1-26-2015

Environment Restoration Operations Consolidated Quarterly Report - January 2015

Sandia National Laboratories/NM

Sandia National Laboratories

Sandia National Laboratories, New Mexico

Environmental Restoration Operations

A U.S. Department of Energy Environmental Cleanup Program

Consolidated Quarterly Report

July – September 2014

January 2015

U.S. DEPARTMENT OF ENERGY

United States Department of Energy
Sandia Field Office

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CONSOLIDATED QUARTERLY REPORT

January 2015

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 2014

OVERVIEW

This Sandia National Laboratories, New Mexico Environmental Restoration Operations (ER) Consolidated Quarterly Report (ER Quarterly Report) fulfills all quarterly reporting requirements set forth in the Hazardous and Solid Waste Amendments (HSWA) Module of the Resource Conservation and Recovery Act Permit, and the Consent Order. 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). A summary of post-closure care activities performed in accordance with the Chemical Waste Landfill Post-Closure Care Permit is also included in this document. 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 Hazardous Waste Facility 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 2014

SECTION II: Perchlorate Screening Quarterly Groundwater Monitoring Report, July – September 2014

SECTION III: Solid Waste Management Units 149 and 154 Quarterly Groundwater Monitoring Report, July – September 2014

SECTION IV: Solid Waste Management Units 8/58 and 68 Quarterly Groundwater Monitoring Report, July – September 2014

ABBREVIATIONS AND ACRONYMS

°C	degrees Celsius
µg/L	microgram(s) per liter
µmhos/cm	micromhos per centimeter
% Sat	percent saturation
AGMR	Annual Groundwater Monitoring Report
ALTMM	Annual Long-Term Monitoring and Maintenance
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)
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
GPS	Global Positioning System
H_2SO_4	sulfuric acid
HASL	Health and Safety Laboratory
HCI	hydrochloric acid
HE	high explosive(s)

HMX	tetrahexamine tetranitramine
HNO_3	nitric acid
HQ	hazard quotient
HSWA	Hazardous and Solid Waste Amendments
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
NaOH	sodium hydroxide
NA	not applicable
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
pH	potential of hydrogen
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
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
TAVG	Technical Area V Groundwater
TAG	Tijeras Arroyo Groundwater
TAL	Target Analyte List
TB	trip blank
TBD	to be determined
Tetryl	2,4,6-trinitrophenylmethylnitramine
The Consent Order	the Compliance Order on Consent
TO	Technical Order
VOC	volatile organic compound
W	Well

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SECTION I
ENVIRONMENTAL RESTORATION OPERATIONS CONSOLIDATED QUARTERLY REPORT, July – September 2014

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 2014 quarterly reporting period. Section 2.0 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 3.0 provides the status of LTS activities that relate to the MWL, Chemical Waste Landfill (CWL), and Corrective Action Management Unit (CAMU). Section 4.0 provides the references noted in Section I of this report.

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 approved the LTMMP on January 8, 2014 (Blaine January 2014). Monitoring, inspections, maintenance/repair, and reporting activities required by the LTMMP are now presented in Section I.3.1, including MWL evapotranspirative cover (ET Cover) supplemental watering and maintenance (LTS Activities). Remaining ER Operations activities at the MWL are presented below.

The work plan for installation of the three multi-port, soil-vapor monitoring wells (SNL/NM January 2014) specified in the MWL LTMMP was approved by the NMED on February 14, 2014 (Blaine February 2014). The drilling field work began on May 23, 2014 and was completed on July 3, 2014. During this reporting period, installation of the MWL-SV05 FLUTe™ soil-vapor monitoring well was completed on July 3, 2014 and flow testing of all the FLUTe™ sampling ports was completed on July 23, 2014.

The FLUTe™ Installation Report (SNL/NM September 2014a) was prepared and submitted to NMED on September 10, 2014, and was approved by the NMED on September 25, 2014 (Kieling September 2014).

With NMED approval of the FLUTe™ Installation Report and pursuant to Section VII.D.6 of the Compliance Order on Consent (the Consent Order), the U.S. Department of Energy/National Nuclear Security Administration (DOE/NNSA) and Sandia Corporation (Sandia) requested a Certificate of Completion stating the Corrective Action is complete with controls at the MWL on September 25, 2014 (Beausoleil September 2014). After receipt of the Certificate of Completion, DOE/NNSA and Sandia will initiate a Class 3 permit modification request. In preparation for this permit modification request, compilation of the MWL Justification Binder was initiated during this reporting period. The Justification Binder will include all major MWL documents and related correspondence from May 2005 to October 2014.

The first semiannual soil-vapor sampling event under the LTMMP occurred on September 11, 2014, approximately 2 months after completion of drilling and installation activities to allow for vadose zone equilibration as specified in the Installation Plan (SNL/NM January 2014). Preliminary results will be provided to NMED on October 14, 2014.

A groundwater monitoring report focusing on filtered and unfiltered metals in groundwater from monitoring well MWL-MW4 from the annual sampling event conducted in January and February 2013 was prepared and submitted to NMED on May 20, 2014 (SNL/NM May 2014). This report addressed results from analysis of groundwater for unfiltered metals (chromium, cobalt, copper, iron, and nickel) that showed an increase in the 2013 samples. NMED provided recommendations on July 24, 2014 that included repeated pumping of the well with the goal of removing as much sediment and stainless steel corrosion particles as possible prior to removing the packer and dedicated sampling pump from the monitoring well for inspection, replacement, and/or cleaning (Kieling July 2014). NMED also recommended sampling for filtered and unfiltered metals during the pumping effort to determine if unfiltered metals concentrations returned to background levels.

From September 8 through September 29, 2014, pumping and sampling of MWL-MW4 was conducted to remove sediment and corrosion particles from the well in accordance with the NMED July 24, 2014 recommendations. A total of 233 gallons of groundwater were removed from the upper screen interval of MWL-MW4 and a total of seven samples (not including duplicate samples) were collected throughout the three-week process. Filtered and unfiltered analytical results demonstrate that the pumping was successful at removing sediment and corrosion particles from the well, and in addition this pumping and sampling effectively cleaned the pump intake screen of corrosion. The unfiltered sample results show an overall decreasing trend, with all chromium, copper, cobalt, iron, and nickel results for the final two sampling events within or close to background levels. These data demonstrate that the elevated 2013 unfiltered metals results were caused by the corrosion of the stainless

steel sampling pump and were not related to contamination in the regional aquifer from the MWL.

Additional work is planned for MWL-MW4 that includes removing the packer and pump equipment, video logging the MWL-MW4 well casing and screen intervals, cleaning and servicing of the packer, replacing the tubing for the packer, and reinstalling the packer. Preliminary sampling results will be presented to NMED on October 14, 2014, and sampling and additional work results will be documented in a final report (submittal date not determined yet). Sampling of monitoring well MWL-MW4 will not be performed in the future; it will be used to measure and monitor the elevation of the regional aquifer water table in accordance with the LTMMP.

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 the Consent Order (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 AOCs (Technical Area -V Groundwater [TAVG], 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, DOE/ Sandia received a letter from the NMED entitled, "Class 3 Permit Modification Requests for Granting Corrective Action Complete Status for 26 SWMUs/AOCs (Request of March 1, 2006) and 5 Other SWMUs/AOCs (Request of January 7, 2008), Sandia National Laboratories, EPA ID #NM5890110518, HWB-SNL-06-007 and HWB-SNL-08-001" (NMED April 2010).

This letter included four main sections:

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

    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.2.3.7 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 (LWDS) Surface Impoundments (Technical Area [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 – LWDS Surface Impoundments (TA-V)
  2. SWMU 5 – LWDS Drainfield
  3. SWMU 28-2 – Mine Shafts
  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 (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 - 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 a letter dated July 27, 2012, the NMED granted CAC status to three SWMUs/AOCs that 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.

In response to the NMED's September 17, 2012 Public Notice and Interested Person Letter, Fact Sheet/Statement of Basis for the Corrective Action Complete Proposal, and the Administrative Record Index, submitted written public comments included requests for a public hearing on the granting of CAC status to the 24 SWMUs/AOCs. The NMED held the Public Hearing on the "Renewal of Hazardous Waste Permit EPA ID Number NM890110518 and Granting of Corrective Action Complete Status For Certain Solid Waste Management Units and Areas Of Concern at Sandia National Laboratories" from May 5 through 8, 2014, at the Hotel Cascada in Albuquerque, New Mexico. Sandia provided testimony at the Hearing in support of granting CAC status to the 24 SWMUs/AOCs.

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 the Public Hearing was held for the granting of CAC status to the remaining 23 sites (one site, under the responsibility of SNL LTS Program rather than ER, brings the number addressed in the Public Hearing to 24 sites).

2.3 Hydrogeologic Characterization

The following sections present hydrogeologic characterization and groundwater monitoring activities conducted at three groundwater AOCs (TAVG, BSG, and TAG), the MWL, the 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 TAVG; BSG; TAG; the MWL; the CWL; and SWMUs 68, 149, 154, 8/58, 49, and 116 will be presented in the SNL/NM Calendar Year (CY) 2014 Annual Groundwater Monitoring Report, which is an anticipated submittal to the NMED in summer 2015.

Analytical results for the CWL groundwater monitoring will be presented and discussed in the CWL Annual Post-Closure Care Report for CY 2014. Also, the analytical results for the MWL groundwater monitoring will be presented and discussed in the MWL Long-Term Monitoring and Maintenance Report for the reporting period of April 1, 2014 to March 31, 2015, which will be submitted to NMED in June 2015.

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

Analytical results for the September 2014 groundwater sampling of monitoring wells at SWMU 149 (CTF-MW3) and SWMU 154 (CTF-MW2) are presented in Section III of this ER Quarterly Report.

Analytical results for the July 2014 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 TAVG was conducted in July and August 2014.

2.3.2 Burn Site Groundwater

No BSG monitoring activities were performed during this reporting period. The NMED approved the Monitoring Well Plug and Abandonment Plan and Well Construction Plan (SNL/NM September 2013a) in June 2014 (NMED June 2014a). SNL/NM personnel are preparing to install groundwater monitoring wells CYN-MW14 and CYN-MW15 during the

Fourth Quarter of CY 2014. The NMED also approved an extension request for the submittal of the Burn Site Corrective Measures Evaluation Report (NMED June 2014b).

2.3.3 Tijeras Arroyo Groundwater

Groundwater sampling at TAG was conducted in August and September 2014. The NMED approved the Monitoring Well Plug and Abandonment Plan and Well Construction Plan (SNL/NM September 2013a) in June (NMED June 2014a). SNL/NM personnel are preparing to install groundwater monitoring well TA2-W-28 and decommission TA2-SW1-320 during the Fourth Quarter of CY 2014.

2.3.4 Mixed Waste Landfill Groundwater

No MWL groundwater monitoring activities were performed during this reporting period. The next semiannual groundwater monitoring event under the MWL LTMMP will be performed in October 2014. Groundwater monitoring results will be presented in the MWL Long-Term Monitoring and Maintenance Report for the reporting period April 1, 2014 to March 31, 2015, which will be submitted to NMED in June 2015.

2.3.5 Chemical Waste Landfill Groundwater

Semiannual groundwater sampling at CWL was conducted in July 2014. Groundwater monitoring results will be presented in the CWL Annual Post-Closure Care Report for CY 2014, which will be submitted to NMED in March 2015.

2.3.6 SWMUs 8/58 Groundwater

SWMUs 8/58 groundwater sampling was conducted in July 2014.

2.3.7 SWMU 49 Groundwater

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

2.3.8 SWMU 68 Groundwater

SWMU 68 groundwater sampling was conducted in July 2014.

2.3.9 SWMU 116 Groundwater

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

2.3.10 SWMU 149 Groundwater

SWMU 149 groundwater sampling was conducted in September 2014.

2.3.11 SWMU 154 Groundwater

SWMU 154 groundwater sampling was conducted in September 2014.

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 BSG Interim Measures Work Plan submitted to the NMED on May 26, 2005 (SNL/NM May 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).
- MWL Groundwater Monitoring Report for CY 2010 submitted to the NMED on September 30, 2011 (SNL/NM September 2011).

3.0 Long-Term Stewardship Work Completed

3.1 Mixed Waste Landfill

The MWL LTMMP was approved by the NMED on January 8, 2014 (Blaine January 2014). Monitoring, inspections, maintenance/repair, and reporting activities required by the LTMMP represent LTS Program activities and are presented in this section. Implementation of all LTMMP inspection and monitoring activities were initiated upon LTMMP approval.

The reporting year for the MWL under the LTMMP is April 1 through March 31of the next year, with Annual Reports due to the NMED by June 30 of each year.

- Quarterly radon air monitoring is ongoing. The detectors deployed April 2, 2014 were collected on July 3, 2014. The protective casings at all locations were inspected and new detectors were deployed at all 17 locations on the same day. No repairs were needed.

- The ET Cover Biology Inspection was performed on August 14, 2014. The vegetation is dominated by native perennial grass species with even coverage across the ET Cover. The ET Cover meets successful revegetation criteria as stipulated in the MWL LTMMP (SNL/NM March 2012), so the inspection frequency will change to annual and be conducted in August or September near the end of the 2014 growing season. From July to September 2014 there has been 4.61 inches of precipitation as measured at the nearby SNL/NM meteorological station A36 and A21 in TA-III.

- Based on the ET Cover Biology Inspection, two anthills and two small animal burrows were flagged, surveyed with a Global Positioning System (GPS) unit, and surface soil samples were collected to complete the annual biota monitoring in accordance with LTMMP requirements. Resampling for mercury analysis at three locations was performed on August 21, 2014 after a cooler arrived at the analytical laboratory out of temperature specifications for mercury due to a delivery delay (delivery truck broke down).

- Annual surface soil samples for tritium analysis were collected at the four corners of the MWL on August 21, 2014 in accordance with LTMMP requirements.

- The ET Cover System Inspection was performed on August 4, 2014. Minor fence repair was completed at one location on the east side of the site during inspection. Tumbleweed accumulations along the perimeter fence were noted and were removed from August 18 through 28, 2014. During this time, tumbleweeds and other non-native grass plants were removed by hand from the ET Cover and perimeter area, and a post-emergent herbicide was applied to the North and South Staging Areas to reduce tumbleweed growth in accordance with manufacturer's instructions. Approximately 10 cubic yards of highly compressed weeds were removed from the site.

- No supplemental watering was performed at the MWL during this reporting period.

- The first MWL Annual Long-Term Monitoring and Maintenance Report for the initial implementation reporting period of January 8 through March 31, 2014 was submitted to

NMED on June 18, 2014 (SNL/NM June 2014) and approved by NMED on August 6, 2014 (Kieling August 2014).

- Drilling, installation, reporting, and sampling related to the three FLUTe™ multi-port soil-vapor monitoring wells was completed during the reporting period. See Section 2.1 for more details.

3.2 Chemical Waste Landfill

The CWL Post-Closure Care Permit (PCCP) (NMED October 2009) became effective on June 2, 2011, when the NMED approved the CWL Final RCRA Closure Report (Kieling June 2011), transitioning the CWL from SNL/NM ER to LTS. A summary of post-closure care activities at the CWL for this reporting period is provided in this ER Quarterly Report. More detailed documentation of ongoing activities under the PCCP will be reported in the CY 2014 CWL Annual Post-Closure Care Report (due to the NMED in March 2015). Activities for this reporting period include the following:

- CWL groundwater monitoring activities were performed from July 7 through July 11, 2014. Groundwater monitoring results will be presented in the CWL Annual Post-Closure Care Report for CY 2014, which will be submitted to NMED in March 2015.

- Annual training was completed with all field personnel who work at the CWL, MWL, and CAMU on July 29, 2014.

- ET Cover maintenance work was conducted from August 14 through 19, 2014. Dead and live weeds were removed from the cover surface, perimeter fence, storm water diversion features, and the perimeter area just outside the fence line. A total of 15 cubic yards of compressed weeds were removed from the site. A post-emergent herbicide was applied to the western perimeter area between the fence line and the road to prevent additional weed growth in accordance with manufacturer's instructions.

- The quarterly ET Cover System Inspection (surface, storm water diversion structures, security fence, and survey monuments) was performed on September 10, 2014. Wind-blown plants were removed from the south side drainage culverts and the two western-most survey monuments were cleared of soil and weeds during the inspection. No other issues were identified.

- No supplemental watering events were performed during the reporting period.

3.3 Corrective Action Management Unit

The 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, August, and September 2014) include the following:

- The September 2013 quarterly inspection identified the need to remove sediment accumulation and make minor repairs to the perimeter drainage at the toe of the containment cell. After evaluating various options and alternatives, the internal work plan was approved on September 23, 2014 and the field effort began on September 30, 2014.

- Quarterly monitoring of the Vadose Zone Monitoring System was conducted in August 2014. The results will be presented in the CAMU Vadose Zone Monitoring System Annual Monitoring Results Report (anticipated submittal to the NMED in September 2015).

- Weekly pumping of leachate from the leachate collection and removal system (LCRS) was performed. Waste management associated with the LCRS during this reporting period is presented in Section I.3.3.1.

- Composite leachate sampling for waste characterization was conducted on July 1, 2014 and September 9, 2014.

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

- Quarterly inspection of the site was performed on September 10 and September 25, 2014, which included the containment cell cover, stormwater diversion structures, security fences, gates, signs, and benchmarks. The findings and maintenance activities include the following:

    - Dirt and tumbleweeds were identified covering the two western most benchmarks; the benchmarks were cleared on September 10, 2014.

    - Weeds and sediment identified on the perimeter drainage grate were removed on September 30, 2014.

- Excessive weed growth in the northwest retention pond was identified and will be cleared during the next reporting period.

- A small number of plants with the potential to develop a deep root system were identified growing on the cover. They will be clipped at or below ground level during the winter months for greatest mortality as recommended by the SNL/NM staff biologist.

- Annual training was completed with all field personnel who work at the CAMU on July 29, 2014.

3.3.1 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. All waste is removed from the site by Hazardous Waste Handling Facility personnel.

- Leachate and rinsate waste stored on site as of June 30, 2014 equaled 53 and 0 gallons, respectively.

- Leachate and rinsate waste generated on site during the reporting period equaled 78 and 3 gallons, respectively. Leachate waste removed from the site on July 15, 2014 equaled 57 gallons. Leachate and rinsate waste removed from the site on September 15, 2014 equaled 53 and 3 gallons, respectively.

- Leachate and rinsate waste remaining on site at the end of this reporting period equaled 21 and 0 gallons, respectively.

3.3.2 CAMU Regulatory Activities

The CAMU Vadose Zone Monitoring System Annual Monitoring Results Report for 2013 (reporting period July 2012 through June 2013) was approved by the NMED on September 24, 2014 (SNL/NM September 2013b).

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

The request for modification to the hazardous waste permit for the CAMU allowing the use of alternative analytical methods for soil-gas samples, including but not limited to,

Environmental Protection Agency Method Technical Order (TO)-15 was sent to the NMED on October 25, 2013 (Beausoleil October 2013).

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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 2014[a]	Quarter of Sampling in CY 2014	Location of Analytical Results	Location of Perchlorate Analytical Results	Monitoring Wells in Network
TAVG	Quarterly	1,2,3,4	AGMR	NA	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	2,4	AGMR	NA	CYN-MW4, CYN-MW7, CYN-MW8, CYN-MW9, CYN-MW10, CYN-MW11, CYN-MW12, CYN-MW13
TAG	Quarterly	1,2,3,4	AGMR	NA	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	Semiannually	2,4	AGMR, Section 4 of MWL ALTMM Report	NA	MWL-BW2, MWL-MW7, MWL-MW8, MWL-MW9
CWL Groundwater	Semiannually	1,3	AGMR, Section 4 CWL PCCP Report	NA	CWL-BW5, CWL-MW9, CWL-MW10, CWL-MW11
SWMUs 8/58 Groundwater	Quarterly	1,2,3,4	AGMR, Section IV of ER Quarterly	Section II of ER Quarterly	CCBA-MW1, CCBA-MW2
SWMU 68 Groundwater	Quarterly	1,2,3,4	AGMR, Section IV of ER Quarterly	Section II of ER Quarterly	OBS-MW1, OBS-MW2, OBS-MW3
SWMU 49 Groundwater	Annually	1	AGMR	AGMR and Section II of ER Quarterly Report, First Quarter of CY13	CYN-MW5
SWMU 116 Groundwater	Annually	1	AGMR	AGMR and Section II of ER Quarterly Report, First Quarter of CY13	CTF-MW1
SWMU 149 Groundwater	Quarterly	1,2,3,4	AGMR	Section II of ER Quarterly	CTF-MW3
SWMU 154 Groundwater	Quarterly	1,2,3,4	AGMR, Section III of ER Quarterly	Section II of ER Quarterly	CTF-MW2

Notes

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

AGMR = Annual Groundwater Monitoring Report.
ALTMM = Annual Long-Term Monitoring and Maintenance.
BSG = Burn Site Groundwater.
BW = Background well.
CWL = Chemical Waste Landfill.
CY = Calendar Year.
ER = Environmental Restoration Operations.
MWL = Mixed Waste Landfill.
NA = Not applicable. No wells in the site network are currently being sampled and analyzed for perchlorate.
PCCP = Post-Closure Care Permit.
SWMU = Solid Waste Management Unit.
TAG = Tijeras Arroyo Groundwater.
TAVG = Technical Area V Groundwater.

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SECTION II
PERCHLORATE SCREENING QUARTERLY GROUNDWATER MONITORING REPORT, July – September 2014

1.0 Introduction

Section IV.B of the Compliance Order on Consent (the Consent 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) 2014 (July, August, and September) in response to the requirements of the Consent Order. The outline of this report is based on the required elements of a "Periodic Monitoring Report" described in Section X.D. of the Consent 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) Area of Concern (AOC) monitoring well that has been under the sampling and reporting requirements of the Consent 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-fifth to be submitted since the November 2005 letter report; the previous reports were submitted for Fourth Quarter of CY 2005 through the First Quarter of CY 2014 (SNL/NM February 2006 and October 2014).

Groundwater at Coyote Test Field (CTF) monitoring well CTF-MW2 has been sampled 15 times; monitoring well CTF-MW3 has been sampled 14 times; Solid Waste Management Units (SWMUs) 8/58 monitoring wells CCBA-MW1 and CCBA-MW2 have been sampled 12 times; and SWMU 68 monitoring wells OBS-MW1, OBS-MW2, and OBS-MW3 have been sampled 12 times (Table II-1). The Consent 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 2014 (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 Consent 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 Consent 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.

SNL/NM personnel performed groundwater sampling for perchlorate at seven wells on the dates listed in Table II-1. Several of the wells were installed after the Consent 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 2014" (SNL/NM July 2014a)

- "SWMU 68 Groundwater Monitoring, Mini-SAP for Fourth Quarter, Fiscal Year 2014" (SNL/NM July 2014b)

- "SWMU 149 Groundwater Monitoring, Mini-SAP for Fourth Quarter, Fiscal Year 2014" (SNL/NM August 2014a)

- "SWMU 154 Groundwater Monitoring, Mini-SAP for Fourth Quarter, Fiscal Year 2013" (SNL/NM August 2014b)

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 EXO1 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 Consent 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 Consent 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 several 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 to be 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 Consent 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 AOC (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 AOC (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 of these 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 8/58—Installation of at least two groundwater monitoring wells west of and near Features YY and OO, submittal and approval of a work plan.
- SWMU 49—Annual sampling of existing monitoring well CYN-MW5.
- SWMU 68—Installation of monitoring wells near the burn pan and associated ditch/surface impoundments, submittal and approval of a work plan.
- SWMU 116—Annual sampling of existing monitoring well CTF-MW1.
- SWMU 149—Submittal of a SAP and quarterly sampling of existing monitoring well CTF-MW3 for a minimum of eight quarters.
- SWMU 154—Submittal of a SAP and quarterly sampling of existing monitoring well CTF-MW2 for a minimum of eight quarters.

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

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

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

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

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

4.0 Monitoring Results

Table II-3 summarizes the details of samples collected from monitoring wells CCBA-MW1, CCBA-MW2, CTF-MW2, CTF-MW3, OBS-MW1, OBS-MW2, and OBS-MW3 in the Third Quarter of CY 2014. 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 2014 perchlorate data is provided in Appendix A. Consistent with historical analytical results, no perchlorate was detected above the screening level in any samples collected from monitoring wells CCBA-MW1, CCBA-MW2, CTF-MW2, CTF-MW3, OBS-MW1, OBS-MW2, or OBS-MW3.

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

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

No variances or nonconformances in perchlorate sampling field activities, or field conditions from requirements in the groundwater monitoring Mini-SAPs (SNL/NM July 2014a, July

2014b, August 2014a, and August 2014b), were identified during the Third Quarter of CY 2014 sampling activities.

5.0 Summary and Conclusions

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

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

- Since June 2004 (the start of sampling as required by the Consent 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. Due to a deficiency of water in CYN-MW6, perchlorate samples have not been collected since October 2012.

DOE/Sandia will continue annual monitoring of perchlorate for monitoring wells CTF-MW1 and CYN-MW5, and quarterly monitoring for monitoring wells CCBA-MW1, CCBA-MW2, CTF-MW2, CTF-MW3, OBS-MW1, OBS-MW2, and OBS-MW3. The semiannual monitoring for the well that will replace monitoring well CYN-MW6 (CYN-MW15) will begin after the well is installed (anticipated in fourth quarter of CY 2014).

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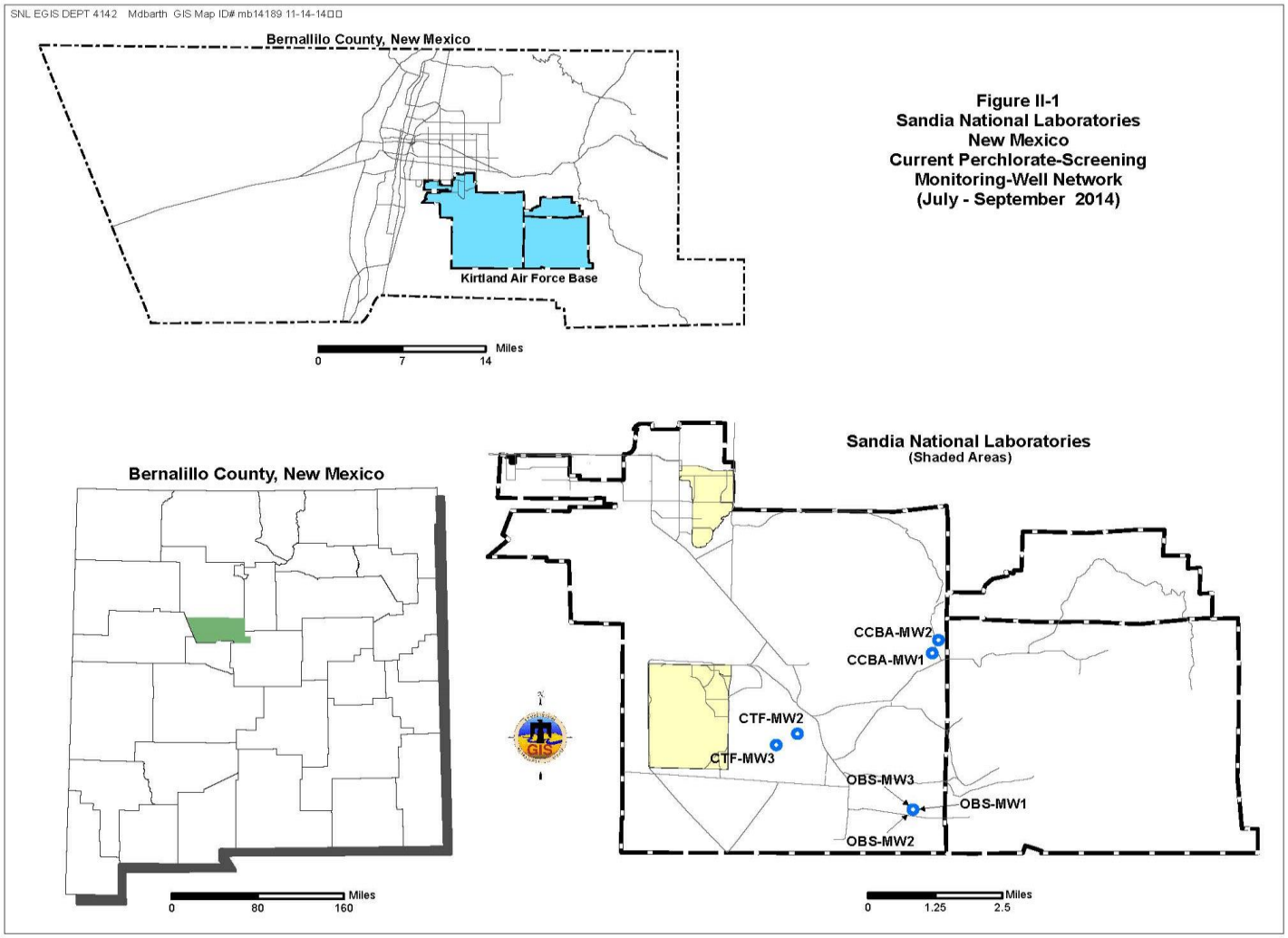

Figure II-1
Sandia National Laboratories, New Mexico
Current Perchlorate Screening Monitoring Well Network, July – September 2014

Tables

Table II-1
Current Perchlorate Screening Monitoring Well Network
Third Quarter, CY 2014

Well	Date Sampled	Number of Consecutive Sampling Events[a]	Remaining Number of Sampling Events[b]	Sampling Equipment
CCBA-MW1	22-Jul-14	12	TBD[c]	Bennett™ Pump
CCBA-MW2	21-Jul-14	12	TBD[c]	Bennett™ Pump
CTF-MW2	08-Sep-14	15	TBD[c]	Bennett™ Pump
CTF-MW3	12-Sep-14	14[d]	TBD[c]	Bennett™ Pump
OBS-MW1	16-Jul-14	12	TBD[c]	Bennett™ Pump
OBS-MW2	15-Jul-14	12	TBD[c]	Bennett™ Pump
OBS-MW3	17-Jul-14	12	TBD[c]	Bennett™ Pump

Notes

[a]Includes this sampling event.
[b]Per the requirements of Table XI-1 of the Consent 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, seven of the nine 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.
[d]Due to road access issues, this well was not sampled in September 2013.

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 Consent Order	= The Compliance Order on Consent.
SWMU	= Solid Waste Management Unit.

Table II-2
Monitoring 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 2014 Perchlorate Sampling

Well	Sample Identification	AR/COC Number	Associated Groundwater Investigation
CCBA-MW1	096269-020	615628	SWMUs 8/58
CCBA-MW1 (Duplicate)	096270-020		
CCBA-MW2	096263-020	615626	
CTF-MW2	096593-020	615788	SWMU 154
CTF-MW3	096595-020	615790	SWMU 149
OBS-MW1	096255-020	615624	SWMU 68
OBS-MW1 (Duplicate)	096256-020		
OBS-MW2	096251-020	615622	
OBS-MW3	096259-020	615625	

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 2014

Well	Sample Date	AR/COC Number	Sample Number	Result (µg/L)	MDL (µg/L)	PQL (µg/L)	MCL (µg/L)	Laboratory Qualifier[a]	Validation Qualifier[b]	Analytical Method[c]	Comments
SWMUs 8/58											
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
	10-Oct-13	615095	094779-020	ND	4.0	12	NE	U		EPA 314.0	
	27-Jan-14	615211	095213-020	ND	4.0	12	NE	U		EPA 314.0	
			095214-020	ND	4.0	12	NE	U		EPA 314.0	Duplicate sample
	07-Apr-14	615424	095725-020	ND	4.0	12	NE	U		EPA 314.0	
	22-Jul-14	615628	096269-020	ND	4.0	12	NE	U		EPA 314.0	
			096270-020	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	
	14-Oct-13	615095	094779-020	ND	4.0	12	NE	U		EPA 314.0	
			094780-020	ND	4.0	12	NE	U		EPA 314.0	Duplicate sample
	23-Jan-14	615209	095208-020	ND	4.0	12	NE	U		EPA 314.0	
	08-Apr-14	615426	095730-020	ND	4.0	12	NE	U		EPA 314.0	
			095731-020	ND	4.0	12	NE	U		EPA 314.0	Duplicate sample
	21-Jul-14	615626	096263-020	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 2014

Well	Sample Date	AR/COC Number	Sample Number	Result (µg/L)	MDL (µg/L)	PQL (µg/L)	MCL (µg/L)	Laboratory Qualifier[a]	Validation Qualifier[b]	Analytical Method[c]	Comments
SWMU 154											
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	
	17-Dec-13	615180	095086-020	ND	4.0	12	NE	U		EPA 314.0	
	18-Mar-14	615417	095579-020	ND	4.0	12	NE	U		EPA 314.0	
			095580-020	ND	4.0	12	NE	U		EPA 314.0	Duplicate sample
	06-Jun-14	615528	096045-020	ND	4.0	12	NE	U		EPA 314.0	
	08-Sep-14	615788	096593-020	ND	4.0	12	NE	U		EPA 314.0	
SWMU 149											
CTF-MW3	09-Mar-11	613450	090243-020	ND	4.0	12	NE	U		EPA 314.0	
			090244-020	ND	4.0	12	NE	U		EPA 314.0	Duplicate sample
	03-Jun-11	613579	090672-020	ND	4.0	12	NE	U		EPA 314.0	
	23-Sep-11	613854	091257-020	ND	4.0	12	NE	U		EPA 314.0	
	08-Dec-11	613928	091523-020	ND	4.0	12	NE	U		EPA 314.0	
	26-Mar-12	614053	091943-020	ND	4.0	12	NE	U		EPA 314.0	
			091944-020	ND	4.0	12	NE	U		EPA 314.0	Duplicate sample
	16-Jun-12	614254	092536-020	ND	4.0	12	NE	U		EPA 314.0	
	21-Sep-12	614390	092860-020	ND	4.0	12	NE	U		EPA 314.0	
	14-Dec-12	614540	093249-020	ND	4.0	12	NE	H, U	UJ, H1	EPA 314.0	
	22-Mar-13	614661	093717-020	ND	4.0	12	NE	U		EPA 314.0	
			093718-020	ND	4.0	12	NE	U		EPA 314.0	Duplicate sample
	28-Jun-13	614829	094044-020	ND	4.0	12	NE	U		EPA 314.0	
	13-Dec-13	615179	095085-020	ND	4.0	12	NE	U		EPA 314.0	
	14-Mar-14	615415	095572-020	ND	4.0	12	NE	U		EPA 314.0	
			095573-020	ND	4.0	12	NE	U		EPA 314.0	Duplicate sample
	27-Jun-14	615590	096142-020	ND	4.0	12	NE	U		EPA 314.0	
	12-Sep-14	615790	096595-020	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 2014

Well	Sample Date	AR/COC Number	Sample Number	Result (µg/L)	MDL (µg/L)	PQL (µg/L)	MCL (µg/L)	Laboratory Qualifier[a]	Validation Qualifier[b]	Analytical Method[c]	Comments
SWMU 68											
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	
	08-Oct-13	615091	094767-020	ND	4.0	12	NE	U		EPA 314.0	
			094768-020	ND	4.0	12	NE	U		EPA 314.0	Duplicate sample
	20-Jan-14	615205	095196-020	ND	4.0	12	NE	U		EPA 314.0	
	14-Apr-14	615427	095733-020	ND	4.0	12	NE	U		EPA 314.0	
	16-Jul-14	615624	096255-020	ND	4.0	12	NE	U		EPA 314.0	
			096256-020	ND	4.0	12	NE	U		EPA 314.0	Duplicate sample
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
	07-Oct-13	615089	094762-020	ND	4.0	12	NE	U		EPA 314.0	
	22-Jan-14	615207	095201-020	ND	4.0	12	NE	U		EPA 314.0	
			095202-020	ND	4.0	12	NE	U		EPA 314.0	Duplicate sample
	15-Apr-14	615428	095736-020	ND	4.0	12	NE	U		EPA 314.0	
	15-Jul-14	615622	096251-020	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 2014

Well	Sample Date	AR/COC Number	Sample Number	Result (µg/L)	MDL (µg/L)	PQL (µg/L)	MCL (µg/L)	Laboratory Qualifier[a]	Validation Qualifier[b]	Analytical Method[c]	Comments
OBS-MW3	24-Oct-11	613882	091342-020	ND	4.0	12	NE	U		EPA 314.0	
			091343-020	ND	4.0	12	NE	U		EPA 314.0	Duplicate sample
	11-Jan-12	613955	091607-020	ND	4.0	12	NE	U		EPA 314.0	
	17-Apr-12	614079	092018-020	ND	4.0	12	NE	U		EPA 314.0	
	19-Jul-12	614292	092625-020	ND	4.0	12	NE	U		EPA 314.0	
			092626-020	ND	4.0	12	NE	U		EPA 314.0	Duplicate sample
	18-Oct-12	614465	093010-020	ND	4.0	12	NE	U		EPA 314.0	
	23-Jan-12	614571	093352-020	ND	4.0	12	NE	U		EPA 314.0	
	23-Apr-12	614744	093870-020	ND	4.0	12	NE	U		EPA 314.0	
			093871-020	ND	4.0	12	NE	U		EPA 314.0	Duplicate sample
	11-Jul-13	614936	094368-020	ND	4.0	12	NE	U		EPA 314.0	
	09-Oct-13	615092	094771-020	ND	4.0	12	NE	U		EPA 314.0	
	21-Jan-14	615208	095205-020	ND	4.0	12	NE	U		EPA 314.0	
	16-Apr-14	615430	095741-020	ND	4.0	12	NE	U		EPA 314.0	
			095742-020	ND	4.0	12	NE	U		EPA 314.0	Duplicate sample
	17-Jul-14	615625	096259-020	ND	4.0	12	NE	U		EPA 314.0	

Notes

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

[b]Validation Qualifier
If cell is blank, then all quality control samples meet acceptance criteria with respect to submitted samples and no qualifier was assigned.
H1 = The holding time criteria was exceeded by >1x, but <2x.
UJ = The analyte was analyzed for but not detected. The associated value is an estimate and may be inaccurate or imprecise.

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

µg/L = Micrograms per liter.
AR/COC = Analysis Request/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.

Table II-4 (Concluded)
Summary of Perchlorate Screening Analytical Results for the Current Monitoring-Well Network as of Third Quarter, CY 2014

Notes (continued)

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.
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.
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 the indicated method under routine laboratory operating conditions.
SWMU = Solid Waste Management Unit.

Table II-5
Perchlorate Screening Groundwater Monitoring
Field Water Quality Measurements[a], Third Quarter, CY 2014

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	22-Jul-14	20.12	490.2	299.6	6.57	0.41	34.1	3.07
CCBA-MW2	21-Jul-14	18.87	550.2	322.4	7.53	0.17	68.0	6.28
SWMU 154								
CTF-MW2	08-Sep-14	17.83	3316.1	31.9	5.58	0.54	1.3	0.12
SWMU 149								
CTF-MW3	12-Sep-14	19.29	1625.6	284.2	6.62	1.36	81.4	7.48
SWMU 68								
OBS-MW1	16-Jul-14	18.09	479.1	301.3	7.40	0.41	37.9	3.58
OBS-MW2	15-Jul-14	18.10	473.8	291.1	7.38	0.28	37.1	3.50
OBS-MW3	17-Jul-14	19.00	484.6	303.6	7.39	0.56	47.3	4.38

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).
SWMU = Solid Waste Management Unit.

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Appendix A
Analytical Laboratory Certificates of Analysis for the Perchlorate Data

CONTRACT LABORATORY
ANALYSIS REQUEST AND CHAIN OF CUSTODY

AOP 95-16

Internal Lab

Batch No. N/A

AR/COC 615628

Project Name:	SWMU 8/58 GWM	Date Samples Shipped:	7/22/14
Project/Task Manager:	Clinton Lum	Carrier/Waybill No.	22466
Project/Task Number:	146422.10.11.01	Lab Contact:	Edie Kent/803-556-8171
Service Order:	CF262-14	Lab Destination:	GEL
		Contract No.:	PO 1303873
Tech Area:		Operational Site:	
Building:	Room:		

SMO Use

SMO Authorization:

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
096268	-001	CCBA-FB2	NA	7/22/14 9:19	DIW	G	3x40 ml	HCL	G	FB	TCL VOC (SW846-8260B)	353139 026
096269	-001	CCBA-MW1	79	7/22/14 9:19	GW	G	3x40 ml	HCL	G	SA	TCL VOC (SW846-8260B)	353139 027
096269	-002	CCBA-MW1	79	7/22/14 9:21	GW	AG	4x1 L	None	G	SA	TCL SVOC (SW846-8270C)	353139 028
096269	-009	CCBA-MW1	79	7/22/14 9:24	GW	P	500 ml	HNO3	G	SA	TAL Metals+U (SW846-6010/6020/7470)	353139 029
096269	-016	CCBA-MW1	79	7/22/14 9:25	GW	P	125 ml	None	G	SA	Anions (SW846-9056)	353139 030
096269	-017	CCBA-MW1	79	7/22/14 9:27	FGW	P	500 ml	HNO3	G	SA	Metals-Ca,Mg,K,Na (SW846-6020)	353176 003
096269	-018	CCBA-MW1	79	7/22/14 9:28	GW	P	125 ml	H2SO4	G	SA	Nitrate+Nitrite (EPA 353.2)	353139 031
096269	-020	CCBA-MW1	79	7/22/14 9:29	GW	P	250 ml	None	G	SA	Perchlorate (EPA 314.0)	353139 032
096269	-022	CCBA-MW1	79	7/22/14 9:30	GW	P	500 ml	None	G	SA	Alkalinity (SM2320B)	353139 033
096269	-024	CCBA-MW1	79	7/22/14 9:31	GW	AG	4x1 L	None	G	SA	High Explosives(SW846-8321A Mod.)	353139 034

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

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

Special Instructions/QC Requirements:
EDD ☑ Yes ☐ No
Turnaround Time ☐ 7 Day* ☐ 15 Day* ☑ 30 Day
Negotiated TAT ☐
Sample Disposal ☐ Return to Client ☑ Disposal by Lab
Return Samples By:
Comments: Send report to Tim Jackson/4142/MS 0729/284-2547
If Perchlorate detected,perform verification analysis using SW846-6850M.Filtered fraction collected in the field using a 0.45 micron in-line filter. Report Anions (as Br,Cl,F,SO4). Alkalinity (as total CaCO3,HCO3,CO3). 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
	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	Org. 4142	Date 7/22/14	Time 1014	3.Relinquished by	Org.	Date	Time
1. Received by	Org. 4142	Date 7/22/14	Time 1014	3. Received by	Org.	Date	Time
2.Relinquished by	Org. 4142	Date 7/22/14	Time 1045	4.Relinquished by	Org.	Date	Time
2. Received by	Org. CEL	Date 7-23-14	Time 0735	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 615628

Project Name:	SWMU 8/58 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
096269	-027	CCBA-MW1	79	7/22/14 9:34	GW	P	250 ml	NaOH	G	SA	Total Cyanide (SW846-9012)	353139 035
096269	-033	CCBA-MW1	79	7/22/14 9:35	GW	P	1 L	HNO3	G	SA	Gamma Spectroscopy (EPA 901.0)	353139 036
096269	-034	CCBA-MW1	79	7/22/14 9:37	GW	P	1 L	HNO3	G	SA	Gross Alpha and Beta (EPA 900.0)	353139 037
096270	-001	CCBA-MW1	79	7/22/14 9:19	GW	G	3x40 ml	HCL	G	DU	TCL VOC (SW846-8260B)	353139 038
096270	-002	CCBA-MW1	79	7/22/14 9:21	GW	AG	4x1 L	None	G	DU	TCL SVOC (SW846-8270C)	353139 039
096270	-009	CCBA-MW1	79	7/22/14 9:24	GW	P	500 ml	HNO3	G	DU	TAL Metals+U (SW846-6010/6020/7470)	353139 040
096270	-016	CCBA-MW1	79	7/22/14 9:25	GW	P	125 ml	None	G	DU	Anions (SW846-9056)	353139 041
096270	-017	CCBA-MW1	79	7/22/14 9:27	FGW	P	500 ml	HNO3	G	DU	Metals-Ca,Mg,K,Na (SW846-6020)	353176 004
096270	-018	CCBA-MW1	79	7/22/14 9:28	GW	P	125 ml	H2SO4	G	DU	Nitrate+Nitrite (EPA 353.2)	353139 042
096270	-020	CCBA-MW1	79	7/22/14 9:29	GW	P	250 ml	None	G	DU	Perchlorate (EPA 314.0)	353139 043
096270	-022	CCBA-MW1	79	7/22/14 9:30	GW	P	500 ml	None	G	DU	Alkalinity (SM2320B)	353139 044
096270	-024	CCBA-MW1	79	7/22/14 9:31	GW	AG	4x1 L	None	G	DU	High Explosives(SW846-8321A Mod.)	353139 045
096270	-027	CCBA-MW1	79	7/22/14 9:34	GW	P	250 ml	NaOH	G	DU	Total Cyanide (SW846-9012)	353139 046
096270	-033	CCBA-MW1	79	7/22/14 9:35	GW	P	1 L	HNO3	G	DU	Gamma Spectroscopy (EPA 901.0)	353139 047
096270	-034	CCBA-MW1	79	7/22/14 9:37	GW	P	1 L	HNO3	G	DU	Gross Alpha and Beta (EPA 900.0)	353139 048
096271	-001	CCBA-TB3	NA	7/22/14 9:19	DIW	G	3x40 ml	HCL	G	TB	TCL VOC (SW846-8260B)	353139 049

Recipient Initials RL MK

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

Certificate of Analysis

Report Date: August 20, 2014

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:	096269-020	Project:	SNLSGWater
Sample ID:	353139032	Client ID:	SNLS004
Matrix:	AQUEOUS		
Collect Date:	22-JUL-14 09:29		
Receive Date:	23-JUL-14	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	08/11/14	2322	1405183	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 20, 2014

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:	096270-020	Project:	SNLSGWater
Sample ID:	353139043	Client ID:	SNLS004
Matrix:	AQUEOUS		
Collect Date:	22-JUL-14 09:29		
Receive Date:	23-JUL-14	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	08/11/14	2342	1405183	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

AOP 95-16

Internal Lab

Batch No. N/A

AR/COC 615626

		SMO Use	
Project Name:	SWMU 8/58 GWM	Date Samples Shipped:	7/21/14
Project/Task Manager:	Clinton Lum	Carrier/Waybill No.	22134 9
Project/Task Number:	146422.10.11.01	Lab Contact:	Edie Kent/803-556-8171
Service Order:	CF262-14	Lab Destination:	GEL
Tech Area:		Contract No.:	PO 1303873
Building:	Room:	Operational Site:	

SMO Authorization:

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
096263	-001	CCBA-MW2	117	7/21/14 9:14	GW	G	3x40 ml	HCL	G	SA	TCL VOC (SW846-8260B)	353139 001
096263	-002	CCBA-MW2	117	7/21/14 9:15	GW	AG	4x1 L	None	G	SA	TCL SVOC (SW846-8270C)	353139 002
096263	-009	CCBA-MW2	117	7/21/14 9:17	GW	P	500 ml	HNO3	G	SA	TAL Metals+U (SW846-6010/6020/7470)	353139 003
096263	-016	CCBA-MW2	117	7/21/14 9:18	GW	P	125 ml	None	G	SA	Anions (SW846-9056)	353139 004
096263	-017	CCBA-MW2	117	7/21/14 9:20	FGW	P	500 ml	HNO3	G	SA	Metals-Ca,Mg,K,Na (SW846-6020)	353176 001
096263	-018	CCBA-MW2	117	7/21/14 9:21	GW	P	125 ml	H2SO4	G	SA	Nitrate+Nitrite (EPA 353.2)	353139 005
096263	-020	CCBA-MW2	117	7/21/14 9:22	GW	P	250 ml	None	G	SA	Perchlorate (EPA 314.0)	353139 006
096263	-022	CCBA-MW2	117	7/21/14 9:23	GW	P	500 ml	None	G	SA	Alkalinity (SM2320B)	353139 007
096263	-024	CCBA-MW2	117	7/21/14 9:24	GW	AG	4x1 L	None	G	SA	High Explosives(SW846-8321A Mod.)	353139 008
096263	-027	CCBA-MW2	117	7/21/14 9:26	GW	P	250 ml	NaOH	G	SA	Total Cyanide (SW846-9012)	353139 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
If Perchlorate detected,perform verification analysis using SW846-6850M.Filtered fraction collected in the field using a 0.45 micron in-line filter. Report Anions (as Br,Cl,F,SO4). Alkalinity (as total CaCO3,HCO3,CO3). 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
	Alfred Santillanes		AS	SNL/4142/505-844-5130/505-228-0710
	William Gibson		WG	SNL/4142/505-284-3307/505-239-7367

1.Relinquished by		Org. 4142	Date 7/21/14	Time 0955	3.Relinquished by	Org.	Date	Time
1. Received by		Org. 4142	Date 7/21/14	Time 0955	3. Received by	Org.	Date	Time
2.Relinquished by		Org. 4142	Date 7/21/14	Time 1119	4.Relinquished by	Org.	Date	Time
2. Received by		Org. GRL	Date 7-22-14	Time 0750	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 615626

Project Name:	SWMU 8/58 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
096263	-033	CCBA-MW2	117	7/21/14 9:27	GW	P	1 L	HNO3	G	SA	Gamma Spectroscopy (EPA 901.0)	353139 010
096263	-034	CCBA-MW2	117	7/21/14 9:28	GW	P	1 L	HNO3	G	SA	Gross Alpha and Beta (EPA 900.0)	353139 011
096264	-001	CCBA-TB1	NA	7/21/14 9:14	DIW	G	3x40 ml	HCL	G	TB	TCL VOC (SW846-8260B)	353139 012

Recipient Initials MK

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

Certificate of Analysis

Report Date: August 20, 2014

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:	096263-020	Project:	SNLSGWater
Sample ID:	353139006	Client ID:	SNLS004
Matrix:	AQUEOUS		
Collect Date:	21-JUL-14 09:22		
Receive Date:	22-JUL-14	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	08/11/14	2244	1405183	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

Page 1 of 2

Batch No. N/A

SMO Use

AR/COC 615624

Project Name:	SWMU 68 GWM	Date Samples Shipped:	7/16/14	SMO Authorization:	☐ Waste Characterization
Project/Task Manager:	Clinton Lum	Carrier/Waybill No.	221213	SMO Contact Phone:	☐ RMMA
Project/Task Number:	146422.10.11.01	Lab Contact:	Edie Kent/803-556-8171	Lorraine Herrera/505-844-3199	☐ Released by COC No.
Service Order:	CF263-14	Lab Destination:	GEL	Send Report to SMO:	☑ 4° Celsius
		Contract No.:	PO 1303873	Rita Kavanaugh/505-284-2553	
Tech Area:				Bill to:Sandia National Laboratories (Accounts Payable), P.O. Box 5800, MS-0154 Albuquerque, NM 87185-0154	
Building:	Room:	Operational Site:			

Sample No.	Fraction	Sample Location Detail	Depth (ft)	Date/Time Collected	Sample Matrix	Container Type	Container Volume	Preservative	Collection Method	Sample Type	Parameter & Method Requested	Lab Sample ID
096255	-001	OBS-MW1	153	7/16/14 9:25	GW	G	3x40 ml	HCL	G	SA	TCL VOC (SW846-8260B)	352683 015
096255	-002	OBS-MW1	153	7/16/14 9:27	GW	AG	4x1 L	None	G	SA	TCL SVOC (SW846-8270C)	352683 016
096255	-009	OBS-MW1	153	7/16/14 9:30	GW	P	500 ml	HNO3	G	SA	TAL Metals+U (SW846-6010/6020/7470)	352683 017
096255	-014	OBS-MW1	153	7/16/14 9:31	GW	P	250 ml	None	G	SA	Hexavalent Chromium (SW846-7196A)	352683 018
096255	-016	OBS-MW1	153	7/16/14 9:32	GW	P	125 ml	None	G	SA	Anions (SW846-9056)	352683 019
096255	-017	OBS-MW1	153	7/16/14 9:34	FGW	P	500 ml	HNO3	G	SA	Metals-Ca,Mg,K,Na (SW846-6020)	352684 002
096255	-018	OBS-MW1	153	7/16/14 9:35	GW	P	125 ml	H2SO4	G	SA	Nitrate+Nitrite (EPA 353.2)	352683 020
096255	-020	OBS-MW1	153	7/16/14 9:36	GW	P	250 ml	None	G	SA	Perchlorate (EPA 314.0)	352683 021
096255	-022	OBS-MW1	153	7/16/14 9:37	GW	P	500 ml	None	G	SA	Alkalinity (SM2320B)	352683 022
096255	-024	OBS-MW1	153	7/16/14 9:38	GW	AG	4x1 L	None	G	SA	High Explosives(SW846-8321A Mod.)	352683 023

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			SNL/4142/505-844-4013/505-250-7090
	Alfred Santillanes			SNL/4142/505-844-5130/505-228-0710
	William Gibson			SNL/4142/505-284-3307/505-239-7367

Special Instructions/QC Requirements:

EDD ☑ Yes ☐ No

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

Negotiated TAT ☐

Sample Disposal ☐ Return to Client ☑ Disposal by Lab

Return Samples By:

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

If Perchlorate detected,perform verification analysis using SW846-6850M.Filtered fraction collected in the field using a 0.45 micron in-line filter. Report Anions (as Br,Cl,F,SO4). Alkalinity (as total CaCO3,HCO3,CO3). Gamma Spectroscopy (as short list isotopes)

Conditions on Receipt

Lab Use

1.Relinquished by		Org. 4142	Date 7/16/14	Time 1013	3.Relinquished by	Org.	Date / Time
1. Received by	GMO	Org. 4142	Date 7/16/14	Time 1013	3. Received by	Org.	Date / Time
2.Relinquished by		Org. 4142	Date 7/16/14	Time 1102	4.Relinquished by	Org.	Date / Time
2. Received by		Org. CEC	Date 7-17-14	Time 0750	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 615624

Project Name:	SWMU 68 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
096255	-027	OBS-MW1	153	7/16/14 9:41	GW	P	250 ml	NaOH	G	SA	Total Cyanide (SW846-9012)	352683 024
096255	-033	OBS-MW1	153	7/16/14 9:42	GW	P	1 L	HNO3	G	SA	Gamma Spectroscopy (EPA 901.0)	352683 025
096255	-034	OBS-MW1	153	7/16/14 9:44	GW	P	1 L	HNO3	G	SA	Gross Alpha and Beta (EPA 900.0)	352683 026
096255	-035	OBS-MW1	153	7/16/14 9:46	GW	P	1 L	HNO3	G	SA	Isotopic Uranium (HASL 300)	352683 027
096256	-001	OBS-MW1	153	7/16/14 9:25	GW	G	3x40 ml	HCL	G	DU	TCL VOC (SW846-8260B)	352683 028
096256	-002	OBS-MW1	153	7/16/14 9:27	GW	AG	4x1 L	None	G	DU	TCL SVOC (SW846-8270C)	352683 029
096256	-009	OBS-MW1	153	7/16/14 9:30	GW	P	500 ml	HNO3	G	DU	TAL Metals+U (SW846-6010/6020/7470)	352683 030
096256	-014	OBS-MW1	153	7/16/14 9:31	GW	P	250 ml	None	G	DU	Hexavalent Chromium (SW846-7196A)	352683 031
096256	-016	OBS-MW1	153	7/16/14 9:32	GW	P	125 ml	None	G	DU	Anions (SW846-9056)	352683 032
096256	-017	OBS-MW1	153	7/16/14 9:34	FGW	P	500 ml	HNO3	G	DU	Metals-Ca,Mg,K,Na (SW846-6020)	352684 003
096256	-018	OBS-MW1	153	7/16/14 9:35	GW	P	125 ml	H2SO4	G	DU	Nitrate+Nitrite (EPA 353.2)	352683 033
096256	-020	OBS-MW1	153	7/16/14 9:36	GW	P	250 ml	None	G	DU	Perchlorate (EPA 314.0)	352683 034
096256	-022	OBS-MW1	153	7/16/14 9:37	GW	P	500 ml	None	G	DU	Alkalinity (SM2320B)	352683 035
096256	-024	OBS-MW1	153	7/16/14 9:38	GW	AG	4x1 L	None	G	DU	High Explosives(SW846-8321A Mod.)	352683 036
096256	-027	OBS-MW1	153	7/16/14 9:41	GW	P	250 ml	NaOH	G	DU	Total Cyanide (SW846-9012)	352683 037
096256	-033	OBS-MW1	153	7/16/14 9:42	GW	P	1 L	HNO3	G	DU	Gamma Spectroscopy (EPA 901.0)	352683 038
096256	-034	OBS-MW1	153	7/16/14 9:44	GW	P	1 L	HNO3	G	DU	Gross Alpha and Beta (EPA 900.0)	352683 039
096256	-035	OBS-MW1	153	7/16/14 9:46	GW	P	1 L	HNO3	G	DU	Isotopic Uranium (HASL 300)	352683 040
096257	-001	OBS-TB3	NA	7/16/14 9:25	DIW	G	3x40 ml	HCL	G	TB	TCL VOC (SW846-8260B)	352683 041
096261	-014	OBS-EB2	NA	7/16/14 8:15	DIW	P	250 ml	None	G	EB	Hexavalent Chromium (SW846-7196A)	352683 042

Recipient Initials

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

Certificate of Analysis

Report Date: August 15, 2014

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:	096255-020	Project:	SNLSGWater
Sample ID:	352683021	Client ID:	SNLS004
Matrix:	AQUEOUS		
Collect Date:	16-JUL-14 09:36		
Receive Date:	17-JUL-14	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	08/11/14	2049	1405183	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 15, 2014

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:	096256-020	Project:	SNLSGWater
Sample ID:	352683034	Client ID:	SNLS004
Matrix:	AQUEOUS		
Collect Date:	16-JUL-14 09:36		
Receive Date:	17-JUL-14	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	08/11/14	2108	1405183	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.

