Sandia National Laboratories, New Mexico

Environmental Restoration Operations

A U.S. Department of Energy Environmental Cleanup Program

Consolidated Quarterly Report

October through December 2011

April 2012

United States Department of Energy
Sandia Site Office

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CONSOLIDATED QUARTERLY REPORT

April 2012

SANDIA NATIONAL LABORATORIES, NEW MEXICO

ENVIRONMENTAL RESTORATION OPERATIONS

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

NUMBER OF POTENTIAL RELEASE SITES SUBJECT TO THIS PERMIT: 36

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

REPORTING PERIOD: **October through December 2011**

OVERVIEW

This Sandia National Laboratories, New Mexico Environmental Restoration Operations (ER) Consolidated Quarterly Report (ER Quarterly Report) addresses all quarterly reporting requirements pertaining to the Hazardous and Solid Waste Amendments (HSWA) Module of the Resource Conservation and Recovery Act Permit, the Compliance Order on Consent, and the Chemical Waste Landfill Post-Closure Care Permit. The 36 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, October – December 2011
SECTION II:	Perchlorate Screening Quarterly Monitoring Report, October – December 2011
SECTION III:	Solid Waste Management Units 149 and 154 Quarterly Groundwater Monitoring Report, October – December 2011
SECTION IV:	Solid Waste Management Units 8/58 and 68 Quarterly Groundwater Monitoring Report, October – December 2011

ABBREVIATIONS AND ACRONYMS

µg/L	microgram(s) per liter
AGMR	SNL/NM Annual Groundwater Monitoring Report
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
CMI	Corrective Measures Implementation
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)
HQ	hazard quotient
HWHF	Hazardous Waste Handling Facility
LTES	Long-Term Environmental Stewardship
LTMMP	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
OBS	Old Burn Site
ORP	oxidation-reduction potential
PCCP	Post-Closure Care Permit
pCi/L	picocurie(s) 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

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SECTION I
ENVIRONMENTAL RESTORATION OPERATIONS CONSOLIDATED QUARTERLY REPORT, OCTOBER – DECEMBER 2011

1.0 Introduction

This Environmental Restoration Operations (ER) Consolidated Quarterly Report (ER Quarterly Report) provides the status of ongoing corrective actions being implemented by Sandia National Laboratories, New Mexico (SNL/NM) ER for the October, November, and December 2011 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 October 14, 2011, the New Mexico Environment Department (NMED) approved the MWL Corrective Measures Implementation (CMI) Report, January 2010, Revision 1 (SNL/NM January 2010 and Kieling October 2011).

- Preparation of the Long-Term Monitoring and Maintenance Plan (LTMMP) began in October 2011 following the approval of the CMI Report. A meeting was held on November 21, 2011, with the NMED staff to identify and resolve remaining LTMMP issues (including final trigger levels, the evaluation process, and scope of the Five-Year Reevaluation Report).

- In December 2011, the U.S. Department of Energy and Sandia Corporation (DOE/Sandia) withdrew the 2007 MWL LTMMP (Wagner December 2011), and the withdrawal was formally accepted by the NMED (Kieling December 2011a). The revised MWL LTMMP will be submitted to the NMED within the required 180 days of CMI Report approval, no later than April 15, 2012 (Kieling October 2011).

- 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. The temporary supplemental watering system, installed from July 19 to August 2, 2011, was drained for the winter season on October 5, 2011. Future watering activities will be planned as needed to supplement natural precipitation and maintain a native plant population that meets revegetation criteria.

- A comprehensive summary report of all supplemental watering and cover maintenance activities will be presented in the revised MWL LTMMP.

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 supplemental watering and cover maintenance activities will be presented in the revised MWL LTMMP.

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, 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 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 (Technical Area [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.

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.

2.3.1 Technical Area V Groundwater

- Groundwater sampling at TA-V was conducted in November 2011. The results for the perchlorate analysis are discussed in Section II of this ER Quarterly Report; other analytical results will be presented and discussed in the SNL/NM Calendar Year (CY) 2011 Annual Groundwater Monitoring Report (AGMR) (anticipated submittal to the NMED in summer 2012).

2.3.2 Burn Site Groundwater

- Groundwater sampling for the BSG investigation was conducted in October 2011. The perchlorate analytical results are discussed in Section II of this ER Quarterly Report; other analytical results will be presented and discussed in the CY 2011 AGMR (anticipated submittal to the NMED in summer 2012).

2.3.3 Tijeras Arroyo Groundwater

- Groundwater sampling for the TAG investigation was conducted in December 2011. Analytical results will be discussed in the CY 2011 AGMR (anticipated submittal to the NMED in summer 2012).

2.3.4 Mixed Waste Landfill Groundwater

- No MWL groundwater monitoring activities were performed during this reporting period.

2.3.5 Chemical Waste Landfill Groundwater

- No CWL groundwater monitoring activities were performed during this reporting period.

2.3.6 SWMUs 8/58 Groundwater

- The groundwater monitoring well installation report for the Coyote Canyon Blast Area (CCBA) groundwater monitoring wells CCBA-MW1 and CCBA-MW2 was submitted to the NMED in November 2011 (SNL/NM November 2011).

- Groundwater sampling for SWMUs 8/58 was conducted in October and November 2011 (Figure I-1). Analytical results for this sampling event are presented in Section IV of this ER Quarterly Report. Analytical results will also be discussed in the CY 2011 AGMR (anticipated submittal to the NMED in summer 2012).

Figure I-1
Tubing Bundle from the Bennett™ Portable Sampling Pump System (photo on front cover) Lowered into a Monitoring Well for Quarterly Sampling

2.3.7 SWMU 68 Groundwater

- The groundwater monitoring well installation report for the Old Burn Site (OBS) groundwater monitoring wells OBS-MW1, OBS-MW2, and OBS-MW3 was submitted to the NMED in November 2011 (SNL/NM November 2011).

- Groundwater sampling for SWMU 68 was conducted in October 2011(Figure I-1). Analytical results for this sampling event are presented in Section IV of this ER Quarterly Report. The results for the perchlorate analysis are discussed in Section II of this ER Quarterly Report. Analytical results will also be discussed in the CY 2011 AGMR (anticipated submittal to the NMED in summer 2012).

2.3.8 SWMU 49 Groundwater

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

2.3.9 SWMU 116 Groundwater

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

2.3.10 SWMU 149 Groundwater

- Groundwater sampling for SWMU 149 was conducted in December 2011. Analytical results for this sampling event are presented in Section III of this ER Quarterly Report. The results for the perchlorate analysis are discussed in Section II of this ER Quarterly Report. Analytical results will also be discussed in the CY 2011 AGMR (anticipated submittal to the NMED in summer 2012).

2.3.11 SWMU 154 Groundwater

- Groundwater sampling for SWMU 154 was conducted in December 2011. Analytical results for this sampling event are presented in Section III of this ER Quarterly Report. The results for the perchlorate analysis are discussed in Section II of this ER Quarterly Report. Analytical results will also be discussed in the CY 2011 AGMR (anticipated submittal to the NMED in summer 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).

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

3.0 Environmental Restoration Operations/Long-Term Stewardship Work Completed

3.1 Chemical Waste Landfill

The CWL Post-Closure Care Permit (PCCP) became effective on June 2, 2011, when the NMED approved the CWL Final RCRA Closure Report (Kieling June 2011), transitioning the CWL from SNL/NM ER to LTS. A summary of post-closure care activities at the CWL for this reporting period is provided in this ER Quarterly Report. More detailed documentation of ongoing activities under the PCCP will be reported in the CWL Post-Closure Care Annual Report (due to the NMED in March 2012).

- Quarterly inspections of the CWL ET cover surface, storm-water diversion structures, and security fence were performed in November 2011. No inspection parameters required repairs.

- Because the ET cover meets successful revegetation criteria based on the September 2011 quarterly biological inspection, no biological inspection was required for this reporting period. Based on the results of the September inspection, cover vegetation inspections will now be conducted annually rather than quarterly.

- On October 18, 2011, a monitoring well plugging and abandonment plan for seven groundwater monitoring wells and one soil-gas monitoring well located at the CWL was submitted to the NMED (wells no longer needed; obsolete, dry, or otherwise not suited for compliance monitoring). The NMED approved the plan on December 12, 2011 (Kieling December 2011b).

- On November 17, 2011, DOE/Sandia submitted "Request for Modifications to Hazardous Waste Post-Closure Care Permit for Sandia National Laboratories," requesting several operational changes at the CWL (Wagner November 2011). The requested modifications affect Permit Attachments 1 through 6 of the CWL PCCP (NMED October 2009). These modifications are summarized in the CWL Post-Closure Care Annual Report (due to the NMED in March 2012).

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 (October through December 2011) include the following:

- Follow-up activities to September 2011 quarterly inspection are as follows:
    - Debris and vegetation were removed from the benchmarks on October 6, 2011.
    - Site locks were lubricated on October 6, 2011.
    - The CWL sanitary sewer protective casings and bollards were repainted on October 11, 2011.
    - Debris and vegetation were removed from the drainage grate and drainage pit on October 17, 2011.
- Quarterly monitoring of the Vadose Zone Monitoring System was conducted in December 2011. 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 October 25, 2011.

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

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

- Quarterly inspection of the site was performed on December 9 and December 22, 2011, and included the containment cell cover, storm water diversion structures, security fences, gates, signs, and benchmarks. The inspection findings are as follows:

  - Six four-wing saltbush plants were identified growing on the containment cell vegetative cover (Figure I-2). Because these plants can develop extensive root systems that could damage the high-density polyethylene fabric that is part of the cover system, the plants will be removed from the cover. Removal is scheduled for January 2012.

  - A warning sign was missing on the north perimeter fence. The sign is scheduled to be replaced in January 2012.

Figure I-2
Corrective Action Management Unit Vegetative Cover

3.2.1 CAMU Waste Management Activities

Reporting errors for CAMU Waste Management Activities (leachate waste generated) were identified in the January 2012 ER Quarterly Report for the July through September 2011 reporting period (SNL/NM January 2012). The corrected leachate waste management data for the previous reporting period (July through September 2011) are reported as follows:

- Leachate waste stored on site as of July 1, 2011:
  - 23 gallons of leachate

- Leachate waste generated on site during the period:
  - 99 gallons of leachate

- Leachate waste removed from the site by Hazardous Waste Handling Facility (HWHF) personnel on August 18, 2011:
  - 77 gallons of leachate

- Leachate waste remaining on site at the end of this period:
  - 45 gallons of leachate

Waste management data for the CAMU are reported in this section for the reporting period of October through December 2011. 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 October 1, 2011:
  - 45 gallons of leachate

- Leachate and rinsate waste generated on site during the reporting period:
  - 107 gallons of leachate
  - 2 gallons of rinsate

- Leachate and rinsate wasted removed from the site by HWHF personnel on November 7, 2011:
  - 78 gallons of leachate
  - 2 gallons of rinsate

- Leachate waste remaining on site at the end of this reporting period:
  - 74 gallons of leachate

3.2.2 CAMU Regulatory Activities

- The NMED conducted an audit of the CAMU on November 15, 2011. No findings were reported by the NMED.

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

This section lists the LTS document that has been submitted to the NMED and is, as of this reporting period, still pending review and approval:

- "Request for Modification to Hazardous Waste Post-Closure Care Permit for Sandia National Laboratories," submitted to the NMED on November 17, 2011 (Wagner November 2011)

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), December 2011a. Letter to P. Wagner (U.S. Department of Energy NNSA/Sandia Site Office) and S.A. Orrell (Sandia National Laboratories/New Mexico), "Withdrawal of Mixed Waste Landfill Long-Term Monitoring and Maintenance Plan, Sandia National Laboratories, EPA ID# NM5890110518, HWB-SNL-07-017," December 21, 2011.

Kieling, J.E. (New Mexico Environment Department), December 2011b. Letter to P. Wagner (U.S. Department of Energy NNSA/Sandia Site Office) and S.A. Orrell (Sandia National Laboratories/New Mexico), "Approval Chemical Waste Landfill Monitoring Well Plugging and Abandonment Plan, Decommissioning of Groundwater Monitoring Wells CWL-MW1A, CWL-MW2BU, CWL-MW2BL, CWL-MW3A, CWL-MW7, CWL-MW8, CWL-BW3, and Vapor Monitoring Well CWL-UI3, September 2011, Sandia National Laboratories, EPA ID# NM5890110518, HWB-SNL-11-014," December 12, 2011.

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. "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), January 2012. “Environmental Restoration Operations Consolidated Quarterly Report, July through September 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.”

Wagner, P. (U.S. Department of Energy NNSA/Sandia Site Office), December 2011. Letter to J. Kieling (New Mexico Environment Department), withdrawing the September 2007 Mixed Waste Landfill Long-Term Monitoring and Maintenance Plan, December 7, 2011.

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SECTION II
PERCHLORATE SCREENING QUARTERLY MONITORING REPORT, OCTOBER – DECEMBER 2011

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) 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 report summarizes the perchlorate screening monitoring completed during the Fourth Quarter of Calendar Year (CY) 2011 (October, November, and December 2011) 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 will remain at a semiannual frequency for sampling and reporting.

This report is the twenty-fourth to be submitted since the November 2005 letter report; the previous reports were submitted for Fourth Quarter of CY 2005 through the Third 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 2011a, and January 2012).

Groundwater at BSG monitoring well CYN-MW6 has been sampled 18 times; Coyote Test Field (CTF) wells CTF-MW2 and CTF-MW3 have been sampled four times; Technical Area (TA)-V wells TAV-MW11, TAV-MW12, TAV-MW13, and TAV-MW14 have been sampled four times; Solid Waste Management Unit (SWMU) 8/58 wells CCBA-MW1 and CCBA-MW2 have been sampled one time; and SWMU 68 wells OBS-MW1, OBS-MW2, and OBS-MW3 have been sampled one time. (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 analytical results for the Fourth Quarter of CY 2011 (October, November, and December 2011) for the wells currently active in the perchlorate-screening program as shown on Figure II-1 and listed in Table II-1. In accordance with the requirements of Table XI-1 of the Order, a well with four consecutive quarters of nondetects (NDs) for perchlorate at the screening level/method detection limit (MDL) of 4 micrograms per liter (µg/L) is removed from the requirement of continued monitoring for perchlorate. Data for numerous wells identified in the Order have satisfied this requirement; therefore, these wells have been removed from the perchlorate-screening program. The perchlorate results for these wells have been provided in previous reports and are not discussed in this current report. Wells discussed in previous perchlorate-screening reports include the following: CYN-MW1D, CYN-MW5 (recently reinstated), CYN-MW7, CYN-MW8, CYN-MW9, CYN-MW10, CYN-MW11, CYN-MW12, LWDS-MW1, MRN-2, MRN-3D, MWL-BW1, MWL-BW2, MWL-MW1, MWL-MW7, MWL-MW8, MWL-MW9, NWTA3-MW2, SWTA3-MW4, TA1-W-03, TA1-W-06, TA1-W-08, TA2-W-01, and TA2-W-27.

SNL/NM personnel performed groundwater sampling at 12 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:

- “TA-V Groundwater Monitoring, Mini-SAP for First Quarter, Fiscal Year 2012” (SNL/NM October 2011b)

- “Burn Site Groundwater Monitoring, Mini-SAP for First Quarter, Fiscal Year 2012” (SNL/NM September 2011a)

- “SWMUs 8/58 Groundwater Monitoring, Mini-SAP for First Quarter, Fiscal Year 2012” (SNL/NM September 2011b)

- “SWMU 68 Groundwater Monitoring, Mini-SAP for First Quarter, Fiscal Year 2012” (SNL/NM September 2011c)

- “SWMU 149 Groundwater Monitoring, Mini-SAP for First Quarter, Fiscal Year 2012” (SNL/NM November 2011a).

- “SWMU 154 Groundwater Monitoring, Mini-SAP for First Quarter, Fiscal Year 2012” (SNL/NM November 2011b).

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 installation into monitoring wells in accordance with procedures described in FOP 05-03, “LTES Groundwater Sampling Equipment Decontamination” (SNL/NM August 2007a). With the exception of CYN-MW6, 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 August 2007b). Well CYN-MW6 is a low-yield monitoring well and was purged dry and allowed to recover before sampling to ensure a representative groundwater sample.

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 620 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%.

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 March 2007, DOE/Sandia received a letter of approval from the NMED, which stated the requirement that DOE/Sandia "determine the nature and extent of the contamination and complete a CME for the perchlorate-impacted groundwater in the vicinity of CYN-MW6" (NMED March 2007). As this was based solely on the four quarters of monitoring results, DOE/Sandia submitted a letter to the NMED in April 2007 (SNL/NM April 2007), which recommended further characterization through continued quarterly monitoring of CYN-MW6 for four additional quarters, ending in December 2007, to ensure appropriate characterization of this well. In January 2008, DOE/Sandia requested a meeting with the

NMED to discuss the need for continued monitoring or additional characterization work and, potentially, a CME.

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

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

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

In April 2009, DOE/Sandia received a letter from the NMED requiring DOE/Sandia to characterize the nature and extent of the perchlorate contamination in soil and groundwater in the BSG study area (NMED April 2009). A characterization work plan was prepared and submitted to the NMED (SNL/NM November 2009), approved by the NMED (February 2010), and implemented in July 2010. 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 TA-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 Fourth Quarter of CY 2011 perchlorate data is included as Appendix A. No perchlorate was detected above the screening level in any samples collected from the newly installed wells CCBA-MW1, CCBA-MW2, OBS-MW1, OBS-MW2, or OBS-MW3. Consistent with historical analytical results, no perchlorate was detected above the screening level in any samples collected from CTF-MW2, CTF-MW3, TAV-MW11, TAV-MW12, TAV-MW13, or TAV-MW14. Also consistent with historical analytical results, perchlorate was detected above the screening level/MDL of 4 µg/L in the sample from CYN-MW6.

As shown on Figure II-2, the October 2011 perchlorate concentration reported for well CYN-MW6 is 6.38 µg/L, which is consistent with the average concentration detected since sampling began in March 2006. The hydrograph for well CYN-MW6 (Figure II-2) shows that the water table is rapidly declining.

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 included as Appendix B.

No variances or nonconformances in field activities or field conditions from requirements in the groundwater monitoring Mini-SAPs (SNL/NM September 2011a, September 2011b, September 2011c; October 2011b; and November 2011a and 2011b) were identified during the Fourth Quarter of CY 2011 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-MW2, CTF-MW3, OBS-MW1, OBS-MW2, or OBS-MW3 at the screening level/MDL of 4 μg/L.

- No perchlorate has been detected during four consecutive quarterly sampling events in samples from TAV-MW11, TAV-MW12, TAV-MW13, or TAV-MW14, so these monitoring wells will be removed from the perchlorate screening well network.

- 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.

- The perchlorate concentration for well CYN-MW6 for the Fourth Quarter of CY 2011 sampling event is 6.38 μg/L, which is consistent with the average concentration reported since the inception of perchlorate sampling at well CYN-MW6 in March 2006 (Figure II-2).

- A human health risk assessment was performed to evaluate the potential for adverse health effects from the concentrations of perchlorate detected in CYN-MW6 groundwater samples. The maximum concentration of perchlorate in CYN-MW6 samples to date (8.93 μg/L) was used in the assessment. The calculated HQ of 0.35 is less than the NMED target level of a hazard index (the sum of all HQs) of 1.0 (NMED June 2006 and SNL/NM March 2008).

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) June 2006. “Technical Background Document for Development of Soil Screening Levels, Revision 4.0,” New Mexico Environment Department, Hazardous Waste Bureau and Ground Water Quality Bureau Voluntary Remediation Program, Santa Fe, New Mexico.

New Mexico Environment Department (NMED), March 2007. “RE: Notice of Approval: Perchlorate Screening Quarterly Monitoring Report, Second Quarter of Calendar Year 2006 (April, May, and June), September 20, 2006, Sandia National Laboratories, EPA ID# NM5890110518, HWB-SNL-06-011.” Letter to P. Wagner (SSO/NNSA) and P. Davies (SNL/NM) from J. Bearzi (NMED/HWB), March 23, 2007.

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.

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) April 2007. Letter to J. Bearzi (New Mexico Environment Department [NMED] Hazardous Waste Bureau) from P. Wagner (Sandia Site Office/NNSA), “Response to NMED approval letter of March 23, 2007, entitled *RE: Notice of Approval: Perchlorate Screening Quarterly Monitoring Report, Second Quarter of Calendar Year 2006 (April, May, and June) September 20, 2006. Sandia National Laboratories, EPA ID# NM5890110518. HWB-SNL-06-011*,” Environmental Restoration Project, Sandia National Laboratories, New Mexico, April 19, 2007.

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), August 2007a. “Long-Term Environmental Stewardship (LTES) Groundwater Sampling 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), August 2007b. “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 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, Collection of Subsurface Soil Samples, November 2009,” Environmental Restoration Project, 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 2009 through September 2009)," Environmental Restoration Project, 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 Project, 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 Project, 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 Project, 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 Project, 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 2011a. “Burn Site Groundwater Monitoring, Mini-Sampling and Analysis Plan (SAP) for First Quarter, Fiscal Year 2012,” Environmental Restoration Operations, Sandia National Laboratories, New Mexico.

Sandia National Laboratories, New Mexico (SNL/NM), September 2011b. “SWMUs 8/58 Groundwater Monitoring, Mini-SAP for First Quarter, Fiscal Year 2012,” Environmental Restoration Operations, Sandia National Laboratories, New Mexico.

Sandia National Laboratories, New Mexico (SNL/NM), September 2011c. “SWMU 68 Groundwater Monitoring, Mini-SAP for First Quarter, Fiscal Year 2012,” Environmental Restoration Operations, Sandia National Laboratories, New Mexico.

Sandia National Laboratories, New Mexico (SNL/NM), October 2011a. “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), October 2011b. “TA-V Groundwater Monitoring, Mini-Sampling and Analysis Plan (SAP) for First Quarter, Fiscal Year 2012,” Environmental Restoration Operations, Sandia National Laboratories, New Mexico.

Sandia National Laboratories, New Mexico (SNL/NM), November 2011a. “SWMU 149 Groundwater Monitoring, Mini-SAP for First Quarter, Fiscal Year 2012,” Environmental Restoration Operations, Sandia National Laboratories, New Mexico.

Sandia National Laboratories, New Mexico (SNL/NM), November 2011b. “SWMU 154 Groundwater Monitoring, Mini-SAP for First Quarter, Fiscal Year 2012,” Environmental Restoration Operations, Sandia National Laboratories, New Mexico.

Sandia National Laboratories, New Mexico (SNL/NM), January 2012. “Consolidated Quarterly Report, July through September 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

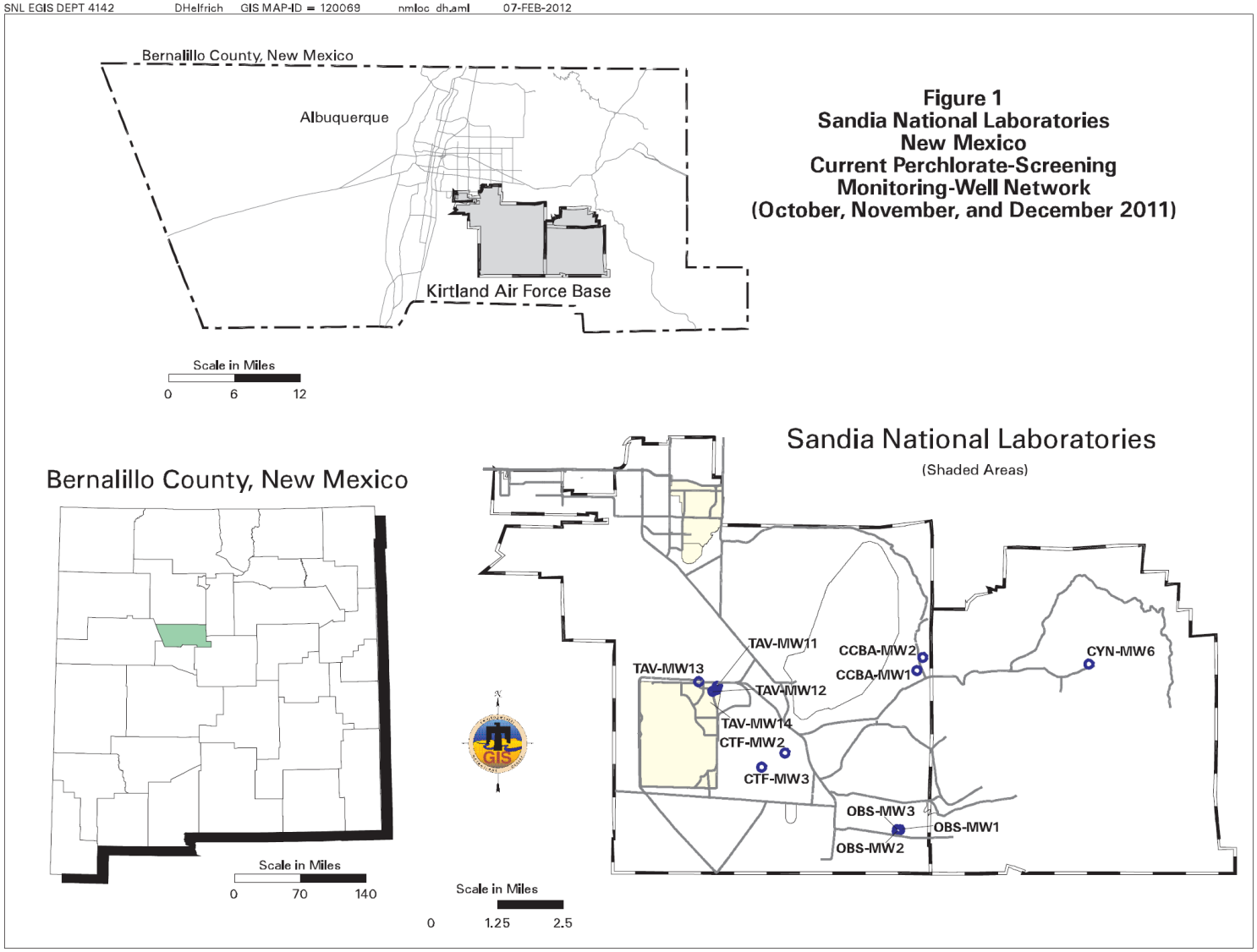

Figure II-1

Sandia National Laboratories, New Mexico

Current Perchlorate-Screening Monitoring-Well Network, October – December 2011

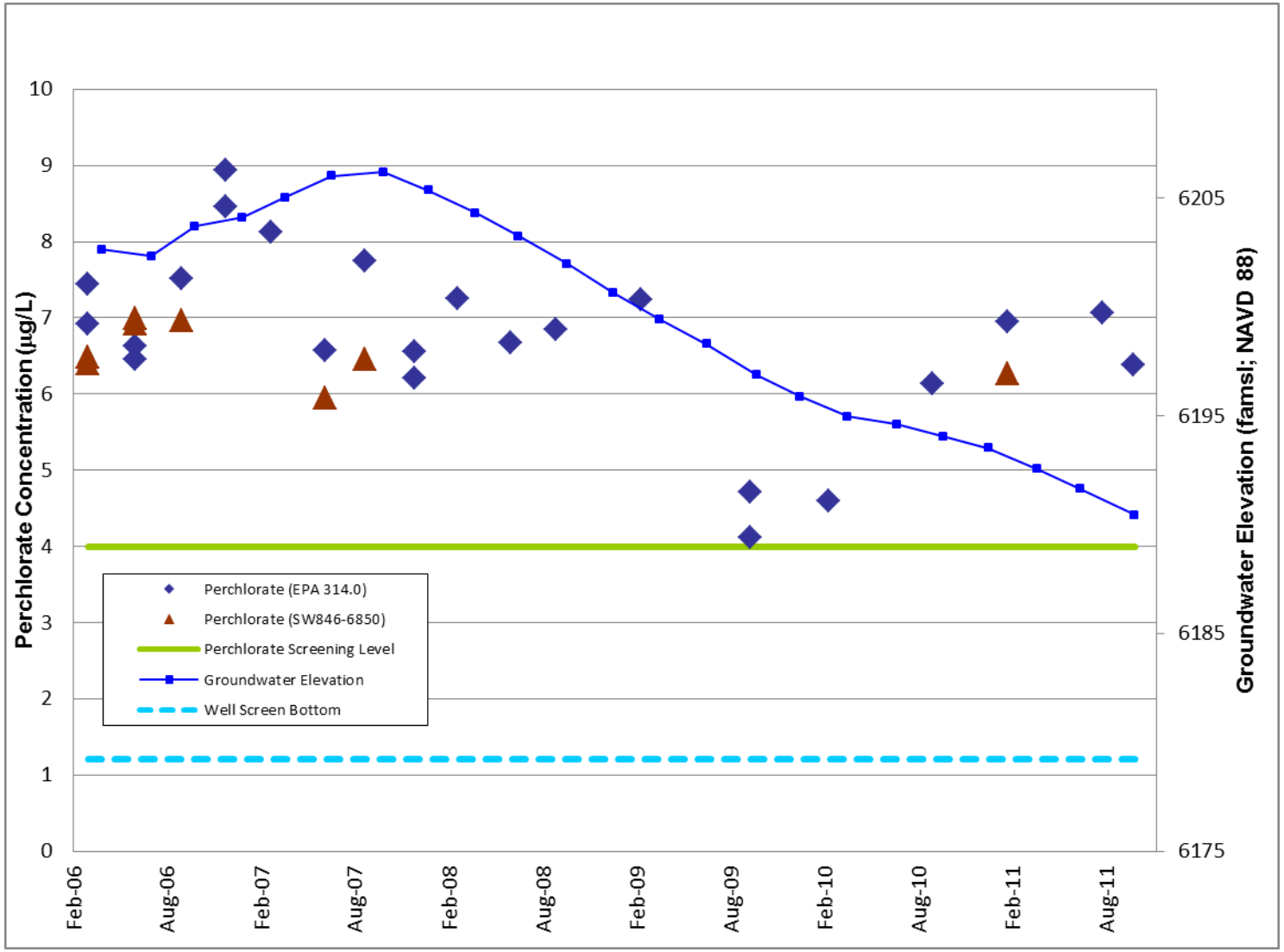

Figure II-2

Groundwater Elevations and Perchlorate Concentrations over Time in CYN-MW6

Tables

Table II-1
Current Perchlorate Screening Monitoring Well Network
Fourth Quarter, CY 2011
(October – December 2011)

Well	Date Sampled	Number of Consecutive Sampling Events[a]	Remaining Number of Sampling Events[b]	Sampling Equipment
CCBA-MW1	31-Oct-11	1	7	Bennett™ Pump
CCBA-MW2	01-Nov-11	1	7	Bennett™ Pump
CTF-MW2	09-Dec-11	4	4	Bennett™ Pump
CTF-MW3	08-Dec-11	4	4	Bennett™ Pump
CYN-MW6	17-Oct-11	18	TBD[c]	Bennett™ Pump
OBS-MW1	25-Oct-11	1	7	Bennett™ Pump
OBS-MW2	26-Oct-11	1	7	Bennett™ Pump
OBS-MW3	24-Oct-11	1	7	Bennett™ Pump
TAV-MW11	10-Nov-11	4	0	Bennett™ Pump
TAV-MW12	28-Nov-11	4	0	Bennett™ Pump
TAV-MW13	07-Nov-11	4	0	Bennett™ Pump
TAV-MW14	22-Nov-11	4	0	Bennett™ Pump

Notes

[a]Includes this sampling event.
[b]Per the requirements of Table XI-1 of the Order (NMED April 2004), a well will be removed from the perchlorate-screening monitoring well network after four quarters unless perchlorate is detected above the screening level/MDL of 4 µg/L. 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.
[c]TBD = To be determined. This well has been sampled for the required initial four quarters. Because perchlorate concentrations in this well have exceeded the screening level, DOE/Sandia and the NMED have agreed to further characterization requirements in the BSG study area (NMED February 2010).

µg/L = Microgram(s) per liter.
BSG = Burn Site Groundwater.
CCBA = Coyote Canyon Blast Area.
CTF = Coyote Test Field.
CY = Calendar Year.
CYN = Canyons (Burn Site).
DOE = U.S. Department of Energy.
MDL = Method detection limit.
MW = Monitoring well.
NMED = New Mexico Environment Department.
OBS = Old Burn Site.
Sandia = Sandia Corporation.
TAV = Technical Area V.

Table II-2
Sample Details for Fourth Quarter, CY 2011 Perchlorate Sampling

Well	Sample Identification	AR/COC Number	Associated Groundwater Investigation
CCBA-MW1	091345-020	613883	SWMU 8/58
CCBA-MW2	091349-020 091350-020	613885	SWMU 8/58
CTF-MW2	091525-020	613929	SWMU 154
CTF-MW3	091523-020	613928	SWMU 149
CYN-MW6	091320-020	613871	BSG
OBS-MW1	091335-020	613879	SWMU 68
OBS-MW2	091337-020	613880	SWMU 68
OBS-MW3	091342-020 091343-020	613882	SWMU 68
TAV-MW11	091416-020 091417-020	613903	TAV
TAV-MW12	091436-020	613911	TAV
TAV-MW13	091408-020	613899	TAV
TAV-MW14	091433-020	613910	TAV

Notes

AR/COC = Analysis Request/Chain of Custody.
BSG = Burn Site Groundwater.
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.
TAV = Technical Area V.

Table II-3
Summary of Perchlorate Screening Analytical Results for the Current Monitoring Well Network as of Fourth Quarter, CY 2011

Well ID	Sample Date	AR/COC No.	Sample No.	Perchlorate Result[a] (µg/L)	MDL[b] (µg/L)	PQL[c] (µg/L)	MCL[d] (µg/L)	Laboratory Qualifier[e]	Validation Qualifier[f]	Analytical Method[g]	Comments
CCBA-MW1	31-Oct-11	613883	091345-020	ND	4.0	12	NE	U		EPA 314.0	
CCBA-MW2	01-Nov-11	613885	091349-020	ND	4.0	12	NE	U		EPA 314.0	
			091350-020	ND	4.0	12	NE	U		EPA 314.0	Duplicate sample
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	
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	
CYN-MW6	23-Mar-06	609578	075985-020	**6.92**	4.0	12	NE	J		EPA 314.0	
			075986-020	**7.44**	4.0	12	NE	J		EPA 314.0	Duplicate sample
			075985-R20	**6.39**	0.50	2.0	NE	Hh	HT, J	EPA 6850M	Verification/Reanalysis
			075986-R20	**6.48**	0.50	2.0	NE	Hh	HT, J	EPA 6850M	Verification/Reanalysis
	22-Jun-06	609929	078687-020	**6.63**	4.0	12	NE	J		EPA 314.0	
			078688-020	**6.45**	4.0	12	NE	J		EPA 314.0	Duplicate sample
			078687-021	**6.99**	1.0	4.0	NE			EPA 6850M	Verification
			078688-021	**6.92**	1.0	4.0	NE			EPA 6850M	Verification/Duplicate Sample
	20-Sep-06	610652	081626-020	**7.52**	4.0	12	NE	J		EPA 314.0	
			081626-R20	**6.96**	1.0	4.0	NE		P2	EPA 6850M	Verification/Reanalysis
	15-Dec-06	611057	083858-020	**8.46**	4.0	12	NE	J		EPA 314.0	
			083859-020	**8.93**	4.0	12	NE	J		EPA 314.0	Duplicate sample
	14-Mar-07	611200	084237-020	**8.12**	4.0	12	NE	J		EPA 314.0	
	27-Jun-07	611399	084833-020	**6.57**	4.0	12	NE	J	J-, X1	EPA 314.0	
			084833-R20	**5.94**	0.5	2.0	NE			EPA 6850M	Verification/Reanalysis
	12-Sep-07	611581	085249-020	**7.74**	4.0	12	NE	J		EPA 314.0	
			085249-R20	**6.46**	0.5	2.0	NE	Hh	J	EPA 6850M	Verification/Reanalysis
	18-Dec-07	611668	085446-020	**6.20**	4.0	12	NE	J		EPA 314.0	
			085447-020	**6.56**	4.0	12	NE	J		EPA 314.0	Duplicate sample
	10-Mar-08	611749	085661-020	**7.25**	4.0	12	NE	J		EPA 314.0	
	23-Jun-08	611912	086280-020	**6.67**	4.0	12	NE	J		EPA 314.0	
	17-Sep-08	612004	086782-020	**6.85**	4.0	12	NE	J		EPA 314.0	
	02-Mar-09	612120	087047-020	**7.24**	4.0	12	NE	J		EPA 314.0	

Refer to footnotes at end of table.

Table II-3 (Continued)
Summary of Perchlorate Screening Analytical Results for the Current Monitoring-Well Network, as of Fourth Quarter, CY 2011

Well ID	Sample Date	AR/COC No.	Sample No.	Perchlorate Result[a] (µg/L)	MDL[b] (µg/L)	PQL[c] (µg/L)	MCL[d] (µg/L)	Laboratory Qualifier[e]	Validation Qualifier[f]	Analytical Method[g]	Comments
CYN-MW6 (Continued)	30-Sep-09	612392	087734-020	**4.12**	4.0	12	NE	J	J-	EPA 314.0	
			087735-020	**4.71**	4.0	12	NE	J	J-	EPA 314.0	Duplicate sample
	03-Mar-10	612580	088180-020	**4.59**	4.0	12	NE	J		EPA 314.0	
	20-Sep-10	613279	089659-020	**6.14**	4.0	12	NE	J		EPA 314.0	
	14-Feb-11	613413	090000-020	**6.95**	4.0	12	NE	J	J-	EPA 314.0	
				6.26	0.5	2.0	NE	Hh		EPA 6850M	Verification/Reanalysis
	18-Aug-11	613723	091035-020	**7.06**	4.0	12	NE	J		EPA 314.0	
	17-Oct-11	613871	091320-020	**6.38**	4.0	12	NE	J		EPA 314.0	
OBS-MW1	25-Oct-11	613879	091335-020	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	
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
TAV-MW11	06-Jan-11	613384	089917-020	ND	4.0	12	NE	U		EPA 314.0	
	18-Apr-11	613524	090435-020	ND	4.0	12	NE	U		EPA 314.0	
	08-Jul-11	613625	090822-020	ND	4.0	12	NE	U		EPA 314.0	
	10-Nov-11	613903	091416-020	ND	4.0	12	NE	U		EPA 314.0	
			091417-020	ND	4.0	12	NE	U		EPA 314.0	Duplicate sample
TAV-MW12	19-Jan-11	613392	089935-020	ND	4.0	12	NE	U		EPA 314.0	
	20-Apr-11	613527	090442-020	ND	4.0	12	NE	U		EPA 314.0	
			090443-020	ND	4.0	12	NE	U		EPA 314.0	Duplicate sample
	15-Jul-11	613631	090837-020	ND	4.0	12	NE	U		EPA 314.0	
	28-Nov-11	613911	091436-020	ND	4.0	12	NE	U		EPA 314.0	
TAV-MW13	10-Jan-11	613386	089921-020	ND	4.0	12	NE	U		EPA 314.0	
			089922-020	ND	4.0	12	NE	U		EPA 314.0	Duplicate sample
	06-Apr-11	613516	090417-020	ND	4.0	12	NE	U		EPA 314.0	
	05-Jul-11	613621	090813-020	ND	4.0	12	NE	U		EPA 314.0	
	07-Nov-11	613899	091408-020	ND	4.0	12	NE	U		EPA 314.0	
TAV-MW14	20-Jan-11	613393	089938-020	ND	4.0	12	NE	U		EPA 314.0	
	21-Apr-11	613528	090445-020	ND	4.0	12	NE	U		EPA 314.0	
	14-Jul-11	613630	090834-020	ND	4.0	12	NE	U		EPA 314.0	
			090835-020	ND	4.0	12	NE	U		EPA 314.0	Duplicate sample
	22-Nov-11	613910	091433-020	ND	4.0	12	NE	U		EPA 314.0	

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.

Table II-3 (Concluded)
Summary of Perchlorate Screening Analytical Results for the Current Monitoring-Well Network, as of Fourth Quarter, CY 2011

Notes (Continued)

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

[a]Result
Values in **bold** exceed the screening level/MDL
ND = Not detected (at MDL).
µg/L = Micrograms per liter.

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

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

[d]MCL
Maximum contaminant level. Established by the U.S. Environmental Protection Agency Primary Water Regulations (40 CFR 141.11, Subpart B) and subsequent amendments or Title 20, Chapter 7, Part 1 of the New Mexico Administrative Code, incorporating 40 CFR 141.
NE = Not established.

[e]Laboratory Qualifier
H = Analytical holding time was exceeded.
h = Preparation holding time was exceeded.
J = Amount detected is below the practical quantitation limit.
U = Analyte is absent or below the method detection limit.

[f]Validation Qualifier
If cell is blank, then all quality control samples meet acceptance criteria with respect to submitted samples and no qualifier was assigned.
HT = The holding time was exceeded for the associated sample analysis.
J = The associated value is an estimated quantity.
J- = The associated value is an estimated quantity with a suspected negative bias.
P2 = Insufficient quality control data to determine laboratory precision.
X1 = General data quality is suspect.

[g]Analytical Method
EPA 314.0: U.S. Environmental Protection Agency, November 1999, “Perchlorate in Drinking Water Using Ion Chromatography,” EPA 815/R-00-014 (EPA November 1999).
EPA 6850M: U.S. Environmental Protection Agency, April 2005, “Perchlorate in Water, Soils, and Solids Using High Performance Liquid Chromatography/Electrospray Ionization/Mass Spectrometry (HPLC/ESI/MS),” draft, Method 6850 (EPA April 2005).

Table II-4
Perchlorate Screening Groundwater Monitoring
Field Water Quality Measurements[a], Fourth Quarter, CY 2011

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	31-Oct-11	15.16	564	420.7	6.51	0.35	25.3	2.52
CCBA-MW2	01-Nov-11	16.84	694	386.6	7.34	3.91	53.8	5.17
CTF-MW2	09-Dec-11	14.85	4021	135.3	5.44	1.96	2.3	0.23
CTF-MW3	08-Dec-11	17.07	1847	414.8	6.72	0.54	70.4	6.69
CYN-MW6	17-Oct-11	15.36	1145	391.5	7.15	1.27	18.9	1.89
OBS-MW1	25-Oct-11	17.63	598	384.7	7.26	2.78	38.2	3.58
OBS-MW2	26-Oct-11	17.37	606	384.4	7.29	0.79	37.3	3.57
OBS-MW3	24-Oct-11	16.74	602	388.4	7.25	0.55	40.7	3.94
TAV-MW11	10-Nov-11	18.91	622	385.9	7.35	0.51	70.4	6.51
TAV-MW12	28-Nov-11	19.66	663	388.8	7.27	0.66	58.3	5.32
TAV-MW13	07-Nov-11	19.68	583	377.2	7.33	1.08	23.2	2.12
TAV-MW14	22-Nov-11	19.11	729	387.9	7.28	0.61	67.0	6.18

Notes

[a]Field measurements obtained immediately before the groundwater sample was collected.
°C = Degrees Celsius.
% Sat = Percent saturation.
µmhos/cm = Micromhos per centimeter.
CCBA = Coyote Canyon Blast Area.
CTF = Coyote Test Field.
CY = Calendar Year.
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).
TAV = Technical Area V.

