

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



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#### **CERTIFIED MAIL-RETURN RECEIPT REQUESTED**

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

NMED Hazardous Waste Bureau

Subject: Department of Energy/National Nuclear Security Administration Sandia National Laboratories Environmental Restoration Operations Consolidated Quarterly Report, January 2014

Dear Mr. Kieling:

Enclosed is the Environmental Restoration Operations Consolidated Quarterly Report, January 2014 for the Department of Energy/National Nuclear Security Administration, Sandia Corporation that addresses all quarterly reporting (July through September 2013) 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 Closure Plan for Sandia National Laboratories/New Mexico, Environmental Protection Agency, identification number NM5890110518.

If you have any questions, please contact me at (505) 845-6036 or John Weckerle of my staff at (505) 845-6026.

Sincerety James W. Todd Assistant Manager for

Assistant Manage Engineering

Enclosures

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# CERTIFICATION STATEMENT FOR APPROVAL AND FINAL RELEASE OF DOCUMENTS

#### Document title: Environmental Restoration Operations Consolidated Quarterly Report, January 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.

121/1#

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

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1

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Owner and Co-Operator

28/14



Sandia National Laboratories, New Mexico

# **Environmental Restoration Operations**

A U.S. Department of Energy Environmental Cleanup Program

# **Consolidated Quarterly Report**

July – September 2013



January 2014



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**

January 2014

#### SANDIA NATIONAL LABORATORIES, NEW MEXICO

#### ENVIRONMENTAL RESTORATION OPERATIONS

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

#### NUMBER OF POTENTIAL RELEASE SITES SUBJECT TO THIS PERMIT: 33

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

#### **REPORTING PERIOD:** July – September 2013

#### **OVERVIEW**

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

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

## **ABBREVIATIONS AND ACRONYMS**

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

HNO <sub>3</sub>	nitric acid
HQ	hazard quotient
L	liter
LCRS	leachate collection and removal system
LTMMP	Long-Term Monitoring and Maintenance Plan
LTS	Long-Term Stewardship
LWDS	liquid waste disposal system
MCL	maximum contaminant level
MDA	minimum detectable activity
MDL	method detection limit
mg/L	milligram(s) per liter
mL	milliliter(s)
mrem/yr	millirem per year
MRN	Magazine Road North
mV	millivolt
MW	monitoring well
MWL	Mixed Waste Landfill
Ν	nitrogen
ND	nondetect
NE	not established
NMED	New Mexico Environment Department
NNSA	National Nuclear Security Administration
NPN	nitrate plus nitrite
NTU	nephelometric turbidity unit
NWTA	Northwest Technical Area
OBS	Old Burn Site
ORP	oxidation-reduction potential
PCCP	Post-Closure Care Permit
pCi/L	picocuries per liter
PQL	practical quantitation limit
QC	quality control
RCRA	Resource Conservation and Recovery Act
RDX	hexahydro-1,3,5-trinitro-1,3,5-triazine
RPD	relative percent difference
Sandia	Sandia Corporation
SAP	Sampling and Analysis Plan
SC	specific conductance
SFO	Sandia Field Office
SM	standard method

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

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

#### 1.0 Introduction

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

### 2.0 **Environmental Restoration Operations Work Completed**

#### 2.1 Mixed Waste Landfill

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

A biology inspection of the MWL evapotranspirative cover (ET Cover) was performed on September 9, 2013 by the SNL/NM staff biologist in accordance with requirements presented in the March 2012 MWL LTMMP. The native foliar coverage was determined to meet successful revegetation criteria with almost no annual invasive weed growth. Despite very limited precipitation prior to the start of the monsoon season in July (only 1.05 inches for January - June), ET Cover vegetation experienced significant growth through the reporting period and appears healthy, with approximately 58 percent foliar coverage. This positive result is largely due to the supplemental watering effort. Restoration field work at the MWL Borrow Pit in Technical Area (TA) III began in May and was completed on August 2, 2013. The restoration field work included the following components:

- Topographic survey to fine tune the final grading plan (cut and fill requirements), designed to enhance the distribution of storm water throughout the site to facilitate revegetation efforts.
- Site grading to create four discrete "topographically low areas" within the Borrow Pit gentle side slopes, and a low-lying perimeter berm between the Borrow Pit and the undisturbed surrounding buffer zone. The four low areas are designed to hold surface water after larger precipitation events to facilitate revegetation.
- Ripping and soil amendment application to support seeding and revegetation efforts by loosening the surface soil and addressing the low total organic content and high alkalinity soil conditions.
- Seeding and gravel mulching the low lying areas, and seeding the surrounding areas including the side slopes and perimeter run-on control (i.e., soil berm feature).

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

#### 2.1.1 MWL Evapotranspirative Cover Supplemental Watering Activities

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

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

#### 2.1.2 MWL Evapotranspirative Cover Maintenance Activities

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

The rills were generally less than 2 inches wide and deep, evenly spaced, and oriented parallel to the slope of the side slopes. Stockpiled soil left over from the ET Cover construction was used to fill in the rills (~three cubic yards). Seeding of the erosion repair areas and three discrete areas with sparse vegetative cover (northwest and southeast corners of the ET Cover, and northeast corner on the side slope) was performed in a three-step process. First, masonry sand was mixed with the same seed mix used to seed the ET Cover in 2009 at a rate of three parts sand to one part seed and applied using a hand broadcast method to achieve a minimum seeding rate of 60 pounds pure live seed per acre (~ five tons of washed masonry sand used). Second, a thin layer approximately ¼ to ½-inch thick of compost was applied over all of the seeded areas (~ six cubic yards). Third, ½ to 34-inch size round river gravel was applied in a single layer over the seeded areas (~five tons). All materials were transported with wheelbarrows; no equipment was driven onto the side slopes or ET Cover surface.

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

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

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

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

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

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

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

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

#### 2.2.2 Permit Modification Request Submitted in January 2008

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

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

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

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

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

This letter included four main sections:

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

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

- The section titled, "SWMUs Requiring Additional Corrective Action," specifies additional groundwater characterization requirements for:
  - 1. SWMU 68 Old Burn Site
  - 2. SWMU 149 Building 9930 Septic System (Coyote Test Field [CTF])
  - 3. SWMU 154 Building 9960 Septic System and Seepage Pits
  - 4. SWMUs 8/58 Open Dump/Coyote Canyon Blast Area

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

- The section titled, "SWMUs/AOCs to be Subject to Groundwater Monitoring Controls," specifies that annual groundwater monitoring is to be conducted at:
  - 1. SWMU 49 Building 9820 Drains (Lurance Canyon)
  - 2. SWMU 116 Building 9990 Septic Systems (CTF)

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

- The section titled, "SWMUs/AOCs to be Restricted to Industrial Land Use," indicates that the NMED intends to restrict the future land use of the following SWMUs/AOCs to industrial:
  - 1. SWMU 4 Liquid Waste Disposal System Surface Impoundments (TA-V)
  - 2. SWMU 46 Old Acid Waste Line Outfall
  - 3. SWMU 91 Lead Firing Site (Thunder Range)
  - 4. SWMU 196 Building 6597 Cistern (TA-V)
  - 5. SWMU 234 Storm Drain System Outfall
  - 6. AOC 1090 Building 6721 Septic System (TA-III)

- The section titled, "SWMUs/AOCs that do not Require Corrective Action," includes the following 25 SWMUs/AOCs:
  - 1. SWMU 4 Liquid Waste Disposal System Surface Impoundments (TA-V)
  - 2. SWMU 5 Liquid Waste Disposal System Drainfield
  - 3. SWMU 28-2 Mine Shaft
  - 4. SWMU 46 Old Acid Waste Line Outfall
  - 5. SWMU 49 Building 9820 Drains (Lurance Canyon)
  - 6. SWMU 91 Lead Firing Site (Thunder Range)
  - 7. SWMU 101 Building 9926/9926A Septic System and Seepage Pit (CTF)
  - 8. SWMU 105 Mercury Spill (Building 6536)
  - 9. SWMU 116 Building 9990 Septic System (CTF)
  - 10. SWMU 138 Building 6630 Septic Systems (TA-III)
  - 11. SWMU 140 Building 9965 Septic System and Drywell (Thunder Range)
  - 12. SWMU 147 Building 9925 Septic Systems (CTF)
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  - 17. SWMU 234 Storm Drain System Outfall
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  - 19. AOC 1094 Live Fire Range East Septic System (Lurance Canyon)
  - 20. AOC 1095 Building 9938 Seepage Pit (CTF)
  - 21. AOC 1101 Building 885 Septic System (TA-I)
  - 22. AOC 1114 Building 9978 Drywell (CTF)
  - 23. AOC 1115 Former Offices Septic System (Solar Tower Complex)
  - 24. AOC 1116 Building 9981A Seepage Pit (Solar Tower Complex)
  - 25. AOC 1117 Building 9982 Drywell (Solar Tower Complex)

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

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

- SWMUs 233 and 234
- AOC 1115

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

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

#### 2.2.4 SWMU 52 Liquid Waste Disposal System

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

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

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

#### 2.3 Hydrogeologic Characterization

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

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

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

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

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

#### 2.3.1 Technical Area V Groundwater

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

#### 2.3.2 Burn Site Groundwater

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

#### 2.3.3 Tijeras Arroyo Groundwater

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

#### 2.3.4 Mixed Waste Landfill Groundwater

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

#### 2.3.5 Chemical Waste Landfill Groundwater

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

#### 2.3.6 SWMUs 8/58 Groundwater

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

#### 2.3.7 SWMU 68 Groundwater

SWMU 68 groundwater sampling was conducted in July 2013.

#### 2.3.8 SWMU 49 Groundwater

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

#### 2.3.9 SWMU 116 Groundwater

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

#### 2.3.10 SWMU 149 Groundwater

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

#### 2.3.11 SWMU 154 Groundwater

SWMU 154 groundwater sampling was conducted in September 2013.

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

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

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

- Summary Report for TA-V Groundwater and Soil-Vapor Monitoring Well Installation submitted to the NMED on June 30, 2011 (SNL/NM June 2011)
- MWL Groundwater Monitoring Report for CY 2010 submitted to the NMED on September 30, 2011 (SNL/NM September 2011)
- MWL LTMMP submitted to the NMED on March 26, 2012 (SNL/NM March 2012)

# 3.0 Long-Term Stewardship Work Completed

### 3.1 Chemical Waste Landfill

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

- Semi-annual groundwater monitoring and groundwater monitoring well inspections were performed July 8 through 12, 2013. No maintenance or repairs were required.
- Annual training was provided to LTS field personnel on August 1, 2013 in accordance with CWL PCCP requirements (Permit Attachment 5).
- A phone conference with LTS, DOE/SFO, and NMED personnel was held on August 29, 2013. An update was provided to NMED on CWL ET Cover vegetation conditions and plans to address weed growth (hand removal and discrete use of a common herbicide), perform seeding, and perform supplemental watering were discussed.
- ET Cover maintenance, including manual weed removal, discrete herbicide application, seeding, and application of a light fertilizer, was performed August 19 through 30, 2013.

- Annual ET Cover Biology Inspection was performed on September 9, 2013.
- Quarterly inspection of the CWL ET Cover surface, storm water diversion structures, security fence, and survey monuments was performed on September 13, 2013. No maintenance or repairs were required.

#### 3.2 **Corrective Action Management Unit**

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

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

- Quarterly monitoring of the Vadose Zone Monitoring System was conducted in September 2013. The results will be presented in the 2014 CAMU Vadose Zone Monitoring System Annual Monitoring Results Report (anticipated submittal to the NMED in September 2014).
- Composite leachate sampling for waste characterization was conducted on July 17, 2013 and September 30, 2013.
- Weekly pumping of leachate from the leachate collection and removal system (LCRS) was performed with the exception of September 16 through September 25, 2013. The pump failed to operate on September 18, 2013 at which time it was removed and inspected. The pump failed due to an electrical issue with the power supply and showed signs of corrosion. The power supply was repaired on September 23, 2013. With the pump removed from the LCRS, a video camera inspection of the LCRS was performed on September 26, 2013. There were no findings other than determining the approximate level of leachate. Immediately following the video inspection the pump was reinstalled and pumping leachate was resumed. A new pump was ordered and will replace the current one upon receipt. Waste management associated with the leachate collection and removal system during this reporting period is presented in Section I.3.2.1.
- Weekly inspections of the RCRA less than 90-day accumulation area were conducted.

- Quarterly inspection of the site was performed on September 9 and September 16, 2013, which included the containment cell cover, storm-water diversion structures, security fences, gates, signs, and benchmarks. The inspection findings are as follows:
  - Weedy plant species and deep rooting four-wing saltbush plants were identified and will be removed by the ET Cover Maintenance contractor, Sequoia Landscaping, Inc., in October 2013.
  - The drainage gate on the northwest side of the containment cell was cleared of debris on September 30, 2013.
  - Channel erosion and sediment accumulation in excess of 6 inches were identified in the perimeter drainage channel. Arrangements are being made to have a contractor repair eroded areas and re-grade the drainage channel.

### 3.2.1 CAMU Waste Management Activities

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

- Leachate waste stored on site as of July 1, 2013 equaled 43 gallons.
- Leachate and rinsate waste generated on site during the reporting period equaled 91 gallons of leachate and 4 gallons of rinsate.
- Leachate and rinsate waste removed from the site by Hazardous Waste Handling Facility personnel on August 1, 2013 equaled 59 gallons of leachate and 2 gallons of rinsate.
- Leachate and rinsate waste remaining on site at the end of this reporting period equaled 75 gallons of leachate and 2 gallons of rinsate.

#### 3.2.2 CAMU Regulatory Activities

No regulatory activities occurred during this quarter.

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

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

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

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# Tables

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

Solid V	Vaste 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	ССВА
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

= Coyote Canyon Blast Area. = Coyote Test Field. = Liquid Waste Disposal System. CCBA

CTF LWDS

MWL = Mixed Waste Landfill.

TA = Technical Area.

TAG = Tijeras Arroyo Groundwater.

# Table I-2Hydrogeologic Characterization

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

#### Notes

<sup>a</sup>Not all wells in a particular investigation are sampled at the same frequency; this represents the maximum frequency of sampling at a site.

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

AGMR = Annual Groundwater Monitoring Report.

BSG = Burn Site Groundwater.

CWL = Chemical Waste Landfill.

CY = Calendar Year.

ER = Environmental Restoration Operations.

MWL = Mixed Waste Landfill.

N/A = No wells in the site network are currently being sampled and analyzed for perchlorate.

SWMU = Solid Waste Management Unit.

TAG = Tijeras Arroyo Groundwater.

TA-V = Technical Area V.

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

# SECTION II PERCHLORATE SCREENING QUARTERLY GROUNDWATER MONITORING REPORT, July – September 2013

#### 1.0 Introduction

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

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

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

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

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

# 2.0 Scope of Activities

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

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

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

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

- "SWMUs 8/58 Groundwater Monitoring, Mini-SAP for Fourth Quarter, Fiscal Year 2013" (SNL/NM June 2013a)
- "SWMU 68 Groundwater Monitoring, Mini-SAP for Fourth Quarter, Fiscal Year 2013" (SNL/NM June 2013b)
- "SWMU 154 Groundwater Monitoring, Mini-SAP for Fourth Quarter, Fiscal Year 2013" (SNL/NM August 2013)

As described in the Mini-SAPs, groundwater sampling was performed in accordance with current SNL/NM Environmental Management, Long-Term Stewardship Project Field Operating Procedures (FOPs). A portable Bennett<sup>™</sup> 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<sup>™</sup> Model 6920 water quality meter. Turbidity was measured with a HACH<sup>™</sup> 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  $\mu$ g/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  $\mu$ g/L in a specific well, then monitoring will continue at that well at a frequency negotiated with the NMED. The Order (NMED April 2004) also requires that for detections equal to or greater than 4  $\mu$ g/L, DOE/Sandia will evaluate the nature and extent of perchlorate contamination, based on a screening level/MDL of 4  $\mu$ g/L, and incorporate the results of this evaluation into a Corrective Measures Evaluation (CME). Section VII.C of the Order clarifies that the CME process will be initiated where there is a documented release to the environment, and where corrective measures are necessary to protect human health and the environment.

## 3.1 Burn Site Groundwater

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

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

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

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

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

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

# 3.2 **Tijeras Arroyo and Technical Area V Groundwater**

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

# 3.3 March 2006 and January 2008 Permit Modification Requests

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

- SWMU 49—Annual sampling of existing monitoring well CYN-MW5. This well was sampled four times from May 2004 through February 2005. Based on four consecutive ND results, monitoring well CYN-MW5 was removed from the perchlorate monitoring network (SNL/NM November 2005).
- SWMU 116—Annual sampling of existing monitoring well CTF-MW1.
- SWMU 149—Submittal of a SAP and quarterly sampling of existing monitoring well CTF-MW3 for a minimum of eight quarters.
- SWMU 154—Submittal of a SAP and quarterly sampling of existing monitoring well CTF-MW2 for a minimum of eight quarters.

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

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

- SWMUs 8/58—Two groundwater monitoring wells must be installed (CCBA-MW1 and CCBA-MW2) and sampled quarterly for a minimum of eight quarters.
- SWMU 68—Three groundwater monitoring wells must be installed (OBS-MW1, OBS-MW2, and OBS-MW3) and sampled quarterly for a minimum of eight quarters.

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

# 4.0 Monitoring Results

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

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

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

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

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

# 5.0 **Summary and Conclusions**

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

- No perchlorate was detected in the environmental samples from groundwater monitoring wells CCBA-MW1, CCBA-MW2, CTF-MW2, OBS-MW1, OBS-MW2, or OBS-MW3 at the screening level/MDL of 4 μg/L.
- Since June 2004 (the start of sampling as required by the Order), perchlorate was detected above the screening level/MDL (4 µg/L) in groundwater samples from only one of the wells (CYN-MW6) in the perchlorate screening monitoring well network.

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

# 6.0 **References**

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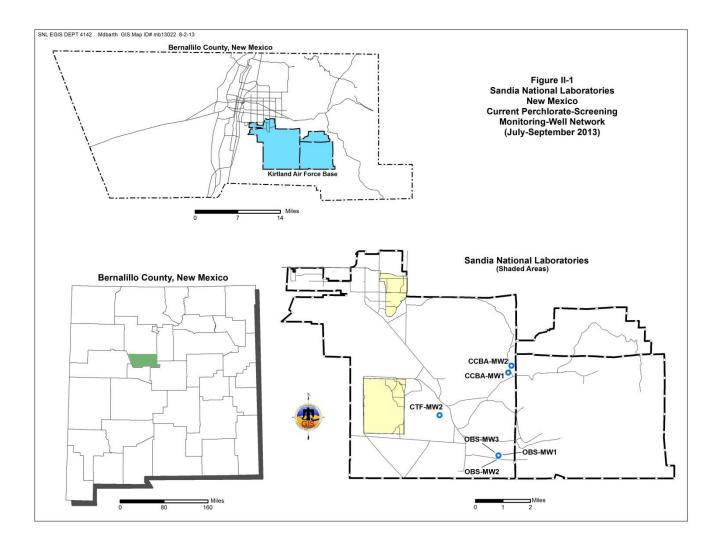
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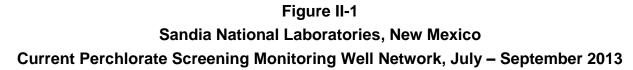
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# Figures





# Tables

# Current Perchlorate Screening Monitoring Well Network Third Quarter, CY 2013

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

#### Notes

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

<sup>b</sup>Per the requirements of Table XI-1 of the Order (NMED April 2004), a well will be removed from the perchlorate screening monitoring well network after four quarters unless perchlorate is detected above the screening level/MDL of 4 μg/L. However, the seven wells currently in the network are being sampled for a minimum of eight events based on site-specific NMED requirements (NMED April 2010).

<sup>o</sup>TBD = To be determined. This well has been sampled for the eight supplemental rounds of groundwater sampling required by NMED (NMED April 2010). However, DOE/Sandia will continue to sample this well quarterly until NMED has determined that characterization is complete at this SWMU.

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

## Wells Discussed in Previous Perchlorate Screening Reports

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

#### Notes

- BW = Background well.
- CTF = Coyote Test Field.
- = Canyons (Burn Site). CYN
- 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).
- ΤA = Technical Area.
- = Well. W

# Sample Details for Third Quarter, CY 2013 Perchlorate Sampling

Well	Sample Identification	AR/COC Number	Associated Groundwater Investigation		
CCBA-MW1	094376-020	614020			
CCBA-MW1 (DUPLICATE)	094377-020	614939	SWMUs 8/58		
CCBA-MW2	094371-020	614937	SWMUs 8/58		
CTF-MW2	094646-020	615029	SWMU 154		
OBS-MW1	094361-020	614933	SWMU 68		
OBS-MW2	094365-020	614935	SWMU 68		
<b>OBS-MW2</b> (DUPLICATE)	094366-020	014935	3001010 00		
OBS-MW3	094368-020	614936	SWMU 68		

#### Notes

CY

CCBA CTF

MW

OBS SWMU

Analysis Request/Chain-of-Cust
Coyote Canyon Blast Area.
Coyote Test Field.
Calendar Year.
Monitoring Well.
Old Burn Site.
Solid Waste Management Unit.

# Summary of Perchlorate Screening Analytical Results for the Current Monitoring Well Network as of Third Quarter, CY 2013

Well	Sample	AR/COC	Sample	Result <sup>a</sup>	MDL <sup>⊳</sup>	PQL <sup>c</sup>	MCL <sup>a</sup>	Laboratory	Validation	Analytical	Comments
weii	Date	Number	Number	(µg/L)	(μg/L)	(μg/L)	(μg/L)	Qualifier <sup>e</sup>	Qualifier <sup>f</sup>	Method <sup>9</sup>	Comments
	31-Oct-11	613883	091345-020	ND	4.0	12	NE	U		EPA 314.0	
	40 1	040050	091615-020	ND	4.0	12	NE	U		EPA 314.0	
	16-Jan-12	613958	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	
		04.4000	092615-020	ND	4.0	12	NE	U		EPA 314.0	
CCBA-MW1	16-Jul-12	614288	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	
	10 Jan 10	614567	093341-020	ND	4.0	12	NE	U		EPA 314.0	
	16-Jan-13	614567	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	
		C1 4020	094376-020	ND	4.0	12	NE	U		EPA 314.0	
	16-Jul-13	614939	094377-020	ND	4.0	12	NE	U		EPA 314.0	Duplicate sample
	04 Nov 44	040005	091349-020	ND	4.0	12	NE	U		EPA 314.0	
	01-Nov-11	613885	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	
	04 4 40	614157	092296-020	ND	4.0	12	NE	U		EPA 314.0	
	24-Apr-12	614157	092297-020	ND	4.0	12	NE	U		EPA 314.0	Duplicate sample
CCBA-MW2	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	
	23-001-12	014400	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	
	20-Api-13	614747	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	
	08-Mar-11	613448	090237-020	ND	4.0	12	NE	U		EPA 314.0	
	00-IVIAI-11	013440	090238-020	ND	4.0	12	NE	U		EPA 314.0	Duplicate sample
	31-May-11	613578	090670-020	ND	4.0	12	NE	U		EPA 314.0	
	29-Sep-11	613855	091259-020	ND	4.0	12	NE	U		EPA 314.0	
	09-Dec-11	613929	091525-020	ND	4.0	12	NE	U		EPA 314.0	
	30-Mar-12	614055	091949-020	ND	4.0	12	NE	U		EPA 314.0	
CTF-MW2		014055	091950-020	ND	4.0	12	NE	U		EPA 314.0	Duplicate sample
517-141442	19-Jun-12	614255	092538-020	ND	4.0	12	NE	U		EPA 314.0	
	25-Sep-12	614391	092862-020	ND	4.0	12	NE	U		EPA 314.0	
	18-Dec-12	614541	093251-020	ND	4.0	12	NE	U		EPA 314.0	
	26-Mar-13	614663	093723-020	ND	4.0	12	NE	U		EPA 314.0	
		014003	093724-020	ND	4.0	12	NE	U		EPA 314.0	Duplicate sample
	25-Jun-13	614827	094042-020	ND	4.0	12	NE	U		EPA 314.0	
	17-Sep-13	615029	094646-020	ND	4.0	12	NE	U		EPA 314.0	

# Table II-4 (Continued)

# Summary of Perchlorate Screening Analytical Results for the Current Monitoring Well Network as of Third Quarter, CY 2013

Well ID	Sample	AR/COC	Sample	Result	MDL⁵	PQL <sup>c</sup>	MCL <sup>a</sup>	Laboratory	Validation	Analytical	0
weilid	Date	Number	Number	(µg/L)	(µg/L)	(µg/L)	(µg/L)	Qualifier	Qualifier <sup>f</sup>	Method <sup>9</sup>	Comments
	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	
	10 Apr 10	614081	092022-020	ND	4.0	12	NE	U		EPA 314.0	
	18-Apr-12	014001	092023-020	ND	4.0	12	NE	U		EPA 314.0	Duplicate sample
OBS-MW1	17-Jul-12	614289	092618-020	ND	4.0	12	NE	U		EPA 314.0	
OB3-IVIVV I	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	
	22-Jan-13	014570	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	
	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	
	10-Jan-12	613954	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	
OBS-MW2	17-Oct-12	614464	093007-020	ND	4.0	12	NE	U		EPA 314.0	
	17-001-12		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	
	10-Jul-13	014935	094366-020	ND	4.0	12	NE	U		EPA 314.0	Duplicate sample
	24-Oct-11	613882	091342-020	ND	4.0	12	NE	U		EPA 314.0	
	24-001-11		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	
OBS-MW3		014292	092626-020	ND	4.0	12	NE	U		EPA 314.0	Duplicate sample
	18-Oct-12	614465	093010-020	ND	4.0	12	NE	U		EPA 314.0	
	23-Jan-12	614571	093352-020	ND	4.0	12	NE	U		EPA 314.0	
	23-Apr-12	614744	093870-020	ND	4.0	12	NE	U		EPA 314.0	
			093871-020	ND	4.0	12	NE	U		EPA 314.0	Duplicate sample
	11-Jul-13	614936	094368-020	ND	4.0	12	NE	U		EPA 314.0	

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

#### Notes

#### <sup>a</sup>Result

**Bold** = Result exceeds the 4  $\mu$ g/L screening level for perchlorate.

- ND = Not detected (at MDL).
- $\mu$ g/L = Micrograms per liter.

#### <sup>▶</sup>MDL

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

#### °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.

#### dMCL

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

#### <sup>e</sup>Laboratory Qualifier

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

#### <sup>f</sup>Validation Qualifier

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

#### <sup>g</sup>Analytical Method

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

- EPA 6850M: U.S. Environmental Protection Agency, April 2005, "Perchlorate in Water, Soils, and Solids Using High Performance Liquid Chromatography/Electrospray Ionization/Mass Spectrometry (HPLC/ESI/MS)," draft, Method 6850 (EPA April 2005).
- AR/COC = Analysis Request and Chain of Custody.
- CCBA = Coyote Canyon Blast Area.
- CFR = Code of Federal Regulations.
- CTF = Coyote Test Field.
- CY = Calendar Year.
- EPA = U.S. Environmental Protection Agency.
- MW = Monitoring well.
- OBS = Old Burn Site.