AR/COC 615622

SMO Use

Project Name:	SWMU 68 GWM	Date Samples Shipped:	7/15/14	SMO Authorization:	Don Wolberg
Project/Task Manager:	Clinton Lum	Carrier/Waybill No.	220819	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:	CF263-14	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
096251	-001	OBS-MW2	252	7/15/14 9:24	GW	G	3x40 ml	HCL	G	SA	TCL VOC (SW846-8260B)	352683 001
096251	-002	OBS-MW2	252	7/15/14 9:25	GW	AG	4x1 L	None	G	SA	TCL SVOC (SW846-8270C)	352683 002
096251	-009	OBS-MW2	252	7/15/14 9:27	GW	P	500 ml	HNO3	G	SA	TAL Metals+U (SW846-6010/6020/7470)	352683 003
096251	-014	OBS-MW2	252	7/15/14 9:28	GW	P	250 ml	None	G	SA	Hexavalent Chromium (SW846-7196A)	352683 004
096251	-016	OBS-MW2	252	7/15/14 9:29	GW	P	125 ml	None	G	SA	Anions (SW846-9056)	352683 005
096251	-017	OBS-MW2	252	7/15/14 9:30	FGW	P	500 ml	HNO3	G	SA	Metals-Ca,Mg,K,Na (SW846-6020)	352654 001
096251	-018	OBS-MW2	252	7/15/14 9:32	GW	P	125 ml	H2SO4	G	SA	Nitrate+Nitrite (EPA 353.2)	352683 006
096251	-020	OBS-MW2	252	7/15/14 9:33	GW	P	250 ml	None	G	SA	Perchlorate (EPA 314.0)	352683 007
096251	-022	OBS-MW2	252	7/15/14 9:34	GW	P	500 ml	None	G	SA	Alkalinity (SM2320B)	352683 008
096251	-024	OBS-MW2	252	7/15/14 9:35	GW	AG	4x1 L	None	G	SA	High Explosives(SW846-8321A Mod.)	352683 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
	Alfred Santillanes	Alfred Santillanes	AS	SNL/4142/505-844-5130/505-228-0710
	William Gibson	William Gibson	WG	SNL/4142/505-284-3307/505-239-7367

Special Instructions/QC Requirements:

EDD ☑ Yes ☐ No

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

Negotiated TAT ☐

Sample Disposal ☐ Return to Client ☑ Disposal by Lab

Return Samples By:

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

If Perchlorate detected, perform verification analysis using SW846-6850M. Filtered fraction collected in the field using a 0.45 micron in-line filter. Report Anions (as Br,Cl,F,SO4). Alkalinity (as total CaCO3,HCO3,CO3). Gamma Spectroscopy (as short list isotopes)

Conditions on Receipt

Lab Use

1. Relinquished by	Alfred Santillanes	Org. 4142	Date 7/15/14	Time 10:10	3. Relinquished by	Org.	Date	Time
1. Received by	Don Wolberg	Org. 4142	Date 7/15/14	Time 1010	3. Received by	Org.	Date	Time
2. Relinquished by	Don Wolberg	Org. 4142	Date 7/15/14	Time 1100	4. Relinquished by	Org.	Date	Time
2. Received by	Mike Lebow	Org. GEL	Date 7-16-14	Time 0735	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 615622

Project Name:	SWMU 68 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
096251	-027	OBS-MW2	252	7/15/14 9:37	GW	P	250 ml	NaOH	G	SA	Total Cyanide (SW846-9012)	352683 010
096251	-033	OBS-MW2	252	7/15/14 9:38	GW	P	1 L	HNO3	G	SA	Gamma Spectroscopy (EPA 901.0)	352683 011
096251	-034	OBS-MW2	252	7/15/14 9:39	GW	P	1 L	HNO3	G	SA	Gross Alpha and Beta (EPA 900.0)	352683 012
096251	-035	OBS-MW2	252	7/15/14 9:40	GW	P	1 L	HNO3	G	SA	Isotopic Uranium (HASL 300)	352683 013
096252	-001	OBS-TB1	NA	7/15/14 9:24	DIW	G	3x40 ml	HCL	G	TB	TCL VOC (SW846-8260B)	352683 014

Recipient Initials

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

Certificate of Analysis

Report Date: August 15, 2014

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:	096251-020	Project:	SNLSGWater
Sample ID:	352683007	Client ID:	SNLS004
Matrix:	AQUEOUS		
Collect Date:	15-JUL-14 09:33		
Receive Date:	16-JUL-14	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	08/11/14	1952	1405183	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. N/A

AR/COC 615625

Project Name:	SWMU 68 GWM	Date Samples Shipped:	7/17/14	SMO Authorization:	☐ Waste Characterization
Project/Task Manager:	Clinton Lum	Carrier/Waybill No.	22248	SMO Contact Phone: Lorraine Herrera/505-844-3199	☐ RMMA
Project/Task Number:	146422.10.11.01	Lab Contact:	Edie Kent/803-556-8171		☐ Released by COC No.
Service Order:	CF263-14	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:			

SMO 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
096258	-001	OBS-FB1	NA	7/17/14 9:35	DIW	G	3x40 ml	HCL	G	FB	TCL VOC (SW846-8260B)	352683 057
096259	-001	OBS-MW3	208	7/17/14 9:35	GW	G	3x40 ml	HCL	G	SA	TCL VOC (SW846-8260B)	352683 058
096259	-002	OBS-MW3	208	7/17/14 9:36	GW	AG	4x1 L	None	G	SA	TCL SVOC (SW846-8270C)	352683 059
096259	-009	OBS-MW3	208	7/17/14 9:38	GW	P	500 ml	HNO3	G	SA	TAL Metals+U (SW846-6010/6020/7470)	352683 060
096259	-014	OBS-MW3	208	7/17/14 9:39	GW	P	250 ml	None	G	SA	Hexavalent Chromium (SW846-7196A)	352683 061
096259	-016	OBS-MW3	208	7/17/14 9:40	GW	P	125 ml	None	G	SA	Anions (SW846-9056)	352683 062
096259	-017	OBS-MW3	208	7/17/14 9:42	FGW	P	500 ml	HNO3	G	SA	Metals-Ca,Mg,K,Na (SW846-6020)	352684 005
096259	-018	OBS-MW3	208	7/17/14 9:43	GW	P	125 ml	H2SO4	G	SA	Nitrate+Nitrite (EPA 353.2)	352683 063
096259	-020	OBS-MW3	208	7/17/14 9:44	GW	P	250 ml	None	G	SA	Perchlorate (EPA 314.0)	352683 064
096259	-022	OBS-MW3	208	7/17/14 9:45	GW	P	500 ml	None	G	SA	Alkalinity (SM2320B)	352683 065

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

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

Special Instructions/QC Requirements:

EDD ☑ Yes ☐ No

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

Negotiated TAT ☐

Sample Disposal ☐ Return to Client ☑ Disposal by Lab

Return Samples By:

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

If Perchlorate detected,perform verification analysis using SW846-6850M.Filtered fraction collected in the field using a 0.45 micron in-line filter. Report Anions (as Br,Cl,F,SO4). Alkalinity (as total CaCO3,HCO3,CO3). Gamma Spectroscopy (as short list isotopes)

Conditions on Receipt

Lab Use

1.Relinquished by		Org. 4142	Date 7/17/14	Time 1024	3.Relinquished by	Org.	Date	Time
1. Received by		Org. 4142	Date 7/17/14	Time 1024	3. Received by	Org.	Date	Time
2.Relinquished by		Org. 4142	Date 7/17/14	Time 1045	4.Relinquished by	Org.	Date	Time
2. Received by		Org. CCL	Date 7-18-14	Time 0725	4. Received by	Org.	Date	Time

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

CONTRACT LABORATORY
ANALYSIS REQUEST AND CHAIN OF CUSTODY (Continuation)

AR/COC 615625

Project Name:	SWMU 68 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
096259	-024	OBS-MW3	208	7/17/14 9:46	GW	AG	4x1 L	None	G	SA	High Explosives(SW846-8321A Mod.)	352683 066
096259	-027	OBS-MW3	208	7/17/14 9:48	GW	P	250 ml	NaOH	G	SA	Total Cyanide (SW846-9012)	352683 069
096259	-033	OBS-MW3	208	7/17/14 9:49	GW	P	1 L	HNO3	G	SA	Gamma Spectroscopy (EPA 901.0)	352683 068
096259	-034	OBS-MW3	208	7/17/14 9:50	GW	P	1 L	HNO3	G	SA	Gross Alpha and Beta (EPA 900.0)	352683 067
096259	-035	OBS-MW3	208	7/17/14 9:51	GW	P	1 L	HNO3	G	SA	Isotopic Uranium (HASL 300)	352683 070
096260	-001	OBS-TB4	NA	7/17/14 9:35	DIW	G	3x40 ml	HCL	G	TB	TCL VOC (SW846-8260B)	352683 071

Recipient Initials MC

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

Certificate of Analysis

Report Date: August 15, 2014

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:	096259-020	Project:	SNLSGWater
Sample ID:	352683064	Client ID:	SNLS004
Matrix:	AQUEOUS		
Collect Date:	17-JUL-14 09:44		
Receive Date:	18-JUL-14	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	08/11/14	2147	1405183	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. MA

AR/COC 615788

Project Name:	SWMU-154 GWM	Date Samples Shipped:	9/8/14
Project/Task Manager:	Clinton Lum	Carrier/Waybill No.	223399
Project/Task Number:	146422.10.11.01	Lab Contact:	Edie Kent/803-556-8171
Service Order:	CF 353-14	Lab Destination:	GEL
		Contract No.:	PO 1303873
Tech Area:			
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
096593	-001	CTF-MW2	128	9/8/14 8:26	GW	G	3x40 ml	HCL	G	SA	TCL VOC (SW846-8260B)	356277 001
096593	-002	CTF-MW2	128	9/8/14 8:28	GW	AG	4x1 Liter	None	G	SA	TCL SVOC (SW846-827C)	356277 002
096593	-009	CTF-MW2	128	9/8/14 8:29	FGW	P	500 ml	HNO3	G	SA	TAL Metals+ U (6010/6020/7470)	356278 001
096593	-010	CTF-MW2	128	9/8/14 8:30	FGW	P	500 ml	HNO3	G	SA	TAL Metals+ U (6010/6020/7470)	356277 003
096593	-016	CTF-MW2	128	9/8/14 8:31	GW	P	125 ml	None	G	SA	Anions (SW846-9056)	356277 004
096593	-018	CTF-MW2	128	9/8/14 8:32	GW	P	125 ml	H2SO4	G	SA	Nitrate+Nitrite (EPA 353.2)	356277 005
096593	-022	CTF-MW2	128	9/8/14 8:33	GW	P	500 ml	None	G	SA	Alkalinity (SM2320B)	356277 006
096593	-020	CTF-MW2	128	9/8/14 8:34	GW	P	250 ml	None	G	SA	Perchlorate (EPA 314.0)	356277 007
096593	-024	CTF-MW2	128	9/8/14 8:36	GW	AG Poly	4X 1 Liter	HNO3	G	SA	HE (SW846-8321A Mod.)	356277 008
096593	-033	CTF-MW2	128	9/8/14 8:38	GW	P	1 Liter	HNO3	G	SA	Gamma Spec (EPA 901.0)	356277 009

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

Special Instructions/QC Requirements:

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

Comments: Send report to Tim Jackson/4142/MS 0729/284-2547
High buffering capacity please check pH and add preservative as needed. If perchlorate detected perform verification method SW846-6850. Filtered fraction collected using a 0.45 micron in-line filter. Report alkalinity as total CaCO3,HCO3,CO3/ Anions as Br,Cl,F,SO4./ short list isotopes for Gamma spectroscopy analysis.

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
	Alfred Santillanes	[signature]	AS	SNL/4142/505-844-5130/505-228-0710

1.Relinquished by	[signature]	Org. 4142	Date 9/8/14	Time 1008	3.Relinquished by	Org.	Date / Time
1. Received by	[signature] SMO	Org. 4142	Date 9/8/14	Time 1008	3. Received by	Org.	Date / Time
2.Relinquished by	[signature] SMO	Org. 4142	Date 9/8/14	Time 1038	4.Relinquished by	Org.	Date / Time
2. Received by	[signature]	Org. CRL	Date 9-9-14	Time 0730	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 615788

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
096593	-034	CTF-MW2	128	9/8/14 8:39	GW	P	1 Liter	HNO3	G	SA	Gross Alpha and Beta (EPA 900.0)	356277 010
096593	-035	CTF-MW2	128	9/8/14 8:40	GW	P	1 Liter	HNO3	G	SA	Isotopic Uranium (HASL 300)	356277 011
096594	-001	CTF-TB 1	N/A	9/8/14 8:26	DIW	G	3x40 ml.	HCL	G	TB	TCL VOC (SW846-8260B)	356277 012

Recipient Initials RC MTC

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

Certificate of Analysis

Report Date: October 8, 2014

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:	096593-020	Project:	SNLSGWater
Sample ID:	356277007	Client ID:	SNLS004
Matrix:	AQUEOUS		
Collect Date:	08-SEP-14 08:34		
Receive Date:	09-SEP-14	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	10/04/14	1650	1421123	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

SMO Use

AR/COC 615790

Project Name	SWMU-149	Date Samples Shipped:	9/12/14	SMO Authorization:	☐ Waste Characterization
Project/Task Manager:	Clinton Lum	Carrier/Waybill No.	223748	SMO Contact Phone: SMO	☐ RMMA
Project/Task Number:	146422.10.11.01	Lab Contact:	Edie Kent/803-556-8171	Lorraine Herrera/505-844-3199	☐ Released by COC No.
Service Order:	CF 352-15	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
096595	-001	CTF-MW3	359	9/12/14 9:54	GW	G	3x40 ml	HCL	G	SA	TCL VOC (SW846-8260B)	356715 001
096595	-009	CTF-MW3	359	9/12/14 9:55	GW	P	500 ml	HNO3	G	SA	TAL Metals(SW846-6010/6020/7470)	356715 002
096595	-010	CTF-MW3	359	9/12/14 9:56	FGW	P	500 ml	HNO3	G	SA	TAL Metals(SW846-6010/6020/7470)	356717 001
096595	-016	CTF-MW3	359	9/12/14 9:57	GW	P	125 ml	None	G	SA	Anions (SW846-9056)	356715 003
096595	-018	CTF-MW3	359	9/12/14 9:58	GW	P	125 ml	H2SO4	G	SA	Nitrate+Nitrite (EPA 353.2)	356715 004
096595	-022	CTF-MW3	359	9/12/14 ~~9:59~~ 10:00	GW	P	500 ml	None	G	SA	Alkalinity (SM2320B)	356715 005
096595	-020	CTF-MW3	359	9/12/14 ~~10:00~~ 9:59	GW	P	250 ml.	None	G	SA	Perchlorate (EPA 314.0)	356715 006
096596	-001	CTF- TB 2	NA	9/12/14 9:54	DIW	G	3x40 ml	HCL	G	TB	TCL VOC (SW846-8260B)	356715 007

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 via email	via	SNL/4142/505-844-5130/505-228-0710

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

Filtered fraction collected in the field using a 0.45 micron in-line filter. If perchlorate detected, then perform verification analysis using SW846-6850M. Report alkalinity as total CaCO3,HCO3,CO3. Report anoins as Br,Cl,F,SO4.

Conditions on Receipt

Lab Use

1.Relinquished by	Alfred Santillanes	Org. 4142	Date 9/12/14	Time 1030	3.Relinquished by		Org.	Date	Time
1. Received by	SMO	Org. 4142	Date 9/12/14	Time 1030	3. Received by		Org.	Date	Time
2.Relinquished by	SMO	Org. 4142	Date 9/12/14	Time 1115	4.Relinquished by		Org.	Date	Time
2. Received by		Org. Fed Ex	Date 9-13-14	Time 0340	4. Received by		Org.	Date	Time

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

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

Certificate of Analysis

Report Date: October 8, 2014

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:	096595-020	Project:	SNLSGWater
Sample ID:	356715006	Client ID:	SNLS004
Matrix:	AQUEOUS		
Collect Date:	12-SEP-14 09:59		
Receive Date:	13-SEP-14	Client Desc.:	CTF-MW3
Collector:	Client	Vol. Recv.:	

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Ion Chromatography											
EPA 314.0 Perchlorate by IC "As Received"											
Perchlorate	U	ND	0.004	0.012	mg/L	1	MAR1	10/04/14	1748	1421123	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 Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
EPA 900.0/SW846 9310			
	096266-034/CCBA-EB1	ALPHA (12587-46-1)	J, FR7
	096266-034/CCBA-EB1	BETA (12587-47-2)	J, FR7
	096269-034/CCBA-MW1	ALPHA (12587-46-1)	8.8U, B2
	096269-034/CCBA-MW1	BETA (12587-47-2)	7.5U, B2
	096270-034/CCBA-MW1	ALPHA (12587-46-1)	8.8U, B2
	096270-034/CCBA-MW1	BETA (12587-47-2)	7.5U, B2
EPA 901.1			
	096263-033/CCBA-MW2	Americium-241 (14596-10-2)	BD, FR3
	096263-033/CCBA-MW2	Cesium-137 (10045-97-3)	BD, FR3
	096263-033/CCBA-MW2	Cobalt-60 (10198-40-0)	BD, FR3
	096263-033/CCBA-MW2	Potassium-40 (13966-00-2)	BD, FR3
	096266-033/CCBA-EB1	Americium-241 (14596-10-2)	BD, FR3
	096266-033/CCBA-EB1	Cesium-137 (10045-97-3)	BD, FR3
	096266-033/CCBA-EB1	Cobalt-60 (10198-40-0)	BD, FR3
	096266-033/CCBA-EB1	Potassium-40 (13966-00-2)	BD, Z2
	096269-033/CCBA-MW1	Americium-241 (14596-10-2)	BD, FR3
	096269-033/CCBA-MW1	Cesium-137 (10045-97-3)	BD, FR3
	096269-033/CCBA-MW1	Cobalt-60 (10198-40-0)	BD, FR3
	096269-033/CCBA-MW1	Potassium-40 (13966-00-2)	BD, FR3
	096270-033/CCBA-MW1	Americium-241 (14596-10-2)	BD, FR3
	096270-033/CCBA-MW1	Cesium-137 (10045-97-3)	BD, FR3
	096270-033/CCBA-MW1	Cobalt-60 (10198-40-0)	BD, FR3
	096270-033/CCBA-MW1	Potassium-40 (13966-00-2)	BD, FR3
SW846 3005/6010B			

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
	096266-009/CCBA-EB1	Vanadium (7440-62-2)	UJ, B4
	096269-009/CCBA-MW1	Vanadium (7440-62-2)	UJ, B4
	096270-009/CCBA-MW1	Vanadium (7440-62-2)	UJ, B4
SW846 3005/6020 DOE-AL			
	096266-009/CCBA-EB1	Calcium (7440-70-2)	0.36U, B
	096266-017/CCBA-EB1	Calcium (7440-70-2)	0.36U, B
	096269-009/CCBA-MW1	Arsenic (7440-38-2)	R, X1
	096269-009/CCBA-MW1	Beryllium (7440-41-7)	J+, MS2
	096269-009/CCBA-MW1	Copper (7440-50-8)	0.0031U, B2
	096270-009/CCBA-MW1	Arsenic (7440-38-2)	R, X1
	096270-009/CCBA-MW1	Beryllium (7440-41-7)	J+, MS2
	096270-009/CCBA-MW1	Copper (7440-50-8)	0.0031U, B2
SW846 3510C/8270D			
	096263-002/CCBA-MW2	2,4-Dinitrophenol (51-28-5)	UJ, I3,C3
	096263-002/CCBA-MW2	p-Nitroaniline (100-01-6)	UJ, I3,C3
	096266-002/CCBA-EB1	2,4-Dinitrophenol (51-28-5)	UJ, I3,C3
	096266-002/CCBA-EB1	p-Nitroaniline (100-01-6)	UJ, I3,C3
	096269-002/CCBA-MW1	1,1'-Biphenyl (92-52-4)	UJ, MS5,MS3
	096269-002/CCBA-MW1	1,2,4-Trichlorobenzene (120-82-1)	UJ, MS5
	096269-002/CCBA-MW1	1,4-Dioxane (123-91-1)	UJ, MS5
	096269-002/CCBA-MW1	2,4,5-Trichlorophenol (95-95-4)	UJ, MS5
	096269-002/CCBA-MW1	2,4,6-Trichlorophenol (88-06-2)	UJ, MS5,MS3
	096269-002/CCBA-MW1	2,4-Dichlorophenol (120-83-2)	UJ, MS5,MS3
	096269-002/CCBA-MW1	2,4-Dimethylphenol (105-67-9)	UJ, MS5
	096269-002/CCBA-MW1	2,4-Dinitrophenol (51-28-5)	UJ, MS5
	096269-002/CCBA-MW1	2,4-Dinitrotoluene (121-14-2)	UJ, MS5
	096269-002/CCBA-MW1	2,6-Dinitrotoluene (606-20-2)	UJ, MS5,MS3
	096269-002/CCBA-MW1	2-Chloronaphthalene (91-58-7)	UJ, MS5,MS3
	096269-002/CCBA-MW1	2-Chlorophenol (95-57-8)	UJ, MS5

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
	096269-002/CCBA-MW1	2-Methyl-4,6-dinitrophenol (534-52-1)	UJ, MS5
	096269-002/CCBA-MW1	2-Methylnaphthalene (91-57-6)	UJ, MS5
	096269-002/CCBA-MW1	2-Nitrophenol (88-75-5)	UJ, MS5,MS3
	096269-002/CCBA-MW1	3,3'-Dichlorobenzidine (91-94-1)	UJ, MS5
	096269-002/CCBA-MW1	4-Bromophenylphenylether (101-55-3)	UJ, MS5,MS3
	096269-002/CCBA-MW1	4-Chloro-3-methylphenol (59-50-7)	UJ, MS5
	096269-002/CCBA-MW1	4-Chloroaniline (106-47-8)	UJ, MS5
	096269-002/CCBA-MW1	4-Chlorophenylphenylether (7005-72-3)	UJ, MS5
	096269-002/CCBA-MW1	4-Nitrophenol (100-02-7)	UJ, MS5
	096269-002/CCBA-MW1	Acenaphthene (83-32-9)	UJ, MS5,MS3
	096269-002/CCBA-MW1	Acenaphthylene (208-96-8)	UJ, MS5,MS3
	096269-002/CCBA-MW1	Acetophenone (98-86-2)	UJ, MS5,MS3
	096269-002/CCBA-MW1	Anthracene (120-12-7)	UJ, MS5,MS3
	096269-002/CCBA-MW1	Atrazine (1912-24-9)	UJ, MS5
	096269-002/CCBA-MW1	Benzaldehyde (100-52-7)	UJ, MS5
	096269-002/CCBA-MW1	Benzo(a)anthracene (56-55-3)	UJ, MS5,MS3
	096269-002/CCBA-MW1	Benzo(a)pyrene (50-32-8)	UJ, MS5,MS3
	096269-002/CCBA-MW1	Benzo(b)fluoranthene (205-99-2)	UJ, MS5,MS3
	096269-002/CCBA-MW1	Benzo(ghi)perylene (191-24-2)	UJ, MS5
	096269-002/CCBA-MW1	Benzo(k)fluoranthene (207-08-9)	UJ, MS5,MS3
	096269-002/CCBA-MW1	bis(2-Chloro-1-methylethyl)ether (108-60-1)	UJ, MS5
	096269-002/CCBA-MW1	bis(2-Chloroethoxy)methane (111-91-1)	UJ, MS5,MS3
	096269-002/CCBA-MW1	bis(2-Chloroethyl) ether (111-44-4)	UJ, MS5
	096269-002/CCBA-MW1	bis(2-Ethylhexyl)phthalate (117-81-7)	UJ, MS5
	096269-002/CCBA-MW1	Butylbenzylphthalate (85-68-7)	UJ, MS5

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
	096269-002/CCBA-MW1	Caprolactam (105-60-2)	UJ, MS5
	096269-002/CCBA-MW1	Carbazole (86-74-8)	UJ, MS5
	096269-002/CCBA-MW1	Chrysene (218-01-9)	UJ, MS5
	096269-002/CCBA-MW1	Dibenzo(a,h)anthracene (53-70-3)	UJ, MS5
	096269-002/CCBA-MW1	Dibenzofuran (132-64-9)	UJ, MS5,MS3
	096269-002/CCBA-MW1	Diethylphthalate (84-66-2)	UJ, MS5,MS3
	096269-002/CCBA-MW1	Dimethylphthalate (131-11-3)	UJ, MS5,MS3
	096269-002/CCBA-MW1	Di-n-butylphthalate (84-74-2)	UJ, MS5
	096269-002/CCBA-MW1	Di-n-octylphthalate (117-84-0)	UJ, MS5
	096269-002/CCBA-MW1	Diphenylamine (122-39-4)	UJ, MS5,MS3
	096269-002/CCBA-MW1	Fluoranthene (206-44-0)	UJ, MS5
	096269-002/CCBA-MW1	Fluorene (86-73-7)	UJ, MS5,MS3
	096269-002/CCBA-MW1	Hexachlorobenzene (118-74-1)	UJ, MS5,MS3
	096269-002/CCBA-MW1	Hexachlorobutadiene (87-68-3)	UJ, MS5
	096269-002/CCBA-MW1	Hexachlorocyclopentadiene (77-47-4)	UJ, MS5
	096269-002/CCBA-MW1	Hexachloroethane (67-72-1)	UJ, MS5
	096269-002/CCBA-MW1	Indeno(1,2,3-cd)pyrene (193-39-5)	UJ, MS5
	096269-002/CCBA-MW1	Isophorone (78-59-1)	UJ, MS5,MS3
	096269-002/CCBA-MW1	m,p-Cresol (N/A)	UJ, MS5
	096269-002/CCBA-MW1	m-Nitroaniline (99-09-2)	UJ, MS5
	096269-002/CCBA-MW1	Naphthalene (91-20-3)	UJ, MS5
	096269-002/CCBA-MW1	Nitrobenzene (98-95-3)	UJ, MS5
	096269-002/CCBA-MW1	N-Nitrosodipropylamine (621-64-7)	UJ, MS5
	096269-002/CCBA-MW1	o-Cresol (95-48-7)	UJ, MS5
	096269-002/CCBA-MW1	o-Nitroaniline (88-74-4)	UJ, MS5
	096269-002/CCBA-MW1	Pentachlorophenol (87-86-5)	UJ, MS5
	096269-002/CCBA-MW1	Phenanthrene (85-01-8)	UJ, MS5,MS3
	096269-002/CCBA-MW1	Phenol (108-95-2)	UJ, MS5

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
	096269-002/CCBA-MW1	p-Nitroaniline (100-01-6)	UJ, C3,MS5
	096269-002/CCBA-MW1	Pyrene (129-00-0)	UJ, MS5
	096270-002/CCBA-MW1	1,1'-Biphenyl (92-52-4)	UJ, MS5,MS3
	096270-002/CCBA-MW1	1,2,4-Trichlorobenzene (120-82-1)	UJ, MS5
	096270-002/CCBA-MW1	1,4-Dioxane (123-91-1)	UJ, MS5
	096270-002/CCBA-MW1	2,4,5-Trichlorophenol (95-95-4)	UJ, MS5
	096270-002/CCBA-MW1	2,4,6-Trichlorophenol (88-06-2)	UJ, MS5,MS3
	096270-002/CCBA-MW1	2,4-Dichlorophenol (120-83-2)	UJ, MS5,MS3
	096270-002/CCBA-MW1	2,4-Dimethylphenol (105-67-9)	UJ, MS5
	096270-002/CCBA-MW1	2,4-Dinitrophenol (51-28-5)	UJ, MS5
	096270-002/CCBA-MW1	2,4-Dinitrotoluene (121-14-2)	UJ, MS5
	096270-002/CCBA-MW1	2,6-Dinitrotoluene (606-20-2)	UJ, MS5,MS3
	096270-002/CCBA-MW1	2-Chloronaphthalene (91-58-7)	UJ, MS5,MS3
	096270-002/CCBA-MW1	2-Chlorophenol (95-57-8)	UJ, MS5
	096270-002/CCBA-MW1	2-Methyl-4,6-dinitrophenol (534-52-1)	UJ, MS5
	096270-002/CCBA-MW1	2-Methylnaphthalene (91-57-6)	UJ, MS5
	096270-002/CCBA-MW1	2-Nitrophenol (88-75-5)	UJ, MS5,MS3
	096270-002/CCBA-MW1	3,3'-Dichlorobenzidine (91-94-1)	UJ, MS5
	096270-002/CCBA-MW1	4-Bromophenylphenylether (101-55-3)	UJ, MS5,MS3
	096270-002/CCBA-MW1	4-Chloro-3-methylphenol (59-50-7)	UJ, MS5
	096270-002/CCBA-MW1	4-Chloroaniline (106-47-8)	UJ, MS5
	096270-002/CCBA-MW1	4-Chlorophenylphenylether (7005-72-3)	UJ, MS5
	096270-002/CCBA-MW1	4-Nitrophenol (100-02-7)	UJ, MS5
	096270-002/CCBA-MW1	Acenaphthene (83-32-9)	UJ, MS5,MS3
	096270-002/CCBA-MW1	Acenaphthylene (208-96-8)	UJ, MS5,MS3
	096270-002/CCBA-MW1	Acetophenone (98-86-2)	UJ, MS5,MS3

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
	096270-002/CCBA-MW1	Anthracene (120-12-7)	UJ, MS5,MS3
	096270-002/CCBA-MW1	Atrazine (1912-24-9)	UJ, MS5
	096270-002/CCBA-MW1	Benzaldehyde (100-52-7)	UJ, MS5
	096270-002/CCBA-MW1	Benzo(a)anthracene (56-55-3)	UJ, MS5,MS3
	096270-002/CCBA-MW1	Benzo(a)pyrene (50-32-8)	UJ, MS5,MS3
	096270-002/CCBA-MW1	Benzo(b)fluoranthene (205-99-2)	UJ, MS5,MS3
	096270-002/CCBA-MW1	Benzo(ghi)perylene (191-24-2)	UJ, MS5
	096270-002/CCBA-MW1	Benzo(k)fluoranthene (207-08-9)	UJ, MS5,MS3
	096270-002/CCBA-MW1	bis(2-Chloro-1-methylethyl)ether (108-60-1)	UJ, MS5
	096270-002/CCBA-MW1	bis(2-Chloroethoxy)methane (111-91-1)	UJ, MS5,MS3
	096270-002/CCBA-MW1	bis(2-Chloroethyl) ether (111-44-4)	UJ, MS5
	096270-002/CCBA-MW1	bis(2-Ethylhexyl)phthalate (117-81-7)	UJ, MS5
	096270-002/CCBA-MW1	Butylbenzylphthalate (85-68-7)	UJ, MS5
	096270-002/CCBA-MW1	Caprolactam (105-60-2)	UJ, MS5
	096270-002/CCBA-MW1	Carbazole (86-74-8)	UJ, MS5
	096270-002/CCBA-MW1	Chrysene (218-01-9)	UJ, MS5
	096270-002/CCBA-MW1	Dibenzo(a,h)anthracene (53-70-3)	UJ, MS5
	096270-002/CCBA-MW1	Dibenzofuran (132-64-9)	UJ, MS5,MS3
	096270-002/CCBA-MW1	Diethylphthalate (84-66-2)	UJ, MS5,MS3
	096270-002/CCBA-MW1	Dimethylphthalate (131-11-3)	UJ, MS5,MS3
	096270-002/CCBA-MW1	Di-n-butylphthalate (84-74-2)	UJ, MS5
	096270-002/CCBA-MW1	Di-n-octylphthalate (117-84-0)	UJ, MS5
	096270-002/CCBA-MW1	Diphenylamine (122-39-4)	UJ, MS5,MS3
	096270-002/CCBA-MW1	Fluoranthene (206-44-0)	UJ, MS5
	096270-002/CCBA-MW1	Fluorene (86-73-7)	UJ, MS5,MS3
	096270-002/CCBA-MW1	Hexachlorobenzene (118-74-1)	UJ, MS5,MS3

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
	096270-002/CCBA-MW1	Hexachlorobutadiene (87-68-3)	UJ, MS5
	096270-002/CCBA-MW1	Hexachlorocyclopentadiene (77-47-4)	UJ, MS5
	096270-002/CCBA-MW1	Hexachloroethane (67-72-1)	UJ, MS5
	096270-002/CCBA-MW1	Indeno(1,2,3-cd)pyrene (193-39-5)	UJ, MS5
	096270-002/CCBA-MW1	Isophorone (78-59-1)	UJ, MS5,MS3
	096270-002/CCBA-MW1	m,p-Cresol (N/A)	UJ, MS5
	096270-002/CCBA-MW1	m-Nitroaniline (99-09-2)	UJ, MS5
	096270-002/CCBA-MW1	Naphthalene (91-20-3)	UJ, MS5
	096270-002/CCBA-MW1	Nitrobenzene (98-95-3)	UJ, MS5
	096270-002/CCBA-MW1	N-Nitrosodipropylamine (621-64-7)	UJ, MS5
	096270-002/CCBA-MW1	o-Cresol (95-48-7)	UJ, MS5
	096270-002/CCBA-MW1	o-Nitroaniline (88-74-4)	UJ, MS5
	096270-002/CCBA-MW1	Pentachlorophenol (87-86-5)	UJ, MS5
	096270-002/CCBA-MW1	Phenanthrene (85-01-8)	UJ, MS5,MS3
	096270-002/CCBA-MW1	Phenol (108-95-2)	UJ, MS5
	096270-002/CCBA-MW1	p-Nitroaniline (100-01-6)	UJ, C3,MS5
	096270-002/CCBA-MW1	Pyrene (129-00-0)	UJ, MS5
SW846 3535/8321A Modified			
	096263-024/CCBA-MW2	1,3,5-Trinitrobenzene (99-35-4)	R, MS3,L3
	096263-024/CCBA-MW2	Tetryl (479-45-8)	R, MS3,L3
	096266-024/CCBA-EB1	1,3,5-Trinitrobenzene (99-35-4)	R, MS3,L3
	096266-024/CCBA-EB1	Tetryl (479-45-8)	R, MS3,L3
	096269-024/CCBA-MW1	1,3,5-Trinitrobenzene (99-35-4)	R, MS3,L3
	096269-024/CCBA-MW1	Tetryl (479-45-8)	R, MS3,L3
	096270-024/CCBA-MW1	1,3,5-Trinitrobenzene (99-35-4)	R, MS3,L3
	096270-024/CCBA-MW1	Tetryl (479-45-8)	R, MS3,L3
SW846 8260B DOE-AL			
	096263-001/CCBA-MW2	Bromomethane (74-83-9)	UJ, I3,C3,MS3

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
	096263-001/CCBA-MW2	Methylene chloride (75-09-2)	UJ, I3,C3
	096264-001/CCBA-TB1	Bromomethane (74-83-9)	UJ, I3,C3,MS3
	096264-001/CCBA-TB1	Methylene chloride (75-09-2)	UJ, I3,C3
	096265-001/CCBA-FB1	Bromoform (75-25-2)	J+, I3,C3,MS2
	096265-001/CCBA-FB1	Bromomethane (74-83-9)	UJ, I3,C3,MS3
	096265-001/CCBA-FB1	Dibromochloromethane (124-48-1)	J+, I3,MS2
	096265-001/CCBA-FB1	Methylene chloride (75-09-2)	UJ, I3,C3
	096266-001/CCBA-EB1	Bromomethane (74-83-9)	UJ, I3,C3,MS3
	096266-001/CCBA-EB1	Dibromochloromethane (124-48-1)	J+, I3,MS2
	096266-001/CCBA-EB1	Methylene chloride (75-09-2)	UJ, I3,C3
	096267-001/CCBA-TB2	Bromomethane (74-83-9)	UJ, I3,C3,MS3
	096267-001/CCBA-TB2	Methylene chloride (75-09-2)	UJ, I3,C3
	096268-001/CCBA-FB2	Bromomethane (74-83-9)	UJ, I3,C3,MS3
	096268-001/CCBA-FB2	Methylene chloride (75-09-2)	UJ, I3,C3
	096269-001/CCBA-MW1	Bromomethane (74-83-9)	UJ, I3,C3,MS3
	096269-001/CCBA-MW1	Methylene chloride (75-09-2)	UJ, I3,C3
	096270-001/CCBA-MW1	Bromomethane (74-83-9)	UJ, I3,C3,MS3
	096270-001/CCBA-MW1	Methylene chloride (75-09-2)	UJ, I3,C3
	096271-001/CCBA-TB3	Bromomethane (74-83-9)	UJ, I3,C3,MS3
	096271-001/CCBA-TB3	Methylene chloride (75-09-2)	UJ, I3,C3

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

ANALYTICAL QUALITY ASSOCIATES, INC.

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Memorandum

Date: October 10, 2014

To: File

From: Mary Donivan

Subject: Inorganic Data Review and Validation – SNL
Site: SWMU 8/58 GWM
AR/COC: 615626, 615627 and 615628
SDG: 353139
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 4.

Summary

Four samples were prepared and analyzed with accepted procedures using methods EPA 9012A (total cyanide), EPA 314.0 (perchlorate), EPA 9056 (anions by IC), EPA 353.2 (nitrate/nitrite) and SM 2320B (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 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.

Alkalinity blank results were reported, but were not assessed for data validation.

Laboratory Control Sample (LCS)

All LCS acceptance criteria were met.

Matrix Spike (MS)

All MS/PS recoveries met QC acceptance criteria.

The MS for perchlorate was performed on an SNL sample from another SDG, no sample data were qualified as a result.

Laboratory Replicate

The replicate analyses met all QC acceptance criteria.

The replicate analysis for perchlorate was performed on an SNL sample from another SDG, no sample data will be qualified as a result.

Detection Limits/Dilutions

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

Nitrate/Nitrite:
Sample -005 was diluted 10X and samples -031 and -042 were diluted 5X.

Anions:
Sample -004 was diluted 10X and samples -030 and -041 were diluted 5X for chloride and sulfate.

Other QC

An EB was submitted with ARCOC 615627 and it was associated with the samples from ARCOC 615628. A field duplicate pair was submitted with ARCOC 615628. 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:** 10/14/14

Sample Findings Summary

AR/COC: 615622, 615623, 615624, 615625

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
DOE EML HASL-300, U-02-RC			
	096251-035/OBS-MW2	Uranium-233/234 (13968-55-3/13966-29-)	R, X1
	096251-035/OBS-MW2	Uranium-235/236 (15117-96-1/13982-70-)	R, X1
	096251-035/OBS-MW2	Uranium-238 (7440-61-1)	R, X1
	096251-R35/OBS-MW2	Uranium-235/236 (15117-96-1/13982-70-)	J, FR7
	096253-035/OBS-EB1	Uranium-233/234 (13968-55-3/13966-29-)	BD, FR3
	096253-035/OBS-EB1	Uranium-235/236 (15117-96-1/13982-70-)	BD, FR3
	096253-035/OBS-EB1	Uranium-238 (7440-61-1)	BD, FR3
EPA 900.0/SW846 9310			
	096251-034/OBS-MW2	ALPHA (12587-46-1)	R, X1
	096251-034/OBS-MW2	BETA (12587-47-2)	R, X1
	096251-R34/OBS-MW2	ALPHA (12587-46-1)	J, MS1
	096251-R34/OBS-MW2	BETA (12587-47-2)	J, MS1
	096253-034/OBS-EB1	ALPHA (12587-46-1)	BD, FR3
	096253-034/OBS-EB1	BETA (12587-47-2)	BD, FR3
EPA 901.1			
	096251-033/OBS-MW2	Americium-241 (14596-10-2)	BD, FR3
	096251-033/OBS-MW2	Cesium-137 (10045-97-3)	BD, FR3
	096251-033/OBS-MW2	Cobalt-60 (10198-40-0)	BD, FR3
	096251-033/OBS-MW2	Potassium-40 (13966-00-2)	R, Z2
	096253-033/OBS-EB1	Americium-241 (14596-10-2)	BD, FR3
	096253-033/OBS-EB1	Cesium-137 (10045-97-3)	BD, FR3
	096253-033/OBS-EB1	Cobalt-60 (10198-40-0)	BD, FR3

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
	096253-033/OBS-EB1	Potassium-40 (13966-00-2)	BD, FR3
	096255-033/OBS-MW1	Americium-241 (14596-10-2)	BD, Z2
	096255-033/OBS-MW1	Cesium-137 (10045-97-3)	BD, FR3
	096255-033/OBS-MW1	Cobalt-60 (10198-40-0)	BD, FR3
	096255-033/OBS-MW1	Potassium-40 (13966-00-2)	BD, FR3
	096256-033/OBS-MW1	Americium-241 (14596-10-2)	BD, FR3
	096256-033/OBS-MW1	Cesium-137 (10045-97-3)	BD, FR3
	096256-033/OBS-MW1	Cobalt-60 (10198-40-0)	BD, FR3
	096256-033/OBS-MW1	Potassium-40 (13966-00-2)	BD, FR3
	096259-033/OBS-MW3	Americium-241 (14596-10-2)	BD, FR3
	096259-033/OBS-MW3	Cesium-137 (10045-97-3)	BD, FR3
	096259-033/OBS-MW3	Cobalt-60 (10198-40-0)	BD, FR3
	096259-033/OBS-MW3	Potassium-40 (13966-00-2)	BD, FR3
SW846 3005/6020 DOE-AL			
	096255-009/OBS-MW1	Copper (7440-50-8)	0.0035U, B2
	096256-009/OBS-MW1	Copper (7440-50-8)	0.0035U, B2
SW846 3535/8321A Modified			
	096251-024/OBS-MW2	m-Nitrotoluene (99-08-1)	UJ, I4
	096251-024/OBS-MW2	o-Nitrotoluene (88-72-2)	UJ, I4
	096251-024/OBS-MW2	p-Nitrotoluene (99-99-0)	UJ, I4
	096251-024/OBS-MW2	Tetryl (479-45-8)	UJ, L3
	096253-024/OBS-EB1	m-Nitrotoluene (99-08-1)	UJ, I4
	096253-024/OBS-EB1	o-Nitrotoluene (88-72-2)	UJ, I4
	096253-024/OBS-EB1	p-Nitrotoluene (99-99-0)	UJ, I4
	096253-024/OBS-EB1	Tetryl (479-45-8)	UJ, L3
	096255-024/OBS-MW1	m-Nitrotoluene (99-08-1)	UJ, I4
	096255-024/OBS-MW1	o-Nitrotoluene (88-72-2)	UJ, I4
	096255-024/OBS-MW1	p-Nitrotoluene (99-99-0)	UJ, I4
	096255-024/OBS-MW1	Tetryl (479-45-8)	UJ, L3

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
	096256-024/OBS-MW1	m-Nitrotoluene (99-08-1)	UJ, I4
	096256-024/OBS-MW1	o-Nitrotoluene (88-72-2)	UJ, I4
	096256-024/OBS-MW1	p-Nitrotoluene (99-99-0)	UJ, I4
	096256-024/OBS-MW1	Tetryl (479-45-8)	UJ, L3
	096259-024/OBS-MW3	m-Nitrotoluene (99-08-1)	UJ, I4
	096259-024/OBS-MW3	o-Nitrotoluene (88-72-2)	UJ, I4
	096259-024/OBS-MW3	p-Nitrotoluene (99-99-0)	UJ, I4
	096259-024/OBS-MW3	Tetryl (479-45-8)	UJ, L3
SW846 7196A			
	096253-014/OBS-EB1	Hexavalent Chromium (18540-29-9)	0.017UJ, B3,H2
	096255-014/OBS-MW1	Hexavalent Chromium (18540-29-9)	UJ, MS1,RP1
	096256-014/OBS-MW1	Hexavalent Chromium (18540-29-9)	0.017UJ, B3,MS1,RP1
	096261-014/OBS-EB2	Hexavalent Chromium (18540-29-9)	UJ, MS1,RP1
SW846 8260B DOE-AL			
	096251-001/OBS-MW2	Bromomethane (74-83-9)	UJ, I3,C3,L3,MS3
	096251-001/OBS-MW2	Methylene chloride (75-09-2)	UJ, I3,C3,L3,MS3
	096251-001/OBS-MW2	Trichlorotrifluoroethane (76-13-1)	UJ, L3
	096252-001/OBS-TB1	Bromomethane (74-83-9)	UJ, I3,C3,L3,MS3
	096252-001/OBS-TB1	Methylene chloride (75-09-2)	UJ, I3,C3,L3,MS3
	096252-001/OBS-TB1	Trichlorotrifluoroethane (76-13-1)	UJ, L3
	096253-001/OBS-EB1	Acetone (67-64-1)	J-, C3
	096253-001/OBS-EB1	Bromomethane (74-83-9)	UJ, I3,C3,L3,MS3
	096253-001/OBS-EB1	Methylene chloride (75-09-2)	UJ, I3,C3,L3,MS3
	096253-001/OBS-EB1	Trichlorotrifluoroethane (76-13-1)	UJ, L3

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
	096254-001/OBS-TB2	Bromomethane (74-83-9)	UJ, I3,C3,L3,MS3
	096254-001/OBS-TB2	Methylene chloride (75-09-2)	UJ, I3,C3,L3,MS3
	096254-001/OBS-TB2	Trichlorotrifluoroethane (76-13-1)	UJ, L3
	096255-001/OBS-MW1	Bromomethane (74-83-9)	UJ, I3,C3,L3,MS3
	096255-001/OBS-MW1	Methylene chloride (75-09-2)	UJ, I3,C3,L3,MS3
	096255-001/OBS-MW1	Trichlorotrifluoroethane (76-13-1)	UJ, L3
	096256-001/OBS-MW1	Bromomethane (74-83-9)	UJ, I3,C3,L3,MS3
	096256-001/OBS-MW1	Methylene chloride (75-09-2)	UJ, I3,C3,L3,MS3
	096256-001/OBS-MW1	Trichlorotrifluoroethane (76-13-1)	UJ, L3
	096257-001/OBS-TB3	Bromomethane (74-83-9)	UJ, I3,C3,L3,MS3
	096257-001/OBS-TB3	Methylene chloride (75-09-2)	UJ, I3,C3,L3,MS3
	096257-001/OBS-TB3	Trichlorotrifluoroethane (76-13-1)	UJ, L3
	096258-001/OBS-FB1	Acetone (67-64-1)	J-, C3
	096258-001/OBS-FB1	Bromomethane (74-83-9)	UJ, I3,C3,L3,MS3
	096258-001/OBS-FB1	Methylene chloride (75-09-2)	UJ, I3,C3,L3,MS3
	096258-001/OBS-FB1	Trichlorotrifluoroethane (76-13-1)	UJ, L3
	096259-001/OBS-MW3	Bromomethane (74-83-9)	UJ, I3,C3,L3,MS3
	096259-001/OBS-MW3	Methylene chloride (75-09-2)	UJ, I3,C3,L3,MS3
	096259-001/OBS-MW3	Trichlorotrifluoroethane (76-13-1)	UJ, L3
	096260-001/OBS-TB4	Bromomethane (74-83-9)	UJ, I3,C3,L3,MS3

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
	096260-001/OBS-TB4	Methylene chloride (75-09-2)	UJ, I3,C3,L3,MS3
	096260-001/OBS-TB4	Trichlorotrifluoroethane (76-13-1)	UJ, L3
SW846 9012B			
	096251-027/OBS-MW2	Cyanide, Total (57-12-5)	UJ, I5
	096253-027/OBS-EB1	Cyanide, Total (57-12-5)	UJ, I5
	096255-027/OBS-MW1	Cyanide, Total (57-12-5)	UJ, I5
	096256-027/OBS-MW1	Cyanide, Total (57-12-5)	UJ, I5
	096259-027/OBS-MW3	Cyanide, Total (57-12-5)	UJ, I5

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

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Memorandum

Date: October 8, 2014

To: File

From: Mary Donivan

Subject: Inorganic Data Review and Validation – SNL
Site: SWMU 68 GWM
AR/COC: 615622, 615623, 615624 and 615625
SDG: 352683
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 4.

Summary

Five samples were prepared and analyzed with accepted procedures using methods EPA 9012A (total cyanide), EPA 314.0 (perchlorate), EPA 9056 (anions by IC), EPA 353.2 (nitrate/nitrite) and SM 2320B (total alkalinity). Six samples were prepared and analyzed with accepted procedures using methods EPA 7196A (hexavalent chromium). Data were reported for all required analytes. Problems were identified with the data package that resulted in the qualification of data.

Hexavalent chromium:

1. Sample 352683046 was received beyond the 24 hour method-specified holding time, but was analyzed within 2X the HT. The associated sample result will be **qualified J-,H2**.
2. Hexavalent chromium was detected at < the PQL in a CCB bracketing samples -018, -031, -042 and -046. The associated results for samples -031 and -046 were detects ≤5X the CCB concentration and will be **qualified 0.017U,B3**.
3. The matrix QC for batch 1404061 was performed on an EB. The associated result for sample -031 was a detect and will be qualified **J,MS1,RP1**. The remaining associated sample results were non-detects and will be **qualified UJ,MS1,RP1**.

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 non-detects and will be **qualified UJ,I5.**

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

Holding Times and Preservation

The samples were prepared and analyzed within the prescribed holding times and properly preserved except as noted above in the Summary section and as follows. Samples -004, -018, -031 and -042 were prepared and analyzed very slightly beyond the 24 hour method-specified holding time for hexavalent chromium. Based on professional judgment, no data will be qualified.

Calibration

All initial and continuing calibration met QC acceptance criteria.

Blanks

No target analytes were detected in the blanks except as noted above in the Summary section and as follows. Hexavalent chromium was detected at < the PQL in a CCB bracketing samples -018, -031, -042 and -046. The associated results for samples -018 and -042 were non-detects and will not be qualified. It should be noted that sample -046 was an EB which was qualified non-detect due to CCB contamination.

Chloride was detected at < the PQL in the EB, sample -047, which was associated with samples -019 and -032. The associated sample results were detects >5X the EB value and will not be qualified.

Alkalinity blank results were reported, but were not assessed for data validation.

Laboratory Control Sample (LCS)

All LCS acceptance criteria were met.

Matrix Spike (MS)

All MS/PS recoveries met QC acceptance criteria.

The MS for total cyanide was performed on an SNL sample from another SDG, no sample data were qualified as a result.

Laboratory Replicate

The replicate analyses met all QC acceptance criteria.

The replicate analysis for total cyanide was performed on an SNL sample from another SDG, no sample data were 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* -048 (EB) were diluted 5X.

Anions:
All samples *except* -047 (EB) were diluted 10X for chloride and sulfate.

Other QC

An EB was submitted with ARCOC 615623 and it was associated with the samples from ARCOC 615624. An additional EB for hexavalent chromium was submitted with ARCOC 615624 and was associated with the samples in that ARCOC. A field duplicate pair was submitted with ARCOC 615624. 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:** 10/09/14

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Memorandum

Date: October 27, 2014

To: File

From: Monica Dymerski

Subject: Inorganic Data Review and Validation – SNL
Site: SWMU 149
AR/COC: 615790
SDG: 356715
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 4.

Summary

One sample was prepared and analyzed with accepted procedures using methods EPA 9056 (anions by IC), EPA 353.2 (nitrate/nitrite-N), SM 2320B (total alkalinity), and EPA 314.0 (Perchlorate by Ion Chromatography). 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 fractions were prepared and analyzed within the prescribed holding times and were properly preserved.

Calibration

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

Anions:
The ICAL intercept for chloride was positive and > the MDL. The associated sample results were detects >3X the value of the intercept and will not be qualified.

Blanks

No target analytes were detected in the blanks.

A method blank was reported for alkalinity, but was not assessed for validation.

Laboratory Control Sample (LCS)

All LCS acceptance criteria were met.

Matrix Spike (MS)

All PS/MS recoveries met QC acceptance criteria.

Anions, nitrate/nitrite-N, and perchlorate:

The MS analyses were performed on SNL samples from other SDGs. No sample data will be qualified as a result.

Laboratory Replicate

The replicate analysis met all QC acceptance criteria.

Anions, nitrate/nitrite-N, and perchlorate:

The replicate analyses were performed on SNL samples from other SDGs. No sample data will be qualified as a result.

Detection Limits/Dilutions

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

Nitrate/nitrite-N:
Sample -004 was diluted 10X.

Anions:
Sample -003 was diluted 50X for chloride and sulfate.

Other QC

No other specific issues that affect data quality were identified.

Reviewed by: Mary Donivan **Level:** I **Date:** 10/27/14

Sample Findings Summary

AR/COC: 615790

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
SW846 3005/6020 DOE-AL			
	096595-009/CTF-MW3	Iron (7439-89-6)	0.18U, B3
SW846 8260B DOE-AL			
	096595-001/CTF-MW3	Trichloroethylene (79-01-6)	1.0U, B
	096596-001/CTF - TB 2	Methylene chloride (75-09-2)	UJ, I3,C3

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

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Memorandum

Date: October 29 2014

To: File

From: Mary Donivan

Subject: Inorganic Data Review and Validation – SNL
Site: SWMU 154 GWM
AR/COC: 615788
SDG: 356277
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 4.

Summary

One sample was prepared and analyzed with accepted procedures using methods EPA 314.0 (perchlorate), EPA 9056 (anions by IC), EPA 353.2 (nitrate/nitrite) and SM 2320B (total alkalinity). Data were reported for all required analytes. Problems were identified with the data package that resulted in the qualification of data.

Alkalinity:

1. An MS was not performed with the sample and no explanation was provided in the narrative. Therefore, the MS %R was not available to evaluate field sample data. The associated sample results for total and bicarbonate alkalinity were detects and will be **qualified J,MS1** and the associated result for carbonate alkalinity was a non-detect and will be **qualified UJ,MS1** due to lack of matrix-specific accuracy 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 fractions were prepared and analyzed within the prescribed holding times and properly preserved.

Calibration

All initial and continuing calibration met QC acceptance criteria except as follows. The ICAL intercept was > the MDL but ≤3X the MDL for chloride. The associated sample result was a detect >3X the intercept and will not be qualified.

Blanks

No target analytes were detected in the blanks.

Blank results were reported for alkalinity, but were not assessed 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.

The MS for anions was performed on an SNL sample from another SDG, no sample data will be qualified as a result.

Laboratory Replicate

The replicate analyses met all QC acceptance criteria.

The replicate analysis for anions was performed on an SNL sample from another SDG, no sample data will be qualified as a result.

The replicate analysis for alkalinity was performed on the LCSD. 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.

Anions:
Sample 356277004 was diluted 100X for chloride and sulfate.

Other QC

No other specific issues that affect data quality were identified.

Reviewed by: Monica Dymerski **Level I** **Date:** 10/30/14

Sample Findings Summary

AR/COC: 615788

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
EPA 900.0/SW846 9310			
	096593-034/CTF-MW2	ALPHA (12587-46-1)	J, MS3
	096593-034/CTF-MW2	BETA (12587-47-2)	J, FR7
EPA 901.1			
	096593-033/CTF-MW2	Americium-241 (14596-10-2)	BD, FR3
	096593-033/CTF-MW2	Cesium-137 (10045-97-3)	BD, FR3
	096593-033/CTF-MW2	Cobalt-60 (10198-40-0)	BD, FR3
SM 2320B			
	096593-022/CTF-MW2	Alkalinity, Total as CaCO3 (N44)	J, MS1
	096593-022/CTF-MW2	Bicarbonate alkalinity (CaCO3) (71-52-3)	J, MS1
	096593-022/CTF-MW2	Carbonate alkalinity (CaCO3) (3812-32-6)	UJ, MS1
SW846 3005/6020 DOE-AL			
	096593-009/CTF-MW2	Copper (7440-50-8)	J-, CK3
	096593-009/CTF-MW2	Manganese (7439-96-5)	J, MS1,D1
	096593-009/CTF-MW2	Nickel (7440-02-0)	J-, CK3
	096593-010/CTF-MW2	Copper (7440-50-8)	J-, CK3
	096593-010/CTF-MW2	Manganese (7439-96-5)	J, MS1,D1
	096593-010/CTF-MW2	Nickel (7440-02-0)	J-, CK3
SW846 3535/8321A Modified			
	096593-024/CTF-MW2	m-Nitrotoluene (99-08-1)	UJ, I4
	096593-024/CTF-MW2	o-Nitrotoluene (88-72-2)	UJ, I4
	096593-024/CTF-MW2	p-Nitrotoluene (99-99-0)	UJ, I4
	096593-024/CTF-MW2	Tetryl (479-45-8)	R, MS3
SW846 7470A			
	096593-009/CTF-MW2	Mercury (7439-97-6)	UJ, B4

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
	096593-010/CTF-MW2	Mercury (7439-97-6)	UJ, B4
SW846 8260B DOE-AL			
	096593-001/CTF-MW2	1,2-Dibromo-3-chloropropane (96-12-8)	UJ, MS5
	096593-001/CTF-MW2	4-Methyl-2-pentanone (108-10-1)	UJ, MS5
	096593-001/CTF-MW2	Acetone (67-64-1)	UJ, MS5
	096593-001/CTF-MW2	Methylene chloride (75-09-2)	UJ, I3,C3
	096594-001/CTF-TB 1	1,2-Dibromo-3-chloropropane (96-12-8)	UJ, MS5
	096594-001/CTF-TB 1	4-Methyl-2-pentanone (108-10-1)	UJ, MS5
	096594-001/CTF-TB 1	Acetone (67-64-1)	UJ, MS5
	096594-001/CTF-TB 1	Methylene chloride (75-09-2)	UJ, I3,C3

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 2014

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 (NMED April 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 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. Monitoring wells CTF-MW2 and CTF-MW3 were installed in August 2001. Prior to the September 2014 sampling event, monitoring wells CTF-MW2 and CTF-MW3 had been sampled 25 times for a variety of constituents.

