ENTERED

National Nuclear Security Administration

Department of Energy
National Nuclear Security Administration
Sandia Field Office
P. O. Box 5400
Albuquerque, NM 87185

APR 21 2015

CERTIFIED MAIL-RETURN RECEIPT REQUESTED

APR 13 2015

Mr. John E. Kieling
Chief
Hazardous Waste Bureau
New Mexico Environment Department
2905 Rodeo Park Drive East, Bldg. 1
Santa Fe, NM 87505

Subject: Department of Energy/National Nuclear Security Administration Sandia National Laboratories Environmental Restoration Operations Consolidated Quarterly Report, April 2015.

Dear Mr. Kieling:

Enclosed is the Environmental Restoration Operations Consolidated Quarterly Report, April 2015 for the Department of Energy, National Nuclear Security Administration, Sandia National Laboratories that addresses all quarterly reporting (October through December 2014) required under the Hazardous and Solid Waste Amendments Module of the Resource Conservation and Recovery Act Permit, the Compliance Order on Consent and the Chemical Waste Landfill Post-Closure Care Permit for Sandia National Laboratories/New Mexico, Environmental Protection Agency Identification Number NM5890110518.

If you have questions, please contact me at (505) 845-5201 or David Rast of my staff at (505) 845-5349.

Sincerely,

William P. Ortiz
Acting Assistant Manager
for Engineering

Enclosure

cc: See Page 2

CERTIFICATION STATEMENT FOR APPROVAL AND FINAL RELEASE OF DOCUMENTS

Document title: **Environmental Restoration Operations Consolidated Quarterly Report, December, 2014**

Document author: **John Cochran, Department 06234**

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision according to a system designed to ensure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine or imprisonment for knowing violations.

Signature: _____ 4/7/15

Date

Peter Davies, Director
Nuclear Energy & Fuel Cycle Programs
Center 6200
Sandia National Laboratories/New Mexico
Albuquerque, New Mexico 87185
Operator

and

Signature: _____ 10 Apr 15

Date

James W. Todd
U.S. Department of Energy
National Nuclear Security Administration
Sandia Site Office
Owner and Co-Operator

Sandia National Laboratories

Sandia National Laboratories, New Mexico

Environmental Restoration Operations

A U.S. Department of Energy Environmental Cleanup Program

Consolidated Quarterly Report

October – December 2014

April 2015

U.S. DEPARTMENT OF ENERGY

United States Department of Energy
Sandia Field Office

Sandia National Laboratories is a multi-program laboratory managed and operated by Sandia Corporation, a wholly owned subsidiary of Lockheed Martin Corporation, for the U.S. Department of Energy's National Nuclear Security Administration under contract DE-AC04-94AL85000.

CONSOLIDATED QUARTERLY REPORT

April 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: October – December 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 Compliance Order on Consent. 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, which 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, October – December 2014

SECTION II: Perchlorate Screening Quarterly Groundwater Monitoring Report, October – December 2014

SECTION III: Solid Waste Management Units 8/58 and 68 Quarterly Groundwater Monitoring Report, October – December 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 Groundwater Area of Concern)
DO	dissolved oxygen
DOE	U.S. Department of Energy
EB	equipment blank
EPA	U.S. Environmental Protection Agency
ER	Environmental Restoration Operations
ER Quarterly Report	Environmental Restoration Operations (ER) Consolidated Quarterly Report
ET Cover	evapotranspirative cover
FB	field blank
FOP	Field Operating Procedure
GEL	GEL Laboratories LLC
H_2SO_4	sulfuric acid
HASL	Health and Safety Laboratory
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
Permit	Hazardous Waste Facility Operating Permit
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

This page intentionally left blank.

SECTION I
TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

SECTION I
ENVIRONMENTAL RESTORATION OPERATIONS CONSOLIDATED QUARTERLY REPORT, October – December 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 October, November, and December 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 groundwater sampling and analysis. 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 U.S. Department of Energy/National Nuclear Security Administration (DOE/NNSA) and Sandia Corporation (Sandia) requested a Certificate of Completion for the MWL on September 25, 2014 (Beausoleil September 2014). NMED provided the Certification of Completion for the MWL on October 8, 2014 (Cobrain October 2014) and DOE/NNSA and Sandia subsequently submitted a request to NMED for a Class 3 Permit Modification to the Resource Conservation and Recovery Act (RCRA) Hazardous Waste Permit (Permit). The Final Order becomes effective on February 26, 2015. The Class 3 Permit Modification Request was dated October 17, 2014 and petitioned the NMED to change the MWL status to Corrective Action Complete (CAC) with Controls (Beausoleil October 2014). The request and associated legal notice initiated the DOE/NNSA and Sandia 60-day public comment

period that will be completed on January 5, 2015, and included a public meeting that was held on November 18, 2014. Compilation of the MWL Justification Binder that includes all major MWL documents and related correspondence from May 2005 to October 2014 was completed and distributed to NMED and the Federal Repository located at the University of New Mexico Zimmerman Library on October 14, 2014. The Class 3 Permit Modification Request, Justification Binders, and supporting information for the November 18, 2014 public meeting (posters, fact sheets, and supplemental information) were also uploaded to the Zimmerman Library website (i.e., LoboVault). Approximately 60 members of the public attended the public meeting (poster session format held from 4 to 8 p.m. at the Manzano Mesa Multigenerational Center) and 12 public comments were received during the meeting.

Installation and reporting associated with the soil-vapor monitoring well network was completed during the last reporting period. 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). Final results were made available to the public at the November 18, 2014 public meeting and on the Zimmerman Library website. Soil-vapor monitoring under the LTMMP is addressed in Section I.3.1.

A groundwater monitoring report focusing on filtered and unfiltered metals in groundwater from monitoring well MWL-MW4 during 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 a significant 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.

- In October 2014, preliminary results were provided to NMED and report preparation began for submittal to NMED in early 2015.

- On December 16, 2014, the dedicated Bennett™ sampling pump, Baski™ packer, supporting metal rods, and associated tubing were removed from MWL-MW4. The Bennett™ pump was inspected and photographed to document corrosion, which was severe. The pumping and sampling data, along with the visual inspections, confirms the source of the anomalous unfiltered metals results from the 2013 groundwater samples was corrosion of the dedicated pump.

- A video log of MWL-MW4 performed on December 16 confirmed the monitoring well is in reasonable condition. Only the inflatable packer was reinstalled after it was cleaned and inspected. MWL-MW4 will be used to measure and monitor the elevation of the regional aquifer water table in accordance with the LTMMP; future sampling is not required.

2.2 Project Management and Site Closure

ER sites in the 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 RCRA Permit for Sandia National Laboratories" for these 26 sites in December 2007 (NMED December 2007). The NMED public review and comment period ended in February 2008.

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

- SWMUs 4, 5, 46, 49, 52, 68, 91, 101, 116, 138, 140, 147, 149, 150, 154, 161, 196, 223, and 224.

- AOCs 1090, 1094, 1095, 1114, 1115, 1116, and 1117

2.2.2 Permit Modification Request Submitted in January 2008

Five additional sites were submitted for the NMED determination of CAC in a Permit modification request submitted in January 2008 (Wagner January 2008). 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 request 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 specifies additional groundwater characterization requirements for five SWMUs in the section titled, "SWMUs Requiring Additional Corrective Action." The SWMUs include the following:

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 8/58 and 68 are presented in Section III of this ER Quarterly Report.

Subsequent correspondence, in 2012 and 2014, from the NMED granted CAC status to the remaining SWMUs and AOCs that were listed in the April 2010 letter from the NMED (NMED April 2010). These letters are described below.

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, the 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, in Albuquerque, New Mexico. Sandia provided testimony at the Hearing in support of granting CAC status to the 24 SWMUs/AOCs.

In December 2014, the NMED Secretary signed the Final Order supporting the grant of CAC status to the 24 SWMUs/AOCs in conjunction with the Hazardous Waste Facility Operating Permit (NMED December 2014). This Permit for treatment and storage of hazardous and mixed waste at the SNL Facility and the granting of CAC for the 24 SWMUs/AOCs will become effective on February 26, 2015.

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, 3 were granted CAC status in 2012, and after a Public Hearing in 2014, the NMED Secretary signed a Final Order supporting the grant of CAC status to the remaining 24 SWMU/AOC sites, which will become effective on February 26, 2015.

2.3 Groundwater Sampling and Analysis

The following sections present 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 groundwater monitoring for these sites.

Analytical results for groundwater monitoring at TAVG AOC; BSG AOC; TAG AOC; 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 anticipated to be submitted to the NMED in the 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, and BSG AOC is discussed in Section II of this ER Quarterly Report.

Analytical results for the October 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 III of this ER Quarterly Report.

2.3.1 Technical Area V Groundwater Area of Concern

Groundwater sampling at TAVG AOC was conducted in October and November 2014.

2.3.2 Burn Site Groundwater Area of Concern

Groundwater sampling at BSG AOC was conducted in December 2014. SNL/NM personnel installed two groundwater monitoring wells (CYN-MW14A and CYN-MW15) based on the NMED-approved Monitoring Well Plug and Abandonment Plan and Well Construction Plan (SNL/NM September 2013; NMED June 2014).

2.3.3 Tijeras Arroyo Groundwater Area of Concern

Groundwater sampling at TAG AOC was conducted in November and December 2014. SNL/NM personnel installed one groundwater monitoring well (TA2-W-28) and

decommissioned one groundwater monitoring well (TA2-SW1-320) based on the NMED-approved Monitoring Well Plug and Abandonment Plan and Well Construction Plan (SNL/NM September 2013; NMED June 2014).

2.3.4 Mixed Waste Landfill Groundwater

Groundwater sampling at MWL was conducted 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

No CWL groundwater monitoring activities were performed during this reporting period. 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 October 2014. In October 2014, DOE and Sandia notified NMED that groundwater monitoring at SWMUs 8/58 had been completed, and would be discontinued (SNL/NM October 2014).

2.3.7 SWMU 49 Groundwater

In December 2014, NMED approved CAC without Controls for SWMU 49 in conjunction with renewal of the Permit (NMED December 2014). As a result, no long-term controls are needed, and no future sampling activities are planned at SWMU 49.

2.3.8 SWMU 68 Groundwater

SWMU 68 groundwater sampling was conducted in October 2014. In October 2014, DOE and Sandia notified NMED that groundwater monitoring at SWMU 68 had been completed, and would be discontinued (SNL/NM October 2014).

2.3.9 SWMU 116 Groundwater

In December 2014, NMED approved CAC without Controls at SWMU 116 in conjunction with renewal of the Permit (NMED December 2014). Therefore, no long-term controls are needed, and no future sampling activities are planned at SWMU 116.

2.3.10 SWMU 149 Groundwater

In October 2014, DOE and Sandia notified NMED that groundwater monitoring at SWMU 149 had been completed, and would be discontinued (SNL/NM October 2014).

2.3.11 SWMU 154 Groundwater

In October 2014, DOE and Sandia notified NMED that groundwater monitoring at SWMU 154 had been completed, and would be discontinued (SNL/NM October 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 Technical Area (TA)-V Geophysical Logs and Slug Test Results Report submitted to the NMED on November 24, 2010 (SNL/NM November 2010).
- The 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 31 of 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 on July 3, 2014 were inspected during the reporting period and will be collected for analysis in early January 2015. No repairs were needed.

- Semiannual groundwater monitoring was performed October 16 to 29, 2014. This completes groundwater monitoring activities for the April 1, 2014 through March 31, 2015 reporting period. Results will be included in the June 2015 annual report.

- The second semiannual soil-vapor monitoring sampling event was completed on October 22, 2014. The first two sampling events for the April 1, 2014 through March 31, 2015 annual reporting period were conducted within 2 months (September and October 2014) to allow for the results to be included in the MWL Annual Long-Term Monitoring and Maintenance Report that will be submitted to the NMED in June 2015 (FLUTe™ well installation completed in July). Future semiannual soil-vapor monitoring will be performed in April and October of each year.

- The quarterly ET Cover System Inspection was performed on December 3, 2014. No maintenance or repairs were required.

- ET Cover maintenance (weed removal from the cover and perimeter fence) was performed October 29 through 30, 2014. Approximately 9 cubic yards of highly compressed weeds were removed from the site, mostly from the perimeter fence.

- One supplemental watering (1/2 inch equivalent) was performed on October 28, 2014, and the supplemental watering system was drained and prepared for winter on November 19, 2014.

- Additional information on activities performed at the MWL during this reporting period are provided in Section I.2.1.

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:

- ET Cover maintenance work was conducted on October 28, 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 approximately 1 cubic yard of compressed weeds was removed from the site.

- The quarterly ET Cover System Inspection (surface, storm water diversion structures, security fence, and survey monuments) was performed on December 9, 2014. Excess sediment in the southwest drainage culvert was removed along with windblown weed debris in the perimeter fence. No other issues were identified.

- Supplemental watering (1 inch equivalent event) was performed over two days from October 13 through 14, 2014. The large sprinkler and hose were decommissioned for the winter on October 29, 2014.

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 (October, November, and December 2014) include the following:

- The September 2013 quarterly inspection identified the need to remove sediment accumulation and make minor repairs to the perimeter drainage on the east and north sides, at the toe of the containment cell. After evaluating various options and alternatives, the internal work plan was approved September 23, 2014 and the field effort began September 30, 2014. The work was completed October 29, 2014. The repair work included removal of excess accumulated sediment from the perimeter drainage, grading to repair rill erosion, and placement of gravel on the slope and perimeter road east and north of the containment cell to help prevent future erosion. Figure I-1 is a view looking south on the east side of the containment cell showing work in progress for removing sediment accumulation from the perimeter drainage and repairing rill erosion. Figure I-2 is a view looking north on the east side of the containment cell showing the completed repair work.

- The September 2014 quarterly inspection identified the need to remove excessive weed growth in the northwest retention pond. The weeds were removed on October 29, 2014.

- Quarterly monitoring of the Vadose Zone Monitoring System was conducted in November 2014. The results will be presented in the CAMU Report of Post-Closure Care Activities, July - December (anticipated submittal to the NMED in March 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 November 17, 2014.

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

- Quarterly inspection of the site was performed on December 9 and December 18, 2014, which included the containment cell cover, stormwater diversion structures, security fences, gates, signs, and benchmarks. The findings and maintenance activities include the following:

    - A small number of plants with the potential to develop a deep root system were identified growing on the cover. They are scheduled to be clipped at or below ground level in February or early March of 2015 per the SNL/NM staff biologist recommendation that greatest mortality is achieved when clipped during the winter months.

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 September 30, 2014 equaled 21 and 0 gallons, respectively.

- Leachate and rinsate waste generated on site during the reporting period equaled 79 and 0 gallons, respectively. Leachate waste removed from the site on November 24, 2014 equaled 66 gallons.

- Leachate waste remaining on site at the end of this reporting period equaled 34 gallons.

3.3.2 CAMU Regulatory Activities

In December 2014, NMED signed the Final Order supporting the issuance of the Permit (NMED December 2014), which will become effective on February 26, 2015. Post-closure care of the CAMU will be performed under the Permit in the CY 2015.

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

The CAMU Vadose Zone Monitoring System Annual Monitoring Results Report for 2014 (reporting period July 2013 through June 2014) was submitted to the NMED on September 29, 2014 (SNL/NM September 2014).

The CWL Annual Post-Closure Care Report, Calendar Year 2013 was submitted to the NMED on March 25, 2014 (SNL/NM March 2014).

4.0 References

Beausoleil, G. (U.S. Department of Energy (NNSA)/Sandia Field Office), October 2013. Letter to D. Cobrain (New Mexico Environment Department). "Request for Modification to Hazardous Waste Permit for the Corrective Action Management Unit at Sandia National Laboratories, EPA ID #NM5890110518," October 25, 2013.

Beausoleil, G. (U.S. Department of Energy (NNSA)/Sandia Field Office), September 2014. Letter to J. Kieling (New Mexico Environment Department). "Request for Certificate of Completion for the Mixed Waste Landfill at Sandia National Laboratories," September 25, 2014.

Beausoleil, G. L. (U.S. Department of Energy), October 2014. Letter to J.E. Kieling (New Mexico Environment Department Hazardous Waste Bureau), "Request for Class 3 Modification to Module IV of Hazardous Waste Permit for Sandia National Laboratories/New Mexico, EPA ID NM5890110518, New Mexico," October 17, 2014.

Blaine, T. (New Mexico Environment Department), January 2014. Letter to G. Beausoleil (U.S. Department of Energy (NNSA)/Sandia Site Office) and S. Orrell (Sandia Corporation), "Approval, Mixed Waste Landfill Long-Term Monitoring and Maintenance Plan, March 2012, Sandia National Laboratories, NM5890110518, HWB-SNL-12-007," January 8, 2014.

Cobrain, D. (New Mexico Environment Department), October 2014. Letter to G. Beausoleil (U.S. Department of Energy (NNSA)/Sandia Site Office) and P. Davies (Sandia Corporation), "Certificate of Completion for the Mixed Waste Landfill, September 25, 2014, Sandia National Laboratories, EPA ID#NM5890110518, HWB-SNL-14-MISC," October 8, 2014.

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

Kieling, J.E. (New Mexico Environment Department), July 2014. Letter to G. Beausoleil (U.S. Department of Energy (NNSA)/Sandia Site Office) and P. Davies (Sandia Corporation), "Mixed Waste Landfill Groundwater Monitoring Report - Monitoring Well MWL-MW4 Metals Data - Calendar Year 2013, May 20, 2014, Sandia National Laboratories, EPA ID#NM5890110518, HWB-SNL-14-009," July 24, 2014.

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

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

New Mexico Environment Department (NMED), April 2010. Letter to K. Davis (U.S. Department of Energy (NNSA)/Sandia Site Office) and M. Walck (Sandia National Laboratories, New Mexico). "Class 3 Permit Modification Requests for Granting Corrective Action Complete Status for 26 SWMUs/AOCs (Request of March 1, 2006) and 5 Other SWMUs/AOCs (Request of January 7, 2008), Sandia National Laboratories, EPA ID #NM5890110518, HWB-SNL-06-007 and HWB-SNL-08-001," Hazardous Waste Bureau, New Mexico Environment Department, Santa Fe, New Mexico, April 8, 2010.

New Mexico Environment Department (NMED), July 2012. Letter to R. Sena (Sandia National Laboratories, New Mexico) and A. Orrell (Sandia National Laboratories, New Mexico). "March 2006 Petition for Corrective Action Complete SWMUs 233 and 234 and AOC 1115, Sandia National Laboratories, EPA ID# NM5890110518, HWB-SNL-06-007," Hazardous Waste Bureau, New Mexico Environment Department, Santa Fe, New Mexico, July 27, 2012.

New Mexico Environment Department (NMED), September 2012. Letter to G. Beausoleil (U.S. Department of Energy (NNSA)/Sandia Site Office) and M. Hazen (Sandia National Laboratories, New Mexico). "Notice of Public Comment Period and Opportunity to Request a Public Hearing on Draft Hazardous Waste Permit for Sandia National Laboratories and Proposed Granting of Corrective Action Complete Status for 24 Solid Waste Management Units of Concern," Hazardous Waste Bureau, New Mexico Environment Department, Santa Fe, New Mexico, September 17, 2012.

New Mexico Environment Department (NMED), June 2014. Letter to G. Beausoleil (U.S. Department of Energy (NNSA)/Sandia Site Office) and M. Hazen (Sandia National Laboratories, New Mexico). "Approval--Monitoring Well Plug and Abandonment Plan and Well Construction Plan; Decommissioning of Groundwater Monitoring Well TA2-SW1-320; Installation of Groundwater Monitoring Wells TA2-W-28, CYN-MW14, and CYN-MW15. September 2013. EPA ID# NM5890110518, HWB-SNL-13-010," Hazardous Waste Bureau, New Mexico Environment Department, Santa Fe, New Mexico, June 4, 2014.

New Mexico Environment Department (NMED), December 2014. "Final Order, State of New Mexico Before the Secretary of the Environment in the Matter of the Renewal of Hazardous Waste EPA ID Number NM5890110518 and Granting of Corrective Action Complete Status for Certain Solid Waste Management Units and Areas of Concern at Sandia National Laboratories, No. HWB 14-01(P)," New Mexico Environment Department, Santa Fe, New Mexico.

NMED, see New Mexico Environment Department.

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

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

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

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

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

Sandia National Laboratories, New Mexico (SNL/NM), September 2013. "Monitoring Well Plug and Abandonment Plan and Well Construction Plan; Decommissioning of Groundwater Monitoring Well TA2-SW1-320; Installation of Groundwater Monitoring Wells TA2-W-28, CYN-MW14, and CYN-MW15," Sandia National Laboratories, Albuquerque, New Mexico.

Sandia National Laboratories, New Mexico (SNL/NM), January 2014. "Work Plan for the Installation of Three Soil-Vapor Monitoring Wells (MWL-SV03, MWL-SV04, and MWL-SV05) at the Mixed Waste Landfill," Sandia National Laboratories, Albuquerque, New Mexico.

Sandia National Laboratories, New Mexico (SNL/NM), March 2014. "CWL Annual Post-Closure Care Report, Calendar Year 2013," Sandia National Laboratories, Albuquerque, New Mexico, March 25, 2014.

Sandia National Laboratories, New Mexico (SNL/NM), May 2014. "Mixed Waste Landfill Groundwater Monitoring Report, Monitoring Well MWL-MW4 Metals Data, Calendar Year 2013," Sandia National Laboratories, Albuquerque, New Mexico, May 20, 2014.

Sandia National Laboratories, New Mexico (SNL/NM), September 2014. "Corrective Action Management Unit Vadose Zone Monitoring System Annual Monitoring Results Report," Sandia National Laboratories, Albuquerque, New Mexico, September 29, 2014.

Sandia National Laboratories, New Mexico (SNL/NM), October 2014. "Completion of Monitoring at Solid Waste Management Units 68, 149, 154, and 8/58," Sandia National Laboratories, Albuquerque, New Mexico."

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

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

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

This page intentionally left blank.

Figures

Figure I-1
CAMU
Repair Work in Progress

Figure I-2
CAMU
Repair Work Completed

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 (Area of Concern).

Table I-2
Groundwater Sampling and Analysis

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 AOC	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 AOC	Semiannually	2,4	AGMR	NA	CYN-MW4, CYN-MW7, CYN-MW8, CYN-MW9, CYN-MW10, CYN-MW11, CYN-MW12, CYN-MW13, CYN-MW14A, CYN-MW15
TAG AOC	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, TA2-W-28, 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 CY14	CYN-MW5
SWMU 116 Groundwater	Annually	1	AGMR	AGMR and Section II of ER Quarterly Report, First Quarter of CY14	CTF-MW1

Table I-2 (Concluded)
Groundwater Sampling and Analysis

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
SWMU 149 Groundwater	Quarterly	1,2,3,4	AGMR	NA	CTF-MW3
SWMU 154 Groundwater	Quarterly	1,2,3,4	AGMR, Section III of ER Quarterly	NA	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.
AOC = Area of Concern.
AVN = Area V (North).
BSG = Burn Site Groundwater (Area of Concern).
BW = Background well.
CCBA = Coyote Canyon Blast Area.
CTF = Coyote Test Field.
CWL = Chemical Waste Landfill.
CY = Calendar Year.
CYN = Lurance Canyon.
ER = Environmental Restoration Operations.
LWDS = Liquid Waste Disposal System.
MW = Monitoring Well.
MWL = Mixed Waste Landfill.
NA = Not applicable. No wells in the site network are currently being sampled and analyzed for perchlorate.
OBS = Old Burn Site.
PCCP = Post-Closure Care Permit.
PGS = Parade Ground South.
SWMU = Solid Waste Management Unit.
TA1-W = Technical Area I (Well).
TA2-NW = Technical Area II (Northwest).
TA2-SW = Technical Area II (Southwest).
TA2-W = Technical Area II (Well).
TAG = Tijeras Arroyo Groundwater (Area of Concern).
TAV = Technical Area V.
TAVG = Technical Area V Groundwater (Area of Concern).
TJA = Tijeras Arroyo.
WYO = Wyoming.

This page intentionally left blank.

SECTION II
TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

LIST OF TABLES (Concluded)

APPENDICES

SECTION II
PERCHLORATE SCREENING QUARTERLY GROUNDWATER MONITORING REPORT, October – December 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 Fourth Quarter of Calendar Year (CY) 2014 (October, November, and December) 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. Due to declining water levels, CYN-MW6 has insufficient water to sample and the replacement monitoring well (CYN-MW15) has assumed the negotiated frequency. 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-sixth to be submitted since the November 2005 letter report; the previous reports were submitted for Fourth Quarter of CY 2005 through the Third Quarter of CY 2014 (SNL/NM February 2006 and January 2015).

Groundwater at Solid Waste Management Units (SWMUs) 8/58 monitoring wells CCBA-MW1 and CCBA-MW2 has been sampled 13 times; and SWMU 68 monitoring wells OBS-MW1, OBS-MW2, and OBS-MW3 has been sampled 13 times; and newly installed BSG AOC monitoring wells was sampled for the first time (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 Fourth Quarter of CY 2014 (October, November, and December) 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 First Quarter, Fiscal Year 2015" (SNL/NM September 2014a)

- "SWMU 68 Groundwater Monitoring, Mini-SAP for First Quarter, Fiscal Year 2015" (SNL/NM September 2014b)

- "Burn Site Groundwater Monitoring, Mini-SAP for First Quarter, Fiscal Year 2015" (SNL/NM November 2014)

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 Area of Concern

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 BSG AOC to be sufficiently characterized. Since 2004, groundwater samples from four other monitoring wells in the vicinity of the BSG AOC 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). Due to declining water levels, CYN-MW6 has insufficient water to sample and the replacement monitoring well (CYN-MW15) has assumed the negotiated frequency.

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 Groundwater and Technical Area V Groundwater Areas of Concern

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 AOC and Technical Area V AOC 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). As of this reporting period, all of the requirements of the April 2010 NMED letter have been met and CTF-MW2 and CTF-MW3 will no longer be sampled for perchlorate.

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). As of this reporting period, all of the requirements of the April 2010 NMED letter have been met and CCBA-MW1, CCBA-MW2, OBS-MW1, OBS-MW2, and OBS-MW3 will no longer be sampled for perchlorate.

4.0 Monitoring Results

Table II-3 summarizes the details of samples collected from monitoring wells CCBA-MW1, CCBA-MW2, CYN-MW14A, CYN-MW15, OBS-MW1, OBS-MW2, and OBS-MW3 in the Fourth 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 Fourth 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, OBS-MW1, OBS-MW2, or OBS-MW3. Also, there was no perchlorate detected above the screening level in any samples collected from the new/replacement monitoring wells CYN-MW14A and CYN-MW15.

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 September 2014a, September 2014b, and November 2014), were identified during the Fourth 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, CYN-MW14A, CYN-MW15, 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, replacement well CYN-MW15 was installed adjacent to CYN-MW6. No perchlorate was detected in samples collected from this replacement well.

Because regulatory requirements have been met, DOE/Sandia will discontinue monitoring of perchlorate for monitoring wells CTF-MW1, CYN-MW5, CCBA-MW1, CCBA-MW2, CTF-MW2, CTF-MW3, OBS-MW1, OBS-MW2, and OBS-MW3. DOE/Sandia will continue periodic monitoring of perchlorate for monitoring wells CYN-MW14A and CYN-MW15.

6.0 References

EPA, see U.S. Environmental Protection Agency.

New Mexico Environment Department (NMED), April 2004. "Compliance Order on Consent Pursuant to the New Mexico Hazardous Waste Act § 74-4-10: Sandia National Laboratories Consent Order," New Mexico Environment Department, April 29, 2004.

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

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

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

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

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

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

New Mexico Environment Department (NMED), April 2010. "Class 3 Permit Modification Requests for Granting Corrective Action Complete Status for 26 SWMUs/AOCs (Request of March 1, 2006) and 5 Other SWMUs/AOCs (Request of January 7, 2008), Sandia National Laboratories, EPA ID #NM5890110518, HWB-SNL-06-007 and HWB-SNL-08-001," April 8, 2010.

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

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

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

NMED, see New Mexico Environment Department.

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

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

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

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

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

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

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

Sandia National Laboratories, New Mexico (SNL/NM), June 2010. "U.S. Department of Energy/Sandia Corporation Response to the New Mexico Environment Department letter of April 8, 2010 entitled, *Class 3 Permit Modification Requests for Granting Corrective Action Complete Status for 26 SWMUs/AOCs (Request of March 1, 2006) and 5 Other SWMUs/AOCs (Request of January 7, 2008) Sandia National Laboratories EPA ID# NM5890110518 HWB-SNL-06-007 and HWB-SNL-08-001,*" Sandia National Laboratories, New Mexico.

Sandia National Laboratories, New Mexico (SNL/NM), September 2010. "SWMU 68 and SWMUs 8/58 Groundwater Characterization Work Plans – U.S. Department of Energy/Sandia Corporation Response to the New Mexico Environment Department letter of April 8, 2010 entitled, *Class 3 Permit Modification Requests for Granting Corrective Action Complete Status for 26 SWMUs/AOCs (Request of March 1, 2006) and 5 Other SWMUs/AOCs (Request of January 7, 2008) Sandia National Laboratories EPA ID# NM5890110518 HWB-SNL-06-007 and HWB-SNL-08-001,*" Sandia National Laboratories, New Mexico.

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

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

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

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

Sandia National Laboratories, New Mexico (SNL/NM), September 2014a. "SWMUs 8/58 Groundwater Monitoring, Mini-SAP for First Quarter, Fiscal Year 2015," Environmental Restoration Operations, Sandia National Laboratories, New Mexico.

Sandia National Laboratories, New Mexico (SNL/NM), September 2014b. "SWMU 68 Groundwater Monitoring, Mini-SAP for First Quarter, Fiscal Year 2015," Environmental Restoration Operations, Sandia National Laboratories, New Mexico.

Sandia National Laboratories, New Mexico (SNL/NM), November 2014. "Burn Site Groundwater Monitoring, Mini-SAP for First Quarter, Fiscal Year 2015," Environmental Restoration Operations, Sandia National Laboratories, New Mexico.

Sandia National Laboratories, New Mexico (SNL/NM), January 2015. "Consolidated Quarterly Report, July through September 2014, Section II: Perchlorate Screening Quarterly Monitoring Report," Environmental Restoration Operations, Sandia National Laboratories, New Mexico.

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

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

Figures

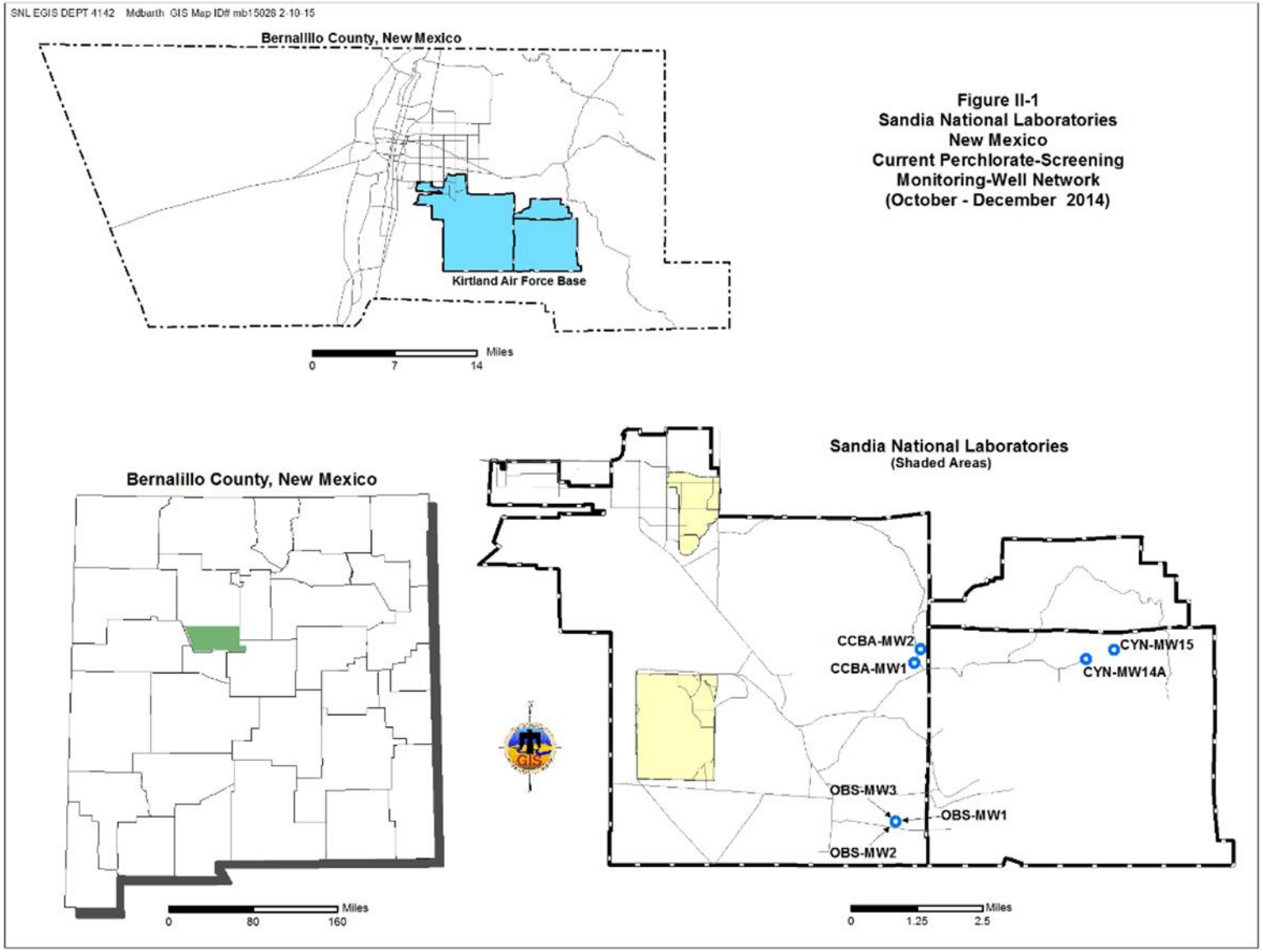

Figure II-1
Sandia National Laboratories, New Mexico
Current Perchlorate Screening Monitoring Well Network, October – December 2014

Tables

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

Well	Date Sampled	Number of Consecutive Sampling Events[a]	Remaining Number of Sampling Events[b]	Sampling Equipment
CCBA-MW1	13-Oct-14	13	0	Bennett™ Pump
CCBA-MW2	14-Oct-14	13	0	Bennett™ Pump
CYN-MW14A	17-Dec-14	1	3	Bennett™ Pump
CYN-MW15	17-Dec-14	1	TBD[c]	Bennett™ Pump
OBS-MW1	06-Oct-14	13	0	Bennett™ Pump
OBS-MW2	07-Oct-14	13	0	Bennett™ Pump
OBS-MW3	08-Oct-14	13	0	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.
[c]TBD = To be determined. This well was installed as a replacement well for CYN-MW6. Because perchlorate concentrations in CYN-MW6 have exceeded the screening level, DOE/Sandia and the NMED have agreed to further characterization requirements in the Burn Site Groundwater Area of Concern (NMED February 2010).