# Perchlorate Screening Groundwater Monitoring Field Water Quality Measurements<sup>a</sup>, Third Quarter, CY 2013

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

#### Notes

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

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

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Appendix A Analytical Laboratory Certificates of Analysis for the Perchlorate Data

Page SMO 2012-ARCOC (4-2012) of 11217 Internal Lab

Batch No. A

Project Name: /

# CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY

SMO Use

Page 1 of 2 AR/COC 614939 100

Project Nam	2 8	SWMU 8/		Date Sample	s Shinned	7	11/1	2	ICHO A				0	AR/COC	61	4939
Project/Task			um	Carrier/Wayb			207			uthorization		1.1	m	Waste Characterization	1	
Project/Task	Number	98026.0	1.12	Lab Contact:		Edie Ker	nt/803-556	9171		ontact Phon			m			
Service Orde	er:	CF 262-	13	Lab Destinati	on	GEL	10000-000	-0171	0	Lonaine Herrera/505-844-3199				Released by COC No.		
				Contract No .:	Send Report to SMU:							1	4º Celsius			
Tech Area:					2: PO 1303873 Rita Kavanaugh/505-284-2553							Bill to:Sandia National Laboratories (Accounts Payable),				
Building:		Room:		Operationa	I Sito:									P.O. Box 5800, MS-0154		
	T			operatione	Depth	Det	. (7)							Albuquerque, NM 87185-0154		
Sample No.	Sample No. Fraction Sample Location Detail				(ft)	Date/Time Collected		Sample		Container Preserv		Collection	Sample		bd	Lab
094376	-001						liected	Matrix	Туре	Volume	ative	Method	Туре	Requested		Sample ID
094370		CCBA-M	VV1		79	7/16/13	9:13	GW	G	3x40ml	HCL	G	SA	TCL VOC (SW846-8260B)		32954
094376	94376 -002 CCBA-MW1				79	7/16/13	9:14	GW	1.0					TCL VOC (30040-8260B)		32954
094376	-009	CODAN	14/4					GW	AG	4x1L	None	G	SA	TCL SVOC (SW846-8270C)	i l	029
034370	-009	CCBA-M	VV1		79	7/16/13	9:16	GW	Р	500 ml	HNO3	G	SA	TAL Metals+U(SW846-6010/602		22954
094376	-016	CCBA-M	W1		79	7/16/13	9:17	GW	P	105			Ort	TAL Metals+0(300646-6010/602	0/7470)	32954
094376	-017	ССВА-М	A/4				5.17		P	125 ml	None	G	SA	Anions(SW846-9056))		031
		CCDA-IVI	VV I		79	7/16/13	9:18	FGW	Р	250 ml	HNO3	G	SA	Metais-Ca,Mg,K,Na(SW846-	60201	329599
094376	4376 -018 CCBA-MW1					7/16/13	9:19	GW	Р	125 ml	10001		100 March 10		0020)	320541
094376	94376 -020 CCBA-MW1							1		125 111	H2SO4	G	SA	NPN (EPA 353.2)		032
		1			79	7/16/13	9:20	GW	Р	250 ml	None	G	SA	Perchlorate (EPA 314.0)		329541
094376	-022	CCBA-M	W1		79	7/16/13	9:21	GW	Р	500 ml	None	G				329541
094376	-024	CCBA-M	<i>N</i> 1		79	7/10/10				000 1111	None	G	SA	Alkalinity (SM2320B)		034
094376	007				-13	7/16/13	9:22	GW	AG	4x1L	None	G	SA	High Explosives (SW846-83)	21A Mod	329541 035
	-027	CCBA-M	<u>W1</u>		79	7/16/13	9:25	GW	Р	250 ml	NaOH	G	SA			329541
Last Chain		√ Yes				Tracking		SMO	Use	Special Instructions/QC Requirements:				Total Cyanide (SW846-9012		036
Validation		⊻ Yes			Date Ente	ered:				EDD		Yes		No		itions on
Backgroun		Yes			Entered b	by:				Turnaroun	d Time	7 Day		No	Re	eceipt
Confirmato		└ Yes		(	QC inits.:					Negotiated				15 Day* 30 Day		
Sample		ame	Signatu	re	Init.	Compa	ny/Organiza	ation/Phone	e/Cell	Sample Dis		Doturn	to Client			
1000000000 VIDO	Robert L		ang.	nd 1	et !		505-844-40			Return San		- Return	to Client	Disposal by Lab		
Members	Tim Jack	son	5-Jull	6			505-284-25			Comments		0				
				/ T	1	,						Send report to	Tim Jackson/	4142/MS 0729/284-2547 r,Cl,F,SO4)Alkalinity(total		
									2	Cacos, ACO.	0,003), If De	rchlorate dete	ected nerfor	m vorification analysis using		
5						,				SW846-6850	A.Gamma S	pectroscopy a	as short list	isotopes.		
1.Relinquishe		1100	47 (	Org. 4/47	Date	7/16	Time	1005							Lab	Use
1. Received b			Ta Suno	Org. 4147				005					Org.	Date	Time	
2.Relinquishe	dby	441	the mo	Org. 4/92			3 Time	1					Org.	Date	Time	
2. Received b		ML	Jele (	Org C.A	Date					uished by			Org.	Date	Time	
*Prior confirm	nation w	ith SMO rea	quired for 7 and 1	15 day TAT		11-1		27351	4. Recei	ved by			Org.	Date	Time	

AOP 95-16

SMO 2012-ARCOC (4-2012)

of 1217

# CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY (Continuation)

AOP 95-16

Page 2 of 2 AR/COC 614939 Project Name: **SWMU 8/58 GWM** Project/Task Manager: **Clinton Lum** Project/Task No .: 98026.01.12 Tech Area: **Building:** Room: Lab use Depth Date/Time Sample Container Collection Sample Preserv Parameter & Method Sample No. Fraction Lab Sample Location Detail (ft) Collected Matrix Type Volume ative Method Type Requested Sample ID 1 094376 -033 CCBA-MW1 79 7/16/13 9:26 GW P 329541 1 L HNO3 G SA Gamma Spectroscopy (EPA 901.0) 037 094376 -034 CCBA-MW1 79 7/16/13 9:27 32954 038 GW Ρ 1 L HNO3 G SA Gross Alpha and Beta (EPA 900.0) 094376 -035 CCBA-MW1 79 7/16/13 9:28 32954 GW P 1 L HNO3 G SA Isotopic Uranium (HASL 300) 094377 -001 CCBA-MW1 79 7/16/13 9:13 GW 32954 G 3x40ml HCL G DU TCL VOC (SW846-8260B) -002 094377 CCBA-MW1 79 7/16/13 32954 9:15 GW AG 4x1L None G DU TCL SVOC (SW846-8270C) -009 1 094377 CCBA-MW1 79 7/16/13 9:16 32954 GW Ρ 500 ml HNO3 G DU TAL Metals+U(SW846-6010/6020/7470) 094377 -016 CCBA-MW1 79 7/16/13 32954 9:17 GW P 125 ml None G DU Anions(SW846-9056)) ø 094377 -017 CCBA-MW1 79 7/16/13 9:18 FGW 329549 Ρ 250 ml HNO3 G DU Metals-Ca,Mg,K,Na(SW846-6020) 004 094377 -018 CCBA-MW1 79 7/16/13 9:19 32954 GW P 125 ml H2SO4 G DU NPN (EPA 353.2) 094377 -020 CCBA-MW1 79 7/16/13 9:20 32454 GW P 250 ml G None DU Perchlorate (EPA 314.0) 094377 -022 CCBA-MW1 79 7/16/13 9:21 GW P 32954 500 ml None G DU Alkalinity (SM2320B) 046 094377 -024 CCBA-MW1 79 7/16/13 9:24 GW AG 32954 4x1L None G DU High Explosives (SW846-8321A) 047 094377 -027 CCBA-MW1 79 7/16/13 32954 9:25 GW P 250 ml NaOH G DU Total Cyanide (SW846-9012 048 094377 -033 CCBA-MW1 79 7/16/13 9:26 GW P 32454 1 L HNO3 G DU Gamma Spectroscopy (EPA 901.0) 049 094377 -034 CCBA-MW1 79 7/16/13 32954 9:27 GW Ρ 1 L HNO3 G DU Gross Alpha and Beta (EPA 900.0) 094377 -035 CCBA-MW1 79 7/16/13 9:28 GW P 32954 1 L HNO3 G DU Isotopic Uranium (HASL 300) 051 094378 -001 CCBA-TB3 NA 7/16/13 9:13 DIW G 3x40ml 329541 HCL G TB TCL VOC (SW846-8260B) 052 MC **Recipient Initials** 

Page T2

# **GEL LABORATORIES LLC**

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

# **Certificate of Analysis**

Report Date: August 14, 2013 Company : Sandia National Laboratories Address : MS-0756, Org. 06765, Bldg. 823/Rm. 4276 1515 Eubank SE Albuquerque, New Mexico 87123 Contact: Ms. Pamela M. Puissant Project: Groundwater, Level C Package Client Sample ID: 094376-020 Project: **SNLSGWater** Sample ID: 329541033 Client ID: SNLS004 Matrix: AQUEOUS Collect Date: 16-JUL-13 09:20 Receive Date: 17-JUL-13 Client Desc.: CCBA-MW1 Collector: Client Vol. Recv.: Parameter Qualifier Result DL RL Units DF Analyst Date Time Batch Method Ion Chromatography

0.004

0.012

mg/L

Analyst Comments

1 MAR1 08/01/13 1912 1318601

1

EPA 314.0 Perchlorate by IC "As Received"PerchlorateUNDThe following Analytical Methods were performed:

EPA 314.0 DOE-AL

Method Description

1

Notes:

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

# **Certificate of Analysis**

							Re	port D	ate:	August	14, 2013
	Company :	Sandia National									
	Address :		)6765, Bldg. 823/Rm.	4276							
		1515 Eubank SE									
	Contact:	Ms. Pamela M. I	ew Mexico 87123								
	Project:	Groundwater, Le									
			ever C I ackage								
	Client Sample ID:	094377-020			Projec		SNLSG				
	Sample ID:	329541045			Client	ID:	SNLS0	04			
	Matrix:	AQUEOUS									
	Collect Date:	16-JUL-13 09:20	)								
	Receive Date:	17-JUL-13			Client	Desc.:	CCBA-	MW1			
	Collector:	Client			Vol. R	ecv.:					
Parameter	Qualif	fier Result	DL	RL	Units	DF	Analyst	Date	Tim	e Batch	Method
Ion Chroma	atography										
EPA 314.0	Perchlorate by IC "A	s Received"									
Perchlorate		U ND	0.004	0.012	mg/L	1	MAR1 08	/01/13	1931	1318601	1
The follow	ring Analytical Method	ods were performe	ed:								
Method	Descri				Anal	yst Co	mments				
1	EPA 314	4.0 DOE-AL							0.0		

Notes:

PageSMO 2012-ARCOC (4-2012) of 1217 Internal Lab

# CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY

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	Batch No.	NA					ONO US								-	Page	<u>1</u> of <u>2</u>
	Project Nam	ie:	SWMU 8/5	8 GWM	Data Camala	- China I	SMO US						101	,	AR/COC	614	4937
	Project/Task				Date Sample Carrier/Wayb		-71		3		uthorization:		49h	~	Waste Characterization	and the second second	
	Project/Task				Lab Contact:	NO.	Edia Kan	06	946	ISMO C	SMO Contact Phone: Smg						
	Service Ord		CF 262-1		Lab Destinati		Edie Ken GEL	10803-556	5-81/1	l	Lorraine Herrera/505-844-3199				Released by COC No.		
					Contract No.:		PO 1303	070		Send F	ad Report to SMO:					1	4º Celsius
	Tech Area:				CONTRACT NO		PU 1303	873		I	Rita Kava	anaugh/50	5-284-2553		Bill to:Sandia National Laboratories	(Accoun	its Pavable)
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	g.				Operationa	· · · · · · · · · · · · · · · · · · ·				· · · · · ·					Albuquerque, NM 87185-0154		
	Sample No.	Fraction	Sar	nple Location D		Depth	1	e/Time	Sample	С	ontainer	Preserv-	Collection	Sample	Parameter & Method		Lab
ħ					etall	(ft)	Col	lected	Matrix	Туре	Volume	ative	Method	Туре	Requested		Sample II
و	094371	-001	CCBA-MV	V2		117	7/15/13	9:41	GW	G	3x40ml	HCL	G	SA			32954
1	094371	-002	ССВА-МУ	N/2		117	7/45/40					HICL	6	SA	TCL VOC (SW846-8260B)		
N			OODATIN	VZ		117	7/15/13	9:42	GW	AG	4x1L	None	G	SA	TCL SVOC (SW846-8270C)		329541
V	094371	-009	CCBA-MV	V2		117	7/15/13	9:44	GW	Р	500 ml	HNO3	G	~			
1	094371	-016	ССВА-МУ	\/2		447					000 1111	111405	6	SA	TAL Metals+U(SW846-6010/6020/7	(470)	32954
				VZ		117	7/15/13	9:45	GW	Р	125 ml	None	G	SA	Anions(SW846-9056))		52954
1	094371	71 -017 CCBA-MW2				117	7/15/13	9:46	FGW	Р	250 ml	HNO3	0				329549
1	094371	-018	ССВА-МУ	10						Г	250 m	HNU3	G	SA	Metals-Ca,Mg,K,Na(SW846-60		001
			CCBA-IVIV	VZ		117	7/15/13	9:47	GW	P	125 ml	H2SO4	G	SA	NPN (EPA 353.2)		32959
1	094371	-020	CCBA-MV	V2		117	7/15/13	9:48	GW	Р	250 ml	None	G				329541
	094371	-022	ССВА-МУ	12		447					200 111	None	6	SA	Perchlorate (EPA 314.0)		006
			OODA-IVIV	VZ		117	7/15/13	9:49	GW	P	500 ml	None	G	SA	Alkalinity (SM2320B)	ŀ	329541
4	094371	-024	CCBA-MV	V2		117	7/15/13	9:50	GW	AG	4x1L	None	G				200000
1	094371	-027	CCBA-MV	12		117	74540	0.54				NUTE	<u> </u>	SA	High Explosives (SW846-8321		
	Last Chain		Yes	12			7/15/13	9:51	GW	Р	250 ml	NaOH	G	SA	Total Cyanide (SW846-9012		329541
	Validation		✓ Yes				Tracking		SMO	Use	Special Ins	tructions		ements:		Condi	tions on
	Backgroun		Yes			Date Ent					EDD		🗹 Yes		No		ceipt
	Confirmato	The second se				Entered					Turnaroun	d Time	7 Da	<u>t</u>	15 Day* 30 Day		ocipi
ł			└── Yes			QC inits.					Negotiated	TAT					
	Sample		ame	Signatur	re/	Init.			ation/Phone		Sample Dis	sposal	Return	to Client	Disposal by Lab		
	Team	Robert Ly		KU YAC	6	W	SNL/4142/	505-844-40	013/505-250	0-7090	Return San	nples By:					
	Members	Tim Jack	son	TEAN	5	T1	SNL/4142/	505-284-2	547/505-263	3-6639	Comments		Send report to	Tim Jackson	4142/MS 0729/284-2547		
				•							FGW(filtered	in field w/0.4	5 micron filte	r) Anions/B	CLE SO(A)Alkalinity(total		
											Lacos, HCO	3,CO3). If pe	rchlorate det	ected nerfor	m verification analysis using		
SVV846-6850M.Gamma Spectroscopy as short list isotopes.																	
	1.Relinquishe		-j 9 -11	5- (	Drg. 4142	Date	7/15/1	3 Time	1025	3 Relina	Luished hu					Lab	Use
	1. Received b	y an	ME. LA		Drg. 4142					3. Recei				Org.	Date	Time	
	2.Relinquishe	dby	2691		Drg. 4142		7115-1							Org.	Date	Time	
	2. Received b		WAR.	EVI	Dra Col			Time			uished by			Org.	Date	Time	
	Prior confirm	nation wi	th SMO req	uired for 7 and 1	5 day TAT	Batt	1-10-12	, me	<u> &lt;27</u>	4. Recei	ved by			Org.	Date	Time	
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AOP 95-16

Page MO 2012-ARCOC (4-2012) of 1217

# CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY (Continuation)

AOP 95-16

Page <u>2</u> of <u>2</u>

I	Davis				1							·····			AR/COC 61	4937
	Project Nam Tech Area:	e:		SWMU 8/58 GWM	Project/Ta	ask Mana	ger:	Clinton Lu	m		Project/Ta:	sk No.:	98	026.01.12		-
- 1	Building:			Room:	-											
ł		1			L	Depth	D.1.1		1	<del></del>						Lab use
	Sample No.	Fra	ction	Sample Location	Detail				Sample		Container p	Preserv- Collection		0.45-0.2-2		Lab
	094371	-03		CCBA-MW2		117			Matrix	Туре	Volume	ative	Method	Туре	Requested	Sample ID
, t	094371					1	7/15/13	9:52	GW	Р	1 L	HNO3	G	SA	Gamma Spectroscopy (EPA 901.0)	329541
ł		-03		CCBA-MW2	-	117	7/15/13	9:53	GW	Р	1 L	HNO3	G	SA	Gross Alpha and Beta (EPA 900.0)	329541
$\left  \right $	094371	-03		CCBA-MW2		117	7/15/13	9:54	GW	Р	1 L	HNO3	G	SA	Isotopic Uranium (HASL 300)	329541 211 329541 012
ł	094372	-00	1	CCBA-TB1		NA	7/15/13	9:40	DIW	G	3x40ml	HCL	G	TB	TCL VOC (SW846-8260B)	329541
ļ	094373	-00	1	CCBA-FB1		NA	7/15/13	9:40	DIW	G	3x40ml	HCL	G		TCL VOC (SW846-8260B)	329541 013 329541
										and a					102 VOC (3W646-8260B)	014
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## **GEL LABORATORIES LLC**

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

# **Certificate of Analysis**

Report Date: August 14, 2013 Company : Sandia National Laboratories Address : MS-0756, Org. 06765, Bldg. 823/Rm. 4276 1515 Eubank SE Albuquerque, New Mexico 87123 Contact: Ms. Pamela M. Puissant Project: Groundwater, Level C Package Client Sample ID: 094371-020 Project: **SNLSGWater** Sample ID: 329541006 Client ID: SNLS004 Matrix: AQUEOUS Collect Date: 15-JUL-13 09:48 Receive Date: 16-JUL-13 Client Desc.: CCBA-MW2 Collector: Client Vol. Recv.: Parameter Qualifier Result DL RL Units DF Analyst Date Time Batch Method Ion Chromatography EPA 314.0 Perchlorate by IC "As Received" Perchlorate U ND 0.004 0.012 mg/L 1 MAR1 08/01/13 1756 1318601 1 The following Analytical Methods were performed: Method Description Analyst Comments 1 EPA 314.0 DOE-AL

Notes:

# CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY

	Internal Lab	AN														Page	1	
	Batch No. NK						SMO Use								AR/COC	Contraction of the second	<u>1 of 2</u>	
	Project Name	e:	SWMU 154 GWM Date Samples Ship								uthorization	1-				01;	5029-	
	Project/Task Manager: Clint		Clinton L	um	Carrier/Waybi					SMO Authorization: Donce Jone					Waste Characterization			
	Project/Task	roject/Task Number: 146422.10.11.01 Lab Contact:				Edie Kent/8	803-556-8	171				5-844-3199						
	Service Order: CF353-14 Lab Destin			Lab Destinatio	Contraction of the second seco				Send R	eport to SMC		5-044-5135		Released by COC No.		40.0-1-1		
					Contract No.:		PO 1303873			Rita Kavanaugh/505-284-2553					Bill to:Sandia National Laboratories (Accounts P		4º Celsius	
	Tech Area:												2012000			P.O. Box 5800, MS-0154		
3	Building:		Room:	: Operation		I Site:									Albuquerque, NM 87185-0154			
			Sample Location Detail			Depth			Sample	C	ontainer Preserv-		Collection	Sample	Parameter & Method			
	Sample No.	Fraction			etail	(ft)			Matrix	Туре	Volume	ative	Method	Type	Requested		Lab Sample ID	
V	094646	-001 1	CTF-MW2			129	9/17/13	9:23	GW	G	3x40ml	HCL	G	SA	TCL VOC (SW846-8260B)		Sample ID 3 33568	
1	094646	-002	CTF-MW2			129	0/17/10	0.04	-		•						333568	
						129	9/17/13	9:24	GW	AG	4x1L	• None	ୈ	SA	TCL SVOC (SW846-8270C)		002	
V	094646	-009 1	CTF-MW2			129	9/17/13	9:26	GW	Р	500 ml	HNO3	G	SA	TAL Metals+U(SW846-6010/6020		333568	
	094646	-010	CTF-MW		129	0/17/12 0	0.00 /							TAL Metals (0(30040-0010/6020/14/0	(1470)	003 333569		
	/	,				129	9/17/13	9:28	FGW	Р	500 ml	HNO3	G	SA	TAL Metals+U(SW846-6010/6020	7470)	001	
1	094646	-016 ″	CTF-MW2			129	9/17/13	9:29 🖌	GW	Р	125 mi	None	G	SA	Anions (SW846-9056)		333568 004	
1	094646	-018 🚩	CTF-MW:		129	9/17/13	9:30	GW	Р	125 ml°	H2SO4	G	SA	NPN (EPA 353.2)		333568		
r	094646	-020 -	CTF-MW2			129	9/17/13	9:31 -	GW	Р	250 ml	None	G	SA	Perchlorate (EPA 314.0)		333568	
1	094646	-022	CTF-MW2			129	0/47/40	0.00 *									333568	
	/					129	9/17/13	9:32 *	GW	Р	500 ml *	None	G	SA	Alkalinity (SM2320B)		007	
1	094646		CTF-MW2		129	9/17/13	9:33 *	GW	AG	4x1L	None	G	SA `	High Explosives(SW846-8321	A mod.	333568		
"	094646		CTF-MW2	CTF-MW2			9/17/13	9:35	GW	Р	11	HNO3	G	SA	Gamma Spectroscopy (EPA	001.0)	333568	
	Last Chain: Ves				Sample Tracking SM					O Use Special Instruction						009 itions on		
	Validation I	Req'd: Yes				Date Entered:					EDD Yes				2 C 1 2 C 1 2 C 1 2 C 1 2 C 1 2 C 1 2 C 1 2 C 1 2 C 1 2 C 1 2 C 1 2 C 1 2 C 1 2 C 1 2 C 1 2 C 1 2 C 1 2 C 1 2 C			
	Backgroun	d:	: Yes			Entered by:					Turnaround Time		7 Da	/*	15 Day* 30 Day		eceipt	
	Confirmato	ry:	L Yes			QC inits.:					Negotiated TAT				10 Day			
	Sample Name			ire	Init.	Company/Organization/Phon			e/Cell	Sample Disposal Return to Clier			to Client	∠ Disposal by Lab				
	Team						SNL/4142/505-844-4013/505-250-7090				Return Samples By:							
	Members					SNL/4142/505-844-5130/505-228-0710				Comments: Send report to Tim Jackson				4142846 0720/084 05 17				
						SNL/4142/505-284-3307/505-239-7367 CTF-MW2 water has hi					ter has high	buffering car	acity.pleas	e check pH and add				
									preservitives as needed. If perchlorate detected, t				letected, th	ten perform verification analysis				
										using SW846-6850.Report anions as Br.CI.F.SO4				A Report Alkalinity as total				
[	1.Relinquishe	d by AL	Jols	till	te 9/17/13 Time 10: 04 3. Relin				CaCO3,HCO3,CO3. Report gamma Spec for shor equished by Org.						b Use			
	1. Received b	y Oh	mil	chann	Org. 414						2 Descional				Name of Street of St	Time		
	2.Relinquishe	d by Di	mali	term	Org. 4/47	Date				uished by Org. Quished by Org.			Date	Time				
	2. Received b	-	Nh.E.	lan	Org. Cer	Date	9-8-13								Date Time			
1	2. Received by Mc Corg. (Charles 9-B-13 Time 0730 4. Received by Org. Date Time 19-B-13 Time 0730 4. Received by Org. Date Time																	

# CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY (Continuation)

Page 2 of 2

AR/COC 61502										5029			
Project Nam	e:	SWMU 154 GWM	Project/Task Manager: Clinton Lum						sk No.:	146422	.10.11.01		
Tech Area:													
Building:		Room:											Lab use
			Dept			Sample	Container		Preserv-	Collection	Sample	Parameter & Method	Lab
Sample No.	Fraction	Sample Location I	Detail (f		ollected	Matrix	Туре	Volume	ative	Method	Туре	Requested	
094646	-034	CTF-MW2	129	9/17/	3 9:36	GW	P	1Ľ	HNO3	G	SA	Gross Alpha and Beta (EPA 900.0)	Sample ID 333568
094646	-035 🖌	CTF-MW2	129	9/17/	3 9:37-	GW	P	1 L	HNO3	G		Isotopic Uranium (HASL 300)	010 333568 011
094647	-001	CTF-TB1 🖌	NA	9/17/	3 9:23 -	DIW	G	3x40ml	HCL	G	тв	TCL VOC (SW846-8260B)	333568
													0.2
						1							
						1							
Recipient Initials													

# **GEL LABORATORIES LLC**

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

# **Certificate of Analysis**

Report Date: October 17, 2013

	Company : Address :	1515 Eubank SE	Laboratories 6765, Bldg. 823/Rm. 4 w Mexico 87123	4276							
	Contact:	Ms. Pamela M. P									
	Project:	Groundwater, Le	vel C Package								
	Client Sample ID:	094646-020			Projec	t:	SNLSG	Water			
	Sample ID:	333568006			Client	ID:	SNLS0	04			
	Matrix:	AQUEOUS									
	Collect Date:	17-SEP-13 09:31									
	Receive Date:	18-SEP-13			Client	Desc.:	CTF-M	W2			
	Collector:	Client			Vol. R	.ecv.:					
Parameter	Quali	fier Result	DL	RL	Units	DF	Analyst	Date	Tim	e Batch	Method
Ion Chroma	itography										
	Perchlorate by IC "A	As Received"									
Perchlorate		U ND	0.004	0.012	mg/L	1	MAR1 10	/10/13	1723	1336270	1
The follow	ing Analytical Meth	ods were performe	d:								
Method 1	Descri EPA 31	ption 4.0 DOE-AL		-	Anal	yst Co	mments				

Notes:

P 00 MO 2012-ARCOC (4-2012) 6

NA

Internal Lab

of 1355

# CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY

Batch No. Page 1 of 2 SMO Use Project Name: AR/COC SWMU 68 GWM 614933 Date Samples Shipped: 7/9/13 SMO Authorization: Project/Task Manager: Clinton Lum Waste Characterization Carrier/Waybill No. 206735 SMO Contact Phone: Project/Task Number: 98026.01.13 RMMA Lab Contact: Edie Kent/803-556-8171 Lorraine Herrera/505-844-3199 Service Order CF 263-13 Released by COC No. Lab Destination: GEL Send Report to SMO: 4º Celsius PO 1303873 Contract No .: Rita Kavanaugh/505-284-2553 Tech Area: Bill to:Sandia National Laboratories (Accounts Payable), **Building:** P.O. Box 5800, MS-0154 Room: **Operational Site:** Albuquerque, NM 87185-0154 Depth Date/Time Sample Container Sample No. Preserv- Collection Fraction Sample Sample Location Detail Parameter & Method (ft) Collected Lab Matrix Type Volume ative Method Type Requested 094361 Sample ID 001 **OBS-MW1** 153 7/9/13 9:44 GW G 3x40ml 329124 HCL G SA TCL VOC (SW846-8260B) 094361 -002 OBS-MW1 001 153 7/9/13 9:46 \* GW AG\* 329129 4x1L None G SA TCL SVOC (SW846-8270C) 094361 002 -009 OBS-MW1 153 7/9/13 9:50 GW P. 329124 500 ml HNO3 G SA TAL Metals+U(SW846-6010/6020/7470) 094361 -014 003 OBS-MW1 153 7/9/13 9:51 Hexavalent Chromium(SW846-7196A GW P 329124 250 ml None G SA 094361 -016 004 OBS-MW1 153 7/9/13 9:52 GW P٠ 329124 125 ml Anions(SW846-9056)) None G SA 094361 -017 005 OBS-MW1 153 7/9/13 9:531 FGW P 250 ml HNO3 29205 G Metals-Ca,Mg,K,Na(SW846-6020) SA 094361 -018 OBS-MW1 001 153 7/9/13 9:54 GW Ρ 125 ml 329129 H2SO4 G SA NPN (EPA 353.2) 006 094361 020 OBS-MW1 153 7/9/13 9:55 GW Ρ 250 ml 329124 None G Perchlorate (EPA 314.0) SA 094361 -022 007 OBS-MW1 153 7/9/13 9:56 P' GW 32912 500 ml None G Alkalinity (SM2320B) SA 094361 -024 OBS-MW1 008 153 7/9/13 10:00 -GW 329120 AG 4x1L \* None ast Chain: G High Explosives (SW846-8321A) SA Yes Sample Tracking SMO Use Special Instructions/QC Requirements: Validation Reg'd 1 Yes Conditions on Date Entered: EDD 1 Background: Yes No Yes Entered by: Receipt **Turnaround Time** Confirmatory: 7 Day\* 15 Day\* 30 Day L Yes QC inits. Negotiated TAT Sample Name Signature Init. Company/Organization/Phone/Cell Sample Disposal Return to Client Team Robert Lynch Disposal by Lab U SNL/4142/505-844-4013/505-250-7090 Return Samples By: Members Tim Jackson etta SNL/4142/505-284-2547/505-263-6639 71 Comments: Send report to Tim Jackson/4142/MS 0729/284-2547 FGW(filtered in field w/40 micron filter) Anions(Br,CI,F,SO4)Alkalinity(total CaCO3, HCO3, CO3) if perchlorate detected, perform Verification analysis using SW846-6850M.Gamma Spectroscopy as short list isotopes. Relinquished by T-A des-Org.4142 Date 7/9/13 Lab Use Time 1033 3.Relinquished by Received by ø Org. Org. 4/42 Date 7/9/13 Date Time Time /027 3. Received by Relinguished by Org. 4/42 Date 7/ 6/13 Org. Date Time Time / 100 4. Relinguished by 2. Received by Org. Date Org. CAL Date 7-10-13 Time Time 07Vil \*Prior confirmation with SMO required for 7 and 15 day TAT 4. Received by Org. Date Time

AOP 95-16

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CMO	2012-ARCOC	(4 - 2012)	

# Page 7 of 1355

# CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY (Continuation)

AOP 95-16

roject Nam	e:	SWMU 68 GWM		Project/T	ask Mana	ger:	Clinton Lur	n		Project/Ta	sk No ·	0.0	026.01.13		514933
ech Area:		<del></del>								1. 10 000 14	SK 110	98	026.01.13		
uilding:		Room:													
ample No.	Fraction	Sample Lo	cation De	etail	Depth (ft)	Date/		Sample Matrix	Со Туре	ntainer Volume	Preserv- ative	Collection Method	Sample Type	Parameter & Method	Lab u Lal
094361	-027 -	OBS-MW1			153	7/9/13	10:01	GW	P	250 ml	NaOH	G	SA	Requested	Samp 329/ 010
094361	-033 r	OBS-MW1			153	7/9/13	10:02	GW	Р	1 L-	HNO3	G	SA	Total Cyanide (SW846-9012	12001
094361	-034 r	OBS-MW1			153	7/9/13	10:03 r	GW	Р	1 L	- HNO3	G	a de la composición d	Gamma Spectroscopy (EPA 901.0	) 01
094361	-035 1	OBS-MW1			153	7/9/13	10:04	GW	P ·	1L,	HNO3	G		Gross Alpha and Beta (EPA 900.0	3291
094362	-001	OBS-TB1			NA	7/9/13	9:44	DIW	G	3x40ml	HCL	G		Isotopic Uranium (HASL 300)	3290 01 3290
										0X40IIII	TICE	<u>G</u>	TB	TCL VOC (SW846-8260B)	01
			_												
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					††										1
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					-+										2
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# **GEL LABORATORIES LLC**