This report summarizes the fifteenth and fourteenth quarterly groundwater sampling events for CTF-MW2 and CTF-MW3, respectively, following the April 8, 2010 letter by NMED requiring eight quarters of additional groundwater monitoring (NMED April 2010). CTF-MW3 is located near SWMU 149 (Building 9930 Septic System) and monitoring well CTF-MW2 is located near SWMU 154 (Building 9960 Septic System and Seepage Pits). This groundwater characterization at the two SWMUs is designed to meet the requirements of Section VII.D.6 of the Compliance Order on Consent (the Consent Order) (NMED April 2004).

Monitoring wells CTF-MW3 and CTF-MW2 were sampled on September 12 and, September 08, 2014, respectively.

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

The samples from monitoring well CTF-MW3 were analyzed for the required constituents, consisting of general chemistry parameters, volatile organic compounds (VOCs), perchlorate, Target Analyte List (TAL) metals, and nitrate plus nitrite (NPN). The samples from monitoring well CTF-MW2 were analyzed for the required constituents, consisting of general chemistry parameters, VOCs, semivolatile organic compounds (SVOCs), high explosive (HE) compounds, perchlorate, TAL metals plus uranium, NPN, gross alpha/beta activity, radionuclides by gamma spectroscopy, and isotopic uranium.

Analytical results for the September 2014 groundwater samples were compared with the U.S. Environmental Protection Agency (EPA) maximum contaminant levels (MCLs) for drinking water (EPA 2009). Except for arsenic, none of the analytical results for the monitoring well CTF-MW2 groundwater samples exceed the MCLs. Arsenic was detected above the MCL of 0.010 milligrams per liter (mg/L) in monitoring well CTF-MW2 groundwater samples in both unfiltered and filtered samples. Arsenic was reported at a concentration of 0.0458 mg/L in the unfiltered sample and at a concentration of 0.0398 mg/L in the filtered sample. The reported values for arsenic are comparable to historical values.

The elevated concentrations of arsenic in monitoring well CTF-MW2 groundwater samples are most likely from a naturally occurring source and not associated with SNL/NM testing activities. Analysis of trace gases and helium isotope data from CTF-MW2 groundwater show that it is a mixture of shallow and upwelling endogenic (deeply derived) fluids (Williams, et al., August 2013).

The quality control (QC) samples for CTF-MW3 and CTF-MW2 consisted of two trip blank (TB) samples. The QC samples were 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 wells CTF-MW3 and CTF-MW2 during the Second Quarter of CY 2014.

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 EXO1 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 within 10 percent, or less than 5 nephelometric turbidity units.
- pH is within 0.1 units.
- Temperature is within 1.0 degree Celsius.
- SC is within 5 percent as micromhos per centimeter.

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

2.3 Groundwater Sample Collection

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

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

3.0 Analytical Results

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

monitoring wells CTF-MW3 and CTF-MW2 are shown in tabulated form in Tables III-4 through III-16. 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 Analysis Request/Chain-of-Custody form are provided in Appendix B.

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

3.1 Field Water Quality Measurements

SWMU 149, Monitoring Well CTF-MW3. Table III-3 summarizes field water quality measurements (turbidity, pH, temperature, SC, ORP, and DO) collected prior to sampling monitoring well CTF-MW3.

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

3.2 Volatile Organic Compounds

SWMU 149, Monitoring Well CTF-MW3. No VOCs were detected at concentrations above established MCLs. The compounds bromodichloromethane, chloroform, and dibromochloromethane were detected above laboratory MDLs at concentrations comparable to historical values. Bromodichloromethane was detected at 0.400 micrograms per liter (µg/L), chloroform at 0.650 µg/L, and dibromochloromethane at 0.320 µg/L. The compound trichloroethene was qualified as not detected during data validation due to laboratory method blank contamination. Table III-4 summarizes detected VOCs in groundwater samples and Table III-5 lists the VOC MDLs.

SWMU 154, Monitoring Well CTF-MW2. No VOCs were detected at concentrations above laboratory MDLs or established MCLs in the monitoring well CTF-MW2 groundwater sample. Table III-6 lists the VOC MDLs.

3.3 Semivolatile Organic Compounds

SWMU 149, Monitoring Well CTF-MW3. Analysis of SVOCs is not required for monitoring well CTF-MW3.

SWMU 154, Monitoring Well CTF-MW2. No SVOCs were reported above laboratory MDLs; therefore, no SVOCs were detected at concentrations above established MCLs in the monitoring well CTF-MW2 groundwater sample. Table III-6 lists the SVOC MDLs.

3.4 High Explosive Compounds

SWMU 149, Monitoring Well CTF-MW3. Analysis of HE compounds is not required for monitoring well CTF-MW3.

SWMU 154, Monitoring Well CTF-MW2. No HE compounds were detected in the monitoring well CTF-MW2 groundwater sample at concentrations above laboratory MDLs. Table III-7 lists the HE compound MDLs.

3.5 Nitrate Plus Nitrite

SWMU 149, Monitoring Well CTF-MW3. Table III-8 summarizes NPN results. NPN values were compared with the nitrate MCL of 10 mg/L. No NPN was detected above the nitrate MCL. The NPN was reported at a concentration of 5.61 mg/L in the groundwater sample.

SWMU 154, Monitoring Well CTF-MW2. Table III-8 summarizes NPN results for monitoring well CTF-MW2. NPN was not detected above the MCL of 10 mg/L or above the MDL.

3.6 Anions and Alkalinity

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

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

3.7 Perchlorate

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

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

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

3.8 Metals

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

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

SWMU 154, Monitoring Well CTF-MW2. No metals were detected above established MCLs in the monitoring well CTF-MW2 groundwater sample, except for arsenic. Arsenic in the unfiltered sample was detected above the MCL of 0.010 mg/L with a concentration of 0.0458 mg/L in the groundwater sample. Arsenic was detected in the filtered sample with a concentration of 0.0398 mg/L. The elevated concentrations of arsenic in the groundwater sample are most likely attributable to deeply-derived upwelling waters. Arsenic concentrations since March 2002 are plotted on Figure III-3. Unfiltered and filtered metal results for monitoring well CTF-MW2 are summarized in Tables III-13 and III-14, respectively.

3.9 Gamma Spectroscopy and Radioisotopic Analyses

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

SWMU 154, Monitoring Well CTF-MW2. The monitoring well CTF-MW2 groundwater sample was screened for gamma-emitting radionuclides and gross alpha/beta activity (EPA 1980 and DOE 1990). An additional sample for isotopic uranium was collected to support evaluation of gross alpha activity results. All radiological results were reviewed by a SNL/NM Certified Health Physicist and determined as nonradioactive. The results for gamma spectroscopy, gross alpha/beta activity, and isotopic uranium are presented in Table III-15.

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

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

3.10 Sample Results Exceeding Maximum Contaminant Levels

Table III-16 lists the results for all constituents that have been detected at concentrations exceeding the EPA MCLs (EPA 2009) during all quarterly sampling events. Arsenic was the only constituent exceeding MCLs detected in the September 2014 CTF-MW2 monitoring well samples. Figure III-3 shows the arsenic concentration 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 that is sourced by a mixture of shallow and deeply-derived upwelling waters.

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) groundwater duplicate, FB, and EB groundwater samples were not required for this sampling event. Two 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 a groundwater or duplicate groundwater sample is collected for VOC analyses to assess whether contamination of the sample has occurred during shipment and storage. The TB samples were brought to the field and accompanied each sample shipment.

SWMU 149, Monitoring Well CTF-MW3. One TB was submitted with the September 2014 samples. No VOCs were detected above associated laboratory MDLs in the TB sample.

SWMU 154, Monitoring Well CTF-MW2. One TB was submitted with the September 2014 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, except for the HE compound tetryl. Tetryl was qualified as unusable during data validation, since the matrix spike and matrix spike duplicates recovered outside acceptance criteria. No corrective action was performed since tetryl has not been detected in historical environmental samples. 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 for SWMUs 149 and 154 (SNL/NM June 2010, Attachment 1 and 2) were identified during the June 2014 sampling activities at monitoring wells CTF-MW3 and CTF-MW2.

4.4 Project Field Notes and Comments

Field observations, activities, and project matters noted during sampling activities are summarized below:

- **SWMU 154, Monitoring Well CTF-MW3.** Water from CTF-MW2 has a high buffering capacity. SNL/NM personnel instructed GEL to check pH upon receipt of samples and add preservative as needed.

- **SWMU 154, Monitoring Well CTF-MW3.** The nitrogen air pressure was increased to the sampling system since the sample pump ceased working at low pressures, and resulted in a higher flow rate during purging and sampling than the previous sampling event.

5.0 Summary

During CY 2014 Third Quarter, samples were collected from monitoring well CTF-MW3, located near SWMU 149, and monitoring well CTF-MW2, located near SWMU 154. The April 8, 2010 letter from NMED required eight quarters of groundwater sampling and analysis. The CY 2014 Third Quarter sampling event represents the fourteenth and fifteenth quarterly groundwater sampling event for monitoring wells CTF-MW3 and CTF-MW2, respectively. Sampling will continue at both wells until further guidance is provided by NMED. Sampling results were compared with EPA MCL guidelines for drinking water (EPA 2009).

Analytical parameters for monitoring well CTF-MW3 samples include VOCs, NPN, major anions, alkalinity, TAL total metals, and perchlorate. No parameters were detected above established MCLs. All groundwater monitoring data for monitoring well CTF-MW3 are comparable to previous results.

Analytical parameters for monitoring well CTF-MW2 include VOCs, SVOCs, HE compounds, NPN, major anions, alkalinity, TAL total metals plus uranium, perchlorate, radionuclides by gamma spectroscopy, gross alpha/beta activity, and isotopic uranium.

No parameters were detected above established MCLs, except for arsenic in monitoring well CTF-MW2. Arsenic was detected above the MCL of 0.010 mg/L at concentrations of 0.0458 mg/L and 0.0398 mg/L in the unfiltered and filtered groundwater samples, respectively. These values are comparable to previous results. 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 that is sourced by a mixture of shallow and upwelling endogenic (deeply derived) waters.

6.0 References

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Figures

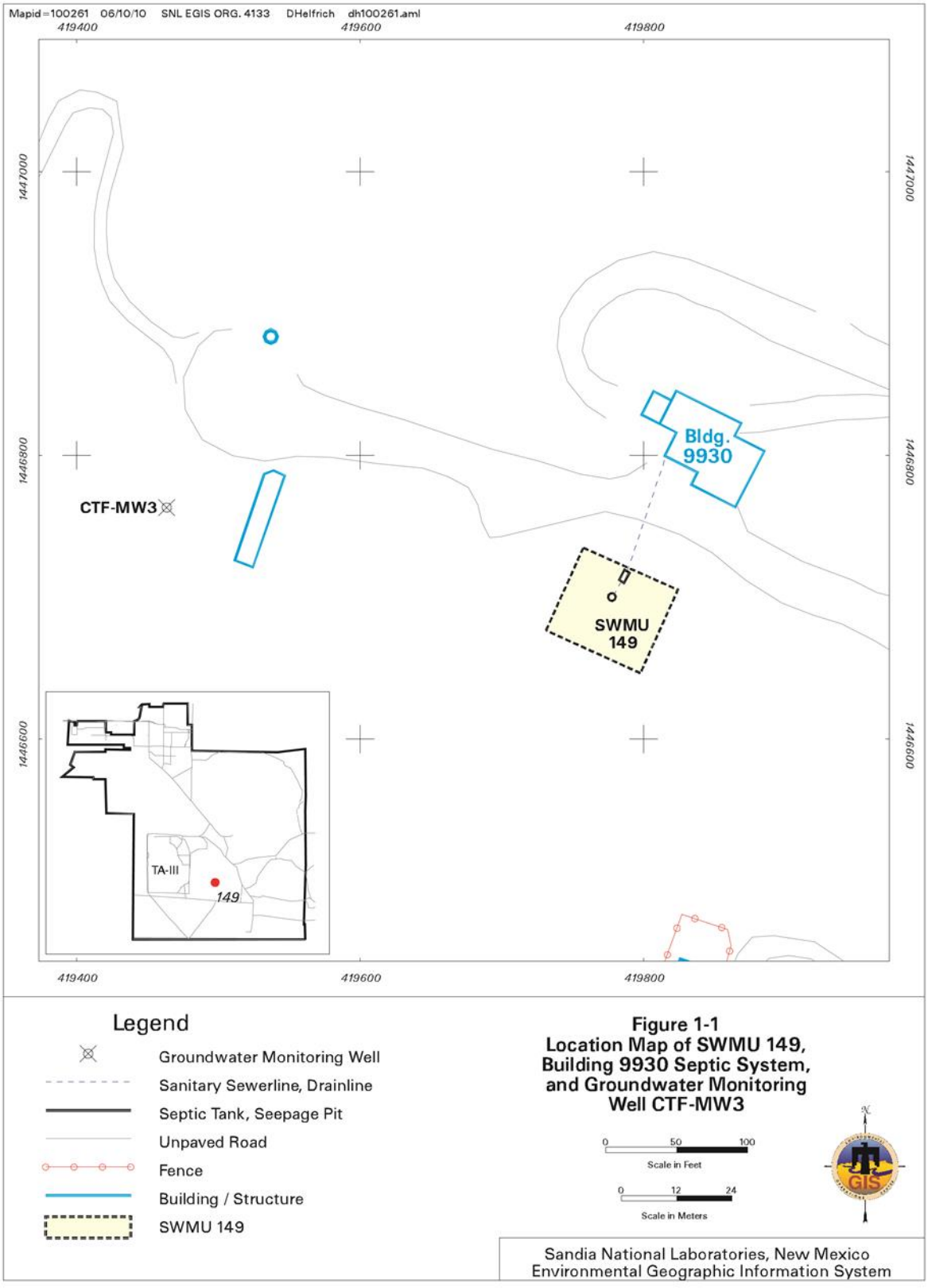

Figure III-1

Location of Monitoring Well CTF-MW3 near SWMU 149

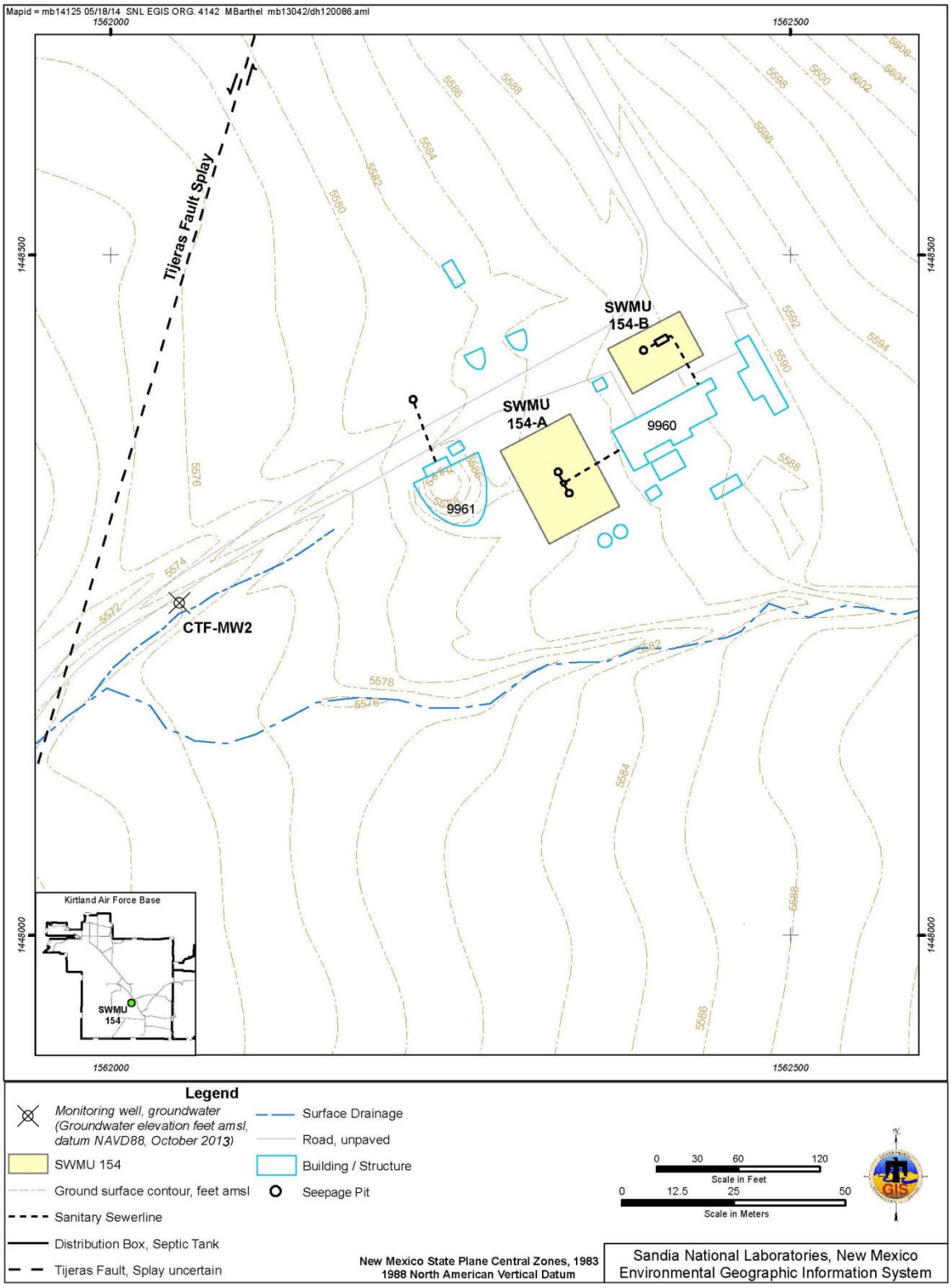

Figure III-2

Location of Monitoring Well CTF-MW2 near SWMU 154

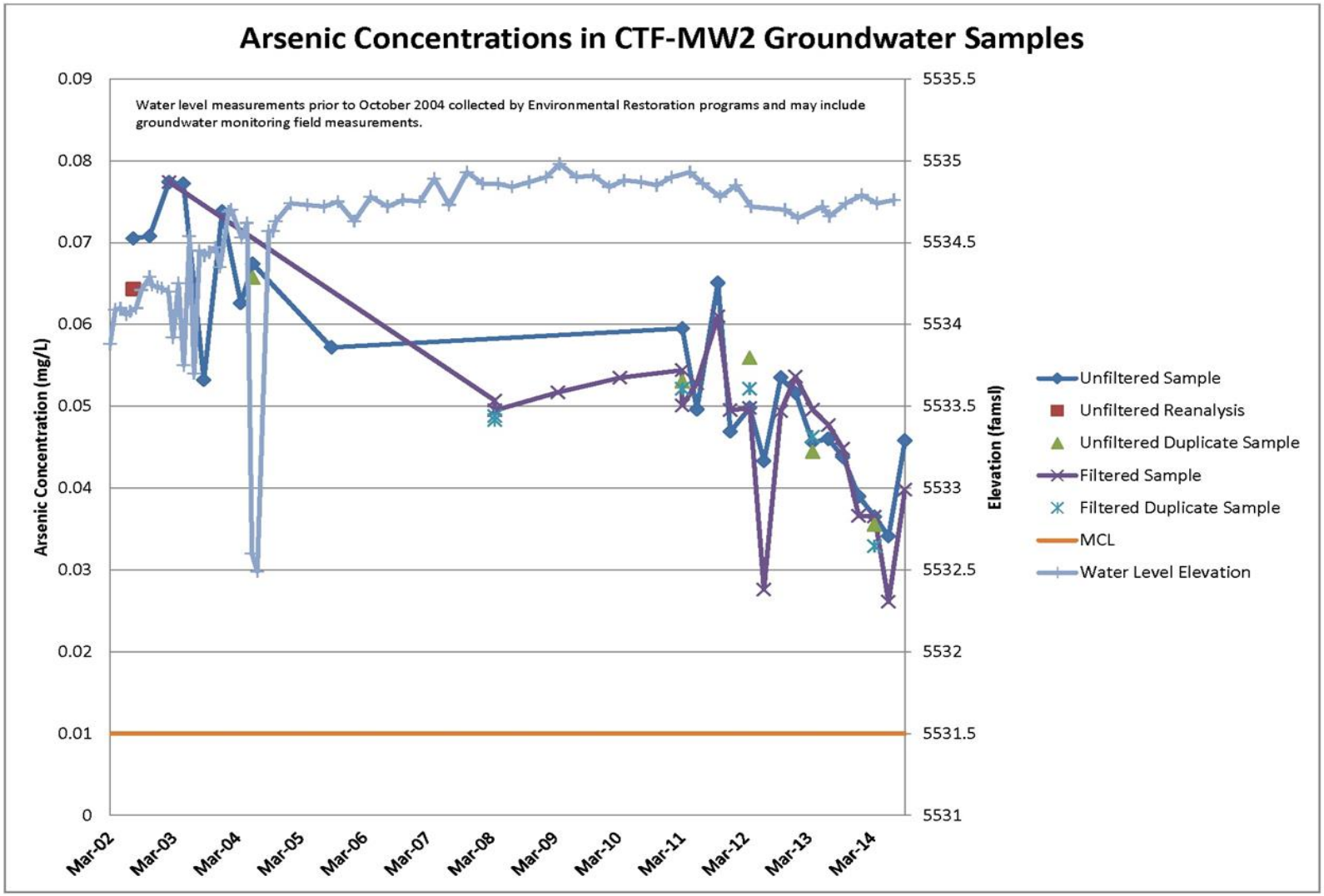

Figure III-3

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

Tables

Table III-1

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

Analysis	Analytical Method[a]	Volume and Container Type/ Preservation Requirements
Volatile Organic Compounds	EPA 8260B	3 x 40-mL glass, HCl, 4°C
Semivolatile Organic Compounds	EPA 8270C	3 x 1-L Amber Glass, 4°C
High Explosives	EPA 8321A	4 x 1-L Amber Glass, 4°C
Metals[b]	EPA 6010/6020/7470	1 x 500-mL polyethylene, HNO_3, 4°C
Perchlorate	EPA 314.0	1 x 250-mL polyethylene, 4°C
Major Anions and Cations[c]	EPA 6020/7470/9056	1 x 500-mL polyethylene, 4°C
Alkalinity as Total, Carbonate, and Bicarbonate	SM 2320B	1 x 500-mL polyethylene, 4°C
Nitrate plus Nitrite	EPA 353.2	1 x 250-mL polyethylene, H_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]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. 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.
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 2014 Groundwater Sampling

SWMUs 149 and 154 Groundwater Monitoring Quarterly Assessment,

July – September 2014

Well	Date Sampled	Sample Identification	AR/COC Number	Associated Groundwater Investigation
CTF-MW3	12-Sep-14	096595	615790	SWMU 149
CTF-MW2	8-Sep-14	096593	615788	SWMU 154

Notes

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

Table III-3

Summary of Field Water Quality Measurements[a]

SWMUs 149 and 154 Groundwater Monitoring

Quarterly Assessment, July – September 2014

Well	Sample Date	Temperature (°C)	Specific Conductivity (μmhos/cm)	Oxidation Reduction Potential (mV)	pH	Turbidity (NTU)	Dissolved Oxygen (% Sat)	Dissolved Oxygen (mg/L)
SWMU 149								
CTF-MW3	12-Sep-14	19.29	1625.6	284.2	6.62	1.36	81.4	7.48
SWMU 154								
CTF-MW2	08-Sep-14	17.83	3316.1	31.9	5.58	0.54	1.3	0.12

Notes

[a]Field measurements collected prior to sampling.

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

Table III-4

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

SWMUs 149 and 154 Groundwater Monitoring

Quarterly Assessment, July – September 2014

Well	Analyte	Result (µg/L)	MDL (µg/L)	PQL (µg/L)	MCL (µg/L)	Laboratory Qualifier[a]	Validation Qualifier[b]	Sample Number	Analytical Method[c]
SWMU 149									
CTF-MW3 12-Sep-14	Bromodichloromethane	0.400	0.300	1.00	NE	J		096595-001	EPA 8260B
	Chloroform	0.650	0.300	1.00	NE	J		096595-001	EPA 8260B
	Dibromochloromethane	0.320	0.300	1.00	NE	J		096595-001	EPA-8260B
	Trichloroethene	0.660	0.300	1.00	5.00	B, J	1.0U	096595-001	EPA 8260B

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 found in the blank above the effective MDL.
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.
U = The analyte was analyzed for but was not detected. The associated numerical value is the quantitation limit.

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

µg/L = Micrograms per liter.
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.
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.
SWMU = Solid Waste Management Unit.

Table III-5
Method Detection Limits for Volatile Organic Compounds
SWMU 149 Groundwater Monitoring
Quarterly Assessment, July – September 2014

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	0.500	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	0.300	EPA 8260B
1,2-Dichloropropane	0.300	EPA 8260B	Methylene chloride	1.70	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	2.50	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

Notes

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

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

Table III-6

Method Detection Limits for Volatile and Semivolatile Organic Compounds

SWMU 154 Groundwater Monitoring

Quarterly Assessment, July – September 2014

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	0.500	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	0.300	EPA 8260B
1,2-Dichloropropane	0.300	EPA 8260B	Methylene chloride	1.70	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	2.50	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-6 (Concluded)

Method Detection Limits for Volatile and Semivolatile Organic Compounds

SWMU 154 Groundwater Monitoring

Quarterly Assessment, July – September 2014

Analyte	MDL (µg/L)	Analytical Method[a]	Analyte	MDL (µg/L)	Analytical Method[a]	Analyte	MDL (µg/L)	Analytical Method[a]
1'-Biphenyl 1	3.09	EPA 8270C	Acenaphthene	0.309	EPA 8270C	Fluoranthene	0.309	EPA 8270C
1,2,4-Trichlorobenzene	3.09	EPA 8270C	Acenaphthylene	0.309	EPA 8270C	Fluorene	0.309	EPA 8270C
1,4-Dioxane	3.09	EPA 8270C	Acetophenone	3.09	EPA 8270C	Hexachlorobenzene	3.09	EPA 8270C
2,4,5-Trichlorophenol	3.09	EPA 8270C	Anthracene	0.309	EPA 8270C	Hexachlorobutadiene	3.09	EPA 8270C
2,4,6-Trichlorophenol	3.09	EPA 8270C	Atrazine	3.09	EPA 8270C	Hexachlorocyclopentadiene	3.09	EPA 8270C
2,4-Dichlorophenol	3.09	EPA 8270C	Benzaldehyde	3.09	EPA 8270C	Hexachloroethane	3.09	EPA 8270C
2,4-Dimethylphenol	3.09	EPA 8270C	Benzo(a)anthracene	0.309	EPA 8270C	Indeno(1,2,3-c,d)pyrene	0.309	EPA 8270C
2,4-Dinitrophenol	5.15	EPA 8270C	Benzo(a)pyrene	0.309	EPA 8270C	Isophorone	3.61	EPA 8270C
2,4-Dinitrotoluene	3.09	EPA 8270C	Benzo(b)fluoranthene	0.309	EPA 8270C	Naphthalene	0.309	EPA 8270C
2,6-Dinitrotoluene	3.09	EPA 8270C	Benzo(ghi)perylene	0.309	EPA 8270C	Nitro-benzene	3.09	EPA 8270C
2-Chloronaphthalene	0.423	EPA 8270C	Benzo(k)fluoranthene	0.309	EPA 8270C	Pentachlorophenol	3.09	EPA 8270C
2-Chlorophenol	3.09	EPA 8270C	Butylbenzyl phthalate	3.09	EPA 8270C	Phenanthrene	0.309	EPA 8270C
2-Methylnaphthalene	0.309	EPA 8270C	Caprolactam	3.09	EPA 8270C	Phenol	3.09	EPA 8270C
2-Nitroaniline	3.09	EPA 8270C	Carbazole	0.309	EPA 8270C	Pyrene	0.309	EPA 8270C
2-Nitrophenol	3.09	EPA 8270C	Chrysene	0.309	EPA 8270C	bis(1-Chloroethyl)ether	3.09	EPA 8270C
3,3'-Dichlorobenzidine	3.09	EPA 8270C	Di-n-butyl phthalate	3.09	EPA 8270C	bis(2-Chloroethoxy)methane	3.09	EPA 8270C
3-Nitroaniline	3.09	EPA 8270C	Di-n-octyl phthalate	3.09	EPA 8270C	bis(2-Chloroisopropyl)ether	3.09	EPA 8270C
4-Bromophenyl phenyl ether	3.09	EPA 8270C	Dibenz[a,h]anthracene	0.309	EPA 8270C	bis(2-Ethylhexyl)phthalate	3.09	EPA 8270C
4-Chloro-3-methylphenol	3.09	EPA 8270C	Dibenzofuran	3.09	EPA 8270C	m,p-Cresol	3.81	EPA 8270C
4-Chlorobenzenamine	3.40	EPA 8270C	Diethylphthalate	3.09	EPA 8270C	n-Nitrosodipropylamine	3.09	EPA 8270C
4-Chlorophenyl phenyl ether	3.09	EPA 8270C	Dimethylphthalate	3.09	EPA 8270C	o-Cresol	3.09	EPA 8270C
4-Nitroaniline	3.09	EPA 8270C	Dinitro-o-cresol	3.09	EPA 8270C			
4-Nitrophenol	3.09	EPA 8270C	Diphenyl amine	3.09	EPA 8270C			

Notes

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

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

Table III-7

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

SWMU 154 Groundwater Monitoring

Quarterly Assessment, July – September 2014

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

Notes

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

Table III-8

Summary of Nitrate Plus Nitrite Results

SWMUs 149 and 154 Groundwater Monitoring

Quarterly Assessment, July – September 2014

Well	Analyte	Result (mg/L)	MDL (mg/L)	PQL (mg/L)	MCL (mg/L)	Laboratory Qualifier[a]	Validation Qualifier[b]	Sample Number	Analytical Method[c]
SWMU 149									
CTF-MW3 12-Sep-14	Nitrate plus nitrite	5.61	0.170	0.500	10.0			096595-018	EPA 353.2
SWMU 154									
CTF-MW2 08-Sep-14	Nitrate plus nitrite	ND	0.017	0.050	10.0	U		096593-018	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, 1984, "Methods for Chemical Analysis of Water and Wastes," EPA 600-4-79-020.
U.S. Environmental Protection Agency, 1986 (and updates), "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods," SW-846, 3rd ed.

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).
PQL = Practical quantitation limit. The lowest concentration of analytes in a sample that can be reliably determined within specified limits of precision and accuracy by that indicated method under routine laboratory operating conditions.
SWMU = Solid Waste Management Unit.

Table III-9

Summary of Anion and Alkalinity Results

SWMUs 149 and 154 Groundwater Monitoring

Quarterly Assessment, July – September 2014

Well	Analyte	Result (mg/L)	MDL (mg/L)	PQL (mg/L)	MCL (mg/L)	Laboratory Qualifier[a]	Validation Qualifier[b]	Sample Number	Analytical Method[c]
SWMU 149									
CTF-MW3	Bicarbonate Alkalinity	318	0.725	1.00	NE			096595-022	SM2320B
12-Sep-14	Carbonate Alkalinity	ND	0.725	1.00	NE	U		096595-022	SM2320B
	Bromide	1.18	0.067	0.200	NE			096595-016	EPA 9056
	Chloride	121	3.35	10.0	NE			096595-016	EPA 9056
	Fluoride	2.64	0.033	0.100	4.0			096595-016	EPA 9056
	Sulfate	483	6.65	20.0	NE			096595-016	EPA 9056
SWMU 154									
CTF-MW2	Bicarbonate Alkalinity	1540	0.725	1.00	NE		J	096593-022	SM2320B
08-Sep-14	Carbonate Alkalinity	ND	0.725	1.00	NE	U	UJ	096593-022	SM2320B
	Bromide	ND	0.067	0.200	NE	U		096593-016	EPA 9056
	Chloride	447	6.70	20.0	NE			096593-016	EPA 9056
	Fluoride	2.67	0.033	0.100	4.0			096593-016	EPA 9056
	Sulfate	153	13.3	40.0	NE			096593-016	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.
J = The associated value is an estimated quantity.
UJ = The analyte was analyzed for but was not detected. The associated value is an estimate and may be inaccurate or imprecise.

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

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.

Table III-9 (Concluded)

Summary of Anion and Alkalinity Results

SWMUs 149 and 154 Groundwater Monitoring

Quarterly Assessment, July – September 2014

Notes (continued)

mg/L = Milligrams per Liter.
MW = Monitoring well.
ND = Not detected (at MDL).
NE = Not established.
PQL = Practical quantitation limit. The lowest concentration of analytes in a sample that can be reliably determined within specified limits of precision and accuracy by that indicated method under routine laboratory operating conditions.
SM = Standard Method.
SWMU = Solid Waste Management Unit.

Table III-10

Summary of Perchlorate Results

SWMUs 149 and 154 Groundwater Monitoring

Quarterly Assessment, July – September 2014

Well	Perchlorate Result (mg/L)	MDL (mg/L)	PQL (mg/L)	MCL (mg/L)	Laboratory Qualifier[a]	Validation Qualifier[b]	Sample Number	Analytical Method[c]
SWMU 149								
CTF-MW3 12-Sep-14	ND	0.004	0.012	NE	U		096595-020	EPA 314.0
SWMU 154								
CTF-MW2 08-Sep-14	ND	0.004	0.012	NE	U		096593-020	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.

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

Table III-11

Summary of Unfiltered Total Metal Results

SWMU 149 Groundwater Monitoring

Quarterly Assessment, July – September 2014

Well	Analyte	Result (mg/L)	MDL (mg/L)	PQL (mg/L)	MCL (mg/L)	Laboratory Qualifier[a]	Validation Qualifier[b]	Sample Number	Analytical Method[c]
CTF-MW3	Aluminum	0.0304	0.015	0.050	NE	J		096595-009	EPA 6020
12-Sep-14	Antimony	ND	0.001	0.003	0.006	U		096595-009	EPA 6020
	Arsenic	ND	0.0017	0.005	0.010	U		096595-009	EPA 6020
	Barium	0.0325	0.0006	0.002	2.00			096595-009	EPA 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		096595-009	EPA 6020
	Cadmium	ND	0.00011	0.001	0.005	U		096595-009	EPA 6020
	Calcium	173	0.300	1.00	NE			096595-009	EPA 6020
	Chromium	ND	0.002	0.010	0.100	U		096595-009	EPA 6020
	Cobalt	ND	0.0001	0.001	NE	U		096595-009	EPA 6020
	Copper	0.000386	0.00035	0.001	NE	J		096595-009	EPA 6020
	Iron	0.0447	0.033	0.100	NE	J	0.18U	096595-009	EPA 6020
	Lead	ND	0.0005	0.002	NE	U		096595-009	EPA 6020
	Magnesium	44.6	0.050	0.150	NE			096595-009	EPA 6020
	Manganese	0.00175	0.001	0.005	NE	J		096595-009	EPA 6020
	Mercury	ND	0.000067	0.0002	0.002	U		096595-009	EPA 6020
	Nickel	0.000598	0.0005	0.002	NE	J		096595-009	EPA 7470
	Potassium	12.1	0.400	1.50	NE			096595-009	EPA 6020
	Selenium	0.0296	0.0015	0.005	0.050			096595-009	EPA 6020
	Silver	ND	0.0002	0.001	NE	U		096595-009	EPA 6020
	Sodium	76.7	2.00	6.25	NE			096595-009	EPA 6020
	Thallium	ND	0.00045	0.002	0.002	U		096595-009	EPA 6020
	Vanadium	ND	0.001	0.005	NE	U		096595-009	EPA 6020
	Zinc	ND	0.0035	0.010	NE	U		096595-009	EPA 6010

Table III-11 (Concluded)
Summary of Unfiltered Total Metal Results
SWMU 149 Groundwater Monitoring
Quarterly Assessment, July – September 2014

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 was not detected. The associated numerical value is the quantitation limit.

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

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

Table III-12

Summary of Filtered Total Metal Results

SWMU 149 Groundwater Monitoring

Quarterly Assessment, July – September 2014

Well	Analyte	Result (mg/L)	MDL (mg/L)	PQL (mg/L)	MCL (mg/L)	Laboratory Qualifier[a]	Validation Qualifier[b]	Sample Number	Analytical Method[c]
CTF-MW3	Aluminum	ND	0.015	0.050	NE	U		096595-010	EPA 6020
12-Sep-14	Antimony	ND	0.001	0.003	0.006	U		096595-010	EPA 6020
	Arsenic	ND	0.0017	0.005	0.010	U		096595-010	EPA 6020
	Barium	0.0336	0.0006	0.002	2.00			096595-010	EPA 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		096595-010	EPA 6020
	Cadmium	ND	0.00011	0.001	0.005	U		096595-010	EPA 6020
	Calcium	184	0.300	1.00	NE			096595-010	EPA 6020
	Chromium	ND	0.002	0.010	0.100	U		096595-010	EPA 6020
	Cobalt	ND	0.0001	0.001	NE	U		096595-010	EPA 6020
	Copper	0.000471	0.00035	0.001	NE	J		096595-010	EPA 6020
	Iron	ND	0.033	0.100	NE	U		096595-010	EPA 6020
	Lead	ND	0.0005	0.002	NE	U		096595-010	EPA 6020
	Magnesium	47.7	0.050	0.150	NE			096595-010	EPA 6020
	Manganese	ND	0.001	0.005	NE	U		096595-010	EPA 6020
	Mercury	ND	0.000067	0.0002	0.002	U		096595-010	EPA 6020
	Nickel	0.000624	0.0005	0.002	NE	J		096595-010	EPA 7470
	Potassium	10.3	0.400	1.50	NE			096595-010	EPA 6020
	Selenium	0.0292	0.0015	0.005	0.050			096595-010	EPA 6020
	Silver	ND	0.0002	0.001	NE	U		096595-010	EPA 6020
	Sodium	75.9	2.00	6.25	NE			096595-010	EPA 6020
	Thallium	ND	0.00045	0.002	0.002	U		096595-010	EPA 6020
	Vanadium	0.00166	0.001	0.005	NE	J		096595-010	EPA 6020
	Zinc	ND	0.0035	0.010	NE	U		096595-010	EPA 6010

Table III-12 (Concluded)
Summary of Filtered Total Metal Results
SWMU 149 Groundwater Monitoring
Quarterly Assessment, July – September 2014

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.

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

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

Table III-13
Summary of Unfiltered Total Metal Results
SWMU 154 Groundwater Monitoring
Quarterly Assessment, July – September 2014

Well	Analyte	Result (mg/L)	MDL (mg/L)	PQL (mg/L)	MCL (mg/L)	Laboratory Qualifier[a]	Validation Qualifier[b]	Sample Number	Analytical Method[c]
CTF-MW2	Aluminum	0.189	0.015	0.050	NE			096593-009	EPA 6020
08-Sep-14	Antimony	ND	0.001	0.003	0.006	U		096593-009	EPA 6020
	Arsenic	**0.0458**	0.0017	0.005	0.010			096593-009	EPA 6020
	Barium	0.0786	0.0006	0.002	2.00			096593-009	EPA 6020
	Beryllium	0.00263	0.0002	0.0005	0.004			096593-009	EPA 6020
	Cadmium	0.000143	0.00011	0.001	0.005	J		096593-009	EPA 6020
	Calcium	381	0.600	2.00	NE			096593-009	EPA 6020
	Chromium	ND	0.002	0.010	0.100	U		096593-009	EPA 6020
	Cobalt	0.0105	0.0001	0.001	NE			096593-009	EPA 6020
	Copper	0.00082	0.00035	0.001	NE	J	J-	096593-009	EPA 6020
	Iron	2.65	0.033	0.100	NE			096593-009	EPA 6020
	Lead	ND	0.0005	0.002	NE	U		096593-009	EPA 6020
	Magnesium	83.3	0.100	0.300	NE			096593-009	EPA 6020
	Manganese	2.98	0.010	0.050	NE		J	096593-009	EPA 6020
	Mercury	ND	0.000067	0.0002	0.002	U	UJ	096593-009	EPA 7470
	Nickel	0.0167	0.0005	0.002	NE		J-	096593-009	EPA 6020
	Potassium	49.5	0.080	0.300	NE			096593-009	EPA 6020
	Selenium	ND	0.0015	0.005	0.050	U		096593-009	EPA 6020
	Silver	ND	0.0002	0.001	NE	U		096593-009	EPA 6020
	Sodium	485	0.800	2.50	NE			096593-009	EPA 6020
	Thallium	0.00117	0.00045	0.002	0.002	J		096593-009	EPA 6020
	Uranium	0.0261	0.000067	0.0002	0.03			096593-009	EPA 6020
	Vanadium	ND	0.001	0.005	NE	U		096593-009	EPA 6010B
	Zinc	0.0366	0.0035	0.010	NE			096593-009	EPA 6020

Table III-13 (Concluded)
Summary of Unfiltered Total Metal Results
SWMU 154 Groundwater Monitoring
Quarterly Assessment, July – September 2014

Notes

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

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

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

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

Table III-14
Summary of Filtered Total Metal Results
SWMU 154 Groundwater Monitoring
Quarterly Assessment, July – September 2014

Well	Analyte	Result (mg/L)	MDL (mg/L)	PQL (mg/L)	MCL (mg/L)	Laboratory Qualifier[a]	Validation Qualifier[b]	Sample Number	Analytical Method[c]
CTF-MW2	Aluminum	0.161	0.015	0.050	NE			096593-010	EPA 6020
08-Sep-14	Antimony	ND	0.001	0.003	0.006	U		096593-010	EPA 6020
	Arsenic	**0.0398**	0.0017	0.005	0.010			096593-010	EPA 6020
	Barium	0.075	0.0006	0.002	2.00			096593-010	EPA 6020
	Beryllium	0.00275	0.0002	0.0005	0.004			096593-010	EPA 6020
	Cadmium	0.000216	0.00011	0.001	0.005	J		096593-010	EPA 6020
	Calcium	367	0.600	2.00	NE			096593-010	EPA 6020
	Chromium	ND	0.002	0.010	0.100	U		096593-010	EPA 6020
	Cobalt	0.00958	0.0001	0.001	NE			096593-010	EPA 6020
	Copper	0.000999	0.00035	0.001	NE	J	J-	096593-010	EPA 6020
	Iron	2.39	0.033	0.100	NE			096593-010	EPA 6020
	Lead	ND	0.0005	0.002	NE	U		096593-010	EPA 6020
	Magnesium	81.2	0.100	0.300	NE			096593-010	EPA 6020
	Manganese	2.84	0.010	0.050	NE		J	096593-010	EPA 6020
	Mercury	ND	0.000067	0.0002	0.002	U	UJ	096593-010	EPA 7470
	Nickel	0.0157	0.0005	0.002	NE		J-	096593-010	EPA 6020
	Potassium	47.7	0.080	0.300	NE			096593-010	EPA 6020
	Selenium	ND	0.0015	0.005	0.050	U		096593-010	EPA 6020
	Silver	ND	0.0002	0.001	NE	U		096593-010	EPA 6020
	Sodium	479	0.800	2.50	NE			096593-010	EPA 6020
	Thallium	0.00139	0.00045	0.002	0.002	J		096593-010	EPA 6020
	Uranium	0.0278	0.000067	0.0002	0.03			096593-010	EPA 6020
	Vanadium	ND	0.001	0.005	NE	U		096593-010	EPA 6010B
	Zinc	0.055	0.0035	0.010	NE			096593-010	EPA 6020

Table III-14 (Concluded)

Summary of Filtered Total Metal Results

SWMU 154 Groundwater Monitoring

Quarterly Assessment, July – September 2014

Notes

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

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

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

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

Table III-15

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

SWMU 154 Groundwater Monitoring

Quarterly Assessment, July – September 2014

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 08-Sep-14	Americium-241	6.64 ± 8.69	14.3	7.01	NE	U	BD	096593-033	EPA 901.1
	Cesium-137	-0.151 ± 1.61	2.72	1.31	NE	U	BD	096593-033	EPA 901.1
	Cobalt-60	0.987 ± 1.84	3.23	1.54	NE	U	BD	096593-033	EPA 901.1
	Potassium-40	90.6 ± 40.7	24.8	11.6	NE			096593-033	EPA 901.1
	Gross Alpha	-7.72	NA	NA	15 pCi/L	NA	None	096593-034	EPA 900.0
	Gross Beta	53.2 ± 17.5	23.7	11.6	4mrem/yr		J	096593-034	EPA 900.0
	Uranium-233/234	62.1 ± 7.94	0.115	0.0504	NE			096593-035	HASL-300
	Uranium-235/236	0.761 ± 0.171	0.0846	0.0334	NE			096593-035	HASL-300
	Uranium-238	8.86 ± 1.20	0.0668	0.0262	NE			096593-035	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 Code of Federal Regulations 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. Department of Energy, 1990, "EML Procedures Manual," 27th ed., Vol. 1, Rev. 1992, Environmental Measurements Laboratory HASL-300.
U.S. Environmental Protection Agency, 1980, "Prescribed Procedures for Measurement of Radioactivity in Drinking Water," EPA-600/4-80-032, U.S. Environmental Protection Agency, Cincinnati, Ohio.

Table III-15 (Concluded)

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

SWMU 154 Groundwater Monitoring

Quarterly Assessment, July – September 2014

Notes (continued)

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

Table III-16

Summary of Constituents Detected above Established MCLs

SWMUs 149 and 154 Groundwater Monitoring

Quarterly Assessments through September 2014

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-Jun-12	Arsenic—Filtered	**0.0276** mg/L	0.010 mg/L			092538-010	EPA 6020
CTF-MW2	25-Sep-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-Sept-13	Arsenic – Filtered	**0.0488** mg/L	0.010 mg/L			094646-010	EPA 6020
CTF-MW2	17-Dec-13	Arsenic – Filtered	**0.0366** mg/L	0.010 mg/L			095086-010	EPA 6020
CTF-MW2	18-Mar-14	Arsenic – Filtered	**0.0365** mg/L	0.010 mg/L			095579-010	EPA 6020
CTF-MW2 (Duplicate)	18-Mar-14	Arsenic – Filtered	**0.0329** mg/L	0.010 mg/L			095580-010	EPA 6020
CTF-MW2	06-Jun-14	Arsenic – Filtered	**0.0261** mg/L	0.010 mg/L			096045-010	EPA 6020
CTF-MW2	08-Sep-14	Arsenic – Filtered	**0.0398 mg/L**	0.010 mg/L			096593-010	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-Jun-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

Table III-16 (Concluded)

Summary of Constituents Detected above Established MCLs

SWMUs 149 and 154 Groundwater Monitoring

Quarterly Assessments through September 2014

Well	Date	Analyte	Result	MCL	Laboratory Qualifier[a]	Validation Qualifier[b]	Sample Number	Analytical Method[c]
SWMU 154								
CTF-MW2	17-Dec-13	Arsenic—Unfiltered	**0.039** mg/L	0.010 mg/L			095086-009	EPA 6020
CTF-MW2	18-Mar-14	Arsenic—Unfiltered	**0.0365** mg/L	0.010 mg/L			095579-009	EPA 6020
CTF-MW2 (Duplicate)	18-Mar-14	Arsenic—Unfiltered	**0.0355** mg/L	0.010 mg/L			095580-009	EPA 6020
CTF-MW2	06-Jun-14	Arsenic —Unfiltered	**0.0341** mg/L	0.010 mg/L			096045-009	EPA 6020
CTF-MW2	08-Sep-14	Arsenic —Unfiltered	**0.0458 mg/L**	0.010 mg/L			096593-009	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	17-Dec-13	Gross Alpha	**21.25 pCi/L**	15 pCi/L	NA	None	095086-034	EPA 900.0
CTF-MW2	08-Mar-11	Thallium—Unfiltered	**0.00249 mg/L**	0.002 mg/L	J		090237-009	EPA 6020

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

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 and Monitoring Well CTF-MW3

FIELD MEASUREMENT LOG FOR GROUNDWATER SAMPLE COLLECTION

Project Name: SWMU 149	Project No.: 146422.10.11.01
Well I.D.: CTF-MW 3	Date: 09/12/14
Well Condition:	Weather Condition:
Method: Portable pump X	Dedicated pump _____ Pump depth: 359'

PURGE MEASUREMENTS

Depth to Water (ft)	Time 24 hr	Vol. (L gal)	Temp (°C)	SC (µS/cm)	ORP (mV)	pH	Turbidity (NTU)	DO (%)	DO mg/L	Comments
308.47	0820		Start							
314.88	0839	5	19.94	1625.6	326.2	6.55	1.43	83.0		7.52
318.10	0849	10	19.78	1625.8	321.2	6.59	2.61	80.1		7.30
320.75	0900	15	19.52	1618.7	316.9	6.60	1.88	80.5		7.34
322.87	0911	20	19.37	1614.7	309.2	6.61	1.47	81.0		7.41
324.66	0923	25	19.42	1622.2	288.2	6.61	1.34	81.7		7.47
326.37	0935	30	19.45	1627.0	285.6	6.62	1.24	81.0		7.39
326.78	0939	32	19.36	1626.3	281.5	6.62	1.29	82.5		7.54
327.28	0944	34	19.29	1623.8	280.4	6.62	1.29	82.4		7.55
327.75	0948	36	19.25	1625.4	283.0	6.62	1.34	81.3		7.48
328.14	0953	38	19.29	1625.6	284.2	6.62	1.36	81.4		7.48
	0954		Sampling							
										~4.00 gals. purged from tubing 0829

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GROUNDWATER SAMPLE COLLECTION FIELD EQUIPMENT CHECK LOG

SNL/NM Project Name: SWMU 149	SNL/NM Project No.: 146422.10.11.01
Calibrations done by: R Lynch	Date: 09/12/14

Make & Model: YSI EXO1

YSI 6820 Sonde (S/N) with DO, Ec, pH, ORP, and temperature probes: 13C101167

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	4.00	20.4	7.01	20.4	10.00	20.4
2. Time: 1051	4.01	20.2	7.00	20.3	10.00	20.3
3. Time:						
4. Time:						
Standard lot no.:	4AE330		4AE635		4AD984	
Expiration date:	5/16		5/16		4/16	

SC Calibration

Reference Value: 1225 uS | Standard Lot No.: 4AE659

	Value	Temp	Expiration Date: 5/15
1. Time: 0651	1228	20.4	
2. Time: 1050	1226	20.2	
3. Time:			
4. Time:			

ORP Calibration

Reference Value: 220 mV | Standard Lot No 4AE189

	Value	Temp	Expiration Date: 2/15
1. Time: 0654	220.3	20.4	
RL 2. Time: ~~0654~~	220.2	20.3	
3. Time: 1053			
4. Time:			

DO Calibration

Calibration Value:	81% air saturation @ 5200 ft.	Atmospheric Pressure in Hg
1. Time: 0650	82.1	24.66
2. Time: 1049	82.2	24.60
3. Time:		
4. Time:		

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

SNL/NM Project Name: SWMU 149		Project No.: 146422.10.11.01		
Calibration done by: R Lynch		Date: 09/12/14		
TURBIDIMETER				
Make & Model: HACH 2100P HACH2100Q		Serial No. S/N 10060C003010		
Reference Value	~~2~~ 10	20	100	800
Standard Lot No.	0161	0167	0168	0161
1. Time 0808	10.2	19.9	103	797
2. Time 1000	10.1	20.1	101	795
3. Time				
4. Time				

Comments:

Portable Pump and Tubing / Water Level Indicator
Decontamination Log Form

Project Name: SWMU 149	**Monitoring Well ID # :** CTF-MW3	**Date:** 9/12/14

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

Pump and Tubing Bundle ID #: 1807-35	**Water Level Indicator ID #:** 210269
Personnel Performing Decontamination: Robert Lynch (Print Name:) RL (Initial:) Alfred Santillanes (Print Name:) (Initial:)	**Personnel Performing Decontamination:** Robert Lynch (Print Name:) RL (Initial:) Alfred Santillanes (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: 82714	**UN #:** 2021
	Manufacturer: ~~Fisher Scientific~~ TJ AROC
	Lot Number: A0316863

Groundwater Monitoring Waste Generation Log

Waste Generator : Alfred Santillanes **Phone:** 844-5130 project leader: Clinton Lum

Project Name	SWMU 149	SWMU 149	SWMU 149
Container ID # (site-date-sequence)	SWMU 149-CTF-MW3-091214-01	SWMU 149-CTF-MW3-091214-02	SWMU 149-091214
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 gallon	CHPD 55 gallon	CHPD 55 gallon
Volume of Waste	24 gallons	18 gallons	30 Gallons
Total Container Weight	220 lbs	160 lbs	260 lbs
COC#: Sample#-Fraction	615790 096595 ~~096596~~ T1	615790 096595 ~~096596~~ T1	615790 096595 ~~096596~~ T1
Accumulation Date	Start: 9/12/14 Full: 9/12/14	Start: 9/12/14 Full: 9/12/14	Start: 9/12/14 Full: 9/12/14
Date Waste Moved to Accumulation Area	9/12/14	9/12/14	9/12/14
Accumulation Area Name	9925	9925	9925
Comments:			

TAILGATE SAFETY MEETING FORM

Dept: 4142 Well Location: CTF-MW3 Date: 9/12/14 Time: 0805

Activities: Groundwater 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: 68.5 °F Wind Speed: 10-20 MPH Humidity: 53.7 % Wind Chill 68.0 °F

Chemicals Used: Acids in sample containers, standard solutions, ~~Hach ACCU-VAC ampules~~ TT
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	Robt Lynch
ALFRED SANTILLANES	Alfred Santillanes

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FIELD MEASUREMENT LOG FOR GROUNDWATER SAMPLE COLLECTION

Project Name: SWMU 154	Project No.: 146422.10.11.01
Well I.D.: CTF-MW-2	Date: 09/08/14
Well Condition:	Weather Condition:
Method: Portable pump X	Dedicated pump _____ Pump depth: 128'

PURGE MEASUREMENTS

Depth to Water (ft)	Time 24 hr	Vol. (L/gal)	Temp (°C)	SC (µS/cm)	ORP (mV)	pH	Turbidity (NTU)	DO (%)	DO mg/L Comments
43.89	0716		START →						
47.00	0729	5	18.01	3166.5	91.7	5.52	3.26	3.1	0.29
47.71	0736	10	17.62	2389.5	71.3	5.51	1.22	2.2	0.21
48.04	0743	15	17.53	3020.7	15.8	5.50	0.87	1.9	0.18
48.28	0752	20	17.58	3188.4	20.9	5.53	0.58	1.6	0.18
48.41	0759	25	17.63	3217.9	33.3	5.55	0.53	1.5	0.14
48.46	0805	30	17.72	3323.4	33.4	5.56	0.76	1.5	0.14
48.48	0812	35	17.84	3318.7	34.6	5.57	0.92	1.4	0.13
48.45	0816	38	17.82	3314.7	34.1	5.58	0.65	1.4	0.13
48.44	0819	40	17.81	3315.5	32.2	5.58	0.74	1.3	0.13
47.81	0822	42	17.84	3315.4	32.0	5.58	0.63	1.3	0.12
47.74	0826	44	17.83	3316.1	31.9	5.58	0.54	1.3	0.12
			Sampling →						
									~4.00 gals. purged from tubing
									0722

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GROUNDWATER SAMPLE COLLECTION FIELD EQUIPMENT CHECK LOG Page 1 of 2

SNL/NM Project Name: swmu 154	SNL/NM Project No.: 146422.10.11.01
Calibrations done by: R Lynch	Date: 09/08/14

Make & Model: ysi exo1

YSI 6820 Sonde (S/N) with DO, Ec, pH, ORP, and temperature probes: 13C101167

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: 0645	4.02	20.7	7.00	20.7	10.01	20.7
2. Time: 0951	4.01	20.7	7.00	20.8	10.02	20.7
3. Time:						
4. Time:						
Standard lot no.:	4AE330		4AE635		4AD984	
Expiration date:	5/16		5/16		4/16	

SC Calibration

Reference Value: 1225 uS Standard Lot No.: 4AE659

	Value	Temp	Expiration Date: 5/15
1. Time: 0648	1228	20.7	
2. Time: 0955	1226	20.7	
3. Time:			
4. Time:			

ORP Calibration

Reference Value: 220 mV Standard Lot No. 4AE189

	Value	Temp	Expiration Date: 2/15
1. Time: 0646	220.1	20.7	
2. Time: 0952	220.4	20.8	
3. Time:			
4. Time:			

DO Calibration

Calibration Value:	81% air saturation @ 5200 ft.	Atmospheric Pressure in Hg
1. Time: 0644	82.1	24.70
2. Time: 0950	82.0	24.69
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: 09/08/14

TURBIDIMETER				
Make & Model: HACH 2100P HACH2100Q		Serial No. S/N 10060C003010		
Reference Value	~~.1~~ 10	20	100	800
Standard Lot No.	0161	0167	0168	0161
1. Time 0707	10.3	19.9	99.6	803
2. Time 0846	10.1	19.7	101	799
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:** 09/08/14

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

Pump and Tubing Bundle ID #: 1807-35	**Water Level Indicator ID #:** 210269
Personnel Performing Decontamination: Robert Lynch (Print Name:) RL (Initial:) _____ (Print Name:) _____ (Initial:)	**Personnel Performing Decontamination:** Robert Lynch (Print Name:) RL (Initial:) _____ (Print Name:) _____ (Initial:)

Condition of Equipment

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

List of Decontamination Materials

Distilled or **Deonized** (circle one) **Source:** Culligan **Lot Number:** 082714	**HNO_3** **Grade:** Reagent **UN #:** 2031 **Manufacturer:** ARCO **Lot Number:** A0316863

Groundwater Monitoring Waste Generation Log

Waste Generator : R Lynch **Phone:** 844-4013 project leader: C Lum

Project Name	SWMU 154	SWMU 154	SWMU 154
Container ID # (site-date-sequence)	SWMU-154-CTF-MW2-090814-01	SWMU-154-CTF-MW2-090814-02	SWMU-154-090814
Initial Label Type (Hazardous or Non-Regulated)	NON-REG	NON-REG	NON-REG
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	~ 200 lbs	~ 200 lbs	~ 270 lbs
COC#: Sample#-Fraction	615788 096593 615789 096593	615788 096593 615789 096593	615788 096593 615789 096593
Accumulation Date	Start: 09/08/14 Full: 09/08/14	Start: 09/08/14 Full: 09/08/14	Start: 09/08/14 Full: 09/08/14
Date Waste Moved to Accumulation Area	09/08/14	09/08/14	09/08/14
Accumulation Area Name	9925	9925	9925
Comments:			

TAILGATE SAFETY MEETING FORM

Dept: 4142 Well Location: CTF-MW 2 Date: 9/8/14 Time: 0705

Activities: Groundwater 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: 69.6 °F Wind Speed: ~~0~~ MPH Humidity: 62.9% Wind Chill NA °F

Chemicals Used: Acids in sample containers, standard solutions, ~~Hach ACCU-VAC ampules~~ T1
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
ALFRED SANTILLANES	Alfred Santillanes

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

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 615790

Project Name	SWMU-149	Date Samples Shipped:	9/12/14	SMO Authorization:	☐ Waste Characterization
Project/Task Manager:	Clinton Lum	Carrier/Waybill No.		SMO Contact Phone: SMO	☐ RMMA
Project/Task Number:	146422.10.11.01	Lab Contact:	Edie Kent/803-556-8171	Lorraine Herrera/505-844-3199	☐ Released by COC No.
Service Order:	CF 352-15	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
096595	-001	CTF-MW3	359	9/12/14 9:54	GW	G	3x40 ml	HCL	G	SA	TCL VOC (SW846-8260B)	
096595	-009	CTF-MW3	359	9/12/14 9:55	GW	P	500 ml	HNO3	G	SA	TAL Metals(SW846-6010/6020/7470)	
096595	-010	CTF-MW3	359	9/12/14 9:56	FGW	P	500 ml	HNO3	G	SA	TAL Metals(SW846-6010/6020/7470)	
096595	-016	CTF-MW3	359	9/12/14 9:57	GW	P	125 ml	None	G	SA	Anions (SW846-9056)	
096595	-018	CTF-MW3	359	9/12/14 9:58	GW	P	125 ml	H2SO4	G	SA	Nitrate+Nitrite (EPA 353.2)	
096595	-022	CTF-MW3	359	9/12/14 ~~9:50~~ 10:00	GW	P	500 ml	None	G	SA	Alkalinity (SM2320B)	
096595	-020	CTF-MW3	359	9/12/14 ~~10:00~~ 9:59	GW	P	250 ml.	None	G	SA	Perchlorate (EPA 314.0)	
096596	-001	CTF- TB 2	NA	9/12/14 9:54	DIW	G	3x40 ml	HCL	G	TB	TCL VOC (SW846-8260B)	

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

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

Sample Disposal ☐ Return to Client ☑ Disposal by Lab

Return Samples By:

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

Filtered fraction collected in the field using a 0.45 micron in-line filter. If perchlorate detected, then perform verification analysis using SW846-6850M. Report alkalinity as total CaCO3,HCO3,CO3. Report anoins as Br,Cl,F,SO4.