μg/L = Microgram(s) per liter.
CCBA = Coyote Canyon Blast Area.
CY = Calendar Year.
CYN = Canyons (Burn Site Groundwater Area of Concern).
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.

Table II-2
Monitoring Wells Discussed in Previous Perchlorate Screening Reports

Well
CTF-MW1
CTF-MW2
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 Groundwater Area of Concern).
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 Fourth Quarter, CY 2014 Perchlorate Sampling

Well	Sample Identification	AR/COC Number	Associated Groundwater Investigation
CCBA-MW1	096685-020	615822	SWMUs 8/58
CCBA-MW2	096691-020	615824	
CCBA-MW2 (Duplicate)	096692-020		
CYN-MW14A	096977-020	615940	BSG AOC
CYN-MW15	096979-020	615941	BSG AOC
OBS-MW1	096653-020	615811	SWMU 68
OBS-MW2	096658-020	615813	
OBS-MW2 (Duplicate)	096659-020		
OBS-MW3	096661-020	615814	

Notes

AR/COC = Analysis Request/Chain-of-Custody.
BSG AOC = Burn Site Groundwater Area of Concern.
CCBA = Coyote Canyon Blast Area.
CY = Calendar Year.
CYN = Canyons (Burn Site Groundwater Area of Concern).
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 Fourth 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
	13-Oct-14	615822	096685-020	ND	4.0	12	NE	U		EPA 314.0	
CCBA-MW2	01-Nov-11	613885	091349-020	ND	4.0	12	NE	U		EPA 314.0	
			091350-020	ND	4.0	12	NE	U		EPA 314.0	Duplicate sample
	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	
	14-Oct-14	615824	096691-020	ND	4.0	12	NE	U		EPA 314.0	
			096692-020	ND	4.0	12	NE	U		EPA 314.0	Duplicate sample

Table II-4 (Continued)
Summary of Perchlorate Screening Analytical Results for the Current Monitoring Well Network as of Fourth 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
Burn Site Groundwater Area of Concern											
CYN-MW14A	17-Dec-14	615940	096977-020	ND	4.0	12	NE	U		EPA 314.0	
CYN-MW15	17-Dec-14	615941	096979-020	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 Fourth 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
	06-Oct-14	615811	096653-020	ND	4.0	12	NE	U		EPA 314.0	
OBS-MW2	26-Oct-11	613880	091337-020	ND	4.0	12	NE	U		EPA 314.0	
	10-Jan-12	613954	091604-020	ND	4.0	12	NE	U		EPA 314.0	
			091605-020	ND	4.0	12	NE	U		EPA 314.0	Duplicate sample
	19-Apr-12	614082	092025-020	ND	4.0	12	NE	U		EPA 314.0	
	18-Jul-12	614290	092620-020	ND	4.0	12	NE	U		EPA 314.0	
	17-Oct-12	614464	093007-020	ND	4.0	12	NE	U		EPA 314.0	
			093008-020	ND	4.0	12	NE	U		EPA 314.0	Duplicate sample
	21-Jan-12	614568	093344-020	ND	4.0	12	NE	U		EPA 314.0	
	22-Apr-13	614742	093866-020	ND	4.0	12	NE	U		EPA 314.0	
	10-Jul-13	614935	094365-020	ND	4.0	12	NE	U		EPA 314.0	
			094366-020	ND	4.0	12	NE	U		EPA 314.0	Duplicate sample
	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	
	07-Oct-14	615813	096658-020	ND	4.0	12	NE	U		EPA 314.0	
			096659-020	ND	4.0	12	NE	U		EPA 314.0	Duplicate sample

Table II-4 (Continued)
Summary of Perchlorate Screening Analytical Results for the Current Monitoring-Well Network as of Fourth 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 (Continued)											
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	
	08-Oct-14	615814	096661-020	ND	4.0	12	NE	U		EPA 314.0	

Notes

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

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

[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.
CY = Calendar Year.
CYN = Canyons (Burn Site Groundwater Area of Concern).
EPA = U.S. Environmental Protection Agency.

Table II-4 (Concluded)
Summary of Perchlorate Screening Analytical Results for the Current Monitoring-Well Network as of Fourth 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], Fourth 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	13-Oct-14	16.10	481.5	305.4	6.42	0.32	33.3	3.28
CCBA-MW2	14-Oct-14	16.52	559.0	297.4	7.38	0.16	63.6	6.20
Burn Site Groundwater Area of Concern								
CYN-MW14A	17-Dec-14	14.59	904.2	49.6	7.39	3.95	12.4	1.26
CYN-MW15	17-Dec-14	15.22	1036.5	190.6	7.01	2.86	10.9	1.09
SWMU 68								
OBS-MW1	06-Oct-14	17.89	511.0	298.8	7.27	0.22	38.8	3.66
OBS-MW2	07-Oct-14	18.70	517.1	301.1	7.22	0.23	37.3	3.47
OBS-MW3	08-Oct-14	17.46	503.1	254.0	7.21	0.18	46.9	4.48

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.
CY = Calendar Year.
CYN = Canyons (Burn Site Groundwater Area of Concern).
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.

This page intentionally left blank.

Appendix A
Analytical Laboratory Certificates of Analysis for the Perchlorate Data

SMO 2012-ARCOC (4-2012)

CONTRACT LABORATORY
ANALYSIS REQUEST AND CHAIN OF CUSTODY

AOP 95-16

Internal Lab

Page 1 of 2

Batch No. NA

SMO Use

AR/COC 615811

Project Name:	SWMU 68 GWM	Date Samples Shipped:	10/6/14	SMO Authorization:	
Project/Task Manager:	Clinton Lum	Carrier/Waybill No.	224565	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:	CF263-15	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	Preserv-ative	Collection Method	Sample Type	Parameter & Method Requested	Lab Sample ID
096652	-001	OBS-FB1	NA	10/6/14 9:20	DIW	G	3x40ml	HCL	G	FB	TCL VOC (SW846-8260B)	358371 001
096653	-001	OBS-MW1	153	10/6/14 9:21	GW	G	3x40ml	HCL	G	SA	TCL VOC (SW846-8260B)	358371 002
096653	-002	OBS-MW1	153	10/6/14 9:22	GW	AG	4x1 L	None	G	SA	TCL SVOC (SW846-8270C)	358371 003
096653	-010	OBS-MW1	153	10/6/14 9:23	GW	P	500 ml	HNO3	G	SA	TAL Metals+U (SW846-6010/6020/7470)	358371 004
096653	-014	OBS-MW1	153	10/6/14 9:24	GW	P	250 ml	None	G	SA	Hexavalent Chromium (SW846-7196A)	358371 020
096653	-016	OBS-MW1	153	10/6/14 9:25	GW	P	125 ml	None	G	SA	Anions (SW846-9056)	358371 006
096653	-017	OBS-MW1	153	10/6/14 9:26	FGW	P	500 ml	HNO3	G	SA	Metals-Ca,Mg,K,Na (SW846-6020)	358373 001
096653	-018	OBS-MW1	153	10/6/14 9:27	GW	P	125 ml	H2SO4	G	SA	Nitrate+Nitrite (EPA 353.2)	358371 007
096653	-020	OBS-MW1	153	10/6/14 9:30	GW	P	250 ml	None	G	SA	Perchlorate (EPA 314.0)	358371 008
096653	-022	OBS-MW1	153	10/6/14 9:31	GW	P	500 ml	None	G	SA	Alkalinity (SM2320B)	358371 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
If perchlorate detected, perform verification analysis using SW846-6850M.Filtered fraction collected in field using a 0.45 micron in line filter.Report Anions (as Br,C,F,SO4), Alkalinity (as total CaCO3,HCO3,CO3), and 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

1.Relinquished by		Org. 4142	Date 10/6/14	Time 1115	3.Relinquished by	Org.	Date	Time
1. Received by	SMO	Org. 4142	Date 10/6/14	Time 1115	3. Received by	Org.	Date	Time
2.Relinquished by	SMO	Org. 4142	Date 10/6/14	Time 1200	4.Relinquished by	Org.	Date	Time
2. Received by		Org. GEL	Date 10-7-14	Time 0800	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 615811

Project Name: SWMU 68	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
096653	-024	OBS-MW1	153	10/6/14 9:33	GW	AG	4x1 L	None	G	SA	High Explosives (SW846-8321A mod)	358371 010
096653	-027	OBS-MW1	153	10/6/14 9:34	GW	P	250 ml	NaOH	G	SA	Total Cyanide (SW846-9012)	358371 011
096653	-033	OBS-MW1	153	10/6/14 9:35	GW	P	1 L	HNO3	G	SA	Gamma Spectroscopy (EPA 901.0)	358371 012
096653	-034	OBS-MW1	153	10/6/14 9:36	GW	P	1 L	HNO3	G	SA	Gross Alpha and Beta (EPA 900.0)	358371 013
096653	-035	OBS-MW1	153	10/6/14 9:38	GW	P	1 L	HNO3	G	SA	Isotopic Uranium (HASL 300)	358371 014
096654	-001	OBS-TB1	NA	10/6/14 9:21	DIW	G	3x40 ml	HCL	G	TB	TCL VOC (SW846-8260B)	358371 015

Recipient Initials MC

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

Certificate of Analysis

Report Date: November 7, 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:	096653-020	Project:	SNLSGWater
Sample ID:	358371008	Client ID:	SNLS004
Matrix:	AQUEOUS		
Collect Date:	06-OCT-14 09:30		
Receive Date:	07-OCT-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	10/16/14	0104	1426176	1

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	EPA 314.0 DOE-AL	

Notes:

SMO 2012-ARCOC (4-2012)

CONTRACT LABORATORY
ANALYSIS REQUEST AND CHAIN OF CUSTODY

AOP 95-16

Internal Lab

Batch No. N/A

SMO Use

AR/COC 615813

Project Name:	SWMU 68 GWM	Date Samples Shipped:	10/7/14	SMO Authorization:	
Project/Task Manager:	Clinton Lum	Carrier/Waybill No.	224722	SMO Contact Phone:	Lorraine Herrera/505-844-3199 SMO
Project/Task Number:	146422.10.11.01	Lab Contact:	Edie Kent/803-556-8171		
Service Order:	CF263-15	Lab Destination:	GEL	Send Report to SMO:	Rita Kavanaugh/505-284-2553
		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	Preserv-ative	Collection Method	Sample Type	Parameter & Method Requested	Lab Sample ID
096658	-001	OBS-MW2	252	10/7/14 9:21	GW	G	3x40ml	HCL	G	SA	TCL VOC (SW846-8260B)	358371 031
096658	-002	OBS-MW2	252	10/7/14 9:23	GW	AG	4x1 L	None	G	SA	TCL SVOC (SW846-8270C)	358371 032
096658	-010	OBS-MW2	252	10/7/14 9:27	GW	P	500 ml	HNO3	G	SA	TAL Metals+U (SW846-6010/6020/7470)	358371 033
096658	-014	OBS-MW2	252	10/7/14 9:28	GW	P	250 ml	None	G	SA	Hexavalent Chromium (SW846-7196A)	358371 034
096658	-016	OBS-MW2	252	10/7/14 9:29	GW	P	125 ml	None	G	SA	Anions (SW846-9056)	358371 035
096658	-017	OBS-MW2	252	10/7/14 9:31	FGW	P	500 ml	HNO3	G	SA	Metals-Ca,Mg,K,Na (SW846-6020)	358373 003
096658	-018	OBS-MW2	252	10/7/14 9:32	GW	P	125 ml	H2SO4	G	SA	Nitrate+Nitrite (EPA 353.2)	358371 036
096658	-020	OBS-MW2	252	10/7/14 9:33	GW	P	250 ml	None	G	SA	Perchlorate (EPA 314.0)	358371 037
096658	-022	OBS-MW2	252	10/7/14 9:34	GW	P	500 ml	None	G	SA	Alkalinity (SM2320B)	358371 038
096658	-024	OBS-MW2	252	10/7/14 9:35	GW	AG	4x1 L	None	G	SA	High Explosives (SW846-8321A mod)	358371 039

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 field using a 0.45 micron in line filter.Report Anions (as Br,C,F,SO4), Alkalinity (as total CaCO3,HCO3,CO3), and 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	10/7/14	Time	1008	3.Relinquished by	Org. Date Time
1. Received by	for GWO	Org.	4142	Date	10/7/14	Time	1008	3. Received by	Org. Date Time
2.Relinquished by	for GWO	Org.	4142	Date	10/7/14	Time	1130	4.Relinquished by	Org. Date Time
2. Received by		Org.	GEL	Date	10/8/14	Time	0740	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 615813

Project Name:	SWMU 68	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
096658	-027	OBS-MW2	252	10/7/14 9:39	GW	P	250 ml	NaOH	G	SA	Total Cyanide (SW846-9012)	358371 040
096658	-033	OBS-MW2	252	10/7/14 9:40	GW	P	1 L	HNO3	G	SA	Gamma Spectroscopy (EPA 901.0)	358371 041
096658	-034	OBS-MW2	252	10/7/14 9:42	GW	P	1 L	HNO3	G	SA	Gross Alpha and Beta (EPA 900.0)	358371 042
096658	-035	OBS-MW2	252	10/7/14 9:44	GW	P	1 L	HNO3	G	SA	Isotopic Uranium (HASL 300)	358371 043
096659	-001	OBS-MW2	252	10/7/14 9:21	GW	G	3x40ml	HCL	G	DU	TCL VOC (SW846-8260B)	358371 044
096659	-002	OBS-MW2	252	10/7/14 9:23	GW	AG	4x1 L	None	G	DU	TCL SVOC (SW846-8270C)	358371 045
096659	-010	OBS-MW2	252	10/7/14 9:27	GW	P	500 ml	HNO3	G	DU	TAL Metals+U (SW846-6010/6020/7470)	358371 046
096659	-014	OBS-MW2	252	10/7/14 9:28	GW	P	250 ml	None	G	DU	Hexavalent Chromium (SW846-7196A)	358371 047
096659	-016	OBS-MW2	252	10/7/14 9:29	GW	P	125 ml	None	G	DU	Anions (SW846-9056)	358371 048
096659	-017	OBS-MW2	252	10/7/14 9:31	FGW	P	500 ml	HNO3	G	DU	Metals-Ca,Mg,K,Na (SW846-6020)	358372 004
096659	-018	OBS-MW2	252	10/7/14 9:32	GW	P	125 ml	H2SO4	G	DU	Nitrate+Nitrite (EPA 353.2)	358371 049
096659	-020	OBS-MW2	252	10/7/14 9:33	GW	P	250 ml	None	G	DU	Perchlorate (EPA 314.0)	358371 050
096659	-022	OBS-MW2	252	10/7/14 9:34	GW	P	500 ml	None	G	DU	Alkalinity (SM2320B)	358371 051
096659	-024	OBS-MW2	252	10/7/14 9:35	GW	AG	4x1 L	None	G	DU	High Explosives (SW846-8321A mod)	358371 052
096659	-027	OBS-MW2	252	10/7/14 9:39	GW	P	250 ml	NaOH	G	DU	Total Cyanide (SW846-9012)	358371 053
096659	-033	OBS-MW2	252	10/7/14 9:40	GW	P	1 L	HNO3	G	DU	Gamma Spectroscopy (EPA 901.0)	358371 054
096659	-034	OBS-MW2	252	10/7/14 9:42	GW	P	1 L	HNO3	G	DU	Gross Alpha and Beta (EPA 900.0)	358371 055
096659	-035	OBS-MW2	252	10/7/14 9:44	GW	P	1 L	HNO3	G	DU	Isotopic Uranium (HASL 300)	358371 056
096660	-001	OBS-TB3	NA	10/7/14 9:21	DIW	G	3x40 ml	HCL	G	TB	TCL VOC (SW846-8260B)	358371 057

Recipient Initials MK

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

Certificate of Analysis

Report Date: November 7, 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:	096658-020	Project:	SNLSGWater
Sample ID:	358371037	Client ID:	SNLS004
Matrix:	AQUEOUS		
Collect Date:	07-OCT-14 09:33		
Receive Date:	08-OCT-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	10/16/14	0221	1426176	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: November 7, 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:	096659-020	Project:	SNLSGWater
Sample ID:	358371050	Client ID:	SNLS004
Matrix:	AQUEOUS		
Collect Date:	07-OCT-14 09:33		
Receive Date:	08-OCT-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	10/16/14	0240	1426176	1

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	EPA 314.0 DOE-AL	

Notes:

SMO 2012-ARCOC (4-2012)

CONTRACT LABORATORY
ANALYSIS REQUEST AND CHAIN OF CUSTODY

AOP 95-16

Internal Lab

Batch No. N/A

SMO Use

AR/COC 615814

Project Name:	SWMU 68 GWM	Date Samples Shipped:	10/8/14	SMO Authorization:	☐ Waste Characterization
Project/Task Manager:	Clinton Lum	Carrier/Waybill No.	224747	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:	CF263-15	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	Preserv-ative	Collection Method	Sample Type	Parameter & Method Requested	Lab Sample ID
096661	-001	OBS-MW3	208	10/8/14 9:17	GW	G	3x40ml	HCL	G	SA	TCL VOC (SW846-8260B)	358371 058
096661	-002	OBS-MW3	208	10/8/14 9:19	GW	AG	4x1 L	None	G	SA	TCL SVOC (SW846-8270C)	358371 059
096661	-010	OBS-MW3	208	10/8/14 9:20	GW	P	500 ml	HNO3	G	SA	TAL Metals+U (SW846-6010/6020/7470)	358371 060
096661	-014	OBS-MW3	208	10/8/14 9:21	GW	P	250 ml	None	G	SA	Hexavalent Chromium (SW846-7196A)	358371 061
096661	-016	OBS-MW3	208	10/8/14 9:22	GW	P	125 ml	None	G	SA	Anions (SW846-9056)	358371 062
096661	-017	OBS-MW3	208	10/8/14 9:23	FGW	P	500 ml	HNO3	G	SA	Metals-Ca,Mg,K,Na (SW846-6020)	358373 005
096661	-018	OBS-MW3	208	10/8/14 9:24	GW	P	125 ml	H2SO4	G	SA	Nitrate+Nitrite (EPA 353.2)	358371 063
096661	-020	OBS-MW3	208	10/8/14 9:25	GW	P	250 ml	None	G	SA	Perchlorate (EPA 314.0)	358371 064
096661	-022	OBS-MW3	208	10/8/14 9:26	GW	P	500 ml	None	G	SA	Alkalinity (SM2320B)	358371 065
096661	-024	OBS-MW3	208	10/8/14 9:28	GW	AG	4x1 L	None	G	SA	High Explosives (SW846-8321A mod)	358371 066

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 field using a 0.45 micron in line filter.Report Anions (as Br,C,F,SO4), Alkalinity (as total CaCO3,HCO3,CO3), and Gamma Spectroscopy (as short list isotopes).

Conditions on Receipt

Lab Use

Sample Team Members	Name	Signature	Init.	Company/Organization/Phone/Cell
	Robert Lynch	Rob 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 10/8/14	Time 0955	3.Relinquished by	Org.	Date	Time
1. Received by	Edie Kent	Org. 4142	Date 10/8/14	Time 0955	3. Received by	Org.	Date	Time
2.Relinquished by	Edie Kent	Org. 4142	Date 10/8/14	Time 1115	4.Relinquished by	Org.	Date	Time
2. Received by	Mike Adams	Org. GEL	Date 10-9-14	Time 0725	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 615814

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
096661	-027	OBS-MW3	208	10/8/14 9:29	GW	P	250 ml	NaOH	G	SA	Total Cyanide (SW846-9012)	358371 067
096661	-033	OBS-MW3	208	10/8/14 9:30	GW	P	1 L	HNO3	G	SA	Gamma Spectroscopy (EPA 901.0)	358371 068
096661	-034	OBS-MW3	208	10/8/14 9:31	GW	P	1 L	HNO3	G	SA	Gross Alpha and Beta (EPA 900.0)	358371 069
096661	-035	OBS-MW3	208	10/8/14 9:33	GW	P	1 L	HNO3	G	SA	Isotopic Uranium (HASL 300)	358371 070
096662	-001	OBS-TB4	NA	10/8/14 9:17	DIW	G	3x40 ml	HCL	G	TB	TCL VOC (SW846-8260B)	358371 071

Recipient Initials MK

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

Certificate of Analysis

Report Date: November 7, 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:	096661-020	Project:	SNLSGWater
Sample ID:	358371064	Client ID:	SNLS004
Matrix:	AQUEOUS		
Collect Date:	08-OCT-14 09:25		
Receive Date:	09-OCT-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	10/16/14	0259	1426176	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 95-1

Internal Lab

Batch No. N/A

SMO Use

AR/COC 615822

Project Name:	SWMU 8/58 GWM	Date Samples Shipped:	10/13/14
Project/Task Manager:	Clinton Lum	Carrier/Waybill No.	224914
Project/Task Number:	146422.10.11.01	Lab Contact:	Edie Kent/803-556-8171
Service Order:	CF262-15	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
096685	-001	CCBA-MW1	79	10/13/14 9:24	GW	G	3x40ml	HCL	G	SA	TCL VOC (SW846-8260B)	358946 001
096685	-002	CCBA-MW1	79	10/13/14 9:26	GW	AG	4x1 L	None	G	SA	TCL SVOC (SW846-8270C)	358946 002
096685	-010	CCBA-MW1	79	10/13/14 9:27	GW	P	500 ml	HNO3	G	SA	TAL Metals+U (SW846-6010/6020/7470)	358946 003
096685	-016	CCBA-MW1	79	10/13/14 9:28	GW	P	125 ml	None	G	SA	Anions (SW846-9056)	358946 004
096685	-017	CCBA-MW1	79	10/13/14 9:29	FGW	P	500 ml	HNO3	G	SA	Metals-Ca,Mg,K,Na (SW846-6020)	358947 001
096685	-018	CCBA-MW1	79	10/13/14 9:30	GW	P	125 ml	H2SO4	G	SA	Nitrate+Nitrite (EPA 353.2)	358946 005
096685	-020	CCBA-MW1	79	10/13/14 9:31	GW	P	250 ml	None	G	SA	Perchlorate (EPA 314.0)	358946 006
096685	-022	CCBA-MW1	79	10/13/14 9:32	GW	P	500 ml	None	G	SA	Alkalinity (SM2320B)	358946 007
096685	-024	CCBA-MW1	79	10/13/14 9:34	GW	AG	4x1 L	None	G	SA	High Explosives (SW846-8321A mod)	358946 008
096685	-027	CCBA-MW1	79	10/13/14 9:35	GW	P	250 ml	NaOH	G	SA	Total Cyanide (SW846-9012)	358946 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 field using a 0.45 micron in line filter.Report Anions (as Br,C,F,SO4), Alkalinity (as total CaCO3,HCO3,CO3), and Gamma Spectroscopy (as short list isotopes).

Conditions on Receipt

Lab Use

Sample Team Members	Name	Signature	Init.	Company/Organization/Phone/Cell
	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 10/13/14	Time 1013	3.Relinquished by	Org. Date Time
1. Received by	Org. 4142	Date 10/13/14	Time 1013	3. Received by	Org. Date Time
2.Relinquished by	Org. 4142	Date 10/13/14	Time 1045	4.Relinquished by	Org. Date Time
2. Received by	Org. CRL	Date 10-14-14	Time 0750	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 615822

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
096685	-033	CCBA-MW1	79	10/13/14 9:36	GW	P	1 L	HNO3	G	SA	Gamma Spectroscopy (EPA 901.0)	358946 010
096685	-034	CCBA-MW1	79	10/13/14 9:38	GW	P	1 L	HNO3	G	SA	Gross Alpha and Beta (EPA 900.0)	358946 011
096686	-001	CCBA-TB1	NA	10/13/14 9:24	DIW	G	3x40 ml	HCL	G	TB	TCL VOC (SW846-8260B)	358946 012

Recipient Initials MK

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

Certificate of Analysis

Report Date: November 12, 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:	096685-020	Project:	SNLSGWater
Sample ID:	358946006	Client ID:	SNLS004
Matrix:	AQUEOUS		
Collect Date:	13-OCT-14 09:31		
Receive Date:	14-OCT-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	10/21/14	1422	1427862	1

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	EPA 314.0 DOE-AL	

Notes:

SMO 2012-ARCOC (4-2012)

CONTRACT LABORATORY
ANALYSIS REQUEST AND CHAIN OF CUSTODY

AOP 95-16

Internal Lab

Batch No. N/A

AR/COC 615824

Project Name:	SWMU 8/58 GWM	Date Samples Shipped:	10/14/14
Project/Task Manager:	Clinton Lum	Carrier/Waybill No.	2224990
Project/Task Number:	146422.10.11.01	Lab Contact:	Edie Kent/803-556-8171
Service Order:	CF262-15	Lab Destination:	GEL
Tech Area:		Contract No.:	PO 1303873
Building:	Room:	Operational Site:	

SMO Use

SMO Authorization: [signature] SMO

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

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

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

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

Sample No.	Fraction	Sample Location Detail	Depth (ft)	Date/Time Collected	Sample Matrix	Container Type	Container Volume	Preservative	Collection Method	Sample Type	Parameter & Method Requested	Lab Sample ID
096690	-001	CCBA-FB2	NA	10/14/14 9:23	DIW	G	3x40ml	HCL	G	FB	TCL VOC (SW846-8260B)	358946 026
096691	-001	CCBA-MW2	117	10/14/14 9:23	GW	G	3x40ml	HCL	G	SA	TCL VOC (SW846-8260B)	358946 027
096691	-002	CCBA-MW2	117	10/14/14 9:25	GW	AG	4x1 L	None	G	SA	TCL SVOC (SW846-8270C)	358946 028
096691	-010	CCBA-MW2	117	10/14/14 9:29	GW	P	500 ml	HNO3	G	SA	TAL Metals+U (SW846-6010/6020/7470)	358946 029
096691	-016	CCBA-MW2	117	10/14/14 9:30	GW	P	125 ml	None	G	SA	Anions (SW846-9056)	358946 030
096691	-017	CCBA-MW2	117	10/14/14 9:32	FGW	P	500 ml	HNO3	G	SA	Metals-Ca,Mg,K,Na (SW846-6020)	358947 003
096691	-018	CCBA-MW2	117	10/14/14 9:33	GW	P	125 ml	H2SO4	G	SA	Nitrate+Nitrite (EPA 353.2)	358946 031
096691	-020	CCBA-MW2	117	10/14/14 9:34	GW	P	250 ml	None	G	SA	Perchlorate (EPA 314.0)	358946 032
096691	-022	CCBA-MW2	117	10/14/14 9:35	GW	P	500 ml	None	G	SA	Alkalinity (SM2320B)	358946 033
096691	-024	CCBA-MW2	117	10/14/14 9:36	GW	AG	4x1 L	None	G	SA	High Explosives (SW846-8321A mod)	358946 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 field using a 0.45 micron in line filter.Report Anions (as Br,C,F,SO4), Alkalinity (as total CaCO3,HCO3,CO3), and Gamma Spectroscopy (as short list isotopes).

Conditions on Receipt

Lab Use

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

1. Relinquished by	[signature]	Org. 4142	Date 10/14/14	Time 1028	3. Relinquished by	Org.	Date	Time
1. Received by	[signature] SMO	Org. 4142	Date 10/14/14	Time 1028	3. Received by	Org.	Date	Time
2. Relinquished by	[signature] SMO	Org. 4142	Date 10/14/14	Time 1100	4. Relinquished by	Org.	Date	Time
2. Received by	[signature]	Org. [illegible]	Date 10-15-14	Time 0745	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 615824

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
096691	-027	CCBA-MW2	117	10/14/14 9:40	GW	P	250 ml	NaOH	G	SA	Total Cyanide (SW846-9012)	358946 035
096691	-033	CCBA-MW2	117	10/14/14 9:41	GW	P	1 L	HNO3	G	SA	Gamma Spectroscopy (EPA 901.0)	358946 036
096691	-034	CCBA-MW2	117	10/14/14 9:43	GW	P	1 L	HNO3	G	SA	Gross Alpha and Beta (EPA 900.0)	358946 037
096692	-001	CCBA-MW2	117	10/14/14 9:23	GW	G	3x40ml	HCL	G	DU	TCL VOC (SW846-8260B)	358946 038
096692	-002	CCBA-MW2	117	10/14/14 9:25	GW	AG	4x1 L	None	G	DU	TCL SVOC (SW846-8270C)	358946 039
096692	-010	CCBA-MW2	117	10/14/14 9:29	GW	P	500 ml	HNO3	G	DU	TAL Metals+U (SW846-6010/6020/7470)	358946 040
096692	-016	CCBA-MW2	117	10/14/14 9:30	GW	P	125 ml	None	G	DU	Anions (SW846-9056)	358946 041
096692	-017	CCBA-MW2	117	10/14/14 9:32	FGW	P	500 ml	HNO3	G	DU	Metals-Ca,Mg,K,Na (SW846-6020)	358947 004
096692	-018	CCBA-MW2	117	10/14/14 9:33	GW	P	125 ml	H2SO4	G	DU	Nitrate+Nitrite (EPA 353.2)	358946 042
096692	-020	CCBA-MW2	117	10/14/14 9:34	GW	P	250 ml	None	G	DU	Perchlorate (EPA 314.0)	358946 043
096692	-022	CCBA-MW2	117	10/14/14 9:35	GW	P	500 ml	None	G	DU	Alkalinity (SM2320B)	358946 044
096692	-024	CCBA-MW2	117	10/14/14 9:36	GW	AG	4x1 L	None	G	DU	High Explosives (SW846-8321A mod)	358946 045
096692	-027	CCBA-MW2	117	10/14/14 9:40	GW	P	250 ml	NaOH	G	DU	Total Cyanide (SW846-9012)	358946 046
096692	-033	CCBA-MW2	117	10/14/14 9:41	GW	P	1 L	HNO3	G	DU	Gamma Spectroscopy (EPA 901.0)	358946 047
096692	-034	CCBA-MW2	117	10/14/14 9:43	GW	P	1 L	HNO3	G	DU	Gross Alpha and Beta (EPA 900.0)	358946 048
096693	-001	CCBA-TB3	NA	10/14/14 9:23	DIW	G	3x40 ml	HCL	G	TB	TCL VOC (SW846-8260B)	358946 049

Recipient Initials AK

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

Certificate of Analysis

Report Date: November 12, 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:	096691-020	Project:	SNLSGWater
Sample ID:	358946032	Client ID:	SNLS004
Matrix:	AQUEOUS		
Collect Date:	14-OCT-14 09:34		
Receive Date:	15-OCT-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	10/21/14	1539	1427862	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: November 12, 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:	096692-020	Project:	SNLSGWater
Sample ID:	358946043	Client ID:	SNLS004
Matrix:	AQUEOUS		
Collect Date:	14-OCT-14 09:34		
Receive Date:	15-OCT-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	10/21/14	1558	1427862	1

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	EPA 314.0 DOE-AL	

Notes:

SMO 2012-ARCOC (4-2012)

AOP 95-1

CONTRACT LABORATORY
ANALYSIS REQUEST AND CHAIN OF CUSTODY

Internal Lab

Batch No. N/A

Page 1 of 1

AR/COC 615940

		SMO Use	
Project Name:	BSG	Date Samples Shipped:	12/17/14
Project/Task Manager:	Mike Skelly	Carrier/Waybill No.	327648
Project/Task Number:	146422.10.11.01	Lab Contact:	Edie Kent/803-556-8171
Service Order:	CF058-15	Lab Destination	GEL
		Contract No.:	PO 1303873
Tech Area:		Operational Site:	
Building:	Room:		

SMO Authorization: SMO

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

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

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

Bill to: Sandia National Laboratories (Accounts Payable), P.O. Box 5800, MS-0154 Albuquerque, NM 87185-0154 363160

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
096977	-005	CYN-MW14A	281	12/17/14 10:17	GW	AG	4x1 L	None	G	SA	TPH DRO (SW846-8015A/B SVOC)	014
096977	-006	CYN-MW14A	281	12/17/14 10:14	GW	AG	3x40ml	None	G	SA	TPH GRO (SW846-8015A/B VOC)	015
096977	-018	CYN-MW14A	281	12/17/14 10:21	GW	P	125 ml	H2SO4	G	SA	NPN (EPA 353.2)	016
096977	-020	CYN-MW14A	281	12/17/14 10:22	GW	P	250 ml	None	G	SA	Perchlorate (EPA 314.0)	017
096978	-006	CYN-TB10	NA	12/17/14 10:14	DIW	AG	3x40ml	None	G	TB	TPH GRO (SW846-8015A/B VOC)	018

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 is detected perform verification analysis SW846-680M

Conditions on Receipt

Lab Use

Sample Team Members	Name	Signature	Init.	Company/Organization/Phone/Cell
	William Gibson		WG	SNL/4142/505-284-3307/505-239-7367
	Gilbert Quintana		GQ	SNL/4143/505-844-2507/505-228-2606

1. Relinquished by		Org. 4142	Date 12/17/14	Time 1118	3. Relinquished by	Org.	Date	Time
1. Received by	SMO	Org. 4142	Date 12/17/14	Time 1118	3. Received by	Org.	Date	Time
2. Relinquished by	SMO	Org. 4142	Date 12/17/14	Time 1128	4. Relinquished by	Org.	Date	Time
2. Received by		Org.	Date 12/18/14	Time 0750	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: January 12, 2015

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:	096977-020	Project:	SNLSGWater
Sample ID:	363160017	Client ID:	SNLS004
Matrix:	AQUEOUS		
Collect Date:	17-DEC-14 10:22		
Receive Date:	18-DEC-14	Client Desc.:	CYN-MW14A
Collector:	Client	Vol. Recv.:	

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Ion Chromatography											
EPA 314.0 Perchlorate by IC "As Received"											
Perchlorate	U	ND	0.004	0.012	mg/L	1	MAR1	12/23/14	2300	1445114	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

Page 1 of 1

Batch No. N/A

SMO Use

AR/COC 615941

Project Name:	BSG	Date Samples Shipped:	12/17/14	SMO Authorization:	☐ Waste Characterization
Project/Task Manager:	Mike Skelly	Carrier/Waybill No.	227648	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:	CF058-15	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	363160
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
096979	-005	CYN-MW15	187	12/17/14 9:37	GW	AG	4x1 L	None	G	SA	TPH DRO (SW846-8015A/B SVOC)	009
096979	-006	CYN-MW15	187	12/17/14 9:35	GW	AG	3x40ml	None	G	SA	TPH GRO (SW846-8015A/B VOC)	010
096979	-018	CYN-MW15	187	12/17/14 9:38	GW	P	125 ml	H2SO4	G	SA	NPN (EPA 353.2)	011
096979	-020	CYN-MW15	187	12/17/14 9:39	GW	P	250 ml	None	G	SA	Perchlorate (EPA 314.0)	012
096980	-006	CYN-TB11	NA	12/17/14 9:35	DIW	AG	3x40ml	None	G	TB	TPH GRO (SW846-8015A/B VOC)	013

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

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 SW846-6850

Conditions on Receipt

Lab Use

1.Relinquished by	Alfred Santillanes	Org.	4142	Date	12/17/14	Time	1620	3.Relinquished by	Org. Date Time
1. Received by	SMO	Org.	4142	Date	12/17/14	Time	1920	3. Received by	Org. Date Time
2.Relinquished by		Org.	4142	Date	12/17/14	Time	1920	4.Relinquished by	Org. Date Time
2. Received by		Org.		Date	12/18/14	Time	0750	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: January 12, 2015

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:	096979-020	Project:	SNLSGWater
Sample ID:	363160012	Client ID:	SNLS004
Matrix:	AQUEOUS		
Collect Date:	17-DEC-14 09:39		
Receive Date:	18-DEC-14	Client Desc.:	CYN-MW15
Collector:	Client	Vol. Recv.:	

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Ion Chromatography											
EPA 314.0 Perchlorate by IC "As Received"											
Perchlorate	U	ND	0.004	0.012	mg/L	1	MAR1	12/23/14	2241	1445114	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

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

Memorandum

Date: November 13, 2014

To: File

From: Monica Dymerski

Subject: Inorganic Data Review and Validation – SNL
Site: SWMU 68 GWM
AR/COC: 615811, 615812, 615813 and 615814
SDG: 358371
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 7196A (hexavalent chromium), 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. Problems were identified with the data package that resulted in the qualification of data.