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

# **Certificate of Analysis**

				Certificati		11 y 515		Rep	oort Da	ate:	August	5, 2013
	Company : Address :	MS-0 1515 Albu	ia National Labora 0756, Org. 06765, 1 Eubank SE querque, New Mex	Bldg. 823/Rm. 4	276							
	Contact:		Pamela M. Puissan									
	Project:		ndwater, Level C I	ackage			24		•••			
	Client Sample ID:	in the second	61-020			Projec		SNLSG				
	Sample ID:		24007			Client	ID:	SNLS0	04			
	Matrix:	AQU	EOUS									
	Collect Date:	09-Л	JL-13 09:55									
	Receive Date:	10-Л	JL-13			Client	Desc.:	OBS-M	W1			
	Collector:	Clien	t			Vol. R	ecv.:					
Demonster	Qualit		Degult	DI	RL	Units	DE	Amplicat	Dete	Tim	a Datah	Mathad
Parameter	Qualif	ler	Result	DL	KL	Units	DF	Analyst	Date	Tim	e Batch	Method
Ion Chroma												
	Perchlorate by IC "A	s Rec										
Perchlorate		U	ND	0.004	0.012	mg/L	1	MAR1 07	/11/13	1657	1314022	1
The follow	ing Analytical Method	ods we	ere performed:									
Method	Descri	otion				Anal	yst Co	mments				
1	EPA 314	4.0 DOE	-AL									

Notes:

Pag GMO 2012-ARCOC (4-2012) 11 of 13 55 Internal Lab

# CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY

Batch No.	NIA																	Pag	ge_1_of_
Project Nam			SWMU 68	CIARA				SMO Use						1 -	$\mathcal{O}$		AR/COC	Statement of the local division of	14935
Project/Task						Date Sample		-74	013		SMO A	Authorization:	a	1.9		M.	aste Characterization	01	4955
Project/Task	Num	or i	08026.01	12		Carrier/Way				71		Contact Phone		4 66	Smil		IMA		
Service Orde			CF 263-1			Lab Contact		Edie Kent	/803-556-	8171	]	Lorraine I	Herrera/50	5-844-3199	2000				
	<b>.</b>		01 200-1	3		Lab Destinat		GEL			Send F	Report to SMC	):				leased by COC No.		1
Tech Area:						Contract No.	.:	PO 13038	373		1			5-284-2553		Bill to: Con			4º Cels
Building:		<u>⊢</u> _,															dia National Laboratori	es (Accou	unts Payat
bununy.	1		Room:			Operation	al Site:										800, MS-0154		
Sample No.	Error		•				Depth	Date	/Time	Sample	С	ontainer	Preserv-	Collection	Samula		ue, NM 87185-0154		
Sample NO.	Frac	lion	Sar	mple L	ocation De	etail	(ft)	Colle	ected	Matrix	Туре		ative	Method	Sample Type	Р	arameter & Metho	d	Lat
094365	-001		OBS-MW	2			252	7/10/13	0.10	0.00			dure	method	Type	-	Requested	_	Sampl
094365	000						202	1/10/13	9:19	GW	G	3x40ml	HCL	G	SA	TCL VOC	(SW846-8260B)		32973
094303	-002	-	DBS-MW	2			252	7/10/13	9:22	GW	AG	4x1L	None	G	C.A.	10			32912
094365	-009		DBS-MW	2			252	7/10/10	0.05				None	<u> </u>	SA	ICL SVC	C (SW846-8270C)		030
00.005							252	7/10/13	9:25	GW	Р	500 ml	HNO3	G	SA	TAL Metals	s+U(SW846-6010/6020	17470)	32912
094365	-014		DBS-MW	2			252	7/10/13	9:26	GW	Р	250 ml	None	0					12000
094365	-016		DBS-MW	2			252	74040			· · ·	200111	None	G	SA	Hexavale	nt Chromium(SW84	6-7196	A 032
004005	-						252	7/10/13	9:27	GW	P	125 ml	None	G	SA	Anions(S	W846-9056))		3291
094365	-017		DBS-MW2	2			252	7/10/13	9:28	FGW	Р	250 ml	HNO3	0					3292
094365	-018		BS-MW2	2			252	7/40/40	0.00		· · ·	230 111		G	SA	Metals-Ca	a,Mg,K,Na(SW846-	6020)	00
00.000-							202	7/10/13	9:29	GW	P	125 ml	H2SO4	G	SA	NPN (EP	A 353 2)		32912
094365	-020	C	BS-MW2	2			252	7/10/13	9:30	GW	P	250 ml	Name	-				-	3291
094365	-022		BS-MW2	2							F	250 mi	None	G	SA	Perchlora	te (EPA 314.0)		039
		H	00-1010 02				252	7/10/13	9:31	GW	Р	500 ml	None	G	SA	Alkalinity	(SM2320B)		3291
094365	-024	C	BS-MW2	2			252	7/9/13	9:33	GW	AG								3291
ast Chain:		[	Yes				Sample		0.00	SMO		4x1L	None	G	SA	High Expl	osives (SW846-832	1A)	037
/alidation I	Req'd		- Yes				Date Ente			31410	Use	Special Ins	tructions/		ements:			Cond	ditions on
Background	d:		Yes				Entered b					EDD		Yes		No		R	eceipt
Confirmato	ry:		Yes				QC inits.:					Turnaround		7 Day	<u>t</u> [].	15 Day*	✓ 30 Day		
Sample		Nam			Signatur		Init.					Negotiated							
	Rober	_		Par	17 Gree				/Organizat			Sample Dis	posal	Return	to Client		Disposal by Lab		
lembers		_			Thatis			SNL/4142/5				Return Sam	ples By:						
		ionoo			Mis	<u> </u>	17	SNL/4142/50	05-284-254	7/505-263	-6639	Comments:		Send report to 7	Tim Jackson/4	142/MS 072	0/084 2547		
ł												FGW(filtered in	n field w/0.4	5 micron filter	Anions/Br	CIESOAN	Il collinite (tested		
ł	-											Lacus, ncus	,CO3) IT perc	chlorate deter	cted perform	vorification	n analysis using		
												SW846-6850N	i.Gamma Sp	pectroscopy a	as short list i	sotopes.			
Relinquished	-	1-	1 day			org. 414	Z Date	7/10/13	Time /	010	3.Relina	uished by						La	b Use
Received by		BA	ty for		SMO 0	rg. 414-	Z Date	Fliplin			3. Recei				Org.		Date	Time	
Relinquished	_	2	AG		Sugo	ing. 4142	Z Date :	2/10/1		100					Org.		Date	Time	
Received by		V	ming	5	1-0	10 10	4 Data	7-11-13	Time		And in case of the local division of the loc				Org.		Date	Time	
Prior confirm	ation	with	SMO room	uirod &	an 7 and 4	F			- mile	118 4	. Receiv	vea by			Org.		Date	Time	

AOP 95-16

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# CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY (Continuation)

AOP 95-16

Project Nam Tech Area:	ie:	SWMU 68 GWM	Project/T	Project/Task Manager: Clinton Lum Project/Task No.: 980							026.01.13		14935	
Building:		Room:												
Sample No.		1	cation Detail	Depth (ft)	Date/ Colle	Time ected	Sample Matrix	Co Type	ntainer Volume	Preserv- ative	Collection Method	Sample Type	Parameter & Method	Lab us Lab
094365	-027	OBS-MW2		252	7/10/13	9:36	GW	Р	250 ml	NaOH	G	SA	Requested Total Cyanide (SW846-9012	Sample 329/2 038
094365	-033	OBS-MW2		252	7/10/13	9:37	GW	Р	1 L	HNO3	G	SA		038 32912 039
094365	-034	OBS-MW2		252	7/10/13	9:38	GW	Р	1 L	HNO3	G	SA	Gamma Spectroscopy (EPA 901.0)	32912
094365	-035	OBS-MW2		252	7/10/13	9:39	GW	Р	1 L	HNO3	G	SA	Gross Alpha and Beta (EPA 900.0)	32912
094366	-001	OBS-MW2		252	7/10/13	9:20	GW	G	3x40ml	HCL	G		Isotopic Uranium (HASL 300)	041
094366	-002	OBS-MW2		252	7/10/13	9:24	GW	AG	4x1L	None	G	DU	TCL VOC (SW846-8260B)	32912
094366	-009	OBS-MW2		252	7/10/13	9:25	GW	P	500 ml	HNO3	G	DU	TCL SVOC (SW846-8270C)	32913
094366	-014	OBS-MW2		252	7/10/13	9:26	GW	P	250 ml	None			TAL Metals+U(SW846-6010/6020/7470)	049
094366	-016	OBS-MW2		252	7/10/13	9:27	GW	P	125 ml		G	0.00000000	Hexavalent Chromium(SW846-7196	
094366	-017	OBS-MW2		252	7/10/13	9:28	FGW	P		None	G		Anions(SW846-9056))	32912 04 32920
094366	-018	OBS-MW2		252	7/10/13	9:29	GW	P	250 ml	HNO3	G		Metals-Ca,Mg,K,Na(SW846-6020)	004
094366	-020	OBS-MW2		252	7/10/13	9:30	GW		125 ml	H2SO4	G		NPN (EPA 353.2)	32912
094366	-022	OBS-MW2		252	7/10/13	9:31	GW	P	250 ml	None	G		Perchlorate (EPA 314.0)	32912
094366	-024	OBS-MW2		252	7/10/13	9:35			500 ml	None	G	DU	Alkalinity (SM2320B)	32912
094366	-027	OBS-MW2		252	7/10/13	9:36	GW	AG	4x1L	None	G	DU	High Explosives (SW846-8321A)	3291
094366	-033	OBS-MW2		252	7/10/13	****	GW	<u>Р</u>	250 ml	NaOH	G	DU	Total Cyanide (SW846-9012	32912
094366	-034	OBS-MW2		252	7/10/13	9:37	GW	P	<u>    1L                                </u>	HNO3	G	DU	Gamma Spectroscopy (EPA 901.0)	32912
094366	-035	OBS-MW2		252		9:38	GW	Р	1L	HNO3	G	DU	Gross Alpha and Beta (EPA 900.0)	32912
094367	-001	OBS-TB3		NA	7/10/13	9:39	GW	<u>Р</u>	<u>1L</u>	HNO3	G	DU	Isotopic Uranium (HASL 300)	32912
					7/10/13	9:19	DIW	G	3x40ml	HCL	G	тв	TCL VOC (SW846-8260B)	32912
cipient Init	ials M	K		L										

## **GEL LABORATORIES LLC**

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

# **Certificate of Analysis**

			Certific	ale of A	1141 9 515		Rep	ort Da	ate: A	ugust	5, 2013
	Company : Address :	1515 Eubank S	06765, Bldg. 823/Rr	m. 4276							
	Contact:	Ms. Pamela M.									
	Project:		level C Package								
	Client Sample ID:	094365-020			Project		SNLSG				
	Sample ID:	329124035			Client I	D:	SNLS00	4			
	Matrix:	AQUEOUS									
	Collect Date:	10-JUL-13 09:3	60								
	Receive Date:	11-JUL-13			Client I	Desc.:	OBS-MV	W2			
	Collector:	Client			Vol. Re	ecv.:					
Parameter	Qualit	fier Result	DI	L RL	Units	DF	Analyst	Date	Time l	Batch	Method
Ion Chroma	atography										
EPA 314.0	Perchlorate by IC "A	As Received"									
Perchlorate	5	U ND	0.004	4 0.012	mg/L	1	MAR1 07/	11/13	1814 13	14022	1
The follow	ing Analytical Meth	ods were perform	ned:								
Method	Descri EPA 314	ption 4.0 DOE-AL			Analy	/st Co	mments		_		

Notes:

## **GEL LABORATORIES LLC**

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

# **Certificate of Analysis**

			Certificate		u <u>y 515</u>	Report Date: August 5, 2013
	Company : Address : Contact:	Sandia National Labo MS-0756, Org. 06765 1515 Eubank SE Albuquerque, New M Ms. Pamela M. Puissa	, Bldg. 823/Rm. 42 exico 87123	276		
	Project:	Groundwater, Level C				
	Client Sample ID:	094366-020			Project:	SNLSGWater
	Sample ID:	329124048			Client ID:	: SNLS004
	Matrix:	AQUEOUS				
	Collect Date:	10-JUL-13 09:30				
	Receive Date:	11-JUL-13			Client De	esc.: OBS-MW2
	Collector:	Client			Vol. Recv	v.:
Parameter	Qualit	fier Result	DL	RL	Units 1	DF Analyst Date Time Batch Method
Ion Chroma	atography					
EPA 314.0	Perchlorate by IC "A	As Received"				
Perchlorate		U ND	0.004	0.012	mg/L	1 MAR1 07/11/13 1833 1314022 1
The follow	ing Analytical Meth	ods were performed:				
Method	Descri				Analyst	t Comments
1	EPA 31-	4.0 DOE-AL				

Notes:

P 200 CMO 2012-ARCOC (4-2012) 4 of 113 55 Internal Lab

# CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY

	h No. 🏒	8114	-												~	107 <b>•</b> 1		_	Pag	e <u>1</u> of <u>2</u>
Proj	ect Name		S	WMU 68	GWM		Data Carri	011	SMO Use			·			10	ß		AR/COC	61	4936
	ect/Task						Date Sample Carrier/Wayt			11/13		SMO A	uthorization	$\Rightarrow$	LY.L	my	Was	ste Characterization		
	ect/Task						Lab Contact:			068		SMO C	ontact Phone			Sino				
	rice Order			F 263-1			Lab Destinat		Edie Kent	803-556-8	8171		Lorraine H	Herrera/50	5-844-3199		Rele	eased by COC No.	27	
							Contract No.		PO 13038	70		Send R	eport to SMC				1		$\Box$	4º Celsius
Tech	n Area:						Contract NO.		PU 13038	13			Rita Kava	anaugh/50	5-284-2553		Bill to:Sandi	a National Laboratorie	s (Accou	ints Pavable)
Buil	ding:		R	oom:			Operation	ol Citer										00, MS-0154		
						]	Operationa	1									Albuquerque	e, NM 87185-0154		
Sam	ple No.	Fract	ion	Sa	mple L	ocation De	etail	Depth (ft)		Time	Sample		ontainer	Preserv-	Collection	Sample		rameter & Method	1	Lab
2 00	4000	004		0.000 00 00		oudon be		(11)	Colle	ected	Matrix	Туре	Volume	ative	Method	Туре		Requested		Sample ID
1 05	94368	-001	-10	BS-MW	13			208	7/11/13	9:20	GW	G	3x40ml	HCL	G	SA	TOLVOO			329124
1 09	4368	-002	0	BS-MW	3			208	7/11/13	0.00	-		1			- SA	TCL VUC	(SW846-8260B)		056
) 00	4000	0.00						200	//1//13	9:22	GW	AG	4x1L	None	G	SA	TCL SVOC	C (SW846-8270C)		329129
1 05	4368	-009	0	BS-MW	3			208	7/11/13	9:23	GW	Р	500 ml	HNO3	G	SA				329124
P 09	4368	-014	0	BS-MW	3			208	7/11/13	0.24	0.44		1			57	TAL Metals+	U(SW846-6010/6020	/7470)	058
00	4000							200	111113	9:24	GW	P	250 ml	None	G	SA	Hexavalen	t Chromium(SW84	6-7196A	329124
09	4368	-016	0	BS-MW	3			208	7/11/13	9:25	GW	P	125 ml	None	G	SA				329124
' 09	4368	-017	0	BS-MW	3			208	7/11/13	9:26	FOW						Allons(SV	V846-9056))		329205
00	4368	-018	6		2					9.20	FGW	P	250 ml	HNO3	G	SA	Metals-Ca,	Mg,K,Na(SW846-6	6020)	005
<u> </u>	4000	-010	4	BS-MW	3			208	7/11/13	9:27	GW	Ρ	125 ml	H2SO4	G	SA	NPN (EPA	353 2)		329124
09	4368	-020	0	BS-MW	3			208	7/11/13	9:28	GW	Р	050							061 329124
1 00	4368	-022	6		~					5.20	GW	P	250 ml	None	G	SA	Perchlorate	e (EPA 314.0)		062
-03	4300	-022	-10	BS-MW	3			208	7/11/13	9:29	GW	Р	500 ml	None	G	SA	Alkalinity (S	SM2320B)		329124
09	4368	-024	0	BS-MW	3			208	7/11/13	9:30	GW	AG	4.41							329120
	Chain:			7 Yes				Sample		0.00	SMO		4x1L	None	G	SA	High Explo	sives (SW846-832	1A)	064
Valio	dation R	leq'd	Ŀ	∠ Yes				Date Ente			SNIQ	use	Special Ins	tructions/		ements:			Cond	litions on
Back	ground	l:		Yes				Entered t					EDD		Yes Yes		No		Re	eceipt
Cont	firmator	y:		Yes				QC inits .:					Turnaround		7 Day	Ľ 🗌	<u>15 Day*</u>	✓ 30 Day		
	mple	-	Nam		0	Signatur		Init.		UOrac -i- i	i	10.11	Negotiated							
	- H	Robert	_		TA	1910		257		//Organizat			Sample Dis		Return	to Client		Disposal by Lab		
Men	nbers		-		1-7.	9-115			SNL/4142/50				Return Sam							
	F				-/-]	10119	· · · ·	17	SNL/4142/50	15-284-254	7/505-263	8-6639	Comments:		Send report to	Tim Jackson/	4142/MS 0729/	284-2547		
	F												FGW(filtered i	n field w/0.4	5 micron filter	Anions/R	CLE SOALA	kalinity/total		
	F												SW846-6850N	A Gamma S	chlorate dete	cted, perform	n Verification	analysis using		1.21
1.Reli	nquished	by -	-1	du -											hermoscobh s	as short list	isotopes.		11	
	ceived by		T	66	$\theta$		Drg. 7192		7/11/13		006	3.Reling	uished by			Org.		Date		b Use
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# CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY (Continuation)

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	Project Nam		SWALL CO. ON AL		I										AR/COC	614936
	Tech Area:		SWMU 68 GWM		Project/Ta	sk Mana	ger:	Clinton Lu	m		Project/Ta	sk No.:	98	026.01.13		
- 3	Building:		Room:												1	
					L	Depth	<b>D</b> .1.1		1							Lab use
	Sample No.	Fraction	n Sample L	ocation [	Detail	(ft)	Date/ Colle		Sample		ntainer		Collection	Sample	Parameter & Method	Lab
,	094368	-027	OBS-MW3						Matrix	Туре	Volume	ative	Method	Туре	Requested	Sample ID
,	094368	-033	OBS-MW3			208	7/11/13	9:31	GW	Р	250 ml	NaOH	G	SA	Total Cyanide (SW846-9012	329129
,	094368					208	7/11/13	9:32	GW	Р	1 L	HNO3	G	SA	Gamma Spectroscopy (EPA 901.0	2001010
		-034	OBS-MW3			208	7/11/13	9:33	GW	Р	1 L	HNO3	G	SA	Gross Alpha and Beta (EPA 900.0	( ) · · · / /
ľ	094368	-035	OBS-MW3			208	7/11/13	9:34	GW	P	1 L	HNO3	G	SA	Isotopic Uranium (HASL 300)	329/24
	094369	-001	OBS-TB4			NA	7/11/13	9:19	DIW	G	3x40ml	HCL	G	ТВ	TCL VOC (SW846-8260B)	329124
	094370	-001	OBS-FB1			NA	7/11/13	9:19	DIW	G	3x40ml	HCL	G		TCL VOC (SW846-8260B)	329124
															TCL VOC (SVV846-8260B)	070
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## **GEL LABORATORIES LLC**

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

# **Certificate of Analysis**

Report Date: August 5, 2013 Company : Sandia National Laboratories MS-0756, Org. 06765, Bldg. 823/Rm. 4276 Address : 1515 Eubank SE Albuquerque, New Mexico 87123 Contact: Ms. Pamela M. Puissant Project: Groundwater, Level C Package Client Sample ID: 094368-020 Project: **SNLSGWater** Sample ID: 329124062 Client ID: SNLS004 Matrix: **AQUEOUS** Collect Date: 11-JUL-13 09:28 Receive Date: 12-JUL-13 Client Desc.: OBS-MW3 Collector: Client Vol. Recv.: Parameter Qualifier Result DL RL Units DF Analyst Date Time Batch Method Ion Chromatography EPA 314.0 Perchlorate by IC "As Received" Perchlorate ND 0.004 0.012 U mg/L 1 MAR1 07/12/13 1038 1314022 1 The following Analytical Methods were performed: Method Description Analyst Comments EPA 314.0 DOE-AL 1

Notes:

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



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

Memorandum

Date: September 26, 2013

To: File

From: Linda Thal

Subject: Inorganic Data Review and Validation – SNL Site: SWMU 68 GWM AR/COC: 614933, 614934, 614935 and 614936 SDG: 329124 and 331750 Laboratory: GEL Project/Task: 98026.01.13 Analysis: General Chemistry

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

#### Summary

Five samples were prepared and analyzed with accepted procedures using methods EPA 7196A (hexavalent chromium), EPA 9056 (anions by IC), EPA 353.2 (nitrate/nitrite), EPA 9012A (total cyanide), EPA 314.0 (perchlorate) and SM2320B (total alkalinity). Data were reported for all required analytes. Problems were identified with the data package that resulted in the qualification of data.

#### Total cyanide:

- 1. The intercept for total cyanide was negative with an absolute value > the MDL but ≤3X the MDL. The associated sample results were NDs and will be **qualified UJ,I5**.
- 2. Total cyanide was detected in the ICB/CCB at negative values with absolute values < the PQL. The associated sample results were NDs and will be **qualified UJ,B4**.
- 3. The MS %R for total cyanide was <75% but ≥30%. The associated sample results were NDs and will be qualified UJ,MS3.

#### Anions:

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

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

#### Holding Times and Preservation

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

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

#### Calibration

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

#### Blanks

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

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

#### Laboratory Control Sample (LCS)

All LCS acceptance criteria were met.

#### Matrix Spike (MS)

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

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

#### Laboratory Replicate

The replicate analyses met all QC acceptance criteria.

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

#### **Detection Limits/Dilutions**

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

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

Anions:

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

#### Other QC

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

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

No other specific issues that affect data quality were identified.

Reviewed by: Monica Dymerski	Level I	Date: 09/30/13
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## AR/COC: 614933, 614934, 614935, 614936

Page 1 of 3

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

## AR/COC: 614933, 614934, 614935, 614936

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
	094368-033/OBS-MW3	Cesium-137 (10045-97-3)	BD, FR3
	094368-033/OBS-MW3	Cobalt-60 (10198-40-0)	BD, FR3
	094368-033/OBS-MW3	Potassium-40 (13966-00-2)	BD, FR3
SW846 3005/6020 DOE-	AL		
	094361-009/OBS-MW1	Barium (7440-39-3)	J, MS1
	094361-009/OBS-MW1	Manganese (7439-96-5)	J, D1
	094363-009/OBS-EB1	Barium (7440-39-3)	UJ, MS1
	094363-009/OBS-EB1	Manganese (7439-96-5)	UJ, D1
	094365-009/OBS-MW2	Barium (7440-39-3)	J, MS1
	094365-009/OBS-MW2	Copper (7440-50-8)	0.0080U, B2
	094365-009/OBS-MW2	Manganese (7439-96-5)	UJ, D1
	094366-009/OBS-MW2	Barium (7440-39-3)	J, MS1
	094366-009/OBS-MW2	Copper (7440-50-8)	0.0080U, B2
	094366-009/OBS-MW2	Manganese (7439-96-5)	UJ, D1
	094368-009/OBS-MW3	Barium (7440-39-3)	J, MS1
	094368-009/OBS-MW3	Manganese (7439-96-5)	J, D1
SW846 3535/8321A Mod	dified		
	094361-024/OBS-MW1	m-Nitrotoluene (99-08-1)	UJ, 14
	094361-024/OBS-MW1	o-Nitrotoluene (88-72-2)	UJ, 14
	094361-024/OBS-MW1	p-Nitrotoluene (99-99-0)	UJ, 14
	094363-024/OBS-EB1	m-Nitrotoluene (99-08-1)	UJ, 14
	094363-024/OBS-EB1	o-Nitrotoluene (88-72-2)	UJ, 14
	094363-024/OBS-EB1	p-Nitrotoluene (99-99-0)	UJ, 14
	094365-024/OBS-MW2	m-Nitrotoluene (99-08-1)	UJ, 14
	094365-024/OBS-MW2	o-Nitrotoluene (88-72-2)	UJ, 14
	094365-024/OBS-MW2	p-Nitrotoluene (99-99-0)	UJ, 14
	094366-024/OBS-MW2	m-Nitrotoluene (99-08-1)	UJ, 14
	094366-024/OBS-MW2	o-Nitrotoluene (88-72-2)	UJ, 14
	094366-024/OBS-MW2	p-Nitrotoluene (99-99-0)	UJ, 14

#### AR/COC: 614933, 614934, 614935, 614936

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
	094368-024/OBS-MW3	m-Nitrotoluene (99-08-1)	UJ, 14
	094368-024/OBS-MW3	o-Nitrotoluene (88-72-2)	UJ, 14
	094368-024/OBS-MW3	p-Nitrotoluene (99-99-0)	UJ, 14
SW846 9012B			
	094361-027/OBS-MW1	Cyanide, Total (57-12-5)	UJ, 15,B4,MS3
	094363-027/OBS-EB1	Cyanide, Total (57-12-5)	UJ, 15,B4,MS3
	094365-027/OBS-MW2	Cyanide, Total (57-12-5)	UJ, 15,B4,MS3
	094366-027/OBS-MW2	Cyanide, Total (57-12-5)	UJ, 15,B4,MS3
	094368-027/OBS-MW3	Cyanide, Total (57-12-5)	UJ, 15,B4,MS3
SW846 9056			
	094365-R16/OBS-MW2	Chloride (16887-00-6)	J, H1
	094365-R16/OBS-MW2	Sulfate (14808-79-8)	J, H1

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



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#### Memorandum - Revised

Date: September 18, 2013

To: File

From: Linda Thal

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

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

#### Summary

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

#### Total cyanide:

- 1. The intercept for total cyanide was negative with an absolute value > the MDL but  $\leq 3X$  the MDL. The associated sample results were NDs and will be **qualified UJ,15**.
- 2. Total cyanide was detected in the ICB/CCB at negative values with absolute values < the PQL. The associated sample results were NDs and will be **qualified UJ,B4**.

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

#### Holding Times and Preservation

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

#### Calibration

All initial and continuing calibration met QC acceptance criteria.

#### **Blanks**

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

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

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

#### Laboratory Control Sample (LCS)

All LCS acceptance criteria were met.

#### Matrix Spike (MS)

All MS/PS recoveries met QC acceptance criteria.

#### Laboratory Replicate

The replicate analyses met all QC acceptance criteria.

#### **Detection Limits/Dilutions**

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

Nitrate/Nitrite:

All samples *except* the EB were diluted 5X.

Anions:

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

#### Other QC

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

No other specific issues that affect data quality were identified.

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



#### AR/COC: 614937, 614938, 614939

## Page 1 of 3

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

#### AR/COC: 614937, 614938, 614939

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
	094376-033/CCBA-MW1	Americium-241 (14596-10-2)	BD, FR3
	094376-033/CCBA-MW1	Cesium-137 (10045-97-3)	BD, FR3
	094376-033/CCBA-MW1	Cobalt-60 (10198-40-0)	BD, FR3
	094376-033/CCBA-MW1	Potassium-40 (13966-00-2)	BD, FR3
	094377-033/CCBA-MW1	Americium-241 (14596-10-2)	BD, FR3
	094377-033/CCBA-MW1	Cesium-137 (10045-97-3)	BD, FR3
	094377-033/CCBA-MW1	Cobalt-60 (10198-40-0)	BD, FR3
	094377-033/CCBA-MW1	Potassium-40 (13966-00-2)	BD, FR3
SW846 3005/6010B			
	094374-009/CCBA-EB1	Vanadium (7440-62-2)	UJ, B4
	094376-009/CCBA-MW1	Vanadium (7440-62-2)	UJ, B4
	094377-009/CCBA-MW1	Vanadium (7440-62-2)	UJ, B4
SW846 3005/6020 DOE-AL			
	094376-009/CCBA-MW1	Copper (7440-50-8)	0.0047U, B2
	094377-009/CCBA-MW1	Copper (7440-50-8)	0.0047U, B2
SW846 3510C/8270D			
	094371-002/CCBA-MW2	1,2,4-Trichlorobenzene (120-82-1)	UJ, MS5
	094371-002/CCBA-MW2	Hexachlorobutadiene (87-68-3)	UJ, MS5
	094371-002/CCBA-MW2	Hexachloroethane (67-72-1)	UJ, MSS
	094374-002/CCBA-EB1	1,2,4-Trichlorobenzene (120-82-1)	UJ, MS5
	094374-002/CCBA-EB1	Hexachlorobutadiene (87-68-3)	UJ, MS5
	094374-002/CCBA-EB1	Hexachloroethane (67-72-1)	UJ, MS5
	094376-002/CCBA-MW1	1,2,4-Trichlorobenzene (120-82-1)	UJ, MS5
	094376-002/CCBA-MW1	Hexachlorobutadiene (87-68-3)	UJ, MS5
	094376-002/CCBA-MW1	Hexachloroethane (67-72-1)	UJ, MS5
	094377-002/CCBA-MW1	1,2,4-Trichlorobenzene (120-82-1)	UJ, MS5
	094377-002/CCBA-MW1	Hexachlorobutadiene (87-68-3)	UJ, MS5
	094377-002/CCBA-MW1	Hexachloroethane (67-72-1)	UJ, MS5
SW846 3535/8321A Modifie	d		
	094371-024/CCBA-MW2	m-Nitrotoluene (99-08-1)	UJ, 14

#### AR/COC: 614937, 614938, 614939

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
	094371-024/CCBA-MW2	o-Nitrotoluene (88-72-2)	UJ, 14
	094371-024/CCBA-MW2	p-Nitrotoluene (99-99-0)	UJ, 14
	094374-024/CCBA-EB1	m-Nitrotoluene (99-08-1)	UJ, 14
	094374-024/CCBA-EB1	o-Nitrotoluene (88-72-2)	UJ, 14
	094374-024/CCBA-EB1	p-Nitrotoluene (99-99-0)	UJ, 14
	094376-024/CCBA-MW1	m-Nitrotoluene (99-08-1)	UJ, 14
	094376-024/CCBA-MW1	o-Nitrotoluene (88-72-2)	UJ, 14
	094376-024/CCBA-MW1	p-Nitrotoluene (99-99-0)	UJ, 14
	094377-024/CCBA-MW1	m-Nitrotoluene (99-08-1)	UJ, 14
	094377-024/CCBA-MW1	o-Nitrotoluene (88-72-2)	UJ, 14
	094377-024/CCBA-MW1	p-Nitrotoluene (99-99-0)	UJ, 14
SW846 9012B			
	094371-027/CCBA-MW2	Cyanide, Total (57-12-5)	UJ, 15,84
	094374-027/CCBA-EB1	Cyanide, Total (57-12-5)	UJ, 15,84
	094376-027/CCBA-MW1	Cyanide, Total (57-12-5)	UJ, 15,B4
	094377-027/CCBA-MW1	Cyanide, Total (57-12-5)	UJ, 15,B4

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



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Memorandum

Date:	October 21, 2013
То:	File
From:	Linda Thal
Subject:	Inorganic Data Review and Validation – SNL Site: SWMU 154 GWM AR/COC: 615029 SDG: 333568 Laboratory: GEL Project/Task: 146422.10.11.01 Analysis: General Chemistry

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

#### Summary

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

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

#### Holding Times and Preservation

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

#### Calibration

All initial and continuing calibration met QC acceptance criteria.