Conditions on Receipt

Lab Use

1.Relinquished by	Alfred Santillanes	Org. 4142	Date 9/12/14	Time 1030	3.Relinquished by	Org.	Date	Time
1. Received by	SMO	Org. 4142	Date 9/12/14	Time 1030	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

Internal Lab

Batch No. MA

AR/COC 615788

Project Name:	SWMU-154 GWM	Date Samples Shipped:	9/8/14
Project/Task Manager:	Clinton Lum	Carrier/Waybill No.	
Project/Task Number:	146422.10.11.01	Lab Contact:	Edie Kent/803-556-8171
Service Order:	CF 353-14	Lab Destination:	GEL
		Contract No.:	PO 1303873
Tech Area:		Operational Site:	
Building:	Room:		

SMO Use

SMO Authorization: GMO

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
096593	-001	CTF-MW2	128	9/8/14 8:26	GW	G	3x40 ml	HCL	G	SA	TCL VOC (SW846-8260B)	
096593	-002	CTF-MW2	128	9/8/14 8:28	GW	AG	4x1 Liter	None	G	SA	TCL SVOC (SW846-827C)	
096593	-009	CTF-MW2	128	9/8/14 8:29	FGW	P	500 ml	HNO3	G	SA	TAL Metals+ U (6010/6020/7470)	
096593	-010	CTF-MW2	128	9/8/14 8:30	GW	P	500 ml	HNO3	G	SA	TAL Metals+ U (6010/6020/7470)	
096593	-016	CTF-MW2	128	9/8/14 8:31	GW	P	125 ml	None	G	SA	Anions (SW846-9056)	
096593	-018	CTF-MW2	128	9/8/14 8:32	GW	P	125 ml	H2SO4	G	SA	Nitrate+Nitrite (EPA 353.2)	
096593	-022	CTF-MW2	128	9/8/14 8:33	GW	P	500 ml	None	G	SA	Alkalinity (SM2320B)	
096593	-020	CTF-MW2	128	9/8/14 8:34	GW	P	250 ml	None	G	SA	Perchlorate (EPA 314.0)	
096593	-024	CTF-MW2	128	9/8/14 8:36	GW	AG Pair	4X 1 Liter	HNO3	G	SA	HE (SW846-8321A Mod.)	
096593	-033	CTF-MW2	128	9/8/14 8:38	GW	P	1 Liter	HNO3	G	SA	Gamma Spec (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
High buffering capacity please check pH and add preservative as needed. If perchlorate detected perform verification method SW846-6850. Filtered fraction collected using a 0.45 micron in-line filter. Report alkalinity as total CaCO3,HCO3,CO3/ Anions as Br,Cl,F,SO4./ short list isotopes for Gamma spectroscopy analysis.

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

1.Relinquished by	Alfred Santillanes	Org. 4142	Date 9/8/14	Time 1008	3.Relinquished by	Org.	Date	Time
1. Received by	GMO	Org. 4142	Date 9/8/14	Time 1008	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

SMO 2012-ARCOC (4-2012)

CONTRACT LABORATORY
ANALYSIS REQUEST AND CHAIN OF CUSTODY (Continuation)

AOP 95-16

AR/COC 615788

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
096593	-034	CTF-MW2	128	9/8/14 8:39	GW	P	1 Liter	HNO3	G	SA	Gross Alpha and Beta (EPA 900.0)	
096593	-035	CTF-MW2	128	9/8/14 8:40	GW	P	1 Liter	HNO3	G	SA	Isotopic Uranium (HASL 300)	
096594	-001	CTF-TB 1	N/A	9/8/14 8:26	DIW	G	3x40 ml.	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

Page 1 of 1

AR/COC 615789

		SMO Use	
Project Name:	SWMU-154 GWM	Date Samples Shipped:	9/8/14
Project/Task Manager:	Clinton Lum	Carrier/Waybill No.	
Project/Task Number:	146422.10.11.01	Lab Contact:	Edie Kent/803-556-8171
Service Order:	CF 353-14	Lab Destination:	GEL
		Contract No.:	PO 1303873
Tech Area:		Operational Site:	
Building:	Room:		

SMO Authorization: [signature] SMO

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

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

- [x] Waste Characterization *
- [ ] RMMA
- [ ] Released by COC No.
- [x] 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	Preserv-ative	Collection Method	Sample Type	Parameter & Method Requested	Lab Sample ID
096593	-023	CTF-MW2	128	9/8/14 8:25	FPW	P	250 ml.	None	G	WC	Aresnic (SW846-6020)	

Last Chain:	[x] 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	[signature]	RL	SNL/4142/505-844-4013/505-250-7090
	Alfred Santillanes	[signature]	AS	SNL/4142/505-844-5130/505-228-0710

Special Instructions/QC Requirements:

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

Comments: Send report to Tim Jackson/4142/MS 0729/284-2547
Water has high buffering capacity, please check pH and add preservatives as needed.

Conditions on Receipt

Lab Use

1. Relinquished by	[signature]	Org. 4142	Date 9/8/14	Time 1016	3. Relinquished by	Org.	Date	Time
1. Received by	[signature] SMO	Org. 4142	Date 9/8/14	Time 1016	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

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

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

Memorandum

Date: October 27, 2014

To: File

From: Monica Dymerski

Subject: Inorganic Data Review and Validation – SNL
Site: SWMU 149
AR/COC: 615790
SDG: 356715
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 4.

Summary

One sample was prepared and analyzed with accepted procedures using methods EPA 9056 (anions by IC), EPA 353.2 (nitrate/nitrite-N), SM 2320B (total alkalinity), and EPA 314.0 (Perchlorate by Ion Chromatography). 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 fractions were prepared and analyzed within the prescribed holding times and were properly preserved.

Calibration

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

Anions:
The ICAL intercept for chloride was positive and > the MDL. The associated sample results were detects >3X the value of the intercept and will not be qualified.

Blanks

No target analytes were detected in the blanks.

A method blank was reported for alkalinity, but was not assessed for validation.

Laboratory Control Sample (LCS)

All LCS acceptance criteria were met.

Matrix Spike (MS)

All PS/MS recoveries met QC acceptance criteria.

Anions, nitrate/nitrite-N, and perchlorate:

The MS analyses were performed on SNL samples from other SDGs. No sample data will be qualified as a result.

Laboratory Replicate

The replicate analysis met all QC acceptance criteria.

Anions, nitrate/nitrite-N, and perchlorate:

The replicate analyses were performed on SNL samples from other SDGs. No sample data will be qualified as a result.

Detection Limits/Dilutions

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

Nitrate/nitrite-N:
Sample -004 was diluted 10X.

Anions:
Sample -003 was diluted 50X for chloride and sulfate.

Other QC

No other specific issues that affect data quality were identified.

Reviewed by: Mary Donivan **Level:** I **Date:** 10/27/14

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

Date: October 27, 2014

To: File

From: Monica Dymerski

Subject: Inorganic Data Review and Validation – SNL
Site: SWMU 149
AR/COC: 615790
SDG: 356715 and 356717
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 4.

Summary

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

ICP-MS:

1. Fe was detected in the ICB at < the PQL. The Fe result for sample 356715002 was a detect <5X the ICB concentration and will be **qualified 0.18U,B3** at 5X the ICB concentration.

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 were properly preserved.

ICP-MS Instrument Tune

The ICP-MS tunes met QC acceptance criteria.

Calibration

All initial and continuing calibration criteria 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 and as follows.
ICP-MS:
Sb was detected in the MB at < the PQL. The associated sample results were non-detects and will not be qualified.
Be and Fe were detected in the ICB at < the PQL. The associated Be sample results and the Fe result for sample 356717001 were non-detects and will not be qualified.

ICP -MS Internal Standards

The ICP-MS internal standards met QC acceptance criteria.

Matrix Spike (MS)

The MS met all QC acceptance criteria except as follows.

ICP-MS:

The parent sample concentrations for Ca, Mg, K and Na were >4X the spike and the %Rs for Ca, Mg and Na did not meet acceptance criteria. 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. Both samples were diluted 5X for Ca, Mg, and K, and 25X for Na. The MDLs and RLs were adjusted accordingly.

ICP Interference Check Sample (ICS A and AB)

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

ICP-MS:

The Ca concentrations of both samples were comparable to or above the ICS levels for the ICP-MS analysis. The ICS A Ba result was > the MDL. The associated results for both samples were detects >50X the ICS A result and will not be qualified.

ICP Serial Dilution

The serial dilutions met all QC acceptance criteria.

Other QC

No other specific issues that affect data quality were identified.

Reviewed by: Mary Donivan **Level:** I **Date:** 10/27/14

Sample Findings Summary

AR/COC: 615790

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
SW846 3005/6020 DOE-AL			
	096595-009/CTF-MW3	Iron (7439-89-6)	0.18U, B3
SW846 8260B DOE-AL			
	096595-001/CTF-MW3	Trichloroethylene (79-01-6)	1.0U, B
	096596-001/CTF - TB 2	Methylene chloride (75-09-2)	UJ, I3,C3

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

ANALYTICAL QUALITY ASSOCIATES, INC.

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

Memorandum

Date: October 27, 2014

To: File

From: Monica Dymerski

Subject: GC/MS Organic Data Review and Validation – SNL
Site: SWMU 149
AR/COC: 615790
SDG: 356715
Laboratory: GEL
Project/Task: 146422.10.11.01
Analysis: VOCs

See the attached Data Validation Worksheets for supporting documentation on the data review and validation. Data are evaluated using SNL/NM SMO AOP 00-03 Rev 4.

Summary

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

1. The %RSD was >15% but ≤40% and the %D was >20% but ≤40% with negative bias for methylene chloride in the ICAL and ICV associated with sample 356715007. The associated sample result was a non-detect and will be **qualified UJ, I3,C3**.

2. Trichloroethylene was detected at < the PQL in the MB associated with sample -001. The associated sample result was a detect < the PQL and will be **qualified 1.0U,B** at the PQL.

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

Holding Times

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

Instrument Tune

All instrument tune requirements were met.

Calibration

The initial calibration and continuing calibration data met QC acceptance criteria except as noted above in the Summary section and as follows. The %RSD was >15% but ≤40% for bromoform for the ICAL associated with sample -007. The associated sample result was a non-detect and will not be qualified.

The %Ds were >20% but ≤40% with negative bias for acetone, 2-butanone, and 2-hexanone in ICVs and/or CCVs associated with both samples, and dichlorodifluoromethane in the ICV associated with sample -007. The associated sample results were non-detects and since no other calibration infractions occurred, will not be qualified.

Blanks

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

Surrogates

All surrogate recoveries met QC acceptance criteria.

Internal Standards

All internal standards met QC acceptance criteria.

Matrix Spike/Matrix Spike Duplicate (MS/MSD)

All MS/MSD acceptance criteria were met.

Laboratory Control Sample (LCS)

All LCS acceptance criteria were met.

Detection Limits/Dilutions

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

Tentatively Identified Compounds (TICs)

TIC reports were not required.

Other QC

One TB was submitted with the ARCOC.

No other specific issues that affect data quality were identified.

Reviewed by: Mary Donivan **Level:** I **Date:** 10/27/14

Data Validation Summary Worksheet

AR/COC #: 615790 Site/Project: SWMU 149 Validation Date: 10/27/14

SDG #: 356715 and 356717 Laboratory: GEL Laboratories LLC Validator: Monica Dymerski

Matrix: Aqueous # of Samples: 8 CVR present: Yes Analysis Type: X Organic X Metals

AR/COC(s) present: Yes Sample Container Integrity: Intact 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**
None								

Comments: Sample collected 09/12/14

_____

_____Revised 7/2007

Monica L Dymerski

Validated By: _____

Organic Worksheet (GC/MS)

AR/COC #: 615790 SDG #: 356715 Matrix: Aqueous

Laboratory Sample IDs: 356715001, -007

Method/Batch #s: 8260B: 1421288 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	TB	5X TB		
	Int.	RF	RSD/ R^2	(ICV) CCV %D										
trichloroethylene	NA	✓	✓	✓	0.760J**	3.8	✓	✓	✓	✓	✓	NA		
methylene chloride	NA	✓	27.3*	(-23.7)*	✓	NA	✓	✓	✓	✓	✓	NA		
acetone	NA	✓	✓	(-31.8)* -26.8**	✓	NA	✓	✓	✓	✓	✓	NA		
bromoform	NA	✓	16.4*	✓	✓	NA	✓	✓	✓	✓	✓	NA		
2-butanone	NA	✓	✓	(-29.4)* (-21.3)** -21.6**	✓	NA	✓	✓	✓	✓	✓	NA		
dichlorodifluoromethane	NA	✓	✓	(-21)*	✓	NA	✓	✓	✓	✓	✓	NA		
2-hexanone	NA	✓	✓	(-28.0)* -21.4**	✓	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: ICALs VOA9 09/03/2014*, VOA6 09/05/14**. Samples -001, -001MS, and -001MSD analyzed on 9/26/14 VOA6**. Sample -007 analyzed on 9/24/14 VOA9*. MS/MSD performed on sample -001.

Inorganic Metals Worksheet

AR/COC #: 615790 SDG #: 356715 and 356717 Matrix: Aqueous

Laboratory Sample IDs: 356715002 and 356717001

Method/Batch #s: **3005A/6010B**:1418941/1418942 **3005A/6020**:1418936/1418937and 1426654/1426655 (Nickel and Zinc) **7470A**:1422396/1422397

ICPMS Mass Cal (pass/fail): Pass ICPMS Resolution (pass/fail): Pass

Analyte (outliers)	**Calibration**						**MB 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**				
	Int. mg/L	**R^2**	**ICV**	**CCV**	**ICB ug/L**	**CCB ug/L**													
Sb	✓	✓	✓	✓	✓	✓	0.00107J	.0089	✓	✓	✓	✓	✓	✓	✓				
Ca	✓	✓	✓	✓	✓	✓	✓	NA	✓	-150*	✓	✓	✓	✓	✓				
Mg	✓	✓	✓	✓	✓	✓	✓	NA	✓	60*	✓	✓	✓	✓	✓				
Na	✓	✓	✓	✓	✓	✓	✓	NA	✓	30*	✓	✓	✓	✓	✓				
Be	✓	✓	✓	✓	0.328J	✓	✓	0.0016	✓	✓	✓	✓	✓	✓	✓				
Fe	✓	✓	✓	✓	35.27J	✓	✓	0.176	✓	✓	✓	✓	✓	✓	✓				
Ba	✓	✓	✓	✓	✓	✓	✓	NA	✓	✓	✓	✓	✓	0.633/ (0.03165)	✓				

IS Outliers *60-125%*				**IS Outliers** *80-120%*			
Sample ID	**%Recovery**	**%Recovery**	**%Recovery**	**CCV/CCB ID**	**%Recovery**	**%Recovery**	**%Recovery**
None				None			

Comments: HTs OK; **6010B and 7470A:** matrix QC performed on sample 356715002. **6020:** matrix QC performed on 615717001 for both batches.

*Ca, Mg, K, and Na >4X spike amount. Filtered and unfiltered samples diluted 5X for Ca, Mg, and K, and 25X for Na.

General Chemistry Worksheet

AR/COC #: 615790 SDG #: 356715 Matrix: Aqueous

Laboratory Sample IDs: 356715 see below

Method/Batch #s: SW846 9056 (Anions):1420844; -003

Method/Batch #s: EPA 353.2 (NO_3/NO_2-N):1419017; -004

Method/Batch #s: SM 2320B (Alkalinity):1419443; -005

Method/Batch #s: EPA 314.0 (Perchlorate by IC):1421123; -006

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**		
	Int.	**R^2**	**ICV**	**CCV**	**ICB mg/L**	**CCB mg/L**										
Chloride	.0677	✓	✓	✓	✓	✓	✓	NA	✓	✓	NA	NA	✓	NA		

Comments: HTs OK. **Matrix QC: Anions, Nitrate/Nitrite-N, and perchlorate:** performed on an SNL sample from another SDG; **Alkalinity**: Performed on sample -005; parent sample concentration >4X the spike concentration. **Dilutions:** Sample -003 diluted 50X chloride and sulfate; -sample -004 diluted 10X for nitrate/nitrite.

SMO 2012-ARCOC (4-2012)

AOP 95-16

CONTRACT LABORATORY
ANALYSIS REQUEST AND CHAIN OF CUSTODY

Page 1 of 1

Internal Lab

Batch No. N/A

SMO Use

AR/COC 615790

Project Name	SWMU-149	Date Samples Shipped:	9/12/14	SMO Authorization:	☐ Waste Characterization
Project/Task Manager:	Clinton Lum	Carrier/Waybill No.	223748	SMO Contact Phone: SMO	☐ RMMA
Project/Task Number:	146422.10.11.01	Lab Contact:	Edie Kent/803-556-8171	Lorraine Herrera/505-844-3199	☐ Released by COC No.
Service Order:	CF 352-15	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
096595	-001	CTF-MW3	359	9/12/14 9:54	GW	G	3x40 ml	HCL	G	SA	TCL VOC (SW846-8260B)	356715 001
096595	-009	CTF-MW3	359	9/12/14 9:55	GW	P	500 ml	HNO3	G	SA	TAL Metals(SW846-6010/6020/7470)	356715 002
096595	-010	CTF-MW3	359	9/12/14 9:56	FGW	P	500 ml	HNO3	G	SA	TAL Metals(SW846-6010/6020/7470)	356717 001
096595	-016	CTF-MW3	359	9/12/14 9:57	GW	P	125 ml	None	G	SA	Anions (SW846-9056)	356715 003
096595	-018	CTF-MW3	359	9/12/14 9:58	GW	P	125 ml	H2SO4	G	SA	Nitrate+Nitrite (EPA 353.2)	356715 004
096595	-022	CTF-MW3	359	9/12/14 ~~9:59~~ 10:00	GW	P	500 ml	None	G	SA	Alkalinity (SM2320B)	356715 005
096595	-020	CTF-MW3	359	9/12/14 ~~10:00~~ 9:59	GW	P	250 ml.	None	G	SA	Perchlorate (EPA 314.0)	356715 006
096596	-001	CTF- TB 2	NA	9/12/14 9:54	DIW	G	3x40 ml	HCL	G	TB	TCL VOC (SW846-8260B)	356715 007

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

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

Filtered fraction collected in the field using a 0.45 micron in-line filter. If perchlorate detected, then perform verification analysis using SW846-6850M. Report alkalinity as total CaCO3,HCO3,CO3. Report anoins as Br,Cl,F,SO4.

Conditions on Receipt

Lab Use

1.Relinquished by	Alfred Santillanes	Org. 4142	Date 9/12/14	Time 1030	3.Relinquished by	Org.	Date	Time
1. Received by	SMO	Org. 4142	Date 9/12/14	Time 1030	3. Received by	Org.	Date	Time
2.Relinquished by	SMO	Org. 4142	Date 9/12/14	Time 1115	4.Relinquished by	Org.	Date	Time
2. Received by		Org. GEL	Date 9-13-14	Time 0340	4. Received by	Org.	Date	Time

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

ANALYTICAL QUALITY ASSOCIATES, INC.

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Memorandum

Date: October 28, 2014

To: File

From: Mary Donivan

Subject: GC/MS Organic Data Review and Validation – SNL
Site: SWMU 154 GWM
AR/COC: 615788
SDG: 356277
Laboratory: GEL
Project/Task: 146422.10.11.01
Analysis: VOCs

See the attached Data Validation Worksheets for supporting documentation on the data review and validation. Data are evaluated using SNL/NM SMO AOP 00-03 Rev 4.

Summary

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

1. The ICAL %RSD was >15% but ≤40% and the ICV %D was >20% but ≤40% with negative bias for methylene chloride. The associated sample results were non-detects and will be **qualified UJ,I3,C3**.
2. The MS/MSD RPDs were > the laboratory acceptance limit for 1,2-dibromo-3-chloropropane, 4-methyl-2-pentanone and acetone. The associated sample results were non-detects 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 time and properly preserved.

Instrument Tune

All instrument tune requirements were met.

Calibration

The initial calibration and continuing calibration data met QC acceptance criteria except as noted above in the Summary section and as follows. The ICAL %RSD was >15% but ≤40% and the CCV %D was >20% with positive bias for bromoform. All associated sample results were non-detects, and since a positive ICV/CCV outlier is not considered a second calibration infraction, no sample results will be qualified.

The ICV and/or CCV %Ds were >20% but ≤40% with negative bias for acetone, dichlorodifluoromethane, 2-butanone and 2-hexanone. All associated sample results were non-detects, and, since no other calibration infractions occurred, no sample results will be qualified.

Blanks

No target analytes were detected in the blanks except as follows. Methylene chloride was detected at a concentration < the PQL in the MB. The associated sample results were non-detects and will not be qualified.

Surrogates

All surrogate recoveries met QC acceptance criteria.

Internal Standards

All internal standards met QC acceptance criteria.

Matrix Spike/Matrix Spike Duplicate (MS/MSD)

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

Laboratory Control Sample (LCS)

All LCS acceptance criteria were met.

Detection Limits/Dilutions

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

Tentatively Identified Compounds (TICs)

TIC reports were not required.

Other QC

One TB was submitted with the ARCOC.

No other specific issues that affect data quality were identified.

Reviewed by: Monica Dymerski **Level I** **Date:** 10/30/14

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Memorandum

Date: October 28, 2014

To: File

From: Mary Donivan

Subject: GC/MS Organic Data Review and Validation – SNL
Site: SWMU 154 GWM
AR/COC: 615788
SDG: 356277
Laboratory: GEL
Project/Task: 146422.10.11.01
Analysis: SVOCs

See the attached Data Validation Worksheets for supporting documentation on the data review and validation. Data are evaluated using SNL/NM SMO AOP 00-03 Rev 4.

Summary

One sample was prepared and analyzed with accepted procedures using methods EPA 3510C/8270D (SVOCs). All compounds were successfully analyzed. No problems were identified with the data package that resulted in the qualification of data.

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

Holding Times

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

Instrument Tune

All instrument tune requirements were met.

Calibration

The initial calibration and continuing calibration data met QC acceptance criteria except as follows. The ICAL %RSD was >15% but ≤40% for p-nitroaniline. The associated sample result was non-detect and since no other calibration infraction occurred, will not be qualified.

The ICV %Ds were >20% but ≤40% with negative bias for hexachlorocyclopentadiene and 2,4-dinitrophenol. The associated sample results were non-detects and since no other calibration infractions occurred, will not be qualified.

Blanks

No target analytes were detected in the blanks.

Surrogates

All surrogate recoveries met QC acceptance criteria.

Internal Standards

All internal standards met QC acceptance criteria.

Matrix Spike/Matrix Spike Duplicate (MS/MSD)

All MS/MSD acceptance criteria were met. The parent sample for the MS/MSD was an SNL sample from another 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 sample was not diluted.

Tentatively Identified Compounds (TICs)

TIC reports were not required.

Other QC

No other specific issues that affect data quality were identified.

Reviewed by: Monica Dymerski **Level I** **Date:** 10/30/14

Sample Findings Summary

AR/COC: 615788

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
EPA 900.0/SW846 9310			
	096593-034/CTF-MW2	ALPHA (12587-46-1)	J, MS3
	096593-034/CTF-MW2	BETA (12587-47-2)	J, FR7
EPA 901.1			
	096593-033/CTF-MW2	Americium-241 (14596-10-2)	BD, FR3
	096593-033/CTF-MW2	Cesium-137 (10045-97-3)	BD, FR3
	096593-033/CTF-MW2	Cobalt-60 (10198-40-0)	BD, FR3
SM 2320B			
	096593-022/CTF-MW2	Alkalinity, Total as CaCO3 (N44)	J, MS1
	096593-022/CTF-MW2	Bicarbonate alkalinity (CaCO3) (71-52-3)	J, MS1
	096593-022/CTF-MW2	Carbonate alkalinity (CaCO3) (3812-32-6)	UJ, MS1
SW846 3005/6020 DOE-AL			
	096593-009/CTF-MW2	Copper (7440-50-8)	J-, CK3
	096593-009/CTF-MW2	Manganese (7439-96-5)	J, MS1,D1
	096593-009/CTF-MW2	Nickel (7440-02-0)	J-, CK3
	096593-010/CTF-MW2	Copper (7440-50-8)	J-, CK3
	096593-010/CTF-MW2	Manganese (7439-96-5)	J, MS1,D1
	096593-010/CTF-MW2	Nickel (7440-02-0)	J-, CK3
SW846 3535/8321A Modified			
	096593-024/CTF-MW2	m-Nitrotoluene (99-08-1)	UJ, I4
	096593-024/CTF-MW2	o-Nitrotoluene (88-72-2)	UJ, I4
	096593-024/CTF-MW2	p-Nitrotoluene (99-99-0)	UJ, I4
	096593-024/CTF-MW2	Tetryl (479-45-8)	R, MS3
SW846 7470A			
	096593-009/CTF-MW2	Mercury (7439-97-6)	UJ, B4

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
	096593-010/CTF-MW2	Mercury (7439-97-6)	UJ, B4
SW846 8260B DOE-AL			
	096593-001/CTF-MW2	1,2-Dibromo-3-chloropropane (96-12-8)	UJ, MS5
	096593-001/CTF-MW2	4-Methyl-2-pentanone (108-10-1)	UJ, MS5
	096593-001/CTF-MW2	Acetone (67-64-1)	UJ, MS5
	096593-001/CTF-MW2	Methylene chloride (75-09-2)	UJ, I3,C3
	096594-001/CTF-TB 1	1,2-Dibromo-3-chloropropane (96-12-8)	UJ, MS5
	096594-001/CTF-TB 1	4-Methyl-2-pentanone (108-10-1)	UJ, MS5
	096594-001/CTF-TB 1	Acetone (67-64-1)	UJ, MS5
	096594-001/CTF-TB 1	Methylene chloride (75-09-2)	UJ, I3,C3

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

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Memorandum

Date: October 29, 2014

To: File

From: Mary Donivan

Subject: Radiochemical Data Review and Validation – SNL
Site: SWMU 154 GWM
AR/COC: 615788
SDG: 356277
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 4.

Summary

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

Gross Alpha/Beta:

1. The MS and MSD %Rs were <75% but ≥25% for gross alpha. The associated sample result will be **qualified J,MS3.**
2. The gross beta sample result was > the MDA but ≤3X the MDA will be **qualified J,FR7.**

Gammaspec:

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

Holding Times and Preservation

The sample fractions were prepared and analyzed within the prescribed holding times. The sample fractions were received by the laboratory at pH >3 and were further acidified by the laboratory.

Quantification

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

Calibration

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

Blanks

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

Tracer/Carrier Recovery

The sample tracer 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

No other specific issues that affect data quality were identified.

Reviewed by: Monica Dymerski **Level I** **Date:** 10/30/14

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Date: October 28, 2014

To: File

From: Mary Donivan

Subject: Inorganic Data Review and Validation – SNL
Site: SWMU 154 GWM
AR/COC: 615788
SDG: 356277 and 356278
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 4.

Summary

One unfiltered and one filtered sample was 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 parent sample concentration for Mn was >4X the spike amount, and the MS %R was outside acceptance criteria. Therefore, the MS %R was not used to evaluate field sample data. The associated sample results were detects and will be **qualified J,MS1** due to lack of matrix-specific accuracy data.
2. The serial dilution %D for Mn was >10%. The associated sample results were detects and will be **qualified J, D1** due to poor serial dilution precision.
3. The Ca concentrations of both samples were above the ICS level for the ICP-MS analysis. The ICS A results for Cu and Ni were negative with absolute values >2X the MDL. The associated sample results were detects at <50X the absolute value of the associated ICS A results and will be **qualified J-,CK3** due to negative ICS A results.

CVAA:

1. Hg was detected in the bracketing CCBs at negative concentrations with absolute values ≤ the PQL. The associated sample results were non-detects 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. The samples were received by the laboratory at pH >3 and were further acidified by the laboratory.

ICP-MS Instrument Tune

The ICP-MS tunes met QC acceptance criteria.

Calibration

All initial and continuing calibration criteria 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 and as follows. Sb was detected in the MB at < the PQL. The associated sample results were non-detects and will not be qualified.

ICP -MS Internal Standards

The ICP-MS internal standards met QC acceptance criteria.

Matrix Spike (MS)

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

ICP-MS:
The parent sample concentrations for Ca, Mg, K and Na were >4X the spike amounts and the %Rs for K and Na did not meet acceptance criteria. 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. Both samples were diluted 10X for Ca, Mg, Mn and Na.

ICP Interference Check Sample (ICS A and AB)

ICP-AES:

Results of the ICS A and AB analyses were not evaluated because the sample concentration of Ca, Mg, Al and Fe were < that in the ICS solution.

ICP-MS:
The Ca concentrations of both samples were above the ICS level for the ICP-MS analysis. The ICS A Ba result was > the MDL. The associated results for both samples were detects >50X the ICS A result and will not be qualified.

ICP Serial Dilution

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

Other QC

No other specific issues that affect data quality were identified.

Reviewed by: Monica Dymerski **Level I** **Date:** 10/30/14

ANALYTICAL QUALITY ASSOCIATES, INC.

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Memorandum

Date: October 28, 2014

To: File

From: Mary Donivan

Subject: LC/MS/MS Organic Data Review and Validation – SNL
Site: SWMU 154 GWM
AR/COC: 615788
SDG: 356277
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 4.

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 MS/MSD %Rs were <10% for tetryl. The associated sample result was non-detect and will be **qualified R,MS3**.
2. The ICAL RFs for m-nitrotoluene, o-nitrotoluene and p-nitrotoluene were <0.05 but ≥0.01. All associated sample results were NDs and will be **qualified UJ,I4.**

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

Holding Times

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

It should be noted that the sample had exceeded the method-specified holding time for re-extraction when the MS/MSD failures occurred.

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 except as noted above in the Summary section.

Laboratory Control Sample (LCS)

All LCS recoveries met QC acceptance criteria except as follows. The LCS %R was < the lower acceptance limit but ≥10% for tetryl. The associated sample result was non-detect and would be qualified UJ,L3, but the sample result was rejected due to MS/MSD recovery and will not be further qualified.

Detection Limits/Dilutions

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

Other QC

The sample was re-analyzed to confirm potential carryover from the previous sample analysis and the re-analysis was reported.

No other specific issues that affect data quality were identified.

Reviewed by: Monica Dymerski **Level I** **Date:** 10/30/14

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Memorandum

Date: October 29 2014

To: File

From: Mary Donivan

Subject: Inorganic Data Review and Validation – SNL
Site: SWMU 154 GWM
AR/COC: 615788
SDG: 356277
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 4.

Summary

One sample was prepared and analyzed with accepted procedures using methods EPA 314.0 (perchlorate), EPA 9056 (anions by IC), EPA 353.2 (nitrate/nitrite) and SM 2320B (total alkalinity). Data were reported for all required analytes. Problems were identified with the data package that resulted in the qualification of data.

Alkalinity:

1. An MS was not performed with the sample and no explanation was provided in the narrative. Therefore, the MS %R was not available to evaluate field sample data. The associated sample results for total and bicarbonate alkalinity were detects and will be **qualified J,MS1** and the associated result for carbonate alkalinity was a non-detect and will be **qualified UJ,MS1** due to lack of matrix-specific accuracy 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 fractions were prepared and analyzed within the prescribed holding times and properly preserved.

Calibration

All initial and continuing calibration met QC acceptance criteria except as follows. The ICAL intercept was > the MDL but ≤3X the MDL for chloride. The associated sample result was a detect >3X the intercept and will not be qualified.

Blanks

No target analytes were detected in the blanks.

Blank results were reported for alkalinity, but were not assessed 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.

The MS for anions was performed on an SNL sample from another SDG, no sample data will be qualified as a result.

Laboratory Replicate

The replicate analyses met all QC acceptance criteria.

The replicate analysis for anions was performed on an SNL sample from another SDG, no sample data will be qualified as a result.

The replicate analysis for alkalinity was performed on the LCSD. 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.

Anions:
Sample 356277004 was diluted 100X for chloride and sulfate.

Other QC

No other specific issues that affect data quality were identified.

Reviewed by: Monica Dymerski **Level I** **Date:** 10/30/14

Data Validation Summary Worksheet

AR/COC #: 615788 Site/Project: SWMU 154 GWM Validation Date: 10/28/2014

SDG #: 356277 and 356278 Laboratory: GEL Laboratories, LLC Validator: Mary Donivan

Matrix: Aqueous # of Samples: 13 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**
None								

Comments: Samples collected 09/08/2014.
Samples 356277003, -009, -010 and 356278001 were received at pH >3, per instructions on COC samples were acidified to pH <2 upon receipt

Validated By: Mary A. Donivan

Organic Worksheet (GC/MS)

AR/COC #: 615788 SDG #:356277 Matrix: Aqueous

Laboratory Sample IDs: 356277001 and -012

Method/Batch #s: 8260B: **1419796** 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	TB -012			
	Int.	RF	RSD/R^2	CCV (ICV) %D										
methylene chloride	NA	✓	27.3	(-23.7)	3.17J	(31.7)	✓	✓	✓	✓	✓			
1,2-dibromo-3-chloropropane	NA	✓	✓	✓	✓	NA	✓	✓	✓	20.9	✓			
4-methyl-2-pentanone	NA	✓	✓	✓	✓	NA	✓	✓	✓	21.8	✓			
acetone	NA	✓	✓	(-31.8) -38.2	✓	NA	✓	✓	✓	21.1	✓			
bromoform	NA	✓	16.4	27.3	✓	NA	✓	✓	✓	✓	✓			
dichlorodifluoromethane	NA	✓	✓	(-21.4)	✓	NA	✓	✓	✓	✓	✓			
2-butanone	NA	✓	✓	(-29.4) -30.6	✓	NA	✓	✓	✓	✓	✓			
2-hexanone	NA	✓	✓	(-28.0) -32.2	✓	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 09/03/14; samples analyzed 09/18/14. MS/MSD performed on -001

Organic Worksheet (GC/MS)

AR/COC #: 615788 SDG #:356277 Matrix: Aqueous

Laboratory Sample IDs: 356277002

Method/Batch #s: 3510C/8270D **1418664/1418673** 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				
	Int.	RF	RSD/ R^2	CCV (ICV) %D										
p-nitroaniline	NA	✓	19.1	✓	✓	NA	✓	✓	✓	✓				
hexachlorocyclopentadiene	NA	✓	✓	(-25.5)	✓	NA	✓	✓	✓	✓				
2,4-dinitrophenol	NA	✓	✓	(-27.0)	✓	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: HT OK, ICAL MSD4.I 09/02/14; sample analyzed 0915/14; MS/MSD on SNL sample from another SDG

High Explosives Worksheet (LC/MS/MS)

AR/COC #: 615788 SDG #: 356277 Matrix: Aqueous

Laboratory Sample IDs: 356277008

Method/Batch #s: 3535/8321A **1418882/1418883**

Analyte (Outliers)	Initial Calibration			Continuing Calibration				Method Blank	5X (10X) Blank	LCS %R	MS %R	MSD %R	MS/ MSD RPD	CRI			
	Int.	RF	COD RSD/R^2	ICV	CCV	ICB	CCB										
m-nitrotoluene	✓	0.021	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓			
o-nitrotoluene	✓	0.026	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓			
p-nitrotoluene	✓	0.011	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓			
tetryl	✓	✓	✓	✓	✓	✓	✓	✓	✓	49.4	5.48	8.34	✓	✓			

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 -008; all sample and QC extracts diluted 1:1 with LC reagent grade water

ICAL LCMSMS3 10/13/2014; sample analyzed 10/13/14

Inorganic Metals Worksheet

AR/COC #: 615788 SDG #: 356277 and 356278 Matrix: Aqueous

Laboratory Sample IDs: 356277003 (F); 356278001 (UF)

Method/Batch #s: **3005A/6010B (ICP-AES):** 1418158(prep)/1418160 **3005A/6020** (ICP-MS): 1418152(prep)/1418153 **7470A** (Hg): 1421339(prep)/1421340

ICPMS Mass Cal (pass/fail) pass ICPMS Resolution (pass/fail) pass

Analyte (outliers)	**Calibration**						**Method Blank 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**					
	Int.	**R^2**	**ICV**	**CCV**	**ICB ug/L**	**CCB ug/L**														
Sb	✓	✓	✓	✓	✓	✓	0.00109	0.005	✓	✓	✓	✓	✓	✓	✓					
Mn	✓	✓	✓	✓	✓	✓	✓	NA	✓	60*	✓	12.7	✓	✓	✓					
K	✓	✓	✓	✓	✓	✓	✓	NA	✓	60*	✓	✓	✓	NA	✓					
Na	✓	✓	✓	✓	✓	✓	✓	NA	✓	50*	✓	✓	✓	NA	✓					
Ba	✓	✓	✓	✓	✓	✓	✓	NA	✓	✓	✓	✓	✓	0.638/ (0.0319)	✓					
Cu	✓	✓	✓	✓	✓	✓	✓	NA	✓	✓	✓	✓	✓	-1.59/ (0.0795)	✓					
Ni	✓	✓	✓	✓	✓	✓	✓	NA	✓	✓	✓	✓	✓	-1.44/ (0.072)	✓					
Hg	✓	✓	✓	✓	✓	-0.084	✓	NA	✓	✓	✓	NA	NA	NA	✓					

IS Outliers *60-125%*				**IS Outliers *80-120%***			
Sample ID	**%Recovery**	**%Recovery**	**%Recovery**	**CCV/CCB ID**	**%Recovery**	**%Recovery**	**%Recovery**
None				None			

Comments: HTs OK. Matrix QC performed on 356277003 for ICP-MS, 356277003 and 356278001 for ICP-AES and 356278001 for Hg analyses. *Ca, Mg, Mn, K and Na >4X spike amount. Both samples were diluted 10X for Ca, Mg, Mn and Na.

General Chemistry Worksheet

AR/COC #: 615788 SDG #: 356277 Matrix: Aqueous

Laboratory Sample IDs: 356277 – see below

Method/Batch #s: EPA 314.0 (perchlorate): Batch 1421123, -007

Method/Batch #s: SW846 9056 (anions): Batch 1420844, -004

Method/Batch #s: EPA 353.2 (NO_3/NO_2 – N): Batch 1417785, -005

Method/Batch #s: SM 2320B (total alkalinity): Batch 1418476, -006

Analyte (outliers)	**Calibration**						**Method Blank**	**5X Blank or 5X MDL**	**LCS %R**	**MS/ PS %R**	**Lab Rep. RPD**					
	Int.	**R^2**	**ICV**	**CCV**	**ICB mg/L**	**CCB mg/L**										
chloride	.068	✓	✓	✓	✓	✓	✓	NA	✓	✓	✓					

Comments: HTs OK, Matrix QC from this SDG except for anions; for alkalinity an LCSD was analyzed but no MS was prepared. Sample -004 diluted 100X for Cl and SO4

Radiochemistry Worksheet

AR/COC #: 615788 SDG #: 356277 Matrix: Aqueous

Laboratory Sample IDs: 356277- See below

Method/Batch #s: EML HASL 300 (alphaspec U): Batch 1418338 Sample -011

Method/Batch #s: EPA 901.1 (gamma spec): Batch 1418217 Sample -009

Method/Batch #s: EPA 900.0 (Gross alpha/beta): Batch 1419065 Sample -010

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**				
Gross alpha	✓	✓	✓	NA	✓	57.0	60.8	✓	✓				

Tracer/Carrier Recovery Outliers

Sample ID	**Tracer/Carrier**	**%R**	**Sample ID**	**Tracer/Carrier**	**%R**	**Sample ID**	**Tracer/Carrier**	**%R**
None								

Comments: **Matrix QC: HASL 300:** performed on -011; **901.1:** Performed on sample -009. **900.0:** Performed on -0110.

Gross alpha/beta parent and DUP = 14 ml, MS/MSD=7 ml (2X dilution)-OK

Peak rejected by laboratory in DUP (K-40)

SMO 2012-ARCOC (4-2012)

AOP 95-16

CONTRACT LABORATORY
ANALYSIS REQUEST AND CHAIN OF CUSTODY

Internal Lab

Batch No. MA

SMO Use

AR/COC 615788

Project Name:	SWMU-154 GWM	Date Samples Shipped:	9/8/14	SMO Authorization:	☐ Waste Characterization
Project/Task Manager:	Clinton Lum	Carrier/Waybill No.	223399	SMO Contact Phone:	☐ RMMA
Project/Task Number:	146422.10.11.01	Lab Contact:	Edie Kent/803-556-8171	Lorraine Herrera/505-844-3199 SMO	☐ Released by COC No.
Service Order:	CF 353-14	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
096593	-001	CTF-MW2	128	9/8/14 8:26	GW	G	3x40 ml	HCL	G	SA	TCL VOC (SW846-8260B)	356277 001
096593	-002	CTF-MW2	128	9/8/14 8:28	GW	AG	4x1 Liter	None	G	SA	TCL SVOC (SW846-827C)	356277 002
096593	-009	CTF-MW2	128	9/8/14 8:29	FGW	P	500 ml	HNO3	G	SA	TAL Metals+ U (6010/6020/7470)	356278 001
096593	-010	CTF-MW2	128	9/8/14 8:30 EDD 9/10/14	FGW	P	500 ml	HNO3	G	SA	TAL Metals+ U (6010/6020/7470)	356277 003
096593	-016	CTF-MW2	128	9/8/14 8:31	GW	P	125 ml	None	G	SA	Anions (SW846-9056)	356277 004
096593	-018	CTF-MW2	128	9/8/14 8:32	GW	P	125 ml	H2SO4	G	SA	Nitrate+Nitrite (EPA 353.2)	356277 005
096593	-022	CTF-MW2	128	9/8/14 8:33	GW	P	500 ml	None	G	SA	Alkalinity (SM2320B)	356277 006
096593	-020	CTF-MW2	128	9/8/14 8:34	GW	P	250 ml	None	G	SA	Perchlorate (EPA 314.0)	356277 007
096593	-024	CTF-MW2	128	9/8/14 8:36	GW	AG Poly	4X 1 Liter	HNO3	G	SA	HE (SW846-8321A Mod.)	356277 008
096593	-033	CTF-MW2	128	9/8/14 8:38	GW	P	1 Liter	HNO3	G	SA	Gamma Spec (EPA 901.0)	356277 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
	Alfred Santillanes	Alfred Santillanes	AS	SNL/4142/505-844-5130/505-228-0710

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

High buffering capacity please check pH and add preservative as needed. If perchlorate detected perform verification method SW846-6850. Filtered fraction collected using a 0.45 micron in-line filter. Report alkalinity as total CaCO3,HCO3,CO3/ Anions as Br,Cl,F,SO4./ short list isotopes for Gamma spectroscopy analysis.

Conditions on Receipt

Lab Use

1.Relinquished by	Alfred Santillanes	Org. 4142	Date 9/8/14	Time 1008	3.Relinquished by	Org.	Date	Time
1. Received by	SMO	Org. 4142	Date 9/8/14	Time 1008	3. Received by	Org.	Date	Time
2.Relinquished by	SMO	Org. 4142	Date 9/8/14	Time 1038	4.Relinquished by	Org.	Date	Time
2. Received by		Org. CCL	Date 9-9-14	Time 0730	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 615788

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
096593	-034	CTF-MW2	128	9/8/14 8:39	GW	P	1 Liter	HNO3	G	SA	Gross Alpha and Beta (EPA 900.0)	356277 010
096593	-035	CTF-MW2	128	9/8/14 8:40	GW	P	1 Liter	HNO3	G	SA	Isotopic Uranium (HASL 300)	356277 011
096594	-001	CTF-TB 1	N/A	9/8/14 8:26	DIW	G	3x40 ml.	HCL	G	TB	TCL VOC (SW846-8260B)	356277 012

Recipient Initials MC

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SECTION IV
SOLID WASTE MANAGEMENT UNITS 8/58 AND 68 QUARTERLY GROUNDWATER MONITORING REPORT, July – September 2014

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.

This is the twelfth quarterly groundwater sampling event following the April 8, 2010 letter by NMED requiring eight quarters of groundwater monitoring. The Coyote Canyon Blast Area (CCBA) monitoring wells CCBA-MW1 and CCBA-MW2 are located within SWMUs 8/58, and Old Burn Site (OBS) monitoring wells OBS-MW1, OBS-MW2, and OBS-MW3 are located within SWMU 68. These five monitoring wells were installed in August 2011 (SNL/NM November 2011). The location of CCBA monitoring wells are shown in Figure IV-1 and OBS monitoring wells in Figure IV-2.

The supplemental groundwater monitoring at these monitoring wells is designed to meet the requirements of Section VII.D.6 of the Compliance Order on Consent (the Consent 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) 2014 reporting period (July – September 2014).

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 with modification by NMED in January 2011 (NMED January 2011).

Monitoring wells CCBA-MW1 and CCBA-MW2 were sampled on July 22 and July 21, 2014, 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, and gross alpha/beta activity.

Monitoring wells OBS-MW1, OBS-MW2, and OBS-MW3 were sampled from July 15 to July 17, 2014. 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 groundwater and groundwater duplicate sample at concentrations of 4.99 mg/L and 5.02 mg/L, respectively. Fluoride in the CCBA-MW2 groundwater sample was above the method detection limit (MDL) with a value of 1.47 mg/L.

Quality control (QC) samples consisting of duplicate groundwater, 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 the Third Quarter, CY 2014.

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 EXO1 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 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 and Test America Laboratories 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-15. 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. The HE compounds 1,3,5-trinitrobenzene and tetryl results (both compounds not detected in the groundwater samples) were qualified as unusable during data validation for all environmental groundwater samples. Both compounds were recovered outside of analytical method control limits in the matrix spike and laboratory control samples. 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 3.41 mg/L in the CCBA-MW2 groundwater 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 1.83 mg/L in the OBS-MW1 groundwater duplicate 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 groundwater sample and groundwater duplicate sample at concentrations of 4.99 mg/L and 5.02 mg/L, respectively. The detection is most likely attributable to the presence of fluorite mineralization in the unconsolidated alluvium and possible weathered quartzite bedrock in which the well is completed and not associated

with SNL/NM testing activities. Review of nearby ore deposits demonstrates that there are large, but uneconomic deposits of fluorite-bearing minerals in the Precambrian and Paleozoic rocks in the eastern portion of Kirtland Air Force Base (Skelly August 2013). Fluoride in the CCBA-MW2 groundwater sample was reported at a concentration of 1.47 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 the evaluation of gross alpha activity results from SWMU 68. Gross alpha activity is measured as a screening tool. The results for gamma spectroscopy, gross alpha/beta activity, and isotopic uranium are presented in Table IV-13.

SWMUs 8/58, Monitoring Wells CCBA-MW1 and CCBA-MW2. All radiological results were reviewed by a SNL/NM Certified Health Physicist and determined as nonradioactive. The corrected gross alpha activity was below the MCL of 15 picocuries per liter (pCi/L) in all groundwater samples. Gross beta activity results do not exceed established MCLs.

SWMU 68, Monitoring Wells OBS-MW1, OBS-MW2, and OBS-MW3. All radiological results were reviewed by a SNL/NM Certified Health Physicist and determined as nonradioactive. The corrected gross alpha activity was below the MCL of 15 pCi/L in all groundwater 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 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 groundwater sample and groundwater duplicate sample. Fluoride detected in the CCBA-MW1 samples are most likely from the mineralized fluorite-bearing unconsolidated alluvium and possible quartzite bedrock in which the well is completed and not associated with SNL/NM testing activities.

4.0 Quality Control Samples

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

4.1 Field Quality Control Samples

Field QC samples for this sampling event included duplicate groundwater, 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 Groundwater Samples

Duplicate groundwater samples were collected from monitoring wells CCBA-MW1 and OBS-MW1 and analyzed to estimate the overall reproducibility of the sampling and analytical process. The duplicate groundwater samples were collected immediately after the original groundwater sample to reduce variability caused by time and/or sampling mechanics. Duplicate groundwater 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-MW1. RPD values were calculated only for detected chemical parameters. The work plans for SWMUs 8/58 and 68 do not specify QC acceptance criteria for duplicate groundwater sample data; however, duplicate sample results show good correlation (RPD values of less than 35 for inorganic analytes) for all calculated parameters.

4.1.2 Equipment Blank Samples

EB samples are collected to verify the effectiveness of the equipment decontamination process. EB samples were collected prior to sampling monitoring well CCBA-MW1 and OBS-MW1 and were submitted for all analyses. EB samples were collected according to procedures described in SNL/NM FOP 05-03 "Groundwater Monitoring Equipment Decontamination" (SNL/NM January 2012a).

SWMUs 8/58, Monitoring Well CCBA-MW1. Acetone, bromodichloromethane, chloroform, chromium, copper, dibromochloromethane, and gross beta were detected above the laboratory MDLs. With the exception of copper, no corrective action was necessary, since these analytes were not detected in groundwater samples, or were detected in groundwater samples at concentrations greater than five times the EB result. Copper was qualified as not detected in both the CCBA-MW1 groundwater and duplicate groundwater samples during data validation, since copper was reported in the EB sample at a concentration greater than the associated groundwater sample.

SWMU 68, Monitoring Well OBS-MW1. Acetone, bromodichloromethane, chloroform, chloride, copper, and sodium were detected above laboratory MDLs. With the exception of copper, no corrective action was necessary since these compounds were not detected in groundwater samples, or were detected in groundwater samples at concentrations greater than five times the EB result. Copper was qualified as not detected in both the OBS-MW1 groundwater and duplicate groundwater samples during data validation, since copper was reported in the EB sample at a concentration within five times the associated groundwater sample results.

4.1.3 Trip Blank Samples

TB samples are submitted whenever groundwater samples are collected for VOC analyses to assess whether contamination of the samples occurred during shipment and storage. TBs were brought to the field and accompanied each sample shipment.

SWMUs 8/58. A total of three trip blanks were submitted with the July 2014 samples. No VOCs were detected above associated laboratory MDLs.

SWMU 68. A total of four trip blanks were submitted with the July 2014 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.

SWMUs 8/58, Monitoring Well CCBA-MW2. The VOCs acetone and chloroform were detected above laboratory MDLs. Bromodichloromethane and chloroform are common byproducts of the water deionization process. No corrective action was required, since these compounds were not detected in the associated groundwater sample.

SWMU 68, Monitoring Well OBS-MW3. The VOCs acetone and chloroform were detected above laboratory MDLs. No corrective action was required, since this compound was not detected in the associated groundwater samples.

Acetone and chloroform are common byproducts of the water deionization process.

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, except for the HE compounds 1,3,5-trinitrobenzene and tetryl for SWMU 8/58 groundwater samples. These compound results were qualified as unusable during data validation for all environmental groundwater samples since both compounds had recoveries outside control limits in both matrix spike and laboratory control samples. No corrective action was required since these compounds have not been detected in historical groundwater samples and HE samples will be collected and analyzed quarterly. No other 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 April 2014 sampling activities.

No variances or nonconformances from requirements in the Groundwater Characterization Work Plan for SWMU 68 (SNL/NM September 2010) occurred during the April 2014 sampling activities.

