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

**<sup>b</sup>Validation Qualifier**

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

**<sup>c</sup>Analytical 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**  
**Solid Waste Management Unit 68 Groundwater Monitoring**  
**Quarterly Assessment, January – March 2012**

Well ID	Hexavalent Chromium Result (mg/L)	MDL (mg/L)	PQL (mg/L)	MCL (mg/L)	Laboratory Qualifier <sup>a</sup>	Validation Qualifier <sup>b</sup>	Sample Number	Analytical Method <sup>c</sup>
OBS-MW1 09-Jan-12	ND	0.003	0.010	NE	U		091600-014	SW846 7196A
OBS-MW2 10-Jan-12	ND	0.003	0.010	NE	U		091604-014	SW846 7196A
OBS-MW2 (Duplicate) 10-Jan-12	ND	0.003	0.010	NE	U		091605-014	SW846 7196A
OBS-MW3 11-Jan-12	ND	0.003	0.010	NE	J		091607-014	SW846 7196A

**Notes**

- CFR = Code of Federal Regulations.
- EPA = U.S. Environmental Protection Agency.
- ID = Identification.
- 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.

**<sup>a</sup>Laboratory Qualifier**

- 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.

**<sup>b</sup>Validation Qualifier**

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

**<sup>c</sup>Analytical Method**

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

**Table IV-10**  
**Summary of Unfiltered Total Metal Results**  
**Solid Waste Management Units 8/58 Groundwater Monitoring**  
**Quarterly Assessment, January – March 2012**

Well ID	Analyte	Result (mg/L)	MDL (mg/L)	PQL (mg/L)	MCL (mg/L)	Laboratory Qualifier <sup>a</sup>	Validation Qualifier <sup>b</sup>	Sample Number	Analytical Method <sup>c</sup>
CCBA-MW1 16-Jan-12	Aluminum	0.0437	0.015	0.050	NE	J		091615-009	SW846 6020
	Antimony	ND	0.001	0.003	0.006	U		091615-009	SW846 6020
	Arsenic	ND	0.0017	0.005	0.010	U		091615-009	SW846 6020
	Barium	0.00672	0.0006	0.002	2.00			091615-009	SW846 6020
	Beryllium	0.000273	0.0002	0.0005	0.004	J		091615-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		091615-009	SW846 6020
	Calcium	43.6	0.060	0.200	NE	B		091615-009	SW846 6020
	Chromium	ND	0.002	0.010	0.100	U		091615-009	SW846 6020
	Cobalt	0.000104	0.0001	0.001	NE	J		091615-009	SW846 6020
	Copper	ND	0.00035	0.001	NE	U		091615-009	SW846 6020
	Iron	0.0869	0.033	0.100	NE	J		091615-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		091615-009	SW846 6020
	Magnesium	10.2	0.010	0.030	NE			091615-009	SW846 6020
	Manganese	0.012	0.001	0.005	NE			091615-009	SW846 6020
	Mercury	ND	0.000066	0.0002	0.002	U		091615-009	SW846 7470
	Nickel	ND	0.0005	0.002	NE	U	UJ	091615-009	SW846 6020
	Potassium	4.53	0.080	0.300	NE			091615-009	SW846 6020
	Selenium	0.00207	0.0015	0.005	0.050	J		091615-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		091615-009	SW846 6020
	Sodium	72.6	0.400	1.25	NE			091615-009	SW846 6020
Thallium	0.000947	0.00045	0.002	0.002	J	0.0032U	091615-009	SW846 6020	
Uranium	0.0019	0.000067	0.0002	0.03			091615-009	SW846 6020	
Vanadium	ND	0.001	0.005	NE	U		091615-009	SW846 6010	
Zinc	0.00359	0.0035	0.010	NE	J		091615-009	SW846 6020	

**Table IV-10 (Continued)**  
**Summary of Unfiltered Total Metal Results**  
**Solid Waste Management Units 8/58 Groundwater Monitoring**  
**Quarterly Assessment, January – March 2012**

Well ID	Analyte	Result (mg/L)	MDL (mg/L)	PQL (mg/L)	MCL (mg/L)	Laboratory Qualifier <sup>a</sup>	Validation Qualifier <sup>b</sup>	Sample Number	Analytical Method <sup>c</sup>
CCBA-MW1 (Duplicate) 16-Jan-12	Aluminum	0.0323	0.015	0.050	NE	J		091616-009	SW846 6020
	Antimony	0.00114	0.001	0.003	0.006	J		091616-009	SW846 6020
	Arsenic	0.00197	0.0017	0.005	0.010	J		091616-009	SW846 6020
	Barium	0.00682	0.0006	0.002	2.00			091616-009	SW846 6020
	Beryllium	0.000501	0.0002	0.0005	0.004			091616-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		091616-009	SW846 6020
	Calcium	43.6	0.300	1.00	NE	B		091616-009	SW846 6020
	Chromium	ND	0.002	0.010	0.100	U		091616-009	SW846 6020
	Cobalt	ND	0.0001	0.001	NE	U		091616-009	SW846 6020
	Copper	ND	0.00035	0.001	NE	U		091616-009	SW846 6020
	Iron	0.0893	0.033	0.100	NE	J		091616-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		091616-009	SW846 6020
	Magnesium	10.4	0.010	0.030	NE			091616-009	SW846 6020
	Manganese	0.012	0.001	0.005	NE			091616-009	SW846 6020
	Mercury	ND	0.000066	0.0002	0.002	U		091616-009	SW846 7470
	Nickel	ND	0.0005	0.002	NE	U	UJ	091616-009	SW846 6020
	Potassium	4.50	0.080	0.300	NE			091616-009	SW846 6020
	Selenium	0.00164	0.0015	0.005	0.050	J		091616-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		091616-009	SW846 6020
	Sodium	65.6	0.080	0.250	NE			091616-009	SW846 6020
Thallium	ND	0.00045	0.002	0.002	U		091616-009	SW846 6020	
Uranium	0.0019	0.000067	0.0002	0.03			091616-009	SW846 6020	
Vanadium	ND	0.001	0.005	NE	U		091616-009	SW846 6010	
Zinc	ND	0.0035	0.010	NE	U		091616-009	SW846 6020	

**Table IV-10 (Continued)**  
**Summary of Unfiltered Total Metal Results**  
**Solid Waste Management Units 8/58 Groundwater Monitoring**  
**Quarterly Assessment, January – March 2012**

Well ID	Analyte	Result (mg/L)	MDL (mg/L)	PQL (mg/L)	MCL (mg/L)	Laboratory Qualifier <sup>a</sup>	Validation Qualifier <sup>b</sup>	Sample Number	Analytical Method <sup>c</sup>
CCBA-MW2 12-Jan-12	Aluminum	ND	0.015	0.050	NE	U	0.29UJ	091610-009	SW846 6020
	Antimony	ND	0.001	0.003	0.006	U		091610-009	SW846 6020
	Arsenic	ND	0.0017	0.005	0.010	U		091610-009	SW846 6020
	Barium	0.0462	0.0006	0.002	2.00			091610-009	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		091610-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		091610-009	SW846 6020
	Calcium	76.5	0.300	1.00	NE			091610-009	SW846 6020
	Chromium	ND	0.002	0.010	0.100	U		091610-009	SW846 6020
	Cobalt	ND	0.0001	0.001	NE	U		091610-009	SW846 6020
	Copper	0.000535	0.00035	0.001	NE	J		091610-009	SW846 6020
	Iron	0.136	0.033	0.100	NE			091610-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		091610-009	SW846 6020
	Magnesium	15.9	0.010	0.030	NE			091610-009	SW846 6020
	Manganese	0.00328	0.001	0.005	NE	J		091610-009	SW846 6020
	Mercury	ND	0.000066	0.0002	0.002	U		091610-009	SW846 7470
	Nickel	ND	0.0005	0.002	NE	U	UJ	091610-009	SW846 6020
	Potassium	1.36	0.080	0.300	NE			091610-009	SW846 6020
	Selenium	0.00562	0.0015	0.005	0.050			091610-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		091610-009	SW846 6020
	Sodium	45.0	0.080	0.250	NE		J	091610-009	SW846 6020
Thallium	0.000709	0.00045	0.002	0.002	J	0.0030U	091610-009	SW846 6020	
Uranium	0.00513	0.000067	0.0002	0.03			091610-009	SW846 6020	
Vanadium	0.0104	0.001	0.005	NE			091610-009	SW846 6010	
Zinc	0.0104	0.0035	0.010	NE			091610-009	SW846 6020	

**Table IV-10 (Concluded)**  
**Summary of Unfiltered Total Metal Results**  
**Solid Waste Management Units 8/58 Groundwater Monitoring**  
**Quarterly Assessment, January – March 2012**

**Notes**

CCBA	= Coyote Canyon Blast Area.
CFR	= Code of Federal Regulations.
EPA	= U.S. Environmental Protection Agency.
ID	= Identification.
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.

**<sup>a</sup>Laboratory 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.

**<sup>b</sup>Validation Qualifier**

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

J	= The associated value is an estimated quantity.
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.

**<sup>c</sup>Analytical Method**

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

**Table IV-11**  
**Summary of Unfiltered Total Metal Results**  
**Solid Waste Management Unit 68 Groundwater Monitoring**  
**Quarterly Assessment, January – March 2012**

Well ID	Analyte	Result (mg/L)	MDL (mg/L)	PQL (mg/L)	MCL (mg/L)	Laboratory Qualifier <sup>a</sup>	Validation Qualifier <sup>b</sup>	Sample Number	Analytical Method <sup>c</sup>
OBS-MW1 09-Jan-12	Aluminum	ND	0.015	0.050	NE	U		091600-009	SW846 6020
	Antimony	ND	0.001	0.003	0.006	U		091600-009	SW846 6020
	Arsenic	ND	0.0017	0.005	0.010	U		091600-009	SW846 6020
	Barium	0.0174	0.0006	0.002	2.00			091600-009	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		091600-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		091600-009	SW846 6020
	Calcium	77.9	0.600	2.00	NE	B		091600-009	SW846 6020
	Chromium	ND	0.002	0.010	0.100	U		091600-009	SW846 6020
	Cobalt	ND	0.0001	0.001	NE	U		091600-009	SW846 6020
	Copper	0.000981	0.00035	0.001	NE	J		091600-009	SW846 6020
	Iron	0.143	0.033	0.100	NE			091600-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		091600-009	SW846 6020
	Magnesium	15.2	0.010	0.030	NE			091600-009	SW846 6020
	Manganese	0.00304	0.001	0.005	NE	J		091600-009	SW846 6020
	Mercury	ND	0.000066	0.0002	0.002	U		091600-009	SW846 7470
	Nickel	0.00096	0.0005	0.002	NE	J		091600-009	SW846 6020
	Potassium	1.50	0.080	0.300	NE			091600-009	SW846 6020
	Selenium	0.00249	0.0015	0.005	0.050	J		091600-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		091600-009	SW846 6020
	Sodium	20.7	0.800	2.50	NE			091600-009	SW846 6020
	Thallium	0.000472	0.00045	0.002	0.002	J		091600-009	SW846 6020
Uranium	0.010	0.000067	0.0002	0.03			091600-009	SW846 6020	
Vanadium	0.0015	0.001	0.005	NE	J		091600-009	SW846 6010	
Zinc	0.00654	0.0035	0.010	NE	J		091600-009	SW846 6020	

**Table IV-11 (Continued)**  
**Summary of Unfiltered Total Metal Results**  
**Solid Waste Management Unit 68 Groundwater Monitoring**  
**Quarterly Assessment, January – March 2012**

Well ID	Analyte	Result (mg/L)	MDL (mg/L)	PQL (mg/L)	MCL (mg/L)	Laboratory Qualifier <sup>a</sup>	Validation Qualifier <sup>b</sup>	Sample Number	Analytical Method <sup>c</sup>
OBS-MW2 10-Jan-12	Aluminum	ND	0.015	0.050	NE	U		091604-009	SW846 6020
	Antimony	ND	0.001	0.003	0.006	U		091604-009	SW846 6020
	Arsenic	ND	0.0017	0.005	0.010	U		091604-009	SW846 6020
	Barium	0.0203	0.0006	0.002	2.00			091604-009	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		091604-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		091604-009	SW846 6020
	Calcium	80.0	0.600	2.00	NE	B		091604-009	SW846 6020
	Chromium	ND	0.002	0.010	0.100	U		091604-009	SW846 6020
	Cobalt	ND	0.0001	0.001	NE	U		091604-009	SW846 6020
	Copper	0.00065	0.00035	0.001	NE	J	0.0028U	091604-009	SW846 6020
	Iron	0.149	0.033	0.100	NE			091604-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		091604-009	SW846 6020
	Magnesium	15.2	0.010	0.030	NE			091604-009	SW846 6020
	Manganese	ND	0.001	0.005	NE	U		091604-009	SW846 6020
	Mercury	ND	0.000066	0.0002	0.002	U		091604-009	SW846 7470
	Nickel	0.000924	0.0005	0.002	NE	J		091604-009	SW846 6020
	Potassium	1.60	0.080	0.300	NE			091604-009	SW846 6020
	Selenium	0.00431	0.0015	0.005	0.050	J		091604-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		091604-009	SW846 6020
	Sodium	21.0	0.800	2.50	NE			091604-009	SW846 6020
	Thallium	ND	0.00045	0.002	0.002	U		091604-009	SW846 6020
Uranium	0.0145	0.000067	0.0002	0.03			091604-009	SW846 6020	
Vanadium	0.00162	0.001	0.005	NE	J		091604-009	SW846 6010	
Zinc	ND	0.0035	0.010	NE	U		091604-009	SW846 6020	

**Table IV-11 (Continued)**  
**Summary of Unfiltered Total Metal Results**  
**Solid Waste Management Unit 68 Groundwater Monitoring**  
**Quarterly Assessment, January – March 2012**

Well ID	Analyte	Result (mg/L)	MDL (mg/L)	PQL (mg/L)	MCL (mg/L)	Laboratory Qualifier <sup>a</sup>	Validation Qualifier <sup>b</sup>	Sample Number	Analytical Method <sup>c</sup>
OBS-MW2 (Duplicate) 10-Jan-12	Aluminum	0.0183	0.015	0.050	NE	J		091605-009	SW846 6020
	Antimony	ND	0.001	0.003	0.006	U		091605-009	SW846 6020
	Arsenic	ND	0.0017	0.005	0.010	U		091605-009	SW846 6020
	Barium	0.0205	0.0006	0.002	2.00			091605-009	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		091605-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		091605-009	SW846 6020
	Calcium	83.5	0.600	2.00	NE	B		091605-009	SW846 6020
	Chromium	0.00213	0.002	0.010	0.100	J		091605-009	SW846 6020
	Cobalt	ND	0.0001	0.001	NE	U		091605-009	SW846 6020
	Copper	0.000605	0.00035	0.001	NE	J	0.0028U	091605-009	SW846 6020
	Iron	0.156	0.033	0.100	NE			091605-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		091605-009	SW846 6020
	Magnesium	15.8	0.010	0.030	NE			091605-009	SW846 6020
	Manganese	ND	0.001	0.005	NE	U		091605-009	SW846 6020
	Mercury	ND	0.000066	0.0002	0.002	U		091605-009	SW846 7470
	Nickel	0.000961	0.0005	0.002	NE	J		091605-009	SW846 6020
	Potassium	1.76	0.080	0.300	NE			091605-009	SW846 6020
	Selenium	0.00488	0.0015	0.005	0.050	J		091605-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		091605-009	SW846 6020
	Sodium	22.3	0.080	0.250	NE			091605-009	SW846 6020
Thallium	ND	0.00045	0.002	0.002	U		091605-009	SW846 6020	
Uranium	0.0151	0.000067	0.0002	0.03			091605-009	SW846 6020	
Vanadium	0.00173	0.001	0.005	NE	J		091605-009	SW846 6010	
Zinc	ND	0.0035	0.010	NE	U		091605-009	SW846 6020	

**Table IV-11 (Continued)**  
**Summary of Unfiltered Total Metal Results**  
**Solid Waste Management Unit 68 Groundwater Monitoring**  
**Quarterly Assessment, January – March 2012**

Well ID	Analyte	Result (mg/L)	MDL (mg/L)	PQL (mg/L)	MCL (mg/L)	Laboratory Qualifier <sup>a</sup>	Validation Qualifier <sup>b</sup>	Sample Number	Analytical Method <sup>c</sup>
OBS-MW3 11-Jan-12	Aluminum	0.0162	0.015	0.050	NE	J		091607-009	SW846 6020
	Antimony	ND	0.001	0.003	0.006	U		091607-009	SW846 6020
	Arsenic	ND	0.0017	0.005	0.010	U		091607-009	SW846 6020
	Barium	0.0287	0.0006	0.002	2.00			091607-009	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		091607-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		091607-009	SW846 6020
	Calcium	76.0	0.600	2.00	NE	B		091607-009	SW846 6020
	Chromium	ND	0.002	0.010	0.100	U		091607-009	SW846 6020
	Cobalt	0.000257	0.0001	0.001	NE	J		091607-009	SW846 6020
	Copper	0.0016	0.00035	0.001	NE			091607-009	SW846 6020
	Iron	0.248	0.033	0.100	NE			091607-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		091607-009	SW846 6020
	Magnesium	16.4	0.010	0.030	NE			091607-009	SW846 6020
	Manganese	0.00198	0.001	0.005	NE	J		091607-009	SW846 6020
	Mercury	ND	0.000066	0.0002	0.002	U		091607-009	SW846 7470
	Nickel	0.00153	0.0005	0.002	NE	J		091607-009	SW846 6020
	Potassium	1.66	0.080	0.300	NE			091607-009	SW846 6020
	Selenium	0.00265	0.0015	0.005	0.050	J		091607-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		091607-009	SW846 6020
	Sodium	21.0	0.080	0.250	NE			091607-009	SW846 6020
	Thallium	ND	0.00045	0.002	0.002	U		091607-009	SW846 6020
Uranium	0.0111	0.000067	0.0002	0.03			091607-009	SW846 6020	
Vanadium	0.00112	0.001	0.005	NE	J		091607-009	SW846 6010	
Zinc	ND	0.0035	0.010	NE	U		091607-009	SW846 6020	

**Table IV-11 (Concluded)**  
**Summary of Unfiltered Total Metal Results**  
**Solid Waste Management Unit 68 Groundwater Monitoring**  
**Quarterly Assessment, January – March 2012**

**Notes**

CFR = Code of Federal Regulations.  
EPA = U.S. Environmental Protection Agency.  
ID = Identification.  
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.

