Sandia National Laboratories

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Sandia National Laboratories, New Mexico

Environmental Restoration Operations

A U.S. Department of Energy Environmental Cleanup Program

Consolidated Quarterly Report

July – September 2013

January 2014

U.S. DEPARTMENT OF ENERGY

United States Department of Energy
Sandia Field Office

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CONSOLIDATED QUARTERLY REPORT

January 2014

SANDIA NATIONAL LABORATORIES, NEW MEXICO

ENVIRONMENTAL RESTORATION OPERATIONS

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

NUMBER OF POTENTIAL RELEASE SITES SUBJECT TO THIS PERMIT: 33

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

REPORTING PERIOD: July – September 2013

OVERVIEW

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

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

ABBREVIATIONS AND ACRONYMS

◦C	degrees Celsius
µg/L	microgram(s) per liter
µmhos/cm	micromhos centimeter
% Sat	percent saturation
AGMR	Annual Groundwater Monitoring Report
AOC	Area of Concern
AOP	Administrative Operating Procedure
AR	Analysis Request
BSG	Burn Site Groundwater
BW	background well
CAC	Corrective Action Complete
CAMU	Corrective Action Management Unit
CCBA	Coyote Canyon Blast Area
CFR	Code of Federal Regulations
CME	Corrective Measures Evaluation
COA	certificates of analyses
COC	Chain-of-Custody
CTF	Coyote Test Field
CWL	Chemical Waste Landfill
CY	Calendar Year
CYN	Canyons (Burn Site)
DI	deionized
DO	dissolved oxygen
DOE	U.S. Department of Energy
EB	equipment blank
EPA	U.S. Environmental Protection Agency
ER	Environmental Restoration Operations
ER Quarterly Report	Environmental Restoration Operations (ER) Consolidated Quarterly Report
ET Cover	evapotranspirative cover
FB	field blank
FOP	Field Operating Procedure
GEL	GEL Laboratories LLC
H_2SO_4	sulfuric acid
HASL	Health and Safety Laboratory
HCL	hydrochloric acid
HE	high explosive(s)
HMX	tetrahexamine tetranitramine

HNO_3	nitric acid
HQ	hazard quotient
L	liter
LCRS	leachate collection and removal system
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)
mrem/yr	millirem per year
MRN	Magazine Road North
mV	millivolt
MW	monitoring well
MWL	Mixed Waste Landfill
N	nitrogen
ND	nondetect
NE	not established
NMED	New Mexico Environment Department
NNSA	National Nuclear Security Administration
NPN	nitrate plus nitrite
NTU	nephelometric turbidity unit
NWTA	Northwest Technical Area
OBS	Old Burn Site
ORP	oxidation-reduction potential
PCCP	Post-Closure Care Permit
pCi/L	picocuries per liter
PQL	practical quantitation limit
QC	quality control
RCRA	Resource Conservation and Recovery Act
RDX	hexahydro-1,3,5-trinitro-1,3,5-triazine
RPD	relative percent difference
Sandia	Sandia Corporation
SAP	Sampling and Analysis Plan
SC	specific conductance
SFO	Sandia Field Office
SM	standard method

SNL/NM	Sandia National Laboratories, New Mexico
SVOC	semivolatile organic compound
SWMU	Solid Waste Management Unit
SWTA	Southwest Technical Area
TA	Technical Area
TAG	Tijeras Arroyo Groundwater
TAL	Target Analyte List
TB	trip blank
Tetryl	2,4,6-trinitrophenylmethylnitramine
the Order	the Compliance Order on Consent
VOC	volatile organic compound

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SECTION I
ENVIRONMENTAL RESTORATION OPERATIONS CONSOLIDATED QUARTERLY REPORT, July – September 2013

1.0 Introduction

This Environmental Restoration Operations (ER) Consolidated Quarterly Report (ER Quarterly Report) provides the status of ongoing corrective actions and related Long-Term Stewardship (LTS) activities being implemented by Sandia National Laboratories, New Mexico (SNL/NM) ER for the July, August, and September 2013 quarterly reporting period. Section 2 provides the status of ER Operations activities including closure activities for the Mixed Waste Landfill (MWL), project management and site closure, and hydrogeologic characterizations. Section 3 provides the status of LTS activities that relate to the Chemical Waste Landfill and the associated Corrective Action Management Unit.

2.0 Environmental Restoration Operations Work Completed

2.1 Mixed Waste Landfill

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

A biology inspection of the MWL evapotranspirative cover (ET Cover) was performed on September 9, 2013 by the SNL/NM staff biologist in accordance with requirements presented in the March 2012 MWL LTMMP. The native foliar coverage was determined to meet successful revegetation criteria with almost no annual invasive weed growth. Despite very limited precipitation prior to the start of the monsoon season in July (only 1.05 inches for January - June), ET Cover vegetation experienced significant growth through the reporting period and appears healthy, with approximately 58 percent foliar coverage. This positive result is largely due to the supplemental watering effort.

Restoration field work at the MWL Borrow Pit in Technical Area (TA) III began in May and was completed on August 2, 2013. The restoration field work included the following components:

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

- Site grading to create four discrete "topographically low areas" within the Borrow Pit gentle side slopes, and a low-lying perimeter berm between the Borrow Pit and the undisturbed surrounding buffer zone. The four low areas are designed to hold surface water after larger precipitation events to facilitate revegetation.

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

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

A summary of the restoration work is being prepared and will be submitted to NMED during the next reporting period to document completion of MWL Corrective Measures Implementation Plan requirements relative to the MWL Borrow Pit.

2.1.1 MWL Evapotranspirative Cover Supplemental Watering Activities

Due to the very dry 2012-2013 winter season and the lack of substantial natural precipitation during the previous reporting period (i.e., April through June 2013), supplemental watering was performed during this reporting period. Three supplemental waterings were performed during the period of July 1 through August 16, with each event applying the equivalent of a 0.5-inch rainfall on the ET Cover surface (total of 1.5 inches). One event was performed on July 1 and the other two events were performed on August 14 and 16 to support seeding efforts that were completed on August 12, 2013. Seven events were performed previously from May 23 through June 28 (equivalent to 3.5 inches of rain). The watering system was modified on June 21, 2013 to provide improved coverage at the north and south ends of the side slopes. No additional supplemental watering will be performed in calendar year (CY) 2013 based on the recommendations of the staff Biologist. Totals for CY 2013 natural precipitation and supplemental watering at the MWL will be provided in the next Quarterly Report.

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

2.1.2 MWL Evapotranspirative Cover Maintenance Activities

MWL ET Cover maintenance activities were performed from August 5 through 12, 2013. These activities included erosion repair of small rills that formed on the northern and western side slopes during the intense July 19 rain event (approximately 0.9 inches in 45 minutes), and limited seeding of repaired areas and other small areas with sparse vegetation. No weed removal was required during the reporting period based upon ET Cover conditions.

The rills were generally less than 2 inches wide and deep, evenly spaced, and oriented parallel to the slope of the side slopes. Stockpiled soil left over from the ET Cover construction was used to fill in the rills (~three cubic yards). Seeding of the erosion repair areas and three discrete areas with sparse vegetative cover (northwest and southeast corners of the ET Cover, and northeast corner on the side slope) was performed in a three-step process. First, masonry sand was mixed with the same seed mix used to seed the ET Cover in 2009 at a rate of three parts sand to one part seed and applied using a hand broadcast method to achieve a minimum seeding rate of 60 pounds pure live seed per acre (~ five tons of washed masonry sand used). Second, a thin layer approximately ¼ to ½-inch thick of compost was applied over all of the seeded areas (~ six cubic yards). Third, ½ to ¾-inch size round river gravel was applied in a single layer over the seeded areas (~five tons). All materials were transported with wheelbarrows; no equipment was driven onto the side slopes or ET Cover surface.

Routine cover maintenance is scheduled for the next reporting period (October through December 2013) as needed based on ET Cover conditions.

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

2.2 Project Management and Site Closure

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

2.2.1 Permit Modification Request Submitted in March 2006

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

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

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

2.2.2 Permit Modification Request Submitted in January 2008

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

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

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

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

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

This letter included four main sections:

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

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

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

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

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

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

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

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

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

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

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

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

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

In a letter dated July 27, 2012, the NMED granted CAC status to three SWMUs/AOCs, which were not opposed by the public in the public comment period ending in February 2008 (NMED July 2012). The two SWMUs and one AOC granted CAC status are as follows:

- SWMUs 233 and 234
- AOC 1115

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

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

2.2.4 SWMU 52 Liquid Waste Disposal System

On October 10, 2012, the NMED requested that Tanks 2 and 4 at SWMU 52 be removed or filled with a permanent insoluble material (Kieling October 2012). NMED also requested that a schedule be submitted by December 11, 2012 and a written report submitted to the NMED by October 11, 2013 (Kieling October 2012). On December 10, 2012, DOE/Sandia requested a 30-day extension for providing the schedule to NMED (Beausoleil December 2012). On December 12, 2012, NMED approved the extension request (Kieling December 2012).

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

Filling of Tanks 2 and 4 was completed on July 30, 2013. Site demobilization and cleanup was completed on July 31, 2013. The completion report "Solid Waste Management Unit (SWMU) 52: Filling Tanks 2 and 4 with a Permanent Insoluble Material" is anticipated to be submitted to NMED in October 2013.

2.3 Hydrogeologic Characterization

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

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

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

Analytical results for the September 2013 groundwater sampling of monitoring well SWMU 154 (CTF-MW2) are presented in Section III of this ER Quarterly Report.

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

2.3.1 Technical Area V Groundwater

Groundwater sampling at TA-V was conducted in July 2013 and the results will be presented in the SNL/NM CY 2013 Annual Groundwater Monitoring Report, as noted above.

2.3.2 Burn Site Groundwater

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

2.3.3 Tijeras Arroyo Groundwater

TAG investigation groundwater sampling was conducted in August and September 2013.

2.3.4 Mixed Waste Landfill Groundwater

No MWL groundwater monitoring activities were performed during this reporting period. Annual groundwater monitoring required under the Compliance Order on Consent (the Order) was performed in the January through March 2013 reporting period.

2.3.5 Chemical Waste Landfill Groundwater

Semi-annual CWL groundwater monitoring activities were performed July 8 through 12, 2013 in accordance with the requirements of the CWL Post-Closure Care Permit (PCCP). Groundwater monitoring results will be presented in the CWL Annual Post-Closure Care Report for CY 2013 that will be submitted to NMED in March 2014.

2.3.6 SWMUs 8/58 Groundwater

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

2.3.7 SWMU 68 Groundwater

SWMU 68 groundwater sampling was conducted in July 2013.

2.3.8 SWMU 49 Groundwater

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

2.3.9 SWMU 116 Groundwater

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

2.3.10 SWMU 149 Groundwater

Unusually heavy rains in September 2013 washed out several access roads that made them impassible. The groundwater sampling truck was unable to access monitoring well CTF-MW3 at SWMU 149 and obtain the third quarter CY 2013 sample. Consequently, there is no analytical data to report for this quarter for CTF-MW3. It is anticipated that the roads will be repaired in time to support a fourth quarter sampling in December of 2013.

2.3.11 SWMU 154 Groundwater

SWMU 154 groundwater sampling was conducted in September 2013.

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

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

- The TA-V Groundwater Corrective Measures Evaluation (CME) Work Plan submitted to the NMED on May 11, 2004 (SNL/NM April 2004)
- The BSG Interim Measures Work Plan submitted to the NMED on May 26, 2005 (SNL/NM May 2005)
- The CME Report for the TAG Investigation submitted to the NMED on September 1, 2005 (SNL/NM August 2005)
- The BSG Current Conceptual Model of Groundwater Flow and Contaminant Transport submitted to the NMED on April 9, 2008 (SNL/NM March 2008)
- The TA-V Geophysical Logs and Slug Test Results Report submitted to the NMED on November 24, 2010 (SNL/NM November 2010)

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

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

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

3.0 Long-Term Stewardship Work Completed

3.1 Chemical Waste Landfill

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

- Semi-annual groundwater monitoring and groundwater monitoring well inspections were performed July 8 through 12, 2013. No maintenance or repairs were required.

- Annual training was provided to LTS field personnel on August 1, 2013 in accordance with CWL PCCP requirements (Permit Attachment 5).

- A phone conference with LTS, DOE/SFO, and NMED personnel was held on August 29, 2013. An update was provided to NMED on CWL ET Cover vegetation conditions and plans to address weed growth (hand removal and discrete use of a common herbicide), perform seeding, and perform supplemental watering were discussed.

- ET Cover maintenance, including manual weed removal, discrete herbicide application, seeding, and application of a light fertilizer, was performed August 19 through 30, 2013.

- Annual ET Cover Biology Inspection was performed on September 9, 2013.

- Quarterly inspection of the CWL ET Cover surface, storm water diversion structures, security fence, and survey monuments was performed on September 13, 2013. No maintenance or repairs were required.

3.2 Corrective Action Management Unit

Corrective Action Management Unit (CAMU) post-closure care operations consist of vadose zone monitoring, leachate removal, and post-closure inspections as required in the PCCP.

Activities for this reporting period (July through September 2013) include the following:

- Quarterly monitoring of the Vadose Zone Monitoring System was conducted in September 2013. The results will be presented in the 2014 CAMU Vadose Zone Monitoring System Annual Monitoring Results Report (anticipated submittal to the NMED in September 2014).

- Composite leachate sampling for waste characterization was conducted on July 17, 2013 and September 30, 2013.

- Weekly pumping of leachate from the leachate collection and removal system (LCRS) was performed with the exception of September 16 through September 25, 2013. The pump failed to operate on September 18, 2013 at which time it was removed and inspected. The pump failed due to an electrical issue with the power supply and showed signs of corrosion. The power supply was repaired on September 23, 2013. With the pump removed from the LCRS, a video camera inspection of the LCRS was performed on September 26, 2013. There were no findings other than determining the approximate level of leachate. Immediately following the video inspection the pump was reinstalled and pumping leachate was resumed. A new pump was ordered and will replace the current one upon receipt. Waste management associated with the leachate collection and removal system during this reporting period is presented in Section I.3.2.1.

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

- Quarterly inspection of the site was performed on September 9 and September 16, 2013, which included the containment cell cover, storm-water diversion structures, security fences, gates, signs, and benchmarks. The inspection findings are as follows:

    - Weedy plant species and deep rooting four-wing saltbush plants were identified and will be removed by the ET Cover Maintenance contractor, Sequoia Landscaping, Inc., in October 2013.

    - The drainage gate on the northwest side of the containment cell was cleared of debris on September 30, 2013.

    - Channel erosion and sediment accumulation in excess of 6 inches were identified in the perimeter drainage channel. Arrangements are being made to have a contractor repair eroded areas and re-grade the drainage channel.

3.2.1 CAMU Waste Management Activities

CAMU waste management data for the reporting period are documented in this section. Solid waste (i.e., personal protective equipment, paper wipes, and plastic drum pump) generated during this reporting period did not exceed 10 pounds.

- Leachate waste stored on site as of July 1, 2013 equaled 43 gallons.

- Leachate and rinsate waste generated on site during the reporting period equaled 91 gallons of leachate and 4 gallons of rinsate.

- Leachate and rinsate waste removed from the site by Hazardous Waste Handling Facility personnel on August 1, 2013 equaled 59 gallons of leachate and 2 gallons of rinsate.

- Leachate and rinsate waste remaining on site at the end of this reporting period equaled 75 gallons of leachate and 2 gallons of rinsate.

3.2.2 CAMU Regulatory Activities

No regulatory activities occurred during this quarter.

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

A Request for Modification to the Post-Closure Care Permit for the Chemical Waste Landfill was submitted to the NMED on February 14, 2013 (SNL/NM February 2013).

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

4.0 References

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

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

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Tables

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

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

Notes

CCBA = Coyote Canyon Blast Area.
CTF = Coyote Test Field.
LWDS = Liquid Waste Disposal System.
MWL = Mixed Waste Landfill.
TA = Technical Area.
TAG = Tijeras Arroyo Groundwater.

Table I-2
Hydrogeologic Characterization

Investigation Site	Sampling Frequency in CY 2013[a]	Quarter of Sampling in CY 2013	Location of Analytical Results	Location of Perchlorate Analytical Results	Monitoring Wells in Network
TA-V Groundwater	Quarterly	1,2,3,4	AGMR	AGMR	AVN-1, LWDS-MW1, LWDS-MW2, TAV-MW2, TAV-MW3, TAV-MW4, TAV-MW5, TAV-MW6, TAV-MW7, TAV-MW8, TAV-MW9, TAV-MW10, TAV-MW11, TAV-MW12, TAV-MW13, TAV-MW14
BSG	Semiannually	1,2, 4	AGMR	AGMR	CYN-MW4, CYN-MW7, CYN-MW8, CYN-MW9, CYN-MW10, CYN-MW11, CYN-MW12, CYN-MW13
TAG	Quarterly	1,2,3,4	AGMR	N/A	PGS-2, TA1-W-01, TA1-W-02, TA1-W-03, TA1-W-04, TA1-W-05, TA1-W-06, TA1-W-08, TA2-NW1-595, TA2-SW1-320, TA2-W-01, TA2-W-19, TA2-W-26, TA2-W-27, TJA-2, TJA-3, TJA-4, TJA-6, TJA-7, WYO-3, WYO-4
MWL Groundwater	Annually	1	AGMR	N/A	MWL-BW2, MWL-MW4, MWL-MW5, MWL-MW6, MWL-MW7, MWL-MW8, MWL-MW9
CWL Groundwater	Semiannually	1,3	AGMR	N/A	CWL-BW5, CWL-MW9, CWL-MW10, CWL-MW11
SWMUs 8/58 Groundwater	Quarterly	1,2,3,4	AGMR, Section IV of ER Quarterly	Section II of ER Quarterly	CCBA-MW1, CCBA-MW2
SWMU 68 Groundwater	Quarterly	1,2,3,4	AGMR, Section IV of ER Quarterly	Section II of ER Quarterly	OBS-MW1, OBS-MW2, OBS-MW3
SWMU 49 Groundwater	Annually	1	AGMR	AGMR and Section II of ER Quarterly Report, First Quarter of CY13	CYN-MW5
SWMU 116 Groundwater	Annually	1	AGMR	AGMR and Section II of ER Quarterly Report, First Quarter of CY13	CTF-MW1
SWMU 149 Groundwater[b]	Quarterly	1,2,3,4	AGMR	AGMR	CTF-MW3
SWMU 154 Groundwater	Quarterly	1,2,3,4	AGMR, Section III of ER Quarterly	Section II of ER Quarterly	CTF-MW2

Notes

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

[b]Unusually heavy rains in September 2013 washed out several access roads that made them impassible. The groundwater sampling truck was unable to access monitoring well CTF-MW3 at SWMU 149 and obtain the third quarter CY 2013 sample. Consequently, there is no analytical data to report for this quarter for CTF-MW3.

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

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SECTION II

PERCHLORATE SCREENING QUARTERLY GROUNDWATER MONITORING REPORT, July – September 2013

1.0 Introduction

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

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

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

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

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

2.0 Scope of Activities

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

Data for numerous wells identified in the Order have satisfied this requirement; therefore, these wells have been removed from the perchlorate screening program. The perchlorate results for these wells have been provided in previous reports and are not discussed in this current report. Wells discussed in previous perchlorate screening reports are included in Table II-2. Unusually heavy rains in September 2013 washed out several access roads that made them impassible. The groundwater sampling truck was unable to access monitoring well CTF-MW3 at SWMU 149 and obtain the third quarter CY2013 sample. Consequently, there is no analytical data to report for this quarter for CTF-MW3. After access roads are repaired, quarterly sampling will resume at this groundwater monitoring well location. In addition, semiannual perchlorate monitoring at well CYN-MW6 was scheduled for October. However, the groundwater elevation in CYN-MW6 has been significantly decreasing in recent years, and currently there is insufficient water to complete the sampling. A work plan has been submitted to NMED to install a deeper, replacement well at this location. After NMED approval and well installation, the replacement well (CYN-MW15) will continue to be sampled semiannually for perchlorate.

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

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

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

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

- "SWMU 154 Groundwater Monitoring, Mini-SAP for Fourth Quarter, Fiscal Year 2013" (SNL/NM August 2013)

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

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

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

- pH is within 0.1 units.

- Temperature is within 1.0 degree Celsius.

- SC is within 5 percent.

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

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

3.0 Regulatory Criteria

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

3.1 Burn Site Groundwater

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

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

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

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

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

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

3.2 Tijeras Arroyo and Technical Area V Groundwater

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

3.3 March 2006 and January 2008 Permit Modification Requests

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

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

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

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

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

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

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

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

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

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

4.0 Monitoring Results

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

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

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

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

2013b, and August 2013), were identified during the third quarter of CY 2013 sampling activities.

5.0 Summary and Conclusions

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

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

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

DOE/Sandia will continue annual monitoring of perchlorate for monitoring wells CTF-MW1 and CYN-MW5, and quarterly monitoring for monitoring wells CCBA-MW1, CCBA-MW2, CTF-MW2, OBS-MW1, OBS-MW2, and OBS-MW3. After access roads are repaired, quarterly sampling will resume at groundwater monitoring well CTF-MW3. The semiannual monitoring for the well that will replace monitoring well CYN-MW6 (CYN-MW15) will begin after the well installation work plan is approved by the NMED, and implemented.

6.0 References

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Figures

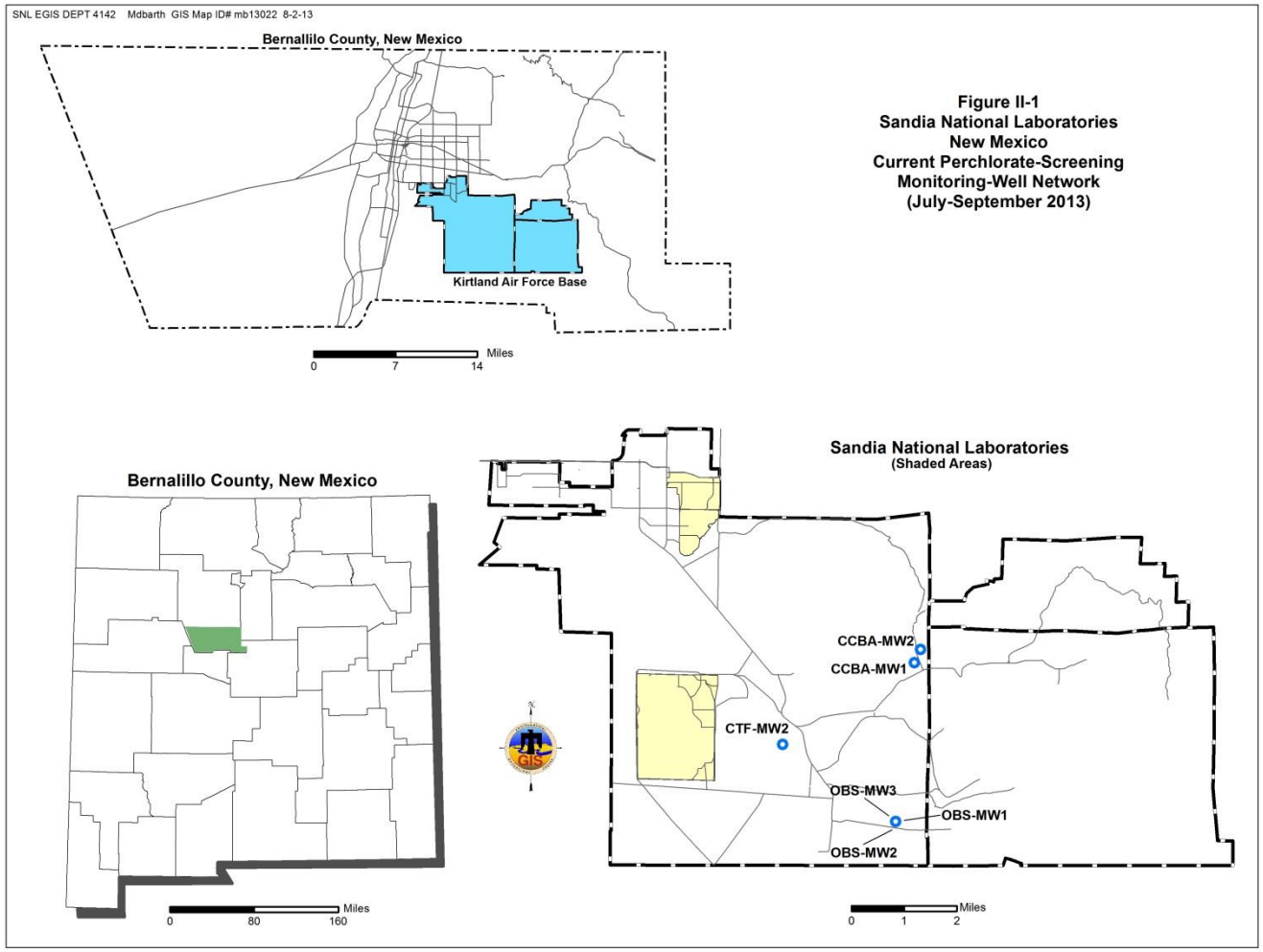

Figure II-1

Sandia National Laboratories, New Mexico

Current Perchlorate Screening Monitoring Well Network, July – September 2013

Tables

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

Well	Date Sampled	Number of Consecutive Sampling Events[a]	Remaining Number of Sampling Events[b]	Sampling Equipment
CCBA-MW1	16-Jul-13	8	TBD[c]	Bennett™ Pump
CCBA-MW2	15-Jul-13	8	TBD[c]	Bennett™ Pump
CTF-MW2	17-Sep-13	11	TBD[c]	Bennett™ Pump
OBS-MW1	09-Jul-13	8	TBD[c]	Bennett™ Pump
OBS-MW2	10-Jul-13	8	TBD[c]	Bennett™ Pump
OBS-MW3	11-Jul-13	8	TBD[c]	Bennett™ Pump

Notes

[a]Includes this sampling event.
[b]Per the requirements of Table XI-1 of the Order (NMED April 2004), a well will be removed from the perchlorate screening monitoring well network after four quarters unless perchlorate is detected above the screening level/MDL of 4 μg/L. However, the seven wells currently in the network are being sampled for a minimum of eight events based on site-specific NMED requirements (NMED April 2010).
[c]TBD = To be determined. This well has been sampled for the eight supplemental rounds of groundwater sampling required by NMED (NMED April 2010). However, DOE/Sandia will continue to sample this well quarterly until NMED has determined that characterization is complete at this SWMU.

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

Table II-2
Wells Discussed in Previous Perchlorate Screening Reports

Well
CTF-MW1
CTF-MW3
CYN-MW1D
CYN-MW5
CYN-MW6
CYN-MW7
CYN-MW8
CYN-MW9
CYN-MW10
CYN-MW11
CYN-MW12
LWDS-MW1
MRN-2
MRN-3D
MWL-BW1
MWL-BW2
MWL-MW1
MWL-MW7
MWL-MW8
MWL-MW9
NWTA3-MW2
SWTA3-MW4
TA1-W-03
TA1-W-06
TA1-W-08
TA2-W-01
TA2-W-27
TAV-MW11
TAV-MW12
TAV-MW13
TAV-MW14

Notes

BW = Background well.
CTF = Coyote Test Field.
CYN = Canyons (Burn Site).
LWDS = Liquid Waste Disposal System.
MRN = Magazine Road North.
MW = Monitoring well.
MWL = Mixed Waste Landfill.
NWTA = Northwest Technical Area (III).
SWTA = Southwest Technical Area (III).
TA = Technical Area.
W = Well.

Table II-3
Sample Details for Third Quarter, CY 2013 Perchlorate Sampling

Well	Sample Identification	AR/COC Number	Associated Groundwater Investigation
CCBA-MW1	094376-020	614939	SWMUs 8/58
CCBA-MW1 (DUPLICATE)	094377-020		
CCBA-MW2	094371-020	614937	SWMUs 8/58
CTF-MW2	094646-020	615029	SWMU 154
OBS-MW1	094361-020	614933	SWMU 68
OBS-MW2	094365-020	614935	SWMU 68
OBS-MW2 (DUPLICATE)	094366-020		
OBS-MW3	094368-020	614936	SWMU 68

Notes

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

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

Well	Sample Date	AR/COC Number	Sample Number	Result[a] (µg/L)	MDL[b] (µg/L)	PQL[c] (µg/L)	MCL[d] (µg/L)	Laboratory Qualifier[e]	Validation Qualifier[f]	Analytical Method[g]	Comments
CCBA-MW1	31-Oct-11	613883	091345-020	ND	4.0	12	NE	U		EPA 314.0	
	16-Jan-12	613958	091615-020	ND	4.0	12	NE	U		EPA 314.0	
			091616-020	ND	4.0	12	NE	U		EPA 314.0	Duplicate sample
	23-Apr-12	614155	092291-020	ND	4.0	12	NE	U		EPA 314.0	
	16-Jul-12	614288	092615-020	ND	4.0	12	NE	U		EPA 314.0	
			092616-020	ND	4.0	12	NE	U		EPA 314.0	Duplicate sample
	22-Oct-12	614466	093013-020	ND	4.0	12	NE	U		EPA 314.0	
	16-Jan-13	614567	093341-020	ND	4.0	12	NE	U		EPA 314.0	
			093342-020	ND	4.0	12	NE	U		EPA 314.0	Duplicate sample
	24-Apr-13	614745	093873-020	ND	4.0	12	NE	U		EPA 314.0	
	16-Jul-13	614939	094376-020	ND	4.0	12	NE	U		EPA 314.0	
			094377-020	ND	4.0	12	NE	U		EPA 314.0	Duplicate sample
CCBA-MW2	01-Nov-11	613885	091349-020	ND	4.0	12	NE	U		EPA 314.0	
			091350-020	ND	4.0	12	NE	U		EPA 314.0	Duplicate sample
	12-Jan-12	613956	091610-020	ND	4.0	12	NE	U		EPA 314.0	
	24-Apr-12	614157	092296-020	ND	4.0	12	NE	U		EPA 314.0	
			092297-020	ND	4.0	12	NE	U		EPA 314.0	Duplicate sample
	12-Jul-12	614286	092610-020	ND	4.0	12	NE	U		EPA 314.0	
	23-Oct-12	614468	093018-020	ND	4.0	12	NE	U		EPA 314.0	
			093019-020	ND	4.0	12	NE	U		EPA 314.0	Duplicate sample
	15-Jan-13	614565	093336-020	ND	4.0	12	NE	U		EPA 314.0	
	25-Apr-13	614747	093878-020	ND	4.0	12	NE	U		EPA 314.0	
			093879-020	ND	4.0	12	NE	U		EPA 314.0	Duplicate sample
	15-Jul-13	614937	094371-020	ND	4.0	12	NE	U		EPA 314.0	
CTF-MW2	08-Mar-11	613448	090237-020	ND	4.0	12	NE	U		EPA 314.0	
			090238-020	ND	4.0	12	NE	U		EPA 314.0	Duplicate sample
	31-May-11	613578	090670-020	ND	4.0	12	NE	U		EPA 314.0	
	29-Sep-11	613855	091259-020	ND	4.0	12	NE	U		EPA 314.0	
	09-Dec-11	613929	091525-020	ND	4.0	12	NE	U		EPA 314.0	
	30-Mar-12	614055	091949-020	ND	4.0	12	NE	U		EPA 314.0	
			091950-020	ND	4.0	12	NE	U		EPA 314.0	Duplicate sample
	19-Jun-12	614255	092538-020	ND	4.0	12	NE	U		EPA 314.0	
	25-Sep-12	614391	092862-020	ND	4.0	12	NE	U		EPA 314.0	
	18-Dec-12	614541	093251-020	ND	4.0	12	NE	U		EPA 314.0	
	26-Mar-13	614663	093723-020	ND	4.0	12	NE	U		EPA 314.0	
			093724-020	ND	4.0	12	NE	U		EPA 314.0	Duplicate sample
	25-Jun-13	614827	094042-020	ND	4.0	12	NE	U		EPA 314.0	
	17-Sep-13	615029	094646-020	ND	4.0	12	NE	U		EPA 314.0	

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

Well ID	Sample Date	AR/COC Number	Sample Number	Result (µg/L)	MDL[b] (µg/L)	PQL[c] (µg/L)	MCL[d] (µg/L)	Laboratory Qualifier[e]	Validation Qualifier[f]	Analytical Method[g]	Comments
OBS-MW1	25-Oct-11	613879	091335-020	ND	4.0	12	NE	U		EPA 314.0	
	09-Jan-12	613952	091600-020	ND	4.0	12	NE	U		EPA 314.0	
	18-Apr-12	614081	092022-020	ND	4.0	12	NE	U		EPA 314.0	
			092023-020	ND	4.0	12	NE	U		EPA 314.0	Duplicate sample
	17-Jul-12	614289	092618-020	ND	4.0	12	NE	U		EPA 314.0	
	16-Oct-12	614462	093003-020	ND	4.0	12	NE	U		EPA 314.0	
	22-Jan-13	614570	093349-020	ND	4.0	12	NE	U		EPA 314.0	
			093350-020	ND	4.0	12	NE	U		EPA 314.0	Duplicate sample
	18-Apr-13	614741	093863-020	ND	4.0	12	NE	U		EPA 314.0	
	09-Jul-13	614933	094361-020	ND	4.0	12	NE	U		EPA 314.0	
OBS-MW2	26-Oct-11	613880	091337-020	ND	4.0	12	NE	U		EPA 314.0	
	10-Jan-12	613954	091604-020	ND	4.0	12	NE	U		EPA 314.0	
			091605-020	ND	4.0	12	NE	U		EPA 314.0	Duplicate sample
	19-Apr-12	614082	092025-020	ND	4.0	12	NE	U		EPA 314.0	
	18-Jul-12	614290	092620-020	ND	4.0	12	NE	U		EPA 314.0	
	17-Oct-12	614464	093007-020	ND	4.0	12	NE	U		EPA 314.0	
			093008-020	ND	4.0	12	NE	U		EPA 314.0	Duplicate sample
	21-Jan-12	614568	093344-020	ND	4.0	12	NE	U		EPA 314.0	
	22-Apr-13	614742	093866-020	ND	4.0	12	NE	U		EPA 314.0	
	10-Jul-13	614935	094365-020	ND	4.0	12	NE	U		EPA 314.0	
			094366-020	ND	4.0	12	NE	U		EPA 314.0	Duplicate sample
OBS-MW3	24-Oct-11	613882	091342-020	ND	4.0	12	NE	U		EPA 314.0	
			091343-020	ND	4.0	12	NE	U		EPA 314.0	Duplicate sample
	11-Jan-12	613955	091607-020	ND	4.0	12	NE	U		EPA 314.0	
	17-Apr-12	614079	092018-020	ND	4.0	12	NE	U		EPA 314.0	
	19-Jul-12	614292	092625-020	ND	4.0	12	NE	U		EPA 314.0	
			092626-020	ND	4.0	12	NE	U		EPA 314.0	Duplicate sample
	18-Oct-12	614465	093010-020	ND	4.0	12	NE	U		EPA 314.0	
	23-Jan-12	614571	093352-020	ND	4.0	12	NE	U		EPA 314.0	
	23-Apr-12	614744	093870-020	ND	4.0	12	NE	U		EPA 314.0	
			093871-020	ND	4.0	12	NE	U		EPA 314.0	Duplicate sample
	11-Jul-13	614936	094368-020	ND	4.0	12	NE	U		EPA 314.0	

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

Notes

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

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

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

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

[e]Laboratory Qualifier
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.

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

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

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

Well	Sample Date	Temperature (°C)	Specific Conductivity (µmhos/cm)	Oxidation-Reduction Potential (mV)	pH	Turbidity (NTU)	Dissolved Oxygen (% Sat)	Dissolved Oxygen (mg/L)
CCBA-MW1	16-Jul-13	17.72	490	142.0	6.75	0.70	33.4	3.17
CCBA-MW2	15-Jul-13	17.13	579	130.3	7.70	0.36	65.7	6.32
CTF-MW2	17-Sep-13	18.64	3871	18.6	5.99	1.08	3.3	0.31
OBS-MW1	09-Jul-13	18.32	499	108.9	7.56	0.62	43.6	3.99
OBS-MW2	10-Jul-13	20.17	482	124.5	7.53	0.43	38.3	3.47
OBS-MW3	11-Jul-13	18.43	471	103.2	7.55	0.69	46.3	4.33

Notes

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

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

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Appendix A
Analytical Laboratory Certificates of Analysis for the Perchlorate Data

SMO 2012-ARCOC (4-2012)

CONTRACT LABORATORY
ANALYSIS REQUEST AND CHAIN OF CUSTODY

AOP 95-16

Internal Lab

Batch No. N/A

AR/COC 614939

		SMO Use	
Project Name:	SWMU 8/58 GWM	Date Samples Shipped:	7/16/13
Project/Task Manager:	Clinton Lum	Carrier/Waybill No.	207015
Project/Task Number:	98026.01.12	Lab Contact:	Edie Kent/803-556-8171
Service Order:	CF 262-13	Lab Destination:	GEL
Tech Area:		Contract No.:	PO 1303873
Building:	Room:	Operational Site:	

SMO Authorization: [signature] SMO

SMO Contact Phone: Lorraine Herrera/505-844-3199

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

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

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

Sample No.	Fraction	Sample Location Detail	Depth (ft)	Date/Time Collected	Sample Matrix	Container Type	Container Volume	Preservative	Collection Method	Sample Type	Parameter & Method Requested	Lab Sample ID
094376	-001	CCBA-MW1	79	7/16/13 9:13	GW	G	3x40ml	HCL	G	SA	TCL VOC (SW846-8260B)	329541 028
094376	-002	CCBA-MW1	79	7/16/13 9:14	GW	AG	4x1L	None	G	SA	TCL SVOC (SW846-8270C)	329541 029
094376	-009	CCBA-MW1	79	7/16/13 9:16	GW	P	500 ml	HNO3	G	SA	TAL Metals+U(SW846-6010/6020/7470)	329541 030
094376	-016	CCBA-MW1	79	7/16/13 9:17	GW	P	125 ml	None	G	SA	Anions(SW846-9056))	329541 031
094376	-017	CCBA-MW1	79	7/16/13 9:18	FGW	P	250 ml	HNO3	G	SA	Metals-Ca,Mg,K,Na(SW846-6020)	329549 003
094376	-018	CCBA-MW1	79	7/16/13 9:19	GW	P	125 ml	H2SO4	G	SA	NPN (EPA 353.2)	329541 032
094376	-020	CCBA-MW1	79	7/16/13 9:20	GW	P	250 ml	None	G	SA	Perchlorate (EPA 314.0)	329541 033
094376	-022	CCBA-MW1	79	7/16/13 9:21	GW	P	500 ml	None	G	SA	Alkalinity (SM2320B)	329541 034
094376	-024	CCBA-MW1	79	7/16/13 9:22	GW	AG	4x1L	None	G	SA	High Explosives (SW846-8321A Mod.	329541 035
094376	-027	CCBA-MW1	79	7/16/13 9:25	GW	P	250 ml	NaOH	G	SA	Total Cyanide (SW846-9012	329541 036

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

Sample Tracking (SMO Use)
Date Entered:
Entered by:
QC inits.:

Special Instructions/QC Requirements:
EDD ☑ Yes ☐ No
Turnaround Time ☐ 7 Day* ☐ 15 Day* ☑ 30 Day
Negotiated TAT ☐
Sample Disposal ☐ Return to Client ☑ Disposal by Lab
Return Samples By:

Conditions on Receipt

Sample Team Members	Name	Signature	Init.	Company/Organization/Phone/Cell
	Robert Lynch	[signature]	RL	SNL/4142/505-844-4013/505-250-7090
	Tim Jackson	[signature]	TJ	SNL/4142/505-284-2547/505-263-6639

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

1.Relinquished by	[signature]	Org.	4142	Date	7/16/13	Time	1005	3.Relinquished by
1. Received by	[signature] SMO	Org.	4142	Date	7/16/13	Time	1005	3. Received by
2.Relinquished by	[signature] SMO	Org.	4142	Date	7/16/13	Time	1130	4.Relinquished by
2. Received by	[signature]	Org.	GEL	Date	7-17-13	Time	0735	4. Received by

Lab Use

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

SMO 2012-ARCOC (4-2012)

CONTRACT LABORATORY
ANALYSIS REQUEST AND CHAIN OF CUSTODY (Continuation)

AOP 95-16

AR/COC 614939

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

Sample No.	Fraction	Sample Location Detail	Depth (ft)	Date/Time Collected	Sample Matrix	Container Type	Container Volume	Preserv-ative	Collection Method	Sample Type	Parameter & Method Requested	Lab use Lab Sample ID
094376	-033	CCBA-MW1	79	7/16/13 9:26	GW	P	1 L	HNO3	G	SA	Gamma Spectroscopy (EPA 901.0)	329541 037
094376	-034	CCBA-MW1	79	7/16/13 9:27	GW	P	1 L	HNO3	G	SA	Gross Alpha and Beta (EPA 900.0)	329541 038
094376	-035	CCBA-MW1	79	7/16/13 9:28	GW	P	1 L	HNO3	G	SA	Isotopic Uranium (HASL 300)	329541 039
094377	-001	CCBA-MW1	79	7/16/13 9:13	GW	G	3x40ml	HCL	G	DU	TCL VOC (SW846-8260B)	329541 040
094377	-002	CCBA-MW1	79	7/16/13 9:15	GW	AG	4x1L	None	G	DU	TCL SVOC (SW846-8270C)	329541 041
094377	-009	CCBA-MW1	79	7/16/13 9:16	GW	P	500 ml	HNO3	G	DU	TAL Metals+U(SW846-6010/6020/7470)	329541 042
094377	-016	CCBA-MW1	79	7/16/13 9:17	GW	P	125 ml	None	G	DU	Anions(SW846-9056))	329541 043
094377	-017	CCBA-MW1	79	7/16/13 9:18	FGW	P	250 ml	HNO3	G	DU	Metals-Ca,Mg,K,Na(SW846-6020)	329549 004
094377	-018	CCBA-MW1	79	7/16/13 9:19	GW	P	125 ml	H2SO4	G	DU	NPN (EPA 353.2)	329541 044
094377	-020	CCBA-MW1	79	7/16/13 9:20	GW	P	250 ml	None	G	DU	Perchlorate (EPA 314.0)	329541 045
094377	-022	CCBA-MW1	79	7/16/13 9:21	GW	P	500 ml	None	G	DU	Alkalinity (SM2320B)	329541 046
094377	-024	CCBA-MW1	79	7/16/13 9:24	GW	AG	4x1L	None	G	DU	High Explosives (SW846-8321A)	329541 047
094377	-027	CCBA-MW1	79	7/16/13 9:25	GW	P	250 ml	NaOH	G	DU	Total Cyanide (SW846-9012	329541 048
094377	-033	CCBA-MW1	79	7/16/13 9:26	GW	P	1 L	HNO3	G	DU	Gamma Spectroscopy (EPA 901.0)	329541 049
094377	-034	CCBA-MW1	79	7/16/13 9:27	GW	P	1 L	HNO3	G	DU	Gross Alpha and Beta (EPA 900.0)	329541 050
094377	-035	CCBA-MW1	79	7/16/13 9:28	GW	P	1 L	HNO3	G	DU	Isotopic Uranium (HASL 300)	329541 051
094378	-001	CCBA-TB3	NA	7/16/13 9:13	DIW	G	3x40ml	HCL	G	TB	TCL VOC (SW846-8260B)	329541 052

Recipient Initials MC

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

Certificate of Analysis

Report Date: August 14, 2013

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

Client Sample ID:	094376-020	Project:	SNLSGWater
Sample ID:	329541033	Client ID:	SNLS004
Matrix:	AQUEOUS		
Collect Date:	16-JUL-13 09:20		
Receive Date:	17-JUL-13	Client Desc.:	CCBA-MW1
Collector:	Client	Vol. Recv.:	

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Ion Chromatography											
EPA 314.0 Perchlorate by IC "As Received"											
Perchlorate	U	ND	0.004	0.012	mg/L	1	MAR1	08/01/13	1912	1318601	1

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	EPA 314.0 DOE-AL	

Notes:

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

Certificate of Analysis

Report Date: August 14, 2013

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

Client Sample ID:	094377-020	Project:	SNLSGWater
Sample ID:	329541045	Client ID:	SNLS004
Matrix:	AQUEOUS		
Collect Date:	16-JUL-13 09:20		
Receive Date:	17-JUL-13	Client Desc.:	CCBA-MW1
Collector:	Client	Vol. Recv.:	

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Ion Chromatography											
EPA 314.0 Perchlorate by IC "As Received"											
Perchlorate	U	ND	0.004	0.012	mg/L	1	MAR1	08/01/13	1931	1318601	1

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	EPA 314.0 DOE-AL	

Notes:

SMO 2012-ARCOC (4-2012)

AOP 95-16

CONTRACT LABORATORY
ANALYSIS REQUEST AND CHAIN OF CUSTODY

Internal Lab

Batch No. N/A

AR/COC 614937

Project Name:	SWMU 8/58 GWM	Date Samples Shipped:	7/15/13	SMO Authorization:	
Project/Task Manager:	Clinton Lum	Carrier/Waybill No.	206946	SMO Contact Phone:	SMO
Project/Task Number:	98026.01.12	Lab Contact:	Edie Kent/803-556-8171	Lorraine Herrera/505-844-3199	
Service Order:	CF 262-13	Lab Destination:	GEL	Send Report to SMO:	
		Contract No.:	PO 1303873	Rita Kavanaugh/505-284-2553	
Tech Area:					
Building:	Room:	Operational Site:			

SMO Use

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

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

Sample No.	Fraction	Sample Location Detail	Depth (ft)	Date/Time Collected	Sample Matrix	Container Type	Container Volume	Preservative	Collection Method	Sample Type	Parameter & Method Requested	Lab Sample ID
094371	-001	CCBA-MW2	117	7/15/13 9:41	GW	G	3x40ml	HCL	G	SA	TCL VOC (SW846-8260B)	329541 001
094371	-002	CCBA-MW2	117	7/15/13 9:42	GW	AG	4x1L	None	G	SA	TCL SVOC (SW846-8270C)	329541 002
094371	-009	CCBA-MW2	117	7/15/13 9:44	GW	P	500 ml	HNO3	G	SA	TAL Metals+U(SW846-6010/6020/7470)	329541 003
094371	-016	CCBA-MW2	117	7/15/13 9:45	GW	P	125 ml	None	G	SA	Anions(SW846-9056))	329541 004
094371	-017	CCBA-MW2	117	7/15/13 9:46	FGW	P	250 ml	HNO3	G	SA	Metals-Ca,Mg,K,Na(SW846-6020)	329549 001
094371	-018	CCBA-MW2	117	7/15/13 9:47	GW	P	125 ml	H2SO4	G	SA	NPN (EPA 353.2)	329541 005
094371	-020	CCBA-MW2	117	7/15/13 9:48	GW	P	250 ml	None	G	SA	Perchlorate (EPA 314.0)	329541 006
094371	-022	CCBA-MW2	117	7/15/13 9:49	GW	P	500 ml	None	G	SA	Alkalinity (SM2320B)	329541 007
094371	-024	CCBA-MW2	117	7/15/13 9:50	GW	AG	4x1L	None	G	SA	High Explosives (SW846-8321A Mod.	329541 008
094371	-027	CCBA-MW2	117	7/15/13 9:51	GW	P	250 ml	NaOH	G	SA	Total Cyanide (SW846-9012	329541 009

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

Sample Tracking (SMO Use)
Date Entered:
Entered by:
QC inits.:

Special Instructions/QC Requirements:
EDD ☑ Yes ☐ No
Turnaround Time ☐ 7 Day* ☐ 15 Day* ☑ 30 Day
Negotiated TAT ☐
Sample Disposal ☐ Return to Client ☑ Disposal by Lab
Return Samples By:
Comments: Send report to Tim Jackson/4142/MS 0729/284-2547
FGW(filtered in field w/0.45 micron filter) Anions(Br,Cl,F,SO4)Alkalinity(total CaCO3,HCO3,CO3). If perchlorate detected,perform verification analysis using SW846-6850M.Gamma Spectroscopy as short list isotopes.