5.0 Summary

During the Third Quarter of CY 2014, 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 groundwater sample and duplicate groundwater sample at concentrations of 4.99 mg/L and 5.02 mg/L, respectively. This detection is similar to historical concentrations and is most likely attributable to the fluorite-bearing minerals in the unconsolidated alluvium and possible quartzite bedrock in which the well is completed (Skelly August 2013). 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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Figures

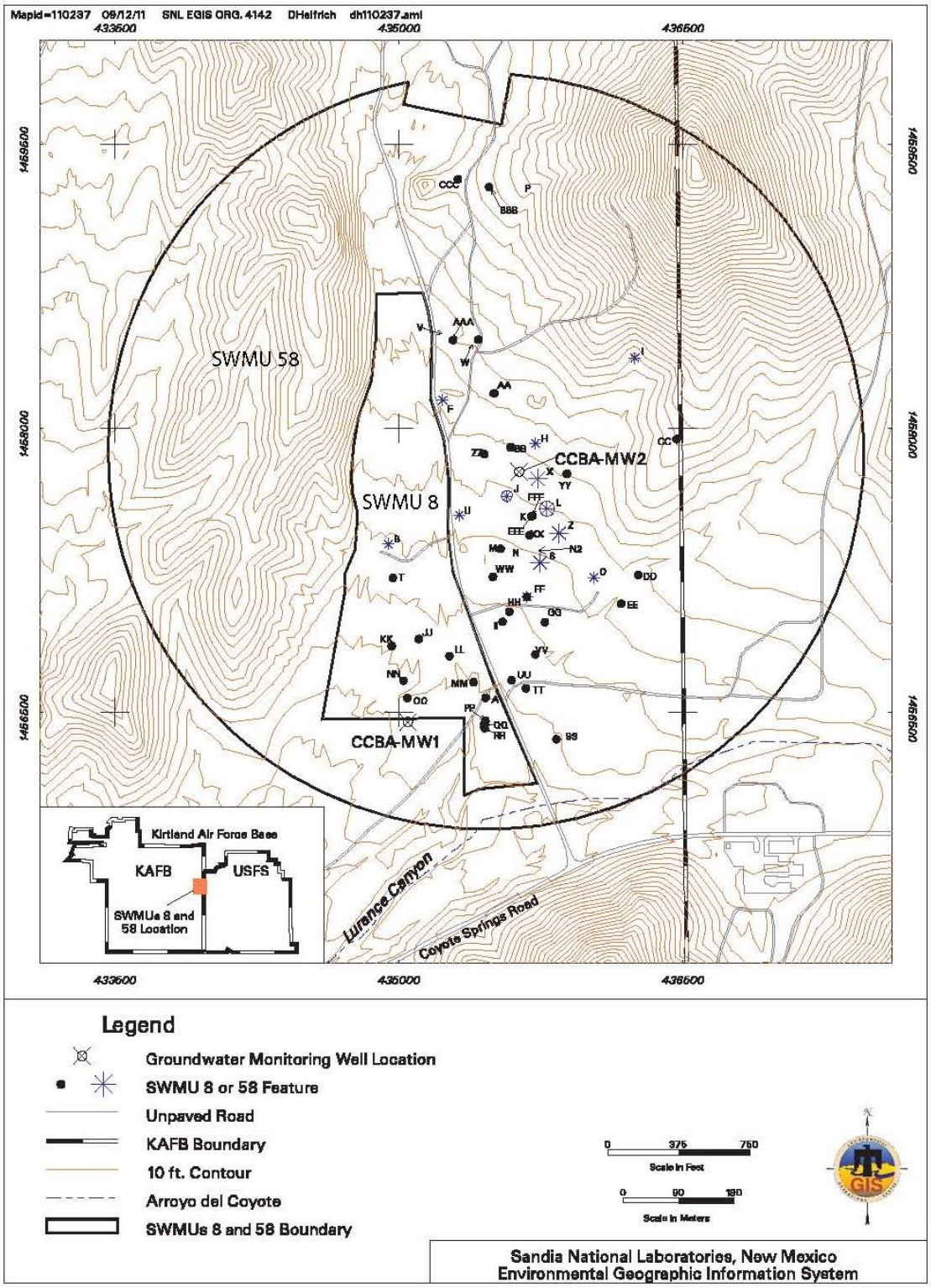

Figure IV-1

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

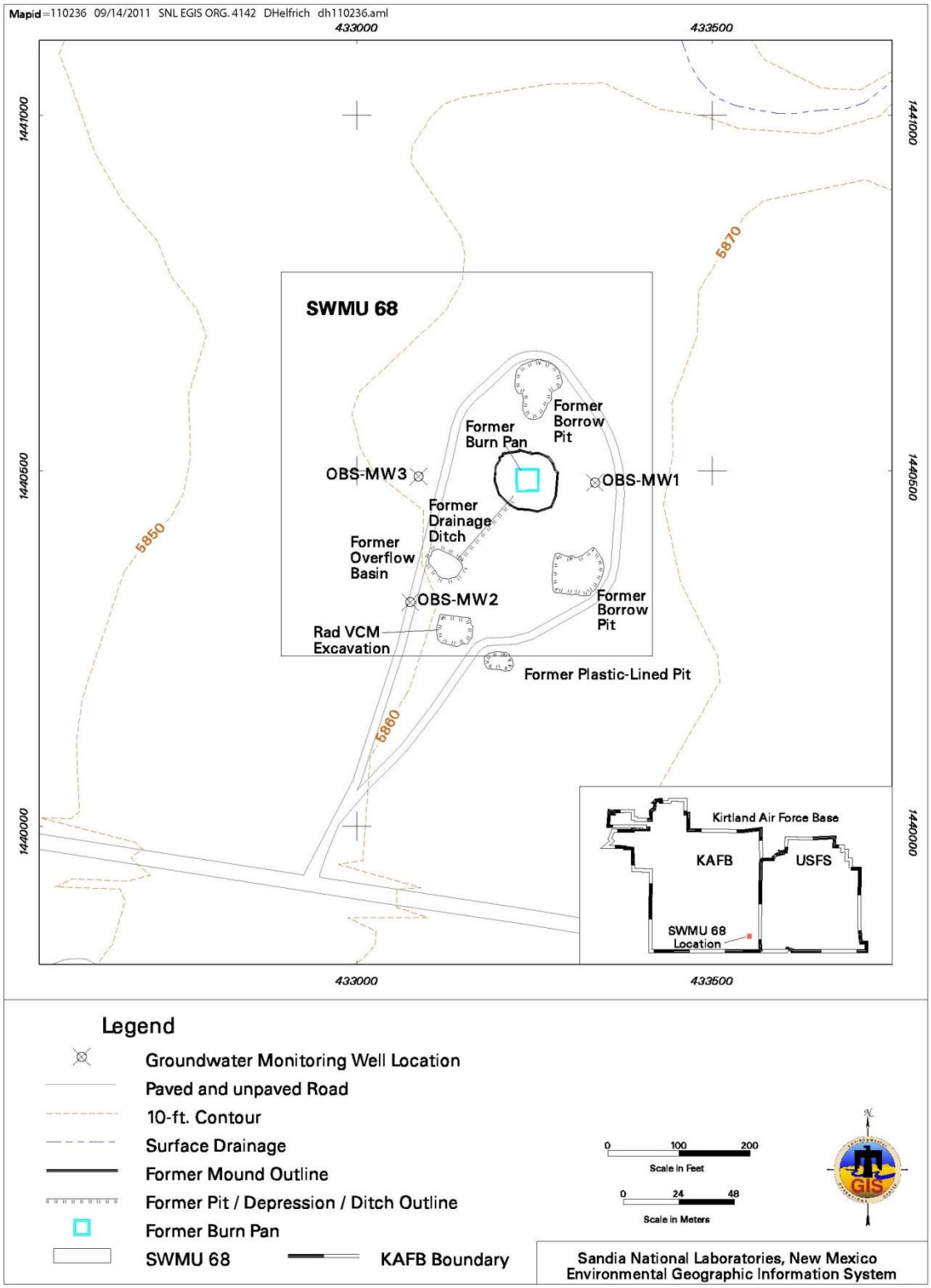

Figure IV-2

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 901.1	1 x 1-L polyethylene, HNO_3, 4°C
Isotopic Uranium	HASL-300	1 x 1-L polyethylene, HNO_3, 4°C

Notes

[a]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.
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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.
[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 2014 Groundwater Sampling

SWMUs 8/58 and 68 Groundwater Monitoring Quarterly Assessment

July – September 2014

Well	Sample Identification	AR/COC Number	Associated Groundwater Investigation
CCBA-MW1	096269	615628	SWMUs 8/58
CCBA-MW1 (duplicate)	096270		
CCBA-MW2	096263	615626	
OBS-MW1	096255	615624	SWMU 68
OBS-MW1 (duplicate)	096256		
OBS-MW2	096251	615622	
OBS-MW3	096259	615625	

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 2014

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	22-Jul-14	20.12	490.2	299.6	6.57	0.41	34.1	3.07
CCBA-MW2	21-Jul-14	18.87	550.2	322.4	7.53	0.17	68.0	6.28
SWMU 68								
OBS-MW1	16-Jul-14	18.09	479.1	301.3	7.40	0.41	37.9	3.58
OBS-MW2	15-Jul-14	18.10	473.8	291.1	7.38	0.28	37.1	3.50
OBS-MW3	17-Jul-14	19.00	484.6	303.6	7.39	0.56	47.3	4.38

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 2014

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	0.500	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	0.300	EPA 8260B
1,2-Dichloropropane	0.300	EPA 8260B	Methylene chloride	1.70	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	2.50	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 2014

SWMU 8/58					
Analyte	**MDL (µg/L)**	**Analytical Method[a]**	**Analyte**	**MDL (µg/L)**	**Analytical Method[a]**
1'-Biphenyl 1	3.00 – 3.03	EPA 8270C	Butylbenzyl phthalate	3.00 – 3.03	EPA 8270C
1,2,4-Trichlorobenzene	3.00 – 3.03	EPA 8270C	Caprolactam	3.00 – 3.03	EPA 8270C
1,4-Dioxane	3.00 – 3.03	EPA 8270C	Carbazole	0.300 – 0.303	EPA 8270C
2,4,5-Trichlorophenol	3.00 – 3.03	EPA 8270C	Chrysene	0.300 – 0.303	EPA 8270C
2,4,6-Trichlorophenol	3.00 – 3.03	EPA 8270C	Di-n-butyl phthalate	3.00 – 3.03	EPA 8270C
2,4-Dichlorophenol	3.00 – 3.03	EPA 8270C	Di-n-octyl phthalate	3.00 – 3.03	EPA 8270C
2,4-Dimethylphenol	3.00 – 3.03	EPA 8270C	Dibenz[a,h]anthracene	0.300 – 0.303	EPA 8270C
2,4-Dinitrophenol	5.00 – 5.05	EPA 8270C	Dibenzofuran	3.00 – 3.03	EPA 8270C
2,4-Dinitrotoluene	3.00 – 3.03	EPA 8270C	Diethylphthalate	3.00 – 3.03	EPA 8270C
2,6-Dinitrotoluene	3.00 – 3.03	EPA 8270C	Dimethylphthalate	3.00 – 3.03	EPA 8270C
2-Chloronaphthalene	0.410 – 0.414	EPA 8270C	Dinitro-o-cresol	3.00 – 3.03	EPA 8270C
2-Chlorophenol	3.00 – 3.03	EPA 8270C	Diphenyl amine	3.00 – 3.03	EPA 8270C
2-Methylnaphthalene	0.300 – 0.303	EPA 8270C	Fluoranthene	0.300 – 0.303	EPA 8270C
2-Nitroaniline	3.00 – 3.03	EPA 8270C	Fluorene	0.300 – 0.303	EPA 8270C
2-Nitrophenol	3.00 – 3.03	EPA 8270C	Hexachlorobenzene	3.00 – 3.03	EPA 8270C
3,3'-Dichlorobenzidine	3.00 – 3.03	EPA 8270C	Hexachlorobutadiene	3.00 – 3.03	EPA 8270C
3-Nitroaniline	3.00 – 3.03	EPA 8270C	Hexachlorocyclopentadiene	3.00 – 3.03	EPA 8270C
4-Bromophenyl phenyl ether	3.00 – 3.03	EPA 8270C	Hexachloroethane	3.00 – 3.03	EPA 8270C
4-Chloro-3-methylphenol	3.00 – 3.03	EPA 8270C	Indeno(1,2,3-c,d)pyrene	0.300 – 0.303	EPA 8270C
4-Chlorobenzenamine	3.30 – 3.33	EPA 8270C	Isophorone	3.50 – 3.54	EPA 8270C
4-Chlorophenyl phenyl ether	3.00 – 3.03	EPA 8270C	Naphthalene	0.300 – 0.303	EPA 8270C
4-Nitroaniline	3.00 – 3.03	EPA 8270C	Nitro-benzene	3.00 – 3.03	EPA 8270C
4-Nitrophenol	3.00 – 3.03	EPA 8270C	Pentachlorophenol	3.00 – 3.03	EPA 8270C
Acenaphthene	0.300 – 0.303	EPA 8270C	Phenanthrene	0.300 – 0.303	EPA 8270C
Acenaphthylene	0.300 – 0.303	EPA 8270C	Phenol	3.00 – 3.03	EPA 8270C
Acetophenone	3.00 – 3.03	EPA 8270C	Pyrene	0.300 – 0.303	EPA 8270C
Anthracene	0.300 – 0.303	EPA 8270C	bis(2-Chloroethoxy)methane	3.00 – 3.03	EPA 8270C
Atrazine	3.00 – 3.03	EPA 8270C	bis(2-Chloroethyl)ether	3.00 – 3.03	EPA 8270C
Benzaldehyde	3.00 – 3.03	EPA 8270C	bis(2-Chloroisopropyl)ether	3.00 – 3.03	EPA 8270C
Benzo(a)anthracene	0.300 – 0.303	EPA 8270C	bis(2-Ethylhexyl)phthalate	3.00 – 3.03	EPA 8270C
Benzo(a)pyrene	0.300 – 0.303	EPA 8270C	m,p-Cresol	3.70 – 3.74	EPA 8270C
Benzo(b)fluoranthene	0.300 – 0.303	EPA 8270C	n-Nitrosodipropylamine	3.00 – 3.03	EPA 8270C
Benzo(ghi)perylene	0.300 – 0.303	EPA 8270C	o-Cresol	3.00 – 3.03	EPA 8270C
Benzo(k)fluoranthene	0.300 – 0.303	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 2014

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	0.500	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	0.300	EPA 8260B
1,2-Dichloropropane	0.300	EPA 8260B	Methylene chloride	1.70	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	2.50	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 2014

SWMU 68					
Analyte	**MDL (µg/L)**	**Analytical Method[a]**	**Analyte**	**MDL (µg/L)**	**Analytical Method[a]**
1'-Biphenyl 1	3.00 - 3.06	EPA 8270C	Butylbenzyl phthalate	3.00 - 3.06	EPA 8270C
1,2,4-Trichlorobenzene	3.00 - 3.06	EPA 8270C	Caprolactam	3.00 - 3.06	EPA 8270C
2,4,5-Trichlorophenol	3.00 - 3.06	EPA 8270C	Carbazole	0.300 - 0.306	EPA 8270C
1,4-Dioxane	3.00 - 3.06	EPA 8270C	Chrysene	0.300 - 0.306	EPA 8270C
2,4,6-Trichlorophenol	3.00 - 3.06	EPA 8270C	Di-n-butyl phthalate	3.00 - 3.06	EPA 8270C
2,4-Dichlorophenol	3.00 - 3.06	EPA 8270C	Di-n-octyl phthalate	3.00 - 3.06	EPA 8270C
2,4-Dimethylphenol	3.00 - 3.06	EPA 8270C	Dibenz[a,h]anthracene	0.300 - 0.306	EPA 8270C
2,4-Dinitrophenol	5.00 - 5.10	EPA 8270C	Dibenzofuran	3.00 - 3.06	EPA 8270C
2,4-Dinitrotoluene	3.00 - 3.06	EPA 8270C	Diethylphthalate	3.00 - 3.06	EPA 8270C
2,6-Dinitrotoluene	3.00 - 3.06	EPA 8270C	Dimethylphthalate	3.00 - 3.06	EPA 8270C
2-Chloronaphthalene	0.410 - 0.418	EPA 8270C	Dinitro-o-cresol	3.00 - 3.06	EPA 8270C
2-Chlorophenol	3.00 - 3.06	EPA 8270C	Diphenyl amine	3.00 - 3.06	EPA 8270C
2-Methylnaphthalene	0.300 - 0.306	EPA 8270C	Fluoranthene	0.300 - 0.306	EPA 8270C
2-Nitroaniline	3.00 - 3.06	EPA 8270C	Fluorene	0.300 - 0.306	EPA 8270C
2-Nitrophenol	3.00 - 3.06	EPA 8270C	Hexachlorobenzene	3.00 - 3.06	EPA 8270C
3,3'-Dichlorobenzidine	3.00 - 3.06	EPA 8270C	Hexachlorobutadiene	3.00 - 3.06	EPA 8270C
3-Nitroaniline	3.00 - 3.06	EPA 8270C	Hexachlorocyclopentadiene	3.00 - 3.06	EPA 8270C
4-Bromophenyl phenyl ether	3.00 - 3.06	EPA 8270C	Hexachloroethane	3.00 - 3.06	EPA 8270C
4-Chloro-3-methylphenol	3.00 - 3.06	EPA 8270C	Indeno(1,2,3-c,d)pyrene	0.300 - 0.306	EPA 8270C
4-Chlorobenzenamine	3.30 - 3.37	EPA 8270C	Isophorone	3.50 - 3.57	EPA 8270C
4-Chlorophenyl phenyl ether	3.00 - 3.06	EPA 8270C	Naphthalene	0.300 - 0.306	EPA 8270C
4-Nitroaniline	3.00 - 3.06	EPA 8270C	Nitro-benzene	3.00 - 3.06	EPA 8270C
4-Nitrophenol	3.00 - 3.06	EPA 8270C	Pentachlorophenol	3.00 - 3.06	EPA 8270C
Acenaphthene	0.300 - 0.306	EPA 8270C	Phenanthrene	0.300 - 0.306	EPA 8270C
Acenaphthylene	0.300 - 0.306	EPA 8270C	Phenol	3.00 - 3.06	EPA 8270C
Acetophenone	3.00 - 3.06	EPA 8270C	Pyrene	0.300 - 0.306	EPA 8270C
Anthracene	0.300 - 0.306	EPA 8270C	bis(2-Chloroethoxy)methane	3.00 - 3.06	EPA 8270C
Atrazine	3.00 - 3.06	EPA 8270C	bis(2-Chloroethyl)ether	3.00 - 3.06	EPA 8270C
Benzaldehyde	3.00 - 3.06	EPA 8270C	bis(2-Chloroisopropyl)ether	3.00 - 3.06	EPA 8270C
Benzo(a)anthracene	0.300 - 0.306	EPA 8270C	bis(2-Ethylhexyl)phthalate	3.00 - 3.06	EPA 8270C
Benzo(a)pyrene	0.300 - 0.306	EPA 8270C	m,p-Cresol	3.70 - 3.78	EPA 8270C
Benzo(b)fluoranthene	0.300 - 0.306	EPA 8270C	n-Nitrosodipropylamine	3.00 - 3.06	EPA 8270C
Benzo(ghi)perylene	0.300 - 0.306	EPA 8270C	o-Cresol	3.00 - 3.06	EPA 8270C
Benzo(k)fluoranthene	0.300 - 0.306	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 2014

Notes

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

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 2014

Analyte	MDL (μg/L)	
	SWMUs 8/58	SWMU 68
1,3,5-Trinitrobenzene	0.0833 – 0.0874	0.0856 – 0.0914
1,3-Dinitrobenzene	0.0833 – 0.0874	0.0856 – 0.0914
2,4,6-Trinitrotoluene	0.0833 – 0.0874	0.0856 – 0.0914
2,4-Dinitrotoluene	0.0833 – 0.0874	0.0856 – 0.0914
2,6-Dinitrotoluene	0.0833 – 0.0874	0.0856 – 0.0914
2-Amino-4,6-dinitrotoluene	0.0833 – 0.0874	0.0856 – 0.0914
2-Nitrotoluene	0.0854 – 0.0896	0.0877 -0.0937
3-Nitrotoluene	0.0833 – 0.0874	0.0856 – 0.0914
4-Amino-2,6-dinitrotoluene	0.0833 – 0.0874	0.0856 – 0.0914
4-Nitrotoluene	0.156 – 0.163	0.160 – 0.171
HMX	0.0833 – 0.0874	0.0856 – 0.0914
Nitrobenzene	0.0833 – 0.0874	0.0856 – 0.0914
Pentaerythritol tetranitrate	0.104 – 0.109	0.107 – 0.114
RDX	0.0833 – 0.0874	0.0856 – 0.0914
Tetryl	0.0833 – 0.0874	0.0856 – 0.0914

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 2014

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 22-Jul-14	Nitrate plus nitrite	1.61	0.085	0.250	10.0			096269-018	EPA 353.2
CCBA-MW1 (Duplicate) 22-Jul-14	Nitrate plus nitrite	1.64	0.085	0.250	10.0			096270-018	EPA 353.2
CCBA-MW2 21-Jul-14	Nitrate plus nitrite	3.41	0.170	0.500	10.0			096263-018	EPA 353.2
SWMU 68									
OBS-MW1 16-Jul-14	Nitrate plus nitrite	1.79	0.085	0.250	10.0			096255-018	EPA 353.2
OBS-MW1 (Duplicate) 16-Jul-14	Nitrate plus nitrite	1.83	0.085	0.250	10.0			096256-018	EPA 353.2
OBS-MW2 15-Jul-14	Nitrate plus nitrite	1.57	0.085	0.250	10.0			096251-018	EPA 353.2
OBS-MW3 17-Jul-14	Nitrate plus nitrite	1.81	0.085	0.250	10.0			096259-018	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, 1984, "Methods for Chemical Analysis of Water and Wastes," EPA 600-4-79-020.
U.S. Environmental Protection Agency, 1986 (and updates), "*Test Methods for Evaluating Solid Waste, Physical/Chemical Methods*," SW-846, 3rd ed.

Table IV-6 (Concluded)

Summary of Nitrate Plus Nitrite Results

SWMUs 8/58 and 68 Groundwater Monitoring

Quarterly Assessment, July – September 2014

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.
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 2014

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	172	0.725	2.00	NE			096269-022	SM 2320B
22-Jul-14	Carbonate Alkalinity	ND	0.725	2.00	NE	U		096269-022	SM 2320B
	Bromide	0.320	0.067	0.200	NE			096269-016	EPA 9056
	Chloride	28.9	0.335	1.00	NE			096269-016	EPA 9056
	Fluoride	**4.99**	0.033	0.100	4.0			096269-016	EPA 9056
	Sulfate	57.5	0.665	2.00	NE			096269-016	EPA 9056
	Total Cyanide	ND	0.00167	0.005	0.200	U		096269-027	EPA 9012
CCBA-MW1 (Duplicate)	Bicarbonate Alkalinity	166	0.725	2.00	NE			096270-022	SM 2320B
22-Jul-14	Carbonate Alkalinity	ND	0.725	2.00	NE	U		096270-022	SM 2320B
	Bromide	0.316	0.067	0.200	NE			096270-016	EPA 9056
	Chloride	29.5	0.335	1.00	NE			096270-016	EPA 9056
	Fluoride	**5.02**	0.033	0.100	4.0			096270-016	EPA 9056
	Sulfate	58.6	0.665	2.00	NE			096270-016	EPA 9056
	Total Cyanide	ND	0.00167	0.005	0.200	U		096270-027	EPA 9012
CCBA-MW2	Bicarbonate Alkalinity	170	0.725	1.00	NE			096263-022	SM 2320B
21-Jul-14	Carbonate Alkalinity	ND	0.725	1.00	NE	U		096263-022	SM 2320B
	Bromide	0.568	0.067	0.200	NE			096263-016	EPA 9056
	Chloride	37.5	0.670	2.00	NE			096263-016	EPA 9056
	Fluoride	1.47	0.033	0.100	4.0			096263-016	EPA 9056
	Sulfate	95.7	1.33	4.00	NE			096263-016	EPA 9056
	Total Cyanide	ND	0.00167	0.005	0.200	U		096263-027	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 2014

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 16-Jul-14	Bicarbonate Alkalinity	181	0.725	1.00	NE			096255-022	SM 2320B
	Carbonate Alkalinity	ND	0.725	1.00	NE	U		096255-022	SM 2320B
	Bromide	0.367	0.067	0.200	NE			096255-016	EPA 9056
	Chloride	25.6	0.670	2.00	NE			096255-016	EPA 9056
	Fluoride	2.24	0.033	0.100	4.00			096255-016	EPA 9056
	Sulfate	85.5	1.33	4.00	NE			096255-016	EPA 9056
	Total Cyanide	ND	0.00167	0.005	0.200	U	UJ	096255-027	EPA 9012
OBS-MW1 (Duplicate) 16-Jul-14	Bicarbonate Alkalinity	182	0.725	1.00	NE			096256-022	SM 2320B
	Carbonate Alkalinity	ND	0.725	1.00	NE	U		096256-022	SM 2320B
	Bromide	0.377	0.067	0.200	NE			096256-016	EPA 9056
	Chloride	25.5	0.670	2.00	NE			096256-016	EPA 9056
	Fluoride	2.21	0.033	0.100	4.00			096256-016	EPA 9056
	Sulfate	85.2	1.33	4.00	NE			096256-016	EPA 9056
	Total Cyanide	ND	0.00167	0.005	0.200	U	UJ	096256-027	EPA 9056
OBS-MW2 15-Jul-14	Bicarbonate Alkalinity	181	0.725	2.00	NE			096251-022	SM 2320B
	Carbonate Alkalinity	ND	0.725	2.00	NE	U		096251-022	SM 2320B
	Bromide	0.371	0.067	0.200	NE			096251-016	EPA 9056
	Chloride	23.9	0.670	2.00	NE			096251-016	EPA 9056
	Fluoride	2.36	0.033	0.100	4.00			096251-016	EPA 9056
	Sulfate	87.2	1.33	4.00	NE			096251-016	EPA 9056
	Total Cyanide	ND	0.00167	0.005	0.200	U	UJ	096251-027	EPA 9012
OBS-MW3 17-Jul-14	Bicarbonate Alkalinity	180	0.725	1.00	NE			096259-022	SM 2320B
	Carbonate Alkalinity	ND	0.725	1.00	NE	U		096259-022	SM 2320B
	Bromide	0.391	0.067	0.200	NE			096259-016	EPA 9056
	Chloride	24.4	0.670	2.00	NE			096259-016	EPA 9056
	Fluoride	2.37	0.033	0.100	4.00			096259-016	EPA 9056
	Sulfate	86.4	1.33	4.00	NE			096259-016	EPA 9056
	Total Cyanide	ND	0.00167	0.005	0.200	U	UJ	096259-027	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 2014

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

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

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 2014

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 22-Jul-14	ND	0.004	0.012	NE	U		096269-020	EPA 314.0
CCBA-MW1 (Duplicate) 22-Jul-14	ND	0.004	0.012	NE	U		096270-020	EPA 314.0
CCBA-MW2 21-Jul-14	ND	0.004	0.012	NE	U		096263-020	EPA 314.0
SWMU 68								
OBS-MW1 16-Jul-14	ND	0.004	0.012	NE	U		096255-020	EPA 314.0
OBS-MW1 (Duplicate) 16-Jul-14	ND	0.004	0.012	NE	U		096256-020	EPA 314.0
OBS-MW2 15-Jul-14	ND	0.004	0.012	NE	U		096251-020	EPA 314.0
OBS-MW3 17-Jul-14	ND	0.004	0.012	NE	U		096259-020	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 2014

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 2014

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 16-Jul-14	ND	0.003	0.010	NE	U	UJ	096255-014	EPA 7196A
OBS-MW1 (Duplicate) 16-Jul-14	0.00438	0.003	0.010	NE	J	0.017UJ	096256-014	EPA 7196A
OBS-MW2 15-Jul-14	ND	0.003	0.010	NE	U		096251-014	EPA 7196A
OBS-MW3 17-Jul-14	ND	0.003	0.010	NE	U		096259-014	EPA 7196A

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.
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-10

Summary of Unfiltered Total Metal Results

SWMUs 8/58 Groundwater Monitoring

Quarterly Assessment, July – September 2014

Well	Analyte	Result (mg/L)	MDL (mg/L)	PQL (mg/L)	MCL (mg/L)	Laboratory Qualifier[a]	Validation Qualifier[b]	Sample Number	Analytical Method[c]
CCBA-MW1	Aluminum	0.0221	0.015	0.050	NE	J		096269-009	EPA 6020
22-Jul-14	Antimony	ND	0.001	0.003	0.006	U		096269-009	EPA 6020
	Arsenic	ND	0.0017	0.005	0.010	U		096269-R09	EPA 6020
	Barium	0.00231	0.0006	0.002	2.00			096269-009	EPA 6020
	Beryllium	0.000515	0.0002	0.0005	0.004	N	J+	096269-009	EPA 6020
	Cadmium	ND	0.00011	0.001	0.005	U		096269-009	EPA 6020
	Calcium	48.9	0.060	0.200	NE	B		096269-009	EPA 6020
	Chromium	ND	0.002	0.010	0.100	U		096269-009	EPA 6020
	Cobalt	0.000119	0.0001	0.001	NE	J		096269-009	EPA 6020
	Copper	0.000491	0.00035	0.001	NE	J	0.0031U	096269-009	EPA 6020
	Iron	0.0928	0.033	0.100	NE	J		096269-009	EPA 6020
	Lead	ND	0.0005	0.002	NE	U		096269-009	EPA 6020
	Magnesium	10.0	0.010	0.030	NE			096269-009	EPA 6020
	Manganese	0.00249	0.001	0.005	NE	J		096269-009	EPA 6020
	Mercury	ND	0.000067	0.0002	0.002	U		096269-009	EPA 7470
	Nickel	0.000908	0.0005	0.002	NE	J		096269-009	EPA 6020
	Potassium	4.12	0.080	0.300	NE			096269-009	EPA 6020
	Selenium	0.00196	0.0015	0.005	0.050	J		096269-009	EPA 6020
	Silver	ND	0.0002	0.001	NE	U		096269-009	EPA 6020
	Sodium	62.4	0.400	1.25	NE			096269-009	EPA 6020
	Thallium	ND	0.00045	0.002	0.002	U		096269-009	EPA 6020
	Uranium	0.00249	0.000067	0.0002	0.03			096269-009	EPA 6020
	Vanadium	ND	0.001	0.005	NE	U	UJ	096269-009	EPA 6010
	Zinc	ND	0.0035	0.010	NE	U		096269-009	EPA 6020

Table IV-10 (Continued)

Summary of Unfiltered Total Metal Results

SWMUs 8/58 Groundwater Monitoring

Quarterly Assessment, July – September 2014

Well	Analyte	Result (mg/L)	MDL (mg/L)	PQL (mg/L)	MCL (mg/L)	Laboratory Qualifier[a]	Validation Qualifier[b]	Sample Number	Analytical Method[c]
CCBA-MW1 (Duplicate) 22-Jul-14	Aluminum	0.025	0.015	0.050	NE	J		096270-009	EPA 6020
	Antimony	ND	0.001	0.003	0.006	U		096270-009	EPA 6020
	Arsenic	ND	0.0017	0.005	0.010	U		096270-R09	EPA 6020
	Barium	0.00233	0.0006	0.002	2.00			096270-009	EPA 6020
	Beryllium	0.000546	0.0002	0.0005	0.004	N	J+	096270-009	EPA 6020
	Cadmium	ND	0.00011	0.001	0.005	U		096270-009	EPA 6020
	Calcium	49.2	0.300	1.00	NE	B		096270-009	EPA 6020
	Chromium	ND	0.002	0.010	0.100	U		096270-009	EPA 6020
	Cobalt	0.000122	0.0001	0.001	NE	J		096270-009	EPA 6020
	Copper	0.000512	0.00035	0.001	NE	J	0.0031U	096270-009	EPA 6020
	Iron	0.0958	0.033	0.100	NE	J		096270-009	EPA 6020
	Lead	ND	0.0005	0.002	NE	U		096270-009	EPA 6020
	Magnesium	10.2	0.010	0.030	NE			096270-009	EPA 6020
	Manganese	0.00273	0.001	0.005	NE	J		096270-009	EPA 6020
	Mercury	ND	0.000067	0.0002	0.002	U		096270-009	EPA 7470
	Nickel	0.00104	0.0005	0.002	NE	J		096270-009	EPA 6020
	Potassium	3.83	0.080	0.300	NE			096270-009	EPA 6020
	Selenium	0.00195	0.0015	0.005	0.050	J		096270-009	EPA 6020
	Silver	ND	0.0002	0.001	NE	U		096270-009	EPA 6020
	Sodium	61.6	0.400	1.25	NE			096270-009	EPA 6020
	Thallium	ND	0.00045	0.002	0.002	U		096270-009	EPA 6020
	Uranium	0.00267	0.000067	0.0002	0.03			096270-009	EPA 6020
	Vanadium	ND	0.001	0.005	NE	U	UJ	096270-009	EPA 6010
	Zinc	ND	0.0035	0.010	NE	U		096270-009	EPA 6020

Table IV-10 (Continued)

Summary of Unfiltered Total Metal Results

SWMUs 8/58 Groundwater Monitoring

Quarterly Assessment, July – September 2014

Well	Analyte	Result (mg/L)	MDL (mg/L)	PQL (mg/L)	MCL (mg/L)	Laboratory Qualifier[a]	Validation Qualifier[b]	Sample Number	Analytical Method[c]
CCBA-MW2	Aluminum	ND	0.015	0.050	NE	U		096263-009	EPA 6020
21-Jul-14	Antimony	ND	0.001	0.003	0.006	U		096263-009	EPA 6020
	Arsenic	ND	0.0017	0.005	0.010	U		096263-009	EPA 6020
	Barium	0.0471	0.0006	0.002	2.00			096263-009	EPA 6020
	Beryllium	ND	0.0002	0.0005	0.004	N, U		096263-009	EPA 6020
	Cadmium	ND	0.00011	0.001	0.005	U		096263-009	EPA 6020
	Calcium	75.7	0.300	1.00	NE	B		096263-009	EPA 6020
	Chromium	ND	0.002	0.010	0.100	U		096263-009	EPA 6020
	Cobalt	0.000106	0.0001	0.001	NE	J		096263-009	EPA 6020
	Copper	0.000665	0.00035	0.001	NE	J		096263-009	EPA 6020
	Iron	0.119	0.033	0.100	NE			096263-009	EPA 6020
	Lead	ND	0.0005	0.002	NE	U		096263-009	EPA 6020
	Magnesium	14.6	0.010	0.030	NE			096263-009	EPA 6020
	Manganese	ND	0.001	0.005	NE	U		096263-009	EPA 6020
	Mercury	ND	0.000067	0.0002	0.002	U		096263-009	EPA 7470
	Nickel	0.00103	0.0005	0.002	NE	J		096263-009	EPA 6020
	Potassium	1.18	0.080	0.300	NE			096263-009	EPA 6020
	Selenium	0.00395	0.0015	0.005	0.050	J		096263-009	EPA 6020
	Silver	ND	0.0002	0.001	NE	U		096263-009	EPA 6020
	Sodium	47.0	0.400	1.25	NE			096263-009	EPA 6020
	Thallium	ND	0.00045	0.002	0.002	U		096263-009	EPA 6020
	Uranium	0.00587	0.000067	0.0002	0.03			096263-009	EPA 6020
	Vanadium	0.00981	0.001	0.005	NE			096263-009	EPA 6010
	Zinc	ND	0.0035	0.010	NE	U		096263-009	EPA 6020

Table IV-10 (Concluded)
Summary of Unfiltered Total Metal Results
SWMUs 8/58 Groundwater Monitoring
Quarterly Assessment, July – September 2014

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 found in the blank above the effective 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 numerical value is an estimated quantity with a suspected positive bias.
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 2014

Well	Analyte	Result (mg/L)	MDL (mg/L)	PQL (mg/L)	MCL (mg/L)	Laboratory Qualifier[a]	Validation Qualifier[b]	Sample Number	Analytical Method[c]
OBS-MW1	Aluminum	0.0271	0.015	0.050	NE	J		096255-009	EPA 6020
16-Jul-14	Antimony	ND	0.001	0.003	0.006	U		096255-009	EPA 6020
	Arsenic	ND	0.0017	0.005	0.010	U		096255-009	EPA 6020
	Barium	0.018	0.0006	0.002	2.00			096255-009	EPA 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		096255-009	EPA 6020
	Cadmium	ND	0.00011	0.001	0.005	U		096255-009	EPA 6020
	Calcium	79.7	0.600	2.00	NE			096255-009	EPA 6020
	Chromium	ND	0.002	0.010	0.100	U		096255-009	EPA 6020
	Cobalt	0.000135	0.0001	0.001	NE	J		096255-009	EPA 6020
	Copper	0.00116	0.00035	0.001	NE		0.0035U	096255-009	EPA 6020
	Iron	0.203	0.033	0.100	NE			096255-009	EPA 6020
	Lead	ND	0.0005	0.002	NE	U		096255-009	EPA 6020
	Magnesium	15.0	0.010	0.030	NE			096255-009	EPA 6020
	Manganese	0.00168	0.001	0.005	NE	J		096255-009	EPA 6020
	Mercury	ND	0.000067	0.0002	0.002	U		096255-009	EPA 7470
	Nickel	0.00185	0.0005	0.002	NE	J		096255-009	EPA 6020
	Potassium	1.76	0.080	0.300	NE			096255-009	EPA 6020
	Selenium	0.00261	0.0015	0.005	0.050	J		096255-009	EPA 6020
	Silver	ND	0.0002	0.001	NE	U		096255-009	EPA 6020
	Sodium	21.2	0.080	0.250	NE			096255-009	EPA 6020
	Thallium	ND	0.00045	0.002	0.002	U		096255-009	EPA 6020
	Uranium	0.00973	0.000067	0.0002	0.03			096255-009	EPA 6020
	Vanadium	ND	0.001	0.005	NE	U		096255-009	EPA 6010
	Zinc	ND	0.0035	0.010	NE	U		096255-009	EPA 6020

Table IV-11 (Continued)

Summary of Unfiltered Total Metal Results

SWMU 68 Groundwater Monitoring

Quarterly Assessment, July – September 2014

Well	Analyte	Result (mg/L)	MDL (mg/L)	PQL (mg/L)	MCL (mg/L)	Laboratory Qualifier[a]	Validation Qualifier[b]	Sample Number	Analytical Method[c]
OBS-MW1	Aluminum	0.0252	0.015	0.050	NE	J		096256-009	EPA 6020
(Duplicate)	Antimony	ND	0.001	0.003	0.006	U		096256-009	EPA 6020
16-Jul-14	Arsenic	ND	0.0017	0.005	0.010	U		096256-009	EPA 6020
	Barium	0.0187	0.0006	0.002	2.00			096256-009	EPA 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		096256-009	EPA 6020
	Cadmium	ND	0.00011	0.001	0.005	U		096256-009	EPA 6020
	Calcium	78.5	0.600	2.00	NE			096256-009	EPA 6020
	Chromium	ND	0.002	0.010	0.100	U		096256-009	EPA 6020
	Cobalt	0.000128	0.0001	0.001	NE	J		096256-009	EPA 6020
	Copper	0.000746	0.00035	0.001	NE	J	0.0035U	096256-009	EPA 6020
	Iron	0.186	0.033	0.100	NE			096256-009	EPA 6020
	Lead	ND	0.0005	0.002	NE	U		096256-009	EPA 6020
	Magnesium	14.4	0.010	0.030	NE			096256-009	EPA 6020
	Manganese	0.00228	0.001	0.005	NE	J		096256-009	EPA 6020
	Mercury	ND	0.000067	0.0002	0.002	U		096256-009	EPA 7470
	Nickel	0.00149	0.0005	0.002	NE	J		096256-009	EPA 6020
	Potassium	1.69	0.080	0.300	NE			096256-009	EPA 6020
	Selenium	0.00273	0.0015	0.005	0.050	J		096256-009	EPA 6020
	Silver	ND	0.0002	0.001	NE	U		096256-009	EPA 6020
	Sodium	22.3	0.080	0.250	NE			096256-009	EPA 6020
	Thallium	ND	0.00045	0.002	0.002	U		096256-009	EPA 6020
	Uranium	0.00982	0.000067	0.0002	0.03			096256-009	EPA 6020
	Vanadium	ND	0.001	0.005	NE	U		096256-009	EPA 6010
	Zinc	ND	0.0035	0.010	NE	U		096256-009	EPA 6020

Table IV-11 (Continued)

Summary of Unfiltered Total Metal Results

SWMU 68 Groundwater Monitoring

Quarterly Assessment, July – September 2014

Well	Analyte	Result (mg/L)	MDL (mg/L)	PQL (mg/L)	MCL (mg/L)	Laboratory Qualifier[a]	Validation Qualifier[b]	Sample Number	Analytical Method[c]
OBS-MW2	Aluminum	0.0268	0.015	0.050	NE	J		096251-009	EPA 6020
15-Jul-14	Antimony	ND	0.001	0.003	0.006	U		096251-009	EPA 6020
	Arsenic	ND	0.0017	0.005	0.010	U		096251-009	EPA 6020
	Barium	0.0194	0.0006	0.002	2.00			096251-009	EPA 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		096251-009	EPA 6020
	Cadmium	ND	0.00011	0.001	0.005	U		096251-009	EPA 6020
	Calcium	81.0	0.600	2.00	NE			096251-009	EPA 6020
	Chromium	ND	0.002	0.010	0.100	U		096251-009	EPA 6020
	Cobalt	0.000124	0.0001	0.001	NE	J		096251-009	EPA 6020
	Copper	0.000678	0.00035	0.001	NE	J		096251-009	EPA 6020
	Iron	0.219	0.033	0.100	NE			096251-009	EPA 6020
	Lead	ND	0.0005	0.002	NE	U		096251-009	EPA 6020
	Magnesium	14.7	0.010	0.030	NE			096251-009	EPA 6020
	Manganese	ND	0.001	0.005	NE	U		096251-009	EPA 6020
	Mercury	ND	0.000067	0.0002	0.002	U		096251-009	EPA 7470
	Nickel	0.00145	0.0005	0.002	NE	J		096251-009	EPA 6020
	Potassium	1.73	0.080	0.300	NE			096251-009	EPA 6020
	Selenium	0.0028	0.0015	0.005	0.050	J		096251-009	EPA 6020
	Silver	ND	0.0002	0.001	NE	U		096251-009	EPA 6020
	Sodium	20.2	0.080	0.250	NE			096251-009	EPA 6020
	Thallium	ND	0.00045	0.002	0.002	U		096251-009	EPA 6020
	Uranium	0.0133	0.000067	0.0002	0.03			096251-009	EPA 6020
	Vanadium	0.00125	0.001	0.005	NE	J		096251-009	EPA 6010
	Zinc	ND	0.0035	0.010	NE	U		096251-009	EPA 6020

Table IV-11 (Continued)

Summary of Unfiltered Total Metal Results

SWMU 68 Groundwater Monitoring

Quarterly Assessment, July – September 2014

Well	Analyte	Result (mg/L)	MDL (mg/L)	PQL (mg/L)	MCL (mg/L)	Laboratory Qualifier[a]	Validation Qualifier[b]	Sample Number	Analytical Method[c]
OBS-MW3	Aluminum	ND	0.015	0.050	NE	U		096259-009	EPA 6020
17-Jul-14	Antimony	ND	0.001	0.003	0.006	U		096259-009	EPA 6020
	Arsenic	ND	0.0017	0.005	0.010	U		096259-009	EPA 6020
	Barium	0.0286	0.0006	0.002	2.00			096259-009	EPA 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		096259-009	EPA 6020
	Cadmium	ND	0.00011	0.001	0.005	U		096259-009	EPA 6020
	Calcium	76.5	0.600	2.00	NE			096259-009	EPA 6020
	Chromium	ND	0.002	0.010	0.100	U		096259-009	EPA 6020
	Cobalt	0.000135	0.0001	0.001	NE	J		096259-009	EPA 6020
	Copper	0.000692	0.00035	0.001	NE	J		096259-009	EPA 6020
	Iron	0.191	0.033	0.100	NE			096259-009	EPA 6020
	Lead	ND	0.0005	0.002	NE	U		096259-009	EPA 6020
	Magnesium	14.7	0.010	0.030	NE			096259-009	EPA 6020
	Manganese	ND	0.001	0.005	NE	U		096259-009	EPA 6020
	Mercury	ND	0.000067	0.0002	0.002	U		096259-009	EPA 7470
	Nickel	0.0015	0.0005	0.002	NE	J		096259-009	EPA 6020
	Potassium	1.61	0.080	0.300	NE			096259-009	EPA 6020
	Selenium	0.00254	0.0015	0.005	0.050	J		096259-009	EPA 6020
	Silver	ND	0.0002	0.001	NE	U		096259-009	EPA 6020
	Sodium	21.2	0.080	0.250	NE			096259-009	EPA 6020
	Thallium	ND	0.00045	0.002	0.002	U		096259-009	EPA 6020
	Uranium	0.0124	0.000067	0.0002	0.03			096259-009	EPA 6020
	Vanadium	0.00105	0.001	0.005	NE	J		096259-009	EPA 6010
	Zinc	ND	0.0035	0.010	NE	U		096259-009	EPA 6020

Table IV-11 (Concluded)
Summary of Unfiltered Total Metal Results
SWMU 68 Groundwater Monitoring
Quarterly Assessment, July – September 2014

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.

[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 2014

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 22-Jul-14	Calcium	49.2	0.060	0.200	NE	B		096269-017	EPA 6020
	Magnesium	9.98	0.010	0.030	NE			096269-017	EPA 6020
	Potassium	4.20	0.080	0.300	NE			096269-017	EPA 6020
	Sodium	62.7	0.400	1.25	NE			096269-017	EPA 6020
CCBA-MW1 (Duplicate) 22-Jul-14	Calcium	48.4	0.060	0.200	NE	B		096270-017	EPA 6020
	Magnesium	9.94	0.010	0.030	NE			096270-017	EPA 6020
	Potassium	4.03	0.080	0.300	NE			096270-017	EPA 6020
	Sodium	63.3	0.400	1.25	NE			096270-017	EPA 6020
CCBA-MW2 21-Jul-14	Calcium	75.7	0.300	1.00	NE	B		096263-017	EPA 6020
	Magnesium	14.7	0.010	0.030	NE			096263-017	EPA 6020
	Potassium	1.24	0.080	0.300	NE			096263-017	EPA 6020
	Sodium	45.0	0.080	0.250	NE			096263-017	EPA 6020
SWMU 68									
OBS-MW1 16-Jul-14	Calcium	82.2	0.300	1.00	NE			096255-017	EPA 6020
	Magnesium	16.7	0.010	0.030	NE			096255-017	EPA 6020
	Potassium	1.78	0.080	0.300	NE			096255-017	EPA 6020
	Sodium	23.0	0.080	0.250	NE			096255-017	EPA 6020
OBS-MW1 (Duplicate) 16-Jul-14	Calcium	81.2	0.300	1.00	NE			096256-017	EPA 6020
	Magnesium	16.4	0.010	0.030	NE			096256-017	EPA 6020
	Potassium	1.60	0.080	0.300	NE			096256-017	EPA 6020
	Sodium	23.6	0.080	0.250	NE			096256-017	EPA 6020
OBS-MW2 15-Jul-14	Calcium	79.9	0.300	1.00	NE			096251-017	EPA 6020
	Magnesium	15.4	0.010	0.030	NE			096251-017	EPA 6020
	Potassium	1.64	0.080	0.300	NE			096251-017	EPA 6020
	Sodium	22.1	0.080	0.250	NE			096251-017	EPA 6020
OBS-MW3 17-Jul-14	Calcium	80.2	0.300	1.00	NE			096259-017	EPA 6020
	Magnesium	15.5	0.010	0.030	NE			096259-017	EPA 6020
	Potassium	1.68	0.080	0.300	NE			096259-017	EPA 6020
	Sodium	22.1	0.080	0.250	NE			096259-017	EPA 6020

Table IV-12 (Concluded)

Summary of Filtered Cation Results

SWMUs 8/58 and 68 Groundwater Monitoring

Quarterly Assessment, July – September 2014

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 found in the blank above the effective MDL.

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

[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 2014

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	-17.1 ± 23.0	21.3	10.4	NE	U	BD	096269-033	EPA 901.1
22-Jul-14	Cesium-137	1.71 ± 2.14	3.60	1.73	NE	U	BD	096269-033	EPA 901.1
	Cobalt-60	-2.88 ± 2.53	3.39	1.58	NE	U	BD	096269-033	EPA 901.1
	Potassium-40	17.6 ± 43.4	35.2	16.5	NE	U	BD	096269-033	EPA 901.1
	Gross Alpha	1.66	NA	NA	15 pCi/L	NA	None	096269-034	EPA 900.0
	Gross Beta	4.62 ± 1.18	1.27	0.610	4mrem/yr		7.5U	096269-034	EPA 900.0
CCBA-MW1 (Duplicate)	Americium-241	4.90 ± 5.91	8.67	4.25	NE	U	BD	096270-033	EPA 901.1
22-Jul-14	Cesium-137	-0.163 ± 1.64	2.86	1.38	NE	U	BD	096270-033	EPA 901.1
	Cobalt-60	-0.92 ± 2.13	3.05	1.45	NE	U	BD	096270-033	EPA 901.1
	Potassium-40	26.1 ± 51.0	28.0	13.2	NE	U	BD	096270-033	EPA 901.1
	Gross Alpha	0.79	NA	NA	15 pCi/L	NA	None	096270-034	EPA 900.0
	Gross Beta	4.91 ± 1.26	1.39	0.672	4mrem/yr		7.5U	096270-034	EPA 900.0
CCBA-MW2	Americium-241	-8.17 ± 6.90	9.26	4.53	NE	U	BD	096263-033	EPA 901.1
21-Jul-14	Cesium-137	1.84 ± 1.54	2.62	1.26	NE	U	BD	096263-033	EPA 901.1
	Cobalt-60	0.0694 ± 1.84	2.88	1.35	NE	U	BD	096263-033	EPA 901.1
	Potassium-40	-35.1 ± 35.9	37.7	18.0	NE	U	BD	096263-033	EPA 901.1
	Gross Alpha	4.65	NA	NA	15 pCi/L	NA	None	096263-034	EPA 900.0
	Gross Beta	3.93 ± 1.05	1.15	0.550	4mrem/yr			096263-034	EPA 900.0

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 2014

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 16-Jul-14	Americium-241	10.4 ± 8.49	10.4	4.33	NE	U	BD	096255-033	EPA 901.1
	Cesium-137	-0.0433 ± 3.68	5.39	2.61	NE	U	BD	096255-033	EPA 901.1
	Cobalt-60	-0.228 ± 3.09	5.36	2.55	NE	U	BD	096255-033	EPA 901.1
	Potassium-40	-28.3 ± 46.9	61.1	29.2	NE	U	BD	096255-033	EPA 901.1
	Gross Alpha	-2.89	NA	NA	15 pCi/L	NA	None	096255-034	EPA 900.0
	Gross Beta	7.11 ± 1.81	2.06	1.01	4 mrem/yr			096255-034	EPA 900.0
	Uranium-233/234	17.3 ± 2.17	0.0676	0.0301	NE			096255-035	HASL-300
	Uranium-235/236	0.175 ± 0.054	0.0407	0.0158	NE			096255-035	HASL-300
	Uranium-238	3.21 ± 0.436	0.0603	0.0265	NE			096255-035	HASL-300
OBS-MW1 (Duplicate) 16-Jul-14	Americium-241	15.9 ± 23.2	35.7	17.5	NE	U	BD	096256-033	EPA 901.1
	Cesium-137	0.146 ± 2.88	4.37	2.11	NE	U	BD	096256-033	EPA 901.1
	Cobalt-60	1.33 ± 2.83	4.96	2.36	NE	U	BD	096256-033	EPA 901.1
	Potassium-40	-20 ± 46.0	60.5	29.0	NE	U	BD	096256-033	EPA 901.1
	Gross Alpha	-2.36	NA	NA	15 pCi/L	NA	None	096256-034	EPA 900.0
	Gross Beta	7.35 ± 1.82	1.91	0.930	4 mrem/yr			096256-034	EPA 900.0
	Uranium-233/234	17.9 ± 2.22	0.0608	0.0271	NE			096256-035	HASL-300
	Uranium-235/236	0.209 ± 0.0563	0.0366	0.0142	NE			096256-035	HASL-300
	Uranium-238	3.25 ± 0.433	0.0543	0.0238	NE			096256-035	HASL-300
OBS-MW2 15-Jul-14	Americium-241	21.9 ± 18.6	24.5	12.1	NE	U	BD	096251-033	EPA 901.1
	Cesium-137	-3.42 ± 3.70	4.11	2.00	NE	U	BD	096251-033	EPA 901.1
	Cobalt-60	-0.897 ± 3.41	3.84	1.83	NE	U	BD	096251-033	EPA 901.1
	Potassium-40	53.1 ± 62.2	35.0	16.7	NE	X	R	096251-033	EPA 901.1
	Gross Alpha	6.34	NA	NA	15 pCi/L	NA	None	096251-R34	EPA 900.0
	Gross Beta	9.14 ± 1.92	1.64	0.798	4 mrem/yr		J	096251-R34	EPA 900.0
	Uranium-233/234	22.6 ± 3.07	0.392	0.171	NE			096251-R35	HASL-300
	Uranium-235/236	0.357 ± 0.227	0.288	0.114	NE		J	096251-R35	HASL-300
	Uranium-238	4.10 ± 0.744	0.227	0.0892	NE			096251-R35	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 2014

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	-1.66 ± 10.8	18.4	9.06	NE	U	BD	096259-033	EPA 901.1
17-Jul-14	Cesium-137	0.233 ± 2.11	3.15	1.52	NE	U	BD	096259-033	EPA 901.1
	Cobalt-60	-4.19 ± 3.35	3.32	1.58	NE	U	BD	096259-033	EPA 901.1
	Potassium-40	13.4 ± 42.0	31.8	15.1	NE	U	BD	096259-033	EPA 901.1
	Gross Alpha	10.99	NA	NA	15 pCi/L	NA	None	096259-034	EPA 900.0
	Gross Beta	6.66 ± 1.49	1.20	0.580	4 mrem/yr			096259-034	EPA 900.0
	Uranium-233/234	20.9 ± 2.63	0.0707	0.0315	NE			096259-035	HASL-300
	Uranium-235/236	0.258 ± 0.0685	0.0425	0.0165	NE			096259-035	HASL-300
	Uranium-238	3.85 ± 0.518	0.0631	0.0277	NE			096259-035	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 Code of Federal Regulations Parts 9, 141, and 142, Table I-4).

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

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

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

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

Table 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 2014

Notes (continued)

CCBA = Coyote Canyon Blast Area.
EPA = U.S. Environmental Protection Agency.
HASL = Health and Safety Laboratory.
MCL = Maximum contaminant level. The following are the MCLs for gross alpha particles and beta particles in community water systems:
15 pCi/L = Gross alpha particle activity, excluding total uranium (40 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.
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 2014

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
CCBA-MW1	10-Oct-13	Fluoride	**4.93** mg/L	4.0 mg/L			094774-016	EPA 9056
CCBA-MW1	27-Jan-14	Fluoride	**4.68** mg/L	4.0 mg/L			095213-016	EPA 9056
CCBA-MW1 (Duplicate)	27-Jan-14	Fluoride	**4.74** mg/L	4.0 mg/L			095214-016	EPA 9056
CCBA-MW1	07-Apr-14	Fluoride	**4.97** mg/L	4.0 mg/L			095725-016	EPA 9056
CCBA-MW1	22-Jul-14	Fluoride	**4.99** mg/L	4.0 mg/L			096269-016	EPA 9056
CCBA-MW1 (Duplicate)	22-Jul-14	Fluoride	**5.02** mg/L	4.0 mg/L			096270-016	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, 1984, "Methods for Chemical Analysis of Water and Wastes," EPA 600-4-79-020.
U.S. Environmental Protection Agency, 1986 (and updates), *"Test Methods for Evaluating Solid Waste, Physical/Chemical Methods,"* SW-846, 3rd ed.

Table IV-14 (Concluded)

Summary of Constituents Detected above Established MCLs

SWMUs 8/58 and 68 Groundwater Monitoring

Quarterly Assessments through September 2014

Notes (continued)

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 2014

Well/Parameter	Environmental Sample (R1)	Duplicate Sample (R2)	RPD[a]
	mg/L unless otherwise noted		
CCBA-MW1			
Nitrate plus Nitrite	1.61	1.64	2
Bicarbonate Alkalinity	172	166	4
Bromide	0.320	0.316	1
Chloride	28.9	29.5	2
Fluoride	4.99	5.02	1
Sulfate	57.5	58.6	2
Aluminum	0.0221	0.025	12
Barium	0.00231	0.00233	1
Beryllium	0.000515	0.000546	6
Calcium	48.9	49.2	1
Cobalt	0.000119	0.000122	2
Iron	0.0928	0.0958	3
Magnesium	10.0	10.2	2
Manganese	0.00249	0.00273	9
Nickel	0.000908	0.00104	14
Potassium	4.12	3.83	7
Selenium	0.00196	0.00195	1
Sodium	62.4	61.6	1
Uranium	0.00249	0.00267	7
Filtered Calcium	49.2	48.4	2
OBS-MW1			
Nitrate plus Nitrite	1.79	1.83	2
Bicarbonate Alkalinity	181	182	1
Bromide	0.367	0.377	3
Chloride	25.6	25.5	< 1
Fluoride	2.24	2.21	1
Sulfate	85.5	85.2	< 1
Aluminum	0.0271	0.0252	7
Barium	0.018	0.0187	4
Calcium	79.7	78.5	2
Cobalt	0.000135	0.000128	5
Iron	0.203	0.186	9
Magnesium	15.0	14.4	4
Manganese	0.00168	0.00228	30

Table IV-15 (Concluded)
Summary of Duplicate Samples
SWMUs 8/58 and 68 Groundwater Monitoring
Quarterly Assessment, July – September 2014

Well/Parameter	Environmental Sample (R1)	Duplicate Sample (R2)	RPD[a]
	mg/L unless otherwise noted		
OBS-MW1			
Nickel	0.00185	0.00149	22
Potassium	1.76	1.69	4
Selenium	0.00261	0.00273	4
Sodium	21.2	22.3	5
Uranium	0.00973	0.00982	1
Filtered Calcium	82.2	81.2	1
Filtered Magnesium	16.7	16.4	2
Filtered Potassium	1.78	1.60	11
Filtered Sodium	23.0	23.6	3

Notes

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

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

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.