**<sup>a</sup>Laboratory 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.

**<sup>b</sup>Validation Qualifier**

If cell is blank, then all quality control samples met acceptance criteria with respect to submitted samples.  
U = The analyte was analyzed for but was not detected. The associated numerical value is the sample quantitation limit.

**<sup>c</sup>Analytical Method**

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

**Table IV-12**  
**Summary of Filtered Cation Results**  
**Solid Waste Management Units 8/58 and 68 Groundwater Monitoring**  
**Quarterly Assessment, January – March 2012**

Well ID	Analyte	Result (mg/L)	MDL (mg/L)	PQL (mg/L)	MCL (mg/L)	Laboratory Qualifier <sup>a</sup>	Validation Qualifier <sup>b</sup>	Sample Number	Analytical Method <sup>c</sup>
<b>SWMUs 8/58</b>									
<b>CCBA-MW1</b> 16-Jan-12	Calcium	44.2	0.060	0.200	NE	B		091615-017	SW846 6020
	Magnesium	9.61	0.010	0.030	NE			091615-017	SW846 6020
	Potassium	4.45	0.080	0.300	NE			091615-017	SW846 6020
	Sodium	67.7	0.400	1.25	NE			091615-017	SW846 6020
<b>CCBA-MW1 (Duplicate)</b> 16-Jan-12	Calcium	43.7	0.300	1.00	NE	B		091615-017	SW846 6020
	Magnesium	10.1	0.010	0.030	NE			091615-017	SW846 6020
	Potassium	4.78	0.080	0.300	NE			091615-017	SW846 6020
	Sodium	68.0	0.080	0.250	NE			091615-017	SW846 6020
<b>CCBA-MW2</b> 12-Jan-12	Calcium	76.4	0.300	1.00	NE			091615-017	SW846 6020
	Magnesium	15.7	0.010	0.030	NE			091615-017	SW846 6020
	Potassium	1.38	0.080	0.300	NE			091615-017	SW846 6020
	Sodium	48.2	0.080	0.250	NE		J	091615-017	SW846 6020
<b>SWMU 68</b>									
<b>OBS-MW1</b> 09-Jan-12	Calcium	79.7	0.600	2.00	NE	B		091600-017	SW846 6020
	Magnesium	15.1	0.010	0.030	NE			091600-017	SW846 6020
	Potassium	1.61	0.080	0.300	NE			091600-017	SW846 6020
	Sodium	21.0	0.800	2.50	NE			091600-017	SW846 6020
<b>OBS-MW2</b> 10-Jan-12	Calcium	74.9	0.600	2.00	NE	B		091600-017	SW846 6020
	Magnesium	14.8	0.010	0.030	NE			091600-017	SW846 6020
	Potassium	1.53	0.080	0.300	NE			091600-017	SW846 6020
	Sodium	20.8	0.800	2.50	NE			091600-017	SW846 6020
<b>OBS-MW2 (Duplicate)</b> 10-Jan-12	Calcium	83.7	0.600	2.00	NE	B		091600-017	SW846 6020
	Magnesium	16.3	0.010	0.030	NE			091600-017	SW846 6020
	Potassium	1.67	0.080	0.300	NE			091600-017	SW846 6020
	Sodium	21.0	0.080	0.250	NE			091600-017	SW846 6020
<b>OBS-MW3</b> 11-Jan-12	Calcium	75.6	0.600	2.00	NE	B		091600-017	SW846 6020
	Magnesium	16.8	0.010	0.030	NE			091600-017	SW846 6020
	Potassium	1.59	0.080	0.300	NE			091600-017	SW846 6020
	Sodium	21.5	0.080	0.250	NE			091600-017	SW846 6020

**Table IV-12 (Concluded)**  
**Summary of Filtered Cation Results**  
**Solid Waste Management Units 8/58 and 68 Groundwater Monitoring**  
**Quarterly Assessment, January – March 2012**

**Notes**

CCBA = Coyote Canyon Blast Area.  
CFR = Code of Federal Regulations.  
EPA = U.S. Environmental Protection Agency.  
ID = Identification.  
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.  
SW = Solid Waste.  
SWMU = Solid Waste Management Unit.

**<sup>a</sup>Laboratory Qualifier**

B = The analyte was detected in the blank above the effective MDL.

**<sup>b</sup>Validation Qualifier**

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

J = The associated value is an estimated quantity.

**<sup>c</sup>Analytical Method**

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

Table IV-13

**Summary of Gamma Spectroscopy, Gross Alpha, Gross Beta, and Isotopic Uranium Results  
Solid Waste Management Units 8/58 and 68 Groundwater Monitoring  
Quarterly Assessment, January – March 2012**

Well ID	Analyte	Activity <sup>a</sup> (pCi/L)	MDA (pCi/L)	Critical Level <sup>b</sup> (pCi/L)	MCL (pCi/L)	Laboratory Qualifier <sup>c</sup>	Validation Qualifier <sup>d</sup>	Sample Number	Analytical Method <sup>e</sup>
<b>SWMUs 8/58</b>									
<b>CCBA-MW1</b> 16-Jan-12	Americium-241	1.76 ± 7.28	12.6	6.16	NE	U	BD	091615-033	EPA 901.1
	Cesium-137	-0.847 ± 2.47	4.26	2.02	NE	U	BD	091615-033	EPA 901.1
	Cobalt-60	1.94 ± 2.91	5.32	2.48	NE	U	BD	091615-033	EPA 901.1
	Potassium-40	10.5 ± 61.1	42.2	19.3	NE	U	BD	091615-033	EPA 901.1
	Gross Alpha	0.99	NA	NA	15	NA	None	091615-034	EPA 900.0
	Gross Beta	4.61 ± 1.20	0.978	0.441	4mrem/yr			091615-034	EPA 900.0
	Uranium-233/234	1.70 ± 0.307	0.0865	0.035	NE			091615-035	HASL-300
	Uranium-235/236	0.0341 ± 0.0391	0.0765	0.0281	NE	U	BD	091615-035	HASL-300
	Uranium-238	0.634 ± 0.151	0.0735	0.0285	NE			091615-035	HASL-300
<b>CCBA-MW1 (Duplicate)</b> 16-Jan-12	Americium-241	-3.76 ± 17.6	28.7	14.0	NE	U	BD	091616-033	EPA 901.1
	Cesium-137	-2.65 ± 2.36	3.37	1.62	NE	U	BD	091616-033	EPA 901.1
	Cobalt-60	0.459 ± 2.05	3.67	1.74	NE	U	BD	091616-033	EPA 901.1
	Potassium-40	-22.6 ± 40.2	47.8	22.9	NE	U	BD	091616-033	EPA 901.1
	Gross Alpha	1.29	NA	NA	15	NA	None	091616-034	EPA 900.0
	Gross Beta	5.93 ± 1.45	0.993	0.438	4mrem/yr			091616-034	EPA 900.0
	Uranium-233/234	1.98 ± 0.374	0.110	0.0445	NE		J+	091616-035	HASL-300
	Uranium-235/236	0.0623 ± 0.0566	0.0972	0.0357	NE	U	BD	091616-035	HASL-300
	Uranium-238	0.564 ± 0.157	0.0933	0.0363	NE		J+	091616-035	HASL-300
<b>CCBA-MW2</b> 12-Jan-12	Americium-241	-8.34 ± 7.20	9.81	4.82	NE	U	BD	091610-033	EPA 901.1
	Cesium-137	0.148 ± 1.78	3.07	1.48	NE	U	BD	091610-033	EPA 901.1
	Cobalt-60	1.67 ± 2.16	3.69	1.76	NE	U	BD	091610-033	EPA 901.1
	Potassium-40	-42.4 ± 40.9	42.7	20.5	NE	U	BD	091610-033	EPA 901.1
	Gross Alpha	2.22	NA	NA	15	NA	None	091610-034	EPA 900.0
	Gross Beta	2.49 ± 0.852	1.07	0.510	4mrem/yr		J	091610-034	EPA 900.0
	Uranium-233/234	6.93 ± 0.947	0.0632	0.026	NE			091610-035	HASL-300
	Uranium-235/236	0.118 ± 0.0506	0.0556	0.0208	NE		J	091610-035	HASL-300
	Uranium-238	1.63 ± 0.264	0.0535	0.0211	NE			091610-035	HASL-300

**Table IV-13 (Continued)**  
**Summary of Gamma Spectroscopy, Gross Alpha, Gross Beta, and Isotopic Uranium Results**  
**Solid Waste Management Units 8/58 and 68 Groundwater Monitoring**  
**Quarterly Assessment, January – March 2012**

Well ID	Analyte	Activity <sup>a</sup> (pCi/L)	MDA (pCi/L)	Critical Level <sup>b</sup> (pCi/L)	MCL (pCi/L)	Laboratory Qualifier <sup>c</sup>	Validation Qualifier <sup>d</sup>	Sample Number	Analytical Method <sup>e</sup>
<b>SWMU 68</b>									
<b>OBS-MW1</b> 09-Jan-12	Americium-241	0.586 ± 8.39	12.7	6.18	NE	U	BD	091600-033	EPA 901.1
	Cesium-137	-1.41 ± 1.78	2.72	1.30	NE	U	BD	091600-033	EPA 901.1
	Cobalt-60	-0.555 ± 1.78	3.00	1.41	NE	U	BD	091600-033	EPA 901.1
	Potassium-40	16.0 ± 40.6	27.9	13.0	NE	U	BD	091600-033	EPA 901.1
	Gross Alpha	7.28	NA	NA	15	NA	None	091600-034	EPA 900.0
	Gross Beta	6.74 ± 1.54	1.16	0.557	4mrem/yr			091600-034	EPA 900.0
	Uranium-233/234	18.9 ± 2.61	0.117	0.0481	NE			091600-035	HASL-300
	Uranium-235/236	0.171 ± 0.0822	0.103	0.0386	NE		J	091600-035	HASL-300
Uranium-238	3.35 ± 0.544	0.0991	0.0391	NE			091600-035	HASL-300	
<b>OBS-MW2</b> 10-Jan-12	Americium-241	3.99 ± 7.23	10.6	5.20	NE	U	BD	091604-033	EPA 901.1
	Cesium-137	-2.24 ± 1.91	2.68	1.28	NE	U	BD	091604-033	EPA 901.1
	Cobalt-60	2.63 ± 2.18	3.44	1.64	NE	U	BD	091604-033	EPA 901.1
	Potassium-40	14.7 ± 39.4	27.2	12.8	NE	U	BD	091604-033	EPA 901.1
	Gross Alpha	5.52	NA	NA	15	NA	None	091604-034	EPA 900.0
	Gross Beta	5.36 ± 1.38	1.43	0.690	4mrem/yr			091604-034	EPA 900.0
	Uranium-233/234	22.3 ± 2.93	0.065	0.0267	NE			091604-035	HASL-300
	Uranium-235/236	0.269 ± 0.0829	0.0571	0.0214	NE			091604-035	HASL-300
Uranium-238	4.31 ± 0.613	0.0551	0.0217	NE			091604-035	HASL-300	
<b>OBS-MW2 (Duplicate)</b> 10-Jan-12	Americium-241	-10.6 ± 12.2	18.7	9.14	NE	U	BD	091605-033	EPA 901.1
	Cesium-137	-0.901 ± 1.77	2.96	1.42	NE	U	BD	091605-033	EPA 901.1
	Cobalt-60	0.0469 ± 1.70	3.06	1.43	NE	U	BD	091605-033	EPA 901.1
	Potassium-40	-37.6 ± 37.4	42.8	20.4	NE	U	BD	091605-033	EPA 901.1
	Gross Alpha	-3.54	NA	NA	15	NA	None	091605-034	EPA 900.0
	Gross Beta	4.53 ± 1.27	1.44	0.695	4mrem/yr			091605-034	EPA 900.0
	Uranium-233/234	22.9 ± 2.97	0.0608	0.025	NE			091605-035	HASL-300
	Uranium-235/236	0.375 ± 0.098	0.0535	0.020	NE			091605-035	HASL-300
Uranium-238	4.66 ± 0.651	0.0515	0.0203	NE			091605-035	HASL-300	

**Table IV-13 (Continued)**  
**Summary of Gamma Spectroscopy, Gross Alpha, Gross Beta, and Isotopic Uranium Results**  
**Solid Waste Management Units 8/58 and 68 Groundwater Monitoring**  
**Quarterly Assessment, January – March 2012**

Well ID	Analyte	Activity <sup>a</sup> (pCi/L)	MDA (pCi/L)	Critical Level <sup>b</sup> (pCi/L)	MCL (pCi/L)	Laboratory Qualifier <sup>c</sup>	Validation Qualifier <sup>d</sup>	Sample Number	Analytical Method <sup>e</sup>
<b>SWMU 68</b>									
<b>OBS-MW3</b>	Americium-241	5.29 ± 3.69	5.30	2.22	NE	U	BD	091607-033	EPA 901.1
11-Jan-12	Cesium-137	-7.66 ± 6.51	5.84	2.85	NE	U	R	091607-033	EPA 901.1
	Cobalt-60	-0.964 ± 2.19	3.73	1.76	NE	U	BD	091607-033	EPA 901.1
	Potassium-40	92.0 ± 42.7	34.5	16.2	NE		J	091607-033	EPA 901.1
	Gross Alpha	2.25	NA	NA	15	NA	None	091607-034	EPA 900.0
	Gross Beta	5.96 ± 1.67	1.86	0.903	4mrem/yr			091607-034	EPA 900.0
	Uranium-233/234	21.3 ± 2.85	0.0731	0.0301	NE			091607-035	HASL-300
	Uranium-235/236	0.273 ± 0.0867	0.0643	0.0241	NE			091607-035	HASL-300
	Uranium-238	4.38 ± 0.639	0.062	0.0245	NE			091607-035	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.

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

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

**Table IV-13 (Concluded)**  
**Summary of Gamma Spectroscopy, Gross Alpha, Gross Beta, and Isotopic Uranium Results**  
**Solid Waste Management Units 8/58 and 68 Groundwater Monitoring**  
**Quarterly Assessment, January – March 2012**

**Notes (continued)**

**<sup>c</sup>Laboratory Qualifier**

NA = Not applicable.  
U = Analyte is absent or below the method detection limit.

**<sup>d</sup>Validation Qualifier**

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

BD = Below detection limit as used in radiochemistry to identify results that are not statistically different from zero.  
J = The associated value is an estimated quantity.  
J+ = The associated numerical value is 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.

**<sup>e</sup>Analytical Method**

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

**Table IV-14**  
**Summary of Constituents Detected above Established MCLs**  
**Solid Waste Management Units 8/58 and 68 Groundwater Monitoring**  
**Quarterly Assessments through March 2012**

Well ID	Date	Analyte	Result	MCL	Laboratory Qualifier	Validation Qualifier <sup>a</sup>	Sample Number	Analytical Method <sup>b</sup>
<b>SWMUs 8/58</b>								
CCBA-MW1	31-Oct-11	Fluoride	5.36 mg/L	4.0 mg/L			091345-016	SW846 9056
CCBA-MW1	16-Jan-12	Fluoride	4.94 mg/L	4.0 mg/L			091615-016	SW846 9056
CCBA-MW1 (Duplicate)	16-Jan-12	Fluoride	4.94 mg/L	4.0 mg/L			091616-016	SW846 9056

**Notes**

CCBA = Coyote Canyon Blast Area.

CFR = Code of Federal Regulations.

EPA = U.S. Environmental Protection Agency.

ID = Identification.

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.

**<sup>a</sup>Validation Qualifier**

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

**<sup>b</sup>Analytical Method**

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

**Table IV-15**  
**Summary of Duplicate Samples**  
**Solid Waste Management Units 8/58 and 68 Groundwater Monitoring**  
**Quarterly Assessment, January – March 2012**

Well ID/Parameter	Environmental Sample (R1)	Duplicate Sample (R2)	RPD <sup>a</sup>
	mg/L unless otherwise noted		
<b>CCBA-MW1</b>			
Nitrate plus Nitrite	1.23	1.20	2
Bicarbonate Alkalinity	178	179	1
Bromide	0.3200	0.372	15
Chloride	27.4	27.0	1
Fluoride	4.94	4.94	< 1
Sulfate	53.6	52.5	2
Aluminum	0.0437	0.032	30
Barium	ND	0.00114	NC
Calcium	ND	0.00197	NC
Cobalt	0.00672	0.00682	1
Iron	0.000273	0.000501	59
Magnesium	43.6	43.6	<1
Manganese	0.000104	ND	NC
Nickel	0.0869	0.0893	3
Potassium	10.2	10.4	2
Selenium	0.012	0.012	<1
Sodium	4.53	4.50	1
Uranium	0.00207	0.00164	23
Vanadium	72.6	65.6	10
Zinc	0.0019	0.0019	<1
Filtered Calcium	0.00359	ND	NC
Filtered Magnesium	44.2	43.7	1
Filtered Potassium	9.61	10.1	5
Filtered Sodium	4.45	4.78	7
Gross Alpha	67.7	68.0	<1
Gross Beta	0.99	1.29	NC
Uranium-233/234	4.61 ± 1.20	5.93 ± 1.45	NC
Uranium-235/236	0.634 ± 0.151	1.98 ± 0.374	NC
Uranium-238	0.634 ± 0.151	0.564 ± 0.157	NC
<b>OBS-MW2</b>			
Nitrate plus Nitrite	1.49	0.540	94
Bicarbonate Alkalinity	176	175	1
Bromide	0.406	0.349	15
Chloride	21.5	21.4	<1
Fluoride	2.11	2.12	<1
Sulfate	87.2	87.0	< 1
Hexavalent Chromium	ND	0.0183	NC
Aluminum	0.0203	0.0205	1
Barium	80.0	83.5	4
Calcium	ND	0.00213	NC
Cobalt	0.149	0.156	5
Lead	15.2	15.8	4
Magnesium	0.000924	0.000961	4
Nickel	1.60	1.76	10
Potassium	0.00431	0.00488	12
Selenium	21.0	22.3	6

**Table IV-15 (Concluded)**  
**Summary of Duplicate Samples**  
**Solid Waste Management Units 8/58 and 68 Groundwater Monitoring**  
**Quarterly Assessment, January – March 2012**

Well ID/Parameter	Environmental Sample (R1)	Duplicate Sample (R2)	RPD <sup>a</sup>
	mg/L unless otherwise noted		
<b>OBS-MW2 (Continued)</b>			
Uranium	0.0145	0.0151	4
Vanadium	0.00162	0.00173	7
Filtered Calcium	74.9	83.7	11
Filtered Magnesium	14.8	16.3	10
Filtered Potassium	1.53	1.67	9
Filtered Sodium	20.8	21.0	1
Gross Alpha	5.52	-3.54	NC
Gross Beta	5.36 ± 1.38	4.53 ± 1.27	NC
Uranium-233/234	22.3 ± 2.93	22.9 ± 2.97	NC
Uranium 235/236	0.269 ± 0.0829	0.375 ± 0.098	NC
Uranium-238	4.31 ± 0.613	4.66 ± 0.651	NC