Appendix A
Analytical Laboratory Certificates of Analysis for the Perchlorate Data

CONTRACT LABORATORY
ANALYSIS REQUEST AND CHAIN OF CUSTODY

Internal Lab

Page 1 of 1

Batch No. N/A

SMO Use

AR/COC 613871

Dept. No./Mail Stop:	4142/MS1126	Date Samples Shipped:	10/17/11	Project/Task No.146422.10.11.01	☐ Waste Characterization
Project/Task Manager:	Don Schofield	Carrier/Waybill No.	330099	SMO Authorization: SMO	-Send preliminary/copy report to:
Project Name:	Burn Site GWM	Lab Contact:	Edie Kent/803-556-8171	Contract #: PO 691436	☐ Released by COC No.:_____
Record Center Code:	ER/1333/DAT	Lab Destination:	GEL		☑ Validation Required
Logbook Ref. No.:	ER 058	SMO Contact/Phone:	Lorraine Herrera/505-844-3199	SEE BOTTLE ORDER	Bill To: Sandia National Labs (Accounts Payable)
Service Order No.	CF058-12	Send Report to SMO:			P.O. Box 5800 MS 0154
Location	Tech Area				Albuquerque, NM 87185-0154
Building	Room				288246

Reference LOV(available at SMO)

Sample No.-Fraction	ER Sample ID or Sample Location Detail	Pump Depth (ft)	ER Site No.	Date/Time(hr) Collected	Sample Matrix	Container Type	Container Volume	Preserv-ative	Collection Method	Sample Type	Parameter & Method Requested	Lab Sample ID
091320-005	CYN-MW6	164	NA	101711\0836	GW	AG	4x1 L	4C	G	SA	TPH DRO (SW846-8015A/B) SVOC	001 .1
091320-006	CYN-MW6	164	NA	101711\0834	GW	AG	3x40 ml	4C	G	SA	TPH GRO (SW846-8015A/B) VOC	002 .2
091320-018	CYN-MW6	164	NA	101711\0837	GW	P	125 ml	H2SO4	G	SA	NPN (353.2)	003 .3
091320-020	CYN-MW6	164	NA	101711\0838	GW	P	250 ml	4C	G	SA	Perchlorate (314.0)	004 .4
091321-006	CYN-TB14	NA	NA	101711\0834	DIW	AG	3x40 ml	4C	G	TB	TPH GRO (SW846-8015A/B) VOC	005 .2

RMMA ☐ Yes ☑ No Ref. No.

Sample Disposal ☐ Return to Client ☑ Disposal by lab

Turnaround Time ☐ 7 Day ☐ 15 Day ☑ 30 Day

Return Samples By: ☐ Negotiated TAT

Sample Tracking — Smo Use
Date Entered(mm/dd/yy)
Entered by:
QC Inits.

Special Instructions/QC Requirements
EDD ☑ Yes ☐ No
Level D Package ☐ Yes ☑ No
*Send report to:
Tim Jackson/Org.4142/MS 0756/505-284-2547
*Please list as separate report.

Abnormal Conditions on Receipt

Lab Use

Sample Team Members	Name	Signature	Init	Company/Organization/Phone/Cellular
	William J Gibson			SNL/4142/844-4013/239-7367
	Robert Lynch			SNL/4142/844-4013/250-7090
	Alfred Santillanes			SNL/4142/844-5130/228-0710

1.Relinquished by	Org. 4142	Date 10/17/11	Time 0912	4.Relinquished by	Org.	Date	Time
1. Received by SMO	Org. 4142	Date 10/17/11	Time 0912	4. Received by	Org.	Date	Time
2.Relinquished by SMO	Org. 4142	Date 10/17/11	Time 1115	5.Relinquished by	Org.	Date	Time
2. Received by	Org. GEL	Date 10-18-11	Time 0820	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

GEL LABORATORIES LLC

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

Certificate of Analysis

Report Date: November 15, 2011

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:	091320-020	Project:	SNLSGWater
Sample ID:	288246004	Client ID:	SNLS003
Matrix:	AQUEOUS		
Collect Date:	17-OCT-11 08:38		
Receive Date:	18-OCT-11	Client Desc.:	CYN-MW6
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	J	0.00638	0.004	0.012	mg/L	1	MAR1	11/01/11	1327	1154805	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. N/A

Page 1 of 2

AR/COC 613879

SMO Use

Dept. No./Mail Stop:	6234/MS 0718	Date Samples Shipped:	10/25/11	Project/Task No.	98026.01.13
Project/Task Manager:	Alicia Aragon	Carrier/Waybill No.	133520	SMO Authorization	
Project Name:	SWMU 68	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		
Service Order No.	CF263-12	Send Report to SMO:			
Location	Tech Area				
Building	Room				

SOS bottle order

☐ 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

Reference LOV(available at SMO)

Sample No.-Fraction	ER Sample ID or Sample Location Detail	Depth (ft)	ER Site No.	Date/Time(hr) Collected	Sample Matrix	Container Type	Container Volume	Preservative	Collection Method	Sample Type	Parameter & Method Requested	Lab Sample ID
091335-001	OBS-MW1	154	NA	10/25/11 0949	GW	G	3x40ml	HCL	G	SA	TCL VOC (SW846-8260B)	045
091335-002	OBS-MW1	154	NA	10/25/11 0951	GW	AG	4x1L	4C	G	SA	TCL SVOC (SW846-8270C)	046
091335-009	OBS-MW1	154	NA	10/25/11 0952	GW	P	500 ml	HNO3	G	SA	TAL Metals+ Ur (SW846-6020/7470)	047
091335-014	OBS-MW1	154	NA	10/25/11 0953	GW	P	250 ml	4C	G	SA	Hexavalent Chromium (SW846-7196A)	048
091335-016	OBS-MW1	154	NA	10/25/11 0954	GW	P	125 ml	4C	G	SA	Anions (SW846-9056)	049
091335-017	OBS-MW1	154	NA	10/25/11 0955	FGW	P	250 ml	HNO3	G	SA	Cations (SW846-6020)	050
091335-018	OBS-MW1	154	NA	10/25/11 0956	GW	P	125 ml	H2SO4	G	SA	NPN (353.2)	051
091335-020	OBS-MW1	154	NA	10/25/11 0957	GW	P	250 ml	4C	G	SA	Perchlorate (314.0)	052
091335-022	OBS-MW1	154	NA	10/25/11 0958	GW	P	500 ml	4C	G	SA	Alkalinity (SM2320B)	053
091335-024	OBS-MW1	154	NA	10/25/11 1001	GW	AG	4x1L	4C	G	SA	High Explosive (SW846-8321A) Mod.	054
091335-027	OBS-MW1	154	NA	10/25/11 1002	GW	P	250 ml	NaOH	G	SA	Total Cyanide (SW846-9012)	055

RMMA ☐ Yes ☑ No Ref. No.

Sample Disposal ☐ Return to Client ☑ Disposal by lab

Turnaround Time ☐ 7 Day ☐ 15 Day ☑ 30 Day

Return Samples By: ☐ Negotiated TAT QC inits.

Sample Tracking Smo Use
Date Entered(mm/dd/yy)
Entered by:

Special Instructions/QC Requirements
EDD ☑ Yes ☐ No
Level D Package ☐ Yes ☑ No
*Send report to:
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,Fl,Cl,SO4
FGW (filtered in field with .45 micron filter)
*Please list as separate report.

Abnormal Conditions on Receipt

Lab Use

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

1.Relinquished by	Org. 4142	Date 10/25/11	Time 1047	4.Relinquished by	Org.	Date	Time
1. Received by	Org. 4143	Date 10/25/11	Time 1047	4. Received by	Org.	Date	Time
2.Relinquished by	Org. 4142	Date 10/25/11	Time 1145	5.Relinquished by	Org.	Date	Time
2. Received by	Org.	Date 10/26/11	Time 0755	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

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

AR/COC- 613879

Project Name:	SWMU 68	Project/Task Manger:	Alicia Aragon	Project/Task No.:	98026.01.13
Location	Tech Area				
Building	Room				

Reference LOV (available at SMO)

Sample No-Fraction	ER Sample ID or Sample Location detail	Pump Depth (ft)	ER Site No.	Date/Time (hr) Collected	Sample Matrix	Container Type	Container Volume	Preserv-ative	Collection Method	Sample Type	Parameter & Method Requested	Lab use Lab Sample ID
091335-033	OBS-MW1	154	NA	10/25/11 1004	GW	P	1 L	HNO3	G	SA	Gamma Spec (short list)(901.0)	056
091335-034	OBS-MW1	154	NA	10/25/11 1005	GW	P	1 L	HNO3	G	SA	Gross Alpha/Beta (900.0)	057
091335-035	OBS-MW1	154	NA	10/25/11 1006	GW	P	1 L	HNO3	G	SA	Isotopic Ur (ASTM D3972-09M)	058
091336-001	OBS-TB1	NA	NA	10/25/11 0949	DIW	G	3x40ml	HCL	G	TB	VOC (SW846-8260B)	059

Abnormal Conditions on Receipt LAB USE

Recipient Initials DBC

GEL LABORATORIES LLC

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

Certificate of Analysis

Report Date: November 25, 2011

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:	091335-020	Project:	SNLSGWater
Sample ID:	288686052	Client ID:	SNLS003
Matrix:	AQUEOUS		
Collect Date:	25-OCT-11 09:57		
Receive Date:	26-OCT-11	Client Desc.:	OBS-MW1
Collector:	Client	Vol. Recv.:	

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Ion Chromatography											
EPA 314.0 Perchlorate by IC "As Received"											
Perchlorate	U	ND	0.004	0.012	mg/L	1	MAR1	11/01/11	1443	1154805	1

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	EPA 314.0 DOE-AL	

Internal Lab

CONTRACT LABORATORY
ANALYSIS REQUEST AND CHAIN OF CUSTODY

Batch No. | SMO Use | AR/COC 613880

Dept. No./Mail Stop:	6234/MS 0718	Date Samples Shipped: 10-26-11		Project/Task No.98026.01.13	☐ Waste Characterization -Send preliminary/copy report to:
Project/Task Manager:	Alicia Aragon	Carrier/Waybill No. 133579		SMO Authorization: SB	
Project Name:	SWMU 68	Lab Contact:	Edie Kent/803-556-8171	Contract # PO 691436	☐ Released by COC No.:
Record Center Code:	NA	Lab Destination:	GEL		☑ Validation Required
Logbook Ref. No.:	NA	SMO Contact/Phone:	Lorraine Herrera /505-844-3199	SEE BOTTLE ORDER	Bill To: Sandia National Labs (Accounts Payable) P.O. Box 5800 MS 0154 Albuquerque, NM 87185-0154
Service Order No.	CF263-12	Send Report to SMO:			
Location	Tech Area				
Building	Room				

288656

Reference LOV(available at SMO)

Sample No.-Fraction	ER Sample ID or Sample Location Detail	Depth (ft)	ER Site No.	Date/Time(hr) Collected	Sample Matrix	Container Type	Container Volume	Preserv-ative	Collection Method	Sample Type	Parameter & Method Requested	Lab Sample ID
091337-001	OBS-MW2	253	NA	102611\0934	GW	G	3x40ml	HCL	G	SA	TCL VOC (SW846-8260B)	060
091337-002	OBS-MW2	253	NA	102611\0936	GW	AG	4x1L	4C	G	SA	TCL SVOC (SW846-8270C)	061
091337-009	OBS-MW2	253	NA	102611\0938	GW	P	500 ml	HNO3	G	SA	TAL Metals+ Ur (SW846-6020/7470)	062
091337-014	OBS-MW2	253	NA	102611\0939	GW	P	250 ml	4C	G	SA	Hexavalent Chromium (SW846-7196A)	063
091337-016	OBS-MW2	253	NA	102611\0940	GW	P	125 ml	4C	G	SA	Anions (SW846-9056)	064
091337-017	OBS-MW2	253	NA	102611\0941	FGW	P	250 ml	HNO3	G	SA	Cations (SW846-6020)	065
091337-018	OBS-MW2	253	NA	102611\0942	GW	P	125 ml	H2SO4	G	SA	NPN (353.2)	066
091337-020	OBS-MW2	253	NA	102611\0943	GW	P	250 ml	4C	G	SA	Perchlorate (314.0)	067
091337-022	OBS-MW2	253	NA	102611\0944	GW	P	500 ml	4C	G	SA	Alkalinity (SM2320B)	068
091337-024	OBS-MW2	253	NA	102611\0945	GW	AG	4x1L	4C	G	SA	High Explosive (SW846-8321A) Mod.	069
091337-027	OBS-MW2	253	NA	102611\0947	GW	P	250 ml	NaOH	G	SA	Total Cyanide (SW846-9012)	070

RMMA ☐ Yes ☑ No Ref. No.

Sample Disposal ☐ Return to Client ☑ Disposal by lab

Turnaround Time ☐ 7 Day ☐ 15 Day ☑ 30 Day

Return Samples By: ☐ Negotiated TAT

Sample Tracking Smo Use
Date Entered(mm/dd/yy)
Entered by:
QC inits

Special Instructions/QC Requirements
EDD ☑ Yes ☐ No
Level D Package ☐ Yes ☑ No
***Send report to:**
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,Fl,Cl,SO4 **(Last well for SWMU 68 1st Qtr.)**
FGW (filtered in field with .45 micron filter)
Please list as separate report.

Abnormal Conditions on Receipt

Lab Use

	Name	Signature	Init	Company/Organization/Phone/Cellular
Sample Team Members	Robert Lynch	Robert Lynch	RL	SNL/4142/844-4013/250-7090
	William Gibson	William Gibson	WG	SNL/4142/844-4013/239-7367

1.Relinquished by Robert Lynch	Org. 4142	Date 10/26/11	Time 10:45	4.Relinquished by	Org.	Date	Time
1. Received by	Org. 4139	Date 10-26-11	Time 10:45	4. Received by	Org.	Date	Time
2.Relinquished by	Org. 4139	Date 11-26-11	Time 1:00	5.Relinquished by	Org.	Date	Time
2. Received by Douglas Tolin	Org.	Date 10/27/11	Time 0739	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

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

AR/COC- 613880

Project Name:	SWMU 68	Project/Task Manger:	Alicia Aragon	Project/Task No.:	98026.01.13
Location	Tech Area				
Building	Room				

Reference LOV (available at SMO)

Sample No-Fraction	ER Sample ID or Sample Location detail	Pump Depth (ft)	ER Site No.	Date/Time (hr) Collected	Sample Matrix	Container Type	Container Volume	Preserv-ative	Collection Method	Sample Type	Parameter & Method Requested	Lab use: Lab Sample ID
091337-033	OBS-MW2	253	NA	102611\0948	GW	P	1 L	HNO3	G	SA	Gamma Spec (short list)(901.0)	071
091337-034	OBS-MW2	253	NA	102611\0949	GW	P	1 L	HNO3	G	SA	Gross Alpha/Beta (900.0)	072
091337-035	OBS-MW2	253	NA	102611\0950	GW	P	1 L	HNO3	G	SA	Isotopic Ur (ASTM D3972-09M)	073
091338-001	OBS-TB2	NA	NA	102611\0934	DIW	G	3x40ml	HCL	G	TB	VOC (SW846-8260B)	074
091339-001	OBS-FB1	NA	NA	102611\0924	DIW	G	3x40ml	HCL	G	FB	VOC (SW846-8260B)	075

Abnormal Conditions on Receipt **LAB USE**

Recipient Initials DBC

GEL LABORATORIES LLC

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

Certificate of Analysis

Report Date: November 25, 2011

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:	091337-020	Project:	SNLSGWater
Sample ID:	288686067	Client ID:	SNLS003
Matrix:	AQUEOUS		
Collect Date:	26-OCT-11 09:43		
Receive Date:	27-OCT-11	Client Desc.:	OBS-MW2
Collector:	Client	Vol. Recv.:	

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Ion Chromatography											
EPA 314.0 Perchlorate by IC "As Received"											
Perchlorate	U	ND	0.004	0.012	mg/L	1	MAR1	11/01/11	1502	1154805	1

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	EPA 314.0 DOE-AL	

CONTRACT LABORATORY
ANALYSIS REQUEST AND CHAIN OF CUSTODY

Internal Lab

Page 1 of 2

Batch No. N/A

SMO Use

AR/COC 613882

Dept. No./Mail Stop:	6234/MS 0718	Date Samples Shipped:	10/24/11	Project/Task No.98026.01.13	☐ Waste Characterization
Project/Task Manager:	Alicia Aragon	Carrier/Waybill No.	133304	SMO Authorization: SMO	-Send preliminary/copy report to:
Project Name:	SWMU 68	Lab Contact:	Edie Kent/803-556-8171	Contract # PO 691436	
Record Center Code:	NA	Lab Destination:	GEL		☐ Released by COC No.:_____
Logbook Ref. No.:	NA	SMO Contact/Phone:	Lorraine Herrera /505-844-3199	SEE BOTTLE ORDER	☑ Validation Required
Service Order No.	CF263-12	Send Report to SMO:			Bill To:Sandia National Labs (Accounts Payable)
Location	Tech Area				P.O. Box 5800 MS 0154
Building	Room				Albuquerque, NM 87185-0154

Reference LOV(available at SMO)

Sample No.-Fraction	ER Sample ID or Sample Location Detail	Depth (ft)	ER Site No.	Date/Time(hr) Collected	Sample Matrix	Container Type	Container Volume	Preserv-ative	Collection Method	Sample Type	Parameter & Method Requested	Lab Sample ID
091342-001	OBS-MW3	209	NA	102411\1008	GW	G	3x40ml	HCL	G	SA	TCL VOC (SW846-8260B)	016
091342-002	OBS-MW3	209	NA	102411\1010	GW	AG	4x1L	4C	G	SA	TCL SVOC (SW846-8270C)	017
091342-009	OBS-MW3	209	NA	102411\1014	GW	P	500 ml	HNO3	G	SA	TAL Metals+ Ur (SW846-6020/7470)	018
091342-014	OBS-MW3	209	NA	102411\1016	GW	P	250 ml	4C	G	SA	Hexavalent Chromium (SW846-7196A)	019
091342-016	OBS-MW3	209	NA	102411\1017	GW	P	125 ml	4C	G	SA	Anions (SW846-9056)	020
091342-017	OBS-MW3	209	NA	102411\1018	FGW	P	250 ml	HNO3	G	SA	Cations (SW846-6020)	021
091342-018	OBS-MW3	209	NA	102411\1019	GW	P	125 ml	H2SO4	G	SA	NPN (353.2)	022
091342-020	OBS-MW3	209	NA	102411\1020	GW	P	250 ml	4C	G	SA	Perchlorate (314.0)	023
091342-022	OBS-MW3	209	NA	102411\1021	GW	P	500 ml	4C	G	SA	Alkalinity (SM2320B)	024
091342-024	OBS-MW3	209	NA	102411\1022	GW	AG	4x1L	4C	G	SA	High Explosive (SW846-8321A) Mod.	025
091342-027	OBS-MW3	209	NA	102411\1026	GW	P	250 ml	NaOH	G	SA	Total Cyanide (SW846-9012)	026

RMMA ☐ Yes ☑ No Ref. No.

Sample Disposal ☐ Return to Client ☑ Disposal by lab

Turnaround Time ☐ 7 Day ☐ 15 Day ☑ 30 Day

Return Samples By: ☐ **Negotiated TAT**

Sample Tracking Smo Use
Date Entered(mm/dd/yy)
Entered by
QC inits:

Special Instructions/QC Requirements
EDD ☑ Yes ☐ No
Level D Package ☐ Yes ☑ No
***Send report to:**
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,Fl,Cl,SO4
FGW (filtered in field with .45 micron filter)
Please list as separate report.

Abnormal Conditions on Receipt

Lab Use

	Name	Signature	Init	Company/Organization/Phone/Cellular
Sample Team Members	Robert Lynch		RL	SNL/4142/844-4013/250-7090
	Alfred Santillanes		AS	SNL/4142/844-5130/228-0710
	William Gibson		WJG	SNL/4142/844-4013/239-7367

1.Relinquished by	Org. 4142	Date 10/24/11	Time 1116	4.Relinquished by	Org.	Date	Time
1. Received by SMO	Org. 4142	Date 10/24/11	Time 1116	4. Received by	Org.	Date	Time
2.Relinquished by SMO	Org. 4142	Date 10/24/11	Time 1200	5.Relinquished by	Org.	Date	Time
2. Received by	Org.	Date 10/25/11	Time 0750	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

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

AR/COC- 613882

Project Name:	SWMU 68	Project/Task Manger:	Alicia Aragon	Project/Task No.:	98026.01.13
Location	Tech Area				
Building	Room				

Reference LOV (available at SMO)

Sample No-Fraction	ER Sample ID or Sample Location detail	Pump Depth (ft)	ER Site No.	Date/Time (hr) Collected	Sample Matrix	Container Type	Container Volume	Preserv-ative	Collection Method	Sample Type	Parameter & Method Requested	Lab use: Lab Sample ID
091342-033	OBS-MW3	209	NA	102411\1028	GW	P	1 L	HNO3	G	SA	Gamma Spec (short list)(901.0)	027
091342-034	OBS-MW3	209	NA	102411\1030	GW	P	1 L	HNO3	G	SA	Gross Alpha/Beta (900.0)	028
091342-035	OBS-MW3	209	NA	102411\1032	GW	P	1 L	HNO3	G	SA	Isotopic Ur (ASTM D3972-09M)	029
091343-001	OBS-MW3	209	NA	102411\1008	GW	G	3x40ml	HCL	G	DU	TCL VOC (SW846-8260B)	030
091343-002	OBS-MW3	209	NA	102411\1010	GW	AG	4x1L	4C	G	DU	TCL SVOC (SW846-8270C)	031
091343-009	OBS-MW3	209	NA	102411\1014	GW	P	500 ml	HNO3	G	DU	TAL Metals+ Ur (SW846-6020/7470)	032
091343-014	OBS-MW3	209	NA	102411\1016	GW	P	250 ml	4C	G	DU	Hexavalent Chromium (SW846-7196A)	033
091343-016	OBS-MW3	209	NA	102411\1017	GW	P	125 ml	4C	G	DU	Anions (SW846-9056)	034
091343-017	OBS-MW3	209	NA	102411\1018	FGW	P	250 ml	HNO3	G	DU	Cations (SW846-6020)	035
091343-018	OBS-MW3	209	NA	102411\1019	GW	P	125 ml	H2SO4	G	DU	NPN (353.2)	036
091343-020	OBS-MW3	209	NA	102411\1020	GW	P	250 ml	4C	G	DU	Perchlorate (314.0)	037
091343-022	OBS-MW3	209	NA	102411\1021	GW	P	500 ml	4C	G	DU	Alkalinity (SM2320B)	038
091343-024	OBS-MW3	209	NA	102411\1022	GW	AG	4x1L	4C	G	DU	High Explosive (SW846-8321A) Mod.	039
091343-027	OBS-MW3	209	NA	102411\1026	GW	P	250 ml	NaOH	G	DU	Total Cyanide (SW846-9012)	040
091343-033	OBS-MW3	209	NA	102411\1028	GW	P	1 L	HNO3	G	DU	Gamma Spec (short list)(901.0)	041
091343-034	OBS-MW3	209	NA	102411\1030	GW	P	1 L	HNO3	G	DU	Gross Alpha/Beta (900.0)	042
091343-035	OBS-MW3	209	NA	102411\1032	GW	P	1 L	HNO3	G	DU	Isotopic Ur (ASTM D3972-09M)	043
091344-001	OBS-TB4	NA	NA	102411\1008	DIW	G	3x40ml	HCL	G	TB	VOC (SW846-8260B)	044

LAB USE

Abnormal Conditions on Receipt

Recipient Initials DB

GEL LABORATORIES LLC

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

Certificate of Analysis

Report Date: November 25, 2011

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:	091342-020	Project:	SNLSGWater
Sample ID:	288686023	Client ID:	SNLS003
Matrix:	AQUEOUS		
Collect Date:	24-OCT-11 10:20		
Receive Date:	25-OCT-11	Client Desc.:	OBS-MW3
Collector:	Client	Vol. Recv.:	

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Ion Chromatography											
EPA 314.0 Perchlorate by IC "As Received"											
Perchlorate	U	ND	0.004	0.012	mg/L	1	MAR1	11/01/11	1405	1154805	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: November 25, 2011

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:	091343-020	Project:	SNLSGWater
Sample ID:	288686037	Client ID:	SNLS003
Matrix:	AQUEOUS		
Collect Date:	24-OCT-11 10:20		
Receive Date:	25-OCT-11	Client Desc.:	OBS-MW3
Collector:	Client	Vol. Recv.:	

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Ion Chromatography											
EPA 314.0 Perchlorate by IC "As Received"											
Perchlorate	U	ND	0.004	0.012	mg/L	1	MAR1	11/01/11	1424	1154805	1

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	EPA 314.0 DOE-AL	

CONTRACT LABORATORY
ANALYSIS REQUEST AND CHAIN OF CUSTODY

Internal Lab

Page 1 of 2

Batch No. NA

SMO Use

AR/COC 613883

Dept. No./Mail Stop:	6234/MS 0718	Date Samples Shipped:	10/31/11	Project/Task No.98026.01.12	☐ Waste Characterization
Project/Task Manager:	Alicia Aragon	Carrier/Waybill No.	133740	SMO Authorization:	-Send preliminary/copy report to:
Project Name:	SWMU 8	Lab Contact:	Edie Kent/803-556-8171	Contract # PO 691436 SMO	
Record Center Code:	NA	Lab Destination:	GEL	SEE BOTTLE ORDER	☐ Released by COC No.:_____
Logbook Ref. No.:	NA	SMO Contact/Phone:	Lorraine Herrera /505-844-3199		☑ Validation Required
Service Order No.	CF262-12	Send Report to SMO:			Bill To:Sandia National Labs (Accounts Payable)
Location	Tech Area				P.O. Box 5800 MS 0154
Building	Room				Albuquerque, NM 87185-0154 289184

Reference LOV(available at SMO)

Sample No.-Fraction	ER Sample ID or Sample Location Detail	Depth (ft)	ER Site No.	Date/Time(hr) Collected	Sample Matrix	Container Type	Container Volume	Preserv-ative	Collection Method	Sample Type	Parameter & Method Requested	Lab Sample ID	
091345-001	CCBA-MW1	79	NA	103111\0935	GW	G	3x40ml	HCL	G	SA	TCL VOC (SW846-8260B)	001	.1
091345-002	CCBA-MW1	79	NA	103111\0937	GW	AG	4x1L	4C	G	SA	TCL SVOC (SW846-8270C)	002	.2
091345-009	CCBA-MW1	79	NA	103111\0938	GW	P	500 ml	HNO3	G	SA	TAL Metals+ Ur (SW846-6020/7470)	003	.3
091345-016	CCBA-MW1	79	NA	103111\0939	GW	P	125 ml	4C	G	SA	Anions (SW846-9056)	004	.4
091345-017	CCBA-MW1	79	NA	103111\0940	FGW	P	250 ml	HNO3	G	SA	Cations (SW846-6020)	005	.
091345-018	CCBA-MW1	79	NA	103111\0941	GW	P	125 ml	H2SO4	G	SA	NPN (353.2)	006	.6
091345-020	CCBA-MW1	79	NA	103111\0942	GW	P	250 ml	4C	G	SA	Perchlorate (314.0)	007	.7
091345-022	CCBA-MW1	79	NA	103111\0943	GW	P	500 ml	4C	G	SA	Alkalinity (SM2320B)	008	.8
091345-024	CCBA-MW1	79	NA	103111\0945	GW	AG	4x1L	4C	G	SA	High Explosive (SW846-8321A) Mod.	009	.9
091345-027	CCBA-MW1	79	NA	103111\0946	GW	P	250 ml	NaOH	G	SA	Total Cyanide (SW846-9012)	010	.10
091345-033	CCBA-MW1	79	NA	103111\0948	GW	P	1 Liter	HNO3	G	SA	Gamma Spec (short list)(901.0)	011	.11

RMMA ☐ Yes ☑ No Ref. No.

Sample Disposal ☐ Return to Client ☑ Disposal by lab

Turnaround Time ☐ 7 Day ☐ 15 Day ☑ 30 Day

Return Samples By: ☐ Negotiated TAT

Sample Tracking Smo Use
Date Entered(mm/dd/yy)
Entered by:
QC inits

Special Instructions/QC Requirements
EDD ☑ Yes ☐ No
Level D Package ☐ Yes ☑ No
*Send report to:
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,Fl,Cl,SO4
FGW (filtered in field with .45 micron filter)
*Please list as separate report.

Abnormal Conditions on Receipt

Lab Use

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

1.Relinquished by	Org. 4142	Date 10/31/11	Time 1026	4.Relinquished by	Org.	Date	Time
1. Received by	SMO Org. 4142	Date 10/31/11	Time 1026	4. Received by	Org.	Date	Time
2.Relinquished by	SMO Org. 4142	Date 10/31/11	Time 1150	5.Relinquished by	Org.	Date	Time
2. Received by	Org. CEL	Date 11-1-11	Time 0740	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

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

AR/COC- 613883

Project Name:	SWMU 8	Project/Task Manger:	Alicia Aragon	Project/Task No.:	98026.01.12
Location	Tech Area				
Building	Room				

Reference LOV (available at SMO)

Sample No-Fraction	ER Sample ID or Sample Location detail	Pump Depth (ft)	ER Site No.	Date/Time (hr) Collected	Sample Matrix	Container Type	Container Volume	Preserv-ative	Collection Method	Sample Type	Parameter & Method Requested	Lab use: Lab Sample ID	
091345-034	CCBA-MW1	79	NA	103111\0949	GW	P	1 Liter	HNO3	G	SA	Gross Alpha/Beta (900.0)	012	.12
091345-035	CCBA-MW1	79	NA	103111\0951	GW	P	1 Liter	HNO3	G	SA	Isotopic Ur (ASTM D3972-09M)	013	.13
091346-001	CCBA-TB1	NA	NA	103111\0935	DIW	G	3x40ml	HCL	G	TB	VOC (SW846-8260B)	014	.1

LAB USE

Abnormal Conditions on Receipt

Recipient Initials MK

GEL LABORATORIES LLC

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

Certificate of Analysis

Report Date: November 29, 2011

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:	091345-020	Project:	SNLSGWater
Sample ID:	289184007	Client ID:	SNLS003
Matrix:	AQUEOUS		
Collect Date:	31-OCT-11 09:42		
Receive Date:	01-NOV-11	Client Desc.:	CCBA-MW1
Collector:	Client	Vol. Recv.:	

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Ion Chromatography											
EPA 314.0 Perchlorate by IC "As Received"											
Perchlorate	U	ND	0.004	0.012	mg/L	1	MAR1	11/05/11	0032	1156878	1

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	EPA 314.0 DOE-AL	

CONTRACT LABORATORY
ANALYSIS REQUEST AND CHAIN OF CUSTODY

Internal Lab

Page 1 of 2

Batch No. N/A

SMO Use

AR/COC 613885

Dept. No./Mail Stop:	6234/MS 0718	Date Samples Shipped:	11/1/11	Project/Task No.98026.01.12	☐ Waste Characterization
Project/Task Manager:	Alicia Aragon	Carrier/Waybill No.	133808	SMO Authorization: SMO	-Send preliminary/copy report to:
Project Name:	SWMU 8	Lab Contact:	Edie Kent/803-556-8171	Contract # PO 691436	☐ Released by COC No.:
Record Center Code:	NA	Lab Destination:	GEL	SUB BOTTLE ORDER	☑ Validation Required
Logbook Ref. No.:	NA	SMO Contact/Phone:	Lorraine Herrera /505-844-3199		Bill To:Sandia National Labs (Accounts Payable)
Service Order No.	CF262-12	Send Report to SMO:			P.O. Box 5800 MS 0154
Location	Tech Area				Albuquerque, NM 87185-0154
Building	Room				

Reference LOV(available at SMO)

Sample No.-Fraction	ER Sample ID or Sample Location Detail	Depth (ft)	ER Site No.	Date/Time(hr) Collected	Sample Matrix	Container Type	Container Volume	Preserv-ative	Collection Method	Sample Type	Parameter & Method Requested	Lab Sample ID
091349-001	CCBA-MW2	117	NA	110111\1000	GW	G	3x40ml	HCL	G	SA	TCL VOC (SW846-8260B)	029
091349-002	CCBA-MW2	117	NA	110111\1004	GW	AG	4x1L	4C	G	SA	TCL SVOC (SW846-8270C)	030
091349-009	CCBA-MW2	117	NA	110111\1005	GW	P	500 ml	HNO3	G	SA	TAL Metals+ Ur (SW846-6020/7470)	031
091349-016	CCBA-MW2	117	NA	110111\1006	GW	P	125 ml	4C	G	SA	Anions (SW846-9056)	032
091349-017	CCBA-MW2	117	NA	110111\1007	FGW	P	250 ml	HNO3	G	SA	Cations (SW846-6020)	033
091349-018	CCBA-MW2	117	NA	110111\1008	GW	P	125 ml	H2SO4	G	SA	NPN (353.2)	034
091349-020	CCBA-MW2	117	NA	110111\1009	GW	P	250 ml	4C	G	SA	Perchlorate (314.0)	035
091349-022	CCBA-MW2	117	NA	110111\1010	GW	P	500 ml	4C	G	SA	Alkalinity (SM2320B)	036
091349-024	CCBA-MW2	117	NA	110111\1012	GW	AG	4x1L	4C	G	SA	High Explosive (SW846-8321A) Mod.	037
091349-027	CCBA-MW2	117	NA	110111\1013	GW	P	250 ml	NaOH	G	SA	Total Cyanide (SW846-9012)	038
091349-033	CCBA-MW2	117	NA	110111\1014	GW	P	1 Liter	HNO3	G	SA	Gamma Spec (short list)(901.0)	039

RMMA ☐ Yes ☑ No Ref. No.

Sample Disposal ☐ Return to Client ☑ Disposal by lab

Turnaround Time ☐ 7 Day ☐ 15 Day ☑ 30 Day

Return Samples By: ☐ Negotiated TAT

Sample Tracking — Smo Use
Date Entered(mm/dd/yy)
Entered by
QC inits

Special Instructions/QC Requirements
EDD ☑ Yes ☐ No
Level D Package ☐ Yes ☑ No
*Send report to:
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,Fl,Cl,SO4
FGW (filtered in field with .45 micron filter)
*Please list as separate report.

Abnormal Conditions on Receipt

Lab Use

Sample Team Members	Name	Signature	Init	Company/Organization/Phone/Cellular
	Robert Lynch			SNL/4142/844-4013/250-7090
	Alfred Santillanes			SNL/4142/844-5130/228-0710
	William Gibson			SNL/4142/844-4013/239-7367
	Danielle Nieto			SNL/4143/845-7706

1.Relinquished by	Org 4142	Date 11/1/11	Time 1112	4.Relinquished by	Org.	Date	Time
1. Received by	Org. 4143	Date 11/1/11	Time 1112	4. Received by	Org.	Date	Time
2.Relinquished by	Org. 4142	Date 11/1/11	Time 1215	5.Relinquished by	Org.	Date	Time
2. Received by	Org. GEL	Date 11/2/11	Time 0750	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

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

AR/COC- 613885

Project Name:	SWMU 8	Project/Task Manger:	Alicia Aragon	Project/Task No.:	98026.01.12
Location	Tech Area				
Building	Room				

Reference LOV (available at SMO)

Sample No-Fraction	ER Sample ID or Sample Location detail	Pump Depth (ft)	ER Site No.	Date/Time (hr) Collected	Sample Matrix	Container Type	Container Volume	Preserv-ative	Collection Method	Sample Type	Parameter & Method Requested	Lab use: Lab Sample ID
091349-034	CCBA-MW2	117	NA	110111\1016	GW	P	1 Liter	HNO3	G	SA	Gross Alpha/Beta (900.0)	040
091349-035	CCBA-MW2	117	NA	110111\1017	GW	P	1 Liter	HNO3	G	SA	Isotopic Ur (ASTM D3972-09M)	041
091350-001	CCBA-MW2	117	NA	110111\1000	GW	G	3x40ml	HCL	G	DU	TCL VOC (SW846-8260B)	042
091350-002	CCBA-MW2	117	NA	110111\1004	GW	AG	4x1L	4C	G	DU	TCL SVOC (SW846-8270C)	043
091350-009	CCBA-MW2	117	NA	110111\1005	GW	P	500 ml	HNO3	G	DU	TAL Metals+ Ur (SW846-6020/7470)	044
091350-016	CCBA-MW2	117	NA	110111\1006	GW	P	125 ml	4C	G	DU	Anions (SW846-9056)	045
091350-017	CCBA-MW2	117	NA	110111\1007	FGW	P	250 ml	HNO3	G	DU	Cations (SW846-6020)	046
091350-018	CCBA-MW2	117	NA	110111\1008	GW	P	125 ml	H2SO4	G	DU	NPN (353.2)	047
091350-020	CCBA-MW2	117	NA	110111\1009	GW	P	250 ml	4C	G	DU	Perchlorate (314.0)	048
091350-022	CCBA-MW2	117	NA	110111\1010	GW	P	500 ml	4C	G	DU	Alkalinity (SM2320B)	049
091350-024	CCBA-MW2	117	NA	110111\1012	GW	AG	4x1L	4C	G	DU	High Explosive (SW846-8321A) Mod.	050
091350-027	CCBA-MW2	117	NA	110111\1013	GW	P	250 ml	NaOH	G	DU	Total Cyanide (SW846-9012)	051
091350-033	CCBA-MW2	117	NA	110111\1014	GW	P	1 Liter	HNO3	G	DU	Gamma Spec (short list)(901.0)	052
091350-034	CCBA-MW2	117	NA	110111\1016	GW	P	1 Liter	HNO3	G	DU	Gross Alpha/Beta (900.0)	053
091350-035	CCBA-MW2	117	NA	110111\1017	GW	P	1 Liter	HNO3	G	DU	Isotopic Ur (ASTM D3972-09M)	054
091351-001	CCBA-TB3	NA	NA	110111\1000	DIW	G	3x40ml	HCL	G	TB	VOC (SW846-8260B)	055
091352-001	CCBA-FB1	NA	NA	110111\0940	DIW	G	3x40ml	HCL	G	FB	VOC (SW846-8260B)	056
											Sampling complete for SWMU	
											8 1st Qtr 2012	

Abnormal Conditions on Receipt

LAB USE

Recipient Initials MK

GEL LABORATORIES LLC

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

Certificate of Analysis

Report Date: November 29, 2011

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:	091349-020	Project:	SNLSGWater
Sample ID:	289184035	Client ID:	SNLS003
Matrix:	AQUEOUS		
Collect Date:	01-NOV-11 10:09		
Receive Date:	02-NOV-11	Client Desc.:	CCBA-MW2
Collector:	Client	Vol. Recv.:	

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Ion Chromatography											
EPA 314.0 Perchlorate by IC "As Received"											
Perchlorate	U	ND	0.004	0.012	mg/L	1	MAR1	11/05/11	0149	1156878	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: November 29, 2011

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:	091350-020	Project:	SNLSGWater
Sample ID:	289184048	Client ID:	SNLS003
Matrix:	AQUEOUS		
Collect Date:	01-NOV-11 10:09		
Receive Date:	02-NOV-11	Client Desc.:	CCBA-MW2
Collector:	Client	Vol. Recv.:	

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Ion Chromatography											
EPA 314.0 Perchlorate by IC "As Received"											
Perchlorate	U	ND	0.004	0.012	mg/L	1	MAR1	11/05/11	0208	1156878	1

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	EPA 314.0 DOE-AL	

CONTRACT LABORATORY
ANALYSIS REQUEST AND CHAIN OF CUSTODY

Internal Lab

Page 1 of 1

Batch No.

SMO Use

AR/COC 613899

Dept. No./Mail Stop:	6234/0719	Date Samples Shipped:	11/7/11	Project/Task No. 98026.01.10	☐ Waste Characterization -Send preliminary/copy report to:
Project/Task Manager:	John Cochran	Carrier/Waybill No.	153987	SMO Authorization:	
Project Name:	TA-V GWC	Lab Contact:	Edie Kent/803-556-8171	Contract #: 691436	
Record Center Code:	ER/1306/DAT	Lab Destination:	GEL		☐ Released by COC No.:
Logbook Ref. No.:	NA	SMO Contact/Phone:	Lorraine Herrera /505-844-3199		☑ Validation Required
Service Order No.	CFO# 240-12	Send Report to SMO:			Bill To: Sandia National Labs (Accounts Payable) P.O. Box 5800 MS 0154 Albuquerque, NM 87185-0154
Location	Tech Area				
Building	Room				

Reference LOV(available at SMO)

Sample No.-Fraction	ER Sample ID or Sample Location Detail	Depth (ft)	ER Site No.	Date/Time(hr) Collected	Sample Matrix	Container Type	Container Volume	Preservative	Collection Method	Sample Type	Parameter & Method Requested	Lab Sample ID
091408-001	TAV-MW13	545	NA	110711\ 0954	GW	G	3x40 ml	HCL	G	SA	TCL VOC (SW846-8260)	289753 001 .1
091408-004	TAV-MW13	545	NA	110711\ 0956	GW	AG	500 ml	H2SO4	G	SA	TOC (SW846-9060)	289753 002 .2
091408-010	TAV-MW13	545	NA	110711\ 0957	FGW	P	500 ml	HNO3	G	SA	Metals-Fe,Mn (SW846-6020)	289753 001
091408-016	TAV-MW13	545	NA	110711\ 0958	GW	P	125 ml	4C	G	SA	Anions (Cl/ SO4) (SW846-9056)	289753 003 .3
091408-017	TAV-MW13	545	NA	110711\ 0959	GW	P	500 ml	HNO3	G	SA	Metals/Cations (SW846-6020)	289753 004
091408-018	TAV-MW13	545	NA	110711\ 1000	GW	P	125 ml	H2SO4	G	SA	NPN (353.2)	289753 005
091408-020	TAV-MW13	545	NA	110711\ 1001	GW	P	250 ml	4C	G	SA	Perchlorate (314.0)	289753 006 .6
091408-022	TAV-MW13	545	NA	110711\ 1002	GW	P	500 ml	4C	G	SA	Alkalinity (SM2320B)	289753 007 .7
091408-023	TAV-MW13	545	NA	110711\ 1004	GW	P	1 L	NaOH-Zn	G	SA	Sulfide (SW846-9034)	289753 008 .8
091409-001	TAV-TB5	NA	NA	110711\ 0954	DIW	G	3x40 ml	HCL	G	TB	TCL VOC (SW846-8260)	289753 009 .1

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:	☐ Negotiated TAT	QC inits:	*Send report to:

Sample Team Members	Name	Signature	Init	Company/Organization/Phone/Cellular
	Robert Lynch		RL	SNL/4142/844-4013/250-7090
	Alfred Santillanes		AS	SNL/4142/844-5130/228-0710
	William J. Gibson		WJG	SNL/4142/844-4013/239-7367
	Danielle Nieto		DN	SNL\4143\845-7706

Tim Jackson/ORG. 4142/MS.0729/ 284-2547
FGW (Filtered in field w/40 micron filter)
If Perchlorate is detected verify using analysis SW846-6850M
Cations (Ca,Mg,K,Na)
Alkalinity (total,bicarbonate,carbonate)
*Please list as separate report.