#### **Blanks**

No target analytes were detected in the blanks.

#### Laboratory Control Sample (LCS)

All LCS acceptance criteria were met.

#### Matrix Spike (MS)

All MS/PS recoveries met QC acceptance criteria.

### Laboratory Replicate

The replicate analyses met all QC acceptance criteria.

#### **Detection Limits/Dilutions**

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

<u>Anions:</u> The sample was diluted 100X for sulfate and chloride.

#### Other QC

No other specific issues that affect data quality were identified.

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

# Sample Findings Summary



AR/COC: 615029

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Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
EPA 901.1			
	094646-033/CTF-MW2	Americium-241 (14596-10-2)	BD, FR3
	094646-033/CTF-MW2	Cesium-137 (10045-97-3)	BD, FR3
	094646-033/CTF-MW2	Cobalt-60 (10198-40-0)	BD, FR3
	094646-033/CTF-MW2	Potassium-40 (13966-00-2)	J, FR7
SW846 3005/6010B			
	094646-009/CTF-MW2	Vanadium (7440-62-2)	0.018UJ, B,B3,DL2
	094646-010/CTF-MW2	Vanadium (7440-62-2)	0.018UJ, B,B3,DL2
SW846 3005/6020 DOE-	AL		
	094646-009/CTF-MW2	Antimony (7440-36-0)	UJ, MS3
	094646-009/CTF-MW2	Barium (7440-39-3)	J, MS1
	094646-009/CTF-MW2	Iron (7439-89-6)	J, MS1
	094646-009/CTF-MW2	Zinc (7440-66-6)	J, MS2
	094646-010/CTF-MW2	Antimony (7440-36-0)	UJ, MS3
	094646-010/CTF-MW2	Barium (7440-39-3)	J, MS1
	094646-010/CTF-MW2	Iron (7439-89-6)	J, MS1
	094646-010/CTF-MW2	Zinc (7440-66-6)	J, MS2
SW846 3535/8321A Mod	dified		
	094646-024/CTF-MW2	HMX (2691-41-0)	UJ, MS5
	094646-024/CTF-MW2	m-Nitrotoluene (99-08-1)	UJ, MS5
	094646-024/CTF-MW2	p-Nitrotoluene (99-99-0)	UJ, 14,MS5
	094646-024/CTF-MW2	RDX (121-82-4)	J, MS5

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

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Appendix A Field Measurement Logs for Monitoring Well CTF-MW2

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# SECTION III SOLID WASTE MANAGEMENT UNITS 149 AND 154 QUARTERLY GROUNDWATER MONITORING REPORT, July – September 2013

## 1.0 Introduction

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

Monitoring wells CTF-MW2 and CTF-MW3 were installed in August 2001. Prior to the September 2013 sampling event, monitoring wells CTF-MW2 and CTF-MW3 had been sampled 21 and 20 times, respectively, for a variety of constituents. Monitoring well CTF-MW3 is located approximately 290 feet to the west and downgradient of SWMU 149 (Figure III-1). Monitoring well CTF-MW2 is located approximately 260 feet to the southwest and downgradient of SWMU 154 (Figure III-2). Both wells are screened in Precambrian bedrock.

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

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

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

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

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

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

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

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

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

# 2.0 Field Methods and Measurements

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

# 2.1 **Equipment Decontamination**

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

# 2.2 Well Evacuation

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

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

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

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

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

# 2.3 Groundwater Sample Collection

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

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

# 3.0 Analytical Results

Groundwater samples were submitted to GEL for chemical and radiological analyses. Samples were analyzed in accordance with applicable EPA analytical methods (EPA 1980, 1984, 1986, and 1999; Clesceri et al. 1998; DOE 1990). Groundwater sampling results are compared with established EPA MCLs for drinking water (EPA 2009). Analytical results and method detection limits (MDLs) for samples collected from monitoring well CTF-MW2 are shown in tabulated form in Tables III-4 through III-12. Analytical reports, including certificates of analyses, analytical methods, MDLs, minimum detectable activity (MDA), critical level, practical quantitation limits, dates of analyses, results for QC analyses, and data validation findings are filed in the SNL/NM Records Center.

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

# 3.1 Field Water Quality Measurements

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

# 3.2 Volatile Organic Compounds

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

# 3.3 Semivolatile Organic Compounds

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

# 3.4 **High Explosive Compounds**

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

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

# 3.5 Nitrate Plus Nitrite

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

# 3.6 Anions and Alkalinity

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

# 3.7 **Perchlorate**

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

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

# 3.8 Metals

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

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

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

# 3.9 Gamma Spectroscopy and Radioisotopic Analyses

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

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

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

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

# 3.10 Sample Results Exceeding Maximum Contaminant Levels

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

# 4.0 **Quality Control Samples**

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

# 4.1 Field Quality Control Samples

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

# 4.1.1 Trip Blank Samples

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

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

# 4.2 Laboratory Quality Control Samples

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

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

## 4.3 Variances and Nonconformances

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

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

# 5.0 Summary

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

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

# 6.0 **References**

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

DOE, see U.S. Department of Energy.

EPA, see U.S. Environmental Protection Agency.

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

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

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

New Mexico Environment Department (NMED), February 2012. "Risk Assessment Guidance for Site Investigations and Remediation." New Mexico Environment Department Hazardous Waste Bureau and the Ground Water Quality Bureau's Voluntary Remediation Program, Santa Fe, New Mexico, Table A-1 updated June 2012.

NMED, see New Mexico Environment Department.

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

Sandia National Laboratories, New Mexico (SNL/NM), May 2011. "Data Validation Procedure for Chemical and Radiochemical Data," Administrative Operating Procedure 00-03, Revision 3, Sample Management Office, Sandia National Laboratories, New Mexico. Sandia National Laboratories, New Mexico (SNL/NM), January 2012a. "Groundwater Monitoring Equipment Decontamination," Field Operating Procedure 05-03, Revision 04, Long-Term Environmental Stewardship, Environmental Management Department, Sandia National Laboratories, New Mexico.

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

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

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

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

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

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

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

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

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# Figures

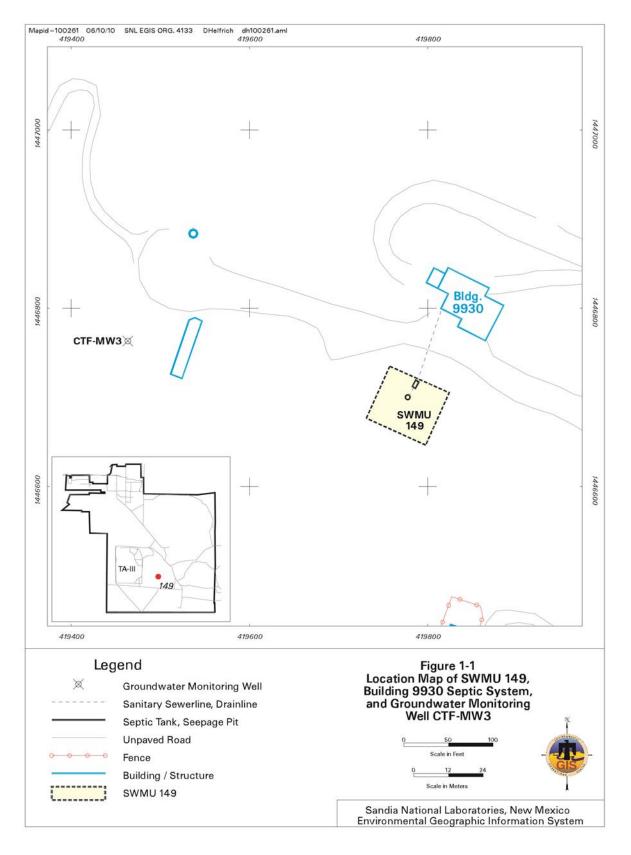


Figure III-1 Location of Monitoring Well CTF-MW3 near SWMU 149

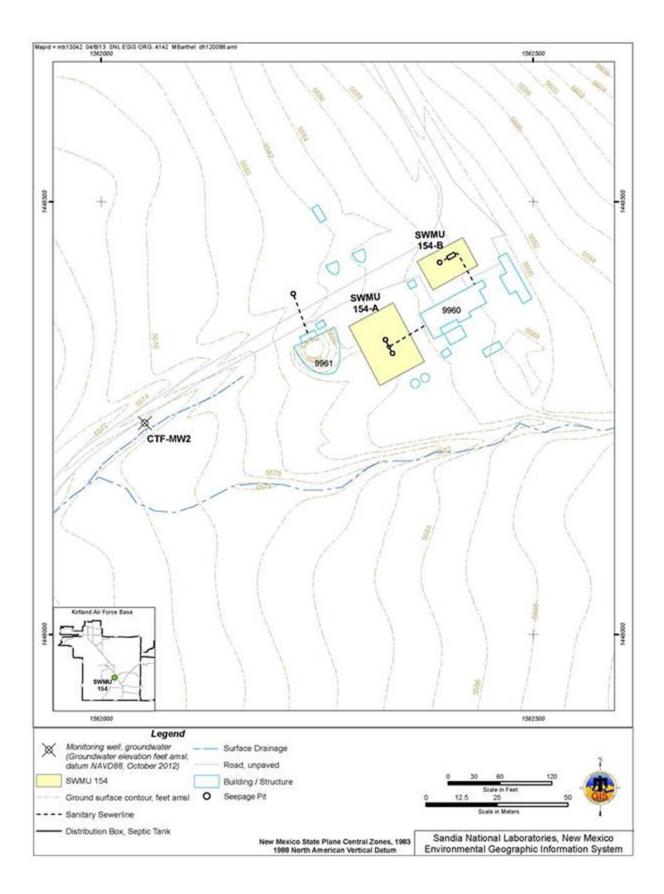
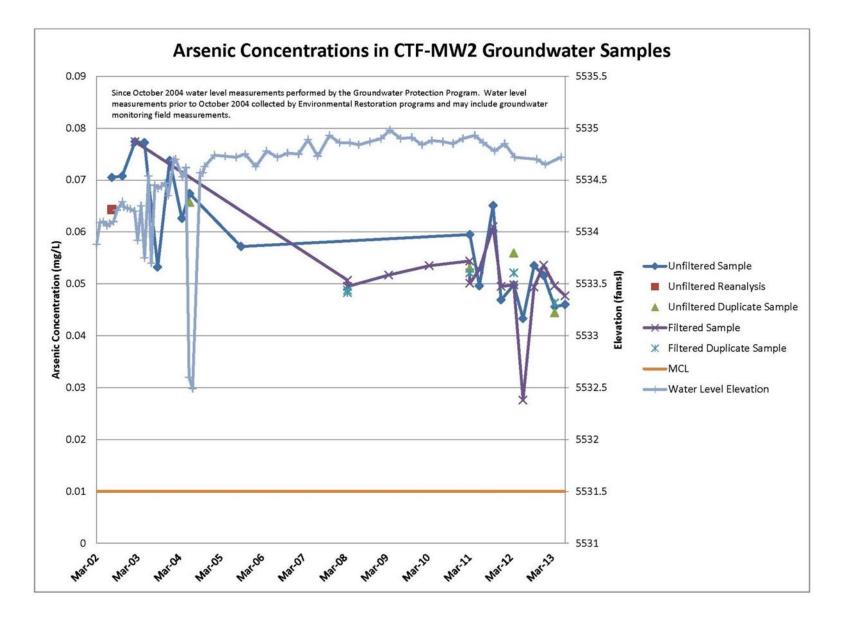


Figure III-2 Location of Monitoring Well CTF-MW2 near SWMU 154



## Figure III-3

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

# Tables

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

Analysis	Analytical Method <sup>a</sup>	Volume and Container Type/ Preservation Requirements
Volatile Organic Compounds	EPA 8260B	3 x 40-mL glass, HCl, 4°C
Semivolatile Organic Compounds	EPA 8270C	3 x 1-L Amber Glass, 4°C
High Explosives	EPA 8321A	4 x 1-L Amber Glass, 4°C
Metals <sup>b</sup>	EPA 6010/6020/7470	1 x 500-mL polyethylene, HNO <sub>3</sub> , 4°C
Perchlorate	EPA 314.0	1 x 250-mL polyethylene, 4°C
Major Anions and Cations <sup>c</sup>	EPA 6020/7470/9056	1 x 500-mL polyethylene, 4°C
Alkalinity as Total, Carbonate, and Bicarbonate	SM 2320B	1 x 500-mL polyethylene, 4°C
Nitrate plus Nitrite	EPA 353.2	1 x 250-mL polyethylene, H <sub>2</sub> SO <sub>4</sub> , 4°C
Gross Alpha/Beta	EPA 900.0	1 x 1-L polyethylene, HNO <sub>3</sub> , 4°C
Gamma Spectroscopy <sup>d</sup>	EPA 901.0	1 x 1-L polyethylene, HNO <sub>3</sub> , 4°C
Isotopic Uranium	HASL-300	1 x 1-L polyethylene, HNO <sub>3</sub> , 4°C

#### Notes

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

U.S. Environmental Protection Agency, 1999, "Perchlorate in Drinking Water Using Ion Chromatography," EPA 815/R-00-014, U.S. Environmental Protection Agency, Washington, D.C. Clesceri, L.S., A.E. Greenburg, and A.D. Eaton, 1998. *Standard Methods for the Examination of Water and Wastewater,* 20<sup>th</sup> ed., Standard Method 2320B, published jointly by American Public Health Association, American Water Works Association, and Water Environment Federation, Washington, D.C.

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

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

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

<sup>c</sup>Major anions include bromide, chloride, fluoride, and sulfate; major cations include calcium, magnesium, potassium, and sodium.

<sup>d</sup>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.
- HCI = Hydrochloric acid.
- $HNO_3$  = Nitric acid.
- L = Liter.
- mL = Milliliter(s).
- SM = Standard Method.
- SWMU = Solid Waste Management Unit.
- TAL = Target Analyte List.

# Sample Details for Third Quarter, CY 2013 Groundwater Sampling

# SWMU 154 Groundwater Monitoring Quarterly Assessment,

## July – September 2013

Well	Date	Sample	AR/COC	Associated Groundwater
	Sampled	Identification	Number	Investigation
CTF-MW2	17-Sept-13	094646	615029	SWMU 154

#### Notes

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

SWMU = Solid Waste Management Unit.

## Summary of Field Water Quality Measurements<sup>a</sup>

## SWMU 154 Groundwater Monitoring

## Quarterly Assessment, July – September 2013

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

#### Notes

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

°C = Degrees Celsius.

% Sat = Percent saturation.

 $\mu$ mhos/cm = Micromhos per centimeter.

CTF = Coyote Test Field.

mg/L = Milligrams per liter.

mV = Millivolts.

MW = Monitoring well.

NTU = Nephelometric turbidity units.

pH = Potential of hydrogen (negative logarithm of the hydrogen ion concentration).

SWMU = Solid Waste Management Unit.

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

## SWMU 154 Groundwater Monitoring

## Quarterly Assessment, July – September 2013

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

#### Notes

#### <sup>a</sup>Laboratory Qualifier

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

#### <sup>b</sup>Validation Qualifier

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

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

#### <sup>c</sup>Analytical Method

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

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

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

# Method Detection Limits for Volatile and Semivolatile Organic Compounds

## SWMU 154 Groundwater Monitoring

## Quarterly Assessment, July – September 2013

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

## Table III-5 (Concluded)

## Method Detection Limits for Volatile and Semivolatile Organic Compounds

## SWMU 154 Groundwater Monitoring

## Quarterly Assessment, July – September 2013

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

#### Notes

#### <sup>a</sup>Analytical Method

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

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

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.

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

## SWMU 154 Groundwater Monitoring

## **Quarterly Assessment, July – September 2013**

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

#### Notes

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

## **Summary of Nitrate Plus Nitrite Results**

## SWMU154 Groundwater Monitoring

### **Quarterly Assessment, July – September 2013**

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

Notes

#### <sup>a</sup>Laboratory Qualifier

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

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

#### <sup>b</sup>Validation Qualifier

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

#### <sup>c</sup>Analytical Method

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

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

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

## **Summary of Anion and Alkalinity Results**

### SWMU 154 Groundwater Monitoring

#### Quarterly Assessment, July – September 2013

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

#### Notes

#### <sup>a</sup>Laboratory Qualifier

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

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

#### <sup>b</sup>Validation Qualifier

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

#### <sup>c</sup>Analytical Method

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

U.S. Environmental Protection Agency, 1984, "Methods for Chemical Analysis of Water and Wastes," EPA 600-4-79-020, U.S. Environmental Protection Agency, Washington, D.C. or Clesceri, Greenburg, and Eaton, 1998, Standard Methods for the Examination of Water and Wastewater, 20<sup>th</sup> ed., Method 2320B.

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

## **Summary of Perchlorate Results**

## SWMU 154 Groundwater Monitoring

## **Quarterly Assessment, July – September 2013**

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

#### Notes

#### <sup>a</sup>Laboratory Qualifier

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

#### <sup>b</sup>Validation Qualifier

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

#### <sup>c</sup>Analytical Method

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

- CTF = Coyote Test Field.
- EPA = U.Ś. 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.

## Summary of Unfiltered Total Metal Results

## SWMU 154 Groundwater Monitoring

## **Quarterly Assessment, July – September 2013**

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

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

#### Notes

#### <sup>a</sup>Laboratory Qualifier

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

- B = The analyte was detected in the blank above the effective method detection limit (MDL).
- J = Estimated value, the analyte concentration fell above the effective MDL and below the effective PQL.
- N = Results associated with a spike analysis that was outside control limits.
- U = Analyte is absent or below the method detection limit.

#### <sup>b</sup>Validation Qualifier

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

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

#### <sup>c</sup>Analytical Method

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

- U.S. Environmental Protection Agency, 1984, "Methods for Chemical Analysis of Water and Wastes," EPA 600-4-79-020.
- **Bold** = Indicates that a result exceeds the MCL.
- CTF = Coyote Test Field.
- EPA = U.S. Environmental Protection Agency.
- MCL = Maximum contaminant level. Established by the EPA Primary Water Regulations (40 Code of Federal Regulations 141.11, Subpart B), National Primary Drinking Water Standards (EPA 2009).
- MDL = Method detection limit. The minimum concentration that can be measured and reported with 99% confidence that the analyte is greater than zero; analyte is matrix-specific.
- mg/L = Milligrams per liter.
- MW = Monitoring well.
- ND = Not detected (at MDL).
- NE = Not established.
- PQL = Practical quantitation limit. The lowest concentration of analytes in a sample that can be reliably determined within specified limits of precision and accuracy by that indicated method under routine laboratory operating conditions.
- SWMU = Solid Waste Management Unit.

# **Summary of Filtered Total Metal Results**

## SWMU 154 Groundwater Monitoring

# **Quarterly Assessment, July – September 2013**

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

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

#### Notes

#### <sup>a</sup>Laboratory Qualifier

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

- B = The analyte was detected in the blank above the effective method detection limit (MDL).
- J = Estimated value, the analyte concentration fell above the effective MDL and below the effective PQL.
- N = Results associated with a spike analysis that was outside control limits.
- U = Analyte is absent or below the method detection limit.

#### <sup>b</sup>Validation Qualifier

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

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

#### <sup>c</sup>Analytical Method

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

- U.S. Environmental Protection Agency, 1984, "Methods for Chemical Analysis of Water and Wastes," EPA 600-4-79-020.
- **Bold** = Indicates that a result exceeds the MCL.
- CTF = Coyote Test Field.
- EPA = U.S. Environmental Protection Agency.
- MCL = Maximum contaminant level. Established by the EPA Primary Water Regulations (40 Code of Federal Regulations 141.11, Subpart B), National Primary Drinking Water Standards (EPA 2009).
- MDL = Method detection limit. The minimum concentration that can be measured and reported with 99% confidence that the analyte is greater than zero; analyte is matrix-specific.
- mg/L = Milligrams per liter.
- MW = Monitoring well.
- ND = Not detected (at MDL).
- NE = Not established.
- PQL = Practical quantitation limit. The lowest concentration of analytes in a sample that can be reliably determined within specified limits of precision and accuracy by that indicated method under routine laboratory operating conditions.
- SWMU = Solid Waste Management Unit.

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

## SWMU 154 Groundwater Monitoring

## Quarterly Assessment, July – September 2013

Well	Analyte	Activity <sup>a</sup> (pCi/L)	MDA (pCi/L)	Critical Level <sup>b</sup> (pCi/L)	MCL (pCi/L)	Laboratory Qualifier <sup>c</sup>	Validation Qualifier <sup>d</sup>	Sample Number	Analytical Method <sup>e</sup>
CTF-MW2	Americium-241	10.1 ± 11.7	16.9	8.28	NE	U	BD	094646-033	EPA 901.1
17-Sep-13	Cesium-137	$1.05\pm2.05$	3.51	1.68	NE	U	BD	094646-033	EPA 901.1
	Cobalt-60	$0.396 \pm 1.95$	3.49	1.63	NE	U	BD	094646-033	EPA 901.1
	Potassium-40	$64.2\pm44.8$	30.3	14.1	NE		J	094646-033	EPA 901.1
	Gross Alpha	23.54	NA	NA	15 pCi/L	NA	None	094646-034	EPA 900.0
	Gross Alpha (Reanalysis)	26.94	NA	NA	15 pCi/L	NA	None	094646-R34	EPA 900.0
	Gross Beta	$44.7\pm10.4$	7.85	3.71	4mrem/yr			094646-034	EPA 900.0
	Gross Beta (Reanalysis)	$89.3\pm30.0$	24.5	9.86	4mrem/yr			094646-035	HASL-300
	Uranium-233/234	$57.3\pm7.34$	0.109	0.0477	NE			094646-035	HASL-300
	Uranium-235/236	$0.536 \pm 0.134$	0.0677	0.0252	NE			094646-035	HASL-300
	Uranium-238	$8.52 \pm 1.16$	0.088	0.037	NE			094646-035	HASL-300

#### Notes

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

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

#### <sup>c</sup>Laboratory Qualifier

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

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

#### <sup>d</sup>Validation Qualifier

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

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

#### <sup>e</sup>Analytical Method

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

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

## Table III-12 (Concluded)

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

## SWMU 154 Groundwater Monitoring

## Quarterly Assessment, July – September 2013

#### Notes (continued)

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

# Summary of Constituents Detected above Established MCLs

## SWMUs 149 and 154 Groundwater Monitoring

## **Quarterly Assessments through September 2013**

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

# Table III-13 (Concluded) Summary of Constituents Detected above Established MCLs SWMUs 149 and 154 Groundwater Monitoring Quarterly Assessments through September 2013

#### Notes

#### <sup>a</sup>Laboratory Qualifier

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

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

NA = Not applicable.

#### <sup>b</sup>Validation Qualifier

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

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

None = No data validation for corrected gross alpha activity.

#### <sup>c</sup>Analytical Method

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

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

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

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

Appendix A Field Measurement Logs for Monitoring Well CTF-MW2

LTS GW-2012-001 (11-2012)

#### FOP 05-01

### FIELD MEASUREMENT LOG FOR GROUNDWATER SAMPLE COLLECTION

Project Name: SWMU 154	Project No.: 146422.10	.11.01
Well I.D.: CTF-MW & 2 WYZ	Date: 09/17/13	
Well Condition:	Weather Condition:	
Method: Portable pump X	Dedicated pump	Pump depth: 129'

## PURGE MEASUREMENTS

Depth to	Time 24	Vol.	Temp		ORP	pH	Turbidity	DO	Comments
Water	hr	(L/gal)	(°C)	(µS/cm)	(mV)	•	(NTU)	(%)	Donall
(ft)	m71-1			10 12 hr				<u>.</u>	10.91-
	0755		51	HIST	••••••••••••••••••••••••••••••••••••••				
47.22	0809	5.	18.11	3788	50.4	5.94	4.30	5.3	0.49
47.79	0817		17.63	3332	18.6	5.91	1.61	44	0-42
	0825	.15	1	3 845	6.6	5.90	1.12	4.1	0.39
	0832	20	17.79		13.7	5.91	1.15	3.9	0.37
48.07	0841	25	18.03	3855	17.5	5.92	1.50	3.8	0.35
47.95		30	18.24		19.1	5.94	1.42	3.6	0.33
47.83	0901		18.44	3854	18.8	5.97	1.26	3.5	0.32
	0908	38	18.52	3873	18.1	5.99	6.88	3.4	0.31
47.72	0912			3879	17.8	5.99	1:08	3.4	0.31
47.72	0918	42	18.69	3380	17.6	5.99	1.09	3.3	0.31
47.72	0922	44	13.64	3871	18.6	5.99		3.3	0.31
	0923		SA	mp).	na-				
				1	0				
		х. -							
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					-				
-									
									-
									- A
								2	-4.00 gals purged
									-4.00 gals purged from tubing
									0802

#### GROUNDWATER SAMPLE COLLECTION FIELD EQUIPMENT CHECK LOG Page 1 of 2

······				SNL/NM Project No.: 146422.10.11.01							
SNL/NM Project Name: SWML											
Calibrations done by: R LYNC	-1		Date: 09/17/13								
Make & Model: YSI 6920V2											
YSI 6820 Sonde (S/N) with DO	Fc nH ORP and	i temperature prob	es: 08H100033								
	, 10, pii, 010, and					· .					
YSI 650 MDS (S/N): N/A											
		рН С	alibration								
pH Calibrated to (std): 7.00			pH sloped to	· · ·							
Reference value:		.00	<u> </u>	7.00		0.00 Temp					
	Value	Temp	Value	Temp	Value	nemp no G					
1. Time: 0635 2. Time: 1047	4.02	20.9	7.01	21.1	10.01	21.0					
3. Time:		20.7	1.00	or nt		810					
4. Time:											
Standard lot no.:	3AD782	· · · · · · · · · · · · · · · · · · ·	3AE725								
Expiration date:	APR-15	•	MAY-15 APR-15								
SC Calibration											
Reference Value: 1413 uS		· · ·	Standard Lot	No.: 3AE221							
· · · · · · · · · · · · · · · · · · ·	Value	Temp	Expiration Da	te:	MAY-15						
1. Time: 0635	1417	20.9									
2. Time: 1049	1419	21.0									
3 Time:	·										
4. Time.											
		ORP C	Calibration 1997757								
Reference Value:	200 mV		Standard Lot No. 1305755								
-	Value	Temp	Expiration Da	Expiration Date: / JAN-14							
1. Time: 0634	199.7	20.7									
2. Time: 1048	199.8	21.0									
3, Time:											
4. Time:											
		DO C:	libration								
Calibration Value:	81% air satura	tion @ 5200 ft.	Atmospheric Pressure in Hg								
1. Time: 0637	81,	4	24.45								
2. Time: 1046	81.6	2	24.46								
3. Time:											
4. Time:			· ·								

LTS GW-2012-002 (11-2012)

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

SNL/NM Project Name: SW	MU 154	Project No.:	Project No.: 146422.10.11.01					
Calibration done by: R LYNC		Date: 09/17/13						
	· T	URBIDIMETER	-	· · · · · · · · · · · · · · · · · · ·				
Make & Model: HACH 210	0P HACH 2100Q	Serial No. S/	Serial No. S/N 10050C002897					
Reference Value	PL-10	20	100	800				
Standard Lot No.	0161	0167	0168	0161.				
1. Time 0750	10.4	20.2	99.8	799				
2. Time 0942	10.1	20.2	99.6	801				
3. Time		•						
4. Time								

Comments:

Portable Pump and Tubin Decontan	ng / Water Level Indicator nination Log Form
Project Name: SWMU-154 Monitoring Well I	D#: CTF-MW2 Date: 9-17-13
The following equipment was decontaminated at c	completion of sampling activities in accordance with FOP-05-03
Pump and Tubing Bundle ID #: <u>1806-792</u>	Water Level Indicator ID #: 62187
Personnel Performing Decontamination:         Robert Lynch       Image: Imag	Personnel Performing Decontamination:Robert Lynch $\mathcal{W}$ Print Name:Initial:William Gibson $\mathcal{W}$ Print Name:Initial:
Conc Pump: Good Tubing Bundle: Good	dition of EquipmentWater Level Indicator: Good
List of D	Decontamination Materials
Distilled or Deonized (circle one) Source: Culligan	HNO <sub>3</sub> Grade: <u>Reagent</u> UN #: <u>2031</u>
Lot Number: <u>8-27-13</u>	Manufacturer: AROC Lot Number: A0305629