**Notes**

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

<sup>a</sup>RPD

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

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

where: R<sub>1</sub> = analysis result  
R<sub>2</sub> = duplicate analysis result

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















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



# CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY

Internal Lab

Batch No. N/A SAR/WR No. \_\_\_\_\_

AR/COC **613958**

Dept. No./Mail Stop: 6234/0718	Date Samples Shipped: <u>1/16/12</u> SMO USE	Contract No.: PO 691436	<input type="checkbox"/> Waste Characterization
Project/Task Manager: Alicia Aragon	Carrier/Waybill No.: <u>136298</u>	Project/Task No.: 98026.01.1212	RCRA Date= _____
Project Name: SWMU 88 GW Char <u>8/58</u>	Lab Contact: Edie Kent/803-556-8171	SMO Authorization: <u>9/19/12</u> TMO	<input type="checkbox"/> Send: Preliminary/report to _____
Record Center Code: ER/1267 074/DAT	Lab Destination: GEL	SEE BOTTLE ORDER	<input checked="" type="checkbox"/> Validation Required
Logbook Ref. No.: ER 049 <u>242-12</u>	SMO Contact/Phone: Lorraine Herrera /505-844-3199		<input type="checkbox"/> Released by COC No.: _____
Service Order No. CFC# <u>0245-12</u>	Send Report to SMO: _____		Bill To: Sandia National Labs (Accounts Payable)

Location	Tech Area	Reference LOV (available at SMO) <u>294/78</u>
Building	Room	

Sample No.-Fraction	ER Sample ID or Sample Location Detail	Beginning Depth (ft)	ER Site No.	Date/Time (hr) Collected	Sample Matrix	Container		Preserve All@4C	Collection Method	Sample Type	Parameter & Method Requested	Lab Sample ID
						Type	Volume					
✓ 091615 -001 ✓	SWMU 8/58-SA1	N/A	N/A	<u>01/16/12</u> 10/16/31 9:06	GW	G	3x40ml	HCL	G	SA	TCL VOC (SW846-8260B)	
✓ 091615 -002 ✓	SWMU 8/58-SA1	N/A	N/A	10/16/31 9:07	GW	AG	4x1L	4C	G	SA	TCL SVOC (SW846-8270C)	
✓ 091615 -009 ✓	SWMU 8/58-SA1	N/A	N/A	10/16/31 9:09	GW	P	500 ml	HNO3	G	SA	TAL Metals + Ur (SW846-6010/6020/7470)	
091615 -016 ✓	SWMU 8/58-SA1	N/A	N/A	10/16/31 9:10	GW	P	125 ml	4C	G	SA	Anions (SW846-9056)	
✓ 091615 -017 ✓	SWMU 8/58-SA1	N/A	N/A	10/16/31 9:11	FGW	P	250 ml	HNO3	G	SA	Cations (SW846-6020)	
✓ 091615 -018 ✓	SWMU 8/58-SA1	N/A	N/A	10/16/31 9:12	GW	P	125 ml	H2SO4	G	SA	NPN (353.2)	
✓ 091615 -020 ✓	SWMU 8/58-SA1	N/A	N/A	10/16/31 9:13	GW	P	250 ml	4C	G	SA	Perchlorate (314.0) *	
✓ 091615 -022 ✓	SWMU 8/58-SA1	N/A	N/A	10/16/31 9:14	GW	P	500 ml	4C	G	SA	Alkalinity (SM2320B)	
✓ 091615 -024 ✓	SWMU 8/58-SA1	N/A	N/A	10/16/31 9:15	GW	AG	4x1L	4C	G	SA	HE (SW846-8321A)	
✓ 091615 -027 ✓	SWMU 8/58-SA1	N/A	N/A	10/16/31 9:17	GW	P	250 ml	NaOH	G	SA	Total Cyanide (SW846-9012)	

RMMA <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Ref. No. _____	Sample Tracking SMO Use	Special Instructions/QC Requirements:	Abnormal Conditions on Receipt
Sample Disposal <input type="checkbox"/> Return to Client <input checked="" type="checkbox"/> Disposal by lab	Date Entered (mm/dd/yy) <u>01/18/2012</u>	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	Entered by: <u>RLC</u>	Raw Data Packag: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	

Return Samples By:	<input type="checkbox"/> Negotiated TAT	QC inits. <u>WJP</u>	*Send/e-mail report to: <b>Tim Jackson/ORG. 4142/MS.0729/ 284-2547</b>
<b>Sample</b>	<b>Name</b>	<b>Signature</b>	<b>Company/Organization/Phone</b>
	Robert Lynch	<i>[Signature]</i>	SNL/4142/844-4013/250-7090
	Alfred Santillanes	<i>[Signature]</i>	SNL/4142/844-5130/228-0710
	William J. Gibson	<i>[Signature]</i>	SNL/4142/844-4013/239-7367

1. Relinquished by <u>Alfred Santillanes</u> Org. 4142 Date <u>1/16/12</u> Time <u>0950</u>	4. Relinquished by _____ Org. _____ Date _____ Time _____
1. Received by <u>Edie Kent</u> Org. 4142 Date <u>1/16/12</u> Time <u>0950</u>	4. Received by _____ Org. _____ Date _____ Time _____
2. Relinquished by <u>Donna Johnson</u> Org. 4143 Date <u>1/16/12</u> Time <u>1200</u>	5. Relinquished by _____ Org. _____ Date _____ Time _____
2. Received by _____ Org. _____ Date _____ Time _____	5. Received by _____ Org. _____ Date _____ Time _____
3. Relinquished by _____ Org. _____ Date _____ Time _____	6. Relinquished by _____ Org. _____ Date _____ Time _____
3. Received by _____ Org. _____ Date _____ Time _____	6. Received by _____ Org. _____ Date _____ Time _____

\*7 & 15 Day Turnaround Time: ERCL requires prior notification.



# CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY

Internal Lab

Batch No. N/A SAR/WR No.

AR/COC **613958**

Dept. No./Mail Stop: 6234/0718	Date Samples Shipped: <u>1/16/12</u> SMO USE	Contract No: PO 691436	<input type="checkbox"/> Waste Characterization RCRA Date= _____ <input type="checkbox"/> Send: Preliminary/report to _____ <input checked="" type="checkbox"/> Validation Required <input type="checkbox"/> Released by COC No.: _____
Project/Task Manager: Alicia Aragon	Carrier/Waybill No. <u>136298</u>	Project/Task No.: 98026.01.13	
Project Name: SWMU 88 GW Char <u>8/58</u>	Lab Contact: Edie Kent/803-556-8171	SMO Authorization: <u>[Signature]</u> SMO	
Record Center Code: ER/1267 074/DAT	Lab Destination: GEL	SEE BOTTLE ORDER	
Logbook Ref. No.: ER 049	SMO Contact/Phone: Lorraine Herrera /505-844-3199		
Service Order No. CFO# 0263-12	Send Report to SMO:		

Location	Tech Area
Building	Room

**Reference LOV (available at SMO)**

Sample No.-Fraction	ER Sample ID or Sample Location Detail	Beginning Depth (ft)	ER Site No.	Date/Time(hr) Collected	Sample Matrix	Container		Preserve All@4C	Collection Method	Sample Type	Parameter & Method Requested	Lab Sample ID
						Type	Volume					
091615 -001	SWMU 8/58-SA1	N/A	N/A	10/16/31 9:06	GW	G	3x40ml	HCL	G	SA	TCL VOC (SW846-8260B)	001
091615 -002	SWMU 8/58-SA1	N/A	N/A	10/16/31 9:07	GW	AG	4x1L	4C	G	SA	TCL SVOC (SW846-8270C)	002
091615 -009	SWMU 8/58-SA1	N/A	N/A	10/16/31 9:09	GW	P	500 ml	HNO3	G	SA	TAL Metals + Ur (SW846-6010/6020/7470)	003
091615 -016	SWMU 8/58-SA1	N/A	N/A	10/16/31 9:10	GW	P	125 ml	4C	G	SA	Anions (SW846-9056)	004
091615 -017	SWMU 8/58-SA1	N/A	N/A	10/16/31 9:11	FGW	P	250 ml	HNO3	G	SA	Cations (SW846-6020)	294182 001
091615 -018	SWMU 8/58-SA1	N/A	N/A	10/16/31 9:12	GW	P	125 ml	H2SO4	G	SA	NPN (353.2)	005
091615 -020	SWMU 8/58-SA1	N/A	N/A	10/16/31 9:13	GW	P	250 ml	4C	G	SA	Perchlorate (314.0) *	006
091615 -022	SWMU 8/58-SA1	N/A	N/A	10/16/31 9:14	GW	P	500 ml	4C	G	SA	Alkalinity (SM2320B)	007
091615 -024	SWMU 8/58-SA1	N/A	N/A	10/16/31 9:15	GW	AG	4x1L	4C	G	SA	HE (SW846-8321A)	008
091615 -027	SWMU 8/58-SA1	N/A	N/A	10/16/31 9:17	GW	P	250 ml	NaOH	G	SA	Total Cyanide (SW846-9012)	009

RMMA <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Ref. No.	Sample Tracking SMO Use	Special Instructions/QC Requirements:	Abnormal Conditions on Receipt
Sample Disposal <input type="checkbox"/> Return to Client <input checked="" type="checkbox"/> Disposal by lab	Date Entered(mm/dd/yy)	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	Entered by:	Raw Data Packag: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	
Return Samples By: <input type="checkbox"/> Negotiated TAT	QC inits.	*Send/e-mail report to: Tim Jackson/ORG. 4142/MS.0729/ 284-2547	

Sample	Name	Signature	Init	Company/Organization/Phone
	Robert Lynch	<u>[Signature]</u>	RL	SNL/4142/844-4013/250-7090
	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

1. Relinquished by <u>Alfred Santillanes</u> Org. 4142 Date <u>1/16/12</u> Time <u>0950</u>	4. Relinquished by _____ Org. _____ Date _____ Time _____
1. Received by <u>Edie Kent</u> Org. GMO Date <u>1/16/12</u> Time <u>0950</u>	4. Received by _____ Org. _____ Date _____ Time _____
2. Relinquished by <u>Robert Lynch</u> Org. 4143 Date <u>1/16/12</u> Time <u>1200</u>	5. Relinquished by _____ Org. _____ Date _____ Time _____
2. Received by <u>William J. Gibson</u> Org. GEL Date <u>1-16-12</u> Time <u>0750</u>	5. Received by _____ Org. _____ Date _____ Time _____
3. Relinquished by _____ Org. _____ Date _____ Time _____	6. Relinquished by _____ Org. _____ Date _____ Time _____
3. Received by _____ Org. _____ Date _____ Time _____	6. Received by _____ Org. _____ Date _____ Time _____

\*7 & 15 Day Turnaround Time: ERCL requires prior notification.



# CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY

Internal Lab 3458  
 Batch No. N/A SAR/WR No. \_\_\_\_\_

AR/COC 613956

Dept. No./Mail Stop: 6234/0718	Date Samples Shipped: <u>1/12/12</u> SMO USE	Contract No: PO 691436
Project/Task Manager: Alicia Aragon	Carrier/Waybill No: <u>136127</u>	Project/Task No.: 98026.01.12
Project Name: SWMU 8/68 GW Char	Lab Contact: Edie Kent/803-556-8171	SMO Authorization: <u>[Signature]</u>
Record Center Code: ER/1267 074/DAT	Lab Destination: GEL	SLE'S BOTTLE ORDER <span style="float: right;">SMO</span>
Logbook Ref. No.: ER 049	SMO Contact/Phone: Lorraine Herrera /505-844-3199	
Service Order No. CFO# 0262-12	Send Report to SMO:	

<input type="checkbox"/> Waste Characterization RCRA Date= _____ <input type="checkbox"/> Send: Preliminary/report to _____ <input checked="" type="checkbox"/> Validation Required <input type="checkbox"/> Released by COC No.: _____	Bill To: Sandia National Labs (Accounts Payable) P.O. Box 5800, MS-0154 Albuquerque, NM., 87185-0154
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Location	Tech Area	Reference LOV (available at SMO) <u>293951</u>
Building	Room	

Sample No.-Fraction	ER Sample ID or Sample Location Detail	Beginning Depth (ft)	ER Site No.	Date/Time (hr) Collected		Sample Matrix	Container		Preserve All@4C	Collection Method	Sample Type	Parameter & Method Requested	Lab Sample ID
				Type	Volume		Type	Volume					
✓ 091610 -001 ✓	SWMU 8/58-SA3	N/A	N/A	1/12/12	8:53	GW	G	3x40ml	HCL	G	SA	TCL VOC (SW846-8260B)	
✓ 091610 -002 ✓	SWMU 8/58-SA3	N/A	N/A	1/12/12	8:55	GW	AG	4x1L	4C	G	SA	TCL SVOC (SW846-8270C)	
✓ 091610 -009 ✓	SWMU 8/58-SA3	N/A	N/A	1/12/12	8:56	GW	P	500 ml	HNO3	G	SA	TAL Metals + Ur (SW846-6010/6020/7470)	
✓ 091610 -016 ✓	SWMU 8/58-SA3	N/A	N/A	1/12/12	8:57	GW	P	125 ml	4C	G	SA	Anions (SW846-9056)	
✓ 091610 -017 ✓	SWMU 8/58-SA3	N/A	N/A	1/12/12	8:58	FGW	P	250 ml	HNO3	G	SA	Cations (SW846-6020)	
✓ 091610 -018 ✓	SWMU 8/58-SA3	N/A	N/A	1/12/12	8:59	GW	P	125 ml	H2SO4	G	SA	NPN (353.2)	
✓ 091610 -020 ✓	SWMU 8/58-SA3	N/A	N/A	1/12/12	9:00	GW	P	250 ml	4C	G	SA	Perchlorate (314.0) *	
✓ 091610 -022 ✓	SWMU 8/58-SA3	N/A	N/A	1/12/12	9:01	GW	P	500 ml	4C	G	SA	Alkalinity (SM2320B)	
✓ 091610 -024 ✓	SWMU 8/58-SA3	N/A	N/A	1/12/12	9:03	GW	AG	4x1L	4C	G	SA	HE (SW846-8321A)	
✓ 091610 -027 ✓	SWMU 8/58-SA3	N/A	N/A	1/12/12	9:04	GW	P	250 ml	NaOH	G	SA	Total Cyanide (SW846-9012)	

RMMA <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Ref. No. _____ Sample Disposal <input type="checkbox"/> Return to Client <input checked="" type="checkbox"/> Disposal by lab Turnaround Time <input type="checkbox"/> 7 Day * <input type="checkbox"/> 15 Day * <input checked="" type="checkbox"/> 30 Day	Sample Tracking SMO Use Date Entered (mm/dd/yy) <u>01/17/12</u> Entered by: <u>RK</u>	Special Instructions/QC Requirements: EDD <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No Raw Data Packag: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Abnormal Conditions on Receipt		
Return Samples By: <input type="checkbox"/> Negotiated TAT <input type="checkbox"/> QC inits. <u>WP</u>		*Send/e-mail report to: Tim Jackson/ORG. 4142/MS.0729/ 284-2547			
Sample	Name	Signature	Init	Company/Organization/Phone	FGW ( Filtered in field w/40 micron filter) Anions (Br,Cl,F,SO4) Cations ( Ca,Mg,K,Na ) Alkalinity (total,bicarbonate,carbonate)
	Robert Lynch	<u>[Signature]</u>	JEL	SNL/4142/844-4013/250-7090	*Please list as separate report.
	Alfred Santillanes	<u>[Signature]</u>	AA	SNL/4142/844-5130/228-0710	
	William J. Gibson	<u>[Signature]</u>	WJG	SNL/4142/844-4013/239-7367	
	Gilbert Quintana	<u>[Signature]</u>	GQ	SNL/4142/844-2507	

1. Relinquished by <u>[Signature]</u> Org. <u>4142</u> Date <u>1/12/12</u> Time <u>1040</u>	4. Relinquished by _____ Org. _____ Date _____ Time _____
1. Received by <u>[Signature]</u> SMO Org. <u>4142</u> Date <u>1/21/12</u> Time <u>1040</u>	4. Received by _____ Org. _____ Date _____ Time _____
2. Relinquished by <u>[Signature]</u> SMO Org. <u>4142</u> Date <u>1/21/12</u> Time <u>1140</u>	5. Relinquished by _____ Org. _____ Date _____ Time _____
2. Received by _____ Org. _____ Date _____ Time _____	5. Received by _____ Org. _____ Date _____ Time _____
3. Relinquished by _____ Org. _____ Date _____ Time _____	6. Relinquished by _____ Org. _____ Date _____ Time _____
3. Received by _____ Org. _____ Date _____ Time _____	6. Received by _____ Org. _____ Date _____ Time _____

\*7 & 15 Day Turnaround Time: ERCL requires prior notification.