Abnormal Conditions on Receipt

Lab Use

1.Relinquished by	Org. 4142	Date 11/7/11	Time 10:20	4.Relinquished by	Org.	Date	Time
1. Received by	Org. 4143	Date 11/7/11	Time 10:20	4. Received by	Org.	Date	Time
2.Relinquished by	Org. 4143	Date 11/7/11	Time 12:10	5.Relinquished by	Org.	Date	Time
2. Received by	Org. GEL	Date 11-8-11	Time 0725	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

GEL LABORATORIES LLC

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

Certificate of Analysis

Report Date: December 9, 2011

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:	091408-020	Project:	SNLSGWater
Sample ID:	289753006	Client ID:	SNLS003
Matrix:	AQUEOUS		
Collect Date:	07-NOV-11 10:01		
Receive Date:	08-NOV-11	Client Desc.:	TAV-MW13
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	11/22/11	2048	1159815	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

Page 1 of 2

Internal Lab

Batch No.

SMO Use

AR/COC 613903

Dept. No./Mail Stop:	6234/0719	Date Samples Shipped: 11/10/11	Project/Task No. 98026.01.10	☐ Waste Characterization	
Project/Task Manager:	John Cochran	Carrier/Waybill No. 139166	SMO Authorization: Ron Williams SMO	-Send preliminary/copy report to:	
Project Name:	TA-V GWC	Lab Contact: Edie Kent/803-556-8171	Contract #: 691436		
Record Center Code:	ER/1306/DAT	Lab Destination: GEL	See Bottle Order	☐ Released by COC No.:	
Logbook Ref. No.:	NA	SMO Contact/Phone: Lorraine Herrera /505-844-3199		☑ Validation Required	
Service Order No.	CFO# 240-12	Send Report to SMO:		Bill To: Sandia National Labs (Accounts Payable)	
Location	Tech Area			P.O. Box 5800 MS 0154	
Building	Room			Albuquerque, NM 87185-0154	

Reference LOV(available at SMO)

Sample No.-Fraction	ER Sample ID or Sample Location Detail	Depth (ft)	ER Site No.	Date/Time(hr) Collected		Sample Matrix	Container Type	Container Volume	Preserv-ative	Collection Method	Sample Type	Parameter & Method Requested	Lab Sample ID	
091416-001	TAV-MW11	530	NA	11/10/2011	0928	GW	G	3x40 ml	HCL	G	SA	TCL VOC (SW846-8260)	289753 019	1
091416-004	TAV-MW11	530	NA	11/10/2011	0930	GW	AG	500 ml	H2SO4	G	SA	TOC (SW846-9060)	289753 020	2
091416-010	TAV-MW11	530	NA	11/10/2011	0931	FGW	P	500 ml	HNO3	G	SA	Metals-Fe,Mn (SW846-6020)	289763 003	
091416-016	TAV-MW11	530	NA	11/10/2011	0932	GW	P	125 ml	4C	G	SA	Anions (Cl/ SO4) (SW846-9056)	289753 021	3
091416-017	TAV-MW11	530	NA	11/10/2011	0933	GW	P	500 ml	HNO3	G	SA	Metals/Cations (SW846-6020)	289753 022	4
091416-018	TAV-MW11	530	NA	11/10/2011	0934	GW	P	125 ml	H2SO4	G	SA	NPN (353.2)	289753 023	
091416-020	TAV-MW11	530	NA	11/10/2011	0935	GW	P	250 ml	4C	G	SA	Perchlorate (314.0)	289753 024	
091416-022	TAV-MW11	530	NA	11/10/2011	0936	GW	P	500 ml	4C	G	SA	Alkalinity (SM2320B)	289753 025	
091416-023	TAV-MW11	530	NA	11/10/2011	0938	GW	P	1 L	NaOH-Zn	G	SA	Sulfide (SW846-9034)	289753 026	8
091417-001	TAV-MW11	530	NA	11/10/2011	0928	GW	G	3x40 ml	HCL	G	DU	TCL VOC (SW846-8260)	289753 027	1
091417-004	TAV-MW11	530	NA	11/10/2011	0930	GW	AG	500 ml	H2SO4	G	DU	TOC (SW846-9060)	289753 028	2

RMMA ☐ Yes ☑ No Ref. No.

Sample Disposal ☐ Return to Client ☑ Disposal by lab

Turnaround Time ☐ 7 Day ☐ 15 Day ☑ 30 Day ☐ Negotiated TAT

Return Samples By:

Sample Tracking Smo Use
Date Entered(mm/dd/yy)
Entered by:
QC inits.

Special Instructions/QC Requirements
EDD ☑ Yes ☐ No
Level D Package ☐ Yes ☑ No
*Send report to:
Tim Jackson/ORG. 4142/MS.0729/ 284-2547
FGW (Filtered in field w/40 micron filter)
If Perchlorate is detected verify using analysis SW846-6850M
Cations (Ca,Mg,K,Na)
Alkalinity (total,bicarbonate,carbonate)
*Please list as separate report.

Abnormal Conditions on Receipt

Lab Use

Sample Team Members	Name	Signature	Init	Company/Organization/Phone/Cellular
	Robert Lynch			SNL/4142/844-4013/250-7090
	Alfred Santillanes			SNL/4142/844-5130/228-0710
	William J. Gibson			SNL/4142/844-4013/239-7367
	Danielle Nieto			SNL/4143/845-7706

1.Relinquished by	Org. 4142	Date 11/10/11	Time 1015	4.Relinquished by	Org.	Date	Time
1. Received by	Org. 4143	Date 11/10/11	Time 1015	4. Received by	Org.	Date	Time
2.Relinquished by	Org. 4143	Date 11/10/11	Time 11:30	5.Relinquished by	Org.	Date	Time
2. Received by	Org. GEL	Date 11-11-11	Time 0730	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

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

AR/COC- 613903

Project Name:	TA-V GWC	Project/Task Manger:	John Cochran	Project/Task No.:	98026.01.10
Location	Tech Area				
Building	Room				

Reference LOV (available at SMO)

Sample No-Fraction	ER Sample ID or Sample Location detail	Pump Depth (ft)	ER Site No.	Date/Time (hr) Collected		Sample Matrix	Container Type	Container Volume	Preserv-ative	Collection Method	Sample Type	Parameter & Method Requested	Lab use: Lab Sample ID
091417-010	TAV-MW11	530	NA	11/10/2011	0931	FGW	P	500 ml	HNO3	G	DU	Metals-Fe,Mn (SW846-6020)	289763 029
091417-016	TAV-MW11	530	NA	11/10/2011	0932	GW	P	125 ml	4C	G	DU	Anions (Cl/ SO4) (SW846-9056)	289753 029 .3
091417-017	TAV-MW11	530	NA	11/10/2011	0933	GW	P	500 ml	HNO3	G	DU	Metals/Cations (SW846-6020)	289753 030 .4
091417-018	TAV-MW11	530	NA	11/10/2011	0934	GW	P	125 ml	H2SO4	G	DU	NPN (353.2)	289753 031 .5
091417-020	TAV-MW11	530	NA	11/10/2011	0935	GW	P	250 ml	4C	G	DU	Perchlorate (314.0)	289753 032 .6
091417-022	TAV-MW11	530	NA	11/10/2011	0936	GW	P	500 ml	4C	G	DU	Alkalinity (SM2320B)	289753 033 .7
091417-023	TAV-MW11	530	NA	11/10/2011	0938	GW	P	1 L	NaOH-Zn	G	DU	Sulfide (SW846-9034)	289753 034 .8
091418-001	TAV-TB9	NA	NA	11/10/2011	0928	DIW	G	3x40 ml	HCL	G	TB	TCL VOC (SW846-8260)	289753 035 .1

Abnormal Conditions on Receipt

LAB USE

Recipient Initials MK

GEL LABORATORIES LLC

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

Certificate of Analysis

Report Date: December 9, 2011

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:	091416-020	Project:	SNLSGWater
Sample ID:	289753024	Client ID:	SNLS003
Matrix:	AQUEOUS		
Collect Date:	10-NOV-11 09:35		
Receive Date:	11-NOV-11	Client Desc.:	TAV-MW11
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	11/22/11	2204	1159815	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: December 9, 2011

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:	091417-020	Project:	SNLSGWater
Sample ID:	289753032	Client ID:	SNLS003
Matrix:	AQUEOUS		
Collect Date:	10-NOV-11 09:35		
Receive Date:	11-NOV-11	Client Desc.:	TAV-MW11
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	11/22/11	2223	1159815	1

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	EPA 314.0 DOE-AL	

CONTRACT LABORATORY
ANALYSIS REQUEST AND CHAIN OF CUSTODY

Internal Lab

Page 1 of 1

Batch No.

SMO Use

AR/COC 613910

Dept. No./Mail Stop:	6234/0719	Date Samples Shipped:	11 / 22 / 11	Project/Task No. 98026.01.10	☐ Waste Characterization
Project/Task Manager:	John Cochran	Carrier/Waybill No:	134708	SMO Authorization: SMO	-Send preliminary/copy report to:
Project Name:	TA-V GWC	Lab Contact:	Edie Kent/803-556-8171	Contract #: 691436	
Record Center Code:	ER/1306/DAT	Lab Destination:	GEL	See bottle order	☐ Released by COC No.:
Logbook Ref. No.:	NA	SMO Contact/Phone:	Lorraine Herrera /505-844-3199		☑ Validation Required
Service Order No.	CFO# 240-12	Send Report to SMO:			Bill To: Sandia National Labs (Accounts Payable)
Location	Tech Area				P.O. Box 5800 MS 0154
Building	Room				Albuquerque, NM 87185-0154

Reference LOV(available at SMO)

Sample No.-Fraction	ER Sample ID or Sample Location Detail	Depth (ft)	ER Site No.	Date/Time(hr) Collected		Sample Matrix	Container Type	Container Volume	Preservative	Collection Method	Sample Type	Parameter & Method Requested	Lab Sample ID
091433-001	TAV-MW14	533	NA	112211\	1000	GW	G	3x40 ml	HCL	G	SA	TCL VOC (SW846-8260)	290864 001 .1
091433-004	TAV-MW14	533	NA	112211\	1001	GW	AG	500 ml	H2SO4	G	SA	TOC (SW846-9060)	290864 002 .2
091433-010	TAV-MW14	533	NA	112211\	1002	FGW	P	500 ml	HNO3	G	SA	Metals-Fe,Mn (SW846-6020)	290868 001
091433-016	TAV-MW14	533	NA	112211\	1003	GW	P	125 ml	4C	G	SA	Anions (Cl/ SO4) (SW846-9056)	290864 003 .3
091433-017	TAV-MW14	533	NA	112211\	1004	GW	P	500 ml	HNO3	G	SA	Metals/Cations (SW846-6020)	290864 004 .4
091433-018	TAV-MW14	533	NA	112211\	1005	GW	P	125 ml	H2SO4	G	SA	NPN (353.2)	290864 005 .5
091433-020	TAV-MW14	533	NA	112211\	1006	GW	P	250 ml	4C	G	SA	Perchlorate (314.0)	290864 006 .6
091433-022	TAV-MW14	533	NA	112211\	1007	GW	P	500 ml	4C	G	SA	Alkalinity (SM2320B)	290864 007 .7
091433-023	TAV-MW14	533	NA	112211\	1009	GW	P	1 L	NaOH-Zn	G	SA	Sulfide (SW846-9034)	290864 008 .8
091434-001	TAV-TB16	NA	NA	112211\	1000	DIW	G	3x40 ml	HCL	G	TB	TCL VOC (SW846-8260)	290864 009 .1
091435-001	TAV-FB3	NA	NA	11 22 11	0947	DIW	G	3x40 ml	HCL	G	FB	TCL VOC (SW846-8260)	290864 010 .1

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:	☐ Negotiated TAT	QC inits.	*Send report to:

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

Tim Jackson/ORG. 4142/MS.0729/ 284-2547

FGW (Filtered in field w/40 micron filter)

If Perchlorate is detected verify using analysis SW846-6850M

Cations (Ca,Mg,K,Na)

Alkalinity (total,bicarbonate,carbonate)

Please list as separate report.

Abnormal Conditions on Receipt

Lab Use

1.Relinquished by		Org. 4142	Date 11/22/11	Time 1040	4.Relinquished by	Org.	Date	Time
1. Received by		Org. 4143	Date 11/22/11	Time 1040	4. Received by	Org.	Date	Time
2.Relinquished by		Org. 4143	Date 11/22/11	Time 1130	5.Relinquished by	Org.	Date	Time
2. Received by		Org.	Date 11/23/11	Time 0823	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

GEL LABORATORIES LLC

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

Certificate of Analysis

Report Date: December 27, 2011

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:	091433-020	Project:	SNLSGWater
Sample ID:	290864006	Client ID:	SNLS003
Matrix:	AQUEOUS		
Collect Date:	22-NOV-11 10:06		
Receive Date:	23-NOV-11	Client Desc.:	TAV-MW14
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	11/29/11	2005	1164943	1

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	EPA 314.0 DOE-AL	

Internal Lab

CONTRACT LABORATORY
ANALYSIS REQUEST AND CHAIN OF CUSTODY

Page 1 of 1

Batch No.

SMO Use

AR/COC 613911

Dept. No./Mail Stop:	6234/0719	Date Samples Shipped:	11-28-11	Project/Task No. 98026.01.10	☐ Waste Characterization -Send preliminary/copy report to:
Project/Task Manager:	John Cochran	Carrier/Waybill No.	134711	SMO Authorization: Don Tatemeyer SMO	
Project Name:	TA-V GWC	Lab Contact:	Edie Kent/803-556-8171	Contract #: 691436	
Record Center Code:	ER/1306/DAT	Lab Destination:	GEL	See Bottle order	☐ Released by COC No.:
Logbook Ref. No.:	NA	SMO Contact/Phone:	Lorraine Herrera /505-844-3199		☑ Validation Required
Service Order No.	CFO# 240-12	Send Report to SMO:			Bill To: Sandia National Labs (Accounts Payable) P.O. Box 5800 MS 0154 Albuquerque, NM 87185-0154
Location	Tech Area				
Building	Room				

Reference LOV(available at SMO)

Sample No.-Fraction	ER Sample ID or Sample Location Detail	Depth (ft)	ER Site No.	Date/Time(hr) Collected	Sample Matrix	Container Type	Container Volume	Preserv-ative	Collection Method	Sample Type	Parameter & Method Requested	Lab Sample ID
091436-001	TAV-MW12	528	NA	112811\ 0933	GW	G	3x40 ml	HCL	G	SA	TCL VOC (SW846-8260)	291007 001 .1
091436-004	TAV-MW12	528	NA	112811\ 0934	GW	AG	500 ml	H2SO4	G	SA	TOC (SW846-9060)	291007 002 .2
091436-010	TAV-MW12	528	NA	112811\ 0935	FGW	P	500 ml	HNO3	G	SA	Metals-Fe,Mn (SW846-6020)	291008 001
091436-016	TAV-MW12	528	NA	112811\ 0936	GW	P	125 ml	4C	G	SA	Anions (Cl/ SO4) (SW846-9056)	291007 003 .3
091436-017	TAV-MW12	528	NA	112811\ 0937	GW	P	500 ml	HNO3	G	SA	Metals/Cations (SW846-6020)	291007 004 .4
091436-018	TAV-MW12	528	NA	112811\ 0938	GW	P	125 ml	H2SO4	G	SA	NPN (353.2)	291007 005 .5
091436-020	TAV-MW12	528	NA	112811\ 0939	GW	P	250 ml	4C	G	SA	Perchlorate (314.0)	291007 006 .6
091436-022	TAV-MW12	528	NA	112811\ 0940	GW	P	500 ml	4C	G	SA	Alkalinity (SM2320B)	291007 007 .7
091436-023	TAV-MW12	528	NA	112811\ 0942	GW	P	1 L	NaOH-Zn	G	SA	Sulfide (SW846-9034)	291007 008 .8
091437-001	TAV-TB17	NA	NA	112811\ 0933	DIW	G	3x40 ml	HCL	G	TB	TCL VOC (SW846-8260)	291007 009 .1

RMMA ☐ Yes ☑ No Ref. No.

Sample Disposal ☐ Return to Client ☑ Disposal by lab

Turnaround Time ☐ 7 Day ☐ 15 Day ☑ 30 Day

Return Samples By: ☐ Negotiated TAT

Sample Tracking: Smo Use
Date Entered(mm/dd/yy)
Entered by:

Special Instructions/QC Requirements
EDD ☑ Yes ☐ No
Level D Package ☐ Yes ☑ No
*Send report to:
Tim Jackson/ORG. 4142/MS.0729/ 284-2547
FGW (Filtered in field w/40 micron filter)
If Perchlorate is detected verify using analysis SW846-6850M
Cations (Ca,Mg,K,Na)
Alkalinity (total,bicarbonate,carbonate)
*Please list as separate report.

Abnormal Conditions on Receipt

Lab Use

QC inits:

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

1.Relinquished by	Alfred Santillanes	Org. 4142	Date 11/28/11	Time 1012	4.Relinquished by	Org.	Date	Time
1. Received by	Don Tatemeyer	Org. 4143	Date 11/28/11	Time 1012	4. Received by	Org.	Date	Time
2.Relinquished by	Don Tatemeyer	Org. 4143	Date 11/28/11	Time 1200	5.Relinquished by	Org.	Date	Time
2. Received by	Davis Carlie	Org.	Date 11/29/11	Time 0930	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

GEL LABORATORIES LLC

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

Certificate of Analysis

Report Date: December 27, 2011

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:	091436-020	Project:	SNLSGWater
Sample ID:	291007006	Client ID:	SNLS003
Matrix:	AQUEOUS		
Collect Date:	28-NOV-11 09:39		
Receive Date:	29-NOV-11	Client Desc.:	TAV-MW12
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	12/07/11	1320	1165896	1

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	EPA 314.0 DOE-AL	

CONTRACT LABORATORY
ANALYSIS REQUEST AND CHAIN OF CUSTODY

Internal Lab

Page 1 of 1

Batch No. N/A

SMO Use

AR/COC 613928

Dept. No./Mail Stop:	6234/MS 0718	Date Samples Shipped:	12/8/11	Project/Task No.98026.01.14	☐ Waste Characterization
Project/Task Manager:	Alicia Aragon	Carrier/Waybill No.	135206	SMO Authorization: SMO	-Send preliminary/copy report to:
Project Name:	SWMU-149	Lab Contact:	Edie Kent/803-556-8171	Contract # PO 691436	☐ Released by COC No.:_____
Record Center Code:	NA	Lab Destination:	GEL		☑ Validation Required
Logbook Ref. No.:	NA	SMO Contact/Phone:	Lorraine Herrera/505-844-3199	500 BOTTLE ORDER	Bill To: Sandia National Labs (Accounts Payable)
Service Order No.	CF 250-12	Send Report to SMO:	Lorraine Herrera /505-844-3199		P.O. Box 5800 MS 0154
Location	Tech Area				Albuquerque, NM 87185-0154
Building	Room				

Reference LOV(available at SMO)

Sample No.-Fraction	ER Sample ID or Sample Location Detail	Depth (ft)	ER Site No.	Date/Time(hr) Collected	Sample Matrix	Container Type	Container Volume	Preserv-ative	Collection Method	Sample Type	Parameter & Method Requested	Lab Sample ID
091523-001	CTF-MW3	360	NA	12/08/11 0947	GW	G	3x40ml	HCL	G	SA	TCL VOC (SW846-8260B)	291691 001
091523-009	CTF-MW3	360	NA	12/08/11 0948	GW	P	500 ml	HNO3	G	SA	TAL Metals (SW846-6020/7470)	291691 002
091523-010	CTF-MW3	360	NA	12/08/11 0949	FGW	P	500 ml	HNO3	G	SA	TAL Metals (SW846-6020/7470)	291696 001
091523-016	CTF-MW3	360	NA	12/08/11 0950	GW	P	125 ml	4C	G	SA	Anions (SW846-9056)	291691 003
091523-018	CTF-MW3	360	NA	12/08/11 0951	GW	P	125 ml	H2SO4	G	SA	NPN (353.2)	291691 004
091523-020	CTF-MW3	360	NA	12/08/11 0952	GW	P	250 ml	4C	G	SA	Perchlorate (314.0)	291691 005
091523-022	CTF-MW3	360	NA	12/08/11 0953	GW	P	500 ml	4C	G	SA	Alkalinity (SM2320B)	291691 006
091524-001	CTF-TB1	NA	NA	12/08/11 0947	DIW	G	3x40ml	HCL	G	TB	VOC (SW846-8260B)	291691 007

RMMA ☐ Yes ☑ No Ref. No.

Sample Disposal ☐ Return to Client ☑ Disposal by lab

Turnaround Time ☐ 7 Day ☐ 15 Day ☑ 30 Day

Return Samples By: ☐ Negotiated TAT

Sample Tracking Smo Use
Date Entered(mm/dd/yy):
Entered by:
QC inits:

Special Instructions/QC Requirements
EDD ☑ Yes ☐ No
Level D Package ☐ Yes ☑ No
*Send report to:
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,Fl,Cl,SO4
FGW (filtered in field with .45 micron filter)
*Please list as separate report.

Abnormal Conditions on Receipt

Lab Use

Sample Team Members

Name	Signature	Init	Company/Organization/Phone/Cellular
Robert Lynch		RL	SNL/4142/844-4013/250-7090
Alfred Santillanes			SNL/4142/844-5130/228-0710
William Gibson			SNL/4142/844-4013/239-7367
Gilbert Quintana			SNL/4142/844-2507

1.Relinquished by	Org.4142	Date 12/8/11	Time 1020	4.Relinquished by	Org.	Date	Time
1. Received by SMO	Org.4142	Date 12/8/11	Time 1020	4. Received by	Org.	Date	Time
2.Relinquished by SMO	Org.4142	Date 12/8/11	Time 1130	5.Relinquished by	Org.	Date	Time
2. Received by	Org. GEL	Date 12-9-11	Time 0730	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

GEL LABORATORIES LLC

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

Certificate of Analysis

Report Date: January 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:	091523-020	Project:	SNLSGWater
Sample ID:	291691005	Client ID:	SNLS003
Matrix:	AQUEOUS		
Collect Date:	08-DEC-11 09:52		
Receive Date:	09-DEC-11	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	12/22/11	1200	1168800	1

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	EPA 314.0 DOE-AL	

CONTRACT LABORATORY
ANALYSIS REQUEST AND CHAIN OF CUSTODY

Internal Lab

Page 1 of 2

Batch No. N/A

SMO Use

AR/COC 613929

Dept. No./Mail Stop:	6234/MS 0718	Date Samples Shipped:	12/9/11	Project/Task No.98026.01.15	☐ Waste Characterization
Project/Task Manager:	Alicia Aragon	Carrier/Waybill No:	135251	SMO Authorization: Dwelden SMO	-Send preliminary/copy report to:
Project Name:	SWMU 154	Lab Contact:	Edie Kent/803-556-8171	Contract # PO 691436	
Record Center Code:	NA	Lab Destination:	GEL		☐ Released by COC No.:
Logbook Ref. No.:	NA	SMO Contact/Phone:	Lorraine Herrera/505-844-3199	See Bottle order	☑ Validation Required
Service Order No.	CF 251-12	Send Report to SMO:	Lorraine Herrera /505-844-3199		Bill To: Sandia National Labs (Accounts Payable)
Location	Tech Area				P.O. Box 5800 MS 0154
Building	Room				Albuquerque, NM 87185-0154

Reference LOV(available at SMO)

Sample No.-Fraction	ER Sample ID or Sample Location Detail	Depth (ft)	ER Site No.	Date/Time(hr) Collected	Sample Matrix	Container Type	Container Volume	Preservative	Collection Method	Sample Type	Parameter & Method Requested	Lab Sample ID
091525-001	CTF-MW2	128	NA	12/09/11 0934	GW	G	3x40ml	HCL	G	SA	TCL VOC (SW846-8260B) *	291801 001
091525-002	CTF-MW2	128	NA	12/09/11 0936	GW	AG	4x1L	4C	G	SA	TCL SVOC (SW846-8270C)	291801 002
091525-009	CTF-MW2	128	NA	12/09/11 0937	GW	P	500 ml	HNO3	G	SA	TAL Metals+ Ur (SW846-6020/7470)	291801 003
091525-010	CTF-MW2	128	NA	12/09/11 0938	FGW	P	500 ml	HNO3	G	SA	TAL Metals+ Ur (SW846-6020/7470)	291802 001
091525-016	CTF-MW2	128	NA	12/09/11 0939	GW	P	250ml	4C	G	SA	Anions (SW846-9056)	291801 004
091525-018	CTF-MW2	128	NA	12/09/11 0940	GW	P	250ml	H2SO4	G	SA	NPN (353.2)	291801 005
091525-020	CTF-MW2	128	NA	12/09/11 0941	GW	P	500ml	4C	G	SA	Perchlorate (314.0)	291801 006
091525-022	CTF-MW2	128	NA	12/09/11 0943	GW	P	500ml	4C	G	SA	Alkalinity (SM2320B)	291801 007
091525-024	CTF-MW2	128	NA	12/09/11 0945	GW	AG	4x1L	4C	G	SA	High Explosive (SW846-8321A) Mod.	291801 008
091525-033	CTF-MW2	128	NA	12/09/11 0946	GW	P	1 Liter	HNO3	G	SA	Gamma Spec (short list)(901.0)	291801 009
091525-034	CTF-MW2	128	NA	12/09/11 0947	GW	P	1 Liter	HNO3	G	SA	Gross Alpha/Beta (900.0)	291801 010

RMMA ☐ Yes ☑ No Ref. No.

Sample Disposal ☐ Return to Client ☑ Disposal by lab

Turnaround Time ☐ 7 Day ☐ 15 Day ☑ 30 Day

Return Samples By: ☐ Negotiated TAT

Sample Tracking — Smo Use
Date Entered(mm/dd/yy):
Entered by:
QC inits:

Special Instructions/QC Requirements
EDD ☑ Yes ☐ No
Level D Package ☐ Yes ☑ No
*Send report to:
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,Fl,Cl,SO4
FGW (filtered in field with .45 micron filter)
*Please list as separate report.

Abnormal Conditions on Receipt

Lab Use

Sample Team Members

Name	Signature	Init	Company/Organization/Phone/Cellular
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
Gilbert Quintana	[signature]	GQ	SNL/4142/844-2507

1.Relinquished by [signature]	Org. 4142	Date 12/9/11	Time 1038	4.Relinquished by	Org.	Date	Time
1. Received by [signature]	Org. 4142	Date 12/9/11	Time 1038	4. Received by	Org.	Date	Time
2.Relinquished by [signature]	Org. 4142	Date 12/9/11	Time 1110	5.Relinquished by	Org.	Date	Time
2. Received by [signature]	Org. GEL	Date 12-10-11	Time 0925	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

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

AR/COC- 613929

Project Name:	SWMU 154	Project/Task Manger:	Alicia Aragon	Project/Task No.:	98026.01.15
Location	Tech Area				
Building	Room				

Reference LOV (available at SMO)

Sample No-Fraction	ER Sample ID or Sample Location detail	Pump Depth (ft)	ER Site No.	Date/Time (hr) Collected	Sample Matrix	Container Type	Container Volume	Preserv-ative	Collection Method	Sample Type	Parameter & Method Requested	Lab use: Lab Sample ID
• 091525-035	CTF-MW2	128	NA	12/09/11 0948	GW	P	1 Liter	HNO3	G	SA	Isotopic Ur (ASTM D3972-09M)	291501 011
• 091526-001	CTF-TB2	NA	NA	12/09/11 0934	DIW	G	3x40ml	HCL	G	TB	VOC (SW846-8260B)	291801 012
											* Zero head space in VOC containers	
											unachievable due to carbonation in	
											groundwater	

Abnormal Conditions on Receipt

LAB USE

Recipient Initials MK

GEL LABORATORIES LLC

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

Certificate of Analysis

Report Date: January 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:	091525-020	Project:	SNLSGWater
Sample ID:	291801006	Client ID:	SNLS003
Matrix:	AQUEOUS		
Collect Date:	09-DEC-11 09:41		
Receive Date:	10-DEC-11	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	12/22/11	1258	1168800	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

616 Maxine NE
Albuquerque, NM 87123
505-299-5201
www.aqainc.net

Memorandum

Date: November 18, 2011

To: File

From: Kevin Lambert

Subject: Inorganic Data Review and Validation – SNL
Site: Burn Site GWM (LTS)
AR/COC: 613871
SDG: 288246
Laboratory: GEL
Project/Task: 146422.10.11.01
Analysis: General Chemistry

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

Summary

One sample was prepared and analyzed with accepted procedures using methods EPA 353.2 (nitrate/nitrite by Cd reduction) and EPA 314.0 (perchlorate). 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.

Laboratory Control Sample (LCS)

All LCS recoveries met QC acceptance criteria.

Matrix Spike (MS)

All MS recoveries met QC acceptance criteria.

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

Laboratory Replicate

The replicate met all QC acceptance criteria.

All Analyses:
It should be noted that the replicate analyses were performed on SNL samples from other SDGs. 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 sample was diluted 50X 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 ≤5X. No sample data will be qualified as a result.

Other QC

No other specific issues that affect data quality were identified.

Reviewed by: David Schwent **Date**: 11/18/11

Sample Findings Summary

AR/COC: 613871

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

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

Sample Findings Summary

AR/COC: 613879, 613880, 613881, 613882

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
DOE EML HASL-300, U-02-RC			
	091340-035/OBS-EB1	Uranium-233/234 (N/A)	BD, FR3
	091340-035/OBS-EB1	Uranium-235/236 (13982-70-2)	BD, FR3
	091340-035/OBS-EB1	Uranium-238 (7440-61-1)	BD, FR3
EPA 353.2			
	091337-018/OBS-MW2	Nitrogen, Nitrate/Nitrite (N/A)	0.069U, B
EPA 900.0/SW846 9310			
	091340-034/OBS-EB1	ALPHA (12587-46-1)	BD, FR3
	091340-034/OBS-EB1	BETA (12587-47-2)	BD, FR3
EPA 901.1			
	091335-033/OBS-MW1	Americium-241 (14596-10-2)	BD, FR3
	091335-033/OBS-MW1	Cesium-137 (10045-97-3)	BD, FR3
	091335-033/OBS-MW1	Cobalt-60 (10198-40-0)	BD, FR3
	091335-033/OBS-MW1	Potassium-40 (13966-00-2)	R, Z2
	091337-033/OBS-MW2	Americium-241 (14596-10-2)	BD, FR3
	091337-033/OBS-MW2	Cesium-137 (10045-97-3)	BD, FR3
	091337-033/OBS-MW2	Cobalt-60 (10198-40-0)	BD, FR3
	091337-033/OBS-MW2	Potassium-40 (13966-00-2)	J, FR7
	091340-033/OBS-EB1	Americium-241 (14596-10-2)	BD, FR3
	091340-033/OBS-EB1	Cesium-137 (10045-97-3)	BD, FR3
	091340-033/OBS-EB1	Cobalt-60 (10198-40-0)	BD, FR3
	091340-033/OBS-EB1	Potassium-40 (13966-00-2)	BD, FR3
	091342-033/OBS-MW3	Americium-241 (14596-10-2)	BD, FR3
	091342-033/OBS-MW3	Cesium-137 (10045-97-3)	BD, FR3
	091342-033/OBS-MW3	Cobalt-60 (10198-40-0)	BD, FR3
	091342-033/OBS-MW3	Potassium-40 (13966-00-2)	BD, FR3

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
	091343-033/OBS-MW3	Americium-241 (14596-10-2)	BD, FR3
	091343-033/OBS-MW3	Cesium-137 (10045-97-3)	BD, FR3
	091343-033/OBS-MW3	Cobalt-60 (10198-40-0)	BD, FR3
	091343-033/OBS-MW3	Potassium-40 (13966-00-2)	BD, FR3
SW846 3005/6020 DOE-AL			
	091335-009/OBS-MW1	Copper (7440-50-8)	0.0019U, B
	091337-009/OBS-MW2	Copper (7440-50-8)	0.0019U, B
	091337-009/OBS-MW2	Iron (7439-89-6)	0.24U, B
	091340-009/OBS-EB1	Calcium (7440-70-2)	0.59U, B
	091340-009/OBS-EB1	Copper (7440-50-8)	0.0019U, B
	091340-009/OBS-EB1	Iron (7439-89-6)	0.24U, B
	091340-017/OBS-EB1	Calcium (7440-70-2)	0.59U, B
	091342-009/OBS-MW3	Copper (7440-50-8)	0.0019U, B
	091342-009/OBS-MW3	Iron (7439-89-6)	0.24U, B
	091342-009/OBS-MW3	Manganese (7439-96-5)	0.0053U, B2
	091343-009/OBS-MW3	Copper (7440-50-8)	0.0019U, B
	091343-009/OBS-MW3	Iron (7439-89-6)	0.24U, B
	091343-009/OBS-MW3	Manganese (7439-96-5)	0.0053U, B2
SW846 7470A			
	091335-009/OBS-MW1	Mercury (7439-97-6)	UJ, B4
	091337-009/OBS-MW2	Mercury (7439-97-6)	UJ, B4
	091340-009/OBS-EB1	Mercury (7439-97-6)	UJ, B4
	091342-009/OBS-MW3	Mercury (7439-97-6)	UJ, B4
	091343-009/OBS-MW3	Mercury (7439-97-6)	UJ, B4
SW846 8270C			
	091335-002/OBS-MW1	4-Nitrophenol (100-02-7)	UJ, L3
	091337-002/OBS-MW2	4-Nitrophenol (100-02-7)	UJ, L3
	091340-002/OBS-EB1	4-Nitrophenol (100-02-7)	UJ, L3
	091342-002/OBS-MW3	4-Nitrophenol (100-02-7)	UJ, L3

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
	091343-002/OBS-MW3	4-Nitrophenol (100-02-7)	UJ, L3

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

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Albuquerque, NM 87123
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www.aqainc.net

Memorandum

Date: December 8, 2011

To: File

From: Kevin Lambert

Subject: Inorganic Data Review and Validation – SNL
Site: SWMU 68 GW Characterization
AR/COC: 613879, 613880, 613881, and 613882
SDG: 288686
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

Five 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:
   Nitrate/Nitrite was detected in the MB at a concentration > the MDL but ≤ the PQL. The nitrate/nitrite result for sample 288686-066 was a detect <5X the MB result and will be **qualified "0.069U,B"** at 5X the value of the MB (mg/L). The other associated sample results were either NDs or detects >5X the MB 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 except as follows.

Hexavalent Chromium:
The 24-hour HT for sample -004 was exceeded by one minute. Based on professional judgment, the associated sample result was not qualified due to this minor HT infraction.

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 EB, sample -005, associated with samples -020 and -034, chloride was detected at a concentration > the PQL. The associated sample results were detects >5X the EB concentration and will not be qualified.

Laboratory Control Sample (LCS)

All LCS recoveries met QC acceptance criteria.

Matrix Spike (MS)

All MS recoveries met QC acceptance criteria.

Laboratory Replicate

The replicate met all QC acceptance criteria.

Detection Limits/Dilutions

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

Anions:
All samples except sample -005 were diluted 5X for chloride and sulfate due to high concentrations for this analysis.

Nitrate/Nitrite:
Samples -022, -036, and -051 were diluted 10X 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

EBs 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 on AR/COC# 613881 is associated with the samples on AR/COC# 613882.

No other specific issues that affect data quality were identified.

Reviewed by: David Schwent **Date**: 12/09/11

Sample Findings Summary

AR/COC: 613883, 613884, 613885

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
DOE EML HASL-300, U-02-RC			
	091345-035/CCBA-MW1	Uranium-235/236 (13982-70-2)	J, FR7
	091347-035/CCBA-EB1	Uranium-233/234 (N/A)	BD, FR3
	091347-035/CCBA-EB1	Uranium-235/236 (13982-70-2)	BD, FR3
	091347-035/CCBA-EB1	Uranium-238 (7440-61-1)	BD, FR3
	091350-035/CCBA-MW2	Uranium-235/236 (13982-70-2)	J, FR7
EPA 353.2			
	091345-018/CCBA-MW1	Nitrogen, Nitrate/Nitrite (N/A)	0.069U, B
EPA 900.0/SW846 9310			
	091345-034/CCBA-MW1	ALPHA (12587-46-1)	J, FR7
	091347-034/CCBA-EB1	ALPHA (12587-46-1)	BD, FR3
	091347-034/CCBA-EB1	BETA (12587-47-2)	BD, FR3
	091349-034/CCBA-MW2	BETA (12587-47-2)	J, FR7
EPA 901.1			
	091345-033/CCBA-MW1	Americium-241 (14596-10-2)	BD, FR3
	091345-033/CCBA-MW1	Cesium-137 (10045-97-3)	BD, FR3
	091345-033/CCBA-MW1	Cobalt-60 (10198-40-0)	BD, FR3
	091345-033/CCBA-MW1	Potassium-40 (13966-00-2)	BD, FR3
	091347-033/CCBA-EB1	Americium-241 (14596-10-2)	BD, FR3
	091347-033/CCBA-EB1	Cesium-137 (10045-97-3)	BD, FR3
	091347-033/CCBA-EB1	Cobalt-60 (10198-40-0)	BD, FR3
	091347-033/CCBA-EB1	Potassium-40 (13966-00-2)	BD, FR3
	091349-033/CCBA-MW2	Americium-241 (14596-10-2)	BD, FR3
	091349-033/CCBA-MW2	Cesium-137 (10045-97-3)	BD, FR3
	091349-033/CCBA-MW2	Cobalt-60 (10198-40-0)	BD, FR3
	091349-033/CCBA-MW2	Potassium-40 (13966-00-2)	BD, FR3

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
	091350-033/CCBA-MW2	Americium-241 (14596-10-2)	BD, FR3
	091350-033/CCBA-MW2	Cesium-137 (10045-97-3)	BD, FR3
	091350-033/CCBA-MW2	Cobalt-60 (10198-40-0)	BD, FR3
	091350-033/CCBA-MW2	Potassium-40 (13966-00-2)	BD, FR3
SW846 3005/6020 DOE-AL			
	091345-009/CCBA-MW1	Sodium (7440-23-5)	J, D1
	091345-017/CCBA-MW1	Sodium (7440-23-5)	J, D1
	091347-009/CCBA-EB1	Calcium (7440-70-2)	0.54U, B
	091347-009/CCBA-EB1	Sodium (7440-23-5)	UJ, D1
	091347-017/CCBA-EB1	Calcium (7440-70-2)	0.54U, B
	091347-017/CCBA-EB1	Sodium (7440-23-5)	UJ, D1
	091349-009/CCBA-MW2	Copper (7440-50-8)	0.0023U, B2
	091349-009/CCBA-MW2	Sodium (7440-23-5)	J, D1
	091349-017/CCBA-MW2	Sodium (7440-23-5)	J, D1
	091350-009/CCBA-MW2	Copper (7440-50-8)	0.0023U, B2
	091350-009/CCBA-MW2	Sodium (7440-23-5)	J, D1
	091350-017/CCBA-MW2	Sodium (7440-23-5)	J, D1
SW846 3535/8321A Modified			
	091345-024/CCBA-MW1	Tetryl (479-45-8)	UJ, L3
	091347-024/CCBA-EB1	Tetryl (479-45-8)	UJ, L3
	091349-024/CCBA-MW2	Tetryl (479-45-8)	UJ, L3
	091350-024/CCBA-MW2	Tetryl (479-45-8)	UJ, L3
SW846 7470A			
	091345-009/CCBA-MW1	Mercury (7439-97-6)	UJ, B4
	091347-009/CCBA-EB1	Mercury (7439-97-6)	UJ, B4
	091349-009/CCBA-MW2	Mercury (7439-97-6)	UJ, B4
	091350-009/CCBA-MW2	Mercury (7439-97-6)	UJ, B4
SW846 8260B DOE-AL			
	091347-001/CCBA-EB1	Bromoform (75-25-2)	J, I3
	091352-001/CCBA-FB1	Bromodichloromethane (75-27-4)	3.3U, B2

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
	091352-001/CCBA-FB1	Chloroform (67-66-3)	3.8U, B2
	091352-001/CCBA-FB1	Dibromochloromethane (124-48-1)	2.9U, B2

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

616 Maxine NE
Albuquerque, NM 87123
505-299-5201
www.aqainc.net

Memorandum

Date: December 9, 2011

To: File

From: Kevin Lambert

Subject: Inorganic Data Review and Validation – SNL
Site: SWMU 8 and 58 GW Characterization
AR/COC: 613883, 613884, and 613885
SDG: 289184
Laboratory: GEL
Project/Task: 98026.01.12
Analysis: General Chemistry

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

Summary

Four samples were prepared and analyzed with accepted procedures using methods EPA 9056 (anions by 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:
   Nitrate/Nitrite was detected in the MB at a concentration > the MDL but ≤ the PQL. The nitrate/nitrite result for sample 289184-006 was a detect <5X the MB result and will be **qualified "0.069U,B"** at 5X the value of the MB (mg/L). The other associated sample results were either NDs or detects >5X the MB 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.

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 EB, sample -018, associated with samples -032 and -045, chloride was detected at a concentration > the PQL. The associated sample results were detects >5X the EB concentration and will not be qualified.

Alkalinity:
In the MB and EB, 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.

Laboratory Replicate

The replicate met all QC acceptance criteria.

Detection Limits/Dilutions

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

Anions:
All samples except sample -018 were diluted 10X for chloride and sulfate due to high concentrations for this analysis.

Nitrate/Nitrite:
Samples -034 and -047 were diluted 10X 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

EBs 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 on AR/COC# 613884 is associated with the samples on AR/COC# 613885.

No other specific issues that affect data quality were identified.

Reviewed by: David Schwent **Date**: 12/13/11

Sample Findings Summary

AR/COC: 613899, 613902, 613903

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
SW846 3005/6020 DOE-AL			
	091408-017/TAV-MW13	Calcium (7440-70-2)	J, D1
	091414-017/TAV-EB2	Calcium (7440-70-2)	0.52UJ, B,D1
	091416-010/TAV-MW11	Iron (7439-89-6)	0.33U, B2
	091416-017/TAV-MW11	Calcium (7440-70-2)	J, D1
	091417-010/TAV-MW11	Iron (7439-89-6)	0.33U, B2
	091417-017/TAV-MW11	Calcium (7440-70-2)	J, D1
SW846 8260B DOE-AL			
	091414-001/TAV-EB2	Dibromochloromethane (124-48-1)	J, I3

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

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Albuquerque, NM 87123
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Memorandum

Date: December 15, 2011

To: File

From: Kevin Lambert

Subject: Inorganic Data Review and Validation – SNL
Site: TA III/V GW Characterization
AR/COC: 613899, 613902, and 613903
SDG: 289753
Laboratory: GEL
Project/Task: 98026.01.10
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 906 (TOC), EPA 9056 (anions by ion chromatography), EPA 353.2 (nitrate/nitrite by Cd reduction), EPA 314.0 (perchlorate), SM 2320B (alkalinity), and EPA 9034 (sulfide). 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:
In the EB, sample 289753-012, associated with samples -021 and -029, chloride and sulfate were detected at concentrations > the PQL. All associated sample results were detects >5X the EB concentration and will not be qualified.