/	Groundwater Monitori	ng Waste Generation Log	
Waste Generator	William Gibson Phone:	239-7367 project	leader: <u>Clinton Lum</u>
Project Name	SWMU-154	SWMU-154	SWMU-154
Container ID # (site-date-sequence)	SWMU-CTF-MW2-091713-01	SWMU-CTF-MW2-091713-02	SWMU-091713
Initial Label Type (Hazardous or Non- Regulated)	Non- Regulated	Non- Regulated	Non- Regulated
Waste Matrix (purge water, decon water, HACH Accu- Vac ampule)	Purge Water	Purge Water	Decon Water
Container Type / Volume	CHPD/ 55 gal.	CHPD/ 55 gal.	CHPD/ 55 gal.
Volume of Waste	~24 gal.	~ 24 gal.	~ 30 gal.
Total Container Weight	~ 190 lbs.	~ 190 lbs.	~ 240 lbs.
	CoC# 615029, 615030	CoC# 615029, 615030	CoC# 615029, 615030
COC#: Sample#- Fraction	Sample # 094646	Sample # 094646	Sample # 094646
Accumulation	Start: 9-17-13	Start: 9-17-13	Start: 9-17-13
Date	Full: 9-17-13	Full: 9-17-13	Full: 9-17-13
Date Waste Moved to Accumulation Area	9-17-13	9-17-13	9-17-13
Accumulation Area Name	9925	9925	9925
Comments:			

Groundwater Monitoring Waste Generation Log

#### LTS GW-2012-006 (11-2012)

TAILGATE SA	FETY MEETING FORM
Dept: 4142 Well Location: CTF-MW 3 2	Date: 09/17/13 Time:0748
Activities: GROUND WATER MONITORING AND SA (Anyone has the right to cease field activities for sa	MPLING
Veather Conditions: Temp: <b>71.2</b> °F Wind Speed: <u> </u>	Humidity: 65.2% Wind Chill MA °F
Chemicals Used: <u>Acids in sample containers, stand</u>	ard solutions, Hach ACCU-VAC ampules
Cafet. 7	Copics Presented
$\boxtimes$ Be aware of slips, trips, and falls. Keep	R Be aware of environmental conditions
work area clean and use a stepping stool when necessary.	<ul> <li>(heat / cold stress). Dress accordingly.</li> <li>Wear sunscreen if necessary. Stay</li> <li>hydrated.</li> </ul>
☑ Wear safety boots.	Be aware of electrical hazards
Use safe lifting practices. Wear leather gloves if necessary.	⊠ Be aware of pressure hazards.
<ul> <li>☑ Be aware of pinch points on pump cable reel and hydraulic tailgate lift.</li> </ul>	No eating or drinking at sampling counter.
$\boxtimes$ 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.	X Avoid spilling purge / decon water.
Hospital/Clinic: <u>Sandia Medical Clinic</u> Phone:	<u>844-0911/911</u> Attendees
Robert Lynch	- Signature
William Gibson	Signature Signature
ALFRED SANTILLANES Printed Name	Signature

Printed Name

Signature

Printed Name

Signature

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

# CONTRACT ' 'BORATORY ANALYSIS REQUEST CHAIN OF CUSTODY

Internal Lab

Internal Lab										· ·						Pag	₽_ <u>1_</u> of_ <u>2</u>
Batch No.						SMO Use									AR/COC		5029~
Project Name Project/Task I	Manager:		um	Date Sample: Carrier/Weyb		911	7/13			uthorization:	Done	Iday		1 ==	/aste Characterization		0020
Project/Task				Lab Contact:		Edie Kent/	803-556-8	3171	1	Lorraine H	lerrera/50	5-844-3199	÷		eleased by COC No.		
Service Order	r: .	CF353-14	4	Lab Destinati	оп:	GEL			Send R	eport to SMC			·····	``		1	4º Celsit
Task Aven				Contract No::		PO 13038	73		· ·	<u>Rita Kava</u>	naugh/50	5-284-2553		Bill to:Sa	ndia National Laboratori	es (Accou	nts Pavable
Tech Area: Building:	<u></u>	Room:												P.O. Box	5800, MS-0154		into i djubiç
bullung.		Room:		Operationa		T		· · · · · · · · · · · · · · · · · · ·						1	que, NM 87185-0154		
Sample No.	Fraction	Sa	mple Location E	Detail	Depth (ft)	Date/ Colle		Sample Matrix	Се Туре	ontainer Volume	Preserv- ative	Collection Method	Sample Type		Parameter & Metho Requested	d	Lab Sample
094646	-001 🔶	CTF-MW	2		129	9/17/13	9:23	GW	G	3x40ml	HCL	G	SA		C (SW846-8260B)		oample.
094646	-002	CTF-MW	2		129	9/17/13	9:24	GW	AG	4x1L	* None	G	SA	1.	OC (SW846-8270C)	······	
094646	-009 🖌	CTF-MW	2		129	9/17/13	9:26 🖌	GW	P	500 ml	HNO3	G	SA	1	· · ·		
094646	-010 🖊	CTF-MW	2		129	9/17/13	9:28	FGW	P	500 ml	HNO3	G	SA		als+U(SW846-6010/602		<u>  </u>
094646	-016 🖊	CTF-MW	2		129	9/17/13	9:29 /	GW	P	125 ml	None	G	SA	•	ais+U(SW846-6010/602	0/7470)	· · · · ·
094646	-018 🛩	CTF-MW	2 .		129	9/17/13	9:30	GW	P	125 ml	H2SO4	G	SA SA	1	(SW846-9056)	·	
094646	-020 -	CTF-MW	2		129	9/17/13	9:31 -	GW	P	250 ml	None	G	SA SA		PA 353.2)		1
094646	-022	CTF-MW	2		129	9/17/13	9:32 -	GW	P	500 ml*	None	G			rate (EPA 314.0)		<u> </u>
094646	-024	CTF-MW	2		129	9/17/13	9:33 *	• GW	AG	4x1L	None	G	SA		y (SM2320B)		
094646	-033 -	CTF-MW	2 .		129	9/17/13	9:35	GW	P	11	HNO3	G	<u>SA ``</u>		plosives(SW846-832		<u> </u>
ast Chain:		✓ Yes			Sample	Tracking			) Use			/QC Requir	SA	Gamma	Spectroscopy (EPA		
/alidation F		✓ Yes	· · · ·		Date En				, 	EDD		Yes		No			litions on
Background		<u> </u>			Entered	by:				Turnaroun	d Time	7 Dav		15 Day*	- √ 30 Day	R	eceipt
Confirmato		Yes	<del></del>		QC inits.				-	Negotiated				<u></u>			
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2. Received b		· · · · · · · · · · · · · · · · · · ·		Org.	Date		Time	<u> </u>	4. Rece				Org.		Date	Time	
Prior confirm	nation w	ith SMO re	quired for 7 and	15 day TAT		·····							Org.		Date	Time	

AOP 95-16

# CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY (Continuation)

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Project Name Tech Area:	e:	SWMU 154 GWM	Project/Ta	sk Manag	ger: (	Clinton Lun	n		Project/Ta	sk No.:	146422	2.10.11.01		
Building:		Room:	4											
Sample No.		Sample Location	Detail	Depth (ft)	Date/1 Collec		Sample Matrix	Со Туре	ntainer Volume	Preserv- ative	Collection Method	Sample Type	Parameter & Method Requested	Lab use Lab Sample ID
094646	-034	CTF-MW2		129	9/17/13	9:36	GW	Р	1Ľ	HNO3	G	SA	Gross Alpha and Beta (EPA 900.0)	J Sample ID
094646	-035 🖊	CTF-MW2		129	9/17/13	9:37-	GW	Р	1 L	HNO3	G	SA	Isotopic Uranium (HASL 300)	
094647	-001	CTF-TB1		NA	9/17/13	9:23 🗸	DIW	G	3x40ml	HCL	G	ТВ	TCL VOC (SW846-8260B)	
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# CONTRACT ' ABORATORY ANALYSIS REQUEST

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Internal Lab

Batch No.				•		SMO Use											
Project Nam	e:	SWMU 1	54 GWM	Date Sample	es Shipped		7/13	<del></del>	ISMO A	uthorization:	- <u>A</u>				AR/COC	61:	5030
Project/Task				Carrier/Way			115			ontact Phone		<u> Im</u>	<u> </u>	T TOTAL OF	Vaste Characterization		<u>ور بر مشاخص من الرو بر می ارسان کار</u>
Project/Task		146422.1		Lab Contact		Edie Kent	/803-556-8	8171				5-844-3199	· .		MMA		
Service Orde	ər:	CF353-1	4	Lab Destinat	tion:	GEL			Send R	eport to SMC		0-044-0199		┫└┘╺╴	eleased by COC No.	<u>[]</u>	
			·	Contract No.	:	PO 13038	373			•		5-284-2553		D111 4 O			¹º Celsius
Tech Area:		<b></b>		ľ		· ·					induginou	-204-2000		Bill to:Sa	ndia National Laboratories	3 (Accoun	ts Payable),
Building:	·	Room:		Operation	al Site:		-						· ·		5800, MS-0154		
					Depth	Date	/Time	Sample	C	ontainer	Preserv-	Collection	Sample		que, NM 87185-0154		
Sample No.	Fraction	Sa	mple Location D	etail	(ft)	Coll	ected	Matrix		Volume	ative	Method	Sample Type		Parameter & Method		Lab
094646	-011 /	CTF-MW	2		NA	9/17/13	9:16 1	FPW	G	- <del>9x40m1</del>	HNO3	G		1.	Requested		Sample ID
	· .						<u> </u>		<u> </u>	500 mi	1.11103	9	WC	Arsenic	(SW846-6020)		
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Last Chain		√ Yes			Sample	Tracking		SMC		0	L			L <u></u>			
Validation	Req'd:	Yes		** <u> </u>	Date Ent	_		OINC	USP	Special Ins	structions					Condi	tions on
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Team	Robert Ly	'nch	Collance	£			05-844-401			Sample Dis			to Client		Disposal by Lab		
Members	Aifred Sa	ntillanes	Hulso	Ade			05-844-513			Return San			· <u> </u>				
	William G	ibson 🦨	Villien A	LID			05-284-330			Comments	:	Send report to	Tim Jackson	/4142/MS 0	729/284-2547		
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*Prior confin	mation wi	th SMO re	quired for 7 and	15 day TAT		· · · · · · · · · · · · · · · · · · ·			7. 11000	wea by			Org.		Date	Time	

AOP 95-16

Page 1 of

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



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

Memorandum

Date: November 14, 2013

To: File

From: Linda Thal

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

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

#### **Summary**

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

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

#### **Holding Times and Preservation**

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

#### **Quantification**

All quantification criteria were met.

#### **Calibration**

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

#### <u>Blanks</u>

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

### **Tracer/Carrier Recovery**

Tracer/carriers were not required.

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

The MS/MSD met all QC acceptance criteria.

#### Laboratory Replicate

All replicate error ratio acceptance criteria were met.

#### Laboratory Control Sample (LCS)

All LCS recoveries met QC acceptance criteria.

#### **Detection Limits/Dilutions**

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

#### Other QC

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

No other specific issues that affect data quality were identified.

Reviewed by: Monica Dymerski	Level I	<b>Date:</b> 11/15/13



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

Memorandum

Date: October 21, 2013

To: File

From: Linda Thal

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

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

#### **Summary**

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

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

#### **Holding Times and Preservation**

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

#### **Calibration**

All initial and continuing calibration met QC acceptance criteria.

#### **Blanks**

No target analytes were detected in the blanks.

#### Laboratory Control Sample (LCS)

All LCS acceptance criteria were met.

#### Matrix Spike (MS)

All MS/PS recoveries met QC acceptance criteria.

### Laboratory Replicate

The replicate analyses met all QC acceptance criteria.

## **Detection Limits/Dilutions**

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

<u>Anions:</u> The sample was diluted 100X for sulfate and chloride.

### Other QC

No other specific issues that affect data quality were identified.

	Reviewed by: Monica D	vmerski Level I	<b>Date:</b> 10/21/13
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PO Box 21987 Albuquerque, NM 87154 1-888-678-5447 www.againc.net

Memorandum

Date:	October 21, 2013
То:	File
From:	Linda Thal
Subject:	Inorganic Data Review and Validation – SNL Site: SWMU 154 GWM AR/COC: 615029 SDG: 333568 and 333569 Laboratory: GEL Project/Task: 146422.10.11.01 Analysis: Metals

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

#### Summary

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

#### ICP-MS:

- 1. The MS %Rs for Ba and Fe were < the LAL. The parent sample results were >4X the spike amounts and, therefore, the associated sample results will not be qualified for these failing recoveries. The associated sample results were detects and will be **qualified J,MS1** due to lack of matrix specific accuracy information.
- 2. The MS %R was <75% but ≥30% for Sb. The associated sample results were NDs and will be **qualified** UJ,MS3.
- 3. The MS %R for Zn was > 125%. The associated sample results were detects and will be **qualified J,MS2**.

#### **ICP-AES**:

- 1. V was detected at < the PQL in the MB and CCBs bracketing the samples. The associated sample results were detects <5X the highest blank value and will be **qualified 0.018U,B,B3** at 5X the highest blank.
- 2. The CRI %R was >130% for V. The associated sample results were detects and will be **qualified J,DL2**.

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

#### **Holding Times and Preservation**

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

#### **ICP-MS Instrument Tune**

The ICP-MS tunes met QC acceptance criteria.

#### **Calibration**

All initial and continuing calibration met QC acceptance criteria.

#### **Reporting Limit Verification**

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

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

#### **Blanks**

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

#### **ICP -MS Internal Standards**

The ICP-MS internal standards met QC acceptance criteria.

#### Matrix Spike (MS)

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

#### ICP-MS:

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

#### ICP-MS and ICP-AES:

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

#### Laboratory Replicate

The replicates met all QC acceptance criteria.

#### ICP-MS and ICP-AES:

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

#### Laboratory Control Sample (LCS)

The LCS met all QC acceptance criteria.

#### **Detection Limits/Dilutions**

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

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

#### ICP-AES:

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

#### ICP-MS:

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

#### ICP Serial Dilution

The serial dilutions met all QC acceptance criteria.

#### ICP-MS and ICP-AES:

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

#### Other QC

No other specific issues that affect data quality were identified.

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



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

Memorandum

Date: October 21, 2013

To: File

From: Linda Thal

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

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

#### **Summary**

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

- 1. The ICAL RF for p-nitrotoluene was <0.05 but ≥0.01. The associated sample result was ND and will be **qualified UJ,I4.**
- 2. The MS/MSD RPDs were > laboratory acceptance limits for m-nitrotoluene, RDX, p-nitrotoluene and HMX. The sample result for RDX was a detect and will be **qualified J,MS5**. The remaining associated sample results were NDs and will be **qualified UJ,MS5**.

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

#### **Holding Times**

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

#### **Instrument Tune**

The instrument tune was not reported or evaluated.

### **Calibration**

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

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

#### **Reporting Limit Verification**

All CRI recoveries met QC acceptance criteria.

#### <u>Blanks</u>

No target analytes were detected in the blanks.

#### **Surrogates**

All surrogate recoveries met QC acceptance criteria.

#### **Internal Standards**

All internal standards met QC acceptance criteria.

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

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

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

#### Laboratory Control Sample (LCS)

All LCS recoveries met QC acceptance criteria.

#### **Detection Limits/Dilutions**

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

#### Other QC

No other specific issues that affect data quality were identified.

<b>Reviewed by:</b> Monica Dymerski	Level I	<b>Date:</b> 10/21/13
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Sample Findings Summary



AR/COC: 615029			Page 1 of 1
Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC

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

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

## 1.0 Introduction

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

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

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

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

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

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

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

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

## 2.0 Field Methods and Measurements

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

## 2.1 **Equipment Decontamination**

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

## 2.2 Well Evacuation

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

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

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

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

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

### 2.3 Groundwater Sample Collection

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

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

### 3.0 Analytical Results

Groundwater samples were submitted to GEL for chemical and radiological analyses. Samples were analyzed in accordance with applicable EPA analytical methods (EPA 1980, 1984, 1986, and 1999; Clesceri et al. 1998; DOE 1990). Table IV-4 lists the MDLs for VOCs and SVOCs and Table IV-5 lists the MDLs for HE compounds. Groundwater sampling results are compared with established EPA MCLs for drinking water (EPA 2009). Analytical results for samples collected from all five monitoring wells are shown in tabulated form in Tables IV-6 through IV-13. Analytical reports, including certificates of analyses, analytical methods, MDLs, minimum detectable activity (MDA), critical level, practical quantitation limits, dates of analyses, results of QC analyses, and data validation findings are filed in the SNL/NM Records Center.

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

### 3.1 Field Water Quality Measurements

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

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

### 3.2 Volatile Organic Compounds

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

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

### 3.3 Semivolatile Organic Compounds

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

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

### 3.4 High Explosive Compounds

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

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

### 3.5 Nitrate Plus Nitrite

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

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

### 3.6 Anions and Alkalinity

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

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

### 3.7 **Perchlorate**

**SWMUs 8/58, Monitoring Wells CCBA-MW1 and CCBA-MW2.** Perchlorate was not detected above the NMED-specified screening level/MDL of 4.0 micrograms per liter ( $\mu$ g/L) (0.004 mg/L) in any groundwater sample from SWMUs 8/58. Table IV-8 presents perchlorate results.

### SWMU 68, Monitoring Wells OBS-MW1, OBS-MW2, and OBS-MW3.

Perchlorate was not detected above the NMED-specified screening level/MDL of 4  $\mu$ g/L (0.004 mg/L) in any groundwater sample from SWMU 68. Table IV-8 presents perchlorate results.

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

### 3.8 Hexavalent Chromium

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

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

### 3.9 Metals

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

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

### 3.10 Cations

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

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

### 3.11 Gamma Spectroscopy and Radioisotopic Analyses

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

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

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

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

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

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

### 3.12 Sample Results Exceeding Maximum Contaminant Levels

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

### 4.0 **Quality Control Samples**

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

### 4.1 Field Quality Control Samples

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

### 4.1.1 **Duplicate Environmental Samples**

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

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

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

### 4.1.2 Equipment Blank Samples

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

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

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

### 4.1.3 Trip Blank Samples

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

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

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

### 4.1.4 Field Blank Samples

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

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

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

### 4.2 Laboratory Quality Control Samples

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

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

### 4.3 Variances and Nonconformances

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

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

### 5.0 Summary

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

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

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

### 6.0 **References**

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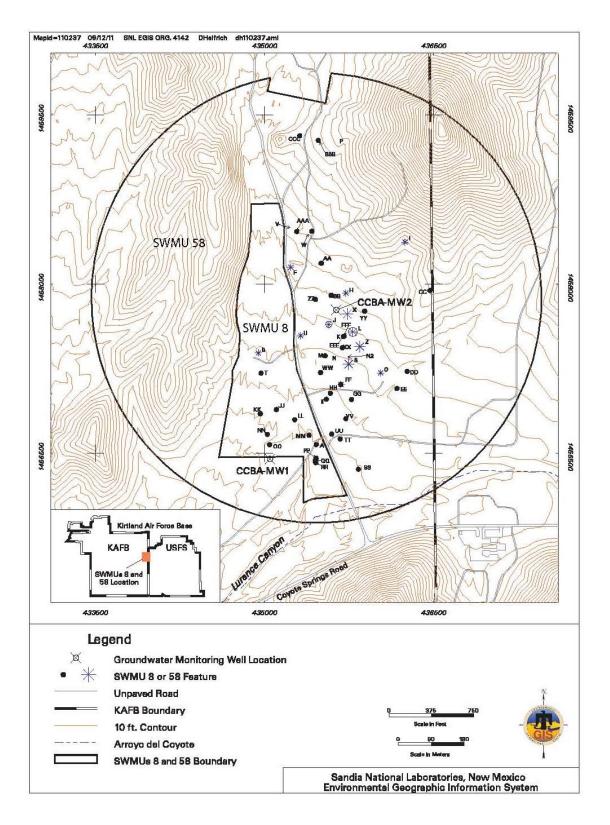
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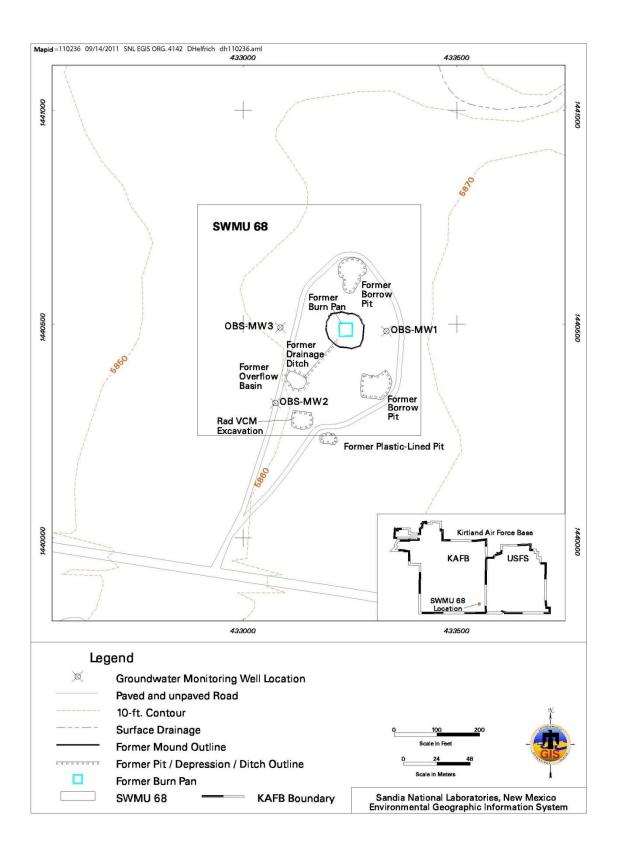
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# Figures





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



### Figure IV-2

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

# Tables

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

Analysis	Analytical Method <sup>a</sup>	Volume and Container Type/ Preservation Requirements
Volatile Organic Compounds	EPA 8260B	3 x 40-mL glass, HCL, 4°C
Semivolatile Organic Compounds	EPA 8270C	3 x 1-L Amber Glass, 4°C
High Explosives	EPA 8321A	4 x 1-L Amber Glass, 4°C
Metals <sup>b</sup>	EPA 6010/6020/7470	1 x 500-mL polyethylene, HNO <sub>3</sub> , 4°C
Hexavalent Chromium	EPA 7196A	1 x 250-mL polyethylene, 4°C
Perchlorate	EPA 314.0	1 x 250-mL polyethylene, 4°C
Major Anions and Cations <sup>c</sup>	EPA 6020/9056	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 <sub>2</sub> SO <sub>4</sub> , 4°C
Gross Alpha/Beta	EPA 900.0	1 x 1-L polyethylene, HNO <sub>3</sub> , 4°C
Gamma Spectroscopy <sup>d</sup>	EPA 901.0	1 x 1-L polyethylene, HNO <sub>3</sub> , 4°C
Isotopic Uranium	HASL-300	1 x 1-L polyethylene, HNO <sub>3</sub> , 4°C

#### Notes

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

U.S. Environmental Protection Agency, 1999, "*Perchlorate in Drinking Water Using Ion Chromatography*," EPA 815/R-00-014, U.S. Environmental Protection Agency, Washington, D.C. Clesceri, L.S., A.E. Greenburg, and A.D. Eaton, 1998. *Standard Methods for the Examination of Water and Wastewater*, 20<sup>th</sup> ed., Standard Method 2320B, published jointly by American Public Health Association, American Water Works Association, and Water Environment Federation, Washington, D.C.

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

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

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

<sup>6</sup>Major anions include bromide, chloride, fluoride, and sulfate; major cations include calcium, magnesium, potassium, and sodium.

<sup>d</sup>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<sub>3</sub> = Nitric acid.
- L = Liter.
- mL = Milliliter(s).
- NaOH = Sodium Hydroxide.
- SM = Standard Method.
- SWMU = Solid Waste Management Unit.
- TAL = Target Analyte List.

## Sample Details for Third Quarter, CY 2013 Groundwater Sampling SWMUs 8/58 and 68 Groundwater Monitoring Quarterly Assessment July – September 2013

Well	Sample Identification	AR/COC Number	Associated Groundwater Investigation		
CCBA-MW1	094376	614939			
CCBA-MW1 (duplicate)	094377	014939	SWMUs 8/58		
CCBA-MW2	094371	614937	1		
OBS-MW1	094361	614933			
OBS-MW2	094365	61 1025			
OBS-MW2 (duplicate)	094366	614935	SWMU 68		
OBS-MW3	094368	614936			

#### Notes

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

Summary of Field Water Quality Measurements<sup>a</sup>

### SWMUs 8/58 and 68 Groundwater Monitoring

### Quarterly Assessment, July – September 2013

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

#### Notes

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

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

### Method Detection Limits for Volatile and Semivolatile Organic Compounds

### SWMUs 8/58 and 68 Groundwater Monitoring

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

### Table IV-4 (Continued)

### Method Detection Limits for Volatile and Semivolatile Organic Compounds

### SWMUs 8/58 and 68 Groundwater Monitoring

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

### Table IV-4 (Continued)

### Method Detection Limits for Volatile and Semivolatile Organic Compounds

### SWMUs 8/58 and 68 Groundwater Monitoring

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

### Table IV-4 (Continued)

### Method Detection Limits for Volatile and Semivolatile Organic Compounds

### SWMUs 8/58 and 68 Groundwater Monitoring

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

### Table IV-4 (Concluded)

# Method Detection Limits for Volatile and Semivolatile Organic Compounds SWMUs 8/58 and 68 Groundwater Monitoring

### Quarterly Assessment, July – September 2013

#### Notes

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

= Micrograms per liter.

µg/L 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.

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

### SWMUs 8/58 and 68 Groundwater Monitoring

### Quarterly Assessment, July – September 2013

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

#### Notes

ιg/L	= Micrograms per liter.
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μg/L EPA = U.S. Environmental Protection Agency.

HMX = Tetrahexamine tetranitramine.

- = Method detection limit. The minimum concentration that can be measured and reported with 99% MDL 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.
- = 2,4,6-trinitrophenylmethylnitramine. Tetryl

**Summary of Nitrate Plus Nitrite Results** 

### SWMUs 8/58 and 68 Groundwater Monitoring

### Quarterly Assessment, July – September 2013

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

#### Notes

#### <sup>a</sup>Laboratory Qualifier

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

#### <sup>b</sup>Validation Qualifier

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

#### <sup>c</sup>Analytical Method

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

## Table IV-6 (Concluded) Summary of Nitrate Plus Nitrite Results SWMUs 8/58 and 68 Groundwater Monitoring Quarterly Assessment, July – September 2013

#### Notes (continued)

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

### Summary of Alkalinity, Anion, and Total Cyanide Results

### SWMUs 8/58 and 68 Groundwater Monitoring

Well	Analyte	Result	MDL (mg/l)	PQL (mg/l)	MCL	Laboratory	Validation Qualifier <sup>b</sup>	Sample Number	Analytical Method <sup>c</sup>
014111-0/50		(mg/L)	(mg/L)	(mg/L)	(mg/L)	Quaimer	Quaimer	numper	Method
SWMUs 8/58	- I			T				-	
CCBA-MW1	Bicarbonate Alkalinity	187	0.725	1.00	NE			094376-022	SM 2320B
16-Jul-13	Carbonate Alkalinity	ND	0.725	1.00	NE	U		094376-022	SM 2320B
	Bromide	0.329	0.067	0.200	NE			094376-016	EPA 9056
	Chloride	28.4	0.335	1.00	NE			094376-016	EPA 9056
	Fluoride	4.78	0.165	0.500	4.0			094376-016	EPA 9056
	Sulfate	56.2	0.665	2.00	NE			094376-016	EPA 9056
	Total Cyanide	ND	0.00167	0.005	0.200	U	UJ	094376-027	EPA 9012
CCBA-MW1 (Duplicate)	Bicarbonate Alkalinity	187	0.725	1.00	NE			094377-022	SM 2320B
16-Jul-13	Carbonate Alkalinity	ND	0.725	1.00	NE	U		094377-022	SM 2320B
	Bromide	0.329	0.067	0.200	NE			094377-016	EPA 9056
	Chloride	28.5	0.335	1.00	NE			094377-016	EPA 9056
	Fluoride	4.82	0.165	0.500	4.0			094377-016	EPA 9056
	Sulfate	56.4	0.665	2.00	NE			094377-016	EPA 9056
	Total Cyanide	ND	0.00167	0.005	0.200	U	UJ	094377-027	EPA 9012
CCBA-MW2	Bicarbonate Alkalinity	181	0.725	1.00	NE	В		094371-022	SM 2320B
15-Jul-13	Carbonate Alkalinity	ND	0.725	1.00	NE	U		094371-022	SM 2320B
	Bromide	0.566	0.067	0.200	NE			094371-016	EPA 9056
	Chloride	36.6	0.670	2.00	NE			094371-016	EPA 9056
	Fluoride	1.61	0.033	0.100	4.0			094371-016	EPA 9056
	Sulfate	93.6	1.33	4.00	NE			094371-016	EPA 9056
	Total Cyanide	ND	0.00167	0.005	0.200	U	UJ	094371-027	EPA 9012

### Table IV-7 (Continued)

### Summary of Alkalinity, Anion, and Total Cyanide Results

### SWMUs 8/58 and 68 Groundwater Monitoring

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

# Table IV-7 (Concluded) Summary of Alkalinity, Anion, and Total Cyanide Results SWMUs 8/58 and 68 Groundwater Monitoring Quarterly Assessment, July – September 2013

#### Notes

#### <sup>a</sup>Laboratory Qualifier

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

- B = The analyte was detected in the blank above the effective method detection limit (MDL).
- H = Analytical holding time was exceeded.
- N = Results associated with a spike analysis that was outside control limits.
- U = Analyte is absent or below the method detection limit.

#### <sup>b</sup>Validation Qualifier

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

- J = Estimated value, the analyte concentration fell above the effective MDL and below the effective PQL.
- UJ = The analyte was analyzed for, but not detected. The associated value is an estimate and may be inaccurate or imprecise.