**FACT LABORATORY**

**Analysis Request And Chain Of Custody (Continuation)**

AR/COC-

**613956**

Project Name: SWMU 8/68 GW Char		Project/Task Manger: Alicia Aragon				Project/Task No.: 98026.01.12						
<b>Location</b>	Tech Area	<b>Reference LOV (available at SMO)</b>										Lab use
Building	Room											
Sample No- Fraction	ER Sample ID or Sample Location detail	Beginning Depth (ft)	ER Site No.	Date/Time (hr) Collected	Sample Matrix	Container		Preservative	Collection Method	Sample Type	Parameter & Method Requested	Lab Sample ID
✓ 091610 -033 ✓	SWMU 8/58-SA3	N/A	N/A	1/12/12 9:05	GW	P	1 L	HNO3	G	SA	Gamma Spec (short list)(901.0)	
✓ 091610 -034 ✓	SWMU 8/58-SA3	N/A	N/A	1/12/12 9:07	GW	P	1 L	HNO3	G	SA	Gross Alpha/Beta (900.0)	
✓ 091610 -035 ✓	SWMU 8/58-SA3	N/A	N/A	1/12/12 9:08	GW	P	1 L	HNO3	G	SA	Isotopic Ur (ASTM D3972-09M)	
✓ 091611 -001 ✓	SWMU 68-TB1	N/A	N/A	1/12/12 8:53	DIW	G	3x40ml	HCL	G	TB	VOC (SW846-8260B)	
✓ 091612 -001 ✓	SWMU 68-FB1	N/A	N/A	1/12/12 8:46	DIW	G	3x40ml	HCL	G	FB	VOC (SW846-8260B)	
Abnormal Conditions on Receipt												
Recipient Initials _____												

# CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY

Internal Lab

Batch No. <i>N/A</i>	SAR/WR No.	<b>AR/COC</b>	<b>613952</b>
Dept. No./Mail Stop: 6234/0718	Date Samples Shipped: <i>1/9/12</i> SMO USE	Contract No: PO 691436	<input type="checkbox"/> Waste Characterization
Project/Task Manager: Alicia Aragon	Carrier/Waybill No. <i>136059</i>	Project/Task No.: 98026.01.13	RCRA Date=
Project Name: SWMU 68 GWC	Lab Contact: Edie Kent/803-556-8171	SMO Authorization: <i>[Signature]</i>	<input type="checkbox"/> Send: Preliminary/report to
Record Center Code: ER/1267 074/DAT	Lab Destination: GEL	<i>500 BOTTLES ROOM SMO</i>	<input checked="" type="checkbox"/> Validation Required
Logbook Ref. No.: ER 049	SMO Contact/Phone: Lorraine Herrera /505-844-3199		<input type="checkbox"/> Released by COC No.:
Service Order No. CFO 263-12	Send Report to SMO:	Bill To: Sandia National Labs (Accounts Payable)	

Location	Tech Area	Reference LOV (available at SMO) <i>293626</i>
Building	Room	

Sample No.-Fraction	ER Sample ID or Sample Location Detail	Beginning Depth (ft)	ER Site No.	Date/Time (hr) Collected		Sample Matrix	Container		Preserve All@4C	Collection Method	Sample Type	Parameter & Method Requested	Lab Sample ID
							Type	Volume					
✓ 091600- -001 ✓	SWMU 68-SA1	N/A	N/A	1/9/12	9:02	GW	G	3x40ml	HCL	G	SA	TCL VOC (SW846-8260B)	
✓ 091600- -002 ✓	SWMU 68-SA1	N/A	N/A	1/9/12	9:05	GW	AG	4x1L	4C	G	SA	TCL SVOC (SW846-8270C)	
✓ 091600- -009 ✓	SWMU 68-SA1	N/A	N/A	1/9/12	9:06	GW	P	500 ml	HNO3	G	SA	TAL Metals + Ur (SW846-6010/6020/7470)	
✓ 091600- -014 ✓	SWMU 68-SA1	N/A	N/A	1/9/12	9:07	GW	P	250 ml	4C	G	SA	Hexavalent Chromium (SW846-719)	
✓ 091600- -016 ✓	SWMU 68-SA1	N/A	N/A	1/9/12	9:08	GW	P	125 ml	4C	G	SA	Anions (SW846-9056)	
✓ 091600- -017 ✓	SWMU 68-SA1	N/A	N/A	1/9/12	9:09	FGW	P	250 ml	HNO3	G	SA	Cations (SW846-6020)	
✓ 091600- -018 ✓	SWMU 68-SA1	N/A	N/A	1/9/12	9:10	GW	P	125 ml	H2SO4	G	SA	NPN (353.2)	
✓ 091600- -020 ✓	SWMU 68-SA1	N/A	N/A	1/9/12	9:11	GW	P	250 ml	4C	G	SA	Perchlorate (314.0)	
✓ 091600- -022 ✓	SWMU 68-SA1	N/A	N/A	1/9/12	9:12	GW	P	500 ml	4C	G	SA	Alkalinity (SM2320B)	
✓ 091600- -024 ✓	SWMU 68-SA1	N/A	N/A	1/9/12	9:14	GW	AG	4x1L	4C	G	SA	HE (SW846-8321A)	

RMMA <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Ref. No.	Sample Tracking SMO Use	Special Instructions/QC Requirements:	Abnormal Conditions on Receipt
Sample Disposal <input type="checkbox"/> Return to Client <input checked="" type="checkbox"/> Disposal by lab	Date Entered (mm/dd/yy) <i>01/10/12</i>	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	Entered by: <i>RK</i>	Raw Data Packag: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	

Return Samples By:	<input type="checkbox"/> Negotiated TAT	QC inits. <i>LH</i>	*Send/e-mail report to:
<b>Sample</b>	<b>Name</b>	<b>Signature</b>	<b>Tim Jackson/ORG. 4142/MS.0729/ 284-2547</b>
	Robert Lynch	<i>[Signature]</i>	If Perchlorate detected, perform verification analysis SW846-6850M
	Alfred Santillanes	<i>[Signature]</i>	Anions (Cl, SO4) Br, Cl, F, SO4
	William J. Gibson	<i>[Signature]</i>	Cations (Ca, Mg, K, Na)
			Alkalinity (total, bicarbonate, carbonate)
			*Please list as separate report.

1. Relinquished by <i>Alfred Santillanes</i> Org. <i>4142</i> Date <i>1/9/12</i> Time <i>1100</i>	4. Relinquished by _____ Org. _____ Date _____ Time _____
1. Received by <i>[Signature]</i> Org. <i>4142</i> Date <i>1/9/12</i> Time <i>1100</i>	4. Received by _____ Org. _____ Date _____ Time _____
2. Relinquished by <i>[Signature]</i> Org. <i>4142</i> Date <i>1/9/12</i> Time <i>1200</i>	5. Relinquished by _____ Org. _____ Date _____ Time _____
2. Received by _____ Org. _____ Date _____ Time _____	5. Received by _____ Org. _____ Date _____ Time _____
3. Relinquished by _____ Org. _____ Date _____ Time _____	6. Relinquished by _____ Org. _____ Date _____ Time _____
3. Received by _____ Org. _____ Date _____ Time _____	6. Received by _____ Org. _____ Date _____ Time _____

\*7 & 15 Day Turnaround Time: ERCL requires prior notification.



RACT LABORATORY

Analysis Request And Chain Of Custody (Continuation)

AR/COC-

613953

Project Name: SWMU 68 GWC		Project/Task Manger: Alicia Aragon				Project/Task No.: 98026.01.13										
Location		Reference LOV (available at SMO)										Lab use				
Building		Tech Area	Room	Beginning Depth (ft)	ER Site No.	Date/Time (hr) Collected		Sample Matrix		Container Type	Volume	Preservative	Collection Method	Sample Type	Parameter & Method Requested	Lab Sample ID
✓	091602- -027 ✓	SWMU 68-EB1	N/A	N/A	1/9/12	10:22	DIW	P	250 ml	NaOH	G	EB	Total Cyanide (SW846-9012)			
✓	091602- -033 ✓	SWMU 68-EB1	N/A	N/A	1/9/12	10:23	DIW	P	1 L	HNO3	G	EB	Gamma Spec (short list)(901.0)			
✓	091602- -034 ✓	SWMU 68-EB1	N/A	N/A	1/9/12	10:24	DIW	P	1 L	HNO3	G	EB	Gross Alpha/Beta (900.0)			
✓	091602- -035 ✓	SWMU 68-EB1	N/A	N/A	1/9/12	10:25	DIW	P	1 L	HNO3	G	EB	Isotopic Ur (ASTM D3972-09M)			
	<del>091603- 001</del>	<del>SWMU 68-TB2</del>	<del>N/A</del>	<del>N/A</del>	<del>4/9/12</del>	<del>10:10</del>	<del>DIW</del>	<del>G</del>	<del>3x40ml</del>	<del>HCL</del>	<del>G</del>	<del>TB</del>	<del>VOG (SW846-8260B)</del>			
													SEE COC			
													613952 FOR			
													TRIP BLANK			
													INFO.			
Abnormal Conditions on Receipt																
Recipient Initials _____																

# CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY

Internal Lab

Batch No. <i>N/A</i>	SAR/WR No.	AR/COC	<b>613953</b>
Dept. No./Mail Stop: 6234/0718	Date Samples Shipped: <i>1/9/12</i>	SMO USE Contract No: PO 691436	<input type="checkbox"/> Waste Characterization RCRA Date= _____ <input type="checkbox"/> Send: Preliminary/report to _____ <input checked="" type="checkbox"/> Validation Required <input type="checkbox"/> Released by COC No.: _____
Project/Task Manager: Alicia Aragon	Carrier/Waybill No. <i>136059</i>	Project/Task No.: 98026.01.13	
Project Name: SWMU 68 GWC	Lab Contact: Edie Kent/803-556-8171	SMO Authorization: <i>[Signature]</i>	
Record Center Code: ER/1267 074/DAT	Lab Destination: GEL	<i>585 BOTTLE OWNER SWMU</i>	
Logbook Ref. No.: ER 049	SMO Contact/Phone: Lorraine Herrera /505-844-3199		
Service Order No. CFO 263-12	Send Report to SMO:		

Location	Tech Area	<b>Reference LOV (available at SMO)</b>	Bill To: Sandia National Labs (Accounts Payable)
Building	Room		P.O. Box 5800, MS-0154 Albuquerque, NM., 87185-0154

Sample No.-Fraction	ER Sample ID or Sample Location Detail	Beginning Depth (ft)	ER Site No.	Date/Time (hr) Collected		Sample Matrix	Container		Preserve All@4C	Collection Method	Sample Type	Parameter & Method Requested	Lab Sample ID
							Type	Volume					
✓ 091602-001	SWMU 68-EB1	N/A	N/A	1/9/12	10:10	DIW	G	3x40ml	HCL	G	EB	TCL VOC (SW846-8260B)	
✓ 091602-002	SWMU 68-EB1	N/A	N/A	1/9/12	10:12	DIW	AG	4x1L	4C	G	EB	TCL SVOC (SW846-8270C)	
✓ 091602-009	SWMU 68-EB1	N/A	N/A	1/9/12	10:13	DIW	P	500 ml	HNO3	G	EB	TAL Metals + Ur (SW846-6020/7470)	
✓ 091602-014	SWMU 68-EB1	N/A	N/A	1/9/12	10:14	DIW	P	250 ml	4C	G	EB	Hexavalent Chromium (SW846-719)	
✓ 091602-016	SWMU 68-EB1	N/A	N/A	1/9/12	10:15	DIW	P	125 ml	4C	G	EB	Anions (SW846-9056)	
✓ 091602-017	SWMU 68-EB1	N/A	N/A	1/9/12	10:16	FDIW	P	250 ml	HNO3	G	EB	Cations (SW846-6020)	
✓ 091602-018	SWMU 68-EB1	N/A	N/A	1/9/12	10:17	DIW	P	125 ml	H2SO4	G	EB	NPN (353.2)	
✓ 091602-020	SWMU 68-EB1	N/A	N/A	1/9/12	10:18	DIW	P	250 ml	4C	G	EB	Perchlorate (314.0)	
✓ 091602-022	SWMU 68-EB1	N/A	N/A	1/9/12	10:19	DIW	P	500 ml	4C	G	EB	Alkalinity (SM2320B)	
✓ 091602-024	SWMU 68-EB1	N/A	N/A	1/9/12	10:21	DIW	AG	4x1L	4C	G	EB	HE (SW846-8321A)	

RMMA <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Ref. No.	Sample Tracking SMO Use Date Entered (mm/dd/yy) <i>01/10/12</i>	Special Instructions/QC Requirements: EDD <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No Raw Data Packag. <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Abnormal Conditions on Receipt
Sample Disposal <input type="checkbox"/> Return to Client <input checked="" type="checkbox"/> Disposal by lab	Entered by: <i>RK</i>	*Send/e-mail report to: Tim Jackson/ORG. 4142/MS.0729/ 284-2547	
Turnaround Time <input type="checkbox"/> 7 Day * <input type="checkbox"/> 15 Day * <input checked="" type="checkbox"/> 30 Day	Negotiated TAT <input type="checkbox"/> QC inits. <i>LH</i>	If perchlorate detected perform verification analysis SW846-6850M Anions (Cl, SO4, Br, Cl, F, SO4) Cations (Ca, Mg, K, Na) Alkalinity (total, bicarbonate, carbonate) *Please list as separate report.	

Sample	Name	Signature	Init	Company/Organization/Phone
	Robert Lynch	<i>[Signature]</i>	<i>RL</i>	SNL/4142/844-4013/250-7090
	Alfred Santillanes	<i>[Signature]</i>	<i>AS</i>	SNL/4142/844-5130/228-0710
	William J. Gibson	<i>[Signature]</i>	<i>WJG</i>	SNL/4142/844-4013/239-7367

1. Relinquished by <i>[Signature]</i> Org. 4142 Date <i>1/9/12</i> Time <i>1105</i>	4. Relinquished by _____ Org. _____ Date _____ Time _____
1. Received by <i>[Signature]</i> Org. 4142 Date <i>1/9/12</i> Time <i>1105</i>	4. Received by _____ Org. _____ Date _____ Time _____
2. Relinquished by <i>[Signature]</i> Org. 4142 Date <i>1/9/12</i> Time <i>1205</i>	5. Relinquished by _____ Org. _____ Date _____ Time _____
2. Received by _____ Org. _____ Date _____ Time _____	5. Received by _____ Org. _____ Date _____ Time _____
3. Relinquished by _____ Org. _____ Date _____ Time _____	6. Relinquished by _____ Org. _____ Date _____ Time _____
3. Received by _____ Org. _____ Date _____ Time _____	6. Received by _____ Org. _____ Date _____ Time _____

\*7 & 15 Day Turnaround Time: ERCL requires prior notification.

# CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY

Internal Lab

Batch No. <i>N/A</i>	SAR/WR No.	AR/COC	<b>613954</b>
Dept. No./Mail Stop: 6234/0718	Date Samples Shipped: <i>1/10/12</i>	SMO USE	Contract No.: PO 691436
Project/Task Manager: Alicia Aragon	Carrier/Waybill No.: <i>136074</i>		Project/Task No.: 98026.01.13
Project Name: SWMU 68 GW Char	Lab Contact: Edie Kent/803-556-8171		SMO Authorization: <i>[Signature]</i>
Record Center Code: ER/1267 074/DAT	Lab Destination: GEL		<b>SELF BOTTLE ONVOL SMO</b>
Logbook Ref. No.: ER 049	SMO Contact/Phone: Lorraine Herrera /505-844-3199		
Service Order No. CFO# 0263-12	Send Report to SMO:		<input type="checkbox"/> Waste Characterization RCRA Date= _____ <input type="checkbox"/> Send: Preliminary/report to _____ <input checked="" type="checkbox"/> Validation Required <input type="checkbox"/> Released by COC No.: _____

Location	Tech Area	
Building	Room	Reference LOV (available at SMO) <i>293716</i>

Sample No.-Fraction	ER Sample ID or Sample Location Detail	Beginning Depth (ft)	ER Site No.	Date/Time (hr) Collected	Sample Matrix	Container		Preserve All@4C	Collection Method	Sample Type	Parameter & Method Requested	Lab Sample ID
						Type	Volume					
✓ 091604 -001 ✓	SWMU 68-SA2	N/A	N/A	1/10/12 8:57	GW	G	3x40ml	HCL	G	SA	TCL VOC (SW846-8260B)	
✓ 091604 -002 ✓	SWMU 68-SA2	N/A	N/A	1/10/12 9:00	GW	AG	4x1L	4C	G	SA	TCL SVOC (SW846-8270C)	
✓ 091604 -009 ✓	SWMU 68-SA2	N/A	N/A	1/10/12 9:02	GW	P	500 ml	HNO3	G	SA	TAL Metals + Ur (SW846-6010/6020/7470)	
✓ 091604 -014 ✓	SWMU 68-SA2	N/A	N/A	1/10/12 9:03	GW	P	250 ml	4C	G	SA	Hexavalent Chromium (SW846-7196A)	
✓ 091604 -016 ✓	SWMU 68-SA2	N/A	N/A	1/10/12 9:04	GW	P	125 ml	4C	G	SA	Anions (SW846-9056) <i>Br, Cl, F, SO4</i>	
✓ 091604 -017 ✓	SWMU 68-SA2	N/A	N/A	1/10/12 9:05	FGW	P	250 ml	HNO3	G	SA	Cations (SW846-6020)	
✓ 091604 -018 ✓	SWMU 68-SA2	N/A	N/A	1/10/12 9:06	GW	P	125 ml	H2SO4	G	SA	NPN (353.2)	
✓ 091604 -020 ✓	SWMU 68-SA2	N/A	N/A	1/10/12 9:07	GW	P	250 ml	4C	G	SA	Perchlorate (314.0)	
✓ 091604 -022 ✓	SWMU 68-SA2	N/A	N/A	1/10/12 9:08	GW	P	500 ml	4C	G	SA	Alkalinity (SM2320B)	
✓ 091604 -024 ✓	SWMU 68-SA2	N/A	N/A	1/10/12 9:10	GW	AG	4x1L	4C	G	SA	HE (SW846-8321A)	

RMMA <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Ref. No.	Sample Tracking SMO Use Date Entered (mm/dd/yy) <i>01/11/12</i> Entered by: <i>RLK</i>	Special Instructions/QC Requirements: EDD <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No Raw Data Packag <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Abnormal Conditions on Receipt
Sample Disposal <input type="checkbox"/> Return to Client <input checked="" type="checkbox"/> Disposal by lab	Turnaround Time <input type="checkbox"/> 7 Day* <input type="checkbox"/> 15 Day* <input checked="" type="checkbox"/> 30 Day	Return Samples By: <input type="checkbox"/> Negotiated TAT <input checked="" type="checkbox"/> QC inits. <i>[initials]</i>	

Sample	Name	Signature	Init	Company/Organization/Phone
	Robert Lynch	<i>[Signature]</i>	<i>RL</i>	SNL/4142/844-4013/250-7090
	Alfred Santillanes	<i>[Signature]</i>	<i>AS</i>	SNL/4142/844-5130/228-0710
	William J. Gibson	<i>[Signature]</i>	<i>WJG</i>	SNL/4142/844-4013/239-7367

\*Send/e-mail report to: **Tim Jackson/ORG. 4142/MS.0729/ 284-2547**  
 FGW ( Filtered in field w/40 micron filter)  
 If perchlorate detected perform verification analysis SW846-6850M  
 Cations ( Ca,Mg,K,Na )  
 Alkalinity (total,bicarbonate,carbonate)  
 \*Please list as separate report.