Hexavalent chromium:

1. Sample 358371020 was analyzed beyond the 24 hour method-specified holding time but within 2X the HT. The associated sample result was a non-detect and will be **qualified UJ,H2**.
2. The %D was >10% but ≤25% with a negative bias for hexavalent chromium in the ICV associated with samples -005 and -020. The associated samples were non-detects and will be **qualified UJ,C3.**

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.**
2. Total cyanide was detected in the ICB at a negative concentration with absolute value > the MDL. 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 except as noted above in the Summary section and as follows. Samples -034, -047, and -061 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 except as noted above in the Summary section.

Blanks

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

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.

Laboratory Replicate

The replicate analyses met all QC acceptance criteria.

Detection Limits/Dilutions

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

Nitrate/Nitrite:
All samples *except* -022 (EB) were diluted 5X.

Anions:
All samples *except* -021 (EB) were diluted 10X for chloride and sulfate.

Other QC

An EB was submitted with ARCOC 615812 and it was associated with the samples from ARCOC 615813. A field duplicate pair was submitted with ARCOC 615813. There are no "required" review criteria for field duplicate analyses comparability; no data will be qualified as a result.

No other specific issues that affect data quality were identified.

Reviewed by: Mary Donivan **Level:** I **Date:** 11/17/14

Sample Findings Summary

AR/COC: 615822, 615823, 615824

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
EPA 900.0/SW846 9310			
	096685-034/CCBA-MW1	ALPHA (12587-46-1)	J, FR7,MS1
	096685-034/CCBA-MW1	BETA (12587-47-2)	J, FR7,MS1
	096688-034/CCBA-EB1	ALPHA (12587-46-1)	BD, FR3,MS1
	096688-034/CCBA-EB1	BETA (12587-47-2)	BD, FR3,MS1
	096691-034/CCBA-MW2	ALPHA (12587-46-1)	J, MS1
	096691-034/CCBA-MW2	BETA (12587-47-2)	J, FR7,MS1
	096692-034/CCBA-MW2	ALPHA (12587-46-1)	J, MS1
	096692-034/CCBA-MW2	BETA (12587-47-2)	BD, FR3,MS1
EPA 901.1			
	096685-033/CCBA-MW1	Americium-241 (14596-10-2)	BD, FR3
	096685-033/CCBA-MW1	Cesium-137 (10045-97-3)	BD, FR3
	096685-033/CCBA-MW1	Cobalt-60 (10198-40-0)	BD, FR3
	096685-033/CCBA-MW1	Potassium-40 (13966-00-2)	BD, FR3
	096688-033/CCBA-EB1	Americium-241 (14596-10-2)	BD, FR3
	096688-033/CCBA-EB1	Cesium-137 (10045-97-3)	BD, FR3
	096688-033/CCBA-EB1	Cobalt-60 (10198-40-0)	BD, FR3
	096688-033/CCBA-EB1	Potassium-40 (13966-00-2)	BD, FR3
	096691-033/CCBA-MW2	Americium-241 (14596-10-2)	BD, FR3
	096691-033/CCBA-MW2	Cesium-137 (10045-97-3)	BD, FR3
	096691-033/CCBA-MW2	Cobalt-60 (10198-40-0)	BD, FR3
	096691-033/CCBA-MW2	Potassium-40 (13966-00-2)	BD, FR3
	096692-033/CCBA-MW2	Americium-241 (14596-10-2)	BD, FR3
	096692-033/CCBA-MW2	Cesium-137 (10045-97-3)	BD, FR3
	096692-033/CCBA-MW2	Cobalt-60 (10198-40-0)	BD, FR3

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
	096692-033/CCBA-MW2	Potassium-40 (13966-00-2)	BD, FR3
SW846 3005/6020 DOE-AL			
	096691-010/CCBA-MW2	Copper (7440-50-8)	0.0042U, B2
	096692-010/CCBA-MW2	Copper (7440-50-8)	0.0042U, B2
SW846 3535/8321A Modified			
	096685-024/CCBA-MW1	m-Nitrotoluene (99-08-1)	UJ, I4
	096685-024/CCBA-MW1	o-Nitrotoluene (88-72-2)	UJ, I4
	096685-024/CCBA-MW1	p-Nitrotoluene (99-99-0)	UJ, I4
	096685-024/CCBA-MW1	Tetryl (479-45-8)	UJ, L3,MS3
	096688-024/CCBA-EB1	m-Nitrotoluene (99-08-1)	UJ, I4
	096688-024/CCBA-EB1	o-Nitrotoluene (88-72-2)	UJ, I4
	096688-024/CCBA-EB1	p-Nitrotoluene (99-99-0)	UJ, I4
	096688-024/CCBA-EB1	Tetryl (479-45-8)	UJ, L3,MS3
	096691-024/CCBA-MW2	m-Nitrotoluene (99-08-1)	UJ, I4
	096691-024/CCBA-MW2	o-Nitrotoluene (88-72-2)	UJ, I4
	096691-024/CCBA-MW2	p-Nitrotoluene (99-99-0)	UJ, I4
	096691-024/CCBA-MW2	Tetryl (479-45-8)	UJ, L3,MS3
	096692-024/CCBA-MW2	m-Nitrotoluene (99-08-1)	UJ, I4
	096692-024/CCBA-MW2	o-Nitrotoluene (88-72-2)	UJ, I4
	096692-024/CCBA-MW2	p-Nitrotoluene (99-99-0)	UJ, I4
	096692-024/CCBA-MW2	Tetryl (479-45-8)	UJ, L3,MS3
SW846 8260B DOE-AL			
	096686-001/CCBA-TB1	Bromomethane (74-83-9)	UJ, I3,C3
	096687-001/CCBA-FB1	Bromomethane (74-83-9)	UJ, I3,C3
	096688-001/CCBA-EB1	Bromomethane (74-83-9)	UJ, I3,C3
	096689-001/CCBA-TB2	Bromomethane (74-83-9)	UJ, I3,C3
	096690-001/CCBA-FB2	Bromomethane (74-83-9)	UJ, I3,C3
SW846 9012B			
	096685-027/CCBA-MW1	Cyanide, Total (57-12-5)	UJ, I5

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
	096688-027/CCBA-EB1	Cyanide, Total (57-12-5)	UJ, I5
	096691-027/CCBA-MW2	Cyanide, Total (57-12-5)	UJ, I5
	096692-027/CCBA-MW2	Cyanide, Total (57-12-5)	UJ, I5

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

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

Memorandum

Date: November 21, 2014

To: File

From: Monica Dymerski

Subject: Inorganic Data Review and Validation – SNL
Site: SWMU 8/58 GWM
AR/COC: 615822, 615823, and 615824
SDG: 358946
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. Problems were identified with the data package that resulted in the qualification of data.

Total cyanide:

1. The intercept for total cyanide was negative with an absolute value > the MDL but ≤3X the MDL. The associated sample results were 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 were properly preserved.

Calibration

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

Blanks

No target analytes were detected in the blanks except as follows. Chloride was detected in a CCB bracketing sample -017 at < the PQL. The associated sample result was a non-detect 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.

Nitrate/nitrite – N:

The MS analysis 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.

Nitrate/nitrite – N:

The replicate analysis 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:
All samples *except* -018 (EB) were diluted 5X.

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

Other QC

An EB was submitted with ARCOC 615823 and it was associated with the samples from ARCOC 615824. A field duplicate pair was submitted with ARCOC 615824. There are no "required" review criteria for field duplicate analyses comparability; no data will be qualified as a result.

No other specific issues that affect data quality were identified.

Reviewed by: Mary Donivan **Level:** I **Date:** 11/24/14

Sample Findings Summary

AR/COC: 615935, 615938, 615940, 615941

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

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

Sample Findings Summary

AR/COC: 615811, 615812, 615813, 615814

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
DOE EML HASL-300, U-02-RC			
	096656-035/OBS-EB1	Uranium-233/234 (13968-55-3/13966-29-)	BD, FR3
	096656-035/OBS-EB1	Uranium-235/236 (15117-96-1/13982-70-)	BD, FR3
	096656-035/OBS-EB1	Uranium-238 (7440-61-1)	BD, FR3
EPA 900.0/SW846 9310			
	096653-034/OBS-MW1	ALPHA (12587-46-1)	J, MS1
	096653-034/OBS-MW1	BETA (12587-47-2)	J, MS1
	096656-034/OBS-EB1	ALPHA (12587-46-1)	BD, FR3,MS1
	096656-034/OBS-EB1	BETA (12587-47-2)	BD, FR3,MS1
	096658-034/OBS-MW2	ALPHA (12587-46-1)	J, MS1
	096658-034/OBS-MW2	BETA (12587-47-2)	J, MS1
	096659-034/OBS-MW2	ALPHA (12587-46-1)	J, MS1
	096659-034/OBS-MW2	BETA (12587-47-2)	J, MS1
	096661-034/OBS-MW3	ALPHA (12587-46-1)	J, MS1
	096661-034/OBS-MW3	BETA (12587-47-2)	J, MS1
EPA 901.1			
	096653-033/OBS-MW1	Americium-241 (14596-10-2)	BD, FR3
	096653-033/OBS-MW1	Cesium-137 (10045-97-3)	BD, FR3
	096653-033/OBS-MW1	Cobalt-60 (10198-40-0)	BD, FR3
	096653-033/OBS-MW1	Potassium-40 (13966-00-2)	J, FR7
	096656-033/OBS-EB1	Americium-241 (14596-10-2)	BD, FR3
	096656-033/OBS-EB1	Cesium-137 (10045-97-3)	BD, FR3
	096656-033/OBS-EB1	Cobalt-60 (10198-40-0)	BD, FR3
	096656-033/OBS-EB1	Potassium-40 (13966-00-2)	BD, FR3

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
	096658-033/OBS-MW2	Americium-241 (14596-10-2)	BD, FR3
	096658-033/OBS-MW2	Cesium-137 (10045-97-3)	BD, FR3
	096658-033/OBS-MW2	Cobalt-60 (10198-40-0)	BD, FR3
	096658-033/OBS-MW2	Potassium-40 (13966-00-2)	BD, FR3
	096659-033/OBS-MW2	Americium-241 (14596-10-2)	BD, FR3
	096659-033/OBS-MW2	Cesium-137 (10045-97-3)	BD, FR3
	096659-033/OBS-MW2	Cobalt-60 (10198-40-0)	BD, FR3
	096659-033/OBS-MW2	Potassium-40 (13966-00-2)	BD, FR3
	096661-033/OBS-MW3	Americium-241 (14596-10-2)	BD, FR3
	096661-033/OBS-MW3	Cesium-137 (10045-97-3)	BD, FR3
	096661-033/OBS-MW3	Cobalt-60 (10198-40-0)	BD, FR3
	096661-033/OBS-MW3	Potassium-40 (13966-00-2)	R, Z2
SW846 3510C/8270D			
	096653-002/OBS-MW1	4-Nitrophenol (100-02-7)	UJ, MS5
	096656-002/OBS-EB1	4-Nitrophenol (100-02-7)	UJ, MS5
	096658-002/OBS-MW2	4-Nitrophenol (100-02-7)	UJ, MS5
	096659-002/OBS-MW2	4-Nitrophenol (100-02-7)	UJ, MS5
	096661-002/OBS-MW3	4-Nitrophenol (100-02-7)	UJ, MS5
SW846 3535/8321A Modified			
	096653-024/OBS-MW1	m-Nitrotoluene (99-08-1)	UJ, I4
	096653-024/OBS-MW1	o-Nitrotoluene (88-72-2)	UJ, I4
	096653-024/OBS-MW1	p-Nitrotoluene (99-99-0)	UJ, I4
	096653-024/OBS-MW1	Tetryl (479-45-8)	UJ, L3,MS3
	096656-024/OBS-EB1	m-Nitrotoluene (99-08-1)	UJ, I4
	096656-024/OBS-EB1	o-Nitrotoluene (88-72-2)	UJ, I4
	096656-024/OBS-EB1	p-Nitrotoluene (99-99-0)	UJ, I4
	096656-024/OBS-EB1	Tetryl (479-45-8)	UJ, L3,MS3
	096658-024/OBS-MW2	m-Nitrotoluene (99-08-1)	UJ, I4
	096658-024/OBS-MW2	o-Nitrotoluene (88-72-2)	UJ, I4

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
	096658-024/OBS-MW2	p-Nitrotoluene (99-99-0)	UJ, I4
	096658-024/OBS-MW2	Tetryl (479-45-8)	UJ, L3,MS3
	096659-024/OBS-MW2	m-Nitrotoluene (99-08-1)	UJ, I4
	096659-024/OBS-MW2	o-Nitrotoluene (88-72-2)	UJ, I4
	096659-024/OBS-MW2	p-Nitrotoluene (99-99-0)	UJ, I4
	096659-024/OBS-MW2	Tetryl (479-45-8)	UJ, L3,MS3
	096661-024/OBS-MW3	m-Nitrotoluene (99-08-1)	UJ, I4
	096661-024/OBS-MW3	o-Nitrotoluene (88-72-2)	UJ, I4
	096661-024/OBS-MW3	p-Nitrotoluene (99-99-0)	UJ, I4
	096661-024/OBS-MW3	Tetryl (479-45-8)	UJ, L3,MS3
SW846 7196A			
	096653-014/OBS-MW1	Hexavalent Chromium (18540-29-9)	UJ, H2,C3
	096656-014/OBS-EB1	Hexavalent Chromium (18540-29-9)	UJ, C3
SW846 9012B			
	096653-027/OBS-MW1	Cyanide, Total (57-12-5)	UJ, I5,B4
	096656-027/OBS-EB1	Cyanide, Total (57-12-5)	UJ, I5,B4
	096658-027/OBS-MW2	Cyanide, Total (57-12-5)	UJ, I5,B4
	096659-027/OBS-MW2	Cyanide, Total (57-12-5)	UJ, I5,B4
	096661-027/OBS-MW3	Cyanide, Total (57-12-5)	UJ, I5,B4

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

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

Memorandum

Date: January 23, 2015

To: File

From: Mary Donivan

Subject: Inorganic Data Review and Validation – SNL
Site: BSG
AR/COC: 615935, 615938, 615940 and 615941
SDG: 363160
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 method EPA 353.2 (nitrate/nitrite) and two samples were prepared and analyzed with accepted procedures using method EPA 314.0 (perchlorate). 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.

Calibration

All initial and continuing calibration met QC acceptance criteria.

Blanks

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

Nitrate/nitrite-N:
Nitrate/nitrite was detected in the ICB at negative concentration with an absolute value ≤ the PQL. The associated sample results were detects ≥5X the MDL and will not be qualified.

Laboratory Control Sample (LCS)

All LCS acceptance criteria were met.

Matrix Spike (MS)

All MS/PS recoveries met QC acceptance criteria.

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

Laboratory Replicate

The replicate analyses met all QC acceptance criteria.

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

Detection Limits/Dilutions

All detection limits were properly reported.

Nitrate/nitrite-N:
Sample 363160003 was diluted 25X and samples -007, -011 and -016 were diluted 50X.

Other QC

No other specific issues that affect data quality were identified.

Reviewed by: Monica Dymerski **Level I** **Date:** 01/26/15

SECTION III
TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

LIST OF TABLES (Concluded)

APPENDICES

This page intentionally left blank.

SECTION III
SOLID WASTE MANAGEMENT UNITS 8/58 AND 68 QUARTERLY GROUNDWATER MONITORING REPORT, October – December 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 thirteenth 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 III-1 and OBS monitoring wells in Figure III-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 Fourth Quarter, Calendar Year (CY) 2014 reporting period (October – December 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 October 13 and October 14, 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 October 6 to October 8, 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 sample at a concentration of 4.81 mg/L. Fluoride in the CCBA-MW2 groundwater sample and groundwater duplicate sample were both above the method detection limit (MDL), and both reported a concentration of 1.50 mg/L. None of the analytical results from the groundwater samples from SWMU 68 exceeded the MCLs.

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 III-1. Table III-2 presents the details for groundwater samples collected from all five monitoring wells during the Fourth 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 III.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 III-3 summarizes the temperature, pH, SC, and turbidity measurements, which are discussed in Section III.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 III-1. Table III-1 also lists the sample containers and preservation requirements. Section III.3.0 summarizes the analytical results.

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

3.0 Analytical Results

Groundwater samples were submitted to GEL 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 III-4 lists the MDLs for VOCs and SVOCs and Table III-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 III-6 through III-14. 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 III-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 III-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 III-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 III-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 III-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 III-4 lists MDLs for associated SVOCs analyzed.

3.4 High Explosive Compounds

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

3.5 Nitrate Plus Nitrite

SWMUs 8/58, Monitoring Wells CCBA-MW1 and CCBA-MW2. Table III-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 3.47 mg/L in the CCBA-MW2 groundwater duplicate sample.

SWMU 68, Monitoring Wells OBS-MW1, OBS-MW2, and OBS-MW3. Table III-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 1.89 mg/L in the OBS-MW3 groundwater sample.

3.6 Anions and Alkalinity

SWMUs 8/58, Monitoring Wells CCBA-MW1 and CCBA-MW2. Table III-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 at a concentration of 4.81 mg/L. 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 and groundwater duplicate sample were both reported at a concentration of 1.50 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 III-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 III-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 III-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 III-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 III-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 III-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 III-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 III-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 III-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 III-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. Fluoride detected in the CCBA-MW1 sample is 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-MW2 and OBS-MW2, 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 III-15 summarizes the results for duplicate sample analyses and calculated relative percent difference (RPD) values for monitoring wells CCBA-MW2 and OBS-MW2. RPD values were calculated only for detected chemical parameters. The work plans for SWMUs 8/58 and 68 do not specify QC acceptance criteria for duplicate 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-MW2 and OBS-MW2 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-MW2. Acetone, bromodichloromethane, chloroform, and copper were detected above the laboratory MDLs or MDAs. With the exception of copper, no corrective action was necessary because compounds were not detected in groundwater samples. Copper was qualified as not detected in both the CCBA-MW2 groundwater and groundwater duplicate samples during data validation, because copper was reported in the EB sample at a concentration greater than associated groundwater samples.

SWMU 68, Monitoring Well OBS-MW2. Acetone, bromodichloromethane, chloroform, chloride, and copper were detected above the laboratory MDLs. No corrective action was necessary because these analytes were not detected in associated groundwater samples.

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 October 2014 samples. No VOCs were detected above associated laboratory MDLs.

SWMU 68. A total of four trip blanks were submitted with the October 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-MW1. The VOCs bromodichloromethane and chloroform were detected above associated laboratory MDLs. Bromodichloromethane and chloroform are common byproducts of the water deionization process. No corrective action was required, because these compounds were not detected in the associated groundwater sample.

SWMU 68, Monitoring Well OBS-MW3. The VOCs acetone, bromodichloromethane, and chloroform were detected above laboratory MDLs. Acetone is a common pervasive laboratory solvent, and bromodichloromethane and chloroform are common byproducts of the water deionization process. No corrective action was required, because these compounds were not detected in the associated groundwater samples.

4.2 Laboratory Quality Control Samples

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

All data are determined to be acceptable and reported QC measures are adequate, except for potassium-40 in the monitoring well OBS-MW3 groundwater sample. Potassium-40 was qualified as unusable during data validation, because the result was rejected by GEL due to the peak not meeting identification criteria. 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 October 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 October 2014 sampling activities.

5.0 Summary

During the Fourth 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 at a concentration of 4.81 mg/L. 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.

In October 2014, DOE and Sandia notified NMED that groundwater monitoring at SWMUs 8/58 and 68 had been completed, and would be discontinued (SNL October, 2014).

6.0 References

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

DOE, see U.S. Department of Energy.

EPA, see U.S. Environmental Protection Agency.

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

New Mexico Environment Department (NMED), April 2010. "Class 3 Permit Modification Requests for Granting Corrective Action Complete Status for 26 SWMUs/AOCs (Request of March 1, 2006) and 5 Other SWMUs/AOCs (Request of January 7, 2008), Sandia National Laboratories, EPA ID# NM5890110518, HWB-SNL-06-007 and HWB-SNL-08-001," New Mexico Environment Department Hazardous Waste Bureau, Santa Fe, New Mexico, April 8, 2010.

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

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

NMED, see New Mexico Environment Department.

Sandia National Laboratories, New Mexico (SNL/NM), September 2010. "SWMU 68 and SWMUs 8/58 Groundwater Characterization Work Plans – U.S. Department of Energy (DOE)/Sandia Corporation (Sandia) Response to the New Mexico Environment Department (NMED) letter of April 8, 2010, entitled, *Class 3 Permit Modification Requests for Granting Corrective Action Complete Status for 26 SWMUs/AOCs (Request of March 1, 2006) and 5 Other SWMUs/AOCs (Request of January 7, 2008), Sandia National Laboratories, EPA ID #NM5890110518 HWB-SNL-06-007 and HWB SNL-08-001,*" Sandia National Laboratories, Albuquerque, New Mexico.

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

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

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

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

Sandia National Laboratories, New Mexico (SNL/NM), October 2014. Completion of Monitoring at Solid Waste Management Units 68, 149, 154, and 8/58, Sandia National Laboratories, Albuquerque, New Mexico.

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

Skelly, M., August 2013. "Occurrence of Natural Fluoride and Metals in the Eastern Portions of Kirtland Air Force Base", Environmental Restoration Operations Organization 06234, Sandia National Laboratories, Albuquerque, New Mexico.

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

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

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

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

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

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

Figures

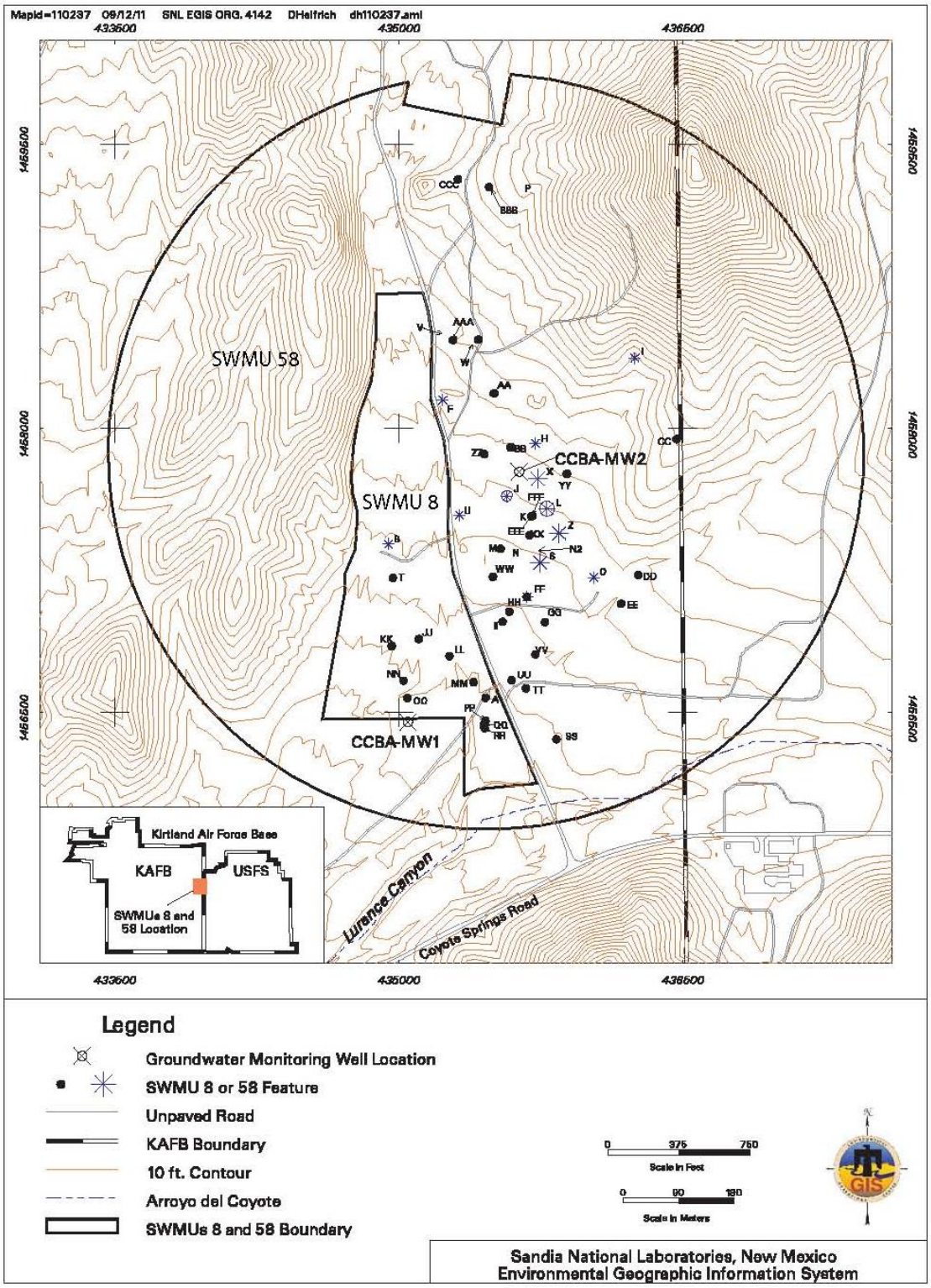

Figure III-1

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

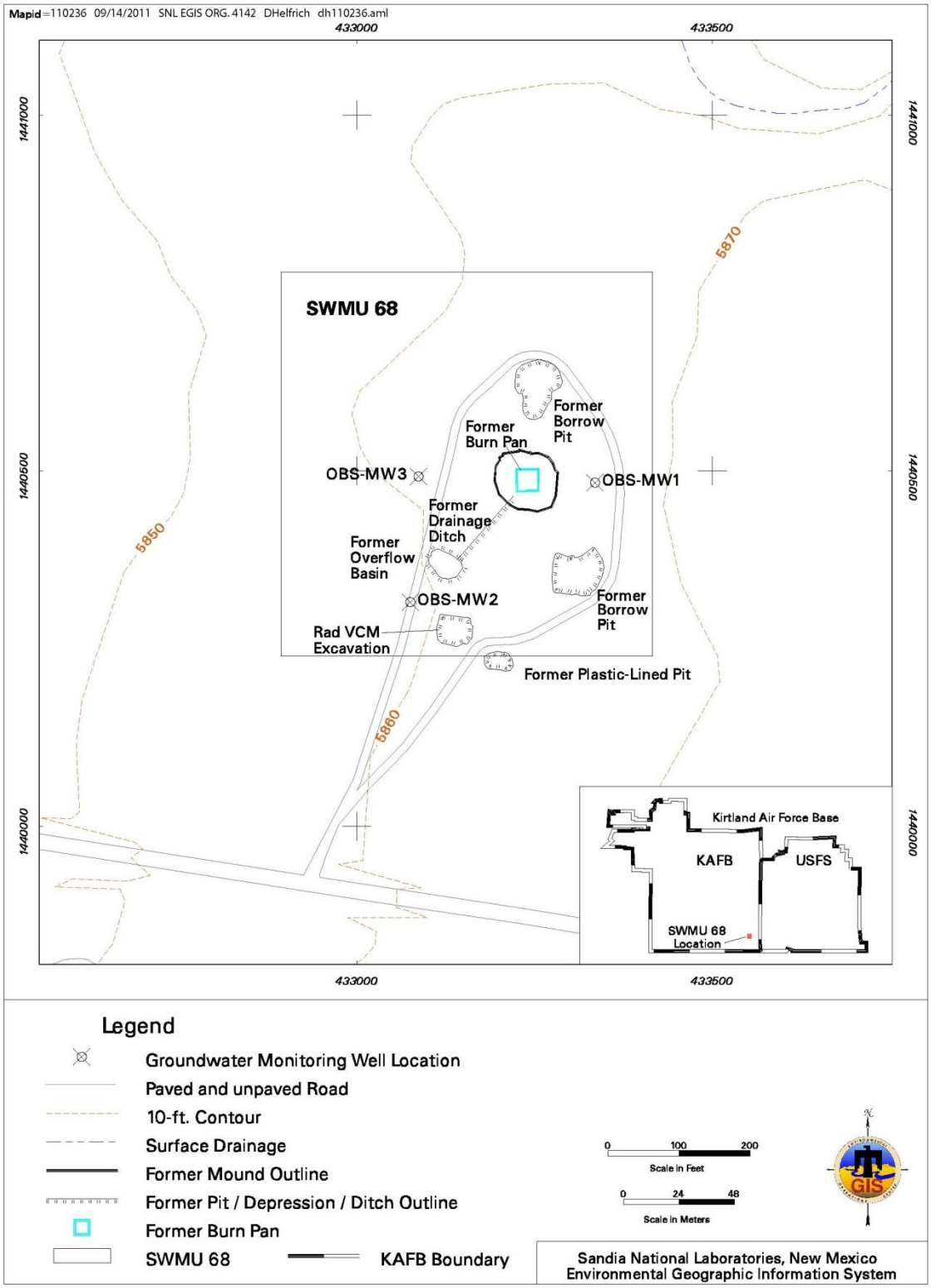

Figure IIII-2

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

Tables

Table III-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.
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.
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 III-2

Sample Details for Fourth Quarter, CY 2014 Groundwater Sampling

SWMUs 8/58 and 68 Groundwater Monitoring Quarterly Assessment

October – December 2014

Well	Sample Identification	AR/COC Number	Associated Groundwater Investigation
SWMUs 8/58			
CCBA-MW1	096685	615822	SWMUs 8/58
CCBA-MW2	096691	615824	
CCBA-MW2 (duplicate)	096692		
SWMU 68			
OBS-MW1	096653	615811	SWMU 68
OBS-MW2	096658	615813	
OBS-MW2 (duplicate)	096659		
OBS-MW3	096661	615814	

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 III-3

Summary of Field Water Quality Measurements[a]

SWMUs 8/58 and 68 Groundwater Monitoring

Quarterly Assessment, October – December 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	13-Oct-14	16.10	481.5	305.4	6.42	0.32	33.3	3.28
CCBA-MW2	14-Oct-14	16.52	559.0	297.4	7.38	0.16	63.6	6.20
SWMU 68								
OBS-MW1	06-Oct-14	17.89	511.0	298.8	7.27	0.22	38.8	3.66
OBS-MW2	07-Oct-14	18.70	517.1	301.1	7.22	0.23	37.3	3.47
OBS-MW3	08-Oct-14	17.46	503.1	254.0	7.21	0.18	46.9	4.48

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 III-4

Method Detection Limits for Volatile and Semivolatile Organic Compounds

SWMUs 8/58 and 68 Groundwater Monitoring

Quarterly Assessment, October – December 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 III-4 (Continued)