Alkalinity:
In the MBs and EB, 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. It should be noted that the MS analyses except for TOC, perchlorate, and alkalinity Batch #1160807 were performed on SNL samples from other SDGs. No sample data will be qualified as a result.

Laboratory Replicate

The replicate met all QC acceptance criteria. It should be noted that the replicate analyses except for TOC, perchlorate, and alkalinity Batch #1160807 were performed on SNL samples from other SDGs. 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 -003 was diluted 2X for sulfate and samples -021 and -029 were diluted 5X for chloride and sulfate due to high concentrations for this analysis.

Nitrate/Nitrite:
Samples -005, -023, and -031 were diluted 10X 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

EBs 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 on AR/COC# 613902 is associated with the samples on AR/COC# 613903.

No other specific issues that affect data quality were identified.

Reviewed by: David Schwent **Date**: 12/20/11

616 Maxine NE
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Memorandum

Date: January 6, 2012

To: File

From: Kevin Lambert

Subject: Inorganic Data Review and Validation – SNL
Site: TA III/V GW Characterization
AR/COC: 613910
SDG: 290864
Laboratory: GEL
Project/Task: 98026.01.10
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 9060 (total organic carbon), EPA 9056 (Anions by Ion Chromatography), EPA 353.2 (nitrate/nitrite by Cd reduction), EPA 314.0 (perchlorate), SM 2320B (alkalinity), and EPA 9034 (sulfide). 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.

Nitrate/Nitrite:
In the CCB, nitrate/nitrite was detected at a negative concentration with an absolute value > the MDL but ≤ the PQL. The associated sample result was a detect >5X the MDL and will not be qualified.

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. It should be noted that the MS analyses except for TOC and perchlorate were performed on SNL samples from other SDGs. No sample data will be qualified as a result.

Laboratory Replicate

The replicate met all QC acceptance criteria. It should be noted that the replicate analyses except for TOC and perchlorate were performed on SNL samples from other SDGs. 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 10X 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 ≤5X. No sample data will be qualified as a result.

Other QC

No other specific issues that affect data quality were identified.

Reviewed by: David Schwent **Date**: 01/10/12

Sample Findings Summary

AR/COC: 613910

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
SW846 8260B DOE-AL			
	091433-001/TAV-MW14	2-Butanone (78-93-3)	UJ, I4
	091433-001/TAV-MW14	Acetone (67-64-1)	UJ, I4
	091434-001/TAV-TB16	2-Butanone (78-93-3)	UJ, I4
	091434-001/TAV-TB16	Acetone (67-64-1)	UJ, I4
	091435-001/TAV-FB3	2-Butanone (78-93-3)	UJ, I4
	091435-001/TAV-FB3	Acetone (67-64-1)	UJ, I4

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

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Albuquerque, NM 87123
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Memorandum

Date: January 6, 2012

To: File

From: Kevin Lambert

Subject: Inorganic Data Review and Validation – SNL
Site: TA III/V GW Characterization
AR/COC: 613911
SDG: 291007
Laboratory: GEL
Project/Task: 98026.01.10
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 9060 (total organic carbon), EPA 9056 (Anions by Ion Chromatography), EPA 353.2 (nitrate/nitrite by Cd reduction), EPA 314.0 (perchlorate), SM 2320B (alkalinity), and EPA 9034 (sulfide). 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.

Nitrate/Nitrite:
In the MB, nitrate/nitrite was detected at a concentration > the MDL but ≤ the PQL. The associated sample result was a detect >5X the MB concentration and will not be qualified.

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

Laboratory Replicate

The replicate met all QC acceptance criteria. It should be noted that the replicate analyses for alkalinity was performed on an SNL sample from another SDG. No sample data will be qualified as a result.

Detection Limits/Dilutions

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

Anions:
The sample was diluted 10X for chloride and sulfate due to high concentrations for this analysis.

Nitrate/Nitrite:
The sample was diluted 10X 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 ≤5X. No sample data will be qualified as a result.

Other QC

No other specific issues that affect data quality were identified.

Reviewed by: David Schwent **Date**: 01/10/12

Sample Findings Summary

AR/COC: 613911

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
SW846 8260B DOE-AL			
	091436-001/TAV-MW12	Bromoform (75-25-2)	UJ, I3
	091436-001/TAV-MW12	Vinyl acetate (108-05-4)	UJ, I4
	091437-001/TAV-TB17	Bromoform (75-25-2)	UJ, I3
	091437-001/TAV-TB17	Vinyl acetate (108-05-4)	UJ, I4

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

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www.aqainc.net

Memorandum

Date: January 19, 2012

To: File

From: Kevin Lambert

Subject: Inorganic Data Review and Validation – SNL
Site: SWMU 154 GWM
AR/COC: 613929
SDG: 291801
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), and SM 2320B (alkalinity). 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 QC acceptance criteria were met.

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

Perchlorate, Anions, and Nitrate/Nitrite:
It should be noted that the MS analyses were performed on SNL samples from other SDGs. No sample data will be qualified as a result.

Laboratory Replicate

The replicate met all QC acceptance criteria.

Perchlorate, Anions, and Nitrate/Nitrite:
It should be noted that the replicate analyses were performed on SNL samples from other SDGs. 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 sample was diluted 5X due to matrix interference.

Anions:
The sample was diluted 50X 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 ≤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**: 02/02/12

Sample Findings Summary

AR/COC: 613929

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
EPA 901.1			
	091525-033/CTF-MW2	Americium-241 (14596-10-2)	BD, FR3
	091525-033/CTF-MW2	Cesium-137 (10045-97-3)	BD, FR3
	091525-033/CTF-MW2	Cobalt-60 (10198-40-0)	BD, FR3
	091525-033/CTF-MW2	Potassium-40 (13966-00-2)	J, FR7
SW846 3005/6020 DOE-AL			
	091525-009/CTF-MW2	Barium (7440-39-3)	J, D1
	091525-009/CTF-MW2	Manganese (7439-96-5)	J, MS1
	091525-009/CTF-MW2	Nickel (7440-02-0)	J+, CK2
	091525-010/CTF-MW2	Barium (7440-39-3)	J, D1
	091525-010/CTF-MW2	Manganese (7439-96-5)	J, MS1
	091525-010/CTF-MW2	Nickel (7440-02-0)	J+, CK2
SW846 3535/8321A Modified			
	091525-024/CTF-MW2	Tetryl (479-45-8)	UJ, L3

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

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SECTION III
SOLID WASTE MANAGEMENT UNITS 149 AND 154 QUARTERLY GROUNDWATER MONITORING REPORT, OCTOBER – DECEMBER 2011

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 as follows.

Monitoring wells CTF-MW3 and CTF-MW2 were installed in August 2001. Prior to this sampling event, CTF-MW3 and CTF-MW2 had been sampled 14 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 fourth 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 supplemental groundwater monitoring 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 section correspond to the reporting period of October through December 2011. Monitoring wells CTF-MW3 and CTF-MW2 were sampled on December 8 and December 9, 2011, 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 December 2011 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 0.0469 mg/L in the unfiltered sample and 0.0495 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 fourth of eight supplemental quarterly events for monitoring wells CTF-MW3 and CTF-MW2. The fifth of the eight supplemental quarterly groundwater sampling events will be conducted during the upcoming quarter (January to March 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 August 2007a and August 2007b). 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 Fourth Quarter, Calendar Year (CY) 2011.

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 Sampling Equipment Decontamination" (SNL/NM August 2007a).

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 August 2007b), 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 620 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 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). 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-16. 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

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 at concentrations of 0.480, 0.730, and 0.340 micrograms per liter (µg/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. The VOC toluene was detected below the MCL of 1,000 µg/L at a concentration of 0.720 µg/L. Table III-4 summarizes VOCs detected in environmental groundwater samples from well CTF-MW2, and Table III-5 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 at concentrations exceeding established MCLs in any of the CTF-MW2 groundwater sample. The HE compound

RDX [hexahydro-1,3,5-trinitro-1,3,5-triazine] was detected in the sample from CTF-MW2 at a concentration of 0.222 µg/L. Table III-4 summarizes HE compounds detected in environmental groundwater samples, and Table III-7 lists the MDLs for the associated HE compounds.

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 5.30 mg/L in the CTF-MW3 environmental sample.

SWMU 154, CTF-MW2. Table III-8 summarizes NPN results for CTF-MW2. No detections of NPN above the laboratory MDL (0.050 mg/L) 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 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 0.0469 mg/L, and dissolved arsenic at 0.0495 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 potassium-40. The potassium-40 activity was reported at 75.4 ± 45.8 picocuries per liter (pCi/L), and 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 was reported below the MCL of 15 pCi/L at 2.85 pCi/L. The results reported for isotopic uranium are as follows: uranium 233/234 at 58.0 ± 8.17 pCi/L, uranium 235/236 at 0.652 ± 0.221 pCi/L, and uranium 238 at 8.00 ± 1.27 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 in CTF-MW2. 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.

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

4.2 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 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 December 2011 sampling event. No VOCs were detected in the TB samples above associated laboratory MDLs.

4.3 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 included as Appendix C.

4.4 Variances and Nonconformances

No variances 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 December 2011 sampling activities at CTF-MW3 and CTF-MW2.

5.0 Summary

During the Fourth Quarter of CY 2011, samples were collected from monitoring wells 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 included 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 included 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 was detected above the MCL of 0.010 mg/L in the CTF-MW2 groundwater samples at concentrations of 0.0469 mg/L in the unfiltered sample and 0.0495 mg/L in the filtered sample. The elevated concentrations of arsenic in the groundwater samples are most likely attributable to background because monitoring well CTF-MW2 is screened in a fault-gouge zone in the Precambrian granite. These values are comparable to 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), August 2007a. "Long-Term Environmental Stewardship (LTES) Groundwater Sampling 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), August 2007b. "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), 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.

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.

Figures

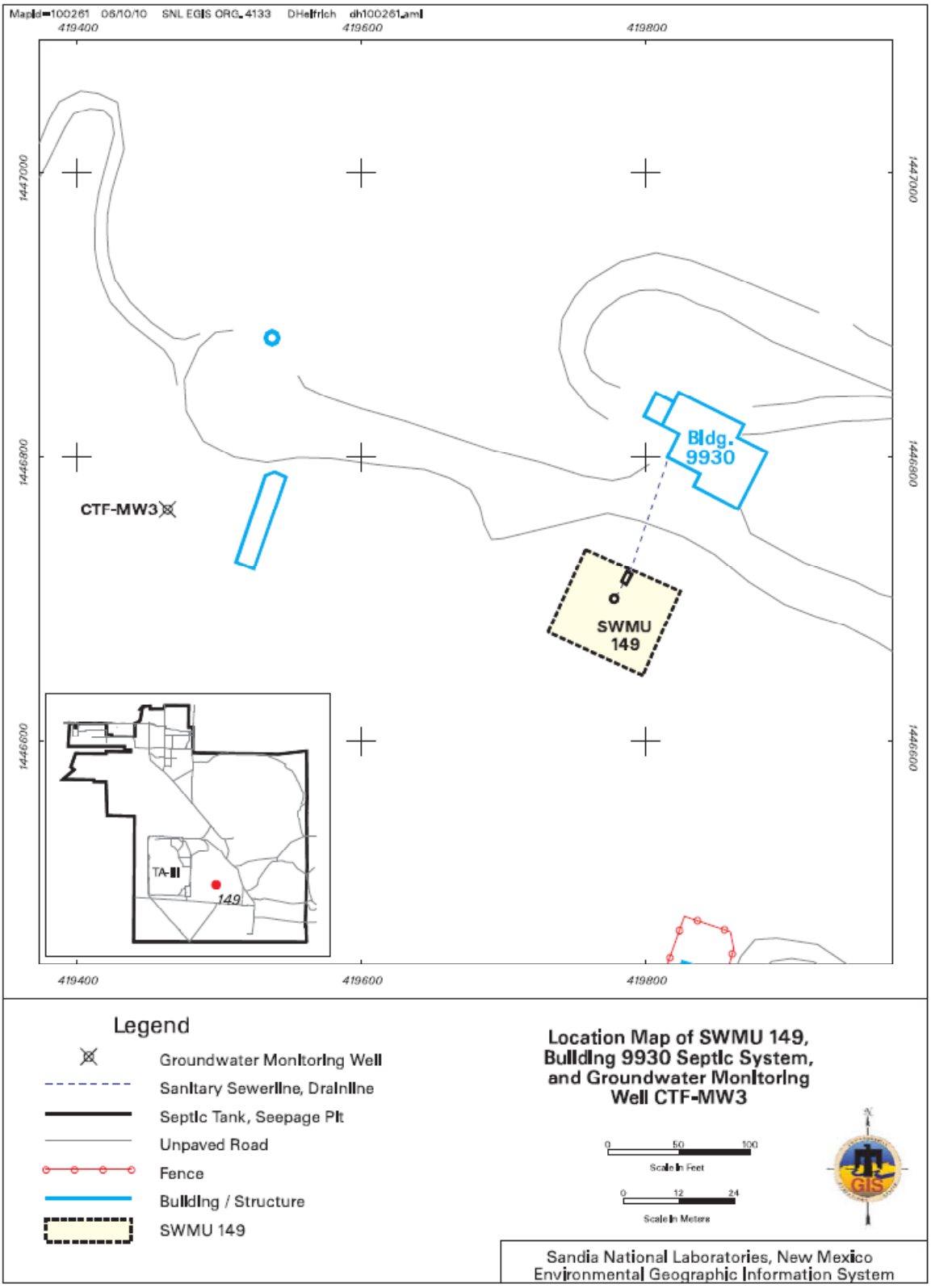

Figure III-1

Location of Monitoring Well CTF-MW3 near SWMU 149

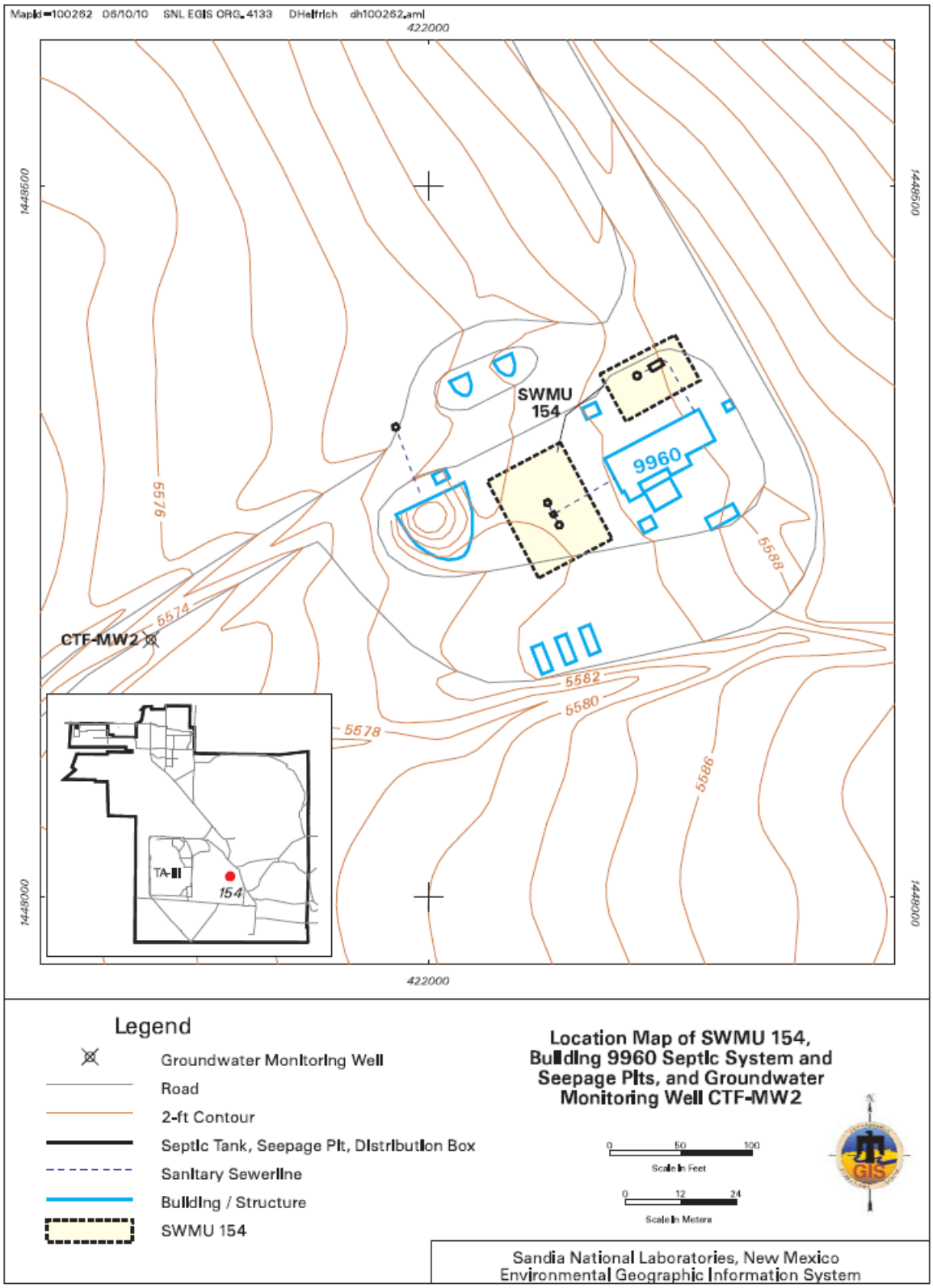

Figure III-2

Location of Monitoring Well CTF-MW2 near SWMU 154

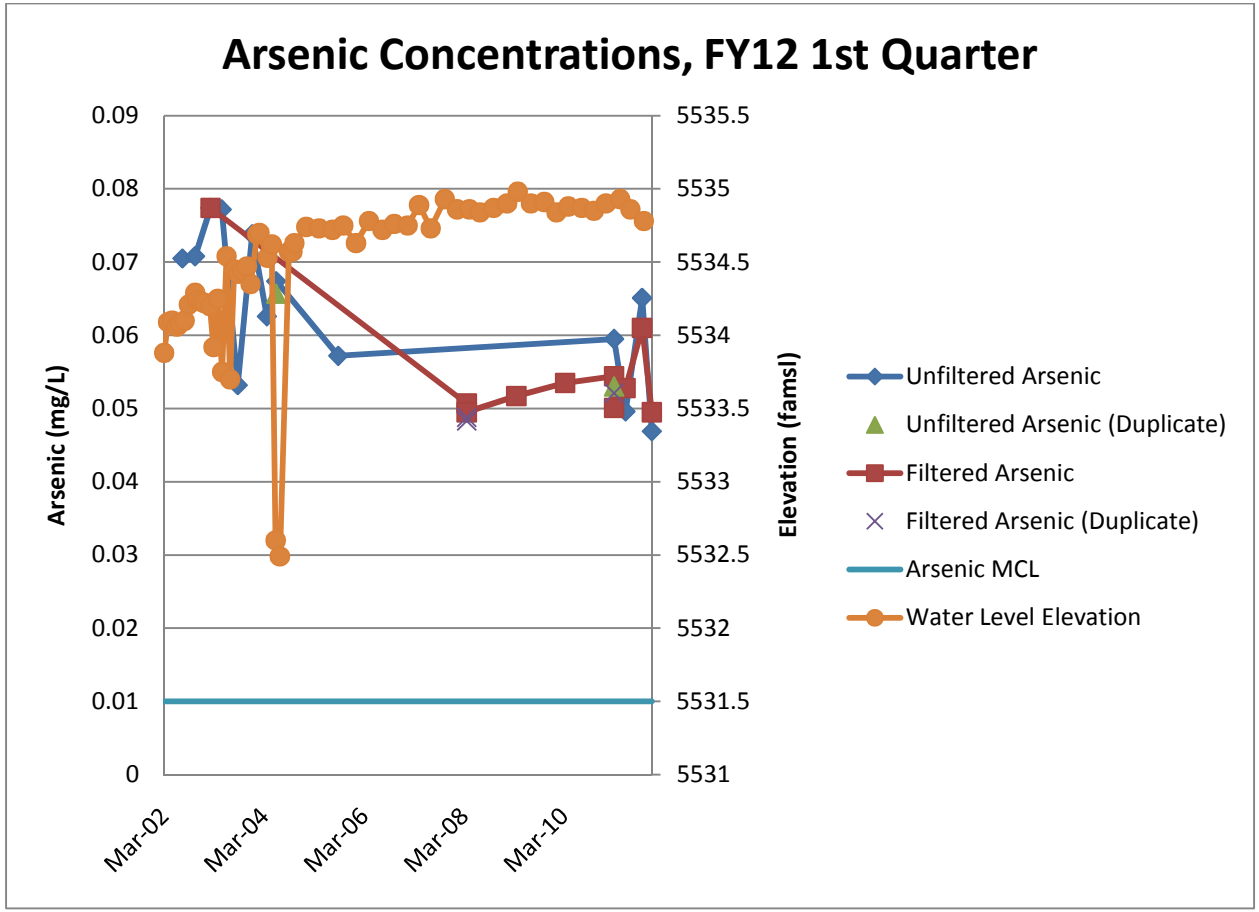

Figure III-3

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 SWMU 149 and 154 Groundwater Samples

Analysis	Analytical Method[a]	Volume and Container Type/Preservation Requirements
Volatile Organic Compounds	EPA 8260B	3 x 40-mL glass, HCL, 4°C
Semivolatile Organic Compounds	EPA 8270C	3 x 1-L Amber Glass, 4°C
High Explosives	EPA 8321A	4 x 1-L Amber Glass, 4°C
Metals[b]	EPA 6020/7470	1 x 500-mL polyethylene, HNO_3, 4°C
Perchlorate	EPA 314.0	1 x 250-mL polyethylene, 4°C
Major Anions and Cations[c]	EPA 6020/7470/9056	1 x 500-mL polyethylene, 4°C
Alkalinity as Total, Carbonate, and Bicarbonate	SM 2320B	1 x 500-mL polyethylene, 4°C
Nitrate plus Nitrite	EPA 353.2	1 x 250-mL polyethylene, H_2SO_4, 4°C
Gross Alpha/Beta	EPA 900.0	1 x 1-L polyethylene, HNO_3, 4°C
Gamma Spectroscopy[d]	EPA 901.0	1 x 1-L polyethylene, HNO_3, 4°C

Notes

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

°C = Degrees Celsius.
EPA = U.S. Environmental Protection Agency.
H_2SO_4 = Sulfuric acid.
HCl = Hydrochloric acid.
HNO_3 = Nitric acid.
L = Liter
mL = Milliliter(s).
SM = Standard Method.
SWMU = Solid Waste Management Unit.
TAL = Target Analyte List.

Table III-2

Sample Details for Fourth Quarter, CY 2011 Groundwater Sampling

Solid Waste Management Units 149 and 154 Groundwater Monitoring Quarterly Assessment

October 2011 – December 2011

Well	Sample Identification	AR/COC Number	Associated Groundwater Investigation
CTF-MW3	091523	613928	SWMU 149
CTF-MW2	091525	613929	SWMU 154

Notes

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

Table III-3

Summary of Field Water Quality Measurements[a]

Solid Waste Management Units 149 and 154 Groundwater Monitoring

Quarterly Assessment, October 2011 – December 2011

Well ID	Sample Date	Temperature (°C)	Specific Conductivity (µmhos/cm)	Oxidation Reduction Potential (mV)	pH	Turbidity (NTU)	Dissolved Oxygen (% Sat)	Dissolved Oxygen (mg/L)
SWMU 149								
CTF-MW3	08-Dec-11	17.07	1847	414.8	6.72	0.54	70.4	6.69
SWMU 154								
CTF-MW2	09-Dec-11	14.85	4021	135.3	5.44	1.96	2.3	0.23

Notes

[a]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, October 2011 – December 2011

Well ID	Analyte	Result (µg/L)	MDL (µg/L)	PQL (µg/L)	MCL (µg/L)	Laboratory Qualifier[a]	Validation Qualifier[b]	Sample No.	Analytical Method[c]
SWMU 149									
CTF-MW3 08-Dec-11	Bromodichloromethane	0.480	0.250	1.00	NE	J		091523-001	SW846-8260B
	Chloroform	0.730	0.250	1.00	NE	J		091523-001	SW846-8260B
	Dibromochloromethane	0.340	0.300	1.00	NE	J		091523-001	SW846-8260B
SWMU 154									
CTF-MW2 09-Dec-11	Toluene	0.720	0.250	1.00	1000	J		091525-001	SW846-8260B
	RDX	0.222	0.104	0.325	NE	J		091525-024	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.

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

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

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

Table III-5

Method Detection Limits for Volatile Organic Compounds (EPA Method 8260)

Solid Waste Management Unit 149 Groundwater Monitoring

Quarterly Assessment, October 2011 – December 2011

Analyte	MDL (µg/L)
1,1,1-Trichloroethane	0.325
1,1,2,2-Tetrachloroethane	0.250
1,1,2-Trichloroethane	0.250
1,1-Dichloroethane	0.300
1,1-Dichloroethene	0.300
1,2-Dichloroethane	0.250
1,2-Dichloropropane	0.250
2-Butanone	1.25
2-Hexanone	1.25
4-methyl-, 2-Pentanone	1.25
Acetone	3.50
Benzene	0.300
Bromodichloromethane	0.250
Bromoform	0.250
Bromomethane	0.300
Carbon disulfide	1.25
Carbon tetrachloride	0.300
Chlorobenzene	0.250
Chloroethane	0.300
Chloroform	0.250
Chloromethane	0.300
Dibromochloromethane	0.300
Ethyl benzene	0.250
Methylene chloride	3.00
Styrene	0.250
Tetrachloroethene	0.300
Toluene	0.250
Trichloroethene	0.250
Vinyl acetate	1.50
Vinyl chloride	0.500
Xylene	0.300
cis-1,2-Dichloroethene	0.300
cis-1,3-Dichloropropene	0.250
trans-1,2-Dichloroethene	0.300
trans-1,3-Dichloropropene	0.250

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, October 2011 – December 2011

Analyte	MDL (µg/L)	Analytical Method[a]	Analyte	MDL (µg/L)	Analytical Method[a]	Analyte	MDL (µg/L)	Analytical Method[a]
1,1,1-Trichloroethane	0.325	8260B	1,2,4-Trichlorobenzene	3.00	8270C	Di-n-butyl phthalate	3.00	8270C
1,1,2,2-Tetrachloroethane	0.250	8260B	1,2-Dichlorobenzene	3.00	8270C	Di-n-octyl phthalate	3.00	8270C
1,1,2-Trichloroethane	0.250	8260B	1,3-Dichlorobenzene	3.00	8270C	Dibenz[a,h]anthracene	0.300	8270C
1,1-Dichloroethane	0.300	8260B	1,4-Dichlorobenzene	3.00	8270C	Dibenzofuran	3.00	8270C
1,1-Dichloroethene	0.300	8260B	2,4,5-Trichlorophenol	3.00	8270C	Diethylphthalate	3.00	8270C
1,2-Dichloroethane	0.250	8260B	2,4,6-Trichlorophenol	3.00	8270C	Dimethylphthalate	3.00	8270C
1,2-Dichloropropane	0.250	8260B	2,4-Dichlorophenol	3.00	8270C	Dinitro-o-cresol	3.00	8270C
2-Butanone	1.25	8260B	2,4-Dimethylphenol	3.00	8270C	Diphenyl amine	3.00	8270C
2-Hexanone	1.25	8260B	2,4-Dinitrophenol	5.00	8270C	Fluoranthene	0.300	8270C
4-methyl-, 2-Pentanone	1.25	8260B	2,4-Dinitrotoluene	3.00	8270C	Fluorene	0.300	8270C
Acetone	3.50	8260B	2,6-Dinitrotoluene	3.00	8270C	Hexachlorobenzene	3.00	8270C
Benzene	0.300	8260B	2-Chloronaphthalene	0.300	8270C	Hexachlorobutadiene	3.00	8270C
Bromodichloromethane	0.250	8260B	2-Chlorophenol	3.00	8270C	Hexachlorocyclopentadiene	3.00	8270C
Bromoform	0.250	8260B	2-Methylnaphthalene	0.300	8270C	Hexachloroethane	3.00	8270C
Bromomethane	0.300	8260B	2-Nitroaniline	3.00	8270C	Indeno(1,2,3-c,d)pyrene	0.300	8270C
Carbon disulfide	1.25	8260B	2-Nitrophenol	3.00	8270C	Isophorone	3.00	8270C
Carbon tetrachloride	0.300	8260B	3,3'-Dichlorobenzidine	3.00	8270C	Naphthalene	0.300	8270C
Chlorobenzene	0.250	8260B	3-Nitroaniline	3.00	8270C	Nitro-benzene	3.00	8270C
Chloroethane	0.300	8260B	4-Bromophenyl phenyl ether	3.00	8270C	Pentachlorophenol	3.00	8270C
Chloroform	0.250	8260B	4-Chloro-3-methylphenol	3.00	8270C	Phenanthrene	0.300	8270C
Chloromethane	0.300	8260B	4-Chlorobenzenamine	3.00	8270C	Phenol	3.00	8270C
Dibromochloromethane	0.300	8260B	4-Chlorophenyl phenyl ether	3.00	8270C	Pyrene	0.300	8270C
Ethyl benzene	0.250	8260B	4-Nitroaniline	3.00	8270C	bis(2-Chloroethoxy)methane	3.00	8270C
Methylene chloride	3.00	8260B	4-Nitrophenol	3.00	8270C	bis(2-Chloroethyl)ether	3.00	8270C
Styrene	0.250	8260B	Acenaphthene	0.300	8270C	bis(2-Ethylhexyl)phthalate	3.00	8270C
Tetrachloroethene	0.300	8260B	Acenaphthylene	0.300	8270C	bis-Chloroisopropyl ether	3.00	8270C
Toluene	0.250	8260B	Anthracene	0.300	8270C	m,p-Cresol	3.00	8270C
Trichloroethene	0.250	8260B	Benzo(a)anthracene	0.300	8270C	n-Nitrosodipropylamine	3.00	8270C
Vinyl acetate	1.50	8260B	Benzo(a)pyrene	0.300	8270C	o-Cresol	3.00	8270C
Vinyl chloride	0.500	8260B	Benzo(b)fluoranthene	0.300	8270C			
Xylene	0.300	8260B	Benzo(ghi)perylene	0.300	8270C			
cis-1,2-Dichloroethene	0.300	8260B	Benzo(k)fluoranthene	0.300	8270C			
cis-1,3-Dichloropropene	0.250	8260B	Butylbenzyl phthalate	3.00	8270C			
trans-1,2-Dichloroethene	0.300	8260B	Carbazole	0.300	8270C			
trans-1,3-Dichloropropene	0.250	8260B	Chrysene	0.300	8270C			

Notes

[a]U.S. Environmental Protection Agency, 1986 (and updates), "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods," SW-846, 3rd ed.
U.S. Environmental Protection Agency, 1984, "Methods for Chemical Analysis of Water and Wastes," EPA 600-4-79-020.
µg/L = Micrograms per liter.
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, October 2011 – December 2011

Analyte	MDL (µg/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

µg/L = Micrograms per liter.
EPA = U.S. Environmental Protection Agency.
HMX = Tetrahexamine tetranitramine.
MDL = Method detection limit. The minimum concentration that can be measured and reported with 99% confidence that the analyte is greater than zero; analyte is matrix-specific.
PETN = Pentaerythritol tetranitrate.
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, October 2011 – December 2011

Well ID	Analyte	Result (mg/L)	MDL (mg/L)	PQL (mg/L)	MCL (mg/L)	Laboratory Qualifier[a]	Validation Qualifier[b]	Sample No.	Analytical Method[c]
SWMU 149									
CTF-MW3 08-Dec-11	Nitrate plus nitrite as N	5.30	0.100	0.500	10.0			091523-018	EPA 353.2
SWMU 154									
CTF-MW2 09-Dec-11	Nitrate plus nitrite as N	ND	0.050	0.250	10.0	U		091525-018	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.

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

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

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

Table III-9

Summary of Anion and Alkalinity Results

Solid Waste Management Units 149 and 154 Groundwater Monitoring

Quarterly Assessment, October 2011 – December 2011

Well ID	Analyte	Result (mg/L)	MDL (mg/L)	PQL (mg/L)	MCL (mg/L)	Laboratory Qualifier[a]	Validation Qualifier[b]	Sample No.	Analytical Method[c]
SWMU 149									
CTF-MW3	Bicarbonate Alkalinity	330	0.725	1.00	NE	B		091523-022	SM2320B
08-Dec-11	Carbonate Alkalinity	ND	0.725	1.00	NE	U		091523-022	SM2320B
	Bromide	1.18	0.066	0.200	NE			091523-016	SW846 9056
	Chloride	118	1.32	4.00	NE			091523-016	SW846 9056
	Fluoride	2.34	0.033	0.100	4.0			091523-016	SW846 9056
	Sulfate	491	2.00	8.00	NE			091523-016	SW846 9056
SWMU 154									
CTF-MW2	Bicarbonate Alkalinity	1570	0.725	1.00	NE	B		091525-022	SM2320B
09-Dec-11	Carbonate Alkalinity	ND	0.725	1.00	NE	U		091525-022	SM2320B
	Bromide	ND	0.066	0.200	NE	U		091525-016	SW846 9056
	Chloride	432	3.30	10.0	NE			091525-016	SW846 9056
	Fluoride	2.23	0.033	0.100	4.0			091525-016	SW846 9056
	Sulfate	149	5.00	20.0	NE			091525-016	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.
PQL = Practical quantitation limit. The lowest concentration of analytes in a sample that can be reliably determined within specified limits of precision and accuracy by that indicated method under routine laboratory operating conditions.
SM = Standard Method.
SWMU = Solid Waste Management Unit.

Table III-9 (Concluded)

Summary of Anion and Alkalinity Results

Solid Waste Management Units 149 and 154 Groundwater Monitoring

Quarterly Assessment, October 2011 – December 2011

Notes (continued)

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

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

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

Table III-10

Summary of Perchlorate Results

Solid Waste Management Units 149 and 154 Groundwater Monitoring

Quarterly Assessment, October 2011 – December 2011

Well ID	Perchlorate Result (mg/L)	MDL (mg/L)	PQL (mg/L)	MCL (mg/L)	Laboratory Qualifier[a]	Validation Qualifier[b]	Sample No.	Analytical Method[c]
SWMU 149								
CTF-MW3 08-Dec-11	ND	0.004	0.012	NE	U		091523-020	EPA 314.0
SWMU 154								
CTF-MW2 09-Dec-11	ND	0.004	0.012	NE	U		091525-020	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.

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

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

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

Table III-11

Summary of Unfiltered Total Metal Results

Solid Waste Management Unit 149 Groundwater Monitoring

Quarterly Assessment, October 2011 – December 2011

Well ID	Analyte	Result (mg/L)	MDL (mg/L)	PQL (mg/L)	MCL (mg/L)	Laboratory Qualifier[a]	Validation Qualifier[b]	Sample No.	Analytical Method[c]
CTF-MW3	Aluminum	0.0157	0.015	0.050	NE	J		091523-009	SW846 6020
08-Dec-11	Antimony	ND	0.001	0.003	0.006	U		091523-009	SW846 6020
	Arsenic	ND	0.0017	0.005	0.010	U		091523-009	SW846 6020
	Barium	0.0286	0.0006	0.002	2.00			091523-009	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		091523-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		091523-009	SW846 6020
	Calcium	197	0.600	2.00	NE	B		091523-009	SW846 6020
	Chromium	ND	0.002	0.010	0.100	U		091523-009	SW846 6020
	Cobalt	0.000293	0.0001	0.001	NE	J	J+	091523-009	SW846 6020
	Copper	0.00306	0.00035	0.001	NE		J+	091523-009	SW846 6020
	Iron	0.384	0.033	0.100	NE			091523-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		091523-009	SW846 6020
	Magnesium	44.0	0.010	0.030	NE		J	091523-009	SW846 6020
	Manganese	0.00239	0.001	0.005	NE	J	J+	091523-009	SW846 6020
	Mercury	ND	0.000066	0.0002	0.002	U		091523-009	SW846 7470
	Nickel	0.00364	0.0005	0.002	NE		J+	091523-009	SW846 6020
	Potassium	10.8	0.080	0.300	NE			091523-009	SW846 6020
	Selenium	0.0238	0.0015	0.005	0.050			091523-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		091523-009	SW846 6020
	Sodium	172	0.800	2.50	NE			091523-009	SW846 6020
	Thallium	ND	0.00045	0.002	0.002	U		091523-009	SW846 6020
	Vanadium	0.00156	0.001	0.005	NE	J		091523-009	SW846 6010
	Zinc	0.00845	0.0035	0.010	NE	J	J+	091523-009	SW846 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.

Table III-11 (Concluded)

Summary of Unfiltered Total Metal Results

Solid Waste Management Unit 149 Groundwater Monitoring

Quarterly Assessment, October 2011 – December 2011

Notes (continued)

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.

[a]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.

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

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

Table III-12

Summary of Filtered Total Metal Results

Solid Waste Management Unit 149 Groundwater Monitoring

Quarterly Assessment, October 2011 – December 2011

Well ID	Analyte	Result (mg/L)	MDL (mg/L)	PQL (mg/L)	MCL (mg/L)	Laboratory Qualifier[a]	Validation Qualifier[b]	Sample No.	Analytical Method[c]
CTF-MW3	Aluminum	ND	0.015	0.050	NE	U		091523-010	SW846 6020
08-Dec-11	Antimony	ND	0.001	0.003	0.006	U		091523-010	SW846 6020
	Arsenic	ND	0.0017	0.005	0.010	U		091523-010	SW846 6020
	Barium	0.0299	0.0006	0.002	2.00			091523-010	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		091523-010	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		091523-010	SW846 6020
	Calcium	207	0.600	2.00	NE	B		091523-010	SW846 6020
	Chromium	ND	0.002	0.010	0.100	U		091523-010	SW846 6020
	Cobalt	0.000366	0.0001	0.001	NE	J	J+	091523-010	SW846 6020
	Copper	0.00359	0.00035	0.001	NE		J+	091523-010	SW846 6020
	Iron	0.403	0.033	0.100	NE			091523-010	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		091523-010	SW846 6020
	Magnesium	48.9	0.010	0.030	NE		J	091523-010	SW846 6020
	Manganese	0.00114	0.001	0.005	NE	J	J+	091523-010	SW846 6020
	Mercury	ND	0.000066	0.0002	0.002	U		091523-010	SW846 7470
	Nickel	0.00367	0.0005	0.002	NE		J+	091523-010	SW846 6020
	Potassium	11.8	0.080	0.300	NE			091523-010	SW846 6020
	Selenium	0.0249	0.0015	0.005	0.050			091523-010	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		091523-010	SW846 6020
	Sodium	184	0.800	2.50	NE			091523-010	SW846 6020
	Thallium	ND	0.00045	0.002	0.002	U		091523-010	SW846 6020
	Vanadium	0.00141	0.001	0.005	NE	J		091523-010	SW846 6010
	Zinc	0.00682	0.0035	0.010	NE	J	J+	091523-010	SW846 6020

Notes

CFR = Code of Federal Regulations.
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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).

Table III-12 (Concluded)

Summary of Filtered Total Metal Results

Solid Waste Management Unit 149 Groundwater Monitoring

Quarterly Assessment, October 2011 – December 2011

Notes (continued)

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.

[a]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.

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

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

Table III-13

Summary of Unfiltered Total Metal Results

Solid Waste Management Unit 154 Groundwater Monitoring

Quarterly Assessment, October 2011 – December 2011

Well ID	Analyte	Result (mg/L)	MDL (mg/L)	PQL (mg/L)	MCL (mg/L)	Laboratory Qualifier[a]	Validation Qualifier[b]	Sample No.	Analytical Method[c]
CTF-MW2	Aluminum	0.230	0.075	0.250	NE	J		091525-009	SW846 6020
09-Dec-11	Antimony	ND	0.001	0.003	0.006	U		091525-009	SW846 6020
	Arsenic	**0.0469**	0.0017	0.005	0.010			091525-009	SW846 6020
	Barium	0.0755	0.0006	0.002	2.00		J	091525-009	SW846 6020
	Beryllium	0.00315	0.001	0.0025	0.004			091525-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		091525-009	SW846 6020
	Calcium	388	0.600	2.00	NE	B		091525-009	SW846 6020
	Chromium	ND	0.010	0.050	0.100	U		091525-009	SW846 6020
	Cobalt	0.00987	0.0005	0.005	NE			091525-009	SW846 6020
	Copper	ND	0.00175	0.005	NE	U		091525-009	SW846 6020
	Iron	2.51	0.165	0.500	NE			091525-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		091525-009	SW846 6020
	Magnesium	85.7	0.050	0.150	NE			091525-009	SW846 6020
	Manganese	2.93	0.010	0.050	NE		J	091525-009	SW846 6020
	Mercury	ND	0.000066	0.0002	0.002	U		091525-009	SW846 7470
	Nickel	0.0206	0.0025	0.010	NE		J+	091525-009	SW846 6020
	Potassium	53.8	0.400	1.50	NE			091525-009	SW846 6020
	Selenium	ND	0.0015	0.005	0.050	U		091525-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		091525-009	SW846 6020
	Sodium	493	1.60	5.00	NE			091525-009	SW846 6020
	Thallium	0.00111	0.00045	0.002	0.002	J		091525-009	SW846 6020
	Uranium	0.0276	0.000067	0.0002	0.03			091525-009	SW846 6020
	Vanadium	ND	0.001	0.005	NE	U		091525-009	SW846 6010
	Zinc	1.19	0.035	0.100	NE			091525-009	SW846 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.
ND = Not detected (at MDL).

Table III-13 (Concluded)

Summary of Unfiltered Total Metal Results

Solid Waste Management Unit 154 Groundwater Monitoring

Quarterly Assessment, October 2011 – December 2011

Notes (continued)

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.

[a]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.

[b]Validation Qualifier
If cell is blank, then all quality control samples met acceptance criteria with respect to submitted samples.
J = The associated value is an estimate and may be inaccurate or imprecise.
J+ = The associated value is an estimated quantity with a suspected positive bias.

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

Table III-14

Summary of Filtered Total Metal Results

Solid Waste Management Unit 154 Groundwater Monitoring

Quarterly Assessment, October 2011 – December 2011

Well ID	Analyte	Result (mg/L)	MDL (mg/L)	PQL (mg/L)	MCL (mg/L)	Laboratory Qualifier[a]	Validation Qualifier[b]	Sample No.	Analytical Method[c]
CTF-MW2	Aluminum	0.239	0.075	0.250	NE	J		091525-010	SW846 6020
09-Dec-11	Antimony	ND	0.001	0.003	0.006	U		091525-010	SW846 6020
	Arsenic	**0.0495**	0.0017	0.005	0.010			091525-010	SW846 6020
	Barium	0.0745	0.0006	0.002	2.00		J	091525-010	SW846 6020
	Beryllium	0.00275	0.001	0.0025	0.004			091525-010	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		091525-010	SW846 6020
	Calcium	359	0.600	2.00	NE	B		091525-010	SW846 6020
	Chromium	ND	0.010	0.050	0.100	U		091525-010	SW846 6020
	Cobalt	0.0102	0.0005	0.005	NE			091525-010	SW846 6020
	Copper	ND	0.00175	0.005	NE	U		091525-010	SW846 6020
	Iron	2.54	0.165	0.500	NE			091525-010	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		091525-010	SW846 6020
	Magnesium	85.7	0.050	0.150	NE			091525-010	SW846 6020
	Manganese	2.71	0.010	0.050	NE		J	091525-010	SW846 6020
	Mercury	ND	0.000066	0.0002	0.002	U		091525-010	SW846 7470
	Nickel	0.0206	0.0025	0.010	NE		J+	091525-010	SW846 6020
	Potassium	53.6	0.400	1.50	NE			091525-010	SW846 6020
	Selenium	ND	0.0015	0.005	0.050	U		091525-010	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		091525-010	SW846 6020
	Sodium	475	1.60	5.00	NE			091525-010	SW846 6020
	Thallium	0.00136	0.00045	0.002	0.002	J		091525-010	SW846 6020
	Uranium	0.0256	0.000067	0.0002	0.03			091525-010	SW846 6020
	Vanadium	ND	0.001	0.005	NE	U		091525-010	SW846 6010
	Zinc	1.06	0.035	0.100	NE			091525-010	SW846 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.
ND = Not detected (at MDL).