1. Relinquished by <i>[Signature]</i> Org. <i>4142</i> Date <i>1/10/12</i> Time <i>1002</i>	4. Relinquished by _____ Org. _____ Date _____ Time _____
1. Received by <i>[Signature]</i> Org. <i>4142</i> Date <i>1/10/12</i> Time <i>1002</i>	4. Received by _____ Org. _____ Date _____ Time _____
2. Relinquished by <i>[Signature]</i> Org. <i>4142</i> Date <i>1/10/12</i> Time <i>1130</i>	5. Relinquished by _____ Org. _____ Date _____ Time _____
2. Received by _____ Org. _____ Date _____ Time _____	5. Received by _____ Org. _____ Date _____ Time _____
3. Relinquished by _____ Org. _____ Date _____ Time _____	6. Relinquished by _____ Org. _____ Date _____ Time _____
3. Received by _____ Org. _____ Date _____ Time _____	6. Received by _____ Org. _____ Date _____ Time _____

\*7 & 15 Day Turnaround Time: ERCL requires prior notification.

## RACT LABORATORY

## Analysis Request And Chain Of Custody (Continuation)

AR/COC-

613954

Project Name: SWMU 68 GW Char		Project/Task Manger: Alicia Aragon				Project/Task No.: 98026.01.13							
Location		Tech Area		Reference LOV (available at SMO)								Lab use	
Building		Room											
Sample No- Fraction	ER Sample ID or Sample Location detail	Beginning Depth (ft)	ER Site No.	Date/Time (hr) Collected	Sample Matrix	Container		Preservative	Collection Method	Sample Type	Parameter & Method Requested	Lab Sample ID	
						Type	Volume						
✓ 091604 -027 ✓	SWMU 68-SA2	N/A	N/A	1/10/12 9:11	GW	P	250 ml	NaOH	G	SA	Total Cyanide (SW846-9012)		
✓ 091604 -033 ✓	SWMU 68-SA2	N/A	N/A	1/10/12 9:13	GW	P	1L	HNO3	G	SA	Gamma spec (short list)(901.0)		
✓ 091604 -034 ✓	SWMU 68-SA2	N/A	N/A	1/10/12 9:14	GW	P	1L	HNO <sub>3</sub>	G	SA	Gross Alpha/Beta (900.0)		
✓ 091604 -035 ✓	SWMU 68-SA2	N/A	N/A	1/10/12 9:16	GW	P	1L	HNO <sub>3</sub>	G	SA	Isotopic Ur (ASTM D3972-09M)		
✓ 091605 -001 ✓	SWMU 68-SA3	N/A	N/A	1/10/12 8:57	GW	G	3x40ml	HCL	G	DU	TCL VOC (SW846-8260B)		
✓ 091605 -002 ✓	SWMU 68-SA3	N/A	N/A	1/10/12 9:00	GW	AG	4x1L	4C	G	DU	TCL SVOC (SW846-8270C)		
✓ 091605 -009 ✓	SWMU 68-SA3	N/A	N/A	1/10/12 9:02	GW	P	500 ml	HNO3	G	DU	TAL Metals + Ur (SW846-6020/7470)		
✓ 091605 -014 ✓	SWMU 68-SA3	N/A	N/A	1/10/12 9:03	GW	P	250 ml	4C	G	DU	Hexavalent Chromium (SW846-719)		
✓ 091605 -016 ✓	SWMU 68-SA3	N/A	N/A	1/10/12 9:04	GW	P	125 ml	4C	G	DU	Anions (SW846-9056) <i>Br, Cl, F, SO4</i>		
✓ 091605 -017 ✓	SWMU 68-SA3	N/A	N/A	1/10/12 9:05	FGW	P	250 ml	HNO3	G	DU	Cations (SW846-6020)		
✓ 091605 -018 ✓	SWMU 68-SA3	N/A	N/A	1/10/12 9:06	GW	P	125 ml	H2SO4	G	DU	NPN (353.2)		
✓ 091605 -020 ✓	SWMU 68-SA3	N/A	N/A	1/10/12 9:07	GW	P	250 ml	4C	G	DU	Perchlorate (314.0)		
✓ 091605 -022 ✓	SWMU 68-SA3	N/A	N/A	1/10/12 9:08	GW	P	500 ml	4C	G	DU	Alkalinity (SM2320B)		
✓ 091605 -024 ✓	SWMU 68-SA3	N/A	N/A	1/10/12 9:10	GW	AG	4x1L	4C	G	DU	HE (SW846-8321A)		
✓ 091605 -027 ✓	SWMU 68-SA3	N/A	N/A	1/10/12 9:11	GW	P	250 ml	NaOH	G	DU	Total Cyanide (SW846-9012)		
✓ 091605 -033 ✓	SWMU 68-SA3	N/A	N/A	1/10/12 9:13	GW	P	1L	HNO3	G	DU	Gamma spec (short list)(901.0)		
✓ 091605 -034 ✓	SWMU 68-SA3	N/A	N/A	1/10/12 9:14	GW	P	1L	HNO3	G	DU	Gross Alpha/Beta (900.0)		
✓ 091605 -035 ✓	SWMU 68-SA3	N/A	N/A	1/10/12 9:16	GW	P	1L	HNO3	G	DU	Isotopic Ur (ASTM D3972-09M)		
✓ 091606 -001 ✓	SWMU 68-TB3	N/A	N/A	1/10/12 8:57	DIW	G	3x40ml	HCL	G	TB	VOC (SW846-8260B)		
Abnormal Conditions on Receipt													
Recipient Initials _____													

# CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY

Internal Lab

Batch No. N/A SAR/WR No. \_\_\_\_\_

AR/COC **613955**

Dept. No./Mail Stop: 6234/0718	Date Samples Shipped: <u>1/11/12</u> SMO USE	Contract No: PO 691436	<input type="checkbox"/> Waste Characterization RCRA Date= _____ <input type="checkbox"/> Send: Preliminary/report to _____ <input checked="" type="checkbox"/> Validation Required <input type="checkbox"/> Released by COC No.: _____ Bill To: Sandia National Labs (Accounts Payable) P.O. Box 5800, MS-0154 Albuquerque, NM., 87185-0154
Project/Task Manager: Alicia Aragon	Carrier/Waybill No. <u>136030</u>	Project/Task No.: 98026.01.13	
Project Name: SWMU 68 GW Char	Lab Contact: Edie Kent/803-556-8171	SMO Authorization: <u>[Signature]</u> SMO	
Record Center Code: ER/1267 074/DAT	Lab Destination: GEL	<u>SBS BOTTLE ORDER</u>	
Logbook Ref. No.: ER 049	SMO Contact/Phone: Lorraine Herrera /505-844-3199		
Service Order No. CFO# 0263-12	Send Report to SMO: _____		

Location	Tech Area	Reference LOV (available at SMO) <u>293838</u>
Building	Room	

Sample No.-Fraction	ER Sample ID or Sample Location Detail	Beginning Depth (ft)	ER Site No.	Date/Time (hr) Collected		Sample Matrix	Container		Preserve All@4C	Collection Method	Sample Type	Parameter & Method Requested	Lab Sample ID
				Type	Volume								
✓ 091607 -001 ✓	SWMU 68-SA4	N/A	N/A	1/11/12	8:54	GW	G	3x40ml	HCL	G	SA	TCL VOC (SW846-8260B)	
✓ 091607 -002 ✓	SWMU 68-SA4	N/A	N/A	1/11/12	8:56	GW	AG	4x1L	4C	G	SA	TCL SVOC (SW846-8270C)	
✓ 091607 -009 ✓	SWMU 68-SA4	N/A	N/A	1/11/12	8:58	GW	P	500 ml	HNO3	G	SA	TAL Metals + Ur(SW846-6010/6020/7470)	
✓ 091607 -014 ✓	SWMU 68-SA4	N/A	N/A	1/11/12	8:59	GW	P	250 ml	4C	G	SA	Hexavalent Chromium (SW846-7196A)	
✓ 091607 -016 ✓	SWMU 68-SA4	N/A	N/A	1/11/12	9:00	GW	P	125 ml	4C	G	SA	Anions (SW846-9056)	
✓ 091607 -017 ✓	SWMU 68-SA4	N/A	N/A	1/11/12	9:01	FGW	P	250 ml	HNO3	G	SA	Cations (SW846-6020)	
✓ 091607 -018 ✓	SWMU 68-SA4	N/A	N/A	1/11/12	9:03	GW	P	125 ml	H2SO4	G	SA	NPN (353.2)	
✓ 091607 -020 ✓	SWMU 68-SA4	N/A	N/A	1/11/12	9:04	GW	P	250 ml	4C	G	SA	Perchlorate (314.0) *	
✓ 091607 -022 ✓	SWMU 68-SA4	N/A	N/A	1/11/12	9:05	GW	P	500 ml	4C	G	SA	Alkalinity (SM2320B)	
✓ 091607 -024 ✓	SWMU 68-SA4	N/A	N/A	1/11/12	9:06	GW	AG	4x1L	4C	G	SA	HE (SW846-8321A)	

RMMA <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Ref. No. _____ Sample Disposal <input type="checkbox"/> Return to Client <input checked="" type="checkbox"/> Disposal by lab Turnaround Time <input type="checkbox"/> 7 Day * <input type="checkbox"/> 15 Day * <input checked="" type="checkbox"/> 30 Day	Sample Tracking Date Entered (mm/dd/yy) <u>09/12/12</u> Entered by: <u>RIC</u>	SMO Use Special Instructions/QC Requirements: EDD <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No Raw Data Packag. <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No *Send/e-mail report to: <u>Tim Jackson/ORG. 4142/MS.0729/ 284-2547</u> FGW ( Filtered in field w/40 micron filter) Anions ( <del>Cl, SO4</del> Br, Cl, F, SO4 <u>RE 1-11-12</u> ) Cations ( Ca, Mg, K, Na) Alkalinity (total, bicarbonate, carbonate) *Please list as separate report.	Abnormal Conditions on Receipt
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Return Samples By:	<input type="checkbox"/> Negotiated TAT	QC inits. <u>LA</u>	
Sample	Name	Signature	Init
	Robert Lynch	<u>[Signature]</u>	<u>RL</u>
	Alfred Santillanes	<u>[Signature]</u>	<u>AS</u>
	William J. Gibson	<u>[Signature]</u>	<u>WJG</u>
	Gilbert Quintana	<u>[Signature]</u>	<u>GQ</u>

1. Relinquished by <u>[Signature]</u> Org. <u>4142</u> Date <u>1/11/12</u> Time <u>1000</u>	4. Relinquished by _____ Org. _____ Date _____ Time _____
1. Received by <u>[Signature]</u> Org. <u>4142</u> Date <u>1/11/12</u> Time <u>1000</u>	4. Received by _____ Org. _____ Date _____ Time _____
2. Relinquished by <u>[Signature]</u> Org. <u>4142</u> Date <u>1/11/12</u> Time <u>1118</u>	5. Relinquished by _____ Org. _____ Date _____ Time _____
2. Received by _____ Org. _____ Date _____ Time _____	5. Received by _____ Org. _____ Date _____ Time _____
3. Relinquished by _____ Org. _____ Date _____ Time _____	6. Relinquished by _____ Org. _____ Date _____ Time _____
3. Received by _____ Org. _____ Date _____ Time _____	6. Received by _____ Org. _____ Date _____ Time _____

\*7 & 15 Day Turnaround Time: ERCL requires prior notification.



## Appendix C

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





## Sample Findings Summary



AR/COC: 613958

Page 1 of 1

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
<b>DOE EML HASL-300, U-02-RC</b>			
	091615-035/SWMU 8/58-SA1	Uranium-235/236 (13982-70-2)	BD, FR3
	091616-035/SWMU 8/58-SA2	Uranium-233/234 (N/A)	J+, IS2
	091616-035/SWMU 8/58-SA2	Uranium-235/236 (13982-70-2)	BD, FR3
	091616-035/SWMU 8/58-SA2	Uranium-238 (7440-61-1)	J+, IS2
<b>EPA 901.1</b>			
	091615-033/SWMU 8/58-SA1	Americium-241 (14596-10-2)	BD, FR3
	091615-033/SWMU 8/58-SA1	Cesium-137 (10045-97-3)	BD, FR3
	091615-033/SWMU 8/58-SA1	Cobalt-60 (10198-40-0)	BD, FR3
	091615-033/SWMU 8/58-SA1	Potassium-40 (13966-00-2)	BD, FR3
	091616-033/SWMU 8/58-SA2	Americium-241 (14596-10-2)	BD, FR3
	091616-033/SWMU 8/58-SA2	Cesium-137 (10045-97-3)	BD, FR3
	091616-033/SWMU 8/58-SA2	Cobalt-60 (10198-40-0)	BD, FR3
	091616-033/SWMU 8/58-SA2	Potassium-40 (13966-00-2)	BD, FR3
<b>SW846 3005/6020 DOE-AL</b>			
	091615-009/SWMU 8/58-SA1	Nickel (7440-02-0)	UJ, B4
	091615-009/SWMU 8/58-SA1	Thallium (7440-28-0)	0.0032U, B3
	091616-009/SWMU 8/58-SA2	Nickel (7440-02-0)	UJ, B4
<b>SW846 3535/8321A Modified</b>			
	091615-024/SWMU 8/58-SA1	Tetryl (479-45-8)	UJ, MS3,MS5,L3
	091616-024/SWMU 8/58-SA2	Tetryl (479-45-8)	UJ, MS3,MS5,L3
<b>SW846 9012B</b>			
	091615-027/SWMU 8/58-SA1	Cyanide, Total (57-12-5)	UJ, B4
	091616-027/SWMU 8/58-SA2	Cyanide, Total (57-12-5)	UJ, B4

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





## Memorandum

Date: February 21, 2012  
To: File  
From: Kevin Lambert  
Subject: Inorganic Data Review and Validation – SNL  
Site: SWMU 8 and 58 GW Characterization  
AR/COC: 613958  
SDG: 294178  
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 EPA 9056 (anions by ion chromatography), EPA 353.2 (nitrate/nitrite by Cd reduction), EPA 314.0 (perchlorate), SM 2320B (alkalinity), and EPA 9012B (total cyanide). Data were reported for all required analytes. Problems were identified with the data package that results in the qualification of data.

1. Total Cyanide:

Total cyanide was detected in the ICB/CCB at negative concentrations with an absolute value > the MDL but  $\leq$  the PQL. The associated sample results were NDs and will be **qualified “UJ,B4.”**

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

### Holding Times and Preservation

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

### Calibration

All initial and continuing calibration met QC acceptance criteria.

### **Blanks**

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

#### **Nitrate/Nitrite:**

Nitrate/Nitrite was detected in the MB at a concentration  $>$  the MDL but  $\leq$  the PQL. The associated sample results were detects  $>5X$  the MB and will not be qualified.

#### **Anions:**

In the EB, sample 293963-006 from another SNL SDG, associated with samples 294178-004 and -016 chloride was detected at a concentration  $>$  the PQL. The associated sample results were detects  $>5X$  the EB and will not be qualified.

#### **Alkalinity:**

In the EB, sample 293963-007 from another SNL SDG, associated with samples 294178-007 and -019 total and bicarbonate alkalinity were detected at concentrations  $>$  the PQL. However, blanks are not applicable for alkalinity and are not assessed for data validation. No sample data will be qualified as a result.

### **Laboratory Control Sample (LCS)**

All LCS recoveries met QC acceptance criteria.

### **Matrix Spike (MS)**

All MS recoveries met QC acceptance criteria.

#### **Anions, Nitrate/Nitrite, Perchlorate, and Alkalinity:**

It should be noted that the MS analyses were performed on a SNL sample from another SDG. No sample data will be qualified as a result.

### **Laboratory Replicate**

The replicate met all QC acceptance criteria.

#### **Anions, Nitrate/Nitrite, Perchlorate, and Alkalinity:**

It should be noted that the replicate analyses were performed on a SNL sample 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 except as follows.

#### **Nitrate/Nitrite:**

The samples were diluted 5X due to matrix interference.

#### **Anions:**

The samples were diluted 2X for chloride and sulfate due to high concentration for this analysis.

All associated batch QC samples were analyzed at dilution factors that resulted in relative dilution factors to the sample that were  $\leq 5X$ . No sample data will be qualified as a result.

**Other QC**

Field duplicate pairs were submitted on the AR/COC(s). There are no “required” review criteria for field duplicate analyses comparability; no data will be qualified as a result. It should be noted that the EBs are from another SNL SDG on AR/COC# 613957.

No other specific issues that affect data quality were identified.

**Reviewed by:** Marcia Hilchey

**Date:** 02/21/12



## Memorandum

Date: February 21, 2012  
To: File  
From: Kevin Lambert  
Subject: LC/MS/MS Organic Data Review and Validation – SNL  
Site: SWMU 8 and 58 GW Characterization  
AR/COC: 613958  
SDG: 294178  
Laboratory: GEL  
Project/Task: 98026.01.12  
Analysis: High Explosives (HE)

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

### Summary

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. The MS and MSD %Rs for tetryl were < the LAL but  $\geq 10\%$ . The associated sample results were NDs and will be **qualified “UJ,MS3.”**
2. The MS/MSD RPD for tetryl was not within the laboratory acceptance limit. The associated sample results were NDs and will be **qualified “UJ,MS5”** due to poor replicate precision.
3. The LCS %R for tetryl was < the LAL but  $\geq 10\%$ . The associated sample result was an ND and will be **qualified “UJ,L3.”**

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**

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)**

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

### **Laboratory Control Sample (LCS)**

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

### **Detection Limits/Dilutions**

All detection limits were properly reported. According to laboratory procedure, all samples 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 data will be qualified as a result. It should be noted that the EB is from another SNL SDG on AR/COC# 613957.

No other specific issues that affect data quality were identified.

**Reviewed by:** Marcia Hilchey

**Date:** 02/21/12

## Memorandum

Date: February 21, 2012  
To: File  
From: Kevin Lambert  
Subject: Inorganic Data Review and Validation – SNL  
Site: SWMU 8 and 58 GW Characterization  
AR/COC: 613958  
SDG: 294178 and 294182  
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 metals). One sample was prepared and analyzed with approved procedures using methods EPA 6010B (ICP metals) and EPA 7470A (CVAA mercury). Data were reported for all required analytes. Problems were identified with the data package that result in the qualification of data.

1. ICP-MS metals:

Tl was detected in the CCB at a concentration  $>$  the MDL but  $\leq$  the PQL. The Tl result for sample 294178-003 was a detect  $<5X$  the CCB result and will be **qualified “0.0032U,B3”** at  $5X$  the CCB value (mg/L). The other associated sample result was an ND and will not be qualified.

Ni was detected in the CCB at a negative concentration with an absolute value  $>$  the MDL but  $\leq$  the PQL. The Ni results for 294178-003 and -015 were NDs and will be **qualified “UJ,B4.”**

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

### Holding Times and Preservation

The samples were 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 metals:**

Ca was detected in the MB at a concentration  $>$  the MDL but  $\leq$  the PQL. The associated sample results were detects  $>5X$  the MB result and will not be qualified.