Conditions on Receipt

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

1.Relinquished by		Org. 4142	Date 7/15/13	Time 1025	3.Relinquished by	Org.	Date / Time
1. Received by	SMO	Org. 4142	Date 7/15/13	Time 1025	3. Received by	Org.	Date / Time
2.Relinquished by		Org. 4142	Date 7/15/13	Time 1130	4.Relinquished by	Org.	Date / Time
2. Received by		Org. GEL	Date 7-16-13	Time 0755	4. Received by	Org.	Date / Time

Lab Use

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

SMO 2012-ARCOC (4-2012)

CONTRACT LABORATORY
ANALYSIS REQUEST AND CHAIN OF CUSTODY (Continuation)

AOP 95-16

AR/COC 614937

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

Sample No.	Fraction	Sample Location Detail	Depth (ft)	Date/Time Collected	Sample Matrix	Container Type	Container Volume	Preserv-ative	Collection Method	Sample Type	Parameter & Method Requested	Lab use Lab Sample ID
094371	-033	CCBA-MW2	117	7/15/13 9:52	GW	P	1 L	HNO3	G	SA	Gamma Spectroscopy (EPA 901.0)	329541 010
094371	-034	CCBA-MW2	117	7/15/13 9:53	GW	P	1 L	HNO3	G	SA	Gross Alpha and Beta (EPA 900.0)	329541 011
094371	-035	CCBA-MW2	117	7/15/13 9:54	GW	P	1 L	HNO3	G	SA	Isotopic Uranium (HASL 300)	329541 012
094372	-001	CCBA-TB1	NA	7/15/13 9:40	DIW	G	3x40ml	HCL	G	TB	TCL VOC (SW846-8260B)	329541 013
094373	-001	CCBA-FB1	NA	7/15/13 9:40	DIW	G	3x40ml	HCL	G	FB	TCL VOC (SW846-8260B)	329541 014

Recipient Initials MK

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

Certificate of Analysis

Report Date: August 14, 2013

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

Client Sample ID:	094371-020	Project:	SNLSGWater
Sample ID:	329541006	Client ID:	SNLS004
Matrix:	AQUEOUS		
Collect Date:	15-JUL-13 09:48		
Receive Date:	16-JUL-13	Client Desc.:	CCBA-MW2
Collector:	Client	Vol. Recv.:	

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Ion Chromatography											
EPA 314.0 Perchlorate by IC "As Received"											
Perchlorate	U	ND	0.004	0.012	mg/L	1	MAR1	08/01/13	1756	1318601	1

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	EPA 314.0 DOE-AL	

Notes:

CONTRACT LABORATORY
ANALYSIS REQUEST AND CHAIN OF CUSTODY

Internal Lab
Batch No. NA

AR/COC 615029-

SMO Use

Project Name:	SWMU 154 GWM	Date Samples Shipped:	9/17/13	SMO Authorization:	Don Hoover
Project/Task Manager:	Clinton Lum	Carrier/Waybill No.		SMO Contact Phone:	Lorraine Herrera/505-844-3199
Project/Task Number:	146422.10.11.01	Lab Contact:	Edie Kent/803-556-8171	Send Report to SMO:	Rita Kavanaugh/505-284-2553
Service Order:	CF353-14	Lab Destination:	GEL		
		Contract No.:	PO 1303873		
Tech Area:					
Building:	Room:	Operational Site:			

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

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

Sample No.	Fraction	Sample Location Detail	Depth (ft)	Date/Time Collected	Sample Matrix	Container Type	Container Volume	Preservative	Collection Method	Sample Type	Parameter & Method Requested	Lab Sample ID
094646	-001	CTF-MW2	129	9/17/13 9:23	GW	G	3x40ml	HCL	G	SA	TCL VOC (SW846-8260B)	333568 001
094646	-002	CTF-MW2	129	9/17/13 9:24	GW	AG	4x1L	None	G	SA	TCL SVOC (SW846-8270C)	333568 002
094646	-009	CTF-MW2	129	9/17/13 9:26	GW	P	500 ml	HNO3	G	SA	TAL Metals+U(SW846-6010/6020/7470)	333568 003
094646	-010	CTF-MW2	129	9/17/13 9:28	FGW	P	500 ml	HNO3	G	SA	TAL Metals+U(SW846-6010/6020/7470)	333569 001
094646	-016	CTF-MW2	129	9/17/13 9:29	GW	P	125 ml	None	G	SA	Anions (SW846-9056)	333568 004
094646	-018	CTF-MW2	129	9/17/13 9:30	GW	P	125 ml	H2SO4	G	SA	NPN (EPA 353.2)	333568 005
094646	-020	CTF-MW2	129	9/17/13 9:31	GW	P	250 ml	None	G	SA	Perchlorate (EPA 314.0)	333568 006
094646	-022	CTF-MW2	129	9/17/13 9:32	GW	P	500 ml	None	G	SA	Alkalinity (SM2320B)	333568 007
094646	-024	CTF-MW2	129	9/17/13 9:33	GW	AG	4x1L	None	G	SA	High Explosives(SW846-8321A mod.)	333568 008
094646	-033	CTF-MW2	129	9/17/13 9:35	GW	P	1 L	HNO3	G	SA	Gamma Spectroscopy (EPA 901.0)	333568 009

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

Special Instructions/QC Requirements:

EDD ☑ Yes ☐ No
Turnaround Time ☐ 7 Day* ☐ 15 Day* ☑ 30 Day
Negotiated TAT ☐
Sample Disposal ☐ Return to Client ☑ Disposal by Lab
Return Samples By:

Comments: Send report to Tim Jackson/4142/MS 0729/284-2547
CTF-MW2 water has high buffering capacity,please check pH and add preservitives as needed.If perchlorate detected, then perform verification analysis using SW846-6850.Report anions as Br,Cl,F,SO4.Report Alkalinity as total CaCO3,HCO3,CO3. Report gamma Spec for short list isotopes.

Conditions on Receipt

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

1.Relinquished by	Alfred Santillanes	Org. 4142	Date 9/17/13	Time 10:04	3.Relinquished by	Org.	Date	Time
1. Received by	Don Hoover	Org. 4142	Date 9/17/13	Time 1084	3. Received by	Org.	Date	Time
2.Relinquished by	Don Hoover	Org. 4142	Date 9/17/13	Time 1200	4.Relinquished by	Org.	Date	Time
2. Received by	[illegible]	Org. [illegible]	Date 9-18-13	Time 0730	4. Received by	Org.	Date	Time

Lab Use

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

CONTRACT LABORATORY
ANALYSIS REQUEST AND CHAIN OF CUSTODY (Continuation)

AR/COC 615029

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

Sample No.	Fraction	Sample Location Detail	Depth (ft)	Date/Time Collected	Sample Matrix	Container Type	Container Volume	Preserv-ative	Collection Method	Sample Type	Parameter & Method Requested	Lab use Lab Sample ID
094646	-034	CTF-MW2	129	9/17/13 9:36	GW	P	1 L	HNO3	G	SA	Gross Alpha and Beta (EPA 900.0)	333568 010
094646	-035	CTF-MW2	129	9/17/13 9:37	GW	P	1 L	HNO3	G	SA	Isotopic Uranium (HASL 300)	333568 011
094647	-001	CTF-TB1	NA	9/17/13 9:23	DIW	G	3x40ml	HCL	G	TB	TCL VOC (SW846-8260B)	333568 012

Recipient Initials MK

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

Certificate of Analysis

Report Date: October 17, 2013

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

Client Sample ID:	094646-020	Project:	SNLSGWater
Sample ID:	333568006	Client ID:	SNLS004
Matrix:	AQUEOUS		
Collect Date:	17-SEP-13 09:31		
Receive Date:	18-SEP-13	Client Desc.:	CTF-MW2
Collector:	Client	Vol. Recv.:	

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Ion Chromatography											
EPA 314.0 Perchlorate by IC "As Received"											
Perchlorate	U	ND	0.004	0.012	mg/L	1	MAR1	10/10/13	1723	1336270	1

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	EPA 314.0 DOE-AL	

Notes:

SMO 2012-ARCOC (4-2012)

CONTRACT LABORATORY
ANALYSIS REQUEST AND CHAIN OF CUSTODY

AOP 95-16

Internal Lab

Batch No. NA

Page 1 of 2

SMO Use

Project Name:	SWMU 68 GWM	Date Samples Shipped:	7/9/13
Project/Task Manager:	Clinton Lum	Carrier/Waybill No.	206735
Project/Task Number:	98026.01.13	Lab Contact:	Edie Kent/803-556-8171
Service Order:	CF 263-13	Lab Destination:	GEL
Tech Area:		Contract No.:	PO 1303873
Building:	Room:	Operational Site:	

SMO Authorization: Don Watenpaugh
SMO Contact Phone: Lorraine Herrera/505-844-3199
Send Report to SMO: Rita Kavanaugh/505-284-2553

AR/COC 614933

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

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

Sample No.	Fraction	Sample Location Detail	Depth (ft)	Date/Time Collected	Sample Matrix	Container Type	Container Volume	Preservative	Collection Method	Sample Type	Parameter & Method Requested	Lab Sample ID
094361	-001	OBS-MW1	153	7/9/13 9:44	GW	G	3x40ml	HCL	G	SA	TCL VOC (SW846-8260B)	329124 001
094361	-002	OBS-MW1	153	7/9/13 9:46	GW	AG	4x1L	None	G	SA	TCL SVOC (SW846-8270C)	329124 002
094361	-009	OBS-MW1	153	7/9/13 9:50	GW	P	500 ml	HNO3	G	SA	TAL Metals+U(SW846-6010/6020/7470)	329124 003
094361	-014	OBS-MW1	153	7/9/13 9:51	GW	P	250 ml	None	G	SA	Hexavalent Chromium(SW846-7196A	329124 004
094361	-016	OBS-MW1	153	7/9/13 9:52	GW	P	125 ml	None	G	SA	Anions(SW846-9056))	329124 005
094361	-017	OBS-MW1	153	7/9/13 9:53	FGW	P	250 ml	HNO3	G	SA	Metals-Ca,Mg,K,Na(SW846-6020)	329205 001
094361	-018	OBS-MW1	153	7/9/13 9:54	GW	P	125 ml	H2SO4	G	SA	NPN (EPA 353.2)	329124 006
094361	-020	OBS-MW1	153	7/9/13 9:55	GW	P	250 ml	None	G	SA	Perchlorate (EPA 314.0)	329124 007
094361	-022	OBS-MW1	153	7/9/13 9:56	GW	P	500 ml	None	G	SA	Alkalinity (SM2320B)	329124 008
094361	-024	OBS-MW1	153	7/9/13 10:00	GW	AG	4x1L	None	G	SA	High Explosives (SW846-8321A)	329124 009

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

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

Special Instructions/QC Requirements:
EDD: ☑ Yes ☐ No
Turnaround Time: ☐ 7 Day* ☐ 15 Day* ☑ 30 Day
Negotiated TAT: ☐
Sample Disposal: ☐ Return to Client ☐ Disposal by Lab
Return Samples By:
Comments: Send report to Tim Jackson/4142/MS 0729/284-2547
FGW(filtered in field w/45 micron filter) Anions(Br,Cl,F,SO4)Alkalinity(total CaCO3,HCO3,CO3) if perchlorate detected,perform Verification analysis using SW846-6850M.Gamma Spectroscopy as short list isotopes.

Conditions on Receipt

Lab Use

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

1. Relinquished by	T Jackson	Org. 4142	Date 7/9/13	Time 1033	3. Relinquished by	Org.	Date Time
1. Received by	Don Watenpaugh	Org. 4142	Date 7/9/13	Time 1033	3. Received by	Org.	Date Time
2. Relinquished by	Don Watenpaugh	Org. 4142	Date 7/9/13	Time 1100	4. Relinquished by	Org.	Date Time
2. Received by		Org. GEL	Date 7-10-13	Time 0740	4. Received by	Org.	Date Time

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

CONTRACT LABORATORY
ANALYSIS REQUEST AND CHAIN OF CUSTODY (Continuation)

AOP 95-16

AR/COC 614933

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

Sample No.	Fraction	Sample Location Detail	Depth (ft)	Date/Time Collected	Sample Matrix	Container Type	Container Volume	Preserv-ative	Collection Method	Sample Type	Parameter & Method Requested	Lab use Lab Sample ID
094361	-027	OBS-MW1	153	7/9/13 10:01	GW	P	250 ml	NaOH	G	SA	Total Cyanide (SW846-9012	329124 010
094361	-033	OBS-MW1	153	7/9/13 10:02	GW	P	1 L	HNO3	G	SA	Gamma Spectroscopy (EPA 901.0)	329124 011
094361	-034	OBS-MW1	153	7/9/13 10:03	GW	P	1 L	HNO3	G	SA	Gross Alpha and Beta (EPA 900.0)	329124 012
094361	-035	OBS-MW1	153	7/9/13 10:04	GW	P	1 L	HNO3	G	SA	Isotopic Uranium (HASL 300)	329124 013
094362	-001	OBS-TB1	NA	7/9/13 9:44	DIW	G	3x40ml	HCL	G	TB	TCL VOC (SW846-8260B)	329124 014

Recipient Initials MK

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

Certificate of Analysis

Report Date: August 5, 2013

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

Client Sample ID:	094361-020	Project:	SNLSGWater
Sample ID:	329124007	Client ID:	SNLS004
Matrix:	AQUEOUS		
Collect Date:	09-JUL-13 09:55		
Receive Date:	10-JUL-13	Client Desc.:	OBS-MW1
Collector:	Client	Vol. Recv.:	

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Ion Chromatography											
EPA 314.0 Perchlorate by IC "As Received"											
Perchlorate	U	ND	0.004	0.012	mg/L	1	MAR1	07/11/13	1657	1314022	1

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	EPA 314.0 DOE-AL	

Notes:

SMO 2012-ARCOC (4-2012)

CONTRACT LABORATORY
ANALYSIS REQUEST AND CHAIN OF CUSTODY

AOP 95-16

Internal Lab

Batch No. N/A

AR/COC 614935

		SMO Use	
Project Name:	SWMU 68 GWM	Date Samples Shipped:	7/10/13
Project/Task Manager:	Clinton Lum	Carrier/Waybill No.	206271
Project/Task Number:	98026.01.13	Lab Contact:	Edie Kent/803-556-8171
Service Order:	CF 263-13	Lab Destination:	GEL
Tech Area:		Contract No.:	PO 1303873
Building:	Room:	Operational Site:	

SMO Authorization: SMO

SMO Contact Phone: Lorraine Herrera/505-844-3199

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

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

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

Sample No.	Fraction	Sample Location Detail	Depth (ft)	Date/Time Collected	Sample Matrix	Container Type	Container Volume	Preservative	Collection Method	Sample Type	Parameter & Method Requested	Lab Sample ID
094365	-001	OBS-MW2	252	7/10/13 9:19	GW	G	3x40ml	HCL	G	SA	TCL VOC (SW846-8260B)	329124 029
094365	-002	OBS-MW2	252	7/10/13 9:22	GW	AG	4x1L	None	G	SA	TCL SVOC (SW846-8270C)	329124 030
094365	-009	OBS-MW2	252	7/10/13 9:25	GW	P	500 ml	HNO3	G	SA	TAL Metals+U(SW846-6010/6020/7470)	329124 031
094365	-014	OBS-MW2	252	7/10/13 9:26	GW	P	250 ml	None	G	SA	Hexavalent Chromium(SW846-7196A	329124 032
094365	-016	OBS-MW2	252	7/10/13 9:27	GW	P	125 ml	None	G	SA	Anions(SW846-9056))	329124 033
094365	-017	OBS-MW2	252	7/10/13 9:28	FGW	P	250 ml	HNO3	G	SA	Metals-Ca,Mg,K,Na(SW846-6020)	329205 003
094365	-018	OBS-MW2	252	7/10/13 9:29	GW	P	125 ml	H2SO4	G	SA	NPN (EPA 353.2)	329124 034
094365	-020	OBS-MW2	252	7/10/13 9:30	GW	P	250 ml	None	G	SA	Perchlorate (EPA 314.0)	329124 035
094365	-022	OBS-MW2	252	7/10/13 9:31	GW	P	500 ml	None	G	SA	Alkalinity (SM2320B)	329124 036
094365	-024	OBS-MW2	252	7/9/13 9:33	GW	AG	4x1L	None	G	SA	High Explosives (SW846-8321A)	329124 037

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

Sample Tracking — **SMO Use**

Date Entered:

Entered by:

QC inits.:

Special Instructions/QC Requirements:

EDD: ☑ Yes ☐ No

Turnaround Time: ☐ 7 Day* ☐ 15 Day* ☑ 30 Day

Negotiated TAT: ☐

Sample Disposal: ☐ Return to Client ☐ Disposal by Lab

Return Samples By:

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

Conditions on Receipt

Lab Use

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

1.Relinquished by	Tim Jackson	Org. 4142	Date 7/10/13	Time 1010	3.Relinquished by / Org. / Date / Time
1. Received by	SMO	Org. 4142	Date 7/10/13	Time 1010	3. Received by / Org. / Date / Time
2.Relinquished by	SMO	Org. 4142	Date 7/10/13	Time 1100	4.Relinquished by / Org. / Date / Time
2. Received by		Org. GEL	Date 7-11-13	Time 0145	4. Received by / Org. / Date / Time

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

CONTRACT LABORATORY
ANALYSIS REQUEST AND CHAIN OF CUSTODY (Continuation)

AOP 95-16

AR/COC 614935

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

Sample No.	Fraction	Sample Location Detail	Depth (ft)	Date/Time Collected	Sample Matrix	Container Type	Container Volume	Preserv-ative	Collection Method	Sample Type	Parameter & Method Requested	Lab use Lab Sample ID
094365	-027	OBS-MW2	252	7/10/13 9:36	GW	P	250 ml	NaOH	G	SA	Total Cyanide (SW846-9012	329124 038
094365	-033	OBS-MW2	252	7/10/13 9:37	GW	P	1 L	HNO3	G	SA	Gamma Spectroscopy (EPA 901.0)	329124 039
094365	-034	OBS-MW2	252	7/10/13 9:38	GW	P	1 L	HNO3	G	SA	Gross Alpha and Beta (EPA 900.0)	329124 040
094365	-035	OBS-MW2	252	7/10/13 9:39	GW	P	1 L	HNO3	G	SA	Isotopic Uranium (HASL 300)	329124 041
094366	-001	OBS-MW2	252	7/10/13 9:20	GW	G	3x40ml	HCL	G	DU	TCL VOC (SW846-8260B)	329124 042
094366	-002	OBS-MW2	252	7/10/13 9:24	GW	AG	4x1L	None	G	DU	TCL SVOC (SW846-8270C)	329124 043
094366	-009	OBS-MW2	252	7/10/13 9:25	GW	P	500 ml	HNO3	G	DU	TAL Metals+U(SW846-6010/6020/7470)	329124 044
094366	-014	OBS-MW2	252	7/10/13 9:26	GW	P	250 ml	None	G	DU	Hexavalent Chromium(SW846-7196A	329124 045
094366	-016	OBS-MW2	252	7/10/13 9:27	GW	P	125 ml	None	G	DU	Anions(SW846-9056))	329124 046
094366	-017	OBS-MW2	252	7/10/13 9:28	FGW	P	250 ml	HNO3	G	DU	Metals-Ca,Mg,K,Na(SW846-6020)	329205 004
094366	-018	OBS-MW2	252	7/10/13 9:29	GW	P	125 ml	H2SO4	G	DU	NPN (EPA 353.2)	329124 047
094366	-020	OBS-MW2	252	7/10/13 9:30	GW	P	250 ml	None	G	DU	Perchlorate (EPA 314.0)	329124 048
094366	-022	OBS-MW2	252	7/10/13 9:31	GW	P	500 ml	None	G	DU	Alkalinity (SM2320B)	329124 049
094366	-024	OBS-MW2	252	7/10/13 9:35	GW	AG	4x1L	None	G	DU	High Explosives (SW846-8321A)	329124 050
094366	-027	OBS-MW2	252	7/10/13 9:36	GW	P	250 ml	NaOH	G	DU	Total Cyanide (SW846-9012	329124 051
094366	-033	OBS-MW2	252	7/10/13 9:37	GW	P	1 L	HNO3	G	DU	Gamma Spectroscopy (EPA 901.0)	329124 052
094366	-034	OBS-MW2	252	7/10/13 9:38	GW	P	1 L	HNO3	G	DU	Gross Alpha and Beta (EPA 900.0)	329124 053
094366	-035	OBS-MW2	252	7/10/13 9:39	GW	P	1 L	HNO3	G	DU	Isotopic Uranium (HASL 300)	329124 054
094367	-001	OBS-TB3	NA	7/10/13 9:19	DIW	G	3x40ml	HCL	G	TB	TCL VOC (SW846-8260B)	329124 055

Recipient Initials MK

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

Certificate of Analysis

Report Date: August 5, 2013

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

Client Sample ID:	094365-020	Project:	SNLSGWater
Sample ID:	329124035	Client ID:	SNLS004
Matrix:	AQUEOUS		
Collect Date:	10-JUL-13 09:30		
Receive Date:	11-JUL-13	Client Desc.:	OBS-MW2
Collector:	Client	Vol. Recv.:	

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Ion Chromatography											
EPA 314.0 Perchlorate by IC "As Received"											
Perchlorate	U	ND	0.004	0.012	mg/L	1	MAR1	07/11/13	1814	1314022	1

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	EPA 314.0 DOE-AL	

Notes:

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

Certificate of Analysis

Report Date: August 5, 2013

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

Client Sample ID:	094366-020	Project:	SNLSGWater
Sample ID:	329124048	Client ID:	SNLS004
Matrix:	AQUEOUS		
Collect Date:	10-JUL-13 09:30		
Receive Date:	11-JUL-13	Client Desc.:	OBS-MW2
Collector:	Client	Vol. Recv.:	

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Ion Chromatography											
EPA 314.0 Perchlorate by IC "As Received"											
Perchlorate	U	ND	0.004	0.012	mg/L	1	MAR1	07/11/13	1833	1314022	1

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	EPA 314.0 DOE-AL	

Notes:

SMO 2012-ARCOC (4-2012)

CONTRACT LABORATORY
ANALYSIS REQUEST AND CHAIN OF CUSTODY

AOP 95-16

Internal Lab

Batch No. N/A

AR/COC 614936

Project Name:	SWMU 68 GWM	Date Samples Shipped:	7/11/13
Project/Task Manager:	Clinton Lum	Carrier/Waybill No.	20648
Project/Task Number:	98026.01.13	Lab Contact:	Edie Kent/803-556-8171
Service Order:	CF 263-13	Lab Destination:	GEL
Tech Area:		Contract No.:	PO 1303873
Building:	Room:	Operational Site:	

SMO Use

SMO Authorization: [signature] SMO

SMO Contact Phone: Lorraine Herrera/505-844-3199

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

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

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

Sample No.	Fraction	Sample Location Detail	Depth (ft)	Date/Time Collected	Sample Matrix	Container Type	Container Volume	Preservative	Collection Method	Sample Type	Parameter & Method Requested	Lab Sample ID
094368	-001	OBS-MW3	208	7/11/13 9:20	GW	G	3x40ml	HCL	G	SA	TCL VOC (SW846-8260B)	329124 056
094368	-002	OBS-MW3	208	7/11/13 9:22	GW	AG	4x1L	None	G	SA	TCL SVOC (SW846-8270C)	329124 057
094368	-009	OBS-MW3	208	7/11/13 9:23	GW	P	500 ml	HNO3	G	SA	TAL Metals+U(SW846-6010/6020/7470)	329124 058
094368	-014	OBS-MW3	208	7/11/13 9:24	GW	P	250 ml	None	G	SA	Hexavalent Chromium(SW846-7196A	329124 059
094368	-016	OBS-MW3	208	7/11/13 9:25	GW	P	125 ml	None	G	SA	Anions(SW846-9056))	329124 060
094368	-017	OBS-MW3	208	7/11/13 9:26	FGW	P	250 ml	HNO3	G	SA	Metals-Ca,Mg,K,Na(SW846-6020)	329205 005
094368	-018	OBS-MW3	208	7/11/13 9:27	GW	P	125 ml	H2SO4	G	SA	NPN (EPA 353.2)	329124 061
094368	-020	OBS-MW3	208	7/11/13 9:28	GW	P	250 ml	None	G	SA	Perchlorate (EPA 314.0)	329124 062
094368	-022	OBS-MW3	208	7/11/13 9:29	GW	P	500 ml	None	G	SA	Alkalinity (SM2320B)	329124 063
094368	-024	OBS-MW3	208	7/11/13 9:30	GW	AG	4x1L	None	G	SA	High Explosives (SW846-8321A)	329124 064

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

Sample Tracking — **SMO Use**

Date Entered:

Entered by:

QC inits.:

Special Instructions/QC Requirements:

EDD: ☑ Yes ☐ No

Turnaround Time: ☐ 7 Day* ☐ 15 Day* ☑ 30 Day

Negotiated TAT: ☐

Sample Disposal: ☐ Return to Client ☐ Disposal by Lab

Return Samples By:

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

Conditions on Receipt

Lab Use

Sample Team Members	Name	Signature	Init.	Company/Organization/Phone/Cell
	Robert Lynch	[signature]	RL	SNL/4142/505-844-4013/505-250-7090
	Tim Jackson	[signature]	TJ	SNL/4142/505-284-2547/505-263-6639

1.Relinquished by	[signature]	Org. 4142	Date 7/11/13	Time 1006	3.Relinquished by	Org.	Date	Time
1. Received by	[signature] SMO	Org. 4142	Date 7/11/13	Time 1006	3. Received by	Org.	Date	Time
2.Relinquished by	[signature] SMO	Org. 4142	Date 7/11/13	Time 1100	4.Relinquished by	Org.	Date	Time
2. Received by	[signature]	Org. GEL	Date 7-12-13	Time 0735	4. Received by	Org.	Date	Time

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

SMO 2012-ARCOC (4-2012)

CONTRACT LABORATORY
ANALYSIS REQUEST AND CHAIN OF CUSTODY (Continuation)

AOP 95-16

AR/COC 614936

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

Sample No.	Fraction	Sample Location Detail	Depth (ft)	Date/Time Collected	Sample Matrix	Container Type	Container Volume	Preserv-ative	Collection Method	Sample Type	Parameter & Method Requested	Lab use Lab Sample ID
094368	-027	OBS-MW3	208	7/11/13 9:31	GW	P	250 ml	NaOH	G	SA	Total Cyanide (SW846-9012	329124 065
094368	-033	OBS-MW3	208	7/11/13 9:32	GW	P	1 L	HNO3	G	SA	Gamma Spectroscopy (EPA 901.0)	329124 066
094368	-034	OBS-MW3	208	7/11/13 9:33	GW	P	1 L	HNO3	G	SA	Gross Alpha and Beta (EPA 900.0)	329124 067
094368	-035	OBS-MW3	208	7/11/13 9:34	GW	P	1 L	HNO3	G	SA	Isotopic Uranium (HASL 300)	329124 068
094369	-001	OBS-TB4	NA	7/11/13 9:19	DIW	G	3x40ml	HCL	G	TB	TCL VOC (SW846-8260B)	329124 069
094370	-001	OBS-FB1	NA	7/11/13 9:19	DIW	G	3x40ml	HCL	G	FB	TCL VOC (SW846-8260B)	329124 070

Recipient Initials MK

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

Certificate of Analysis

Report Date: August 5, 2013

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

Client Sample ID:	094368-020	Project:	SNLSGWater
Sample ID:	329124062	Client ID:	SNLS004
Matrix:	AQUEOUS		
Collect Date:	11-JUL-13 09:28		
Receive Date:	12-JUL-13	Client Desc.:	OBS-MW3
Collector:	Client	Vol. Recv.:	

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Ion Chromatography											
EPA 314.0 Perchlorate by IC "As Received"											
Perchlorate	U	ND	0.004	0.012	mg/L	1	MAR1	07/12/13	1038	1314022	1

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	EPA 314.0 DOE-AL	

Notes:

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

ANALYTICAL QUALITY ASSOCIATES, IN

PO Box 2198
Albuquerque, NM 8715
1-888-678-544
www.aqainc.ne

Memorandum

Date: September 26, 2013

To: File

From: Linda Thal

Subject: Inorganic Data Review and Validation – SNL
Site: SWMU 68 GWM
AR/COC: 614933, 614934, 614935 and 614936
SDG: 329124 and 331750
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 IC), EPA 353.2 (nitrate/nitrite), EPA 9012A (total cyanide), EPA 314.0 (perchlorate) and SM2320B (total alkalinity). Data were reported for all required analytes. Problems were identified with the data package that resulted in the qualification of data.

Total cyanide:

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

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

3. The MS %R for total cyanide was <75% but ≥30%. The associated sample results were NDs and will be **qualified UJ,MS3**.

Anions:

1. Sample 331750001 was analyzed >1X but ≤2X past the method specified holding time. The associated sample results were detects and will be **qualified J,H1**.

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

Holding Times and Preservation

The samples were prepared and analyzed within the prescribed holding times and properly preserved except as noted above in the Summary section and as follows.

All samples, excluding the EB, were prepared and analyzed for hexavalent chromium very slightly past the method 24 hour holding time. Based on professional judgment, no data were qualified.

Calibration

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

Blanks

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

Alkalinity was detected in the MB associated with samples 329124049 and -063 but was not evaluated for data validation.

Laboratory Control Sample (LCS)

All LCS acceptance criteria were met.

Matrix Spike (MS)

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

Total cyanide and Anions (samples associated with SDG 329124):
The MS was performed on a sample of similar matrix from another SNL SDG. No sample data will be qualified as a result.

Laboratory Replicate

The replicate analyses met all QC acceptance criteria.

Total cyanide and Anions (samples associated with SDG 329124):
The replicate was performed on a sample of similar matrix from another SNL SDG. No sample data will be qualified as a result.

Detection Limits/Dilutions

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

Nitrate/Nitrite:
All samples *except* the EB were diluted 5X.

Anions:
All samples *except* the EB were diluted 20X for chloride and sulfate.

Other QC

An EB was submitted with AR/COC 614934 to be applied to the samples on AR/COC 614935. A field duplicate pair was submitted with AR/COC 614935. There are no "required" review criteria for field duplicate analyses comparability; no data will be qualified as a result.

At the request of the client, sample 329124033 from AR/COC 614935, was re-logged and re-analyzed (for chloride and sulfate) as sample 331750001.

No other specific issues that affect data quality were identified.

Reviewed by: Monica Dymerski **Level I** **Date:** 09/30/13

Sample Findings Summary

AR/COC: 614933, 614934, 614935, 614936

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
DOE EML HASL-300, U-02-RC			
	094363-035/OBS-EB1	Uranium-233/234 (13968-55-3/13966-29-)	BD, FR3
	094363-035/OBS-EB1	Uranium-235/236 (15117-96-1/13982-70-)	BD, FR3
	094363-035/OBS-EB1	Uranium-238 (7440-61-1)	BD, FR3
EPA 900.0/SW846 9310			
	094363-034/OBS-EB1	ALPHA (12587-46-1)	BD, FR3
	094363-034/OBS-EB1	BETA (12587-47-2)	BD, FR3
EPA 901.1			
	094361-033/OBS-MW1	Americium-241 (14596-10-2)	BD, FR3
	094361-033/OBS-MW1	Cesium-137 (10045-97-3)	BD, FR3
	094361-033/OBS-MW1	Cobalt-60 (10198-40-0)	BD, FR3
	094361-033/OBS-MW1	Potassium-40 (13966-00-2)	BD, FR3
	094363-033/OBS-EB1	Americium-241 (14596-10-2)	BD, FR3
	094363-033/OBS-EB1	Cesium-137 (10045-97-3)	BD, FR3
	094363-033/OBS-EB1	Cobalt-60 (10198-40-0)	BD, FR3
	094363-033/OBS-EB1	Potassium-40 (13966-00-2)	BD, FR3
	094365-033/OBS-MW2	Americium-241 (14596-10-2)	BD, FR3
	094365-033/OBS-MW2	Cesium-137 (10045-97-3)	BD, FR3
	094365-033/OBS-MW2	Cobalt-60 (10198-40-0)	BD, FR3
	094365-033/OBS-MW2	Potassium-40 (13966-00-2)	BD, FR3
	094366-033/OBS-MW2	Americium-241 (14596-10-2)	BD, FR3
	094366-033/OBS-MW2	Cesium-137 (10045-97-3)	BD, FR3
	094366-033/OBS-MW2	Cobalt-60 (10198-40-0)	BD, FR3
	094366-033/OBS-MW2	Potassium-40 (13966-00-2)	BD, FR3
	094368-033/OBS-MW3	Americium-241 (14596-10-2)	BD, FR3

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
	094368-033/OBS-MW3	Cesium-137 (10045-97-3)	BD, FR3
	094368-033/OBS-MW3	Cobalt-60 (10198-40-0)	BD, FR3
	094368-033/OBS-MW3	Potassium-40 (13966-00-2)	BD, FR3
SW846 3005/6020 DOE-AL			
	094361-009/OBS-MW1	Barium (7440-39-3)	J, MS1
	094361-009/OBS-MW1	Manganese (7439-96-5)	J, D1
	094363-009/OBS-EB1	Barium (7440-39-3)	UJ, MS1
	094363-009/OBS-EB1	Manganese (7439-96-5)	UJ, D1
	094365-009/OBS-MW2	Barium (7440-39-3)	J, MS1
	094365-009/OBS-MW2	Copper (7440-50-8)	0.0080U, B2
	094365-009/OBS-MW2	Manganese (7439-96-5)	UJ, D1
	094366-009/OBS-MW2	Barium (7440-39-3)	J, MS1
	094366-009/OBS-MW2	Copper (7440-50-8)	0.0080U, B2
	094366-009/OBS-MW2	Manganese (7439-96-5)	UJ, D1
	094368-009/OBS-MW3	Barium (7440-39-3)	J, MS1
	094368-009/OBS-MW3	Manganese (7439-96-5)	J, D1
SW846 3535/8321A Modified			
	094361-024/OBS-MW1	m-Nitrotoluene (99-08-1)	UJ, I4
	094361-024/OBS-MW1	o-Nitrotoluene (88-72-2)	UJ, I4
	094361-024/OBS-MW1	p-Nitrotoluene (99-99-0)	UJ, I4
	094363-024/OBS-EB1	m-Nitrotoluene (99-08-1)	UJ, I4
	094363-024/OBS-EB1	o-Nitrotoluene (88-72-2)	UJ, I4
	094363-024/OBS-EB1	p-Nitrotoluene (99-99-0)	UJ, I4
	094365-024/OBS-MW2	m-Nitrotoluene (99-08-1)	UJ, I4
	094365-024/OBS-MW2	o-Nitrotoluene (88-72-2)	UJ, I4
	094365-024/OBS-MW2	p-Nitrotoluene (99-99-0)	UJ, I4
	094366-024/OBS-MW2	m-Nitrotoluene (99-08-1)	UJ, I4
	094366-024/OBS-MW2	o-Nitrotoluene (88-72-2)	UJ, I4
	094366-024/OBS-MW2	p-Nitrotoluene (99-99-0)	UJ, I4

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
	094368-024/OBS-MW3	m-Nitrotoluene (99-08-1)	UJ, I4
	094368-024/OBS-MW3	o-Nitrotoluene (88-72-2)	UJ, I4
	094368-024/OBS-MW3	p-Nitrotoluene (99-99-0)	UJ, I4
SW846 9012B			
	094361-027/OBS-MW1	Cyanide, Total (57-12-5)	UJ, I5,B4,MS3
	094363-027/OBS-EB1	Cyanide, Total (57-12-5)	UJ, I5,B4,MS3
	094365-027/OBS-MW2	Cyanide, Total (57-12-5)	UJ, I5,B4,MS3
	094366-027/OBS-MW2	Cyanide, Total (57-12-5)	UJ, I5,B4,MS3
	094368-027/OBS-MW3	Cyanide, Total (57-12-5)	UJ, I5,B4,MS3
SW846 9056			
	094365-R16/OBS-MW2	Chloride (16887-00-6)	J, H1
	094365-R16/OBS-MW2	Sulfate (14808-79-8)	J, H1

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

ANALYTICAL QUALITY ASSOCIATES, IN

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Memorandum - Revised

Date: September 18, 2013

To: File

From: Linda Thal

Subject: Inorganic Data Review and Validation – SNL
Site: SWMU 8/58 GWM
AR/COC: 614937, 614938 and 614939
SDG: 329541
Laboratory: GEL
Project/Task: 98026.01.12
Analysis: General Chemistry

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

Summary

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

Total cyanide:

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

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

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

Holding Times and Preservation

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

Calibration

All initial and continuing calibration met QC acceptance criteria.

Blanks

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

Chloride was detected at < the PQL in the EB, sample 329541018. The associated sample results were detects >5X the EB value and will not be qualified.

Alkalinity and bicarbonate alkalinity were detected in the method blank, but were not assessed for validation.

Laboratory Control Sample (LCS)

All LCS acceptance criteria were met.

Matrix Spike (MS)

All MS/PS recoveries met QC acceptance criteria.

Laboratory Replicate

The replicate analyses met all QC acceptance criteria.

Detection Limits/Dilutions

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

Nitrate/Nitrite:
All samples *except* the EB were diluted 5X.

Anions:
Samples -004 was diluted 10X for chloride and sulfate and samples -031 and -043 were diluted 5X for fluoride, chloride and sulfate.

Other QC

An EB was submitted with AR/COC 614938 to be applied to the samples on AR/COC 614939. A field duplicate pair was submitted with AR/COC 614939. There are no "required" review criteria for field duplicate analyses comparability; no data will be qualified as a result.

No other specific issues that affect data quality were identified.

Reviewed by: Monica Dymerski **Level:** I **Date:** 10/07/13

Sample Findings Summary

AR/COC: 614937, 614938, 614939

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
DOE EML HASL-300, U-02-RC			
	094371-035/CCBA-MW2	Uranium-235/236 (15117-96-1/13982-70-)	J, FR7
	094374-035/CCBA-EB1	Uranium-233/234 (11-08-5)	BD, FR3
	094374-035/CCBA-EB1	Uranium-235/236 (13982-70-2)	BD, FR3
	094374-035/CCBA-EB1	Uranium-238 (7440-61-1)	BD, FR3
	094376-035/CCBA-MW1	Uranium-235/236 (13982-70-2)	J, FR7
	094377-035/CCBA-MW1	Uranium-235/236 (13982-70-2)	BD, FR3
EPA 900.0/SW846 9310			
	094371-034/CCBA-MW2	ALPHA (12587-46-1)	J, MS1
	094371-034/CCBA-MW2	BETA (12587-47-2)	J, FR7,MS1
	094374-034/CCBA-EB1	ALPHA (12587-46-1)	BD, FR3,MS1
	094374-034/CCBA-EB1	BETA (12587-47-2)	BD, FR3,MS1
	094376-034/CCBA-MW1	ALPHA (12587-46-1)	J, FR7,MS1
	094376-034/CCBA-MW1	BETA (12587-47-2)	J, FR7,MS1
	094377-034/CCBA-MW1	ALPHA (12587-46-1)	J, FR7,MS1
	094377-034/CCBA-MW1	BETA (12587-47-2)	J, MS1
EPA 901.1			
	094371-033/CCBA-MW2	Americium-241 (14596-10-2)	BD, FR3
	094371-033/CCBA-MW2	Cesium-137 (10045-97-3)	BD, FR3
	094371-033/CCBA-MW2	Cobalt-60 (10198-40-0)	BD, FR3
	094371-033/CCBA-MW2	Potassium-40 (13966-00-2)	BD, FR3
	094374-033/CCBA-EB1	Americium-241 (14596-10-2)	BD, FR3
	094374-033/CCBA-EB1	Cesium-137 (10045-97-3)	BD, FR3
	094374-033/CCBA-EB1	Cobalt-60 (10198-40-0)	BD, FR3
	094374-033/CCBA-EB1	Potassium-40 (13966-00-2)	BD, FR3

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
	094376-033/CCBA-MW1	Americium-241 (14596-10-2)	BD, FR3
	094376-033/CCBA-MW1	Cesium-137 (10045-97-3)	BD, FR3
	094376-033/CCBA-MW1	Cobalt-60 (10198-40-0)	BD, FR3
	094376-033/CCBA-MW1	Potassium-40 (13966-00-2)	BD, FR3
	094377-033/CCBA-MW1	Americium-241 (14596-10-2)	BD, FR3
	094377-033/CCBA-MW1	Cesium-137 (10045-97-3)	BD, FR3
	094377-033/CCBA-MW1	Cobalt-60 (10198-40-0)	BD, FR3
	094377-033/CCBA-MW1	Potassium-40 (13966-00-2)	BD, FR3
SW846 3005/6010B			
	094374-009/CCBA-EB1	Vanadium (7440-62-2)	UJ, B4
	094376-009/CCBA-MW1	Vanadium (7440-62-2)	UJ, B4
	094377-009/CCBA-MW1	Vanadium (7440-62-2)	UJ, B4
SW846 3005/6020 DOE-AL			
	094376-009/CCBA-MW1	Copper (7440-50-8)	0.0047U, B2
	094377-009/CCBA-MW1	Copper (7440-50-8)	0.0047U, B2
SW846 3510C/8270D			
	094371-002/CCBA-MW2	1,2,4-Trichlorobenzene (120-82-1)	UJ, MS5
	094371-002/CCBA-MW2	Hexachlorobutadiene (87-68-3)	UJ, MS5
	094371-002/CCBA-MW2	Hexachloroethane (67-72-1)	UJ, MS5
	094374-002/CCBA-EB1	1,2,4-Trichlorobenzene (120-82-1)	UJ, MS5
	094374-002/CCBA-EB1	Hexachlorobutadiene (87-68-3)	UJ, MS5
	094374-002/CCBA-EB1	Hexachloroethane (67-72-1)	UJ, MS5
	094376-002/CCBA-MW1	1,2,4-Trichlorobenzene (120-82-1)	UJ, MS5
	094376-002/CCBA-MW1	Hexachlorobutadiene (87-68-3)	UJ, MS5
	094376-002/CCBA-MW1	Hexachloroethane (67-72-1)	UJ, MS5
	094377-002/CCBA-MW1	1,2,4-Trichlorobenzene (120-82-1)	UJ, MS5
	094377-002/CCBA-MW1	Hexachlorobutadiene (87-68-3)	UJ, MS5
	094377-002/CCBA-MW1	Hexachloroethane (67-72-1)	UJ, MS5
SW846 3535/8321A Modified			
	094371-024/CCBA-MW2	m-Nitrotoluene (99-08-1)	UJ, I4

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
	094371-024/CCBA-MW2	o-Nitrotoluene (88-72-2)	UJ, I4
	094371-024/CCBA-MW2	p-Nitrotoluene (99-99-0)	UJ, I4
	094374-024/CCBA-EB1	m-Nitrotoluene (99-08-1)	UJ, I4
	094374-024/CCBA-EB1	o-Nitrotoluene (88-72-2)	UJ, I4
	094374-024/CCBA-EB1	p-Nitrotoluene (99-99-0)	UJ, I4
	094376-024/CCBA-MW1	m-Nitrotoluene (99-08-1)	UJ, I4
	094376-024/CCBA-MW1	o-Nitrotoluene (88-72-2)	UJ, I4
	094376-024/CCBA-MW1	p-Nitrotoluene (99-99-0)	UJ, I4
	094377-024/CCBA-MW1	m-Nitrotoluene (99-08-1)	UJ, I4
	094377-024/CCBA-MW1	o-Nitrotoluene (88-72-2)	UJ, I4
	094377-024/CCBA-MW1	p-Nitrotoluene (99-99-0)	UJ, I4
SW846 9012B			
	094371-027/CCBA-MW2	Cyanide, Total (57-12-5)	UJ, I5,B4
	094374-027/CCBA-EB1	Cyanide, Total (57-12-5)	UJ, I5,B4
	094376-027/CCBA-MW1	Cyanide, Total (57-12-5)	UJ, I5,B4
	094377-027/CCBA-MW1	Cyanide, Total (57-12-5)	UJ, I5,B4

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

ANALYTICAL QUALITY ASSOCIATES, IN

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Memorandum

Date: October 21, 2013

To: File

From: Linda Thal

Subject: Inorganic Data Review and Validation – SNL
Site: SWMU 154 GWM
AR/COC: 615029
SDG: 333568
Laboratory: GEL
Project/Task: 146422.10.11.01
Analysis: General Chemistry

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

Summary

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

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

Holding Times and Preservation

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

Calibration

All initial and continuing calibration met QC acceptance criteria.

Blanks

No target analytes were detected in the blanks.

Laboratory Control Sample (LCS)

All LCS acceptance criteria were met.

Matrix Spike (MS)

All MS/PS recoveries met QC acceptance criteria.

Laboratory Replicate

The replicate analyses met all QC acceptance criteria.

Detection Limits/Dilutions

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

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

Other QC

No other specific issues that affect data quality were identified.