Table III-14 (Concluded)

Summary of Filtered Total Metal Results

Solid Waste Management Unit 154 Groundwater Monitoring

Quarterly Assessment, October 2011 – December 2011

Notes (continued)

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.

[a]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.

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

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

Table III-15

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

Solid Waste Management Unit 154 Groundwater Monitoring

Quarterly Assessment, October 2011 – December 2011

Well ID	Analyte	Activity[a] (pCi/L)	MDA (pCi/L)	Critical Level[b] (pCi/L)	MCL (pCi/L)	Laboratory Qualifier[c]	Validation Qualifier[d]	Sample No.	Analytical Method[e]
CTF-MW2	Americium-241	-1.92 ± 5.93	10.1	4.95	NE	U	BD	091525-033	EPA 901.1
09-Dec-11	Cesium-137	-2.77 ± 2.05	2.48	1.18	NE	U	BD	091525-033	EPA 901.1
	Cobalt-60	0.586 ± 1.79	3.18	1.50	NE	U	BD	091525-033	EPA 901.1
	Potassium-40	75.4 ± 45.8	25.6	11.9	NE		J	091525-033	EPA 901.1
	Gross Alpha	2.85	NA	NA	15	NA	None	091525-034	EPA 900.0
	Gross Beta	69.6 ± 12.9	6.19	2.96	4mrem/yr			091525-034	EPA 900.0
	Uranium-233/234	58.0 ± 8.17	0.191	0.0785	NE			091525-035	HASL-300
	Uranium-235/236	0.652 ± 0.221	0.168	0.063	NE			091525-035	HASL-300
	Uranium-238	8.00 ± 1.27	0.162	0.064	NE			091525-035	HASL-300

Notes

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

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

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

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, October 2011 – December 2011

Notes (continued)

[c]Laboratory Qualifier
NA = Not applicable.
U = Analyte is absent or below the method detection limit.

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

[e]Analytical Method
U.S. 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 December 2011

Well ID	Date	Analyte	Result	MCL	Laboratory Qualifier[a]	Validation Qualifier[b]	Sample No.	Analytical Method[c]
SWMU 154								
CTF-MW2	08-Mar-11	Arsenic—Filtered	0.0544 mg/L	0.010 mg/L			090237-010	EPA 6020
CTF-MW2 (Duplicate)	08-Mar-11	Arsenic—Filtered	0.0521 mg/L	0.010 mg/L			090238-010	EPA 6020
CTF-MW2	31-May-11	Arsenic—Filtered	0.0528 mg/L	0.010 mg/L			090670-010	EPA 6020
CTF-MW2	29-Sep-11	Arsenic—Filtered	0.0610 mg/L	0.010 mg/L			090670-010	EPA 6020
CTF-MW2	09-Dec-11	Arsenic—Filtered	0.0495 mg/L	0.010 mg/L			091525-010	EPA 6020
CTF-MW2	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	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.

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

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

Table III-16 (Concluded)

Summary of Constituents Detected Above Established MCLs

Solid Waste Management Units 149 and 154 Groundwater Monitoring

Quarterly Assessments through December 2011

Notes (continued)

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

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

FIELD MEASUREMENT LOG FOR GROUNDWATER SAMPLE COLLECTION

Project Name: SWMU	Project No.:
Well I.D.: CTF-MW3	Date: 12/08/11
Well Condition:	Weather Condition: 24.49" Hg 18°F
Method: Portable pump X Dedicated pump ____	Pump depth: 360'

PURGE MEASUREMENTS

Depth to Water (ft)	Time 24 hr	Vol. (L/gal)	Temp (°C)	SC (µS/cm)	ORP (mV)	pH	Turbidity (NTU)	DO (%)	Comments DO mg/L
306.90	0811		START						
313.43	0831	5	16.19	1823	400.0	6.94	2.33	73.0	7.14
316.84	0842	10	16.90	1825	406.1	6.85	0.80	69.8	6.72
319.83	0853	15	17.10	1831	409.6	6.79	0.90	70.1	6.71
322.10	0905	20	17.07	1835	411.8	6.75	1.02	76.2	7.27
324.05	0916	25	17.23	1840	413.1	6.73	0.71	71.9	6.88
324.80	0921	27	17.27	1845	413.6	6.72	0.74	71.6	6.88
325.48	0926	29	17.27	1846	413.9	6.72	0.66	72.2	6.89
325.78	0931	31	17.12	1847	414.4	6.72	0.63	73.4	7.01
325.37	0940	33	17.09	1847	415.3	6.72	0.61	78.2	7.50
325.99	0946	35	17.07	1847	414.8	6.72	0.54	70.4	6.69
	0947		Sampling						
									~4.00 gals purged from tubing 0820

FIELD MEASUREMENT LOG FOR GROUNDWATER SAMPLE COLLECTION

Project Name: SWMU	Project No.:
Well I.D.: CTF-MW2	Date: 12/09/11
Well Condition:	Weather Condition: 24.53 Hg. in 28°F
Method: Portable pump X	Dedicated pump ____ Pump depth: 128'

PURGE MEASUREMENTS

Depth to Water (ft)	Time 24 hr	Vol. (L/gal)	Temp (°C)	SC (µS/cm)	ORP (mV)	pH	Turbidity (NTU)	DO (%)	Comments DO mg/L
43.84	0755		Start						
48.10	0821	10	14.70	3849	341.1	5.42	3.66	4.7	0.49
48.58	0830	15	15.01	3956	287.9	5.42	2.43	2.8	0.28
47.65	0841	20	14.77	4007	234.6	5.47	1.76	3.7	0.37
47.39	0854	25	14.40	4074	178.3	5.48	1.67	2.2	0.23
47.23	0908	30	13.97	4043	153.6	5.49	1.83	2.2	0.22
47.68	0921	35	14.45	4025	141.2	5.44	1.90	3.7	0.37
47.96	0925	37	14.75	4020	138.5	5.44	1.98	2.2	0.22
48.14	0929	39	14.83	4021	139.8	5.44	1.99	2.3	0.23
48.46	0933	41	14.85	4021	135.3	5.44	1.96	2.3	0.23
	0934		Sampling						
									0805
									gal.
									4.00 purged
									prior to measurement.

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

CONTRACT LABORATORY
ANALYSIS REQUEST AND CHAIN OF CUSTODY

Internal Lab

Batch No. N/A

SMO Use

AR/COC 613928

Dept. No./Mail Stop:	6234/MS 0718	Date Samples Shipped:	12/8/11	Project/Task No.98026.01.14	☐ Waste Characterization
Project/Task Manager:	Alicia Aragon	Carrier/Waybill No:		SMO Authorization: SMO	-Send preliminary/copy report to:
Project Name:	SWMU-149	Lab Contact:	Edie Kent/803-556-8171	Contract # PO 691436	
Record Center Code:	NA	Lab Destination:	GEL		☐ Released by COC No.:_____
Logbook Ref. No.:	NA	SMO Contact/Phone:	Lorraine Herrera/505-844-3199	500 BOTTLE ORDER	☑ Validation Required
Service Order No.	CF 250-12	Send Report to SMO:	Lorraine Herrera /505-844-3199		Bill To:Sandia National Labs (Accounts Payable)
Location	Tech Area				P.O. Box 5800 MS 0154
Building	Room				Albuquerque, NM 87185-0154

Reference LOV(available at SMO)

Sample No.-Fraction	ER Sample ID or Sample Location Detail	Depth (ft)	ER Site No.	Date/Time(hr) Collected	Sample Matrix	Container Type	Container Volume	Preserv-ative	Collection Method	Sample Type	Parameter & Method Requested	Lab Sample ID
091523-001	CTF-MW3	360	NA	12/08/11 0947	GW	G	3x40ml	HCL	G	SA	TCL VOC (SW846-8260B)	
091523-009	CTF-MW3	360	NA	12/08/11 0948	GW	P	500 ml	HNO3	G	SA	TAL Metals (SW846-6020/7470)	
091523-010	CTF-MW3	360	NA	12/08/11 0949	FGW	P	500 ml	HNO3	G	SA	TAL Metals (SW846-6020/7470)	
091523-016	CTF-MW3	360	NA	12/08/11 0950	GW	P	125 ml	4C	G	SA	Anions (SW846-9056)	
091523-018	CTF-MW3	360	NA	12/08/11 0951	GW	P	125 ml	H2SO4	G	SA	NPN (353.2)	
091523-020	CTF-MW3	360	NA	12/08/11 0952	GW	P	250 ml	4C	G	SA	Perchlorate (314.0)	
091523-022	CTF-MW3	360	NA	12/08/11 0953	GW	P	500 ml	4C	G	SA	Alkalinity (SM2320B)	
091524-001	CTF-TB1	NA	NA	12/08/11 0947	DIW	G	3x40ml	HCL	G	TB	VOC (SW846-8260B)	

RMMA ☐ Yes ☑ No Ref. No.

Sample Disposal ☐ Return to Client ☑ Disposal by lab

Turnaround Time ☐ 7 Day ☐ 15 Day ☑ 30 Day

Return Samples By: ☐ Negotiated TAT

Sample Tracking — Smo Use
Date Entered(mm/dd/yy)
Entered by
QC inits.

Special Instructions/QC Requirements
EDD ☑ Yes ☐ No
Level D Package ☐ Yes ☑ No
*Send report to:
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,Fl,Cl,SO4
FGW (filtered in field with .45 micron filter)
*Please list as separate report.

Abnormal Conditions on Receipt

Lab Use

Sample Team Members	Name	Signature	Init	Company/Organization/Phone/Cellular
	Robert Lynch			SNL/4142/844-4013/250-7090
	Alfred Santillanes			SNL/4142/844-5130/228-0710
	William Gibson			SNL/4142/844-4013/239-7367
	Gilbert Quintana			SNL/4142/844-2507

1.Relinquished by	Org.4142	Date 12/8/11	Time 1020	4.Relinquished by	Org.	Date	Time
1. Received by SMO	Org.4142	Date 12/8/11	Time 1020	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

CONTRACT LABORATORY
ANALYSIS REQUEST AND CHAIN OF CUSTODY

Internal Lab

Batch No.

SMO Use

AR/COC 613929

Dept. No./Mail Stop:	6234/MS 0718	Date Samples Shipped:	12/9/11	Project/Task No.98026.01.15	☐ Waste Characterization
Project/Task Manager:	Alicia Aragon	Carrier/Waybill No.		SMO Authorization: Dwelden SMO	-Send preliminary/copy report to:
Project Name:	SWMU 154	Lab Contact:	Edie Kent/803-556-8171	Contract # PO 691436	
Record Center Code:	NA	Lab Destination:	GEL		☐ Released by COC No.:
Logbook Ref. No.:	NA	SMO Contact/Phone:	Lorraine Herrera/505-844-3199	See Bottle order	☑ Validation Required
Service Order No.	CF 251-12	Send Report to SMO:	Lorraine Herrera /505-844-3199		Bill To:Sandia National Labs (Accounts Payable)
Location	Tech Area				P.O. Box 5800 MS 0154
Building	Room				Albuquerque, NM 87185-0154

Reference LOV(available at SMO)

	Sample No.-Fraction	ER Sample ID or Sample Location Detail	Depth (ft)	ER Site No.	Date/Time(hr) Collected	Sample Matrix	Container Type	Container Volume	Preserv-ative	Collection Method	Sample Type	Parameter & Method Requested	Lab Sample ID
	091525-001	CTF-MW2	128	NA	12/09/11 0934	GW	G	3x40ml	HCL	G	SA	TCL VOC (SW846-8260B) *	
	091525-002	CTF-MW2	128	NA	12/09/11 0936	GW	AG	4x1L	4C	G	SA	TCL SVOC (SW846-8270C)	
	091525-009	CTF-MW2	128	NA	12/09/11 0937	GW	P	500 ml	HNO3	G	SA	TAL Metals+ Ur (SW846-6020/7470)	
	091525-010	CTF-MW2	128	NA	12/09/11 0938	FGW	P	500 ml	HNO3	G	SA	TAL Metals+ Ur (SW846-6020/7470)	
	091525-016	CTF-MW2	128	NA	12/09/11 0939	GW	P	250ml	4C	G	SA	Anions (SW846-9056)	
	091525-018	CTF-MW2	128	NA	12/09/11 0940	GW	P	250ml	H2SO4	G	SA	NPN (353.2)	
	091525-020	CTF-MW2	128	NA	12/09/11 0941	GW	P	500ml	4C	G	SA	Perchlorate (314.0)	
	091525-022	CTF-MW2	128	NA	12/09/11 0943	GW	P	500ml	4C	G	SA	Alkalinity (SM2320B)	
	091525-024	CTF-MW2	128	NA	12/09/11 0945	GW	AG	4x1L	4C	G	SA	High Explosive (SW846-8321A) Mod.	
	091525-033	CTF-MW2	128	NA	12/09/11 0946	GW	P	1 Liter	HNO3	G	SA	Gamma Spec (short list)(901.0)	
	091525-034	CTF-MW2	128	NA	12/09/11 0947	GW	P	1 Liter	HNO3	G	SA	Gross Alpha/Beta (900.0)	

RMMA ☐ Yes ☑ No Ref. No.

Sample Disposal ☐ Return to Client ☑ Disposal by lab

Turnaround Time ☐ 7 Day ☐ 15 Day ☑ 30 Day

Sample Tracking Smo Use

Date Entered(mm/dd/yy)

Entered by:

Special Instructions/QC Requirements

EDD ☑ Yes ☐ No

Level D Package ☐ Yes ☑ No

Abnormal Conditions on Receipt

Return Samples By: ☐ Negotiated TAT QC inits.

*Send report to:

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,Fl,Cl,SO4

FGW (filtered in field with .45 micron filter)

*Please list as separate report.

Lab Use

Sample Team Members	Name	Signature	Init	Company/Organization/Phone/Cellular
	Robert Lynch		RL	SNL/4142/844-4013/250-7090
	Alfred Santillanes			SNL/4142/844-5130/228-0710
	William Gibson			SNL/4142/844-4013/239-7367
	Gilbert Quintana			SNL/4142/844-2507

1.Relinquished by Alfred Santillanes	Org. 4142	Date 12/9/11	Time 1038	4.Relinquished by	Org.	Date	Time
1. Received by	Org.	Date	Time	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

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

AR/COC- 613929

Project Name:	SWMU 154	Project/Task Manger:	Alicia Aragon	Project/Task No.:	98026.01.15
Location	Tech Area				
Building	Room	Reference LOV (available at SMO)			

Sample No-Fraction	ER Sample ID or Sample Location detail	Pump Depth (ft)	ER Site No.	Date/Time (hr) Collected	Sample Matrix	Container Type	Container Volume	Preserv-ative	Collection Method	Sample Type	Parameter & Method Requested	Lab use: Lab Sample ID
091525-035	CTF-MW2	128	NA	12/09/11 0948	GW	P	1 Liter	HNO3	G	SA	Isotopic Ur (ASTM D3972-09M)	
091526-001	CTF-TB2	NA	NA	12/09/11 0934	DIW	G	3x40ml	HCL	G	TB	VOC (SW846-8260B)	
											* Zero head space in VOC containers	
											unachievable due to carbonation in	
											groundwater	

Abnormal Conditions on Receipt

LAB USE

Recipient Initials_____

CONTRACT LABORATORY
ANALYSIS REQUEST AND CHAIN OF CUSTODY

Internal Lab

Batch No.

SMO Use

AR/COC 613930

Dept. No./Mail Stop:	6234/MS 0718	Date Samples Shipped: 12/9/11		Project/Task No.98026.01.15	☑ Waste Characterization
Project/Task Manager:	Alicia Aragon	Carrier/Waybill No.		SMO Authorization: Dan Watson SMO	-Send preliminary/copy report to: Tim Jackson
Project Name:	SWMU 154	Lab Contact:	Edie Kent/803-556-8171	Contract # PO 691436	
Record Center Code:	NA	Lab Destination:	GEL		☐ Released by COC No.:
Logbook Ref. No.:	NA	SMO Contact/Phone:	Lorraine Herrera/505-844-3199	See Bottle Order	☐ Validation Required
Service Order No.	CF 251-12	Send Report to SMO:	Lorraine Herrera /505-844-3199		Bill To: Sandia National Labs (Accounts Payable)
Location	Tech Area				P.O. Box 5800 MS 0154
Building	Room				Albuquerque, NM 87185-0154

Reference LOV(available at SMO)

Sample No.-Fraction	ER Sample ID or Sample Location Detail	Depth (ft)	ER Site No.	Date/Time(hr) Collected	Sample Matrix	Container Type	Container Volume	Preserv-ative	Collection Method	Sample Type	Parameter & Method Requested	Lab Sample ID
091527-011	CTF-MW2 PW	NA	NA	12/09/11 0930	FPW	P	500 ml	HNO3	G	SA	Arsenic (SW846-6020)	

RMMA ☐ Yes ☑ No Ref. No.

Sample Disposal ☐ Return to Client ☑ Disposal by lab

Turnaround Time ☐ 7 Day ☐ 15 Day ☑ 30 Day

Return Samples By: ☐ Negotiated TAT

Sample Tracking Smo Use
Date Entered(mm/dd/yy)
Entered by:
QC inits

Special Instructions/QC Requirements
EDD ☑ Yes ☐ No
Level D Package ☐ Yes ☑ No
*Send report to:
Tim Jackson/ORG.4142/MS.0729/ 284-2547

FPW (filtered in field with .45 micron filter)
*Please list as separate report.

Abnormal Conditions on Receipt

Lab Use

Sample Team Members	Name	Signature	Init	Company/Organization/Phone/Cellular
	Robert Lynch			SNL/4142/844-4013/250-7090
	Alfred Santillanes			SNL/4142/844-5130/228-0710
	William Gibson			SNL/4142/844-4013/239-7367
	Gilbert Quintana			SNL/4142/844-2507

1.Relinquished by Alfred Santillanes	Org. 4142	Date 12/9/11	Time 1038	4.Relinquished by	Org.	Date	Time
1. Received by	Org.	Date	Time	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 Groundwater Data from Monitoring Wells CTF-MW3 and CTF-MW2

Sample Findings Summary

AR/COC: 613928

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
SW846 3005/6020 DOE-AL			
	091523-009/CTF-MW3	Cobalt (7440-48-4)	J+, CK2
	091523-009/CTF-MW3	Copper (7440-50-8)	J+, CK2
	091523-009/CTF-MW3	Magnesium (7439-95-4)	J, D1
	091523-009/CTF-MW3	Manganese (7439-96-5)	J+, CK2
	091523-009/CTF-MW3	Nickel (7440-02-0)	J+, CK2
	091523-009/CTF-MW3	Zinc (7440-66-6)	J+, CK2
	091523-010/CTF-MW3	Cobalt (7440-48-4)	J+, CK2
	091523-010/CTF-MW3	Copper (7440-50-8)	J+, CK2
	091523-010/CTF-MW3	Magnesium (7439-95-4)	J, D1
	091523-010/CTF-MW3	Manganese (7439-96-5)	J+, CK2
	091523-010/CTF-MW3	Nickel (7440-02-0)	J+, CK2
	091523-010/CTF-MW3	Zinc (7440-66-6)	J+, CK2

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

616 Maxine NE
Albuquerque, NM 87123
505-299-5201
www.aqainc.net

Memorandum

Date: January 12, 2012

To: File

From: Kevin Lambert

Subject: Inorganic Data Review and Validation – SNL
Site: SWMU 149 GWM
AR/COC: 613928
SDG: 291691
Laboratory: GEL
Project/Task: 98026.01.14
Analysis: General Chemistry

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

Summary

One sample was prepared and analyzed with accepted procedures using methods EPA 9056 (anions by ion chromatography), EPA 353.2 (nitrate/nitrite by Cd reduction), EPA 314.0 (perchlorate), and SM 2320B (alkalinity). 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 QC acceptance criteria were met.

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

Laboratory Replicate

The replicate met all QC acceptance criteria.

Nitrate/Nitrite and Alkalinity:
It should be noted that the replicate analyses were performed on SNL samples from other SDGs. 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 sample was diluted 10X due to high concentration for this analysis.

Anions:
The sample was diluted 20X 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 ≤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**: 01/17/12

616 Maxine NE
Albuquerque, NM 87123
505-299-5201
www.aqainc.net

Memorandum

Date: January 12, 2012

To: File

From: Kevin Lambert

Subject: GC/MS Organic Data Review and Validation – SNL
Site: SWMU 149 GWM
AR/COC: 613928
SDG: 291691
Laboratory: GEL
Project/Task: 98026.01.14
Analysis: VOCs

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

Summary

Two samples were prepared and analyzed with accepted procedures using method EPA 8260B (VOCs). All compounds were successfully analyzed. 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 %D for 1,1,1-trichloroethane; 2-hexanone; acetone; carbon tetra chloride; and vinyl acetate were >20% with positive bias. All associated sample results were NDs and will not be qualified for the calibration infraction.

The calibration verification %D for acetone was >20% but ≤40% with negative bias. 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.

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 follows.

The MSD %R for 1,1,1-trichloroethane was > the UAL. The associated sample results were NDs and will not be qualified. Also, it should be noted that the MS/MSD 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 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 was submitted on the AR/COC(s).

No other specific issues that affect data quality were identified.

Reviewed by: Marcia Hilchey **Date**: 01/17/12

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Memorandum

Date: January 12, 2012

To: File

From: Kevin Lambert

Subject: Inorganic Data Review and Validation – SNL
Site: SWMU 149 GWM
AR/COC: 613928
SDG: 291691 and 291696
Laboratory: GEL
Project/Task: 98026.01.14
Analysis: Metals

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

Summary

Two samples were prepared and analyzed with approved procedures using methods EPA 6010B (ICP metals), EPA 6020 (ICP-MS 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:
   The Ca concentrations for samples 291691-002 and 291696-001 were > the ICS A Ca concentration and the ICS A results for Co, Cu, Mn, Ni, and Zn were > the MDLs. All associated sample results were detects <50X the ICS A results and will be **qualified "J+,CK2."**

   The serial dilution %D for Mg 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 except as follows.

ICP-MS metals:
The CRI %R for Ca was >130%. The associated sample results were detects >5X the PQL and will not be qualified.

Blanks

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

ICP-MS metals:
In the MB, Ca was detected at a concentration > the MDL but ≤ the PQL. The associated sample results were detects >5X the MB 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 K, Ca, Mg, and Na concentrations >4X the analyte spike concentrations and the MS %Rs for K, Ca, Mg, and Na did not meet QC acceptance criteria. However, according to AOP criteria, K, Ca, Mg, and Na are not 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 291691-002 and 291696-001 were diluted 10X for Ca and 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 ≤5X. No sample data will be qualified as a result.

ICP Interference Check Sample (ICS A and AB)

All ICS A and AB met QC acceptance criteria except as noted above in the summary section and as follows.

ICP-MS metals:
The Ca concentrations for samples 291691-002 and 291696-001 were > the ICS A Ca concentration and the ICS A results for Cd and Cr were > the MDLs. However, the associated sample results were NDs and will not be qualified.

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**: 01/17/12

Sample Findings Summary

AR/COC: 613929

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
EPA 901.1			
	091525-033/CTF-MW2	Americium-241 (14596-10-2)	BD, FR3
	091525-033/CTF-MW2	Cesium-137 (10045-97-3)	BD, FR3
	091525-033/CTF-MW2	Cobalt-60 (10198-40-0)	BD, FR3
	091525-033/CTF-MW2	Potassium-40 (13966-00-2)	J, FR7
SW846 3005/6020 DOE-AL			
	091525-009/CTF-MW2	Barium (7440-39-3)	J, D1
	091525-009/CTF-MW2	Manganese (7439-96-5)	J, MS1
	091525-009/CTF-MW2	Nickel (7440-02-0)	J+, CK2
	091525-010/CTF-MW2	Barium (7440-39-3)	J, D1
	091525-010/CTF-MW2	Manganese (7439-96-5)	J, MS1
	091525-010/CTF-MW2	Nickel (7440-02-0)	J+, CK2
SW846 3535/8321A Modified			
	091525-024/CTF-MW2	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: January 19, 2012

To: File

From: Kevin Lambert

Subject: Inorganic Data Review and Validation – SNL
Site: SWMU 154 GWM
AR/COC: 613929
SDG: 291801
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), and SM 2320B (alkalinity). 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 QC acceptance criteria were met.

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

Perchlorate, Anions, and Nitrate/Nitrite:
It should be noted that the MS analyses were performed on SNL samples from other SDGs. No sample data will be qualified as a result.

Laboratory Replicate

The replicate met all QC acceptance criteria.

Perchlorate, Anions, and Nitrate/Nitrite:
It should be noted that the replicate analyses were performed on SNL samples from other SDGs. 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 sample was diluted 5X due to matrix interference.

Anions:
The sample was diluted 50X 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 ≤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**: 02/02/12

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Memorandum

Date: January 19, 2012

To: File

From: Kevin Lambert

Subject: GC/MS Organic Data Review and Validation – SNL
Site: SWMU 154 GWM
AR/COC: 613929
SDG: 291801
Laboratory: GEL
Project/Task: 98026.01.15
Analysis: VOCs

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

Summary

Two samples were prepared and analyzed with accepted procedures using method EPA 8260B (VOCs). All compounds were successfully analyzed. No problems were identified with the data package that 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 %D for 1,1,1-trichloroethane; 2-hexanone; acetone; carbon tetrachloride; and vinyl acetate were >20% with positive bias. All associated sample results were NDs and will not be qualified for the calibration infraction.

The calibration verification %D for acetone was >20% but ≤40% with negative bias. 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.

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 follows.

The MSD %R for 1,1,1-trichloroethane was > the UAL. The associated sample results were NDs and will not be qualified. Also, it should be noted that the MS/MSD 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 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 was submitted on the AR/COC(s).

No other specific issues that affect data quality were identified.

Reviewed by: Marcia Hilchey **Date**: 02/02/12

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Memorandum

Date: January 19, 2012

To: File

From: Kevin Lambert

Subject: GC/MS Organic Data Review and Validation – SNL
Site: SWMU 154 GWM
AR/COC: 613929
SDG: 291801
Laboratory: GEL
Project/Task: 98026.01.15
Analysis: SVOCs

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

Summary

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

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 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**: 02/02/12

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Memorandum

Date: February 2, 2012

To: File

From: Kevin Lambert

Subject: LC/MS/MS Organic Data Review and Validation – SNL
Site: SWMU 154 GWM
AR/COC: 613929
SDG: 291801
Laboratory: GEL
Project/Task: 98026.01.15
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 ≥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 except as follows.

The calibration verification %Ds for 2,4,6-trinitrotoluene were >20% with a positive bias. The associated sample result was an ND 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.

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**: 02/02/12

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Memorandum

Date: January 19, 2012

To: File

From: Kevin Lambert

Subject: Inorganic Data Review and Validation – SNL
Site: SWMU 154 GWM
AR/COC: 613929
SDG: 291801
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 6010B (ICP metals), EPA 6020 (ICP-MS 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:
   The MS had a Mn concentration >4X the analyte spike concentration and the MS %R did not meet QC acceptance criteria. The associated sample results were detects and will be **qualified "J,MS1"** due to lack of matrix-specific accuracy data.

   The Ca concentrations for samples 291801-003 and 291802-001 were > the ICS A Ca concentration and the ICS A result for Ni was > the MDL. The associated sample results were detects <50X the ICS A results and will be **qualified "J+,CK2."**

   The serial dilution %D for Ba 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 except as follows. Samples 291801-003 and 291802-001 were received with a preservation infraction of pH = 3. SNL was notified and directed the laboratory to properly preserve the samples. No sample data 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 follows.

ICP-MS metals:
The CRI %R for Ca was >130%. The associated sample results were detects >5X the PQL and will not be qualified.

Blanks

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

ICP-MS metals:
In the ICB/CCB, Na was detected at negative concentrations with an absolute value > the MDL but ≤ the PQL. The associated sample results were detects >5X the MDL and will not be qualified.

In the MB, Ca was detected at a concentration > the MDL but ≤ the PQL. The associated sample results were detects >5X the MB and will not be qualified.

ICP-MS Internal Standards

All internal standards met QC acceptance criteria.

Matrix Spike (MS)

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

ICP-MS metals:
It should be noted that the MS had K, Ca, Mg, and Na concentrations >4X the analyte spike concentrations and the MS %Rs for K, Ca, Mg, and Na did not meet QC acceptance criteria. However, according to AOP criteria, K, Ca, Mg, and Na are not 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 291801-003 and 291802-001 required dilutions of 5X, 10X, and 20X for various target analytes due to over-range concentrations and/or repeated instrument QC failures.

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

ICP Interference Check Sample (ICS A and AB)

All ICS A and AB met QC acceptance criteria except as noted above in the summary section and as follows.

ICP-MS metals:
The Ca concentrations for samples 291801-003 and 291802-001 were > the ICS A Ca concentration and the ICS A results for Cd, Mn, Zn, U, Sb, Cr, Co, and Cu were > the MDLs. However, the associated sample results were NDs or detects ≥50X the ICS A results and will not be qualified.

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**: 02/02/12

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Memorandum

Date: January 19, 2012

To: File

From: Kevin Lambert

Subject: Radiochemical Data Review and Validation – SNL
Site: SWMU 154 GWM
AR/COC: 613929
SDG: 291801
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.

1. Gamma Spec:
   For sample 291801-009, the K-40 result was <3X the associated MDA and will be **qualified "J,FR7."**

   All associated gamma spec results that were either < the associated 2-sigma TPU or < the associated MDA will be **qualified "BD,FR3."**

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

Holding Times and Preservation

The samples were analyzed within the prescribed holding times and properly preserved except as follows. Samples -009, -010, and -011 were received with a preservation infraction of pH = 5. SNL was notified and directed the laboratory to properly preserve the samples. No sample data will be qualified as a result.

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

No other specific issues that affect data quality were identified.

Reviewed by: Marcia Hilchey **Date**: 02/02/12

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SECTION IV
SOLID WASTE MANAGEMENT UNITS 8/58 AND 68 QUARTERLY GROUNDWATER MONITORING REPORT, OCTOBER – DECEMBER 2011

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 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 first 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 October and November 2011. 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 section correspond to the Fourth Quarter, Calendar Year (CY) 2011 reporting period (October through December 2011).

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 October 31 and November 1, 2011, 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 October 24 to October 26, 2011. 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 sample from CCBA-MW1 at a concentration of 5.36 mg/L. Fluoride was reported in CCBA-MW2 samples above the method detection limit (MDL) at concentrations of 1.72 and 1.74 mg/L. No analytical results for the SWMU 68 groundwater samples exceed the corresponding MCLs.

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

This groundwater sampling event represents the first of eight supplemental quarterly events for the five monitoring wells. The second of the eight supplemental quarterly groundwater sampling events will be conducted during the upcoming quarter (January to March 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 August 2007a and August 2007b). 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 Fourth Quarter, CY 2011.

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 Sampling Equipment Decontamination" (SNL/NM August 2007a). Section IV.4.3 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 August 2007b), 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 620 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). 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 in any groundwater sample from SWMUs 8/58 above laboratory MDLs. Table IV-4 lists MDLs for associated VOCs analyzed.

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

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

SWMU 68, OBS-MW1, OBS-MW2, and OBS-MW3. No HE compounds were detected in any SWMU 68 groundwater sample above laboratory MDLs. 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 concentrations of 3.24 mg/L in the CCBA-MW2 environmental sample and 3.31 mg/L in the CCBA-MW2 duplicate environmental sample. NPN was qualified as not detected during data validation in the CCBA-MW1 sample as NPN was also detected in the associated laboratory method blank 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 1.92 mg/L in the sample from OBS-MW1.

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 sample from CCBA-MW1 at a concentration of 5.36 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 samples from CCBA-MW2 below the MCL at concentrations of 1.72 and 1.74 mg/L. No other anions or total cyanide was 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.

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 (µg/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 µg/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 are summarized in Table IV-9. No hexavalent chromium was detected above laboratory MDLs, except in the OBS-MW3 duplicate environmental sample. Hexavalent chromium was reported at a concentration of 0.00317 mg/L in the OBS-MW3 duplicate environmental sample. 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. No parameters were detected above established MCLs.

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. No parameters were detected above established MCLs.

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 0.036 ± 0.0201 pCi/L of uranium 235/236 to 7.31 ± 1.04 pCi/L of 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 activity in the sample from OBS-MW1 was qualified as unusable during data validation because the analytical laboratory was unable to meet

identification criteria. The result for potassium-40 was qualified as an estimated value in the OBS-MW2 sample as the result was less than three times the MDA.

The corrected gross alpha activity was reported below the MCL of 15 pCi/L in all samples. Gross beta activity results do not exceed established MCLs. Isotopic uranium activities range from 0.20 ± 0.0634 pCi/L of uranium 235/236 to 21.7 ± 3.02 pCi/L of 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 Works Plans for SWMUs 8/58 and 68 (SNL/NM September 2010, Attachments A and B).

4.2 Duplicate Environmental Samples

Duplicate environmental samples were collected from CCBA-MW2 and OBS-MW3 and analyzed to estimate the overall reproducibility of the sampling and analytical process. The duplicate environmental samples were collected immediately after the original

environmental sample to reduce variability caused by time and/or sampling mechanics. Duplicate environmental samples were analyzed for all parameters.

Table IV-15 summarizes the results for duplicate sample analyses and calculated relative percent difference (RPD) values for CCBA-MW2 and OBS-MW3. RPD values were calculated only for detected parameters. The Work Plans for SWMUs 8/58 and 68 do not specify QC acceptance criteria for duplicate environmental sample data; however, duplicate sample results show good correlation (RPD values of less than 20 for organic compounds and less than 35 for inorganic analyses) for most calculated parameters.

SWMUs 8/58, CCBA-MW2. The RPD for alkalinity was calculated at 50 and for iron at 48.

SWMU 68, OBS-MW3. The RPD for aluminum was calculated at 44, but this is an estimated value because the reported values are less than the associated laboratory PQL.

4.3 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 Sampling Equipment Decontamination," (SNL/NM August 2007a). In accordance with SNL/NM FOP 05-03, the following solutions were pumped through the sampling system: 5 gallons of deionized (DI) water mixed with 20 milliliters (mL) nonphosphate laboratory detergent; 5 gallons of DI water; 5 gallons of DI water mixed with 20 mL reagent-grade nitric acid; and 15 gallons of DI water. In addition, the outside of the pump tubing was rinsed with DI water. EB samples are collected to verify the effectiveness of the equipment decontamination process. EB samples were collected prior to sampling monitoring wells CCBA-MW2 and OBS-MW3 and were submitted for all analyses.

SWMUs 8/58, CCBA-MW2. Alkalinity, antimony, bromodichloromethane, chloride, copper, and dibromochloromethane were detected above the laboratory MDLs in the EB sample. No corrective action was necessary for alkalinity, antimony, bromodichloromethane, chloride, or dibromochloromethane because these analytes were either not detected in environmental samples or detected at concentrations greater than five times the blank result. Copper was detected in the CCBA-MW2 environmental and duplicate environmental samples at concentrations less than five times the associated EB result, and the results were qualified as not detected during data validation.

SWMU 68, OBS-MW3. Bromodichloromethane, calcium (filtered), chloride, chloroform, dibromochloromethane, manganese, and thallium were detected above the laboratory MDLs in the EB sample. No corrective action was necessary for bromodichloromethane, calcium (filtered), chloride, chloroform, dibromochloromethane, or thallium as these analytes were either not detected in environmental samples or detected at concentrations greater than five times the EB result. Manganese was detected in the OBS-MW3 environmental samples at concentrations less than five times the EB results, and the result was qualified as not detected during data validation.

4.4 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 from SWMUs 8/58 during the October through December 2011 sampling event. No VOCs were detected above associated laboratory MDLs, except 2-butanone and chloroform. No corrective action was necessary as these compounds were not detected in the associated environmental sample. These compounds were qualified as not detected in the EB sample due to associated TB sample contamination.

SWMU 68. A total of four TB samples were submitted with the SWMU 68 samples collected during the October through December 2011 sampling event. No VOCs were detected above associated laboratory MDLs.

4.5 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 to simulate the transfer of environmental samples from the sampling system to the sample container.

SWMUs 8/58, CCBA-MW2. The VOC compounds bromodichloromethane, chloroform, and dibromochloromethane were detected above the laboratory MDLs. No corrective

action was necessary as these compounds were not detected in the associated environmental samples.

SWMU 68, OBS-MW2. The VOC compounds bromodichloromethane, chloroform, and dibromochloromethane were detected above the laboratory MDLs. No corrective action was necessary as these compounds were not detected in the associated environmental samples.

4.6 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 as Appendix C.

4.7 Variances and Nonconformances

No variances or nonconformances from requirements in the Groundwater Characterization Work Plans for SWMUs 8/58 and 68 or project-specific issues were identified during the October to December 2011 sampling activities at CCBA-MW1, CCBA-MW2, OBS-MW1, OBS-MW2, and OBS-MW3.

5.0 Summary

During the Fourth Quarter of CY 2011, 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 included 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 sample at a concentration of 5.36 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 included 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.