In the EB, sample 293963-003 from another SNL SDG, associated with samples 294178-003 and -015 Cu was detected at a concentration  $>$  the MDL but  $\leq$  the PQL. The associated sample results were NDs 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.

#### **ICP-MS metals:**

It should be noted that the MS had Ca, Mg, and Na at concentrations  $>4X$  the analyte spike concentrations and the MS %R for Ca, Mg, and Na did not meet QC acceptance criteria. However, according to AOP criteria, Ca, Mg, and Na are not a required MS analytes. No sample data will be qualified as a result.

### **Laboratory Replicate**

The replicate 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. No samples were diluted except as follows.

ICP-MS metals:

Samples were diluted 5X for Na due to over-range concentrations.

All associated batch QC samples were analyzed at dilution factors that resulted in relative dilution factors to the samples that were  $\leq 5X$ . No sample data will be qualified as a result.

**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.

**Other QC**

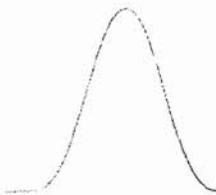
EBs and field duplicate pairs were submitted on the AR/COC(s). There are no "required" review criteria for field duplicate analyses comparability; no data will be qualified as a result. It should be noted that the EBs are from another SNL SDG on AR/COC# 613957.

No other specific issues that affect data quality were identified.

**Reviewed by:** Marcia Hilchey

**Date:** 02/21/12





## Memorandum

Date: February 21, 2012  
To: File  
From: Kevin Lambert  
Subject: Radiochemical Data Review and Validation – SNL  
Site: SWMU 8 and 58 GW Characterization  
AR/COC: 613958  
SDG: 294178  
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 – short list), EPA 900.0 (gross alpha/beta), and HASL 300, U-02-RC Mod (Alpha Spec U). Problems were identified with the data package that result in the qualification of data.

1. Gamma Spec:

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

2. Alpha Spec U:

The U-235/236 results for samples 294178-012 and -024 were either  $<$  the associated 2-sigma TPU or  $<$  the associated MDA and will be **qualified “BD,FR3.”**

The U-232 tracer %R for sample -024 was  $\geq 10\%$  but  $< 50\%$ . The U-233/234 and U-238 results were detects and will be **qualified “J+, IS2.”**

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

### Holding Times and Preservation

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

### **Quantification**

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

### **Calibration**

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

### **Blanks**

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

### **Tracer/Carrier Recovery**

All tracer/carrier recoveries met QC acceptance criteria except as noted above in the summary section.

### **Matrix Spike (MS)**

A MS met all QC acceptance criteria.

### **Laboratory Replicate**

All replicate error ratio acceptance criteria were met.

#### **Gamma Spec and Alpha Spec U:**

It should be noted that the replicate analyses were performed on a SNL sample from another SDG. No sample data will be qualified as a result.

#### **Gross Alpha/Beta:**

Since a replicate and MSD were performed for gross alpha/beta analysis, two measures of precision were available. The MS/MSD pair was used to evaluate gross alpha/beta precision.

### **Laboratory Control Sample (LCS)**

All LCS recoveries met QC acceptance criteria.

### **Detection Limits/Dilutions**

All required detection limits were met. No dilutions were required.

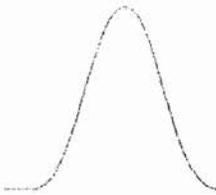
### **Other QC**

A field duplicate pair was submitted on the AR/COC(s). There are no "required" review criteria for field duplicate analyses comparability; no data will be qualified as a result. It should be noted that the EBs are from another SNL SDG on AR/COC# 613957.

No other specific issues that affect data quality were identified.

**Reviewed by:** Marcia Hilchey

**Date:** 02/21/12



## Memorandum

Date: February 21, 2012  
To: File  
From: Kevin Lambert  
Subject: GC/MS Organic Data Review and Validation – SNL  
Site: SWMU 8 and 58 GW Characterization  
AR/COC: 613958  
SDG: 294178  
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. 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 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 calibration verification %D for bis(2-ethylhexyl)phthalate was >20% with a positive bias. The associated sample results were NDs and will not be qualified for the calibration infraction.

The calibration verification %Ds for benzo(ghi)perylene; dibenzo(a,h)anthracene; and hexachlorocyclopentadiene were >20% but ≤40% with negative bias. All associated sample results were NDs, and no other calibration infractions occurred for these analytes. Therefore, the associated sample results will not be qualified.

#### **Blanks**

No target analytes were detected in the blanks.

#### **Surrogates**

All surrogate recoveries met QC acceptance criteria.

#### **Internal Standards**

All internal standards met QC acceptance criteria.

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

The MS/MSD analyses met QC acceptance criteria.

#### **Laboratory Control Sample (LCS)**

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

#### **Detection Limits/Dilutions**

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

#### **Tentatively Identified Compounds (TICs)**

TIC reports were not required.

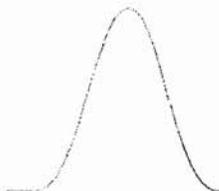
#### **Other QC**

A field duplicate pair was submitted on the AR/COC(s). There are no “required” review criteria for field duplicate analyses comparability; no data will be qualified as a result. It should be noted that the EB is from another SNL SDG on AR/COC# 613957.

No other specific issues that affect data quality were identified.

**Reviewed by:** Marcia Hilchey

**Date:** 02/21/12



## Memorandum

Date: February 21, 2012  
To: File  
From: Kevin Lambert  
Subject: GC/MS Organic Data Review and Validation – SNL  
Site: SWMU 8 and 58 GW Characterization  
AR/COC: 613958  
SDG: 294178  
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 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

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

The initial calibration %RSD for bromoform was >15% but ≤40%. The associated sample results were NDs and no other calibration infractions occurred for this analyte. Therefore, the associated sample results will not be qualified.

### **Blanks**

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

In the EB, sample 293963-001 from another SNL SDG, associated with samples 294178-001 and -013, acetone, bromodichloromethane, and dibromochloromethane were detected at concentrations > the MDLs but < the PQLs and chloroform was detected at a concentration > the PQL. All associated sample results were NDs and will not be qualified.

### **Surrogates**

All surrogate recoveries met QC acceptance criteria.

### **Internal Standards**

All internal standards met QC acceptance criteria.

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

The MS/MSD analyses met QC acceptance criteria. It should be noted that the MS/MSD analyses were performed on a SNL sample 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 samples were not diluted.

### **Tentatively Identified Compounds (TICs)**

TIC reports were not required.

### **Other QC**

A TB and a field duplicate pair were submitted on the AR/COC(s). There are no “required” review criteria for field duplicate analyses comparability; no data will be qualified as a result. It should be noted that the EB is from another SNL SDG on AR/COC# 613957.

No other specific issues that affect data quality were identified.

**Reviewed by:** Marcia Hilchey

**Date:** 02/21/12



## Sample Findings Summary



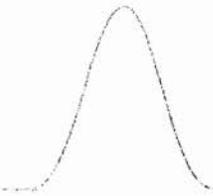
AR/COC: 613956

Page 1 of 1

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
<b>DOE EML HASL-300, U-02-RC</b>	091610-035/SWMU 8/58-SA3	Uranium-235/236 (13982-70-2)	J, FR7
<b>EPA 900.0/SW846 9310</b>	091610-034/SWMU 8/58-SA3	BETA (12587-47-2)	J, FR7
<b>EPA 901.1</b>	091610-033/SWMU 8/58-SA3	Americium-241 (14596-10-2)	BD, FR3
	091610-033/SWMU 8/58-SA3	Cesium-137 (10045-97-3)	BD, FR3
	091610-033/SWMU 8/58-SA3	Cobalt-60 (10198-40-0)	BD, FR3
	091610-033/SWMU 8/58-SA3	Potassium-40 (13966-00-2)	BD, FR3
<b>SW846 3005/6020 DOE-AL</b>	091610-009/SWMU 8/58-SA3	Aluminum (7429-90-5)	0.29UJ, B
	091610-009/SWMU 8/58-SA3	Nickel (7440-02-0)	UJ, B4
	091610-009/SWMU 8/58-SA3	Sodium (7440-23-5)	J, D1
	091610-009/SWMU 8/58-SA3	Thallium (7440-28-0)	0.0030U, B3
	091610-017/SWMU 8/58-SA3	Sodium (7440-23-5)	J, D1
<b>SW846 3535/8321A Modified</b>	091610-024/SWMU 8/58-SA3	Tetryl (479-45-8)	UJ, L3
<b>SW846 8270C</b>	091610-002/SWMU 8/58-SA3	4-Nitrophenol (100-02-7)	UJ, MS3,MS5,L3
	091610-002/SWMU 8/58-SA3	bis(1-Chloroisopropyl)ether (108-60-1)	UJ, C3
	091610-002/SWMU 8/58-SA3	p-Nitroaniline (100-01-6)	UJ, MS5
	091610-002/SWMU 8/58-SA3	Pyrene (129-00-0)	UJ, MS5

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





## Memorandum

Date: February 23, 2012  
To: File  
From: Kevin Lambert  
Subject: Inorganic Data Review and Validation – SNL  
Site: SWMU 8 and 58 GW Characterization  
AR/COC: 613956  
SDG: 293951  
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

One sample was prepared and analyzed with accepted procedures using methods EPA 9056 (anions by ion chromatography), EPA 353.2 (nitrate/nitrite by Cd reduction), EPA 314.0 (perchlorate), SM 2320B (alkalinity), and EPA 9012B (total cyanide). Data were reported for all required analytes. No problems were identified with the data package that results 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 analyzed within the prescribed holding times and properly preserved.

### Calibration

All initial and continuing calibration met QC acceptance criteria.

### Blanks

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

Nitrate/Nitrite:

Nitrate/Nitrite was detected in the MB at a concentration > the MDL but ≤ the PQL. The associated sample result was an ND 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.

Nitrate/Nitrite, Perchlorate, and Total Cyanide:

It should be noted that the MS analyses were performed on a SNL sample from another SDG. No sample data will be qualified as a result.

**Laboratory Replicate**

The replicate met all QC acceptance criteria.

Nitrate/Nitrite, Perchlorate, and Total Cyanide:

It should be noted that the replicate analyses were performed on a SNL sample 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 except as follows.

Anions:

Sample 293951-004 was diluted 5X due to high concentration for this analysis.

Nitrate/Nitrite:

Sample -005 was diluted 5X for chloride and sulfate due to high concentrations for this analysis.

All associated batch QC samples were analyzed at dilution factors that resulted in relative dilution factors to the sample that were ≤5X. No sample data will be qualified as a result.

**Other QC**

No other specific issues that affect data quality were identified.

**Reviewed by:** Marcia Hilchey

**Date:** 02/23/12



## Memorandum

Date: February 23, 2012  
To: File  
From: Kevin Lambert  
Subject: LC/MS/MS Organic Data Review and Validation – SNL  
Site: SWMU 8 and 58 GW Characterization  
AR/COC: 613956  
SDG: 293951  
Laboratory: GEL  
Project/Task: 98026.01.12  
Analysis: High Explosives (HE)

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

### Summary

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 LCS %R for tetryl was < the LAL but  $\geq 10\%$ . The associated sample result was an ND and will be **qualified “UJ,L3.”**

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 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)**

The MS/MSD analyses met QC acceptance criteria. It should be noted that the MS/MSD analyses were performed on a SNL sample from another SDG. No sample data will be qualified as a result.

**Laboratory Control Sample (LCS)**

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

**Detection Limits/Dilutions**

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

**Other QC**

No other specific issues that affect data quality were identified.

**Reviewed by:** Marcia Hilchey

**Date:** 02/23/12



## Memorandum

Date: February 23, 2012  
To: File  
From: Kevin Lambert  
Subject: Inorganic Data Review and Validation – SNL  
Site: SWMU 8 and 58 GW Characterization  
AR/COC: 613956  
SDG: 293951 and 293962  
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 metals). One sample was prepared and analyzed with approved procedures using methods EPA 6010B (ICP metals) and EPA 7470A (CVAA mercury). Data were reported for all required analytes. Problems were identified with the data package that result in the qualification of data.

#### 1. ICP-MS metals:

Tl was detected in the CCB at a concentration  $>$  the MDL but  $\leq$  the PQL. The associated sample result was a detect  $<5X$  the CCB result and will be **qualified “0.0030U,B3”** at  $5X$  the CCB value (mg/L).

Ni was detected in the CCB at a negative concentration with an absolute value  $>$  the MDL but  $\leq$  the PQL. The associated sample result was an ND and will be **qualified “UJ,B4.”**

Al was detected in the MB at a concentration  $>$  the PQL. The associated sample result was an ND and will be **qualified “0.29UJ,B”** at  $5X$  the MB value (mg/L).

The serial dilution %D for Na was  $>10\%$ . The associated sample results were detects and will be **qualified “J,D1”** due to poor serial dilution precision.

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

### **Holding Times and Preservation**

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

### **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.

#### ICP-MS metals:

It should be noted that the MS had Ca, Mg, and Na at concentrations >4X the analyte spike concentrations and the MS %R for Ca, Mg, and Na did not meet QC acceptance criteria. However, according to AOP criteria, Ca, Mg, and Na are not a required MS analytes. No sample data will be qualified as a result.

### **Laboratory Replicate**

The replicate 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. No samples were diluted except as follows.

#### ICP-MS metals:

Samples were diluted 5X for Ca due to over-range concentrations.

All associated batch QC samples were analyzed at dilution factors that resulted in relative dilution factors to the samples that were  $\leq 5X$ . No sample data will be qualified as a result.

**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:** Marcia Hilchey

**Date:** 02/23/12





## Memorandum

Date: February 23, 2012  
To: File  
From: Kevin Lambert  
Subject: Radiochemical Data Review and Validation – SNL  
Site: SWMU 8 and 58 GW Characterization  
AR/COC: 613956  
SDG: 293951  
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

One sample was prepared and analyzed with approved procedures using methods EPA 901.1 (gamma spec – short list), EPA 900.0 (gross alpha/beta), and HASL 300, U-02-RC Mod (Alpha Spec U). Problems were identified with the data package that result in the qualification of data.

1. Gamma Spec:  
All associated gamma spec results were either < the associated 2-sigma TPU or < the associated MDA and will be **qualified “BD,FR3.”**
2. Gross Alpha/Beta:  
The gross beta result for sample 293951-011 was <3X the associated MDA and will be **qualified “J,FR7.”**
3. Alpha Spec U:  
The U-235/236 result for sample -010 was <3X the associated MDA and will be **qualified “J,FR7.”**

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

### **Holding Times and Preservation**

The samples were 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**

All tracer/carrier recoveries met QC acceptance criteria.

### **Matrix Spike (MS)**

A MS met all QC acceptance criteria.

#### Gross Alpha/Beta:

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

### **Laboratory Replicate**

All replicate error ratio acceptance criteria were met.

#### All Analyses:

It should be noted that the replicate analyses were performed on a SNL sample from another SDG. No sample data will be qualified as a result. Since a replicate and MSD were performed for gross alpha/beta analysis, two measures of precision were available. The MS/MSD pair was used to evaluate gross alpha/beta precision.

### **Laboratory Control Sample (LCS)**

All LCS recoveries met QC acceptance criteria.

### **Detection Limits/Dilutions**

All required detection limits were met. No dilutions were required.

### **Other QC**

No other specific issues that affect data quality were identified.

**Reviewed by:** Marcia Hilchey

**Date:** 02/23/12

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## Memorandum

Date: February 23, 2012

To: File

From: Kevin Lambert

Subject: GC/MS Organic Data Review and Validation – SNL  
Site: SWMU 8 and 58 GW Characterization  
AR/COC: 613956  
SDG: 293951  
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

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

1. The calibration verification %D for bis(2-chloroisopropyl)ether was  $>40\%$  but  $\leq 60\%$  with negative bias. The associated sample result was an ND and will be **qualified “UJ,C3.”**
2. The MS %R for 4-nitrophenol was  $<$  the LAL but  $\geq 10\%$ . The associated sample result was an ND and will be **qualified “UJ,MS3.”**
3. The MS/MSD RPDs for 4-nitrophenol; pyrene and p-nitroaniline were not within the laboratory acceptance limits. All associated sample results were NDs and will be **qualified “UJ,MS5”** due to poor replicate precision.
4. The LCS %R for 4-nitrophenol was  $<10\%$ . 4-Nitrophenol is known to be a poor responding analyte that is subject to erratic chromatography behavior as stated in the method. This may account for the low recovery observed in the LCS, as well as in the MS (see technical case narrative and data exception report). Therefore, based on professional judgment, the associated ND sample result will be **qualified “UJ,L3.”**

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 noted above in the summary section and as follows.

The calibration verification %Ds for 4-nitrophenol; hexachlorocyclopentadiene; pyrene; and bis(2-chloroethyl)ether were >20% but ≤40% with negative bias. All associated sample results were NDs, and no other calibration infractions occurred for these analytes. Therefore, the associated sample results will not be qualified.

### **Blanks**

No target analytes were detected in the blanks.

### **Surrogates**

All surrogate recoveries met QC acceptance criteria.

### **Internal Standards**

All internal standards met QC acceptance criteria. It should be noted that for the MSD, the area counts of IS chrysene-d12 and perylene-d12 were <50% the average area count obtained from the calibration standards. Since this was a QC sample, no sample data will be qualified.

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

The MS/MSD analyses met QC acceptance criteria except as noted above in the summary section. It should be noted that the MS/MSD analyses were performed on a SNL sample from another SDG. No sample data will be qualified as a result.

### **Laboratory Control Sample (LCS)**

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

### **Detection Limits/Dilutions**

All detection limits were properly reported. 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:** 02/23/12





## Memorandum

Date: February 23, 2012  
To: File  
From: Kevin Lambert  
Subject: GC/MS Organic Data Review and Validation – SNL  
Site: SWMU 8 and 58 GW Characterization  
AR/COC: 613956  
SDG: 293951  
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 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

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

The initial calibration %RSD for bromoform was >15% but ≤40%. The associated sample results were NDs and no other calibration infractions occurred for this analyte. Therefore, the associated sample results will not be qualified.

### **Blanks**

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

In the TB, sample 293951-013, associated with samples -001 and -014, bromodichloromethane was detected at a concentration > the MDL but <PQL and chloroform was detected at a concentration > the PQL. All associated sample results were NDs and will not be qualified.

### **Surrogates**

All surrogate recoveries met QC acceptance criteria.