Reviewed by: Monica Dymerski **Level I** **Date:** 10/21/13

Sample Findings Summary

AR/COC: 615029

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
EPA 901.1			
	094646-033/CTF-MW2	Americium-241 (14596-10-2)	BD, FR3
	094646-033/CTF-MW2	Cesium-137 (10045-97-3)	BD, FR3
	094646-033/CTF-MW2	Cobalt-60 (10198-40-0)	BD, FR3
	094646-033/CTF-MW2	Potassium-40 (13966-00-2)	J, FR7
SW846 3005/6010B			
	094646-009/CTF-MW2	Vanadium (7440-62-2)	0.018UJ, B,B3,DL2
	094646-010/CTF-MW2	Vanadium (7440-62-2)	0.018UJ, B,B3,DL2
SW846 3005/6020 DOE-AL			
	094646-009/CTF-MW2	Antimony (7440-36-0)	UJ, MS3
	094646-009/CTF-MW2	Barium (7440-39-3)	J, MS1
	094646-009/CTF-MW2	Iron (7439-89-6)	J, MS1
	094646-009/CTF-MW2	Zinc (7440-66-6)	J, MS2
	094646-010/CTF-MW2	Antimony (7440-36-0)	UJ, MS3
	094646-010/CTF-MW2	Barium (7440-39-3)	J, MS1
	094646-010/CTF-MW2	Iron (7439-89-6)	J, MS1
	094646-010/CTF-MW2	Zinc (7440-66-6)	J, MS2
SW846 3535/8321A Modified			
	094646-024/CTF-MW2	HMX (2691-41-0)	UJ, MS5
	094646-024/CTF-MW2	m-Nitrotoluene (99-08-1)	UJ, MS5
	094646-024/CTF-MW2	p-Nitrotoluene (99-99-0)	UJ, I4,MS5
	094646-024/CTF-MW2	RDX (121-82-4)	J, MS5

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, July – September 2013

1.0 Introduction

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

Monitoring wells CTF-MW2 and CTF-MW3 were installed in August 2001. Prior to the September 2013 sampling event, monitoring wells CTF-MW2 and CTF-MW3 had been sampled 21 and 20 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 eleventh quarterly groundwater sampling events for Coyote Test Field (CTF) monitoring well CTF-MW3 following the April 8, 2010 letter by NMED requiring eight quarters of additional groundwater monitoring. CTF-MW3 is, located near SWMU 149 (Building 9930 Septic System), and monitoring well CTF-MW2, located near SWMU 154 (Building 9960 Septic System and Seepage Pits). This groundwater characterization at the two SWMUs is designed to address the requirements of Section VII.D.6 of the Compliance Order on Consent (the Order) (NMED April 2004) and the letter dated April 8, 2010, from the NMED Hazardous Waste Bureau (NMED April 2010).

The analytical results discussed in this section correspond to the reporting period of July through September 2013. Monitoring well CTF-MW2 was sampled on September 17, 2013. Unusually heavy rains in September 2013 washed out several access roads that

made them impassible. The groundwater sampling truck was unable to access monitoring well CTF-MW3 at SWMU 149 and obtain the third quarter, calendar year (CY) 2013 sample. Consequently, there is no analytical data to report for this quarter for CTF-MW3. After access roads are repaired, quarterly sampling will resume at this groundwater monitoring well location.

Groundwater sampling was conducted in conformance with the procedure "Sampling and Analysis Plan for Collection and Analysis of Additional Groundwater Samples Collected from Monitoring Well CTF-MW2, Located Near SNL/NM SWMU 154" (SNL/NM June 2010, Attachment 2). The sampling and analysis plans (SAP) was approved by NMED in December 2010 (NMED December 2010).

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

Analytical results for the September 2013 groundwater sample were compared with the U.S. Environmental Protection Agency (EPA) maximum contaminant levels (MCLs) for drinking water (EPA 2009). Except for arsenic and gross alpha, none of the analytical results for the monitoring well CTF-MW2 groundwater samples exceed the MCLs. Arsenic was detected above the MCL of 0.010 milligrams per liter (mg/L) in monitoring well CTF-MW2 groundwater samples in both unfiltered and filtered samples. Arsenic was reported at concentrations of 0.0438 mg/L in the unfiltered sample and 0.0448 mg/L in the filtered sample. Gross alpha was reported above the MCL of 15 picocuries per liter (pCi/L) in the original analysis at 23.54 pCi/L and at 26.94 pCi/L in the reanalysis. These reported values for both arsenic and gross alpha are comparable to historical values.

The elevated concentrations of arsenic and gross alpha in the groundwater samples are most likely attributable to background conditions because monitoring well CTF-MW2 is screened in a fault-gouge zone in the Precambrian granite. Because of the fine-grained nature and disrupted texture of the rock surrounding monitoring well CTF-MW2, naturally occurring arsenic and gross alpha may be more likely to be present in the local groundwater.

The quality control (QC) sample consisted of one trip blank (TB) for CTF MW2 that was submitted for analysis during this quarterly sampling event. The following sections

provide descriptions of the field methods used and discussions of the analytical and QC sampling results.

2.0 Field Methods and Measurements

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

2.1 Equipment Decontamination

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

2.2 Well Evacuation

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

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

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

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

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

2.3 Groundwater Sample Collection

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

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

3.0 Analytical Results

Groundwater samples were submitted to GEL for chemical and radiological analyses. Samples were analyzed in accordance with applicable EPA analytical methods (EPA 1980, 1984, 1986, and 1999; Clesceri et al. 1998; DOE 1990). Groundwater sampling results are compared with established EPA MCLs for drinking water (EPA 2009). Analytical results and method detection limits (MDLs) for samples collected from

monitoring well CTF-MW2 are shown in tabulated form in Tables III-4 through III-12. Analytical reports, including certificates of analyses, analytical methods, MDLs, minimum detectable activity (MDA), critical level, practical quantitation limits, dates of analyses, results for QC analyses, and data validation findings are filed in the SNL/NM Records Center.

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

3.1 Field Water Quality Measurements

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

3.2 Volatile Organic Compounds

SWMU 154, Monitoring Well CTF-MW2. No VOCs were detected at concentrations above established MCLs in the monitoring well CTF-MW2 environmental sample. No VOCs were reported above laboratory MDLs. Table III-5 lists the VOC MDLs.

3.3 Semivolatile Organic Compounds

SWMU 154, Monitoring Well CTF-MW2. No SVOCs were reported above laboratory MDLs; therefore, no SVOCs were detected at concentrations above established MCLs in the monitoring well CTF-MW2 environmental sample. Table III-5 lists the SVOC MDLs.

3.4 High Explosive Compounds

SWMU 154, Monitoring Well CTF-MW2. No HE compounds were detected in the monitoring well CTF-MW2 groundwater sample at concentrations above laboratory MDLs, except hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX). RDX was detected in the environmental sample collected from monitoring well CTF-MW2 at a concentration of 0.357 micrograms per liter (μg/L). The EPA does not have an MCL of RDX. NMED does have a tap water screening level for RDX of 6.11 μg/L (NMED February 2012), which is approximately 17 times greater than CTF-MW2 analytical concentration.

Table III-4 summarizes the HE compounds detected in the environmental groundwater sample and Table III-6 lists the HE compound MDLs.

3.5 Nitrate Plus Nitrite

SWMU 154, Monitoring Well CTF-MW2. Table III-7 summarizes NPN results for monitoring well CTF-MW2. NPN was not detected above the MDL in the monitoring well CTF-MW2 environmental sample. NPN values were compared with the nitrate MCL of 10 mg/L. No NPN was detected above the MCL.

3.6 Anions and Alkalinity

SWMU 154, Monitoring Well CTF-MW2. Table III-8 summarizes alkalinity and major anion (i.e., bromide, chloride, fluoride, and sulfate) results for monitoring well CTF-MW2. No parameters were detected above established MCLs.

3.7 Perchlorate

SWMU 154, Monitoring Well CTF-MW2. Perchlorate was not detected above the NMED-specified screening level/MDL of 4 µg/L (0.004 mg/L) in the sample from monitoring well CTF-MW2. Table III-9 presents the perchlorate results.

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

3.8 Metals

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

SWMU 154, Monitoring Well CTF-MW2. No metals were detected above established MCLs in the monitoring well CTF-MW2 groundwater sample, except for arsenic. Arsenic was detected above the MCL of 0.010 mg/L with a concentration of 0.0438 mg/L in the unfiltered sample and 0.0448 mg/L in the filtered sample. The elevated concentrations of arsenic in the groundwater sample are most likely attributable to background because monitoring well CTF-MW2 is screened in a fault-gouge zone in the Precambrian granite, as noted in Section III.1.0. Arsenic concentrations since March

2002 are plotted on Figure III-3. Unfiltered and filtered metal results for monitoring well CTF-MW2 are summarized in Tables III-10 and III-11, respectively.

3.9 Gamma Spectroscopy and Radioisotopic Analyses

SWMU 154, Monitoring Well CTF-MW2. The monitoring well CTF-MW2 groundwater sample was screened for gamma-emitting radionuclides and gross alpha/beta activity (EPA 1980 and DOE 1990). An additional sample for isotopic uranium was collected to support evaluation of gross alpha activity results. All radiological results were reviewed by Mark Miller, SNL/NM Certified Health Physicist, and determined as nonradioactive. The results for gamma spectroscopy, gross alpha/beta activity, and isotopic uranium are presented in Table III-12.

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

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

No radiological analyses exceeded established MCLs, except gross alpha. Gross alpha was reported above the MCL of 15 pCi/L in the original analysis at 23.54 pCi/L and at 26.94 pCi/L in the reanalysis. These reported activities are comparable to historical values and is likely due to the monitoring well CTF-MW2 being screened in a fault-gouge zone in Precambrian granite.

3.10 Sample Results Exceeding Maximum Contaminant Levels

Table III-13 lists the results for all constituents that have been detected at concentrations exceeding the EPA MCLs (EPA 2009) during all quarterly sampling events. Arsenic and gross alpha were the only constituents exceeding MCLs in samples collected during this quarter, which was detected in the monitoring well CTF-MW2 samples. Figure III-3 shows the concentrations of arsenic and groundwater elevations over time for monitoring well CTF-MW2. The elevated concentrations of arsenic in the groundwater samples are most likely attributable to background because monitoring well CTF-MW2 is screened in a fault-gouge zone in the Precambrian granite.

4.0 Quality Control Samples

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

4.1 Field Quality Control Samples

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

4.1.1 Trip Blank Samples

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

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

4.2 Laboratory Quality Control Samples

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

Although some analytical results were qualified during the data validation process, no significant data quality problems were noted for project constituents of concern. The data validation sample findings summary sheets are provided in Appendix C. The data are acceptable and reported QC measures are adequate.

4.3 Variances and Nonconformances

No variances or nonconformances from the requirements in the Groundwater Monitoring SAP SWMU 154 (SNL/NM June 2010, Attachment 2) were identified during the September 2013 sampling activities at monitoring well CTF-MW2.

Due to weather-impacted access roads, the groundwater sampling truck was unable to access monitoring well CTF-MW3 at SWMU 149 and obtain the third quarter CY2013 sample. Consequently, there are no analytical data to report for this quarter for CTF-MW3.

5.0 Summary

During CY 2013 third quarter, samples were collected from monitoring well CTF-MW2, located near SWMU 154. The monitoring well CTF-MW3 located near SWMU 149 was not sampled because several access roads were washed out, but will resume once the roads are repaired. It is anticipated that roads will be repaired in time to support a fourth quarter sampling in December 2013. The CY2013 third quarter sampling event represents the eleventh quarterly groundwater sampling event for monitoring well CTF-MW2, as well as the third additional sampling event following the eight quarterly groundwater sampling events required by the April 8, 2010 letter from NMED. Sampling will continue at both wells until further guidance is provided by NMED. Sampling results were compared with EPA MCL guidelines for drinking water (EPA 2009).

Analytical parameters for monitoring well CTF-MW2 include VOCs, SVOCs, HE compounds, NPN, major anions, alkalinity, TAL total metals plus uranium, perchlorate, radionuclides by gamma spectroscopy, gross alpha/beta activity, and isotopic uranium. No parameters were detected above established MCLs, except for arsenic and gross alpha. Arsenic detections exceed the MCL of 0.010 mg/L in the monitoring well CTF-MW2. In the groundwater samples, arsenic concentrations were 0.0438 mg/L in the unfiltered sample and 0.0448 mg/L in the filtered sample. Gross alpha was reported above the MCL of 15 pCi/L in the original analysis at 23.54 pCi/L and at 26.94 pCi/L in the reanalysis. The elevated concentrations of arsenic and gross alpha in the groundwater samples are most likely attributable to background because monitoring well CTF-MW2 is screened in a fault-gouge zone in the Precambrian granite. These values are comparable to previous results.

6.0 References

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.

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Figures

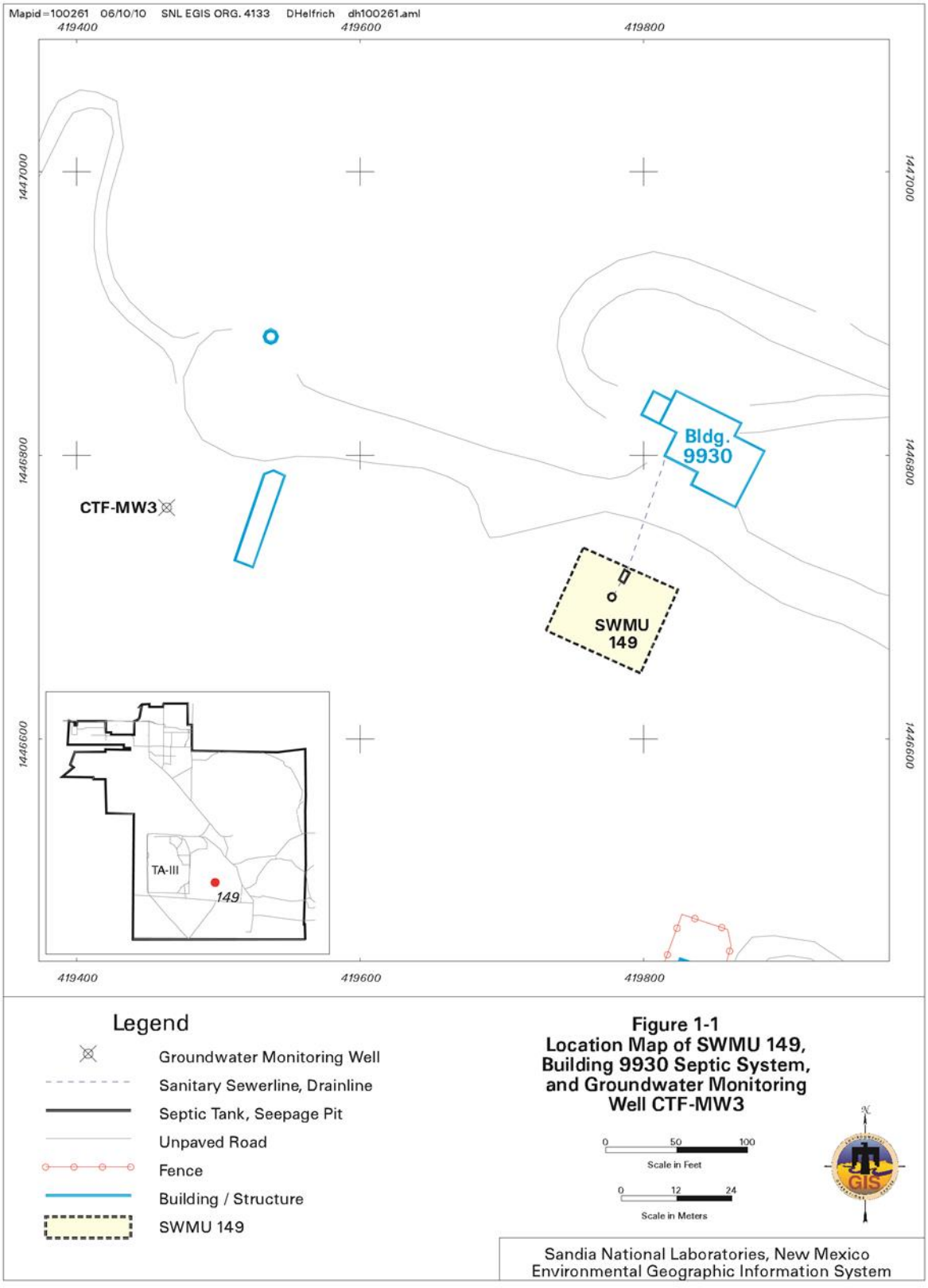

Figure III-1

Location of Monitoring Well CTF-MW3 near SWMU 149

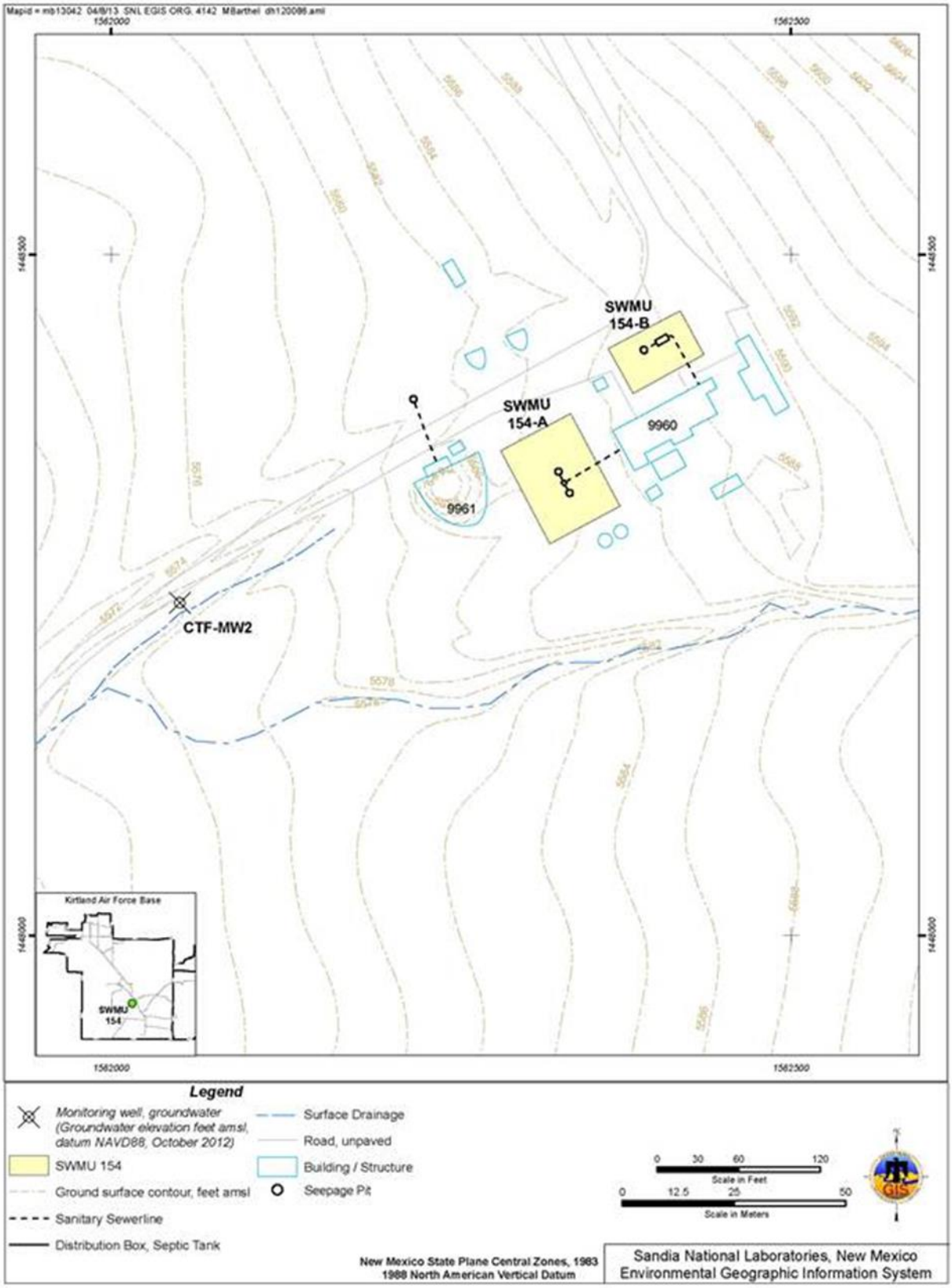

Figure III-2

Location of Monitoring Well CTF-MW2 near SWMU 154

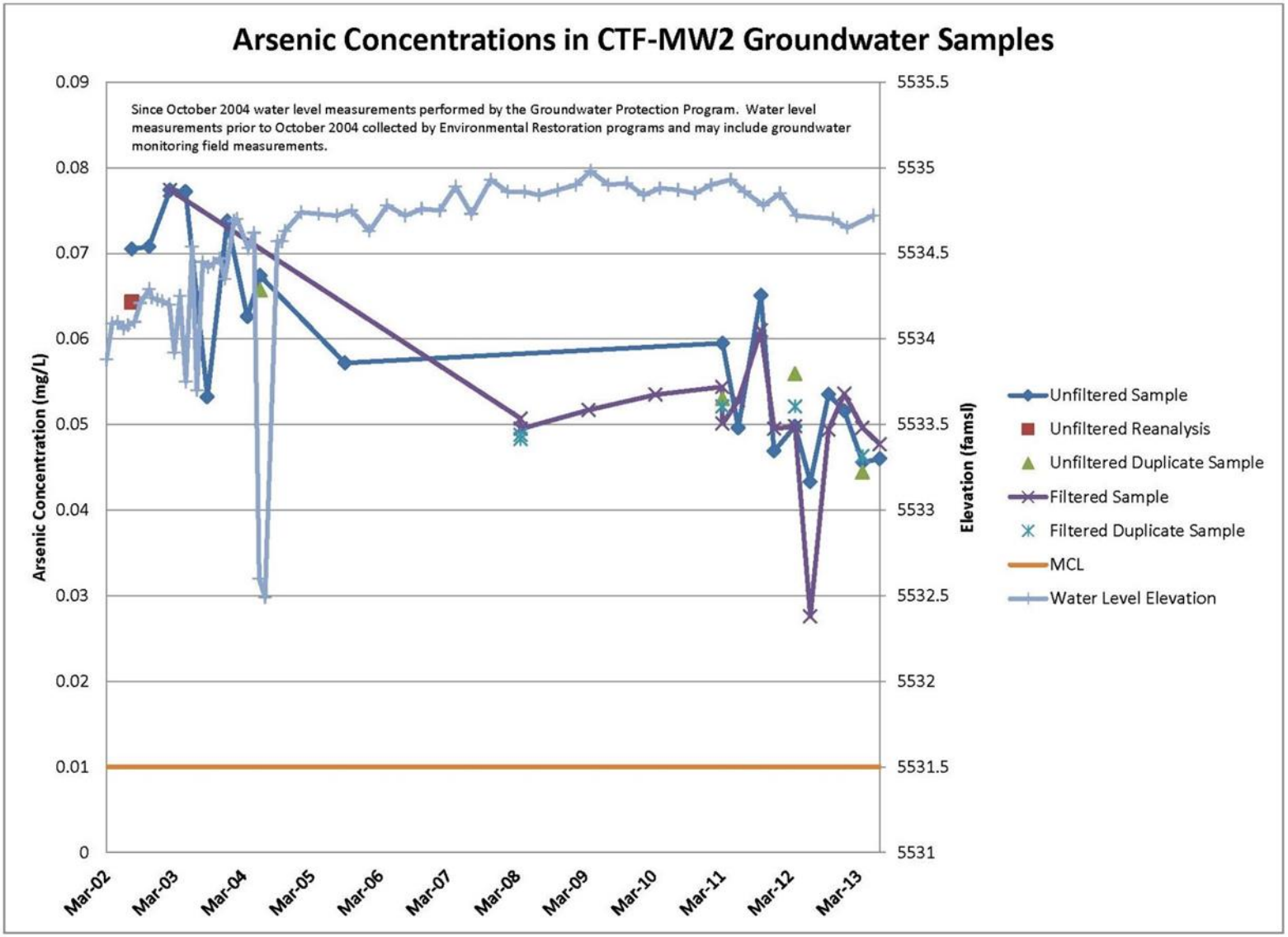

Figure III-3

Concentrations of Arsenic and Groundwater Elevations over Time in Monitoring Well CTF-MW2 near SWMU 154

Tables

Table III-1

Laboratory Analytical Methods, Container Types, and Preservation Requirements for SWMUs 149 and 154 Groundwater Samples

Analysis	Analytical Method[a]	Volume and Container Type/ Preservation Requirements
Volatile Organic Compounds	EPA 8260B	3 x 40-mL glass, HCl, 4°C
Semivolatile Organic Compounds	EPA 8270C	3 x 1-L Amber Glass, 4°C
High Explosives	EPA 8321A	4 x 1-L Amber Glass, 4°C
Metals[b]	EPA 6010/6020/7470	1 x 500-mL polyethylene, HNO_3, 4°C
Perchlorate	EPA 314.0	1 x 250-mL polyethylene, 4°C
Major Anions and Cations[c]	EPA 6020/7470/9056	1 x 500-mL polyethylene, 4°C
Alkalinity as Total, Carbonate, and Bicarbonate	SM 2320B	1 x 500-mL polyethylene, 4°C
Nitrate plus Nitrite	EPA 353.2	1 x 250-mL polyethylene, H_2SO_4, 4°C
Gross Alpha/Beta	EPA 900.0	1 x 1-L polyethylene, HNO_3, 4°C
Gamma Spectroscopy[d]	EPA 901.0	1 x 1-L polyethylene, HNO_3, 4°C
Isotopic Uranium	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 = filtered and unfiltered samples, TAL metals including barium, calcium, magnesium, potassium, and sodium, plus uranium.
[c]Major anions include bromide, chloride, fluoride, and sulfate; major cations include calcium, magnesium, potassium, and sodium.
[d]Gamma spectroscopy = Americium-241, Cesium-137, Cobalt-60, and Potassium-40.

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

Table III-2

Sample Details for Third Quarter, CY 2013 Groundwater Sampling

SWMU 154 Groundwater Monitoring Quarterly Assessment,

July – September 2013

Well	Date Sampled	Sample Identification	AR/COC Number	Associated Groundwater Investigation
CTF-MW2	17-Sept-13	094646	615029	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]

SWMU 154 Groundwater Monitoring

Quarterly Assessment, July – September 2013

Well	Sample Date	Temperature (°C)	Specific Conductivity (µmhos/cm)	Oxidation Reduction Potential (mV)	pH	Turbidity (NTU)	Dissolved Oxygen (% Sat)	Dissolved Oxygen (mg/L)
SWMU 154								
CTF-MW2	17-Sept-13	20.30	3322	24.5	6.01	0.61	3.1	0.27

Notes

[a]Field measurements collected prior to sampling.

°C = Degrees Celsius.
% Sat = Percent saturation.
µmhos/cm = Micromhos per centimeter.
CTF = Coyote Test Field.
mg/L = Milligrams per liter.
mV = Millivolts.
MW = Monitoring well.
NTU = Nephelometric turbidity units.
pH = Potential of hydrogen (negative logarithm of the hydrogen ion concentration).
SWMU = Solid Waste Management Unit.

Table III-4

Summary of Detected Volatile Organic, Semivolatile Organic, and High Explosive Compounds

SWMU 154 Groundwater Monitoring

Quarterly Assessment, July – September 2013

Well	Analyte	Result (µg/L)	MDL (µg/L)	PQL (µg/L)	MCL (µg/L)	Laboratory Qualifier[a]	Validation Qualifier[b]	Sample Number	Analytical Method[c]
SWMU 154									
CTF-MW2 17-Sept-13	RDX	0.357	0.0833	0.260	NE		J	094646-024	EPA 8321A

Notes

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

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

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

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

Table III-5

Method Detection Limits for Volatile and Semivolatile Organic Compounds

SWMU 154 Groundwater Monitoring

Quarterly Assessment, July – September 2013

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

Table III-5 (Concluded)

Method Detection Limits for Volatile and Semivolatile Organic Compounds

SWMU 154 Groundwater Monitoring

Quarterly Assessment, July – September 2013

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

Notes

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

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

Table III-6

Method Detection Limits for High Explosive Compounds (EPA Method 8321A)

SWMU 154 Groundwater Monitoring

Quarterly Assessment, July – September 2013

Analyte	MDL (μg/L)
1,3,5-Trinitrobenzene	0.0833
1,3-Dinitrobenzene	0.0833
2,4,6-Trinitrotoluene	0.0833
2,4-Dinitrotoluene	0.0833
2,6-Dinitrotoluene	0.0833
2-Amino-4,6-dinitrotoluene	0.0833
2-Nitrotoluene	0.0854
3-Nitrotoluene	0.0833
4-Amino-2,6-dinitrotoluene	0.0833
4-Nitrotoluene	0.156
HMX	0.0833
Nitro-benzene	0.0833
Pentaerythritol tetranitrate	0.104
RDX	0.0833
Tetryl	0.0833

Notes

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

Table III-7

Summary of Nitrate Plus Nitrite Results

SWMU154 Groundwater Monitoring

Quarterly Assessment, July – September 2013

Well	Analyte	Result (mg/L)	MDL (mg/L)	PQL (mg/L)	MCL (mg/L)	Laboratory Qualifier[a]	Validation Qualifier[b]	Sample Number	Analytical Method[c]
SWMU 154									
CTF-MW2 17-Sep-13	Nitrate plus nitrite as N	ND	0.017	0.050	10.0	U		094646-018	EPA 353.2

Notes

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

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

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

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

Table III-8
Summary of Anion and Alkalinity Results
SWMU 154 Groundwater Monitoring
Quarterly Assessment, July – September 2013

Well	Analyte	Result (mg/L)	MDL (mg/L)	PQL (mg/L)	MCL (mg/L)	Laboratory Qualifier[a]	Validation Qualifier[b]	Sample Number	Analytical Method[c]
SWMU 154									
CTF-MW2	Bicarbonate Alkalinity	1480	0.725	1.00	NE			094646-022	SM2320B
17-Sep-13	Carbonate Alkalinity	ND	0.725	1.00	NE	U		094646-022	SM2320B
	Bromide	1.89	0.067	0.200	NE			094646-016	EPA 9056
	Chloride	453	6.70	20.0	NE			094646-016	EPA 9056
	Fluoride	2.22	0.033	0.100	4.0			094646-016	EPA 9056
	Sulfate	150	13.3	40.0	NE			094646-016	EPA 9056

Notes

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

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

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

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

Table III-9
Summary of Perchlorate Results
SWMU 154 Groundwater Monitoring
Quarterly Assessment, July – September 2013

Well	Perchlorate Result (mg/L)	MDL (mg/L)	PQL (mg/L)	MCL (mg/L)	Laboratory Qualifier[a]	Validation Qualifier[b]	Sample Number	Analytical Method[c]
SWMU 154								
CTF-MW2 17-Sep-13	ND	0.004	0.012	NE	U		094646-020	EPA 314.0

Notes

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

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

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

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

Table III-10

Summary of Unfiltered Total Metal Results

SWMU 154 Groundwater Monitoring

Quarterly Assessment, July – September 2013

Well	Analyte	Result (mg/L)	MDL (mg/L)	PQL (mg/L)	MCL (mg/L)	Laboratory Qualifier[a]	Validation Qualifier[b]	Sample Number	EPA Analytical Method[c]
CTF-MW2	Aluminum	0.118	0.075	0.250	NE	J		094646-009	SW846 6020
17-Sep-13	Antimony	ND	0.001	0.003	0.006	N, U	UJ	094646-009	SW846 6020
	Arsenic	**0.0438**	0.0017	0.005	0.010			094646-009	SW846 6020
	Barium	0.080	0.0006	0.002	2.00		J	094646-009	SW846 6020
	Beryllium	0.00318	0.0002	0.0005	0.004			094646-009	SW846 6020
	Cadmium	ND	0.00055	0.005	0.005	U		094646-009	SW846 6020
	Calcium	367	6.00	20.0	NE			094646-009	SW846 6020
	Chromium	ND	0.010	0.050	0.100	U		094646-009	SW846 6020
	Cobalt	0.00968	0.0005	0.005	NE			094646-009	SW846 6020
	Copper	ND	0.00175	0.005	NE	U		094646-009	SW846 6020
	Iron	2.44	0.165	0.500	NE		J	094646-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		094646-009	SW846 6020
	Magnesium	75.8	0.050	0.150	NE			094646-009	SW846 6020
	Manganese	2.93	0.005	0.025	NE			094646-009	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	U		094646-009	SW846 7470
	Nickel	0.0187	0.0025	0.010	NE			094646-009	SW846 6020
	Potassium	47.4	0.400	1.50	NE			094646-009	SW846 6020
	Selenium	ND	0.0075	0.025	0.050	U		094646-009	SW846 6020
	Silver	ND	0.001	0.005	NE	U		094646-009	SW846 6020
	Sodium	451	8.00	25.0	NE			094646-009	SW846 6020
	Thallium	0.00115	0.00045	0.002	0.002	J		094646-009	SW846 6020
	Uranium	0.0255	0.000067	0.0002	0.03			094646-009	SW846 6020
	Vanadium	0.00386	0.001	0.005	NE	B, J	0.018UJ	094646-009	SW846 6010
	Zinc	0.290	0.0175	0.050	NE	N	J	094646-009	SW846 6020

Table III-10 (Concluded)
Summary of Unfiltered Total Metal Results
SWMU 154 Groundwater Monitoring
Quarterly Assessment, July – September 2013

Notes

[a]Laboratory Qualifier
If cell is blank, then all quality control samples met acceptance criteria with respect to submitted samples.
B = The analyte was detected in the blank above the effective method detection limit (MDL).
J = Estimated value, the analyte concentration fell above the effective MDL and below the effective PQL.
N = Results associated with a spike analysis that was outside control limits.
U = Analyte is absent or below the method detection limit.

[b]Validation Qualifier
If cell is blank, then all quality control samples met acceptance criteria with respect to submitted samples.
J = The associated value is an estimated quantity.
UJ = The analyte was analyzed for, but not detected. The associated value is an estimate and may be inaccurate or imprecise.

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

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

Table III-11
Summary of Filtered Total Metal Results
SWMU 154 Groundwater Monitoring
Quarterly Assessment, July – September 2013

Well	Analyte	Result (mg/L)	MDL (mg/L)	PQL (mg/L)	MCL (mg/L)	Laboratory Qualifier[a]	Validation Qualifier[b]	Sample Number	EPA Analytical Method[c]
CTF-MW2	Aluminum	0.106	0.075	0.250	NE	J		094646-010	SW846 6020
17-Sep-13	Antimony	ND	0.001	0.003	0.006	N, U	UJ	094646-010	SW846 6020
	Arsenic	**0.0448**	0.0085	0.025	0.010			094646-010	SW846 6020
	Barium	0.085	0.0006	0.002	2.00		J	094646-010	SW846 6020
	Beryllium	0.00287	0.001	0.0025	0.004			094646-010	SW846 6020
	Cadmium	ND	0.00055	0.005	0.005	U		094646-010	SW846 6020
	Calcium	378	6.00	20.0	NE			094646-010	SW846 6020
	Chromium	ND	0.010	0.050	0.100	U		094646-010	SW846 6020
	Cobalt	0.00958	0.0005	0.005	NE			094646-010	SW846 6020
	Copper	ND	0.00175	0.005	NE	U		094646-010	SW846 6020
	Iron	2.43	0.165	0.500	NE		J	094646-010	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		094646-010	SW846 6020
	Magnesium	73.8	0.050	0.150	NE			094646-010	SW846 6020
	Manganese	2.84	0.005	0.025	NE			094646-010	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	U		094646-010	SW846 7470
	Nickel	0.0192	0.0025	0.010	NE			094646-010	SW846 6020
	Potassium	45.7	0.400	1.50	NE			094646-010	SW846 6020
	Selenium	ND	0.0075	0.025	0.050	U		094646-010	SW846 6020
	Silver	ND	0.001	0.005	NE	U		094646-010	SW846 6020
	Sodium	473	8.00	25.0	NE			094646-010	SW846 6020
	Thallium	0.00122	0.00045	0.002	0.002	J		094646-010	SW846 6020
	Uranium	0.0246	0.000067	0.0002	0.03			094646-010	SW846 6020
	Vanadium	0.00409	0.001	0.005	NE	B, J	0.018UJ	094646-010	SW846 6010
	Zinc	0.291	0.0175	0.050	NE	N	J	094646-010	SW846 6020

Table III-11 (Concluded)
Summary of Filtered Total Metal Results
SWMU 154 Groundwater Monitoring
Quarterly Assessment, July – September 2013

Notes

[a]Laboratory Qualifier
If cell is blank, then all quality control samples met acceptance criteria with respect to submitted samples.
B = The analyte was detected in the blank above the effective method detection limit (MDL).
J = Estimated value, the analyte concentration fell above the effective MDL and below the effective PQL.
N = Results associated with a spike analysis that was outside control limits.
U = Analyte is absent or below the method detection limit.

[b]Validation Qualifier
If cell is blank, then all quality control samples met acceptance criteria with respect to submitted samples.
J = The associated value is an estimated quantity.
UJ = The analyte was analyzed for, but not detected. The associated value is an estimate and may be inaccurate or imprecise.

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

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

Table III-12

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

SWMU 154 Groundwater Monitoring

Quarterly Assessment, July – September 2013

Well	Analyte	Activity[a] (pCi/L)	MDA (pCi/L)	Critical Level[b] (pCi/L)	MCL (pCi/L)	Laboratory Qualifier[c]	Validation Qualifier[d]	Sample Number	Analytical Method[e]
CTF-MW2 17-Sep-13	Americium-241	10.1 ± 11.7	16.9	8.28	NE	U	BD	094646-033	EPA 901.1
	Cesium-137	1.05 ± 2.05	3.51	1.68	NE	U	BD	094646-033	EPA 901.1
	Cobalt-60	0.396 ± 1.95	3.49	1.63	NE	U	BD	094646-033	EPA 901.1
	Potassium-40	64.2 ± 44.8	30.3	14.1	NE		J	094646-033	EPA 901.1
	Gross Alpha	**23.54**	NA	NA	15 pCi/L	NA	None	094646-034	EPA 900.0
	Gross Alpha (Reanalysis)	**26.94**	NA	NA	15 pCi/L	NA	None	094646-R34	EPA 900.0
	Gross Beta	44.7 ± 10.4	7.85	3.71	4mrem/yr			094646-034	EPA 900.0
	Gross Beta (Reanalysis)	89.3 ± 30.0	24.5	9.86	4mrem/yr			094646-035	HASL-300
	Uranium-233/234	57.3 ± 7.34	0.109	0.0477	NE			094646-035	HASL-300
	Uranium-235/236	0.536 ± 0.134	0.0677	0.0252	NE			094646-035	HASL-300
	Uranium-238	8.52 ± 1.16	0.088	0.037	NE			094646-035	HASL-300

Notes

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

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

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

[d]**Validation Qualifier**
If cell is blank, then all quality control samples met acceptance criteria with respect to submitted samples.
BD = Below detection limit as used in radiochemistry to identify results that are not statistically different from zero.
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-12 (Concluded)

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

SWMU 154 Groundwater Monitoring

Quarterly Assessment, July – September 2013

Notes (continued)

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

Table III-13

Summary of Constituents Detected above Established MCLs

SWMUs 149 and 154 Groundwater Monitoring

Quarterly Assessments through September 2013

Well	Date	Analyte	Result	MCL	Laboratory Qualifier[a]	Validation Qualifier[b]	Sample Number	Analytical Method[c]
SWMU 154								
CTF-MW2	08-Mar-11	Arsenic—Filtered	**0.0544 mg/L**	0.010 mg/L			090237-010	EPA 6020
CTF-MW2 (Duplicate)	08-Mar-11	Arsenic—Filtered	**0.0521 mg/L**	0.010 mg/L			090238-010	EPA 6020
CTF-MW2	31-May-11	Arsenic—Filtered	**0.0528 mg/L**	0.010 mg/L			090670-010	EPA 6020
CTF-MW2	29-Sep-11	Arsenic—Filtered	**0.0610 mg/L**	0.010 mg/L			090670-010	EPA 6020
CTF-MW2	09-Dec-11	Arsenic—Filtered	**0.0495 mg/L**	0.010 mg/L			091525-010	EPA 6020
CTF-MW2	30-Mar-12	Arsenic—Filtered	**0.0498 mg/L**	0.010 mg/L			091949-010	EPA 6020
CTF-MW2 (Duplicate)	30-Mar-12	Arsenic—Filtered	**0.0521 mg/L**	0.010 mg/L			091950-010	EPA 6020
CTF-MW2	19-June-12	Arsenic—Filtered	**0.0276 mg/L**	0.010 mg/L			092538-010	EPA 6020
CTF-MW2	25-Sept-12	Arsenic—Filtered	**0.0494 mg/L**	0.010 mg/L			092862-010	EPA 6020
CTF-MW2	18-Dec-12	Arsenic—Filtered	**0.0536 mg/L**	0.010 mg/L		J-	093251-010	EPA 6020
CTF-MW2	26-Mar-13	Arsenic—Filtered	**0.0496 mg/L**	0.010 mg/L			093723-010	EPA 6020
CTF-MW2 (Duplicate)	26-Mar-13	Arsenic—Filtered	**0.0463 mg/L**	0.010 mg/L			093724-010	EPA 6020
CTF-MW2	25-Jun-13	Arsenic – Filtered	**0.0477 mg/L**	0.010 mg/L			094042-010	EPA 6020
CTF-MW2	17-Sep-13	Arsenic – Filtered	**0.0488 mg/L**	0.010 mg/L			094646-010	EPA 6020
CTF-MW2	08-Mar-11	Arsenic—Unfiltered	**0.0595 mg/L**	0.010 mg/L			090237-009	EPA 6020
CTF-MW2	31-May-11	Arsenic—Unfiltered	**0.0496 mg/L**	0.010 mg/L			090670-009	EPA 6020
CTF-MW2	29-Sep-11	Arsenic—Unfiltered	**0.0651 mg/L**	0.010 mg/L			091259-009	EPA 6020
CTF-MW2	09-Dec-11	Arsenic—Unfiltered	**0.0469 mg/L**	0.010 mg/L			091525-009	EPA 6020
CTF-MW2	30-Mar-12	Arsenic—Unfiltered	**0.0498 mg/L**	0.010 mg/L			091949-009	EPA 6020
CTF-MW2 (Duplicate)	30-Mar-12	Arsenic—Unfiltered	**0.0559 mg/L**	0.010 mg/L			091950-009	EPA 6020
CTF-MW2	19-June-12	Arsenic—Unfiltered	**0.0433 mg/L**	0.010 mg/L			092538-009	EPA 6020
CTF-MW2	25-Sept-12	Arsenic—Unfiltered	**0.0535 mg/L**	0.010 mg/L			092862-009	EPA 6020
CTF-MW2	18-Dec-12	Arsenic—Unfiltered	**0.0516 mg/L**	0.010 mg/L		J-	093251-009	EPA 6020
CTF-MW2	26-Mar-13	Arsenic—Unfiltered	**0.0456 mg/L**	0.010 mg/L			093723-009	EPA 6020
CTF-MW2 (Duplicate)	26-Mar-13	Arsenic—Unfiltered	**0.0444 mg/L**	0.010 mg/L			093724-009	EPA 6020
CTF-MW2	25-Jun-13	Arsenic—Unfiltered	**0.046 mg/L**	0.010 mg/L			094042-009	EPA 6020
CTF-MW2	17-Sep-13	Arsenic—Unfiltered	**0.0438 mg/L**	0.010 mg/L			094646-009	EPA 6020
CTF-MW2	31-May-11	Gross Alpha	**23.38 pCi/L**	15 pCi/L			090670-010	EPA 900.0
CTF-MW2	17-Sep-13	Gross Alpha	**23.54 pCi/L**	15 pCi/L	NA	None	094646-034	EPA 900.0
CTF-MW2 (Reanalysis)	17-Sep-13	Gross Alpha	**26.94 pCi/L**	15 pCi/L	NA	None	094646-R34	EPA 900.0
CTF-MW2	08-Mar-11	Thallium—Unfiltered	**0.00249 mg/L**	0.002 mg/L	J		090237-009	EPA 6020

Table III-13 (Concluded)

Summary of Constituents Detected above Established MCLs

SWMUs 149 and 154 Groundwater Monitoring

Quarterly Assessments through September 2013

Notes

[a]Laboratory Qualifier
If cell is blank, then all quality control samples met acceptance criteria with respect to submitted samples.
J = Estimated value, the analyte concentration fell above the effective MDL and below the effective PQL.
NA = Not applicable.

[b]Validation Qualifier
If cell is blank, then all quality control samples met acceptance criteria with respect to submitted samples.
J- = The associated numerical value is an estimated quantity with a suspected negative bias.
None = No data validation for corrected gross alpha activity.