Method Detection Limits for Volatile and Semivolatile Organic Compounds

SWMUs 8/58 and 68 Groundwater Monitoring

Quarterly Assessment, October – December 2014

SWMU 8/58 (Continued)					
Analyte	**MDL (µg/L)**	**Analytical Method[a]**	**Analyte**	**MDL (µg/L)**	**Analytical Method[a]**
1'-Biphenyl 1	3.00–3.26	EPA 8270C	Butylbenzyl phthalate	3.00–3.26	EPA 8270C
1,2,4-Trichlorobenzene	3.00–3.26	EPA 8270C	Caprolactam	3.00–3.26	EPA 8270C
1,4-Dioxane	3.00–3.26	EPA 8270C	Carbazole	0.300–0.326	EPA 8270C
2,4,5-Trichlorophenol	3.00–3.26	EPA 8270C	Chrysene	0.300–0.326	EPA 8270C
2,4,6-Trichlorophenol	3.00–3.26	EPA 8270C	Di-n-butyl phthalate	3.00–3.26	EPA 8270C
2,4-Dichlorophenol	3.00–3.26	EPA 8270C	Di-n-octyl phthalate	3.00–3.26	EPA 8270C
2,4-Dimethylphenol	3.00–3.26	EPA 8270C	Dibenz[a,h]anthracene	0.300–0.326	EPA 8270C
2,4-Dinitrophenol	5.00–5.43	EPA 8270C	Dibenzofuran	3.00–3.26	EPA 8270C
2,4-Dinitrotoluene	3.00–3.26	EPA 8270C	Diethylphthalate	3.00–3.26	EPA 8270C
2,6-Dinitrotoluene	3.00–3.26	EPA 8270C	Dimethylphthalate	3.00–3.26	EPA 8270C
2-Chloronaphthalene	0.410–0.446	EPA 8270C	Dinitro-o-cresol	3.00–3.26	EPA 8270C
2-Chlorophenol	3.00–3.26	EPA 8270C	Diphenyl amine	3.00–3.26	EPA 8270C
2-Methylnaphthalene	0.300–0.326	EPA 8270C	Fluoranthene	0.300–0.326	EPA 8270C
2-Nitroaniline	3.00–3.26	EPA 8270C	Fluorene	0.300–0.326	EPA 8270C
2-Nitrophenol	3.00–3.26	EPA 8270C	Hexachlorobenzene	3.00–3.26	EPA 8270C
3,3'-Dichlorobenzidine	3.00–3.26	EPA 8270C	Hexachlorobutadiene	3.00–3.26	EPA 8270C
3-Nitroaniline	3.00–3.26	EPA 8270C	Hexachlorocyclopentadiene	3.00–3.26	EPA 8270C
4-Bromophenyl phenyl ether	3.00–3.26	EPA 8270C	Hexachloroethane	3.00–3.26	EPA 8270C
4-Chloro-3-methylphenol	3.00–3.26	EPA 8270C	Indeno(1,2,3-c,d)pyrene	0.300–0.326	EPA 8270C
4-Chlorobenzenamine	3.30–3.59	EPA 8270C	Isophorone	3.50–3.80	EPA 8270C
4-Chlorophenyl phenyl ether	3.00–3.26	EPA 8270C	Naphthalene	0.300–0.326	EPA 8270C
4-Nitroaniline	3.00–3.26	EPA 8270C	Nitro-benzene	3.00–3.26	EPA 8270C
4-Nitrophenol	3.00–3.26	EPA 8270C	Pentachlorophenol	3.00–3.26	EPA 8270C
Acenaphthene	0.300–0.326	EPA 8270C	Phenanthrene	0.300–0.326	EPA 8270C
Acenaphthylene	0.300–0.326	EPA 8270C	Phenol	3.00–3.26	EPA 8270C
Acetophenone	3.00–3.26	EPA 8270C	Pyrene	0.300–0.326	EPA 8270C
Anthracene	0.300–0.326	EPA 8270C	bis(2-Chloroethoxy)methane	3.00–3.26	EPA 8270C
Atrazine	3.00–3.26	EPA 8270C	bis(2-Chloroethyl)ether	3.00–3.26	EPA 8270C
Benzaldehyde	3.00–3.26	EPA 8270C	bis(2-Chloroisopropyl)ether	3.00–3.26	EPA 8270C
Benzo(a)anthracene	0.300–0.326	EPA 8270C	bis(2-Ethylhexyl)phthalate	3.00–3.26	EPA 8270C
Benzo(a)pyrene	0.300–0.326	EPA 8270C	m,p-Cresol	3.70–4.02	EPA 8270C
Benzo(b)fluoranthene	0.300–0.326	EPA 8270C	n-Nitrosodipropylamine	3.00–3.26	EPA 8270C
Benzo(ghi)perylene	0.300–0.326	EPA 8270C	o-Cresol	3.00–3.26	EPA 8270C
Benzo(k)fluoranthene	0.300–0.326	EPA 8270C			

Table III-4 (Continued)

Method Detection Limits for Volatile and Semivolatile Organic Compounds

SWMUs 8/58 and 68 Groundwater Monitoring

Quarterly Assessment, October – December 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 III-4 (Continued)

Method Detection Limits for Volatile and Semivolatile Organic Compounds

SWMUs 8/58 and 68 Groundwater Monitoring

Quarterly Assessment, October – December 2014

SWMU 68 (Continued)					
Analyte	**MDL (µg/L)**	**Analytical Method[a]**	**Analyte**	**MDL (µg/L)**	**Analytical Method[a]**
1'-Biphenyl 1	3.00–3.13	EPA 8270C	Butylbenzyl phthalate	3.00–3.13	EPA 8270C
1,2,4-Trichlorobenzene	3.00–3.13	EPA 8270C	Caprolactam	3.00–3.13	EPA 8270C
2,4,5-Trichlorophenol	3.00–3.13	EPA 8270C	Carbazole	0.300–0.313	EPA 8270C
1,4-Dioxane	3.00–3.13	EPA 8270C	Chrysene	0.300–0.313	EPA 8270C
2,4,6-Trichlorophenol	3.00–3.13	EPA 8270C	Di-n-butyl phthalate	3.00–3.13	EPA 8270C
2,4-Dichlorophenol	3.00–3.13	EPA 8270C	Di-n-octyl phthalate	3.00–3.13	EPA 8270C
2,4-Dimethylphenol	3.00–3.13	EPA 8270C	Dibenz[a,h]anthracene	0.300–0.313	EPA 8270C
2,4-Dinitrophenol	5.00–5.21	EPA 8270C	Dibenzofuran	3.00–3.13	EPA 8270C
2,4-Dinitrotoluene	3.00–3.13	EPA 8270C	Diethylphthalate	3.00–3.13	EPA 8270C
2,6-Dinitrotoluene	3.00–3.13	EPA 8270C	Dimethylphthalate	3.00–3.13	EPA 8270C
2-Chloronaphthalene	0.410–0.427	EPA 8270C	Dinitro-o-cresol	3.00–3.13	EPA 8270C
2-Chlorophenol	3.00–3.13	EPA 8270C	Diphenyl amine	3.00–3.13	EPA 8270C
2-Methylnaphthalene	0.300–0.313	EPA 8270C	Fluoranthene	0.300–0.313	EPA 8270C
2-Nitroaniline	3.00–3.13	EPA 8270C	Fluorene	0.300–0.313	EPA 8270C
2-Nitrophenol	3.00–3.13	EPA 8270C	Hexachlorobenzene	3.00–3.13	EPA 8270C
3,3'-Dichlorobenzidine	3.00–3.13	EPA 8270C	Hexachlorobutadiene	3.00–3.13	EPA 8270C
3-Nitroaniline	3.00–3.13	EPA 8270C	Hexachlorocyclopentadiene	3.00–3.13	EPA 8270C
4-Bromophenyl phenyl ether	3.00–3.13	EPA 8270C	Hexachloroethane	3.00–3.13	EPA 8270C
4-Chloro-3-methylphenol	3.00–3.13	EPA 8270C	Indeno(1,2,3-c,d)pyrene	0.300–0.313	EPA 8270C
4-Chlorobenzenamine	3.30–3.44	EPA 8270C	Isophorone	3.50–3.65	EPA 8270C
4-Chlorophenyl phenyl ether	3.00–3.13	EPA 8270C	Naphthalene	0.300–0.313	EPA 8270C
4-Nitroaniline	3.00–3.13	EPA 8270C	Nitro-benzene	3.00–3.13	EPA 8270C
4-Nitrophenol	3.00–3.13	EPA 8270C	Pentachlorophenol	3.00–3.13	EPA 8270C
Acenaphthene	0.300–0.313	EPA 8270C	Phenanthrene	0.300–0.313	EPA 8270C
Acenaphthylene	0.300–0.313	EPA 8270C	Phenol	3.00–3.13	EPA 8270C
Acetophenone	3.00–3.13	EPA 8270C	Pyrene	0.300–0.313	EPA 8270C
Anthracene	0.300–0.313	EPA 8270C	bis(2-Chloroethoxy)methane	3.00–3.13	EPA 8270C
Atrazine	3.00–3.13	EPA 8270C	bis(2-Chloroethyl)ether	3.00–3.13	EPA 8270C
Benzaldehyde	3.00–3.13	EPA 8270C	bis(2-Chloroisopropyl)ether	3.00–3.13	EPA 8270C
Benzo(a)anthracene	0.300–0.313	EPA 8270C	bis(2-Ethylhexyl)phthalate	3.00–3.13	EPA 8270C
Benzo(a)pyrene	0.300–0.313	EPA 8270C	m,p-Cresol	3.70–3.85	EPA 8270C
Benzo(b)fluoranthene	0.300–0.313	EPA 8270C	n-Nitrosodipropylamine	3.00–3.13	EPA 8270C
Benzo(ghi)perylene	0.300–0.313	EPA 8270C	o-Cresol	3.00–3.13	EPA 8270C
Benzo(k)fluoranthene	0.300–0.313	EPA 8270C			

Table III-4 (Concluded)

Method Detection Limits for Volatile and Semivolatile Organic Compounds

SWMUs 8/58 and 68 Groundwater Monitoring

Quarterly Assessment, October – December 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 III-5

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

SWMUs 8/58 and 68 Groundwater Monitoring

Quarterly Assessment, October – December 2014

Analyte	MDL (μg/L)	
	SWMUs 8/58	SWMU 68
1,3,5-Trinitrobenzene	0.0833–0.0874	0.0847–0.0894
1,3-Dinitrobenzene	0.0833–0.0874	0.0847–0.0894
2,4,6-Trinitrotoluene	0.0833–0.0874	0.0847–0.0894
2,4-Dinitrotoluene	0.0833–0.0874	0.0847–0.0894
2,6-Dinitrotoluene	0.0833–0.0874	0.0847–0.0894
2-Amino-4,6-dinitrotoluene	0.0833–0.0874	0.0847–0.0894
2-Nitrotoluene	0.0854–0.0896	0.0868 -0.0916
3-Nitrotoluene	0.0833–0.0874	0.0847–0.0894
4-Amino-2,6-dinitrotoluene	0.0833–0.0874	0.0847–0.0894
4-Nitrotoluene	0.156–0.164	0.159–0.168
HMX	0.0833–0.0874	0.0847–0.0894
Nitrobenzene	0.0833–0.0874	0.0847–0.0894
Pentaerythritol tetranitrate	0.104–0.109	0.106–0.112
RDX	0.0833–0.0874	0.0847–0.0894
Tetryl	0.0833–0.0874	0.0847–0.0894

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-6

Summary of Nitrate Plus Nitrite Results

SWMUs 8/58 and 68 Groundwater Monitoring

Quarterly Assessment, October – December 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 13-Oct-14	Nitrate plus nitrite	1.59	0.085	0.250	10.0			096685-018	EPA 353.2
CCBA-MW2 14-Oct-14	Nitrate plus nitrite	3.32	0.085	0.250	10.0			096691-018	EPA 353.2
CCBA-MW2 (Duplicate) 14-Oct-14	Nitrate plus nitrite	3.47	0.085	0.250	10.0			096692-018	EPA 353.2
SWMU 68									
OBS-MW1 06-Oct-14	Nitrate plus nitrite	1.79	0.085	0.250	10.0			096653-018	EPA 353.2
OBS-MW2 07-Oct-14	Nitrate plus nitrite	1.55	0.085	0.250	10.0			096658-018	EPA 353.2
OBS-MW2 (Duplicate) 07-Oct-14	Nitrate plus nitrite	1.56	0.085	0.250	10.0			096659-018	EPA 353.2
OBS-MW3 08-Oct-14	Nitrate plus nitrite	1.89	0.085	0.250	10.0			096661-018	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 III-6 (Concluded)

Summary of Nitrate Plus Nitrite Results

SWMUs 8/58 and 68 Groundwater Monitoring

Quarterly Assessment, October – December 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 III-7

Summary of Alkalinity, Anion, and Total Cyanide Results

SWMUs 8/58 and 68 Groundwater Monitoring

Quarterly Assessment, October – December 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	178	0.725	1.00	NE			096685-022	SM 2320B
13-Oct-14	Carbonate Alkalinity	ND	0.725	1.00	NE	U		096685-022	SM 2320B
	Bromide	0.320	0.067	0.200	NE			096685-016	EPA 9056
	Chloride	28.8	0.335	1.00	NE			096685-016	EPA 9056
	Fluoride	**4.81**	0.033	0.100	4.0			096685-016	EPA 9056
	Sulfate	55.9	0.665	2.00	NE			096685-016	EPA 9056
	Total Cyanide	ND	0.00167	0.005	0.200	U	UJ	096685-027	EPA 9012
CCBA-MW2	Bicarbonate Alkalinity	175	0.725	1.00	NE			096691-022	SM 2320B
14-Oct-14	Carbonate Alkalinity	ND	0.725	1.00	NE	U		096691-022	SM 2320B
	Bromide	0.558	0.067	0.200	NE			096691-016	EPA 9056
	Chloride	38.2	0.670	2.00	NE			096691-016	EPA 9056
	Fluoride	1.50	0.033	0.100	4.0			096691-016	EPA 9056
	Sulfate	93.8	1.33	4.00	NE			096691-016	EPA 9056
	Total Cyanide	ND	0.00167	0.005	0.200	U	UJ	096691-027	EPA 9012
CCBA-MW2 (Duplicate)	Bicarbonate Alkalinity	179	0.725	1.00	NE			096692-022	SM 2320B
14-Oct-14	Carbonate Alkalinity	ND	0.725	1.00	NE	U		096692-022	SM 2320B
	Bromide	0.553	0.067	0.200	NE			096692-016	EPA 9056
	Chloride	37.9	0.670	2.00	NE			096692-016	EPA 9056
	Fluoride	1.50	0.033	0.100	4.0			096692-016	EPA 9056
	Sulfate	94.1	1.33	4.00	NE			096692-016	EPA 9056
	Total Cyanide	ND	0.00167	0.005	0.200	U	UJ	096692-027	EPA 9012

Table III-7 (Continued)

Summary of Alkalinity, Anion, and Total Cyanide Results

SWMUs 8/58 and 68 Groundwater Monitoring

Quarterly Assessment, October – December 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 06-Oct-14	Bicarbonate Alkalinity	186	0.725	1.00	NE			096653-022	SM 2320B
	Carbonate Alkalinity	ND	0.725	1.00	NE	U		096653-022	SM 2320B
	Bromide	0.359	0.067	0.200	NE			096653-016	EPA 9056
	Chloride	23.0	0.670	2.00	NE			096653-016	EPA 9056
	Fluoride	2.01	0.033	0.100	4.00			096653-016	EPA 9056
	Sulfate	79.3	1.33	4.00	NE			096653-016	EPA 9056
	Total Cyanide	ND	0.00167	0.005	0.200	U	UJ	096653-027	EPA 9012
OBS-MW2 07-Oct-14	Bicarbonate Alkalinity	183	0.725	1.00	NE			096658-022	SM 2320B
	Carbonate Alkalinity	ND	0.725	1.00	NE	U		096658-022	SM 2320B
	Bromide	0.343	0.067	0.200	NE			096658-016	EPA 9056
	Chloride	21.9	0.670	2.00	NE			096658-016	EPA 9056
	Fluoride	2.13	0.033	0.100	4.00			096658-016	EPA 9056
	Sulfate	81.5	1.33	4.00	NE			096658-016	EPA 9056
	Total Cyanide	ND	0.00167	0.005	0.200	U	UJ	096658-027	EPA 9056
OBS-MW2 (Duplicate) 07-Oct-14	Bicarbonate Alkalinity	183	0.725	1.00	NE			096659-022	SM 2320B
	Carbonate Alkalinity	ND	0.725	1.00	NE	U		096659-022	SM 2320B
	Bromide	0.367	0.067	0.200	NE			096659-016	EPA 9056
	Chloride	21.9	0.670	2.00	NE			096659-016	EPA 9056
	Fluoride	2.15	0.033	0.100	4.00			096659-016	EPA 9056
	Sulfate	81.3	1.33	4.00	NE			096659-016	EPA 9056
	Total Cyanide	ND	0.00167	0.005	0.200	U	UJ	096659-027	EPA 9012
OBS-MW3 08-Oct-14	Bicarbonate Alkalinity	181	0.725	1.00	NE			096661-022	SM 2320B
	Carbonate Alkalinity	ND	0.725	1.00	NE	U		096661-022	SM 2320B
	Bromide	0.375	0.067	0.200	NE			096661-016	EPA 9056
	Chloride	22.4	0.670	2.00	NE			096661-016	EPA 9056
	Fluoride	2.16	0.033	0.100	4.00			096661-016	EPA 9056
	Sulfate	80.8	1.33	4.00	NE			096661-016	EPA 9056
	Total Cyanide	ND	0.00167	0.005	0.200	U	UJ	096661-027	EPA 9012

Table III-7 (Concluded)

Summary of Alkalinity, Anion, and Total Cyanide Results

SWMUs 8/58 and 68 Groundwater Monitoring

Quarterly Assessment, October – December 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 MDL.

[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 III-8

Summary of Perchlorate Results

SWMUs 8/58 and 68 Groundwater Monitoring

Quarterly Assessment, October – December 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 13-Oct-14	ND	0.004	0.012	NE	U		096685-020	EPA 314.0
CCBA-MW2 14-Oct-14	ND	0.004	0.012	NE	U		096691-020	EPA 314.0
CCBA-MW2 (Duplicate) 14-Oct-14	ND	0.004	0.012	NE	U		096692-020	EPA 314.0
SWMU 68								
OBS-MW1 06-Oct-14	ND	0.004	0.012	NE	U		096653-020	EPA 314.0
OBS-MW2 07-Oct-14	ND	0.004	0.012	NE	U		096658-020	EPA 314.0
OBS-MW2 (Duplicate) 07-Oct-14	ND	0.004	0.012	NE	U		096659-020	EPA 314.0
OBS-MW3 08-Oct-14	ND	0.004	0.012	NE	U		096661-020	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 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, 1999 (and updates), *"Perchlorate in Drinking Water Using Ion Chromatography,"* EPA 815/R-00-014.

Table III-8 (Concluded)

Summary of Perchlorate Results

SWMUs 8/58 and 68 Groundwater Monitoring

Quarterly Assessment, October – December 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 III-9

Summary of Hexavalent Chromium Results

SWMU 68 Groundwater Monitoring

Quarterly Assessment, October – December 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 06-Oct-14	ND	0.003	0.010	NE	U	UJ	096653-014	EPA 7196A
OBS-MW2 07-Oct-14	ND	0.003	0.010	NE	U		096658-014	EPA 7196A
OBS-MW2 (Duplicate) 07-Oct-14	ND	0.003	0.010	NE	U		096659-014	EPA 7196A
OBS-MW3 08-Oct-14	ND	0.003	0.010	NE	U		096661-014	EPA 7196A

Notes

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

[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 III-10

Summary of Unfiltered Total Metal Results

SWMUs 8/58 Groundwater Monitoring

Quarterly Assessment, October – December 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	0.0199	0.015	0.050	NE	J		096685-010	EPA 6020
13-Oct-14	Antimony	ND	0.001	0.003	0.006	U		096685-010	EPA 6020
	Arsenic	ND	0.0017	0.005	0.010	U		096685-010	EPA 6020
	Barium	0.00193	0.0006	0.002	2.00	J		096685-010	EPA 6020
	Beryllium	0.000467	0.0002	0.0005	0.004	J		096685-010	EPA 6020
	Cadmium	ND	0.00011	0.001	0.005	U		096685-010	EPA 6020
	Calcium	54.0	0.300	1.00	NE			096685-010	EPA 6020
	Chromium	ND	0.002	0.010	0.100	U		096685-010	EPA 6020
	Cobalt	0.0001	0.0001	0.001	NE	J		096685-010	EPA 6020
	Copper	0.000509	0.00035	0.001	NE	J		096685-010	EPA 6020
	Iron	0.0617	0.033	0.100	NE	J		096685-010	EPA 6020
	Lead	ND	0.0005	0.002	NE	U		096685-010	EPA 6020
	Magnesium	10.6	0.010	0.030	NE			096685-010	EPA 6020
	Manganese	0.00221	0.001	0.005	NE	J		096685-010	EPA 6020
	Mercury	ND	0.000067	0.0002	0.002	U		096685-010	EPA 7470
	Nickel	0.000673	0.0005	0.002	NE	J		096685-010	EPA 6020
	Potassium	4.36	0.080	0.300	NE			096685-010	EPA 6020
	Selenium	0.00207	0.0015	0.005	0.050	J		096685-010	EPA 6020
	Silver	ND	0.0002	0.001	NE	U		096685-010	EPA 6020
	Sodium	67.3	0.400	1.25	NE			096685-010	EPA 6020
	Thallium	ND	0.00045	0.002	0.002	U		096685-010	EPA 6020
	Uranium	0.00249	0.000067	0.0002	0.03			096685-010	EPA 6020
	Vanadium	ND	0.001	0.005	NE	U		096685-010	EPA 6010
	Zinc	ND	0.0035	0.010	NE	U		096685-010	EPA 6020

Table III-10 (Continued)

Summary of Unfiltered Total Metal Results

SWMUs 8/58 Groundwater Monitoring

Quarterly Assessment, October – December 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		096691-010	EPA 6020
14-Oct-14	Antimony	ND	0.001	0.003	0.006	U		096691-010	EPA 6020
	Arsenic	ND	0.0017	0.005	0.010	U		096691-010	EPA 6020
	Barium	0.0464	0.0006	0.002	2.00			096691-010	EPA 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		096691-010	EPA 6020
	Cadmium	ND	0.00011	0.001	0.005	U		096691-010	EPA 6020
	Calcium	84.1	0.300	1.00	NE			096691-010	EPA 6020
	Chromium	ND	0.002	0.010	0.100	U		096691-010	EPA 6020
	Cobalt	0.000106	0.0001	0.001	NE	J		096691-010	EPA 6020
	Copper	0.000561	0.00035	0.001	NE	J	0.0042U	096691-010	EPA 6020
	Iron	0.0812	0.033	0.100	NE	J		096691-010	EPA 6020
	Lead	ND	0.0005	0.002	NE	U		096691-010	EPA 6020
	Magnesium	15.6	0.010	0.030	NE			096691-010	EPA 6020
	Manganese	ND	0.001	0.005	NE	U		096691-010	EPA 6020
	Mercury	ND	0.000067	0.0002	0.002	U		096691-010	EPA 7470
	Nickel	0.00086	0.0005	0.002	NE	J		096691-010	EPA 6020
	Potassium	1.33	0.080	0.300	NE			096691-010	EPA 6020
	Selenium	0.00418	0.0015	0.005	0.050	J		096691-010	EPA 6020
	Silver	ND	0.0002	0.001	NE	U		096691-010	EPA 6020
	Sodium	52.3	0.400	1.25	NE			096691-010	EPA 6020
	Thallium	ND	0.00045	0.002	0.002	U		096691-010	EPA 6020
	Uranium	0.00585	0.000067	0.0002	0.03			096691-010	EPA 6020
	Vanadium	0.00999	0.001	0.005	NE			096691-010	EPA 6010
	Zinc	ND	0.0035	0.010	NE	U		096691-010	EPA 6020

Table III-10 (Continued)

Summary of Unfiltered Total Metal Results

SWMUs 8/58 Groundwater Monitoring

Quarterly Assessment, October – December 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 (Duplicate) 14-Oct-14	Aluminum	ND	0.015	0.050	NE	U		096692-010	EPA 6020
	Antimony	ND	0.001	0.003	0.006	U		096692-010	EPA 6020
	Arsenic	ND	0.0017	0.005	0.010	U		096692-010	EPA 6020
	Barium	0.0458	0.0006	0.002	2.00			096692-010	EPA 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		096692-010	EPA 6020
	Cadmium	ND	0.00011	0.001	0.005	U		096692-010	EPA 6020
	Calcium	82.1	0.300	1.00	NE			096692-010	EPA 6020
	Chromium	ND	0.002	0.010	0.100	U		096692-010	EPA 6020
	Cobalt	ND	0.0001	0.001	NE	U		096692-010	EPA 6020
	Copper	0.000569	0.00035	0.001	NE	J	0.0042U	096692-010	EPA 6020
	Iron	0.0814	0.033	0.100	NE	J		096692-010	EPA 6020
	Lead	ND	0.0005	0.002	NE	U		096692-010	EPA 6020
	Magnesium	15.5	0.010	0.030	NE			096692-010	EPA 6020
	Manganese	ND	0.001	0.005	NE	U		096692-010	EPA 6020
	Mercury	ND	0.000067	0.0002	0.002	U		096692-010	EPA 7470
	Nickel	0.00087	0.0005	0.002	NE	J		096692-010	EPA 6020
	Potassium	1.31	0.080	0.300	NE			096692-010	EPA 6020
	Selenium	0.00385	0.0015	0.005	0.050	J		096692-010	EPA 6020
	Silver	ND	0.0002	0.001	NE	U		096692-010	EPA 6020
	Sodium	50.7	0.400	1.25	NE			096692-010	EPA 6020
	Thallium	ND	0.00045	0.002	0.002	U		096692-010	EPA 6020
	Uranium	0.00611	0.000067	0.0002	0.03			096692-010	EPA 6020
	Vanadium	0.0107	0.001	0.005	NE			096692-010	EPA 6010
	Zinc	ND	0.0035	0.010	NE	U		096692-010	EPA 6020

Table III-10 (Concluded)

Summary of Unfiltered Total Metal Results

SWMUs 8/58 Groundwater Monitoring

Quarterly Assessment, October – December 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 MDL.

[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.

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 III-11

Summary of Unfiltered Total Metal Results

SWMU 68 Groundwater Monitoring

Quarterly Assessment, October – December 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	ND	0.015	0.050	NE	U		096653-009	EPA 6020
06-Oct-14	Antimony	ND	0.001	0.003	0.006	U		096653-009	EPA 6020
	Arsenic	ND	0.0017	0.005	0.010	U		096653-009	EPA 6020
	Barium	0.0175	0.0006	0.002	2.00			096653-009	EPA 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		096653-009	EPA 6020
	Cadmium	ND	0.00011	0.001	0.005	U		096653-009	EPA 6020
	Calcium	81.6	0.300	1.00	NE			096653-009	EPA 6020
	Chromium	ND	0.002	0.010	0.100	U		096653-009	EPA 6020
	Cobalt	ND	0.0001	0.001	NE	U		096653-009	EPA 6020
	Copper	ND	0.00035	0.001	NE	U		096653-009	EPA 6020
	Iron	ND	0.033	0.100	NE	U		096653-009	EPA 6020
	Lead	ND	0.0005	0.002	NE	U		096653-009	EPA 6020
	Magnesium	17.5	0.010	0.030	NE			096653-009	EPA 6020
	Manganese	ND	0.001	0.005	NE	U		096653-009	EPA 6020
	Mercury	ND	0.000067	0.0002	0.002	U		096653-009	EPA 7470
	Nickel	ND	0.0005	0.002	NE	U		096653-009	EPA 6020
	Potassium	1.84	0.080	0.300	NE			096653-009	EPA 6020
	Selenium	0.00278	0.0015	0.005	0.050	J		096653-009	EPA 6020
	Silver	ND	0.0002	0.001	NE	U		096653-009	EPA 6020
	Sodium	25.0	0.080	0.250	NE			096653-009	EPA 6020
	Thallium	ND	0.00045	0.002	0.002	U		096653-009	EPA 6020
	Uranium	0.00945	0.000067	0.0002	0.03			096653-009	EPA 6020
	Vanadium	ND	0.001	0.005	NE	U		096653-009	EPA 6010
	Zinc	ND	0.0035	0.010	NE	U		096653-009	EPA 6020

Table III-11 (Continued)

Summary of Unfiltered Total Metal Results

SWMU 68 Groundwater Monitoring

Quarterly Assessment, October – December 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	ND	0.015	0.050	NE	U		096658-009	EPA 6020
07-Oct-14	Antimony	ND	0.001	0.003	0.006	U		096658-009	EPA 6020
	Arsenic	ND	0.0017	0.005	0.010	U		096658-009	EPA 6020
	Barium	0.0206	0.0006	0.002	2.00			096658-009	EPA 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		096658-009	EPA 6020
	Cadmium	ND	0.00011	0.001	0.005	U		096658-009	EPA 6020
	Calcium	81.6	0.300	1.00	NE			096658-009	EPA 6020
	Chromium	ND	0.002	0.010	0.100	U		096658-009	EPA 6020
	Cobalt	ND	0.0001	0.001	NE	U		096658-009	EPA 6020
	Copper	ND	0.00035	0.001	NE	U		096658-009	EPA 6020
	Iron	ND	0.033	0.100	NE	U		096658-009	EPA 6020
	Lead	ND	0.0005	0.002	NE	U		096658-009	EPA 6020
	Magnesium	17.8	0.010	0.030	NE			096658-009	EPA 6020
	Manganese	ND	0.001	0.005	NE	U		096658-009	EPA 6020
	Mercury	ND	0.000067	0.0002	0.002	U		096658-009	EPA 7470
	Nickel	ND	0.0005	0.002	NE	U		096658-009	EPA 6020
	Potassium	1.84	0.080	0.300	NE			096658-009	EPA 6020
	Selenium	0.00327	0.0015	0.005	0.050	J		096658-009	EPA 6020
	Silver	ND	0.0002	0.001	NE	U		096658-009	EPA 6020
	Sodium	25.2	0.080	0.250	NE			096658-009	EPA 6020
	Thallium	ND	0.00045	0.002	0.002	U		096658-009	EPA 6020
	Uranium	0.0128	0.000067	0.0002	0.03			096658-009	EPA 6020
	Vanadium	ND	0.001	0.005	NE	U		096658-009	EPA 6010
	Zinc	ND	0.0035	0.010	NE	U		096658-009	EPA 6020

Table III-11 (Continued)

Summary of Unfiltered Total Metal Results

SWMU 68 Groundwater Monitoring

Quarterly Assessment, October – December 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 (Duplicate) 07-Oct-14	Aluminum	ND	0.015	0.050	NE	U		096659-009	EPA 6020
	Antimony	ND	0.001	0.003	0.006	U		096659-009	EPA 6020
	Arsenic	ND	0.0017	0.005	0.010	U		096659-009	EPA 6020
	Barium	0.0205	0.0006	0.002	2.00			096659-009	EPA 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		096659-009	EPA 6020
	Cadmium	ND	0.00011	0.001	0.005	U		096659-009	EPA 6020
	Calcium	81.0	0.300	1.00	NE			096659-009	EPA 6020
	Chromium	ND	0.002	0.010	0.100	U		096659-009	EPA 6020
	Cobalt	ND	0.0001	0.001	NE	U		096659-009	EPA 6020
	Copper	ND	0.00035	0.001	NE	U		096659-009	EPA 6020
	Iron	ND	0.033	0.100	NE	U		096659-009	EPA 6020
	Lead	ND	0.0005	0.002	NE	U		096659-009	EPA 6020
	Magnesium	17.3	0.010	0.030	NE			096659-009	EPA 6020
	Manganese	ND	0.001	0.005	NE	U		096659-009	EPA 6020
	Mercury	ND	0.000067	0.0002	0.002	U		096659-009	EPA 7470
	Nickel	ND	0.0005	0.002	NE	U		096659-009	EPA 6020
	Potassium	1.72	0.080	0.300	NE			096659-009	EPA 6020
	Selenium	0.00289	0.0015	0.005	0.050	J		096659-009	EPA 6020
	Silver	ND	0.0002	0.001	NE	U		096659-009	EPA 6020
	Sodium	24.7	0.080	0.250	NE			096659-009	EPA 6020
	Thallium	ND	0.00045	0.002	0.002	U		096659-009	EPA 6020
	Uranium	0.0128	0.000067	0.0002	0.03			096659-009	EPA 6020
	Vanadium	0.00108	0.001	0.005	NE	J		096659-009	EPA 6010
	Zinc	ND	0.0035	0.010	NE	U		096659-009	EPA 6020

Table III-11 (Continued)

Summary of Unfiltered Total Metal Results

SWMU 68 Groundwater Monitoring

Quarterly Assessment, October – December 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		096661-009	EPA 6020
08-Oct-14	Antimony	ND	0.001	0.003	0.006	U		096661-009	EPA 6020
	Arsenic	ND	0.0017	0.005	0.010	U		096661-009	EPA 6020
	Barium	0.0268	0.0006	0.002	2.00			096661-009	EPA 6020
	Beryllium	ND	0.0002	0.0005	0.004	U		096661-009	EPA 6020
	Cadmium	ND	0.00011	0.001	0.005	U		096661-009	EPA 6020
	Calcium	81.5	0.300	1.00	NE			096661-009	EPA 6020
	Chromium	ND	0.002	0.010	0.100	U		096661-009	EPA 6020
	Cobalt	ND	0.0001	0.001	NE	U		096661-009	EPA 6020
	Copper	ND	0.00035	0.001	NE	U		096661-009	EPA 6020
	Iron	ND	0.033	0.100	NE	U		096661-009	EPA 6020
	Lead	ND	0.0005	0.002	NE	U		096661-009	EPA 6020
	Magnesium	18.2	0.010	0.030	NE			096661-009	EPA 6020
	Manganese	ND	0.001	0.005	NE	U		096661-009	EPA 6020
	Mercury	ND	0.000067	0.0002	0.002	U		096661-009	EPA 7470
	Nickel	ND	0.0005	0.002	NE	U		096661-009	EPA 6020
	Potassium	1.88	0.080	0.300	NE			096661-009	EPA 6020
	Selenium	0.00363	0.0015	0.005	0.050	J		096661-009	EPA 6020
	Silver	ND	0.0002	0.001	NE	U		096661-009	EPA 6020
	Sodium	25.9	0.080	0.250	NE			096661-009	EPA 6020
	Thallium	ND	0.00045	0.002	0.002	U		096661-009	EPA 6020
	Uranium	0.0122	0.000067	0.0002	0.03			096661-009	EPA 6020
	Vanadium	0.00124	0.001	0.005	NE	J		096661-009	EPA 6010
	Zinc	ND	0.0035	0.010	NE	U		096661-009	EPA 6020

Table III-11 (Concluded)

Summary of Unfiltered Total Metal Results

SWMU 68 Groundwater Monitoring

Quarterly Assessment, October – December 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 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.