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), August 2007a. "Long-Term Environmental Stewardship (LTES) Groundwater Sampling 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), August 2007b. "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

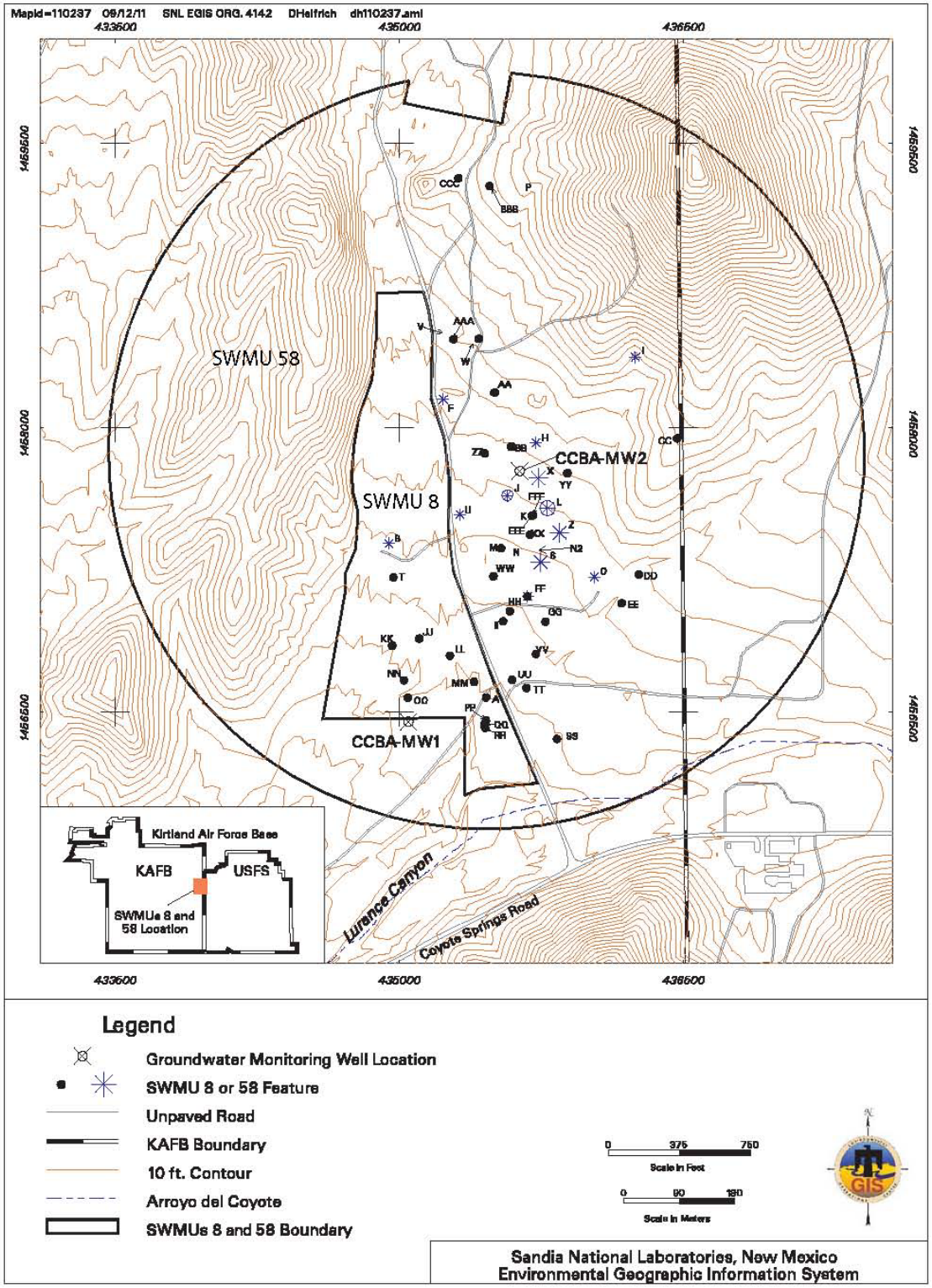

Figure IV-1

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

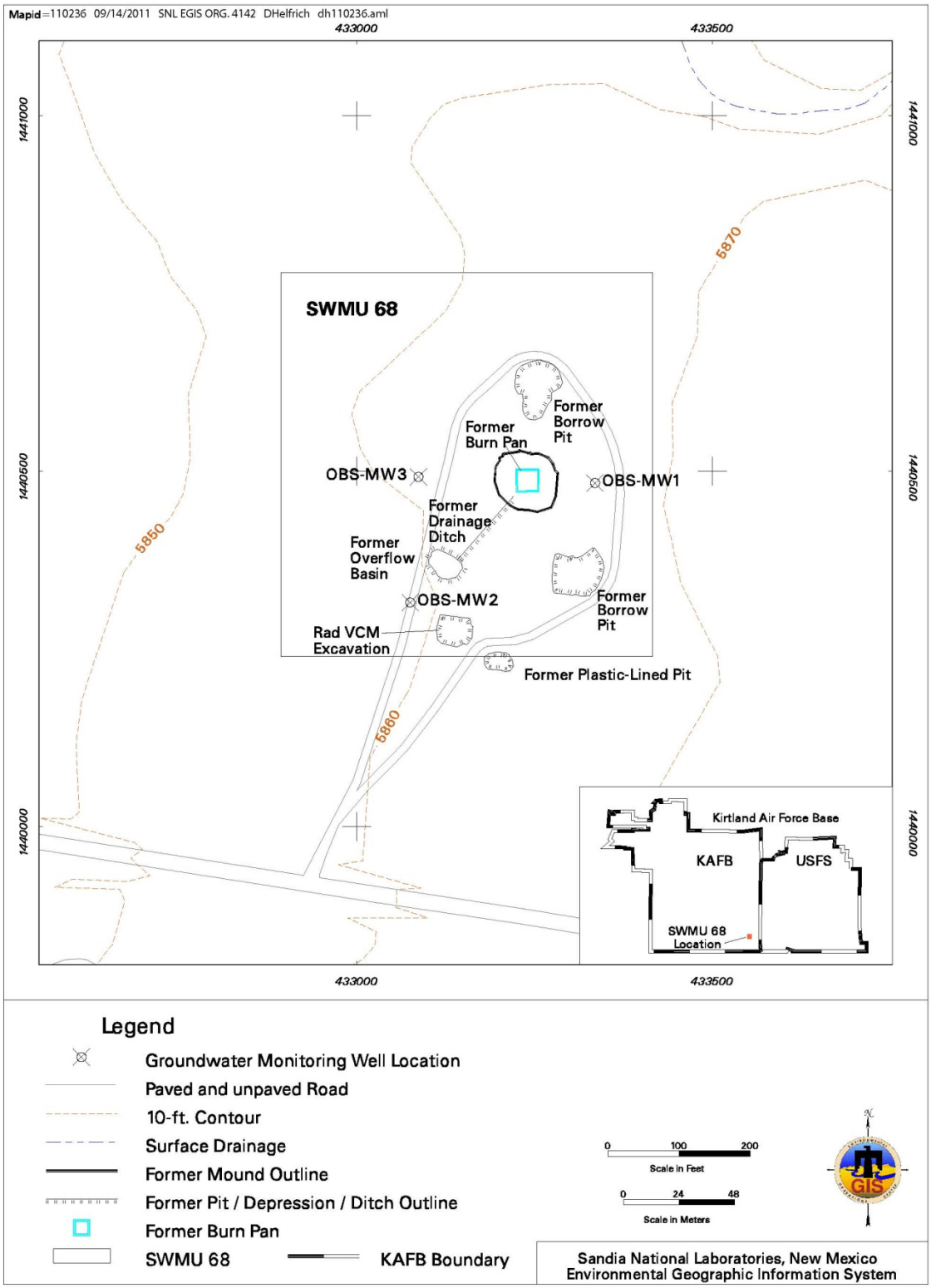

Figure IV-2

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 SWMU 8/58 and 68 Groundwater Samples

Analysis	Analytical Method[a]	Volume and Container Type/Preservation Requirements
Volatile Organic Compounds	EPA 8260B	3 x 40-mL glass, HCL, 4°C
Semivolatile Organic Compounds	EPA 8270C	3 x 1-L Amber Glass, 4°C
High Explosives	EPA 8321A	4 x 1-L Amber Glass, 4°C
Metals[b]	EPA 6020/7470	1 x 500-mL polyethylene, HNO_3, 4°C
Hexavalent Chromium	EPA 7196A	1 x 250-mL polyethylene, 4°C
Perchlorate	EPA 314.0	1 x 250-mL polyethylene, 4°C
Major Anions and Cations[c]	EPA 6020/7470/9056	1 x 500-mL polyethylene, 4°C
Alkalinity as Total, Carbonate, and Bicarbonate	SM 2320B	1 x 500-mL polyethylene, 4°C
Nitrate plus Nitrite	EPA 353.2	1 x 250-mL polyethylene, H_2SO_4, 4°C
Gross Alpha/Beta	EPA 900.0	1 x 1-L polyethylene, HNO_3, 4°C
Gamma Spectroscopy[d]	EPA 901.0	1 x 1-L polyethylene, HNO_3, 4°C
Isotopic Uranium	HASL-300	1 x 1-L polyethylene, HNO_3, 4°C

Notes

[a]U.S. Environmental Protection Agency, 1986 (and updates), "*Test Methods for Evaluating Solid Waste, Physical/Chemical Methods*," SW-846, 3rd ed., U.S. Environmental Protection Agency, Washington, D.C.
U.S. Environmental Protection Agency, 1999, "*Perchlorate in Drinking Water Using Ion Chromatography*," EPA 815/R-00-014, U.S. Environmental Protection Agency, Washington, D.C.
Clesceri, L.S., A.E. Greenburg, and A.D. Eaton, 1998. *Standard Methods for the Examination of Water and Wastewater,* 20th ed., Standard Method 2320B, published jointly by American Public Health Association, American Water Works Association, and Water Environment Federation, Washington, D.C.
U.S. Environmental Protection Agency, 1980, "*Prescribed Procedures for Measurement of Radioactivity in Drinking Water,"* EPA-600/4-80-032, U.S. Environmental Protection Agency, Cincinnati, Ohio.
U.S. Department of Energy, 1990, *"EML Procedures Manual,"* 27th ed., Vol. 1, Rev. 1992, Environmental Measurements Laboratory HASL-300.
[b]Metals = TAL metals including barium, calcium, magnesium, potassium, and sodium, plus uranium.
[c]Major anions include bromide, chloride, fluoride, and sulfate.
[d]Gamma spectroscopy = Americium-241, Cesium-137, Cobalt-60, and Potassium-40.

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

Table IV-2

Sample Details for Fourth Quarter, CY 2011 Groundwater Sampling

Solid Waste Management Units 8/58 and 68 Groundwater Monitoring Quarterly Assessment

October 2011 – December 2011

Well	Sample Identification	AR/COC Number	Associated Groundwater Investigation
CCBA-MW1	091345	613883	SWMUs 8/58
CCBA-MW2	091349	613885	SWMUs 8/58
CCBA-MW2 (dup)	091350	613885	SWMUs 8/58
OBS-MW1	091335	613879	SWMU 68
OBS-MW2	091337	613880	SWMU 68
OBS-MW3	091342	613882	SWMU 68
OBS-MW3 (dup)	091343	613882	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[a]

Solid Waste Management Units 8/58 and 68 Groundwater Monitoring

Quarterly Assessment, October 2011 – December 2011

Well ID	Sample Date	Temperature (°C)	Specific Conductivity (µmhos/cm)	Oxidation Reduction Potential (mV)	pH	Turbidity (NTU)	Dissolved Oxygen (% Sat)	Dissolved Oxygen (mg/L)
SWMU 8/58								
CCBA-MW1	31-Oct-11	15.16	564	420.7	6.51	0.35	25.3	2.52
CCBA-MW2	01-Nov-11	16.84	694	386.6	7.34	3.91	53.8	5.17
SWMU 68								
OBS-MW1	25-Oct-11	17.63	598	384.7	7.26	2.78	38.2	3.58
OBS-MW2	26-Oct-11	17.37	606	384.4	7.29	0.79	37.3	3.57
OBS-MW3	24-Oct-11	16.74	602	388.4	7.25	0.55	40.7	3.94

Notes

[a]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, October 2011 – December 2011

Analyte	MDL (µg/L)	Analytical Method[a]	Analyte	MDL (µg/L)	Analytical Method[a]	Analyte	MDL (µg/L)	Analytical Method[a]
1,1,1-Trichloroethane	0.325	8260B	1,2,4-Trichlorobenzene	3.00	8270C	Di-n-butyl phthalate	3.00	8270C
1,1,2,2-Tetrachloroethane	0.250	8260B	1,2-Dichlorobenzene	3.00	8270C	Di-n-octyl phthalate	3.00	8270C
1,1,2-Trichloroethane	0.250	8260B	1,3-Dichlorobenzene	3.00	8270C	Dibenz[a,h]anthracene	0.300	8270C
1,1-Dichloroethane	0.300	8260B	1,4-Dichlorobenzene	3.00	8270C	Dibenzofuran	3.00	8270C
1,1-Dichloroethene	0.300	8260B	2,4,5-Trichlorophenol	3.00	8270C	Diethylphthalate	3.00	8270C
1,2-Dichloroethane	0.250	8260B	2,4,6-Trichlorophenol	3.00	8270C	Dimethylphthalate	3.00	8270C
1,2-Dichloropropane	0.250	8260B	2,4-Dichlorophenol	3.00	8270C	Dinitro-o-cresol	3.00	8270C
2-Butanone	1.25	8260B	2,4-Dimethylphenol	3.00	8270C	Diphenyl amine	3.00	8270C
2-Hexanone	1.25	8260B	2,4-Dinitrophenol	5.00	8270C	Fluoranthene	0.300	8270C
4-methyl-, 2-Pentanone	1.25	8260B	2,4-Dinitrotoluene	3.00	8270C	Fluorene	0.300	8270C
Acetone	3.50	8260B	2,6-Dinitrotoluene	3.00	8270C	Hexachlorobenzene	3.00	8270C
Benzene	0.300	8260B	2-Chloronaphthalene	0.300	8270C	Hexachlorobutadiene	3.00	8270C
Bromodichloromethane	0.250	8260B	2-Chlorophenol	3.00	8270C	Hexachlorocyclopentadiene	3.00	8270C
Bromoform	0.250	8260B	2-Methylnaphthalene	0.300	8270C	Hexachloroethane	3.00	8270C
Bromomethane	0.300	8260B	2-Nitroaniline	3.00	8270C	Indeno(1,2,3-c,d)pyrene	0.300	8270C
Carbon disulfide	1.25	8260B	2-Nitrophenol	3.00	8270C	Isophorone	3.00	8270C
Carbon tetrachloride	0.300	8260B	3,3'-Dichlorobenzidine	3.00	8270C	Naphthalene	0.300	8270C
Chlorobenzene	0.250	8260B	3-Nitroaniline	3.00	8270C	Nitro-benzene	3.00	8270C
Chloroethane	0.300	8260B	4-Bromophenyl phenyl ether	3.00	8270C	Pentachlorophenol	3.00	8270C
Chloroform	0.250	8260B	4-Chloro-3-methylphenol	3.00	8270C	Phenanthrene	0.300	8270C
Chloromethane	0.300	8260B	4-Chlorobenzenamine	3.00	8270C	Phenol	3.00	8270C
Dibromochloromethane	0.300	8260B	4-Chlorophenyl phenyl ether	3.00	8270C	Pyrene	0.300	8270C
Ethyl benzene	0.250	8260B	4-Nitroaniline	3.00	8270C	bis(2-Chloroethoxy)methane	3.00	8270C
Methylene chloride	3.00	8260B	4-Nitrophenol	3.00	8270C	bis(2-Chloroethyl)ether	3.00	8270C
Styrene	0.250	8260B	Acenaphthene	0.300	8270C	bis(2-Ethylhexyl)phthalate	3.00	8270C
Tetrachloroethene	0.300	8260B	Acenaphthylene	0.300	8270C	bis-Chloroisopropyl ether	3.00	8270C
Toluene	0.250	8260B	Anthracene	0.300	8270C	m,p-Cresol	3.00	8270C
Trichloroethene	0.250	8260B	Benzo(a)anthracene	0.300	8270C	n-Nitrosodipropylamine	3.00	8270C
Vinyl acetate	1.50	8260B	Benzo(a)pyrene	0.300	8270C	o-Cresol	3.00	8270C
Vinyl chloride	0.500	8260B	Benzo(b)fluoranthene	0.300	8270C			
Xylene	0.300	8260B	Benzo(ghi)perylene	0.300	8270C			
cis-1,2-Dichloroethene	0.300	8260B	Benzo(k)fluoranthene	0.300	8270C			
cis-1,3-Dichloropropene	0.250	8260B	Butylbenzyl phthalate	3.00	8270C			
trans-1,2-Dichloroethene	0.300	8260B	Carbazole	0.300	8270C			
trans-1,3-Dichloropropene	0.250	8260B	Chrysene	0.300	8270C			

Notes

[a]U.S. Environmental Protection Agency, 1986 (and updates), "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods," SW-846, 3rd ed.
U.S. Environmental Protection Agency, 1984, "Methods for Chemical Analysis of Water and Wastes," EPA 600-4-79-020.
µg/L = Micrograms per liter.
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, October 2011 – December 2011

Analyte	MDL (µg/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

µg/L = Micrograms per liter.
EPA = U.S. Environmental Protection Agency.
HMX = Tetrahexamine tetranitramine.
MDL = Method detection limit. The minimum concentration that can be measured and reported with 99% confidence that the analyte is greater than zero; analyte is matrix-specific.
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, October 2011 – December 2011

Well ID	Analyte	Result (mg/L)	MDL (mg/L)	PQL (mg/L)	MCL (mg/L)	Laboratory Qualifier[a]	Validation Qualifier[b]	Sample No.	Analytical Method[c]
SWMU 8/58									
CCBA-MW1 31-Oct-11	Nitrate plus nitrite as N	0.0518	0.010	0.050	10.0	B	0.069U	091345-018	EPA 353.2
CCBA-MW2 01-Nov-11	Nitrate plus nitrite as N	3.24	0.100	0.500	10.0	B		091349-018	EPA 353.2
CCBA-MW2 (Duplicate) 01-Nov-11	Nitrate plus nitrite as N	3.31	0.100	0.500	10.0	B		091350-018	EPA 353.2
SWMU 68									
OBS-MW1 25-Oct-11	Nitrate plus nitrite as N	1.92	0.100	0.500	10.0	B		091335-018	EPA 353.2
OBS-MW2 26-Oct-11	Nitrate plus nitrite as N	0.0319	0.010	0.050	10.0	B, J	0.069U	091337-018	EPA 353.2
OBS-MW3 24-Oct-11	Nitrate plus nitrite as N	1.56	0.100	0.500	10.0	B		091342-018	EPA 353.2
OBS-MW3 (Duplicate) 24-Oct-11	Nitrate plus nitrite as N	1.61	0.100	0.500	10.0	B		091343-018	EPA 353.2

Notes

CCBA = Coyote Canyon Blast Area.
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.

[a]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.

Table IV-6 (Concluded)

Summary of Nitrate plus Nitrite Results

Solid Waste Management Units 8/58 and 68 Groundwater Monitoring

Quarterly Assessment, October 2011 – December 2011

Notes (continued)

[b]Validation Qualifier
If cell is blank, then all quality control samples met acceptance criteria with respect to submitted samples.
U = The analyte was analyzed for but was not detected. The associated numerical value is the sample quantitation limit.

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

Table IV-7

Summary of Alkalinity, Anion, and Total Cyanide Results

Solid Waste Management Units 8/58 and 68 Groundwater Monitoring

Quarterly Assessment, October 2011 – December 2011

Well ID	Analyte	Result (mg/L)	MDL (mg/L)	PQL (mg/L)	MCL (mg/L)	Laboratory Qualifier[a]	Validation Qualifier[b]	Sample No.	Analytical Method[c]
SWMU 8/58									
CCBA-MW1	Bicarbonate Alkalinity	181	0.725	1.00	NE	B		091345-022	SM2320B
31-Oct-11	Carbonate Alkalinity	ND	0.725	1.00	NE	U		091345-022	SM2320B
	Bromide	0.339	0.066	0.200	NE			091345-016	SW846 9056
	Chloride	24.0	0.660	2.00	NE			091345-016	SW846 9056
	Fluoride	**5.36**	0.033	0.100	4.0			091345-016	SW846 9056
	Sulfate	46.5	1.00	4.00	NE			091345-016	SW846 9056
	Total Cyanide	ND	0.0015	0.005	0.200	U		091345-027	SW846 9012
CCBA-MW2	Bicarbonate Alkalinity	185	0.725	1.00	NE	B		091349-022	SM2320B
01-Nov-11	Carbonate Alkalinity	ND	0.725	1.00	NE	U		091349-022	SM2320B
	Bromide	0.567	0.066	0.200	NE			091349-016	SW846 9056
	Chloride	35.1	0.660	2.00	NE			091349-016	SW846 9056
	Fluoride	1.72	0.033	0.100	4.0			091349-016	SW846 9056
	Sulfate	90.5	1.00	4.00	NE			091349-016	SW846 9056
	Total Cyanide	ND	0.0015	0.005	0.200	U		091349-027	SW846 9012
CCBA-MW2 (Duplicate)	Bicarbonate Alkalinity	111	0.725	1.00	NE	B		091350-022	SM2320B
01-Nov-11	Carbonate Alkalinity	ND	0.725	1.00	NE	U		091350-022	SM2320B
	Bromide	0.539	0.066	0.200	NE			091350-016	SW846 9056
	Chloride	35.4	0.660	2.00	NE			091350-016	SW846 9056
	Fluoride	1.74	0.033	0.100	4.0			091350-016	SW846 9056
	Sulfate	91.3	1.00	4.00	NE			091350-016	SW846 9056
	Total Cyanide	ND	0.0015	0.005	0.200	U		091350-027	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, October 2011 – December 2011

Well ID	Analyte	Result (mg/L)	MDL (mg/L)	PQL (mg/L)	MCL (mg/L)	Laboratory Qualifier[a]	Validation Qualifier[b]	Sample No.	Analytical Method[c]
SWMU 68									
OBS-MW1	Bicarbonate Alkalinity	187	0.725	1.00	NE			091335-022	SM2320B
25-Oct-11	Carbonate Alkalinity	ND	0.725	1.00	NE	U		091335-022	SM2320B
	Bromide	0.350	0.066	0.200	NE			091335-016	SW846 9056
	Chloride	21.4	0.330	1.00	NE			091335-016	SW846 9056
	Fluoride	2.17	0.033	0.100	4.0			091335-016	SW846 9056
	Sulfate	74.5	0.500	2.00	NE			091335-016	SW846 9056
	Total Cyanide	ND	0.0015	0.005	0.200	U		091335-027	SW846 9012
OBS-MW2	Bicarbonate Alkalinity	175	0.725	1.00	NE			091337-022	SM2320B
26-Oct-11	Carbonate Alkalinity	ND	0.725	1.00	NE	U		091337-022	SM2320B
	Bromide	0.351	0.066	0.200	NE			091337-016	SW846 9056
	Chloride	21.6	0.330	1.00	NE			091337-016	SW846 9056
	Fluoride	2.26	0.033	0.100	4.0			091337-016	SW846 9056
	Sulfate	88.8	0.500	2.00	NE			091337-016	SW846 9056
	Total Cyanide	ND	0.0015	0.005	0.200	U		091337-027	SW846 9012
OBS-MW3	Bicarbonate Alkalinity	178	0.725	1.00	NE			091342-022	SM2320B
24-Oct-11	Carbonate Alkalinity	ND	0.725	1.00	NE	U		091342-022	SM2320B
	Bromide	0.369	0.066	0.200	NE			091342-016	SW846 9056
	Chloride	21.8	0.330	1.00	NE			091342-016	SW846 9056
	Fluoride	2.29	0.033	0.100	4.0			091342-016	SW846 9056
	Sulfate	87.7	0.500	2.00	NE			091342-016	SW846 9056
	Total Cyanide	ND	0.0015	0.005	0.200	U		091342-027	SW846 9012
OBS-MW3 (Duplicate)	Bicarbonate Alkalinity	171	0.725	1.00	NE			091343-022	SM2320B
24-Oct-11	Carbonate Alkalinity	ND	0.725	1.00	NE	U		091343-022	SM2320B
	Bromide	0.373	0.066	0.200	NE			091343-016	SW846 9056
	Chloride	22.2	0.330	1.00	NE			091343-016	SW846 9056
	Fluoride	2.32	0.033	0.100	4.0			091343-016	SW846 9056
	Sulfate	87.4	0.500	2.00	NE			091343-016	SW846 9056
	Total Cyanide	ND	0.0015	0.005	0.200	U		091343-027	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, October 2011 – December 2011

Notes

CCBA = Coyote Canyon Blast Area.
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.

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

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

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

Table IV-8

Summary of Perchlorate Results

Solid Waste Management Units 8/58 and 68 Groundwater Monitoring

Quarterly Assessment, October 2011 – December 2011

Well ID	Perchlorate Result (mg/L)	MDL (mg/L)	PQL (mg/L)	MCL (mg/L)	Laboratory Qualifier[a]	Validation Qualifier[b]	Sample No.	Analytical Method[c]
SWMU 8/58								
CCBA-MW1 31-Oct-11	ND	0.004	0.012	NE	U		091345-020	EPA 314.0
CCBA-MW2 01-Nov-11	ND	0.004	0.012	NE	U		091349-020	EPA 314.0
CCBA-MW2 (Duplicate) 01-Nov-11	ND	0.004	0.012	NE	U		091350-020	EPA 314.0
SWMU 68								
OBS-MW1 25-Oct-11	ND	0.004	0.012	NE	U		091335-020	EPA 314.0
OBS-MW1 26-Oct-11	ND	0.004	0.012	NE	U		091337-020	EPA 314.0
OBS-MW1 24-Oct-11	ND	0.004	0.012	NE	U		091342-020	EPA 314.0
OBS-MW1 (Duplicate) 24-Oct-11	ND	0.004	0.012	NE	U		091343-020	EPA 314.0

Notes

CCBA = Coyote Canyon Blast Area.
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, October 2011 – December 2011

Notes (continued)

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

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

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

Table IV-9

Summary of Hexavalent Chromium Results

Solid Waste Management Unit 68 Groundwater Monitoring

Quarterly Assessment, October 2011 – December 2011

Well ID	Hexavalent Chromium Result (mg/L)	MDL (mg/L)	PQL (mg/L)	MCL (mg/L)	Laboratory Qualifier[a]	Validation Qualifier[b]	Sample No.	Analytical Method[c]
OBS-MW1 25-Oct-11	ND	0.003	0.010	NE	U		091335-014	SW846 7196A
OBS-MW2 26-Oct-11	ND	0.003	0.010	NE	U		091337-014	SW846 7196A
OBS-MW3 24-Oct-11	ND	0.003	0.010	NE	U		091342-014	SW846 7196A
OBS-MW3 (Duplicate) 24-Oct-11	0.00317	0.003	0.010	NE	J		091343-014	SW846 7196A

Notes

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.

[a]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.

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

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

Table IV-10

Summary of Unfiltered Total Metal Results

Solid Waste Management Units 8/58 Groundwater Monitoring

Quarterly Assessment, October 2011 – December 2011

Well ID	Analyte	Result (mg/L)	MDL (mg/L)	PQL (mg/L)	MCL (mg/L)	Laboratory Qualifier[a]	Validation Qualifier[b]	Sample No.	Analytical Method[c]
CCBA-MW1	Aluminum	0.0642	0.015	0.050	NE			091345-009	SW846 6020
31-Oct-11	Antimony	ND	0.001	0.003	0.006	U		091345-009	SW846 6020
	Arsenic	ND	0.0017	0.005	0.010	U		091345-009	SW846 6020
	Barium	0.0133	0.0006	0.002	2.00			091345-009	SW846 6020
	Beryllium	0.000594	0.0002	0.0005	0.004			091345-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		091345-009	SW846 6020
	Calcium	42.4	0.060	0.200	NE	B		091345-009	SW846 6020
	Chromium	ND	0.002	0.010	0.100	U		091345-009	SW846 6020
	Cobalt	0.000153	0.0001	0.001	NE	J		091345-009	SW846 6020
	Copper	0.000697	0.00035	0.001	NE	J		091345-009	SW846 6020
	Iron	0.103	0.033	0.100	NE			091345-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		091345-009	SW846 6020
	Magnesium	8.98	0.010	0.030	NE			091345-009	SW846 6020
	Manganese	0.0219	0.001	0.005	NE			091345-009	SW846 6020
	Mercury	ND	0.000066	0.0002	0.002	U	UJ	091345-009	SW846 7470
	Nickel	0.00135	0.0005	0.002	NE	J		091345-009	SW846 6020
	Potassium	4.20	0.080	0.300	NE			091345-009	SW846 6020
	Selenium	0.00286	0.0015	0.005	0.050	J		091345-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		091345-009	SW846 6020
	Sodium	67.6	0.400	1.25	NE		J	091345-009	SW846 6020
	Thallium	ND	0.00045	0.002	0.002	U		091345-009	SW846 6020
	Uranium	0.00187	0.000067	0.0002	0.03	B		091345-009	SW846 6020
	Vanadium	ND	0.001	0.005	NE	U		091345-009	SW846 6010
	Zinc	ND	0.0035	0.010	NE	U		091345-009	SW846 6020

Table IV-10 (Continued)

Summary of Unfiltered Total Metal Results

Solid Waste Management Units 8/58 Groundwater Monitoring

Quarterly Assessment, October 2011 – December 2011

Well ID	Analyte	Result (mg/L)	MDL (mg/L)	PQL (mg/L)	MCL (mg/L)	Laboratory Qualifier[a]	Validation Qualifier[b]	Sample No.	Analytical Method[c]
CCBA-MW2	Aluminum	0.0638	0.015	0.050	NE			091349-009	SW846 6020
01-Nov-11	Antimony	ND	0.001	0.003	0.006	U		091349-009	SW846 6020
	Arsenic	ND	0.0017	0.005	0.010	U		091349-009	SW846 6020
	Barium	0.0481	0.0006	0.002	2.00			091349-009	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		091349-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		091349-009	SW846 6020
	Calcium	78.4	0.300	1.00	NE	B		091349-009	SW846 6020
	Chromium	ND	0.002	0.010	0.100	U		091349-009	SW846 6020
	Cobalt	0.000115	0.0001	0.001	NE	J		091349-009	SW846 6020
	Copper	0.00192	0.00035	0.001	NE		0.0023U	091349-009	SW846 6020
	Iron	0.215	0.033	0.100	NE			091349-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		091349-009	SW846 6020
	Magnesium	15.6	0.010	0.030	NE			091349-009	SW846 6020
	Manganese	0.012	0.001	0.005	NE			091349-009	SW846 6020
	Mercury	ND	0.000066	0.0002	0.002	U	UJ	091349-009	SW846 7470
	Nickel	0.00114	0.0005	0.002	NE	J		091349-009	SW846 6020
	Potassium	1.51	0.080	0.300	NE			091349-009	SW846 6020
	Selenium	0.00452	0.0015	0.005	0.050	J		091349-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		091349-009	SW846 6020
	Sodium	49.0	0.080	0.250	NE		J	091349-009	SW846 6020
	Thallium	ND	0.00045	0.002	0.002	U		091349-009	SW846 6020
	Uranium	0.00586	0.000067	0.0002	0.03	B		091349-009	SW846 6020
	Vanadium	0.00826	0.001	0.005	NE			091349-009	SW846 6010
	Zinc	0.0432	0.0035	0.010	NE			091349-009	SW846 6020

Table IV-10 (Continued)

Summary of Unfiltered Total Metal Results

Solid Waste Management Units 8/58 Groundwater Monitoring

Quarterly Assessment, October 2011 – December 2011

Well ID	Analyte	Result (mg/L)	MDL (mg/L)	PQL (mg/L)	MCL (mg/L)	Laboratory Qualifier[a]	Validation Qualifier[b]	Sample No.	Analytical Method[c]
CCBA-MW2 (Duplicate) 01-Nov-11	Aluminum	0.061	0.015	0.050	NE			091350-009	SW846 6020
	Antimony	ND	0.001	0.003	0.006	U		091350-009	SW846 6020
	Arsenic	ND	0.0017	0.005	0.010	U		091350-009	SW846 6020
	Barium	0.0478	0.0006	0.002	2.00			091350-009	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		091350-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		091350-009	SW846 6020
	Calcium	78.7	0.300	1.00	NE	B		091350-009	SW846 6020
	Chromium	ND	0.002	0.010	0.100	U		091350-009	SW846 6020
	Cobalt	0.000124	0.0001	0.001	NE	J		091350-009	SW846 6020
	Copper	0.00195	0.00035	0.001	NE		0.0023U	091350-009	SW846 6020
	Iron	0.349	0.033	0.100	NE			091350-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		091350-009	SW846 6020
	Magnesium	14.9	0.010	0.030	NE			091350-009	SW846 6020
	Manganese	0.0124	0.001	0.005	NE			091350-009	SW846 6020
	Mercury	ND	0.000066	0.0002	0.002	U	UJ	091350-009	SW846 7470
	Nickel	0.0013	0.0005	0.002	NE	J		091350-009	SW846 6020
	Potassium	1.52	0.080	0.300	NE			091350-009	SW846 6020
	Selenium	0.00477	0.0015	0.005	0.050	J		091350-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		091350-009	SW846 6020
	Sodium	46.7	0.080	0.250	NE		J	091350-009	SW846 6020
	Thallium	ND	0.00045	0.002	0.002	U		091350-009	SW846 6020
	Uranium	0.00581	0.000067	0.0002	0.03	B		091350-009	SW846 6020
	Vanadium	0.00814	0.001	0.005	NE			091350-009	SW846 6010
	Zinc	0.0455	0.0035	0.010	NE			091350-009	SW846 6020

Notes

CCBA = Coyote Canyon Blast Area.
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.

Table IV-10 (Concluded)

Summary of Unfiltered Total Metal Results

Solid Waste Management Units 8/58 Groundwater Monitoring

Quarterly Assessment, October 2011 – December 2011

Notes (continued)

[a]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.

[b]Validation Qualifier

If cell is blank, then all quality control samples met acceptance criteria with respect to submitted samples.
J = The associated value is an estimated quantity.
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.

[c]Analytical Method

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

Table IV-11

Summary of Unfiltered Total Metal Results

Solid Waste Management Unit 68 Groundwater Monitoring

Quarterly Assessment, October 2011 – December 2011

Well ID	Analyte	Result (mg/L)	MDL (mg/L)	PQL (mg/L)	MCL (mg/L)	Laboratory Qualifier[a]	Validation Qualifier[b]	Sample No.	Analytical Method[c]
OBS-MW1	Aluminum	0.105	0.015	0.050	NE			091335-009	SW846 6020
25-Oct-11	Antimony	ND	0.001	0.003	0.006	U		091335-009	SW846 6020
	Arsenic	ND	0.0017	0.005	0.010	U		091335-009	SW846 6020
	Barium	0.0249	0.0006	0.002	2.00			091335-009	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		091335-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		091335-009	SW846 6020
	Calcium	84.9	0.600	2.00	NE	B		091335-009	SW846 6020
	Chromium	ND	0.002	0.010	0.100	U		091335-009	SW846 6020
	Cobalt	0.000175	0.0001	0.001	NE	J		091335-009	SW846 6020
	Copper	0.00177	0.00035	0.001	NE	B	0.0019U	091335-009	SW846 6020
	Iron	0.270	0.033	0.100	NE	B		091335-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		091335-009	SW846 6020
	Magnesium	15.9	0.010	0.030	NE			091335-009	SW846 6020
	Manganese	0.0175	0.001	0.005	NE			091335-009	SW846 6020
	Mercury	ND	0.000066	0.0002	0.002	U	UJ	091335-009	SW846 7470
	Nickel	0.00222	0.0005	0.002	NE			091335-009	SW846 6020
	Potassium	2.57	0.080	0.300	NE			091335-009	SW846 6020
	Selenium	0.00424	0.0015	0.005	0.050	J		091335-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		091335-009	SW846 6020
	Sodium	24.5	0.800	2.50	NE			091335-009	SW846 6020
	Thallium	ND	0.00045	0.002	0.002	U		091335-009	SW846 6020
	Uranium	0.0111	0.000067	0.0002	0.03	B		091335-009	SW846 6020
	Vanadium	0.00124	0.001	0.005	NE	J		091335-009	SW846 6010
	Zinc	0.0571	0.0035	0.010	NE			091335-009	SW846 6020

Table IV-11 (Continued)

Summary of Unfiltered Total Metal Results

Solid Waste Management Unit 68 Groundwater Monitoring

Quarterly Assessment, October 2011 – December 2011

Well ID	Analyte	Result (mg/L)	MDL (mg/L)	PQL (mg/L)	MCL (mg/L)	Laboratory Qualifier[a]	Validation Qualifier[b]	Sample No.	Analytical Method[c]
OBS-MW2	Aluminum	0.0248	0.015	0.050	NE	J		091337-009	SW846 6020
26-Oct-11	Antimony	ND	0.001	0.003	0.006	U		091337-009	SW846 6020
	Arsenic	ND	0.0017	0.005	0.010	U		091337-009	SW846 6020
	Barium	0.0224	0.0006	0.002	2.00			091337-009	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		091337-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		091337-009	SW846 6020
	Calcium	81.3	0.600	2.00	NE	B		091337-009	SW846 6020
	Chromium	ND	0.002	0.010	0.100	U		091337-009	SW846 6020
	Cobalt	0.000156	0.0001	0.001	NE	J		091337-009	SW846 6020
	Copper	0.00114	0.00035	0.001	NE	B	0.0019U	091337-009	SW846 6020
	Iron	0.236	0.033	0.100	NE	B	0.24U	091337-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		091337-009	SW846 6020
	Magnesium	16.6	0.010	0.030	NE			091337-009	SW846 6020
	Manganese	0.00141	0.001	0.005	NE	J		091337-009	SW846 6020
	Mercury	ND	0.000066	0.0002	0.002	U	UJ	091337-009	SW846 7470
	Nickel	0.00221	0.0005	0.002	NE			091337-009	SW846 6020
	Potassium	1.88	0.080	0.300	NE			091337-009	SW846 6020
	Selenium	0.00418	0.0015	0.005	0.050	J		091337-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		091337-009	SW846 6020
	Sodium	23.3	0.800	2.50	NE			091337-009	SW846 6020
	Thallium	ND	0.00045	0.002	0.002	U		091337-009	SW846 6020
	Uranium	0.0147	0.000067	0.0002	0.03	B		091337-009	SW846 6020
	Vanadium	ND	0.001	0.005	NE	U		091337-009	SW846 6010
	Zinc	ND	0.0035	0.010	NE	U		091337-009	SW846 6020

Table IV-11 (Continued)

Summary of Unfiltered Total Metal Results

Solid Waste Management Unit 68 Groundwater Monitoring

Quarterly Assessment, October 2011 – December 2011

Well ID	Analyte	Result (mg/L)	MDL (mg/L)	PQL (mg/L)	MCL (mg/L)	Laboratory Qualifier[a]	Validation Qualifier[b]	Sample No.	Analytical Method[c]
OBS-MW3	Aluminum	0.0426	0.015	0.050	NE	J		091342-009	SW846 6020
24-Oct-11	Antimony	ND	0.001	0.003	0.006	U		091342-009	SW846 6020
	Arsenic	ND	0.0017	0.005	0.010	U		091342-009	SW846 6020
	Barium	0.0302	0.0006	0.002	2.00			091342-009	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		091342-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		091342-009	SW846 6020
	Calcium	86.1	0.600	2.00	NE	B		091342-009	SW846 6020
	Chromium	ND	0.002	0.010	0.100	U		091342-009	SW846 6020
	Cobalt	0.00023	0.0001	0.001	NE	J		091342-009	SW846 6020
	Copper	0.00158	0.00035	0.001	NE	B	0.0019U	091342-009	SW846 6020
	Iron	0.216	0.033	0.100	NE	B	0.24U	091342-009	SW846 6020
	Lead	0.00103	0.0005	0.002	NE	J		091342-009	SW846 6020
	Magnesium	18.9	0.010	0.030	NE			091342-009	SW846 6020
	Manganese	0.00417	0.001	0.005	NE	J	0.0053U	091342-009	SW846 6020
	Mercury	ND	0.000066	0.0002	0.002	U	UJ	091342-009	SW846 7470
	Nickel	0.00225	0.0005	0.002	NE			091342-009	SW846 6020
	Potassium	1.83	0.080	0.300	NE			091342-009	SW846 6020
	Selenium	0.00428	0.0015	0.005	0.050	J		091342-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		091342-009	SW846 6020
	Sodium	24.2	0.080	0.250	NE			091342-009	SW846 6020
	Thallium	ND	0.00045	0.002	0.002	U		091342-009	SW846 6020
	Uranium	0.0136	0.000067	0.0002	0.03	B		091342-009	SW846 6020
	Vanadium	0.00161	0.001	0.005	NE	J		091342-009	SW846 6010
	Zinc	0.0055	0.0035	0.010	NE	J		091342-009	SW846 6020

Table IV-11 (Continued)

Summary of Unfiltered Total Metal Results

Solid Waste Management Unit 68 Groundwater Monitoring

Quarterly Assessment, October 2011 – December 2011

Well ID	Analyte	Result (mg/L)	MDL (mg/L)	PQL (mg/L)	MCL (mg/L)	Laboratory Qualifier[a]	Validation Qualifier[b]	Sample No.	Analytical Method[c]
OBS-MW3 (Duplicate) 24-Oct-11	Aluminum	0.0273	0.015	0.050	NE	J		091343-009	SW846 6020
	Antimony	ND	0.001	0.003	0.006	U		091343-009	SW846 6020
	Arsenic	ND	0.0017	0.005	0.010	U		091343-009	SW846 6020
	Barium	0.0296	0.0006	0.002	2.00			091343-009	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		091343-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		091343-009	SW846 6020
	Calcium	82.4	0.600	2.00	NE	B		091343-009	SW846 6020
	Chromium	ND	0.002	0.010	0.100	U		091343-009	SW846 6020
	Cobalt	0.000205	0.0001	0.001	NE	J		091343-009	SW846 6020
	Copper	0.00127	0.00035	0.001	NE	B	0.0019U	091343-009	SW846 6020
	Iron	0.218	0.033	0.100	NE	B	0.24U	091343-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		091343-009	SW846 6020
	Magnesium	17.1	0.010	0.030	NE			091343-009	SW846 6020
	Manganese	0.00433	0.001	0.005	NE	J	0.0053U	091343-009	SW846 6020
	Mercury	ND	0.000066	0.0002	0.002	U	UJ	091343-009	SW846 7470
	Nickel	0.00171	0.0005	0.002	NE	J		091343-009	SW846 6020
	Potassium	1.75	0.080	0.300	NE			091343-009	SW846 6020
	Selenium	0.00369	0.0015	0.005	0.050	J		091343-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		091343-009	SW846 6020
	Sodium	24.8	0.080	0.250	NE			091343-009	SW846 6020
	Thallium	ND	0.00045	0.002	0.002	U		091343-009	SW846 6020
	Uranium	0.0129	0.000067	0.0002	0.03	B		091343-009	SW846 6020
	Vanadium	0.00151	0.001	0.005	NE	J		091343-009	SW846 6010
	Zinc	0.00544	0.0035	0.010	NE	J		091343-009	SW846 6020

Table IV-11 (Concluded)

Summary of Unfiltered Total Metal Results

Solid Waste Management Unit 68 Groundwater Monitoring

Quarterly Assessment, October 2011 – December 2011

Notes

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.

[a]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.

[b]Validation Qualifier
If cell is blank, then all quality control samples met acceptance criteria with respect to submitted samples.
U = The analyte was analyzed for but 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.

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

Table IV-12

Summary of Filtered Cation Results

Solid Waste Management Units 8/58 and 68 Groundwater Monitoring

Quarterly Assessment, October 2011 – December 2011

Well ID	Analyte	Result (mg/L)	MDL (mg/L)	PQL (mg/L)	MCL (mg/L)	Laboratory Qualifier[a]	Validation Qualifier[b]	Sample No.	Analytical Method[c]
SWMU 8/58									
CCBA-MW1	Calcium	43.7	0.060	0.200	NE	B		091345-017	SW846 6020
31-Oct-11	Magnesium	9.16	0.010	0.030	NE			091345-017	SW846 6020
	Potassium	4.48	0.080	0.300	NE			091345-017	SW846 6020
	Sodium	64.3	0.400	1.25	NE		J	091345-017	SW846 6020
CCBA-MW2	Calcium	79.9	0.300	1.00	NE	B		091349-017	SW846 6020
01-Nov-11	Magnesium	15.2	0.010	0.030	NE			091349-017	SW846 6020
	Potassium	1.53	0.080	0.300	NE			091349-017	SW846 6020
	Sodium	47.7	0.080	0.250	NE		J	091349-017	SW846 6020
CCBA-MW2 (Duplicate)	Calcium	81.3	0.300	1.00	NE	B		091350-017	SW846 6020
01-Nov-11	Magnesium	14.7	0.010	0.030	NE			091350-017	SW846 6020
	Potassium	1.52	0.080	0.300	NE			091350-017	SW846 6020
	Sodium	48.2	0.080	0.250	NE		J	091350-017	SW846 6020
SWMU 68									
OBS-MW1	Calcium	80.5	0.600	2.00	NE	B		091335-017	SW846 6020
25-Oct-11	Magnesium	15.8	0.010	0.030	NE			091335-017	SW846 6020
	Potassium	1.97	0.080	0.300	NE			091335-017	SW846 6020
	Sodium	23.0	0.800	2.50	NE			091335-017	SW846 6020
OBS-MW2	Calcium	82.0	0.600	2.00	NE	B		091337-017	SW846 6020
26-Oct-11	Magnesium	16.1	0.010	0.030	NE			091337-017	SW846 6020
	Potassium	1.88	0.080	0.300	NE			091337-017	SW846 6020
	Sodium	22.9	0.800	2.50	NE			091337-017	SW846 6020
OBS-MW3	Calcium	81.7	0.600	2.00	NE	B		091342-017	SW846 6020
24-Oct-11	Magnesium	17.9	0.010	0.030	NE			091342-017	SW846 6020
	Potassium	1.80	0.080	0.300	NE			091342-017	SW846 6020
	Sodium	24.7	0.080	0.250	NE			091342-017	SW846 6020
OBS-MW3 (Duplicate)	Calcium	77.9	0.600	2.00	NE	B		091343-017	SW846 6020
24-Oct-11	Magnesium	16.3	0.010	0.030	NE			091343-017	SW846 6020
	Potassium	1.64	0.080	0.300	NE			091343-017	SW846 6020
	Sodium	25.0	0.080	0.250	NE			091343-017	SW846 6020

Table IV-12 (Concluded)

Summary of Filtered Cation Results

Solid Waste Management Units 8/58 and 68 Groundwater Monitoring

Quarterly Assessment, October 2011 – December 2011

Notes

CCBA = Coyote Canyon Blast Area.
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.

[a]Laboratory Qualifier
B = The analyte was detected in the blank above the effective MDL.