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

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

Appendix A
Field Measurement Logs for Monitoring Well CTF-MW2

FIELD MEASUREMENT LOG FOR GROUNDWATER SAMPLE COLLECTION

Project Name: SWMU 154	Project No.: 146422.10.11.01
Well I.D.: CTF-MW~~2~~ 12	Date: 09/17/13
Well Condition:	Weather Condition:
Method: Portable pump X	Dedicated pump _____ Pump depth: 129'

PURGE MEASUREMENTS

Depth to Water (ft)	Time 24 hr	Vol. (L/gal)	Temp (°C)	SC (µS/cm)	ORP (mV)	pH	Turbidity (NTU)	DO (%)	Comments DO mg/L
43.92	0755	/	START						
47.22	0809	5	18.11	3788	50.4	5.94	4.30	5.3	0.49
47.79	0817	10	17.63	3832	18.6	5.91	1.61	4.4	0.42
47.98	0825	15	17.62	3845	6.6	5.90	1.12	4.1	0.39
48.05	0832	20	17.79	3850	13.7	5.91	1.15	3.9	0.37
48.07	0841	25	18.03	3855	17.5	5.92	1.50	3.8	0.35
47.95	0851	30	18.24	3856	19.1	5.94	1.42	3.6	0.33
47.83	0901	35	18.44	3854	18.8	5.97	1.26	3.5	0.32
47.74	0908	38	18.52	3873	18.1	5.99	0.88	3.4	0.31
47.72	0912	40	18.62	3879	17.8	5.99	1.08	3.4	0.31
47.72	0918	42	18.69	3880	17.6	5.99	1.09	3.3	0.31
47.72	0922	44	18.64	3871	18.6	5.99	1.08	3.3	0.31
	0923	/	SAMPLING						
									~4.00 gals purged from tubing
									0802

GROUNDWATER SAMPLE COLLECTION FIELD EQUIPMENT CHECK LOG

SNL/NM Project Name: SWMU 154	SNL/NM Project No.: 146422.10.11.01
Calibrations done by: R LYNCH	Date: 09/17/13

Make & Model: YSI 6920V2

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

YSI 650 MDS (S/N): N/A

pH Calibration

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

Reference value:	4.00		7.00		10.00	
	Value	Temp	Value	Temp	Value	Temp
1. Time: 0633	4.02	20.9	7.01	20.9	10.00	20.9
2. Time: 1047	4.01	20.9	7.00	21.1	10.01	21.0
3. Time:						
4. Time:						
Standard lot no.:	3AD782		3AE725		3AD357	
Expiration date:	APR-15		MAY-15		APR-15	

SC Calibration

Reference Value: 1413 uS — Standard Lot No.: 3AE221

Expiration Date: MAY-15

	Value	Temp
1. Time: 0635	1417	20.9
2. Time: 1049	1419	21.0
3. Time:		
4. Time:		

ORP Calibration

Reference Value: 200 mV — Standard Lot No. 1305755

Expiration Date: JAN-14

	Value	Temp
1. Time: 0634	199.7	20.7
2. Time: 1048	199.8	21.0
3. Time:		
4. Time:		

DO Calibration

Calibration Value:	81% air saturation @ 5200 ft.	Atmospheric Pressure in Hg
1. Time: 0632	81.4	24.45
2. Time: 1046	81.6	24.46
3. Time:		
4. Time:		

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

SNL/NM Project Name: SWMU 154	Project No.: 146422.10.11.01
Calibration done by: R LYNCH	Date: 09/17/13

TURBIDIMETER

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

Reference Value	RL ~~1~~ 10	20	100	800
Standard Lot No.	0161	0167	0168	0161
1. Time 0750	10.4	20.2	99.8	799
2. Time 0942	10.1	19.9	99.6	801
3. Time				
4. Time				

Comments:

Portable Pump and Tubing / Water Level Indicator
Decontamination Log Form

Project Name: SWMU-154	**Monitoring Well ID # :** CTF-MW2	**Date:** 9-17-13

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

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

Condition of Equipment

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

List of Decontamination Materials

Distilled or **Deonized** (circle one)	**HNO_3**
Source: Culligan	**Grade:** Reagent
Lot Number: 8-27-13	**UN #:** 2031
	Manufacturer: AROC
	Lot Number: A0305629

Groundwater Monitoring Waste Generation Log

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

Project Name	SWMU-154	SWMU-154	SWMU-154
Container ID # (site-date-sequence)	SWMU-CTF-MW2-091713-01	SWMU-CTF-MW2-091713-02	SWMU-091713
Initial Label Type (Hazardous or Non-Regulated)	Non- Regulated	Non- Regulated	Non- Regulated
Waste Matrix (purge water, decon water, HACH Accu-Vac ampule)	Purge Water	Purge Water	Decon Water
Container Type / Volume	CHPD/ 55 gal.	CHPD/ 55 gal.	CHPD/ 55 gal.
Volume of Waste	~24 gal.	~ 24 gal.	~ 30 gal.
Total Container Weight	~ 190 lbs.	~ 190 lbs.	~ 240 lbs.
COC#: Sample#-Fraction	CoC# 615029, 615030 Sample # 094646	CoC# 615029, 615030 Sample # 094646	CoC# 615029, 615030 Sample # 094646
Accumulation Date	Start: 9-17-13 Full: 9-17-13	Start: 9-17-13 Full: 9-17-13	Start: 9-17-13 Full: 9-17-13
Date Waste Moved to Accumulation Area	9-17-13	9-17-13	9-17-13
Accumulation Area Name	9925	9925	9925
Comments:			

TAILGATE SAFETY MEETING FORM

Dept: 4142 Well Location: CTF-MW ~~3~~ 2 (EL) Date: 09/17/13 Time: 0748

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

Weather Conditions:
Temp: 71.2 °F Wind Speed: 0 MPH Humidity: 65.2% Wind Chill N/A °F

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

Safety Topics Presented

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

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

Attendees

Printed Name	Signature
Robert Lynch	Robert Lynch
William Gibson	William Gibson
ALFRED SANTILLANES	Alfred Santillanes

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

Appendix B
Analytical Laboratory Certificates of Analysis for Monitoring Well CTF-MW2 Groundwater Data

SMO 2012-ARCOC (4-2012)

AOP 95-16

CONTRACT LABORATORY
ANALYSIS REQUEST AND CHAIN OF CUSTODY

Internal Lab

Batch No.

SMO Use

AR/COC 615029

Project Name:	SWMU 154 GWM	Date Samples Shipped:	9/17/13	SMO Authorization:	Don Hoggan
Project/Task Manager:	Clinton Lum	Carrier/Waybill No.		SMO Contact Phone:	Lorraine Herrera/505-844-3199
Project/Task Number:	146422.10.11.01	Lab Contact:	Edie Kent/803-556-8171	Send Report to SMO:	Rita Kavanaugh/505-284-2553
Service Order:	CF353-14	Lab Destination:	GEL		
		Contract No.:	PO 1303873		

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

Tech Area:

Building: Room: Operational Site:

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

Sample No.	Fraction	Sample Location Detail	Depth (ft)	Date/Time Collected	Sample Matrix	Container Type	Container Volume	Preservative	Collection Method	Sample Type	Parameter & Method Requested	Lab Sample ID
094646	-001	CTF-MW2	129	9/17/13 9:23	GW	G	3x40ml	HCL	G	SA	TCL VOC (SW846-8260B)	
094646	-002	CTF-MW2	129	9/17/13 9:24	GW	AG	4x1L	None	G	SA	TCL SVOC (SW846-8270C)	
094646	-009	CTF-MW2	129	9/17/13 9:26	GW	P	500 ml	HNO3	G	SA	TAL Metals+U(SW846-6010/6020/7470)	
094646	-010	CTF-MW2	129	9/17/13 9:28	FGW	P	500 ml	HNO3	G	SA	TAL Metals+U(SW846-6010/6020/7470)	
094646	-016	CTF-MW2	129	9/17/13 9:29	GW	P	125 ml	None	G	SA	Anions (SW846-9056)	
094646	-018	CTF-MW2	129	9/17/13 9:30	GW	P	125 ml	H2SO4	G	SA	NPN (EPA 353.2)	
094646	-020	CTF-MW2	129	9/17/13 9:31	GW	P	250 ml	None	G	SA	Perchlorate (EPA 314.0)	
094646	-022	CTF-MW2	129	9/17/13 9:32	GW	P	500 ml	None	G	SA	Alkalinity (SM2320B)	
094646	-024	CTF-MW2	129	9/17/13 9:33	GW	AG	4x1L	None	G	SA	High Explosives(SW846-8321A mod.	
094646	-033	CTF-MW2	129	9/17/13 9:35	GW	P	1 L	HNO3	G	SA	Gamma Spectroscopy (EPA 901.0)	

Last Chain: ☑ Yes

Validation Req'd: ☑ Yes

Background: ☐ Yes

Confirmatory: ☐ Yes

Sample Tracking (SMO Use)

Date Entered:

Entered by:

QC Inits.:

Special Instructions/QC Requirements:

EDD ☑ Yes ☐ No

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

Negotiated TAT ☐

Sample Disposal ☐ Return to Client ☑ Disposal by Lab

Return Samples By:

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

CTF-MW2 water has high buffering capacity,please check pH and add preservitives as needed.If perchlorate detected, then perform verification analysis using SW846-6850.Report anions as Br,Cl,F,SO4.Report Alkalinity as total CaCO3,HCO3,CO3. Report gamma Spec for short list isotopes.

Conditions on Receipt

Lab Use

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

1.Relinquished by	Alfred Santillanes	Org.	4142	Date	9/17/13	Time	10:04	3.Relinquished by	Org. Date Time
1. Received by	Don Hoggan	Org.	4142	Date	9/17/13	Time	1004	3. Received by	Org. Date Time
2.Relinquished by		Org.		Date		Time		4.Relinquished by	Org. Date Time
2. Received by		Org.		Date		Time		4. Received by	Org. Date Time

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

SMO 2012-ARCOC (4-2012)

CONTRACT LABORATORY
ANALYSIS REQUEST AND CHAIN OF CUSTODY (Continuation)

AOP 95-16

AR/COC 615029

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

Sample No.	Fraction	Sample Location Detail	Depth (ft)	Date/Time Collected	Sample Matrix	Container Type	Container Volume	Preservative	Collection Method	Sample Type	Parameter & Method Requested	Lab use Lab Sample ID
094646	-034	CTF-MW2	129	9/17/13 9:36	GW	P	1 L	HNO3	G	SA	Gross Alpha and Beta (EPA 900.0)	
094646	-035	CTF-MW2	129	9/17/13 9:37	GW	P	1 L	HNO3	G	SA	Isotopic Uranium (HASL 300)	
094647	-001	CTF-TB1	NA	9/17/13 9:23	DIW	G	3x40ml	HCL	G	TB	TCL VOC (SW846-8260B)	

Recipient Initials_____

SMO 2012-ARCOC (4-2012)

AOP 95-16

CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY

Internal Lab

Batch No.

SMO Use

AR/COC 615030

Project Name:	SWMU 154 GWM	Date Samples Shipped:	9/17/13	SMO Authorization:	Don Lum
Project/Task Manager:	Clinton Lum	Carrier/Waybill No.		SMO Contact Phone:	Lorraine Herrera/505-844-3199
Project/Task Number:	146422.10.11.01	Lab Contact:	Edie Kent/803-556-8171	Send Report to SMO:	Rita Kavanaugh/505-284-2553
Service Order:	CF353-14	Lab Destination:	GEL	☑ Waste Characterization ☐ RMMA ☐ Released by COC No.	☑ 4° Celsius
Tech Area:		Contract No.:	PO 1303873	Bill to: Sandia National Laboratories (Accounts Payable), P.O. Box 5800, MS-0154 Albuquerque, NM 87185-0154	
Building:	Room:	Operational Site:			

Sample No.	Fraction	Sample Location Detail	Depth (ft)	Date/Time Collected	Sample Matrix	Container Type	Container Volume	Preservative	Collection Method	Sample Type	Parameter & Method Requested	Lab Sample ID
094646	-011	CTF-MW2	NA	9/17/13 9:16	FPW	G	~~8x40ml~~ 500 ml	HNO3	G	WC	Arsenic (SW846-6020)	

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

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

Special Instructions/QC Requirements:

EDD ☑ Yes ☐ No

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

Negotiated TAT ☐

Sample Disposal ☐ Return to Client ☑ Disposal by Lab

Return Samples By:

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

Conditions on Receipt

1. Relinquished by	Alfred Santillanes	Org. 4142	Date 9/17/13	Time 10:06	3. Relinquished by	Org.	Date	Time
1. Received by	Don Lum	Org. 4142	Date 9/17/13	Time 10:06	3. Received by	Org.	Date	Time
2. Relinquished by		Org.	Date	Time	4. Relinquished by	Org.	Date	Time
2. Received by		Org.	Date	Time	4. Received by	Org.	Date	Time

Lab Use

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

Appendix C
Data Validation Sample Findings Summary Sheets for Monitoring Well CTF-MW2 Groundwater Data

ANALYTICAL QUALITY ASSOCIATES, INC.

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

Memorandum

Date: November 14, 2013

To: File

From: Linda Thal

Subject: Radiochemical Data Review and Validation – SNL
Site: SWMU 154 GWM
AR/COC: 615029 reanalysis
SDG: 336634
Laboratory: GEL
Project/Task: 146422.10.11.01
Analysis: RAD

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

Summary

One sample was re-prepared and re-analyzed with approved procedures using method EPA 900.0 (gross alpha/beta). No problems were identified with the data package that resulted in the qualification of data.

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

Holding Times and Preservation

The sample was prepared and analyzed within the prescribed holding times. The sample was received at the laboratory with a pH >3 and was acidified by the laboratory.

Quantification

All quantification criteria were met.

Calibration

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

Blanks

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

Tracer/Carrier Recovery

Tracer/carriers were not required.

Matrix Spike/Matrix Spike Duplicate (MS/MSD)

The MS/MSD met all QC acceptance criteria.

Laboratory Replicate

All replicate error ratio acceptance criteria were met.

Laboratory Control Sample (LCS)

All LCS recoveries met QC acceptance criteria.

Detection Limits/Dilutions

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

Other QC

Sample 336634001 (094646-R34) is a relog of sample 335568010 (094646-034).

No other specific issues that affect data quality were identified.

Reviewed by: Monica Dymerski **Level I** **Date:** 11/15/13

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

Memorandum

Date: October 21, 2013

To: File

From: Linda Thal

Subject: Inorganic Data Review and Validation – SNL
Site: SWMU 154 GWM
AR/COC: 615029
SDG: 333568
Laboratory: GEL
Project/Task: 146422.10.11.01
Analysis: General Chemistry

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

Summary

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

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

Holding Times and Preservation

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

Calibration

All initial and continuing calibration met QC acceptance criteria.

Blanks

No target analytes were detected in the blanks.

Laboratory Control Sample (LCS)

All LCS acceptance criteria were met.

Matrix Spike (MS)

All MS/PS recoveries met QC acceptance criteria.

Laboratory Replicate

The replicate analyses met all QC acceptance criteria.

Detection Limits/Dilutions

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

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

Other QC

No other specific issues that affect data quality were identified.

Reviewed by: Monica Dymerski **Level I** **Date:** 10/21/13

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

Memorandum

Date: October 21, 2013

To: File

From: Linda Thal

Subject: Inorganic Data Review and Validation – SNL
Site: SWMU 154 GWM
AR/COC: 615029
SDG: 333568 and 333569
Laboratory: GEL
Project/Task: 146422.10.11.01
Analysis: Metals

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

Summary

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

ICP-MS:

1. The MS %Rs for Ba and Fe were < the LAL. The parent sample results were >4X the spike amounts and, therefore, the associated sample results will not be qualified for these failing recoveries. The associated sample results were detects and will be **qualified J,MS1** due to lack of matrix specific accuracy information.

2. The MS %R was <75% but ≥30% for Sb. The associated sample results were NDs and will be **qualified UJ,MS3.**

3. The MS %R for Zn was > 125%. The associated sample results were detects and will be **qualified J,MS2**.

ICP-AES:

1. V was detected at < the PQL in the MB and CCBs bracketing the samples**.** The associated sample results were detects <5X the highest blank value and will be **qualified 0.018U,B,B3** at 5X the highest blank.

2. The CRI %R was >130% for V. The associated sample results were detects and will be **qualified J,DL2**.

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

Holding Times and Preservation

The samples were prepared and analyzed within the prescribed holding times. The samples were received at the laboratory with a pH >3 and were acidified by the laboratory.

ICP-MS Instrument Tune

The ICP-MS tunes met QC acceptance criteria.

Calibration

All initial and continuing calibration met QC acceptance criteria.

Reporting Limit Verification

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

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

Blanks

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

ICP -MS Internal Standards

The ICP-MS internal standards met QC acceptance criteria.

Matrix Spike (MS)

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

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

ICP-MS and ICP-AES:
It should be noted that the MS was performed on a sample of similar matrix from another SNL SDG. No sample data will be qualified as a result.

Laboratory Replicate

The replicates met all QC acceptance criteria.

ICP-MS and ICP-AES:
It should be noted that the replicate was performed on a sample of similar matrix from another SNL SDG. No sample data will be qualified as a result.

Laboratory Control Sample (LCS)

The LCS met all QC acceptance criteria.

Detection Limits/Dilutions

All detection limits were properly reported. Both samples were diluted 100X for Ca and Na and 5X for Al, As, Be, Cd, Cr, Co, Cu, Mg, Mn, Ni, K, Se, Ag, Zn and Fe.

ICP Interference Check Sample (ICS A and AB)

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

ICP-MS:
Results of the ICS A and AB analyses were evaluated and applied to the 1X analyses of samples 333568003 and 333569001 because the sample concentrations of Ca were > those in the ICS solution. All acceptance criteria were met

ICP Serial Dilution

The serial dilutions met all QC acceptance criteria.

ICP-MS and ICP-AES:
It should be noted that the MS was performed on a sample of similar matrix from another SNL SDG. No sample data will be qualified as a result.

Other QC

No other specific issues that affect data quality were identified.

Reviewed by: Monica Dymerski **Level I** **Date:** 10/21/13

ANALYTICAL QUALITY ASSOCIATES, INC.

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

Memorandum

Date: October 21, 2013

To: File

From: Linda Thal

Subject: LC/MS/MS Organic Data Review and Validation – SNL
Site: SWMU 154 GWM
AR/COC: 615029
SDG: 333568
Laboratory: GEL
Project/Task: 146422.10.11.01
Analysis: High Explosives (HE)

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

Summary

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

1. The ICAL RF for p-nitrotoluene was <0.05 but ≥0.01. The associated sample result was ND and will be **qualified UJ,I4.**

2. The MS/MSD RPDs were > laboratory acceptance limits for m-nitrotoluene, RDX, p-nitrotoluene and HMX. The sample result for RDX was a detect and will be **qualified J,MS5**. The remaining associated sample results were NDs and will be **qualified UJ,MS5**.

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

Holding Times

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

Instrument Tune

The instrument tune was not reported or evaluated.

Calibration

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

The CCV %Ds were >20% with positive bias for HMX; 2,4,6-trinitrotoluene; 4-amino-2,6-dinitrotoluene and PETN. The associated sample results were NDs and will not be qualified.

Reporting Limit Verification

All CRI recoveries met QC acceptance criteria.

Blanks

No target analytes were detected in the blanks.

Surrogates

All surrogate recoveries met QC acceptance criteria.

Internal Standards

All internal standards met QC acceptance criteria.

Matrix Spike/Matrix Spike Duplicate (MS/MSD)

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

The MSD %R was > the laboratory UAL for m-nitrotoluene. The associated sample result was ND and will not be qualified.

Laboratory Control Sample (LCS)

All LCS recoveries met QC acceptance criteria.

Detection Limits/Dilutions

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

Other QC

No other specific issues that affect data quality were identified.

Reviewed by: Monica Dymerski **Level I** **Date:** 10/21/13

Sample Findings Summary

AR/COC: 615029

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

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

SECTION IV
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LIST OF TABLES (Concluded)

APPENDICES

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

1.0 Introduction

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

The eighth of eight quarterly groundwater sampling events occurred in July 2013 for Coyote Canyon Blast Area (CCBA) monitoring wells CCBA-MW1 and CCBA-MW2, located within SWMUs 8/58, and Old Burn Site (OBS) monitoring wells, OBS-MW1, OBS-MW2, and OBS-MW3, located within SWMU 68. These monitoring wells were installed in August 2011 (SNL/NM November 2011). The location of CCBA monitoring wells are shown Figure IV-1, and OBS monitoring wells in Figure IV-2.

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

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

Monitoring wells CCBA-MW1 and CCBA-MW2 were sampled on July 16 and July 15, 2013, respectively. The samples were analyzed for the required constituents, consisting of volatile organic compounds (VOCs), semivolatile organic compounds (SVOCs), high explosive (HE) compounds, nitrate plus nitrite (NPN), major anions (i.e., bromide, chloride, fluoride, and sulfate), major cations (i.e., calcium, magnesium, potassium, and sodium), alkalinity, Target Analyte List (TAL) metals plus uranium, perchlorate, total cyanide, radionuclides by gamma spectroscopy, gross alpha/beta activity, and isotopic uranium.

Monitoring wells OBS-MW1, OBS-MW2, and OBS-MW3 were sampled from July 9 to July 11, 2013. The samples were analyzed for the required constituents, consisting of VOCs, SVOCs, HE compounds, NPN, major anions, major cations, alkalinity, TAL metals plus uranium, hexavalent chromium, perchlorate, total cyanide, radionuclides by gamma spectroscopy, gross alpha/beta activity, and isotopic uranium.

Analytical results for the groundwater samples were compared with the U.S. Environmental Protection Agency (EPA) maximum contaminant levels (MCLs) for drinking water (EPA 2009). Except for fluoride, none of the analytical results for the groundwater samples from SWMUs 8/58 exceed the MCLs. Fluoride was detected above the established MCL of 4.0 milligrams per liter (mg/L) in the CCBA-MW1 environmental and duplicate samples at concentrations of 4.78 mg/L and 4.82 mg/L, respectively. Fluoride in the CCBA-MW2 environmental sample was above the method detection limit (MDL) at a concentration of 1.61 mg/L.

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

2.0 Field Methods and Measurements

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

2.1 Equipment Decontamination

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

2.2 Well Evacuation

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

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

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

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

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

2.3 Groundwater Sample Collection

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

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

3.0 Analytical Results

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

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

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

3.1 Field Water Quality Measurements

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

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

3.2 Volatile Organic Compounds

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

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

3.3 Semivolatile Organic Compounds

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

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

3.4 High Explosive Compounds

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

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

3.5 Nitrate Plus Nitrite

SWMUs 8/58, Monitoring Wells CCBA-MW1 and CCBA-MW2. Table IV-6 summarizes NPN results. NPN was not detected above the MCL of 10 mg/L in any groundwater sample. NPN was reported at a maximum concentration of 3.62 mg/L in the CCBA-MW2 environmental sample.

SWMU 68, Monitoring Wells OBS-MW1, OBS-MW2, and OBS-MW3. Table IV-6 summarizes NPN results. NPN was not detected above the MCL of 10 mg/L in any groundwater sample. NPN was reported at a maximum concentration of 1.95 mg/L in the OBS-MW1 environmental sample.

3.6 Anions and Alkalinity

SWMUs 8/58, Monitoring Wells CCBA-MW1 and CCBA-MW2. Table IV-7 summarizes alkalinity, major anion (i.e., bromide, chloride, fluoride, and sulfate), and total cyanide results. Fluoride was detected above the established MCL of 4.0 mg/L in the CCBA-MW1 environmental sample and duplicate environmental sample at concentrations of 4.78 mg/L and 4.82 mg/L, respectively. This detection is most likely attributable to the mineralization of the Precambrian bedrock in which the well is completed and not associated with SNL/NM testing activities. Fluoride was reported in the CCBA-MW2 environmental sample at a concentration of 1.61 mg/L. No other anions or total cyanide were detected above established MCLs. There are no established MCLs for bromide, chloride, sulfate, or alkalinity.

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

3.7 Perchlorate

SWMUs 8/58, Monitoring Wells CCBA-MW1 and CCBA-MW2. Perchlorate was not detected above the NMED-specified screening level/MDL of 4.0 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, Monitoring Wells OBS-MW1, OBS-MW2, and OBS-MW3. Perchlorate was not detected above the NMED-specified screening level/MDL of 4 µg/L (0.004 mg/L) in any groundwater sample from SWMU 68. Table IV-8 presents perchlorate results.

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

3.8 Hexavalent Chromium

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

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

3.9 Metals

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

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

3.10 Cations

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

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

3.11 Gamma Spectroscopy and Radioisotopic Analyses

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

Gross alpha activity is measured as a screening tool. In accordance with Title 40, Code of Federal Regulations, Parts 9, 141, and 142, Table I-4, gross alpha activity measurements were corrected by subtracting out the uranium activity, which is measured independently (see Tables IV-10 and IV-11 for total uranium results).

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

The corrected gross alpha activity was below the MCL of 15 picocuries per liter (pCi/L) in all samples. Gross beta activity results do not exceed established MCLs.

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

The corrected gross alpha activity is below the MCL of 15 pCi/L in all samples. Gross beta activity results do not exceed established MCLs.

3.12 Sample Results Exceeding Maximum Contaminant Levels

Table IV-14 lists the results for all constituents that have been detected at concentrations exceeding the EPA MCLs (EPA 2009) during the eight quarterly sampling events at SWMUs 8/58 and 68. The only constituent that is exceeding the MCLs in samples collected during this quarter is fluoride, detected in the CCBA-MW1 environmental and duplicate samples. Fluoride detected in the CCBA-MW1samples is most likely from the mineralized Precambrian bedrock in which the well is completed and not associated with SNL/NM testing activities.

4.0 Quality Control Samples

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

4.1 Field Quality Control Samples

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

4.1.1 Duplicate Environmental Samples

Duplicate environmental samples were collected from monitoring wells CCBA-MW1 and OBS-MW2 and analyzed to estimate the overall reproducibility of the sampling and analytical process. The duplicate environmental samples were collected immediately after the original environmental sample to reduce variability caused by time and/or sampling mechanics. Duplicate environmental samples were analyzed for all parameters.

Table IV-15 summarizes the results for duplicate sample analyses and calculated relative percent difference (RPD) values for monitoring wells CCBA-MW1 and OBS-MW2. RPD values were calculated only for detected chemical parameters. The work plans for SWMUs 8/58 and 68 do not specify QC acceptance criteria for duplicate environmental sample data; however, duplicate sample results show good correlation (RPD values of less than 20 for organic compounds and less than 35 for inorganic analytes) for all calculated parameters, except nickel for OBS-MW2. The RPD for nickel was calculated

at 47 and is an estimated value, as nickel was reported below the practical quantitation limit in both the environmental and environmental duplicate.

4.1.2 Equipment Blank Samples

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

SWMUs 8/58, Monitoring Well CCBA-MW1. Cadmium, chloroform, chloride, and copper were detected above the laboratory MDLs. No corrective action was necessary, except for copper, since these analytes were not detected in environmental samples, or were detected in environmental samples at concentrations greater than five times the EB result. The copper values reported in environmental samples were qualified as not detected during data validation, since copper was reported in the EB sample at a concentration greater than reported environmental samples.

SWMU 68, Monitoring Well OBS-MW3. Acetone, chloroform, and copper were detected above laboratory MDLs. No corrective action was necessary, for parameters except copper, since these analytes were not detected in environmental samples. Copper was detected in the EB sample at concentration higher than values reported for the associated environmental samples. Therefore, copper was qualified as not detected during data validation in both environmental and duplicate environmental samples.

4.1.3 Trip Blank Samples

TB samples are submitted whenever samples are collected for VOC analyses to assess whether contamination of the samples has occurred during shipment and storage. TB samples consist of laboratory reagent-grade water with hydrochloric acid preservative contained in 40-mL volatile organic analysis vials prepared by the analytical laboratory,

which accompany the empty sample containers supplied by the laboratory. TBs were brought to the field and accompanied each sample shipment.

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

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

4.1.4 Field Blank Samples

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

SWMUs 8/58, Monitoring Well CCBA-MW2. The VOC chloroform was detected above laboratory MDLs. No corrective action was required, since this compound was not detected in the associated environmental sample.

SWMU 68, Monitoring Well OBS-MW3. The VOC chloroform was detected above laboratory MDLs. No corrective action was necessary, since this compound was not detected in the associated environmental samples.

4.2 Laboratory Quality Control Samples

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

All data are determined to be acceptable and reported QC measures are adequate. No significant data quality problems were noted. The data validation sample findings summary sheets are provided in Appendix C.

4.3 Variances and Nonconformances

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

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

5.0 Summary

During the Third Quarter of CY 2013, samples were collected from SWMUs 8/58 monitoring wells CCBA-MW1 and CCBA-MW2, and SWMU 68 monitoring wells OBS-MW1, OBS-MW2, and OBS-MW3. Sampling results were compared with EPA MCL guidelines for drinking water (EPA 2009).

Analytical parameters for monitoring wells CCBA-MW1 and CCBA-MW2 consist of VOCs, SVOCs, HE compounds, NPN, major anions, major cations, alkalinity, TAL metals plus uranium, perchlorate, total cyanide, radionuclides by gamma spectroscopy, gross alpha/beta activity, and isotopic uranium. No parameters were detected above established MCLs, except for fluoride in CCBA-MW1. Fluoride was detected above the established MCL of 4.0 mg/L in the monitoring well CCBA-MW1 environmental and duplicate sample at concentrations of 4.78 mg/L and 4.82 mg/L, respectively. This detection is similar to historical concentrations and is most likely attributable to the mineralization of the Precambrian bedrock in which the well is completed. Fluoride is not a site contaminant of concern and is not associated with SNL/NM testing activities.

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

6.0 References

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DOE, see U.S. Department of Energy.

EPA, see U.S. Environmental Protection Agency.

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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.

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Figures

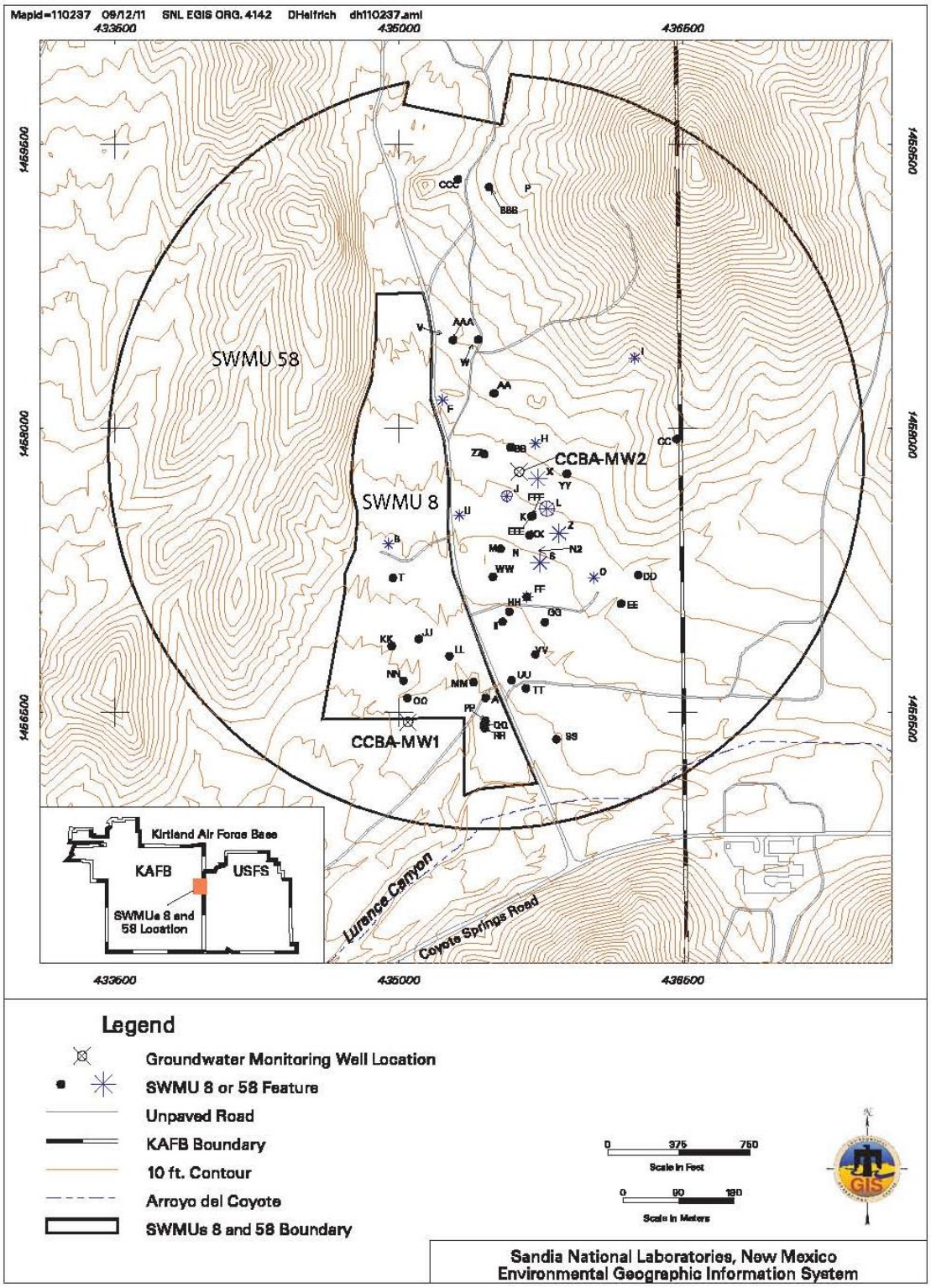

Figure IV-1

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

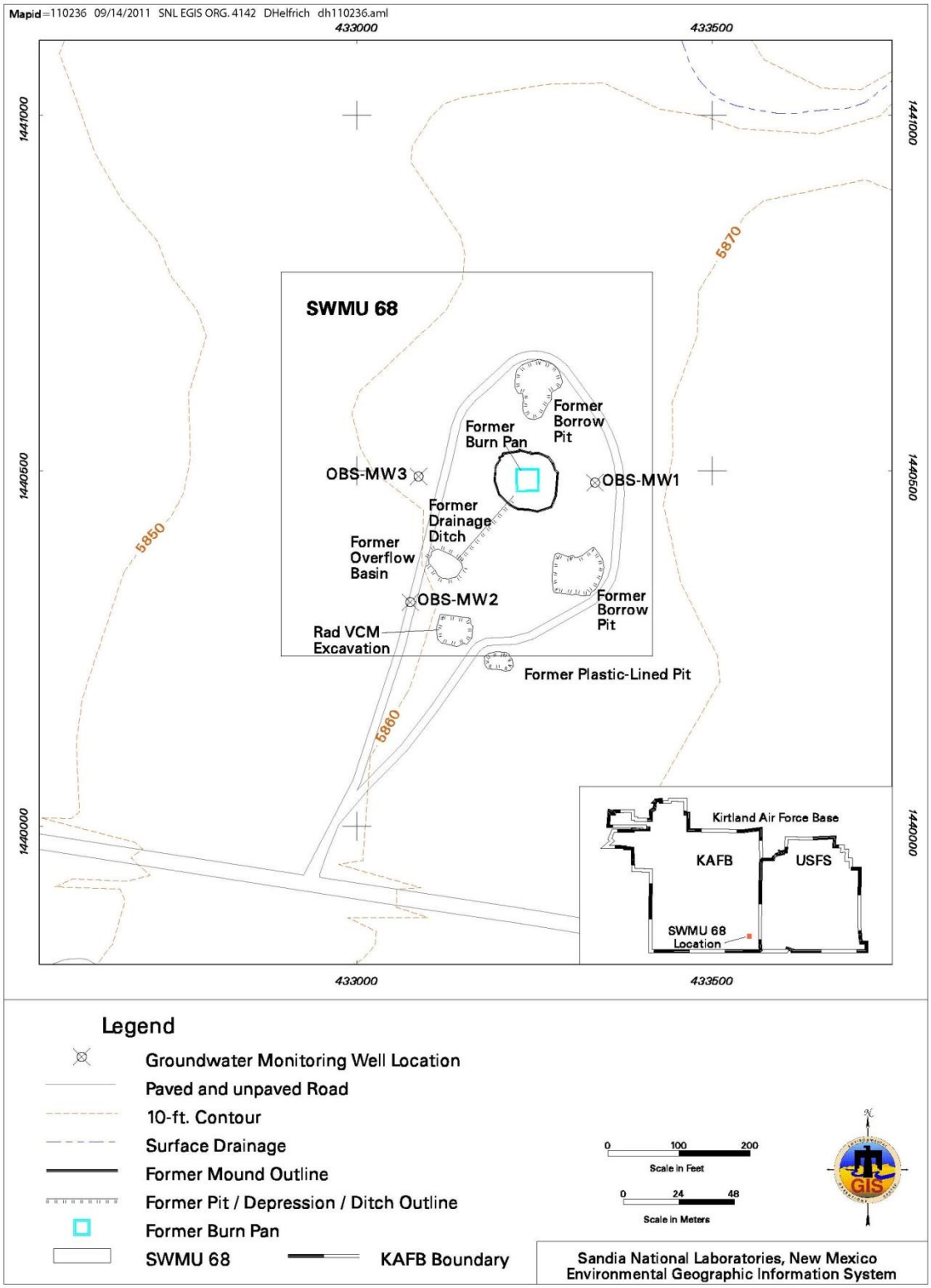

Figure IV-2

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

Tables

Table IV-1

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

Analysis	Analytical Method[a]	Volume and Container Type/ Preservation Requirements
Volatile Organic Compounds	EPA 8260B	3 x 40-mL glass, HCL, 4°C
Semivolatile Organic Compounds	EPA 8270C	3 x 1-L Amber Glass, 4°C
High Explosives	EPA 8321A	4 x 1-L Amber Glass, 4°C
Metals[b]	EPA 6010/6020/7470	1 x 500-mL polyethylene, HNO_3, 4°C
Hexavalent Chromium	EPA 7196A	1 x 250-mL polyethylene, 4°C
Perchlorate	EPA 314.0	1 x 250-mL polyethylene, 4°C
Major Anions and Cations[c]	EPA 6020/9056	1 x 500-mL polyethylene, 4°C
Alkalinity as Total, Carbonate, and Bicarbonate	SM 2320B	1 x 500-mL polyethylene, 4°C
Total Cyanide	EPA 9012	1 x 250-mL polyethylene, NaOH, 4°C
Nitrate plus Nitrite as Nitrogen	EPA 353.2	1 x 250-mL polyethylene, H_2SO_4, 4°C
Gross Alpha/Beta	EPA 900.0	1 x 1-L polyethylene, HNO_3, 4°C
Gamma Spectroscopy[d]	EPA 901.0	1 x 1-L polyethylene, HNO_3, 4°C
Isotopic Uranium	HASL-300	1 x 1-L polyethylene, HNO_3, 4°C

Notes

[a]U.S. Environmental Protection Agency, 1986 (and updates), "*Test Methods for Evaluating Solid Waste, Physical/Chemical Methods*," SW-846, 3rd ed., U.S. Environmental Protection Agency, Washington, D.C.
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U.S. Environmental Protection Agency, 1980, "*Prescribed Procedures for Measurement of Radioactivity in Drinking Water,"* EPA-600/4-80-032, U.S. Environmental Protection Agency, Cincinnati, Ohio.
U.S. Department of Energy, 1990, *"EML Procedures Manual,"* 27th ed., Vol. 1, Rev. 1992, Environmental Measurements Laboratory HASL-300.
[b]Metals = TAL metals including barium, calcium, magnesium, potassium, and sodium, plus uranium.
[c]Major anions include bromide, chloride, fluoride, and sulfate; major cations include calcium, magnesium, potassium, and sodium.
[d]Gamma spectroscopy = Americium-241, Cesium-137, Cobalt-60, and Potassium-40.

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

Table IV-2

Sample Details for Third Quarter, CY 2013 Groundwater Sampling

SWMUs 8/58 and 68 Groundwater Monitoring Quarterly Assessment

July – September 2013

Well	Sample Identification	AR/COC Number	Associated Groundwater Investigation
CCBA-MW1	094376	614939	SWMUs 8/58
CCBA-MW1 (duplicate)	094377		
CCBA-MW2	094371	614937	
OBS-MW1	094361	614933	SWMU 68
OBS-MW2	094365	614935	
OBS-MW2 (duplicate)	094366		
OBS-MW3	094368	614936	

Notes

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

Table IV-3

Summary of Field Water Quality Measurements[a]

SWMUs 8/58 and 68 Groundwater Monitoring

Quarterly Assessment, July – September 2013

Well	Sample Date	Temperature (°C)	Specific Conductivity (μmhos/cm)	Oxidation Reduction Potential (mV)	pH	Turbidity (NTU)	Dissolved Oxygen (% Sat)	Dissolved Oxygen (mg/L)
SWMUs 8/58								
CCBA-MW1	16-Jul-13	17.72	490	142.0	6.75	0.70	33.4	3.17
CCBA-MW2	15-Jul-13	17.13	579	130.3	7.70	0.36	65.7	6.32
SWMU 68								
OBS-MW1	09-Jul-13	18.32	499	108.9	7.56	0.62	43.6	3.99
OBS-MW2	10-Jul-13	20.17	482	124.5	7.53	0.43	38.3	3.47
OBS-MW3	11-Jul-13	18.43	471	103.2	7.55	0.69	46.3	4.33

Notes

[a]Field measurements collected prior to sampling.

°C = Degrees Celsius.
% Sat = Percent saturation.
μmhos/cm = Micromhos per centimeter.
CCBA = Coyote Canyon Blast Area.
mg/L = Milligrams per liter.
mV = Millivolts.
MW = Monitoring well.
NTU = Nephelometric turbidity units.
OBS = Old Burn Site.
pH = Potential of hydrogen (negative logarithm of the hydrogen ion concentration).
SWMU = Solid Waste Management Unit.

Table IV-4

Method Detection Limits for Volatile and Semivolatile Organic Compounds

SWMUs 8/58 and 68 Groundwater Monitoring

Quarterly Assessment, July – September 2013

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

Table IV-4 (Continued)

Method Detection Limits for Volatile and Semivolatile Organic Compounds

SWMUs 8/58 and 68 Groundwater Monitoring

Quarterly Assessment, July – September 2013

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

Table IV-4 (Continued)

Method Detection Limits for Volatile and Semivolatile Organic Compounds

SWMUs 8/58 and 68 Groundwater Monitoring

Quarterly Assessment, July – September 2013

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

Table IV-4 (Continued)

Method Detection Limits for Volatile and Semivolatile Organic Compounds

SWMUs 8/58 and 68 Groundwater Monitoring

Quarterly Assessment, July – September 2013

SWMU 68					
Analyte	**MDL (µg/L)**	**Analytical Method[a]**	**Analyte**	**MDL (µg/L)**	**Analytical Method[a]**
1'-Biphenyl 1	3.00 – 3.26	EPA 8270C	Butylbenzyl phthalate	3.00 – 3.26	EPA 8270C
1,2,4-Trichlorobenzene	3.00 – 3.26	EPA 8270C	Caprolactam	3.00 – 3.26	EPA 8270C
2,4,5-Trichlorophenol	3.00 – 3.26	EPA 8270C	Carbazole	0.300 – 0.326	EPA 8270C
1,4-Dioxane	3.00 – 3.26	EPA 8270C	Chrysene	0.300 – 0.326	EPA 8270C
2,4,6-Trichlorophenol	3.00 – 3.26	EPA 8270C	Di-n-butyl phthalate	3.00 – 3.26	EPA 8270C
2,4-Dichlorophenol	3.00 – 3.26	EPA 8270C	Di-n-octyl phthalate	3.00 – 3.26	EPA 8270C
2,4-Dimethylphenol	3.00 – 3.26	EPA 8270C	Dibenz[a,h]anthracene	0.300 – 0.326	EPA 8270C
2,4-Dinitrophenol	5.00 – 5.43	EPA 8270C	Dibenzofuran	3.00 – 3.26	EPA 8270C
2,4-Dinitrotoluene	3.00 – 3.26	EPA 8270C	Diethylphthalate	3.00 – 3.26	EPA 8270C
2,6-Dinitrotoluene	3.00 – 3.26	EPA 8270C	Dimethylphthalate	3.00 – 3.26	EPA 8270C
2-Chloronaphthalene	0.410 – 0.446	EPA 8270C	Dinitro-o-cresol	3.00 – 3.26	EPA 8270C
2-Chlorophenol	3.00 – 3.26	EPA 8270C	Diphenyl amine	3.00 – 3.26	EPA 8270C
2-Methylnaphthalene	0.300 – 0.326	EPA 8270C	Fluoranthene	0.300 – 0.326	EPA 8270C
2-Nitroaniline	3.00 – 3.26	EPA 8270C	Fluorene	0.300 – 0.326	EPA 8270C
2-Nitrophenol	3.00 – 3.26	EPA 8270C	Hexachlorobenzene	3.00 – 3.26	EPA 8270C
3,3'-Dichlorobenzidine	3.00 – 3.26	EPA 8270C	Hexachlorobutadiene	3.00 – 3.26	EPA 8270C
3-Nitroaniline	3.00 – 3.26	EPA 8270C	Hexachlorocyclopentadiene	3.00 – 3.26	EPA 8270C
4-Bromophenyl phenyl ether	3.00 – 3.26	EPA 8270C	Hexachloroethane	3.00 – 3.26	EPA 8270C
4-Chloro-3-methylphenol	3.00 – 3.26	EPA 8270C	Indeno(1,2,3-c,d)pyrene	0.300 – 0.326	EPA 8270C
4-Chlorobenzenamine	3.30 – 3.59	EPA 8270C	Isophorone	3.50 – 3.8	EPA 8270C
4-Chlorophenyl phenyl ether	3.00 – 3.26	EPA 8270C	Naphthalene	0.300 – 0.326	EPA 8270C
4-Nitroaniline	3.00 – 3.26	EPA 8270C	Nitro-benzene	3.00 – 3.26	EPA 8270C
4-Nitrophenol	3.00 – 3.26	EPA 8270C	Pentachlorophenol	3.00 – 3.26	EPA 8270C
Acenaphthene	0.300 – 0.326	EPA 8270C	Phenanthrene	0.300 – 0.326	EPA 8270C
Acenaphthylene	0.300 – 0.326	EPA 8270C	Phenol	3.00 – 3.26	EPA 8270C
Acetophenone	3.00 – 3.26	EPA 8270C	Pyrene	0.300 – 0.326	EPA 8270C
Anthracene	0.300 – 0.326	EPA 8270C	bis(2-Chloroethoxy)methane	3.00 – 3.26	EPA 8270C
Atrazine	3.00 – 3.26	EPA 8270C	bis(2-Chloroethyl)ether	3.00 – 3.26	EPA 8270C
Benzaldehyde	3.00 – 3.26	EPA 8270C	bis(2-Chloroisopropyl)ether	3.00 – 3.26	EPA 8270C
Benzo(a)anthracene	0.300 – 0.326	EPA 8270C	bis(2-Ethylhexyl)phthalate	3.00 – 3.26	EPA 8270C
Benzo(a)pyrene	0.300 – 0.326	EPA 8270C	m,p-Cresol	3.70 – 4.02	EPA 8270C
Benzo(b)fluoranthene	0.300 – 0.326	EPA 8270C	n-Nitrosodipropylamine	3.00 – 3.26	EPA 8270C
Benzo(ghi)perylene	0.300 – 0.326	EPA 8270C	o-Cresol	3.00 – 3.26	EPA 8270C
Benzo(k)fluoranthene	0.300 – 0.326	EPA 8270C			

Table IV-4 (Concluded)

Method Detection Limits for Volatile and Semivolatile Organic Compounds

SWMUs 8/58 and 68 Groundwater Monitoring

Quarterly Assessment, July – September 2013

Notes

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

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

Table IV-5

Method Detection Limits for High Explosive Compounds (EPA Method 8321A)

SWMUs 8/58 and 68 Groundwater Monitoring

Quarterly Assessment, July – September 2013

Analyte	MDL (μg/L)	
	SWMUs 8/58	SWMU 68
1,3,5-Trinitrobenzene	0.0851 – 0.0860	0.0851 – 0.0874
1,3-Dinitrobenzene	0.0851 – 0.0860	0.0851 – 0.0874
2,4,6-Trinitrotoluene	0.0851 – 0.0860	0.0851 – 0.0874
2,4-Dinitrotoluene	0.0851 – 0.0860	0.0851 – 0.0874
2,6-Dinitrotoluene	0.0851 – 0.0860	0.0851 – 0.0874
2-Amino-4,6-dinitrotoluene	0.0851 – 0.0860	0.0851 – 0.0874
2-Nitrotoluene	0.0872 – 0.0882	0.0872 – 0.0896
3-Nitrotoluene	0.0851 – 0.0860	0.0851 – 0.0874
4-Amino-2,6-dinitrotoluene	0.0851 – 0.0860	0.0851 – 0.0874
4-Nitrotoluene	0.160 – 0.161	0.160 – 0.164
HMX	0.0851 – 0.0860	0.0851 – 0.0874
Nitro-benzene	0.0851 – 0.0860	0.0851 – 0.0874
Pentaerythritol tetranitrate	0.106 – 0.108	0.106 – 0.109
RDX	0.0851 – 0.0860	0.0851 – 0.0874
Tetryl	0.0851 – 0.0860	0.0851 – 0.0874