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 III-12

Summary of Filtered Cation Results

SWMUs 8/58 and 68 Groundwater Monitoring

Quarterly Assessment, October – December 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 13-Oct-14	Calcium	54.1	0.300	1.00	NE			096685-017	EPA 6020
	Magnesium	10.7	0.010	0.030	NE			096685-017	EPA 6020
	Potassium	4.41	0.080	0.300	NE			096685-017	EPA 6020
	Sodium	69.9	0.400	1.25	NE			096685-017	EPA 6020
CCBA-MW2 14-Oct-14	Calcium	83.2	0.300	1.00	NE			096691-017	EPA 6020
	Magnesium	15.5	0.010	0.030	NE			096691-017	EPA 6020
	Potassium	1.30	0.080	0.300	NE			096691-017	EPA 6020
	Sodium	53.2	0.400	1.25	NE			096691-017	EPA 6020
CCBA-MW2 (Duplicate) 14-Oct-14	Calcium	81.1	0.300	1.00	NE			096692-017	EPA 6020
	Magnesium	15.5	0.010	0.030	NE			096692-017	EPA 6020
	Potassium	1.30	0.080	0.300	NE			096692-017	EPA 6020
	Sodium	52.0	0.400	1.25	NE			096692-017	EPA 6020
SWMU 68									
OBS-MW1 06-Oct-14	Calcium	80.3	0.300	1.00	NE			096653-017	EPA 6020
	Magnesium	17.0	0.010	0.030	NE			096653-017	EPA 6020
	Potassium	1.74	0.080	0.300	NE			096653-017	EPA 6020
	Sodium	23.5	0.080	0.250	NE			096653-017	EPA 6020
OBS-MW2 07-Oct-14	Calcium	78.3	0.300	1.00	NE			096658-017	EPA 6020
	Magnesium	16.9	0.010	0.030	NE			096658-017	EPA 6020
	Potassium	1.72	0.080	0.300	NE			096658-017	EPA 6020
	Sodium	23.7	0.080	0.250	NE			096658-017	EPA 6020
OBS-MW2 (Duplicate) 07-Oct-14	Calcium	81.6	0.300	1.00	NE			096659-017	EPA 6020
	Magnesium	17.3	0.010	0.030	NE			096659-017	EPA 6020
	Potassium	1.76	0.080	0.300	NE			096659-017	EPA 6020
	Sodium	24.0	0.080	0.250	NE			096659-017	EPA 6020
OBS-MW3 08-Oct-14	Calcium	79.0	0.300	1.00	NE			096661-017	EPA 6020
	Magnesium	17.0	0.010	0.030	NE			096661-017	EPA 6020
	Potassium	1.70	0.080	0.300	NE			096661-017	EPA 6020
	Sodium	24.4	0.080	0.250	NE			096661-017	EPA 6020

Table III-12 (Concluded)

Summary of Filtered Cation Results

SWMUs 8/58 and 68 Groundwater Monitoring

Quarterly Assessment, October – December 2014

Notes

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

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

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

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

Table III-13

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

SWMUs 8/58 and 68 Groundwater Monitoring

Quarterly Assessment, October – December 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 13-Oct-14	Americium-241	7.63 ± 11.7	17.6	8.62	NE	U	BD	096685-033	EPA 901.1
	Cesium-137	0.457 ± 2.06	3.54	1.70	NE	U	BD	096685-033	EPA 901.1
	Cobalt-60	1.33 ± 2.06	3.64	1.72	NE	U	BD	096685-033	EPA 901.1
	Potassium-40	-11.5 ± 36.2	46.2	22.1	NE	U	BD	096685-033	EPA 901.1
	Gross Alpha	1.62	NA	NA	15 pCi/L	NA	None	096685-034	EPA 900.0
	Gross Beta	4.88 ± 1.38	1.70	0.825	4mrem/yr		J	096685-034	EPA 900.0
CCBA-MW2 14-Oct-14	Americium-241	0.919 ± 25.1	29.1	14.2	NE	U	BD	096691-033	EPA 901.1
	Cesium-137	0.105 ± 2.17	3.90	1.86	NE	U	BD	096691-033	EPA 901.1
	Cobalt-60	1.51 ± 2.28	4.20	1.96	NE	U	BD	096691-033	EPA 901.1
	Potassium-40	-3.67 ± 47.9	52.9	25.0	NE	U	BD	096691-033	EPA 901.1
	Gross Alpha	5.39	NA	NA	15 pCi/L	NA	None	096691-034	EPA 900.0
	Gross Beta	2.76 ± 1.04	1.44	0.694	4mrem/yr		J	096691-034	EPA 900.0
CCBA-MW2 (Duplicate) 14-Oct-14	Americium-241	4.06 ± 5.66	7.89	3.88	NE	U	BD	096692-033	EPA 901.1
	Cesium-137	-2.89 ± 3.47	5.28	2.53	NE	U	BD	096692-033	EPA 901.1
	Cobalt-60	-3.78 ± 5.01	6.16	2.90	NE	U	BD	096692-033	EPA 901.1
	Potassium-40	-8.69 ± 55.1	68.6	32.5	NE	U	BD	096692-033	EPA 901.1
	Gross Alpha	6.61	NA	NA	15 pCi/L	NA	None	096692-034	EPA 900.0
	Gross Beta	1.22 ± 0.997	1.62	0.783	4mrem/yr	U	BD	096692-034	EPA 900.0

Table III-13 (Continued)

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

SWMUs 8/58 and 68 Groundwater Monitoring

Quarterly Assessment, October – December 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 06-Oct-14	Americium-241	-2.95 ± 7.02	11.8	5.75	NE	U	BD	096653-033	EPA 901.1
	Cesium-137	-0.302 ± 3.41	3.41	1.64	NE	U	BD	096653-033	EPA 901.1
	Cobalt-60	-0.133 ± 1.82	3.17	1.48	NE	U	BD	096653-033	EPA 901.1
	Potassium-40	41.4 ± 39.0	30.4	14.2	NE		J	096653-033	EPA 901.1
	Gross Alpha	7.13	NA	NA	15 pCi/L	NA	None	096653-034	EPA 900.0
	Gross Beta	5.79 ± 1.47	1.64	0.795	4 mrem/yr		J	096653-034	EPA 900.0
	Uranium-233/234	16.3 ± 2.12	0.104	0.0465	NE			096653-035	HASL-300
	Uranium-235/236	0.220 ± 0.0754	0.0729	0.0295	NE			096653-035	HASL-300
	Uranium-238	2.75 ± 0.406	0.0555	0.0221	NE			096653-035	HASL-300
OBS-MW2 07-Oct-14	Americium-241	-10.8 ± 17.6	29.4	14.3	NE	U	BD	096658-033	EPA 901.1
	Cesium-137	-0.468 ± 2.27	3.93	1.87	NE	U	BD	096658-033	EPA 901.1
	Cobalt-60	2.21 ± 3.01	4.84	2.27	NE	U	BD	096658-033	EPA 901.1
	Potassium-40	9.73 ± 54.6	42.9	20.0	NE	U	BD	096658-033	EPA 901.1
	Gross Alpha	-0.81	NA	NA	15 pCi/L	NA	None	096658-034	EPA 900.0
	Gross Beta	6.76 ± 1.50	1.38	0.669	4 mrem/yr		J	096658-034	EPA 900.0
	Uranium-233/234	21.7 ± 2.77	0.0836	0.0373	NE			096658-035	HASL-300
	Uranium-235/236	0.345 ± 0.0863	0.0585	0.0237	NE			096658-035	HASL-300
	Uranium-238	4.27 ± 0.585	0.0445	0.0178	NE			096658-035	HASL-300
OBS-MW2 (Duplicate) 07-Oct-14	Americium-241	-0.956 ± 6.74	10.4	5.10	NE	U	BD	096659-033	EPA 901.1
	Cesium-137	1.59 ± 2.14	3.63	1.75	NE	U	BD	096659-033	EPA 901.1
	Cobalt-60	-0.696 ± 2.88	3.62	1.71	NE	U	BD	096659-033	EPA 901.1
	Potassium-40	-35.6 ± 38.2	46.5	22.2	NE	U	BD	096659-033	EPA 901.1
	Gross Alpha	2.41	NA	NA	15 pCi/L	NA	None	096659-034	EPA 900.0
	Gross Beta	7.12 ± 1.70	1.81	0.880	4 mrem/yr		J	096659-034	EPA 900.0
	Uranium-233/234	22.4 ± 2.88	0.0877	0.0391	NE			096659-035	HASL-300
	Uranium-235/236	0.693 ± 0.139	0.0614	0.0249	NE			096659-035	HASL-300
	Uranium-238	4.60 ± 0.631	0.0467	0.0186	NE			096659-035	HASL-300

Table III-13 (Continued)

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

SWMUs 8/58 and 68 Groundwater Monitoring

Quarterly Assessment, October – December 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 (Continued)									
OBS-MW3	Americium-241	3.56 ± 5.80	9.83	4.81	NE	U	BD	096661-033	EPA 901.1
08-Oct-14	Cesium-137	-0.854 ± 1.92	3.24	1.56	NE	U	BD	096661-033	EPA 901.1
	Cobalt-60	-0.454 ± 1.90	3.32	1.56	NE	U	BD	096661-033	EPA 901.1
	Potassium-40	40.8 ± 44.8	33.6	15.8	NE	X	R	096661-033	EPA 901.1
	Gross Alpha	4.59	NA	NA	15 pCi/L	NA	None	096661-034	EPA 900.0
	Gross Beta	7.31 ± 1.61	1.44	0.698	4 mrem/yr		J	096661-034	EPA 900.0
	Uranium-233/234	21.6 ± 2.78	0.0863	0.0385	NE			096661-035	HASL-300
	Uranium-235/236	0.330 ± 0.0859	0.0604	0.0245	NE			096661-035	HASL-300
	Uranium-238	4.18 ± 0.577	0.046	0.0183	NE			096661-035	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 MDL.
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 and reanalysis are necessary for verification.
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-13 (Concluded)

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

SWMUs 8/58 and 68 Groundwater Monitoring

Quarterly Assessment, October – December 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 III-14

Summary of Constituents Detected above Established MCLs

SWMUs 8/58 and 68 Groundwater Monitoring

Quarterly Assessments through December 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
CCBA-MW1	13-Oct-14	Fluoride	**4.81** mg/L	4.0 mg/L			096685-016	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 III-14 (Concluded)

Summary of Constituents Detected above Established MCLs

SWMUs 8/58 and 68 Groundwater Monitoring

Quarterly Assessments through December 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 III-15

Summary of Duplicate Samples

SWMUs 8/58 and 68 Groundwater Monitoring

Quarterly Assessment, October – December 2014

Well/Parameter	Environmental Sample (R1)	Duplicate Sample (R2)	RPD[a]
	mg/L unless otherwise noted		
CCBA-MW2			
Nitrate plus Nitrite	3.32	3.47	4
Bicarbonate Alkalinity	175	179	2
Bromide	0.558	0.553	1
Chloride	38.2	37.9	1
Fluoride	1.50	1.50	< 1
Sulfate	93.8	94.1	< 1
Barium	0.0464	0.0458	1
Calcium	84.1	82.1	2
Iron	0.0812	0.0814	< 1
Magnesium	15.6	15.5	1
Nickel	0.00086	0.00087	1
Potassium	1.33	1.31	2
Selenium	0.00418	0.00385	8
Sodium	52.3	50.7	3
Uranium	0.00585	0.00611	4
Vanadium	0.00999	0.0107	7
Filtered Calcium	83.2	81.1	3
Filtered Magnesium	15.5	15.5	< 1
Filtered Potassium	1.30	1.30	< 1
Filtered Sodium	53.2	52.0	2
OBS-MW2			
Nitrate plus Nitrite	1.55	1.56	1
Bicarbonate Alkalinity	183	183	< 1
Bromide	0.343	0.367	7
Chloride	21.9	21.9	< 1
Fluoride	2.13	2.15	1
Sulfate	81.5	81.3	< 1
Barium	0.0206	0.0205	< 1
Calcium	81.6	81.0	1
Magnesium	17.8	17.3	3
Potassium	1.84	1.72	7
Selenium	0.00327	0.00289	12
Sodium	25.2	24.7	2
Uranium	0.0128	0.0128	< 1

Table III-15 (Concluded)
Summary of Duplicate Samples
SWMUs 8/58 and 68 Groundwater Monitoring
Quarterly Assessment, October – December 2014

Well/Parameter	Environmental Sample (R1)	Duplicate Sample (R2)	RPD[a]
	mg/L unless otherwise noted		
OBS-MW1 (Continued)			
Filtered Calcium	78.3	81.6	4
Filtered Magnesium	16.9	17.3	2
Filtered Potassium	1.72	1.76	2
Filtered Sodium	23.7	24.0	1

Notes

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

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

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

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

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: 10/13/14
Well Condition:	Weather Condition:
Method: Portable pump X	Dedicated pump _____ Pump depth: 79'

PURGE MEASUREMENTS

Depth to Water (ft)	Time 24 hr	Vol. (L/gal)	Temp (°C)	SC (µS/cm)	ORP (mV)	pH	Turbidity (NTU)	DO (%)	Comments DO mg/L
48.12	0824	/							
49.62	0837	5	14.29	515.8	336.3	6.35	1.72	17.4	1.77
49.71	0843	10	14.87	503.6	317.6	6.33	1.32	21.4	2.14
49.83	0850	15	15.26	496.3	309.1	6.40	1.24	30.5	3.04
49.92	0857	20	15.62	496.2	308.2	6.43	0.76	32.9	3.25
49.92	0905	25	15.85	496.8	309.9	6.44	0.47	33.8	3.35
49.89	0912	30	15.95	498.2	308.4	6.43	0.44	33.7	3.32
49.89	0916	32	15.99	478.9	306.8	6.43	0.28	33.8	3.33
49.89	0919	34	16.02	478.4	306.7	6.43	0.30	33.8	3.33
48.89	0923	36	16.10	481.5	305.4	6.42	0.32	33.3	3.28
	0924	—	SAMPLING			—	—	—	—
									~ 4 gal. purge prior to measurement
									0830

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: 10/14/14
Well Condition:	Weather Condition:
Method: Portable pump X	Dedicated pump _____ Pump depth: 117'

PURGE MEASUREMENTS

Depth to Water (ft)	Time 24 hr	Vol. (L/gal)	Temp (°C)	SC (µS/cm)	ORP (mV)	pH	Turbidity (NTU)	DO (%)	DO mg/L Comments
71.93	0808		START						
72.42	0825	5	16.02	547.7	356.7	7.16	0.48	59.4	5.85
72.44	0834	10	16.03	547.7	348.5	7.30	0.43	58.9	5.80
72.46	0843	15	15.97	547.5	342.5	7.34	0.28	60.3	5.95
72.46	0852	20	16.06	549.5	338.7	7.35	0.27	61.9	6.09
72.47	0901	25	16.28	555.1	329.1	7.36	0.26	63.1	6.18
72.46	0910	30	16.45	557.8	315.5	7.37	0.14	63.4	6.18
72.46	0914	32	16.47	558.0	308.0	7.38	0.13	63.6	6.21
72.46	0918	34	16.51	558.9	301.3	7.38	0.18	63.7	6.21
72.46	0922	36	16.52	559.0	297.4	7.38	0.16	63.6	6.20
	0923		SAMPLING						
									~4.00 gals purged from tubing 0816

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

GROUNDWATER 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~~ W. Gibson	Date: 10-13-14

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: 0809	4.00	21.1	6.98	21.3	9.97	21.3
2. Time: 1124	4.00	21.7	6.97	21.7	9.97	21.7
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 | Expiration Date: 5/15

	Value	Temp
1. Time: 0807	1224	21.1
2. Time: 1121	1224	21.7
3. Time:		
4. Time:		

ORP Calibration

Reference Value: 220 mV | Standard Lot No 4AE189 | Expiration Date: 2/15

	Value	Temp
1. Time: 0805	219.7	21.1
2. Time 1119	219.7	21.7
3. Time:		
4. Time:		

DO Calibration

Calibration Value:	81% air saturation @ 5200 ft	Atmospheric Pressure in Hg
1. Time 0803	81.4	24.33
2. Time 1115	82.0	24.52
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~~ W. Gibson	Date: 10-13-14

TURBIDIMETER				
Make & Model: HACH 2100P HACH 2100Q		Serial No. S/N 10060C003010		
Reference Value	WP x10	20	100	800
Standard Lot No.	A4164	A4211	A4195	A4193
1. Time 0812	9.74	19.1	101	800
2. Time 1110	9.79	19.3	101	797
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: 10/14/14

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: 0639	4.01	17.8	6.99	17.8	9.99	17.8
2. Time: 1032	4.00	17.9	6.99	17.8	10.00	17.9
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: 0638	1220	17.8	
2. Time: 1031	1221	17.9	
3. Time:			
4. Time:			

ORP Calibration

Reference Value: 220 mV | Standard Lot No: 4AE189

	Value	Temp	Expiration Date: 2/15
1. Time: 0641	219.9	17.8	
2. Time: 1034	220.2	17.9	
3. Time:			
4. Time:			

DO Calibration

Calibration Value:	81% air saturation @ 5200 ft	Atmospheric Pressure in Hg
1. Time: 0637	81.8	24.37
2. Time: 1030	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 8-58		Project No.: 146422.10.11.01		
Calibration done by: R Lynch		Date: 10/14/14		
TURBIDIMETER				
Make & Model: HACH 2100P HACH 2100Q		Serial No. S/N 10060C003010		
Reference Value	.1	20	100	800
Standard Lot No.	A4164	A4211	A4195	A4193
1. Time 0803	.09	20.1	101	796
2. Time 0947	.12	20.3	99.7	798
3. Time				
4. Time				

Comments:

Portable Pump and Tubing / Water Level Indicator
Decontamination Log Form

Project Name: SWMU 8/58	**Monitoring Well ID # :** CCBA-MW1	**Date:** 10/13/14

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

Pump and Tubing Bundle ID #: 1806-587	**Water Level Indicator ID #:** 210269
Personnel Performing Decontamination: Alfred Santillanes — Print Name: — Initial: AS William Gibson — Print Name: — Initial: WJG	**Personnel Performing Decontamination:** Alfred Santillanes — Print Name: — Initial: AS William Gibson — Print Name: — Initial: WJG

Condition of Equipment

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

List of Decontamination Materials

Distilled or **Deonized** (circle one)	**HNO_3**
Source: Culligan	**Grade:** Reagent
Lot Number: 91714	**UN #:** ~~2021~~ 2031 WJG
	Manufacturer: ~~Fisher Scientific~~ ARCO WJG
	Lot Number: A0316863

Portable Pump and Tubing / Water Level Indicator
Decontamination Log Form

Project Name: SWMU 8/58	**Monitoring Well ID # :** CCBA-MW2	**Date:** 10-14-14

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: 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: 09-17-14	**UN #:** 2031
	Manufacturer: ARCO
	Lot Number: A0316863

Groundwater Monitoring Waste Generation Log

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

Project Name	SWMU 8/58	SWMU 8/58	SWMU 8/58
Container ID # (site-date-sequence)	CCBA-MW1-101314-01	CCBA-MW1-101314-02	CCBA-101314
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	19 gallons	21 gallons	30 gallons
Total Container Weight	170 lbs	190 lbs	250 lbs
COC#: Sample#-Fraction	615822 096685 ~~096686~~ TJ 10-29-14	615822 096685 ~~096686~~ TJ 10-29-14	615822 096685 ~~096686~~ TJ 10-29-14
Accumulation Date	Start: 10/13/14 Full: 10/13/14	Start: 10/13/14 Full: 10/13/14	Start: 10/13/14 Full: 10/13/14
Date Waste Moved to Accumulation Area	10/13/14	10/13/14	10/13/14
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)	CCBA-MW2-101414-01	CCBA-MW2-101414-02	CCBA-101414
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# 615824 Sample # 096691, 096692	CoC# 615824 Sample # 096691, 096692	CoC# 615824 Sample # 096691, 096692
Accumulation Date	Start: 10-14-14 Full: 10-14-14	Start: 10-14-14 Full: 10-14-14	Start: 10-14-14 Full: 10-14-14
Date Waste Moved to Accumulation Area	10-14-14	10-14-14	10-14-14
Accumulation Area Name	9925	9925	9925
Comments:			

TAILGATE SAFETY MEETING FORM

Dept: 4142 Well Location: CCBA - MW1 Date: 10-13-14 Time: 0759

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: 48 °F Wind Speed: 0 MPH Humidity: 63 % Wind Chill N/A °F

Chemicals Used: Acids in sample containers, standard solutions, ~~Hach ACCU-VAC ampules~~ WJG 10-13-14
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
William Gibson	William Gibson
ALFRED SANTILLANES	Alfred Santillanes

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

TAILGATE SAFETY MEETING FORM

Dept: 4142 Well Location: CCBA-MW 2 Date: 10/14/14 Time: 0800

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: 61.8 °F Wind Speed: 0 MPH Humidity: 34.3 % Wind Chill NA °F

Chemicals Used: Acids in sample containers, standard solutions, ~~Hach ACCU-VAC ampules~~ T 10-24-14
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	Robert Lynch
William Gibson	William Gibson
ALFRED SANTILLANES	Alfred Santillanes

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

FIELD MEASUREMENT LOG FOR GROUNDWATER SAMPLE COLLECTION

Project Name: SWMU 68	Project No.: 146422.10.11.01
Well I.D.: OBS-MW1	Date: 10/06/14
Well Condition:	Weather Condition:
Method: Portable pump X	Dedicated pump _____ Pump depth: 153'

PURGE MEASUREMENTS

Depth to Water (ft)	Time 24 hr	Vol. (L (ga))	Temp (°C)	SC (µS/cm)	ORP (mV)	pH	Turbidity (NTU)	DO (%)	DO mg/L Comments
72.31	0802		START						
72.39	0819	5	16.14	490.3	321.8	7.03	1.34	38.7	3.81
72.37	0827	10	16.64	496.0	314.4	7.19	1.12	38.3	3.73
72.37	0834	15	16.92	500.4	311.1	7.23	0.51	38.2	3.69
72.37	0845	20	17.27	504.7	309.4	7.25	0.30	38.4	3.68
72.37	0853	24	17.55	508.1	305.4	7.26	0.24	38.4	3.66
72.37	0858	26	17.68	509.4	304.6	7.26	0.20	38.5	3.66
72.37	0903	28	17.79	511.0	302.8	7.27	0.24	38.6	3.66
72.37	0907	30	17.89	512.1	299.1	7.27	0.21	38.6	3.66
72.37	0911	32	17.88	511.3	299.2	7.27	0.26	38.7	3.66
72.36	0916	34	17.90	511.4	298.9	7.27	0.20	38.7	3.65
72.36	0920	36	17.89	511.0	298.8	7.27	0.22	38.8	3.66
	0921		SAMPLING						
									24.00 gals purged from tubing
									0810

FIELD MEASUREMENT LOG FOR GROUNDWATER SAMPLE COLLECTION

Project Name: SWMU 68	Project No.: 146422.10.11.01
Well I.D.: OBS-MW 2	Date: 10/07/14
Well Condition:	Weather Condition:
Method: Portable pump X	Dedicated pump _____ Pump depth: 252'

PURGE MEASUREMENTS

Depth to Water (ft)	Time 24 hr	Vol. (L/gal)	Temp (°C)	SC (µS/cm)	ORP (mV)	pH	Turbidity (NTU)	DO (%)	DO mg/L Comments
174.77	0803	✓	START						→
175.81	0823	5	17.37	500.1	354.4	7.03	0.32	38.0	3.64
175.82	0832	10	17.53	502.3	345.6	7.12	0.22	37.1	3.54
175.88	0841	15	17.80	501.4	338.4	7.18	0.19	36.9	3.50
175.87	0850	20	18.08	508.7	331.1	7.20	0.25	37.0	3.51
175.84	0859	25	18.31	509.4	318.2	7.21	0.20	36.8	3.46
175.82	0908	30	18.46	513.5	306.1	7.22	0.19	36.9	3.46
175.81	0912	32	18.62	515.6	301.7	7.22	0.21	37.2	3.47
175.80	0916	34	18.68	516.2	308.1	7.22	0.19	37.3	3.48
175.78	0920	36	18.70	517.1	301.1	7.22	0.23	37.3	3.47
	0921	✓	Sampling						→
									~4.00 gals purged from tubing
									0813

FIELD MEASUREMENT LOG FOR GROUNDWATER SAMPLE COLLECTION

Project Name: SWMU 68	Project No.: 146422.10.11.01
Well I.D.: OBS-MW 3	Date: 10/08/14
Well Condition:	Weather Condition:
Method: Portable pump X	Dedicated pump _____ Pump depth: 208'

PURGE MEASUREMENTS

Depth to Water (ft)	Time 24 hr	Vol. (L/gal)	Temp (°C)	SC (µS/cm)	ORP (mV)	pH	Turbidity (NTU)	DO (%)	DO mg/L Comments
69.53	0803		START						
73.59	0817	5	17.39	501.9	359.5	7.13	0.48	47.7	4.56
75.50	0827	10	17.37	501.8	346.2	7.18	0.51	46.8	4.48
76.59	0836	15	17.36	501.7	339.3	7.21	0.34	46.7	4.47
77.18	0845	20	17.39	502.2	289.2	7.21	0.55	46.8	4.48
77.48	0855	25	17.41	502.4	272.0	7.21	0.29	46.5	4.45
77.62	0905	30	17.42	502.4	263.1	7.21	0.25	46.7	4.46
77.68	0908	32	17.43	502.7	259.3	7.21	0.21	46.7	4.46
77.70	0912	34	17.44	502.6	256.0	7.21	0.16	46.7	4.46
77.70	0916	36	17.46	503.1	254.0	7.21	0.18	46.9	4.48
	0917		SAMPLING						
									~4.00 gals purged
									from tubing
									0808

GROUNDWATER SAMPLE COLLECTION FIELD EQUIPMENT CHECK LOG

SNL/NM Project Name: SWMU 68	SNL/NM Project No.: 146422.10.11.01
Calibrations done by: R Lynch	Date: 10/6/14

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: 0642	4.01	20.2	7.00	20.2	10.00	20.2
2. Time: 1053	4.02	20.3	7.00	20.2	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: 0641	1226	20.2	
2. Time: 1052	1228	20.3	
3. Time:			
4. Time:			

ORP Calibration

Reference Value: 220 mV Standard Lot No. 4AE189

	Value	Temp	Expiration Date: 2/15
1. Time: 0644	220.1	20.2	
2. Time: 1054	220.2	20.2	
3. Time:			
4. Time:			

DO Calibration

Calibration Value:	81% air saturation @ 5200 ft	Atmospheric Pressure in Hg
1. Time: 0640	82.0	24.68
2. Time: 1050	82.1	24.71
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: 10/6/14		
TURBIDIMETER				
Make & Model: HACH 2100P HACH 2100Q		Serial No. S/N 10060C003010		
Reference Value	.1	20	100	800
Standard Lot No.	A4164	A4211	A4195	A4193
1. Time 0800	.12	20.1	103	798
2. Time 0942	.11	20.3	99.8	796
3. Time				
4. Time				

Comments:

GROUNDWATER SAMPLE COLLECTION FIELD EQUIPMENT CHECK LOG

SNL/NM Project Name: SWMU 68	SNL/NM Project No.: 146422.10.11.01
Calibrations done by: R Lynch	Date: 10/7/14

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: 0647	4.00	19.9	7.00	19.8	9.99	19.9
2. Time: 1113	4.01	20.1	7.01	20.1	10.00	20.1
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: 0645	1222	19.8	
2. Time: 1111	1224	19.9	
3. Time:			
4. Time:			

ORP Calibration

Reference Value: 220 mV			Standard Lot No. 4AE189
	Value	Temp	Expiration Date: 2/15
1. Time: 0648	220.1	19.8	
2. Time: 1114	220.3	20.1	
3. Time:			
4. Time:			

DO Calibration

Calibration Value:	81% air saturation @ 5200 ft.	Atmospheric Pressure in Hg
1. Time: 0644	81.9	24.64
2. Time: 1110	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 68		Project No.: 146422.10.11.01		
Calibration done by: R Lynch		Date: 10/7/14		
TURBIDIMETER				
Make & Model: HACH 2100P HACH 2100Q		Serial No. S/N 10060C003010		
Reference Value	.1	20	100	800
Standard Lot No.	A4164	A4211	A4195	A4193
1. Time 0757	.12	20.2	103	797
2. Time 0949	.11	20.3	101	801
3. Time				
4. Time				

Comments:

GROUNDWATER SAMPLE COLLECTION FIELD EQUIPMENT CHECK LOG

SNL/NM Project Name: SWMU 68	SNL/NM Project No.: 146422.10.11.01
Calibrations done by: R Lynch	Date: 10/8/14

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	19.6	6.99	19.6	10.00	19.6
2. Time: 1039	4.01	19.7	7.00	19.7	10.01	19.7
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: 0643	1222	19.6	
2. Time: 1038	1224	19.8	
3. Time:			
4. Time:			

ORP Calibration

Reference Value: 220 mV | Standard Lot No 4AE189

	Value	Temp	Expiration Date: 2/15
1. Time: 0646	219.9	19.6	
2. Time: 1040	220.1	19.8	
3. Time:			
4. Time:			

DO Calibration

Calibration Value:	81% air saturation @ 5200 ft.	Atmospheric Pressure in Hg
1. Time: 0642	86.1	24.28
2. Time: 1037	86.3	24.29
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: 10/8/14		
TURBIDIMETER				
Make & Model: HACH 2100P HACH 2100Q		Serial No. S/N 10060C003010		
Reference Value	.1	20	100	800
Standard Lot No.	A4164	A4211	A4195	A4193
1. Time 0758	.09	19.8	103	801
2. Time 0933	.11	20.2	105	799
3. Time				
4. Time				

Comments:

Portable Pump and Tubing / Water Level Indicator
Decontamination Log Form

Project Name: SWMU 68	**Monitoring Well ID # :** OBS-MW1	**Date:** 10-06-14

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: Alfred Santillanes — Print Name: — Initial: Robert Lynch — Print Name: — Initial: RL	**Personnel Performing Decontamination:** Alfred Santillanes — Print Name: — Initial: 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: 09-17-14	**UN #:** 2031
	Manufacturer: AROC
	Lot Number: A0316368

Portable Pump and Tubing / Water Level Indicator
Decontamination Log Form

Project Name: SWMU-68	**Monitoring Well ID # :** OBS-MW2	**Date:** 10-07-14

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: 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: 09-17-14	**UN #:** 2031
	Manufacturer: AROC
	Lot Number: A0316863

Portable Pump and Tubing / Water Level Indicator
Decontamination Log Form

Project Name: SWMU 68 GWM	**Monitoring Well ID # :** OBS-MW3	**Date:** 10/8/14

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

Pump and Tubing Bundle ID #: 1807-797	**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: 92614	**UN #:** 2021
	Manufacturer: Fisher Scientific
	Lot Number: A0316863

Groundwater Monitoring Waste Generation Log

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

Project Name	SWMU 68 GWM	SWMU 68 GWM	SWMU 68 GWM
Container ID # (site-date-sequence)	OBS-MW1-100614-01	OBS-MW1-100614-02	OBS-100614
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 gallons
Volume of Waste	24 gallons	16 gallons	30 gallons
Total Container Weight	180 lbs	120 gallons	240 gallons
COC#: Sample#-Fraction	615811 ~~096652~~ TJ 10-29-14 096653 ~~096654~~ TJ 10-29-14	615811 ~~096652~~ TJ 10-29-14 096653 ~~096654~~ TJ 10-29-14	
Accumulation Date	Start: 10/06/14 Full: 10/06/14	Start: 10/06/14 Full: 10/06/14	Start: 10/06/14 Full: 10/06/14
Date Waste Moved to Accumulation Area	10/06/14	10/06/14	10/06/14
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)	OBS-MW2-100714-01	OBS-MW2-100714-02	OBS-100714
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 # 615813 Sample # 096658, 096659	CoC # 615813 Sample # 096658, 096659	CoC # 615813 Sample # 096658, 096659
Accumulation Date	Start: 10-07-14 Full: 10-07-14	Start: 10-07-14 Full: 10-07-14	Start: 10-07-14 Full: 10-07-14
Date Waste Moved to Accumulation Area	10-07-14	10-07-14	10-07-14
Accumulation Area Name	9925	9925	9925
Comments:			

Groundwater Monitoring Waste Generation Log

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

Project Name	SWMU 68 GWM	SWMU 68 GWM	SWMU 68 GWM
Container ID # (site-date-sequence)	OBS-MW3-100814-01	OBS-MW3-100814-02	OBS-100814
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	19 gallons	21 gallons	30 gallons
Total Container Weight	170 lbs	190 lbs	250 lbs
COC#: Sample#-Fraction	615814 096661 ~~096662~~ TJ 10-24-14	615814 096661 ~~096662~~ TJ 10-24-14	
Accumulation Date	Start: 10/8/14 Full: 10/8/14	Start: 10/8/14 Full: 10/8/14	Start: 10/8/14 Full: 10/8/14
Date Waste Moved to Accumulation Area	10/8/14	10/8/14	10/8/14
Accumulation Area Name	9925	9925	9925
Comments:			

TAILGATE SAFETY MEETING FORM

Dept: 4142 Well Location: OBS-MW1 Date: 10/6/14 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: 64.7 °F Wind Speed: 0 MPH Humidity: 37.1 % Wind Chill NA °F

Chemicals Used: Acids in sample containers, standard solutions. ~~Hach ACCU-VAC ampules~~ TJ 10-29-14
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 Lynch	
William Gibson	
Alfred Santillanos	

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

TAILGATE SAFETY MEETING FORM

Dept: 4142 Well Location: OBS-MW2 Date: 10/7/14 Time: 0755

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: 61.3 °F Wind Speed: 0 MPH Humidity: 33.3 % Wind Chill NA °F

Chemicals Used: Acids in sample containers, standard solutions, ~~Hach ACCU-VAC ampules~~ TA 10-24-14
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	Robert Lynch
William Gibson	William J Gibson
ALFRED SANTILLANES	Alfred Santillanes

TAILGATE SAFETY MEETING FORM

Dept: 4142 Well Location: DBS-MW3 Date: 10/8/14 Time: 0755

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: 63.6 °F Wind Speed: 0 MPH Humidity: 35.2% Wind Chill NA °F