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: 07/22/14
Well Condition: Good	Weather Condition: See Safety Tailgate Form
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 (%)	DO mg/L Comments
48.14	0753	/	—	START	→				→
49.23	0810	5	22.22	577.2	313.1	6.34	0.39	19.5	1.72
49.39	0820	10	20.55	535.7	304.6	6.38	0.85	22.3	2.01
49.47	0829	15	19.79	494.8	303.7	6.49	0.54	32.4	2.96
49.50	0839	20	19.69	487.4	305.2	6.54	0.42	33.3	3.05
49.39	0851	25	19.91	488.1	306.5	6.57	0.32	34.3	3.13
49.37	0903	30	20.02	489.3	305.1	6.57	0.34	35.4	3.21
49.36	0908	32	20.10	492.2	301.7	6.57	0.32	35.0	3.17
49.34	0913	34	20.16	490.7	300.7	6.57	0.31	34.9	3.16
49.27	0918	36	20.12	490.2	299.6	6.57	0.41	34.1	3.07
	0919	/	SAMPLING	→					→
									~4.00 gals purged from tubing
									0800

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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: 07/21/14
Well Condition: Good	Weather Condition: See Safety Tailgate Form
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 (%)	DO mg/L Comments
71.87	0757	/	START						
72.40	0814	5	20.69	570.4	302.5	7.40	0.26	64.6	5.79
72.45	0822	10	18.97	546.3	310.7	7.49	0.28	61.6	5.70
72.40	0830	15	18.45	540.5	314.5	7.50	0.30	63.9	5.98
72.36	0840	20	18.48	540.8	317.7	7.52	0.22	64.1	6.00
72.33	0850	25	18.70	542.0	319.8	7.52	0.26	66.3	6.18
72.36	0859	30	18.83	548.8	321.5	7.53	0.17	65.7	6.11
72.31	0904	32	18.85	550.0	321.9	7.53	0.21	67.4	6.25
72.31	0908	34	18.86	550.1	322.3	7.53	0.25	67.1	6.22
72.31	0913	36	18.87	550.2	322.4	7.53	0.17	68.0	6.28
	0914	/	Sampling						
									~4.00 gals purged from tubing
									0805

GROUNDWATER SAMPLE COLLECTION FIELD EQUIPMENT CHECK LOG

SNL/NM Project Name: SWMU 8/58	SNL/NM Project No.: 146422.10.11.01
Calibrations done by: R Lynch	Date: 7/21/14

Make & Model: YSI EXO 1

YSI 6820 Sonde (S/N) with DO, Ec, pH, ORP, and temperature probes: 13C101167

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: 0638	4.01	20.6	7.00	20.6	9.99	20.6
2. Time: 1057	3.99	20.8	7.00	20.7	10.00	20.7
3. Time:						
4. Time:						
Standard lot no.:	3AD782		3AE725		3AD357	
Expiration date:	4/15		5/15		4/15	

SC Calibration

Reference Value: 1225 uS | Standard Lot No.: 3AE221

	Value	Temp	Expiration Date: 5/15
1. Time: 0637	1227	20.6	
2. Time: 1056	1229	20.8	
3. Time:			
4. Time:			

ORP Calibration

Reference Value: 220 mV | Standard Lot No. 4AA010

	Value	Temp	Expiration Date: 7/14
1. Time: 0640	220.3	20.6	
2. Time: 1058	220.6	20.8	
3. Time:			
4. Time:			

DO Calibration

Calibration Value:	81% air saturation @ 5200 ft.	Atmospheric Pressure in Hg
1. Time: 0636	81.4	24.33
2. Time: 1055	81.8	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: 7/21/14		
TURBIDIMETER				
Make & Model: HACH 2100P HACH 2100Q		Serial No. S/N 10060C003010		
Reference Value	RL+ 10	20	100	800
Standard Lot No.	0161	0167	0168	0161
1. Time 0753	10.3	19.9	104	798
2. Time 0933	9.97	19.8	102	794
3. Time				
4. Time				

Comments:

GROUNDWATER SAMPLE COLLECTION FIELD EQUIPMENT CHECK LOG

SNL/NM Project Name: SWMU 8/58	SNL/NM Project No.: 146422.10.11.01
Calibrations done by: R Lynch	Date: 7/22/14

Make & Model: YSI EXO 1

YSI 6820 Sonde (S/N) with DO, Ec, pH, ORP, and temperature probes: 13C101167

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: 0629	3.99	20.1	7.01	20.1	9.99	20.1
2. Time: 1035	4.01	20.2	7.00	20.3	10.01	20.3
3. Time:						
4. Time:						
Standard lot no.:	3AD782		3AE725		3AD357	
Expiration date:	4/15		5/15		4/15	

SC Calibration

Reference Value: 1225 uS — Standard Lot No.: 3AE221

	Value	Temp	Expiration Date: 5/15
1. Time: 0628	1227	20.2	
2. Time: 1034	1226	20.2	
3. Time:			
4. Time:			

ORP Calibration

Reference Value: 220 mV — Standard Lot No.: 4AA010

	Value	Temp	Expiration Date: 7/14
1. Time: 0630	219.8	20.2	
2. Time: 1036	220.1	20.3	
3. Time:			
4. Time:			

DO Calibration

Calibration Value:	81% air saturation @ 5200 ft.	Atmospheric Pressure in Hg
1. Time: 0627	82.0	24.39
2. Time: 1033	82.1	24.42
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:		
TURBIDIMETER				
Make & Model: HACH 2100P HACH 2100Q		Serial No. S/N 10060C003010		
Reference Value	RL+10	20	100	800
Standard Lot No.	0161	0167	0168	0161
1. Time 0750	10.1	19.6	104	795
2. Time 0945	9.97	19.9	106	793
3. Time				
4. Time				

Comments:

Portable Pump and Tubing / Water Level Indicator
Decontamination Log Form

Project Name: SWMU 8/58	**Monitoring Well ID # :** CCBA-MW2	**Date:** 7/21/14

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

Pump and Tubing Bundle ID #: 1806-586	**Water Level Indicator ID #:** 210269
Personnel Performing Decontamination: Robert Lynch (Print Name:) RL (Initial:) Alfred Santillanes (Print Name:) (Initial:)	**Personnel Performing Decontamination:** Robert Lynch (Print Name:) RL (Initial:) Alfred Santillanes (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: 062374	**UN #:** 2031
	Manufacturer: AROC
	Lot Number: A0316863

Portable Pump and Tubing / Water Level Indicator
Decontamination Log Form

Project Name: SWMU 8/58	**Monitoring Well ID # :** CCBA-MW1	**Date:** 7/22/14

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

Pump and Tubing Bundle ID #: 1806-586	**Water Level Indicator ID #:** 210269
Personnel Performing Decontamination: William Gibson — Print Name: — Initial: WJG Robert Lynch — Print Name: — Initial: RL	**Personnel Performing Decontamination:** William Gibson — Print Name: — Initial: WJG Robert Lynch — Print Name: — Initial: RL

Condition of Equipment

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

List of Decontamination Materials

Distilled or **Deonized** (circle one)	**HNO_3**
Source: Culligan	**Grade:** Reagent
Lot Number: 062414	**UN #:** 2031
	Manufacturer: AROC
	Lot Number: A0316863

Groundwater Monitoring Waste Generation Log

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

Project Name	SWMU 8/58	SWMU 8/58	SWMU 8/58
Container ID # (site-date-sequence)	SWMU-CCBA-MW2-072114-01	SWMU-CCBA-MW2-072114-02	SWMU-072114
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	~ 19 gal.	~ 21 gal.	~ 30 gal.
Total Container Weight	~ 150 lbs.	~ 170 lbs.	~ 240 lbs.
COC#: Sample#-Fraction	CoC # 615626 Sample # 096263	CoC # 615626 Sample # 096263	CoC # 615626 Sample # 096263
Accumulation Date	Start: 07 / 21 / 14 Full: 07 / 21 / 14	Start: 07 / 21 / 14 Full: 07 / 21 / 14	Start: 07 / 21 / 14 Full: 07 / 21 / 14
Date Waste Moved to Accumulation Area	07 / 21 / 14	07 / 21 / 14	07 / 21 / 14
Accumulation Area Name	9925	9925	9925
Comments:			

Groundwater Monitoring Waste Generation Log

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

Project Name	SWMU 8/58	SWMU 8/58	SWMU 8/58
Container ID # (site-date-sequence)	SWMU-CCBA-MW1-072214-01	SWMU-CCBA-MW1-072214-02	SWMU-072214
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	~ 19 gal.	~ 22 gal.	~ 30 gal.
Total Container Weight	~ 150 lbs.	~ 170 lbs.	~240 lbs.
COC#: Sample#-Fraction	CoC# 615628 Sample # 096269, 096270	CoC# 615628 Sample # 096269, 096270	CoC# 615628 Sample # 096269, 096270
Accumulation Date	Start: 07 / 22 / 14 Full: 07 / 22 / 14	Start: 07 / 22 / 14 Full: 07 / 22 / 14	Start: 07 / 22 / 14 Full: 07 / 22 / 14
Date Waste Moved to Accumulation Area	07 / 22 / 14	07 / 22 / 14	07 / 22 / 14
Accumulation Area Name	9925	9925	9925
Comments:			

TAILGATE SAFETY MEETING FORM

Dept: 4142 Well Location: CCBA-MW2 Date: 7/21/14 Time: 0750

Activities: Groundwater 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: 78.0 °F Wind Speed: ~~0~~ MPH Humidity: 39.4 % Wind Chill NA °F

Chemicals Used: Acids in sample containers, standard solutions, ~~Hach ACCU-VAC ampules~~ 7/24/14
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	
ALFRED SANTILLANES	
William Gibson	

TAILGATE SAFETY MEETING FORM

Dept: 4142 Well Location: CCBA-MW1 Date: 07/22/14 Time: 0745

Activities: Groundwater 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: 80.8 °F Wind Speed: 0 MPH Humidity: 38.9 % Wind Chill NA °F

Chemicals Used: Acids in sample containers, standard solutions, ~~Hach ACCU-VAC ampules~~ TI 7/29/14
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 T Lynch	Robert T Lynch
William Gibson	William J Gibson
ALFRED SANTILLANES	Alfred Santillanes

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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: 07/16/14
Well Condition: good	Weather Condition: See Safety Tailgate Form
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 (%)	DO mg/L Comments
72.34	0749	/	START →						
72.38	0809	5	18.44	482.1	303.8	7.31	1.15	39.7	3.72
72.35	0822	10	17.83	473.5	304.9	7.37	0.55	38.9	3.70
72.38	0833	15	17.74	474.2	304.3	7.39	0.46	38.1	3.62
72.38	0844	20	17.80	475.3	303.7	7.38	0.44	38.2	3.63
72.38	0856	25	18.02	476.8	302.6	7.40	0.33	37.8	3.57
72.38	0904	28	18.18	479.6	301.8	7.40	0.24	37.7	3.55
72.38	0909	30	18.26	480.0	302.0	7.41	0.28	38.0	3.58
72.40	0914	32	18.22	479.8	301.8	7.41	0.27	38.0	3.57
72.40	0919	34	18.16	479.3	301.4	7.40	0.33	38.2	3.60
72.39	0924	36	18.09	479.1	301.3	7.40	0.41	37.9	3.58
	0925	/	sampling →						
									~4.00 gals purged from tubing
									0759

FIELD MEASUREMENT LOG FOR GROUNDWATER SAMPLE COLLECTION

Project Name: SWMU 68	Project No.: 146422.10.11.01
Well I.D.: OBS-MW 2	Date: 07/15/14
Well Condition: Good	Weather Condition: See Safety Tailgate Form
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 (%)	DO mg/L Comments
174.82	0752		START						
175.71	0816	5	19.11	484.0	282.1	7.31	0.40	38.8	3.54
175.76	0828	10	18.39	476.9	286.3	7.36	0.36	37.8	3.54
175.91	0840	15	18.12	473.7	289.2	7.37	0.34	37.0	3.49
175.94	0850	20	18.08	473.5	291.1	7.37	0.30	37.0	3.49
175.96	0900	25	18.07	473.3	291.7	7.37	0.28	37.0	3.49
175.91	0906	28	18.07	472.1	292.3	7.37	0.26	36.9	3.49
175.90	0910	30	18.09	472.8	292.2	7.38	0.30	37.1	3.50
175.89	0914	32	18.08	473.0	291.6	7.38	0.27	37.1	3.50
175.87	0919	34	18.09	473.3	291.7	7.38	0.34	37.1	3.50
175.87	0923	36	18.10	473.8	291.1	7.38	0.28	37.1	3.50
	0924		SAMPLING						
									24.00 gals purged from tubing
									0804

FIELD MEASUREMENT LOG FOR GROUNDWATER SAMPLE COLLECTION

Project Name: SWMU 68	Project No.: 146422.01.11.01
Well I.D.: OBS-MW 3	Date: 07/17/14
Well Condition: Good	Weather Condition: See Safety Tailgate Form
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 (%)	DO mg/L	Comments
69.53	0752		START							
73.25	0813	5	19.11	485.8	318.2	7.29	1.53	49.2	4.54	
74.70	0824	10	18.84	482.3	316.9	7.36	0.82	48.0	4.46	
74.83	0837	15	19.01	484.8	314.1	7.38	0.78	46.9	4.35	
74.35	0853	20	19.23	487.4	310.1	7.39	0.50	47.1	4.34	
75.04	0906	25	19.14	486.0	308.8	7.39	0.54	47.2	4.36	
75.15	0914	28	18.99	484.3	307.6	7.39	0.52	46.8	4.33	
75.27	0919	30	19.10	485.8	306.6	7.39	0.56	47.5	4.39	
75.47	0924	32	19.01	484.8	306.8	7.40	0.89	47.3	4.39	
75.65	0929	34	19.05	485.0	304.1	7.39	0.54	47.6	4.42	
75.61	0934	36	19.00	484.6	303.6	7.39	0.56	47.3	4.38	
	0935		SAMPLING							
										~4.00 gals purged from tubing
										0804

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GROUNDWATER SAMPLE COLLECTION FIELD EQUIPMENT CHECK LOG Page 1 of 2

SNL/NM Project Name: SWMU 68	SNL/NM Project No.: 146422.10.11.01
Calibrations done by: R Lynch	Date: 7/15/14

Make & Model: YSI EXO 1

YSI 6820 Sonde (S/N) with DO, Ec, pH, ORP, and temperature probes: 13C101167

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: 0633	4.00	19.2	6.99	19.2	10.00	19.2
2. Time: 1042	4.01	19.3	7.00	19.4	10.01	19.4
3. Time:						
4. Time:						
Standard lot no.:	3AD782		3AE725		3AD357	
Expiration date:	4/15		5/15		4/15	

SC Calibration

Reference Value: 1225 uS Standard Lot No.: 3AE221

Expiration Date: 5/15

	Value	Temp
1. Time: 0632	1222	19.2
2. Time: 1041	1225	19.4
3. Time:		
4. Time:		

ORP Calibration

Reference Value: 220 mV Standard Lot No: 4AA010

Expiration Date: 7/14

	Value	Temp
1. Time: 0634	220.1	19.2
2. Time: 1043	220.4	19.3
3. Time:		
4. Time:		

DO Calibration

Calibration Value:	81% air saturation @ 5200 ft.	Atmospheric Pressure in Hg
1. Time: 0631	81.5	24.39
2. Time: 1040	81.6	24.41
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: 7/15/14		
TURBIDIMETER				
Make & Model: HACH 2100P HAVH 2100Q		Serial No. S/N 10060C003101		
Reference Value	RL×10	20	100	800
Standard Lot No.	0161	0167	0168	0161
1. Time 0747	10.2	19.8	103	795
2. Time 0933	10.4	19.6	101	792
3. Time				
4. Time				

Comments:

GROUNDWATER SAMPLE COLLECTION FIELD EQUIPMENT CHECK LOG

SNL/NM Project Name: SWMU 68	SNL/NM Project No.: 146422.01.11.01
Calibrations done by: R Lynch	Date: 07/16/14

Make & Model: YSI EXO 1

YSI 6820 Sonde (S/N) with DO, Ec, pH, ORP, and temperature probes: 13C101167

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: 0640	3.99	19.3	6.99	19.3	10.00	19.3
2. Time: 1052	4.01	19.4	7.01	19.4	9.99	19.4
3. Time:						
4. Time:						
Standard lot no.:	3AD782		3AE725		3AD357	
Expiration date:	4/15		5/15		4/15	

SC Calibration

Reference Value: 1225 uS			Standard Lot No.: 3AE221
	Value	Temp	Expiration Date: 5/15
1. Time: 0639	1224	19.3	
2. Time: 1051	1226	19.3	
3. Time:			
4. Time:			

ORP Calibration

Reference Value: 220 mV			Standard Lot No: 4AA010
	Value	Temp	Expiration Date: 7/14
1. Time: 0642	219.9	19.3	
2. Time: 1053	220.2	19.4	
3. Time:			
4. Time:			

DO Calibration

Calibration Value:	81% air saturation @ 5200 ft.	Atmospheric Pressure in Hg
1. Time: 0638	81.6	24.37
2. Time: 1050	81.7	24.39
3. Time:		
4. Time:		

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

SNL/NM Project Name: SWMU 68		Project No.: 146422.01.11.01		
Calibration done by: R Lynch		Date: 07/16/14		
TURBIDIMETER				
Make & Model: HACH 2100P HACH 2100Q		Serial No. S/N 10060C003101		
Reference Value	RL=1.0	20	100	800
Standard Lot No.	0161	0167	0168	0161
1. Time 0744	10.3	19.8	101	795
2. Time 0947	10.1	19.6	102	797
3. Time				
4. Time				

Comments:

GROUNDWATER SAMPLE COLLECTION FIELD EQUIPMENT CHECK LOG

SNL/NM Project Name: SWMU 68	SNL/NM Project No.: 146422.01.11.01
Calibrations done by: R Lynch	Date: 7/17/14

Make & Model: YSI EXO 1

YSI 6820 Sonde (S/N) with DO, Ec, pH, ORP, and temperature probes: 13C101167

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: 0646	3.99	18.9	6.99	18.9	10.00	18.9
2. Time: 1104	3.99	19.0	6.99	19.0	10.00	19.0
3. Time:						
4. Time:						
Standard lot no.:	3AD782		3AE725		3AD357	
Expiration date:	4/15		5/15		4/15	

SC Calibration

Reference Value: 1225 uS — Standard Lot No.: 3AE221

Expiration Date: 5/15

	Value	Temp
1. Time: 0645	1220	18.8
2. Time: 1103	1221	18.9
3. Time:		
4. Time:		

ORP Calibration

Reference Value: 220 mV — Standard Lot No 4AA010

Expiration Date 7/14

	Value	Temp
1. Time: 0648	219.8	18.8
2. Time: 1105	220.2	19.0
3. Time:		
4. Time:		

DO Calibration

Calibration Value:	81% air saturation @ 5200 ft.	Atmospheric Pressure in Hg
1. Time: 0644	81.4	24.27
2. Time: 1102	81.8	24.35
3. Time:		
4. Time:		

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

SNL/NM Project Name: SWMU 68		Project No.: 146422.01.11.01		
Calibration done by: R Lynch		Date: 7/17/14		
TURBIDIMETER				
Make & Model: HACH 2100P HACH 2100Q		Serial No. S/N 10060C003101		
Reference Value	~~0~~ 10	20	100	800
Standard Lot No.	0161	0167	0168	0161
1. Time 0750	9.97	19.8	103	806
2. Time 0950	10.1	19.6	99.8	802
3. Time				
4. Time				

Comments:

TAILGATE SAFETY MEETING FORM

Dept: 4142 Well Location: OBS-MW 2 Date: 7/15/14 Time: 0744

Activities: Groundwater 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: 67.8 °F Wind Speed: 0 MPH Humidity: 61.5 % Wind Chill NA °F

Chemicals Used: Acids in sample containers, standard solutions, ~~Hach ACCU-VAC ampules~~ TJ 7/22/14
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

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TAILGATE SAFETY MEETING FORM

Dept: 4142 Well Location: OBS- MW 1 Date: 7/16/14 Time: 0740

Activities: Groundwater 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: 69.2 °F Wind Speed: 0 MPH Humidity: 59.6 % Wind Chill NA °F

Chemicals Used: Acids in sample containers, standard solutions, ~~Hach ACCU-VAC ampules~~ 7/29/14 TT
Other:

Safety Topics Presented

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

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

Attendees

Printed Name	Signature
Robert Lynch	
William Gibson	
ALFRED SANTILLANES	

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TAILGATE SAFETY MEETING FORM

Dept: 4142 Well Location: OBS-MW3 Date: 7/17/14 Time: 0740

Activities: Groundwater 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: 73.2 °F Wind Speed: 0 MPH Humidity: 59.6 % Wind Chill NA °F

Chemicals Used: Acids in sample containers, standard solutions, ~~Hach ACCU-VAC ampules~~ TJ 7/17/14
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

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Portable Pump and Tubing / Water Level Indicator
Decontamination Log Form

Project Name: SWMU 68	**Monitoring Well ID # :** OBS-MW2	**Date:** 07-15-14

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

Pump and Tubing Bundle ID #: 1806-586	**Water Level Indicator ID #:** 210269
Personnel Performing Decontamination: Alfred Santillanes (Print Name:) (Initial:) William Gibson (Print Name:) (Initial:)	**Personnel Performing Decontamination:** Alfred Santillanes (Print Name:) (Initial:) William Gibson (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: 062414	**UN #:** 2031
	Manufacturer: AROC
	Lot Number: A0316863

Portable Pump and Tubing / Water Level Indicator
Decontamination Log Form

Project Name: SWMU 68	**Monitoring Well ID # :** OBS-MW1	**Date:** 07/16/14

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

Pump and Tubing Bundle ID #: 1806-586	**Water Level Indicator ID #:** 210269
Personnel Performing Decontamination: Robert Lynch (Print Name:) RL (Initial:) Alfred Santillanes (Print Name:) (Initial:)	**Personnel Performing Decontamination:** Robert Lynch (Print Name:) RL (Initial:) Alfred Santillanes (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: 062414	**UN #:** 2031
	Manufacturer: AROC
	Lot Number: A0316863

Portable Pump and Tubing / Water Level Indicator
Decontamination Log Form

Project Name: SWMU 68	**Monitoring Well ID # :** OBS-MW3	**Date:** 7-17-14

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

Pump and Tubing Bundle ID #: 1806-586	**Water Level Indicator ID #:** 210269
Personnel Performing Decontamination: Afred Santillanes (Print Name:) (Initial:) William Gibson (Print Name:) (Initial:)	**Personnel Performing Decontamination:** Afred Santillanes (Print Name:) (Initial:) William Gibson (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: 062514	**UN #:** 2031
	Manufacturer: AROC
	Lot Number: A0316863

Groundwater Monitoring Waste Generation Log

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

Project Name	SWMU-68	SWMU-68	SWMU-68
Container ID # (site-date-sequence)	SWMU-OBS-MW2-071514-01	SWMU-OBS-MW2-071514-02	SWMU-071514
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	~19 gal.	~~17~~ 21 gal. WJG	~30 gal.
Total Container Weight	~ 150 lbs.	~~130~~ 170 lbs. WJG	~ 240 lbs.
COC#: Sample#-Fraction	CoC # 615622 Sample # 096251	CoC # 615622 Sample # 096251	CoC # 615622 Sample # 096251
Accumulation Date	Start: 07 / 15 / 14 Full: 07 / 15 / 14	Start: 07 / 15 / 14 Full: 07 / 15 / 14	Start: 07 / 15 / 14 Full: 07 / 15 / 14
Date Waste Moved to Accumulation Area	07 / 15 / 14	07 / 15 / 14	07 / 15 / 14
Accumulation Area Name	9925	9925	9925
Comments:			

Groundwater Monitoring Waste Generation Log

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

Project Name	SWMU 68	SWMU 68	SWMU 68
Container ID # (site-date-sequence)	SWMU-OBS-MW1-071614-01	SWMU-OBS-MW1-071614-02	SWMU-071614
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	~ 19 gal.	~ 21 gal.	~ 30 gal.
Total Container Weight	~150 lbs.	~ 170 lbs.	~ 240 lbs.
COC#: Sample#-Fraction	CoC # 615624 Sample # 096255, 096256	CoC # 615624 Sample # 096255, 096256	CoC # 615624 Sample # 096255, 096256
Accumulation Date	Start: 07 / 16 / 14 Full: 07 / 16 / 14	Start: 07 / 16 / 14 Full: 07 / 16 / 14	Start: 07 / 16 / 14 Full: 07 / 16 / 14
Date Waste Moved to Accumulation Area	07 / 16 / 14	07 / 16 / 14	07 / 16 / 14
Accumulation Area Name	9925	9925	9925
Comments:			

Groundwater Monitoring Waste Generation Log

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

Project Name	SWMU 68	SWMU 68	SWMU 68
Container ID # (site-date-sequence)	SWMU-OBS-MW3-071714-01	SWMU-OBS-MW3-071714-02	SWMU-071714
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 / 55gal.	CHPD / 55gal.	CHPD / 55gal.
Volume of Waste	~ 19 gal.	~ 21 gal.	~ 30 gal.
Total Container Weight	~ 150 lbs.	~ 170 lbs.	~ 240 lbs.
COC#: Sample#-Fraction	CoC# 615625 Sample # 096259	CoC# 615625 Sample # 096259	CoC# 615625 Sample # 096259
Accumulation Date	Start: 07 / 17 / 14 Full: 07 / 17 / 14	Start: 07 / 17 / 14 Full: 07 / 17 / 14	Start: 07 / 17 / 14 Full: 07 / 17 / 14
Date Waste Moved to Accumulation Area	07 / 17 / 14	07 / 17 / 14	07 / 17 / 14
Accumulation Area Name	9925	9925	9925
Comments:			

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

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 615628

Project Name:	SWMU 8/58 GWM	Date Samples Shipped:	7/22/14	SMO Authorization:	☐ Waste Characterization
Project/Task Manager:	Clinton Lum	Carrier/Waybill No.		SMO Contact Phone:	☐ RMMA
Project/Task Number:	146422.10.11.01	Lab Contact:	Edie Kent/803-556-8171	Lorraine Herrera/505-844-3199	☐ Released by COC No.
Service Order:	CF262-14	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:		Operational Site:			
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 Sample ID
096268	-001	CCBA-FB2	NA	7/22/14 9:19	DIW	G	3x40 ml	HCL	G	FB	TCL VOC (SW846-8260B)	
096269	-001	CCBA-MW1	79	7/22/14 9:19	GW	G	3x40 ml	HCL	G	SA	TCL VOC (SW846-8260B)	
096269	-002	CCBA-MW1	79	7/22/14 9:21	GW	AG	4x1 L	None	G	SA	TCL SVOC (SW846-8270C)	
096269	-009	CCBA-MW1	79	7/22/14 9:24	GW	P	500 ml	HNO3	G	SA	TAL Metals+U (SW846-6010/6020/7470)	
096269	-016	CCBA-MW1	79	7/22/14 9:25	GW	P	125 ml	None	G	SA	Anions (SW846-9056)	
096269	-017	CCBA-MW1	79	7/22/14 9:27	FGW	P	500 ml	HNO3	G	SA	Metals-Ca,Mg,K,Na (SW846-6020)	
096269	-018	CCBA-MW1	79	7/22/14 9:28	GW	P	125 ml	H2SO4	G	SA	Nitrate+Nitrite (EPA 353.2)	
096269	-020	CCBA-MW1	79	7/22/14 9:29	GW	P	250 ml	None	G	SA	Perchlorate (EPA 314.0)	
096269	-022	CCBA-MW1	79	7/22/14 9:30	GW	P	500 ml	None	G	SA	Alkalinity (SM2320B)	
096269	-024	CCBA-MW1	79	7/22/14 9:31	GW	AG	4x1 L	None	G	SA	High Explosives(SW846-8321A Mod.)	

Last Chain: * ☑ Yes *	Sample Tracking	SMO Use	Special Instructions/QC Requirements:
Validation Req'd: ☑ Yes	Date Entered:		EDD ☑ Yes ☐ No
Background: ☐ Yes	Entered by:		Turnaround Time ☐ 7 Day* ☐ 15 Day* ☑ 30 Day
Confirmatory: ☐ Yes	QC inits.:		Negotiated TAT ☐
			Sample Disposal ☐ Return to Client ☑ Disposal by Lab
			Return Samples By:
			Comments: Send report to Tim Jackson/4142/MS 0729/284-2547
			If Perchlorate detected,perform verification analysis using SW846-6850M.Filtered fraction collected in the field using a 0.45 micron in-line filter. Report Anions (as Br,Cl,F,SO4). Alkalinity (as total CaCO3,HCO3,CO3). 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
	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 7/22/14	Time 1014	3.Relinquished by		Org.	Date	Time
1. Received by		Org. 4142	Date 7/22/14	Time 1014	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 615628

Project Name:	SWMU 8/58 GWM	Project/Task Manager:	Clinton Lum	Project/Task No.:	146422.10.11.01		Lab use
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 Sample ID
096269	-027	CCBA-MW1	79	7/22/14 9:34	GW	P	250 ml	NaOH	G	SA	Total Cyanide (SW846-9012)	
096269	-033	CCBA-MW1	79	7/22/14 9:35	GW	P	1 L	HNO3	G	SA	Gamma Spectroscopy (EPA 901.0)	
096269	-034	CCBA-MW1	79	7/22/14 9:37	GW	P	1 L	HNO3	G	SA	Gross Alpha and Beta (EPA 900.0)	
096270	-001	CCBA-MW1	79	7/22/14 9:19	GW	G	3x40 ml	HCL	G	DU	TCL VOC (SW846-8260B)	
096270	-002	CCBA-MW1	79	7/22/14 9:21	GW	AG	4x1 L	None	G	DU	TCL SVOC (SW846-8270C)	
096270	-009	CCBA-MW1	79	7/22/14 9:24	GW	P	500 ml	HNO3	G	DU	TAL Metals+U (SW846-6010/6020/7470)	
096270	-016	CCBA-MW1	79	7/22/14 9:25	GW	P	125 ml	None	G	DU	Anions (SW846-9056)	
096270	-017	CCBA-MW1	79	7/22/14 9:27	FGW	P	500 ml	HNO3	G	DU	Metals-Ca,Mg,K,Na (SW846-6020)	
096270	-018	CCBA-MW1	79	7/22/14 9:28	GW	P	125 ml	H2SO4	G	DU	Nitrate+Nitrite (EPA 353.2)	
096270	-020	CCBA-MW1	79	7/22/14 9:29	GW	P	250 ml	None	G	DU	Perchlorate (EPA 314.0)	
096270	-022	CCBA-MW1	79	7/22/14 9:30	GW	P	500 ml	None	G	DU	Alkalinity (SM2320B)	
096270	-024	CCBA-MW1	79	7/22/14 9:31	GW	AG	4x1 L	None	G	DU	High Explosives(SW846-8321A Mod.)	
096270	-027	CCBA-MW1	79	7/22/14 9:34	GW	P	250 ml	NaOH	G	DU	Total Cyanide (SW846-9012)	
096270	-033	CCBA-MW1	79	7/22/14 9:35	GW	P	1 L	HNO3	G	DU	Gamma Spectroscopy (EPA 901.0)	
096270	-034	CCBA-MW1	79	7/22/14 9:37	GW	P	1 L	HNO3	G	DU	Gross Alpha and Beta (EPA 900.0)	
096271	-001	CCBA-TB3	NA	7/22/14 9:19	DIW	G	3x40 ml	HCL	G	TB	TCL VOC (SW846-8260B)	

Recipient Initials_____

SMO 2012-ARCOC (4-2012)

AOP 95-16

CONTRACT LABORATORY
ANALYSIS REQUEST AND CHAIN OF CUSTODY

Internal Lab

Batch No. N/A

SMO Use

AR/COC 615626

Project Name:	SWMU 8/58 GWM	Date Samples Shipped:	7/21/14	SMO Authorization:	☐ Waste Characterization
Project/Task Manager:	Clinton Lum	Carrier/Waybill No.		SMO Contact Phone: Lorraine Herrera/505-844-3199	☐ RMMA
Project/Task Number:	146422.10.11.01	Lab Contact:	Edie Kent/803-556-8171		☐ Released by COC No.
Service Order:	CF262-14	Lab Destination:	GEL	Send Report to SMO: Rita Kavanaugh/505-284-2553	☑ 4° Celsius
		Contract No.:	PO 1303873		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
096263	-001	CCBA-MW2	117	7/21/14 9:14	GW	G	3x40 ml	HCL	G	SA	TCL VOC (SW846-8260B)	
096263	-002	CCBA-MW2	117	7/21/14 9:15	GW	AG	4x1 L	None	G	SA	TCL SVOC (SW846-8270C)	
096263	-009	CCBA-MW2	117	7/21/14 9:17	GW	P	500 ml	HNO3	G	SA	TAL Metals+U (SW846-6010/6020/7470)	
096263	-016	CCBA-MW2	117	7/21/14 9:18	GW	P	125 ml	None	G	SA	Anions (SW846-9056)	
096263	-017	CCBA-MW2	117	7/21/14 9:20	FGW	P	500 ml	HNO3	G	SA	Metals-Ca,Mg,K,Na (SW846-6020)	
096263	-018	CCBA-MW2	117	7/21/14 9:21	GW	P	125 ml	H2SO4	G	SA	Nitrate+Nitrite (EPA 353.2)	
096263	-020	CCBA-MW2	117	7/21/14 9:22	GW	P	250 ml	None	G	SA	Perchlorate (EPA 314.0)	
096263	-022	CCBA-MW2	117	7/21/14 9:23	GW	P	500 ml	None	G	SA	Alkalinity (SM2320B)	
096263	-024	CCBA-MW2	117	7/21/14 9:24	GW	AG	4x1 L	None	G	SA	High Explosives(SW846-8321A Mod.)	
096263	-027	CCBA-MW2	117	7/21/14 9:26	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 Disposal ☐ Return to Client ☑ Disposal by Lab
			Return Samples By:

Conditions on Receipt

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

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

If Perchlorate detected,perform verification analysis using SW846-6850M.Filtered fraction collected in the field using a 0.45 micron in-line filter. Report Anions (as Br,Cl,F,SO4). Alkalinity (as total CaCO3,HCO3,CO3). Gamma Spectroscopy (as short list isotopes)

Lab Use

1.Relinquished by		Org. 4142	Date 7/21/14	Time 0955	3.Relinquished by	Org.	Date	Time
1. Received by		Org. 4142	Date 7/21/14	Time 0955	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 615626

Project Name:	SWMU 8/58 GWM	Project/Task Manager:	Clinton Lum	Project/Task No.:	146422.10.11.01		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
096263	-033	CCBA-MW2	117	7/21/14 9:27	GW	P	1 L	HNO3	G	SA	Gamma Spectroscopy (EPA 901.0)	
096263	-034	CCBA-MW2	117	7/21/14 9:28	GW	P	1 L	HNO3	G	SA	Gross Alpha and Beta (EPA 900.0)	
096264	-001	CCBA-TB1	NA	7/21/14 9:14	DIW	G	3x40 ml	HCL	G	TB	TCL VOC (SW846-8260B)	

Recipient Initials_____

SMO 2012-ARCOC (4-2012)

AOP 95-1

CONTRACT LABORATORY
ANALYSIS REQUEST AND CHAIN OF CUSTODY

Internal Lab

Batch No. N/A

SMO Use

AR/COC 615627

Project Name:	SWMU 8/58 GWM	Date Samples Shipped:	7-21-14	SMO Authorization:	☐ Waste Characterization
Project/Task Manager:	Clinton Lum	Carrier/Waybill No.		SMO Contact Phone:	☐ RMMA
Project/Task Number:	146422.10.11.01	Lab Contact:	Edie Kent/803-556-8171	Lorraine Herrera/505-844-3199	☐ Released by COC No.
Service Order:	CF262-14	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
096265	-001	CCBA-FB1	NA	7/21/14 10:43	DIW	G	3x40 ml	HCL	G	FB	TCL VOC (SW846-8260B)	
096266	-001	CCBA-EB1	NA	7/21/14 10:43	DIW	G	3x40 ml	HCL	G	EB	TCL VOC (SW846-8260B)	
096266	-002	CCBA-EB1	NA	7/21/14 10:45	DIW	AG	4x1 L	None	G	EB	TCL SVOC (SW846-8270C)	
096266	-009	CCBA-EB1	NA	7/21/14 10:47	DIW	P	500 ml	HNO3	G	EB	TAL Metals+U (SW846-6010/6020/7470)	
096266	-016	CCBA-EB1	NA	7/21/14 10:48	DIW	P	125 ml	None	G	EB	Anions (SW846-9056)	
096266	-017	CCBA-EB1	NA	7/21/14 10:50	FDIW	P	500 ml	HNO3	G	EB	Metals-Ca,Mg,K,Na (SW846-6020)	
096266	-018	CCBA-EB1	NA	7/21/14 10:51	DIW	P	125 ml	H2SO4	G	EB	Nitrate+Nitrite (EPA 353.2)	
096266	-020	CCBA-EB1	NA	7/21/14 10:52	DIW	P	250 ml	None	G	EB	Perchlorate (EPA 314.0)	
096266	-022	CCBA-EB1	NA	7/21/14 10:53	DIW	P	500 ml	None	G	EB	Alkalinity (SM2320B)	
096266	-024	CCBA-EB1	NA	7/21/14 10:54	DIW	AG	4x1 L	None	G	EB	High Explosives(SW846-8321A Mod.)	

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

Special Instructions/QC Requirements:

EDD ☑ Yes ☐ No

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

Negotiated TAT ☐

Sample Disposal ☐ Return to Client ☑ Disposal by Lab

Return Samples By:

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

If Perchlorate detected,perform verification analysis using SW846-6850M.Filtered fraction collected in the field using a 0.45 micron in-line filter. Report Anions (as Br,Cl,F,SO4). Alkalinity (as total CaCO3,HCO3,CO3). 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
	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 7/21/14	Time 1116	3.Relinquished by	Org.	Date	Time
1. Received by	[signature] SNL	Org. 4142	Date 7/21/14	Time 1116	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 615627

Project Name:	SWMU 8/58 GWM	Project/Task Manager:	Clinton Lum	Project/Task No.:	146422.10.11.01		Lab use
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 Sample ID
096266	-027	CCBA-EB1	NA	7/21/14 10:56	DIW	P	250 ml	NaOH	G	EB	Total Cyanide (SW846-9012)	
096266	-033	CCBA-EB1	NA	7/21/14 10:57	DIW	P	1 L	HNO3	G	EB	Gamma Spectroscopy (EPA 901.0)	
096266	-034	CCBA-EB1	NA	7/21/14 10:58	DIW	P	1 L	HNO3	G	EB	Gross Alpha and Beta (EPA 900.0)	
096267	-001	CCBA-TB2	NA	7/21/14 10:43	DIW	G	3x40 ml	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 615624

Project Name:	SWMU 68 GWM	Date Samples Shipped:	7/16/14	SMO Authorization:	☐ Waste Characterization
Project/Task Manager:	Clinton Lum	Carrier/Waybill No.		SMO Contact Phone:	☐ RMMA
Project/Task Number:	146422.10.11.01	Lab Contact:	Edie Kent/803-556-8171	Lorraine Herrera/505-844-3199	☐ Released by COC No.
Service Order:	CF263-14	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
096255	-001	OBS-MW1	153	7/16/14 9:25	GW	G	3x40 ml	HCL	G	SA	TCL VOC (SW846-8260B)	
096255	-002	OBS-MW1	153	7/16/14 9:27	GW	AG	4x1 L	None	G	SA	TCL SVOC (SW846-8270C)	
096255	-009	OBS-MW1	153	7/16/14 9:30	GW	P	500 ml	HNO3	G	SA	TAL Metals+U (SW846-6010/6020/7470)	
096255	-014	OBS-MW1	153	7/16/14 9:31	GW	P	250 ml	None	G	SA	Hexavalent Chromium (SW846-7196A)	
096255	-016	OBS-MW1	153	7/16/14 9:32	GW	P	125 ml	None	G	SA	Anions (SW846-9056)	
096255	-017	OBS-MW1	153	7/16/14 9:34	FGW	P	500 ml	HNO3	G	SA	Metals-Ca,Mg,K,Na (SW846-6020)	
096255	-018	OBS-MW1	153	7/16/14 9:35	GW	P	125 ml	H2SO4	G	SA	Nitrate+Nitrite (EPA 353.2)	
096255	-020	OBS-MW1	153	7/16/14 9:36	GW	P	250 ml	None	G	SA	Perchlorate (EPA 314.0)	
096255	-022	OBS-MW1	153	7/16/14 9:37	GW	P	500 ml	None	G	SA	Alkalinity (SM2320B)	
096255	-024	OBS-MW1	153	7/16/14 9:38	GW	AG	4x1 L	None	G	SA	High Explosives(SW846-8321A Mod.)	

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

Special Instructions/QC Requirements:

EDD ☑ Yes ☐ No

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

Negotiated TAT ☐

Sample Disposal ☐ Return to Client ☑ Disposal by Lab

Return Samples By:

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

If Perchlorate detected,perform verification analysis using SW846-6850M.Filtered fraction collected in the field using a 0.45 micron in-line filter. Report Anions (as Br,Cl,F,SO4). Alkalinity (as total CaCO3,HCO3,CO3). Gamma Spectroscopy (as short list isotopes)

Conditions on Receipt

Lab Use

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

1.Relinquished by		Org. 4142	Date 7/16/14	Time 1013	3.Relinquished by	Org.	Date	Time
1. Received by	GMO	Org. 4142	Date 7/16/14	Time 1013	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 615624

Project Name:	SWMU 68 GWM	Project/Task Manager:	Clinton Lum	Project/Task No.:	146422.10.11.01		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
096255	-027	OBS-MW1	153	7/16/14 9:41	GW	P	250 ml	NaOH	G	SA	Total Cyanide (SW846-9012)	
096255	-033	OBS-MW1	153	7/16/14 9:42	GW	P	1 L	HNO3	G	SA	Gamma Spectroscopy (EPA 901.0)	
096255	-034	OBS-MW1	153	7/16/14 9:44	GW	P	1 L	HNO3	G	SA	Gross Alpha and Beta (EPA 900.0)	
096255	-035	OBS-MW1	153	7/16/14 9:46	GW	P	1 L	HNO3	G	SA	Isotopic Uranium (HASL 300)	
096256	-001	OBS-MW1	153	7/16/14 9:25	GW	G	3x40 ml	HCL	G	DU	TCL VOC (SW846-8260B)	
096256	-002	OBS-MW1	153	7/16/14 9:27	GW	AG	4x1 L	None	G	DU	TCL SVOC (SW846-8270C)	
096256	-009	OBS-MW1	153	7/16/14 9:30	GW	P	500 ml	HNO3	G	DU	TAL Metals+U (SW846-6010/6020/7470)	
096256	-014	OBS-MW1	153	7/16/14 9:31	GW	P	250 ml	None	G	DU	Hexavalent Chromium (SW846-7196A)	
096256	-016	OBS-MW1	153	7/16/14 9:32	GW	P	125 ml	None	G	DU	Anions (SW846-9056)	
096256	-017	OBS-MW1	153	7/16/14 9:34	FGW	P	500 ml	HNO3	G	DU	Metals-Ca,Mg,K,Na (SW846-6020)	
096256	-018	OBS-MW1	153	7/16/14 9:35	GW	P	125 ml	H2SO4	G	DU	Nitrate+Nitrite (EPA 353.2)	
096256	-020	OBS-MW1	153	7/16/14 9:36	GW	P	250 ml	None	G	DU	Perchlorate (EPA 314.0)	
096256	-022	OBS-MW1	153	7/16/14 9:37	GW	P	500 ml	None	G	DU	Alkalinity (SM2320B)	
096256	-024	OBS-MW1	153	7/16/14 9:38	GW	AG	4x1 L	None	G	DU	High Explosives(SW846-8321A Mod.)	
096256	-027	OBS-MW1	153	7/16/14 9:41	GW	P	250 ml	NaOH	G	DU	Total Cyanide (SW846-9012)	
096256	-033	OBS-MW1	153	7/16/14 9:42	GW	P	1 L	HNO3	G	DU	Gamma Spectroscopy (EPA 901.0)	
096256	-034	OBS-MW1	153	7/16/14 9:44	GW	P	1 L	HNO3	G	DU	Gross Alpha and Beta (EPA 900.0)	
096256	-035	OBS-MW1	153	7/16/14 9:46	GW	P	1 L	HNO3	G	DU	Isotopic Uranium (HASL 300)	
096257	-001	OBS-TB3	NA	7/16/14 9:25	DIW	G	3x40 ml	HCL	G	TB	TCL VOC (SW846-8260B)	
096261	-014	OBS-EB2	NA	7/16/14 8:15	DIW	P	250 ml	None	G	EB	Hexavalent Chromium (SW846-7196A)	

Recipient Initials_____

CONTRACT LABORATORY
ANALYSIS REQUEST AND CHAIN OF CUSTODY

Internal Lab

Batch No. | SMO Use | AR/COC 615622

Project Name:	SWMU 68 GWM	Date Samples Shipped:		SMO Authorization:	☐ Waste Characterization ☐ RMMA ☐ Released by COC No. ☑ 4° Celsius
Project/Task Manager:	Clinton Lum	Carrier/Waybill No.		SMO Contact Phone:	
Project/Task Number:	146422.10.11.01	Lab Contact:	Edie Kent/803-556-8171	Lorraine Herrera/505-844-3199	
Service Order:	CF263-14	Lab Destination:	GEL	Send Report to SMO:	
		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
096251	-001	OBS-MW2	252	7/15/14 9:24	GW	G	3x40 ml	HCL	G	SA	TCL VOC (SW846-8260B)	
096251	-002	OBS-MW2	252	7/15/14 9:25	GW	AG	4x1 L	None	G	SA	TCL SVOC (SW846-8270C)	
096251	-009	OBS-MW2	252	7/15/14 9:27	GW	P	500 ml	HNO3	G	SA	TAL Metals+U (SW846-6010/6020/7470)	
096251	-014	OBS-MW2	252	7/15/14 9:28	GW	P	250 ml	None	G	SA	Hexavalent Chromium (SW846-7196A)	
096251	-016	OBS-MW2	252	7/15/14 9:29	GW	P	125 ml	None	G	SA	Anions (SW846-9056)	
096251	-017	OBS-MW2	252	7/15/14 9:30	FGW	P	500 ml	HNO3	G	SA	Metals-Ca,Mg,K,Na (SW846-6020)	
096251	-018	OBS-MW2	252	7/15/14 9:32	GW	P	125 ml	H2SO4	G	SA	Nitrate+Nitrite (EPA 353.2)	
096251	-020	OBS-MW2	252	7/15/14 9:33	GW	P	250 ml	None	G	SA	Perchlorate (EPA 314.0)	
096251	-022	OBS-MW2	252	7/15/14 9:34	GW	P	500 ml	None	G	SA	Alkalinity (SM2320B)	
096251	-024	OBS-MW2	252	7/15/14 9:35	GW	AG	4x1 L	None	G	SA	High Explosives(SW846-8321A Mod.)	

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

Special Instructions/QC Requirements:

EDD ☑ Yes ☐ No

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

Negotiated TAT ☐

Sample Disposal ☐ Return to Client ☑ Disposal by Lab

Return Samples By:

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

If Perchlorate detected,perform verification analysis using SW846-6850M.Filtered fraction collected in the field using a 0.45 micron in-line filter. Report Anions (as Br,Cl,F,SO4). Alkalinity (as total CaCO3,HCO3,CO3). 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
	Alfred Santillanes		AS	SNL/4142/505-844-5130/505-228-0710
	William Gibson		WJG	SNL/4142/505-284-3307/505-239-7367

1.Relinquished by		Org. 4142	Date 7/15/14	Time 10:10	3.Relinquished by		Org.	Date	Time
1. Received by		Org. 4142	Date 7/15/14	Time 1010	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 615622

Project Name:	SWMU 68 GWM	Project/Task Manager:	Clinton Lum	Project/Task No.:	146422.10.11.01		Lab use
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 Sample ID
096251	-027	OBS-MW2	252	7/15/14 9:37	GW	P	250 ml	NaOH	G	SA	Total Cyanide (SW846-9012)	
096251	-033	OBS-MW2	252	7/15/14 9:38	GW	P	1 L	HNO3	G	SA	Gamma Spectroscopy (EPA 901.0)	
096251	-034	OBS-MW2	252	7/15/14 9:39	GW	P	1 L	HNO3	G	SA	Gross Alpha and Beta (EPA 900.0)	
096251	-035	OBS-MW2	252	7/15/14 9:40	GW	P	1 L	HNO3	G	SA	Isotopic Uranium (HASL 300)	
096252	-001	OBS-TB1	NA	7/15/14 9:24	DIW	G	3x40 ml	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 615625

Project Name:	SWMU 68 GWM	Date Samples Shipped:	7/17/14	SMO Authorization:	☐ Waste Characterization
Project/Task Manager:	Clinton Lum	Carrier/Waybill No.		SMO Contact Phone:	☐ RMMA
Project/Task Number:	146422.10.11.01	Lab Contact:	Edie Kent/803-556-8171	Lorraine Herrera/505-844-3199	☐ Released by COC No.
Service Order:	CF263-14	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
096258	-001	OBS-FB1	NA	7/17/14 9:35	DIW	G	3x40 ml	HCL	G	FB	TCL VOC (SW846-8260B)	
096259	-001	OBS-MW3	208	7/17/14 9:35	GW	G	3x40 ml	HCL	G	SA	TCL VOC (SW846-8260B)	
096259	-002	OBS-MW3	208	7/17/14 9:36	GW	AG	4x1 L	None	G	SA	TCL SVOC (SW846-8270C)	
096259	-009	OBS-MW3	208	7/17/14 9:38	GW	P	500 ml	HNO3	G	SA	TAL Metals+U (SW846-6010/6020/7470)	
096259	-014	OBS-MW3	208	7/17/14 9:39	GW	P	250 ml	None	G	SA	Hexavalent Chromium (SW846-7196A)	
096259	-016	OBS-MW3	208	7/17/14 9:40	GW	P	125 ml	None	G	SA	Anions (SW846-9056)	
096259	-017	OBS-MW3	208	7/17/14 9:42	FGW	P	500 ml	HNO3	G	SA	Metals-Ca,Mg,K,Na (SW846-6020)	
096259	-018	OBS-MW3	208	7/17/14 9:43	GW	P	125 ml	H2SO4	G	SA	Nitrate+Nitrite (EPA 353.2)	
096259	-020	OBS-MW3	208	7/17/14 9:44	GW	P	250 ml	None	G	SA	Perchlorate (EPA 314.0)	
096259	-022	OBS-MW3	208	7/17/14 9:45	GW	P	500 ml	None	G	SA	Alkalinity (SM2320B)	

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

If Perchlorate detected,perform verification analysis using SW846-6850M.Filtered fraction collected in the field using a 0.45 micron in-line filter. Report Anions (as Br,Cl,F,SO4). Alkalinity (as total CaCO3,HCO3,CO3). 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
	Alfred Santillanes			SNL/4142/505-844-5130/505-228-0710
	William Gibson			SNL/4142/505-284-3307/505-239-7367

1.Relinquished by		Org. 4142	Date 7/17/14	Time 1024	3.Relinquished by	Org.	Date	Time
1. Received by		Org. 4142	Date 7/17/14	Time 1024	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 615625

Project Name:	SWMU 68 GWM	Project/Task Manager:	Clinton Lum	Project/Task No.:	146422.10.11.01		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
096259	-024	OBS-MW3	208	7/17/14 9:46	GW	AG	4x1 L	None	G	SA	High Explosives(SW846-8321A Mod.)	
096259	-027	OBS-MW3	208	7/17/14 9:48	GW	P	250 ml	NaOH	G	SA	Total Cyanide (SW846-9012)	
096259	-033	OBS-MW3	208	7/17/14 9:49	GW	P	1 L	HNO3	G	SA	Gamma Spectroscopy (EPA 901.0)	
096259	-034	OBS-MW3	208	7/17/14 9:50	GW	P	1 L	HNO3	G	SA	Gross Alpha and Beta (EPA 900.0)	
096259	-035	OBS-MW3	208	7/17/14 9:51	GW	P	1 L	HNO3	G	SA	Isotopic Uranium (HASL 300)	
096260	-001	OBS-TB4	NA	7/17/14 9:35	DIW	G	3x40 ml	HCL	G	TB	TCL VOC (SW846-8260B)	

Recipient Initials_____

SMO 2012-ARCOC (4-2012)

AOP 95-16

CONTRACT LABORATORY
ANALYSIS REQUEST AND CHAIN OF CUSTODY

Internal Lab

Batch No.

SMO Use

AR/COC 615623

Project Name:	SWMU 68 GWM	Date Samples Shipped:		SMO Authorization:	☐ Waste Characterization
Project/Task Manager:	Clinton Lum	Carrier/Waybill No.		SMO Contact Phone:	☐ RMMA
Project/Task Number:	146422.10.11.01	Lab Contact:	Edie Kent/803-556-8171	Lorraine Herrera/505-844-3199	☐ Released by COC No.
Service Order:	CF263-14	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
096253	-001	OBS-EB1	NA	7/15/14 10:58	DIW	G	3x40 ml	HCL	G	EB	TCL VOC (SW846-8260B)	
096253	-002	OBS-EB1	NA	7/15/14 10:59	DIW	AG	4x1 L	None	G	EB	TCL SVOC (SW846-8270C)	
096253	-009	OBS-EB1	NA	7/15/14 11:01	DIW	P	500 ml	HNO3	G	EB	TAL Metals+U (SW846-6010/6020/7470)	
096253	-014	OBS-EB1	NA	7/15/14 11:02	DIW	P	250 ml	None	G	EB	Hexavalent Chromium (SW846-7196A)	
096253	-016	OBS-EB1	NA	7/15/14 11:03	DIW	P	125 ml	None	G	EB	Anions (SW846-9056)	
096253	-017	OBS-EB1	NA	7/15/14 11:04	FDIW	P	500 ml	HNO3	G	EB	Metals-Ca,Mg,K,Na (SW846-6020)	
096253	-018	OBS-EB1	NA	7/15/14 11:06	DIW	P	125 ml	H2SO4	G	EB	Nitrate+Nitrite (EPA 353.2)	
096253	-020	OBS-EB1	NA	7/15/14 11:07	DIW	P	250 ml	None	G	EB	Perchlorate (EPA 314.0)	
096253	-022	OBS-EB1	NA	7/15/14 11:08	DIW	P	500 ml	None	G	EB	Alkalinity (SM2320B)	
096253	-024	OBS-EB1	NA	7/15/14 11:09	DIW	AG	4x1 L	None	G	EB	High Explosives(SW846-8321A Mod.)	

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

Special Instructions/QC Requirements:

EDD ☑ Yes ☐ No

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

Negotiated TAT ☐

Sample Disposal ☐ Return to Client ☑ Disposal by Lab

Return Samples By:

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

If Perchlorate detected,perform verification analysis using SW846-6850M.Filtered fraction collected in the field using a 0.45 micron in-line filter. Report Anions (as Br,Cl,F,SO4). Alkalinity (as total CaCO3,HCO3,CO3). 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
	Alfred Santillanes		AS	SNL/4142/505-844-5130/505-228-0710
	William Gibson			SNL/4142/505-284-3307/505-239-7367

1.Relinquished by		Org. 4142	Date 7/15/14	Time 1414	3.Relinquished by	Org.	Date	Time
1. Received by	SNL	Org. 4142	Date 7/15/14	Time 1414	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 615623

Project Name:	SWMU 68 GWM	Project/Task Manager:	Clinton Lum	Project/Task No.:	146422.10.11.01		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
096253	-027	OBS-EB1	NA	7/15/14 11:11	DIW	P	250 ml	NaOH	G	EB	Total Cyanide (SW846-9012)	
096253	-033	OBS-EB1	NA	7/15/14 11:12	DIW	P	1 L	HNO3	G	EB	Gamma Spectroscopy (EPA 901.0)	
096253	-034	OBS-EB1	NA	7/15/14 11:13	DIW	P	1 L	HNO3	G	EB	Gross Alpha and Beta (EPA 900.0)	
096253	-035	OBS-EB1	NA	7/15/14 11:14	DIW	P	1 L	HNO3	G	EB	Isotopic Uranium (HASL 300)	
096254	-001	OBS-TB2	NA	7/15/14 10:58	DIW	G	3x40 ml	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: October 10, 2014

To: File

From: Mary Donivan

Subject: Inorganic Data Review and Validation – SNL
Site: SWMU 8/58 GWM
AR/COC: 615626, 615627 and 615628
SDG: 353139
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 4.

Summary

Four samples were prepared and analyzed with accepted procedures using methods EPA 9012A (total cyanide), EPA 314.0 (perchlorate), EPA 9056 (anions by IC), EPA 353.2 (nitrate/nitrite) and SM 2320B (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 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.

Alkalinity blank results were reported, but were not assessed for data validation.

Laboratory Control Sample (LCS)

All LCS acceptance criteria were met.

Matrix Spike (MS)

All MS/PS recoveries met QC acceptance criteria.

The MS for perchlorate was performed on an SNL sample from another SDG, no sample data were qualified as a result.

Laboratory Replicate

The replicate analyses met all QC acceptance criteria.

The replicate analysis for perchlorate was performed on an SNL sample from another SDG, no sample data will be qualified as a result.

Detection Limits/Dilutions

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

Nitrate/Nitrite:
Sample -005 was diluted 10X and samples -031 and -042 were diluted 5X.

Anions:
Sample -004 was diluted 10X and samples -030 and -041 were diluted 5X for chloride and sulfate.

Other QC

An EB was submitted with ARCOC 615627 and it was associated with the samples from ARCOC 615628. A field duplicate pair was submitted with ARCOC 615628. 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:** 10/14/14

ANALYTICAL QUALITY ASSOCIATES, INC.

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

Memorandum

Date: October 10, 2014

To: File

From: Mary Donivan

Subject: LC/MS/MS Organic Data Review and Validation – SNL
Site: SWMU 8/58 GWM
AR/COC: 615626, 615627 and 615628
SDG: 353139
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 4.

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 MS/MSD %Rs were <10% for 1,3,5-trinitrobenzene and tetryl. The associated sample results were non-detects and will be **qualified R,MS3**.
2. The LCS %Rs were <10% for 1,3,5-trinitrobenzene and tetryl. The associated sample results were non-detects and will be **qualified R,L3**.