Notes

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

Table IV-6

Summary of Nitrate Plus Nitrite Results

SWMUs 8/58 and 68 Groundwater Monitoring

Quarterly Assessment, July – September 2013

Well	Analyte	Result (mg/L)	MDL (mg/L)	PQL (mg/L)	MCL (mg/L)	Laboratory Qualifier[a]	Validation Qualifier[b]	Sample Number	Analytical Method[c]
SWMUs 8/58									
CCBA-MW1 16-Jul-13	Nitrate plus nitrite as N	1.57	0.085	0.250	10.0			094376-018	EPA 353.2
CCBA-MW1 (Duplicate) 16-Jul-13	Nitrate plus nitrite as N	1.63	0.085	0.250	10.0			094377-018	EPA 353.2
CCBA-MW2 15-Jul-13	Nitrate plus nitrite as N	3.62	0.085	0.250	10.0			094371-018	EPA 353.2
SWMU 68									
OBS-MW1 09-Jul-13	Nitrate plus nitrite as N	1.95	0.085	0.250	10.0			094361-018	EPA 353.2
OBS-MW2 10-Jul-13	Nitrate plus nitrite as N	1.60	0.085	0.250	10.0			094365-018	EPA 353.2
OBS-MW2 (Duplicate) 10-Jul-13	Nitrate plus nitrite as N	1.58	0.085	0.250	10.0			094366-018	EPA 353.2
OBS-MW3 11-Jul-13	Nitrate plus nitrite as N	1.73	0.085	0.250	10.0			094368-018	EPA 353.2

Notes

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

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

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

Table IV-6 (Concluded)

Summary of Nitrate Plus Nitrite Results

SWMUs 8/58 and 68 Groundwater Monitoring

Quarterly Assessment, July – September 2013

Notes (continued)

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

Table IV-7

Summary of Alkalinity, Anion, and Total Cyanide Results

SWMUs 8/58 and 68 Groundwater Monitoring

Quarterly Assessment, July – September 2013

Well	Analyte	Result (mg/L)	MDL (mg/L)	PQL (mg/L)	MCL (mg/L)	Laboratory Qualifier[a]	Validation Qualifier[b]	Sample Number	Analytical Method[c]
SWMUs 8/58									
CCBA-MW1	Bicarbonate Alkalinity	187	0.725	1.00	NE			094376-022	SM 2320B
16-Jul-13	Carbonate Alkalinity	ND	0.725	1.00	NE	U		094376-022	SM 2320B
	Bromide	0.329	0.067	0.200	NE			094376-016	EPA 9056
	Chloride	28.4	0.335	1.00	NE			094376-016	EPA 9056
	Fluoride	**4.78**	0.165	0.500	4.0			094376-016	EPA 9056
	Sulfate	56.2	0.665	2.00	NE			094376-016	EPA 9056
	Total Cyanide	ND	0.00167	0.005	0.200	U	UJ	094376-027	EPA 9012
CCBA-MW1 (Duplicate)	Bicarbonate Alkalinity	187	0.725	1.00	NE			094377-022	SM 2320B
16-Jul-13	Carbonate Alkalinity	ND	0.725	1.00	NE	U		094377-022	SM 2320B
	Bromide	0.329	0.067	0.200	NE			094377-016	EPA 9056
	Chloride	28.5	0.335	1.00	NE			094377-016	EPA 9056
	Fluoride	**4.82**	0.165	0.500	4.0			094377-016	EPA 9056
	Sulfate	56.4	0.665	2.00	NE			094377-016	EPA 9056
	Total Cyanide	ND	0.00167	0.005	0.200	U	UJ	094377-027	EPA 9012
CCBA-MW2	Bicarbonate Alkalinity	181	0.725	1.00	NE	B		094371-022	SM 2320B
15-Jul-13	Carbonate Alkalinity	ND	0.725	1.00	NE	U		094371-022	SM 2320B
	Bromide	0.566	0.067	0.200	NE			094371-016	EPA 9056
	Chloride	36.6	0.670	2.00	NE			094371-016	EPA 9056
	Fluoride	1.61	0.033	0.100	4.0			094371-016	EPA 9056
	Sulfate	93.6	1.33	4.00	NE			094371-016	EPA 9056
	Total Cyanide	ND	0.00167	0.005	0.200	U	UJ	094371-027	EPA 9012

Table IV-7 (Continued)

Summary of Alkalinity, Anion, and Total Cyanide Results

SWMUs 8/58 and 68 Groundwater Monitoring

Quarterly Assessment, July – September 2013

Well	Analyte	Result (mg/L)	MDL (mg/L)	PQL (mg/L)	MCL (mg/L)	Laboratory Qualifier[a]	Validation Qualifier[b]	Sample Number	Analytical Method[c]
SWMU 68									
OBS-MW1 09-Jul-13	Bicarbonate Alkalinity	184	0.725	1.00	NE			094361-022	SM 2320B
	Carbonate Alkalinity	ND	0.725	1.00	NE	U		094361-022	SM 2320B
	Bromide	0.356	0.067	0.200	NE			094361-016	EPA 9056
	Chloride	23.5	1.34	4.00	NE			094361-016	EPA 9056
	Fluoride	2.17	0.033	0.100	4.00			094361-016	EPA 9056
	Sulfate	81.3	2.66	8.00	NE			094361-016	EPA 9056
	Total Cyanide	ND	0.00167	0.005	0.200	N, U	UJ	094361-027	EPA 9012
OBS-MW2 10-Jul-13	Bicarbonate Alkalinity	194	0.725	1.00	NE			094365-022	SM 2320B
	Carbonate Alkalinity	ND	0.725	1.00	NE	U		094365-022	SM 2320B
	Bromide	0.391	0.067	0.200	NE			094365-016	EPA 9056
	Chloride	13.6	1.34	4.00	NE			094365-016	EPA 9056
	Chloride (reanalysis)	21.6	1.34	4.00	NE	H	J	094365-R16	EPA 9056
	Fluoride	2.32	0.033	0.100	4.00			094365-016	EPA 9056
	Sulfate	51.6	2.66	8.00	NE			094365-016	EPA 9056
	Sulfate (reanalysis)	82.5	2.66	8.00	NE	H	J	094365-R16	EPA 9056
	Total Cyanide	ND	0.00167	0.005	0.200	N, U	UJ	094365-027	EPA 9012
OBS-MW2 (Duplicate) 10-Jul-13	Bicarbonate Alkalinity	180	0.725	1.00	NE	B		094366-022	SM 2320B
	Carbonate Alkalinity	ND	0.725	1.00	NE	U		094366-022	SM 2320B
	Bromide	0.313	0.067	0.200	NE			094366-016	EPA 9056
	Chloride	21.5	1.34	4.00	NE			094366-016	EPA 9056
	Fluoride	2.34	0.033	0.100	4.00			094366-016	EPA 9056
	Sulfate	81.9	2.66	8.00	NE			094366-016	EPA 9056
	Total Cyanide	ND	0.00167	0.005	0.200	N, U	UJ	094366-027	EPA 9012
OBS-MW3 11-Jul-13	Bicarbonate Alkalinity	179	0.725	1.00	NE	B		094368-022	SM 2320B
	Carbonate Alkalinity	ND	0.725	1.00	NE	U		094368-022	SM 2320B
	Bromide	0.317	0.067	0.200	NE			094368-016	EPA 9056
	Chloride	22.7	1.34	4.00	NE			094368-016	EPA 9056
	Fluoride	2.37	0.033	0.100	4.00			094368-016	EPA 9056
	Sulfate	83.4	2.66	8.00	NE			094368-016	EPA 9056
	Total Cyanide	ND	0.00167	0.005	0.200	N, U	UJ	094368-027	EPA 9012

Table IV-7 (Concluded)

Summary of Alkalinity, Anion, and Total Cyanide Results

SWMUs 8/58 and 68 Groundwater Monitoring

Quarterly Assessment, July – September 2013

Notes

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

[b]Validation Qualifier
If cell is blank, then all quality control samples met acceptance criteria with respect to submitted samples.
J = Estimated value, the analyte concentration fell above the effective MDL and below the effective PQL.
UJ = The analyte was analyzed for, but not detected. The associated value is an estimate and may be inaccurate or imprecise.

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

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

Table IV-8

Summary of Perchlorate Results

SWMUs 8/58 and 68 Groundwater Monitoring

Quarterly Assessment, July – September 2013

Well	Result (mg/L)	MDL (mg/L)	PQL (mg/L)	MCL (mg/L)	Laboratory Qualifier[a]	Validation Qualifier[b]	Sample Number	Analytical Method[c]
SWMUs 8/58								
CCBA-MW1 16-Jul-13	ND	0.004	0.012	NE	U		094376-020	EPA 314.0
CCBA-MW1 (Duplicate) 16-Jul-13	ND	0.004	0.012	NE	U		094377-020	EPA 314.0
CCBA-MW2 15-Jul-13	ND	0.004	0.012	NE	U		094371-020	EPA 314.0
SWMU 68								
OBS-MW1 09-Jul-13	ND	0.004	0.012	NE	U		094361-020	EPA 314.0
OBS-MW2 10-Jul-13	ND	0.004	0.012	NE	U		094365-020	EPA 314.0
OBS-MW2 (Duplicate) 10-Jul-13	ND	0.004	0.012	NE	U		094366-020	EPA 314.0
OBS-MW3 11-Jul-13	ND	0.004	0.012	NE	U		094368-020	EPA 314.0

Notes

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

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

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

Table IV-8 (Concluded)

Summary of Perchlorate Results

SWMUs 8/58 and 68 Groundwater Monitoring

Quarterly Assessment, July – September 2013

Notes (continued)

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

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

Well	Result (mg/L)	MDL (mg/L)	PQL (mg/L)	MCL (mg/L)	Laboratory Qualifier[a]	Validation Qualifier[b]	Sample Number	Analytical Method[c]
OBS-MW1 09-Jul-13	ND	0.0033	0.010	NE	U		094361-014	EPA 7196A
OBS-MW2 10-Jul-13	ND	0.0033	0.010	NE	U		094365-014	EPA 7196A
OBS-MW2 (Duplicate) 10-Jul-13	ND	0.0033	0.010	NE	U		094366-014	EPA 7196A
OBS-MW3 11-Jul-13	ND	0.0033	0.010	NE	U		094368-014	EPA 7196A

Notes

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

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

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

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

Table IV-10

Summary of Unfiltered Total Metal Results

SWMUs 8/58 Groundwater Monitoring

Quarterly Assessment, July – September 2013

Well	Analyte	Result (mg/L)	MDL (mg/L)	PQL (mg/L)	MCL (mg/L)	Laboratory Qualifier[a]	Validation Qualifier[b]	Sample Number	EPA Analytical Method[c]
CCBA-MW1 16-Jul-13	Aluminum	0.0195	0.015	0.050	NE	J		094376-009	SW846 6020
	Antimony	ND	0.001	0.003	0.006	U		094376-009	SW846 6020
	Arsenic	ND	0.0017	0.005	0.010	U		094376-009	SW846 6020
	Barium	0.00271	0.0006	0.002	2.00			094376-009	SW846 6020
	Beryllium	0.000411	0.0002	0.0005	0.004	J		094376-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		094376-009	SW846 6020
	Calcium	48.7	0.060	0.200	NE			094376-009	SW846 6020
	Chromium	ND	0.002	0.010	0.100	U		094376-009	SW846 6020
	Cobalt	ND	0.0001	0.001	NE	U		094376-009	SW846 6020
	Copper	0.000351	0.00035	0.001	NE	J	0.0047U	094376-009	SW846 6020
	Iron	0.0927	0.033	0.100	NE	J		094376-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		094376-009	SW846 6020
	Magnesium	10.2	0.010	0.030	NE			094376-009	SW846 6020
	Manganese	0.00328	0.001	0.005	NE	J		094376-009	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	U		094376-009	SW846 7470
	Nickel	0.00068	0.0005	0.002	NE	J		094376-009	SW846 6020
	Potassium	4.16	0.080	0.300	NE			094376-009	SW846 6020
	Selenium	0.00241	0.0015	0.005	0.050	J		094376-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		094376-009	SW846 6020
	Sodium	57.2	0.400	1.25	NE			094376-009	SW846 6020
	Thallium	ND	0.00045	0.002	0.002	U		094376-009	SW846 6020
	Uranium	0.00219	0.000067	0.0002	0.03			094376-009	SW846 6020
	Vanadium	ND	0.001	0.005	NE	U	UJ	094376-009	SW846 6010
	Zinc	ND	0.0035	0.010	NE	U		094376-009	SW846 6020

Table IV-10 (Continued)

Summary of Unfiltered Total Metal Results

SWMUs 8/58 Groundwater Monitoring

Quarterly Assessment, July – September 2013

Well	Analyte	Result (mg/L)	MDL (mg/L)	PQL (mg/L)	MCL (mg/L)	Laboratory Qualifier[a]	Validation Qualifier[b]	Sample Number	EPA Analytical Method[c]
CCBA-MW1 (Duplicate) 16-Jul-13	Aluminum	0.019	0.015	0.050	NE	J		094377-009	SW846 6020
	Antimony	ND	0.001	0.003	0.006	U		094377-009	SW846 6020
	Arsenic	0.00198	0.0017	0.005	0.010	J		094377-009	SW846 6020
	Barium	0.00256	0.0006	0.002	2.00			094377-009	SW846 6020
	Beryllium	0.000456	0.0002	0.0005	0.004	J		094377-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		094377-009	SW846 6020
	Calcium	45.9	0.060	0.200	NE			094377-009	SW846 6020
	Chromium	ND	0.002	0.010	0.100	U		094377-009	SW846 6020
	Cobalt	ND	0.0001	0.001	NE	U		094377-009	SW846 6020
	Copper	0.000384	0.00035	0.001	NE	J	0.0047U	094377-009	SW846 6020
	Iron	0.0759	0.033	0.100	NE	J		094377-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		094377-009	SW846 6020
	Magnesium	10.7	0.010	0.030	NE			094377-009	SW846 6020
	Manganese	0.00341	0.001	0.005	NE	J		094377-009	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	U		094377-009	SW846 7470
	Nickel	0.000571	0.0005	0.002	NE	J		094377-009	SW846 6020
	Potassium	3.74	0.080	0.300	NE			094377-009	SW846 6020
	Selenium	0.0022	0.0015	0.005	0.050	J		094377-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		094377-009	SW846 6020
	Sodium	56.3	0.400	1.25	NE			094377-009	SW846 6020
	Thallium	ND	0.00045	0.002	0.002	U		094377-009	SW846 6020
	Uranium	0.00209	0.000067	0.0002	0.03			094377-009	SW846 6020
	Vanadium	ND	0.001	0.005	NE	U	UJ	094377-009	SW846 6010
	Zinc	ND	0.0035	0.010	NE	U		094377-009	SW846 6020

Table IV-10 (Continued)

Summary of Unfiltered Total Metal Results

SWMUs 8/58 Groundwater Monitoring

Quarterly Assessment, July – September 2013

Well	Analyte	Result (mg/L)	MDL (mg/L)	PQL (mg/L)	MCL (mg/L)	Laboratory Qualifier[a]	Validation Qualifier[b]	Sample Number	EPA Analytical Method[c]
CCBA-MW2	Aluminum	ND	0.015	0.050	NE	U		094371-009	SW846 6020
15-Jul-13	Antimony	ND	0.001	0.003	0.006	U		094371-009	SW846 6020
	Arsenic	ND	0.0017	0.005	0.010	U		094371-009	SW846 6020
	Barium	0.0478	0.0006	0.002	2.00			094371-009	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		094371-009	SW846 6020
	Cadmium	0.000131	0.00011	0.001	0.005	J		094371-009	SW846 6020
	Calcium	73.2	0.300	1.00	NE			094371-009	SW846 6020
	Chromium	ND	0.002	0.010	0.100	U		094371-009	SW846 6020
	Cobalt	ND	0.0001	0.001	NE	U		094371-009	SW846 6020
	Copper	0.000935	0.00035	0.001	NE	J		094371-009	SW846 6020
	Iron	0.101	0.033	0.100	NE			094371-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		094371-009	SW846 6020
	Magnesium	15.1	0.010	0.030	NE			094371-009	SW846 6020
	Manganese	ND	0.001	0.005	NE	U		094371-009	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	U		094371-009	SW846 7470
	Nickel	0.000641	0.0005	0.002	NE	J		094371-009	SW846 6020
	Potassium	1.34	0.080	0.300	NE			094371-009	SW846 6020
	Selenium	0.00447	0.0015	0.005	0.050	J		094371-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		094371-009	SW846 6020
	Sodium	45.2	0.080	0.250	NE			094371-009	SW846 6020
	Thallium	ND	0.00045	0.002	0.002	U		094371-009	SW846 6020
	Uranium	0.00532	0.000067	0.0002	0.03			094371-009	SW846 6020
	Vanadium	0.00895	0.001	0.005	NE			094371-009	SW846 6010
	Zinc	0.00448	0.0035	0.010	NE	J		094371-009	SW846 6020

Table IV-10 (Concluded)
Summary of Unfiltered Total Metal Results
SWMUs 8/58 Groundwater Monitoring
Quarterly Assessment, July – September 2013

Notes

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

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

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

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

Table IV-11

Summary of Unfiltered Total Metal Results

SWMU 68 Groundwater Monitoring

Quarterly Assessment, July – September 2013

Well	Analyte	Result (mg/L)	MDL (mg/L)	PQL (mg/L)	MCL (mg/L)	Laboratory Qualifier[a]	Validation Qualifier[b]	Sample Number	EPA Analytical Method[c]
OBS-MW1	Aluminum	0.0442	0.015	0.050	NE	J		094361-009	SW846 6020
09-Jul-13	Antimony	ND	0.001	0.003	0.006	U		094361-009	SW846 6020
	Arsenic	ND	0.0017	0.005	0.010	U		094361-009	SW846 6020
	Barium	0.0204	0.0006	0.002	2.00		J	094361-009	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		094361-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		094361-009	SW846 6020
	Calcium	74.5	0.300	1.00	NE			094361-009	SW846 6020
	Chromium	ND	0.002	0.010	0.100	U		094361-009	SW846 6020
	Cobalt	ND	0.0001	0.001	NE	U		094361-009	SW846 6020
	Copper	0.00064	0.00035	0.001	NE	J		094361-009	SW846 6020
	Iron	0.116	0.033	0.100	NE			094361-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		094361-009	SW846 6020
	Magnesium	16.9	0.010	0.030	NE			094361-009	SW846 6020
	Manganese	0.00714	0.001	0.005	NE		J	094361-009	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	U		094361-009	SW846 7470
	Nickel	0.000971	0.0005	0.002	NE	J		094361-009	SW846 6020
	Potassium	1.76	0.080	0.300	NE			094361-009	SW846 6020
	Selenium	0.00242	0.0015	0.005	0.050	J		094361-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		094361-009	SW846 6020
	Sodium	23.3	0.080	0.250	NE			094361-009	SW846 6020
	Thallium	ND	0.00045	0.002	0.002	U		094361-009	SW846 6020
	Uranium	0.0105	0.000067	0.0002	0.03			094361-009	SW846 6020
	Vanadium	0.00165	0.001	0.005	NE	J		094361-009	SW846 6010
	Zinc	ND	0.0035	0.010	NE	U		094361-009	SW846 6020

Table IV-11 (Continued)

Summary of Unfiltered Total Metal Results

SWMU 68 Groundwater Monitoring

Quarterly Assessment, July – September 2013

Well	Analyte	Result (mg/L)	MDL (mg/L)	PQL (mg/L)	MCL (mg/L)	Laboratory Qualifier[a]	Validation Qualifier[b]	Sample Number	EPA Analytical Method[c]
OBS-MW2	Aluminum	ND	0.015	0.050	NE	U		094365-009	SW846 6020
10-Jul-13	Antimony	ND	0.001	0.003	0.006	U		094365-009	SW846 6020
	Arsenic	ND	0.0017	0.005	0.010	U		094365-009	SW846 6020
	Barium	0.0221	0.0006	0.002	2.00		J	094365-009	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		094365-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		094365-009	SW846 6020
	Calcium	76.6	0.300	1.00	NE			094365-009	SW846 6020
	Chromium	ND	0.002	0.010	0.100	U		094365-009	SW846 6020
	Cobalt	ND	0.0001	0.001	NE	U		094365-009	SW846 6020
	Copper	0.000415	0.00035	0.001	NE	J	0.008U	094365-009	SW846 6020
	Iron	0.0947	0.033	0.100	NE	J		094365-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		094365-009	SW846 6020
	Magnesium	16.4	0.010	0.030	NE			094365-009	SW846 6020
	Manganese	ND	0.001	0.005	NE	U	UJ	094365-009	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	U		094365-009	SW846 7470
	Nickel	0.000747	0.0005	0.002	NE	J		094365-009	SW846 6020
	Potassium	1.73	0.080	0.300	NE			094365-009	SW846 6020
	Selenium	0.00241	0.0015	0.005	0.050	J		094365-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		094365-009	SW846 6020
	Sodium	23.9	0.080	0.250	NE			094365-009	SW846 6020
	Thallium	ND	0.00045	0.002	0.002	U		094365-009	SW846 6020
	Uranium	0.0139	0.000067	0.0002	0.03			094365-009	SW846 6020
	Vanadium	0.00105	0.001	0.005	NE	J		094365-009	SW846 6010
	Zinc	ND	0.0035	0.010	NE	U		094365-009	SW846 6020

Table IV-11 (Continued)

Summary of Unfiltered Total Metal Results

SWMU 68 Groundwater Monitoring

Quarterly Assessment, July – September 2013

Well	Analyte	Result (mg/L)	MDL (mg/L)	PQL (mg/L)	MCL (mg/L)	Laboratory Qualifier[a]	Validation Qualifier[b]	Sample Number	EPA Analytical Method[c]
OBS-MW2 (Duplicate) 10-Jul-13	Aluminum	ND	0.015	0.050	NE	U		094366-009	SW846 6020
	Antimony	ND	0.001	0.003	0.006	U		094366-009	SW846 6020
	Arsenic	ND	0.0017	0.005	0.010	U		094366-009	SW846 6020
	Barium	0.0223	0.0006	0.002	2.00		J	094366-009	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		094366-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		094366-009	SW846 6020
	Calcium	76.4	0.300	1.00	NE			094366-009	SW846 6020
	Chromium	ND	0.002	0.010	0.100	U		094366-009	SW846 6020
	Cobalt	ND	0.0001	0.001	NE	U		094366-009	SW846 6020
	Copper	0.000463	0.00035	0.001	NE	J	0.008U	094366-009	SW846 6020
	Iron	0.120	0.033	0.100	NE			094366-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		094366-009	SW846 6020
	Magnesium	16.2	0.010	0.030	NE			094366-009	SW846 6020
	Manganese	ND	0.001	0.005	NE	U	UJ	094366-009	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	U		094366-009	SW846 7470
	Nickel	0.0012	0.0005	0.002	NE	J		094366-009	SW846 6020
	Potassium	1.65	0.080	0.300	NE			094366-009	SW846 6020
	Selenium	0.00249	0.0015	0.005	0.050	J		094366-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		094366-009	SW846 6020
	Sodium	22.4	0.080	0.250	NE			094366-009	SW846 6020
	Thallium	ND	0.00045	0.002	0.002	U		094366-009	SW846 6020
	Uranium	0.014	0.000067	0.0002	0.03			094366-009	SW846 6020
	Vanadium	ND	0.001	0.005	NE	U		094366-009	SW846 6010
	Zinc	ND	0.0035	0.010	NE	U		094366-009	SW846 6020

Table IV-11 (Continued)

Summary of Unfiltered Total Metal Results

SWMU 68 Groundwater Monitoring

Quarterly Assessment, July – September 2013

Well	Analyte	Result (mg/L)	MDL (mg/L)	PQL (mg/L)	MCL (mg/L)	Laboratory Qualifier[a]	Validation Qualifier[b]	Sample Number	EPA Analytical Method[c]
OBS-MW3	Aluminum	0.0587	0.015	0.050	NE			094368-009	SW846 6020
11-Jul-13	Antimony	ND	0.001	0.003	0.006	U		094368-009	SW846 6020
	Arsenic	ND	0.0017	0.005	0.010	U		094368-009	SW846 6020
	Barium	0.0299	0.0006	0.002	2.00		J	094368-009	SW846 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		094368-009	SW846 6020
	Cadmium	ND	0.00011	0.001	0.005	U		094368-009	SW846 6020
	Calcium	78.4	0.300	1.00	NE			094368-009	SW846 6020
	Chromium	ND	0.002	0.010	0.100	U		094368-009	SW846 6020
	Cobalt	ND	0.0001	0.001	NE	U		094368-009	SW846 6020
	Copper	0.00089	0.00035	0.001	NE	J		094368-009	SW846 6020
	Iron	0.141	0.033	0.100	NE			094368-009	SW846 6020
	Lead	ND	0.0005	0.002	NE	U		094368-009	SW846 6020
	Magnesium	16.2	0.010	0.030	NE			094368-009	SW846 6020
	Manganese	0.00138	0.001	0.005	NE	J	J	094368-009	SW846 6020
	Mercury	ND	0.000067	0.0002	0.002	U		094368-009	SW846 7470
	Nickel	0.000888	0.0005	0.002	NE	J		094368-009	SW846 6020
	Potassium	1.77	0.080	0.300	NE			094368-009	SW846 6020
	Selenium	0.00239	0.0015	0.005	0.050	J		094368-009	SW846 6020
	Silver	ND	0.0002	0.001	NE	U		094368-009	SW846 6020
	Sodium	22.0	0.080	0.250	NE			094368-009	SW846 6020
	Thallium	ND	0.00045	0.002	0.002	U		094368-009	SW846 6020
	Uranium	0.0126	0.000067	0.0002	0.03			094368-009	SW846 6020
	Vanadium	0.00111	0.001	0.005	NE	J		094368-009	SW846 6010
	Zinc	ND	0.0035	0.010	NE	U		094368-009	SW846 6020

Table IV-11 (Concluded)
Summary of Unfiltered Total Metal Results
SWMU 68 Groundwater Monitoring
Quarterly Assessment, July – September 2013

Notes

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

[b]Validation Qualifier
If cell is blank, then all quality control samples met acceptance criteria with respect to submitted samples.
J = Estimated value, the analyte concentration fell above the effective MDL and below the effective PQL.
U = The analyte was analyzed for, but not detected. The associated numerical value is the sample quantitation limit.
UJ = The analyte was analyzed for, but not detected. The associated value is an estimate and may be inaccurate or imprecise.

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

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

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

Well	Analyte	Result (mg/L)	MDL (mg/L)	PQL (mg/L)	MCL (mg/L)	Laboratory Qualifier[a]	Validation Qualifier[b]	Sample Number	EPA Analytical Method[c]
SWMUs 8/58									
CCBA-MW1 16-Jul-13	Calcium	46.3	0.060	0.200	NE			094376-017	SW846 6020
	Magnesium	10.3	0.010	0.030	NE			094376-017	SW846 6020
	Potassium	4.43	0.080	0.300	NE			094376-017	SW846 6020
	Sodium	61.8	0.400	1.25	NE			094376-017	SW846 6020
CCBA-MW1 (Duplicate) 16-Jul-13	Calcium	48.9	0.060	0.200	NE			094377-017	SW846 6020
	Magnesium	11.0	0.010	0.030	NE			094377-017	SW846 6020
	Potassium	4.45	0.080	0.300	NE			094377-017	SW846 6020
	Sodium	60.6	0.400	1.25	NE			094377-017	SW846 6020
CCBA-MW2 15-Jul-13	Calcium	69.9	0.300	1.00	NE			094371-017	SW846 6020
	Magnesium	15.5	0.010	0.030	NE			094371-017	SW846 6020
	Potassium	1.42	0.080	0.300	NE			094371-017	SW846 6020
	Sodium	43.7	0.080	0.250	NE			094371-017	SW846 6020
SWMU 68									
OBS-MW1 09-Jul-13	Calcium	75.0	0.300	1.00	NE			094361-017	SW846 6020
	Magnesium	16.4	0.010	0.030	NE			094361-017	SW846 6020
	Potassium	1.81	0.080	0.300	NE			094361-017	SW846 6020
	Sodium	24.4	0.080	0.250	NE			094361-017	SW846 6020
OBS-MW2 10-Jul-13	Calcium	75.6	0.300	1.00	NE			094365-017	SW846 6020
	Magnesium	16.4	0.010	0.030	NE			094365-017	SW846 6020
	Potassium	1.65	0.080	0.300	NE			094365-017	SW846 6020
	Sodium	23.8	0.080	0.250	NE			094365-017	SW846 6020
OBS-MW2 (Duplicate) 10-Jul-13	Calcium	77.9	0.300	1.00	NE			094366-017	SW846 6020
	Magnesium	16.0	0.010	0.030	NE			094366-017	SW846 6020
	Potassium	1.74	0.080	0.300	NE			094366-017	SW846 6020
	Sodium	23.9	0.080	0.250	NE			094366-017	SW846 6020
OBS-MW3 11-Jul-13	Calcium	72.1	0.300	1.00	NE			094368-017	SW846 6020
	Magnesium	16.5	0.010	0.030	NE			094368-017	SW846 6020
	Potassium	1.61	0.080	0.300	NE			094368-017	SW846 6020
	Sodium	25.2	0.080	0.250	NE			094368-017	SW846 6020

Table IV-12 (Concluded)

Summary of Filtered Cation Results

SWMUs 8/58 and 68 Groundwater Monitoring

Quarterly Assessment, July – September 2013

Notes

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

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

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

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

Table IV-13

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

SWMUs 8/58 and 68 Groundwater Monitoring

Quarterly Assessment, July – September 2013

Well	Analyte	Activity[a] (pCi/L)	MDA (pCi/L)	Critical Level[b] (pCi/L)	MCL	Laboratory Qualifier[c]	Validation Qualifier[d]	Sample Number	Analytical Method[e]
SWMUs 8/58									
CCBA-MW1	Americium-241	4.75 ± 9.29	14.0	6.86	NE	U	BD	094376-033	EPA 901.1
16-Jul-13	Cesium-137	1.66 ± 1.77	2.86	1.38	NE	U	BD	094376-033	EPA 901.1
	Cobalt-60	0.201 ± 1.52	2.70	1.27	NE	U	BD	094376-033	EPA 901.1
	Potassium-40	-0.298 ± 33.0	40.1	19.3	NE	U	BD	094376-033	EPA 901.1
	Gross Alpha	-0.58	NA	NA	15 pCi/L	NA	None	094376-034	EPA 900.0
	Gross Beta	3.93 ± 1.21	1.52	0.736	4mrem/yr		J	094376-034	EPA 900.0
	Uranium-233/234	2.32 ± 0.351	0.0845	0.037	NE			094376-035	HASL-300
	Uranium-235/236	0.0529 ± 0.0347	0.0518	0.0194	NE		J	094376-035	HASL-300
	Uranium-238	0.720 ± 0.140	0.0733	0.0314	NE			094376-035	HASL-300
CCBA-MW1 (Duplicate)	Americium-241	8.04 ± 16.2	24.6	12.0	NE	U	BD	094377-033	EPA 901.1
16-Jul-13	Cesium-137	1.55 ± 1.85	2.91	1.39	NE	U	BD	094377-033	EPA 901.1
	Cobalt-60	-0.72 ± 1.83	3.05	1.43	NE	U	BD	094377-033	EPA 901.1
	Potassium-40	10.9 ± 32.2	45.5	21.8	NE	U	BD	094377-033	EPA 901.1
	Gross Alpha	-0.81	NA	NA	15 pCi/L	NA	None	094377-034	EPA 900.0
	Gross Beta	4.63 ± 1.09	1.02	0.488	4mrem/yr		J	094377-034	EPA 900.0
	Uranium-233/234	2.30 ± 0.355	0.0908	0.0397	NE			094377-035	HASL-300
	Uranium-235/236	0.0465 ± 0.0342	0.0556	0.0208	NE	U	BD	094377-035	HASL-300
	Uranium-238	0.745 ± 0.146	0.0788	0.0337	NE			094377-035	HASL-300
CCBA-MW2	Americium-241	-3.57 ± 6.02	9.53	4.66	NE	U	BD	094371-033	EPA 901.1
15-Jul-13	Cesium-137	-0.387 ± 2.51	2.76	1.32	NE	U	BD	094371-033	EPA 901.1
	Cobalt-60	-0.0207 ± 2.93	2.70	1.27	NE	U	BD	094371-033	EPA 901.1
	Potassium-40	4.44 ± 30.8	25.7	12.0	NE	U	BD	094371-033	EPA 901.1
	Gross Alpha	-1.03	NA	NA	15 pCi/L	NA	None	094371-034	EPA 900.0
	Gross Beta	2.87 ± 1.18	1.69	0.820	4mrem/yr		J	094371-034	EPA 900.0
	Uranium-233/234	7.80 ± 1.06	0.110	0.0432	NE			094371-035	HASL-300
	Uranium-235/236	0.113 ± 0.0594	0.0674	0.0252	NE		J	094371-035	HASL-300
	Uranium-238	1.71 ± 0.284	0.0956	0.0409	NE			094371-035	HASL-300

Table IV-13 (Continued)

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

SWMUs 8/58 and 68 Groundwater Monitoring

Quarterly Assessment, July – September 2013

Well	Analyte	Activity[a] (pCi/L)	MDA (pCi/L)	Critical Level[b] (pCi/L)	MCL	Laboratory Qualifier[c]	Validation Qualifier[d]	Sample Number	Analytical Method[e]
SWMU 68									
OBS-MW1 09-Jul-13	Americium-241	8.25 ± 8.00	11.3	5.56	NE	U	BD	094361-033	EPA 901.1
	Cesium-137	-0.29 ± 2.22	3.36	1.63	NE	U	BD	094361-033	EPA 901.1
	Cobalt-60	-1.42 ± 2.40	3.32	1.59	NE	U	BD	094361-033	EPA 901.1
	Potassium-40	-26.9 ± 42.4	44.5	21.5	NE	U	BD	094361-033	EPA 901.1
	Gross Alpha	3.33	NA	NA	15 pCi/L	NA	None	094361-034	EPA 900.0
	Gross Beta	6.80 ± 1.55	1.46	0.708	4 mrem/yr			094361-034	EPA 900.0
	Uranium-233/234	17.2 ± 2.15	0.0433	0.0188	NE			094361-035	HASL-300
	Uranium-235/236	0.273 ± 0.0633	0.0253	0.00915	NE			094361-035	HASL-300
	Uranium-238	3.30 ± 0.439	0.0349	0.0146	NE			094361-035	HASL-300
OBS-MW2 10-Jul-13	Americium-241	-30.1 ± 24.3	32.7	16.1	NE	U	BD	094365-033	EPA 901.1
	Cesium-137	-1.26 ± 3.67	3.98	1.92	NE	U	BD	094365-033	EPA 901.1
	Cobalt-60	-3.45 ± 4.40	4.55	2.17	NE	U	BD	094365-033	EPA 901.1
	Potassium-40	-33 ± 44.9	51.3	24.6	NE	U	BD	094365-033	EPA 901.1
	Gross Alpha	-4.44	NA	NA	15 pCi/L	NA	None	094365-034	EPA 900.0
	Gross Beta	6.16 ± 1.55	1.64	0.797	4 mrem/yr			094365-034	EPA 900.0
	Uranium-233/234	23.1 ± 2.93	0.0485	0.0211	NE			094365-035	HASL-300
	Uranium-235/236	0.283 ± 0.0687	0.0283	0.0103	NE			094365-035	HASL-300
	Uranium-238	4.26 ± 0.569	0.0391	0.0164	NE			094365-035	HASL-300
OBS-MW2 (Duplicate) 10-Jul-13	Americium-241	7.39 ± 8.28	12.1	5.93	NE	U	BD	094366-033	EPA 901.1
	Cesium-137	0.146 ± 2.37	3.63	1.76	NE	U	BD	094366-033	EPA 901.1
	Cobalt-60	-1.18 ± 2.12	3.52	1.67	NE	U	BD	094366-033	EPA 901.1
	Potassium-40	1.15 ± 48.2	34.3	16.3	NE	U	BD	094366-033	EPA 901.1
	Gross Alpha	2.51	NA	NA	15 pCi/L	NA	None	094366-034	EPA 900.0
	Gross Beta	6.24 ± 1.49	1.39	0.672	4 mrem/yr			094366-034	EPA 900.0
	Uranium-233/234	22.1 ± 2.77	0.0437	0.019	NE			094366-035	HASL-300
	Uranium-235/236	0.268 ± 0.0627	0.0255	0.00922	NE			094366-035	HASL-300
	Uranium-238	4.22 ± 0.554	0.0352	0.0147	NE			094366-035	HASL-300

Table IV-13 (Continued)

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

SWMUs 8/58 and 68 Groundwater Monitoring

Quarterly Assessment, July – September 2013

Well	Analyte	Activity[a] (pCi/L)	MDA (pCi/L)	Critical Level[b] (pCi/L)	MCL	Laboratory Qualifier[c]	Validation Qualifier[d]	Sample Number	Analytical Method[e]
SWMU 68									
OBS-MW3	Americium-241	-8.99 ± 11.2	17.6	8.58	NE	U	BD	094368-033	EPA 901.1
11-Jul-13	Cesium-137	1.18 ± 3.66	3.14	1.51	NE	U	BD	094368-033	EPA 901.1
	Cobalt-60	-0.763 ± 1.86	3.16	1.48	NE	U	BD	094368-033	EPA 901.1
	Potassium-40	25.7 ± 42.9	31.8	15.0	NE	U	BD	094368-033	EPA 901.1
	Gross Alpha	-6.04	NA	NA	15 pCi/L	NA	None	094368-034	EPA 900.0
	Gross Beta	8.12 ± 1.67	1.15	0.557	4 mrem/yr			094368-034	EPA 900.0
	Uranium-233/234	20.5 ± 2.59	0.0484	0.021	NE			094368-035	HASL-300
	Uranium-235/236	0.210 ± 0.0561	0.0283	0.0102	NE			094368-035	HASL-300
	Uranium-238	3.63 ± 0.488	0.039	0.0163	NE			094368-035	HASL-300

Notes

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

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

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

[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 IV-13 (Concluded)

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

SWMUs 8/58 and 68 Groundwater Monitoring

Quarterly Assessment, July – September 2013

Notes (continued)

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

Table IV-14

Summary of Constituents Detected above Established MCLs

SWMUs 8/58 and 68 Groundwater Monitoring

Quarterly Assessments through September 2013

Well	Date	Analyte	Result	MCL	Laboratory Qualifier[a]	Validation Qualifier[b]	Sample Number	Analytical Method[c]
SWMUs 8/58								
CCBA-MW1	31-Oct-11	Fluoride	**5.36 mg/L**	4.0 mg/L			091345-016	EPA 9056
CCBA-MW1	16-Jan-12	Fluoride	**4.94 mg/L**	4.0 mg/L			091615-016	EPA 9056
CCBA-MW1 (Duplicate)	16-Jan-12	Fluoride	**4.94 mg/L**	4.0 mg/L			091616-016	EPA 9056
CCBA-MW1	23-Apr-12	Fluoride	**4.93 mg/L**	4.0 mg/L			092291-016	EPA 9056
CCBA-MW1	16-Jul-12	Fluoride	**5.03 mg/L**	4.0 mg/L			092615-016	EPA 9056
CCBA-MW1 (Duplicate)	16-Jul-12	Fluoride	**5.00 mg/L**	4.0 mg/L			092616-016	EPA 9056
CCBA-MW1	22-Oct-12	Fluoride	**5.32 mg/L**	4.0 mg/L			093013-016	EPA 9056
CCBA-MW2	15-Jan-13	Benzo(a)pyrene	**0.640 µg/L**	0.440 µg/L	J		093336-002	EPA 8270C
CCBA-MW1	16-Jan-13	Fluoride	**4.97 mg/L**	4.0 mg/L			093341-016	EPA 9056
CCBA-MW1 (Duplicate)	16-Jan-13	Fluoride	**5.00 mg/L**	4.0 mg/L			093342-016	EPA 9056
CCBA-MW1	24-Apr-13	Fluoride	**4.57 mg/L**	4.0 mg/L			093863-016	EPA 9056
CCBA-MW1	16-Jul-13	Fluoride	**4.78 mg/L**	4.0 mg/L			094376-016	EPA 9056
CCBA-MW1 (Duplicate)	16-Jul-13	Fluoride	**4.82 mg/L**	4.0 mg/L			094377-016	EPA 9056

Notes

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

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

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

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

Table IV-15
Summary of Duplicate Samples
SWMUs 8/58 and 68 Groundwater Monitoring
Quarterly Assessment, July – September 2013

Well /Parameter	Environmental Sample (R1)	Duplicate Sample (R2)	RPD[a]
	mg/L unless otherwise noted		
CCBA-MW2			
Nitrate plus Nitrite	1.57	1.63	4
Bicarbonate Alkalinity	187	187	< 1
Bromide	0.329	0.329	< 1
Chloride	28.4	28.5	< 1
Fluoride	4.78	4.82	1
Sulfate	56.2	56.4	< 1
Aluminum	0.0195	0.019	3
Barium	0.00271	0.00256	6
Beryllium	0.000411	0.000456	10
Calcium	48.7	45.9	6
Iron	0.0927	0.0759	20
Magnesium	10.2	10.7	5
Manganese	0.00328	0.00341	4
Nickel	0.00068	0.000571	17
Potassium	4.16	3.74	11
Selenium	0.00241	0.0022	9
Sodium	57.2	56.3	2
Uranium	0.00219	0.00209	5
Filtered Calcium	46.3	48.9	5
Filtered Magnesium	10.3	11.0	7
Filtered Potassium	4.43	4.45	< 1
Filtered Sodium	61.8	60.6	2
OBS-MW1			
Nitrate plus Nitrite	1.60	1.58	1
Bicarbonate Alkalinity	194	180	7
Bromide	0.391	0.313	22
Chloride	21.6	21.5	< 1
Fluoride	2.32	2.34	1
Sulfate	82.5	81.9	1
Barium	0.0221	0.0223	1
Calcium	76.6	76.4	< 1
Iron	0.0947	0.120	24
Magnesium	16.4	16.2	1
Nickel	0.000747	0.0012	47
Potassium	1.73	1.65	5
Selenium	0.00241	0.00249	3

Table IV-15 (Concluded)
Summary of Duplicate Samples
SWMUs 8/58 and 68 Groundwater Monitoring
Quarterly Assessment, July – September 2013

Well /Parameter	Environmental Sample (R1)	Duplicate Sample (R2)	RPD[a]
	mg/L unless otherwise noted		
OBS-MW1			
Sodium	23.9	22.4	6
Uranium	0.0139	0.014	1
Filtered Calcium	75.6	77.9	3
Filtered Magnesium	16.4	16.0	2
Filtered Potassium	1.65	1.74	5
Filtered Sodium	23.8	23.9	< 1

Notes

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

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

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

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

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

FIELD MEASUREMENT LOG FOR GROUNDWATER SAMPLE COLLECTION

Project Name: SWMU 8/58	Project No.: 146422.10.11.01
Well I.D.: CCBA-MW 1	Date: 07/16/13
Well Condition:	Weather Condition:
Method: Portable pump X	Dedicated pump _____ Pump depth: 79'

PURGE MEASUREMENTS

Depth to Water (ft)	Time 24 hr	Vol. (L/gal)	Temp (°C)	SC (µS/cm)	ORP (mV)	pH	Turbidity (NTU)	DO (%)	Comments DO mg/L
48.14	0757		START						
49.30	0815	5	17.80	606	169.7	6.57	1.15	17.8	1.69
49.50	0823	10	17.57	554	161.4	6.62	2.09	20.7	1.98
49.55	0832	15	17.58	496	156.0	6.71	1.92	29.5	2.82
49.58	0841	20	17.59	481	153.0	6.73	1.76	31.1	2.96
49.59	0850	25	17.42	490	151.2	6.74	0.86	31.7	3.04
49.60	0856	28	17.47	478	148.0	6.75	0.85	32.5	3.10
49.60	0900	30	17.50	488	146.1	6.74	0.98	31.9	3.04
49.60	0904	32	17.62	489	144.2	6.75	0.76	32.7	3.12
49.60	0908	34	17.71	490	142.9	6.76	0.61	32.6	3.10
49.60	0912	36	17.72	490	142.0	6.75	0.70	33.4	3.17
	0913		Sampling						
									~4.00 gals purged from tubing
									0806

FIELD MEASUREMENT LOG FOR GROUNDWATER SAMPLE COLLECTION

Project Name: SWMU 8/58	Project No.: 146422.10.11.01
Well I.D.: CCBA-MW 2	Date: 07/15/13
Well Condition:	Weather Condition:
Method: Portable pump X	Dedicated pump _____ Pump depth: 117'

PURGE MEASUREMENTS

Depth to Water (ft)	Time 24 hr	Vol. (L/gal)	Temp (°C)	SC (µS/cm)	ORP (mV)	pH	Turbidity (NTU)	DO (%)	Comments DO mg/L
71.75	0800	/	START						
72.22	0821	5	19.34	639	162.7	7.71	1.04	59.0	5.42
72.25	0830	10	18.14	626	146.8	7.72	1.07	57.8	5.44
72.22	0840	15	17.73	607	142.6	7.70	0.58	61.9	5.89
72.21	0855	20	17.53	577	137.9	7.70	0.46	64.3	5.99
72.10	0908	25	17.41	544	134.0	7.70	0.49	65.0	6.23
72.15	0916	28	17.34	534	133.0	7.70	0.50	64.8	6.21
72.15	0922	30	17.27	577	132.3	7.70	0.46	65.7	6.31
72.15	0928	32	17.21	579	132.1	7.70	0.42	66.5	6.39
72.15	0934	34	17.17	578	131.8	7.70	0.32	65.5	6.30
72.15	0940	36	17.13	579	130.3	7.70	0.36	65.7	6.32
	0941	/	SAMPLING						
									~4.00 gals purged from tubing
									0810

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GROUNDWATER SAMPLE COLLECTION FIELD EQUIPMENT CHECK LOG Page 1 of 2

SNL/NM Project Name: SWMU 8/58	SNL/NM Project No.: 146422.10.11.01
Calibrations done by: R Lynch	Date: 7/15/13

Make & Model: YSI 6920V2

YSI 6820 Sonde (S/N) with DO, Ec, pH, ORP, and temperature probes: 08H100032

YSI 650 MDS (S/N): NA

pH Calibration

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

Reference value:	4.00		7.00		10.00	
	Value	Temp	Value	Temp	Value	Temp
1. Time: 0656	4.02	19.8	7.00	19.8	10.01	19.8
2. Time: 1051	4.01	20.1	7.01	20.1	10.01	20.1
3. Time:						
4. Time:						
Standard lot no.:	3AD782		3AE725		3AD357	
Expiration date:	APR-15		MAY-15		APR-15	