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

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

Table IV-13

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

Solid Waste Management Units 8/58 and 68 Groundwater Monitoring

Quarterly Assessment, October 2011 – December 2011

Well ID	Analyte	Activity[a] (pCi/L)	MDA (pCi/L)	Critical Level[b] (pCi/L)	MCL (pCi/L)	Laboratory Qualifier[c]	Validation Qualifier[d]	Sample No.	Analytical Method[e]
SWMU 8/58									
CCBA-MW1	Americium-241	4.06 ± 7.14	10.4	5.10	NE	U	BD	091345-033	EPA 901.1
31-Oct-11	Cesium-137	-0.718 ± 1.90	3.16	1.53	NE	U	BD	091345-033	EPA 901.1
	Cobalt-60	-0.0847 ± 1.92	3.35	1.59	NE	U	BD	091345-033	EPA 901.1
	Potassium-40	-35.3 ± 39.8	43.9	21.1	NE	U	BD	091345-033	EPA 901.1
	Gross Alpha	1.84	NA	NA	15	NA	None	091345-034	EPA 900.0
	Gross Beta	6.07 ± 1.32	1.15	0.557	4mrem/yr			091345-034	EPA 900.0
	Uranium-233/234	1.62 ± 0.248	0.0569	0.0254	NE			091345-035	HASL-300
	Uranium-235/236	0.036 ± 0.0201	0.0298	0.0111	NE		J	091345-035	HASL-300
	Uranium-238	0.593 ± 0.107	0.0252	0.00956	NE			091345-035	HASL-300
CCBA-MW2	Americium-241	5.34 ± 7.13	10.8	5.27	NE	U	BD	091349-033	EPA 901.1
01-Nov-11	Cesium-137	-1.3 ± 1.77	2.73	1.31	NE	U	BD	091349-033	EPA 901.1
	Cobalt-60	0.064 ± 1.62	2.86	1.34	NE	U	BD	091349-033	EPA 901.1
	Potassium-40	-26.4 ± 35.1	40.6	19.4	NE	U	BD	091349-033	EPA 901.1
	Gross Alpha	0.36	NA	NA	15	NA	None	091349-034	EPA 900.0
	Gross Beta	3.94 ± 1.25	1.56	0.760	4mrem/yr		J	091349-034	EPA 900.0
	Uranium-233/234	7.31 ± 1.04	0.0708	0.0316	NE			091349-035	HASL-300
	Uranium-235/236	0.169 ± 0.0526	0.0371	0.0139	NE			091349-035	HASL-300
	Uranium-238	1.80 ± 0.282	0.0313	0.0119	NE			091349-035	HASL-300
CCBA-MW2 (Duplicate)	Americium-241	3.43 ± 7.90	13.6	6.62	NE	U	BD	091350-033	EPA 901.1
01-Nov-11	Cesium-137	-0.83 ± 2.43	4.19	1.99	NE	U	BD	091350-033	EPA 901.1
	Cobalt-60	1.49 ± 2.81	5.17	2.40	NE	U	BD	091350-033	EPA 901.1
	Potassium-40	-21.2 ± 54.3	64.4	30.4	NE	U	BD	091350-033	EPA 901.1
	Gross Alpha	3.41	NA	NA	15	NA	None	091350-034	EPA 900.0
	Gross Beta	4.66 ± 1.25	1.49	0.728	4mrem/yr			091350-034	EPA 900.0
	Uranium-233/234	6.78 ± 1.01	0.0982	0.0438	NE			091350-035	HASL-300
	Uranium-235/236	0.100 ± 0.054	0.0514	0.0192	NE		J	091350-035	HASL-300
	Uranium-238	1.61 ± 0.274	0.0434	0.0165	NE			091350-035	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, October 2011 – December 2011

Well ID	Analyte	Activity[a] (pCi/L)	MDA (pCi/L)	Critical Level[b] (pCi/L)	MCL (pCi/L)	Laboratory Qualifier[c]	Validation Qualifier[d]	Sample No.	Analytical Method[e]
SWMU 8/58									
OBS-MW1	Americium-241	0.498 ± 17.4	25.5	12.5	NE	U	BD	091335-033	EPA 901.1
25-Oct-11	Cesium-137	-1.16 ± 1.84	3.02	1.45	NE	U	BD	091335-033	EPA 901.1
	Cobalt-60	-0.198 ± 1.93	3.42	1.61	NE	U	BD	091335-033	EPA 901.1
	Potassium-40	72.0 ± 28.3	33.1	15.5	NE	X	R	091335-033	EPA 901.1
	Gross Alpha	0.03	NA	NA	15	NA	None	091335-034	EPA 900.0
	Gross Beta	6.11 ± 1.73	2.02	0.978	4mrem/yr			091335-034	EPA 900.0
	Uranium-233/234	18.0 ± 2.53	0.109	0.0486	NE			091335-035	HASL-300
	Uranium-235/236	0.201 ± 0.074	0.0569	0.0213	NE			091335-035	HASL-300
	Uranium-238	3.40 ± 0.523	0.0481	0.0183	NE			091335-035	HASL-300
OBS-MW2	Americium-241	15.8 ± 13.8	19.1	9.34	NE	U	BD	091337-033	EPA 901.1
26-Oct-11	Cesium-137	0.781 ± 1.94	3.36	1.62	NE	U	BD	091337-033	EPA 901.1
	Cobalt-60	1.08 ± 2.05	3.71	1.76	NE	U	BD	091337-033	EPA 901.1
	Potassium-40	73.3 ± 40.2	34.5	16.2	NE		J	091337-033	EPA 901.1
	Gross Alpha	6.69	NA	NA	15	NA	None	091337-034	EPA 900.0
	Gross Beta	6.95 ± 1.86	2.03	0.983	4mrem/yr			091337-034	EPA 900.0
	Uranium-233/234	21.7 ± 3.02	0.0762	0.0341	NE			091337-035	HASL-300
	Uranium-235/236	0.260 ± 0.0727	0.0399	0.0149	NE			091337-035	HASL-300
	Uranium-238	3.95 ± 0.584	0.0337	0.0128	NE			091337-035	HASL-300
OBS-MW3	Americium-241	2.81 ± 3.21	4.64	2.27	NE	U	BD	091342-033	EPA 901.1
24-Oct-11	Cesium-137	-4.49 ± 5.06	5.64	2.75	NE	U	BD	091342-033	EPA 901.1
	Cobalt-60	1.06 ± 2.13	3.85	1.82	NE	U	BD	091342-033	EPA 901.1
	Potassium-40	18.6 ± 64.9	35.3	16.6	NE	U	BD	091342-033	EPA 901.1
	Gross Alpha	8.60	NA	NA	15	NA	None	091342-034	EPA 900.0
	Gross Beta	7.22 ± 2.09	2.39	1.16	4mrem/yr			091342-034	EPA 900.0
	Uranium-233/234	20.4 ± 2.83	0.0691	0.0309	NE			091342-035	HASL-300
	Uranium-235/236	0.296 ± 0.0744	0.0362	0.0135	NE			091342-035	HASL-300
	Uranium-238	3.80 ± 0.556	0.0306	0.0116	NE			091342-035	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, October 2011 – December 2011

Well ID	Analyte	Activity[a] (pCi/L)	MDA (pCi/L)	Critical Level[b] (pCi/L)	MCL (pCi/L)	Laboratory Qualifier[c]	Validation Qualifier[d]	Sample No.	Analytical Method[e]
OBS-MW3 (Duplicate) 24-Oct-11	Americium-241	0.555 ± 5.06	7.84	3.84	NE	U	BD	091343-033	EPA 901.1
	Cesium-137	-0.372 ± 2.53	2.84	1.37	NE	U	BD	091343-033	EPA 901.1
	Cobalt-60	-1.36 ± 4.03	3.30	1.57	NE	U	BD	091343-033	EPA 901.1
	Potassium-40	-16.6 ± 37.6	37.7	18.1	NE	U	BD	091343-033	EPA 901.1
	Gross Alpha	6.52	NA	NA	15	NA	None	091343-034	EPA 900.0
	Gross Beta	5.82 ± 1.52	1.38	0.658	4mrem/yr			091343-034	EPA 900.0
	Uranium-233/234	19.8 ± 2.79	0.0839	0.0375	NE			091343-035	HASL-300
	Uranium-235/236	0.200 ± 0.0634	0.0439	0.0164	NE			091343-035	HASL-300
	Uranium-238	3.48 ± 0.527	0.0371	0.0141	NE			091343-035	HASL-300

Notes

CCBA = Coyote Canyon Blast Area.
EPA = U.S. Environmental Protection Agency.
HASL = Health and Safety Laboratory.
MCL = Maximum contaminant level. The following are the MCLs for gross alpha particles and beta particles in community water systems:
15 pCi/L = Gross alpha particle activity, excluding total uranium (40 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.

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

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

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, October 2011 – December 2011

Notes (continued)

[c]Laboratory Qualifier
NA = Not applicable.
U = Analyte is absent or below the method detection limit.
X = Uncertain identification for gamma spectroscopy analysis and/or peak not meeting identification criteria.

[d]Validation Qualifier
If cell is blank, then all quality control samples met acceptance criteria with respect to submitted samples.
BD = Below detection limit as used in radiochemistry to identify results that are not statistically different from zero.
J = The associated value is an estimated quantity.
R = The data are unusable, and resampling or reanalysis are necessary for verification.
None = No data validation for corrected gross alpha activity.

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

Table IV-14

Summary of Constituents Detected Above Established MCLs

Solid Waste Management Units 8/58 and 68 Groundwater Monitoring

Quarterly Assessments through December 2011

Well ID	Date	Analyte	Result	MCL	Laboratory Qualifier[a]	Validation Qualifier[b]	Sample No.	Analytical Method[c]
SWMU 8/58								
CCBA-MW1	31-Oct-11	Fluoride	5.36 mg/L	4.0 mg/L			091345-016	SW846 9056

Notes

CCBA = Coyote Canyon Blast Area.
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.
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.

[a]Laboratory Qualifier

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

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

Table IV-15

Summary of Duplicate Samples

Solid Waste Management Units 8/58 and 68 Groundwater Monitoring

Quarterly Assessment, October 2011 – December 2011

Well ID/Parameter	Environmental Sample (R1)	Duplicate Sample (R2)	RPD[a]
	mg/L unless otherwise noted		
CCBA-MW2			
Nitrate plus Nitrite	3.24	3.31	2
Bicarbonate Alkalinity	185	111	50
Bromide	0.567	0.539	5
Chloride	35.1	35.4	1
Fluoride	1.72	1.74	1
Sulfate	90.5	91.3	1
Aluminum	0.0638	0.061	4
Barium	0.0481	0.0478	1
Calcium	78.4	78.7	< 1
Cobalt	0.000115	0.000124	8
Iron	0.215	0.349	48
Magnesium	15.6	14.9	5
Manganese	0.012	0.0124	3
Nickel	0.00114	0.0013	13
Potassium	1.51	1.52	1
Selenium	0.00452	0.00477	5
Sodium	49.0	46.7	5
Uranium	0.00586	0.00581	1
Vanadium	0.00826	0.00814	1
Zinc	0.0432	0.0455	5
Filtered Calcium	79.9	81.3	2
Filtered Magnesium	15.2	14.7	3
Filtered Potassium	1.53	1.52	1
Filtered Sodium	47.7	48.2	1
Gross Alpha	0.36	3.41	NC
Gross Beta	3.94 ± 1.25	4.66 ± 1.25	NC
Uranium-233/234	7.31 ± 1.04	6.78 ± 1.01	NC
Uranium-235/236	0.169 ± 0.0526	0.100 ± 0.054	NC
Uranium-238	1.80 ± 0.282	1.61 ± 0.274	NC
OBS-MW3			
Nitrate plus Nitrite	1.56	1.61	3
Bicarbonate Alkalinity	178	171	4
Bromide	0.369	0.373	1
Chloride	21.8	22.2	2
Fluoride	2.29	2.32	1
Sulfate	87.7	87.4	< 1
Hexavalent Chromium	ND	0.00317	NC
Aluminum	0.0426	0.0273	44
Barium	0.0302	0.0296	2
Calcium	86.1	82.4	4
Cobalt	0.00023	0.000205	11
Lead	0.00103	ND	NC
Magnesium	18.9	17.1	10
Nickel	0.00225	0.00171	27
Potassium	1.83	1.75	4
Selenium	0.00428	0.00369	15

Table IV-15
Summary of Duplicate Samples
Solid Waste Management Units 8/58 and 68 Groundwater Monitoring
Quarterly Assessment, October 2011 – December 2011

Well ID/Parameter	Environmental Sample (R1)	Duplicate Sample (R2)	RPD[a]
	mg/L unless otherwise noted		
OBS-MW3 (Continued)			
Sodium	24.2	24.8	2
Uranium	0.0136	0.0129	5
Vanadium	0.00161	0.00151	6
Zinc	0.0055	0.00544	1
Filtered Calcium	81.7	77.9	5
Filtered Magnesium	17.9	16.3	9
Filtered Potassium	1.80	1.64	9
Filtered Sodium	24.7	25.0	1
Gross Alpha	8.60	6.52	NC
Gross Beta	7.22 ± 2.09	5.82 ± 1.52	NC
Uranium-233/234	20.4 ± 2.83	19.8 ± 2.79	NC
Uranium-235/236	0.296 ± 0.0744	0.200 ± 0.0634	NC
Uranium-238	3.80 ± 0.556	3.48 ± 0.527	NC

Notes

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

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

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

where: R_1 = analysis result
R_2 = duplicate analysis result

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

FIELD MEASUREMENT LOG FOR GROUNDWATER SAMPLE COLLECTION

Project Name: SWMU	Project No.:
Well I.D.: CCBA-MW1	Date: 10/31/11
Well Condition:	Weather Condition: 24.25"Hg
Method: Portable pump X	Dedicated pump _____ Pump depth: 79'

PURGE MEASUREMENTS

Depth to Water (ft)	Time 24 hr	Vol. (L/gal)	Temp (°C)	SC (µS/cm)	ORP (mV)	pH	Turbidity (NTU)	DO (%)	Comments DO mg/L
47.87	0756	/	START						→
48.68	0819	5	13.37	587	416.1	6.77	1.91	19.2	2.00
48.86	0830	10	13.77	577	418.2	6.66	2.40	24.0	2.44
48.91	0844	15	14.07	567	418.7	6.61	1.57	24.5	2.52
48.96	0856	20	14.24	563	419.5	6.58	1.60	25.6	2.62
48.95	0910	25	14.64	563	420.1	6.55	0.76	25.8	2.62
48.94	0915	27	14.84	564	420.3	6.54	0.56	26.0	2.62
49.93	0921	29	15.10	565	420.8	6.52	0.52	25.9	2.61
49.92	0928	31	15.13	564	420.9	6.51	0.42	26.2	2.62
49.88	0934	33	15.16	564	420.7	6.51	0.35	25.3	2.52
	0935	/	SAMPLING						→
									~4.00 gals purged
									from tubing
									0806

FIELD MEASUREMENT LOG FOR GROUNDWATER SAMPLE COLLECTION

Project Name: SWMU	Project No.:
Well I.D.: CCBA-MW2	Date: 11/01/11
Well Condition:	Weather Condition:
Method: Portable pump X	Dedicated pump ____ Pump depth: 117'

PURGE MEASUREMENTS

Depth to Water (ft)	Time 24 hr	Vol. (L/gal)	Temp (°C)	SC (µS/cm)	ORP (mV)	pH	Turbidity (NTU)	DO (%)	Comments DO mg/L
65.95	0748	/	START						→
71.79	0809	5	14.62	697	368.3	7.23	15.1	25.4	2.58
71.76	0823	10	14.98	698	371.7	7.28	11.2	25.1	2.53
71.78	0836	15	15.30	697	374.8	7.29	9.71	28.1	2.82
71.65	0853	20	15.70	695	378.8	7.31	6.16	39.0	3.87
71.62	0916	25	16.26	693	381.9	7.33	4.91	47.1	4.62
71.61	0926	27	16.61	693	382.9	7.34	4.08	51.9	5.05
71.60	0937	29	16.88	693	388.6	7.34	3.82	51.2	4.96
71.60	0948	31	16.81	694	387.6	7.34	3.97	51.4	4.96
71.57	0959	33	16.84	694	386.6	7.34	3.91	53.8	5.17
	1000	/	sampling						→
									~4.00 gals purged from tubing 0757

FIELD MEASUREMENT LOG FOR GROUNDWATER SAMPLE COLLECTION

Project Name: SWMU	Project No.:
Well I.D.: OBS-MW1	Date: 10/25/11
Well Condition:	Weather Condition: 24.24"Hg
Method: Portable pump X	Dedicated pump _____ Pump depth: 154'

PURGE MEASUREMENTS

Depth to Water (ft)	Time 24 hr	Vol. (L/gal)	Temp (°C)	SC (µS/cm)	ORP (mV)	pH	Turbidity (NTU)	DO (%)	Comments DO mg/L
72.08	0747	/	START						
72.11	0806	5	15.45	594	367.0	7.42	6.50	32.1	3.20
72.12	0821	10	16.18	596	374.0	7.36	4.30	32.6	3.20
72.11	0836	15	16.83	596	378.1	7.32	3.50	34.4	3.34
72.11	0855	20	17.27	597	380.6	7.28	3.48	35.0	3.36
72.10	0915	25	17.45	597	381.6	7.27	2.89	34.8	3.32
72.11	0923	27	17.41	597	383.1	7.27	2.87	35.1	3.36
72.11	0932	29	17.52	597	384.4	7.26	2.91	34.6	3.31
72.11	0940	31	17.65	597	384.9	7.26	2.89	35.9	3.41
72.11	0948	33	17.63	598	384.7	7.26	2.78	38.0	3.58
	0949	/	Sampling						
									~4.00 gals. purged from tubing 0752

FIELD MEASUREMENT LOG FOR GROUNDWATER SAMPLE COLLECTION

Project Name: SWMU	Project No.:
Well I.D.: OBS-MW2	Date: 10/26/11
Well Condition:	Weather Condition:
Method: Portable pump X	Dedicated pump ____ Pump depth: 253'

PURGE MEASUREMENTS

Depth to Water (ft)	Time 24 hr	Vol. (L/gal)	Temp (°C)	SC (µS/cm)	ORP (mV)	pH	Turbidity (NTU)	DO (%)	Comments DO mg/L
176.68	0809	/	START						
177.35	0827	5	16.72	604	366.0	7.47	1.15	38.4	3.73
177.39	0839	10	16.92	605	371.7	7.41	1.03	39.4	3.81
177.36	0849	15	17.24	605	375.8	7.37	0.98	38.5	3.70
177.33	0902	20	17.55	606	379.0	7.34	0.96	38.7	3.69
177.33	0914	25	17.58	606	380.1	7.31	0.81	38.3	3.65
177.30	0919	27	17.49	606	382.0	7.30	0.74	38.4	3.67
177.30	0923	29	17.45	606	382.8	7.30	0.81	38.4	3.67
177.30	0928	31	17.41	606	383.7	7.29	0.79	38.3	3.67
177.30	0933	33	17.37	606	384.4	7.29	0.79	37.3	3.57
	0934	/	SAMPLING						
									~4.00 gals. purged from tubing 0816

FIELD MEASUREMENT LOG FOR GROUNDWATER SAMPLE COLLECTION

Project Name: SWMU	Project No.:
Well I.D.: OBS-MW~~1~~ 3	Date: 10/24/11
Well Condition: good	Weather Condition: 24.32" Hg
Method: Portable pump X Dedicated pump ____	Pump depth: 209'

PURGE MEASUREMENTS

Depth to Water (ft)	Time 24 hr	Vol. (L/gal)	Temp (°C)	SC (µS/cm)	ORP (mV)	pH	Turbidity (NTU)	DO (%)	Comments DO mg/L
69.35	0824	/	START						
73.27	0849	5	14.71	600	378.1	7.36	1.24	40.0	4.05
74.37	0901	10	15.68	601	381.4	7.32	1.22	39.8	3.95
74.82	0913	15	16.07	601	383.6	7.30	1.15	39.9	3.93
74.83	0926	20	16.34	602	385.7	7.27	1.29	40.2	3.94
74.76	0940	25	16.55	602	387.0	7.26	0.74	40.6	3.96
74.71	0945	27	16.62	602	387.4	7.25	0.49	40.7	3.95
74.68	0952	29	16.68	602	387.7	7.25	0.50	40.8	3.97
74.62	0958	31	16.73	602	388.0	7.25	0.54	40.8	3.96
74.60	1007	33	16.74	602	388.4	7.25	0.55	40.7	3.94
	1008	/	Sampling						
									~4.00 gals purged from tubing 0836

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

SMO Use

AR/COC 613883

Dept. No./Mail Stop:	6234/MS 0718	Date Samples Shipped:	10/31/11	Project/Task No. 98026.01.12	☐ Waste Characterization
Project/Task Manager:	Alicia Aragon	Carrier/Waybill No.		SMO Authorization:	-Send preliminary/copy report to:
Project Name:	SWMU 8	Lab Contact:	Edie Kent/803-556-8171	Contract # PO 691436 SMO	
Record Center Code:	NA	Lab Destination:	GEL	SEE BOTTLE ORDER	☐ Released by COC No.:
Logbook Ref. No.:	NA	SMO Contact/Phone:	Lorraine Herrera /505-844-3199		☑ Validation Required
Service Order No.	CF262-12	Send Report to SMO:			Bill To: Sandia National Labs (Accounts Payable)
Location	Tech Area				P.O. Box 5800 MS 0154
Building	Room				Albuquerque, NM 87185-0154

Reference LOV(available at SMO)

Sample No.-Fraction	ER Sample ID or Sample Location Detail	Depth (ft)	ER Site No.	Date/Time(hr) Collected	Sample Matrix	Container Type	Container Volume	Preserv-ative	Collection Method	Sample Type	Parameter & Method Requested	Lab Sample ID
091345-001	CCBA-MW1	79	NA	103111\0935	GW	G	3x40ml	HCL	G	SA	TCL VOC (SW846-8260B)	
091345-002	CCBA-MW1	79	NA	103111\0937	GW	AG	4x1L	4C	G	SA	TCL SVOC (SW846-8270C)	
091345-009	CCBA-MW1	79	NA	103111\0938	GW	P	500 ml	HNO3	G	SA	TAL Metals+ Ur (SW846-6020/7470)	
091345-016	CCBA-MW1	79	NA	103111\0939	GW	P	125 ml	4C	G	SA	Anions (SW846-9056)	
091345-017	CCBA-MW1	79	NA	103111\0940	FGW	P	250 ml	HNO3	G	SA	Cations (SW846-6020)	
091345-018	CCBA-MW1	79	NA	103111\0941	GW	P	125 ml	H2SO4	G	SA	NPN (353.2)	
091345-020	CCBA-MW1	79	NA	103111\0942	GW	P	250 ml	4C	G	SA	Perchlorate (314.0)	
091345-022	CCBA-MW1	79	NA	103111\0943	GW	P	500 ml	4C	G	SA	Alkalinity (SM2320B)	
091345-024	CCBA-MW1	79	NA	103111\0945	GW	AG	4x1L	4C	G	SA	High Explosive (SW846-8321A) Mod.	
091345-027	CCBA-MW1	79	NA	103111\0946	GW	P	250 ml	NaOH	G	SA	Total Cyanide (SW846-9012)	
091345-033	CCBA-MW1	79	NA	103111\0948	GW	P	1 Liter	HNO3	G	SA	Gamma Spec (short list)(901.0)	

RMMA ☐ Yes ☑ No Ref. No.

Sample Disposal ☐ Return to Client ☑ Disposal by lab

Turnaround Time ☐ 7 Day ☐ 15 Day ☑ 30 Day

Return Samples By: ☐ Negotiated TAT

Sample Tracking — Smo Use
Date Entered(mm/dd/yy):
Entered by:
QC inits:

Special Instructions/QC Requirements
EDD ☑ Yes ☐ No
Level D Package ☐ Yes ☑ No
*Send report to:
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,Fl,Cl,SO4
FGW (filtered in field with .45 micron filter)
*Please list as separate report.

Abnormal Conditions on Receipt

Lab Use

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

1.Relinquished by	Org. 4142	Date 10/31/11	Time 1026	4.Relinquished by	Org.	Date	Time
1. Received by SMO	Org. 4142	Date 10/31/11	Time 1026	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

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

AR/COC- 613883

Project Name:	SWMU 8	Project/Task Manger:	Alicia Aragon	Project/Task No.:	98026.01.12
Location	Tech Area				
Building	Room				

Reference LOV (available at SMO)

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 Type	Container Volume	Preserv-ative	Collection Method	Sample Type	Parameter & Method Requested	Lab Sample ID
091345-034	CCBA-MW1	79	NA	103111\0949	GW	P	1 Liter	HNO3	G	SA	Gross Alpha/Beta (900.0)	
091345-035	CCBA-MW1	79	NA	103111\0951	GW	P	1 Liter	HNO3	G	SA	Isotopic Ur (ASTM D3972-09M)	
091346-001	CCBA-TB1	NA	NA	103111\0935	DIW	G	3x40ml	HCL	G	TB	VOC (SW846-8260B)	

Abnormal Conditions on Receipt

LAB USE

Recipient Initials_____

CONTRACT LABORATORY
ANALYSIS REQUEST AND CHAIN OF CUSTODY

Internal Lab

Batch No.

SMO Use

AR/COC 613885

Dept. No./Mail Stop:	6234/MS 0718	Date Samples Shipped:		Project/Task No.98026.01.12	☐ Waste Characterization
Project/Task Manager:	Alicia Aragon	Carrier/Waybill No.		SMO Authorization:	-Send preliminary/copy report to:
Project Name:	SWMU 8	Lab Contact:	Edie Kent/803-556-8171	Contract # PO 691436	
Record Center Code:	NA	Lab Destination:	GEL		☐ Released by COC No.:
Logbook Ref. No.:	NA	SMO Contact/Phone:	Lorraine Herrera /505-844-3199		☑ Validation Required
Service Order No.	CF262-12	Send Report to SMO:			Bill To:Sandia National Labs (Accounts Payable)
Location	Tech Area				P.O. Box 5800 MS 0154
Building	Room				Albuquerque, NM 87185-0154

Reference LOV(available at SMO)

Sample No.-Fraction	ER Sample ID or Sample Location Detail	Depth (ft)	ER Site No.	Date/Time(hr) Collected	Sample Matrix	Container Type	Container Volume	Preserv-ative	Collection Method	Sample Type	Parameter & Method Requested	Lab Sample ID
091349-001	CCBA-MW2	117	NA	110111\1000	GW	G	3x40ml	HCL	G	SA	TCL VOC (SW846-8260B)	
091349-002	CCBA-MW2	117	NA	110111\1004	GW	AG	4x1L	4C	G	SA	TCL SVOC (SW846-8270C)	
091349-009	CCBA-MW2	117	NA	110111\1005	GW	P	500 ml	HNO3	G	SA	TAL Metals+ Ur (SW846-6020/7470)	
091349-016	CCBA-MW2	117	NA	110111\1006	GW	P	125 ml	4C	G	SA	Anions (SW846-9056)	
091349-017	CCBA-MW2	117	NA	110111\1007	FGW	P	250 ml	HNO3	G	SA	Cations (SW846-6020)	
091349-018	CCBA-MW2	117	NA	110111\1008	GW	P	125 ml	H2SO4	G	SA	NPN (353.2)	
091349-020	CCBA-MW2	117	NA	110111\1009	GW	P	250 ml	4C	G	SA	Perchlorate (314.0)	
091349-022	CCBA-MW2	117	NA	110111\1010	GW	P	500 ml	4C	G	SA	Alkalinity (SM2320B)	
091349-024	CCBA-MW2	117	NA	110111\1012	GW	AG	4x1L	4C	G	SA	High Explosive (SW846-8321A) Mod.	
091349-027	CCBA-MW2	117	NA	110111\1013	GW	P	250 ml	NaOH	G	SA	Total Cyanide (SW846-9012)	
091349-033	CCBA-MW2	117	NA	110111\1014	GW	P	1 Liter	HNO3	G	SA	Gamma Spec (short list)(901.0)	

RMMA ☐ Yes ☑ No Ref. No.

Sample Disposal ☐ Return to Client ☑ Disposal by lab

Turnaround Time ☐ 7 Day ☐ 15 Day ☑ 30 Day

Return Samples By: ☐ Negotiated TAT

Sample Tracking Smo Use

Date Entered(mm/dd/yy)

Entered by:

QC inits:

Special Instructions/QC Requirements

EDD ☑ Yes ☐ No

Level D Package ☐ Yes ☑ No

*Send report to:

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,Fl,Cl,SO4

FGW (filtered in field with .45 micron filter)

*Please list as separate report.

Abnormal Conditions on Receipt

Lab Use

Sample Team Members

Name	Signature	Init	Company/Organization/Phone/Cellular
Robert Lynch			SNL/4142/844-4013/250-7090
Alfred Santillanes			SNL/4142/844-5130/228-0710
William Gibson			SNL/4142/844-4013/239-7367
Danielle Nieto			SNL/4143/845-7706

1.Relinquished by	Org.4142	Date 11/1/11	Time 1112	4.Relinquished by	Org.	Date	Time
1. Received by	Org.4143	Date 11/1/11	Time 1112	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

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

AR/COC- 613885

Project Name:	SWMU 8	Project/Task Manger:	Alicia Aragon	Project/Task No.:	98026.01.12
Location	Tech Area				
Building	Room	Reference LOV (available at SMO)			

Sample No-Fraction	ER Sample ID or Sample Location detail	Pump Depth (ft)	ER Site No.	Date/Time (hr) Collected	Sample Matrix	Container Type	Container Volume	Preserv-ative	Collection Method	Sample Type	Parameter & Method Requested	Lab use: Lab Sample ID
091349-034	CCBA-MW2	117	NA	110111\1016	GW	P	1 Liter	HNO3	G	SA	Gross Alpha/Beta (900.0)	
091349-035	CCBA-MW2	117	NA	110111\1017	GW	P	1 Liter	HNO3	G	SA	Isotopic Ur (ASTM D3972-09M)	
091350-001	CCBA-MW2	117	NA	110111\1000	GW	G	3x40ml	HCL	G	DU	TCL VOC (SW846-8260B)	
091350-002	CCBA-MW2	117	NA	110111\1004	GW	AG	4x1L	4C	G	DU	TCL SVOC (SW846-8270C)	
091350-009	CCBA-MW2	117	NA	110111\1005	GW	P	500 ml	HNO3	G	DU	TAL Metals+ Ur (SW846-6020/7470)	
091350-016	CCBA-MW2	117	NA	110111\1006	GW	P	125 ml	4C	G	DU	Anions (SW846-9056)	
091350-017	CCBA-MW2	117	NA	110111\1007	FGW	P	250 ml	HNO3	G	DU	Cations (SW846-6020)	
091350-018	CCBA-MW2	117	NA	110111\1008	GW	P	125 ml	H2SO4	G	DU	NPN (353.2)	
091350-020	CCBA-MW2	117	NA	110111\1009	GW	P	250 ml	4C	G	DU	Perchlorate (314.0)	
091350-022	CCBA-MW2	117	NA	110111\1010	GW	P	500 ml	4C	G	DU	Alkalinity (SM2320B)	
091350-024	CCBA-MW2	117	NA	110111\1012	GW	AG	4x1L	4C	G	DU	High Explosive (SW846-8321A) Mod.	
091350-027	CCBA-MW2	117	NA	110111\1013	GW	P	250 ml	NaOH	G	DU	Total Cyanide (SW846-9012)	
091350-033	CCBA-MW2	117	NA	110111\1014	GW	P	1 Liter	HNO3	G	DU	Gamma Spec (short list)(901.0)	
091350-034	CCBA-MW2	117	NA	110111\1016	GW	P	1 Liter	HNO3	G	DU	Gross Alpha/Beta (900.0)	
091350-035	CCBA-MW2	117	NA	110111\1017	GW	P	1 Liter	HNO3	G	DU	Isotopic Ur (ASTM D3972-09M)	
091351-001	CCBA-TB3	NA	NA	110111\1000	DIW	G	3x40ml	HCL	G	TB	VOC (SW846-8260B)	
091352-001	CCBA-FB1	NA	NA	110111\0940	DIW	G	3x40ml	HCL	G	FB	VOC (SW846-8260B)	
											Sampling complete for SWMU	
											8 1st Qtr 2012	

Abnormal Conditions on Receipt

LAB USE

Recipient Initials_____

CONTRACT LABORATORY
ANALYSIS REQUEST AND CHAIN OF CUSTODY

Internal Lab

Batch No.

SMO Use

AR/COC 613884

Dept. No./Mail Stop:	6234/MS 0718	Date Samples Shipped:		Project/Task No.98026.01.12	☐ Waste Characterization
Project/Task Manager:	Alicia Aragon	Carrier/Waybill No.		SMO Authorization:	-Send preliminary/copy report to:
Project Name:	SWMU 8	Lab Contact:	Edie Kent/803-556-8171	Contract # PO 691436	
Record Center Code:	NA	Lab Destination:	GEL		☐ Released by COC No.:
Logbook Ref. No.:	NA	SMO Contact/Phone:	Lorraine Herrera /505-844-3199		☑ Validation Required
Service Order No.	CF262-12	Send Report to SMO:			Bill To: Sandia National Labs (Accounts Payable)
Location	Tech Area				P.O. Box 5800 MS 0154
Building	Room				Albuquerque, NM 87185-0154

Reference LOV(available at SMO)

Sample No.-Fraction	ER Sample ID or Sample Location Detail	Depth (ft)	ER Site No.	Date/Time(hr) Collected	Sample Matrix	Container Type	Container Volume	Preserv-ative	Collection Method	Sample Type	Parameter & Method Requested	Lab Sample ID
091347-001	CCBA-EB1	NA	NA	10/31/11 1100	DIW	G	3x40ml	HCL	G	EB	TCL VOC (SW846-8260B)	
091347-002	CCBA-EB1	NA	NA	10/31/11 1102	DIW	AG	4x1L	4C	G	EB	TCL SVOC (SW846-8270C)	
091347-009	CCBA-EB1	NA	NA	10/31/11 1103	DIW	P	500 ml	HNO3	G	EB	TAL Metals+ Ur (SW846-6020/7470)	
091347-016	CCBA-EB1	NA	NA	10/31/11 1104	DIW	P	125 ml	4C	G	EB	Anions (SW846-9056)	
091347-017	CCBA-EB1	NA	NA	10/31/11 1105	FDIW	P	250 ml	HNO3	G	EB	Cations (SW846-6020)	
091347-018	CCBA-EB1	NA	NA	10/31/11 1106	DIW	P	125 ml	H2SO4	G	EB	NPN (353.2)	
091347-020	CCBA-EB1	NA	NA	10/31/11 1107	DIW	P	250 ml	4C	G	EB	Perchlorate (314.0)	
091347-022	CCBA-EB1	NA	NA	10/31/11 1108	DIW	P	500 ml	4C	G	EB	Alkalinity (SM2320B)	
091347-024	CCBA-EB1	NA	NA	10/31/11 1109	DIW	AG	4x1L	4C	G	EB	High Explosive (SW846-8321A) Mod.	
091347-027	CCBA-EB1	NA	NA	10/31/11 1111	DIW	P	250 ml	NaOH	G	EB	Total Cyanide (SW846-9012)	
091347-033	CCBA-EB1	NA	NA	10/31/11 1112	DIW	P	1 Liter	HNO3	G	EB	Gamma Spec (short list)(901.0)	

RMMA ☐ Yes ☑ No Ref. No.

Sample Disposal ☐ Return to Client ☑ Disposal by lab

Turnaround Time ☐ 7 Day ☐ 15 Day ☑ 30 Day

Return Samples By: ☐ **Negotiated TAT** QC inits.

Sample Tracking Smo Use

Date Entered(mm/dd/yy)

Entered by:

Special Instructions/QC Requirements

EDD ☑ Yes ☐ No

Level D Package ☐ Yes ☑ No

***Send report to:**

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,Fl,Cl,SO4

FDIW (filtered in field with .45 micron filter)

Please list as separate report.

Abnormal Conditions on Receipt

Lab Use

Sample Team Members	Name	Signature	Init	Company/Organization/Phone/Cellular
	Robert Lynch	[signature]	RL	SNL/4142/844-4013/250-7090
	Alfred Santillanes	[signature]	AS	SNL/4142/844-5130/228-0710
	William Gibson	[signature]		SNL/4142/844-4013/239-7367

1.Relinquished by [signature]	Org.4142	Date 11/1/11	Time 1103	4.Relinquished by	Org.	Date	Time
1. Received by [signature]	Org.4142	Date 11/1/11	Time 1103	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

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

AR/COC- 613884

Project Name:	SWMU 8	Project/Task Manger:	Alicia Aragon	Project/Task No.:	98026.01.12
Location	Tech Area				
Building	Room				

Reference LOV (available at SMO)

Sample No-Fraction	ER Sample ID or Sample Location detail	Pump Depth (ft)	ER Site No.	Date/Time (hr) Collected	Sample Matrix	Container Type	Container Volume	Preserv-ative	Collection Method	Sample Type	Parameter & Method Requested	Lab use: Lab Sample ID
091347-034	CCBA-EB1	NA	NA	10/31/11 1113	DIW	P	1 Liter	HNO3	G	EB	Gross Alpha/Beta (900.0)	
091347-035	CCBA-EB1	NA	NA	10/31/11 1114	DIW	P	1 Liter	HNO3	G	EB	Isotopic Ur (ASTM D3972-09M)	
091348-001	CCBA-TB2	NA	NA	10/31/11 1100	DIW	G	3x40ml	HCL	G	TB	VOC (SW846-8260B)	

Abnormal Conditions on Receipt

LAB USE

Recipient Initials_____

CONTRACT LABORATORY
ANALYSIS REQUEST AND CHAIN OF CUSTODY

Internal Lab

Batch No.

SMO Use

AR/COC 613879

Dept. No./Mail Stop:	6234/MS 0718	Date Samples Shipped:		Project/Task No.98026.01.13	☐ Waste Characterization -Send preliminary/copy report to:
Project/Task Manager:	Alicia Aragon	Carrier/Waybill No.		SMO Authorization:	
Project Name:	SWMU 68	Lab Contact:	Edie Kent/803-556-8171	Contract # PO 691436	
Record Center Code:	NA	Lab Destination:	GEL		☐ Released by COC No.:
Logbook Ref. No.:	NA	SMO Contact/Phone:	Lorraine Herrera /505-844-3199		☑ Validation Required
Service Order No.	CF263-12	Send Report to SMO:			Bill To:Sandia National Labs (Accounts Payable) P.O. Box 5800 MS 0154 Albuquerque, NM 87185-0154
Location	Tech Area				
Building	Room				

Reference LOV(available at SMO)

Sample No.-Fraction	ER Sample ID or Sample Location Detail	Depth (ft)	ER Site No.	Date/Time(hr) Collected	Sample Matrix	Container Type	Container Volume	Preservative	Collection Method	Sample Type	Parameter & Method Requested	Lab Sample ID
091335-001	OBS-MW1	154	NA	10/25/11 0949	GW	G	3x40ml	HCL	G	SA	TCL VOC (SW846-8260B)	
091335-002	OBS-MW1	154	NA	10/25/11 0951	GW	AG	4x1L	4C	G	SA	TCL SVOC (SW846-8270C)	
091335-009	OBS-MW1	154	NA	10/25/11 0952	GW	P	500 ml	HNO3	G	SA	TAL Metals+ Ur (SW846-6020/7470)	
091335-014	OBS-MW1	154	NA	10/25/11 0953	GW	P	250 ml	4C	G	SA	Hexavalent Chromium (SW846-7196A)	
091335-016	OBS-MW1	154	NA	10/25/11 0954	GW	P	125 ml	4C	G	SA	Anions (SW846-9056)	
091335-017	OBS-MW1	154	NA	10/25/11 0955	FGW	P	250 ml	HNO3	G	SA	Cations (SW846-6020)	
091335-018	OBS-MW1	154	NA	10/25/11 0956	GW	P	125 ml	H2SO4	G	SA	NPN (353.2)	
091335-020	OBS-MW1	154	NA	10/25/11 0957	GW	P	250 ml	4C	G	SA	Perchlorate (314.0)	
091335-022	OBS-MW1	154	NA	10/25/11 0958	GW	P	500 ml	4C	G	SA	Alkalinity (SM2320B)	
091335-024	OBS-MW1	154	NA	10/25/11 1001	GW	AG	4x1L	4C	G	SA	High Explosive (SW846-8321A) Mod.	
091335-027	OBS-MW1	154	NA	10/25/11 1002	GW	P	250 ml	NaOH	G	SA	Total Cyanide (SW846-9012)	

RMMA ☐ Yes ☑ No Ref. No.

Sample Disposal ☐ Return to Client ☑ Disposal by lab

Turnaround Time ☐ 7 Day ☐ 15 Day ☑ 30 Day

Return Samples By: ☐ Negotiated TAT

Sample Tracking Smo Use

Date Entered(mm/dd/yy)

Entered by:

QC inits.

Special Instructions/QC Requirements

EDD ☑ Yes ☐ No

Level D Package ☐ Yes ☑ No

***Send report to:**

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,Fl,Cl,SO4

FGW (filtered in field with .45 micron filter)

Please list as separate report.

Abnormal Conditions on Receipt

Lab Use

Sample Team Members

Name	Signature	Init	Company/Organization/Phone/Cellular
Robert Lynch		RL	SNL/4142/844-4013/250-7090
Alfred Santillanes			SNL/4142/844-5130/228-0710
William Gibson			SNL/4142/844-4013/239-7367

1.Relinquished by	Org.4142	Date 10/25/11	Time 1047	4.Relinquished by	Org.	Date	Time
1. Received by	Org.4143	Date 10/25/11	Time 1047	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

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

AR/COC- 613879

Project Name:	SWMU 68	Project/Task Manger:	Alicia Aragon	Project/Task No.:	98026.01.13
Location	Tech Area				
Building	Room				

Reference LOV (available at SMO)

Sample No-Fraction	ER Sample ID or Sample Location detail	Pump Depth (ft)	ER Site No.	Date/Time (hr) Collected	Sample Matrix	Container Type	Container Volume	Preserv-ative	Collection Method	Sample Type	Parameter & Method Requested	Lab use: Lab Sample ID
091335-033	OBS-MW1	154	NA	10/25/11 1004	GW	P	1 L	HNO3	G	SA	Gamma Spec (short list)(901.0)	
091335-034	OBS-MW1	154	NA	10/25/11 1005	GW	P	1 L	HNO3	G	SA	Gross Alpha/Beta (900.0)	
091335-035	OBS-MW1	154	NA	10/25/11 1006	GW	P	1 L	HNO3	G	SA	Isotopic Ur (ASTM D3972-09M)	
091336-001	OBS-TB1	NA	NA	10/25/11 0949	DIW	G	3x40ml	HCL	G	TB	VOC (SW846-8260B)	

Abnormal Conditions on Receipt LAB USE

Recipient Initials_____

CONTRACT LABORATORY
ANALYSIS REQUEST AND CHAIN OF CUSTODY

Internal Lab

Batch No.