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

Holding Times

The samples were extracted and analyzed within the prescribed holding times and properly preserved. It should be noted that the samples had exceeded the method-specified holding time for re-extraction when the LCS and MS/MSD failures occurred.

Instrument Tune

The instrument tune was not reported or evaluated.

Calibration

All initial and continuing calibration met QC acceptance criteria.

Reporting Limit Verification

All CRI recoveries met QC acceptance criteria.

Blanks

No target analytes were detected in the blanks.

Surrogates

All surrogate recoveries met QC acceptance criteria.

Internal Standards

All internal standards met QC acceptance criteria.

Matrix Spike/Matrix Spike Duplicate (MS/MSD)

The MS/MSD analyses met all QC acceptance criteria except as noted above in the Summary section and as follows. The MS/MSD RPD was >20% for 1,3,5-trinitrobenzene. The associated sample results were non-detects and would be qualified UJ,MS5, but the sample results were rejected due to MS and LCS recovery failures and will not be further qualified.

Laboratory Control Sample (LCS)

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

Detection Limits/Dilutions

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

Other QC

An EB was submitted with ARCOC 615627 and it was associated with the samples from ARCOC 615628. A field duplicate pair was submitted with ARCOC 615628. 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:** 10/14/14

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Date: October 10, 2014

To: File

From: Mary Donivan

Subject: Inorganic Data Review and Validation – SNL
Site: SWMU 8/58 GWM
AR/COC: 615626, 615627 and 615628
SDG: 353139, 353176 and 356816
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 4.

Summary

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

ICP-AES:

1. V was detected in the ICB and a bracketing CCB at negative concentrations with absolute values < PQL. The associated results for samples 353139016, -029 and -040 were non-detects and will be **qualified UJ, B4.**

ICP-MS:

1. The original As results for samples 353139029 (096269-009) and -040 (096270-009) did not agree with historical data. The samples were re-logged and reanalyzed as 356816001(096269-R09) and -002 (096270-R09). Since the original sample results were not verified, they will be **qualified R,X1** per client request.
2. Ca was detected at <PQL in the MB. The associated results for samples 353139016 and 353176002 were detects ≤5X the MB concentration and will be **qualified 0.36U,B** at 5X the MB value.
3. Cu was detected at <PQL in the unfiltered EB, sample 353139016, which was associated with samples -029 and -040. The associated sample results were detects ≤5X the EB value and will be **qualified 0.0031U,B2** at 5X the EB value.
4. The MS %R was >125% for Be. The associated results for samples -029 and -040 were detects and will be **qualified J+,MS2**.

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 criteria 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 and as follows.

ICP-AES:
V was detected in the ICB and a bracketing CCB at negative concentrations with absolute values < PQL. The associated result for sample -003 was a detect >5X the MDL and will not be qualified.

ICP-MS:
Ca was detected at < PQL in the MB. The associated results for all samples *except* 353139016 and 353176002 were detects >5X the MB concentration and will not be qualified.

Sb was detected in the MB at a concentration < the PQL. The associated sample results were non-detects and will not be qualified.

Ca was detected in the unfiltered EB, sample 353139016, and the filtered EB, sample 35353176002 at concentrations < the PQL. These results were qualified non-detect due to MB contamination and were not applied to the associated sample results.

Cr was detected in the unfiltered EB, sample -016, which was associated with samples -029 and -040 at a concentration < the PQL. The associated sample results were non-detects and will not be qualified.

ICP -MS Internal Standards

The ICP-MS internal standards met QC acceptance criteria.

Matrix Spike (MS)

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

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

The MS %R was >125% for Be. The associated results for samples -003 and -016 were non-detects and will not 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. All unfiltered samples *except* 353139016 were diluted 5X for Na, samples -003 and -040 were diluted 5X for Ca and all filtered samples *except* 353176002 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 concentration of Ca, Mg, Al and Fe were < that in the ICS solution.

ICP Serial Dilution

The serial dilutions met all QC acceptance criteria.

Other QC
An EB was submitted with ARCOC 615627 and it was associated with the samples from ARCOC 615628. A field duplicate pair was submitted with ARCOC 615628. 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:** 10/14/14

ANALYTICAL QUALITY ASSOCIATES, INC.

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Memorandum

Date: October 13, 2014

To: File

From: Mary Donivan

Subject: Radiochemical Data Review and Validation – SNL
Site: SWMU 8/58 GWM
AR/COC: 615626, 615627 and 615628
SDG: 353139
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 4.

Summary

Four samples were prepared and analyzed with approved procedures using methods EPA 901.1 (gamma spec – short list) 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. Gross alpha and gross beta were detected at > the MDAs and the 2-sigma TPUs in the EB, sample 353139024, which was associated with samples -037 and -048. The associated sample results were detects > the MDAs and the 2-sigma TPUs but ≤5X the EB values and will be **qualified 8.8U,B2** for gross alpha and **7.5U,B2** for gross beta.
2. All sample results that were > the MDA but ≤3X the MDA will be **qualified J,FR7.**

Gammaspec:

1. No peaks were identified for K-40 for sample -023. The associated sample result is considered ND at the calculated MDA and will be **qualified BD,Z2**.
2. All sample results which were either < the associated 2-sigma TPU or < the associated MDA will be **qualified BD,FR3.**

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 except as noted above in the Summary section.

Tracer/Carrier Recovery

Tracers or carriers were not required for these methods.

Matrix Spike/Matrix Spike Duplicate (MS/MSD)

The MS/MSD met all QC acceptance criteria.

Gross Alpha/Beta:
It should be noted that the MS/MSD was performed on a sample of similar matrix from another SNL SDG for gross alpha only. No sample data will be qualified as a result.

Laboratory Replicate

All replicate error ratio acceptance criteria were met.

Gross Alpha/Beta:
It should be noted that the replicate was performed on a sample of similar matrix from another SNL SDG for gross alpha only. No sample data will be qualified as a result.

Laboratory Control Sample (LCS)

All LCS recoveries met QC acceptance criteria.

Detection Limits/Dilutions

The samples were not diluted.

Other QC

An EB was submitted with ARCOC 615627 and it was associated with the samples from ARCOC 615628. A field duplicate pair was submitted with ARCOC 615628. 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:** 10/14/14

PO Box 21987
Albuquerque, NM 87154
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Memorandum

Date: October 9, 2014

To: File

From: Mary Donivan

Subject: GC/MS Organic Data Review and Validation – SNL
Site: SWMU 8/58 GWM
AR/COC: 615626, 615627 and 615628
SDG: 353139
Laboratory: GEL
Project/Task: 146422.10.11.01
Analysis: SVOCs

See the attached Data Validation Worksheets for supporting documentation on the data review and validation. Data are evaluated using SNL/NM SMO AOP 00-03 Rev 4.

Summary

Four samples were prepared and analyzed with accepted procedures using methods EPA 3510C/8270D (SVOCs). All compounds were successfully analyzed. Problems were identified with the data package that resulted in the qualification of data.

Instrument MSD8 (samples 353139002 and -015):

1. The ICAL %RSD was >15% but ≤40% and the ICV %D was >20% but ≤40% with negative bias for 2,4-dinitrophenol. The associated sample results were non-detects and will be **qualified UJ,I3,C3**.
2. The ICAL %RSD was >15% but ≤40% and CCV %D was >40% but ≤60% with negative bias for p-nitroaniline. The associated sample results were non-detects and will be **qualified UJ,I3,C3**.

Instrument MSD5 (samples -028 and -039):

1. The CCV %D was >40% but ≤60% with a negative bias for p-nitroaniline. The associated sample results were non-detects and will be **qualified UJ,C3.**
2. The MS/MSD RPDs were >30% for all target compounds. All associated sample results were non-detects and will be **qualified UJ,MS5**.
3. The MSD %Rs were < the lower laboratory acceptance limit for 24 compounds (see SVOC worksheet). The associated sample results were all non-detects and will be **qualified UJ,MS3.**

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

Holding Times

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

Instrument Tune

All instrument tune requirements were met.

Calibration

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

Instrument MSD8 (samples -002 and -015):
The CCV %D was >20% but ≤40% with negative bias for carbazole. The associated sample results were non-detects and since no other calibration infractions occurred, will not be qualified.

The CCV %Ds were >20% with positive bias for hexachlorobenzene and dibenzo(a,h)anthracene. The associated sample results were non-detects and since no other calibration infractions occurred, will not be qualified.

Instrument MSD5 (samples -028 and -039):
The ICV or CCV %Ds were >20% but ≤40% with negative bias for 2,4-dinitrophenol, carbazole, and hexachlorocyclopentadiene. The associated sample results were non-detects and since no other calibration infractions occurred, will not be qualified.

The CCV %Ds were >20% with positive bias for di-n-butylphthalate, di-n-octylphthalate, hexachloroethane, n-nitrosodipropylamine and bis(2-ethylhexyl)phthalate. The associated sample results were non-detects and since no other calibration infractions occurred, will not be qualified.

Blanks

No target analytes were detected in the blanks.

Surrogates

All surrogate recoveries met QC acceptance criteria.

Internal Standards

All internal standards met QC acceptance criteria.

Matrix Spike/Matrix Spike Duplicate (MS/MSD)

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

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 ARCOC 615627 and it was associated with the samples from ARCOC 615628. A field duplicate pair was submitted with ARCOC 615628. 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:** 10/14/14

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Memorandum

Date: October 8, 2014

To: File

From: Mary Donivan

Subject: GC/MS Organic Data Review and Validation – SNL
Site: SWMU 8/58 GWM
AR/COC: 615626, 615627 and 615628
SDG: 353139
Laboratory: GEL
Project/Task: 146422.10.11.01
Analysis: VOCs

See the attached Data Validation Worksheets for supporting documentation on the data review and validation. Data are evaluated using SNL/NM SMO AOP 00-03 Rev 4.

Summary

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

1. The ICAL %RSD was >40% but ≤60%, the ICV %D was >20% but ≤40% with negative bias and the CCV %D was >40% but ≤60% with negative bias for methylene chloride. The associated sample results were non-detects and will be **qualified UJ,I3,C3**.
2. The ICAL %RSD was >15% but ≤40% and the ICV/CCV %Ds were >20% but ≤40% with negative bias for bromomethane. The associated sample results were non-detects and will be **qualified UJ,I3,C3**.
3. The ICAL %RSD was >15% but ≤40% and the ICV %D was >20% with positive bias for bromoform. The associated result for sample 353139013 was a detect and will be **qualified J+,I3,C3**.
4. The ICAL %RSD was >15% but ≤40% for dibromochloromethane. The associated results for samples -013 and -014 were detects and will be **qualified J+,I3.**
5. The MS/MSD %Rs were > the upper laboratory acceptance limit for bromoform and dibromochloromethane. The bromoform result for sample -013 and the dibromochloromethane results for samples -013 and -014 were detects and will be **qualified J+,MS2.**
6. The MSD %R was < the lower laboratory acceptance limits but ≥10% for bromomethane. The associated sample results were non-detects and will be **qualified UJ,MS3**.

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

Holding Times

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

Instrument Tune

All instrument tune requirements were met.

Calibration

The initial calibration and continuing calibration data met QC acceptance criteria except as noted above in the Summary section and as follows. The ICAL %RSD was >15% but ≤40% for dibromochloromethane. The associated results for all samples *except* -013 and -014 were non-detects and since no other calibration infractions occurred, will not be qualified.

The ICAL %RSDs were >15% but ≤40% and the ICV %D was >20% with positive bias for bromoform and 1,2-dibromo-3-chloropropane. All associated sample results *except* the bromoform result for sample -013 were non-detects, and since a positive ICV/CCV outlier is not considered a second calibration infraction, no sample results will be qualified.

Blanks

No target analytes were detected in the blanks except as follows. Acetone was detected at a concentration < the PQL and bromodichloromethane, chloroform and dibromochloromethane at concentrations >the PQL in the EB, sample -014, which was associated with samples -027 and -038. The associated sample results were non-detects and will not be qualified.

Acetone was detected at a concentration < the PQL and chloroform was detected at a concentration > the PQL was in the FB, sample -026, which was associated with samples -027 and -038. The associated sample results were non-detects and will not be qualified.

Bromoform was detected at a concentration < the PQL and bromodichloromethane, chloroform and dibromochloromethane at concentrations >the PQL in the FB, sample -013, which was not associated with any samples in this SDG. No sample results were qualified.

Surrogates

All surrogate recoveries met QC acceptance criteria.

Internal Standards

All internal standards met QC acceptance criteria.

Matrix Spike/Matrix Spike Duplicate (MS/MSD)

All MS/MSD acceptance criteria were met except as noted above in the Summary section and as follows. The MS and/or MSD %Rs were > the upper laboratory acceptance limit for bromoform, dibromochloromethane and 1,2-dibromo-3-chloropane. All associated sample results *except* the bromoform result for sample -013 and the dibromochloromethane results for samples -013 and -014 were non-detects and will not be qualified.

It should be noted that the parent sample for the MS/MSD was an SNL sample from another SDG. No sample data were qualified as a result.

Laboratory Control Sample (LCS)

All LCS acceptance criteria were met except as follows. The %Rs were < the lower laboratory acceptance limit but ≥10% for bromomethane and methylene chloride. Up to three outliers per LCS are allowed since 52 analytes were reported. Therefore, the associated sample results will not be qualified.

Detection Limits/Dilutions

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

Tentatively Identified Compounds (TICs)

TIC reports were not required.

Other QC

Three TBs were submitted, one associated with each ARCOC. An EB was submitted with ARCOC 615627 and it was associated with the samples from ARCOC 615628. An FB was submitted with ARCOC 615627 and was not associated with any samples. An FB was submitted with ARCOC 615628 and was associated with the samples from that ARCOC. A field duplicate pair was submitted with ARCOC 615628. 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:** 10/14/14

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
EPA 900.0/SW846 9310			
	096266-034/CCBA-EB1	ALPHA (12587-46-1)	J, FR7
	096266-034/CCBA-EB1	BETA (12587-47-2)	J, FR7
	096269-034/CCBA-MW1	ALPHA (12587-46-1)	8.8U, B2
	096269-034/CCBA-MW1	BETA (12587-47-2)	7.5U, B2
	096270-034/CCBA-MW1	ALPHA (12587-46-1)	8.8U, B2
	096270-034/CCBA-MW1	BETA (12587-47-2)	7.5U, B2
EPA 901.1			
	096263-033/CCBA-MW2	Americium-241 (14596-10-2)	BD, FR3
	096263-033/CCBA-MW2	Cesium-137 (10045-97-3)	BD, FR3
	096263-033/CCBA-MW2	Cobalt-60 (10198-40-0)	BD, FR3
	096263-033/CCBA-MW2	Potassium-40 (13966-00-2)	BD, FR3
	096266-033/CCBA-EB1	Americium-241 (14596-10-2)	BD, FR3
	096266-033/CCBA-EB1	Cesium-137 (10045-97-3)	BD, FR3
	096266-033/CCBA-EB1	Cobalt-60 (10198-40-0)	BD, FR3
	096266-033/CCBA-EB1	Potassium-40 (13966-00-2)	BD, Z2
	096269-033/CCBA-MW1	Americium-241 (14596-10-2)	BD, FR3
	096269-033/CCBA-MW1	Cesium-137 (10045-97-3)	BD, FR3
	096269-033/CCBA-MW1	Cobalt-60 (10198-40-0)	BD, FR3
	096269-033/CCBA-MW1	Potassium-40 (13966-00-2)	BD, FR3
	096270-033/CCBA-MW1	Americium-241 (14596-10-2)	BD, FR3
	096270-033/CCBA-MW1	Cesium-137 (10045-97-3)	BD, FR3
	096270-033/CCBA-MW1	Cobalt-60 (10198-40-0)	BD, FR3
	096270-033/CCBA-MW1	Potassium-40 (13966-00-2)	BD, FR3
SW846 3005/6010B			

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
	096266-009/CCBA-EB1	Vanadium (7440-62-2)	UJ, B4
	096269-009/CCBA-MW1	Vanadium (7440-62-2)	UJ, B4
	096270-009/CCBA-MW1	Vanadium (7440-62-2)	UJ, B4
SW846 3005/6020 DOE-AL			
	096266-009/CCBA-EB1	Calcium (7440-70-2)	0.36U, B
	096266-017/CCBA-EB1	Calcium (7440-70-2)	0.36U, B
	096269-009/CCBA-MW1	Arsenic (7440-38-2)	R, X1
	096269-009/CCBA-MW1	Beryllium (7440-41-7)	J+, MS2
	096269-009/CCBA-MW1	Copper (7440-50-8)	0.0031U, B2
	096270-009/CCBA-MW1	Arsenic (7440-38-2)	R, X1
	096270-009/CCBA-MW1	Beryllium (7440-41-7)	J+, MS2
	096270-009/CCBA-MW1	Copper (7440-50-8)	0.0031U, B2
SW846 3510C/8270D			
	096263-002/CCBA-MW2	2,4-Dinitrophenol (51-28-5)	UJ, I3,C3
	096263-002/CCBA-MW2	p-Nitroaniline (100-01-6)	UJ, I3,C3
	096266-002/CCBA-EB1	2,4-Dinitrophenol (51-28-5)	UJ, I3,C3
	096266-002/CCBA-EB1	p-Nitroaniline (100-01-6)	UJ, I3,C3
	096269-002/CCBA-MW1	1,1'-Biphenyl (92-52-4)	UJ, MS5,MS3
	096269-002/CCBA-MW1	1,2,4-Trichlorobenzene (120-82-1)	UJ, MS5
	096269-002/CCBA-MW1	1,4-Dioxane (123-91-1)	UJ, MS5
	096269-002/CCBA-MW1	2,4,5-Trichlorophenol (95-95-4)	UJ, MS5
	096269-002/CCBA-MW1	2,4,6-Trichlorophenol (88-06-2)	UJ, MS5,MS3
	096269-002/CCBA-MW1	2,4-Dichlorophenol (120-83-2)	UJ, MS5,MS3
	096269-002/CCBA-MW1	2,4-Dimethylphenol (105-67-9)	UJ, MS5
	096269-002/CCBA-MW1	2,4-Dinitrophenol (51-28-5)	UJ, MS5
	096269-002/CCBA-MW1	2,4-Dinitrotoluene (121-14-2)	UJ, MS5
	096269-002/CCBA-MW1	2,6-Dinitrotoluene (606-20-2)	UJ, MS5,MS3
	096269-002/CCBA-MW1	2-Chloronaphthalene (91-58-7)	UJ, MS5,MS3
	096269-002/CCBA-MW1	2-Chlorophenol (95-57-8)	UJ, MS5

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
	096269-002/CCBA-MW1	2-Methyl-4,6-dinitrophenol (534-52-1)	UJ, MS5
	096269-002/CCBA-MW1	2-Methylnaphthalene (91-57-6)	UJ, MS5
	096269-002/CCBA-MW1	2-Nitrophenol (88-75-5)	UJ, MS5,MS3
	096269-002/CCBA-MW1	3,3'-Dichlorobenzidine (91-94-1)	UJ, MS5
	096269-002/CCBA-MW1	4-Bromophenylphenylether (101-55-3)	UJ, MS5,MS3
	096269-002/CCBA-MW1	4-Chloro-3-methylphenol (59-50-7)	UJ, MS5
	096269-002/CCBA-MW1	4-Chloroaniline (106-47-8)	UJ, MS5
	096269-002/CCBA-MW1	4-Chlorophenylphenylether (7005-72-3)	UJ, MS5
	096269-002/CCBA-MW1	4-Nitrophenol (100-02-7)	UJ, MS5
	096269-002/CCBA-MW1	Acenaphthene (83-32-9)	UJ, MS5,MS3
	096269-002/CCBA-MW1	Acenaphthylene (208-96-8)	UJ, MS5,MS3
	096269-002/CCBA-MW1	Acetophenone (98-86-2)	UJ, MS5,MS3
	096269-002/CCBA-MW1	Anthracene (120-12-7)	UJ, MS5,MS3
	096269-002/CCBA-MW1	Atrazine (1912-24-9)	UJ, MS5
	096269-002/CCBA-MW1	Benzaldehyde (100-52-7)	UJ, MS5
	096269-002/CCBA-MW1	Benzo(a)anthracene (56-55-3)	UJ, MS5,MS3
	096269-002/CCBA-MW1	Benzo(a)pyrene (50-32-8)	UJ, MS5,MS3
	096269-002/CCBA-MW1	Benzo(b)fluoranthene (205-99-2)	UJ, MS5,MS3
	096269-002/CCBA-MW1	Benzo(ghi)perylene (191-24-2)	UJ, MS5
	096269-002/CCBA-MW1	Benzo(k)fluoranthene (207-08-9)	UJ, MS5,MS3
	096269-002/CCBA-MW1	bis(2-Chloro-1-methylethyl)ether (108-60-1)	UJ, MS5
	096269-002/CCBA-MW1	bis(2-Chloroethoxy)methane (111-91-1)	UJ, MS5,MS3
	096269-002/CCBA-MW1	bis(2-Chloroethyl) ether (111-44-4)	UJ, MS5
	096269-002/CCBA-MW1	bis(2-Ethylhexyl)phthalate (117-81-7)	UJ, MS5
	096269-002/CCBA-MW1	Butylbenzylphthalate (85-68-7)	UJ, MS5

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
	096269-002/CCBA-MW1	Caprolactam (105-60-2)	UJ, MS5
	096269-002/CCBA-MW1	Carbazole (86-74-8)	UJ, MS5
	096269-002/CCBA-MW1	Chrysene (218-01-9)	UJ, MS5
	096269-002/CCBA-MW1	Dibenzo(a,h)anthracene (53-70-3)	UJ, MS5
	096269-002/CCBA-MW1	Dibenzofuran (132-64-9)	UJ, MS5,MS3
	096269-002/CCBA-MW1	Diethylphthalate (84-66-2)	UJ, MS5,MS3
	096269-002/CCBA-MW1	Dimethylphthalate (131-11-3)	UJ, MS5,MS3
	096269-002/CCBA-MW1	Di-n-butylphthalate (84-74-2)	UJ, MS5
	096269-002/CCBA-MW1	Di-n-octylphthalate (117-84-0)	UJ, MS5
	096269-002/CCBA-MW1	Diphenylamine (122-39-4)	UJ, MS5,MS3
	096269-002/CCBA-MW1	Fluoranthene (206-44-0)	UJ, MS5
	096269-002/CCBA-MW1	Fluorene (86-73-7)	UJ, MS5,MS3
	096269-002/CCBA-MW1	Hexachlorobenzene (118-74-1)	UJ, MS5,MS3
	096269-002/CCBA-MW1	Hexachlorobutadiene (87-68-3)	UJ, MS5
	096269-002/CCBA-MW1	Hexachlorocyclopentadiene (77-47-4)	UJ, MS5
	096269-002/CCBA-MW1	Hexachloroethane (67-72-1)	UJ, MS5
	096269-002/CCBA-MW1	Indeno(1,2,3-cd)pyrene (193-39-5)	UJ, MS5
	096269-002/CCBA-MW1	Isophorone (78-59-1)	UJ, MS5,MS3
	096269-002/CCBA-MW1	m,p-Cresol (N/A)	UJ, MS5
	096269-002/CCBA-MW1	m-Nitroaniline (99-09-2)	UJ, MS5
	096269-002/CCBA-MW1	Naphthalene (91-20-3)	UJ, MS5
	096269-002/CCBA-MW1	Nitrobenzene (98-95-3)	UJ, MS5
	096269-002/CCBA-MW1	N-Nitrosodipropylamine (621-64-7)	UJ, MS5
	096269-002/CCBA-MW1	o-Cresol (95-48-7)	UJ, MS5
	096269-002/CCBA-MW1	o-Nitroaniline (88-74-4)	UJ, MS5
	096269-002/CCBA-MW1	Pentachlorophenol (87-86-5)	UJ, MS5
	096269-002/CCBA-MW1	Phenanthrene (85-01-8)	UJ, MS5,MS3
	096269-002/CCBA-MW1	Phenol (108-95-2)	UJ, MS5

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
	096269-002/CCBA-MW1	p-Nitroaniline (100-01-6)	UJ, C3,MS5
	096269-002/CCBA-MW1	Pyrene (129-00-0)	UJ, MS5
	096270-002/CCBA-MW1	1,1'-Biphenyl (92-52-4)	UJ, MS5,MS3
	096270-002/CCBA-MW1	1,2,4-Trichlorobenzene (120-82-1)	UJ, MS5
	096270-002/CCBA-MW1	1,4-Dioxane (123-91-1)	UJ, MS5
	096270-002/CCBA-MW1	2,4,5-Trichlorophenol (95-95-4)	UJ, MS5
	096270-002/CCBA-MW1	2,4,6-Trichlorophenol (88-06-2)	UJ, MS5,MS3
	096270-002/CCBA-MW1	2,4-Dichlorophenol (120-83-2)	UJ, MS5,MS3
	096270-002/CCBA-MW1	2,4-Dimethylphenol (105-67-9)	UJ, MS5
	096270-002/CCBA-MW1	2,4-Dinitrophenol (51-28-5)	UJ, MS5
	096270-002/CCBA-MW1	2,4-Dinitrotoluene (121-14-2)	UJ, MS5
	096270-002/CCBA-MW1	2,6-Dinitrotoluene (606-20-2)	UJ, MS5,MS3
	096270-002/CCBA-MW1	2-Chloronaphthalene (91-58-7)	UJ, MS5,MS3
	096270-002/CCBA-MW1	2-Chlorophenol (95-57-8)	UJ, MS5
	096270-002/CCBA-MW1	2-Methyl-4,6-dinitrophenol (534-52-1)	UJ, MS5
	096270-002/CCBA-MW1	2-Methylnaphthalene (91-57-6)	UJ, MS5
	096270-002/CCBA-MW1	2-Nitrophenol (88-75-5)	UJ, MS5,MS3
	096270-002/CCBA-MW1	3,3'-Dichlorobenzidine (91-94-1)	UJ, MS5
	096270-002/CCBA-MW1	4-Bromophenylphenylether (101-55-3)	UJ, MS5,MS3
	096270-002/CCBA-MW1	4-Chloro-3-methylphenol (59-50-7)	UJ, MS5
	096270-002/CCBA-MW1	4-Chloroaniline (106-47-8)	UJ, MS5
	096270-002/CCBA-MW1	4-Chlorophenylphenylether (7005-72-3)	UJ, MS5
	096270-002/CCBA-MW1	4-Nitrophenol (100-02-7)	UJ, MS5
	096270-002/CCBA-MW1	Acenaphthene (83-32-9)	UJ, MS5,MS3
	096270-002/CCBA-MW1	Acenaphthylene (208-96-8)	UJ, MS5,MS3
	096270-002/CCBA-MW1	Acetophenone (98-86-2)	UJ, MS5,MS3

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
	096270-002/CCBA-MW1	Anthracene (120-12-7)	UJ, MS5,MS3
	096270-002/CCBA-MW1	Atrazine (1912-24-9)	UJ, MS5
	096270-002/CCBA-MW1	Benzaldehyde (100-52-7)	UJ, MS5
	096270-002/CCBA-MW1	Benzo(a)anthracene (56-55-3)	UJ, MS5,MS3
	096270-002/CCBA-MW1	Benzo(a)pyrene (50-32-8)	UJ, MS5,MS3
	096270-002/CCBA-MW1	Benzo(b)fluoranthene (205-99-2)	UJ, MS5,MS3
	096270-002/CCBA-MW1	Benzo(ghi)perylene (191-24-2)	UJ, MS5
	096270-002/CCBA-MW1	Benzo(k)fluoranthene (207-08-9)	UJ, MS5,MS3
	096270-002/CCBA-MW1	bis(2-Chloro-1-methylethyl)ether (108-60-1)	UJ, MS5
	096270-002/CCBA-MW1	bis(2-Chloroethoxy)methane (111-91-1)	UJ, MS5,MS3
	096270-002/CCBA-MW1	bis(2-Chloroethyl) ether (111-44-4)	UJ, MS5
	096270-002/CCBA-MW1	bis(2-Ethylhexyl)phthalate (117-81-7)	UJ, MS5
	096270-002/CCBA-MW1	Butylbenzylphthalate (85-68-7)	UJ, MS5
	096270-002/CCBA-MW1	Caprolactam (105-60-2)	UJ, MS5
	096270-002/CCBA-MW1	Carbazole (86-74-8)	UJ, MS5
	096270-002/CCBA-MW1	Chrysene (218-01-9)	UJ, MS5
	096270-002/CCBA-MW1	Dibenzo(a,h)anthracene (53-70-3)	UJ, MS5
	096270-002/CCBA-MW1	Dibenzofuran (132-64-9)	UJ, MS5,MS3
	096270-002/CCBA-MW1	Diethylphthalate (84-66-2)	UJ, MS5,MS3
	096270-002/CCBA-MW1	Dimethylphthalate (131-11-3)	UJ, MS5,MS3
	096270-002/CCBA-MW1	Di-n-butylphthalate (84-74-2)	UJ, MS5
	096270-002/CCBA-MW1	Di-n-octylphthalate (117-84-0)	UJ, MS5
	096270-002/CCBA-MW1	Diphenylamine (122-39-4)	UJ, MS5,MS3
	096270-002/CCBA-MW1	Fluoranthene (206-44-0)	UJ, MS5
	096270-002/CCBA-MW1	Fluorene (86-73-7)	UJ, MS5,MS3
	096270-002/CCBA-MW1	Hexachlorobenzene (118-74-1)	UJ, MS5,MS3

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
	096270-002/CCBA-MW1	Hexachlorobutadiene (87-68-3)	UJ, MS5
	096270-002/CCBA-MW1	Hexachlorocyclopentadiene (77-47-4)	UJ, MS5
	096270-002/CCBA-MW1	Hexachloroethane (67-72-1)	UJ, MS5
	096270-002/CCBA-MW1	Indeno(1,2,3-cd)pyrene (193-39-5)	UJ, MS5
	096270-002/CCBA-MW1	Isophorone (78-59-1)	UJ, MS5,MS3
	096270-002/CCBA-MW1	m,p-Cresol (N/A)	UJ, MS5
	096270-002/CCBA-MW1	m-Nitroaniline (99-09-2)	UJ, MS5
	096270-002/CCBA-MW1	Naphthalene (91-20-3)	UJ, MS5
	096270-002/CCBA-MW1	Nitrobenzene (98-95-3)	UJ, MS5
	096270-002/CCBA-MW1	N-Nitrosodipropylamine (621-64-7)	UJ, MS5
	096270-002/CCBA-MW1	o-Cresol (95-48-7)	UJ, MS5
	096270-002/CCBA-MW1	o-Nitroaniline (88-74-4)	UJ, MS5
	096270-002/CCBA-MW1	Pentachlorophenol (87-86-5)	UJ, MS5
	096270-002/CCBA-MW1	Phenanthrene (85-01-8)	UJ, MS5,MS3
	096270-002/CCBA-MW1	Phenol (108-95-2)	UJ, MS5
	096270-002/CCBA-MW1	p-Nitroaniline (100-01-6)	UJ, C3,MS5
	096270-002/CCBA-MW1	Pyrene (129-00-0)	UJ, MS5
SW846 3535/8321A Modified			
	096263-024/CCBA-MW2	1,3,5-Trinitrobenzene (99-35-4)	R, MS3,L3
	096263-024/CCBA-MW2	Tetryl (479-45-8)	R, MS3,L3
	096266-024/CCBA-EB1	1,3,5-Trinitrobenzene (99-35-4)	R, MS3,L3
	096266-024/CCBA-EB1	Tetryl (479-45-8)	R, MS3,L3
	096269-024/CCBA-MW1	1,3,5-Trinitrobenzene (99-35-4)	R, MS3,L3
	096269-024/CCBA-MW1	Tetryl (479-45-8)	R, MS3,L3
	096270-024/CCBA-MW1	1,3,5-Trinitrobenzene (99-35-4)	R, MS3,L3
	096270-024/CCBA-MW1	Tetryl (479-45-8)	R, MS3,L3
SW846 8260B DOE-AL			
	096263-001/CCBA-MW2	Bromomethane (74-83-9)	UJ, I3,C3,MS3

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
	096263-001/CCBA-MW2	Methylene chloride (75-09-2)	UJ, I3,C3
	096264-001/CCBA-TB1	Bromomethane (74-83-9)	UJ, I3,C3,MS3
	096264-001/CCBA-TB1	Methylene chloride (75-09-2)	UJ, I3,C3
	096265-001/CCBA-FB1	Bromoform (75-25-2)	J+, I3,C3,MS2
	096265-001/CCBA-FB1	Bromomethane (74-83-9)	UJ, I3,C3,MS3
	096265-001/CCBA-FB1	Dibromochloromethane (124-48-1)	J+, I3,MS2
	096265-001/CCBA-FB1	Methylene chloride (75-09-2)	UJ, I3,C3
	096266-001/CCBA-EB1	Bromomethane (74-83-9)	UJ, I3,C3,MS3
	096266-001/CCBA-EB1	Dibromochloromethane (124-48-1)	J+, I3,MS2
	096266-001/CCBA-EB1	Methylene chloride (75-09-2)	UJ, I3,C3
	096267-001/CCBA-TB2	Bromomethane (74-83-9)	UJ, I3,C3,MS3
	096267-001/CCBA-TB2	Methylene chloride (75-09-2)	UJ, I3,C3
	096268-001/CCBA-FB2	Bromomethane (74-83-9)	UJ, I3,C3,MS3
	096268-001/CCBA-FB2	Methylene chloride (75-09-2)	UJ, I3,C3
	096269-001/CCBA-MW1	Bromomethane (74-83-9)	UJ, I3,C3,MS3
	096269-001/CCBA-MW1	Methylene chloride (75-09-2)	UJ, I3,C3
	096270-001/CCBA-MW1	Bromomethane (74-83-9)	UJ, I3,C3,MS3
	096270-001/CCBA-MW1	Methylene chloride (75-09-2)	UJ, I3,C3
	096271-001/CCBA-TB3	Bromomethane (74-83-9)	UJ, I3,C3,MS3
	096271-001/CCBA-TB3	Methylene chloride (75-09-2)	UJ, I3,C3

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

Data Validation Summary Worksheet

AR/COC #: 615626, 615627 and 615628 | Site/Project: SWMU 8/58 GWM | Validation Date: 10/08/2014

SDG #: 353139, 353176 and 356816 | Laboratory: GEL Laboratories, LLC | Validator: Mary Donivan

Matrix: Aqueous | # of Samples: 53 | 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
None								

Comments: Samples collected 07/21-22/2014.

Revised 7/2007

Validated By: Mary A. Donivan

Organic Worksheet (GC/MS)

AR/COC #: 615626, 615627 and 615628 SDG #:353139 Matrix: Aqueous

Laboratory Sample IDs: 353139001, -012, -013, -014, -025, -026, -027, -038 and -049

Method/Batch #s: 8260B/**1408228** 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 -014**	**FB -013**	**FB -026**	
	Int.	**RF**	**RSD/R^2**	**CCV (ICV) %D**										
acetone	NA	✓	✓	✓	✓	NA	✓	✓	✓	✓	2.92J	✓	4.62J	
bromodichloromethane	NA	✓	✓	✓	✓	NA	✓	✓	✓	✓	2.72	5.14	✓	
bromoform	NA	✓	29.2	(23.1)	✓	NA	✓	139	137	✓	✓	0.420J	✓	
chloroform	NA	✓	✓	✓	✓	NA	✓	✓	✓	✓	6.52	9.79	4.49	
dibromochloromethane	NA	✓	20.0	✓	✓	NA	✓	134	132	✓	1.35	2.63	✓	
bromomethane	NA		24.3	(-25.9) -33.0	✓	NA	67.4	✓	65.1	✓	✓	✓	✓	
methylene chloride	NA	✓	51.5	(-37.2) -45.2	✓	NA	63.5	✓	✓	✓	✓	✓	✓	
1,2-dibromo-3-chloropropane	NA	✓	28.8	(27.2)	✓	NA	✓	131	✓	✓	✓	✓	✓	

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 VOAA.I 07/17/14; MS/MSD performed on SNL sample from another SDG

Organic Worksheet (GC/MS)

AR/COC #: 615626, 615627 and 615628 SDG #:353139 Matrix: Aqueous

Laboratory Sample IDs: 353139002, -015, -028 and -039

Method/Batch #s: 3510C/8270D **1406520/1406522** (-002 and -015) **1407108/1407110** (-028 and -039) 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 -044**			
	Int.	**RF**	**RSD/ R^2**	**CCV (ICV) %D**										
2,4-dinitrophenol*	NA	✓	15.6	(-29.2)	✓	NA	✓	✓	✓	✓	✓			
p-nitroaniline*	NA	✓	18.6	-44.4	✓	NA	✓	✓	✓	✓	✓			
hexachlorobenzene*	NA	✓	✓	33.9	✓	NA	✓	✓	✓	✓	✓			
carbazole*	NA	✓	✓	-36.0	✓	NA	✓	✓	✓	✓	✓			
dibenzo(a,h)anthracene*	NA	✓	✓	23.7	✓	NA	✓	✓	✓	✓	✓			
2,4-dinitrophenol	NA	✓	✓	(-23.7)	✓	NA	✓	✓	✓	**	NA			
carbazole	NA	✓	✓	-33.8	✓	NA	✓	✓	✓	**	NA			
di-n-butylphthalate	NA	✓	✓	21.4	✓	NA	✓	✓	✓	**	NA			
di-n-octylphthalate	NA	✓	✓	31.3	✓	NA	✓	✓	✓	**	NA			
hexachlorocyclopentadiene	NA	✓	✓	(-21.5)	✓	NA	✓	✓	✓	**	NA			
hexachloroethane	NA	✓	✓	20.9	✓	NA	✓	✓	✓	**	NA			
n-nitrosodipropylamine	NA	✓	✓	24.1	✓	NA	✓	✓	✓	**	NA			
bis(2-ethylhexyl)phthalate	NA	✓	✓	23.2	✓	NA	✓	✓	✓	**	NA			
p-nitroaniline	NA	✓	✓	-48.6	✓	NA	✓	✓	✓	**	NA			
1,1-biphenyl	NA	✓	✓	✓	✓	NA	✓	✓	29.5	**	NA			
2,4,6-trichlorophenol	NA	✓	✓	✓	✓	NA	✓	✓	30.0	**	NA			
2,4-dichlorophenol	NA	✓	✓	✓	✓	NA	✓	✓	28.3	**	NA			
2,6-dinitrotoluene	NA	✓	✓	✓	✓	NA	✓	✓	34.8	**	NA			
2-chloronaphthalene	NA	✓	✓	✓	✓	NA	✓	✓	27.5	**	NA			
2-nitrophenol	NA	✓	✓	✓	✓	NA	✓	✓	28.8	**	NA			
4-bromophenylphenylether	NA	✓	✓	✓	✓	NA	✓	✓	28.3	**	NA			
acenaphthene	NA	✓	✓	✓	✓	NA	✓	✓	28.7	**	NA			
acenaphthylene	NA	✓	✓	✓	✓	NA	✓	✓	31.7	**	NA			
acetophenone	NA	✓	✓	✓	✓	NA	✓	✓	36.6	**	NA			
anthracene	NA	✓	✓	✓	✓	NA	✓	✓	30.7	**	NA			
benzo(a)anthracene	NA	✓	✓	✓	✓	NA	✓	✓	33.7	**	NA			
benzo(a)pyrene	NA	✓	✓	✓	✓	NA	✓	✓	30.4	**	NA			
benzo(b)fluoranthene	NA	✓	✓	✓	✓	NA	✓	✓	29.8	**	NA			
benzo(k)fluoranthene	NA	✓	✓	✓	✓	NA	✓	✓	28.8	**	NA			
dibenzofuran	NA	✓	✓	✓	✓	NA	✓	✓	31.2	**	NA			
diethylphthalate	NA	✓	✓	✓	✓	NA	✓	✓	38.6	**	NA			
dimethylphthalate	NA	✓	✓	✓	✓	NA	✓	✓	36.5	**	NA			
diphenylamine	NA	✓	✓	✓	✓	NA	✓	✓	28.6	**	NA			

fluorene	NA	✓	✓	✓	✓	NA	✓	✓	31.7	**	NA			
hexachlorobenzene	NA	✓	✓	✓	✓	NA	✓	✓	30.0	**	NA			
isophorone	NA	✓	✓	✓	✓	NA	✓	✓	35.5	**	NA			
phenanthrene	NA	✓	✓	✓	✓	NA	✓	✓	30.8	**	NA			
bis(2-chloroethoxy)methane	NA	✓	✓	✓	✓	NA	✓	✓	29.6	**	NA			

Surrogate Recovery Outliers

Sample ID	2,4,6-tribromophenol	2-fluorobiphenyl	2-fluorophenol	nitrobenzene-d5	phenol-d5	p-terphenyl-d14
353139028MSD	✓	27.1	✓	29.9	✓	30.6

IS Outliers

Sample ID	Area	RT	Area	RT	Area	RT	Area	RT	Area	RT	Area	RT
None												

Comments: HT OK, ICAL MSD8.I 06/04/14 (-002 and -015)* MSD5.I 05/01/14 (-028 and -039)

MS/MSD -002 (MSD8) and -028 (MSD5)

**All target compounds failed MS/MSD RPD criteria

High Explosives Worksheet (LC/MS/MS)

AR/COC #: 615626, 615627 and 615628 SDG #: 353139 Matrix: Aqueous

Laboratory Sample IDs: 353139008, -021, -034 and -045

Method/Batch #s: 8535/8321A **1406906/1406907**

Analyte (Outliers)	Initial Calibration			Continuing Calibration				Method Blank	5X (10X) Blank	LCS %R	MS %R	MSD %R	MS/ MSD RPD	CRI	EB -021		
	Int.	RF	COD RSD/R^2	ICV	CCV	ICB	CCB										
1,3,5-trinitrobenzene	✓	✓	✓	✓	✓	✓	✓	✓	✓	0.0	3.83	2.29	51.1	✓	✓		
tetryl	✓	✓	✓	✓	✓	✓	✓	✓	✓	0.0	0	0	✓	✓	✓		

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 -008; all sample and QC extracts diluted 1:1 with LC reagent grade water

ICAL LCMSMS3 09/04/2014

Inorganic Metals Worksheet

AR/COC #: 615626, 615627 and 615628 SDG #: 353139, 353176 and 356816 Matrix: Aqueous

Laboratory Sample IDs: 353139003, -016, -029 and -040 (UF); 33176001 through -004 (F); 356816001 and -002 (As re-analysis)

Method/Batch #s: **3005A/6010B (ICP-AES):** 1405870(prep)/1405871 **3005A/6020** (ICP-MS): 1405901(prep)/1405903(UF & F); 1419502(prep)/1419503(As re-analysis)

7470A (Hg): 1409602(prep)/1409604

ICPMS Mass Cal (pass/fail) pass ICPMS Resolution (pass/fail) pass

Analyte (outliers)	**Calibration**						**Method Blank**	**5X Blank or (5X MDL)**	**LCS %R**	**MS %R**	**Lab Rep. RPD**	**Serial Dil. %D**	**ICS AB %R**	**ICS A ± MDL**	**CRA/ CRI %R**	**EB**	**5X EB**			
	Int.	**R^2**	**ICV**	**CCV**	**ICB**	**CCB**														
Ca (UF)	✓	✓	✓	✓	✓	✓	0.0721	0.360	✓	150*	✓	✓	✓	✓	✓	0.0896J^	0.448			
Cr	✓	✓	✓	✓	✓	✓	✓	NA	✓	✓	✓	✓	✓	NA	✓	0.00231J	0.012			
Cu	✓	✓	✓	✓	✓	✓	✓	NA	✓	✓	✓	✓	✓	NA	✓	0.000629J	0.0031			
Sb	✓	✓	✓	✓	✓	✓	0.00102	0.005	✓	✓	✓	✓	✓	NA	✓	NA	NA			
Be	✓	✓	✓	✓	✓	✓	✓	NA	✓	127	✓	✓	✓	NA	✓	NA	NA			
Na(UF)	✓	✓	✓	✓	✓	✓	✓	NA	✓	195*	✓	✓	✓	NA	✓	NA	NA			
V	✓	✓	✓	✓	-0.0010	-0.0014	✓	(0.005)	✓	✓	✓	✓	✓	NA	✓	NA	NA			
Ca (F)	✓	✓	✓	✓	✓	✓	0.0721	0.360	✓	150*	✓	✓	✓	NA	✓	0.0903^	0.452			
Na (F)	✓	✓	✓	✓	✓	✓	✓	NA	✓	195*	✓	✓	✓	NA	✓	✓	✓			

IS Outliers *60-125%*				**IS Outliers *80-120%***			
Sample ID	**%Recovery**	**%Recovery**	**%Recovery**	**CCV/CCB ID**	**%Recovery**	**%Recovery**	**%Recovery**
None				None			

Comments: HTs OK. Matrix QC performed on 353139003 for ICP-AES (UF) and Hg (UF), 353176001 for ICP-MS (UF & F) analyses and 356816001 for As re-analysis. *Ca, Mg, and Na >4X spike amount.
353139003, -029 and -040 were diluted 5X for Na; -003 and -040 were diluted 5X for Ca and all filtered samples *except* 353176002 were diluted 5X for Na.
^EB results were qualified ND due to MB contamination

General Chemistry Worksheet

AR/COC #: 615626, 615627 and 615628 SDG #: 353139 Matrix: Aqueous

Laboratory Sample IDs: 353139 - See below

Method/Batch #s: EPA 9012A (total cyanide): Batch 1406383(prep)/1406385 Samples -009, -022, -035 and -046

Method/Batch #s: EPA 314.0 (perchlorate): Batch 1405183 Samples -006, -019, -032 and -043

Method/Batch #s: EPA 9056 (anions): Batch 1408717 Samples -004, -017, -030 and -041

Method/Batch #s: EPA 353.2 (NO_3/NO_2 – N): Batch 1406072 Samples -005, -018, -031 and -042

Method/Batch #s: SM2320B (alkalinity): Batch 1408230 Samples -007, -020; Batch 1408958 Samples -033, -044

Analyte (outliers)	**Calibration**						**Method Blank**	**5X Blank or 5X MDL**	**LCS %R**	**MS %R**	**Lab Rep. RPD**	**EB**	**5X EB**			
	Int.	**R^2**	**ICV**	**CCV**	**ICB**	**CCB**										
None																

Comments: HTs OK. **Matrix QC: 9012A:** performed on sample -009**; 314.0:** performed on SNL sample from another SDG; **9056**: performed on samples -004 and -030; **353.2**: performed on sample -005; **SM2320B**: performed on samples -007(1408230) and -033(1408958).

Anions – sample-004 diluted 10X for Cl and SO4, samples -030 and -041 diluted 5X for Cl and SO4. NO_3/NO_2 – sample -005 diluted 10X, samples -031 and -42 diluted 5X

Radiochemistry Worksheet

AR/COC #: 615626, 615627 and 615628 SDG #: 353139 Matrix: Aqueous

Laboratory Sample IDs: 353139 – See below

Method/Batch #s: EPA 901.1 (gamma spec): Batch 1407085 Samples -010, -023, -036 and -047

Method/Batch #s: EPA 900.0 (Gross alpha/beta): Batches 1407929(gross beta) and 1413034(gross alpha) Samples -011, -024, -037 and -048

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**	**5X EB**		
Gross alpha	✓	✓	✓	NA	✓	✓	✓	✓	✓	1.76	8.8		
Gross beta	✓	✓	✓	NA	✓	✓	✓	✓	✓	1.50	7.5		

Tracer/Carrier Recovery Outliers

Sample ID	**Tracer/Carrier**	**%R**	**Sample ID**	**Tracer/Carrier**	**%R**	**Sample ID**	**Tracer/Carrier**	**%R**
NA								

Comments: **Matrix QC: 901.1:** Performed on sample -010. **900.0:** Performed on sample -011 for gross beta and on an SNL sample from another SDG for gross alpha.

Gross alpha/beta parent and DUP = 150 ml, MS/MSD=50 ml (3X dilution)-results not qualified

CONTRACT LABORATORY
ANALYSIS REQUEST AND CHAIN OF CUSTODY

AOP 95-16

Internal Lab

Batch No. N/A

AR/COC 615626

Project Name:	SWMU 8/58 GWM	SMO Use			
Project/Task Manager:	Clinton Lum	Date Samples Shipped:	7/21/14	SMO Authorization:	
Project/Task Number:	146422.10.11.01	Carrier/Waybill No.	221349	SMO Contact Phone:	Lorraine Herrera/505-844-3199
Service Order:	CF262-14	Lab Contact:	Edie Kent/803-556-8171	Send Report to SMO:	Rita Kavanaugh/505-284-2553
Tech Area:		Lab Destination:	GEL		
Building:	Room:	Contract No.:	PO 1303873	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
096263	-001	CCBA-MW2	117	7/21/14 9:14	GW	G	3x40 ml	HCL	G	SA	TCL VOC (SW846-8260B)	353139 001
096263	-002	CCBA-MW2	117	7/21/14 9:15	GW	AG	4x1 L	None	G	SA	TCL SVOC (SW846-8270C)	353139 002
096263	-009	CCBA-MW2	117	7/21/14 9:17	GW	P	500 ml	HNO3	G	SA	TAL Metals+U (SW846-6010/6020/7470)	353139 003
096263	-016	CCBA-MW2	117	7/21/14 9:18	GW	P	125 ml	None	G	SA	Anions (SW846-9056)	353139 004
096263	-017	CCBA-MW2	117	7/21/14 9:20	FGW	P	500 ml	HNO3	G	SA	Metals-Ca,Mg,K,Na (SW846-6020)	353176 001
096263	-018	CCBA-MW2	117	7/21/14 9:21	GW	P	125 ml	H2SO4	G	SA	Nitrate+Nitrite (EPA 353.2)	353139 005
096263	-020	CCBA-MW2	117	7/21/14 9:22	GW	P	250 ml	None	G	SA	Perchlorate (EPA 314.0)	353139 006
096263	-022	CCBA-MW2	117	7/21/14 9:23	GW	P	500 ml	None	G	SA	Alkalinity (SM2320B)	353139 007
096263	-024	CCBA-MW2	117	7/21/14 9:24	GW	AG	4x1 L	None	G	SA	High Explosives(SW846-8321A Mod.)	353139 008
096263	-027	CCBA-MW2	117	7/21/14 9:26	GW	P	250 ml	NaOH	G	SA	Total Cyanide (SW846-9012)	353139 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

If Perchlorate detected, perform verification analysis using SW846-6850M. Filtered fraction collected in the field using a 0.45 micron in-line filter. Report Anions (as Br,Cl,F,SO4). Alkalinity (as total CaCO3,HCO3,CO3). 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
	Alfred Santillanes		AS	SNL/4142/505-844-5130/505-228-0710
	William Gibson		WG	SNL/4142/505-284-3307/505-239-7367

1. Relinquished by		Org.	4142	Date	7/21/14	Time	0955	3. Relinquished by
1. Received by		Org.	4142	Date	7/21/14	Time	0955	3. Received by
2. Relinquished by		Org.	4142	Date	7/21/14	Time	1119	4. Relinquished by
2. Received by		Org.	GEL	Date	7-22-14	Time	0750	4. Received by

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

CONTRACT LABORATORY
ANALYSIS REQUEST AND CHAIN OF CUSTODY (Continuation)

AR/COC 615626

Project Name:	SWMU 8/58 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
096263	-033	CCBA-MW2	117	7/21/14 9:27	GW	P	1 L	HNO3	G	SA	Gamma Spectroscopy (EPA 901.0)	353139 010
096263	-034	CCBA-MW2	117	7/21/14 9:28	GW	P	1 L	HNO3	G	SA	Gross Alpha and Beta (EPA 900.0)	353139 011
096264	-001	CCBA-TB1	NA	7/21/14 9:14	DIW	G	3x40 ml	HCL	G	TB	TCL VOC (SW846-8260B)	353139 012

Recipient Initials MC

SMO 2012-ARCOC (4-2012)

CONTRACT LABORATORY
ANALYSIS REQUEST AND CHAIN OF CUSTODY

AOP 95-16

Internal Lab

Batch No. N/A

AR/COC 615627

Project Name:	SWMU 8/58 GWM	Date Samples Shipped:	7-21-14	SMO Authorization:	
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:	CF262-14	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
096265	-001	CCBA-FB1	NA	7/21/14 10:43	DIW	G	3x40 ml	HCL	G	FB	TCL VOC (SW846-8260B)	353139 013
096266	-001	CCBA-EB1	NA	7/21/14 10:43	DIW	G	3x40 ml	HCL	G	EB	TCL VOC (SW846-8260B)	353139 014
096266	-002	CCBA-EB1	NA	7/21/14 10:45	DIW	AG	4x1 L	None	G	EB	TCL SVOC (SW846-8270C)	353139 015
096266	-009	CCBA-EB1	NA	7/21/14 10:47	DIW	P	500 ml	HNO3	G	EB	TAL Metals+U (SW846-6010/6020/7470)	353139 016
096266	-016	CCBA-EB1	NA	7/21/14 10:48	DIW	P	125 ml	None	G	EB	Anions (SW846-9056)	353139 017
096266	-017	CCBA-EB1	NA	7/21/14 10:50	FDIW	P	500 ml	HNO3	G	EB	Metals-Ca,Mg,K,Na (SW846-6020)	353176 002
096266	-018	CCBA-EB1	NA	7/21/14 10:51	DIW	P	125 ml	H2SO4	G	EB	Nitrate+Nitrite (EPA 353.2)	353139 018
096266	-020	CCBA-EB1	NA	7/21/14 10:52	DIW	P	250 ml	None	G	EB	Perchlorate (EPA 314.0)	353139 019
096266	-022	CCBA-EB1	NA	7/21/14 10:53	DIW	P	500 ml	None	G	EB	Alkalinity (SM2320B)	353139 020
096266	-024	CCBA-EB1	NA	7/21/14 10:54	DIW	AG	4x1 L	None	G	EB	High Explosives(SW846-8321A Mod.)	353139 021

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

If Perchlorate detected, perform verification analysis using SW846-6850M. Filtered fraction collected in the field using a 0.45 micron in-line filter. Report Anions (as Br,Cl,F,SO4). Alkalinity (as total CaCO3,HCO3,CO3). 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
	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

1. Relinquished by	Alfred Santillanes	Org. 4142	Date 7/21/14	Time 1116	3. Relinquished by	Org.	Date	Time
1. Received by		Org. 4142	Date 7/21/14	Time 1116	3. Received by	Org.	Date	Time
2. Relinquished by		Org. 4142	Date 7/21/14	Time 1218	4. Relinquished by	Org.	Date	Time
2. Received by		Org. OCR	Date 7-22-14	Time 0750	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 615627

Project Name:	SWMU 8/58 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
096266	-027	CCBA-EB1	NA	7/21/14 10:56	DIW	P	250 ml	NaOH	G	EB	Total Cyanide (SW846-9012)	353139 022
096266	-033	CCBA-EB1	NA	7/21/14 10:57	DIW	P	1 L	HNO3	G	EB	Gamma Spectroscopy (EPA 901.0)	353139 023
096266	-034	CCBA-EB1	NA	7/21/14 10:58	DIW	P	1 L	HNO3	G	EB	Gross Alpha and Beta (EPA 900.0)	353139 024
096267	-001	CCBA-TB2	NA	7/21/14 10:43	DIW	G	3x40 ml	HCL	G	TB	TCL VOC (SW846-8260B)	353139 025

Recipient Initials MC

CONTRACT LABORATORY
ANALYSIS REQUEST AND CHAIN OF CUSTODY

Internal Lab

Batch No. N/A

SMO Use

AR/COC 615628

Project Name:	SWMU 8/58 GWM	Date Samples Shipped:	7/22/14	SMO Authorization:	☐ Waste Characterization
Project/Task Manager:	Clinton Lum	Carrier/Waybill No.	221466	SMO Contact Phone:	☐ RMMA
Project/Task Number:	146422.10.11.01	Lab Contact:	Edie Kent/803-556-8171	Lorraine Herrera/505-844-3199	☐ Released by COC No.
Service Order:	CF262-14	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
096268	-001	CCBA-FB2	NA	7/22/14 9:19	DIW	G	3x40 ml	HCL	G	FB	TCL VOC (SW846-8260B)	353139 026
096269	-001	CCBA-MW1	79	7/22/14 9:19	GW	G	3x40 ml	HCL	G	SA	TCL VOC (SW846-8260B)	353139 027
096269	-002	CCBA-MW1	79	7/22/14 9:21	GW	AG	4x1 L	None	G	SA	TCL SVOC (SW846-8270C)	353139 028
096269	-009	CCBA-MW1	79	7/22/14 9:24	GW	P	500 ml	HNO3	G	SA	TAL Metals+U (SW846-6010/6020/7470)	353139 029
096269	-016	CCBA-MW1	79	7/22/14 9:25	GW	P	125 ml	None	G	SA	Anions (SW846-9056)	353139 030
096269	-017	CCBA-MW1	79	7/22/14 9:27	FGW	P	500 ml	HNO3	G	SA	Metals-Ca,Mg,K,Na (SW846-6020)	353176 003
096269	-018	CCBA-MW1	79	7/22/14 9:28	GW	P	125 ml	H2SO4	G	SA	Nitrate+Nitrite (EPA 353.2)	353139 031
096269	-020	CCBA-MW1	79	7/22/14 9:29	GW	P	250 ml	None	G	SA	Perchlorate (EPA 314.0)	353139 032
096269	-022	CCBA-MW1	79	7/22/14 9:30	GW	P	500 ml	None	G	SA	Alkalinity (SM2320B)	353139 033
096269	-024	CCBA-MW1	79	7/22/14 9:31	GW	AG	4x1 L	None	G	SA	High Explosives(SW846-8321A Mod.)	353139 034

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

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

Special Instructions/QC Requirements:
EDD ☑ Yes ☐ No
Turnaround Time ☐ 7 Day* ☐ 15 Day* ☑ 30 Day
Negotiated TAT ☐
Sample Disposal ☐ Return to Client ☑ Disposal by Lab
Return Samples By:
Comments: Send report to Tim Jackson/4142/MS 0729/284-2547
If Perchlorate detected,perform verification analysis using SW846-6850M.Filtered fraction collected in the field using a 0.45 micron in-line filter. Report Anions (as Br,Cl,F,SO4). Alkalinity (as total CaCO3,HCO3,CO3). 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
	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		Org. 4142	Date 7/22/14	Time 1014	3.Relinquished by	Org.	Date	Time
1. Received by		Org. 4142	Date 7/22/14	Time 1014	3. Received by	Org.	Date	Time
2.Relinquished by		Org. 4142	Date 7/22/14	Time 1045	4.Relinquished by	Org.	Date	Time
2. Received by		Org. GEL	Date 7-23-14	Time 0735	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 615628

Project Name:	SWMU 8/58 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
096269	-027	CCBA-MW1	79	7/22/14 9:34	GW	P	250 ml	NaOH	G	SA	Total Cyanide (SW846-9012)	353139 035
096269	-033	CCBA-MW1	79	7/22/14 9:35	GW	P	1 L	HNO3	G	SA	Gamma Spectroscopy (EPA 901.0)	353139 036
096269	-034	CCBA-MW1	79	7/22/14 9:37	GW	P	1 L	HNO3	G	SA	Gross Alpha and Beta (EPA 900.0)	353139 037
096270	-001	CCBA-MW1	79	7/22/14 9:19	GW	G	3x40 ml	HCL	G	DU	TCL VOC (SW846-8260B)	353139 038
096270	-002	CCBA-MW1	79	7/22/14 9:21	GW	AG	4x1 L	None	G	DU	TCL SVOC (SW846-8270C)	353139 039
096270	-009	CCBA-MW1	79	7/22/14 9:24	GW	P	500 ml	HNO3	G	DU	TAL Metals+U (SW846-6010/6020/7470)	353139 040
096270	-016	CCBA-MW1	79	7/22/14 9:25	GW	P	125 ml	None	G	DU	Anions (SW846-9056)	353139 041
096270	-017	CCBA-MW1	79	7/22/14 9:27	FGW	P	500 ml	HNO3	G	DU	Metals-Ca,Mg,K,Na (SW846-6020)	353136 004
096270	-018	CCBA-MW1	79	7/22/14 9:28	GW	P	125 ml	H2SO4	G	DU	Nitrate+Nitrite (EPA 353.2)	353139 042
096270	-020	CCBA-MW1	79	7/22/14 9:29	GW	P	250 ml	None	G	DU	Perchlorate (EPA 314.0)	353139 043
096270	-022	CCBA-MW1	79	7/22/14 9:30	GW	P	500 ml	None	G	DU	Alkalinity (SM2320B)	353139 044
096270	-024	CCBA-MW1	79	7/22/14 9:31	GW	AG	4x1 L	None	G	DU	High Explosives(SW846-8321A Mod.)	353139 045
096270	-027	CCBA-MW1	79	7/22/14 9:34	GW	P	250 ml	NaOH	G	DU	Total Cyanide (SW846-9012)	353139 046
096270	-033	CCBA-MW1	79	7/22/14 9:35	GW	P	1 L	HNO3	G	DU	Gamma Spectroscopy (EPA 901.0)	353139 047
096270	-034	CCBA-MW1	79	7/22/14 9:37	GW	P	1 L	HNO3	G	DU	Gross Alpha and Beta (EPA 900.0)	353139 048
096271	-001	CCBA-TB3	NA	7/22/14 9:19	DIW	G	3x40 ml	HCL	G	TB	TCL VOC (SW846-8260B)	353139 049

Recipient Initials RW MK

ANALYTICAL QUALITY ASSOCIATES, INC.