SC Calibration

Reference Value: 1413 uS Standard Lot No.: 3AE221

Expiration Date: MAY-15

	Value	Temp
1. Time: 0659	1414	19.9
2. Time: 1054	1411	20.0
3. Time:		
4. Time:		

ORP Calibration

Reference Value: 200 mV Standard Lot No. 1305755

Expiration Date: JAN-14

	Value	Temp
1. Time: 0658	201.0	19.8
2. Time: 1053	200.7	20.2
3. Time:		
4. Time:		

DO Calibration

Calibration Value:	81% air saturation @ 5200 ft.	Atmospheric Pressure in Hg
1. Time: 0655	81.6	24.41
2. Time: 1050	81.6	24.40
3. Time:		
4. Time:		

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

SNL/NM Project Name: SWMU 8/58		Project No.: 146422.10.11.01		
Calibration done by: R Lynch		Date: 7/15/13		
TURBIDIMETER				
Make & Model: HACH 2100P HACH 2100Q		Serial No. S/N 10050C002896		
Reference Value	RL x 10	20	100	800
Standard Lot No.	0161	0168	0162	0161
1. Time 0753	10.2	19.7	99.8	795
2. Time 0949	10.1	19.9	99.6	794
3. Time				
4. Time				

Comments:

GROUNDWATER SAMPLE COLLECTION FIELD EQUIPMENT CHECK LOG Page 1 of 2

SNL/NM Project Name: SWMU 8/58	SNL/NM Project No.: 146422.10.11.01
Calibrations done by: R Lynch	Date: 7/16/13

Make & Model: YSI 6920V2

YSI 6820 Sonde (S/N) with DO, Ec, pH, ORP, and temperature probes: 08H100032

YSI 650 MDS (S/N): NA

pH Calibration

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

Reference value:	4.00		7.00		10.00	
	Value	Temp	Value	Temp	Value	Temp
1. Time: 0635	4.03	22.0	7.01	22.0	10.02	22.0
2. Time: 1042	4.02	21.7	7.01	21.7	10.01	21.7
3. Time:						
4. Time:						
Standard lot no.:	3AD782		3AE725		3AD357	
Expiration date:	APR-15		MAY-15		APR-15	

SC Calibration

Reference Value: 1413 uS | Standard Lot No.: 3AE221

Expiration Date: MAY-15

	Value	Temp
1. Time: 0639	1419	22.0
2. Time: 1045	1418	21.7
3. Time:		
4. Time:		

ORP Calibration

Reference Value: 200 mV | Standard Lot No. 1305755

Expiration Date: JAN-14

	Value	Temp
1. Time: 0637	199.9	21.9
2. Time: 1044	200.4	21.7
3. Time:		
4. Time:		

DO Calibration

Calibration Value:	81% air saturation @ 5200 ft.	Atmospheric Pressure in Hg
1. Time: 0634	81.9	24.49
2. Time: 1041	81.8	24.46
3. Time:		
4. Time:		

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

SNL/NM Project Name: SWMU 8/58		Project No.: 146422.10.11.01		
Calibration done by: R Lynch		Date: 7/16/13		
TURBIDIMETER				
Make & Model: HACH 2100P HACH 2100Q		Serial No. S/N 10050C002896		
Reference Value	~~25~~ 10	20	100	800
Standard Lot No.	0161	0168	0162	0161
1. Time 0749	10.1	19.7	101	803
2. Time 0933	10.3	20.1	104	802
3. Time				
4. Time				

Comments:

Portable Pump and Tubing / Water Level Indicator
Decontamination Log Form

Project Name: SWMU 8/58 GWM	**Monitoring Well ID # :** CCBA-MW2	**Date:** 7/15/13

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

Pump and Tubing Bundle ID #: 1807-32	**Water Level Indicator ID #:** 62187
Personnel Performing Decontamination: Robert Lynch (Print Name:) RL (Initial:) Tim Jackson (Print Name:) TJ (Initial:)	**Personnel Performing Decontamination:** Robert Lynch (Print Name:) RL (Initial:) Tim Jackson (Print Name:) TJ (Initial:)

Condition of Equipment

Pump: Good (high pressure) **Tubing Bundle:** Good **Water Level Indicator:** Good

List of Decontamination Materials

Distilled or **Deonized** (circle one)	**HNO_3**
Source: Culligan	**Grade:** Reagent
Lot Number: 070913	**UN #:** 2031
	Manufacturer: AROC
	Lot Number: A0305629

Portable Pump and Tubing / Water Level Indicator
Decontamination Log Form

Project Name: SWMU 8/58 GWM	**Monitoring Well ID # :** CCBA-MW1	**Date:** 7/16/13

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

Pump and Tubing Bundle ID #: 1807-32	**Water Level Indicator ID #:** 62187
Personnel Performing Decontamination: Robert Lynch (Print Name:) RL (Initial:) Tim Jackson (Print Name:) TJ (Initial:)	**Personnel Performing Decontamination:** Robert Lynch (Print Name:) RL (Initial:) Tim Jackson (Print Name:) TJ (Initial:)

Condition of Equipment

Pump: Good (high pressure) **Tubing Bundle:** Good **Water Level Indicator:** Good

List of Decontamination Materials

Distilled or **Deonized** (circle one)	**HNO_3**
Source: Culligan	**Grade:** Reagent
Lot Number: 070913	**UN #:** 2031
	Manufacturer: AROC
	Lot Number: A0305629

Groundwater Monitoring Waste Generation Log

Waste Generator : Robert Lynch **Phone:** 250-7090 project leader: Clinton Lum

Project Name	SWMU 8/58 GWM	SWMU 8/58 GWM	SWMU 8/58 GWM
Container ID # (site-date-sequence)	CCBA-MW2-071513-01	CCBA-MW2-071513-02	CCBA-071513
Initial Label Type (Hazardous or Non-Regulated)	non-Regulated	non-Regulated	non-Regulated
Waste Matrix (purge water, decon water, HACH Accu-Vac ampule)	Purge H2O	Purge H2O	Decon H2O
Container Type / Volume	CHPD/55-gal	CHPD/55-gal	CHPD/55-gal
Volume of Waste	19-gal	21-gal	35-gal
Total Container Weight	~150 lbs	~180 lbs	~230 lbs
COC#: Sample#-Fraction	614937 094371	614937 094371	614937 094371
Accumulation Date	Start: 7/15/13 Full: 7/15/13	Start: 7/15/13 Full: 7/15/13	Start: 7/15/13 Full: 7/15/13
Date Waste Moved to Accumulation Area	7/15/13	7/15/13	7/15/13
Accumulation Area Name	9925	9925	9925
Comments:			EB prior to CCBA-MW1

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Groundwater Monitoring Waste Generation Log

Waste Generator : Robert Lynch **Phone:** 250-7090 project leader: Clinton Lum

Project Name	SWMU 8/58 GWM	SWMU 8/58 GWM	SWMU 8/58 GWM
Container ID # (site-date-sequence)	CCBA-MW1-071613-01 T1	CCBA-MW1-071613-02	CCBA-071613
Initial Label Type (Hazardous or Non-Regulated)	non-Regulated	non-Regulated	non-Regulated
Waste Matrix (purge water, decon water, HACH Accu-Vac ampule)	Purge H2O	Purge H2O	Decon H2O
Container Type / Volume	CHPD/55-gal	CHPD/55-gal	CHPD/55-gal
Volume of Waste	19-gal	21-gal	30-gal
Total Container Weight	~150 lbs	~180 lbs	~230 lbs
COC#: Sample#-Fraction	614939 094376 094377	614939 094376 094377	614939 094376 094377
Accumulation Date	Start: 16/7/13 T1 Full: 16/7/13 T1	Start: 16/7/13 T1 Full: 16/7/13 T1	Start: 16/7/13 T1 Full: 16/7/13 T1
Date Waste Moved to Accumulation Area	16/7/13 T1	16/7/13 T1	16/7/13 T1
Accumulation Area Name	9925	9925	9925
Comments:			~~FB prior to CCBA-MW1~~ T1

TAILGATE SAFETY MEETING FORM

Dept: 4142 Well Location: CCBA-MW2 Date: 7/15/13 Time: 0752

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

Weather Conditions:
Temp: 68.9 °F Wind Speed: 15-20 MPH Humidity: 56.2 % Wind Chill 68.0 °F

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

Safety Topics Presented

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

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

Attendees

Printed Name	Signature
Robert Lynch	
Tim Jackson	

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TAILGATE SAFETY MEETING FORM

Dept: 4142 Well Location: CCBA-MW1 Date: 7/16/13 Time: 0748

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

Weather Conditions:
Temp: 69.4 °F Wind Speed: 0 MPH Humidity: 56.9 % Wind Chill NA °F

Chemicals Used: Acids in sample containers, standard solutions. ~~Hach ACCUVAC ampules~~
Other: _____

Safety Topics Presented

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

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

Attendees

Printed Name	Signature
Robert Lynch	Robert Lynch
Tim Jackson	Tim Jackson

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FIELD MEASUREMENT LOG FOR GROUNDWATER SAMPLE COLLECTION

Project Name: SWMU 68	Project No.: 146422.10.11.01
Well I.D.: OBS-MW 1	Date: 07/09/13
Well Condition:	Weather Condition:
Method: Portable pump X	Dedicated pump _____ Pump depth: 153'

PURGE MEASUREMENTS

Depth to Water (ft)	Time 24 hr	Vol. (L/gal)	Temp (°C)	SC (µS/cm)	ORP (mV)	pH	Turbidity (NTU)	DO (%)	Comments DO mg/L
72.64	0820	/	START						
72.70	0839	5	19.38	556	121.4	7.55	2.69	42.1	3.87
72.69	0848	10	18.42	548	113.9	7.55	1.59	48.0	4.63
72.70	0859	15	18.08	539	110.9	7.55	1.55	40.5	3.82
72.70	0909	20	17.96	526	110.7	7.55	0.75	40.6	3.84
72.70	0917	24	17.96	515	110.7	7.55	0.81	40.6	3.84
72.70	0921	26	18.05	502	109.9	7.55	0.56	41.7	3.93
72.70	0926	28	18.09	501	109.5	7.55	0.68	41.5	3.91
72.70	0930	30	18.12	500	109.2	7.56	0.64	41.1	3.87
72.70	0934	32	18.18	500	109.5	7.56	0.59	41.3	3.89
72.70	0939	34	18.31	501	109.1	7.56	0.60	42.0	3.94
72.70	0943	36	18.32	499	108.9	7.56	0.62	43.6	3.99
	0944	/	Sampling						
									~4.00 gals purged from tubin
									0830

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FIELD MEASUREMENT LOG FOR GROUNDWATER SAMPLE COLLECTION

Project Name: SWMU 68	Project No.: 146422.10.11.01
Well I.D.: OBS-MW 2	Date: 07/10/13
Well Condition:	Weather Condition:
Method: Portable pump X	Dedicated pump _____ Pump depth: 252'

PURGE MEASUREMENTS

Depth to Water (ft)	Time 24 hr	Vol. (L/gal)	Temp (°C)	SC (µS/cm)	ORP (mV)	pH	Turbidity (NTU)	DO (%)	Comments DO mg/L
173.82	0755	/	START						
174.86	0818	5	21.18	537	162.2	7.52	0.64	40.4	3.58
174.95	0828	10	20.24	521	149.7	7.52	0.52	39.6	3.58
174.99	0837	15	19.97	503	142.9	7.52	0.66	39.7	3.61
174.99	0847	20	19.90	488	138.4	7.53	0.82	39.6	3.60
174.95	0856	25	19.93	496	132.9	7.53	0.47	39.5	3.60
174.95	0902	28	19.87	494	130.5	7.53	0.77	38.7	3.52
174.92	0906	30	19.92	486	129.1	7.53	0.68	38.6	3.51
174.90	0910	32	19.99	480	127.8	7.53	0.67	38.8	3.52
174.96	0914	34	20.07	481	127.2	7.53	0.40	38.2	3.46
174.90	0918	36	20.17	482	124.5	7.53	0.43	38.3	3.47
	0919	/	Sampling						
									~4.00 gals purged from tubing
									0806

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FIELD MEASUREMENT LOG FOR GROUNDWATER SAMPLE COLLECTION

Project Name: SWMU 68	Project No.: 146422.10.11.01
Well I.D.: OBS-MW 3	Date: 07/11/13
Well Condition:	Weather Condition:
Method: Portable pump X	Dedicated pump _____ Pump depth: 208'

PURGE MEASUREMENTS

Depth to Water (ft)	Time 24 hr	Vol. (L/gal)	Temp (°C)	SC (µS/cm)	ORP (mV)	pH	Turbidity (NTU)	DO (%)	Comments DO mg/L
69.72	0758	✓	START						
74.45	0816	5	19.43	535	161.6	7.53	1.96	47.9	4.42
75.94	0825	10	18.43	519	140.9	7.53	1.92	46.7	4.37
76.80	0834	15	18.14	498	127.6	7.54	1.45	46.3	4.37
76.65	0844	20	18.30	473	115.7	7.54	0.77	46.3	4.35
76.45	0854	25	18.38	481	111.5	7.54	0.68	46.2	4.33
76.35	0901	28	18.34	471	107.9	7.56	0.78	46.0	4.32
76.25	0905	30	18.37	468	106.7	7.54	0.82	46.2	4.34
76.10	0910	32	18.38	470	106.6	7.55	0.53	50.7	4.76
76.00	0914	34	18.40	470	105.5	7.55	0.58	46.0	4.32
75.85	0919	36	18.43	471	103.2	7.55	0.69	46.3	4.33
	0920	✓	SAMPLING						
									~4.00 gals purged from tubing
									0807

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GROUNDWATER SAMPLE COLLECTION FIELD EQUIPMENT CHECK LOG Page 1 of 2

SNL/NM Project Name: SWMU 68	SNL/NM Project No.: 146422.10.11.01
Calibrations done by: R Lynch	Date: 7/9/13

Make & Model: YSI 6920V2

YSI 6820 Sonde (S/N) with DO, Ec, pH, ORP, and temperature probes: 08H100032

YSI 650 MDS (S/N): NA

pH Calibration

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

Reference value:	4.00		7.00		10.00	
	Value	Temp	Value	Temp	Value	Temp
1. Time: 0652	4.02	22.6	7.01	22.6	10.01	22.6
2. Time: 1245	4.03	23.6	7.01	23.6	10.02	23.6
3. Time:						
4. Time:						
Standard lot no.:	2AG653		2AH113		2AF557	
Expiration date:	JUL-14		AUG-14		JUL-14	

SC Calibration

Reference Value: 1413 uS | Standard Lot No.: 2AG086

Expiration Date: JUL-13

	Value	Temp
1. Time: 0655	1410	22.6
2. Time: 1247	1413	23.6
3. Time:		
4. Time:		

ORP Calibration

Reference Value: 200 mV | Standard Lot No. 1301187

Expiration Date: OCT-13

	Value	Temp
1. Time: 0654	200.7	22.7
2. Time: 1246	201.2	23.6
3. Time:		
4. Time:		

DO Calibration

Calibration Value:	81% air saturation @ 5200 ft.	Atmospheric Pressure in Hg
1. Time: 0650	82.0	24.53
2. Time: 1244	83.0	24.54
3. Time:		
4. Time:		

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

SNL/NM Project Name: SWMU 68		Project No.: 146422.10.11.01		
Calibration done by: R Lynch		Date: 7/9/13		
TURBIDIMETER				
Make & Model: HACH 2100P HACH 2100Q		Serial No. S/N 10050C002897		
Reference Value	RL 10	20	100	800
Standard Lot No.	0161	0168	0162	0161
1. Time 0806	10.1	19.8	102	795
2. Time 1003	10.2	19.7	103	797
3. Time				
4. Time				

Comments:

GROUNDWATER SAMPLE COLLECTION FIELD EQUIPMENT CHECK LOG Page 1 of 2

SNL/NM Project Name: SWMU 68	SNL/NM Project No.: 146422.10.11.01
Calibrations done by: R Lynch	Date: 7/10/13

Make & Model: YSI 6920V2

YSI 6820 Sonde (S/N) with DO, Ec, pH, ORP, and temperature probes: 08H100032

YSI 650 MDS (S/N): NA

pH Calibration

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

Reference value:	4.00		7.00		10.00	
	Value	Temp	Value	Temp	Value	Temp
1. Time: 0635	3.99	21.7	7.00	21.7	9.99	21.7
2. Time: 1111	4.01	22.4	7.01	22.4	10.02	22.4
3. Time:						
4. Time:						
Standard lot no.:	2AG653		2AH113		2AF557	
Expiration date:	JUL-14		AUG-14		JUL-14	

SC Calibration

Reference Value: 1413 uS Standard Lot No.: 2AG086

	Value	Temp	Expiration Date: JUL-13
1. Time: 0638	1407	21.6	
2. Time: 1115	1420	22.4	
3. Time:			
4. Time:			

ORP Calibration

Reference Value: 200 mV Standard Lot No. 1301187

	Value	Temp	Expiration Date: OCT-13
1. Time: 0637	199.9	21.6	
2. Time: 1113	201.6	22.4	
3. Time:			
4. Time:			

DO Calibration

Calibration Value:	81% air saturation @ 5200 ft.	Atmospheric Pressure in Hg
1. Time: 0634	81.8	24.50
2. Time: 1110	82.0	24.56
3. Time:		
4. Time:		

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

SNL/NM Project Name: SWMU 68		Project No.: 146422.10.11.01		
Calibration done by: R Lynch		Date: 7/10/13		
TURBIDIMETER				
Make & Model: HACH 2100P HACH 2100Q		Serial No. S/N 10050C002897		
Reference Value	RL 10	20	100	800
Standard Lot No.	0161	0168	0162	0161
1. Time 0750	10.4	20.1	99.8	795
2. Time 0930	10.1	19.9	101	797
3. Time				
4. Time				

Comments:

GROUNDWATER SAMPLE COLLECTION FIELD EQUIPMENT CHECK LOG Page 1 of 2

SNL/NM Project Name: SWMU 68	SNL/NM Project No.: 146422.10.11.01
Calibrations done by: R Lynch	Date: 7/11/13

Make & Model: YSI 6920V2

YSI 6820 Sonde (S/N) with DO, Ec, pH, ORP, and temperature probes: 08H100032

YSI 650 MDS (S/N): NA

pH Calibration

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

Reference value:	4.00		7.00		10.00	
	Value	Temp	Value	Temp	Value	Temp
1. Time: 0635	4.03	22.2	7.01	22.2	10.02	22.2
2. Time: 1050	4.02	21.8	7.02	21.8	10.01	21.8
3. Time:						
4. Time:						
Standard lot no.:	2AG653		2AH113		2AF557	
Expiration date:	JUL-14		AUG-14		JUL-14	

SC Calibration

Reference Value: 1413 uS Standard Lot No.: 2AG086

	Value	Temp	Expiration Date: JUL-13
1. Time: 0638	1418	22.2	
2. Time: 1053	1414	21.8	
3. Time:			
4. Time:			

ORP Calibration

Reference Value: 200 mV Standard Lot No. 1301187

	Value	Temp	Expiration Date: OCT-13
1. Time: 0637	201.3	22.2	
2. Time: 1052	201.1	21.8	
3. Time:			
4. Time:			

DO Calibration

Calibration Value:	81% air saturation @ 5200 ft.	Atmospheric Pressure in Hg
1. Time: 0634	82.0	24.51
2. Time: 1049	81.9	24.47
3. Time:		
4. Time:		

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

SNL/NM Project Name: SWMU 68		Project No.: 146422.10.11.01		
Calibration done by: R Lynch		Date: 7/11/13		
TURBIDIMETER				
Make & Model: HACH 2100P HACH 2100Q		Serial No. S/N 10050C002897		
Reference Value	~~0~~ 10	20	100	800
Standard Lot No.	0161	0168	0162	0161
1. Time 0750	10.4	20.2	101	798
2. Time 0942	10.1	19.9	102	794
3. Time				
4. Time				

Comments:

Portable Pump and Tubing / Water Level Indicator
Decontamination Log Form

Project Name: SWMU 68	**Monitoring Well ID # :** OBS-MW 1	**Date:** 07/09/13

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

Pump and Tubing Bundle ID #: 1806-792	**Water Level Indicator ID #:** 62187
Personnel Performing Decontamination: Robert Lynch (Print Name:) RL (Initial:) Tim Jackson (Print Name:) TJ (Initial:)	**Personnel Performing Decontamination:** Robert Lynch (Print Name:) RL (Initial:) Tim Jackson (Print Name:) TJ (Initial:)

Condition of Equipment

Pump: GOOD **Tubing Bundle:** GOOD **Water Level Indicator:** GOOD

List of Decontamination Materials

Distilled or **Deonized** (circle one)	**HNO_3**
Source: Culligan	**Grade:** Reagent
Lot Number: 062013	**UN #:** 2031
	Manufacturer: ARCO
	Lot Number: A0305629

Portable Pump and Tubing / Water Level Indicator
Decontamination Log Form

Project Name: SWMU 68 GWM	**Monitoring Well ID # :** OBS-MW2	**Date:** 7/10/13

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

Pump and Tubing Bundle ID #: 807-132	**Water Level Indicator ID #:** 62187
Personnel Performing Decontamination: Robert Lynch (Print Name:) RL (Initial:) Tim Jackson (Print Name:) TJ (Initial:)	**Personnel Performing Decontamination:** Robert Lynch (Print Name:) RL (Initial:) Tim Jackson (Print Name:) TJ (Initial:)

Condition of Equipment

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

List of Decontamination Materials

Distilled or **Deonized** (circle one)	**HNO_3**
Source: Culligan	**Grade:** Reagent
Lot Number: 062013	**UN #:** 2031
	Manufacturer: AROC
	Lot Number: A0305629

Portable Pump and Tubing / Water Level Indicator
Decontamination Log Form

Project Name: SWMU 68 GWM	**Monitoring Well ID # :** OBS-MW3	**Date:** 7/11/13

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

Pump and Tubing Bundle ID #: 807-132	**Water Level Indicator ID #:** 62187
Personnel Performing Decontamination: Robert Lynch (RL) Print Name: Initial: Tim Jackson (TJ) Print Name: Initial:	**Personnel Performing Decontamination:** Robert Lynch (RL) Print Name: Initial: Tim Jackson (TJ) Print Name: Initial:

Condition of Equipment

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

List of Decontamination Materials

Distilled or **Deonized** (circle one)	**HNO_3**
Source: Culligan	**Grade:** Reagent
Lot Number: 062013	**UN #:** 2031
	Manufacturer: AROC
	Lot Number: A0305629

Groundwater Monitoring Waste Generation Log

Waste Generator : R Lynch **Phone:** 844-4013 project leader: Clinton Lum

Project Name	SWMU 68 GWM	SWMU 68 GWM	SWMU 68 GWM
Container ID # (site-date-sequence)	OBS-MW1-070913-01	mw1- OBS-070913-02	OBS-070913
Initial Label Type (Hazardous or Non-Regulated)	non-Regulated	non-Regulated	non-Regulated
Waste Matrix (purge water, decon water, HACH Accu-Vac ampule)	Purge H2O	Purge H2O	Decon H2O
Container Type / Volume	CHPD/55-gal	CHPD/55-gal	CHPD/55-gal
Volume of Waste	19-gal	21-gal	35-gal
Total Container Weight	~180 lbs	~200 lbs	~270 lbs
COC#: Sample#-Fraction	614933 094361	614933 094361	614933 094361
Accumulation Date	Start: 070913 Full: 070913	Start: 070913 Full: 070913	Start: 070913 Full: 070913
Date Waste Moved to Accumulation Area	070913	070913	070913
Accumulation Area Name	9925	9925	9925
Comments:			

Groundwater Monitoring Waste Generation Log

Waste Generator : Robert Lynch **Phone:** 250-7090 project leader: Mike Skelly

Project Name	SWMU 68 GWM	SWMU 68 GWM	SWMU 68 GWM
Container ID # (site-date-sequence)	OBS-MW2-071013-01	OBS-MW2-071013-02	OBS-071013
Initial Label Type (Hazardous or Non-Regulated)	non-Regulated	non-Regulated	non-Regulated
Waste Matrix (purge water, decon water, HACH Accu-Vac ampule)	Purge H2O	Purge H2O	Decon H2O
Container Type / Volume	CHPD/55-gal	CHPD/55-gal	CHPD/55-gal
Volume of Waste	19-gal	21-gal	30-gal
Total Container Weight	~180 lbs	~200 lbs	~210 lbs
COC#: Sample#-Fraction	614935 094365 094366	614935 094365 094366	614935 094365 094366
Accumulation Date	Start: 7/10/13 Full: 7/10/13	Start: 7/10/13 Full: 7/10/13	Start: 7/10/13 Full: 7/10/13
Date Waste Moved to Accumulation Area	7/10/13	7/10/13	7/10/13
Accumulation Area Name	9925	9925	9925
Comments:			

Groundwater Monitoring Waste Generation Log

Waste Generator : Robert Lynch **Phone:** 250-7090 project leader: Mike Skelly

Project Name	SWMU 68 GWM	SWMU 68 GWM	SWMU 68 GWM
Container ID # (site-date-sequence)	OBS-MW3-071113-01	OBS-MW3-071113-02	OBS-071113
Initial Label Type (Hazardous or Non-Regulated)	non-Regulated	non-Regulated	non-Regulated
Waste Matrix (purge water, decon water, HACH Accu-Vac ampule)	Purge H2O	Purge H2O	Decon H2O
Container Type / Volume	CHPD/55-gal	CHPD/55-gal	CHPD/55-gal
Volume of Waste	19-gal	21-gal	30-gal
Total Container Weight	~180 lbs	~200 lbs	~270 lbs
COC#: Sample#-Fraction	614936 094368	614936 094368	614936 094368
Accumulation Date	Start: 7/11/13 Full: 7/11/13	Start: 7/11/13 Full: 7/11/13	Start: 7/11/13 Full: 7/11/13
Date Waste Moved to Accumulation Area	7/11/13	7/11/13	7/11/13
Accumulation Area Name	9925	9925	9925
Comments:			

TAILGATE SAFETY MEETING FORM

Dept: 4142 Well Location: OBS-MW1 Date: 7/9/13 Time: 0800

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

Weather Conditions:
Temp: 73.0 °F Wind Speed: 0 MPH Humidity: 61.6 % Wind Chill NA °F

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

Safety Topics Presented

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

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

Attendees

Printed Name	Signature
Robert Lynch	Robert Lynch
Tim Jackson	Tim Jackson

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TAILGATE SAFETY MEETING FORM

Dept: 4142 Well Location: OBS-MW 2 Date: 7/10/13 Time: 0746

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

Weather Conditions:
Temp: 75.2 °F Wind Speed: Ø MPH Humidity: 51.4 % Wind Chill NA °F

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

Safety Topics Presented

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

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

Attendees

Printed Name	Signature
Robert Lynch	
Tim Jackson	

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TAILGATE SAFETY MEETING FORM

Dept: 4142 Well Location: OBS-MW3 Date: 7/11/13 Time: 0745

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

Weather Conditions:
Temp: 73.2 °F Wind Speed: 0 MPH Humidity: 53.0% Wind Chill NA °F

Chemicals Used: Acids in sample containers, standard solutions. ~~Hach ACCUVAC sampler~~
Other:

Safety Topics Presented

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

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

Attendees

Printed Name	Signature
Robert Lynch	
Tim Jackson	

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

CONTRACT LABORATORY
ANALYSIS REQUEST AND CHAIN OF CUSTODY

Internal Lab

Batch No. N/A

SMO Use

AR/COC 614939

Project Name:	SWMU 8/58 GWM	Date Samples Shipped:	7/16/13	SMO Authorization:	☐ Waste Characterization
Project/Task Manager:	Clinton Lum	Carrier/Waybill No.	207015	SMO Contact Phone:	☐ RMMA
Project/Task Number:	98026.01.12	Lab Contact:	Edie Kent/803-556-8171	Lorraine Herrera/505-844-3199	☐ Released by COC No.
Service Order:	CF 262-13	Lab Destination:	GEL	Send Report to SMO:	☑ 4° Celsius
		Contract No.:	PO 1303873	Rita Kavanaugh/505-284-2553	Bill to:Sandia National Laboratories (Accounts Payable), P.O. Box 5800, MS-0154 Albuquerque, NM 87185-0154
Tech Area:					
Building:	Room:	Operational Site:			

Sample No.	Fraction	Sample Location Detail	Depth (ft)	Date/Time Collected	Sample Matrix	Container Type	Container Volume	Preservative	Collection Method	Sample Type	Parameter & Method Requested	Lab Sample ID
094376	-001	CCBA-MW1	79	7/16/13 9:13	GW	G	3x40ml	HCL	G	SA	TCL VOC (SW846-8260B)	
094376	-002	CCBA-MW1	79	7/16/13 9:14	GW	AG	4x1L	None	G	SA	TCL SVOC (SW846-8270C)	
094376	-009	CCBA-MW1	79	7/16/13 9:16	GW	P	500 ml	HNO3	G	SA	TAL Metals+U(SW846-6010/6020/7470)	
094376	-016	CCBA-MW1	79	7/16/13 9:17	GW	P	125 ml	None	G	SA	Anions(SW846-9056))	
094376	-017	CCBA-MW1	79	7/16/13 9:18	FGW	P	250 ml	HNO3	G	SA	Metals-Ca,Mg,K,Na(SW846-6020)	
094376	-018	CCBA-MW1	79	7/16/13 9:19	GW	P	125 ml	H2SO4	G	SA	NPN (EPA 353.2)	
094376	-020	CCBA-MW1	79	7/16/13 9:20	GW	P	250 ml	None	G	SA	Perchlorate (EPA 314.0)	
094376	-022	CCBA-MW1	79	7/16/13 9:21	GW	P	500 ml	None	G	SA	Alkalinity (SM2320B)	
094376	-024	CCBA-MW1	79	7/16/13 9:22	GW	AG	4x1L	None	G	SA	High Explosives (SW846-8321A Mod.	
094376	-027	CCBA-MW1	79	7/16/13 9:25	GW	P	250 ml	NaOH	G	SA	Total Cyanide (SW846-9012	

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

Special Instructions/QC Requirements:

EDD ☑ Yes ☐ No

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

Negotiated TAT ☐

Sample Disposal ☐ Return to Client ☑ Disposal by Lab

Return Samples By:

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

FGW(filtered in field w/0.45 micron filter) Anions(Br,Cl,F,SO4)Alkalinity(total CaCO3,HCO3,CO3). If perchlorate detected,perform verification analysis using SW846-6850M.Gamma Spectroscopy as short list isotopes.

Conditions on Receipt

Lab Use

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

1.Relinquished by	T-Jackson	Org.	4142	Date	7/16/13	Time	1005	3.Relinquished by	Org. Date Time
1. Received by	SMO	Org.	4142	Date	7/16/13	Time	1005	3. Received by	Org. Date Time
2.Relinquished by		Org.		Date		Time		4.Relinquished by	Org. Date Time
2. Received by		Org.		Date		Time		4. Received by	Org. Date Time

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

CONTRACT LABORATORY
ANALYSIS REQUEST AND CHAIN OF CUSTODY (Continuation)

AR/COC 614939

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

Sample No.	Fraction	Sample Location Detail	Depth (ft)	Date/Time Collected	Sample Matrix	Container Type	Container Volume	Preserv-ative	Collection Method	Sample Type	Parameter & Method Requested	Lab Sample ID
094376	-033	CCBA-MW1	79	7/16/13 9:26	GW	P	1 L	HNO3	G	SA	Gamma Spectroscopy (EPA 901.0)	
094376	-034	CCBA-MW1	79	7/16/13 9:27	GW	P	1 L	HNO3	G	SA	Gross Alpha and Beta (EPA 900.0)	
094376	-035	CCBA-MW1	79	7/16/13 9:28	GW	P	1 L	HNO3	G	SA	Isotopic Uranium (HASL 300)	
094377	-001	CCBA-MW1	79	7/16/13 9:13	GW	G	3x40ml	HCL	G	DU	TCL VOC (SW846-8260B)	
094377	-002	CCBA-MW1	79	7/16/13 9:15	GW	AG	4x1L	None	G	DU	TCL SVOC (SW846-8270C)	
094377	-009	CCBA-MW1	79	7/16/13 9:16	GW	P	500 ml	HNO3	G	DU	TAL Metals+U(SW846-6010/6020/7470)	
094377	-016	CCBA-MW1	79	7/16/13 9:17	GW	P	125 ml	None	G	DU	Anions(SW846-9056))	
094377	-017	CCBA-MW1	79	7/16/13 9:18	FGW	P	250 ml	HNO3	G	DU	Metals-Ca,Mg,K,Na(SW846-6020)	
094377	-018	CCBA-MW1	79	7/16/13 9:19	GW	P	125 ml	H2SO4	G	DU	NPN (EPA 353.2)	
094377	-020	CCBA-MW1	79	7/16/13 9:20	GW	P	250 ml	None	G	DU	Perchlorate (EPA 314.0)	
094377	-022	CCBA-MW1	79	7/16/13 9:21	GW	P	500 ml	None	G	DU	Alkalinity (SM2320B)	
094377	-024	CCBA-MW1	79	7/16/13 9:24	GW	AG	4x1L	None	G	DU	High Explosives (SW846-8321A)	
094377	-027	CCBA-MW1	79	7/16/13 9:25	GW	P	250 ml	NaOH	G	DU	Total Cyanide (SW846-9012	
094377	-033	CCBA-MW1	79	7/16/13 9:26	GW	P	1 L	HNO3	G	DU	Gamma Spectroscopy (EPA 901.0)	
094377	-034	CCBA-MW1	79	7/16/13 9:27	GW	P	1 L	HNO3	G	DU	Gross Alpha and Beta (EPA 900.0)	
094377	-035	CCBA-MW1	79	7/16/13 9:28	GW	P	1 L	HNO3	G	DU	Isotopic Uranium (HASL 300)	
094378	-001	CCBA-TB3	NA	7/16/13 9:13	DIW	G	3x40ml	HCL	G	TB	TCL VOC (SW846-8260B)	

Recipient Initials_____

SMO 2012-ARCOC (4-2012)

CONTRACT LABORATORY
ANALYSIS REQUEST AND CHAIN OF CUSTODY

AOP 95-16

Internal Lab

Batch No. N/A

SMO Use

AR/COC 614937

Project Name:	SWMU 8/58 GWM	Date Samples Shipped:	7/15/13	SMO Authorization:	☐ Waste Characterization
Project/Task Manager:	Clinton Lum	Carrier/Waybill No.		SMO Contact Phone:	☐ RMMA
Project/Task Number:	98026.01.12	Lab Contact:	Edie Kent/803-556-8171	Lorraine Herrera/505-844-3199	☐ Released by COC No.
Service Order:	CF 262-13	Lab Destination:	GEL	Send Report to SMO:	☑ 4° Celsius
		Contract No.:	PO 1303873	Rita Kavanaugh/505-284-2553	Bill to:Sandia National Laboratories (Accounts Payable), P.O. Box 5800, MS-0154 Albuquerque, NM 87185-0154
Tech Area:					
Building:	Room:	Operational Site:			

Sample No.	Fraction	Sample Location Detail	Depth (ft)	Date/Time Collected	Sample Matrix	Container Type	Container Volume	Preserv-ative	Collection Method	Sample Type	Parameter & Method Requested	Lab Sample ID
094371	-001	CCBA-MW2	117	7/15/13 9:41	GW	G	3x40ml	HCL	G	SA	TCL VOC (SW846-8260B)	
094371	-002	CCBA-MW2	117	7/15/13 9:42	GW	AG	4x1L	None	G	SA	TCL SVOC (SW846-8270C)	
094371	-009	CCBA-MW2	117	7/15/13 9:44	GW	P	500 ml	HNO3	G	SA	TAL Metals+U(SW846-6010/6020/7470)	
094371	-016	CCBA-MW2	117	7/15/13 9:45	GW	P	125 ml	None	G	SA	Anions(SW846-9056))	
094371	-017	CCBA-MW2	117	7/15/13 9:46	FGW	P	250 ml	HNO3	G	SA	Metals-Ca,Mg,K,Na(SW846-6020)	
094371	-018	CCBA-MW2	117	7/15/13 9:47	GW	P	125 ml	H2SO4	G	SA	NPN (EPA 353.2)	
094371	-020	CCBA-MW2	117	7/15/13 9:48	GW	P	250 ml	None	G	SA	Perchlorate (EPA 314.0)	
094371	-022	CCBA-MW2	117	7/15/13 9:49	GW	P	500 ml	None	G	SA	Alkalinity (SM2320B)	
094371	-024	CCBA-MW2	117	7/15/13 9:50	GW	AG	4x1L	None	G	SA	High Explosives (SW846-8321A Mod.	
094371	-027	CCBA-MW2	117	7/15/13 9:51	GW	P	250 ml	NaOH	G	SA	Total Cyanide (SW846-9012	

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

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

Sample Disposal ☐ Return to Client ☑ Disposal by Lab

Return Samples By:

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

FGW(filtered in field w/0.45 micron filter) Anions(Br,Cl,F,SO4)Alkalinity(total CaCO3,HCO3,CO3). If perchlorate detected,perform verification analysis using SW846-6850M.Gamma Spectroscopy as short list isotopes.

Conditions on Receipt

Lab Use

1.Relinquished by	Tim Jackson	Org.	4142	Date	7/15/13	Time	1025	3.Relinquished by	Org.	Date	Time
1. Received by	SMO	Org.	4142	Date	7/15/13	Time	1025	3. Received by	Org.	Date	Time
2.Relinquished by		Org.		Date		Time		4.Relinquished by	Org.	Date	Time
2. Received by		Org.		Date		Time		4. Received by	Org.	Date	Time

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

SMO 2012-ARCOC (4-2012)

CONTRACT LABORATORY
ANALYSIS REQUEST AND CHAIN OF CUSTODY (Continuation)

AOP 95-16

AR/COC 614937

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

Sample No.	Fraction	Sample Location Detail	Depth (ft)	Date/Time Collected	Sample Matrix	Container Type	Container Volume	Preserv-ative	Collection Method	Sample Type	Parameter & Method Requested	Lab Sample ID
094371	-033	CCBA-MW2	117	7/15/13 9:52	GW	P	1 L	HNO3	G	SA	Gamma Spectroscopy (EPA 901.0)	
094371	-034	CCBA-MW2	117	7/15/13 9:53	GW	P	1 L	HNO3	G	SA	Gross Alpha and Beta (EPA 900.0)	
094371	-035	CCBA-MW2	117	7/15/13 9:54	GW	P	1 L	HNO3	G	SA	Isotopic Uranium (HASL 300)	
094372	-001	CCBA-TB1	NA	7/15/13 9:40	DIW	G	3x40ml	HCL	G	TB	TCL VOC (SW846-8260B)	
094373	-001	CCBA-FB1	NA	7/15/13 9:40	DIW	G	3x40ml	HCL	G	FB	TCL VOC (SW846-8260B)	

Recipient Initials_____

SMO 2012-ARCOC (4-2012)

AOP 95-16

CONTRACT LABORATORY
ANALYSIS REQUEST AND CHAIN OF CUSTODY

Internal Lab

Batch No. N/A

SMO Use

AR/COC 614938

Project Name:	SWMU 8/58 GWM	Date Samples Shipped:	7/15/13	SMO Authorization:	☐ Waste Characterization
Project/Task Manager:	Clinton Lum	Carrier/Waybill No.	206946	SMO Contact Phone:	☐ RMMA
Project/Task Number:	98026.01.12	Lab Contact:	Edie Kent/803-556-8171	Lorraine Herrera/505-844-3199	☐ Released by COC No.
Service Order:	CF 262-13	Lab Destination:	GEL	Send Report to SMO:	☑ 4° Celsius
		Contract No.:	PO 1303873	Rita Kavanaugh/505-284-2553	Bill to:Sandia National Laboratories (Accounts Payable), P.O. Box 5800, MS-0154 Albuquerque, NM 87185-0154
Tech Area:					
Building:	Room:	Operational Site:			

Sample No.	Fraction	Sample Location Detail	Depth (ft)	Date/Time Collected	Sample Matrix	Container Type	Container Volume	Preservative	Collection Method	Sample Type	Parameter & Method Requested	Lab Sample ID
094374	-001	CCBA-EB1	NA	7/15/13 10:50	DIW	G	3x40ml	HCL	G	EB	TCL VOC (SW846-8260B)	
094374	-002	CCBA-EB1	NA	7/15/13 10:51	DIW	AG	4x1L	None	G	EB	TCL SVOC (SW846-8270C)	
094374	-009	CCBA-EB1	NA	7/15/13 10:52	DIW	P	500 ml	HNO3	G	EB	TAL Metals+U(SW846-6010/6020/7470)	
094374	-016	CCBA-EB1	NA	7/15/13 10:53	DIW	P	125 ml	None	G	EB	Anions(SW846-9056))	
094374	-017	CCBA-EB1	NA	7/15/13 10:54	FDIW	P	250 ml	HNO3	G	EB	Metals-Ca,Mg,K,Na(SW846-6020)	
094374	-018	CCBA-EB1	NA	7/15/13 10:55	DIW	P	125 ml	H2SO4	G	EB	NPN (EPA 353.2)	
094374	-020	CCBA-EB1	NA	7/15/13 10:56	DIW	P	250 ml	None	G	EB	Perchlorate (EPA 314.0)	
094374	-022	CCBA-EB1	NA	7/15/13 10:57	DIW	P	500 ml	None	G	EB	Alkalinity (SM2320B)	
094374	-024	CCBA-EB1	NA	7/15/13 10:58	DIW	AG	4x1L	None	G	EB	High Explosives (SW846-8321A Mod.	
094374	-027	CCBA-EB1	NA	7/15/13 10:59	DIW	P	250 ml	NaOH	G	EB	Total Cyanide (SW846-9012	

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

Special Instructions/QC Requirements:

EDD ☑ Yes ☐ No

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

Negotiated TAT ☐

Sample Disposal ☐ Return to Client ☑ Disposal by Lab

Return Samples By:

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

FDIW(filtered in field w/0.45 micron filter) Anions(Br,Cl,F,SO4)Alkalinity(total CaCO3,HCO3,CO3). If perchlorate detected,perform verification analysis using SW846-6850M.Gamma Spectroscopy as short list isotopes.

Conditions on Receipt

Lab Use

Sample Team Members	Name	Signature	Init.	Company/Organization/Phone/Cell
	Robert Lynch		RL	SNL/4142/505-844-4013/505-250-7090
	Tim Jackson		TJ	SNL/4142/505-284-2547/505-269-6639

1.Relinquished by		Org. 4142	Date 7/15/13	Time 1130	3.Relinquished by	Org.	Date	Time
1. Received by		Org. 4142	Date 7/15/13	Time 1130	3. Received by	Org.	Date	Time
2.Relinquished by		Org.	Date	Time	4.Relinquished by	Org.	Date	Time
2. Received by		Org.	Date	Time	4. Received by	Org.	Date	Time

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

SMO 2012-ARCOC (4-2012)

AOP 95-16

CONTRACT LABORATORY
ANALYSIS REQUEST AND CHAIN OF CUSTODY (Continuation)

AR/COC 614938

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

Sample No.	Fraction	Sample Location Detail	Depth (ft)	Date/Time Collected	Sample Matrix	Container Type	Container Volume	Preserv-ative	Collection Method	Sample Type	Parameter & Method Requested	Lab Sample ID
094374	-033	CCBA-EB1	NA	7/15/13 11:00	DIW	P	1 L	HNO3	G	EB	Gamma Spectroscopy (EPA 901.0)	
094374	-034	CCBA-EB1	NA	7/15/13 11:01	DIW	P	1 L	HNO3	G	EB	Gross Alpha and Beta (EPA 900.0)	
094374	-035	CCBA-EB1	NA	7/15/13 11:02	DIW	P	1 L	HNO3	G	EB	Isotopic Uranium (HASL 300)	
094375	-001	CCBA-TB2	NA	7/15/13 10:50	DIW	G	3x40ml	HCL	G	TB	TCL VOC (SW846-8260B)	

Recipient Initials_____

SMO 2012-ARCOC (4-2012)

AOP 95-16

CONTRACT LABORATORY
ANALYSIS REQUEST AND CHAIN OF CUSTODY

Internal Lab

Page 1 of 2

Batch No. NA

SMO Use

AR/COC 614933

Project Name:	SWMU 68 GWM	Date Samples Shipped:		SMO Authorization: Don Watenpaugh	☐ Waste Characterization
Project/Task Manager:	Clinton Lum	Carrier/Waybill No.		SMO Contact Phone:	☐ RMMA
Project/Task Number:	98026.01.13	Lab Contact:	Edie Kent/803-556-8171	Lorraine Herrera/505-844-3199	☐ Released by COC No.
Service Order:	CF 263-13	Lab Destination:	GEL	Send Report to SMO:	☑ 4° Celsius
		Contract No.:	PO 1303873	Rita Kavanaugh/505-284-2553	Bill to: Sandia National Laboratories (Accounts Payable), P.O. Box 5800, MS-0154 Albuquerque, NM 87185-0154
Tech Area:					
Building:	Room:	Operational Site:			

Sample No.	Fraction	Sample Location Detail	Depth (ft)	Date/Time Collected	Sample Matrix	Container Type	Container Volume	Preservative	Collection Method	Sample Type	Parameter & Method Requested	Lab Sample ID
094361	-001	OBS-MW1	153	7/9/13 9:44	GW	G	3x40ml	HCL	G	SA	TCL VOC (SW846-8260B)	
094361	-002	OBS-MW1	153	7/9/13 9:46	GW	AG	4x1L	None	G	SA	TCL SVOC (SW846-8270C)	
094361	-009	OBS-MW1	153	7/9/13 9:50	GW	P	500 ml	HNO3	G	SA	TAL Metals+U(SW846-6010/6020/7470)	
094361	-014	OBS-MW1	153	7/9/13 9:51	GW	P	250 ml	None	G	SA	Hexavalent Chromium(SW846-7196A	
094361	-016	OBS-MW1	153	7/9/13 9:52	GW	P	125 ml	None	G	SA	Anions(SW846-9056))	
094361	-017	OBS-MW1	153	7/9/13 9:53	FGW	P	250 ml	HNO3	G	SA	Metals-Ca,Mg,K,Na(SW846-6020)	
094361	-018	OBS-MW1	153	7/9/13 9:54	GW	P	125 ml	H2SO4	G	SA	NPN (EPA 353.2)	
094361	-020	OBS-MW1	153	7/9/13 9:55	GW	P	250 ml	None	G	SA	Perchlorate (EPA 314.0)	
094361	-022	OBS-MW1	153	7/9/13 9:56	GW	P	500 ml	None	G	SA	Alkalinity (SM2320B)	
094361	-024	OBS-MW1	153	7/9/13 10:00	GW	AG	4x1L	None	G	SA	High Explosives (SW846-8321A)	

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

Conditions on Receipt

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

Comments: Send report to Tim Jackson/4142/MS 0729/284-2547
FGW(filtered in field w/45 micron filter) Anions(Br,Cl,F,SO4)Alkalinity(total CaCO3,HCO3,CO3) if perchlorate detected,perform Verification analysis using SW846-6850M.Gamma Spectroscopy as short list isotopes.