#### <sup>c</sup>Analytical Method

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

U.S. Environmental Protection Agency, 1984, "Methods for Chemical Analysis of Water and Wastes," EPA 600-4-79-020, U.S. Environmental Protection Agency, Washington, D.C. or Clesceri, Greenburg, and Eaton, 1998, *Standard Methods for the Examination of Water and Wastewater*, 20<sup>th</sup> ed., Method 2320B.

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

### **Summary of Perchlorate Results**

### SWMUs 8/58 and 68 Groundwater Monitoring

### Quarterly Assessment, July – September 2013

Well	Result (mg/L)	MDL (mg/L)	PQL (mg/L)	MCL (mg/L)	Laboratory Qualifier <sup>a</sup>	Validation Qualifier <sup>b</sup>	Sample Number	Analytical Method <sup>c</sup>		
SWMUs 8/58										
<b>CCBA-MW1</b> 16-Jul-13	ND	0.004	0.012	NE	U		094376-020	EPA 314.0		
CCBA-MW1 (Duplicate)	ND	0.004	0.012	NE	U		094377-020	EPA 314.0		
16-Jul-13 CCBA-MW2	ND	0.004	0.012	NE	U		094371-020	EPA 314.0		
15-Jul-13 SWMU 68	110		0.012		, C		001011020	217101110		
<b>OBS-MW1</b> 09-Jul-13	ND	0.004	0.012	NE	U		094361-020	EPA 314.0		
<b>OBS-MW2</b> 10-Jul-13	ND	0.004	0.012	NE	U		094365-020	EPA 314.0		
<b>OBS-MW2</b> (Duplicate) 10-Jul-13	ND	0.004	0.012	NE	U		094366-020	EPA 314.0		
<b>OBS-MW3</b> 11-Jul-13	ND	0.004	0.012	NE	U		094368-020	EPA 314.0		

#### Notes

#### <sup>a</sup>Laboratory Qualifier

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

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

#### <sup>b</sup>Validation Qualifier

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

#### <sup>c</sup>Analytical Method

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

### Table IV-8 (Concluded)

### Summary of Perchlorate Results

### SWMUs 8/58 and 68 Groundwater Monitoring

### **Quarterly Assessment, July – September 2013**

#### Notes (continued)

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

### **Summary of Hexavalent Chromium Results**

### SWMU 68 Groundwater Monitoring

### Quarterly Assessment, July – September 2013

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

#### Notes

#### <sup>a</sup>Laboratory Qualifier

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

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

#### <sup>b</sup>Validation Qualifier

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

#### <sup>c</sup>Analytical Method

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

### Summary of Unfiltered Total Metal Results

### SWMUs 8/58 Groundwater Monitoring

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

### Table IV-10 (Continued)

### Summary of Unfiltered Total Metal Results

### SWMUs 8/58 Groundwater Monitoring

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

## Table IV-10 (Continued)

## Summary of Unfiltered Total Metal Results

## SWMUs 8/58 Groundwater Monitoring

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

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

#### Notes

#### <sup>a</sup>Laboratory Qualifier

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

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

#### <sup>b</sup>Validation Qualifier

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

- U = The analyte was analyzed for, but not detected. The associated numerical value is the sample quantitation limit.
- UJ = The analyte was analyzed for, but not detected. The associated value is an estimate and may be inaccurate or imprecise.

#### <sup>c</sup>Analytical Method

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

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

## Table IV-11

## Summary of Unfiltered Total Metal Results

## SWMU 68 Groundwater Monitoring

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

# Table IV-11 (Continued)

## Summary of Unfiltered Total Metal Results

## SWMU 68 Groundwater Monitoring

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

# Table IV-11 (Continued)

## Summary of Unfiltered Total Metal Results

## SWMU 68 Groundwater Monitoring

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

# Table IV-11 (Continued)

## Summary of Unfiltered Total Metal Results

## SWMU 68 Groundwater Monitoring

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

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

#### Notes

#### <sup>a</sup>Laboratory Qualifier

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

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

#### <sup>b</sup>Validation Qualifier

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

- J = Estimated value, the analyte concentration fell above the effective MDL and below the effective PQL.
- U = The analyte was analyzed for, but not detected. The associated numerical value is the sample quantitation limit.
- UJ = The analyte was analyzed for, but not detected. The associated value is an estimate and may be inaccurate or imprecise.

#### <sup>c</sup>Analytical Method

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

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

## Table IV-12

## **Summary of Filtered Cation Results**

## SWMUs 8/58 and 68 Groundwater Monitoring

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

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

#### Notes

#### <sup>a</sup>Laboratory Qualifier

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

#### <sup>b</sup>Validation Qualifier

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

#### <sup>c</sup>Analytical Method

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

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

### Table IV-13

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

## SWMUs 8/58 and 68 Groundwater Monitoring

Well	Analyte	Activity <sup>a</sup> (pCi/L)	MDA (pCi/L)	Critical Level <sup>b</sup> (pCi/L)	MCL	Laboratory Qualifier <sup>c</sup>	Validation Qualifier <sup>d</sup>	Sample Number	Analytical Method <sup>e</sup>
SWMUs 8/58									
CCBA-MW1	Americium-241	$4.75\pm9.29$	14.0	6.86	NE	U	BD	094376-033	EPA 901.1
16-Jul-13	Cesium-137	$1.66 \pm 1.77$	2.86	1.38	NE	U	BD	094376-033	EPA 901.1
	Cobalt-60	$0.201 \pm 1.52$	2.70	1.27	NE	U	BD	094376-033	EPA 901.1
	Potassium-40	$-0.298 \pm 33.0$	40.1	19.3	NE	U	BD	094376-033	EPA 901.1
	Gross Alpha	-0.58	NA	NA	15 pCi/L	NA	None	094376-034	EPA 900.0
	Gross Beta	$\textbf{3.93} \pm \textbf{1.21}$	1.52	0.736	4mrem/yr		J	094376-034	EPA 900.0
	Uranium-233/234	$\textbf{2.32} \pm \textbf{0.351}$	0.0845	0.037	NE			094376-035	HASL-300
	Uranium-235/236	$0.0529 \pm 0.0347$	0.0518	0.0194	NE		J	094376-035	HASL-300
	Uranium-238	$0.720 \pm 0.140$	0.0733	0.0314	NE			094376-035	HASL-300
CCBA-MW1 (Duplicate)	Americium-241	$8.04 \pm 16.2$	24.6	12.0	NE	U	BD	094377-033	EPA 901.1
16-Jul-13	Cesium-137	$1.55 \pm 1.85$	2.91	1.39	NE	U	BD	094377-033	EPA 901.1
	Cobalt-60	-0.72 ± 1.83	3.05	1.43	NE	U	BD	094377-033	EPA 901.1
	Potassium-40	$10.9\pm32.2$	45.5	21.8	NE	U	BD	094377-033	EPA 901.1
	Gross Alpha	-0.81	NA	NA	15 pCi/L	NA	None	094377-034	EPA 900.0
	Gross Beta	$4.63 \pm 1.09$	1.02	0.488	4mrem/yr		J	094377-034	EPA 900.0
	Uranium-233/234	$2.30\pm0.355$	0.0908	0.0397	NE			094377-035	HASL-300
	Uranium-235/236	$0.0465 \pm 0.0342$	0.0556	0.0208	NE	U	BD	094377-035	HASL-300
	Uranium-238	$0.745 \pm 0.146$	0.0788	0.0337	NE			094377-035	HASL-300
CCBA-MW2	Americium-241	$-3.57 \pm 6.02$	9.53	4.66	NE	U	BD	094371-033	EPA 901.1
15-Jul-13	Cesium-137	-0.387 ± 2.51	2.76	1.32	NE	U	BD	094371-033	EPA 901.1
	Cobalt-60	$-0.0207 \pm 2.93$	2.70	1.27	NE	U	BD	094371-033	EPA 901.1
	Potassium-40	$4.44\pm30.8$	25.7	12.0	NE	U	BD	094371-033	EPA 901.1
	Gross Alpha	-1.03	NA	NA	15 pCi/L	NA	None	094371-034	EPA 900.0
	Gross Beta	2.87 ± 1.18	1.69	0.820	4mrem/yr		J	094371-034	EPA 900.0
	Uranium-233/234	$7.80 \pm 1.06$	0.110	0.0432	NE			094371-035	HASL-300
	Uranium-235/236	$0.113 \pm 0.0594$	0.0674	0.0252	NE		J	094371-035	HASL-300
	Uranium-238	1.71 ± 0.284	0.0956	0.0409	NE			094371-035	HASL-300

## Table IV-13 (Continued)

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

## SWMUs 8/58 and 68 Groundwater Monitoring

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

## Table IV-13 (Continued)

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

### SWMUs 8/58 and 68 Groundwater Monitoring

### Quarterly Assessment, July - September 2013

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

#### Notes

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

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

#### <sup>c</sup>Laboratory Qualifier

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

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

#### <sup>d</sup>Validation Qualifier

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

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

#### <sup>e</sup>Analytical Method

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

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

### Table IV-13 (Concluded)

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

### SWMUs 8/58 and 68 Groundwater Monitoring

### Quarterly Assessment, July – September 2013

#### Notes (continued)

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

### Table IV-14

### Summary of Constituents Detected above Established MCLs

### SWMUs 8/58 and 68 Groundwater Monitoring

### **Quarterly Assessments through September 2013**

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

#### Notes

#### <sup>a</sup>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.

#### <sup>b</sup>Validation Qualifier

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

#### <sup>c</sup>Analytical Method

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

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

## Table IV-15

## Summary of Duplicate Samples

## SWMUs 8/58 and 68 Groundwater Monitoring

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

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

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

#### Notes

<sup>a</sup>RPD

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

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

 $R_1$ = analysis result. where:

 $R_2$ = duplicate analysis result.

CCBA	= Coyote Canyon Blast Area.
------	-----------------------------

= Milligrams per liter. = Monitoring well.

mg/L MW

OBS SWMU

Old Burn Site.Solid Waste Management Unit.

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

Project Name: SWMU 8/58	Project No.: 146422.10.1	1.01
Well I.D.: CCBA-MW 1	Date: 07/16/13	
Well Condition:	Weather Condition:	
Method: Portable pump X	Dedicated pump	Pump depth: 79'

Depth to	Time 24	Vol.	Temp	SC	ORP	pН	Turbidity	DO	Comments
Water	hr	(Lgal)	(°C)	(µS/cm)	(mV)	pn	(NTU)	(%)	
(ft)									DOmg/L
48.14	6757		St	ART-					
49.30	0815	15	17.80	606	169.7	6.57	1.15	17.8	1.69
	0823	10	17.57	554	161.4	6.62	2.09	20.7	1.98
49.55		15	17.5B	496	156.0	6.71	1.92	29.5	2.82
49.58	0841	20	17.59	481	153.0	6.73	1.76	31.1	2.96
49.59	0850	.25	17:42	490	151.2	6.74	0.86	31.7	3.04
49.66		28	17.47	478	148.0	6.75	0.85	32.5	3-10
49.60		30	17.5D		146.1	6.74	0.98	31.9	3.04
49.60	0904	32	17.62	489	(44.2	6.75	0.76	32.7	3.12
49.60	0908	34	17.71	490	142.9	6.76	0.61	32.6	3.10
49.60		36	17.72	490	1420	6.75		33.4	3.17
	0913		SAM	pling		47			
				0					
			р. 						
								~	4.00 gals purged
									from tubing
	*				<	8			0806

### **PURGE MEASUREMENTS**

Project Name: SWMU 8/58	Project No.: 146422.10.11	.01
Well I.D.: CCBA-MW 2	Date: 07/15/13	
Well Condition:	Weather Condition:	
Method: Portable pump X	Dedicated pump	Pump depth: 117'

Depth to	Time 24	Vol.	Temp	SC	ORP	pН	Turbidity	DO	Comments
Water	hr	(Lgal)	(°C)	(µS/cm)	(mV)	1_	(NTU)	(%)	Domg/L
(ft)				7101					212
71.75	0800		57	MRT-					
72.22	0821	5	19.34	639	162.7	7.71	1.04	59.0	
72.25		10	18.14	626	146.8		1.07	57.8	5.44
72.22	0840	15	17.73	607	1412.6	7.70	0.58	61.9	5.89
72.21	0855	20	17.53	577	137.9	7.70	0.46	64.3	5.99
72.10	0908	25	17.41	544	134.0	7.70	0.49	65.0	6.23
72.15	0916	28	17.34	534	133.0	7.70	0.50	64.8	6.21
72.15	0922	30	17.27	577	132.3	7.70	0.46	65.7	6.31
	0928	32	17.21	579	132.1	7.70	0.42	66.5	6.39
72.15	0934	34	17.17	578	131.8	7.70	0.32	65.5	6.30
72.15	0940	36	17.13	579	130.3	7.70	0.36	65.7	6.32
	0941		SH	np/ing					
		~		/ (	)				2
				с.					
								~	-4.00 palsound =1
									from tubing
									0810

## PURGE MEASUREMENTS

SNL/NM Project Name: SWMU 8/58			SNL/NM Project No.: 146422.10.11.01			
Calibrations done by: R Lync	h		Date: 7//	5/13		
Make & Model: YSI 6920	/2			/		
YSI 6820 Sonde (S/N) with D	O. Ec. pH. ORP. and	l temperature prob	es: 08H100032			
	-, -, -, -, -,,	F				
YSI 650 MDS (S/N): <u>NA</u>						
		pH Ca	libration			
pH Calibrated to (std): 7.00			pH sloped to (			
Reference value:		.00		7.00		0.00
51 51	Value	Temp	Value	Temp	Value	Temp
1. Time: 0656	4.02	19.8	7.00	19.8	10.01	19.8
2. Time: 1051	4.01	20.1	1-01	20.1	10-01	20.1
3. Time:						
4. Time:						
Standard lot no.:	3AD782		3AE725 3AD357			
Expiration date:	APR-15		MAY-15		APR-15	
		SC Ca	libration			
Reference Value: 1413 uS			Standard Lot N	No.: 3AE221		
	Value	Temp	Expiration Dat	te:	MAY-15	
1. Time: 0659	1414	19.9				
2. Time: 1054	1411	20-0				
3. Time:						
4. Time:						电路 日本 日
		ORP C	alibration			
Reference Value:	200 mV		Standard Lot No. 1305755			
	Value	Temp	Expiration Dat	e:	JAN-14	
1. Time: 065B	201.0	19.8				
2. Time: 1053	200.7	20.7				
3. Time:						
4. Time:						
		DO Ca	libration			
Calibration Value:	81% air satura	ation @ 5200 ft.		Atmospheri	c Pressure in Hg	
1. Time: 0655	81.4	81.6		.41		2
2. Time: 1050	81.6		24			
3. Time:						

SNL/NM Project Name: SW	MU 8/58	Project No.:	Project No.: 146422.10.11.01			
Calibration done by: R Lynch		Date: 7	Date: 7/15/13			
	,	TURBIDIMETER				
Make & Model: HACH 210	00P HACH 2100Q	Serial No. S	/N 10050C002896			
Reference Value	P-10	20	100	800		
Standard Lot No.	0161	0168	0162	0161		
1. Time 0753	10.2	19.7	99.8	795		
<sup>2. Time</sup> 0949	10.1	19.9	99-6	794		
3. Time						
4. Time						
Comments:						

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

SNL/NM Project Name: SW	SNL/NM Proje	SNL/NM Project No.: 146422.10.11.01					
Calibrations done by: R Lynd	Date: 7/1	6/13					
Make & Model: YSI 6920	V2		. ,	/			
YSI 6820 Sonde (S/N) with I	DO Ec pH ORP and	temperature prob	<sub>es:</sub> 08H100032				
	- , , , , , , , , , , , , , , , , , , ,				8		
YSI 650 MDS (S/N): <u>NA</u>							
		pH Ca	libration				
pH Calibrated to (std): 7.00			pH sloped to (s	std): 10.00			
Reference value:	4	.00	1	7.00		10.00	
	Value	Temp	Value	Temp	Value	Temp	
1. Time: 0635 2. Time: 1042	4.03	22.0	7.01	23.0	10.02	22.0	
	4.02	21.7	7.01	21.7	10.01	21.7	
3. Time:							
4. Time: Standard lot no.:			3AE725		040057		
Expiration date:	3AD782 APR-15		MAY-15		3AD357 APR-15		
	Arteio	00.0					
		SC Ca	libration				
Reference Value: 1413 uS			Standard Lot No.: 3AE221				
	Value	Temp	Expiration Dat	e:	MAY-15		
1. Time: 0639	1419	25.0					
2. Time: 1045	14118	21.7					
3. Time:							
4. Time:							
		ORP C	alibration				
Reference Value:	200 mV		Standard Lot No. 1305755				
	Value	Temp	Expiration Dat	e:	JAN-14		
1. Time: 0637	199.9	21-9					
2. Time: 1044	200.4	21.7					
3. Time:							
4. Time:							
		DO Ca	libration				
Calibration Value:	ibration Value: 81% air saturation @ 5200 ft.			Atmospheric Pressure in Hg			
1. Time: 6634	81.	9	24.4	-19			
2. Time: 1041	8].	8	24.	46			
3. Time:							
S. IIIIC.							

SNL/NM Project Name: SWI	MU 8/58	Project No.:	Project No.: 146422.10.11.01				
Calibration done by: R Lynch		Date: 7/1	Date: 7/16/13				
TURBIDIMETER							
Make & Model: HACH 210	0P HACH 2100Q	Serial No. S	/N 10050C002896				
Reference Value	2 10	20	100	800			
Standard Lot No.	0161	0168	0162	0161			
<sup>1. Time</sup> 0749	10.1	19.7	[0]	803			
2. Time 0933	10.3	20.1	104	802			
3. Time		6					
4. Time							
Comments:	••••••••••••••••••••••••••••••••••••••						

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

### Portable Pump and Tubing / Water Level Indicator Decontamination Log Form

Project Name: SWMU 8/58 GWM Monitoring Well ID	# : <u>CCBA-MW2</u>		Date: 7/15/13					
The following equipment was decontaminated at co	The following equipment was decontaminated at completion of sampling activities in accordance with FOP-05-03							
Pump and Tubing Bundle ID #: <u>1807-32</u>	Water Level Indic	cator ID #: <u>62187</u>						
Personnel Performing Decontamination:         Robert Lynch       Image: Initial:         Print Name:       Initial:         Tim Jackson       Image: Initial:         Print Name:       Image: Initial:	Personnel Performing Decontamination:         Robert Lynch $\mathcal{M}_{1}$ Print Name:       Initial:         Tim Jackson $\overline{I}_{2}$ Print Name:       Initial:							
	on of Equipment		ad					
Pump: Good (high pressure) Tubing Bundle: Good	Water Level Indicator: Good							
List of Decc	ntamination Materials							
Distilled or Despired (simila one)		HNO <sub>3</sub>						
Distilled or Deonized (circle one)	Grade:	Reagent						
Source: Culligan	UN #:	2031						
Lot Number: 070913	Manufacturer:	AROC						
	Lot Number:	A0305629						

### Portable Pump and Tubing / Water Level Indicator Decontamination Log Form

Project Name: SWMU 8/58 GWM	Monitoring Well ID # : CCBA-MW1			Date: 7/16/13				
The following equipment was decontaminated at completion of sampling activities in accordance with FOP-05-03								
Pump and Tubing Bundle ID #: <u>1807-32</u>	_	Water Level Indi	cator ID #: 62187					
Personnel Performing Decontamination:Robert Lynch $\mathcal{M}$ Print Name:Initial:Tim Jackson $\mathcal{T}_{\mathcal{N}}$ Print Name:Initial:	Personnel Performing Decontamination:         Robert Lynch $\mathcal{PL}_{Initial:}$ Print Name: $\mathcal{T}_{\mathcal{P}}_{Initial:}$ Tim Jackson $\mathcal{T}_{\mathcal{P}}_{Initial:}$ Print Name:       Initial:							
		of Equipment						
Pump: Good (high pressure) Tubi	ing Bundle: Good	Water Level Indicator: Good						
	List of Deconta	mination Materials						
<b>Distilled</b> or <b>Deonized</b> (circle		HNO <sub>3</sub>						
Distined of Deolinzed (circle one)		Grade:	Reagent					
Source: Culligan	UN #: 2031							
Lot Number: 070913		Manufacturer:	AROC					
	Lot Number:	A0305629						

Waste Generator :	Robert Lynch Phone:	250-7090 project le	eader: Clinton Lum
Project Name	SWMU 8/58 GWM	SWMU 8/58 GWM	SWMU 8/58 GWM
Container ID # (site-date-sequence)	CCBA-MW2-071513-01	CCBA-MW2-071513-02	CCBA-071513
Initial Label Type (Hazardous or Non- Regulated)	non-Regulated	non-Regulated	non-Regulated
Waste Matrix (purge water, decon water, HACH Accu- Vac ampule)	Purge H2O	Purge H2O	Decon H2O
Container Type / Volume	CHPD/55-gal	CHPD/55-gal	CHPD/55-gal
Volume of Waste	19-gal	21-gal	35-gal
Total Container Weight	~150 lbs	~180 lbs	~230 lbs
COC#: Sample#- Fraction	614937 094371	614937 094371	614937 094371
Accumulation Date	Start: 7/15/13 Full: 7/15/13	Start: 7/15/13 Full: 7/15/13	Start: 7/15/13 Full: 7/15/13
Date Waste Moved to Accumulation Area	7/15/13	7/15/13	7/15/13
Accumulation Area Name	9925	9925	9925
Comments:			EB prior to CCBA-MW1

## **Groundwater Monitoring Waste Generation Log**

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Waste Generator :	Robert Lynch Phone:	250-7090 project l	eader: Clinton Lum
Project Name	SWMU 8/58 GWM	SWMU 8/58 GWM	SWMU 8/58 GWM
Container ID # (site-date-sequence)	CCBA-MW1-0715/613-01	CCBA-MW1-071613-02	CCBA-071613
Initial Label Type (Hazardous or Non- Regulated)	non-Regulated	non-Regulated	non-Regulated
Waste Matrix (purge water, decon water, HACH Accu- Vac ampule)	Purge H2O	Purge H2O	Decon H2O
Container Type / Volume	CHPD/55-gal	CHPD/55-gal	CHPD/55-gal
Volume of Waste	19-gal	21-gal	30-gal
Total Container Weight	~150 lbs	~180 lbs	~230 lbs
COC#: Sample#- Fraction	614939 094376 094377 	614939 094376 094377	614939 094376 094377 
Accumulation Date	Start: 7/19/13 Full: 7/19/13	Start: 7/18/13 Full: 7/19/13	Start: 7/16/13 16 Full: 7/16/13
Date Waste Moved to Accumulation Area	16 7/16/13 T1	16 -1 7/1/\$/13 -1	16 TA 7/18/13 TA
Accumulation Area Name	9925	9925	9925
Comments:			EEpidein COSA MAN T1

## Groundwater Monitoring Waste Generation Log

Time: 0752

### TAILGATE SAFETY MEETING FORM

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

Activities: Groundwater Monitoring (purging, sampling, decon)

(Anyone has the right to cease field activities for safety concerns. The buddy system will be used when needed.)

Weather Conditions: Temp: **68.9** °F Wind Speed: **15-20**MPH

Wind Speed: 15-20MPH Humidity: 56.2% Wind Chill 66.0°F

Chemicals Used: <u>Acids in sample containers, standard solutions</u>. <del>Hach ACCU VAC ampules</del> Other:

Safety T	opics Presented
IX Be aware of slips, trips, and falls. Keep work area clean and use a stepping stool when necessary.	<ul> <li>IX Be aware of environmental conditions (heat / cold stress). Dress accordingly.</li> <li>Wear sunscreen if necessary. Stay hydrated.</li> </ul>
🛛 Wear safety boots.	⊠ Be aware of electrical hazards
<sup>∞</sup> Use safe lifting practices. Wear leather gloves if necessary.	X Be aware of pressure hazards.
Be aware of pinch points on pump cable reel and hydraulic tailgate lift.	XNo 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.	X Avoid spilling purge / decon water.

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

	Attendees	
RoberTLynch	Athnel	
Printed Name	Signature	
Tim Jackson	T= 9-	NS-
Printed Name	Signature	
Printed Name	Signature	na n
		<i>p</i>
Printed Name	Signature	anne an transmission ann an ann an ann ann ann ann ann ann
Printed Name	Signature	

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## TAILGATE SAFETY MEETING FORM

Dept: 4142 Well Location: CCBA-MW Date: 7/16/13

Time: 0748

Activities: Groundwater Monitoring (purging, sampling, decon)

(Anyone has the right to cease field activities for safety concerns. The buddy system will be used when needed.)

Weather Conditions: Temp: <u>69.4</u> °F Wind Speed: <u>6</u> MPH Humidity:<u>56.9</u> % Wind Chill <u>N#</u> °F

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

Safety Ti	opics Presented
X Be aware of slips, trips, and falls. Keep work area clean and use a stepping stool when necessary.	<ul> <li>IX Be aware of environmental conditions (heat / cold stress). Dress accordingly.</li> <li>Wear sunscreen if necessary. Stay hydrated.</li> </ul>
🛛 Wear safety boots.	🛛 Be aware of electrical hazards
⊠ Use safe lifting practices. Wear leather gloves if necessary.	X Be aware of pressure hazards.
⊠ Be aware of pinch points on pump cable reel and hydraulic tailgate lift.	XNo 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).
X Wear chemical safety goggles.	X Avoid spilling purge / decon water.

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

	Attendees	VO
Printed Name	Signature	Inc
Tim Jackson	signature.	dia
Printed Name	Signature	999 - 999 - 999 - 999 - 999 - 999 - 999 - 999 - 999 - 999 - 999 - 999 - 999 - 999 - 999 - 999 - 999 - 999 - 999
Printed Name	Signature	
Printed Name	Signature	na mining ang ang ang ang ang ang ang ang ang a
Printed Name IMPORTANT NOTICE: A printed copy of this doc	Signature	

located on the Sandia Restricted Network (SRN), department home page

Project Name: SWMU 68	Project No.: 146422.10.1	1.01
Well I.D.: OBS-MW 1	Date: 07/09/13	
Well Condition:	Weather Condition:	
Method: Portable pump X	Dedicated pump	Pump depth: 153'

		V-1	Taman	50	ODD		Trankiditar	DO	Commente
Depth to	Time 24	Vol.	Temp	SC	ORP	pН	Turbidity	DO	Comments
Water	hr	(L/gal)	(°C)	(µS/cm)	(mV)	_	(NTU)	(%)	Do la
(ft)				8					DOmg/L
72.64	0820		STA	Rt-					
72.70	0839	5	19.38	556	121.4	7.55	2.69	421	3.87
72.69		10	18.42	548	113.9	7.55	1.59	48.0	4.63
72.70		15	18.08		110.9	7.55	1.55	40.5	
72.70		20	17.96	526	110.7	7.55	0.75	40.6	3.84
72.70		24	17.96	515	110.7	7.55		40.6	
72.70	0921	26	18.05		109.9	7.55	0.56	41.7	
72.70		28	18.09	501	109.5	7.55	0.68	41.5	3.91
72.70		30	18.12	500	109.2	7.56	0-64	41.1	3.87
72.70	0934	32	18.18	500	109.5	7.56	0.59	41.3	
72.70	0939	34	18.31	501	109.1	7.56	0-60	42.0	3.94
72.70	0943	36	18.32	499	108.9	7.56	0.62	43.6	3.99
	0944		SA	mpli	ing-				
				/	0				
								^	
								~	4.00 gals purged
									from tubin
									0830

## PURGE MEASUREMENTS

Project Name: SWMU 68	Project No.: 146422.10.11	.01
Well I.D.: OBS-MW 2	Date: 07/10/13	
Well Condition:	Weather Condition:	
Method: Portable pump X	Dedicated pump	Pump depth: 252'

Depth to	Time 24	Vol.	Temp	SC	ORP	pН	Turbidity	DO	Comments
Water	hr	(Lgal)	(°C)	$(\mu S/cm)$	(mV)	1	(NTU)	(%)	Donall
(ft)									DONG/L
173.82	0755		57	ARJ.					
174.86	0818	5	21.1B	537	162.2	7.52	0.64	404	3.58
174.95	0828	10 15	20.24	521	149.7	7.52	0.52	39.6	3.58
174.99	0837	15	19.97	503	142.9	7.52	0.66	39.7	3.61
174.99	0847	20	19.90	488	138.4	7.53	0.82	39.6	3.60
174.95	0856	25	19.93	496	132.9	7.53	0.47	39.5	
174.95	0902	28	19.87	494	130.5	2.53	0.77	38.7	3.52
174.92		30	19.92	486	129.1	7.53	0.68	38.6	3.51
174.90		32	19.99	480	127.8	7.53		38,8	3.52
174.90	0914	34	20.07	481	127.2	7.53	0.40	38.2	
174.90		36	20.17	482	124.5	7.53		38.3	
	0919		SA	m p/in	$cr$ $\sim$				
				/	0				
				^					
								~	- 4.00 gals oward
									-4.00 gals purged from tubing 0806
									0806

## **PURGE MEASUREMENTS**

Project Name: SWMU 68	Project No.: 146422.10.1	1.01
Well I.D.: OBS-MW 3	Date: 07/11/13	
Well Condition:	Weather Condition:	
Method: Portable pump X	Dedicated pump	Pump depth: 208'

Depth to	Time 24	Vol.	Temp	SC	ORP	pН	Turbidity	DO	Comments
Water	hr	(L(gal)	(°C)	(µS/cm)	(mV)	P	(NTU)	(%)	D
(ft)									Dmg/L
69.72	6758		STI	ART-		-			
74.45		5	19.43	535	161.6	7.53	1.96	47.9	4.42
75.94		10	18.43	519	140.9	7.53	1.92	46.7	4.37
76.80	0834	15	18.14	498	127.6	7.54	1.45	46.3	4.37
76.65	0844	20	18.30	473	115.7	7.54	0.77	46.3	4.35
76.45		25	18.38	481	111.5	7.54	0.68	46.2	4.33
76.35		28	18.34	471	107.9	7.56	0.78	46.0	
76.25	0905	30	18.37		106.7	7.54	0.82	46.2	4.34
76.10	0910	32	18.38	470	106.6	7.55	0.53	50.7	4.76
76.00	0914	34		470	105.5	7.55	0.58	46.0	4.32
75.85	0919	36	18.43	471	103.2	7.55	0.69	46.3	4.33
	0920		5A	mplin	g —				
-									
								~	-4.00 gals purged
					5				from tubing
							X		0807 0