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

Memorandum

Date: October 8, 2014

To: File

From: Mary Donivan

Subject: Inorganic Data Review and Validation – SNL
Site: SWMU 68 GWM
AR/COC: 615622, 615623, 615624 and 615625
SDG: 352683
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 4.

Summary

Five samples were prepared and analyzed with accepted procedures using methods EPA 9012A (total cyanide), EPA 314.0 (perchlorate), EPA 9056 (anions by IC), EPA 353.2 (nitrate/nitrite) and SM 2320B (total alkalinity). Six samples were prepared and analyzed with accepted procedures using methods EPA 7196A (hexavalent chromium). Data were reported for all required analytes. Problems were identified with the data package that resulted in the qualification of data.

Hexavalent chromium:

1. Sample 352683046 was received beyond the 24 hour method-specified holding time, but was analyzed within 2X the HT. The associated sample result will be **qualified J-,H2**.
2. Hexavalent chromium was detected at < the PQL in a CCB bracketing samples -018, -031, -042 and -046. The associated results for samples -031 and -046 were detects ≤5X the CCB concentration and will be **qualified 0.017U,B3**.
3. The matrix QC for batch 1404061 was performed on an EB. The associated result for sample -031 was a detect and will be qualified **J,MS1,RP1**. The remaining associated sample results were non-detects and will be **qualified UJ,MS1,RP1**.

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 non-detects and will be **qualified UJ,I5.**

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

Holding Times and Preservation

The samples were prepared and analyzed within the prescribed holding times and properly preserved except as noted above in the Summary section and as follows. Samples -004, -018, -031 and -042 were prepared and analyzed very slightly beyond the 24 hour method-specified holding time for hexavalent chromium. Based on professional judgment, no data will be qualified.

Calibration

All initial and continuing calibration met QC acceptance criteria.

Blanks

No target analytes were detected in the blanks except as noted above in the Summary section and as follows. Hexavalent chromium was detected at < the PQL in a CCB bracketing samples -018, -031, -042 and -046. The associated results for samples -018 and -042 were non-detects and will not be qualified. It should be noted that sample -046 was an EB which was qualified non-detect due to CCB contamination.

Chloride was detected at < the PQL in the EB, sample -047, which was associated with samples -019 and -032. The associated sample results were detects >5X the EB value and will not be qualified.

Alkalinity blank results were reported, but were not assessed for data validation.

Laboratory Control Sample (LCS)

All LCS acceptance criteria were met.

Matrix Spike (MS)

All MS/PS recoveries met QC acceptance criteria.

The MS for total cyanide was performed on an SNL sample from another SDG, no sample data were qualified as a result.

Laboratory Replicate

The replicate analyses met all QC acceptance criteria.

The replicate analysis for total cyanide was performed on an SNL sample from another SDG, no sample data were 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* -048 (EB) were diluted 5X.

Anions:
All samples *except* -047 (EB) were diluted 10X for chloride and sulfate.

Other QC

An EB was submitted with ARCOC 615623 and it was associated with the samples from ARCOC 615624. An additional EB for hexavalent chromium was submitted with ARCOC 615624 and was associated with the samples in that ARCOC. A field duplicate pair was submitted with ARCOC 615624. 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:** 10/09/14

ANALYTICAL QUALITY ASSOCIATES, INC.

PO Box 21987
Albuquerque, NM 87154
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www.aqainc.net

Memorandum

Date: October 7, 2014

To: File

From: Mary Donivan

Subject: LC/MS/MS Organic Data Review and Validation – SNL
Site: SWMU 68 GWM
AR/COC: 615622, 615623, 615624 and 615625
SDG: 352683
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 4.

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 ICAL 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.**
2. The LCS %R was < the lower acceptance limit but ≥10% for tetryl. The associated sample result was an ND and will be **qualified UJ,L3.**

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

Holding Times

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

Instrument Tune

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 except as noted above in the Summary section.

Detection Limits/Dilutions

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

Other QC

An EB was submitted with ARCOC 615623 and it was associated with the samples from ARCOC 615624. A field duplicate pair was submitted with ARCOC 615624. 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:** 10/09/14

PO Box 21987
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Date: October 7, 2014

To: File

From: Mary Donivan

Subject: Inorganic Data Review and Validation – SNL
Site: SWMU 68 GWM
AR/COC: 615622, 615623, 615624 and 615625
SDG: 352683 and 3352684
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 4.

Summary

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

ICP-MS:

1. Cu was detected at <PQL in the unfiltered EB, sample 352683045, which was associated with samples -017 and -030. The associated sample results were detects ≤5X the EB value and will be **qualified 0.0035U,B2** at 5X the EB value.

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 criteria 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 and as follows. Na was detected in the unfiltered EB, sample -045, which was associated with samples -017 and -030, and the filtered EB, sample 352684004, which was associated with samples -002 and -003, at concentrations < the PQL. The associated sample results were detects >5X the EB concentrations 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 unfiltered parent sample concentrations for Ca, Mg and Na were >4X the spike and the %R for Na did not meet acceptance criteria. The filtered parent sample concentrations for Ca, Mg and Na were >4X the spike and the %Rs for Ca and Mg did not meet acceptance criteria. 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. All unfiltered samples *except* 352683045 were diluted 10X for Ca and all filtered samples *except* 352684004 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 concentration of Ca, Mg, Al and Fe were < that in the ICS solution.

ICP Serial Dilution

The serial dilutions met all QC acceptance criteria.

Other QC

An EB was submitted with ARCOC 615623 and it was associated with the samples from ARCOC 615624. A field duplicate pair was submitted with ARCOC 615624. 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:** 10/09/14

ANALYTICAL QUALITY ASSOCIATES, INC.

PO Box 21987
Albuquerque, NM 87154
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www.aqainc.net

Memorandum

Date: October 8, 2014

To: File

From: Mary Donivan

Subject: Radiochemical Data Review and Validation – SNL
Site: SWMU 68 GWM
AR/COC: 615622, 615623, 615624 and 615625
SDG: 352683 and 356247
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 4.

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.**

Gross Alpha/Beta:

1. The original gross alpha/beta results for sample 352683012 (096251-034) did not agree with historical data. The sample was re-logged and reanalyzed as 356247001(096251-R34). Since the original sample results were not verified, they will be **qualified R,X1** per client request.
2. For the reanalysis batch, 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.**
3. All sample results that were > the MDA but ≤3X the MDA will be **qualified J,FR7.**

Alphaspec U:

1. The original alphaspec U results for sample 352683013 (096251-035) did not agree with historical data. The sample was re-logged and reanalyzed as 356247001(096251-R35). Since the original sample results were not verified, they will be **qualified R,X1** per client request.
2. All sample results that were > the MDA but ≤3X the MDA will be **qualified J,FR7.**

Gammaspec:

1. The K-40 result for sample 352683011 was rejected by the laboratory due to the peak not meeting identification criteria and will be **qualified R,Z2**.
2. No peaks were identified for Am-241 for sample 352683025. The associated sample result is considered ND at the calculated MDA and will be **qualified BD,Z2**.

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 sample tracer 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.

Gross Alpha/Beta:
It should be noted that the MS/MSD was performed on a sample of similar matrix from another SNL SDG for gross beta only in the original analysis. No sample data will be qualified as a result.

Laboratory Replicate

All replicate error ratio acceptance criteria were met.

Gross Alpha/Beta:
It should be noted that the replicate was performed on a sample of similar matrix from another SNL SDG for gross beta only in the original analysis. No sample data will be qualified as a result.

Laboratory Control Sample (LCS)

All LCS recoveries met QC acceptance criteria.

Detection Limits/Dilutions

The samples were not diluted. All required detection limits were met except as follows. Sample 352683038 did not meet the required detection limit for Am-241.

Other QC

An EB was submitted with ARCOC 615623 and it was associated with the samples from ARCOC 615624. A field duplicate pair was submitted with ARCOC 615624. 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:** 10/09/14

PO Box 21987
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Memorandum

Date: October 7, 2014

To: File

From: Mary Donivan

Subject: GC/MS Organic Data Review and Validation – SNL
Site: SWMU 68 GWM
AR/COC: 615622, 615623, 615624 and 615625
SDG: 352683
Laboratory: GEL
Project/Task: 146422.10.11.01
Analysis: SVOCs

See the attached Data Validation Worksheets for supporting documentation on the data review and validation. Data are evaluated using SNL/NM SMO AOP 00-03 Rev 4.

Summary

Five samples were prepared and analyzed with accepted procedures using methods EPA 3510C/8270D (SVOCs). All compounds were successfully analyzed. No problems were identified with the data package that resulted in the qualification of data.

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

Holding Times

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

Instrument Tune

All instrument tune requirements were met.

Calibration

The initial calibration and continuing calibration data met QC acceptance criteria except as follows. The ICAL %RSD was >15% but ≤40% for p-nitroaniline. The associated sample results were non-detects and since no other calibration infraction occurred, will not be qualified.

The ICV %D was >20% but ≤40% with negative bias for 2,4-dinitrophenol. The associated sample results were non-detects and since no other calibration infractions occurred, will not be qualified.

The ICV %D was >20% but ≤40% with negative bias and the %D for the CCV associated with sample 352683059 was >20% for hexachlorocyclopentadiene. All associated sample results were non-detects, and since a positive CCV outlier is not considered a second calibration infraction, no sample results will be qualified.

Blanks

No target analytes were detected in the blanks.

Surrogates

All surrogate recoveries met QC acceptance criteria.

Internal Standards

All internal standards met QC acceptance criteria.

Matrix Spike/Matrix Spike Duplicate (MS/MSD)

All MS/MSD acceptance criteria were met.

Laboratory Control Sample (LCS)

All LCS acceptance criteria were met.

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 ARCOC 615623 and it was associated with the samples from ARCOC 615624. A field duplicate pair was submitted with ARCOC 615624. 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:** 10/09/14

ANALYTICAL QUALITY ASSOCIATES, INC.

PO Box 21987
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Memorandum

Date: October 7, 2014

To: File

From: Mary Donivan

Subject: GC/MS Organic Data Review and Validation – SNL
Site: SWMU 68 GWM
AR/COC: 615622, 615623, 615624 and 615625
SDG: 352683
Laboratory: GEL
Project/Task: 146422.10.11.01
Analysis: VOCs

See the attached Data Validation Worksheets for supporting documentation on the data review and validation. Data are evaluated using SNL/NM SMO AOP 00-03 Rev 4.

Summary

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

1. The ICAL %RSD was >40% but ≤60% and the ICV/CCV %Ds were >20% but ≤40% with negative bias for methylene chloride. The associated sample results were non-detects and will be **qualified UJ,I3,C3**.
2. The ICAL %RSD was >15% but ≤40% and the ICV/CCV %Ds were >20% but ≤40% with negative bias for bromomethane. The associated sample results were non-detects and will be **qualified UJ,I3,C3**.
3. The CCV %D was >20% but ≤40% with negative bias for acetone. The associated results for samples 352683043 and -057 were detects, and will be **qualified J-,C3**.
4. The LCS %Rs were < the lower laboratory acceptance limit but ≥10% for bromomethane, methylene chloride and trichlorotrifluoroethane. The associated sample results were non-detects and will be **qualified UJ,L3**.
5. The MS/MSD %Rs were < the lower laboratory acceptance limits but ≥10% for bromomethane and methylene chloride. The associated sample results were non-detects and will be **qualified UJ,MS3**.

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

Holding Times

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

Instrument Tune

All instrument tune requirements were met.

Calibration

The initial calibration and continuing calibration data met QC acceptance criteria except as noted above in the Summary section and as follows. The ICAL %RSD was >15% but ≤40% for dibromochloromethane. The associated sample results were non-detects and since no other calibration infractions occurred, will not be qualified.

The ICAL %RSDs were >15% but ≤40% and the ICV/CCV %Ds were >20% with positive bias for bromoform and 1,2-dibromo-3-chloropropane. All associated sample results were non-detects, and since a positive ICV/CCV outlier is not considered a second calibration infraction, no sample results will be qualified.

The CCV %D was >20% but ≤40% with negative bias for 2-butanone. All associated sample results were non-detects, and, since no other calibration infractions occurred, no sample results will be qualified.

The CCV %D was >20% but ≤40% with negative bias for acetone. The associated results for all samples *except* -043 and -057 were non-detects, and, since no other calibration infractions occurred, will not be qualified.

Blanks

No target analytes were detected in the blanks except as follows. Acetone and bromodichloromethane were detected at a concentration < the PQL and chloroform at a concentration >the PQL in the EB, sample -043, which was associated with samples -015 and -028. The associated sample results were non-detects and will not be qualified.

Acetone was detected at a concentration < the PQL and chloroform was detected at a concentration > the PQL was in the FB, sample -057, which was associated with sample -058. The associated sample results were non-detects and will not be qualified.

Surrogates

All surrogate recoveries met QC acceptance criteria.

Internal Standards

All internal standards met QC acceptance criteria.

Matrix Spike/Matrix Spike Duplicate (MS/MSD)

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

Laboratory Control Sample (LCS)

All LCS acceptance criteria were met except as noted above in the Summary section and as follows. The %R was > the upper laboratory acceptance limit for 1,2-dibromo-3-chloropropane. The associated sample results were non-detects and will not be qualified.

Detection Limits/Dilutions

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

Tentatively Identified Compounds (TICs)

TIC reports were not required.

Other QC

Four TBs were submitted, one associated with each ARCOC. An EB was submitted with ARCOC 615623 and it was associated with the samples from ARCOC 615624. A FB was submitted with ARCOC 615625 and was associated with the sample from that ARCOC. A field duplicate pair was submitted with ARCOC 615624. 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:** 10/09/14

Sample Findings Summary

AR/COC: 615622, 615623, 615624, 615625

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
DOE EML HASL-300, U-02-RC			
	096251-035/OBS-MW2	Uranium-233/234 (13968-55-3/13966-29-)	R, X1
	096251-035/OBS-MW2	Uranium-235/236 (15117-96-1/13982-70-)	R, X1
	096251-035/OBS-MW2	Uranium-238 (7440-61-1)	R, X1
	096251-R35/OBS-MW2	Uranium-235/236 (15117-96-1/13982-70-)	J, FR7
	096253-035/OBS-EB1	Uranium-233/234 (13968-55-3/13966-29-)	BD, FR3
	096253-035/OBS-EB1	Uranium-235/236 (15117-96-1/13982-70-)	BD, FR3
	096253-035/OBS-EB1	Uranium-238 (7440-61-1)	BD, FR3
EPA 900.0/SW846 9310			
	096251-034/OBS-MW2	ALPHA (12587-46-1)	R, X1
	096251-034/OBS-MW2	BETA (12587-47-2)	R, X1
	096251-R34/OBS-MW2	ALPHA (12587-46-1)	J, MS1
	096251-R34/OBS-MW2	BETA (12587-47-2)	J, MS1
	096253-034/OBS-EB1	ALPHA (12587-46-1)	BD, FR3
	096253-034/OBS-EB1	BETA (12587-47-2)	BD, FR3
EPA 901.1			
	096251-033/OBS-MW2	Americium-241 (14596-10-2)	BD, FR3
	096251-033/OBS-MW2	Cesium-137 (10045-97-3)	BD, FR3
	096251-033/OBS-MW2	Cobalt-60 (10198-40-0)	BD, FR3
	096251-033/OBS-MW2	Potassium-40 (13966-00-2)	R, Z2
	096253-033/OBS-EB1	Americium-241 (14596-10-2)	BD, FR3
	096253-033/OBS-EB1	Cesium-137 (10045-97-3)	BD, FR3
	096253-033/OBS-EB1	Cobalt-60 (10198-40-0)	BD, FR3

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
	096253-033/OBS-EB1	Potassium-40 (13966-00-2)	BD, FR3
	096255-033/OBS-MW1	Americium-241 (14596-10-2)	BD, Z2
	096255-033/OBS-MW1	Cesium-137 (10045-97-3)	BD, FR3
	096255-033/OBS-MW1	Cobalt-60 (10198-40-0)	BD, FR3
	096255-033/OBS-MW1	Potassium-40 (13966-00-2)	BD, FR3
	096256-033/OBS-MW1	Americium-241 (14596-10-2)	BD, FR3
	096256-033/OBS-MW1	Cesium-137 (10045-97-3)	BD, FR3
	096256-033/OBS-MW1	Cobalt-60 (10198-40-0)	BD, FR3
	096256-033/OBS-MW1	Potassium-40 (13966-00-2)	BD, FR3
	096259-033/OBS-MW3	Americium-241 (14596-10-2)	BD, FR3
	096259-033/OBS-MW3	Cesium-137 (10045-97-3)	BD, FR3
	096259-033/OBS-MW3	Cobalt-60 (10198-40-0)	BD, FR3
	096259-033/OBS-MW3	Potassium-40 (13966-00-2)	BD, FR3
SW846 3005/6020 DOE-AL			
	096255-009/OBS-MW1	Copper (7440-50-8)	0.0035U, B2
	096256-009/OBS-MW1	Copper (7440-50-8)	0.0035U, B2
SW846 3535/8321A Modified			
	096251-024/OBS-MW2	m-Nitrotoluene (99-08-1)	UJ, I4
	096251-024/OBS-MW2	o-Nitrotoluene (88-72-2)	UJ, I4
	096251-024/OBS-MW2	p-Nitrotoluene (99-99-0)	UJ, I4
	096251-024/OBS-MW2	Tetryl (479-45-8)	UJ, L3
	096253-024/OBS-EB1	m-Nitrotoluene (99-08-1)	UJ, I4
	096253-024/OBS-EB1	o-Nitrotoluene (88-72-2)	UJ, I4
	096253-024/OBS-EB1	p-Nitrotoluene (99-99-0)	UJ, I4
	096253-024/OBS-EB1	Tetryl (479-45-8)	UJ, L3
	096255-024/OBS-MW1	m-Nitrotoluene (99-08-1)	UJ, I4
	096255-024/OBS-MW1	o-Nitrotoluene (88-72-2)	UJ, I4
	096255-024/OBS-MW1	p-Nitrotoluene (99-99-0)	UJ, I4
	096255-024/OBS-MW1	Tetryl (479-45-8)	UJ, L3

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
	096256-024/OBS-MW1	m-Nitrotoluene (99-08-1)	UJ, I4
	096256-024/OBS-MW1	o-Nitrotoluene (88-72-2)	UJ, I4
	096256-024/OBS-MW1	p-Nitrotoluene (99-99-0)	UJ, I4
	096256-024/OBS-MW1	Tetryl (479-45-8)	UJ, L3
	096259-024/OBS-MW3	m-Nitrotoluene (99-08-1)	UJ, I4
	096259-024/OBS-MW3	o-Nitrotoluene (88-72-2)	UJ, I4
	096259-024/OBS-MW3	p-Nitrotoluene (99-99-0)	UJ, I4
	096259-024/OBS-MW3	Tetryl (479-45-8)	UJ, L3
SW846 7196A			
	096253-014/OBS-EB1	Hexavalent Chromium (18540-29-9)	0.017UJ, B3,H2
	096255-014/OBS-MW1	Hexavalent Chromium (18540-29-9)	UJ, MS1,RP1
	096256-014/OBS-MW1	Hexavalent Chromium (18540-29-9)	0.017UJ, B3,MS1,RP1
	096261-014/OBS-EB2	Hexavalent Chromium (18540-29-9)	UJ, MS1,RP1
SW846 8260B DOE-AL			
	096251-001/OBS-MW2	Bromomethane (74-83-9)	UJ, I3,C3,L3,MS3
	096251-001/OBS-MW2	Methylene chloride (75-09-2)	UJ, I3,C3,L3,MS3
	096251-001/OBS-MW2	Trichlorotrifluoroethane (76-13-1)	UJ, L3
	096252-001/OBS-TB1	Bromomethane (74-83-9)	UJ, I3,C3,L3,MS3
	096252-001/OBS-TB1	Methylene chloride (75-09-2)	UJ, I3,C3,L3,MS3
	096252-001/OBS-TB1	Trichlorotrifluoroethane (76-13-1)	UJ, L3
	096253-001/OBS-EB1	Acetone (67-64-1)	J-, C3
	096253-001/OBS-EB1	Bromomethane (74-83-9)	UJ, I3,C3,L3,MS3
	096253-001/OBS-EB1	Methylene chloride (75-09-2)	UJ, I3,C3,L3,MS3
	096253-001/OBS-EB1	Trichlorotrifluoroethane (76-13-1)	UJ, L3

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
	096254-001/OBS-TB2	Bromomethane (74-83-9)	UJ, I3,C3,L3,MS3
	096254-001/OBS-TB2	Methylene chloride (75-09-2)	UJ, I3,C3,L3,MS3
	096254-001/OBS-TB2	Trichlorotrifluoroethane (76-13-1)	UJ, L3
	096255-001/OBS-MW1	Bromomethane (74-83-9)	UJ, I3,C3,L3,MS3
	096255-001/OBS-MW1	Methylene chloride (75-09-2)	UJ, I3,C3,L3,MS3
	096255-001/OBS-MW1	Trichlorotrifluoroethane (76-13-1)	UJ, L3
	096256-001/OBS-MW1	Bromomethane (74-83-9)	UJ, I3,C3,L3,MS3
	096256-001/OBS-MW1	Methylene chloride (75-09-2)	UJ, I3,C3,L3,MS3
	096256-001/OBS-MW1	Trichlorotrifluoroethane (76-13-1)	UJ, L3
	096257-001/OBS-TB3	Bromomethane (74-83-9)	UJ, I3,C3,L3,MS3
	096257-001/OBS-TB3	Methylene chloride (75-09-2)	UJ, I3,C3,L3,MS3
	096257-001/OBS-TB3	Trichlorotrifluoroethane (76-13-1)	UJ, L3
	096258-001/OBS-FB1	Acetone (67-64-1)	J-, C3
	096258-001/OBS-FB1	Bromomethane (74-83-9)	UJ, I3,C3,L3,MS3
	096258-001/OBS-FB1	Methylene chloride (75-09-2)	UJ, I3,C3,L3,MS3
	096258-001/OBS-FB1	Trichlorotrifluoroethane (76-13-1)	UJ, L3
	096259-001/OBS-MW3	Bromomethane (74-83-9)	UJ, I3,C3,L3,MS3
	096259-001/OBS-MW3	Methylene chloride (75-09-2)	UJ, I3,C3,L3,MS3
	096259-001/OBS-MW3	Trichlorotrifluoroethane (76-13-1)	UJ, L3
	096260-001/OBS-TB4	Bromomethane (74-83-9)	UJ, I3,C3,L3,MS3

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
	096260-001/OBS-TB4	Methylene chloride (75-09-2)	UJ, I3,C3,L3,MS3
	096260-001/OBS-TB4	Trichlorotrifluoroethane (76-13-1)	UJ, L3
SW846 9012B			
	096251-027/OBS-MW2	Cyanide, Total (57-12-5)	UJ, I5
	096253-027/OBS-EB1	Cyanide, Total (57-12-5)	UJ, I5
	096255-027/OBS-MW1	Cyanide, Total (57-12-5)	UJ, I5
	096256-027/OBS-MW1	Cyanide, Total (57-12-5)	UJ, I5
	096259-027/OBS-MW3	Cyanide, Total (57-12-5)	UJ, I5

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

Data Validation Summary Worksheet

AR/COC #: 615622, 615623, 615624 and 615625 Site/Project: SWMU 68 GWM Validation Date: 10/07/2014

SDG #: 352683, 352684, 356247 Laboratory: GEL Laboratories, LLC Validator: Mary Donivan

Matrix: Aqueous # of Samples: 76 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
096253-014	352683046	Hexavalent Cr	4°C	07/15/14	NA	07/17/14	yes	no

Comments: Samples collected 07/15-17/2014. Sample 096253-014 was received beyond the method specified HT of 24 hours.

Validated By: Mary A. Donivan

Organic Worksheet (GC/MS)

AR/COC #: 615622, 615623, 615624 and 615625 SDG #:352683 Matrix: Aqueous

Laboratory Sample IDs: 352683001, -014, -015, -028, -041, -043, -056, -057, -058 and -071

Method/Batch #s: 8260B: **1406391** 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 -043**	**FB -057**		
	Int.	**RF**	**RSD/R^2**	**CCV (ICV) %D**										
acetone	NA	✓	✓	-27.7	✓	NA	✓	✓	✓	✓	3.69J	4.27J		
bromodichloromethane	NA	✓	✓	✓	✓	NA	✓	✓	✓	✓	0.370J	✓		
chloroform	NA	✓	✓	✓	✓	NA	✓	✓	✓	✓	3.58	3.51		
bromomethane	NA		24.3	(-25.9) -28.6	✓	NA	67.2	62.5	64.2	✓	✓	✓		
methylene chloride	NA	✓	51.5	(-37.2) -38.9	✓	NA	64.8	62.6	62.9	✓	✓	✓		
dibromochloromethane	NA	✓	20.0	✓	✓	NA	✓	✓	✓	✓	✓	✓		
bromoform	NA	✓	29.2	(23.1) 30.1	✓	NA	✓	✓	✓	✓	✓	✓		
1,2-dibromo-3-chloropropane	NA	✓	28.8	(27.2) 24.8	✓	NA	129	✓	✓	✓	✓	✓		
2-butanone	NA	✓	✓	-28.5	✓	NA	✓	✓	✓	✓	✓	✓		
trichlorotrifluoroethane	NA	✓	✓	✓	✓	NA	64.6	✓	✓	✓	✓	✓		

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 VOAA.I 07/17/14; MS/MSD performed on -001

Organic Worksheet (GC/MS)

AR/COC #: 615622, 615623, 615624 and 615625 SDG #:352683 Matrix: Aqueous

Laboratory Sample IDs: 352683002, -016, -029, -044 and -059

Method/Batch #s: 3510C/8270D **1404952/1404953** 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 -044**			
	Int.	**RF**	**RSD/ R^2**	**CCV (ICV) %D**										
p-nitroaniline	NA	✓	17.5	✓	✓	NA	✓	✓	✓	✓	✓			
hexachlorocyclopentadiene	NA	✓	✓	(-25.0) 21.9*	✓	NA	✓	✓	✓	✓	✓			
2,4-dinitrophenol	NA	✓	✓	(-22.9)	✓	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: HT OK, ICAL MSD3.I 07/22/14 *CCV associated with sample -059

MS/MSD -002

High Explosives Worksheet (LC/MS/MS)

AR/COC #: 615622, 615623, 615624 and 615625 SDG #: 352683 Matrix: Aqueous

Laboratory Sample IDs: 352683009, -023, -036, -051 and -066

Method/Batch #s: 8535/8321A **1404601/1404606**

Analyte (Outliers)	Initial Calibration			Continuing Calibration				Method Blank	5X (10X) Blank	LCS %R	MS %R	MSD %R	MS/ MSD RPD	CRI	EB -044		
	Int.	RF	COD RSD/R^2	ICV	CCV	ICB	CCB										
m-nitrotoluene	✓	0.026	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		
o-nitrotoluene	✓	0.036	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		
p-nitrotoluene	✓	0.0195	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		
tetryl	✓	✓	✓	✓	✓	✓	✓	✓	✓	31.0	✓	✓	✓	✓	✓		

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; all sample and QC extracts diluted 1:1 with LC reagent grade water

ICAL LCMSMS3 08/13/2014

Inorganic Metals Worksheet

AR/COC #: 615622, 615623, 615624 and 615625 SDG #: 352683 and 352684 Matrix: Aqueous

Laboratory Sample IDs: 352683003, -017, -030, -045 and -060 (UF); 352684001 through -005 (F)

Method/Batch #s: **3005A/6010B (ICP-AES):** 1404860(prep)/1404861 **3005A/6020** (ICP-MS): 1407726(prep)/140727(UF); 1413268(prep)/1413270(UF); 1404830(prep)/1404831(F) **7470A** (Hg): 1408921(prep)/1408923

ICPMS Mass Cal (pass/fail) pass ICPMS Resolution (pass/fail) pass

Analyte (outliers)	**Calibration**						**Method Blank**	**5X Blank or 5X MDL**	**LCS %R**	**MS %R**	**Lab Rep. RPD**	**Serial Dil. %D**	**ICS AB %R**	**ICS A ± MDL**	**CRA/ CRI %R**	**EB**	**5X EB**			
	Int.	**R^2**	**ICV**	**CCV**	**ICB**	**CCB**														
Cu (UF)	✓	✓	✓	✓	✓	✓	✓	NA	✓	✓	✓	✓	✓	✓	✓	0.000701J	0.0035			
Na (UF)	✓	✓	✓	✓	✓	✓	✓	NA	✓	✓	✓	✓	✓	NA	✓	0.0953J	0.48			
Ca (UF)	✓	✓	✓	✓	✓	✓	✓	NA	✓	155*	✓	✓	✓	NA	✓	✓	✓			
Na (F)	✓	✓	✓	✓	✓	✓	✓	NA	✓	✓	✓	✓	✓	NA	✓	0.203J	1.02			
Ca (F)	✓	✓	✓	✓	✓	✓	✓	NA	✓	150*	✓	✓	✓	NA	✓	✓	✓			
Mg (F)	✓	✓	✓	✓	✓	✓	✓	NA	✓	155*	✓	✓	✓	NA	✓	✓	✓			

IS Outliers *60-125%*				**IS Outliers *80-120%***			
Sample ID	**%Recovery**	**%Recovery**	**%Recovery**	**CCV/CCB ID**	**%Recovery**	**%Recovery**	**%Recovery**
None				None			

Comments: HTs OK. Matrix QC performed on 352683003 for ICP-MS, ICP-AES and Hg (UF) and 352684001 for ICP-AES (F) analyses. *Ca, Mg, and Na >4X spike amount.

All unfiltered samples *except* 352683045 were diluted 10X for Ca and all filtered samples *except* 352684004 were diluted 5X for Ca.

General Chemistry Worksheet

AR/COC #: 615622, 615623, 615624 and 615625 SDG #: 352683 Matrix: Aqueous

Laboratory Sample IDs: 352683 - See below

Method/Batch #s: EPA 9012A (total cyanide): Batch 1404370(prep)/1404371 Samples -010, -024, -037, -052 and -067

Method/Batch #s: EPA 314.0 (perchlorate): Batch 1405183 Samples -007, -021, -034, -049 and -064

Method/Batch #s: EPA 9056 (anions): Batch 1406824 Samples -005, -019, -032, -047 and -062

Method/Batch #s: EPA 353.2 (NO_3/NO_2 – N): Batch 1404662 Samples -006, -020, -033, -048 and -063

Method/Batch #s: EPA 7196A (hexavalent Cr): Batch 1403613 Sample -004; Batch 1404061 Samples -018, -031, -042, -046; Batch 1404391 Sample -061

Method/Batch #s: SM2320B (alkalinity): Batch 1406561 Samples -008, -050; Batch 1407436 Samples -022, -035, -065

Analyte (outliers)	**Calibration**						**Method Blank**	**5X Blank or 5X MDL**	**LCS %R**	**MS %R**	**Lab Rep. RPD**	**EB**	**5X EB**			
	Int.	**R^2**	**ICV**	**CCV**	**ICB**	**CCB**										
chloride	✓	✓	✓	✓	✓	✓	✓	NA	✓	✓	✓	0.156J	0.78			
total cyanide	-0.00187	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓	NA			
hexavalent Cr	✓	✓	✓	✓	✓	0.0034*	✓	0.017	✓	✓	✓	0.0034**	0.017			

Comments: HTs OK. **Matrix QC: 9012A:** performed on SNL sample from another SDG**; 314.0:** performed on sample -007; **9056**: performed on sample -047; **353.2**: performed on sample -006; **7196A;** performed on samples -004(1403613), -046(1404061) and -061(1404391); **SM2320B**: performed on samples -008(1406561) and -022(1407436).

Anions – all samples except EB diluted 10X for Cl and SO4. NO_3/NO_2 – all samples except EB diluted 5X

*associated with samples -018, -031, -042 and -046

** qualified ND due to CCB contamination

Radiochemistry Worksheet

AR/COC #: 615622, 615623, 615624 and 615625 SDG #: 352683 and 356247 Matrix: Aqueous

Laboratory Sample IDs: 352683- and 356247- See below

Method/Batch #s: EML HASL 300 (alphaspec U): Batch 1404451 Samples -013, -027, -040, -055 and -070; batch 1417460 Sample 356247002

Method/Batch #s: EPA 901.1 (gamma spec): Batch 1404403 Samples -011, -025, -038, -053 and -068

Method/Batch #s: EPA 900.0 (Gross alpha/beta): Batch 1407929(beta)/1413034(alpha) Samples -012, -026, -039, -054 and -069; Batch 1417446 Sample 356247001

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: **Matrix QC: HASL 300:** performed on -013 and 356247002; **901.1:** Performed on sample -011. **900.0:** Performed on SNL sample from another SDG for batch 1407929 (beta), sample -012 for batch 1413034 (alpha) and 356247001 for batch 1417446.

Gross alpha/beta parent and DUP = 150 ml, MS/MSD=5 ml (30X dilution)-results qualified for batch 1417446, other batches OK

Peak rejected by laboratory -011 (K-40)

SMO 2012-ARCOC (4-2012)

AOP 95-16

CONTRACT LABORATORY
ANALYSIS REQUEST AND CHAIN OF CUSTODY

Internal Lab

Batch No.

Page 1 of 2

SMO Use

AR/COC **615622**

Project Name:	SWMU 68 GWM	Date Samples Shipped:	7/15/14	SMO Authorization:	Don W...
Project/Task Manager:	Clinton Lum	Carrier/Waybill No.	220819	SMO Contact Phone:	
Project/Task Number:	146422.10.11.01	Lab Contact:	Edie Kent/803-556-8171		Lorraine Herrera/505-844-3199
Service Order:	CF263-14	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
096251	-001	OBS-MW2	252	7/15/14	9:24	GW	G	3x40 ml	HCL	G	SA	TCL VOC (SW846-8260B)	352683 001
096251	-002	OBS-MW2	252	7/15/14	9:25	GW	AG	4x1 L	None	G	SA	TCL SVOC (SW846-8270C)	352683 002
096251	-009	OBS-MW2	252	7/15/14	9:27	GW	P	500 ml	HNO3	G	SA	TAL Metals+U (SW846-6010/6020/7470)	352683 003
096251	-014	OBS-MW2	252	7/15/14	9:28	GW	P	250 ml	None	G	SA	Hexavalent Chromium (SW846-7196A)	352683 004
096251	-016	OBS-MW2	252	7/15/14	9:29	GW	P	125 ml	None	G	SA	Anions (SW846-9056)	352683 005
096251	-017	OBS-MW2	252	7/15/14	9:30	FGW	P	500 ml	HNO3	G	SA	Metals-Ca,Mg,K,Na (SW846-6020)	352654 001
096251	-018	OBS-MW2	252	7/15/14	9:32	GW	P	125 ml	H2SO4	G	SA	Nitrate+Nitrite (EPA 353.2)	352683 006
096251	-020	OBS-MW2	252	7/15/14	9:33	GW	P	250 ml	None	G	SA	Perchlorate (EPA 314.0)	352683 007
096251	-022	OBS-MW2	252	7/15/14	9:34	GW	P	500 ml	None	G	SA	Alkalinity (SM2320B)	352683 008
096251	-024	OBS-MW2	252	7/15/14	9:35	GW	AG	4x1 L	None	G	SA	High Explosives(SW846-8321A Mod.)	352683 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
If Perchlorate detected,perform verification analysis using SW846-6850M.Filtered fraction collected in the field using a 0.45 micron in-line filter. Report Anions (as Br,Cl,F,SO4). Alkalinity (as total CaCO3,HCO3,CO3). Gamma Spectroscopy (as short list isotopes)

Conditions on Receipt

Lab Use

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

		Org.	Date	Time		Org.	Date	Time
1.Relinquished by	Alfred Santillanes	4142	7/15/14	10:10	3.Relinquished by			
1. Received by	Don W...	4142	7/15/14	1010	3. Received by			
2.Relinquished by	Don W...	4142	7/15/14	1100	4.Relinquished by			
2. Received by	[illegible]	Gel	7-16-14	0735	4. Received by			

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

CONTRACT LABORATORY
ANALYSIS REQUEST AND CHAIN OF CUSTODY (Continuation)

AR/COC 615622

Project Name:	SWMU 68 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
096251	-027	OBS-MW2	252	7/15/14 9:37	GW	P	250 ml	NaOH	G	SA	Total Cyanide (SW846-9012)	352683 010
096251	-033	OBS-MW2	252	7/15/14 9:38	GW	P	1 L	HNO3	G	SA	Gamma Spectroscopy (EPA 901.0)	352683 011
096251	-034	OBS-MW2	252	7/15/14 9:39	GW	P	1 L	HNO3	G	SA	Gross Alpha and Beta (EPA 900.0)	352683 012
096251	-035	OBS-MW2	252	7/15/14 9:40	GW	P	1 L	HNO3	G	SA	Isotopic Uranium (HASL 300)	352683 013
096252	-001	OBS-TB1	NA	7/15/14 9:24	DIW	G	3x40 ml	HCL	G	TB	TCL VOC (SW846-8260B)	352683 014

Recipient Initials

CONTRACT LABORATORY
ANALYSIS REQUEST AND CHAIN OF CUSTODY

AOP 95-16

Internal Lab

Batch No. N/A

AR/COC 615624

Project Name: SWMU 68 GWM	Date Samples Shipped: 7/16/14	SMO Authorization:	☐ Waste Characterization
Project/Task Manager: Clinton Lum	Carrier/Waybill No. 2212 13	SMO Contact Phone:	☐ RMMA
Project/Task Number: 146422.10.11.01	Lab Contact: Edie Kent/803-556-8171	Lorraine Herrera/505-844-3199	☐ Released by COC No.
Service Order: CF263-14	Lab Destination: GEL	Send Report to SMO:	☑ 4° Celsius
	Contract No.: PO 1303873	Rita Kavanaugh/505-284-2553	
Tech Area:		Bill to: Sandia National Laboratories (Accounts Payable), P.O. Box 5800, MS-0154 Albuquerque, NM 87185-0154	
Building: Room:	Operational Site:		

SMO 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
096255	-001	OBS-MW1	153	7/16/14 9:25	GW	G	3x40 ml	HCL	G	SA	TCL VOC (SW846-8260B)	352683 015
096255	-002	OBS-MW1	153	7/16/14 9:27	GW	AG	4x1 L	None	G	SA	TCL SVOC (SW846-8270C)	352683 016
096255	-009	OBS-MW1	153	7/16/14 9:30	GW	P	500 ml	HNO3	G	SA	TAL Metals+U (SW846-6010/6020/7470)	352683 017
096255	-014	OBS-MW1	153	7/16/14 9:31	GW	P	250 ml	None	G	SA	Hexavalent Chromium (SW846-7196A)	352683 018
096255	-016	OBS-MW1	153	7/16/14 9:32	GW	P	125 ml	None	G	SA	Anions (SW846-9056)	352683 019
096255	-017	OBS-MW1	153	7/16/14 9:34	FGW	P	500 ml	HNO3	G	SA	Metals-Ca,Mg,K,Na (SW846-6020)	352684 002
096255	-018	OBS-MW1	153	7/16/14 9:35	GW	P	125 ml	H2SO4	G	SA	Nitrate+Nitrite (EPA 353.2)	352683 020
096255	-020	OBS-MW1	153	7/16/14 9:36	GW	P	250 ml	None	G	SA	Perchlorate (EPA 314.0)	352683 021
096255	-022	OBS-MW1	153	7/16/14 9:37	GW	P	500 ml	None	G	SA	Alkalinity (SM2320B)	352683 022
096255	-024	OBS-MW1	153	7/16/14 9:38	GW	AG	4x1 L	None	G	SA	High Explosives(SW846-8321A Mod.)	352683 023

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

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

Special Instructions/QC Requirements:

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

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

If Perchlorate detected, perform verification analysis using SW846-6850M. Filtered fraction collected in the field using a 0.45 micron in-line filter. Report Anions (as Br,Cl,F,SO4). Alkalinity (as total CaCO3,HCO3,CO3). Gamma Spectroscopy (as short list isotopes)

Conditions on Receipt

Lab Use

1. Relinquished by		Org. 4142	Date 7/16/14	Time 1013	3. Relinquished by	Org.	Date / Time
1. Received by	GMO	Org. 4142	Date 7/16/14	Time 1013	3. Received by	Org.	Date / Time
2. Relinquished by		Org. 4142	Date 7/16/14	Time 1600	4. Relinquished by	Org.	Date / Time
2. Received by		Org. CEL	Date 7-17-14	Time 0750	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 615624

Project Name:	SWMU 68 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
096255	-027	OBS-MW1	153	7/16/14 9:41	GW	P	250 ml	NaOH	G	SA	Total Cyanide (SW846-9012)	352683 024
096255	-033	OBS-MW1	153	7/16/14 9:42	GW	P	1 L	HNO3	G	SA	Gamma Spectroscopy (EPA 901.0)	352683 025
096255	-034	OBS-MW1	153	7/16/14 9:44	GW	P	1 L	HNO3	G	SA	Gross Alpha and Beta (EPA 900.0)	352683 026
096255	-035	OBS-MW1	153	7/16/14 9:46	GW	P	1 L	HNO3	G	SA	Isotopic Uranium (HASL 300)	352683 027
096256	-001	OBS-MW1	153	7/16/14 9:25	GW	G	3x40 ml	HCL	G	DU	TCL VOC (SW846-8260B)	352683 028
096256	-002	OBS-MW1	153	7/16/14 9:27	GW	AG	4x1 L	None	G	DU	TCL SVOC (SW846-8270C)	352683 029
096256	-009	OBS-MW1	153	7/16/14 9:30	GW	P	500 ml	HNO3	G	DU	TAL Metals+U (SW846-6010/6020/7470)	352683 030
096256	-014	OBS-MW1	153	7/16/14 9:31	GW	P	250 ml	None	G	DU	Hexavalent Chromium (SW846-7196A)	352683 031
096256	-016	OBS-MW1	153	7/16/14 9:32	GW	P	125 ml	None	G	DU	Anions (SW846-9056)	352683 032
096256	-017	OBS-MW1	153	7/16/14 9:34	FGW	P	500 ml	HNO3	G	DU	Metals-Ca,Mg,K,Na (SW846-6020)	352684 003
096256	-018	OBS-MW1	153	7/16/14 9:35	GW	P	125 ml	H2SO4	G	DU	Nitrate+Nitrite (EPA 353.2)	352683 033
096256	-020	OBS-MW1	153	7/16/14 9:36	GW	P	250 ml	None	G	DU	Perchlorate (EPA 314.0)	352683 034
096256	-022	OBS-MW1	153	7/16/14 9:37	GW	P	500 ml	None	G	DU	Alkalinity (SM2320B)	352683 035
096256	-024	OBS-MW1	153	7/16/14 9:38	GW	AG	4x1 L	None	G	DU	High Explosives(SW846-8321A Mod.)	352683 036
096256	-027	OBS-MW1	153	7/16/14 9:41	GW	P	250 ml	NaOH	G	DU	Total Cyanide (SW846-9012)	352683 037
096256	-033	OBS-MW1	153	7/16/14 9:42	GW	P	1 L	HNO3	G	DU	Gamma Spectroscopy (EPA 901.0)	352683 038
096256	-034	OBS-MW1	153	7/16/14 9:44	GW	P	1 L	HNO3	G	DU	Gross Alpha and Beta (EPA 900.0)	352683 039
096256	-035	OBS-MW1	153	7/16/14 9:46	GW	P	1 L	HNO3	G	DU	Isotopic Uranium (HASL 300)	352683 040
096257	-001	OBS-TB3	NA	7/16/14 9:25	DIW	G	3x40 ml	HCL	G	TB	TCL VOC (SW846-8260B)	352683 041
096261	-014	OBS-EB2	NA	7/16/14 8:15	DIW	P	250 ml	None	G	EB	Hexavalent Chromium (SW846-7196A)	352683 042

Recipient Initials

CONTRACT LABORATORY
ANALYSIS REQUEST AND CHAIN OF CUSTODY

Internal Lab

Batch No. N/A

AR/COC 615623

Project Name:	SWMU 68 GWM	Date Samples Shipped:	7/16/14	SMO Authorization:	☐ Waste Characterization
Project/Task Manager:	Clinton Lum	Carrier/Waybill No.	221185	SMO Contact Phone:	☐ RMMA
Project/Task Number:	146422.10.11.01	Lab Contact:	Edie Kent/803-556-8171	Lorraine Herrera/505-844-3199	☐ Released by COC No.
Service Order:	CF263-14	Lab Destination:	GEL	Send Report to SMO:	☑ 4° Celsius
		Contract No.:	PO 1303873	Rita Kavanaugh/505-284-2553	
Tech Area:				Bill to: Sandia National Laboratories (Accounts Payable), P.O. Box 5800, MS-0154 Albuquerque, NM 87185-0154	
Building:	Room:	Operational Site:			

SMO 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
096253	-001	OBS-EB1	NA	7/15/14 10:58	DIW	G	3x40 ml	HCL	G	EB	TCL VOC (SW846-8260B)	352683 043
096253	-002	OBS-EB1	NA	7/15/14 10:59	DIW	AG	4x1 L	None	G	EB	TCL SVOC (SW846-8270C)	352683 044
096253	-009	OBS-EB1	NA	7/15/14 11:01	DIW	P	500 ml	HNO3	G	EB	TAL Metals+U (SW846-6010/6020/7470)	352683 045
096253	-014	OBS-EB1 analysis reinstated EMK 7/18/14	NA	7/15/14 11:02	DIW	P	250 ml	None	G	EB	~~Hexavalent Chromium (SW846-7196A)~~ EMK 7/17/14	352683 046
096253	-016	OBS-EB1	NA	7/15/14 11:03	DIW	P	125 ml	None	G	EB	Anions (SW846-9056)	352683 047
096253	-017	OBS-EB1	NA	7/15/14 11:04	FDIW	P	500 ml	HNO3	G	EB	Metals-Ca,Mg,K,Na (SW846-6020)	352684 004
096253	-018	OBS-EB1	NA	7/15/14 11:06	DIW	P	125 ml	H2SO4	G	EB	Nitrate+Nitrite (EPA 353.2)	352683 048
096253	-020	OBS-EB1	NA	7/15/14 11:07	DIW	P	250 ml	None	G	EB	Perchlorate (EPA 314.0)	352683 049
096253	-022	OBS-EB1	NA	7/15/14 11:08	DIW	P	500 ml	None	G	EB	Alkalinity (SM2320B)	352683 050
096253	-024	OBS-EB1	NA	7/15/14 11:09	DIW	AG	4x1 L	None	G	EB	High Explosives(SW846-8321A Mod.)	352683 051

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

If Perchlorate detected,perform verification analysis using SW846-6850M.Filtered fraction collected in the field using a 0.45 micron in-line filter. Report Anions (as Br,Cl,F,SO4). Alkalinity (as total CaCO3,HCO3,CO3). 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
	Alfred Santillanes		AS	SNL/4142/505-844-5130/505-228-0710
	William Gibson			SNL/4142/505-284-3307/505-239-7367

1. Relinquished by		Org.	4142	Date	7/15/14	Time	1414	
1. Received by	SMO	Org.	4142	Date	7/15/14	Time	1414	
2. Relinquished by	SMO	Org.	4142	Date	7/16/14	Time	0900	
2. Received by		Org.	GEL	Date	7-17-14	Time	0750	
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 615623

Project Name:	SWMU 68 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
096253	-027	OBS-EB1	NA	7/15/14 11:11	DIW	P	250 ml	NaOH	G	EB	Total Cyanide (SW846-9012)	352683 052
096253	-033	OBS-EB1	NA	7/15/14 11:12	DIW	P	1 L	HNO3	G	EB	Gamma Spectroscopy (EPA 901.0)	352683 053
096253	-034	OBS-EB1	NA	7/15/14 11:13	DIW	P	1 L	HNO3	G	EB	Gross Alpha and Beta (EPA 900.0)	352683 054
096253	-035	OBS-EB1	NA	7/15/14 11:14	DIW	P	1 L	HNO3	G	EB	Isotopic Uranium (HASL 300)	352683 055
096254	-001	OBS-TB2	NA	7/15/14 10:58	DIW	G	3x40 ml	HCL	G	TB	TCL VOC (SW846-8260B)	352683 056

Recipient Initials MK

CONTRACT LABORATORY
ANALYSIS REQUEST AND CHAIN OF CUSTODY

Internal Lab

Batch No. N/A

SMO Use

AR/COC 615625

Project Name:	SWMU 68 GWM	Date Samples Shipped:	7/17/14	SMO Authorization:	☐ Waste Characterization
Project/Task Manager:	Clinton Lum	Carrier/Waybill No.	22248	SMO Contact Phone:	☐ RMMA
Project/Task Number:	146422.10.11.01	Lab Contact:	Edie Kent/803-556-8171	Lorraine Herrera/505-844-3199	☐ Released by COC No.
Service Order:	CF263-14	Lab Destination:	GEL	Send Report to SMO:	☑ 4° Celsius
		Contract No.:	PO 1303873	Rita Kavanaugh/505-284-2553	
Tech Area:				Bill to:Sandia National Laboratories (Accounts Payable), P.O. Box 5800, MS-0154 Albuquerque, NM 87185-0154	
Building:	Room:	Operational Site:			

Sample No.	Fraction	Sample Location Detail	Depth (ft)	Date/Time Collected	Sample Matrix	Container Type	Container Volume	Preservative	Collection Method	Sample Type	Parameter & Method Requested	Lab Sample ID
096258	-001	OBS-FB1	NA	7/17/14 9:35	DIW	G	3x40 ml	HCL	G	FB	TCL VOC (SW846-8260B)	352683 057
096259	-001	OBS-MW3	208	7/17/14 9:35	GW	G	3x40 ml	HCL	G	SA	TCL VOC (SW846-8260B)	352683 058
096259	-002	OBS-MW3	208	7/17/14 9:36	GW	AG	4x1 L	None	G	SA	TCL SVOC (SW846-8270C)	352683 059
096259	-009	OBS-MW3	208	7/17/14 9:38	GW	P	500 ml	HNO3	G	SA	TAL Metals+U (SW846-6010/6020/7470)	352683 060
096259	-014	OBS-MW3	208	7/17/14 9:39	GW	P	250 ml	None	G	SA	Hexavalent Chromium (SW846-7196A)	352683 061
096259	-016	OBS-MW3	208	7/17/14 9:40	GW	P	125 ml	None	G	SA	Anions (SW846-9056)	352683 062
096259	-017	OBS-MW3	208	7/17/14 9:42	FGW	P	500 ml	HNO3	G	SA	Metals-Ca,Mg,K,Na (SW846-6020)	352684 005
096259	-018	OBS-MW3	208	7/17/14 9:43	GW	P	125 ml	H2SO4	G	SA	Nitrate+Nitrite (EPA 353.2)	352683 063
096259	-020	OBS-MW3	208	7/17/14 9:44	GW	P	250 ml	None	G	SA	Perchlorate (EPA 314.0)	352683 064
096259	-022	OBS-MW3	208	7/17/14 9:45	GW	P	500 ml	None	G	SA	Alkalinity (SM2320B)	352683 065

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

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

Special Instructions/QC Requirements:

EDD ☑ Yes ☐ No

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

Negotiated TAT ☐

Sample Disposal ☐ Return to Client ☑ Disposal by Lab

Return Samples By:

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

If Perchlorate detected,perform verification analysis using SW846-6850M.Filtered fraction collected in the field using a 0.45 micron in-line filter. Report Anions (as Br,Cl,F,SO4). Alkalinity (as total CaCO3,HCO3,CO3). Gamma Spectroscopy (as short list isotopes)

Conditions on Receipt

Lab Use

1.Relinquished by		Org. 4142	Date 7/17/14	Time 1024	3.Relinquished by	Org.	Date	Time
1. Received by	SMO	Org. 4142	Date 7/17/14	Time 1024	3. Received by	Org.	Date	Time
2.Relinquished by	SMO	Org. 4142	Date 7/17/14	Time 1045	4.Relinquished by	Org.	Date	Time
2. Received by		Org. CEL	Date 7-18-14	Time 0725	4. Received by	Org.	Date	Time

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

CONTRACT LABORATORY
ANALYSIS REQUEST AND CHAIN OF CUSTODY (Continuation)

AR/COC 615625

Project Name:	SWMU 68 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
096259	-024	OBS-MW3	208	7/17/14 9:46	GW	AG	4x1 L	None	G	SA	High Explosives(SW846-8321A Mod.)	352683 066
096259	-027	OBS-MW3	208	7/17/14 9:48	GW	P	250 ml	NaOH	G	SA	Total Cyanide (SW846-9012)	352683 067
096259	-033	OBS-MW3	208	7/17/14 9:49	GW	P	1 L	HNO3	G	SA	Gamma Spectroscopy (EPA 901.0)	352683 068
096259	-034	OBS-MW3	208	7/17/14 9:50	GW	P	1 L	HNO3	G	SA	Gross Alpha and Beta (EPA 900.0)	352683 069
096259	-035	OBS-MW3	208	7/17/14 9:51	GW	P	1 L	HNO3	G	SA	Isotopic Uranium (HASL 300)	352683 070
096260	-001	OBS-TB4	NA	7/17/14 9:35	DIW	G	3x40 ml	HCL	G	TB	TCL VOC (SW846-8260B)	352683 071

Recipient Initials MK

Sandia National Laboratories