Lab Use

1.Relinquished by	Tim Jackson	Org. 4142	Date 7/9/13	Time 1033	3.Relinquished by	Org.	Date	Time
1. Received by	Don Watenpaugh	Org. 4142	Date 7/9/13	Time 1033	3. Received by	Org.	Date	Time
2.Relinquished by		Org.	Date	Time	4.Relinquished by	Org.	Date	Time
2. Received by		Org.	Date	Time	4. Received by	Org.	Date	Time

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

CONTRACT LABORATORY
ANALYSIS REQUEST AND CHAIN OF CUSTODY (Continuation)

AR/COC 614933

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

Sample No.	Fraction	Sample Location Detail	Depth (ft)	Date/Time Collected	Sample Matrix	Container Type	Container Volume	Preservative	Collection Method	Sample Type	Parameter & Method Requested	Lab use Lab Sample ID
094361	-027	OBS-MW1	153	7/9/13 10:01	GW	P	250 ml	NaOH	G	SA	Total Cyanide (SW846-9012	
094361	-033	OBS-MW1	153	7/9/13 10:02	GW	P	1 L	HNO3	G	SA	Gamma Spectroscopy (EPA 901.0)	
094361	-034	OBS-MW1	153	7/9/13 10:03	GW	P	1 L	HNO3	G	SA	Gross Alpha and Beta (EPA 900.0)	
094361	-035	OBS-MW1	153	7/9/13 10:04	GW	P	1 L	HNO3	G	SA	Isotopic Uranium (HASL 300)	
094362	-001	OBS-TB1	NA	7/9/13 9:44	DIW	G	3x40ml	HCL	G	TB	TCL VOC (SW846-8260B)	

Recipient Initials_____

CONTRACT LABORATORY
ANALYSIS REQUEST AND CHAIN OF CUSTODY

Internal Lab

Batch No. N/A

SMO Use

AR/COC 614935

Project Name:	SWMU 68 GWM	Date Samples Shipped:	7/10/13	SMO Authorization:	☐ Waste Characterization
Project/Task Manager:	Clinton Lum	Carrier/Waybill No.	20 0271	SMO Contact Phone:	☐ RMMA
Project/Task Number:	98026.01.13	Lab Contact:	Edie Kent/803-556-8171	Lorraine Herrera/505-844-3199	☐ Released by COC No.
Service Order:	CF 263-13	Lab Destination:	GEL	Send Report to SMO:	☑ 4° Celsius
		Contract No.:	PO 1303873	Rita Kavanaugh/505-284-2553	Bill to:Sandia National Laboratories (Accounts Payable), P.O. Box 5800, MS-0154 Albuquerque, NM 87185-0154
Tech Area:					
Building:	Room:	Operational Site:			

Sample No.	Fraction	Sample Location Detail	Depth (ft)	Date/Time Collected	Sample Matrix	Container Type	Container Volume	Preserv-ative	Collection Method	Sample Type	Parameter & Method Requested	Lab Sample ID
094365	-001	OBS-MW2	252	7/10/13 9:19	GW	G	3x40ml	HCL	G	SA	TCL VOC (SW846-8260B)	
094365	-002	OBS-MW2	252	7/10/13 9:22	GW	AG	4x1L	None	G	SA	TCL SVOC (SW846-8270C)	
094365	-009	OBS-MW2	252	7/10/13 9:25	GW	P	500 ml	HNO3	G	SA	TAL Metals+U(SW846-6010/6020/7470)	
094365	-014	OBS-MW2	252	7/10/13 9:26	GW	P	250 ml	None	G	SA	Hexavalent Chromium(SW846-7196A	
094365	-016	OBS-MW2	252	7/10/13 9:27	GW	P	125 ml	None	G	SA	Anions(SW846-9056))	
094365	-017	OBS-MW2	252	7/10/13 9:28	FGW	P	250 ml	HNO3	G	SA	Metals-Ca,Mg,K,Na(SW846-6020)	
094365	-018	OBS-MW2	252	7/10/13 9:29	GW	P	125 ml	H2SO4	G	SA	NPN (EPA 353.2)	
094365	-020	OBS-MW2	252	7/10/13 9:30	GW	P	250 ml	None	G	SA	Perchlorate (EPA 314.0)	
094365	-022	OBS-MW2	252	7/10/13 9:31	GW	P	500 ml	None	G	SA	Alkalinity (SM2320B)	
094365	-024	OBS-MW2	252	7/9/13 9:33	GW	AG	4x1L	None	G	SA	High Explosives (SW846-8321A)	

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

Special Instructions/QC Requirements:

EDD ☑ Yes ☐ No

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

Negotiated TAT ☐

Sample Disposal ☐ Return to Client ☐ Disposal by Lab

Return Samples By:

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

FGW(filtered in field w/0.45 micron filter) Anions(Br,Cl,F,SO4)Alkalinity(total CaCO3,HCO3,CO3) if perchlorate detected,perform verification analysis using SW846-6850M.Gamma Spectroscopy as short list isotopes.

Conditions on Receipt

Lab Use

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

1.Relinquished by	T Jackson	Org.	4142	Date	7/10/13	Time	1010
1. Received by	Clinton Lum SMO	Org.	4142	Date	7/10/13	Time	1010
2.Relinquished by		Org.		Date		Time	
2. Received by		Org.		Date		Time	
3.Relinquished by		Org.		Date		Time	
3. Received by		Org.		Date		Time	
4.Relinquished by		Org.		Date		Time	
4. Received by		Org.		Date		Time	

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

CONTRACT LABORATORY
ANALYSIS REQUEST AND CHAIN OF CUSTODY (Continuation)

AR/COC 614935

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

Sample No.	Fraction	Sample Location Detail	Depth (ft)	Date/Time Collected	Sample Matrix	Container Type	Container Volume	Preserv-ative	Collection Method	Sample Type	Parameter & Method Requested	Lab Sample ID
094365	-027	OBS-MW2	252	7/10/13 9:36	GW	P	250 ml	NaOH	G	SA	Total Cyanide (SW846-9012	
094365	-033	OBS-MW2	252	7/10/13 9:37	GW	P	1 L	HNO3	G	SA	Gamma Spectroscopy (EPA 901.0)	
094365	-034	OBS-MW2	252	7/10/13 9:38	GW	P	1 L	HNO3	G	SA	Gross Alpha and Beta (EPA 900.0)	
094365	-035	OBS-MW2	252	7/10/13 9:39	GW	P	1 L	HNO3	G	SA	Isotopic Uranium (HASL 300)	
094366	-001	OBS-MW2	252	7/10/13 9:20	GW	G	3x40ml	HCL	G	DU	TCL VOC (SW846-8260B)	
094366	-002	OBS-MW2	252	7/10/13 9:24	GW	AG	4x1L	None	G	DU	TCL SVOC (SW846-8270C)	
094366	-009	OBS-MW2	252	7/10/13 9:25	GW	P	500 ml	HNO3	G	DU	TAL Metals+U(SW846-6010/6020/7470)	
094366	-014	OBS-MW2	252	7/10/13 9:26	GW	P	250 ml	None	G	DU	Hexavalent Chromium(SW846-7196A	
094366	-016	OBS-MW2	252	7/10/13 9:27	GW	P	125 ml	None	G	DU	Anions(SW846-9056))	
094366	-017	OBS-MW2	252	7/10/13 9:28	FGW	P	250 ml	HNO3	G	DU	Metals-Ca,Mg,K,Na(SW846-6020)	
094366	-018	OBS-MW2	252	7/10/13 9:29	GW	P	125 ml	H2SO4	G	DU	NPN (EPA 353.2)	
094366	-020	OBS-MW2	252	7/10/13 9:30	GW	P	250 ml	None	G	DU	Perchlorate (EPA 314.0)	
094366	-022	OBS-MW2	252	7/10/13 9:31	GW	P	500 ml	None	G	DU	Alkalinity (SM2320B)	
094366	-024	OBS-MW2	252	7/10/13 9:35	GW	AG	4x1L	None	G	DU	High Explosives (SW846-8321A)	
094366	-027	OBS-MW2	252	7/10/13 9:36	GW	P	250 ml	NaOH	G	DU	Total Cyanide (SW846-9012	
094366	-033	OBS-MW2	252	7/10/13 9:37	GW	P	1 L	HNO3	G	DU	Gamma Spectroscopy (EPA 901.0)	
094366	-034	OBS-MW2	252	7/10/13 9:38	GW	P	1 L	HNO3	G	DU	Gross Alpha and Beta (EPA 900.0)	
094366	-035	OBS-MW2	252	7/10/13 9:39	GW	P	1 L	HNO3	G	DU	Isotopic Uranium (HASL 300)	
094367	-001	OBS-TB3	NA	7/10/13 9:19	DIW	G	3x40ml	HCL	G	TB	TCL VOC (SW846-8260B)	

Recipient Initials_____

SMO 2012-ARCOC (4-2012)

CONTRACT LABORATORY
ANALYSIS REQUEST AND CHAIN OF CUSTODY

AOP 95-16

Internal Lab

Batch No. N/A

SMO Use

AR/COC 614936

Project Name:	SWMU 68 GWM	Date Samples Shipped:	7/11/13	SMO Authorization:	B. H. G. Lum SMO
Project/Task Manager:	Clinton Lum	Carrier/Waybill No.	206 848	SMO Contact Phone:	
Project/Task Number:	98026.01.13	Lab Contact:	Edie Kent/803-556-8171		Lorraine Herrera/505-844-3199
Service Order:	CF 263-13	Lab Destination:	GEL	Send Report to SMO:	
		Contract No.:	PO 1303873		Rita Kavanaugh/505-284-2553
Tech Area:					
Building:	Room:	Operational Site:			

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

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

Sample No.	Fraction	Sample Location Detail	Depth (ft)	Date/Time Collected	Sample Matrix	Container Type	Container Volume	Preservative	Collection Method	Sample Type	Parameter & Method Requested	Lab Sample ID
094368	-001	OBS-MW3	208	7/11/13 9:20	GW	G	3x40ml	HCL	G	SA	TCL VOC (SW846-8260B)	
094368	-002	OBS-MW3	208	7/11/13 9:22	GW	AG	4x1L	None	G	SA	TCL SVOC (SW846-8270C)	
094368	-009	OBS-MW3	208	7/11/13 9:23	GW	P	500 ml	HNO3	G	SA	TAL Metals+U(SW846-6010/6020/7470)	
094368	-014	OBS-MW3	208	7/11/13 9:24	GW	P	250 ml	None	G	SA	Hexavalent Chromium(SW846-7196A	
094368	-016	OBS-MW3	208	7/11/13 9:25	GW	P	125 ml	None	G	SA	Anions(SW846-9056))	
094368	-017	OBS-MW3	208	7/11/13 9:26	FGW	P	250 ml	HNO3	G	SA	Metals-Ca,Mg,K,Na(SW846-6020)	
094368	-018	OBS-MW3	208	7/11/13 9:27	GW	P	125 ml	H2SO4	G	SA	NPN (EPA 353.2)	
094368	-020	OBS-MW3	208	7/11/13 9:28	GW	P	250 ml	None	G	SA	Perchlorate (EPA 314.0)	
094368	-022	OBS-MW3	208	7/11/13 9:29	GW	P	500 ml	None	G	SA	Alkalinity (SM2320B)	
094368	-024	OBS-MW3	208	7/11/13 9:30	GW	AG	4x1L	None	G	SA	High Explosives (SW846-8321A)	

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

Special Instructions/QC Requirements:

EDD ☑ Yes ☐ No

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

Negotiated TAT ☐

Sample Disposal ☐ Return to Client ☐ Disposal by Lab

Return Samples By:

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

Conditions on Receipt

Lab Use

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

1.Relinquished by	T. Jackson	Org.	4142	Date	7/11/13	Time	1006	3.Relinquished by
1. Received by	B. H. G. Lum SMO	Org.	4142	Date	7/11/13	Time	1006	3. Received by
2.Relinquished by		Org.		Date		Time		4.Relinquished by
2. Received by		Org.		Date		Time		4. Received by

Org.	Date	Time	
Org.	Date	Time	
Org.	Date	Time	
Org.	Date	Time	

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

CONTRACT LABORATORY
ANALYSIS REQUEST AND CHAIN OF CUSTODY (Continuation)

AR/COC 614936

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

Sample No.	Fraction	Sample Location Detail	Depth (ft)	Date/Time Collected	Sample Matrix	Container Type	Container Volume	Preserv-ative	Collection Method	Sample Type	Parameter & Method Requested	Lab Sample ID
094368	-027	OBS-MW3	208	7/11/13 9:31	GW	P	250 ml	NaOH	G	SA	Total Cyanide (SW846-9012	
094368	-033	OBS-MW3	208	7/11/13 9:32	GW	P	1 L	HNO3	G	SA	Gamma Spectroscopy (EPA 901.0)	
094368	-034	OBS-MW3	208	7/11/13 9:33	GW	P	1 L	HNO3	G	SA	Gross Alpha and Beta (EPA 900.0)	
094368	-035	OBS-MW3	208	7/11/13 9:34	GW	P	1 L	HNO3	G	SA	Isotopic Uranium (HASL 300)	
094369	-001	OBS-TB4	NA	7/11/13 9:19	DIW	G	3x40ml	HCL	G	TB	TCL VOC (SW846-8260B)	
094370	-001	OBS-FB1	NA	7/11/13 9:19	DIW	G	3x40ml	HCL	G	FB	TCL VOC (SW846-8260B)	

Recipient Initials_____

SMO 2012-ARCOC (4-2012)

AOP 95-16

CONTRACT LABORATORY
ANALYSIS REQUEST AND CHAIN OF CUSTODY

Internal Lab

Batch No. NA

SMO Use

AR/COC 614934

Project Name:	SWMU 68 GWM	Date Samples Shipped:		SMO Authorization: Don Watkins	☐ Waste Characterization
Project/Task Manager:	Clinton Lum	Carrier/Waybill No.		SMO Contact Phone:	☐ RMMA
Project/Task Number:	98026.01.13	Lab Contact:	Edie Kent/803-556-8171	Lorraine Herrera/505-844-3199	☐ Released by COC No.
Service Order:	CF 263-13	Lab Destination:	GEL	Send Report to SMO:	☑ 4° Celsius
		Contract No.:	PO 1303873	Rita Kavanaugh/505-284-2553	Bill to:Sandia National Laboratories (Accounts Payable), P.O. Box 5800, MS-0154 Albuquerque, NM 87185-0154
Tech Area:					
Building:	Room:	Operational Site:			

Sample No.	Fraction	Sample Location Detail	Depth (ft)	Date/Time Collected	Sample Matrix	Container Type	Container Volume	Preservative	Collection Method	Sample Type	Parameter & Method Requested	Lab Sample ID
094363	-001	OBS-EB1	NA	7/9/13 11:15	DIW	G	3x40ml	HCL	G	SA	TCL VOC (SW846-8260B)	
094363	-002	OBS-EB1	NA	7/9/13 11:20	DIW	AG	4x1L	None	G	SA	TCL SVOC (SW846-8270C)	
094363	-009	OBS-EB1	NA	7/9/13 11:21	DIW	P	500 ml	HNO3	G	SA	TAL Metals+U(SW846-6010/6020/7470)	
094363	-014	OBS-EB1	NA	7/9/13 11:22	DIW	P	250 ml	None	G	SA	Hexavalent Chromium(SW846-7196A	
094363	-016	OBS-EB1	NA	7/9/13 11:23	DIW	P	125 ml	None	G	SA	Anions(SW846-9056))	
094363	-017	OBS-EB1	NA	7/9/13 11:24	FDIW	P	250 ml	HNO3	G	SA	Metals-Ca,Mg,K,Na(SW846-6020)	
094363	-018	OBS-EB1	NA	7/9/13 11:25	DIW	P	125 ml	H2SO4	G	SA	NPN (EPA 353.2)	
094363	-020	OBS-EB1	NA	7/9/13 11:26	DIW	P	250 ml	None	G	SA	Perchlorate (EPA 314.0)	
094363	-022	OBS-EB1	NA	7/9/13 11:27	DIW	P	500 ml	None	G	SA	Alkalinity (SM2320B)	
094363	-024	OBS-EB1	NA	7/9/13 11:30	DIW	AG	4x1L	None	G	SA	High Explosives (SW846-8321A)	

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

Special Instructions/QC Requirements:

EDD ☑ Yes ☐ No

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

Negotiated TAT ☐

Sample Disposal ☐ Return to Client ☐ Disposal by Lab

Return Samples By:

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

Conditions on Receipt

Lab Use

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

1.Relinquished by	Tim Jackson	Org. 4142	Date 7/9/13	Time 1146	3.Relinquished by	Org.	Date	Time
1. Received by	Don Watkins	Org. 4142	Date 7/9/13	Time 1146	3. Received by	Org.	Date	Time
2.Relinquished by		Org.	Date	Time	4.Relinquished by	Org.	Date	Time
2. Received by		Org.	Date	Time	4. Received by	Org.	Date	Time

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

SMO 2012-ARCOC (4-2012)

AOP 95-16

CONTRACT LABORATORY
ANALYSIS REQUEST AND CHAIN OF CUSTODY (Continuation)

AR/COC 614934

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

Sample No.	Fraction	Sample Location Detail	Depth (ft)	Date/Time Collected	Sample Matrix	Container Type	Container Volume	Preservative	Collection Method	Sample Type	Parameter & Method Requested	Lab Sample ID
094363	-027	OBS-EB1	NA	7/9/13 11:31	DIW	P	250 ml	NaOH	G	SA	Total Cyanide (SW846-9012	
094363	-033	OBS-EB1	NA	7/9/13 11:32	DIW	P	1 L	HNO3	G	SA	Gamma Spectroscopy (EPA 901.0)	
094363	-034	OBS-EB1	NA	7/9/13 11:33	DIW	P	1 L	HNO3	G	SA	Gross Alpha and Beta (EPA 900.0)	
094363	-035	OBS-EB1	NA	7/9/13 11:34	DIW	P	1 L	HNO3	G	SA	Isotopic Uranium (HASL 300)	
094364	-001	OBS-TB2	NA	7/9/13 11:15	DIW	G	3x40ml	HCL	G	TB	TCL VOC (SW846-8260B)	

Recipient Initials_____

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

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

Memorandum

Date: September 17, 2013

To: File

From: Linda Thal

Subject: LC/MS/MS Organic Data Review and Validation – SNL
Site: SWMU 8/58 GWM
AR/COC: 614937, 614938 and 614939
SDG: 329541
Laboratory: GEL
Project/Task: 98026.01.12
Analysis: High Explosives (HE)

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

Summary

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

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

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

Holding Times

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

Instrument Tune

The instrument tune was not reported or evaluated.

Calibration

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

Reporting Limit Verification

All CRI recoveries met QC acceptance criteria.

Blanks

No target analytes were detected in the blanks.

Surrogates

All surrogate recoveries met QC acceptance criteria.

Internal Standards

All internal standards met QC acceptance criteria.

Matrix Spike/Matrix Spike Duplicate (MS/MSD)

The MS/MSD analyses met all QC acceptance criteria.

Laboratory Control Sample (LCS)

All LCS recoveries met QC acceptance criteria.

Detection Limits/Dilutions

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

Other QC

An EB was submitted with AR/COC 614938 to be applied to the samples on AR/COC 614939. A field duplicate pair was submitted with AR/COC 614939. There are no "required" review criteria for field duplicate analyses comparability; no data will be qualified as a result.

No other specific issues that affect data quality were identified.

Reviewed by: Mary Donivan **Level:** I **Date:** 09/20/13

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

Memorandum

Date: September 17, 2013

To: File

From: Linda Thal

Subject: Radiochemical Data Review and Validation – SNL
Site: SWMU 8/58 GWM
AR/COC: 614937, 614938 and 614939
SDG: 329541
Laboratory: GEL
Project/Task: 98026.01.12
Analysis: RAD

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

Summary

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

Gross Alpha/Beta:

1. The relative dilution factor between the parent sample and the gross alpha/beta MS/MSD QC samples was >5 and, as a result, the MS/MSD analyses were not used to evaluate gross alpha and gross beta sample data. The associated sample results will be **qualified J,MS1.**

All analyses:

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

Gross alpha/beta and alphaspec U:

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

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

Holding Times and Preservation

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

Quantification

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

Calibration

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

Blanks

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

Tracer/Carrier Recovery

The tracer/carrier recoveries met QC acceptance criteria.

Matrix Spike/Matrix Spike Duplicate (MS/MSD)

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

Laboratory Replicate

All replicate error ratio acceptance criteria were met.

Laboratory Control Sample (LCS)

All LCS recoveries met QC acceptance criteria.

Detection Limits/Dilutions

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

Other QC

An EB was submitted with AR/COC 614938 to be applied to the samples on AR/COC 614939. A field duplicate pair was submitted with AR/COC 614939. There are no "required" review criteria for field duplicate analyses comparability; no data will be qualified as a result.

No other specific issues that affect data quality were identified.

Reviewed by: Mary Donivan **Level:** I **Date:** 09/20/13

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

Memorandum

Date: September 17, 2013

To: File

From: Linda Thal

Subject: GC/MS Organic Data Review and Validation – SNL
Site: SWMU 8/58 GWM
AR/COC: 614937, 614938 and 614939
SDG: 329541
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 8260B (VOCs). All compounds were successfully analyzed. Problems were identified with the data package that resulted in the qualification of data.

1. The MS/MSD RPD was > 30% for 1,2,4-trichlorobenzene; hexachlorobutadiene and hexachloroethane. The associated sample results were NDs and will be **qualified UJ,MS5**.

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

Holding Times

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

Instrument Tune

All instrument tune requirements were met.

Calibration

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

The initial calibration intercept for p-nitroaniline was positive and > the MDL. The associated sample results were NDs and will not be qualified.

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

The ICV or CCV %Ds were >20% with positive bias for nitrobenzene; isophorone; 2,6-dinitrotoluene; 2,4-dinitrotoluene; carbazole; indeno(1,2,3-cd)pyrene; dibenzo(a,h)anthracene and benzo(g,h,i)perylene. The associated sample results were NDs and will not be qualified.

Blanks

No target analytes were detected in the blank.

Surrogates

All surrogate recoveries met QC acceptance criteria.

Internal Standards

All internal standards met QC acceptance criteria.

Matrix Spike/Matrix Spike Duplicate (MS/MSD)

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

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

Laboratory Control Sample (LCS)

All LCS acceptance criteria were met.

Detection Limits/Dilutions

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

Tentatively Identified Compounds (TICs)

TIC reports were not required.

Other QC

An EB was submitted with AR/COC 614938 to be applied to the samples on AR/COC 614939. A field duplicate pair was submitted with AR/COC 614939. There are no "required" review criteria for field duplicate analyses comparability; no data will be qualified as a result.

No other specific issues that affect data quality were identified.

Reviewed by: Mary Donivan **Level:** I **Date:** 09/20/13

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

Memorandum

Date: September 17, 2013

To: File

From: Linda Thal

Subject: GC/MS Organic Data Review and Validation – SNL
Site: SWMU 8/58 GWM
AR/COC: 614937, 614938 and 614939
SDG: 329541
Laboratory: GEL
Project/Task: 98026.01.12
Analysis: VOCs

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

Summary

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

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

Holding Times

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

Instrument Tune

All instrument tune requirements were met.

Calibration

The initial calibration and continuing calibration data met QC acceptance criteria with the following exceptions.

The ICAL %RSDs were >15% but ≤40% and the associated CCV %Ds were >20% with positive bias for bromoform and 1,2-dibromo-3-chloropropane. The associated sample results were NDs, and since a positive CCV is not considered to be a second calibration infraction, will not be qualified.

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

The CCV %D was >20% with positive bias for dibromochloromethane. The associated sample results were NDs and will not be qualified.

Blanks

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

Chloroform was detected in the FB, (sample 329541014) and the EB, (sample -015). The associated sample results were NDs and will not be qualified.

Surrogates

All surrogate recoveries met QC acceptance criteria.

Internal Standards

All internal standards met QC acceptance criteria.

Matrix Spike/Matrix Spike Duplicate (MS/MSD)

All MS/MSD acceptance criteria were met.

Laboratory Control Sample (LCS)

All LCS acceptance criteria were met with the following exceptions.

The %Rs were > the UAL for 1,2-dibromo-3-chloropropane and bromoform for the LCS associated with samples -052, -028 and -040. 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.

It should be noted that methylene chloride was reported as ND at an MDL of 3.0ug/L.

Tentatively Identified Compounds (TICs)

TIC reports were not required.

Other QC

Three TBs were submitted, one with each AR/COC. One FB was submitted with AR/COC 614937. An EB was submitted with AR/COC 614938 to be applied to the samples on AR/COC 614939. A field duplicate pair was submitted with AR/COC 614939. There are no "required" review criteria for field duplicate analyses comparability; no data will be qualified as a result.

No other specific issues that affect data quality were identified.

Reviewed by: Mary Donivan **Level:** I **Date:** 09/20/13

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

Memorandum - Revised

Date: September 18, 2013

To: File

From: Linda Thal

Subject: Inorganic Data Review and Validation – SNL
Site: SWMU 8/58 GWM
AR/COC: 614937, 614938 and 614939
SDG: 329541
Laboratory: GEL
Project/Task: 98026.01.12
Analysis: General Chemistry

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

Summary

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

Total cyanide:

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

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

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

Holding Times and Preservation

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

Calibration

All initial and continuing calibration met QC acceptance criteria.

Blanks

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

Chloride was detected at < the PQL in the EB, sample 329541018. The associated sample results were detects >5X the EB value and will not be qualified.

Alkalinity and bicarbonate alkalinity were detected in the method blank, but were not assessed for validation.

Laboratory Control Sample (LCS)

All LCS acceptance criteria were met.

Matrix Spike (MS)

All MS/PS recoveries met QC acceptance criteria.

Laboratory Replicate

The replicate analyses met all QC acceptance criteria.

Detection Limits/Dilutions

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

Nitrate/Nitrite:
All samples *except* the EB were diluted 5X.

Anions:
Samples -004 was diluted 10X for chloride and sulfate and samples -031 and -043 were diluted 5X for fluoride, chloride and sulfate.

Other QC

An EB was submitted with AR/COC 614938 to be applied to the samples on AR/COC 614939. A field duplicate pair was submitted with AR/COC 614939. There are no "required" review criteria for field duplicate analyses comparability; no data will be qualified as a result.

No other specific issues that affect data quality were identified.

Reviewed by: Monica Dymerski **Level:** I **Date:** 10/07/13

ANALYTICAL QUALITY ASSOCIATES, INC.

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

Memorandum

Date: September 18, 2013

To: File

From: Linda Thal

Subject: Inorganic Data Review and Validation – SNL
Site: SWMU 8/58 GWM
AR/COC: 614937, 614938 and 614939
SDG: 329541 and 329549
Laboratory: GEL
Project/Task: 98026.01.12
Analysis: Metals

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

Summary

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

ICP-MS:

1. Cu was detected at < the PQL in the unfiltered EB, sample 329541017. The associated results for samples -030 and -042 were detects <5X the EB value and will be **qualified 0.0047U,B2** at 5X the EB value.

ICP-AES:

1. V was detected at a negative value with an absolute value < the PQL in the CCBs bracketing all samples. The associated results for samples 329541017, -030 and -042 were NDs and will be **qualified UJ,B4**.

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

Holding Times and Preservation

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

ICP-MS Instrument Tune

The ICP-MS tunes met QC acceptance criteria.

Calibration

All initial and continuing calibration met QC acceptance criteria.

Reporting Limit Verification

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

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

Blanks

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

Cd was detected at < the PQL in the EB, sample 329541017. The associated sample results were NDs and will not be qualified.

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

V was detected at a negative value with an absolute value < the PQL in the CCBs bracketing all samples. The associated result for sample 329541003 was a detect >5X the MDL and will not be qualified.

ICP -MS Internal Standards

The ICP-MS internal standards met QC acceptance criteria.

Matrix Spike (MS)

The MS met all QC acceptance criteria.

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

Laboratory Replicate

The replicate met all QC acceptance criteria.

Laboratory Control Sample (LCS)

The LCS met all QC acceptance criteria.

Detection Limits/Dilutions

All detection limits were properly reported. Samples 329541003 and 329549001 were diluted 5X for Ca and samples 329541030 and -042; 329549003 and -004 were diluted 5X for Na.

ICP Interference Check Sample (ICS A and AB)

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

ICP Serial Dilution

The serial dilutions met all QC acceptance criteria.

Other QC

An EB was submitted with AR/COC 614938 to be applied to the samples on AR/COC 614939. A field duplicate pair was submitted with AR/COC 614939. There are no "required" review criteria for field duplicate analyses comparability; no data will be qualified as a result.

No other specific issues that affect data quality were identified.

Reviewed by: Mary Donivan **Level:** I **Date:** 09/20/13

Sample Findings Summary

AR/COC: 614937, 614938, 614939

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
DOE EML HASL-300, U-02-RC			
	094371-035/CCBA-MW2	Uranium-235/236 (15117-96-1/13982-70-)	J, FR7
	094374-035/CCBA-EB1	Uranium-233/234 (11-08-5)	BD, FR3
	094374-035/CCBA-EB1	Uranium-235/236 (13982-70-2)	BD, FR3
	094374-035/CCBA-EB1	Uranium-238 (7440-61-1)	BD, FR3
	094376-035/CCBA-MW1	Uranium-235/236 (13982-70-2)	J, FR7
	094377-035/CCBA-MW1	Uranium-235/236 (13982-70-2)	BD, FR3
EPA 900.0/SW846 9310			
	094371-034/CCBA-MW2	ALPHA (12587-46-1)	J, MS1
	094371-034/CCBA-MW2	BETA (12587-47-2)	J, FR7,MS1
	094374-034/CCBA-EB1	ALPHA (12587-46-1)	BD, FR3,MS1
	094374-034/CCBA-EB1	BETA (12587-47-2)	BD, FR3,MS1
	094376-034/CCBA-MW1	ALPHA (12587-46-1)	J, FR7,MS1
	094376-034/CCBA-MW1	BETA (12587-47-2)	J, FR7,MS1
	094377-034/CCBA-MW1	ALPHA (12587-46-1)	J, FR7,MS1
	094377-034/CCBA-MW1	BETA (12587-47-2)	J, MS1
EPA 901.1			
	094371-033/CCBA-MW2	Americium-241 (14596-10-2)	BD, FR3
	094371-033/CCBA-MW2	Cesium-137 (10045-97-3)	BD, FR3
	094371-033/CCBA-MW2	Cobalt-60 (10198-40-0)	BD, FR3
	094371-033/CCBA-MW2	Potassium-40 (13966-00-2)	BD, FR3
	094374-033/CCBA-EB1	Americium-241 (14596-10-2)	BD, FR3
	094374-033/CCBA-EB1	Cesium-137 (10045-97-3)	BD, FR3
	094374-033/CCBA-EB1	Cobalt-60 (10198-40-0)	BD, FR3
	094374-033/CCBA-EB1	Potassium-40 (13966-00-2)	BD, FR3

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
	094376-033/CCBA-MW1	Americium-241 (14596-10-2)	BD, FR3
	094376-033/CCBA-MW1	Cesium-137 (10045-97-3)	BD, FR3
	094376-033/CCBA-MW1	Cobalt-60 (10198-40-0)	BD, FR3
	094376-033/CCBA-MW1	Potassium-40 (13966-00-2)	BD, FR3
	094377-033/CCBA-MW1	Americium-241 (14596-10-2)	BD, FR3
	094377-033/CCBA-MW1	Cesium-137 (10045-97-3)	BD, FR3
	094377-033/CCBA-MW1	Cobalt-60 (10198-40-0)	BD, FR3
	094377-033/CCBA-MW1	Potassium-40 (13966-00-2)	BD, FR3
SW846 3005/6010B			
	094374-009/CCBA-EB1	Vanadium (7440-62-2)	UJ, B4
	094376-009/CCBA-MW1	Vanadium (7440-62-2)	UJ, B4
	094377-009/CCBA-MW1	Vanadium (7440-62-2)	UJ, B4
SW846 3005/6020 DOE-AL			
	094376-009/CCBA-MW1	Copper (7440-50-8)	0.0047U, B2
	094377-009/CCBA-MW1	Copper (7440-50-8)	0.0047U, B2
SW846 3510C/8270D			
	094371-002/CCBA-MW2	1,2,4-Trichlorobenzene (120-82-1)	UJ, MS5
	094371-002/CCBA-MW2	Hexachlorobutadiene (87-68-3)	UJ, MS5
	094371-002/CCBA-MW2	Hexachloroethane (67-72-1)	UJ, MS5
	094374-002/CCBA-EB1	1,2,4-Trichlorobenzene (120-82-1)	UJ, MS5
	094374-002/CCBA-EB1	Hexachlorobutadiene (87-68-3)	UJ, MS5
	094374-002/CCBA-EB1	Hexachloroethane (67-72-1)	UJ, MS5
	094376-002/CCBA-MW1	1,2,4-Trichlorobenzene (120-82-1)	UJ, MS5
	094376-002/CCBA-MW1	Hexachlorobutadiene (87-68-3)	UJ, MS5
	094376-002/CCBA-MW1	Hexachloroethane (67-72-1)	UJ, MS5
	094377-002/CCBA-MW1	1,2,4-Trichlorobenzene (120-82-1)	UJ, MS5
	094377-002/CCBA-MW1	Hexachlorobutadiene (87-68-3)	UJ, MS5
	094377-002/CCBA-MW1	Hexachloroethane (67-72-1)	UJ, MS5
SW846 3535/8321A Modified			
	094371-024/CCBA-MW2	m-Nitrotoluene (99-08-1)	UJ, I4

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
	094371-024/CCBA-MW2	o-Nitrotoluene (88-72-2)	UJ, I4
	094371-024/CCBA-MW2	p-Nitrotoluene (99-99-0)	UJ, I4
	094374-024/CCBA-EB1	m-Nitrotoluene (99-08-1)	UJ, I4
	094374-024/CCBA-EB1	o-Nitrotoluene (88-72-2)	UJ, I4
	094374-024/CCBA-EB1	p-Nitrotoluene (99-99-0)	UJ, I4
	094376-024/CCBA-MW1	m-Nitrotoluene (99-08-1)	UJ, I4
	094376-024/CCBA-MW1	o-Nitrotoluene (88-72-2)	UJ, I4
	094376-024/CCBA-MW1	p-Nitrotoluene (99-99-0)	UJ, I4
	094377-024/CCBA-MW1	m-Nitrotoluene (99-08-1)	UJ, I4
	094377-024/CCBA-MW1	o-Nitrotoluene (88-72-2)	UJ, I4
	094377-024/CCBA-MW1	p-Nitrotoluene (99-99-0)	UJ, I4
SW846 9012B			
	094371-027/CCBA-MW2	Cyanide, Total (57-12-5)	UJ, I5,B4
	094374-027/CCBA-EB1	Cyanide, Total (57-12-5)	UJ, I5,B4
	094376-027/CCBA-MW1	Cyanide, Total (57-12-5)	UJ, I5,B4
	094377-027/CCBA-MW1	Cyanide, Total (57-12-5)	UJ, I5,B4

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

PO Box 21987
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Memorandum

Date: September 25, 2013

To: File

From: Linda Thal

Subject: LC/MS/MS Organic Data Review and Validation – SNL
Site: SWMU 68 GWM
AR/COC: 614933, 614934, 614935 and 614936
SDG: 329124
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. Problems were identified with the data package that resulted in the qualification of data.

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

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

Holding Times

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

Instrument Tune

The instrument tune was not reported or evaluated.

Calibration

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

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

Reporting Limit Verification

All CRI recoveries met QC acceptance criteria.

Blanks

No target analytes were detected in the blanks.

Surrogates

All surrogate recoveries met QC acceptance criteria.

Internal Standards

All internal standards met QC acceptance criteria.

Matrix Spike/Matrix Spike Duplicate (MS/MSD)

The MS/MSD analyses met all QC acceptance criteria.

Laboratory Control Sample (LCS)

All LCS recoveries met QC acceptance criteria.

Detection Limits/Dilutions

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

Other QC

An EB was submitted with AR/COC 614934 to be applied to the samples on AR/COC 614935. A field duplicate pair was submitted with AR/COC 614935. There are no "required" review criteria for field duplicate analyses comparability; no data will be qualified as a result.

No other specific issues that affect data quality were identified.

Reviewed by: Monica Dymerski **Level I** **Date:** 09/30/13

PO Box 21987
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1-888-678-5447
www.aqainc.net

Memorandum

Date: September 25, 2013

To: File

From: Linda Thal

Subject: GC/MS Organic Data Review and Validation – SNL
Site: SWMU 68 GWM
AR/COC: 614933, 614934, 614935 and 614936
SDG: 329124
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 methods EPA 3510/8270D (SVOCs). All compounds were successfully analyzed. No problems were identified with the data package that resulted in the qualification of data.

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

Holding Times

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

Instrument Tune

All instrument tune requirements were met.

Calibration

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

The initial calibration intercept for p-nitroaniline was positive and > the MDL. The associated sample results were NDs and will not be qualified.

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

The ICV %Ds were >20% with positive bias for nitrobenzene; isophorone; 2,6-dinitrotoluene; 2,4-dinitrotoluene and carbazole. The associated sample results were NDs and will not be qualified.

Blanks

No target analytes were detected in the blank.

Surrogates

All surrogate recoveries met QC acceptance criteria.

Internal Standards

All internal standards met QC acceptance criteria.

Matrix Spike/Matrix Spike Duplicate (MS/MSD)

All MS/MSD acceptance criteria were met.

Laboratory Control Sample (LCS)

All LCS acceptance criteria were met.

Detection Limits/Dilutions

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

Tentatively Identified Compounds (TICs)

TIC reports were not required.

Other QC

An EB was submitted with AR/COC 614934 to be applied to the samples on AR/COC 614935. A field duplicate pair was submitted with AR/COC 614935. There are no "required" review criteria for field duplicate analyses comparability; no data will be qualified as a result.

No other specific issues that affect data quality were identified.

Reviewed by: Monica Dymerski **Level I** **Date:** 09/30/13

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Memorandum

Date: September 25, 2013

To: File

From: Linda Thal

Subject: GC/MS Organic Data Review and Validation – SNL
Site: SWMU 68 GWM
AR/COC: 614933, 614934, 614935 and 614936
SDG: 329124
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 resulted in the qualification of data.

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

Holding Times

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

Instrument Tune

All instrument tune requirements were met.

Calibration

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

The ICAL %RSD was >15% but ≤40% and the associated CCV %D was >20% with positive bias for bromoform. The ICAL %RSD was >15% but ≤40% for 1,2-dibromo-3-chloropropane. The associated sample results were NDs, and since a positive CCV is not considered to be a second calibration infraction, will not be qualified.

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

Blanks

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

Chloroform was detected in the FB, (sample 329124070) and the EB, (sample -015) at values > the PQL. Acetone was detected at < the PQL in the EB. The associated sample results were NDs and will not be qualified.

Surrogates

All surrogate recoveries met QC acceptance criteria.

Internal Standards

All internal standards met QC acceptance criteria.

Matrix Spike/Matrix Spike Duplicate (MS/MSD)

All MS/MSD acceptance criteria were met.

Laboratory Control Sample (LCS)

All LCS acceptance criteria were met.

Detection Limits/Dilutions

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

Tentatively Identified Compounds (TICs)

TIC reports were not required.

Other QC

Four TBs were submitted, one with each AR/COC. One FB was submitted with AR/COC 614936. An EB was submitted with AR/COC 614934 to be applied to the samples on AR/COC 614935. A field duplicate pair was submitted with AR/COC 614935. There are no "required" review criteria for field duplicate analyses comparability; no data will be qualified as a result.

No other specific issues that affect data quality were identified.

Reviewed by: Monica Dymerski **Level I** **Date:** 09/30/13

ANALYTICAL QUALITY ASSOCIATES, INC.

PO Box 21987
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Memorandum

Date: September 26, 2013

To: File

From: Linda Thal

Subject: Inorganic Data Review and Validation – SNL
Site: SWMU 68 GWM
AR/COC: 614933, 614934, 614935 and 614936
SDG: 329124 and 329205
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

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

ICP-MS:

1. Cu was detected at > the PQL in the unfiltered EB, sample 329124017. The associated results for samples -031 and -044 were detects <5X the EB value and will be **qualified 0.0080U,B2** at 5X the EB value.

2. The MS %R did not meet acceptance criteria for Ba. The parent sample result was >4X the spike amount and, therefore, the associated sample results will not be qualified for these failing recoveries. The associated sample results that were detects will be **qualified J,MS1** and those that were NDs will be **qualified UJ,MS1** due to lack of matrix specific accuracy information.

3. The original Mn result for the serial dilution parent sample was >50X the MDL and the serial dilution %D was >10%. All associated sample results that were detects will be **qualified J,D1** and those that were NDs will be **qualified UJ,D1**.

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

Holding Times and Preservation

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

ICP-MS Instrument Tune

The ICP-MS tunes met QC acceptance criteria.

Calibration

All initial and continuing calibration met QC acceptance criteria.

Reporting Limit Verification

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

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

Blanks

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

ICP -MS Internal Standards

The ICP-MS internal standards met QC acceptance criteria.

Matrix Spike (MS)

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

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

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

Laboratory Replicate

The replicate met all QC acceptance criteria.

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

Laboratory Control Sample (LCS)

The LCS met all QC acceptance criteria.

Detection Limits/Dilutions

All detection limits were properly reported. All samples except the EB were diluted 5X for Ca.

ICP Interference Check Sample (ICS A and AB)

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

ICP Serial Dilution

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

All analyses:
The serial dilution was performed on a sample of similar matrix from another SNL SDG. No sample data will be qualified as a result.

Other QC

An EB was submitted with AR/COC 614934 to be applied to the samples on AR/COC 614935. A field duplicate pair was submitted with AR/COC 614935. There are no "required" review criteria for field duplicate analyses comparability; no data will be qualified as a result.

No other specific issues that affect data quality were identified.

Reviewed by: Monica Dymerski **Level I** **Date:** 09/30/13

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Memorandum

Date: September 26, 2013

To: File

From: Linda Thal

Subject: Inorganic Data Review and Validation – SNL
Site: SWMU 68 GWM
AR/COC: 614933, 614934, 614935 and 614936
SDG: 329124 and 331750
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 IC), EPA 353.2 (nitrate/nitrite), EPA 9012A (total cyanide), EPA 314.0 (perchlorate) and SM2320B (total alkalinity). Data were reported for all required analytes. Problems were identified with the data package that resulted in the qualification of data.

Total cyanide:

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

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

3. The MS %R for total cyanide was <75% but ≥30%. The associated sample results were NDs and will be **qualified UJ,MS3**.

Anions:

1. Sample 331750001 was analyzed >1X but ≤2X past the method specified holding time. The associated sample results were detects and will be **qualified J,H1**.

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

Holding Times and Preservation

The samples were prepared and analyzed within the prescribed holding times and properly preserved except as noted above in the Summary section and as follows.

All samples, excluding the EB, were prepared and analyzed for hexavalent chromium very slightly past the method 24 hour holding time. Based on professional judgment, no data were qualified.

Calibration

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

Blanks

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

Alkalinity was detected in the MB associated with samples 329124049 and -063 but was not evaluated for data validation.

Laboratory Control Sample (LCS)

All LCS acceptance criteria were met.

Matrix Spike (MS)

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

Total cyanide and Anions (samples associated with SDG 329124):
The MS was performed on a sample of similar matrix from another SNL SDG. No sample data will be qualified as a result.

Laboratory Replicate

The replicate analyses met all QC acceptance criteria.

Total cyanide and Anions (samples associated with SDG 329124):
The replicate was performed on a sample of similar matrix from another SNL SDG. No sample data will be qualified as a result.

Detection Limits/Dilutions

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

Nitrate/Nitrite:
All samples *except* the EB were diluted 5X.

Anions:
All samples *except* the EB were diluted 20X for chloride and sulfate.

Other QC

An EB was submitted with AR/COC 614934 to be applied to the samples on AR/COC 614935. A field duplicate pair was submitted with AR/COC 614935. There are no “required” review criteria for field duplicate analyses comparability; no data will be qualified as a result.

At the request of the client, sample 329124033 from AR/COC 614935, was re-logged and re-analyzed (for chloride and sulfate) as sample 331750001.

No other specific issues that affect data quality were identified.

Reviewed by: Monica Dymerski **Level I** **Date:** 09/30/13

PO Box 21987
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Memorandum

Date: September 27, 2013

To: File

From: Linda Thal

Subject: Radiochemical Data Review and Validation – SNL
Site: SWMU 68 GWM
AR/COC: 614933, 614934, 614935 and 614936
SDG: 329124
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), DOE EML HASL 300 (alphaspec uranium) and EPA 900.0 (gross alpha/beta). Problems were identified with the data package that resulted in the qualification of data.

All analyses:

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

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

Holding Times and Preservation

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

Quantification

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

Calibration

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

Blanks

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

Tracer/Carrier Recovery

The tracer recoveries met QC acceptance criteria.

Matrix Spike/Matrix Spike Duplicate (MS/MSD)

The MS/MSD met all QC acceptance criteria.

Laboratory Replicate

All replicate error ratio acceptance criteria were met.

Laboratory Control Sample (LCS)

All LCS recoveries met QC acceptance criteria.

Detection Limits/Dilutions

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

Am-241 did not meet the required detection limit for sample 329124039.

Other QC

An EB was submitted with AR/COC 614934 to be applied to the samples on AR/COC 614935. A field duplicate pair was submitted with AR/COC 614935. There are no "required" review criteria for field duplicate analyses comparability; no data will be qualified as a result.

No other specific issues that affect data quality were identified.