## **PURGE MEASUREMENTS**

SNL/NM Project Name: SW	/MU 68		SNL/NM Pro	SNL/NM Project No.: 146422.10.11.01				
Calibrations done by: R Lyn	ich		Date: 7/	9/13				
Make & Model: YSI 6920	)V2			1				
YSI 6820 Sonde (S/N) with	DO, Ec, pH, ORP, and	l temperature prob	es: 08H100032			_		
YSI 650 MDS (S/N): NA								
5		pH Ca	libration					
pH Calibrated to (std): 7.00			pH sloped to	(std): 10.00				
Reference value:	4	.00		7.00	1	0.00		
	Value	Temp	Value	Temp	Value	Temp		
1. Time: 0652	4.02	22.6	7.01	22.6	10.01	22.6		
2. Time: 1245	4.03	23.6	7.01	23.6	10.02	23.6		
3. Time:								
4. Time:								
Standard lot no.:	2AG653		2AH113 2AF557					
Expiration date:	JUL-14		AUG-14 JUL-14					
	(°)	SC Ca	libration		ř.			
Reference Value: 1413 uS			-	No.: 2AG086		r.		
	Expiration Date: JUL-13							
1. Time: 0653	1410	22.6						
2. Time: 1247	1413	23.6						
3. Time:		2	1.42.84					
4. Time:								
		ORP C	alibration					
Reference Value:	200 mV		Standard Lot No. 1301187					
	Value	Temp	Expiration Date: OCT-13					
1. Time: 0654	200.7	22.7						
2. Time: 1246	201.2	23.6						
3. Time:								
4. Time:								
		DO Ca	libration					
Calibration Value:	81% air satura	ation @ 5200 ft.	Atmospheric Pressure in Hg					
1. Time: 0650	82.0	)		24.53				
2. Time: 1744	83.0		24.54					
3. Time:								
			1					

SNL/NM Project Name: SWMU 68		Project No.:	Project No.: 146422.10.11.01		
Calibration done by: R Lynch	Date: 7/	Date: 7/9/13			
TURBIDIMETER					
Make & Model: HACH 2100P HACH 2100Q		Serial No. S	Serial No. S/N 10050C002897		
Reference Value	EL 10	20	100	800	
Standard Lot No.	0161	0168	0162	0161	
1. Time 0806	10.1	19.8	109	795	
2. Time 1663	10.2	19.7	103	797	
3. Time					
4. Time					
Comments:					

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

SNL/NM Project Name: SWN	1U 68		SNL/NM Project No.: 146422.10.11.01			
Calibrations done by: R Lynch		Date: 7/	Date: 7/10/13			
Make & Model: YSI 6920V	/2					
YSI 6820 Sonde (S/N) with D	O, Ec, pH, ORP, and	l temperature prob	es: 08H100032			_
YSI 650 MDS (S/N): NA						
		рН Са	libration			
pH Calibrated to (std): 7.00			pH sloped to (s	std): 10.00		
Reference value:	4	.00		7.00	1	0.00
	Value	Temp	Value	Temp	Value	Temp
1. Time: 0635	3.99	21.7	7.00	21.7	9-99	21.7
2. Time: 1111	4.01	22.4	2.01	22.4	10.02	22.4
3. Time:						
4. Time:						
Standard lot no.:	2AG653		2AH113 2AF557			
Expiration date:	JUL-14		AUG-14		JUL-14	
		SC Ca	libration			
Reference Value: 1413 uS			Standard Lot N	No.: 2AG086		
	Value	Temp	Expiration Dat	te:	JUL-13	
1. Time: 0638	1407	21.6				
2. Time: 1115	1420	22.4				
3. Time:						
4. Time:	-					
		ORP C	alibration		2	
Reference Value:	200 mV		Standard Lot N	No. 1301187		
	Value	Temp	Expiration Dat	te:	OCT-13	
1. Time: 0637	199.9	21.6				
2. Time: 1/13	201.6	22.4				
3. Time:						
4. Time:				2 같은 말했는 것		
		DO Ca	alibration			
Calibration Value:	ration Value: 81% air saturation @ 5200 ft.			Atmospheri	c Pressure in Hg	
1. Time: 0634	81.5	81.8		1.50		
2. Time: ///O	82.0		20	1.56		
3. Time:						

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

SNL/NM Project Name: SWM	MU 68	Pr	Project No.: 146422.10.11.01		
Calibration done by: R Lynch			Date: 7/10/13		
TURBID			ETER		
Make & Model: HACH 210	0P HACH 2100Q	Se	erial No. S/	N 10050C002897	
Reference Value	et 10	20	)	100	800
Standard Lot No.	0161	016	68	0162	0161
1. Time 0750	10.4	20.		99.8	795
2. Time 6930	10.1	19-	9	101	797
3. Time				· ·	
4. Time					
Comments:					

	FER SAMPLE COI	LECTION FI				Page 1 of 2
SNL/NM Project Name:	SWMU 68		SNL/NM Project No.: 146422.10.11.01			
Calibrations done by: R Lynch			Date: 7	11/13		
Make & Model: YSI 6	920V2		1	/		
YSI 6820 Sonde (S/N) w	vith DO, Ec, pH, ORP, and	d temperature prob	es: 08H100032			
YSI 650 MDS (S/N):	A					_
		рН Са	alibration			
pH Calibrated to (std): 7	.00		pH sloped to (	std): 10.00		
Reference value:	2	1.00		7.00	1	0.00
	Value	Temp	Value	Temp	Value	Temp
1. Time: 0635	5 4.03	22.2	7.01	22.2	10.02	22.2
2. Time: 10,50	4.02	21-8	2.02	21-8	10.01	21-8
3. Time:						
4. Time:			0.011/14/0			
Standard lot no.: Expiration date:	2AG653		2AH113		2AF557	
	JUL-14	SC Ca	AUG-14		JUL-14	
Reference Value: 1413	uS		Standard Lot 1	Ja . 2AG086		
Reference value.	Value	Temp	Expiration Dat	the second se	JUL-13	
1. Time: D638	1118	22.2			1. ( p. // 5. / 8. p. / 1.	
2. Time: 1053	1410	21-8				
3. Time:		01-0	-			
4. Time:						
		ORP C	alibration			
Reference Value:	200 mV		Standard Lot No. 1301187			
	Value	Temp	Expiration Dat	te:	OCT-13	
1. Time: 0637	201.3	22.2				
2. Time: 1052	201.1	21.8				
3. Time:						
4. Time:						
		DO Ca	alibration		1	
Calibration Value:		ation @ 5200 ft.		Atmospheric	e Pressure in Hg	
1. Time: 0634				24.51		:
2. Time: 1049	81.	9	2	4.47		
3. Time:						
4. Time:						

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

SNL/NM Project Name: SWM	MU 68		Project No.: 146422.10.11.01		
Calibration done by: R Lynch			Date: 7/11/13		
TURBID			IMETER	2 2	
Make & Model: HACH 210	0P HACH 2100Q		Serial No. S/	N 10050C002897	
Reference Value	er 10		20	100	800
Standard Lot No.	0161		0168	0162	0161
1. Time 0750	10.4	2	0.2	101	798
2. Time 0942	10.1	1	9.9	102	794
3. Time					
4. Time					
Comments:					

# Portable Pump and Tubing / Water Level Indicator Decontamination Log Form

Project Name: SWMU 68	Monitoring Well ID # : OBS-MW 1		Date: 07/09/13	
The following equipment wa	s decontaminated at comp	letion of sampling a	activities in accordance with FC	DP-05-03
Pump and Tubing Bundle ID #: <u>1806-792</u>		Water Level Indi	cator ID #: 62187	
Personnel Performing Decontamination:Robert LynchInitial:Print Name:Initial:Tim JacksonInitial:Print Name:Initial:		Personnel Perfor Robert Lynch Print Name: Tim Jackson Print Name:	ming Decontamination:	tial:
	Condition	of Equipment		
Pump: GOOD Tub	ing Bundle: GOOD		_Water Level Indicator: _GC	DOD
	List of Deconta	mination Materials		
Distilled or Deonized (circle	e one)	Grade:	HNO <sub>3</sub> Reagent	
Source: Culligan		<b>UN</b> #:	2031	
Lot Number: 062013		Manufacturer:	ARCO	
		Lot Number:	A0305629	

#### Portable Pump and Tubing / Water Level Indicator Decontamination Log Form

Project Name: SWMU 68 GWM	Monitoring Well ID # : OBS-MW2		Date: 7/10/13	
The following equipment wa	s decontaminated at comp	letion of sampling a	activities in accordance with FC	DP-05-03
Pump and Tubing Bundle ID #:/807-132		Water Level Indicator ID #: 62187		
Personnel Performing Decontamination:         Robert Lynch       Image: Initial:         Print Name:       Image: Initial:         Tim Jackson       Image: Initial:         Print Name:       Image: Initial:		Personnel Performing Decontamination:Robert Lynch $\mathcal{PL}$ Print Name: $\mathcal{I}_1$ Tim Jackson $\mathcal{I}_2$ Print Name: $\mathcal{I}_2$		
	Condition	of Equipment		
Pump: Good Tub	ing Bundle: Good	Water Level Indicator: Good		
	List of Deconta	amination Materials		
Distilled or Deonized (circle one)		Grade:	HNO <sub>3</sub> Reagent	
Source: Culligan		UN #:	2031	
Lot Number: 062013		Manufacturer:	AROC	
		Lot Number:	A0305629	

#### Portable Pump and Tubing / Water Level Indicator Decontamination Log Form

Project Name: SWMU 68 GWM	Monitoring Well ID # : OBS-MW3		Date: 7/11/13	
The following equipment was decontaminated at completion of sampling activities in accordance with FOP-05-03				
Pump and Tubing Bundle ID # <b>1@</b> 07-132		Water Level Indicator ID #: 62187		
Robert Lynch Th		Personnel Performing Decontamination:         Robert Lynch $\mathcal{P}_{L}$ Print Name:       Initial:         Tim Jackson $\mathcal{T}_{I}$		7
Print Name: Initial:		Print Name:	In	tial:
	Condition	of Equipment		
Pump: Good Tub	ing Bundle: Good	Water Level Indicator: Good		
	List of Deconta	amination Materials		
	N N	HNO <sub>3</sub>		
Distilled or Deonized (circle one)		Grade:	Reagent	
Source: Culligan	·	UN #:	2031	
Lot Number: 062013		Manufacturer:	AROC	
		Lot Number:	A0305629	

project leader: Clinton Lum

Start: 070913

Full: 070913

070913

9925

#### **Groundwater Monitoring Waste Generation Log**

Waste Generator : R Lynch

Date

Area

Accumulation

**Date Waste** Moved to

Accumulation

Accumulation

Area Name **Comments:**  Start: 070913

Full: 070913

070913

9925

Phone: 844-4013

Project Name	SWMU 68 GWM	SWMU 68 GWM	SWMU 68 GWM
Container ID # (site-date-sequence)	OBS-MW1-070913-01	OBS-070913-02	OBS-070913
Initial Label Type (Hazardous or Non- Regulated)	non-Regulated	non-Regulated	non-Regulated
Waste Matrix (purge water, decon water, HACH Accu- Vac ampule)	Purge H2O	Purge H2O	Decon H2O
Container Type / Volume	CHPD/55-gal	CHPD/55-gal	CHPD/55-gal
Volume of Waste	19-gal	21-gal	35-gal
Total Container Weight	~180 lbs	~200 lbs	~270 lbs
	614933	614933	614933
	094361	094361	094361
COC#: Sample#- Fraction			

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

Start: 070913

Full: 070913

070913

9925

Waste Generator :		250-7090 project la	eader: Mike Skelly
Project Name	SWMU 68 GWM	SWMU 68 GWM	SWMU 68 GWM
Container ID # (site-date-sequence)	OBS-MW2-071013-01	OBS-MW2-071013-02	OBS-071013
Initial Label Type (Hazardous or Non- Regulated)	non-Regulated	non-Regulated	non-Regulated
Waste Matrix (purge water, decon water, HACH Accu- Vac ampule)	Purge H2O	Purge H2O	Decon H2O
Container Type / Volume	CHPD/55-gal	CHPD/55-gal	CHPD/55-gal
Volume of Waste	19-gal	21-gal	30-gal
Total Container Weight	~180 lbs	~200 lbs	~210 lbs
COC#: Sample#- Fraction	614935 094365 094366	614935 094365 094366	614935 094365 094366
Accumulation Date	Start: 7/10/13 Full: 7/10/13	Start: 7/10/13 Full: 7/10/13	Start: 7/10/13 Full: 7/10/13
Date Waste Moved to Accumulation Area	7/10/13	7/10/13	7/10/13
Accumulation Area Name	9925	9925	9925
Comments:			

# Groundwater Monitoring Waste Generation Log

Waste Generator		250-7090 project l	eader:
Project Name	SWMU 68 GWM	SWMU 68 GWM	SWMU 68 GWM
Container ID # (site-date-sequence)	OBS-MW3-071113-01	OBS-MW3-071113-02	OBS-071113
Initial Label Type (Hazardous or Non- Regulated)	non-Regulated	non-Regulated	non-Regulated
Waste Matrix (purge water, decon water, HACH Accu- Vac ampule)	Purge H2O	Purge H2O	Decon H2O
Container Type / Volume	CHPD/55-gal	CHPD/55-gal	CHPD/55-gal
Volume of Waste	19-gal	21-gal	30-gal
Total Container Weight	~180 lbs	~200 lbs	~270 lbs
COC#: Sample#- Fraction	614936 094368	614936 094368	<u>614936</u> 094368
Accumulation Date	Start: 7/11/13 Full: 7/11/13	Start: 7/11/13 Full: 7/11/13	Start: 7/11/13 Full: 7/11/13
Date Waste Moved to Accumulation Area	7/11/13	7/11/13	7/11/13
Accumulation Area Name	9925	9925	9925
Comments:			

# **Groundwater Monitoring Waste Generation Log**

Groundwater Monitoring Health and Safety Plan January 2012

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Time: 0800

## TAILGATE SAFETY MEETING FORM

Date: 7/9/13

Dept: 4142 Well Location: 0B5- MWI

Activities: Groundwater Monitoring (purging, sampling, decon)

(Anyone has the right to cease field activities for safety concerns. The buddy system will be used when needed.)

Weather Conditions: Temp: 73.0 °F Wind Speed: 1 MPH Humidity: 61.6% Wind Chill NA °F

Chemicals Used: Acids in sample containers, standard solutions. Hack ACCU VAC ampules Other:

Safety 1	Topics Presented
X Be aware of slips, trips, and falls. Keep work area clean and use a stepping stool when necessary.	IX Be aware of environmental conditions (heat / cold stress). Dress accordingly. Wear sunscreen if necessary. Stay hydrated.
X Wear safety boots.	🛛 Be aware of electrical hazards
☑ Use safe lifting practices. Wear leather gloves if necessary.	⊠ Be aware of pressure hazards.
$\overline{X}$ Be aware of pinch points on pump cable reel and hydraulic tailgate lift.	IX 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).
X Wear chemical safety goggles.	X Avoid spilling purge / decon water.

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

	Attendees
RobertLynch	Utfynd
Printed Name	Signature
1, - JACKgo-	T = (1 4/2)
Printed Name	Signature
Printed Name	Signature
	ę
Printed Name	Signature
Printed Name	Signature

Time: 0746

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	1.1	13	1.4	1.7	1.1	L A.	15	1.3.	-11	1		1	1.1	1 1	11	41	11	1	11	1	0	11	11	۲.

Dept: 4142 Well Location: OBS-MW 2

Activities: Groundwater Monitoring (purging, sampling, decon)

(Anyone has the right to cease field activities for safety concerns. The buddy system will be used when needed.)

Weather Condition				
Temp: <b><u>75.2</u> °F</b>	Wind	Speed:	Ø	MPH

Humidity: 51.4 % Wind Chill NA °F

Date: 7/10/13

Safety 1	Topics Presented
X Be aware of slips, trips, and falls. Keep work area clean and use a stepping stool when necessary.	<ul> <li>R Be aware of environmental conditions (heat / cold stress). Dress accordingly.</li> <li>Wear sunscreen if necessary. Stay hydrated.</li> </ul>
🛿 Wear safety boots.	🛛 Be aware of electrical hazards
<sup>∞</sup> Use safe lifting practices. Wear leather gloves if necessary.	IX Be aware of pressure hazards.
⊠ Be aware of pinch points on pump cable reel and hydraulic tailgate lift.	IX No eating or drinking at sampling counter.
🛛 Be aware of chemical hazards.	X Be aware of biohazards (snakes, spiders, etc.)
Wear nitrile or latex gloves when sampling.	☑ Wear communication device (cell phone, EOC pager).
X Wear chemical safety goggles.	IX Avoid spilling purge / decon water.

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

Attendees Roberth Jadesu-Printed Name Signature Printed Name Signature Printed Name Signature Printed Name Signature Printed Name Signature

Time: 07.45

## TAILGATE SAFETY MEETING FORM

Date: 7/11/13

Dept: 4142 Well Location: OBS-MW3

Activities: Groundwater Monitoring (purging, sampling, decon)

(Anyone has the right to cease field activities for safety concerns. The buddy system will be used when needed.)

Weather Conditions: Temp: **73.2** °F Wind Speed: **X** MPH

Humidity: 53.0% Wind Chill NA °F

Chemicals Used: <u>Acids in sample containers, standard solutions</u>, <del>Hach ACCU VAC ampules</del> Other:

Be aware of environmental conditions (heat / cold stress). Dress accordingly.
Wear sunscreen if necessary. Stay hydrated.
Be aware of electrical hazards
Be aware of pressure hazards.
KNo eating or drinking at sampling counter.
Be aware of biohazards (snakes, spiders, etc.)
Wear communication device (cell phone, EOC pager).
Avoid spilling purge / decon water.

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

Attendees Kober Signatur Printed 1 Signature Printed Name Signature Printed Name Signature Printed Name Signature Printed Name 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

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# CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY

	Internal Lab	. / .															_	Page	1_of_2_
	Batch No. N	MA					SMO Use	1					11	1		Α	R/COC	614	939
	Project Name	: //	SWMU 8/5	8 GWM	Date Samples	Shipped:	71	16/13		SMO Au	thorization	24	9.1	-		Waste Char	acterization		
	Project/Task I	Manager:	Clinton Lu	ım	Carrier/Waybi	II No.	0	070	-		ntact Phone			Gru		RMMA			
	Project/Task I		98026.01.		Lab Contact:		Edie Kent	803-556-8			Lorraine H	lerrera/505	5-844-3199	110		Released b	y COC No.		
	Service Order		CF 262-13	3	Lab Destination	on:	GEL			Send Re	port to SMC	):						14	° Celsius
				H.	Contract No.:		PO 13038	73			Rita Kava	naugh/505	-284-2553	×	Bill to:	Sandia Natio	nal Laboratorie	the second se	the second s
	Tech Area:										· · · · ·				1	ox 5800, MS		•	,
	Building:		Room:		Operationa	I Site:										erque, NM 8			
						Depth	Date	Time	Sample	Co	ntainer	Preserv-	Collection	Sample	<u> </u>	Paramet	er & Method		Lab
	Sample No.	Fraction	San	nple Location D	etail	(ft)	Colle	ected	Matrix	Туре	Volume	ative	Method	Туре			uested		Sample ID
r.	094376	-001	CCBA-MV	V1		79	7/16/13	9:13	GW	G	3x40ml	HCL	G	SA	TCL V	/OC (SW84	46-8260B)		
/	094376	-002	CCBA-MV	V1		79	7/16/13	9:14	GW	AG	4x1L	None	G	SA	TCL S	SVOC (SW	846-8270C)		
,	094376	-009	ССВА-МУ	V1		79	7/16/13	9:16	GW	Р	500 ml	HNO3	G	SA			346-6010/6020	(7470)	
1	094376	-016	CCBA-MV			79	7/16/13	9:17	GW	P	125 ml	None	G	SA				(1470)	
,	094376	-017	CCBA-MV			79				P						s(SW846-9			
0							7/16/13	9:18	FGW		250 ml	HNO3	G	SA			Na(SW846-6	5020)	
	094376	-018	CCBA-MV	V I		79	7/16/13	9:19	GW	P	125 ml	H2SO4	G	SA	NPN (	(EPA 353.2	2)		
/	094376	-020	CCBA-MV	V1		79	7/16/13	9:20	GW	Р	250 ml	None	G	SA	Perch	lorate (EPA	A 314.0)		
	094376	-022	CCBA-MV	V1		79	7/16/13	9:21	GW	Р	500 ml	None	G	SA	Alkali	nity (SM23	20B)		
1	094376	-024	ССВА-МУ	V1		79	7/16/13	9:22	GW	AG	4x1L	None	G	SA	High I	Explosives	(SW846-832	1A Mod.	
1	094376	-027	CCBA-MV	V1		79	7/16/13	9:25	GW	P	250 ml	NaOH	G	SA	Total	Cyanide (S	W846-9012		
	Last Chain:		✓ Yes			Sample	Tracking		SMC	) Use	Special Ins	tructions	QC Requir	rements:				Cond	tions on
	Validation I	Req'd:	✓ Yes			Date Ent	ered:				EDD		✓ Yes		No			Re	ceipt
	Backgroun		Yes			Entered	by:				Turnaroun	d Time	<u>7 Da</u>	<u>y*</u>	<u>15 Da</u>	<u>iy*</u> [	✓ 30 Day		
	Confirmato	ry:	Yes			QC inits.	:				Negotiated	TAT							
	Sample	N	ame	Signat	ure	Init.	Compar	ny/Organizat	tion/Phon	e/Cell	Sample Dis	sposal	Retur	n to Client		U Disp	osal by Lab		
	Team	Robert L	ynch	AVIA	Al	RE	SNL/4142/	505-844-401	3/505-25	0-7090	Return Sar	nples By:							
	Members	Tim Jack	son		14	TA	SNL/4142/	505-284-254	7/505-26	3-6639	Comments	:	Send report to	Tim Jackson	v/4142/M	S 0729/284-25	47		
					/	1					FGW(filtered		45 micron filte	er) Anions(E	Br,CI,F,S	SO4)Alkalinit	y(total		
											CaCO3,HCO SW846-6850						sis using		
							, /				000040-0050	w.Gamma a	speciroscopy	as short lis	solope	85.		La	Use
	1.Relinquishe	d by 7	= Indi	45	Org. 414	Z Date	7/16	3 Time /	005	3.Relind	uished by			Org.		Date		Time	
	1. Received b	y A	14 9.	To Sun(					005	3. Rece				Org.		Date		Time	
	2.Relinquishe		100	Contra la	Org.	Date	116 11	Time			uished by			Org.		Date		Time	
	2. Received b	y			Org.	Date		Time		4. Rece				Org.	0	Date		Time	
		-	ith SMO re	quired for 7 and		r					,			- 3					

Page 2 of 2

								T. 11						AR/COC 6	14939
	Project Nam	e:	SWMU 8/58 GWM	Project/Tas	sk Manag	ger: (	Clinton Lur	n		Project/Tas	sk No.:	980	026.01.12		
ł	Tech Area:			-											
ł	Building:		Room:	I	Depth	Date/1	limo	Sample	Co	ntainer		Collection	Sample	Parameter & Method	Lab use
	Sample No.	Fraction	Sample Location I	Detail	(ft)	Colle		Matrix	Туре	Volume	Preserv- ative	Method	Type	Requested	Sample II
0	094376	-033	CCBA-MW1		79	7/16/13	9:26	GW	P	1 L	HNO3	G	SA	Gamma Spectroscopy (EPA 901.0	
1	094376	-034	CCBA-MW1		79	7/16/13	9:27	GW	Р	1 L	HNO3	G	SA	Gross Alpha and Beta (EPA 900.0)	
,	094376	-035	CCBA-MW1		79	7/16/13	9:28	GW	Р	1 L	HNO3	G	SA	Isotopic Uranium (HASL 300)	
0	094377	-001	CCBA-MW1		79	7/16/13	9:13	GW	G	3x40ml	HCL	G	DU	TCL VOC (SW846-8260B)	
1	094377	-002	CCBA-MW1		79	7/16/13	9:15	GW	AG	4x1L	None	G	DU	TCL SVOC (SW846-8270C)	
1	094377	-009	CCBA-MW1		79	7/16/13	9:16	GW	Р	500 ml	HNO3	G	DU	TAL Metals+U(SW846-6010/6020/7470)	
	094377	-016	CCBA-MW1		79	7/16/13	9:17	GW	Р	125 ml	None	G	DU	Anions(SW846-9056))	
P	094377	-017	CCBA-MW1		79	7/16/13	9:18	FGW	Р	250 ml	HNO3	G	DU	Metals-Ca,Mg,K,Na(SW846-6020)	
1	094377	-018	CCBA-MW1		79	7/16/13	9:19	GW	Р	125 ml	H2SO4	G	DU	NPN (EPA 353.2)	
1	094377	-020	CCBA-MW1		79	7/16/13	9:20	GW	Р	250 ml	None	G	DU	Perchlorate (EPA 314.0)	
0	094377	-022	CCBA-MW1		79	7/16/13	9:21	GW	Р	500 ml	None	G	DU	Alkalinity (SM2320B)	
- 1	094377	-024	CCBA-MW1		79	7/16/13	9:24	GW	AG	4x1L	None	G	DU	High Explosives (SW846-8321A)	
t	094377	-027	CCBA-MW1		79	7/16/13	9:25	GW	Р	250 ml	NaOH	G	DU	Total Cyanide (SW846-9012	
1	094377	-033	CCBA-MW1		79	7/16/13	9:26	GW	Р	1 L	HNO3	G	DU	Gamma Spectroscopy (EPA 901.0	)
1	094377	-034	CCBA-MW1		79	7/16/13	9:27	GW	Р	1 L	HNO3	G	DU	Gross Alpha and Beta (EPA 900.0	
	094377	-035	CCBA-MW1	*	79	7/16/13	9:28	GW	Р	1 L	HNO3	G	DU	Isotopic Uranium (HASL 300)	
•	094378	-001	ССВА-ТВЗ		NA	7/16/13	9:13	DIW	G	3x40ml	HCL	G	ТВ	TCL VOC (SW846-8260B)	
	Decinient la	itiala													
	Recipient In	itials		-										· · · · · · · · · · · · · · · · · · ·	

# CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY

	Internal Lab	,														÷	Page	_1_ of _2_
	Batch No.	VA					SMO Us	e ,					101	ĸ		AR/COC	614	1937
	Project Name		SWMU 8/58	8 GWM	Date Samples	s Shipped:	7	15 11	3	SMO A	thorization:	01	5.6.	-	Waste	e Characterization		
	Project/Task I				Carrier/Wayb					4	ontact Phone		1900	SMO				
	Project/Task I				Lab Contact:		Edie Ker	nt/803-556-	-8171	1	Lorraine H	lerrera/505	5-844-3199	110	Relea	sed by COC No.		
	Service Order		CF 262-13		Lab Destination	on:	GEL			Send Re	eport to SMC	):				-	1	<sup>o</sup> Celsius
			4		Contract No.:		PO 1303	8873		1	Rita Kava	naugh/505	-284-2553		Bill to:Sandia	National Laboratories	s (Accoun	ts Payable),
	Tech Area:		2												P.O. Box 580	0, MS-0154		
	Building:		Room:		Operationa	I Site:									Albuquerque,	NM 87185-0154		
						Depth	Dat	te/Time	Sample	Co	ontainer	Preserv-	Collection	Sample	Par	ameter & Method		Lab
	Sample No.	Fraction	San	nple Location D	etail	(ft)	Co	llected	Matrix	Туре	Volume	ative	Method	Туре		Requested		Sample ID
ł	094371	-001	CCBA-MV	V2		117	7/15/13	9:41	GW	G	3x40ml	HCL	G	SA	TCL VOC (	SW846-8260B)		
1	094371	-002	ССВА-МУ			117	7/15/13		GW	AG	4x1L	None	G	SA	· · · · · ·	(SW846-8270C)		
ŀ	094371	-009	CCBA-MV			117	7/15/13		GW	P	500 ml	HNO3	G				- (70)	
	094371		CCBA-IVIV	VZ		11/	//15/13	9.44	GVV		1 500 mi	HNU3	G	SA	TAL Metals+0	U(SW846-6010/6020/	7470)	
ļ	094371	-016	CCBA-MV	V2		117	7/15/13	9:45	GW	P	125 ml	None	G	SA	Anions(SW	846-9056))		
1	094371	-017	CCBA-MV	V2		117	7/15/13	9:46	FGW	Р	250 ml	HNO3	G	SA	Metals-Ca,	Mg,K,Na(SW846-6	020)	
/	094371	-018	CCBA-MV	V2		117	7/15/13	9:47	GW	Р	125 ml	H2SO4	G	SA	NPN (EPA	353.2)		
1	094371	-020	CCBA-MV	V2		117	7/15/13	9:48	GW	Р	250 ml	None	G	SA	Perchlorate	e (EPA 314.0)		
,	094371	-022	CCBA-MV	V2		117	7/15/13	9:49	GW	Р	500 ml	None	G	SA	Alkalinity (S	SM2320B)		
4	094371	-024	CCBA-MV	V2		117	7/15/13	9:50	GW	AG	4x1L	None	G	SA	High Explos	sives (SW846-832	1A Mod.	
1	094371	-027	CCBA-MV	V2		117	7/15/13	3 9:51	GW	Р	250 ml	NaOH	G	SA	Total Cyani	ide (SW846-9012		
	Last Chain:		Yes			Sample	Tracking		SMC	) Use	Special Ins	structions	QC Requir	rements:	· · · ·		Cond	itions on
	Validation F	Reg'd:	✓ Yes			Date Ent	ered:				EDD		✓ Yes		No		Re	eceipt
	Backgroun		Yes			Entered					Turnaroun	d Time	7 Da	V*	15 Day*	✓ 30 Day		
	Confirmato		Yes			QC inits.	:				Negotiated	TAT						
	Sample	N	lame	Signati	ure	Init.	Comp	any/Organiz	ation/Phon	e/Cell	Sample Di	sposal	Retur	n to Client	J	Disposal by Lab		
	Team	Robert L	ynch	KATHNO	L	RV	SNL/4142	2/505-844-40	013/505-25	50-7090	Return Sa	nples By:						
	Members	Tim Jack	son	TIAN	15	TI	SNL/4142	2/505-284-2	547/505-26	3-6639	Comments	5:	Send report to	Tim Jacksor	n/4142/MS 0729/	284-2547		
				( (											Br,Cl,F,SO4)Al			
																analysis using		
											- 500040-0050	wi.Gamma	Spectroscopy	as short lis	t isotopes.		La	b Use
	1.Relinquishe	d by	T-Id.	15-	Org. 414	Z Date	7/15	13 Time	1025	3.Relind	uished by			Org.		Date	Time	
	1. Received b	y O	4.E. J	A*	Org. 414		_	13 Time	1025	3. Rece				Org.		Date	Time	
	2.Relinquishe	d by	0		Org.	Date		Time		4.Reline	quished by			Org.		Date	Time	
	2. Received b	у			Org.	Date		Time		4. Rece	ived by			Org.		Date	Time	
	*Prior confir	mation w	ith SMO re	quired for 7 and	15 day TAT	г												