### **Internal Standards**

All internal standards met QC acceptance criteria.

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

The MS/MSD analyses met 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**

A TB and an FB were submitted on the AR/COC(s).

No other specific issues that affect data quality were identified.

**Reviewed by:** Marcia Hilchey

**Date:** 02/23/12



## Sample Findings Summary



AR/COC: 613952, 613953

Page 1 of 2

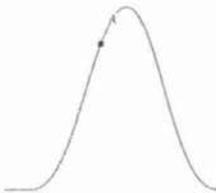
Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
<b>DOE EML HASL-300, U-02-RC</b>			
	091600-035/SWMU 68-SA1	Uranium-235/236 (13982-70-2)	J, FR7
	091602-035/SWMU 68-EB1	Uranium-233/234 (N/A)	BD, FR3
	091602-035/SWMU 68-EB1	Uranium-235/236 (13982-70-2)	BD, FR3
	091602-035/SWMU 68-EB1	Uranium-238 (7440-61-1)	BD, FR3
<b>EPA 353.2</b>			
	091600-018/SWMU 68-SA1	Nitrogen, Nitrate/Nitrite (N/A)	J, MS1,RP1
	091602-018/SWMU 68-EB1	Nitrogen, Nitrate/Nitrite (N/A)	UJ, MS1,RP1
<b>EPA 900.0/SW846 9310</b>			
	091602-034/SWMU 68-EB1	ALPHA (12587-46-1)	BD, FR3
	091602-034/SWMU 68-EB1	BETA (12587-47-2)	BD, FR3
<b>EPA 901.1</b>			
	091600-033/SWMU 68-SA1	Americium-241 (14596-10-2)	BD, FR3
	091600-033/SWMU 68-SA1	Cesium-137 (10045-97-3)	BD, FR3
	091600-033/SWMU 68-SA1	Cobalt-60 (10198-40-0)	BD, FR3
	091600-033/SWMU 68-SA1	Potassium-40 (13966-00-2)	BD, FR3
	091602-033/SWMU 68-EB1	Americium-241 (14596-10-2)	BD, FR3
	091602-033/SWMU 68-EB1	Cesium-137 (10045-97-3)	BD, FR3
	091602-033/SWMU 68-EB1	Cobalt-60 (10198-40-0)	BD, FR3
	091602-033/SWMU 68-EB1	Potassium-40 (13966-00-2)	BD, FR3
<b>SW846 3005/6020 DOE-AL</b>			
	091602-009/SWMU 68-EB1	Calcium (7440-70-2)	0.68U, B
	091602-017/SWMU 68-EB1	Calcium (7440-70-2)	0.68U, B
<b>SW846 3535/8321A Modified</b>			
	091600-024/SWMU 68-SA1	HMX (2691-41-0)	UJ, MS5
	091600-024/SWMU 68-SA1	Tetryl (479-45-8)	UJ, L3
	091602-024/SWMU 68-EB1	HMX (2691-41-0)	UJ, MS5

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Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
	091602-024/SWMU 68-EB1	Tetryl (479-45-8)	UJ, L3

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

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## Memorandum

Date: February 24, 2012  
To: File  
From: Kevin Lambert  
Subject: Inorganic Data Review and Validation – SNL  
Site: SWMU 68 GW Characterization  
AR/COC: 613952 and 613953  
SDG: 293626 and 293630  
Laboratory: GEL  
Project/Task: 98026.01.13  
Analysis: Metals

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

### Summary

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

#### 1. ICP-MS metals:

Ca was detected in the MB at a concentration  $>$  the MDL but  $\leq$  the PQL. The Ca results for samples 293626-017 and 293630-002 were detects  $<5X$  the MB result and will be **qualified “0.68U,B”** at  $5X$  the MB value (mg/L). The other associated sample results were detects  $>5X$  the MB result and will not be qualified.

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

### Holding Times and Preservation

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

### 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.

#### **ICP-MS metals:**

It should be noted that the MS had Ca, Mg, and Na at concentrations >4X the analyte spike concentrations and the MS %Rs for Ca, Mg, and Na did not meet QC acceptance criteria. However, according to AOP criteria, Ca, Mg, and Na are not a required MS analytes. No sample data will be qualified as a result.

### **Laboratory Replicate**

The replicate 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. No samples were diluted except as follows.

#### **ICP-MS metals:**

Samples 293626-003 and 293630-001 were diluted 5X for Ca due to over-range concentrations.

All associated batch QC samples were analyzed at dilution factors that resulted in relative dilution factors to the samples that were  $\leq 5X$ . No sample data will be qualified as a result.

### **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.

**Other QC**

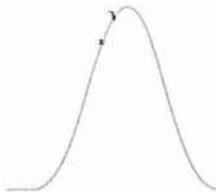
EBs were submitted on the AR/COC(s). It should be noted that the EBs on AR/COC# 613953 are associated with the samples on AR/COC# 613954 in another SDG.

No other specific issues that affect data quality were identified.

**Reviewed by:** Marcia Hilchey

**Date:** 02/24/12





## Memorandum

Date: February 24, 2012  
To: File  
From: Kevin Lambert  
Subject: Inorganic Data Review and Validation – SNL  
Site: SWMU 68 GW Characterization  
AR/COC: 613952 and 613953  
SDG: 293626  
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 EPA 7196A (hexavalent chromium), EPA 9056 (anions by ion chromatography), EPA 353.2 (nitrate/nitrite by Cd reduction), EPA 314.0 (perchlorate), SM 2320B (alkalinity), and EPA 9012B (total cyanide). Data were reported for all required analytes. Problems were identified with the data package that results in the qualification of data.

#### 1. Nitrate/Nitrite:

The relative dilution factor between samples 293626-006 and -010 and the QC sample was >5. The nitrate/nitrite result for sample -006 was a detect and will be **qualified “J,MS1,RP1”** due to lack of matrix-specific accuracy and precision data. The nitrate/nitrite result for sample -010 was an ND and will be **qualified “UJ,MS1,RP1”** due to lack of matrix-specific accuracy and precision data.

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

### Holding Times and Preservation

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

### Calibration

All initial and continuing calibration met QC acceptance criteria.

## **Blanks**

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

### **Alkalinity:**

In the MB, total and bicarbonate alkalinity were detected at concentrations > the PQL. However, blanks are not applicable for alkalinity and are not assessed for data validation. No sample data will be qualified as a result.

## **Laboratory Control Sample (LCS)**

All LCS recoveries met QC acceptance criteria.

## **Matrix Spike (MS)**

All MS recoveries met QC acceptance criteria.

### **Nitrate/Nitrite:**

It should be noted that the MS analyses were performed on a SNL sample from another SDG. No sample data will be qualified as a result.

## **Laboratory Replicate**

The replicate met all QC acceptance criteria.

### **Nitrate/Nitrite:**

It should be noted that the replicate analyses were performed on a SNL sample 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 except as follows.

### **Anions:**

Sample -005 was diluted 5X for chloride and sulfate due to high concentrations for this analysis.

### **Nitrate/Nitrite:**

Sample -006 was diluted 5X due to high concentration for this analysis and sample -020 was diluted 5X due to matrix interference.

All associated batch QC samples, except as noted above in the summary section, were analyzed at dilution factors that resulted in relative dilution factors to the sample that were  $\leq 5X$ . No sample data will be qualified as a result.

## **Other QC**

EBs were submitted on the AR/COC(s). It should be noted that the EBs on AR/COC# 613953 are associated with the samples on AR/COC# 613954 in another SDG.

No other specific issues that affect data quality were identified.

**Reviewed by:** Marcia Hilchey

**Date:** 02/24/12

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## Memorandum

Date: February 24, 2012  
To: File  
From: Kevin Lambert  
Subject: LC/MS/MS Organic Data Review and Validation – SNL  
Site: SWMU 68 GW Characterization  
AR/COC: 613952 and 613953  
SDG: 293626  
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

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. The MS/MSD RPD for HMX was not within the laboratory acceptance limit. The associated sample results were NDs and will be **qualified “UJ,MS5”** due to poor replicate precision.
2. The LCS %R for tetryl was < the LAL but  $\geq 10\%$ . The associated sample result results were NDs and will be **qualified “UJ,L3.”**

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

### Holding Times

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

### Instrument Tune

All instrument tune requirements were met.

### **Calibration**

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

The calibration verification %D for 2,4,6-trinitrotoluene was >20% with a positive bias. The associated sample results were NDs and will not be qualified for the calibration infraction.

### **Reporting Limit Verification**

All CRI recoveries met QC acceptance criteria.

### **Blanks**

No target analytes were detected in the blanks.

### **Surrogates**

All surrogate recoveries met QC acceptance criteria.

### **Internal Standards**

All internal standards met QC acceptance criteria.

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

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

### **Laboratory Control Sample (LCS)**

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

### **Detection Limits/Dilutions**

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

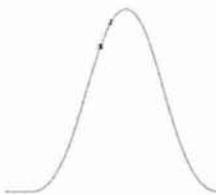
### **Other QC**

An EB was submitted on the AR/COC(s). It should be noted that the EB on AR/COC# 613953 is associated with the samples on AR/COC# 613954 in another SDG.

No other specific issues that affect data quality were identified.

**Reviewed by:** Marcia Hilchey

**Date:** 02/24/12



## Memorandum

Date: February 24, 2012

To: File

From: Kevin Lambert

Subject: Radiochemical Data Review and Validation – SNL  
Site: SWMU 68 GW Characterization  
AR/COC: 613952 and 613953  
SDG: 293626  
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

Two samples were prepared and analyzed with approved procedures using methods EPA 901.1 (gamma spec – short list), EPA 900.0 (gross alpha/beta), and HASL 300, U-02-RC Mod (Alpha Spec U). Problems were identified with the data package that result in the qualification of data.

1. Gamma Spec:  
All associated gamma spec results were either < the associated 2-sigma TPU or < the associated MDA and will be **qualified “BD,FR3.”**
2. Gross Alpha/Beta:  
The gross alpha and gross beta results for sample 293626-026 were either < the associated 2-sigma TPU or < the associated MDA and will be **qualified “BD,FR3.”**
3. Alpha Spec U:  
The U-235/236 result for sample -013 was <3X the associated MDA and will be **qualified “J,FR7.”**

The U-233/234, U-235/236, and U-238 results for sample -027 were either < the associated 2-sigma TPU or < the associated MDA and will be **qualified “BD,FR3.”**

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

**Holding Times and Preservation**

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

**Quantification**

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

**Calibration**

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

**Blanks**

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

**Tracer/Carrier Recovery**

All tracer/carrier recoveries met QC acceptance criteria.

**Matrix Spike (MS)**

A MS met all QC acceptance criteria.

**Laboratory Replicate**

All replicate error ratio acceptance criteria were met.

**Gross Alpha/Beta:**

Since a replicate and MSD were performed for gross alpha/beta analysis, two measures of precision were available. The MS/MSD pair was used to evaluate gross alpha/beta precision.

**Laboratory Control Sample (LCS)**

All LCS recoveries met QC acceptance criteria.

**Detection Limits/Dilutions**

All required detection limits were met. No dilutions were required.

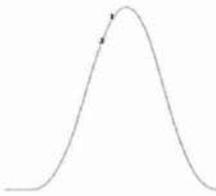
**Other QC**

EBs were submitted on the AR/COC(s). It should be noted that the EBs on AR/COC# 613953 are associated with the samples on AR/COC# 613954 in another SDG.

No other specific issues that affect data quality were identified.

**Reviewed by:** Marcia Hilchey

**Date:** 02/24/12



## Memorandum

Date: February 24, 2012

To: File

From: Kevin Lambert

Subject: GC/MS Organic Data Review and Validation – SNL  
Site: SWMU 68 GW Characterization  
AR/COC: 613952 and 613953  
SDG: 293626  
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

Two samples were 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 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 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 calibration verification %Ds for 4-nitrophenol and o-nitroaniline were >20% but ≤40% with negative bias. All associated sample results were NDs, and no other calibration infractions occurred for these analytes. Therefore, the associated sample results will not be qualified.

#### **Blanks**

No target analytes were detected in the blanks.

#### **Surrogates**

All surrogate recoveries met QC acceptance criteria.

#### **Internal Standards**

All internal standards met QC acceptance criteria. It should be noted that for the MS and/or MSD, the area counts of IS naphthalene-d8, phenanthrene-d10, chrysene-d12, and perylene-d12 were <50% the average area count obtained from the calibration standards. Since these were QC samples, no sample data will be qualified.

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

The MS/MSD analyses met QC acceptance criteria except as noted above in the summary section. It should be noted that the MS/MSD analyses were performed on a SNL sample 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.

#### **Tentatively Identified Compounds (TICs)**

TIC reports were not required.

#### **Other QC**

An EB was submitted on the AR/COC(s). It should be noted that the EB on AR/COC# 613953 is associated with the samples on AR/COC# 613954 in another SDG.

No other specific issues that affect data quality were identified.

**Reviewed by:** Marcia Hilchey

**Date:** 02/24/12



## Memorandum

Date: February 24, 2012  
To: File  
From: Kevin Lambert  
Subject: GC/MS Organic Data Review and Validation – SNL  
Site: SWMU 68 GW Characterization  
AR/COC: 613952 and 613953  
SDG: 293626  
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

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 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

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

The initial calibration %RSD for bromoform was >15% but ≤40%. The associated sample results were NDs and no other calibration infractions occurred for this analyte. Therefore, the associated sample results will not be qualified.

The calibration verification %Ds for carbon disulfide and vinyl acetate were >20% with a positive bias. All associated sample results were NDs and will not be qualified for the calibration infraction.

#### **Blanks**

No target analytes were detected in the blanks.

#### **Surrogates**

All surrogate recoveries met QC acceptance criteria.

#### **Internal Standards**

All internal standards met QC acceptance criteria.

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

The MS/MSD analyses met 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**

A TB and an EB were submitted on the AR/COC(s). It should be noted that the EB on AR/COC# 613953 is associated with the samples on AR/COC# 613954 in another SDG.

No other specific issues that affect data quality were identified.

**Reviewed by:** Marcia Hilchey

**Date:** 02/24/12



## Sample Findings Summary



AR/COC: 613954

Page 1 of 1

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
EPA 353.2	091604-018/SWMU 68-SA2	Nitrogen, Nitrate/Nitrite (N/A)	J, MS1,RP1
	091605-018/SWMU 68-SA3	Nitrogen, Nitrate/Nitrite (N/A)	J, MS1,RP1
EPA 901.1	091604-033/SWMU 68-SA2	Americium-241 (14596-10-2)	BD, FR3
	091604-033/SWMU 68-SA2	Cesium-137 (10045-97-3)	BD, FR3
	091604-033/SWMU 68-SA2	Cobalt-60 (10198-40-0)	BD, FR3
	091604-033/SWMU 68-SA2	Potassium-40 (13966-00-2)	BD, FR3
	091605-033/SWMU 68-SA3	Americium-241 (14596-10-2)	BD, FR3
	091605-033/SWMU 68-SA3	Cesium-137 (10045-97-3)	BD, FR3
	091605-033/SWMU 68-SA3	Cobalt-60 (10198-40-0)	BD, FR3
	091605-033/SWMU 68-SA3	Potassium-40 (13966-00-2)	BD, FR3
SW846 3005/6020 DOE-AL	091604-009/SWMU 68-SA2	Copper (7440-50-8)	0.0028U, B2
	091605-009/SWMU 68-SA3	Copper (7440-50-8)	0.0028U, B2
SW846 3535/8321A Modified	091604-024/SWMU 68-SA2	Tetryl (479-45-8)	UJ, MS3,MS5,L3
	091605-024/SWMU 68-SA3	Tetryl (479-45-8)	UJ, MS3,MS5,L3

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





## Memorandum

Date: February 24, 2012  
To: File  
From: Kevin Lambert  
Subject: Inorganic Data Review and Validation – SNL  
Site: SWMU 68 GW Characterization  
AR/COC: 613954  
SDG: 293716  
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 EPA 7196A (hexavalent chromium), EPA 9056 (anions by ion chromatography), EPA 353.2 (nitrate/nitrite by Cd reduction), EPA 314.0 (perchlorate), SM 2320B (alkalinity), and EPA 9012B (total cyanide). Data were reported for all required analytes. Problems were identified with the data package that results in the qualification of data.

#### 1. Nitrate/Nitrite:

The relative dilution factor between samples 293716-006 and -019 and the QC sample was >5. The associated sample results were detects and will be **qualified "J,MS1,RP1"** due to lack of matrix-specific accuracy and precision data.

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

### Holding Times and Preservation

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

### Calibration

All initial and continuing calibration met QC acceptance criteria.

**Blanks**

No target analytes were detected in the blanks.

**Laboratory Control Sample (LCS)**

All LCS recoveries met QC acceptance criteria.

**Matrix Spike (MS)**

All MS recoveries met QC acceptance criteria.

Anions, Nitrate/Nitrite, Perchlorate, Total Cyanide:

It should be noted that the MS analyses were performed on a SNL sample from another SDG. No sample data will be qualified as a result.

**Laboratory Replicate**

The replicate met all QC acceptance criteria.

Anions, Nitrate/Nitrite, Perchlorate, Total Cyanide:

It should be noted that the replicate analyses were performed on a SNL sample 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 except as follows.

Anions:

Samples were diluted 5X for chloride and sulfate due to high concentrations for this analysis.

Nitrate/Nitrite:

Samples were diluted 5X due to matrix interference.

All associated batch QC samples, except as noted above in the summary section, were analyzed at dilution factors that resulted in relative dilution factors to the sample that were  $\leq 5X$ . No sample data will be qualified as a result.

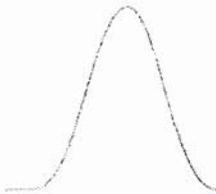
**Other QC**

A field duplicate pair was submitted on the AR/COC(s). There are no "required" review criteria for field duplicate analyses comparability; no data will be qualified as a result. It should be noted that the EBs are from another SNL SDG on AR/COC# 613953.

No other specific issues that affect data quality were identified.