Chemicals Used: Acids in sample containers, standard solutions, ~~Hach ACCU-VAC ampules~~ TY 10-29-14
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 Lynch	Robert Lynch
ALFRED SANTILLANES	Alfred Santillanes

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

Appendix B
Analytical Laboratory Certificates of Analysis for 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 615822

Project Name:	SWMU 8/58 GWM	Date Samples Shipped:	10/13/14	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:	CF262-15	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	Preserv-ative	Collection Method	Sample Type	Parameter & Method Requested	Lab Sample ID
096685	-001	CCBA-MW1	79	10/13/14 9:24	GW	G	3x40ml	HCL	G	SA	TCL VOC (SW846-8260B)	
096685	-002	CCBA-MW1	79	10/13/14 9:26	GW	AG	4x1 L	None	G	SA	TCL SVOC (SW846-8270C)	
096685	-010	CCBA-MW1	79	10/13/14 9:27	GW	P	500 ml	HNO3	G	SA	TAL Metals+U (SW846-6010/6020/7470)	
096685	-016	CCBA-MW1	79	10/13/14 9:28	GW	P	125 ml	None	G	SA	Anions (SW846-9056)	
096685	-017	CCBA-MW1	79	10/13/14 9:29	FGW	P	500 ml	HNO3	G	SA	Metals-Ca,Mg,K,Na (SW846-6020)	
096685	-018	CCBA-MW1	79	10/13/14 9:30	GW	P	125 ml	H2SO4	G	SA	Nitrate+Nitrite (EPA 353.2)	
096685	-020	CCBA-MW1	79	10/13/14 9:31	GW	P	250 ml	None	G	SA	Perchlorate (EPA 314.0)	
096685	-022	CCBA-MW1	79	10/13/14 9:32	GW	P	500 ml	None	G	SA	Alkalinity (SM2320B)	
096685	-024	CCBA-MW1	79	10/13/14 9:34	GW	AG	4x1 L	None	G	SA	High Explosives (SW846-8321A mod	
096685	-027	CCBA-MW1	79	10/13/14 9:35	GW	P	250 ml	NaOH	G	SA	Total Cyanide (SW846-9012)	

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

Special Instructions/QC Requirements:

EDD ☑ Yes ☐ No

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

Negotiated TAT ☐

Sample Disposal ☐ Return to Client ☑ Disposal by Lab

Return Samples By:

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

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

Conditions on Receipt

Lab Use

Sample Team Members	Name	Signature	Init.	Company/Organization/Phone/Cell
	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 10/13/14	Time 1013	3.Relinquished by	Org.	Date	Time
1. Received by		Org. 4142	Date 10/13/14	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

SMO 2012-ARCOC (4-2012)

CONTRACT LABORATORY
ANALYSIS REQUEST AND CHAIN OF CUSTODY (Continuation)

AOP 95-16

AR/COC 615822

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
096685	-033	CCBA-MW1	79	10/13/14 9:36	GW	P	1 L	HNO3	G	SA	Gamma Spectroscopy (EPA 901.0)	
096685	-034	CCBA-MW1	79	10/13/14 9:38	GW	P	1 L	HNO3	G	SA	Gross Alpha and Beta (EPA 900.0)	
096686	-001	CCBA-TB1	NA	10/13/14 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 615824

Project Name:	SWMU 8/58 GWM	Date Samples Shipped:	10/14/14	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:	CF262-15	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	Preserv-ative	Collection Method	Sample Type	Parameter & Method Requested	Lab Sample ID
096690	-001	CCBA-FB2	NA	10/14/14 9:23	DIW	G	3x40ml	HCL	G	FB	TCL VOC (SW846-8260B)	
096691	-001	CCBA-MW2	117	10/14/14 9:23	GW	G	3x40ml	HCL	G	SA	TCL VOC (SW846-8260B)	
096691	-002	CCBA-MW2	117	10/14/14 9:25	GW	AG	4x1 L	None	G	SA	TCL SVOC (SW846-8270C)	
096691	-010	CCBA-MW2	117	10/14/14 9:29	GW	P	500 ml	HNO3	G	SA	TAL Metals+U (SW846-6010/6020/7470)	
096691	-016	CCBA-MW2	117	10/14/14 9:30	GW	P	125 ml	None	G	SA	Anions (SW846-9056)	
096691	-017	CCBA-MW2	117	10/14/14 9:32	FGW	P	500 ml	HNO3	G	SA	Metals-Ca,Mg,K,Na (SW846-6020)	
096691	-018	CCBA-MW2	117	10/14/14 9:33	GW	P	125 ml	H2SO4	G	SA	Nitrate+Nitrite (EPA 353.2)	
096691	-020	CCBA-MW2	117	10/14/14 9:34	GW	P	250 ml	None	G	SA	Perchlorate (EPA 314.0)	
096691	-022	CCBA-MW2	117	10/14/14 9:35	GW	P	500 ml	None	G	SA	Alkalinity (SM2320B)	
096691	-024	CCBA-MW2	117	10/14/14 9:36	GW	AG	4x1 L	None	G	SA	High Explosives (SW846-8321A mod)	

Last Chain:	☑ Yes	Sample Tracking	SMO Use	Special Instructions/QC Requirements:	Conditions on Receipt
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~~			~~SNL/4142/505-844-5130/505-228-0710~~
WJG	William Gibson	William J Gibson	WJG	SNL/4142/505-284-3307/505-239-7367

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 field using a 0.45 micron in line filter.Report Anions (as Br,C,F,SO4), Alkalinity (as total CaCO3,HCO3,CO3), and Gamma Spectroscopy (as short list isotopes).

Lab Use

1.Relinquished by	William J Gibson	Org. 4142	Date 10/14/14	Time 1028	3.Relinquished by	Org.	Date	Time
1. Received by	[signature]	Org. 4142	Date 10/14/14	Time 1028	3. Received by	Org.	Date	Time
2.Relinquished by		Org.	Date	Time	4.Relinquished by	Org.	Date	Time
2. Received by		Org.	Date	Time	4. Received by	Org.	Date	Time

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

CONTRACT LABORATORY
ANALYSIS REQUEST AND CHAIN OF CUSTODY (Continuation)

AR/COC 615824

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
096691	-027	CCBA-MW2	117	10/14/14 9:40	GW	P	250 ml	NaOH	G	SA	Total Cyanide (SW846-9012)	
096691	-033	CCBA-MW2	117	10/14/14 9:41	GW	P	1 L	HNO3	G	SA	Gamma Spectroscopy (EPA 901.0)	
096691	-034	CCBA-MW2	117	10/14/14 9:43	GW	P	1 L	HNO3	G	SA	Gross Alpha and Beta (EPA 900.0)	
096692	-001	CCBA-MW2	117	10/14/14 9:23	GW	G	3x40ml	HCL	G	DU	TCL VOC (SW846-8260B)	
096692	-002	CCBA-MW2	117	10/14/14 9:25	GW	AG	4x1 L	None	G	DU	TCL SVOC (SW846-8270C)	
096692	-010	CCBA-MW2	117	10/14/14 9:29	GW	P	500 ml	HNO3	G	DU	TAL Metals+U (SW846-6010/6020/7470)	
096692	-016	CCBA-MW2	117	10/14/14 9:30	GW	P	125 ml	None	G	DU	Anions (SW846-9056)	
096692	-017	CCBA-MW2	117	10/14/14 9:32	FGW	P	500 ml	HNO3	G	DU	Metals-Ca,Mg,K,Na (SW846-6020)	
096692	-018	CCBA-MW2	117	10/14/14 9:33	GW	P	125 ml	H2SO4	G	DU	Nitrate+Nitrite (EPA 353.2)	
096692	-020	CCBA-MW2	117	10/14/14 9:34	GW	P	250 ml	None	G	DU	Perchlorate (EPA 314.0)	
096692	-022	CCBA-MW2	117	10/14/14 9:35	GW	P	500 ml	None	G	DU	Alkalinity (SM2320B)	
096692	-024	CCBA-MW2	117	10/14/14 9:36	GW	AG	4x1 L	None	G	DU	High Explosives (SW846-8321A mod)	
096692	-027	CCBA-MW2	117	10/14/14 9:40	GW	P	250 ml	NaOH	G	DU	Total Cyanide (SW846-9012)	
096692	-033	CCBA-MW2	117	10/14/14 9:41	GW	P	1 L	HNO3	G	DU	Gamma Spectroscopy (EPA 901.0)	
096692	-034	CCBA-MW2	117	10/14/14 9:43	GW	P	1 L	HNO3	G	DU	Gross Alpha and Beta (EPA 900.0)	
096693	-001	CCBA-TB3	NA	10/14/14 9:23	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

Page 1 of 2

Batch No. N/A

SMO Use

AR/COC 615823

Project Name:	SWMU 8/58 GWM	Date Samples Shipped:	10/14/14	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:	CF262-15	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),
Tech Area:					P.O. Box 5800, MS-0154
Building:	Room:	Operational Site:			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
096687	-001	CCBA-FB1	NA	10/13/14 10:55	DIW	G	3x40ml	HCL	G	FB	TCL VOC (SW846-8260B)	
096688	-001	CCBA-EB1	NA	10/13/14 10:55	DIW	G	3x40ml	HCL	G	EB	TCL VOC (SW846-8260B)	
096688	-002	CCBA-EB1	NA	10/13/14 10:57	DIW	AG	4x1 L	None	G	EB	TCL SVOC (SW846-8270C)	
096688	-010	CCBA-EB1	NA	10/13/14 10:58	DIW	P	500 ml	HNO3	G	EB	TAL Metals+U (SW846-6010/6020/7470)	
096688	-016	CCBA-EB1	NA	10/13/14 10:59	DIW	P	125 ml	None	G	EB	Anions (SW846-9056)	
096688	-017	CCBA-EB1	NA	10/13/14 11:00	FDIW	P	500 ml	HNO3	G	EB	Metals-Ca,Mg,K,Na (SW846-6020)	
096688	-018	CCBA-EB1	NA	10/13/14 11:01	DIW	P	125 ml	H2SO4	G	EB	Nitrate+Nitrite (EPA 353.2)	
096688	-020	CCBA-EB1	NA	10/13/14 11:02	DIW	P	250 ml	None	G	EB	Perchlorate (EPA 314.0)	
096688	-022	CCBA-EB1	NA	10/13/14 11:03	DIW	P	500 ml	None	G	EB	Alkalinity (SM2320B)	
096688	-024	CCBA-EB1	NA	10/13/14 11:05	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 field using a 0.45 micron in line filter.Report Anions (as Br,C,F,SO4), Alkalinity (as total CaCO3,HCO3,CO3), and Gamma Spectroscopy (as short list isotopes).

Conditions on Receipt

Lab Use

Sample Team Members	Name	Signature	Init.	Company/Organization/Phone/Cell
	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 10/14/14	Time 0914	3.Relinquished by	Org.	Date	Time
1. Received by	EMD	Org. 4142	Date 10/14/14	Time 0914	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

10

CONTRACT LABORATORY
ANALYSIS REQUEST AND CHAIN OF CUSTODY (Continuation)

AR/COC 615823

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
096688	-027	CCBA-EB1	NA	10/13/14 11:06	DIW	P	250 ml	NaOH	G	EB	Total Cyanide (SW846-9012)	
096688	-033	CCBA-EB1	NA	10/13/14 11:07	DIW	P	1 L	HNO3	G	EB	Gamma Spectroscopy (EPA 901.0)	
096688	-034	CCBA-EB1	NA	10/13/14 11:09	DIW	P	1 L	HNO3	G	EB	Gross Alpha and Beta (EPA 900.0)	
096689	-001	CCBA-TB2	NA	10/13/14 10:55	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

Page 1 of 2

Batch No. NA

SMO Use

AR/COC 615811

Project Name:	SWMU 68 GWM	Date Samples Shipped:	10/6/14	SMO Authorization:	☐ Waste Characterization
Project/Task Manager:	Clinton Lum	Carrier/Waybill No.	224565	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:	CF263-15	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
096652	-001	OBS-FB1	NA	10/6/14 9:20	DIW	G	3x40ml	HCL	G	FB	TCL VOC (SW846-8260B)	
096653	-001	OBS-MW1	153	10/6/14 9:21	GW	G	3x40ml	HCL	G	SA	TCL VOC (SW846-8260B)	
096653	-002	OBS-MW1	153	10/6/14 9:22	GW	AG	4x1 L	None	G	SA	TCL SVOC (SW846-8270C)	
096653	-010	OBS-MW1	153	10/6/14 9:23	GW	P	500 ml	HNO3	G	SA	TAL Metals+U (SW846-6010/6020/7470)	
096653	-014	OBS-MW1	153	10/6/14 9:24	GW	P	250 ml	None	G	SA	Hexavalent Chromium (SW846-7196A)	
096653	-016	OBS-MW1	153	10/6/14 9:25	GW	P	125 ml	None	G	SA	Anions (SW846-9056)	
096653	-017	OBS-MW1	153	10/6/14 9:26	FGW	P	500 ml	HNO3	G	SA	Metals-Ca,Mg,K,Na (SW846-6020)	
096653	-018	OBS-MW1	153	10/6/14 9:27	GW	P	125 ml	H2SO4	G	SA	Nitrate+Nitrite (EPA 353.2)	
096653	-020	OBS-MW1	153	10/6/14 9:30	GW	P	250 ml	None	G	SA	Perchlorate (EPA 314.0)	
096653	-022	OBS-MW1	153	10/6/14 9:31	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 field using a 0.45 micron in line filter.Report Anions (as Br,C,F,SO4), Alkalinity (as total CaCO3,HCO3,CO3), and 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

1.Relinquished by	Alfred Santillanes	Org. 4142	Date 10/6/14	Time 1115	3.Relinquished by		Org.	Date	Time
1. Received by	Clinton Lum SMO	Org. 4142	Date 10/6/14	Time 1115	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 615811

Project Name:	SWMU 68	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
096653	-024	OBS-MW1	153	10/6/14 9:33	GW	AG	4x1 L	None	G	SA	High Explosives (SW846-8321A mod)	
096653	-027	OBS-MW1	153	10/6/14 9:34	GW	P	250 ml	NaOH	G	SA	Total Cyanide (SW846-9012)	
096653	-033	OBS-MW1	153	10/6/14 9:35	GW	P	1 L	HNO3	G	SA	Gamma Spectroscopy (EPA 901.0)	
096653	-034	OBS-MW1	153	10/6/14 9:36	GW	P	1 L	HNO3	G	SA	Gross Alpha and Beta (EPA 900.0)	
096653	-035	OBS-MW1	153	10/6/14 9:38	GW	P	1 L	HNO3	G	SA	Isotopic Uranium (HASL 300)	
096654	-001	OBS-TB1	NA	10/6/14 9:21	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

SMO Use

AR/COC 615813

Project Name:	SWMU 68 GWM	Date Samples Shipped:	10/7/14	SMO Authorization:	☐ Waste Characterization
Project/Task Manager:	Clinton Lum	Carrier/Waybill No.	224722	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:	CF263-15	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
096658	-001	OBS-MW2	252	10/7/14 9:21	GW	G	3x40ml	HCL	G	SA	TCL VOC (SW846-8260B)	
096658	-002	OBS-MW2	252	10/7/14 9:23	GW	AG	4x1 L	None	G	SA	TCL SVOC (SW846-8270C)	
096658	-010	OBS-MW2	252	10/7/14 9:27	GW	P	500 ml	HNO3	G	SA	TAL Metals+U (SW846-6010/6020/7470)	
096658	-014	OBS-MW2	252	10/7/14 9:28	GW	P	250 ml	None	G	SA	Hexavalent Chromium (SW846-7196A)	
096658	-016	OBS-MW2	252	10/7/14 9:29	GW	P	125 ml	None	G	SA	Anions (SW846-9056)	
096658	-017	OBS-MW2	252	10/7/14 9:31	FGW	P	500 ml	HNO3	G	SA	Metals-Ca,Mg,K,Na (SW846-6020)	
096658	-018	OBS-MW2	252	10/7/14 9:32	GW	P	125 ml	H2SO4	G	SA	Nitrate+Nitrite (EPA 353.2)	
096658	-020	OBS-MW2	252	10/7/14 9:33	GW	P	250 ml	None	G	SA	Perchlorate (EPA 314.0)	
096658	-022	OBS-MW2	252	10/7/14 9:34	GW	P	500 ml	None	G	SA	Alkalinity (SM2320B)	
096658	-024	OBS-MW2	252	10/7/14 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 field using a 0.45 micron in line filter.Report Anions (as Br,C,F,SO4), Alkalinity (as total CaCO3,HCO3,CO3), and 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 10/7/14	Time 1008	3.Relinquished by	Org.	Date	Time
1. Received by	[signature] for SMO	Org. 4142	Date 10/7/14	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

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

CONTRACT LABORATORY
ANALYSIS REQUEST AND CHAIN OF CUSTODY (Continuation)

AR/COC 615813

Project Name: SWMU 68	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
096658	-027	OBS-MW2	252	10/7/14 9:39	GW	P	250 ml	NaOH	G	SA	Total Cyanide (SW846-9012)	
096658	-033	OBS-MW2	252	10/7/14 9:40	GW	P	1 L	HNO3	G	SA	Gamma Spectroscopy (EPA 901.0)	
096658	-034	OBS-MW2	252	10/7/14 9:42	GW	P	1 L	HNO3	G	SA	Gross Alpha and Beta (EPA 900.0)	
096658	-035	OBS-MW2	252	10/7/14 9:44	GW	P	1 L	HNO3	G	SA	Isotopic Uranium (HASL 300)	
096659	-001	OBS-MW2	252	10/7/14 9:21	GW	G	3x40ml	HCL	G	DU	TCL VOC (SW846-8260B)	
096659	-002	OBS-MW2	252	10/7/14 9:23	GW	AG	4x1 L	None	G	DU	TCL SVOC (SW846-8270C)	
096659	-010	OBS-MW2	252	10/7/14 9:27	GW	P	500 ml	HNO3	G	DU	TAL Metals+U (SW846-6010/6020/7470)	
096659	-014	OBS-MW2	252	10/7/14 9:28	GW	P	250 ml	None	G	DU	Hexavalent Chromium (SW846-7196A)	
096659	-016	OBS-MW2	252	10/7/14 9:29	GW	P	125 ml	None	G	DU	Anions (SW846-9056)	
096659	-017	OBS-MW2	252	10/7/14 9:31	FGW	P	500 ml	HNO3	G	DU	Metals-Ca,Mg,K,Na (SW846-6020)	
096659	-018	OBS-MW2	252	10/7/14 9:32	GW	P	125 ml	H2SO4	G	DU	Nitrate+Nitrite (EPA 353.2)	
096659	-020	OBS-MW2	252	10/7/14 9:33	GW	P	250 ml	None	G	DU	Perchlorate (EPA 314.0)	
096659	-022	OBS-MW2	252	10/7/14 9:34	GW	P	500 ml	None	G	DU	Alkalinity (SM2320B)	
096659	-024	OBS-MW2	252	10/7/14 9:35	GW	AG	4x1 L	None	G	DU	High Explosives (SW846-8321A mod	
096659	-027	OBS-MW2	252	10/7/14 9:39	GW	P	250 ml	NaOH	G	DU	Total Cyanide (SW846-9012)	
096659	-033	OBS-MW2	252	10/7/14 9:40	GW	P	1 L	HNO3	G	DU	Gamma Spectroscopy (EPA 901.0)	
096659	-034	OBS-MW2	252	10/7/14 9:42	GW	P	1 L	HNO3	G	DU	Gross Alpha and Beta (EPA 900.0)	
096659	-035	OBS-MW2	252	10/7/14 9:44	GW	P	1 L	HNO3	G	DU	Isotopic Uranium (HASL 300)	
096660	-001	OBS-TB3	NA	10/7/14 9:21	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 615814

Project Name:	SWMU 68 GWM	Date Samples Shipped:	10/8/14	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:	CF263-15	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	Preserv-ative	Collection Method	Sample Type	Parameter & Method Requested	Lab Sample ID
096661	-001	OBS-MW3	208	10/8/14 9:17	GW	G	3x40ml	HCL	G	SA	TCL VOC (SW846-8260B)	
096661	-002	OBS-MW3	208	10/8/14 9:19	GW	AG	4x1 L	None	G	SA	TCL SVOC (SW846-8270C)	
096661	-010	OBS-MW3	208	10/8/14 9:20	GW	P	500 ml	HNO3	G	SA	TAL Metals+U (SW846-6010/6020/7470)	
096661	-014	OBS-MW3	208	10/8/14 9:21	GW	P	250 ml	None	G	SA	Hexavalent Chromium (SW846-7196A)	
096661	-016	OBS-MW3	208	10/8/14 9:22	GW	P	125 ml	None	G	SA	Anions (SW846-9056)	
096661	-017	OBS-MW3	208	10/8/14 9:23	FGW	P	500 ml	HNO3	G	SA	Metals-Ca,Mg,K,Na (SW846-6020)	
096661	-018	OBS-MW3	208	10/8/14 9:24	GW	P	125 ml	H2SO4	G	SA	Nitrate+Nitrite (EPA 353.2)	
096661	-020	OBS-MW3	208	10/8/14 9:25	GW	P	250 ml	None	G	SA	Perchlorate (EPA 314.0)	
096661	-022	OBS-MW3	208	10/8/14 9:26	GW	P	500 ml	None	G	SA	Alkalinity (SM2320B)	
096661	-024	OBS-MW3	208	10/8/14 9:28	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 field using a 0.45 micron in line filter.Report Anions (as Br,C,F,SO4), Alkalinity (as total CaCO3,HCO3,CO3), and 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

1.Relinquished by	Alfred Santillanes	Org. 4142	Date 10/8/14	Time 0955	3.Relinquished by	Org.	Date	Time
1. Received by	[signature] for SMO	Org. 4142	Date 10/8/14	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

CONTRACT LABORATORY
ANALYSIS REQUEST AND CHAIN OF CUSTODY (Continuation)

AR/COC 615814

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
096661	-027	OBS-MW3	208	10/8/14 9:29	GW	P	250 ml	NaOH	G	SA	Total Cyanide (SW846-9012)	
096661	-033	OBS-MW3	208	10/8/14 9:30	GW	P	1 L	HNO3	G	SA	Gamma Spectroscopy (EPA 901.0)	
096661	-034	OBS-MW3	208	10/8/14 9:31	GW	P	1 L	HNO3	G	SA	Gross Alpha and Beta (EPA 900.0)	
096661	-035	OBS-MW3	208	10/8/14 9:33	GW	P	1 L	HNO3	G	SA	Isotopic Uranium (HASL 300)	
096662	-001	OBS-TB4	NA	10/8/14 9:17	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 615812

Project Name:	SWMU 68 GWM	Date Samples Shipped:	10/6/14	SMO Authorization:	☐ Waste Characterization
Project/Task Manager:	Clinton Lum	Carrier/Waybill No.	224565	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:	CF263-15	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	Preserv-ative	Collection Method	Sample Type	Parameter & Method Requested	Lab Sample ID
096655	-001	OBS-FB2	NA	10/6/14 10:46	DIW	G	3x40ml	HCL	G	FB	TCL VOC (SW846-8260B)	
096656	-001	OBS-EB1	NA	10/6/14 10:46	DIW	G	3x40ml	HCL	G	EB	TCL VOC (SW846-8260B)	
096656	-002	OBS-EB1	NA	10/6/14 10:48	DIW	AG	4x1 L	None	G	EB	TCL SVOC (SW846-8270C)	
096656	-010	OBS-EB1	NA	10/6/14 10:49	DIW	P	500 ml	HNO3	G	EB	TAL Metals+U (SW846-6010/6020/7470)	
096656	-014	OBS-EB1	NA	10/6/14 10:50	DIW	P	250 ml	None	G	EB	Hexavalent Chromium (SW846-7196A)	
096656	-016	OBS-EB1	NA	10/6/14 10:51	DIW	P	125 ml	None	G	EB	Anions (SW846-9056)	
096656	-017	OBS-EB1	NA	10/6/14 10:52	FDIW	P	500 ml	HNO3	G	EB	Metals-Ca,Mg,K,Na (SW846-6020)	
096656	-018	OBS-EB1	NA	10/6/14 10:53	DIW	P	125 ml	H2SO4	G	EB	Nitrate+Nitrite (EPA 353.2)	
096656	-020	OBS-EB1	NA	10/6/14 10:54	DIW	P	250 ml	None	G	EB	Perchlorate (EPA 314.0)	
096656	-022	OBS-EB1	NA	10/6/14 10:55	DIW	P	500 ml	None	G	EB	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 field using a 0.45 micron in line filter.Report Anions (as Br,C,F,SO4), Alkalinity (as total CaCO3,HCO3,CO3), and 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

1.Relinquished by	Alfred Santillanes	Org. 4142	Date 10/6/14	Time 1124	3.Relinquished by	Org.	Date Time
1. Received by	Edie Kent SMO	Org. 4142	Date 10/6/14	Time 1124	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 615812

Project Name: SWMU 68	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
096656	-024	OBS-EB1	NA	10/6/14 10:57	DIW	AG	4x1 L	None	G	EB	High Explosives (SW846-8321A mod)	
096656	-027	OBS-EB1	NA	10/6/14 10:58	DIW	P	250 ml	NaOH	G	EB	Total Cyanide (SW846-9012)	
096656	-033	OBS-EB1	NA	10/6/14 10:59	DIW	P	1 L	HNO3	G	EB	Gamma Spectroscopy (EPA 901.0)	
096656	-034	OBS-EB1	NA	10/6/14 11:00	DIW	P	1 L	HNO3	G	EB	Gross Alpha and Beta (EPA 900.0)	
096656	-035	OBS-EB1	NA	10/6/14 11:01	DIW	P	1 L	HNO3	G	EB	Isotopic Uranium (HASL 300)	
096657	-001	OBS-TB2	NA	10/6/14 10:46	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

Sample Findings Summary

AR/COC: 615811, 615812, 615813, 615814

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
DOE EML HASL-300, U-02-RC			
	096656-035/OBS-EB1	Uranium-233/234 (13968-55-3/13966-29-)	BD, FR3
	096656-035/OBS-EB1	Uranium-235/236 (15117-96-1/13982-70-)	BD, FR3
	096656-035/OBS-EB1	Uranium-238 (7440-61-1)	BD, FR3
EPA 900.0/SW846 9310			
	096653-034/OBS-MW1	ALPHA (12587-46-1)	J, MS1
	096653-034/OBS-MW1	BETA (12587-47-2)	J, MS1
	096656-034/OBS-EB1	ALPHA (12587-46-1)	BD, FR3,MS1
	096656-034/OBS-EB1	BETA (12587-47-2)	BD, FR3,MS1
	096658-034/OBS-MW2	ALPHA (12587-46-1)	J, MS1
	096658-034/OBS-MW2	BETA (12587-47-2)	J, MS1
	096659-034/OBS-MW2	ALPHA (12587-46-1)	J, MS1
	096659-034/OBS-MW2	BETA (12587-47-2)	J, MS1
	096661-034/OBS-MW3	ALPHA (12587-46-1)	J, MS1
	096661-034/OBS-MW3	BETA (12587-47-2)	J, MS1
EPA 901.1			
	096653-033/OBS-MW1	Americium-241 (14596-10-2)	BD, FR3
	096653-033/OBS-MW1	Cesium-137 (10045-97-3)	BD, FR3
	096653-033/OBS-MW1	Cobalt-60 (10198-40-0)	BD, FR3
	096653-033/OBS-MW1	Potassium-40 (13966-00-2)	J, FR7
	096656-033/OBS-EB1	Americium-241 (14596-10-2)	BD, FR3
	096656-033/OBS-EB1	Cesium-137 (10045-97-3)	BD, FR3
	096656-033/OBS-EB1	Cobalt-60 (10198-40-0)	BD, FR3
	096656-033/OBS-EB1	Potassium-40 (13966-00-2)	BD, FR3

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
	096658-033/OBS-MW2	Americium-241 (14596-10-2)	BD, FR3
	096658-033/OBS-MW2	Cesium-137 (10045-97-3)	BD, FR3
	096658-033/OBS-MW2	Cobalt-60 (10198-40-0)	BD, FR3
	096658-033/OBS-MW2	Potassium-40 (13966-00-2)	BD, FR3
	096659-033/OBS-MW2	Americium-241 (14596-10-2)	BD, FR3
	096659-033/OBS-MW2	Cesium-137 (10045-97-3)	BD, FR3
	096659-033/OBS-MW2	Cobalt-60 (10198-40-0)	BD, FR3
	096659-033/OBS-MW2	Potassium-40 (13966-00-2)	BD, FR3
	096661-033/OBS-MW3	Americium-241 (14596-10-2)	BD, FR3
	096661-033/OBS-MW3	Cesium-137 (10045-97-3)	BD, FR3
	096661-033/OBS-MW3	Cobalt-60 (10198-40-0)	BD, FR3
	096661-033/OBS-MW3	Potassium-40 (13966-00-2)	R, Z2
SW846 3510C/8270D			
	096653-002/OBS-MW1	4-Nitrophenol (100-02-7)	UJ, MS5
	096656-002/OBS-EB1	4-Nitrophenol (100-02-7)	UJ, MS5
	096658-002/OBS-MW2	4-Nitrophenol (100-02-7)	UJ, MS5
	096659-002/OBS-MW2	4-Nitrophenol (100-02-7)	UJ, MS5
	096661-002/OBS-MW3	4-Nitrophenol (100-02-7)	UJ, MS5
SW846 3535/8321A Modified			
	096653-024/OBS-MW1	m-Nitrotoluene (99-08-1)	UJ, I4
	096653-024/OBS-MW1	o-Nitrotoluene (88-72-2)	UJ, I4
	096653-024/OBS-MW1	p-Nitrotoluene (99-99-0)	UJ, I4
	096653-024/OBS-MW1	Tetryl (479-45-8)	UJ, L3,MS3
	096656-024/OBS-EB1	m-Nitrotoluene (99-08-1)	UJ, I4
	096656-024/OBS-EB1	o-Nitrotoluene (88-72-2)	UJ, I4
	096656-024/OBS-EB1	p-Nitrotoluene (99-99-0)	UJ, I4
	096656-024/OBS-EB1	Tetryl (479-45-8)	UJ, L3,MS3
	096658-024/OBS-MW2	m-Nitrotoluene (99-08-1)	UJ, I4
	096658-024/OBS-MW2	o-Nitrotoluene (88-72-2)	UJ, I4

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
	096658-024/OBS-MW2	p-Nitrotoluene (99-99-0)	UJ, I4
	096658-024/OBS-MW2	Tetryl (479-45-8)	UJ, L3,MS3
	096659-024/OBS-MW2	m-Nitrotoluene (99-08-1)	UJ, I4
	096659-024/OBS-MW2	o-Nitrotoluene (88-72-2)	UJ, I4
	096659-024/OBS-MW2	p-Nitrotoluene (99-99-0)	UJ, I4
	096659-024/OBS-MW2	Tetryl (479-45-8)	UJ, L3,MS3
	096661-024/OBS-MW3	m-Nitrotoluene (99-08-1)	UJ, I4
	096661-024/OBS-MW3	o-Nitrotoluene (88-72-2)	UJ, I4
	096661-024/OBS-MW3	p-Nitrotoluene (99-99-0)	UJ, I4
	096661-024/OBS-MW3	Tetryl (479-45-8)	UJ, L3,MS3
SW846 7196A			
	096653-014/OBS-MW1	Hexavalent Chromium (18540-29-9)	UJ, H2,C3
	096656-014/OBS-EB1	Hexavalent Chromium (18540-29-9)	UJ, C3
SW846 9012B			
	096653-027/OBS-MW1	Cyanide, Total (57-12-5)	UJ, I5,B4
	096656-027/OBS-EB1	Cyanide, Total (57-12-5)	UJ, I5,B4
	096658-027/OBS-MW2	Cyanide, Total (57-12-5)	UJ, I5,B4
	096659-027/OBS-MW2	Cyanide, Total (57-12-5)	UJ, I5,B4
	096661-027/OBS-MW3	Cyanide, Total (57-12-5)	UJ, I5,B4

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

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

Memorandum

Date: November 13, 2014

To: File

From: Monica Dymerski

Subject: Inorganic Data Review and Validation – SNL
Site: SWMU 68 GWM
AR/COC: 615811, 615812, 615813 and 615814
SDG: 358371
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 7196A (hexavalent chromium), 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. Problems were identified with the data package that resulted in the qualification of data.

Hexavalent chromium:

1. Sample 358371020 was analyzed beyond the 24 hour method-specified holding time but within 2X the HT. The associated sample result was a non-detect and will be **qualified UJ,H2**.
2. The %D was >10% but ≤25% with a negative bias for hexavalent chromium in the ICV associated with samples -005 and -020. The associated samples were non-detects and will be **qualified UJ,C3.**

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.**
2. Total cyanide was detected in the ICB at a negative concentration with absolute value > the MDL. 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 except as noted above in the Summary section and as follows. Samples -034, -047, and -061 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 except as noted above in the Summary section.

Blanks

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

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.

Laboratory Replicate

The replicate analyses met all QC acceptance criteria.

Detection Limits/Dilutions

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

Nitrate/Nitrite:
All samples *except* -022 (EB) were diluted 5X.

Anions:
All samples *except* -021 (EB) were diluted 10X for chloride and sulfate.

Other QC

An EB was submitted with ARCOC 615812 and it was associated with the samples from ARCOC 615813. A field duplicate pair was submitted with ARCOC 615813. There are no "required" review criteria for field duplicate analyses comparability; no data will be qualified as a result.

No other specific issues that affect data quality were identified.

Reviewed by: Mary Donivan **Level:** I **Date:** 11/17/14

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

Memorandum

Date: November 13, 2014

To: File

From: Monica Dymerski

Subject: LC/MS/MS Organic Data Review and Validation – SNL
Site: SWMU 68 GWM
AR/COC: 615811, 615812, 615813 and 615814
SDG: 358371
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 results were non-detects and will be **qualified UJ,L3.**
3. The MS and MSD %Rs were < the lower acceptance limit but ≥10% for Tetryl. 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 extracted and analyzed within the prescribed holding times and were 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 except as noted above in the Summary section.