SMO Use

AR/COC 613880

Dept. No./Mail Stop:	6234/MS 0718	Date Samples Shipped:	10-26-11	Project/Task No.98026.01.13	☐ Waste Characterization
Project/Task Manager:	Alicia Aragon	Carrier/Waybill No.	133579	SMO Authorization: LAB	-Send preliminary/copy report to:
Project Name:	SWMU 68	Lab Contact:	Edie Kent/803-556-8171	Contract # PO 691436	
Record Center Code:	NA	Lab Destination:	GEL		☐ Released by COC No.:
Logbook Ref. No.:	NA	SMO Contact/Phone:	Lorraine Herrera /505-844-3199	SEE BOTTLE ORDER	☑ Validation Required
Service Order No.	CF263-12	Send Report to SMO:			Bill To: Sandia National Labs (Accounts Payable)
Location	Tech Area				P.O. Box 5800 MS 0154
Building	Room				Albuquerque, NM 87185-0154

Reference LOV(available at SMO)

Sample No.-Fraction	ER Sample ID or Sample Location Detail	Depth (ft)	ER Site No.	Date/Time(hr) Collected	Sample Matrix	Container Type	Container Volume	Preserv-ative	Collection Method	Sample Type	Parameter & Method Requested	Lab Sample ID
091337-001	OBS-MW2	253	NA	102611\0934	GW	G	3x40ml	HCL	G	SA	TCL VOC (SW846-8260B)	
091337-002	OBS-MW2	253	NA	102611\0936	GW	AG	4x1L	4C	G	SA	TCL SVOC (SW846-8270C)	
091337-009	OBS-MW2	253	NA	102611\0938	GW	P	500 ml	HNO3	G	SA	TAL Metals+ Ur (SW846-6020/7470)	
091337-014	OBS-MW2	253	NA	102611\0939	GW	P	250 ml	4C	G	SA	Hexavalent Chromium (SW846-7196A)	
091337-016	OBS-MW2	253	NA	102611\0940	GW	P	125 ml	4C	G	SA	Anions (SW846-9056)	
091337-017	OBS-MW2	253	NA	102611\0941	FGW	P	250 ml	HNO3	G	SA	Cations (SW846-6020)	
091337-018	OBS-MW2	253	NA	102611\0942	GW	P	125 ml	H2SO4	G	SA	NPN (353.2)	
091337-020	OBS-MW2	253	NA	102611\0943	GW	P	250 ml	4C	G	SA	Perchlorate (314.0)	
091337-022	OBS-MW2	253	NA	102611\0944	GW	P	500 ml	4C	G	SA	Alkalinity (SM2320B)	
091337-024	OBS-MW2	253	NA	102611\0945	GW	AG	4x1L	4C	G	SA	High Explosive (SW846-8321A) Mod.	
091337-027	OBS-MW2	253	NA	102611\0947	GW	P	250 ml	NaOH	G	SA	Total Cyanide (SW846-9012)	

RMMA ☐ Yes ☑ No Ref. No.

Sample Disposal ☐ Return to Client ☑ Disposal by lab

Turnaround Time ☐ 7 Day ☐ 15 Day ☑ 30 Day

Return Samples By: ☐ Negotiated TAT

Sample Tracking — Smo Use
Date Entered(mm/dd/yy)
Entered by:
QC inits

Special Instructions/QC Requirements
EDD ☑ Yes ☐ No
Level D Package ☐ Yes ☑ No
*Send report to:
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,Fl,Cl,SO4 **(Last well for SWMU 68 1st Qtr.)**
FGW (filtered in field with .45 micron filter)
*Please list as separate report.

Abnormal Conditions on Receipt

Lab Use

Sample Team Members	Name	Signature	Init	Company/Organization/Phone/Cellular
	Robert Lynch	Robert Lynch	RL	SNL/4142/844-4013/250-7090
	William Gibson	William Gibson	WG	SNL/4142/844-4013/239-7367

1.Relinquished by Robert Lynch	Org. 4142	Date 10/26/11	Time 10:45	4.Relinquished by	Org.	Date	Time
1. Received by Barry Baker	Org. 4139	Date 10-26-11	Time 10:45	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

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

AR/COC- 613880

Project Name:	SWMU 68	Project/Task Manger:	Alicia Aragon			Project/Task No.:	98026.01.13					
Location	Tech Area											
Building	Room	**Reference LOV (available at SMO)**										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 Type	Container Volume	Preserv-ative	Collection Method	Sample Type	**Parameter & Method Requested**	Lab Sample ID
091337-033	OBS-MW2	253	NA	102611\0948	GW	P	1 L	HNO3	G	SA	Gamma Spec (short list)(901.0)	
091337-034	OBS-MW2	253	NA	102611\0949	GW	P	1 L	HNO3	G	SA	Gross Alpha/Beta (900.0)	
091337-035	OBS-MW2	253	NA	102611\0950	GW	P	1 L	HNO3	G	SA	Isotopic Ur (ASTM D3972-09M)	
091338-001	OBS-TB2	NA	NA	102611\0934	DIW	G	3x40ml	HCL	G	TB	VOC (SW846-8260B)	
091339-001	OBS-FB1	NA	NA	102611\0924	DIW	G	3x40ml	HCL	G	FB	VOC (SW846-8260B)	

Abnormal Conditions on Receipt

LAB USE

Recipient Initials_____

CONTRACT LABORATORY
ANALYSIS REQUEST AND CHAIN OF CUSTODY

Internal Lab

Batch No. N/A

SMO Use

AR/COC **613882**

Dept. No./Mail Stop:	6234/MS 0718	Date Samples Shipped:	10/24/11	Project/Task No.98026.01.13	☐ Waste Characterization
Project/Task Manager:	Alicia Aragon	Carrier/Waybill No.	133307	SMO Authorization: SMO	-Send preliminary/copy report to:
Project Name:	SWMU 68	Lab Contact:	Edie Kent/803-556-8171	Contract # PO 691436	
Record Center Code:	NA	Lab Destination:	GEL		☐ Released by COC No.:
Logbook Ref. No.:	NA	SMO Contact/Phone:	Lorraine Herrera /505-844-3199	SEE BOTTLE ORDER	☑ Validation Required
Service Order No.	CF263-12	Send Report to SMO:			Bill To: Sandia National Labs (Accounts Payable)
Location	Tech Area				P.O. Box 5800 MS 0154
Building	Room				Albuquerque, NM 87185-0154

Reference LOV(available at SMO)

Sample No.-Fraction	ER Sample ID or Sample Location Detail	Depth (ft)	ER Site No.	Date/Time(hr) Collected	Sample Matrix	Container Type	Container Volume	Preserv-ative	Collection Method	Sample Type	Parameter & Method Requested	Lab Sample ID
091342-001	OBS-MW3	209	NA	102411\1008	GW	G	3x40ml	HCL	G	SA	TCL VOC (SW846-8260B)	
091342-002	OBS-MW3	209	NA	102411\1010	GW	AG	4x1L	4C	G	SA	TCL SVOC (SW846-8270C)	
091342-009	OBS-MW3	209	NA	102411\1014	GW	P	500 ml	HNO3	G	SA	TAL Metals+ Ur (SW846-6020/7470)	
091342-014	OBS-MW3	209	NA	102411\1016	GW	P	250 ml	4C	G	SA	Hexavalent Chromium (SW846-7196A)	
091342-016	OBS-MW3	209	NA	102411\1017	GW	P	125 ml	4C	G	SA	Anions (SW846-9056)	
091342-017	OBS-MW3	209	NA	102411\1018	FGW	P	250 ml	HNO3	G	SA	Cations (SW846-6020)	
091342-018	OBS-MW3	209	NA	102411\1019	GW	P	125 ml	H2SO4	G	SA	NPN (353.2)	
091342-020	OBS-MW3	209	NA	102411\1020	GW	P	250 ml	4C	G	SA	Perchlorate (314.0)	
091342-022	OBS-MW3	209	NA	102411\1021	GW	P	500 ml	4C	G	SA	Alkalinity (SM2320B)	
091342-024	OBS-MW3	209	NA	102411\1022	GW	AG	4x1L	4C	G	SA	High Explosive (SW846-8321A) Mod.	
091342-027	OBS-MW3	209	NA	102411\1026	GW	P	250 ml	NaOH	G	SA	Total Cyanide (SW846-9012)	

RMMA ☐ Yes ☑ No Ref. No.

Sample Disposal ☐ Return to Client ☑ Disposal by lab

Turnaround Time ☐ 7 Day ☐ 15 Day ☑ 30 Day

Return Samples By: ☐ Negotiated TAT

Sample Tracking — Smo Use
Date Entered(mm/dd/yy)
Entered by:
QC inits

Special Instructions/QC Requirements
EDD ☑ Yes ☐ No
Level D Package ☐ Yes ☑ No
*Send report to:
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,Fl,Cl,SO4
FGW (filtered in field with .45 micron filter)
*Please list as separate report.

Abnormal Conditions on Receipt

Lab Use

Sample Team Members	Name	Signature	Init	Company/Organization/Phone/Cellular
	Robert Lynch		RL	SNL/4142/844-4013/250-7090
	Alfred Santillanes		AS	SNL/4142/844-5130/228-0710
	William Gibson		WG	SNL/4142/844-4013/239-7367

1.Relinquished by	Org. 4142	Date 10/24/11	Time 1116	4.Relinquished by	Org.	Date	Time
1. Received by SMO	Org. 4142	Date 10/24/11	Time 1116	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

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

AR/COC- 613882

Project Name:	SWMU 68	Project/Task Manger:	Alicia Aragon	Project/Task No.:	98026.01.13
Location	Tech Area				
Building	Room				

Reference LOV (available at SMO)

Sample No-Fraction	ER Sample ID or Sample Location detail	Pump Depth (ft)	ER Site No.	Date/Time (hr) Collected	Sample Matrix	Container Type	Container Volume	Preserv-ative	Collection Method	Sample Type	Parameter & Method Requested	Lab use: Lab Sample ID
091342-033	OBS-MW3	209	NA	102411\1028	GW	P	1 L	HNO3	G	SA	Gamma Spec (short list)(901.0)	
091342-034	OBS-MW3	209	NA	102411\1030	GW	P	1 L	HNO3	G	SA	Gross Alpha/Beta (900.0)	
091342-035	OBS-MW3	209	NA	102411\1032	GW	P	1 L	HNO3	G	SA	Isotopic Ur (ASTM D3972-09M)	
091343-001	OBS-MW3	209	NA	102411\1008	GW	G	3x40ml	HCL	G	DU	TCL VOC (SW846-8260B)	
091343-002	OBS-MW3	209	NA	102411\1010	GW	AG	4x1L	4C	G	DU	TCL SVOC (SW846-8270C)	
091343-009	OBS-MW3	209	NA	102411\1014	GW	P	500 ml	HNO3	G	DU	TAL Metals+ Ur (SW846-6020/7470)	
091343-014	OBS-MW3	209	NA	102411\1016	GW	P	250 ml	4C	G	DU	Hexavalent Chromium (SW846-7196A)	
091343-016	OBS-MW3	209	NA	102411\1017	GW	P	125 ml	4C	G	DU	Anions (SW846-9056)	
091343-017	OBS-MW3	209	NA	102411\1018	FGW	P	250 ml	HNO3	G	DU	Cations (SW846-6020)	
091343-018	OBS-MW3	209	NA	102411\1019	GW	P	125 ml	H2SO4	G	DU	NPN (353.2)	
091343-020	OBS-MW3	209	NA	102411\1020	GW	P	250 ml	4C	G	DU	Perchlorate (314.0)	
091343-022	OBS-MW3	209	NA	102411\1021	GW	P	500 ml	4C	G	DU	Alkalinity (SM2320B)	
091343-024	OBS-MW3	209	NA	102411\1022	GW	AG	4x1L	4C	G	DU	High Explosive (SW846-8321A) Mod.	
091343-027	OBS-MW3	209	NA	102411\1026	GW	P	250 ml	NaOH	G	DU	Total Cyanide (SW846-9012)	
091343-033	OBS-MW3	209	NA	102411\1028	GW	P	1 L	HNO3	G	DU	Gamma Spec (short list)(901.0)	
091343-034	OBS-MW3	209	NA	102411\1030	GW	P	1 L	HNO3	G	DU	Gross Alpha/Beta (900.0)	
091343-035	OBS-MW3	209	NA	102411\1032	GW	P	1 L	HNO3	G	DU	Isotopic Ur (ASTM D3972-09M)	
091344-001	OBS-TB4	NA	NA	102411\1008	DIW	G	3x40ml	HCL	G	TB	VOC (SW846-8260B)	

Abnormal Conditions on Receipt

LAB USE

Recipient Initials_____

Prior to OBS-MW3

Internal Lab

CONTRACT LABORATORY
ANALYSIS REQUEST AND CHAIN OF CUSTODY

Batch No. N/A

SMO Use

AR/COC 613881

Dept. No./Mail Stop:	6234/MS 0718	Date Samples Shipped:	10/24/11	Project/Task No.98026.01.13	☐ Waste Characterization -Send preliminary/copy report to:
Project/Task Manager:	Alicia Aragon	Carrier/Waybill No.		SMO Authorization:	
Project Name:	SWMU 68	Lab Contact:	Edie Kent/803-556-8171	Contract # PO 691436	☐ Released by COC No.:
Record Center Code:	NA	Lab Destination:	GEL		☑ Validation Required
Logbook Ref. No.:	NA	SMO Contact/Phone:	Lorraine Herrera /505-844-3199		Bill To: Sandia National Labs (Accounts Payable)
Service Order No.	CF263-12	Send Report to SMO:			P.O. Box 5800 MS 0154
Location	Tech Area				Albuquerque, NM 87185-0154
Building	Room				

Reference LOV(available at SMO)

Sample No.-Fraction	ER Sample ID or Sample Location Detail	Depth (ft)	ER Site No.	Date/Time(hr) Collected	Sample Matrix	Container Type	Container Volume	Preserv-ative	Collection Method	Sample Type	Parameter & Method Requested	Lab Sample ID
091340-001	OBS-EB1	NA	NA	10/24/11 0806	DIW	G	3x40ml	HCL	G	EB	TCL VOC (SW846-8260B)	
091340-002	OBS-EB1	NA	NA	10/24/11 0809	DIW	AG	4x1L	4C	G	EB	TCL SVOC (SW846-8270C)	
091340-009	OBS-EB1	NA	NA	10/24/11 0810	DIW	P	500 ml	HNO3	G	EB	TAL Metals+ Ur (SW846-6020/7470)	
091340-014	OBS-EB1	NA	NA	10/24/11 0811	DIW	P	250 ml	4C	G	EB	Hexavalent Chromium (SW846-7196A)	
091340-016	OBS-EB1	NA	NA	10/24/11 0812	DIW	P	125 ml	4C	G	EB	Anions (SW846-9056)	
091340-017	OBS-EB1	NA	NA	10/24/11 0813	FDIW	P	250 ml	HNO3	G	EB	Cations (SW846-6020)	
091340-018	OBS-EB1	NA	NA	10/24/11 0814	DIW	P	125 ml	H2SO4	G	EB	NPN (353.2)	
091340-020	OBS-EB1	NA	NA	10/24/11 0815	DIW	P	250 ml	4C	G	EB	Perchlorate (314.0)	
091340-022	OBS-EB1	NA	NA	10/24/11 0816	DIW	P	500 ml	4C	G	EB	Alkalinity (SM2320B)	
091340-024	OBS-EB1	NA	NA	10/24/11 0818	DIW	AG	4x1L	4C	G	EB	High Explosive (SW846-8321A) Mod.	
091340-027	OBS-EB1	NA	NA	10/24/11 0819	DIW	P	250 ml	NaOH	G	EB	Total Cyanide (SW846-9012)	

RMMA ☐ Yes ☑ No Ref. No.

Sample Disposal ☐ Return to Client ☑ Disposal by lab

Turnaround Time ☐ 7 Day ☐ 15 Day ☑ 30 Day

Return Samples By: ☐ Negotiated TAT

Sample Tracking Smo Use

Date Entered(mm/dd/yy)

Entered by:

QC inits.

Special Instructions/QC Requirements

EDD ☑ Yes ☐ No

Level D Package ☐ Yes ☑ No

*Send report to:

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,Fl,Cl,SO4

FDIW (filtered in field with .45 micron filter)

*Please list as separate report.

Abnormal Conditions on Receipt

Lab Use

Sample Team Members	Name	Signature	Init	Company/Organization/Phone/Cellular
	Robert Lynch	Rob Lynch	RL	SNL/4142/844-4013/250-7090
	Alfred Santillanes	Alfred Santillanes	AS	SNL/4142/844-5130/228-0710
	William Gibson	William Gibson	WG	SNL/4142/844-4013/239-7367

1.Relinquished by	Alfred Santillanes	Org. 4142	Date 10/24/11	Time 1110	4.Relinquished by	Org.	Date	Time
1. Received by	[signature] SMO	Org. 4142	Date 10/24/11	Time 1110	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

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

AR/COC- 613881

Project Name:	SWMU 68	Project/Task Manger:	Alicia Aragon	Project/Task No.:	98026.01.13
Location	Tech Area				
Building	Room				

Reference LOV (available at SMO)

Sample No-Fraction	ER Sample ID or Sample Location detail	Pump Depth (ft)	ER Site No.	Date/Time (hr) Collected	Sample Matrix	Container Type	Container Volume	Preserv-ative	Collection Method	Sample Type	Parameter & Method Requested	Lab use: Lab Sample ID
091340-033	OBS-EB1	NA	NA	10/24/11 0820	DIW	P	1 L	HNO3	G	EB	Gamma Spec (short list)(901.0)	
091340-034	OBS-EB1	NA	NA	10/24/11 0821	DIW	P	1 L	HNO3	G	EB	Gross Alpha/Beta (900.0)	
091340-035	OBS-EB1	NA	NA	10/24/11 0823	DIW	P	1 L	HNO3	G	EB	Isotopic Ur (ASTM D3972-09M)	
091341-001	OBS-TB3	NA	NA	10/24/11 0806	DIW	G	3x40ml	HCL	G	TB	VOC (SW846-8260B)	

Abnormal Conditions on Receipt

LAB USE

Recipient Initials_____

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

Sample Findings Summary

AR/COC: 613883, 613884, 613885

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
DOE EML HASL-300, U-02-RC			
	091345-035/CCBA-MW1	Uranium-235/236 (13982-70-2)	J, FR7
	091347-035/CCBA-EB1	Uranium-233/234 (N/A)	BD, FR3
	091347-035/CCBA-EB1	Uranium-235/236 (13982-70-2)	BD, FR3
	091347-035/CCBA-EB1	Uranium-238 (7440-61-1)	BD, FR3
	091350-035/CCBA-MW2	Uranium-235/236 (13982-70-2)	J, FR7
EPA 353.2			
	091345-018/CCBA-MW1	Nitrogen, Nitrate/Nitrite (N/A)	0.069U, B
EPA 900.0/SW846 9310			
	091345-034/CCBA-MW1	ALPHA (12587-46-1)	J, FR7
	091347-034/CCBA-EB1	ALPHA (12587-46-1)	BD, FR3
	091347-034/CCBA-EB1	BETA (12587-47-2)	BD, FR3
	091349-034/CCBA-MW2	BETA (12587-47-2)	J, FR7
EPA 901.1			
	091345-033/CCBA-MW1	Americium-241 (14596-10-2)	BD, FR3
	091345-033/CCBA-MW1	Cesium-137 (10045-97-3)	BD, FR3
	091345-033/CCBA-MW1	Cobalt-60 (10198-40-0)	BD, FR3
	091345-033/CCBA-MW1	Potassium-40 (13966-00-2)	BD, FR3
	091347-033/CCBA-EB1	Americium-241 (14596-10-2)	BD, FR3
	091347-033/CCBA-EB1	Cesium-137 (10045-97-3)	BD, FR3
	091347-033/CCBA-EB1	Cobalt-60 (10198-40-0)	BD, FR3
	091347-033/CCBA-EB1	Potassium-40 (13966-00-2)	BD, FR3
	091349-033/CCBA-MW2	Americium-241 (14596-10-2)	BD, FR3
	091349-033/CCBA-MW2	Cesium-137 (10045-97-3)	BD, FR3
	091349-033/CCBA-MW2	Cobalt-60 (10198-40-0)	BD, FR3
	091349-033/CCBA-MW2	Potassium-40 (13966-00-2)	BD, FR3

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
	091350-033/CCBA-MW2	Americium-241 (14596-10-2)	BD, FR3
	091350-033/CCBA-MW2	Cesium-137 (10045-97-3)	BD, FR3
	091350-033/CCBA-MW2	Cobalt-60 (10198-40-0)	BD, FR3
	091350-033/CCBA-MW2	Potassium-40 (13966-00-2)	BD, FR3
SW846 3005/6020 DOE-AL			
	091345-009/CCBA-MW1	Sodium (7440-23-5)	J, D1
	091345-017/CCBA-MW1	Sodium (7440-23-5)	J, D1
	091347-009/CCBA-EB1	Calcium (7440-70-2)	0.54U, B
	091347-009/CCBA-EB1	Sodium (7440-23-5)	UJ, D1
	091347-017/CCBA-EB1	Calcium (7440-70-2)	0.54U, B
	091347-017/CCBA-EB1	Sodium (7440-23-5)	UJ, D1
	091349-009/CCBA-MW2	Copper (7440-50-8)	0.0023U, B2
	091349-009/CCBA-MW2	Sodium (7440-23-5)	J, D1
	091349-017/CCBA-MW2	Sodium (7440-23-5)	J, D1
	091350-009/CCBA-MW2	Copper (7440-50-8)	0.0023U, B2
	091350-009/CCBA-MW2	Sodium (7440-23-5)	J, D1
	091350-017/CCBA-MW2	Sodium (7440-23-5)	J, D1
SW846 3535/8321A Modified			
	091345-024/CCBA-MW1	Tetryl (479-45-8)	UJ, L3
	091347-024/CCBA-EB1	Tetryl (479-45-8)	UJ, L3
	091349-024/CCBA-MW2	Tetryl (479-45-8)	UJ, L3
	091350-024/CCBA-MW2	Tetryl (479-45-8)	UJ, L3
SW846 7470A			
	091345-009/CCBA-MW1	Mercury (7439-97-6)	UJ, B4
	091347-009/CCBA-EB1	Mercury (7439-97-6)	UJ, B4
	091349-009/CCBA-MW2	Mercury (7439-97-6)	UJ, B4
	091350-009/CCBA-MW2	Mercury (7439-97-6)	UJ, B4
SW846 8260B DOE-AL			
	091347-001/CCBA-EB1	Bromoform (75-25-2)	J, I3
	091352-001/CCBA-FB1	Bromodichloromethane (75-27-4)	3.3U, B2

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
	091352-001/CCBA-FB1	Chloroform (67-66-3)	3.8U, B2
	091352-001/CCBA-FB1	Dibromochloromethane (124-48-1)	2.9U, B2

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

616 Maxine NE
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Memorandum

Date: December 9, 2011

To: File

From: Kevin Lambert

Subject: Inorganic Data Review and Validation – SNL
Site: SWMU 8 and 58 GW Characterization
AR/COC: 613883, 613884, and 613885
SDG: 289184
Laboratory: GEL
Project/Task: 98026.01.12
Analysis: General Chemistry

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

Summary

Four samples were prepared and analyzed with accepted procedures using methods EPA 9056 (anions by 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:
   Nitrate/Nitrite was detected in the MB at a concentration > the MDL but ≤ the PQL. The nitrate/nitrite result for sample 289184-006 was a detect <5X the MB result and will be **qualified "0.069U,B"** at 5X the value of the MB (mg/L). The other associated sample results were either NDs or detects >5X the MB 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.

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 EB, sample -018, associated with samples -032 and -045, chloride was detected at a concentration > the PQL. The associated sample results were detects >5X the EB concentration and will not be qualified.

Alkalinity:
In the MB and EB, 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.

Laboratory Replicate

The replicate met all QC acceptance criteria.

Detection Limits/Dilutions

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

Anions:
All samples except sample -018 were diluted 10X for chloride and sulfate due to high concentrations for this analysis.

Nitrate/Nitrite:
Samples -034 and -047 were diluted 10X 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

EBs 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 on AR/COC# 613884 is associated with the samples on AR/COC# 613885.

No other specific issues that affect data quality were identified.

Reviewed by: David Schwent **Date**: 12/13/11

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Memorandum

Date: December 9, 2011

To: File

From: Kevin Lambert

Subject: GC/MS Organic Data Review and Validation – SNL
Site: SWMU 8 and 58 GW Characterization
AR/COC: 613883, 613884, and 613885
SDG: 289184
Laboratory: GEL
Project/Task: 98026.01.12
Analysis: VOCs

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

Summary

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

1. The initial calibration %RSD for bromoform was >15% but ≤40%. The bromoform result for sample 289184-015 was a detect and will be **qualified "J,I3."** The other associated sample results were NDs and no other calibration infractions occurred for this analyte. Therefore, the associated sample results will not be qualified.

2. In the EB, sample -015, associated with samples -029, -042, and -056, chloroform; bromodichloromethane; and dibromochloromethane were detected at concentrations > the PQL. The chloroform; bromodichloromethane; and dibromochloromethane results for sample -056 were detects <5X the EB concentrations but > the PQL and will be **qualified"3.8U,B2," "3.3U,B2,"** and **"2.9U,B2"**, respectively, at their reported values (ug/L). All other associated sample results were NDs 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

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 calibration verification %Ds for 2-hexanone; 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.

The calibration verification %D for acetone was >20% but ≤40% with negative bias. 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 noted above in the summary section and as follows.

In the TB, sample -014, associated with sample -001, 2-butanone and chloroform were detected at concentrations > the MDLs but < the PQLs. All associated sample results were NDs and will not be qualified.

In the TB, sample -028, associated with sample -015, 2-butanone and chloroform were detected at concentrations > the MDLs but < the PQLs. The 2-butanone result was an ND and will not be qualified. The chloroform result was a detect >5X the TB result and will not be qualified.

In the TB, sample -055, associated with samples -029, -042, and -056, 2-butanone and chloroform were detected at concentrations > the MDLs but < the PQLs. The chloroform result for sample -056 was a detect >5X the TB result and will not be qualified. All other associated sample results were NDs and will not be qualified.

In the EB, sample -015, associated with samples -029, -042, and -056, bromoform was detected at a concentration > the MDL but < the PQL. The associated sample results were NDs and will not be qualified.

In the FB, sample -056, associated with samples, -029 and -042 chloroform; bromodichloromethane; and dibromochloromethane were detected at concentrations > the PQL. However, it should be noted that the chloroform; bromodichloromethane; and dibromochloromethane results for the FB have already been qualified NDs due to EB contamination and, thus, do not affect the associated field sample results.

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 follows.

The MS and MSD %Rs for carbon disulfide were > the UAL. The associated sample results were NDs and will not be qualified.

Laboratory Control Sample (LCS)

All LCS recoveries met QC acceptance criteria except as follows.

The LCS %R for carbon disulfide was > the UAL. The associated sample results were NDs and will not be qualified.

Detection Limits/Dilutions

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

Tentatively Identified Compounds (TICs)

TIC reports were not required.

Other QC

TBs, EB, FB, 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 on AR/COC# 613884 is associated with the samples on AR/COC# 613885.

No other specific issues that affect data quality were identified.

Reviewed by: David Schwent **Date**: 12/13/11

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Memorandum

Date: December 9, 2011

To: File

From: Kevin Lambert

Subject: GC/MS Organic Data Review and Validation – SNL
Site: SWMU 8 and 58 GW Characterization
AR/COC: 613883, 613884, and 613885
SDG: 289184
Laboratory: GEL
Project/Task: 98026.01.12
Analysis: SVOCs

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

Summary

Four samples were prepared and analyzed with accepted procedures using method EPA 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 carbazole and p-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.

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

EB 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 on AR/COC# 613884 is associated with the samples on AR/COC# 613885.

No other specific issues that affect data quality were identified.

Reviewed by: David Schwent **Date**: 12/13/11

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Memorandum

Date: December 9, 2011

To: File

From: Kevin Lambert

Subject: LC/MS/MS Organic Data Review and Validation – SNL
Site: SWMU 8 and 58 GW Characterization
AR/COC: 613883, 613884, and 613885
SDG: 289184
Laboratory: GEL
Project/Task: 98026.01.12
Analysis: High Explosives (HE)

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

Summary

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

1. The LCS %R for tetryl was < the LAL but ≥10%. The associated sample 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 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 except as follows.

The calibration verification %Ds for 2,4,6-trinitrotoluene; 4-amino-2,6-dinitrotoluene; HMX; PETN; RDX; and o-nitrotoluene were >20% with a positive bias. All associated sample results were NDs and will not be qualified for the calibration infraction.

Reporting Limit Verification

All CRI recoveries met QC acceptance criteria except as follows.

The CRI %R for nitrobenzene was >130%. The associated sample results were NDs and will not be qualified.

Blanks

No target analytes were detected in the blanks.

Surrogates

All surrogate recoveries met QC acceptance criteria.

Internal Standards

All internal standards met QC acceptance criteria.

Matrix Spike/Matrix Spike Duplicate (MS/MSD)

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

EB 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 on AR/COC# 613884 is associated with the samples on AR/COC# 613885.

No other specific issues that affect data quality were identified.

Reviewed by: David Schwent **Date**: 12/13/11

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Albuquerque, NM 87123
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Memorandum

Date: December 12, 2011

To: File

From: Kevin Lambert

Subject: Inorganic Data Review and Validation – SNL
Site: SWMU 8 and 58 GW Characterization
AR/COC: 613883, 613884, and 613885
SDG: 289184
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

Eight samples were prepared and analyzed with approved procedures using methods EPA 6020 (ICP-MS metals). Four 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 ≤ the PQL. The Ca results for samples 289184-017 and -019 were detects <5X the MB result and will be **qualified "0.54U,B"** at 5X the MB value (mg/L). The other associated sample results were detects >5X the MB result and will not be qualified.

   Cu was detected in the EB, sample -017, associated with samples -031 and -044, at a concentration > the MDL but ≤ the PQL. The associated sample results were detects <5X the EB result and will be **qualified "0.0023U,B2"** at 5X the EB value (mg/L).

   The serial dilution %D for Na was >10%. The Na results for samples -017 and -019 were NDs and will be **qualified "UJ,D1"** due to poor serial dilution precision. The other associated sample results were detects and will be **qualified "J,D1"** due to poor serial dilution precision.

2. CVAA mercury:
   Hg was detected in the ICB at a negative concentration 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.

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 was detected in the MB at a concentration > the MDL but ≤ the PQL. The associated sample results were NDs and will not be qualified.

In the EB, sample -017, associated with samples -031 and -044, Sb and Ca were detected at a concentrations ≥ the MDL but < 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. The Sb sample results were NDs and will not be qualified.

In the EB, sample -019, associated with samples -033 and -046, Ca was detected at a concentration > the MDL but < 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, 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:
Various samples were diluted 5X for Ca and 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 ≤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

EBs 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 on AR/COC# 613884 is associated with the samples on AR/COC# 613885.

No other specific issues that affect data quality were identified.

Reviewed by: David Schwent **Date**: 12/13/11

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Memorandum

Date: December 9, 2011

To: File

From: Kevin Lambert

Subject: Radiochemical Data Review and Validation – SNL
Site: SWMU 8 and 58 GW Characterization
AR/COC: 613883, 613884, and 613885
SDG: 289184
Laboratory: GEL
Project/Task: 98026.01.12
Analysis: RAD

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

Summary

Four samples were prepared and analyzed with approved procedures using methods EPA 901.1 (gamma spec – short list), 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 289184-026 were either < the associated 2-sigma TPU or < the associated MDA and will be **qualified "BD,FR3."**

   The gross alpha result for sample -012 and the gross beta result for sample -040 were <3X the associated MDA and will be **qualified "J,FR7."**

3. Alpha Spec U:
   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."**

   The U-235/236 results for samples -013 and -054 were <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 except as follows.

Alpha Spec U:
The U-232 tracer %R for sample -027 was ≥10% but <50%. All associated sample results were NDs and will not be qualified.

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 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 on AR/COC# 613884 is associated with the samples on AR/COC# 613885.

No other specific issues that affect data quality were identified.

Reviewed by: David Schwent **Date**: 12/13/11

Sample Findings Summary

AR/COC: 613879, 613880, 613881, 613882

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
DOE EML HASL-300, U-02-RC			
	091340-035/OBS-EB1	Uranium-233/234 (N/A)	BD, FR3
	091340-035/OBS-EB1	Uranium-235/236 (13982-70-2)	BD, FR3
	091340-035/OBS-EB1	Uranium-238 (7440-61-1)	BD, FR3
EPA 353.2			
	091337-018/OBS-MW2	Nitrogen, Nitrate/Nitrite (N/A)	0.069U, B
EPA 900.0/SW846 9310			
	091340-034/OBS-EB1	ALPHA (12587-46-1)	BD, FR3
	091340-034/OBS-EB1	BETA (12587-47-2)	BD, FR3
EPA 901.1			
	091335-033/OBS-MW1	Americium-241 (14596-10-2)	BD, FR3
	091335-033/OBS-MW1	Cesium-137 (10045-97-3)	BD, FR3
	091335-033/OBS-MW1	Cobalt-60 (10198-40-0)	BD, FR3
	091335-033/OBS-MW1	Potassium-40 (13966-00-2)	R, Z2
	091337-033/OBS-MW2	Americium-241 (14596-10-2)	BD, FR3
	091337-033/OBS-MW2	Cesium-137 (10045-97-3)	BD, FR3
	091337-033/OBS-MW2	Cobalt-60 (10198-40-0)	BD, FR3
	091337-033/OBS-MW2	Potassium-40 (13966-00-2)	J, FR7
	091340-033/OBS-EB1	Americium-241 (14596-10-2)	BD, FR3
	091340-033/OBS-EB1	Cesium-137 (10045-97-3)	BD, FR3
	091340-033/OBS-EB1	Cobalt-60 (10198-40-0)	BD, FR3
	091340-033/OBS-EB1	Potassium-40 (13966-00-2)	BD, FR3
	091342-033/OBS-MW3	Americium-241 (14596-10-2)	BD, FR3
	091342-033/OBS-MW3	Cesium-137 (10045-97-3)	BD, FR3
	091342-033/OBS-MW3	Cobalt-60 (10198-40-0)	BD, FR3
	091342-033/OBS-MW3	Potassium-40 (13966-00-2)	BD, FR3

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
	091343-033/OBS-MW3	Americium-241 (14596-10-2)	BD, FR3
	091343-033/OBS-MW3	Cesium-137 (10045-97-3)	BD, FR3
	091343-033/OBS-MW3	Cobalt-60 (10198-40-0)	BD, FR3
	091343-033/OBS-MW3	Potassium-40 (13966-00-2)	BD, FR3
SW846 3005/6020 DOE-AL			
	091335-009/OBS-MW1	Copper (7440-50-8)	0.0019U, B
	091337-009/OBS-MW2	Copper (7440-50-8)	0.0019U, B
	091337-009/OBS-MW2	Iron (7439-89-6)	0.24U, B
	091340-009/OBS-EB1	Calcium (7440-70-2)	0.59U, B
	091340-009/OBS-EB1	Copper (7440-50-8)	0.0019U, B
	091340-009/OBS-EB1	Iron (7439-89-6)	0.24U, B
	091340-017/OBS-EB1	Calcium (7440-70-2)	0.59U, B
	091342-009/OBS-MW3	Copper (7440-50-8)	0.0019U, B
	091342-009/OBS-MW3	Iron (7439-89-6)	0.24U, B
	091342-009/OBS-MW3	Manganese (7439-96-5)	0.0053U, B2
	091343-009/OBS-MW3	Copper (7440-50-8)	0.0019U, B
	091343-009/OBS-MW3	Iron (7439-89-6)	0.24U, B
	091343-009/OBS-MW3	Manganese (7439-96-5)	0.0053U, B2
SW846 7470A			
	091335-009/OBS-MW1	Mercury (7439-97-6)	UJ, B4
	091337-009/OBS-MW2	Mercury (7439-97-6)	UJ, B4
	091340-009/OBS-EB1	Mercury (7439-97-6)	UJ, B4
	091342-009/OBS-MW3	Mercury (7439-97-6)	UJ, B4
	091343-009/OBS-MW3	Mercury (7439-97-6)	UJ, B4
SW846 8270C			
	091335-002/OBS-MW1	4-Nitrophenol (100-02-7)	UJ, L3
	091337-002/OBS-MW2	4-Nitrophenol (100-02-7)	UJ, L3
	091340-002/OBS-EB1	4-Nitrophenol (100-02-7)	UJ, L3
	091342-002/OBS-MW3	4-Nitrophenol (100-02-7)	UJ, L3

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
	091343-002/OBS-MW3	4-Nitrophenol (100-02-7)	UJ, L3

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

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Memorandum

Date: December 8, 2011

To: File

From: Kevin Lambert

Subject: Inorganic Data Review and Validation – SNL
Site: SWMU 68 GW Characterization
AR/COC: 613879, 613880, 613881, and 613882
SDG: 288686
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

Five 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:
   Nitrate/Nitrite was detected in the MB at a concentration > the MDL but ≤ the PQL. The nitrate/nitrite result for sample 288686-066 was a detect <5X the MB result and will be **qualified "0.069U,B"** at 5X the value of the MB (mg/L). The other associated sample results were either NDs or detects >5X the MB 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 except as follows.

Hexavalent Chromium:
The 24-hour HT for sample -004 was exceeded by one minute. Based on professional judgment, the associated sample result was not qualified due to this minor HT infraction.

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 EB, sample -005, associated with samples -020 and -034, chloride was detected at a concentration > the PQL. The associated sample results were detects >5X the EB concentration and will not be qualified.

Laboratory Control Sample (LCS)

All LCS recoveries met QC acceptance criteria.

Matrix Spike (MS)

All MS recoveries met QC acceptance criteria.

Laboratory Replicate

The replicate met all QC acceptance criteria.

Detection Limits/Dilutions

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

Anions:
All samples except sample -005 were diluted 5X for chloride and sulfate due to high concentrations for this analysis.

Nitrate/Nitrite:
Samples -022, -036, and -051 were diluted 10X 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

EBs 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 on AR/COC# 613881 is associated with the samples on AR/COC# 613882.

No other specific issues that affect data quality were identified.

Reviewed by: David Schwent **Date**: 12/09/11

616 Maxine NE
Albuquerque, NM 87123
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Memorandum

Date: December 8, 2011

To: File

From: Kevin Lambert

Subject: GC/MS Organic Data Review and Validation – SNL
Site: SWMU 68 GW Characterization
AR/COC: 613879, 613880, 613881, and 613882
SDG: 288686
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

Ten 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 calibration verification %D for vinyl acetate was >20% with a positive bias. All associated sample results were NDs and will not be qualified for the calibration infraction.

The calibration verification %D for acetone was >20% but ≤40% with negative bias. 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 288686-001, associated with samples -016 and -030, bromodichloromethane; chloroform; and dibromochloromethane were detects at concentrations > the PQL. All associated sample results were NDs and will not be qualified.

In the FB, sample -075, associated with sample -060, bromodichloromethane; chloroform; and dibromochloromethane were detects 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 except as follows.

The MS and/or MSD %Rs for 1,2-dichloropropane; carbon disulfide; and vinyl acetate were > the UALs. All associated sample results were NDs and will not be qualified.

Laboratory Control Sample (LCS)

All LCS recoveries met QC acceptance criteria except as follows.

The LCS %R for carbon disulfide was > the UAL. The associated sample results were NDs and will not be qualified.

Detection Limits/Dilutions

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

Tentatively Identified Compounds (TICs)

TIC reports were not required.

Other QC

TBs, EB, FB, 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 on AR/COC# 613881 is associated with the samples on AR/COC# 613882.

No other specific issues that affect data quality were identified.

Reviewed by: David Schwent **Date**: 12/09/11

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www.aqainc.net

Memorandum

Date: December 8, 2011

To: File

From: Kevin Lambert

Subject: GC/MS Organic Data Review and Validation – SNL
Site: SWMU 68 GW Characterization
AR/COC: 613879, 613880, 613881, and 613882
SDG: 288686
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

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

1. The LCS %R for 4-nitrophenol was < the LAL but ≥10%. The associated sample 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 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; benzo(k)fluoranthene; butylbenzylphthalate; carbazole; hexachlorocyclopentadiene; pyrene; bis(2-chloroethyl)ether; bis(2-chloroisopropyl)ether; bis(2-ethylhexyl)phthalate; m-nitroaniline; o-nitroaniline; and p-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.

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

EB 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 on AR/COC# 613881 is associated with the samples on AR/COC# 613882.

No other specific issues that affect data quality were identified.

Reviewed by: David Schwent **Date**: 12/09/11

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Memorandum

Date: December 8, 2011

To: File

From: Kevin Lambert

Subject: Inorganic Data Review and Validation – SNL
Site: SWMU 68 GW Characterization
AR/COC: 613879, 613880, 613881, and 613882
SDG: 288686
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

Five 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.

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.

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

EB 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 on AR/COC# 613881 is associated with the samples on AR/COC# 613882.

No other specific issues that affect data quality were identified.

Reviewed by: David Schwent **Date**: 12/09/11

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Memorandum

Date: December 8, 2011

To: File

From: Kevin Lambert

Subject: Inorganic Data Review and Validation – SNL
Site: SWMU 68 GW Characterization
AR/COC: 613879, 613880, 613881, and 613882
SDG: 288686
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

Ten samples were prepared and analyzed with approved procedures using methods EPA 6020 (ICP-MS metals). Five 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, Cu, and Fe were detected in the MB at concentrations > the MDL but ≤ the PQL. The Ca results for samples 288686-003 and -006 were detects <5X the MB result and will be **qualified "0.59U,B"** at 5X the MB value (mg/L). All Cu results were detects <5X the MB result and will be **qualified "0.0019U,B"** at 5X the MB value (mg/L). The Fe results for sample -003, -018, -032, and -062 were detects <5X the MB result and will be **qualified "0.24U,B"** at 5X the MB value (mg/L). All other associated sample results were detects >5X the MB result and will not be qualified.

   Mn was detected in the EB, sample -003, associated with samples -018 and -032, at a concentration > the MDL but ≤ the PQL. The associated sample results were detects <5X the EB result and will be **qualified "0.0053U,B2"** at 5X the EB value (mg/L).

2. CVAA mercury:
   Hg was detected in the CCB at a negative concentration 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.

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 U were detected in the CCB at concentrations > the MDL but ≤ the PQL. All associated sample results were either NDs or detects >5X the CCB results and will not be qualified.

Sb and U were detected in the MB at concentrations > the MDL but ≤ the PQL. All associated sample results were either NDs or detects >5X the MB results and will not be qualified.

In the EB, sample -006, associated with samples -021 and -035, Ca was detected at a concentration > the MDL but < 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 -003, associated with samples -018 and -032, Ca, Fe, and Tl were detected at a concentrations ≥ the MDL but < the PQL and Cu was detected at a concentration > the PQL. However, it should be noted that the Ca, Cu, and Fe results for the EB have already been qualified ND due to MB contamination and, thus, do not affect the associated field sample results. The Tl 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:
Various samples were diluted 10X for Ca and 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 ≤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 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 on AR/COC# 613881 is associated with the samples on AR/COC# 613882.

No other specific issues that affect data quality were identified.

Reviewed by: David Schwent **Date**: 12/09/11

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Albuquerque, NM 87123
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www.aqainc.net

Memorandum

Date: December 6, 2011

To: File

From: Kevin Lambert

Subject: Radiochemical Data Review and Validation – SNL
Site: SWMU 68 GW Characterization
AR/COC: 613879, 613880, 613881, and 613882
SDG: 288686
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

Five 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:
   The K-40 result for sample 288686-056 was X-flagged by the laboratory due to peak not meeting identification criteria and will be **qualified "R,Z2."**

   All associated gamma spec results that were either < the associated 2-sigma TPU or < the associated MDA will be **qualified "BD,FR3."**

   The K-40 result for sample -071 was <3X the associated MDA and will be **qualified "J,FR7."**

2. Gross Alpha/Beta:
   The gross alpha and gross beta results for sample -013 were either < the associated 2-sigma TPU or < the associated MDA will be **qualified "BD,FR3."**

3. Alpha Spec U:
   The U-233/234, U-235/236, and U-238 results for sample -014 were either < the associated 2-sigma TPU or < the associated MDA will be **qualified "BD,FR3."**

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

Holding Times and Preservation

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

Quantification

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 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 on AR/COC# 613881 is associated with the samples on AR/COC# 613882.

No other specific issues that affect data quality were identified.

Reviewed by: David Schwent **Date**: 12/13/11