**Reviewed by:** Marcia Hilchey

**Date:** 02/25/12



## Memorandum

Date: February 24, 2012  
To: File  
From: Kevin Lambert  
Subject: LC/MS/MS Organic Data Review and Validation – SNL  
Site: SWMU 68 GW Characterization  
AR/COC: 613954  
SDG: 293716  
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

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. The MS %R for tetryl was < the LAL but  $\geq 10\%$ . The associated sample results were NDs and will be **qualified “UJ,MS3.”**
2. The MS/MSD RPD for tetryl was not within the laboratory acceptance limit. The associated sample results were NDs and will be **qualified “UJ,MS5”** due to poor replicate precision.
3. The LCS %R for tetryl was < the LAL but  $\geq 10\%$ . The associated sample results were ND and will be **qualified “UJ,L3.”**

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**

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)**

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

**Laboratory Control Sample (LCS)**

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

**Detection Limits/Dilutions**

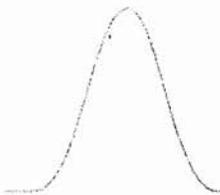
All detection limits were properly reported. According to laboratory procedure, all samples and QC extracts were diluted 2X with HPLC grade water.

**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 data will be qualified as a result. It should be noted that the EB is from another SNL SDG on AR/COC# 613953.

No other specific issues that affect data quality were identified.

**Reviewed by:** Marcia Hilchey \_\_\_\_\_ **Date:** 02/25/12



## Memorandum

Date: February 24, 2012  
To: File  
From: Kevin Lambert  
Subject: Inorganic Data Review and Validation – SNL  
Site: SWMU 68 GW Characterization  
AR/COC: 613954  
SDG: 293716 and 293718  
Laboratory: GEL  
Project/Task: 98026.01.13  
Analysis: Metals

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

### Summary

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

#### 1. ICP-MS metals:

In the EB, sample 293626-017 from another SNL SDG, associated with samples 293716-003 and -016, Cu was detected at a concentration  $>$  the MDL but  $\leq$  the PQL. The associated sample results were detects  $<5X$  the EB result and will be **qualified “0.0028U,B2”** at  $5X$  the EB value (mg/L).

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

### Holding Times and Preservation

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

### 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 metals:**

Tl was detected in the ICB/CCB at concentrations  $>$  the MDL but  $\leq$  the PQL. The associated sample results were NDs and will not be qualified.

K was detected in the CCB at a negative concentration with an absolute value  $>$  the MDL but  $\leq$  the PQL. The associated sample results were detects  $>5X$  the MDL and will not be qualified.

Ca was detected in the MB at a concentration  $>$  the MDL but  $\leq$  the PQL. The associated sample results were detects  $>5X$  the MB result and will not be qualified.

In the EB, sample 293626-017 from another SNL SDG, associated with samples 293716-003 and -016, Ca was detected at a concentration  $>$  the MDL but  $\leq$  the PQL. However, it should be noted that the Ca result for the EB has already been qualified ND due to MB contamination and, thus, does not affect the associated field sample results.

In the EB, sample 293630-002 from another SNL SDG, associated with samples 293718-001 and -002, Ca was detected at a concentration  $>$  the MDL but  $\leq$  the PQL. However, it should be noted that the Ca result for the EB has already been qualified ND due to MB contamination and, thus, does not affect the associated field sample results.

### **ICP -MS Internal Standards**

All internal standards met QC acceptance criteria.

### **Matrix Spike (MS)**

All MS recoveries met QC acceptance criteria.

#### **ICP-MS metals:**

It should be noted that the MS had Ca, Mg, and Na at concentrations  $>4X$  the analyte spike concentrations and the MS %R for Ca and Na did not meet QC acceptance criteria. However, according to AOP criteria, Ca, Mg, and Na are not a required MS analytes. No sample data will be qualified as a result.

### **Laboratory Replicate**

The replicate 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. No samples were diluted except as follows.

#### **ICP-MS metals:**

Samples were diluted 5X for Ca due to over-range concentrations.

All associated batch QC samples were analyzed at dilution factors that resulted in relative dilution factors to the samples that were  $\leq 5X$ . No sample data will be qualified as a result.

### **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.

### **Other QC**

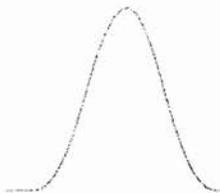
A field duplicate pair was submitted on the AR/COC(s). There are no "required" review criteria for field duplicate analyses comparability; no data will be qualified as a result. It should be noted that the EBs are from another SNL SDG on AR/COC# 613953.

No other specific issues that affect data quality were identified.

**Reviewed by:** Marcia Hilchey

**Date:** 02/25/12





## Memorandum

Date: February 24, 2012  
To: File  
From: Kevin Lambert  
Subject: Radiochemical Data Review and Validation – SNL  
Site: SWMU 68 GW Characterization  
AR/COC: 613954  
SDG: 293716  
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

Two samples were prepared and analyzed with approved procedures using methods EPA 901.1 (gamma spec – short list), EPA 900.0 (gross alpha/beta), and HASL 300, U-02-RC Mod (Alpha Spec U). Problems were identified with the data package that result in the qualification of data.

1. Gamma Spec:

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

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

### Holding Times and Preservation

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

### Quantification

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

### **Calibration**

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

### **Blanks**

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

### **Tracer/Carrier Recovery**

All tracer/carrier recoveries met QC acceptance criteria.

### **Matrix Spike (MS)**

A MS met all QC acceptance criteria.

#### Gross Alpha/Beta:

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

### **Laboratory Replicate**

All replicate error ratio acceptance criteria were met.

#### All Analyses:

It should be noted that the replicate analyses were performed on a SNL sample from another SDG. No sample data will be qualified as a result. Since a replicate and MSD were performed for gross alpha/beta analysis, two measures of precision were available. The MS/MSD pair was used to evaluate gross alpha/beta precision.

### **Laboratory Control Sample (LCS)**

All LCS recoveries met QC acceptance criteria.

### **Detection Limits/Dilutions**

All required detection limits were met. No dilutions were 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 data will be qualified as a result. It should be noted that the EBs are from another SNL SDG on AR/COC# 613953.

No other specific issues that affect data quality were identified.

**Reviewed by:** Marcia Hilchey

**Date:** 02/25/12



## Memorandum

Date: February 24, 2012  
To: File  
From: Kevin Lambert  
Subject: GC/MS Organic Data Review and Validation – SNL  
Site: SWMU 68 GW Characterization  
AR/COC: 613954  
SDG: 293716  
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

Two samples were 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 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 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.

**Blanks**

No target analytes were detected in the blanks.

**Surrogates**

All surrogate recoveries met QC acceptance criteria.

**Internal Standards**

All internal standards met QC acceptance criteria

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

The MS/MSD analyses met QC acceptance criteria.

**Laboratory Control Sample (LCS)**

All LCS recoveries met QC acceptance criteria except as follows.

The LCS %R for hexachlorocyclopentadiene was < the LAL but  $\geq 10\%$ . The associated sample results were NDs. Up to four LCS recovery infractions are allowed since 64 LCS analytes were reported. Therefore, the associated sample results will not be qualified.

**Detection Limits/Dilutions**

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

**Tentatively Identified Compounds (TICs)**

TIC reports were not required.

**Other QC**

A field duplicate pair was submitted on the AR/COC(s). There are no "required" review criteria for field duplicate analyses comparability; no data will be qualified as a result. It should be noted that the EB is from another SNL SDG on AR/COC# 613953.

No other specific issues that affect data quality were identified.

**Reviewed by:** Marcia Hilchey

**Date:** 02/25/12



## Memorandum

Date: February 24, 2012  
To: File  
From: Kevin Lambert  
Subject: GC/MS Organic Data Review and Validation – SNL  
Site: SWMU 68 GW Characterization  
AR/COC: 613954  
SDG: 293716  
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

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 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

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

The initial calibration %RSD for bromoform was >15% but ≤40%. The associated sample results were NDs and no other calibration infractions occurred for this analyte. Therefore, the associated sample results will not be qualified.

### **Blanks**

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

In the EB, sample 293626-015 from another SNL SDG, associated with samples 293716-001 and -014, bromodichloromethane and chloroform were detected at concentrations > the PQL. All associated sample results were NDs and will not be qualified.

### **Surrogates**

All surrogate recoveries met QC acceptance criteria.

### **Internal Standards**

All internal standards met QC acceptance criteria.

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

The MS/MSD analyses met QC acceptance criteria. It should be noted that the MS/MSD analyses were performed on a SNL sample 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 samples were not diluted.

### **Tentatively Identified Compounds (TICs)**

TIC reports were not required.

### **Other QC**

A TB and a field duplicate pair were submitted on the AR/COC(s). There are no “required” review criteria for field duplicate analyses comparability; no data will be qualified as a result. It should be noted that the EB is from another SNL SDG on AR/COC# 613953.

No other specific issues that affect data quality were identified.

**Reviewed by:** Marcia Hilchey

**Date:** 02/25/12



## Sample Findings Summary



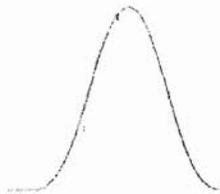
AR/COC: 613955

Page 1 of 1

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
EPA 901.1	091607-033/SWMU 68-SA4	Americium-241 (14596-10-2)	BD, Z2
	091607-033/SWMU 68-SA4	Cesium-137 (10045-97-3)	R, FR4
	091607-033/SWMU 68-SA4	Cobalt-60 (10198-40-0)	BD, FR3
	091607-033/SWMU 68-SA4	Potassium-40 (13966-00-2)	J, FR7
SW846 3535/8321A Modified	091607-024/SWMU 68-SA4	Tetryl (479-45-8)	UJ, L3
SW846 8270C	091607-002/SWMU 68-SA4	4-Nitrophenol (100-02-7)	UJ, MS3,L3
	091607-002/SWMU 68-SA4	bis(1-Chloroisopropyl)ether (108-60-1)	UJ, C3
SW846 9012B	091607-027/SWMU 68-SA4	Cyanide, Total (57-12-5)	UJ, B4

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





## Memorandum

Date: February 17, 2012  
To: File  
From: Kevin Lambert  
Subject: Inorganic Data Review and Validation – SNL  
Site: SWMU 68 GW Characterization  
AR/COC: 613955  
SDG: 293838  
Laboratory: GEL  
Project/Task: 98026.01.13  
Analysis: General Chemistry

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

### Summary

One sample was prepared and analyzed with accepted procedures using methods EPA 7196A (hexavalent chromium), EPA 9056 (anions by ion chromatography), EPA 353.2 (nitrate/nitrite by Cd reduction), EPA 314.0 (perchlorate), SM 2320B (alkalinity), and EPA 9012B (total cyanide). Data were reported for all required analytes. Problems were identified with the data package that results in the qualification of data.

1. Total Cyanide:

Total cyanide was detected in the CCB at a negative concentration with an absolute value > the MDL but ≤ the PQL. The associated sample result was an ND and will be **qualified “UJ,B4.”**

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

### Holding Times and Preservation

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

### Calibration

All initial and continuing calibration met QC acceptance criteria.

### **Blanks**

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

#### Nitrate/Nitrite:

Nitrate/Nitrite was detected in the MB at a concentration  $>$  the MDL but  $\leq$  the PQL. The associated sample result was a detect  $>5X$  the MB 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.

#### Anions and Perchlorate:

It should be noted that the MS analyses were performed on a SNL sample from another SDG. No sample data will be qualified as a result.

### **Laboratory Replicate**

The replicate met all QC acceptance criteria.

#### Anions and Perchlorate:

It should be noted that the replicate analyses were performed on a SNL sample 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 except as follows.

#### Anions:

The sample was diluted 5X for chloride and sulfate due to high concentrations for this analysis.

#### Nitrate/Nitrite:

The sample was diluted 5X due to matrix interference.

All associated batch QC samples were analyzed at dilution factors that resulted in relative dilution factors to the sample that were  $\leq 5X$ . No sample data will be qualified as a result.

### **Other QC**

No other specific issues that affect data quality were identified.

**Reviewed by:** Marcia Hilchey

**Date:** 02/20/12



## Memorandum

Date: February 17, 2012  
To: File  
From: Kevin Lambert  
Subject: LC/MS/MS Organic Data Review and Validation – SNL  
Site: SWMU 68 GW Characterization  
AR/COC: 613955  
SDG: 293838  
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 LCS %R for tetryl was < the LAL but  $\geq 10\%$ . The associated sample result was an ND and will be **qualified “UJ,L3.”**

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 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)**

The MS/MSD analyses met QC acceptance criteria

**Laboratory Control Sample (LCS)**

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

**Detection Limits/Dilutions**

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

**Other QC**

No other specific issues that affect data quality were identified.

**Reviewed by:** Marcia Hilchey

**Date:** 02/20/12



## Memorandum

Date: February 17, 2012  
To: File  
From: Kevin Lambert  
Subject: Inorganic Data Review and Validation – SNL  
Site: SWMU 68 GW Characterization  
AR/COC: 613955  
SDG: 293838  
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

Two samples were prepared and analyzed with approved procedures using methods EPA 6020 (ICP-MS metals). One sample was prepared and analyzed with approved procedures using methods EPA 6010B (ICP metals) and EPA 7470A (CVAA mercury). Data were reported for all required analytes. 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 and Preservation

The samples were 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 metals:**

Sb and Ca were detected in the MB at concentrations  $>$  the MDL but  $\leq$  the PQL. All associated sample results were either NDs or detects  $>5X$  the MB result 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.

#### **ICP-MS metals:**

It should be noted that the MS had Ca, Mg, and Na at concentrations  $>4X$  the analyte spike concentrations and the MS %R for Ca did not meet QC acceptance criteria. However, according to AOP criteria, Ca, Mg, and Na are not a required MS analytes. No sample data will be qualified as a result.

### **Laboratory Replicate**

The replicate 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. No samples were diluted except as follows.

#### **ICP-MS metals:**

Samples were diluted 5X for Ca due to over-range concentrations.

All associated batch QC samples were analyzed at dilution factors that resulted in relative dilution factors to the samples that were  $\leq 5X$ . No sample data will be qualified as a result.

### **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.

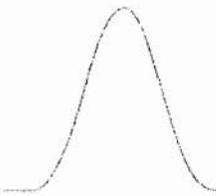
**Other QC**

No other specific issues that affect data quality were identified.

**Reviewed by:** Marcia Hilchey

**Date:** 02/20/12





## Memorandum

Date: February 17, 2012  
To: File  
From: Kevin Lambert  
Subject: Radiochemical Data Review and Validation – SNL  
Site: SWMU 68 GW Characterization  
AR/COC: 613955  
SDG: 293838  
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 – short list), EPA 900.0 (gross alpha/beta), and HASL 300, U-02-RC Mod (Alpha Spec U). Problems were identified with the data package that result in the qualification of data.

1. Gamma Spec:

The Cs-137 result was negative with an absolute value >2X the associated MDA and will be **qualified “R,FR4.”**

No valid peaks for Am-241 were identified by the laboratory and the associated MDA was bias low due to a forced activity calculation. The associated Am-241 result should be considered ND at the calculated MDA and will be **qualified “BD,Z2.”**

The Co-60 result was either < the associated 2-sigma TPU or < the associated MDA and will be **qualified “BD,FR3.”**

The K-40 result was <3X the associated MDA and 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**

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**

All tracer/carrier recoveries met QC acceptance criteria.

#### **Matrix Spike (MS)**

A MS met all QC acceptance criteria.

#### **Gross Alpha/Beta:**

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

#### **Laboratory Replicate**

All replicate error ratio acceptance criteria were met.

#### **All Analyses:**

It should be noted that the replicate analyses were performed on a SNL sample from another SDG. No sample data will be qualified as a result. Since a replicate and MSD were performed for gross alpha/beta analysis, two measures of precision were available. The MS/MSD pair was used to evaluate gross alpha/beta precision.

#### **Laboratory Control Sample (LCS)**

All LCS recoveries met QC acceptance criteria.

#### **Detection Limits/Dilutions**

All required detection limits were met. No dilutions were required.

#### **Other QC**

No other specific issues that affect data quality were identified.

**Reviewed by:** Marcia Hilchey

**Date:** 02/20/12

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## Memorandum

Date: February 17, 2012  
To: File  
From: Kevin Lambert  
Subject: GC/MS Organic Data Review and Validation – SNL  
Site: SWMU 68 GW Characterization  
AR/COC: 613955  
SDG: 293838  
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 8270C (SVOCs). All compounds were successfully analyzed. Problems were identified with the data package that result in the qualification of data.

1. The calibration verification %D for bis(2-chloroisopropyl)ether was >40% but ≤60% with negative bias. The associated sample result was an ND and will be **qualified “UJ,C3.”**
2. The MSD %R for 4-nitrophenol was < the LAL but ≥10%. The associated sample result was an ND and will be **qualified “UJ,MS3.”**
3. The LCS %R for 4-nitrophenol was <10%. 4-Nitrophenol is known to be a poor responding analyte that is subject to erratic chromatography behavior as stated in the method. This may account for the low recovery observed in the LCS, as well as in the MSD (see technical case narrative and data exception report). Therefore, based on professional judgment, the associated ND sample result will be **qualified “UJ,L3.”**

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 noted above in the summary section and as follows.

The calibration verification %Ds for 4-nitrophenol; hexachlorocyclopentadiene; and bis(2-chloroethyl)ether were >20% but ≤40% with negative bias. All associated sample results were NDs, and no other calibration infractions occurred for these analytes. Therefore, the associated sample results will not be qualified.

### **Blanks**

No target analytes were detected in the blanks.

### **Surrogates**

All surrogate recoveries met QC acceptance criteria.

### **Internal Standards**

All internal standards met QC acceptance criteria.

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

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

### **Laboratory Control Sample (LCS)**

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

### **Detection Limits/Dilutions**

All detection limits were properly reported. 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:** 02/20/12

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## Memorandum

Date: February 17, 2012  
To: File  
From: Kevin Lambert  
Subject: GC/MS Organic Data Review and Validation – SNL  
Site: SWMU 68 GW Characterization  
AR/COC: 613955  
SDG: 293838  
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

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 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

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

The initial calibration %RSD for bromoform was >15% but ≤40%. The associated sample results were NDs and no other calibration infractions occurred for this analyte. Therefore, the associated sample results will not be qualified.

### **Blanks**

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

In the FB, sample 293838-015, associated with samples -001 and -014, bromodichloromethane and dibromochloromethane were detected at concentrations > the MDL but <PQL and chloroform was a detect at a concentration > the PQL. All associated sample results were NDs and will not be qualified.

### **Surrogates**

All surrogate recoveries met QC acceptance criteria.

### **Internal Standards**

All internal standards met QC acceptance criteria.

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

The MS/MSD analyses met QC acceptance criteria. It should be noted that the MS/MSD analyses were performed on a SNL sample 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 samples were not diluted.

### **Tentatively Identified Compounds (TICs)**

TIC reports were not required.

### **Other QC**

A TB and an FB were submitted on the AR/COC(s).

No other specific issues that affect data quality were identified.

**Reviewed by:** Marcia Hilchey

**Date:** 02/20/12