Laboratory Control Sample (LCS)

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

Detection Limits/Dilutions

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

Other QC

An EB was submitted with ARCOC 615812 and it was associated with the samples from ARCOC 615813. A field duplicate pair was submitted with ARCOC 615813. There are no "required" review criteria for field duplicate analyses comparability; no data will be qualified as a result.

No other specific issues that affect data quality were identified.

Reviewed by: Mary Donivan **Level:** I **Date:** 11/17/14

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

Date: November 13, 2014

To: File

From: Monica Dymerski

Subject: Inorganic Data Review and Validation – SNL
Site: SWMU 68 GWM
AR/COC: 615811, 615812, 615813 and 615814
SDG: 358371 and 358373
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. 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.

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 follows. Cu was detected at > the PQL in unfiltered EB sample 358371019, which was associated with samples -033 and -046. The associated sample results were non-detects and will not be qualified.

U was detected at < the PQL in the ICB. The associated sample results were either detects >5X the ICB concentration or 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 unfiltered parent sample concentrations for Ca, Mg and Na were >4X the spike and the %Rs for Ca, Mg, and Na did not meet acceptance criteria. The filtered parent sample concentrations for Ca, Mg and Na were >4X the spike and the %Rs for 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. All unfiltered samples *except* 358371019 were diluted 5X for Ca and all filtered samples *except* 358373002 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 615812 and it was associated with the samples from ARCOC 615813. A field duplicate pair was submitted with ARCOC 615813. There are no “required” review criteria for field duplicate analyses comparability; no data will be qualified as a result.

No other specific issues that affect data quality were identified.

Reviewed by: Mary Donivan **Level:** I **Date:** 11/17/14

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

Memorandum

Date: November 13, 2014

To: File

From: Monica Dymerski

Subject: Radiochemical Data Review and Validation – SNL
Site: SWMU 68 GWM
AR/COC: 615811, 615812, 615813 and 615814
SDG: 358371
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 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.**

Gammaspec:

1. The K-40 result for sample 358371068 was rejected by the laboratory due to the peak not meeting identification criteria and will be **qualified R,Z2**.
2. All sample results that were > the MDA but ≤3X the MDA will be **qualified J,FR7.**

Holding Times and Preservation

The samples were prepared and analyzed within the prescribed holding times and were properly preserved with the following exception. The gamma spec container for sample -068 was received at a pH of 7. Nitric acid was added by the laboratory upon receipt. No sample data will be qualified as a result.

Quantification

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

Calibration

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

Blanks

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

Tracer/Carrier Recovery

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. 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. 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.

Other QC

An EB was submitted with ARCOC 615812 and it was associated with the samples from ARCOC 615813. A field duplicate pair was submitted with ARCOC 615813. There are no “required” review criteria for field duplicate analyses comparability; no data will be qualified as a result.

No other specific issues that affect data quality were identified.

Reviewed by: Mary Donivan **Level:** I **Date:** 11/17/14

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

Memorandum

Date: November 13, 2014

To: File

From: Monica Dymerski

Subject: GC/MS Organic Data Review and Validation – SNL
Site: SWMU 68 GWM
AR/COC: 615811, 615812, 615813 and 615814
SDG: 358371
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. Problems were identified with the data package that resulted in the qualification of data.

1. The MS/MSD RPD was > the acceptance limit for 4-nitrophenol. 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 times 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 follows.

The CCV %Ds were >20% but ≤40% with negative bias for bis(2-chloro-1-methylethyl)ether, 2,4-dinitrophenol, p-nitroaniline, and pentachlorophenol. The associated sample results were non-detects and since no other calibration infractions occurred, will not be qualified.

The CCV %D was >20% with positive bias for atrazine. All associated sample results were non-detects, and will not be qualified.

Blanks

No target analytes were detected in the blanks.

Surrogates

All surrogate recoveries met QC acceptance criteria except as follows. The 2-fluorophenol, 2,4,6-tribromophenol, nitrobenzene-d5, 2-fluorobiphenyl, and p-terphenyl-d14 surrogate %Rs were > the upper acceptance limits for sample 358371045. All associated sample results were non-detects and will not be qualified.

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 615812 and it was associated with the samples from ARCOC 615813. A field duplicate pair was submitted with ARCOC 615813. There are no "required" review criteria for field duplicate analyses comparability; no data will be qualified as a result.

No other specific issues that affect data quality were identified.

Reviewed by: Mary Donivan **Level:** I **Date:** 11/17/14

ANALYTICAL QUALITY ASSOCIATES, INC.

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

Memorandum

Date: November 13, 2014

To: File

From: Monica Dymerski

Subject: GC/MS Organic Data Review and Validation – SNL
Site: SWMU 68 GWM
AR/COC: 615811, 615812, 615813 and 615814
SDG: 358371
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

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

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

Holding Times

The samples were analyzed within the prescribed holding time and 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 follows.

The ICV %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% with positive bias for dichlorodifluoromethane. The associated results for all samples were non-detects and 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 FB sample -001, associated with sample -002, and in EB sample -017, associated with samples -031 and -044. The associated sample results were non-detects and will not be qualified.

Bromodichloromethane was detected at a concentration < the PQL and chloroform was detected at a concentration > the PQL in FB, sample -016, which was not associated with any samples. No sample data will be qualified as a result.

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 follows. The MS %Rs were > the upper acceptance limits for benzene and methylene chloride. The associated sample results were non-detects and will not be qualified.

Laboratory Control Sample (LCS)

All LCS acceptance criteria were met.

Detection Limits/Dilutions

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

Tentatively Identified Compounds (TICs)

TIC reports were not required.

Other QC

Four TBs were submitted, one associated with each ARCOC. An EB was submitted with ARCOC 615812 and it was associated with the samples from ARCOC 615813. An FB was submitted with ARCOC 615811 and was associated with the sample from that ARCOC. A second FB was submitted with ARCOC 615812, and was not associated with any field samples. A field duplicate pair was submitted with ARCOC 615813. There are no "required" review criteria for field duplicate analyses comparability; no data will be qualified as a result.

No other specific issues that affect data quality were identified.

Reviewed by: Mary Donivan **Level:** I **Date:** 11/17/14

Data Validation Summary Worksheet

AR/COC #: 615811, 615812, 615813 and 615814 Site/Project: SWMU 68 GWM Validation Date: 11/13/2014

SDG #: 353871 and 358373 Laboratory: GEL Laboratories LLC Validator: Monica Dymerski

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
096653-014	358371020	EPA 7196A Cr^{+6}	4ºC	10/06/14 09:24	NA	10/07/14 11:08	yes	no
096658-014	358371034	EPA 7196A Cr^{+6}	4ºC	10/07/14 09:28	NA	10/08/14 10:17	yes	no
096659-014	358371047	EPA 7196A Cr^{+6}	4ºC	10/07/14 09:28	NA	10/08/14 10:19	yes	no
096661-014	358371061	EPA 7196A Cr^{+6}	4ºC	10/08/14 09:21	NA	10/09/14 10:16	yes	no

Comments: Samples collected 10/06-08/2014. Sample 0969661-033 was received at a pH of 7 and was acidified with HNO_3 upon receipt.

Revised 7/2007

Validated By: _____ Monica L Dymerski

Organic Worksheet (GC/MS)

AR/COC #: 615811, 615812, 615813 and 615814 SDG #:358371 Matrix: Aqueous

Laboratory Sample IDs: 358371001, -002, -015, -016, -017, -030, -031, -044, -057, -058 and -071

Method/Batch #s: 8260B: **1428028** 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**	**FB1 -001**	**5X (10X) FB1**	**FB2 - 016**	**5X (10X) FB1**	**EB1 -017**	**5X (10X) EB1**
	Int.	**RF**	**RSD/R^2**	**CCV (ICV) %D**												
acetone	NA	✓	✓	✓	✓	NA	✓	✓	✓	✓	3.19J	(31.9)	✓	NA	2.72J	(27.2)
bromodichloromethane	NA	✓	✓	✓	✓	NA	✓	✓	✓	✓	0.540J	2.7	0.480J	2.4	0.420J	2.1
chloroform	NA	✓	✓	✓	✓	NA	✓	✓	✓	✓	5.53	27.65	4.86	24.3	4.64	23.2
benzene	NA	✓	✓	✓	✓	NA	✓	119	✓	✓	✓	NA	✓	NA	✓	NA
methylene chloride	✓	✓	✓	✓	✓	NA	✓	121	✓	✓	✓	NA	✓	NA	✓	NA
2-butanone	NA	✓	✓	(-21.3)	✓	NA	✓	✓	✓	✓	✓	NA	✓	NA	✓	NA
dichlorofluoromethane	NA	✓	✓	23.0	✓	NA	✓	✓	✓	✓	✓	NA	✓	NA	✓	NA

Surrogate Recovery Outliers

Sample ID								
None								

IS Outliers

Sample ID	**Area**	**RT**	**Area**	**RT**	**Area**	**RT**	**Area**	**RT**	**Area**	**RT**			**Area**	**RT**
None														

Comments: HTs OK, ICAL VOA6 09/05/14; samples analyzed 10/17/14. MS/MSD performed on -002

Organic Worksheet (GC/MS)

AR/COC #: 615811, 615812, 615813 and 615814 SDG #:358371 Matrix: Aqueous

Laboratory Sample IDs: 358371003, -018, -032, -045 and -059

Method/Batch #s: 3510C/8270D **1425971/1425972** 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 -018	5X (10X) EB		
	Int.	RF	RSD/ R^2	CCV (ICV) %D										
4-nitrophenol	✓	✓	✓	✓	✓	NA	✓	✓	✓	31.8	✓	NA		
Bis(2-chloro-1-methylethyl)ether	NA	✓	✓	-28.35	✓	NA	✓	✓	✓	✓	✓	NA		
2,4-dinitrophenol	✓	✓	✓	-24.73	✓	NA	✓	✓	✓	✓	✓	NA		
p-nitroaniline	✓	✓	✓	-20.6	✓	NA	✓	✓	✓	✓	✓	NA		
pentachlorophenol	✓	✓	✓	-28.75	✓	NA	✓	✓	✓	✓	✓	NA		
atrazine	NA	✓	✓	24.5	✓	NA	✓	✓	✓	✓	✓	NA		

Surrogate Recovery Outliers

Sample ID	2-fluorophenol	Phenol-d5	2,4,6-tribromophenol	Nitrobenzene-d5	2-fluorobiphenyl	p-terphenyl-d14
358371045	128%	✓	282%	204%	201%	263%

IS Outliers

Sample ID	Area	RT	Area	RT	Area	RT	Area	RT	Area	RT	Area	RT
None												

Comments: HTs OK, ICAL MSD8.I 09/16/14 and 09/23/14. Samples analyzed 10/12/14.

MS/MSD performed on sample -003.

High Explosives Worksheet (LC/MS/MS)

AR/COC #: 615811, 615812, 615813 and 615814 SDG #: 358371 Matrix: Aqueous

Laboratory Sample IDs: 358371010, -025, -039, -052 and -066

Method/Batch #s: 3535/8321A **1426109/1426110**

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	✓	0.022	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		
o-nitrotoluene	✓	0.027	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		
p-nitrotoluene	✓	0.012	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		
tetryl	✓	✓	✓	✓	✓	✓	✓	✓	✓	34.8	31.8	31.6	✓	✓	✓		

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 performed on sample -010; all sample and QC extracts diluted 1:1 with LC reagent grade water

ICAL LCMSMS3 10/17/2014. Samples analyzed on 10/17-18/2014.

Inorganic Metals Worksheet

AR/COC #: 615811, 615812, 615813 and 615814 SDG #: 358371 and 358373 Matrix: Aqueous

Laboratory Sample IDs: 358371004, -019, -033, -046 and -060 (UF); 358373001 through -005 (F, 6020 Ca, Mg, K, and Na only)

Method/Batch #s: **3005A/6010B (ICP-AES):** 1425949(prep)/1425950 **3005A/6020** (ICP-MS): UF: 1426070(prep)/1426074 F: 1426118(prep)/1426122 **7470A** (Hg): 1426760(prep)/1426761

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**	**UF EB 358371019**	**5X EB**			
	Int.	**R^2**	**ICV**	**CCV**	**ICB**	**CCB**														
Cu (UF)	✓	✓	✓	✓	✓	✓	✓	NA	✓	✓	✓	✓	NA	NA	✓	0.00194	0.0097			
Ca (UF)	✓	✓	✓	✓	✓	✓	✓	NA	✓	220*	✓	✓	NA	NA	✓	✓	NA			
Mg (UF)	✓	✓	✓	✓	✓	✓	✓	NA	✓	150*	✓	✓	NA	NA	✓	✓	NA			
Na (UF)	✓	✓	✓	✓	✓	✓	✓	NA	✓	160*	✓	✓	NA	NA	✓	✓	NA			
U (UF)	✓	✓	✓	✓	0.07J	✓	✓	0.35	✓	✓	✓	✓	NA	NA	✓	✓	NA			
Mg(F)	✓	✓	✓	✓	✓	✓	✓	NA	✓	135*	✓	✓	NA	NA	✓	✓	NA			
Na (F)	✓	✓	✓	✓	✓	✓	✓	NA	✓	185*	✓	✓	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 352683004 for ICP-MS, ICP-AES and Hg. *Ca, Mg, and Na >4X spike amount.

All unfiltered samples *except* 358371019 were diluted 5X for Ca and all filtered samples *except* 358373002 were diluted 5X for Ca.

General Chemistry Worksheet

AR/COC #: 615811, 615812, 615813 and 615814 SDG #: 358371 Matrix: Aqueous

Laboratory Sample IDs: 358371 - See below

Method/Batch #s: EPA 9012A (total cyanide): Batch 1426060(prep)/1426061 Samples -011, -026, -040, -053 and -067

Method/Batch #s: EPA 314.0 (perchlorate): Batch 1426176 Samples -008, -023, -037, -050 and -064

Method/Batch #s: EPA 9056 (anions): Batch 1426695 Samples -006, -021, -035, -048 and -062

Method/Batch #s: EPA 353.2 (NO_3/NO_2 – N): Batch 1425672 Samples -007, -022, -036, -049 and -063

Method/Batch #s: EPA 7196A (hexavalent Cr): Batch 1425131 Samples -005 and -020; Batch 1425575 Samples -034 and -047; Batch 1425936 Sample -061

Method/Batch #s: SM2320B (alkalinity): Batch 1427551 Samples -009, -024, -038, -051, and -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 %D**	**CCV %D**	**ICB**	**CCB**										
total cyanide	-0.00186	✓	✓	✓	-0.00208	✓	✓	(0.00835)	✓	✓	✓	✓	NA			
hexavalent Cr	✓	✓	-11.6*	✓	✓	✓	✓	NA	✓	✓	✓	✓	NA			

Comments: HTs OK for all analyses except Cr^{+6}. **Matrix QC: 9012A:** performed on sample -011**; 314.0:** performed on sample -008; **9056**: performed on sample -006; **353.2**: performed on sample -007; **7196A;** performed on samples -005(1425131), -034(1425575) and -061(1425936); **SM2320B**: performed on sample -009.

Anions – all samples except EB diluted 10X for Cl and SO4. NO_3/NO_2 – all samples except EB diluted 5X

*associated with samples -005 and -020.

Radiochemistry Worksheet

AR/COC #: 615811, 615812, 615813 and 615814 SDG #: 358371 Matrix: Aqueous

Laboratory Sample IDs: 358371- See below

Method/Batch #s: EML HASL 300 (alphaspec U): Batch 1426102 Samples -014, -029, -043, -056 and -070

Method/Batch #s: EPA 901.1 (gamma spec): Batch 1426848 Samples -012, -027, -041, -054 and -068

Method/Batch #s: EPA 900.0 (Gross alpha/beta): Batch 1430818 Samples -013, -028, -042, -055 and -069

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 -014 **901.1:** Performed on sample -012. **900.0:** Performed on an SNL sample from another SDG.

Gross alpha/beta parent and DUP = 150 ml, MS/MSD=25 ml (6X dilution)-results qualified.

Peak rejected by laboratory due to peak not meeting identification criteria:-068 (K-40)

SMO 2012-ARCOC (4-2012)

AOP 95-16

CONTRACT LABORATORY
ANALYSIS REQUEST AND CHAIN OF CUSTODY

Internal Lab

Page 1 of 2

Batch No. NA

SMO Use

AR/COC 615811

Project Name:	SWMU 68 GWM	Date Samples Shipped:	10/6/14	SMO Authorization:	☐ Waste Characterization
Project/Task Manager:	Clinton Lum	Carrier/Waybill No.	224565	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:	CF263-15	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
096652	-001	OBS-FB1	NA	10/6/14 9:20	DIW	G	3x40ml	HCL	G	FB	TCL VOC (SW846-8260B)	358371 001
096653	-001	OBS-MW1	153	10/6/14 9:21	GW	G	3x40ml	HCL	G	SA	TCL VOC (SW846-8260B)	358371 002
096653	-002	OBS-MW1	153	10/6/14 9:22	GW	AG	4x1 L	None	G	SA	TCL SVOC (SW846-8270C)	358371 003
096653	-010	OBS-MW1	153	10/6/14 9:23	GW	P	500 ml	HNO3	G	SA	TAL Metals+U (SW846-6010/6020/7470)	358371 004
096653	-014	OBS-MW1	153	10/6/14 9:24	GW	P	250 ml	None	G	SA	Hexavalent Chromium (SW846-7196A)	358371 020
096653	-016	OBS-MW1	153	10/6/14 9:25	GW	P	125 ml	None	G	SA	Anions (SW846-9056)	358371 006
096653	-017	OBS-MW1	153	10/6/14 9:26	FGW	P	500 ml	HNO3	G	SA	Metals-Ca,Mg,K,Na (SW846-6020)	358373 001
096653	-018	OBS-MW1	153	10/6/14 9:27	GW	P	125 ml	H2SO4	G	SA	Nitrate+Nitrite (EPA 353.2)	358371 007
096653	-020	OBS-MW1	153	10/6/14 9:30	GW	P	250 ml	None	G	SA	Perchlorate (EPA 314.0)	358371 008
096653	-022	OBS-MW1	153	10/6/14 9:31	GW	P	500 ml	None	G	SA	Alkalinity (SM2320B)	358371 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

If perchlorate detected, perform verification analysis using SW846-6850M.Filtered fraction collected in field using a 0.45 micron in line filter.Report Anions (as Br,C,F,SO4), Alkalinity (as total CaCO3,HCO3,CO3), and 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

1.Relinquished by	Alfred Santillanes	Org.	4142	Date	10/6/14	Time	1115	3.Relinquished by	Org. Date Time
1. Received by	SMO	Org.	4142	Date	10/6/14	Time	1115	3. Received by	Org. Date Time
2.Relinquished by	SMO	Org.	4142	Date	10/6/14	Time	1200	4.Relinquished by	Org. Date Time
2. Received by		Org.	Lab	Date	10-7-14	Time	0300	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 615811

Project Name:	SWMU 68	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
096653	-024	OBS-MW1	153	10/6/14 9:33	GW	AG	4x1 L	None	G	SA	High Explosives (SW846-8321A mod)	358371 010
096653	-027	OBS-MW1	153	10/6/14 9:34	GW	P	250 ml	NaOH	G	SA	Total Cyanide (SW846-9012)	358371 011
096653	-033	OBS-MW1	153	10/6/14 9:35	GW	P	1 L	HNO3	G	SA	Gamma Spectroscopy (EPA 901.0)	358371 012
096653	-034	OBS-MW1	153	10/6/14 9:36	GW	P	1 L	HNO3	G	SA	Gross Alpha and Beta (EPA 900.0)	358371 013
096653	-035	OBS-MW1	153	10/6/14 9:38	GW	P	1 L	HNO3	G	SA	Isotopic Uranium (HASL 300)	358371 014
096654	-001	OBS-TB1	NA	10/6/14 9:21	DIW	G	3x40 ml	HCL	G	TB	TCL VOC (SW846-8260B)	358371 015

Recipient Initials MC

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 615812

Project Name:	SWMU 68 GWM	Date Samples Shipped:	10/6/14	SMO Authorization:	☐ Waste Characterization
Project/Task Manager:	Clinton Lum	Carrier/Waybill No.	224565	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:	CF263-15	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),
Tech Area:					P.O. Box 5800, MS-0154
Building:	Room:	Operational Site:			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
096655	-001	OBS-FB2	NA	10/6/14 10:46	DIW	G	3x40ml	HCL	G	FB	TCL VOC (SW846-8260B)	358371 016
096656	-001	OBS-EB1	NA	10/6/14 10:46	DIW	G	3x40ml	HCL	G	EB	TCL VOC (SW846-8260B)	358371 017
096656	-002	OBS-EB1	NA	10/6/14 10:48	DIW	AG	4x1 L	None	G	EB	TCL SVOC (SW846-8270C)	358371 018
096656	-010	OBS-EB1	NA	10/6/14 10:49	DIW	P	500 ml	HNO3	G	EB	TAL Metals+U (SW846-6010/6020/7470)	358371 019
096656	-014	OBS-EB1	NA	10/6/14 10:50	DIW	P	250 ml	None	G	EB	Hexavalent Chromium (SW846-7196A)	358371 005
096656	-016	OBS-EB1	NA	10/6/14 10:51	DIW	P	125 ml	None	G	EB	Anions (SW846-9056) 10/8/14	358371 021
096656	-017	OBS-EB1	NA	10/6/14 10:52	FDIW	P	500 ml	HNO3	G	EB	Metals-Ca,Mg,K,Na (SW846-6020)	358373 002
096656	-018	OBS-EB1	NA	10/6/14 10:53	DIW	P	125 ml	H2SO4	G	EB	Nitrate+Nitrite (EPA 353.2)	358371 022
096656	-020	OBS-EB1	NA	10/6/14 10:54	DIW	P	250 ml	None	G	EB	Perchlorate (EPA 314.0)	358371 023
096656	-022	OBS-EB1	NA	10/6/14 10:55	DIW	P	500 ml	None	G	EB	Alkalinity (SM2320B)	358371 024

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 field using a 0.45 micron in line filter.Report Anions (as Br,C,F,SO4), Alkalinity (as total CaCO3,HCO3,CO3), and Gamma Spectroscopy (as short list isotopes).

Conditions on Receipt

Lab Use

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

1.Relinquished by	AlfredSantillanes	Org.	4142	Date	10/6/14	Time	1124	3.Relinquished by
1. Received by	[signature] SMO	Org.	4142	Date	10/6/14	Time	1124	3. Received by
2.Relinquished by	[signature] SMO	Org.	4142	Date	10/6/14	Time	1200	4.Relinquished by
2. Received by	[signature]	Org.	ltl	Date	10-7-14	Time	0900	4. Received by

*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 615812

Project Name: SWMU 68	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
096656	-024	OBS-EB1	NA	10/6/14 10:57	DIW	AG	4x1 L	None	G	EB	High Explosives (SW846-8321A mod)	358371 025
096656	-027	OBS-EB1	NA	10/6/14 10:58	DIW	P	250 ml	NaOH	G	EB	Total Cyanide (SW846-9012)	358371 026
096656	-033	OBS-EB1	NA	10/6/14 10:59	DIW	P	1 L	HNO3	G	EB	Gamma Spectroscopy (EPA 901.0)	358371 027
096656	-034	OBS-EB1	NA	10/6/14 11:00	DIW	P	1 L	HNO3	G	EB	Gross Alpha and Beta (EPA 900.0)	358371 028
096656	-035	OBS-EB1	NA	10/6/14 11:01	DIW	P	1 L	HNO3	G	EB	Isotopic Uranium (HASL 300)	358371 029
096657	-001	OBS-TB2	NA	10/6/14 10:46	DIW	G	3x40 ml	HCL	G	TB	TCL VOC (SW846-8260B)	358371 030

Recipient Initials MK

SMO 2012-ARCOC (4-2012)

AOP 95-16

CONTRACT LABORATORY
ANALYSIS REQUEST AND CHAIN OF CUSTODY

Internal Lab

Page 1 of 2

Batch No. N/A

SMO Use

AR/COC 615813

Project Name:	SWMU 68 GWM	Date Samples Shipped:	10/7/14	SMO Authorization:	
Project/Task Manager:	Clinton Lum	Carrier/Waybill No.	224722	SMO Contact Phone:	Lorraine Herrera/505-844-3199 SMO
Project/Task Number:	146422.10.11.01	Lab Contact:	Edie Kent/803-556-8171		
Service Order:	CF263-15	Lab Destination:	GEL	Send Report to SMO:	Rita Kavanaugh/505-284-2553
		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
096658	-001	OBS-MW2	252	10/7/14 9:21	GW	G	3x40ml	HCL	G	SA	TCL VOC (SW846-8260B)	358371 031
096658	-002	OBS-MW2	252	10/7/14 9:23	GW	AG	4x1 L	None	G	SA	TCL SVOC (SW846-8270C)	358371 032
096658	-010	OBS-MW2	252	10/7/14 9:27	GW	P	500 ml	HNO3	G	SA	TAL Metals+U (SW846-6010/6020/7470)	358371 033
096658	-014	OBS-MW2	252	10/7/14 9:28	GW	P	250 ml	None	G	SA	Hexavalent Chromium (SW846-7196A)	358371 034
096658	-016	OBS-MW2	252	10/7/14 9:29	GW	P	125 ml	None	G	SA	Anions (SW846-9056)	358371 035
096658	-017	OBS-MW2	252	10/7/14 9:31	FGW	P	500 ml	HNO3	G	SA	Metals-Ca,Mg,K,Na (SW846-6020)	358373 009
096658	-018	OBS-MW2	252	10/7/14 9:32	GW	P	125 ml	H2SO4	G	SA	Nitrate+Nitrite (EPA 353.2)	358371 036
096658	-020	OBS-MW2	252	10/7/14 9:33	GW	P	250 ml	None	G	SA	Perchlorate (EPA 314.0)	358371 037
096658	-022	OBS-MW2	252	10/7/14 9:34	GW	P	500 ml	None	G	SA	Alkalinity (SM2320B)	358371 038
096658	-024	OBS-MW2	252	10/7/14 9:35	GW	AG	4x1 L	None	G	SA	High Explosives (SW846-8321A mod)	358371 039

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 field using a 0.45 micron in line filter.Report Anions (as Br,C,F,SO4), Alkalinity (as total CaCO3,HCO3,CO3), and 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 10/7/14	Time 1008	3.Relinquished by	Org.	Date	Time
1. Received by	Edie Kent for GMO	Org. 4142	Date 10/7/14	Time 1008	3. Received by	Org.	Date	Time
2.Relinquished by	Edie Kent for GMO	Org. 4142	Date 10/7/14	Time 1130	4.Relinquished by	Org.	Date	Time
2. Received by	[illegible]	Org. Cer	Date 10-8-14	Time 0740	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 615813

Project Name:	SWMU 68	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
096658	-027	OBS-MW2	252	10/7/14 9:39	GW	P	250 ml	NaOH	G	SA	Total Cyanide (SW846-9012)	358371 040
096658	-033	OBS-MW2	252	10/7/14 9:40	GW	P	1 L	HNO3	G	SA	Gamma Spectroscopy (EPA 901.0)	358371 041
096658	-034	OBS-MW2	252	10/7/14 9:42	GW	P	1 L	HNO3	G	SA	Gross Alpha and Beta (EPA 900.0)	358371 042
096658	-035	OBS-MW2	252	10/7/14 9:44	GW	P	1 L	HNO3	G	SA	Isotopic Uranium (HASL 300)	358371 043
096659	-001	OBS-MW2	252	10/7/14 9:21	GW	G	3x40ml	HCL	G	DU	TCL VOC (SW846-8260B)	358371 044
096659	-002	OBS-MW2	252	10/7/14 9:23	GW	AG	4x1 L	None	G	DU	TCL SVOC (SW846-8270C)	358371 045
096659	-010	OBS-MW2	252	10/7/14 9:27	GW	P	500 ml	HNO3	G	DU	TAL Metals+U (SW846-6010/6020/7470)	358371 046
096659	-014	OBS-MW2	252	10/7/14 9:28	GW	P	250 ml	None	G	DU	Hexavalent Chromium (SW846-7196A)	358371 047
096659	-016	OBS-MW2	252	10/7/14 9:29	GW	P	125 ml	None	G	DU	Anions (SW846-9056)	358371 048
096659	-017	OBS-MW2	252	10/7/14 9:31	FGW	P	500 ml	HNO3	G	DU	Metals-Ca,Mg,K,Na (SW846-6020)	358372 004
096659	-018	OBS-MW2	252	10/7/14 9:32	GW	P	125 ml	H2SO4	G	DU	Nitrate+Nitrite (EPA 353.2)	358371 049
096659	-020	OBS-MW2	252	10/7/14 9:33	GW	P	250 ml	None	G	DU	Perchlorate (EPA 314.0)	358371 050
096659	-022	OBS-MW2	252	10/7/14 9:34	GW	P	500 ml	None	G	DU	Alkalinity (SM2320B)	358371 051
096659	-024	OBS-MW2	252	10/7/14 9:35	GW	AG	4x1 L	None	G	DU	High Explosives (SW846-8321A mod)	358371 052
096659	-027	OBS-MW2	252	10/7/14 9:39	GW	P	250 ml	NaOH	G	DU	Total Cyanide (SW846-9012)	358371 053
096659	-033	OBS-MW2	252	10/7/14 9:40	GW	P	1 L	HNO3	G	DU	Gamma Spectroscopy (EPA 901.0)	358371 054
096659	-034	OBS-MW2	252	10/7/14 9:42	GW	P	1 L	HNO3	G	DU	Gross Alpha and Beta (EPA 900.0)	358371 055
096659	-035	OBS-MW2	252	10/7/14 9:44	GW	P	1 L	HNO3	G	DU	Isotopic Uranium (HASL 300)	358371 056
096660	-001	OBS-TB3	NA	10/7/14 9:21	DIW	G	3x40 ml	HCL	G	TB	TCL VOC (SW846-8260B)	358371 057

Recipient Initials MK

SMO 2012-ARCOC (4-2012)

AOP 95-16

CONTRACT LABORATORY
ANALYSIS REQUEST AND CHAIN OF CUSTODY

Internal Lab

Page 1 of 2

Batch No. N/A

SMO Use

AR/COC 615814

Project Name:	SWMU 68 GWM	Date Samples Shipped:	10/8/14	SMO Authorization:	☐ Waste Characterization
Project/Task Manager:	Clinton Lum	Carrier/Waybill No.	224747	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:	CF263-15	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
096661	-001	OBS-MW3	208	10/8/14 9:17	GW	G	3x40ml	HCL	G	SA	TCL VOC (SW846-8260B)	358371 058
096661	-002	OBS-MW3	208	10/8/14 9:19	GW	AG	4x1 L	None	G	SA	TCL SVOC (SW846-8270C)	358371 059
096661	-010	OBS-MW3	208	10/8/14 9:20	GW	P	500 ml	HNO3	G	SA	TAL Metals+U (SW846-6010/6020/7470)	358371 060
096661	-014	OBS-MW3	208	10/8/14 9:21	GW	P	250 ml	None	G	SA	Hexavalent Chromium (SW846-7196A)	358371 061
096661	-016	OBS-MW3	208	10/8/14 9:22	GW	P	125 ml	None	G	SA	Anions (SW846-9056)	358371 062
096661	-017	OBS-MW3	208	10/8/14 9:23	FGW	P	500 ml	HNO3	G	SA	Metals-Ca,Mg,K,Na (SW846-6020)	358373 005
096661	-018	OBS-MW3	208	10/8/14 9:24	GW	P	125 ml	H2SO4	G	SA	Nitrate+Nitrite (EPA 353.2)	358371 063
096661	-020	OBS-MW3	208	10/8/14 9:25	GW	P	250 ml	None	G	SA	Perchlorate (EPA 314.0)	358371 064
096661	-022	OBS-MW3	208	10/8/14 9:26	GW	P	500 ml	None	G	SA	Alkalinity (SM2320B)	358371 065
096661	-024	OBS-MW3	208	10/8/14 9:28	GW	AG	4x1 L	None	G	SA	High Explosives (SW846-8321A mod)	358371 066

Last Chain:	☑ Yes	Sample Tracking	SMO Use	Special Instructions/QC Requirements:	Conditions on Receipt
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

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

Lab Use

1.Relinquished by	Robert Lynch	Org. 4142	Date 10/8/14	Time 0955	3.Relinquished by		Org.		Date		Time
1. Received by	SNL	Org. 4142	Date 10/8/14	Time 0955	3. Received by		Org.		Date		Time
2.Relinquished by	SNL	Org. 4142	Date 10/8/14	Time 1115	4.Relinquished by		Org.		Date		Time
2. Received by		Org. CEC	Date 10-9-14	Time 0725	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 615814

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
096661	-027	OBS-MW3	208	10/8/14 9:29	GW	P	250 ml	NaOH	G	SA	Total Cyanide (SW846-9012)	358371 067
096661	-033	OBS-MW3	208	10/8/14 9:30	GW	P	1 L	HNO3	G	SA	Gamma Spectroscopy (EPA 901.0)	358371 068
096661	-034	OBS-MW3	208	10/8/14 9:31	GW	P	1 L	HNO3	G	SA	Gross Alpha and Beta (EPA 900.0)	358371 069
096661	-035	OBS-MW3	208	10/8/14 9:33	GW	P	1 L	HNO3	G	SA	Isotopic Uranium (HASL 300)	358371 070
096662	-001	OBS-TB4	NA	10/8/14 9:17	DIW	G	3x40 ml	HCL	G	TB	TCL VOC (SW846-8260B)	358371 071

Recipient Initials MK

Sample Findings Summary

AR/COC: 615822, 615823, 615824

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
EPA 900.0/SW846 9310			
	096685-034/CCBA-MW1	ALPHA (12587-46-1)	J, FR7,MS1
	096685-034/CCBA-MW1	BETA (12587-47-2)	J, FR7,MS1
	096688-034/CCBA-EB1	ALPHA (12587-46-1)	BD, FR3,MS1
	096688-034/CCBA-EB1	BETA (12587-47-2)	BD, FR3,MS1
	096691-034/CCBA-MW2	ALPHA (12587-46-1)	J, MS1
	096691-034/CCBA-MW2	BETA (12587-47-2)	J, FR7,MS1
	096692-034/CCBA-MW2	ALPHA (12587-46-1)	J, MS1
	096692-034/CCBA-MW2	BETA (12587-47-2)	BD, FR3,MS1
EPA 901.1			
	096685-033/CCBA-MW1	Americium-241 (14596-10-2)	BD, FR3
	096685-033/CCBA-MW1	Cesium-137 (10045-97-3)	BD, FR3
	096685-033/CCBA-MW1	Cobalt-60 (10198-40-0)	BD, FR3
	096685-033/CCBA-MW1	Potassium-40 (13966-00-2)	BD, FR3
	096688-033/CCBA-EB1	Americium-241 (14596-10-2)	BD, FR3
	096688-033/CCBA-EB1	Cesium-137 (10045-97-3)	BD, FR3
	096688-033/CCBA-EB1	Cobalt-60 (10198-40-0)	BD, FR3
	096688-033/CCBA-EB1	Potassium-40 (13966-00-2)	BD, FR3
	096691-033/CCBA-MW2	Americium-241 (14596-10-2)	BD, FR3
	096691-033/CCBA-MW2	Cesium-137 (10045-97-3)	BD, FR3
	096691-033/CCBA-MW2	Cobalt-60 (10198-40-0)	BD, FR3
	096691-033/CCBA-MW2	Potassium-40 (13966-00-2)	BD, FR3
	096692-033/CCBA-MW2	Americium-241 (14596-10-2)	BD, FR3
	096692-033/CCBA-MW2	Cesium-137 (10045-97-3)	BD, FR3
	096692-033/CCBA-MW2	Cobalt-60 (10198-40-0)	BD, FR3

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
	096692-033/CCBA-MW2	Potassium-40 (13966-00-2)	BD, FR3
SW846 3005/6020 DOE-AL			
	096691-010/CCBA-MW2	Copper (7440-50-8)	0.0042U, B2
	096692-010/CCBA-MW2	Copper (7440-50-8)	0.0042U, B2
SW846 3535/8321A Modified			
	096685-024/CCBA-MW1	m-Nitrotoluene (99-08-1)	UJ, I4
	096685-024/CCBA-MW1	o-Nitrotoluene (88-72-2)	UJ, I4
	096685-024/CCBA-MW1	p-Nitrotoluene (99-99-0)	UJ, I4
	096685-024/CCBA-MW1	Tetryl (479-45-8)	UJ, L3,MS3
	096688-024/CCBA-EB1	m-Nitrotoluene (99-08-1)	UJ, I4
	096688-024/CCBA-EB1	o-Nitrotoluene (88-72-2)	UJ, I4
	096688-024/CCBA-EB1	p-Nitrotoluene (99-99-0)	UJ, I4
	096688-024/CCBA-EB1	Tetryl (479-45-8)	UJ, L3,MS3
	096691-024/CCBA-MW2	m-Nitrotoluene (99-08-1)	UJ, I4
	096691-024/CCBA-MW2	o-Nitrotoluene (88-72-2)	UJ, I4
	096691-024/CCBA-MW2	p-Nitrotoluene (99-99-0)	UJ, I4
	096691-024/CCBA-MW2	Tetryl (479-45-8)	UJ, L3,MS3
	096692-024/CCBA-MW2	m-Nitrotoluene (99-08-1)	UJ, I4
	096692-024/CCBA-MW2	o-Nitrotoluene (88-72-2)	UJ, I4
	096692-024/CCBA-MW2	p-Nitrotoluene (99-99-0)	UJ, I4
	096692-024/CCBA-MW2	Tetryl (479-45-8)	UJ, L3,MS3
SW846 8260B DOE-AL			
	096686-001/CCBA-TB1	Bromomethane (74-83-9)	UJ, I3,C3
	096687-001/CCBA-FB1	Bromomethane (74-83-9)	UJ, I3,C3
	096688-001/CCBA-EB1	Bromomethane (74-83-9)	UJ, I3,C3
	096689-001/CCBA-TB2	Bromomethane (74-83-9)	UJ, I3,C3
	096690-001/CCBA-FB2	Bromomethane (74-83-9)	UJ, I3,C3
SW846 9012B			
	096685-027/CCBA-MW1	Cyanide, Total (57-12-5)	UJ, I5

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
	096688-027/CCBA-EB1	Cyanide, Total (57-12-5)	UJ, I5
	096691-027/CCBA-MW2	Cyanide, Total (57-12-5)	UJ, I5
	096692-027/CCBA-MW2	Cyanide, Total (57-12-5)	UJ, I5

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

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

Memorandum

Date: November 21, 2014

To: File

From: Monica Dymerski

Subject: Inorganic Data Review and Validation – SNL
Site: SWMU 8/58 GWM
AR/COC: 615822, 615823, and 615824
SDG: 358946
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. Problems were identified with the data package that resulted in the qualification of data.