Reviewed by: Monica Dymerski **Level I** **Date:** 09/30/13

Data Validation Summary Worksheet

AR/COC #: 614933, 614934, 614935 and 614936 | Site/Project: SWMU 68 GWM | Validation Date: 09/25/2013

SDG #: 329124, 329205 and 331750 | Laboratory: GEL | Validator: Linda Thal

Matrix: Aqueous | # of Samples: 75 CVR present: Yes | Analysis Type: X□ Organic X□ Metals

AR/COC(s) present: Yes | Sample Container Integrity: OK | X□ Rad X□ Gen Chem

Requested Analyses Not Reported

Sample Number	Laboratory ID	organic	genchem	metals	rad	Comments
None						

Hold Time/Preservation Outliers

Sample Number	Laboratory ID	Analysis	Pres.	Coll. Date	Prep. Date	Anal. Date	Anal. within 2X HT	Anal. beyond 2X HT
094361-014	329124004	7196A	0-6C	07/09/2013 9:51	07/10/2013 10.36	07/10/2013 10.36	Yes	Yes
094365-014	329124032	7196A	0-6C	07/10/2013 9:26	07/11/2013 9.52	07/11/2013 9.52	Yes	Yes
094366-014	329124045	7196A	0-6C	07/10/2013 9:26	07/11/2013 9.55	07/11/2013 9.55	Yes	Yes
094368-014	329124059	7196A	0-6C	07/11/2013 9:24	07/12/2013 10.22	07/12/2013 10.22	Yes	Yes
*094365-R16	331750001	9056	0-6C	07/10/2013	08/18/2013 14.51	08/18/2013 14.51	Yes	Yes

Comments: Sampled 7/9 thru 7/11/2013

*Note sample 094365-016 (329124033) from ARCOC 614935 was relogged and reanalyzed out of HT as 331750001 (Cl and SO_4)

Validated by: L Thal

Revised 7/2007

Organic Worksheet (GC/MS)

AR/COC #: 614933, 614934, 614935 and 614936 SDG #: 329124 Matrix: Aqueous

Laboratory Sample IDs: 329124001, -014, -015, -028, -029, -042, -055, -056, -069 and -070

Method/Batch #s: 8260B: 1315625 Tuning (pass/fail): Pass TICs Required? (yes/no): No

Analyte (outliers)	Calibration				Method Blank	5X (10X) MB	LCS %R	MS %R	MSD %R	MS/ MSD RPD	FB -070	FB X5	EB -015	EB X5 (X10)
	Int.	RF	RSD/ R^2	(ICV) CCV %D										
Acetone	✓	✓	✓	✓	✓	NA	✓	✓	✓	✓	✓	NA	7.91J	(79.1)
Chloroform	NA	✓	✓	✓	✓	NA	✓	✓	✓	✓	3.52	17.6	3.14	15.7
Bromoform	NA	✓	21.6	+21	✓	NA	✓	✓	✓	✓	✓	NA	✓	NA
1,2-Dibromo-3-chloropropane	NA	✓	16.9	✓	✓	NA	✓	✓	✓	✓	✓	NA	✓	NA
Dichlorodifluoromethane	NA	✓	✓	(-22)	✓	NA	✓	✓	✓	✓	✓	NA	✓	NA

Surrogate Recovery Outliers

Sample ID						
None						

IS Outliers

Sample ID	Area	RT	Area	RT	Area	RT	Area	RT	Area	RT	Area	RT
None												

Comments: HTs OK: ICAL VOA9.I 7/01/2013; MS/MSD -056 spiked with trichlorotrifluoroethane; Acetone linear intercept <MDL;

Organic Worksheet (GC/MS)

AR/COC #: 614933, 614934, 614935 and 614936 SDG #: 329124 Matrix: Aqueous

Laboratory Sample IDs: 329124002, -016, -030, -043 and -057

Method/Batch #s: 8270D: 1314422/1314420 (prep) Tuning (pass/fail): Pass TICs Required? (yes/no): No

Analyte (outliers)	Calibration				Method Blank	5X (10X) Blank	LCS %R	MS %R	MSD %R	MS/ MSD RPD	EB -016			
	Int.	RF	RSD/ R^2	(ICV) CCV %D										
1,2,4-Trichlorobenzene	NA	✓	✓	✓	✓	NA	✓	✓	✓	✓	✓			
Hexachlorobutadiene	NA	✓	✓	✓	✓	NA	✓	✓	✓	✓	✓			
Hexachloroethane	NA	✓	✓	✓	✓	NA	✓	✓	✓	✓	✓			
p-Nitroaniline	+7.1	✓	✓	✓	✓	NA	✓	✓	✓	✓	✓			
Nitrobenzene	NA	✓	✓	(+26)	✓	NA	✓	✓	✓	✓	✓			
Isophorone	NA	✓	✓	(+25)	✓	NA	✓	✓	✓	✓	✓			
Hexachlorocyclopentadiene	NA	✓	✓	(-29)	✓	NA	✓	✓	✓	✓	✓			
2,6-Dinitrotoluene	NA	✓	✓	(+25)	✓	NA	✓	✓	✓	✓	✓			
2,4-Dinitrotoluene	NA	✓	✓	(+23)	✓	NA	✓	✓	✓	✓	✓			
Carbazole	NA	✓	✓	(+21)	✓	NA	✓	✓	✓	✓	✓			

Surrogate Recovery Outliers

Sample ID						
None						

IS Outliers

Sample ID	Area	RT	Area	RT	Area	RT	Area	RT	Area	RT	Area	RT
None												

Comments: HTs OK; MS/MSD on -002; ICAL MSD4.I 7/12/2013; p-nitroaniline linear

High Explosives Worksheet (LC/MS/MS)

AR/COC #: 614933, 614934, 614935 and 614936 SDG #: 329124 Matrix: Aqueous

Laboratory Sample IDs: 329124009, -023, -037, -050 and -064

Method/Batch #s: 8321A: 1314714/1314712 (prep)

Analyte (Outliers)	Initial Calibration			Continuing Calibration				Method Blank	5X (10X) Blank	LCS %R	MS %R	MSD %R	MS/ MSD RPD	CRI	EB -023		
	Int.	RF	COD RSD/R^2	ICV	CCV %D	ICB	CCB										
m-Nitrotoluene	NA	.017	✓	✓	✓	✓	✓	✓	NA	✓	✓	✓	✓	✓	✓		
o-Nitrotoluene	NA	.022	✓	✓	✓	✓	✓	✓	NA	✓	✓	✓	✓	✓	✓		
p-Nitrotoluene	NA	.012	✓	✓	✓	✓	✓	✓	NA	✓	✓	✓	✓	✓	✓		
Nitrobenzene	NA	✓	✓	✓	-22.8	✓	✓	✓	NA	✓	✓	✓	✓	✓	✓		

Surrogate Recovery Outliers

Sample ID					
None					

Internal Standard Outliers

Sample ID	Area	RT	Sample ID	Area	RT	Sample ID	Area	RT
None								

Comments: HTs OK; MS/MSD -009; primary analytes only; LCMSMS#3; all sample and QC extracts diluted 1:1

Inorganic Metals Worksheet

AR/COC #: 614933, 614934, 614935 and 614936 SDG #: 329124 and 329205 Matrix: Aqueous

Laboratory Sample IDs: 329124003, -017, -031, -044 and -058(UF); 329205001 thru -005 (F)

Method/Batch #s: **6010**: 1315153; **6020**: 1315220 (F&UF); **7470A**:1318877

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

Analyte (outliers)	**Calibration**						**Method Blank mg/L mg/L**	**5X Blank or (5X MDL) mg/L**	**LCS %R**	**MS %R**	**Lab Rep RPD**	**Serial Dil. %D**	**ICS AB %R**	**ICS A ± MDL ug/L x50 (mg/L)**	**CRA/ CRI %R**	**EB -017 UF**	**EB X5**		
	Int. mg/L	**R^2**	**ICV**	**CCV**	**ICB ug/L**	**CCB ug/L**													
Cu	NA	✓	✓	✓	✓	✓	✓	NA	✓	✓	✓	✓	NA	NA	✓	.0016	.008		
Mn	NA	✓	✓	✓	✓	✓	✓	NA	✓	✓	✓	15	NA	NA	✓	✓	NA		
Ba	NA	✓	✓	✓	✓	✓	✓	NA	✓	68*	✓	✓	NA	NA	✓	✓	NA		

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

Comments: HTs OK; Matrix QC on samples from other SNL SDGs (F&UF); ICS NA for All; *Ba, Mn, Ca, Mg, Na >4X spike amount; F samples Mg, Ca, Na and K only.

Ca diluted 5X for samples 329124003, -031, -044 and -058; Ca diluted 5X for samples 329205001, -003, -004 and -005

General Chemistry Worksheet

AR/COC #: 614933, 614934, 614935 and 614936 SDG #: 329124 and 331750 Matrix: Aqueous

Laboratory Sample IDs: 329124 - see below – and 331750001

Method/Batch #s: SW846 9012A (Total Cyanide): 1314809/04; -010, -024, -038, -051 and -065

Method/Batch #s: SW846 9056 (Anions): [2]1314371; -005, -019, -033, -046 and -060 [3]1323401; 33175001 (repeat of sample 329124033)

Method/Batch #s: EPA 353.2 (NO_3/NO_2):1314793; -006, -020, -034, -047 and -061

Method/Batch #s: SM 2320B (Total alkalinity):1314811; -008, -022 and -036 [1]1315566; -049 and -063

Method/Batch #s: EPA 314.0 (Perchlorate); 1314022; -007, -021, -035, -048 and -062

Method/Batch #s: SW846 7196A (Hexavalent Chromium); 1313522; -004, -018 1313959; -032, -045 1314351; -059

Analyte (outliers)	**Calibration**						**Method Blank**	**5X Blank or 5X MDL**	**LCS %R**	**MS %R**	**MSD %R**	**MS/ MSD RPD**	**Lab Rep. RPD**	**Partial/ Total RPD**	**EB**	**EB X5**
	Int.	**R^2**	**ICV**	**CCV**	**ICB mg/L**	**CCB mg/L**										
Total cyanide	-.00257	✓	✓	✓	-.00185	-.00305	✓	(.0084)	✓	45.3	NA	NA	✓	✓	✓	NA
Total Alk	NA	NA	NA	NA	NA	NA	1.04[1]	5.2	✓	✓	NA	NA	✓	NA	✓	NA

Comments: HTs OK; Matrix QC from this SDG for NO3/NO2 (-006), Perchl (-007); Alkalinity (-008 and -063); Hex Cr (-004, -032, -059); [3]Anions (331750001)

Matrix QC from another SNL SDG: TCN (2 MS – one passed and one was low), [2]Anions ; FD don't agree anions

Cl and SO4: 20X; All except EB NO_3/NO_2: 5X; All except EB

Radiochemistry Worksheet

AR/COC #: 614933, 614934, 614935 and 614936 SDG #: 329124 Matrix: Aqueous

Laboratory Sample IDs: see below

Method/Batch#s: DOE EML HASL 300: Alphaspec U/1314334; -013, -027, -041, -054 and -068

Method/Batch#s: EPA 901.1: Gammaspec /1314421; -011, -025, -039, -052 and -066

Method/Batch#s: EPA 900.0: Gross alpha/beta/1314877; -012, -026, -040, -053 and -067

Analyte (outliers)	**Control Freq.**	**Control Eval.**	**Method Blank**	**5X Blank or 5X MDC**	**LCS %R**	**MS %R**	**MSD %R**	**MS/ MSD RER**	**Lab Rep. RER**	**EB**			
None													

Tracer/Carrier Recovery Outliers

Sample ID	**Tracer/Carrier**	**%R**	**Sample ID**	**Tracer/Carrier**	**%R**	**Sample ID**	**Tracer/Carrier**	**%R**
None								

Comments: Iso-U DUP -013, Gammaspec DUP -039; Gross A/B DUP and MS/MSD -012: Gross A/B parent and DUP =150ml, MS/MSD = 50ml 3X dilution – no qual.

Sample -039 did not meet Am-241 required DL

Data rejected due to peak not meeting identification criteria: K-40 MB. All samples ND.

SMO 2012-ARCOC (4-2012)

CONTRACT LABORATORY
ANALYSIS REQUEST AND CHAIN OF CUSTODY

AOP 95-16

Internal Lab

Batch No. NA

AR/COC 614933

SMO Use

Project Name: SWMU 68 GWM	Date Samples Shipped: 7/9/13	SMO Authorization: Don Watenpaugh	☐ Waste Characterization
Project/Task Manager: Clinton Lum	Carrier/Waybill No. 206735	SMO Contact Phone: Lorraine Herrera/505-844-3199	☐ RMMA
Project/Task Number: 98026.01.13	Lab Contact: Edie Kent/803-556-8171		☐ Released by COC No.
Service Order: CF 263-13	Lab Destination: GEL	Send Report to SMO: Rita Kavanaugh/505-284-2553	☑ 4° Celsius
Tech Area:	Contract No.: PO 1303873		Bill to:Sandia National Laboratories (Accounts Payable), P.O. Box 5800, MS-0154 Albuquerque, NM 87185-0154
Building: Room:	Operational Site:		

Sample No.	Fraction	Sample Location Detail	Depth (ft)	Date/Time Collected	Sample Matrix	Container Type	Container Volume	Preservative	Collection Method	Sample Type	Parameter & Method Requested	Lab Sample ID
094361	-001	OBS-MW1	153	7/9/13 9:44	GW	G	3x40ml	HCL	G	SA	TCL VOC (SW846-8260B)	329124 001
094361	-002	OBS-MW1	153	7/9/13 9:46	GW	AG	4x1L	None	G	SA	TCL SVOC (SW846-8270C)	329124 002
094361	-009	OBS-MW1	153	7/9/13 9:50	GW	P	500 ml	HNO3	G	SA	TAL Metals+U(SW846-6010/6020/7470)	329124 003
094361	-014	OBS-MW1	153	7/9/13 9:51	GW	P	250 ml	None	G	SA	Hexavalent Chromium(SW846-7196A	329124 004
094361	-016	OBS-MW1	153	7/9/13 9:52	GW	P	125 ml	None	G	SA	Anions(SW846-9056))	329124 005
094361	-017	OBS-MW1	153	7/9/13 9:53	FGW	P	250 ml	HNO3	G	SA	Metals-Ca,Mg,K,Na(SW846-6020)	329205 001
094361	-018	OBS-MW1	153	7/9/13 9:54	GW	P	125 ml	H2SO4	G	SA	NPN (EPA 353.2)	329124 006
094361	-020	OBS-MW1	153	7/9/13 9:55	GW	P	250 ml	None	G	SA	Perchlorate (EPA 314.0)	329124 007
094361	-022	OBS-MW1	153	7/9/13 9:56	GW	P	500 ml	None	G	SA	Alkalinity (SM2320B)	329124 008
094361	-024	OBS-MW1	153	7/9/13 10:00	GW	AG	4x1L	None	G	SA	High Explosives (SW846-8321A)	329124 009

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

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

Special Instructions/QC Requirements:

EDD ☑ Yes ☐ No

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

Negotiated TAT ☐

Sample Disposal ☐ Return to Client ☐ Disposal by Lab

Return Samples By:

Comments: Send report to Tim Jackson/4142/MS 0729/284-2547
FGW(filtered in field w/45 micron filter) Anions(Br,Cl,F,SO4)Alkalinity(total CaCO3,HCO3,CO3) if perchlorate detected,perform Verification analysis using SW846-6850M.Gamma Spectroscopy as short list isotopes.

Conditions on Receipt

Lab Use

1.Relinquished by		Org. 4142	Date 7/9/13	Time 1033	3.Relinquished by	Org.	Date Time
1. Received by		Org. 4142	Date 7/9/13	Time 1033	3. Received by	Org.	Date Time
2.Relinquished by		Org. 4142	Date 7/9/13	Time 1100	4.Relinquished by	Org.	Date Time
2. Received by		Org. GEL	Date 7-10-13	Time 0741	4. Received by	Org.	Date Time

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

CONTRACT LABORATORY
ANALYSIS REQUEST AND CHAIN OF CUSTODY (Continuation)

AR/COC 614933

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

Sample No.	Fraction	Sample Location Detail	Depth (ft)	Date/Time Collected	Sample Matrix	Container Type	Container Volume	Preserv-ative	Collection Method	Sample Type	Parameter & Method Requested	Lab use Lab Sample ID
094361	-027	OBS-MW1	153	7/9/13 10:01	GW	P	250 ml	NaOH	G	SA	Total Cyanide (SW846-9012	329129 010
094361	-033	OBS-MW1	153	7/9/13 10:02	GW	P	1 L	HNO3	G	SA	Gamma Spectroscopy (EPA 901.0)	329129 011
094361	-034	OBS-MW1	153	7/9/13 10:03	GW	P	1 L	HNO3	G	SA	Gross Alpha and Beta (EPA 900.0)	329129 012
094361	-035	OBS-MW1	153	7/9/13 10:04	GW	P	1 L	HNO3	G	SA	Isotopic Uranium (HASL 300)	329129 013
094362	-001	OBS-TB1	NA	7/9/13 9:44	DIW	G	3x40ml	HCL	G	TB	TCL VOC (SW846-8260B)	329129 014

Recipient Initials MK

SMO 2012-ARCOC (4-2012)

AOP 95-16

CONTRACT LABORATORY
ANALYSIS REQUEST AND CHAIN OF CUSTODY

Internal Lab Batch No. NA

Page 1 of 2

SMO Use

AR/COC **614934**

Project Name:	SWMU 68 GWM	Date Samples Shipped:	7/9/13	SMO Authorization:	[signature]
Project/Task Manager:	Clinton Lum	Carrier/Waybill No.	206735	SMO Contact Phone:	
Project/Task Number:	98026.01.13	Lab Contact:	Edie Kent/803-556-8171		Lorraine Herrera/505-844-3199
Service Order:	CF 263-13	Lab Destination:	GEL	Send Report to SMO:	
		Contract No.:	PO 1303873		Rita Kavanaugh/505-284-2553
Tech Area:					
Building:	Room:	Operational Site:			

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

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

Sample No.	Fraction	Sample Location Detail	Depth (ft)	Date/Time Collected	Sample Matrix	Container Type	Container Volume	Preservative	Collection Method	Sample Type	Parameter & Method Requested	Lab Sample ID
094363	-001	OBS-EB1	NA	7/9/13 11:15	DIW	G	3x40ml	HCL	G	SA	TCL VOC (SW846-8260B)	329124 015
094363	-002	OBS-EB1	NA	7/9/13 11:20	DIW	AG	4x1L	None	G	SA	TCL SVOC (SW846-8270C)	329124 016
094363	-009	OBS-EB1	NA	7/9/13 11:21	DIW	P	500 ml	HNO3	G	SA	TAL Metals+U(SW846-6010/6020/7470)	329124 017
094363	-014	OBS-EB1	NA	7/9/13 11:22	DIW	P	250 ml	None	G	SA	Hexavalent Chromium(SW846-7196A	329124 018
094363	-016	OBS-EB1	NA	7/9/13 11:23	DIW	P	125 ml	None	G	SA	Anions(SW846-9056))	329124 019
094363	-017	OBS-EB1	NA	7/9/13 11:24	FDIW	P	250 ml	HNO3	G	SA	Metals-Ca,Mg,K,Na(SW846-6020)	329205 002
094363	-018	OBS-EB1	NA	7/9/13 11:25	DIW	P	125 ml	H2SO4	G	SA	NPN (EPA 353.2)	329124 020
094363	-020	OBS-EB1	NA	7/9/13 11:26	DIW	P	250 ml	None	G	SA	Perchlorate (EPA 314.0)	329124 021
094363	-022	OBS-EB1	NA	7/9/13 11:27	DIW	P	500 ml	None	G	SA	Alkalinity (SM2320B)	329124 022
094363	-024	OBS-EB1	NA	7/9/13 11:30	DIW	AG	4x1L	None	G	SA	High Explosives (SW846-8321A)	329124 023

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

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

Special Instructions/QC Requirements:
EDD ☑ Yes ☐ No
Turnaround Time ☐ 7 Day* ☐ 15 Day* ☑ 30 Day
Negotiated TAT ☐
Sample Disposal ☐ Return to Client ☐ Disposal by Lab
Return Samples By:
Comments: Send report to Tim Jackson/4142/MS 0729/284-2547
FGW(filtered in field w/0.45 micron filter) Anions(Br,Cl,F,SO4)Alkalinity(total CaCO3,HCO3,CO3) if perchlorate detected,perform Verification analysis using SW846-6850M.Gamma Spectroscopy as short list isotopes.

Conditions on Receipt — Lab Use

Sample Team Members: Name	Signature	Init.	Company/Organization/Phone/Cell
Robert Lynch	[signature]	RL	SNL/4142/505-844-4013/505-250-7090
Tim Jackson	[signature]	TJ	SNL/4142/505-284-2547/505-263-6639

		Org.	Date	Time		Org.	Date	Time
1.Relinquished by [signature]		4142	7/9/13	1146	3.Relinquished by			
1. Received by [signature]		4142	7/9/13	1146	3. Received by			
2.Relinquished by [signature]		4142	7/9/13	1200	4.Relinquished by			
2. Received by [signature]		GEL	7-10-13	0740	4. Received by			

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

CONTRACT LABORATORY
ANALYSIS REQUEST AND CHAIN OF CUSTODY (Continuation)

AOP 95-16

AR/COC 614934

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

Sample No.	Fraction	Sample Location Detail	Depth (ft)	Date/Time Collected	Sample Matrix	Container Type	Container Volume	Preserv-ative	Collection Method	Sample Type	Parameter & Method Requested	Lab use Lab Sample ID
094363	-027	OBS-EB1	NA	7/9/13 11:31	DIW	P	250 ml	NaOH	G	SA	Total Cyanide (SW846-9012	329124 024
094363	-033	OBS-EB1	NA	7/9/13 11:32	DIW	P	1 L	HNO3	G	SA	Gamma Spectroscopy (EPA 901.0)	329124 025
094363	-034	OBS-EB1	NA	7/9/13 11:33	DIW	P	1 L	HNO3	G	SA	Gross Alpha and Beta (EPA 900.0)	329124 026
094363	-035	OBS-EB1	NA	7/9/13 11:34	DIW	P	1 L	HNO3	G	SA	Isotopic Uranium (HASL 300)	329124 027
094364	-001	OBS-TB2	NA	7/9/13 11:15	DIW	G	3x40ml	HCL	G	TB	TCL VOC (SW846-8260B)	329124 028

Recipient Initials MK

SMO 2012-ARCOC (4-2012)

CONTRACT LABORATORY
ANALYSIS REQUEST AND CHAIN OF CUSTODY

AOP 95-16

Internal Lab

Batch No. N/A

AR/COC 614935

Project Name: SWMU 68 GWM	Date Samples Shipped: 7/10/13	SMO Authorization:	☐ Waste Characterization
Project/Task Manager: Clinton Lum	Carrier/Waybill No. 206271	SMO Contact Phone:	☐ RMMA
Project/Task Number: 98026.01.13	Lab Contact: Edie Kent/803-556-8171	Lorraine Herrera/505-844-3199	☐ Released by COC No.
Service Order: CF 263-13	Lab Destination: GEL	Send Report to SMO:	☑ 4° Celsius
Tech Area:	Contract No.: PO 1303873	Rita Kavanaugh/505-284-2553	Bill to:Sandia National Laboratories (Accounts Payable), P.O. Box 5800, MS-0154 Albuquerque, NM 87185-0154
Building: Room:	Operational Site:		

Sample No.	Fraction	Sample Location Detail	Depth (ft)	Date/Time Collected	Sample Matrix	Container Type	Container Volume	Preservative	Collection Method	Sample Type	Parameter & Method Requested	Lab Sample ID
094365	-001	OBS-MW2	252	7/10/13 9:19	GW	G	3x40ml	HCL	G	SA	TCL VOC (SW846-8260B)	329124 029
094365	-002	OBS-MW2	252	7/10/13 9:22	GW	AG	4x1L	None	G	SA	TCL SVOC (SW846-8270C)	329124 030
094365	-009	OBS-MW2	252	7/10/13 9:25	GW	P	500 ml	HNO3	G	SA	TAL Metals+U(SW846-6010/6020/7470)	329124 031
094365	-014	OBS-MW2	252	7/10/13 9:26	GW	P	250 ml	None	G	SA	Hexavalent Chromium(SW846-7196A	329124 032
094365	-016	OBS-MW2	252	7/10/13 9:27	GW	P	125 ml	None	G	SA	Anions(SW846-9056))	329124 033
094365	-017	OBS-MW2	252	7/10/13 9:28	FGW	P	250 ml	HNO3	G	SA	Metals-Ca,Mg,K,Na(SW846-6020)	329205 003
094365	-018	OBS-MW2	252	7/10/13 9:29	GW	P	125 ml	H2SO4	G	SA	NPN (EPA 353.2)	329124 034
094365	-020	OBS-MW2	252	7/10/13 9:30	GW	P	250 ml	None	G	SA	Perchlorate (EPA 314.0)	329124 035
094365	-022	OBS-MW2	252	7/10/13 9:31	GW	P	500 ml	None	G	SA	Alkalinity (SM2320B)	329124 036
094365	-024	OBS-MW2	252	7/9/13 9:33	GW	AG	4x1L	None	G	SA	High Explosives (SW846-8321A)	329124 037

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

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

Special Instructions/QC Requirements:

EDD ☑ Yes ☐ No

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

Negotiated TAT ☐

Sample Disposal ☐ Return to Client ☐ Disposal by Lab

Return Samples By:

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

Conditions on Receipt

Lab Use

1.Relinquished by	T-Jackson	Org. 4142	Date 7/10/13	Time 1010	3.Relinquished by	Org.	Date	Time
1. Received by	SMO	Org. 4142	Date 7/10/13	Time 1010	3. Received by	Org.	Date	Time
2.Relinquished by	SMO	Org. 4142	Date 7/10/13	Time 1100	4.Relinquished by	Org.	Date	Time
2. Received by		Org. GEL	Date 7-11-13	Time 0145	4. Received by	Org.	Date	Time

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

CONTRACT LABORATORY
ANALYSIS REQUEST AND CHAIN OF CUSTODY (Continuation)

AOP 95-16

AR/COC 614935

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

Sample No.	Fraction	Sample Location Detail	Depth (ft)	Date/Time Collected	Sample Matrix	Container Type	Container Volume	Preserv-ative	Collection Method	Sample Type	Parameter & Method Requested	Lab use Lab Sample ID
094365	-027	OBS-MW2	252	7/10/13 9:36	GW	P	250 ml	NaOH	G	SA	Total Cyanide (SW846-9012	329129 038
094365	-033	OBS-MW2	252	7/10/13 9:37	GW	P	1 L	HNO3	G	SA	Gamma Spectroscopy (EPA 901.0)	329129 039
094365	-034	OBS-MW2	252	7/10/13 9:38	GW	P	1 L	HNO3	G	SA	Gross Alpha and Beta (EPA 900.0)	329129 040
094365	-035	OBS-MW2	252	7/10/13 9:39	GW	P	1 L	HNO3	G	SA	Isotopic Uranium (HASL 300)	329129 041
094366	-001	OBS-MW2	252	7/10/13 9:20	GW	G	3x40ml	HCL	G	DU	TCL VOC (SW846-8260B)	329129 042
094366	-002	OBS-MW2	252	7/10/13 9:24	GW	AG	4x1L	None	G	DU	TCL SVOC (SW846-8270C)	329129 043
094366	-009	OBS-MW2	252	7/10/13 9:25	GW	P	500 ml	HNO3	G	DU	TAL Metals+U(SW846-6010/6020/7470)	329129 044
094366	-014	OBS-MW2	252	7/10/13 9:26	GW	P	250 ml	None	G	DU	Hexavalent Chromium(SW846-7196A	329129 045
094366	-016	OBS-MW2	252	7/10/13 9:27	GW	P	125 ml	None	G	DU	Anions(SW846-9056))	329129 046
094366	-017	OBS-MW2	252	7/10/13 9:28	FGW	P	250 ml	HNO3	G	DU	Metals-Ca,Mg,K,Na(SW846-6020)	329209 004
094366	-018	OBS-MW2	252	7/10/13 9:29	GW	P	125 ml	H2SO4	G	DU	NPN (EPA 353.2)	329129 047
094366	-020	OBS-MW2	252	7/10/13 9:30	GW	P	250 ml	None	G	DU	Perchlorate (EPA 314.0)	329129 048
094366	-022	OBS-MW2	252	7/10/13 9:31	GW	P	500 ml	None	G	DU	Alkalinity (SM2320B)	329129 049
094366	-024	OBS-MW2	252	7/10/13 9:35	GW	AG	4x1L	None	G	DU	High Explosives (SW846-8321A)	329129 050
094366	-027	OBS-MW2	252	7/10/13 9:36	GW	P	250 ml	NaOH	G	DU	Total Cyanide (SW846-9012	329129 051
094366	-033	OBS-MW2	252	7/10/13 9:37	GW	P	1 L	HNO3	G	DU	Gamma Spectroscopy (EPA 901.0)	329129 052
094366	-034	OBS-MW2	252	7/10/13 9:38	GW	P	1 L	HNO3	G	DU	Gross Alpha and Beta (EPA 900.0)	329129 053
094366	-035	OBS-MW2	252	7/10/13 9:39	GW	P	1 L	HNO3	G	DU	Isotopic Uranium (HASL 300)	329129 054
094367	-001	OBS-TB3	NA	7/10/13 9:19	DIW	G	3x40ml	HCL	G	TB	TCL VOC (SW846-8260B)	329129 055

Recipient Initials MK

SMO 2012-ARCOC (4-2012)

CONTRACT LABORATORY
ANALYSIS REQUEST AND CHAIN OF CUSTODY

AOP 95-16

Internal Lab

Batch No. N/A

AR/COC 614936

Project Name:	SWMU 68 GWM	Date Samples Shipped:	7/11/13	SMO Authorization:	
Project/Task Manager:	Clinton Lum	Carrier/Waybill No.	206 848	SMO Contact Phone:	SMO
Project/Task Number:	98026.01.13	Lab Contact:	Edie Kent/803-556-8171	Lorraine Herrera/505-844-3199	
Service Order:	CF 263-13	Lab Destination:	GEL	Send Report to SMO:	
		Contract No.:	PO 1303873	Rita Kavanaugh/505-284-2553	
Tech Area:					
Building:	Room:	Operational Site:			

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

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

Sample No.	Fraction	Sample Location Detail	Depth (ft)	Date/Time Collected	Sample Matrix	Container Type	Container Volume	Preservative	Collection Method	Sample Type	Parameter & Method Requested	Lab Sample ID
094368	-001	OBS-MW3	208	7/11/13 9:20	GW	G	3x40ml	HCL	G	SA	TCL VOC (SW846-8260B)	329124 056
094368	-002	OBS-MW3	208	7/11/13 9:22	GW	AG	4x1L	None	G	SA	TCL SVOC (SW846-8270C)	329124 057
094368	-009	OBS-MW3	208	7/11/13 9:23	GW	P	500 ml	HNO3	G	SA	TAL Metals+U(SW846-6010/6020/7470)	329124 058
094368	-014	OBS-MW3	208	7/11/13 9:24	GW	P	250 ml	None	G	SA	Hexavalent Chromium(SW846-7196A	329124 059
094368	-016	OBS-MW3	208	7/11/13 9:25	GW	P	125 ml	None	G	SA	Anions(SW846-9056))	329124 060
094368	-017	OBS-MW3	208	7/11/13 9:26	FGW	P	250 ml	HNO3	G	SA	Metals-Ca,Mg,K,Na(SW846-6020)	329205 005
094368	-018	OBS-MW3	208	7/11/13 9:27	GW	P	125 ml	H2SO4	G	SA	NPN (EPA 353.2)	329124 061
094368	-020	OBS-MW3	208	7/11/13 9:28	GW	P	250 ml	None	G	SA	Perchlorate (EPA 314.0)	329124 062
094368	-022	OBS-MW3	208	7/11/13 9:29	GW	P	500 ml	None	G	SA	Alkalinity (SM2320B)	329124 063
094368	-024	OBS-MW3	208	7/11/13 9:30	GW	AG	4x1L	None	G	SA	High Explosives (SW846-8321A)	329124 064

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

Special Instructions/QC Requirements:

EDD	☑ Yes	☐ No	
Turnaround Time	☐ 7 Day*	☐ 15 Day*	☑ 30 Day
Negotiated TAT	☐		
Sample Disposal	☐ Return to Client	☐ Disposal by Lab	
Return Samples By:			

Conditions on Receipt

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

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

1.Relinquished by	T-Jackson	Org. 4142	Date 7/11/13	Time 1006	3.Relinquished by	Org.	Date	Time
1. Received by	SMO	Org. 4142	Date 7/11/13	Time 1006	3. Received by	Org.	Date	Time
2.Relinquished by	SMO	Org. 4142	Date 7/11/13	Time 1100	4.Relinquished by	Org.	Date	Time
2. Received by		Org. Cal	Date 7-12-13	Time 0735	4. Received by	Org.	Date	Time

Lab Use

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

CONTRACT LABORATORY
ANALYSIS REQUEST AND CHAIN OF CUSTODY (Continuation)

AR/COC 614936

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

Sample No.	Fraction	Sample Location Detail	Depth (ft)	Date/Time Collected	Sample Matrix	Container Type	Container Volume	Preserv-ative	Collection Method	Sample Type	Parameter & Method Requested	Lab use Lab Sample ID
094368	-027	OBS-MW3	208	7/11/13 9:31	GW	P	250 ml	NaOH	G	SA	Total Cyanide (SW846-9012	329124 065
094368	-033	OBS-MW3	208	7/11/13 9:32	GW	P	1 L	HNO3	G	SA	Gamma Spectroscopy (EPA 901.0)	329124 066
094368	-034	OBS-MW3	208	7/11/13 9:33	GW	P	1 L	HNO3	G	SA	Gross Alpha and Beta (EPA 900.0)	329124 067
094368	-035	OBS-MW3	208	7/11/13 9:34	GW	P	1 L	HNO3	G	SA	Isotopic Uranium (HASL 300)	329124 068
094369	-001	OBS-TB4	NA	7/11/13 9:19	DIW	G	3x40ml	HCL	G	TB	TCL VOC (SW846-8260B)	329124 069
094370	-001	OBS-FB1	NA	7/11/13 9:19	DIW	G	3x40ml	HCL	G	FB	TCL VOC (SW846-8260B)	329124 070

Recipient Initials MC

CONTRACT LABORATORY
ANALYSIS REQUEST AND CHAIN OF CUSTODY

AOP 95-16

Internal Lab

Batch No. N/A

AR/COC 614935

		SMO Use	
Project Name:	SWMU 68 GWM	Date Samples Shipped:	7/10/13
Project/Task Manager:	Clinton Lum	Carrier/Waybill No.	20 0271
Project/Task Number:	98026.01.13	Lab Contact:	Edie Kent/803-556-8171
Service Order:	CF 263-13	Lab Destination:	GEL
		Contract No.:	PO 1303873
Tech Area:		Operational Site:	
Building:	Room:		

SMO Authorization: SMO
SMO Contact Phone: Lorraine Herrera/505-844-3199
Send Report to SMO: Rita Kavanaugh/505-284-2553

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

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

Sample No.	Fraction	Sample Location Detail	Depth (ft)	Date/Time Collected	Sample Matrix	Container Type	Container Volume	Preservative	Collection Method	Sample Type	Parameter & Method Requested	Lab Sample ID
094365	-001	OBS-MW2	252	7/10/13 9:19	GW	G	3x40ml	HCL	G	SA	TCL VOC (SW846-8260B)	329124 029
094365	-002	OBS-MW2	252	7/10/13 9:22	GW	AG	4x1L	None	G	SA	TCL SVOC (SW846-8270C)	329124 030
094365	-009	OBS-MW2	252	7/10/13 9:25	GW	P	500 ml	HNO3	G	SA	TAL Metals+U(SW846-6010/6020/7470)	329124 031
094365	-014	OBS-MW2	252	7/10/13 9:26	GW	P	250 ml	None	G	SA	Hexavalent Chromium(SW846-7196A	329124 032
094365	-016	OBS-MW2	252	7/10/13 9:27	GW	P	125 ml	None	G	SA	Anions(SW846-9056)) 331750001	329124 033
094365	-017	OBS-MW2	252	7/10/13 9:28	FGW	P	250 ml	HNO3	G	SA	Metals-Ca,Mg,K,Na(SW846-6020)	329205 003
094365	-018	OBS-MW2	252	7/10/13 9:29	GW	P	125 ml	H2SO4	G	SA	NPN (EPA 353.2)	329124 034
094365	-020	OBS-MW2	252	7/10/13 9:30	GW	P	250 ml	None	G	SA	Perchlorate (EPA 314.0)	329124 035
094365	-022	OBS-MW2	252	7/10/13 9:31	GW	P	500 ml	None	G	SA	Alkalinity (SM2320B)	329124 036
094365	-024	OBS-MW2	252	7/9/13 9:33	GW	AG	4x1L	None	G	SA	High Explosives (SW846-8321A)	329124 037

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

Special Instructions/QC Requirements:
EDD ☑ Yes ☐ No
Turnaround Time ☐ 7 Day* ☐ 15 Day* ☑ 30 Day
Negotiated TAT ☐
Sample Disposal ☐ Return to Client ☐ Disposal by Lab
Return Samples By:
Comments: Send report to Tim Jackson/4142/MS 0729/284-2547
FGW(filtered in field w/0.45 micron filter) Anions(Br,Cl,F,SO4)Alkalinity(total CaCO3,HCO3,CO3) if perchlorate detected,perform verification analysis using SW846-6850M.Gamma Spectroscopy as short list isotopes.

Conditions on Receipt

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

Lab Use

1.Relinquished by	T-Jackson	Org.	4142	Date	7/10/13	Time	1010
1. Received by	SMO	Org.	4142	Date	7/10/13	Time	1010
2.Relinquished by	SMO	Org.	4142	Date	7/10/13	Time	1100
2. Received by		Org.	GEL	Date	7-11-13	Time	0145

3.Relinquished by		Org.		Date		Time	
3. Received by		Org.		Date		Time	
4.Relinquished by		Org.		Date		Time	
4. Received by		Org.		Date		Time	

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

CONTRACT LABORATORY
ANALYSIS REQUEST AND CHAIN OF CUSTODY (Continuation)

AR/COC 614935

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

Sample No.	Fraction	Sample Location Detail	Depth (ft)	Date/Time Collected	Sample Matrix	Container Type	Container Volume	Preserv-ative	Collection Method	Sample Type	Parameter & Method Requested	Lab use Lab Sample ID
094365	-027	OBS-MW2	252	7/10/13 9:36	GW	P	250 ml	NaOH	G	SA	Total Cyanide (SW846-9012	329129 038
094365	-033	OBS-MW2	252	7/10/13 9:37	GW	P	1 L	HNO3	G	SA	Gamma Spectroscopy (EPA 901.0)	329129 039
094365	-034	OBS-MW2	252	7/10/13 9:38	GW	P	1 L	HNO3	G	SA	Gross Alpha and Beta (EPA 900.0)	329129 040
094365	-035	OBS-MW2	252	7/10/13 9:39	GW	P	1 L	HNO3	G	SA	Isotopic Uranium (HASL 300)	329129 041
094366	-001	OBS-MW2	252	7/10/13 9:20	GW	G	3x40ml	HCL	G	DU	TCL VOC (SW846-8260B)	329129 042
094366	-002	OBS-MW2	252	7/10/13 9:24	GW	AG	4x1L	None	G	DU	TCL SVOC (SW846-8270C)	329129 043
094366	-009	OBS-MW2	252	7/10/13 9:25	GW	P	500 ml	HNO3	G	DU	TAL Metals+U(SW846-6010/6020/7470)	329129 044
094366	-014	OBS-MW2	252	7/10/13 9:26	GW	P	250 ml	None	G	DU	Hexavalent Chromium(SW846-7196A	329129 045
094366	-016	OBS-MW2	252	7/10/13 9:27	GW	P	125 ml	None	G	DU	Anions(SW846-9056))	329129 046
094366	-017	OBS-MW2	252	7/10/13 9:28	FGW	P	250 ml	HNO3	G	DU	Metals-Ca,Mg,K,Na(SW846-6020)	329205 004
094366	-018	OBS-MW2	252	7/10/13 9:29	GW	P	125 ml	H2SO4	G	DU	NPN (EPA 353.2)	329129 047
094366	-020	OBS-MW2	252	7/10/13 9:30	GW	P	250 ml	None	G	DU	Perchlorate (EPA 314.0)	329129 048
094366	-022	OBS-MW2	252	7/10/13 9:31	GW	P	500 ml	None	G	DU	Alkalinity (SM2320B)	329129 049
094366	-024	OBS-MW2	252	7/10/13 9:35	GW	AG	4x1L	None	G	DU	High Explosives (SW846-8321A)	329129 050
094366	-027	OBS-MW2	252	7/10/13 9:36	GW	P	250 ml	NaOH	G	DU	Total Cyanide (SW846-9012	329129 051
094366	-033	OBS-MW2	252	7/10/13 9:37	GW	P	1 L	HNO3	G	DU	Gamma Spectroscopy (EPA 901.0)	329129 052
094366	-034	OBS-MW2	252	7/10/13 9:38	GW	P	1 L	HNO3	G	DU	Gross Alpha and Beta (EPA 900.0)	329129 053
094366	-035	OBS-MW2	252	7/10/13 9:39	GW	P	1 L	HNO3	G	DU	Isotopic Uranium (HASL 300)	329129 054
094367	-001	OBS-TB3	NA	7/10/13 9:19	DIW	G	3x40ml	HCL	G	TB	TCL VOC (SW846-8260B)	329129 055

Recipient Initials MK

Sample Findings Summary

AR/COC: 614933, 614934, 614935, 614936

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
DOE EML HASL-300, U-02-RC			
	094363-035/OBS-EB1	Uranium-233/234 (13968-55-3/13966-29-)	BD, FR3
	094363-035/OBS-EB1	Uranium-235/236 (15117-96-1/13982-70-)	BD, FR3
	094363-035/OBS-EB1	Uranium-238 (7440-61-1)	BD, FR3
EPA 900.0/SW846 9310			
	094363-034/OBS-EB1	ALPHA (12587-46-1)	BD, FR3
	094363-034/OBS-EB1	BETA (12587-47-2)	BD, FR3
EPA 901.1			
	094361-033/OBS-MW1	Americium-241 (14596-10-2)	BD, FR3
	094361-033/OBS-MW1	Cesium-137 (10045-97-3)	BD, FR3
	094361-033/OBS-MW1	Cobalt-60 (10198-40-0)	BD, FR3
	094361-033/OBS-MW1	Potassium-40 (13966-00-2)	BD, FR3
	094363-033/OBS-EB1	Americium-241 (14596-10-2)	BD, FR3
	094363-033/OBS-EB1	Cesium-137 (10045-97-3)	BD, FR3
	094363-033/OBS-EB1	Cobalt-60 (10198-40-0)	BD, FR3
	094363-033/OBS-EB1	Potassium-40 (13966-00-2)	BD, FR3
	094365-033/OBS-MW2	Americium-241 (14596-10-2)	BD, FR3
	094365-033/OBS-MW2	Cesium-137 (10045-97-3)	BD, FR3
	094365-033/OBS-MW2	Cobalt-60 (10198-40-0)	BD, FR3
	094365-033/OBS-MW2	Potassium-40 (13966-00-2)	BD, FR3
	094366-033/OBS-MW2	Americium-241 (14596-10-2)	BD, FR3
	094366-033/OBS-MW2	Cesium-137 (10045-97-3)	BD, FR3
	094366-033/OBS-MW2	Cobalt-60 (10198-40-0)	BD, FR3
	094366-033/OBS-MW2	Potassium-40 (13966-00-2)	BD, FR3
	094368-033/OBS-MW3	Americium-241 (14596-10-2)	BD, FR3

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
	094368-033/OBS-MW3	Cesium-137 (10045-97-3)	BD, FR3
	094368-033/OBS-MW3	Cobalt-60 (10198-40-0)	BD, FR3
	094368-033/OBS-MW3	Potassium-40 (13966-00-2)	BD, FR3
SW846 3005/6020 DOE-AL			
	094361-009/OBS-MW1	Barium (7440-39-3)	J, MS1
	094361-009/OBS-MW1	Manganese (7439-96-5)	J, D1
	094363-009/OBS-EB1	Barium (7440-39-3)	UJ, MS1
	094363-009/OBS-EB1	Manganese (7439-96-5)	UJ, D1
	094365-009/OBS-MW2	Barium (7440-39-3)	J, MS1
	094365-009/OBS-MW2	Copper (7440-50-8)	0.0080U, B2
	094365-009/OBS-MW2	Manganese (7439-96-5)	UJ, D1
	094366-009/OBS-MW2	Barium (7440-39-3)	J, MS1
	094366-009/OBS-MW2	Copper (7440-50-8)	0.0080U, B2
	094366-009/OBS-MW2	Manganese (7439-96-5)	UJ, D1
	094368-009/OBS-MW3	Barium (7440-39-3)	J, MS1
	094368-009/OBS-MW3	Manganese (7439-96-5)	J, D1
SW846 3535/8321A Modified			
	094361-024/OBS-MW1	m-Nitrotoluene (99-08-1)	UJ, I4
	094361-024/OBS-MW1	o-Nitrotoluene (88-72-2)	UJ, I4
	094361-024/OBS-MW1	p-Nitrotoluene (99-99-0)	UJ, I4
	094363-024/OBS-EB1	m-Nitrotoluene (99-08-1)	UJ, I4
	094363-024/OBS-EB1	o-Nitrotoluene (88-72-2)	UJ, I4
	094363-024/OBS-EB1	p-Nitrotoluene (99-99-0)	UJ, I4
	094365-024/OBS-MW2	m-Nitrotoluene (99-08-1)	UJ, I4
	094365-024/OBS-MW2	o-Nitrotoluene (88-72-2)	UJ, I4
	094365-024/OBS-MW2	p-Nitrotoluene (99-99-0)	UJ, I4
	094366-024/OBS-MW2	m-Nitrotoluene (99-08-1)	UJ, I4
	094366-024/OBS-MW2	o-Nitrotoluene (88-72-2)	UJ, I4
	094366-024/OBS-MW2	p-Nitrotoluene (99-99-0)	UJ, I4

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
	094368-024/OBS-MW3	m-Nitrotoluene (99-08-1)	UJ, I4
	094368-024/OBS-MW3	o-Nitrotoluene (88-72-2)	UJ, I4
	094368-024/OBS-MW3	p-Nitrotoluene (99-99-0)	UJ, I4
SW846 9012B			
	094361-027/OBS-MW1	Cyanide, Total (57-12-5)	UJ, I5,B4,MS3
	094363-027/OBS-EB1	Cyanide, Total (57-12-5)	UJ, I5,B4,MS3
	094365-027/OBS-MW2	Cyanide, Total (57-12-5)	UJ, I5,B4,MS3
	094366-027/OBS-MW2	Cyanide, Total (57-12-5)	UJ, I5,B4,MS3
	094368-027/OBS-MW3	Cyanide, Total (57-12-5)	UJ, I5,B4,MS3
SW846 9056			
	094365-R16/OBS-MW2	Chloride (16887-00-6)	J, H1
	094365-R16/OBS-MW2	Sulfate (14808-79-8)	J, H1

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


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