Total cyanide:

1. The intercept for total cyanide was negative with an absolute value > the MDL but ≤3X the MDL. The associated sample results were 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 were properly preserved.

Calibration

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

Blanks

No target analytes were detected in the blanks except as follows. Chloride was detected in a CCB bracketing sample -017 at < the PQL. The associated sample result was a non-detect 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.

Nitrate/nitrite – N:

The MS analysis 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.

Nitrate/nitrite – N:

The replicate analysis 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:
All samples *except* -018 (EB) were diluted 5X.

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

Other QC

An EB was submitted with ARCOC 615823 and it was associated with the samples from ARCOC 615824. A field duplicate pair was submitted with ARCOC 615824. There are no "required" review criteria for field duplicate analyses comparability; no data will be qualified as a result.

No other specific issues that affect data quality were identified.

Reviewed by: Mary Donivan **Level:** I **Date:** 11/24/14

ANALYTICAL QUALITY ASSOCIATES, INC.

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

Memorandum

Date: November 21, 2014

To: File

From: Monica Dymerski

Subject: LC/MS/MS Organic Data Review and Validation – SNL
Site: SWMU 8/58 GWM
AR/COC: 615822, 615823, and 615824
SDG: 358946
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 ICAL RFs or calibration slope for m-nitrotoluene, o-nitrotoluene and p-nitrotoluene were <0.05 but ≥0.01. All associated sample results were non-detects and will be **qualified UJ,I4.**
2. The LCS %R was < the lower acceptance limit but ≥10% for Tetryl. The associated sample results were non-detects and will be **qualified UJ,L3.**
3. The MS %R was < the lower acceptance limit but ≥10% for Tetryl. 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 extracted and analyzed within the prescribed holding times and were 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 except as noted above in the Summary section.

Laboratory Control Sample (LCS)

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

Detection Limits/Dilutions

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

Other QC

An EB was submitted with ARCOC 615823 and it was associated with the samples from ARCOC 615824. A field duplicate pair was submitted with ARCOC 615824. There are no "required" review criteria for field duplicate analyses comparability; no data will be qualified as a result.

No other specific issues that affect data quality were identified.

Reviewed by: Mary Donivan **Level:** I **Date:** 11/24/14

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

Date: November 21, 2014

To: File

From: Monica Dymerski

Subject: Inorganic Data Review and Validation – SNL
Site: SWMU 8/58 GWM
AR/COC: 615822, 615823, and 615824
SDG: 358946 and 358947
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-MS:

1. Cu was detected at < the PQL in EB sample 358946016, associated with samples -029 and -040. The associated sample results were detects ≤5X the EB concentration and will be **qualified 0.0042U,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. 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 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.

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* 358946016 were diluted 5X for Ca and Na, and all filtered samples *except* 358947002 were diluted 5X for Ca and Na.

ICP Interference Check Sample (ICS A and AB)

Results of the ICS A and AB analyses were not evaluated because the 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 615823 and it was associated with the samples from ARCOC 615824. A field duplicate pair was submitted with ARCOC 615824. There are no "required" review criteria for field duplicate analyses comparability; no data will be qualified as a result.

No other specific issues that affect data quality were identified.

Reviewed by: Mary Donivan **Level:** I **Date:** 11/24/14

ANALYTICAL QUALITY ASSOCIATES, INC.

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

Memorandum

Date: November 21, 2014

To: File

From: Monica Dymerski

Subject: Radiochemical Data Review and Validation – SNL
Site: SWMU 8/58 GWM
AR/COC: 615822, 615823, and 615824
SDG: 358946
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.

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 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.**
2. All sample results that were > the MDA but ≤3X the MDA will be **qualified J,FR7.**

Holding Times and Preservation

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

Quantification

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

Calibration

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

Blanks

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

Tracer/Carrier Recovery

Tracers and /or carriers are not required for the methods used.

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.

Gamma spec:
It should be noted that the replicate was performed on a sample of similar matrix from another SNL SDG. No sample data will be qualified as a result.

Laboratory Control Sample (LCS)

All LCS recoveries met QC acceptance criteria.

Detection Limits/Dilutions

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

Other QC

An EB was submitted with ARCOC 615823 and it was associated with the samples from ARCOC 615824. A field duplicate pair was submitted with ARCOC 615824. There are no "required" review criteria for field duplicate analyses comparability; no data will be qualified as a result.

No other specific issues that affect data quality were identified.

Reviewed by: Mary Donivan **Level:** I **Date:** 11/24/14

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

Memorandum

Date: November 21, 2014

To: File

From: Monica Dymerski

Subject: GC/MS Organic Data Review and Validation – SNL
Site: SWMU 8/58 GWM
AR/COC: 615822, 615823, and 615824
SDG: 358946
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. 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 extracted and analyzed within the prescribed holding times 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 follows.

The ICAL %RSD was >15% but ≤40% and the ICV %D was >20% with a positive bias for p-nitroaniline. The associated sample results were non-detects and, since a positively biased calibration verification outlier is not considered a second calibration infraction, will not be qualified.

The ICV or CCV %Ds were >20% but ≤40% with negative bias for hexachlorocyclopentadiene, 2,4-dinitrophenol, pentachlorophenol, 1,4-dioxane, and benzaldehyde. 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.

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 615823 and it was associated with the samples from ARCOC 615824. A field duplicate pair was submitted with ARCOC 615824. There are no "required" review criteria for field duplicate analyses comparability; no data will be qualified as a result.

No other specific issues that affect data quality were identified.

Reviewed by: Mary Donivan **Level:** I **Date:** 11/24/14

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

Memorandum

Date: November 21, 2014

To: File

From: Monica Dymerski

Subject: GC/MS Organic Data Review and Validation – SNL
Site: SWMU 8/58 GWM
AR/COC: 615822, 615823, and 615824
SDG: 358946
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 >15% but ≤40%, and the ICV and CCV %Ds were >20% but ≤40% with negative bias for bromomethane for the calibration associated with samples -012, -013, -014, -025, and -026. The associated sample results were non-detects and will be **qualified UJ,I3,C3.**

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

Holding Times

The samples were 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.

For the ICAL associated with samples -012, -013, -014, -025, and -026, the %RSDs were >15% but ≤40% for dibromochloromethane, bromoform, and 1,2-dibromo3-chloropropane, and the ICV %Ds were >20% positive bias for bromoform and 1,2-dibromo-3-chloropropane. The associated sample results were non-detects, and since a positively biased ICV outlier is not considered to be a second calibration infraction, will not be qualified.

For the ICAL associated with samples -001, -027, -038, and -049, the %RSDs were >15% but ≤40% for acetone and carbon disulfide, and the ICV %D was >20% with positive bias for carbon disulfide. The associated sample results were non-detects, and since a positively biased ICV outlier is not considered to be a second calibration infraction, 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 EB sample -014, associated with samples -027 and -038. Bromodichloromethane was detected at < the PQL, and chloroform was detected at > the PQL in FB sample -026, associated with samples -027 and -038. The associated sample results were non-detects and will not be qualified.

Acetone and bromodichloromethane were detected at a concentration < the PQL and chloroform was detected at a concentration > the PQL in FB sample -013, which was not associated with any samples. No sample data will be qualified as a result.

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

Three TBs were submitted, one associated with each ARCOC. An EB was submitted with ARCOC 615823 and it was associated with the samples from ARCOC 615824. An FB was submitted with ARCOC 615824 and was associated with the sample from that ARCOC. A second FB was submitted with

ARCOC 615823, and was not associated with any field samples. A field duplicate pair was submitted with ARCOC 615824. There are no “required” review criteria for field duplicate analyses comparability; no data will be qualified as a result.

No other specific issues that affect data quality were identified.

Reviewed by: Mary Donivan **Level:** I **Date:** 11/24/14

Data Validation Summary Worksheet

AR/COC #: 615822, 615823, and 615824 Site/Project: SWMU 8/58 G Validation Date: 11/21/2014

SDG #: 353946 and 358947 Laboratory: GEL Laboratories LLC Validator: Monica Dymerski

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 10/13-14/2014.

Revised 7/2007

Validated By: _____ Monica L Dymerski

Organic Worksheet (GC/MS)

AR/COC #: 615822, 615823, and 615824 SDG #:358946 Matrix: Aqueous

Laboratory Sample IDs: 358946001, -012, -013, -014, -025, -026, -027, -038, and -049

Method/Batch #s: 8260B: **1430102** 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**	**FB1 -013**	**5X (10X) FB1**	**EB1 -014**	**5X (10X) EB1**	**FB2 -026**	**5X (10X) FB2**
	Int.	**RF**	**RSD/R^2**	**CCV (ICV) %D**												
acetone	NA	✓	22.3*	✓	✓	NA	✓	✓	✓	✓	2.53J	(25.3)	2.70J	(27.0)	✓	NA
bromodichloromethane	NA	✓	✓	✓	✓	NA	✓	✓	✓	✓	0.600J	3.00	0.520J	2.6	0.460J	2.3
chloroform	NA	✓	✓	✓	✓	NA	✓	✓	✓	✓	3.70	18.5	3.85	19.25	4.24	21.2
bromomethane	NA	✓	24.6**	(-21.6)**/ -20.6**	✓	NA	✓	✓	✓	✓	✓	NA	✓	NA	✓	NA
dibromochloromethane	NA	✓	18.0**	✓	✓	NA	✓	✓	✓	✓	✓	NA	✓	NA	✓	NA
bromoform	NA	✓	26.4**	(24.8)**	✓	NA	✓	✓	✓	✓	✓	NA	✓	NA	✓	NA
1,2-dibromo-3-chloropropane	NA	✓	30.6**	(21.3)**	✓	NA	✓	✓	✓	✓	✓	NA	✓	NA	✓	NA
carbon disulfide	NA	✓	18.5*	30.0*	✓	NA	✓	✓	✓	✓	✓	NA	✓	NA	✓	NA

Surrogate Recovery Outliers

Sample ID									
None									

IS Outliers

Sample ID	**Area**	**RT**	**Area**	**RT**	**Area**	**RT**	**Area**	**RT**	**Area**	**RT**			**Area**	**RT**
None														

Comments: HTs OK, *ICAL VOA4 10/20/14; samples -001, 027, -038, and -049 analyzed 10/24/14. ** ICAL VOAA 09/12 through 15/14. Samples -012, -013, -014, -025, and -026 analyzed on 10/23/14. MS/MSD performed on -001

Organic Worksheet (GC/MS)

AR/COC #: 615822, 615823, and 615824 SDG #:358946 Matrix: Aqueous

Laboratory Sample IDs: 358946002, -015, -028, and -039

Method/Batch #s: 3510C/8270D **1428628/1428629** 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 -015	5X (10X) EB		
	Int.	RF	RSD/ R^2	CCV (ICV) %D										
p-nitroaniline	NA	✓	19.5	(21.4)	✓	NA	✓	✓	✓	✓	✓	NA		
hexachlorocyclopentadiene	NA	✓	✓	(-26.9)	✓	NA	✓	✓	✓	✓	✓	NA		
2,4-dinitrophenol	✓	✓	✓	-23.8	✓	NA	✓	✓	✓	✓	✓	NA		
pentachlorophenol	NA	✓	✓	-30.6	✓	NA	✓	✓	✓	✓	✓	NA		
1,4-dioxane	NA	✓	✓	-21.5	✓	NA	✓	✓	✓	✓	✓	NA		
benzaldehyde	NA	✓	✓	-21.9	✓	NA	✓	✓	✓	✓	✓	NA		

Surrogate Recovery Outliers

Sample ID	2-fluorophenol	phenol-d5	2,4,6-tribromophenol	nitrobenzene-d5	2-fluorobiphenyl	p-terphenyl-d14
None						

IS Outliers

Sample ID	Area	RT	Area	RT	Area	RT	Area	RT	Area	RT	Area	RT
None												

Comments: HTs OK, ICAL MSD3.I 10/02/14 and 10/03/14. Samples analyzed 10/20/14.

MS/MSD performed on sample -002.

High Explosives Worksheet (LC/MS/MS)

AR/COC #: 615822, 615823, and 615824 SDG #: 358946 Matrix: Aqueous

Laboratory Sample IDs: 358946008, -021, -034, and -045

Method/Batch #s: 3535/8321A **1428283/1428291**

Analyte (Outliers)	Initial Calibration			Continuing Calibration				Method Blank	5X (10X) Blank	LCS %R	LCSD %R	LCS/ LCSD RPD	MS %R	MSD %R	MS/ MSD RPD	CRI	EB -021
	Int.	RF	COD RSD/R^2	ICV	CCV	ICB	CCB										
m-nitrotoluene	NA	0.022	✓	✓	✓	✓	✓	✓	NA	✓	✓	✓	✓	✓	✓	✓	✓
o-nitrotoluene	NA	0.029	✓	✓	✓	✓	✓	✓	NA	✓	✓	✓	✓	✓	✓	✓	✓
p-nitrotoluene	✓	0.012	✓	✓	✓	✓	✓	✓	NA	✓	✓	✓	✓	✓	✓	✓	✓
tetryl	✓	✓	✓	✓	✓	✓	✓	✓	NA	37	33	✓	30.4	✓	✓	✓	✓

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

ICAL LCMSMS3 10/30/2014. Samples analyzed on 10/31/2014.

Inorganic Metals Worksheet

AR/COC #: 615822, 615823, and 615824 SDG #: 358946 and 358947 Matrix: Aqueous

Laboratory Sample IDs: 358946003, -016, -029, and -040 (UF); 358947001 through -004 (F, 6020 Ca, Mg, K, and Na only)

Method/Batch #s: **3005A/6010B (ICP-AES):** 1427723(prep)/1427725 **3005A/6020** (ICP-MS): 1427697(prep)/1427698 **7470A** (Hg): 1431585 (prep)/1431587

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**	**UF EB 358946016**	**5X EB**			
	Int.	**R^2**	**ICV**	**CCV**	**ICB**	**CCB**														
Cu	✓	✓	✓	✓	✓	✓	✓	NA	✓	✓	✓	✓	NA	NA	✓	0.000835J	0.0042			
Sb	✓	✓	✓	✓	✓	✓	0.00101J	0.00505	✓	✓	✓	✓	NA	NA	✓	✓	NA			
Ca	✓	✓	✓	✓	✓	✓	✓	NA	✓	20*	✓	✓	NA	NA	✓	✓	NA			
Na	✓	✓	✓	✓	✓	✓	✓	NA	✓	-5*	✓	✓	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: ICP-MS:** Performed on 358947001. **ICP-AES and Hg:** performed on 358946003. *Ca, Mg, and Na >4X spike amount.

All unfiltered samples *except* 358946016 were diluted 5X for Ca and Na, and all filtered samples *except* 358947002 were diluted 5X for Ca and Na.

General Chemistry Worksheet

AR/COC #: 615822, 615823, and 615824 SDG #: 358946 Matrix: Aqueous

Laboratory Sample IDs: 358946 - See below

Method/Batch #s: EPA 9012B (total cyanide): Batch 1427815(prep)/1427816 Samples -009, -022, -035, and -046

Method/Batch #s: EPA 314.0 (perchlorate): Batch 1427862 Samples -006, -019, -032, and -043

Method/Batch #s: EPA 9056 (anions): Batch 1427860 Samples -004, -017, -030, and -041

Method/Batch #s: EPA 353.2 (NO_3/NO_2 – N): Batch 1425672 Samples -005, -018, -031, and -042

Method/Batch #s: SM2320B (alkalinity): Batch 1430054 Samples -007, -020, -033, and -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 %D**	**CCV %D**	**ICB**	**CCB**										
total cyanide	-0.00186	✓	✓	✓	✓	✓	✓	NA	✓	✓	✓	✓	NA			
Chloride	✓	✓	✓	✓	✓	0.103*	✓	0.515	✓	✓	✓	✓	NA			

Comments: HTs OK. **Matrix QC: 9012A:** performed on sample -009**; 314.0:** performed on sample -006; **9056**: performed on sample -004; **353.2**: performed on an SNL sample from another SDG; **SM2320B**: performed on sample -033.

*Associated with sample -017 only.

Anions – Sample -004 was diluted 5X for chloride and sulfate. Samples -030 and -041 were diluted 10X for chloride and sulfate. NO_3/NO_2 – all samples except EB diluted 5X

Radiochemistry Worksheet

AR/COC #: 615822, 615823, and 615824 SDG #: 358946 Matrix: Aqueous

Laboratory Sample IDs: 358946- See below

Method/Batch #s: EPA 901.1 (gamma spec): Batch 1426848 Samples -010, -023, -036, and -047

Method/Batch #s: EPA 900.0 (Gross alpha/beta): Batch 1430818 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**			
None													

Tracer/Carrier Recovery Outliers

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

Comments: **Matrix QC: 901.1:** Performed on SNL samples from other SDGs. **900.0:** Performed on sample -011.

Gross alpha/beta parent and DUP = 150 ml, MS/MSD=25 ml (6X dilution)-results qualified.

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 2

AR/COC 615822

Project Name:	SWMU 8/58 GWM	Date Samples Shipped:	10/13/14
Project/Task Manager:	Clinton Lum	Carrier/Waybill No.	224914
Project/Task Number:	146422.10.11.01	Lab Contact:	Edie Kent/803-556-8171
Service Order:	CF262-15	Lab Destination:	GEL
Tech Area:		Contract No.:	PO 1303873
Building:	Room:	Operational Site:	

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
096685	-001	CCBA-MW1	79	10/13/14 9:24	GW	G	3x40ml	HCL	G	SA	TCL VOC (SW846-8260B)	358946 001
096685	-002	CCBA-MW1	79	10/13/14 9:26	GW	AG	4x1 L	None	G	SA	TCL SVOC (SW846-8270C)	358946 002
096685	-010	CCBA-MW1	79	10/13/14 9:27	GW	P	500 ml	HNO3	G	SA	TAL Metals+U (SW846-6010/6020/7470)	358946 003
096685	-016	CCBA-MW1	79	10/13/14 9:28	GW	P	125 ml	None	G	SA	Anions (SW846-9056)	358946 004
096685	-017	CCBA-MW1	79	10/13/14 9:29	FGW	P	500 ml	HNO3	G	SA	Metals-Ca,Mg,K,Na (SW846-6020)	358947 001
096685	-018	CCBA-MW1	79	10/13/14 9:30	GW	P	125 ml	H2SO4	G	SA	Nitrate+Nitrite (EPA 353.2)	358946 005
096685	-020	CCBA-MW1	79	10/13/14 9:31	GW	P	250 ml	None	G	SA	Perchlorate (EPA 314.0)	358946 006
096685	-022	CCBA-MW1	79	10/13/14 9:32	GW	P	500 ml	None	G	SA	Alkalinity (SM2320B)	358946 007
096685	-024	CCBA-MW1	79	10/13/14 9:34	GW	AG	4x1 L	None	G	SA	High Explosives (SW846-8321A mod)	358946 008
096685	-027	CCBA-MW1	79	10/13/14 9:35	GW	P	250 ml	NaOH	G	SA	Total Cyanide (SW846-9012)	358946 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 field using a 0.45 micron in line filter.Report Anions (as Br,C,F,SO4), Alkalinity (as total CaCO3,HCO3,CO3), and Gamma Spectroscopy (as short list isotopes).

Conditions on Receipt

Lab Use

Sample Team Members	Name	Signature	Init.	Company/Organization/Phone/Cell
	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 10/13/14	Time 1013	3.Relinquished by	Org.	Date Time
1. Received by		Org. 4142	Date 10/13/14	Time 1013	3. Received by	Org.	Date Time
2.Relinquished by		Org. 4142	Date 10/13/14	Time 1045	4.Relinquished by	Org.	Date Time
2. Received by		Org. CRL	Date 10-14-14	Time 0750	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 615822

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
096685	-033	CCBA-MW1	79	10/13/14 9:36	GW	P	1 L	HNO3	G	SA	Gamma Spectroscopy (EPA 901.0)	358946 010
096685	-034	CCBA-MW1	79	10/13/14 9:38	GW	P	1 L	HNO3	G	SA	Gross Alpha and Beta (EPA 900.0)	358946 011
096686	-001	CCBA-TB1	NA	10/13/14 9:24	DIW	G	3x40 ml	HCL	G	TB	TCL VOC (SW846-8260B)	358946 012

Recipient Initials MK

SMO 2012-ARCOC (4-2012)

CONTRACT LABORATORY
ANALYSIS REQUEST AND CHAIN OF CUSTODY

AOP 95-1€

Internal Lab

Batch No. N/A

SMO Use

AR/COC 615823

Project Name: SWMU 8/58 GWM	Date Samples Shipped: 10/14/14	SMO Authorization:	☐ Waste Characterization
Project/Task Manager: Clinton Lum	Carrier/Waybill No. 224990	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: CF262-15	Lab Destination: GEL	Send Report to SMO: Rita Kavanaugh/505-284-2553	☑ 4° Celsius
Tech Area:	Contract No.: PO 1303873		Bill to:Sandia National Laboratories (Accounts Payable), P.O. Box 5800, MS-0154 Albuquerque, NM 87185-0154
Building: Room:	Operational Site:		

Sample No.	Fraction	Sample Location Detail	Depth (ft)	Date/Time Collected	Sample Matrix	Container Type	Container Volume	Preserv-ative	Collection Method	Sample Type	Parameter & Method Requested	Lab Sample ID
096687	-001	CCBA-FB1	NA	10/13/14 10:55	DIW	G	3x40ml	HCL	G	FB	TCL VOC (SW846-8260B)	358946 013
096688	-001	CCBA-EB1	NA	10/13/14 10:55	DIW	G	3x40ml	HCL	G	EB	TCL VOC (SW846-8260B)	358946 014
096688	-002	CCBA-EB1	NA	10/13/14 10:57	DIW	AG	4x1 L	None	G	EB	TCL SVOC (SW846-8270C)	358946 015
096688	-010	CCBA-EB1	NA	10/13/14 10:58	DIW	P	500 ml	HNO3	G	EB	TAL Metals+U (SW846-6010/6020/7470)	358946 016
096688	-016	CCBA-EB1	NA	10/13/14 10:59	DIW	P	125 ml	None	G	EB	Anions (SW846-9056)	358946 017
096688	-017	CCBA-EB1	NA	10/13/14 11:00	FDIW	P	500 ml	HNO3	G	EB	Metals-Ca,Mg,K,Na (SW846-6020)	358947 002
096688	-018	CCBA-EB1	NA	10/13/14 11:01	DIW	P	125 ml	H2SO4	G	EB	Nitrate+Nitrite (EPA 353.2)	358946 018
096688	-020	CCBA-EB1	NA	10/13/14 11:02	DIW	P	250 ml	None	G	EB	Perchlorate (EPA 314.0)	358946 019
096688	-022	CCBA-EB1	NA	10/13/14 11:03	DIW	P	500 ml	None	G	EB	Alkalinity (SM2320B)	358946 020
096688	-024	CCBA-EB1	NA	10/13/14 11:05	DIW	AG	4x1 L	None	G	EB	High Explosives (SW846-8321A mod)	358946 021

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
	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 field using a 0.45 micron in line filter.Report Anions (as Br,C,F,SO4), Alkalinity (as total CaCO3,HCO3,CO3), and Gamma Spectroscopy (as short list isotopes).

Conditions on Receipt

Lab Use

1.Relinquished by		Org. 4142	Date 10/14/14	Time 0914	3.Relinquished by	Org.	Date	Time
1. Received by	SMO	Org. 4142	Date 10/14/14	Time 0914	3. Received by	Org.	Date	Time
2.Relinquished by	SMO	Org. 4142	Date 10/14/14	Time 1000	4.Relinquished by	Org.	Date	Time
2. Received by		Org. Gel	Date 10-15-14	Time 0745	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 615823

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
096688	-027	CCBA-EB1	NA	10/13/14 11:06	DIW	P	250 ml	NaOH	G	EB	Total Cyanide (SW846-9012)	358946 022
096688	-033	CCBA-EB1	NA	10/13/14 11:07	DIW	P	1 L	HNO3	G	EB	Gamma Spectroscopy (EPA 901.0)	358946 023
096688	-034	CCBA-EB1	NA	10/13/14 11:09	DIW	P	1 L	HNO3	G	EB	Gross Alpha and Beta (EPA 900.0)	358946 024
096689	-001	CCBA-TB2	NA	10/13/14 10:55	DIW	G	3x40 ml	HCL	G	TB	TCL VOC (SW846-8260B)	358946 025

Recipient Initials MK

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 615824

Project Name:	SWMU 8/58 GWM	Date Samples Shipped:	10/14/14	SMO Authorization:	☐ Waste Characterization
Project/Task Manager:	Clinton Lum	Carrier/Waybill No.	2124990	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:	CF262-15	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
096690	-001	CCBA-FB2	NA	10/14/14 9:23	DIW	G	3x40ml	HCL	G	FB	TCL VOC (SW846-8260B)	358946 026
096691	-001	CCBA-MW2	117	10/14/14 9:23	GW	G	3x40ml	HCL	G	SA	TCL VOC (SW846-8260B)	358946 027
096691	-002	CCBA-MW2	117	10/14/14 9:25	GW	AG	4x1 L	None	G	SA	TCL SVOC (SW846-8270C)	358946 028
096691	-010	CCBA-MW2	117	10/14/14 9:29	GW	P	500 ml	HNO3	G	SA	TAL Metals+U (SW846-6010/6020/7470)	358946 029
096691	-016	CCBA-MW2	117	10/14/14 9:30	GW	P	125 ml	None	G	SA	Anions (SW846-9056)	358946 030
096691	-017	CCBA-MW2	117	10/14/14 9:32	FGW	P	500 ml	HNO3	G	SA	Metals-Ca,Mg,K,Na (SW846-6020)	358947 003
096691	-018	CCBA-MW2	117	10/14/14 9:33	GW	P	125 ml	H2SO4	G	SA	Nitrate+Nitrite (EPA 353.2)	358946 031
096691	-020	CCBA-MW2	117	10/14/14 9:34	GW	P	250 ml	None	G	SA	Perchlorate (EPA 314.0)	358946 032
096691	-022	CCBA-MW2	117	10/14/14 9:35	GW	P	500 ml	None	G	SA	Alkalinity (SM2320B)	358946 033
096691	-024	CCBA-MW2	117	10/14/14 9:36	GW	AG	4x1 L	None	G	SA	High Explosives (SW846-8321A mod)	358946 034

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 field using a 0.45 micron in line filter.Report Anions (as Br,C,F,SO4), Alkalinity (as total CaCO3,HCO3,CO3), and 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~~			~~SNL/4142/505-844-5130/505-228-0710~~
WJG	William Gibson	William J Gibson	WJG	SNL/4142/505-284-3307/505-239-7367

1.Relinquished by	William J Gibson	Org. 4142	Date 10/14/14	Time 1028	3.Relinquished by	Org.	Date	Time
1. Received by	[signature] SNL	Org. 4142	Date 10/14/14	Time 1028	3. Received by	Org.	Date	Time
2.Relinquished by	[signature] SNL	Org. 4142	Date 10/14/14	Time 1100	4.Relinquished by	Org.	Date	Time
2. Received by	[signature]	Org. Cor	Date 10-15-14	Time 0745	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 615824

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
096691	-027	CCBA-MW2	117	10/14/14 9:40	GW	P	250 ml	NaOH	G	SA	Total Cyanide (SW846-9012)	358946 035
096691	-033	CCBA-MW2	117	10/14/14 9:41	GW	P	1 L	HNO3	G	SA	Gamma Spectroscopy (EPA 901.0)	358946 036
096691	-034	CCBA-MW2	117	10/14/14 9:43	GW	P	1 L	HNO3	G	SA	Gross Alpha and Beta (EPA 900.0)	358946 037
096692	-001	CCBA-MW2	117	10/14/14 9:23	GW	G	3x40ml	HCL	G	DU	TCL VOC (SW846-8260B)	358946 038
096692	-002	CCBA-MW2	117	10/14/14 9:25	GW	AG	4x1 L	None	G	DU	TCL SVOC (SW846-8270C)	358946 039
096692	-010	CCBA-MW2	117	10/14/14 9:29	GW	P	500 ml	HNO3	G	DU	TAL Metals+U (SW846-6010/6020/7470)	358946 040
096692	-016	CCBA-MW2	117	10/14/14 9:30	GW	P	125 ml	None	G	DU	Anions (SW846-9056)	358946 041
096692	-017	CCBA-MW2	117	10/14/14 9:32	FGW	P	500 ml	HNO3	G	DU	Metals-Ca,Mg,K,Na (SW846-6020)	358947 001
096692	-018	CCBA-MW2	117	10/14/14 9:33	GW	P	125 ml	H2SO4	G	DU	Nitrate+Nitrite (EPA 353.2)	358946 042
096692	-020	CCBA-MW2	117	10/14/14 9:34	GW	P	250 ml	None	G	DU	Perchlorate (EPA 314.0)	358946 043
096692	-022	CCBA-MW2	117	10/14/14 9:35	GW	P	500 ml	None	G	DU	Alkalinity (SM2320B)	358946 044
096692	-024	CCBA-MW2	117	10/14/14 9:36	GW	AG	4x1 L	None	G	DU	High Explosives (SW846-8321A mod)	358946 045
096692	-027	CCBA-MW2	117	10/14/14 9:40	GW	P	250 ml	NaOH	G	DU	Total Cyanide (SW846-9012)	358946 046
096692	-033	CCBA-MW2	117	10/14/14 9:41	GW	P	1 L	HNO3	G	DU	Gamma Spectroscopy (EPA 901.0)	358946 047
096692	-034	CCBA-MW2	117	10/14/14 9:43	GW	P	1 L	HNO3	G	DU	Gross Alpha and Beta (EPA 900.0)	358946 048
096693	-001	CCBA-TB3	NA	10/14/14 9:23	DIW	G	3x40 ml	HCL	G	TB	TCL VOC (SW846-8260B)	358946 049

Recipient Initials MK

Sandia National Laboratories