Page 2 of 2 AR/COC 614937

														AR/CUC 61	4937
	Project Nam	e:	SWMU 8/58 GWM	Project/Ta	sk Mana	ger:	Clinton Lur	n		Project/Tas	sk No.:	98	026.01.12		
ĺ	Tech Area:		v												
	Building:		Room:												Lab use
					Depth	Date/		Sample		ntainer		Collection		Parameter & Method	Lab
.	Sample No.	1		Detail	(ft)	Colle		Matrix	Туре	Volume	ative	Method	Туре	Requested	Sample ID
1	094371	-033	CCBA-MW2		117	7/15/13	9:52	GW	Р	1 L	HNO3	G	SA	Gamma Spectroscopy (EPA 901.0)	
1	094371	-034	CCBA-MW2		117	7/15/13	9:53	GW	Р	1 L	HNO3	G	SA	Gross Alpha and Beta (EPA 900.0)	
1	094371	-035	CCBA-MW2		117	7/15/13	9:54	GW	Р	1 L	ниоз	G	SA	Isotopic Uranium (HASL 300)	
1	094372	-001	CCBA-TB1		NA	7/15/13	9:40	DIW	G	3x40ml	HCL	G	ТВ	TCL VOC (SW846-8260B)	
!	094373	-001	CCBA-FB1		NA	7/15/13	9:40	DIW	G	3x40ml	HCL	G	FB	TCL VOC (SW846-8260B)	
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	Recipient In	itials													
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# CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY

	Internal Lab															Page <u>1</u> of <u>2</u>
	Batch No.	VIA					SMO Use						1	1	AR/COC	614938
	Project Name	);	<b>SWMU 8/5</b>	8 GWM	Date Samples	s Shipped:	7/15	-113		SMO AL	thorization;	D	1.8 1.		Waste Characterization	
	Project/Task		Clinton Lu		Carrier/Wayb		20		10		ontact Phone	en	till	CALIP		
	Project/Task		98026.01		Lab Contact:		Edie Kent/8						5-844-3199	9110	Released by COC No.	
	Service Orde		CF 262-1		Lab Destinati	00.	GEL		////	Sand R	eport to SMC		-044-5155		Keleased by COC NO.	✓ 4º Celsius
			01 202 1	0	Contract No.:	011.	PO 130387	3		Send R			-284-2553			the second se
	Tech Area:				Contract No		10130307	5			Rild Rava	naugh/505	-204-2000		Bill to:Sandia National Laboratories (	Accounts Payable),
															P.O. Box 5800, MS-0154	
	Building:		Room:		Operationa				1						Albuquerque, NM 87185-0154	
						Depth	Date/T		Sample		ontainer	4	Collection	Sample	Parameter & Method	Lab
	Sample No.	Fraction	Sar	mple Location D	etail	(ft)	Collec	cted	Matrix	Туре	Volume	ative	Method	Туре	Requested	Sample ID
8	094374	-001	CCBA-EB	31		NA	7/15/13	10:50	DIW	G	3x40ml	HCL	G	EB	TCL VOC (SW846-8260B)	
1	094374	-002	CCBA-EB	31		NA	7/15/13	10:51	DIW	AG	4x1L	None	G	EB	TCL SVOC (SW846-8270C)	
,	094374	-009	CCBA-EB	31		NA	7/15/13	10:52	DIW	Р	500 ml	HNO3	G	EB	TAL Metals+U(SW846-6010/6020/74	170)
	094374	-016	CCBA-EB	31		NA	7/15/13	10:53	DIW	Р	125 ml	None	G	EB	Anions(SW846-9056))	
•	094374	-017	CCBA-EB	31		ŃA	7/15/13	10:54	FDIW	Р	250 ml	HNO3	G	EB	Metals-Ca,Mg,K,Na(SW846-60	20)
	094374	-018	CCBA-EB	31		NA	7/15/13	10:55	DIW	Р	125 ml	H2SO4	G	EB	NPN (EPA 353.2)	
1	094374	-020	CCBA-EB	31		NA	7/15/13	10:56	DIW	Р	250 ml	None	G	EB	Perchlorate (EPA 314.0)	
P	094374	-022	CCBA-EB	31		NA	7/15/13	10:57	DIW	Р	500 ml	None	G	EB	Alkalinity (SM2320B)	
	094374	-024	CCBA-EB	31		NA	7/15/13	10:58	DIW	AG	4x1L	None	G	EB	High Explosives (SW846-8321A	Mod.
	094374	-027	CCBA-EB	31		NA	7/15/13	10:59	DIW	Р	250 ml	NaOH	G	EB	Total Cyanide (SW846-9012	
	Last Chain:	:	Yes			Sample	Tracking		SMC	) Use	Special Ins	tructions	QC Requir	ements:		Conditions on
	Validation I	Req'd:	√ Yes			Date Ent	tered:				EDD		Yes		No	Receipt
	Backgroun	d:	Yes			Entered	by:				Turnaroun	d Time	7 Da	/*	15 Day* 30 Day	
	Confirmato	ry:	Yes			QC inits.	:				Negotiated	TAT				
	Sample	N	ame	2 Signatu	ure /	Init.	Company	/Organiza	tion/Phon	e/Cell	Sample Dis		Return	to Client	└ Disposal by Lab	
		Robert Ly		VIIIN	ot	RL	SNL/4142/50				Return Sar		iteruit	r to olient		
	Members			TI		Tel	SNL/4142/50			2.0.2.2.2	Comments		0			
	Members	TITT DOCK	3011	1-4-21	2	17	5141/4142/50	05-204-254	+77505-20	9-0039					/4142/MS 0729/284-2547 Br,CI,F,SO4)Alkalinity(total	
						<i>,</i>					CaCO3.HCO	3.CO3). If p	erchlorate det	ected.perfo	rm verification analysis using	
											SW846-6850	M.Gamma S	Spectroscopy	as short list	t isotopes.	
		-	/													Lab Use
	1.Relinquishe		14 41	5	Org. 414	Autoritation and a second seco	7/15/13	Time /		3.Relind	uished by			Org.	Date	Time
	1. Received b		49. E	a GNO	Org. 414	Z Date	7115113	Time /	130	3. Rece				Org.	Date	Time
	2.Relinquishe	d by		- ( - •	Org.	Date		Time		4.Relind	uished by			Org.	Date	Time
	2. Received b	y			Org.	Date		Time		4. Rece	ived by			Org.	Date	Time
	*Prior confir	mation w	ith SMO re	quired for 7 and	15 day TAT	-										

Page 2 of 2

														AR/COC	614938
	ct Name	e:	SWMU 8/58 GWM	Project/Ta	sk Manag	ger:	Clinton Lur	n		Project/Tas	sk No.:	98	026.01.12		
Tech /				4											
Buildi	ing:		Room:												Lab us
Samp	ole No.	Fraction	Sample Location	Detail	Depth (ft)	Date/ Colle		Sample Matrix	Со Туре	ntainer Volume	Preserv- ative	Collection Method	Sample Type	Parameter & Method Requested	Lab Sample
			CCBA-EB1		NA	7/15/13	11:00	DIW	P	1 L	HNO3	G		Gamma Spectroscopy (EPA 90	
			CCBA-EB1		NA	7/15/13	11:01	DIW	P	1 L	HNO3	G		Gross Alpha and Beta (EPA 90	
		-035	CCBA-EB1		NA	7/15/13	11:02	DIW	Р	1L	HNO3	G		Isotopic Uranium (HASL 300)	0.07
			ССВА-ТВ2		NA	7/15/13	10:50	DIW	G	3x40ml	HCL	G	ТВ	TCL VOC (SW846-8260B)	
								-							
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# CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY

Internal Lab																	Pag	e <u>1</u> of <u>2</u>
Batch No.	j (X					SMO Use					~	1 /				AR/CO	C 61	4933-
Project Name:	:	SWMU 68	GWM	Date Samples	s Shipped:				SMO AL	thorization:	Don	Water	ent		Waste C	haracterizat	tion	
Project/Task N	lanager:	Clinton Lu	ım	Carrier/Wayb	ill No.				SMO Co	ontact Phone	:				RMMA			
Project/Task N	lumber:	98026.01.	13	Lab Contact:		Edie Kent	/803-556-8	3171	1	Lorraine H	lerrera/505	5-844-3199			Release	d by COC N	0.	
Service Order	:	CF 263-13	3 .	Lab Destination	on:	GEL			Send Re	eport to SMC	);			1			1	4º Celsi
				Contract No .:		PO 13038	73		1	Rita Kava	naugh/505	5-284-2553		Bill to:	Sandia Na	ational Labora	atories (Accor	unts Payable
Tech Area:														P.O. E	Box 5800,	MS-0154		
Building:		Room:		Operationa	al Site:									Albug	uerque, NI	M 87185-01	54	
					Depth	Date	/Time	Sample	Co	ontainer	Preserv-	Collection	Sample		Paran	neter & Me	thod	Lab
Sample No.	Fraction	San	nple Location D	etail	(ft)	, Colle	ected	Matrix	Туре	Volume	ative	Method	Туре		F	Requested	0	Sample
094361	-001 -	OBS-MW	1		153	7/9/13	9:44	GW	G *	3x40ml *	HCL	G	SA	TCL	VOC (SV	V846-8260	B)	
094361	-002 🗸	OBS-MW	1		153	7/9/13	9:46 🐔	GW	AG⁺	4x1L .	None	G	SA	TCL	SVOC (S	W846-827	0C)	
094361	-009 ′	OBS-MW	1		153	7/9/13	9:50	GW	P	500 ml	HNO3	G	SA	TAL	/letals+U(S	SW846-6010	/6020/7470)	
094361	-014′	OBS-MW	1		153	7/9/13	9:51	GW	P.	250 ml <sup>*</sup>	None	G	SA	Неха	valent Cl	hromium(S	W846-7196	A
094361	-016 ^	OBS-MW	1		153	7/9/13	9:52	GW	P۰	125 ml '	None	G	SA	Anio	ns(SW84	6-9056))		
094361	-017	OBS-MW	1		153	7/9/13	9:531	FGW	Р	250 ml	HNO3	G	SA			,K,Na(SW	346-6020)	
094361	-018	OBS-MW	1		153	7/9/13	9:54	GW	Р	125 ml *	H2SO4	G	SA		(EPA 35			
094361	-020 -	OBS-MW	1		153	7/9/13	9:55	GW	Р	250 ml	None	G	SA	Perci	hlorate (E	EPA 314.0)		
094361	-022 *	OBS-MW	1		153	7/9/13	9:56	GW	P	500 ml	None `	G	SA	Alkal	inity (ຣ໌M	2320B)		
094361	-024 🤇	OBS-MW	1		153	7/9/13	10:00 -	GW	AG	4x1L -	None	G	SA	High	Explosiv	es (SW846	-8321A)	
Last Chain:		Yes			Sample	Tracking		SMC	) Use	Special Ins	tructions	/QC Requir	ements:				Con	ditions on
Validation F	Req'd:	✓ Yes			Date En	tered:				EDD		✓ Yes		No			F	Receipt
Background	d:	Yes			Entered	by:				Turnaroun	d Time	7 Da	<u>v*</u>	15 D	ay*	✓ 30 D		
Confirmator	ry:	Yes			QC inits.	.:				Negotiated	TAT						_	
Sample	N	ame	Signati	ure /	Init.	Compar	y/Organizat	tion/Phon	e/Cell	Sample Dis	sposal	Return	n to Client	í.	Di	isposal by I	ab	
Team	Robert L	ynch	Kul Lyna	sh	U	SNL/4142/	505-844-401	3/505-25	0-7090	Return Sar	nples By:							
Members	Tim Jack	son	TEAL	etter	TI	SNL/4142/	505-284-254	17/505-26	3-6639	Comments	-	Send report to					_	
Ļ										FGW(filtered CaCO3,HCO	in field w/4	micron filter)	Anions(Br,	CI,F,SC	04)Alkalin	ity(total		
-										SW846-6850	M.Gamma	Spectroscopy	as short lis	t isotor	es.	alysis using		
I.Relinquished	d by 7	1-115-		Org.4142	Date	7/9/13	Time / G	033	3.Relino	uished by			Org.		D	ate	L Tim	ab Use e
1. Received by	y 0.	will				7/9/13	Time /		3. Rece	ived by			Org.		D	ate	Tim	е
2.Relinquished				Org.	Date	/	Time			uished by			Org.			ate	Tim	
2. Received by				Org.	Date		Time		4. Rece				Org.			ate	Tim	

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Project Nam Fech Area:	e:	SWMU 68 GWM	Project/Ta	ask Manag	ger:	Clinton Lur	n		Project/Tas	sk No.:	980	026.01.13		
Building:		Room:	-										* p.	Lab us
Sample No.	Eraction		n Detail	Depth (ft)		/Time	Sample		ntainer		Collection		Parameter & Method	Lab
094361	-027	OBS-MW1	n Detall	153	7/9/13	10:01	Matrix GW	Type P	Volume 250 ml	ative NaOH	Method G	Type SA	Requested	Sample
094361	-033 r	OBS-MW1		153	7/9/13	10:02	GW	P	250 mi	HNO3	G		Total Cyanide (SW846-9012 Gamma Spèctroscopy (EPA 901.0)	
094361		OBS-MW1		153	7/9/13	10:02	GW	P	1L	- HNO3	G		Gross Alpha and Beta (EPA 900.0)	
094361	-035 1	OBS-MW1		153	7/9/13	10:04	GW	P ·	1L.	HNO3	G		Isotopic Uranium (HASL 300)	
094362	-001	OBS-TB1		NA	7/9/13	9:44	DIW	G	3x40ml	HCL	G		TCL VOC (SW846-8260B)	
001002					110/10	0.11			5,40111	TIOL		10		
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			p											

# CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY

Internal Lab															Page <u>1</u> o
Batch No.	VIA					SMO Us	e į					10	$\square$	AR/COC	61493
Project Name	e:	SWMU 68	GWM	Date Sample	s Shipped:	71	10/13		SMO A	uthorization:	RI	19.1	1.4.	Waste Characterization	
Project/Task	Manager:	Clinton Lu	ım	Carrier/Wayb	oill No.	2	0102	71	SMO C	ontact Phone		440	Smo	RMMA	
Project/Task	Number:	98026.01.	.13	Lab Contact:		Edie Ker	nt/803-556-8	3171	1	Lorraine H	lerrera/50	5-844-3199		Released by COC No.	
Service Orde	r:	CF 263-13	3	Lab Destinati	ion:	GEL			Send R	eport to SMC	):				✓ 4º Cel
				Contract No.:		PO 1303	873		1	Rita Kava	naugh/505	5-284-2553		Bill to:Sandia National Laboratories	and the second sec
Tech Area:							-							P.O. Box 5800, MS-0154	
Building:		Room:		Operationa	al Site:									Albuquerque, NM 87185-0154	
					Depth	Dat	e/Time	Sample	Co	ontainer	Preserv-	Collection	Sample	Parameter & Method	La
Sample No.	Fraction	San	nple Location D	Detail	(ft)	Co	llected	Matrix	Туре	Volume	ative	Method	Туре	Requested	Samp
094365	-001	OBS-MW	2		252	7/10/13	9:19	GW	G	3x40ml	HCL	G	SA	TCL VOC (SW846-8260B)	
094365	-002	OBS-MW	2		252	7/10/13	9:22	GW	AG	4x1L	None	G	SA	TCL SVOC (SW846-8270C)	
094365	-009	OBS-MW	2		252	7/10/13	9:25	GW	Р	500 ml	HNO3	G	SA	TAL Metals+U(SW846-6010/6020/	7470)
094365	-014	OBS-MW	2		252	7/10/13	9:26	GW	Р	250 ml	None	G	SA	Hexavalent Chromium(SW846	6-7196A
094365	-016	OBS-MW	2		252	7/10/13	9:27	GW	Р	125 ml	None	G	SA	Anions(SW846-9056))	
094365	-017	OBS-MW2	2		252	7/10/13	9:28	FGW	Р	250 ml	HNO3	G	SA	Metals-Ca,Mg,K,Na(SW846-6	020)
094365	-018	OBS-MW2	2		252	7/10/13	9:29	GW	Р	125 ml	H2SO4	G	SA	NPN (EPA 353.2)	
094365	-020	OBS-MW2	2		252	7/10/13	9:30	GW	Р	250 ml	None	G	SA	Perchlorate (EPA 314.0)	
094365	-022	OBS-MW2	2		252	7/10/13	9:31	GW	Р	500 ml	None	G	SA	Alkalinity (SM2320B)	
094365	-024	OBS-MW2	2		252	7/9/13	9:33	GW	AG	4x1L	None	G	SA	High Explosives (SW846-832	1A)
Last Chain:		Yes			4	Tracking		SMC	) Use	Special Ins	structions	/QC Requi	ements:		Conditions
Validation I	Req'd:	✓ Yes			Date Ent	tered:				EDD		🗹 Yes		No	Receipt
Backgroun	d:	Yes			Entered	by:				Turnaroun	d Time	<u>7 Da</u>	¥ 🗌	15 Day* 30 Day	
Confirmato	ry:	L Yes			QC inits.	:				Negotiated	TAT				
Sample	N	ame	Signat	ure /	Init.	Compa	any/Organiza	tion/Phon	e/Cell	Sample Di	sposal	Retur	n to Client	Disposal by Lab	
Team	Robert L	ynch	Kelt 4m	ch	TU	SNL/4142	/505-844-40	13/505-25	0-7090	Return Sar	nples By:				
Members	Tim Jack	son	T-Thally	~	17	SNL/4142	/505-284-254	47/505-26	3-6639	Comments	5:	Send report to	Tim Jackson	/4142/MS 0729/284-2547	
					/		7							r,Cl,F,SO4)Alkalinity(total	
										and the second second from the second				m verification analysis using	
										500040-0050	w.Gamma	Spectroscopy	as short lis	t isotopes.	Lab Use
1.Relinquishe	d by 7	-1 -1 -1 (4	-	Org. 419	Z Date	7/10/1	3 Time	1010	3.Relind	uished by			Org.	Date	Time
1. Received b	y P	19.1	Pa SMO				7 Time		3. Rece				Org.	Date	Time
2.Relinquishe	d by			Org.	Date		Time			uished by			Org.	Date	Time
	)V				Date										

Page 2 of 2

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Γ	Project Nam	0.	SWMU 68 GWM	Project/Ta	ok Manay	105	Clinton Lun			Deciset/Ter	I. N	0.00	000 04 40		4935
	Tech Area:	е.	3001010 08 G00101	Projecura	SK Walla	Jer.	Clinton Lun	1		Project/Tas	SK NO.:	980	026.01.13		
	Building:		Room:	1											Lab us
	Sample No.	Fraction	Sample Location [	Detail	Depth (ft)	Date/ Colle		Sample Matrix	Со Туре	ntainer Volume	Preserv- ative	Collection Method	Sample Type	Parameter & Method Requested	Lab Sample
ł	094365	-027	OBS-MW2	Jotan	252	7/10/13	9:36	GW	P	250 ml	NaOH	G	SA	Total Cyanide (SW846-9012	Sample
ł	094365	-033	OBS-MW2		252	7/10/13	9:37	GW	P	1 L	HNO3	G	SA		
ł	094365	-034	OBS-MW2		252	7/10/13	9:38	GW	P P					Gamma Spectroscopy (EPA 901.0)	
ŀ	094365	-035	OBS-MW2							1 L	HNO3	G	SA	Gross Alpha and Beta (EPA 900.0)	
ł					252	7/10/13	9:39	GW	P	1 L	HNO3	G	SA	Isotopic Uranium (HASL 300)	
ŀ	094366	-001	OBS-MW2		252	7/10/13	9:20	GW	G	3x40ml	HCL	G	DU	TCL VOC (SW846-8260B)	
ŀ	094366	-002	OBS-MW2		252	7/10/13	9:24	GW	AG	4x1L	None	G	DU	TCL SVOC (SW846-8270C)	
$\left  \right $	094366	-009	OBS-MW2		252	7/10/13	9:25	GW	P	500 ml	HNO3	G	DU	TAL Metals+U(SW846-6010/6020/7470)	
•	094366	-014	OBS-MW2		252	7/10/13	9:26	GW	P	250 ml	None	G	DU	Hexavalent Chromium(SW846-7196A	
╞	094366	-016	OBS-MW2		252	7/10/13	9:27	GW	Р	125 ml	None	G	DU	Anions(SW846-9056))	
	094366	-017	OBS-MW2		252	7/10/13	9:28	FGW	Р	250 ml	HNO3	G	DU	Metals-Ca,Mg,K,Na(SW846-6020)	
╞	094366	-018	OBS-MW2		252	7/10/13	9:29	GW	Р	125 ml	H2SO4	G	DU	NPN (EPA 353.2)	
	094366	-020	OBS-MW2		252	7/10/13	9:30	GW	Р	250 ml	None	G	DU	Perchlorate (EPA 314.0)	
ľ	094366	-022	OBS-MW2		252	7/10/13	9:31	GW	P	500 ml	None	G	DU	Alkalinity (SM2320B)	
4	094366	-024	OBS-MW2		252	7/10/13	9:35	GW	AG	4x1L	None	G	DU	High Explosives (SW846-8321A)	
1	094366	-027	OBS-MW2		252	7/10/13	9:36	GW	Р	250 ml	NaOH	G	DU	Total Cyanide (SW846-9012	
'	094366	-033	OBS-MW2		252	7/10/13	9:37	GW	Р	1 L	HNO3	G	DU	Gamma Spectroscopy (EPA 901.0)	
1	094366	-034	OBS-MW2		252	7/10/13	9:38	GW	Р	1 L	HNO3	G	DU	Gross Alpha and Beta (EPA 900.0)	
•	094366	-035	OBS-MW2		252	7/10/13	9:39	GW	Р	1 L	HNO3	G	DU	Isotopic Uranium (HASL 300)	
•	094367	-001	OBS-TB3		NA	7/10/13	9:19	DIW	G	3x40ml	HCL	G	ТВ	TCL VOC (SW846-8260B)	

# CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY

Project Name:       SWMU 68 GWM       Date Samples Shipped:       IIII 13       SMO Authorization:       IIII 13       SMO Authorization:       Waste Char.         Project/Task Manager:       Clinton Lum       Carrier/Waybill No.       Edie Kent/803-556-8171       Lorraine Herrera/505-844-3199       Released by         Service Order:       98026.01.13       Lab Contact:       Edie Kent/803-556-8171       Lorraine Herrera/505-844-3199       Released by         Service Order:       CF 263-13       Lab Destination:       GEL       Send Report to SMO:       Rita Kavanaugh/505-284-2553       Bill to:Sandia Nation         Tech Area:       Operational Site:       Operational Site:       PO 1303873       Rita Kavanaugh/505-284-2553       Bill to:Sandia Nation         Sample No.       Fraction       Sample Location Detail       Operational Site:       Po. Box 5800, MS-Albuquerque, NM A         094368       -001       OBS-MW3       208       7/11/13       9:22       GW       AG       4x1L       None       G       SA       TCL VOC (SW84         094368       -002       OBS-MW3       208       7/11/13       9:22       GW       AG       4x1L       None       G       SA       TCL VOC (SW84         094368       -009       OBS-MW3       208       7/11/13	
Project/Task Manager:       Clinton Lum       Carrier/Waybill No. Lab Contact:       SMO Contact Phone:       SMO Contact Phone:       RMMA         Project/Task Number:       98026.01.13       Lab Contact:       Edie Kent/803-556-8171       Lorraine Herrera/505-844-3199       Released by         Service Order:       CF 263-13       Lab Destination:       GEL       Send Report to SMO:       Rita Kavanaugh/505-284-2553       Bill to:Sandia Nation         Tech Area:       Destination:       Contract No.:       PO 1303873       Rample       Send Report to SMO:       Released by         Building:       Room:       Operational Site:       PO 1303873       Rample       P.O. Box 5800, MS-Albuquerque, NM 8         Sample No.       Fraction       Sample Location Detail       Ift)       Date/Time       Sample       Matrix       Type       Volume       Ative       Method       Type       Released by         094368       -001       OBS-MW3       208       7/11/13       9:22       GW       AG       4x1L       None       G       SA       TCL VOC (SW84         094368       -009       OBS-MW3       208       7/11/13       9:23       GW       P       500 ml       HNO3       G       SA       TAL Metals+U(SW84         094368	
Project/Task Manager:       Clinton Lum       Carrier/Waybill No. Lab Contact:       SMO Contact Phone:       SMO Contact Phone:       RMMA         Project/Task Number:       98026.01.13       Lab Contact:       Edie Kent/803-556-8171       Lorraine Herrera/505-844-3199       Released by         Service Order:       CF 263-13       Lab Destination:       GEL       Send Report to SMO:       Rita Kavanaugh/505-284-2553       Bill to:Sandia Nation         Tech Area:       Destination:       Contract No.:       PO 1303873       Rample       Send Report to SMO:       Released by         Building:       Room:       Operational Site:       PO 1303873       Rample       P.O. Box 5800, MS-Albuquerque, NM 8         Sample No.       Fraction       Sample Location Detail       Ift)       Date/Time       Sample       Matrix       Type       Volume       Ative       Method       Type       Released by         094368       -001       OBS-MW3       208       7/11/13       9:22       GW       AG       4x1L       None       G       SA       TCL VOC (SW84         094368       -009       OBS-MW3       208       7/11/13       9:23       GW       P       500 ml       HNO3       G       SA       TAL Metals+U(SW84         094368	
Project/Task Number:         98026.01.13         Lab Contact:         Edie Kent/803-556-8171         Lorraine Herrera/505-844-3199         Released by           Service Order:         CF 263-13         Lab Destination:         GEL         Send Report to SMO:         Bill to:Sandia Nation           Tech Area:         Departional Site:         Operational Site:         Sample No.         Fraction         Sample Location Detail         (ft)         Collected         Matrix         Type         Volume         Ative         Method         Type         Reg           094368         -002         OBS-MW3         208         7/11/13         9:22         GW         AG         4x1L         None         G         SA         TCL VOC (SW84           094368         -009         OBS-MW3         208         7/11/13         9:22         GW         AG         4x1L         None         G         SA         TCL VOC (SW84           094368         -009         OBS-MW3         208         7/11/13         9:22         GW         AG         4x1L         None         G         SA         TCL VOC (SW84           094368         -014         OBS-MW3         208         7/11/13         9:22         GW         P         500 ml         HNO3         G<	
Service Order:         CF 263-13         Lab Destination: Contract No.:         GEL PO 1303873         Send Report to SMO: Rita Kavanaugh/505-284-2553         Bill to:Sandia Nation P.O. Box 5800, MS- Albuquerque, NM 8           Tech Area:           Building:         Room:         Operational Site:         Sample         Contract No.:         PO 1303873         Rita Kavanaugh/505-284-2553         Bill to:Sandia Nation P.O. Box 5800, MS- Albuquerque, NM 8           Building:         Room:         Operational Site:         Depth (ft)         Date/Time Collected         Sample         Contrainer         Preserv- ative         Collection Sample         Paramete Req           094368         -001         OBS-MW3         208         7/11/13         9:20         GW         G         3x40ml         HCL         G         SA         TCL VOC (SW84           094368         -002         OBS-MW3         208         7/11/13         9:22         GW         AG         4x1L         None         G         SA         TAL Metals+U(SW84           094368         -009         OBS-MW3         208         7/11/13         9:23         GW         P         500 ml         HNO3         G         SA         TAL Metals+U(SW84           094368         -014         OBS-MW3         208         7/	COC NO.
Contract No::         PO 1303873         Rita Kavanaugh/505-284-2553         Bill to:Sandia Nation           Tech Area:           Building:         Room:         Operational Site:         PO 1303873         Rita Kavanaugh/505-284-2553         Bill to:Sandia Nation           Building:         Room:         Operational Site:         Preserv- Collection         Sample No. Fraction         Sample Location Detail         Depth (ft)         Collected         Matrix         Type         Collection         Sample No. Fraction         Sample Location Detail         Collected         Matrix         Type         Collection         Sample Mo. Fraction         Sample Location Detail         Operational Site:         Preserv- Collection         Sample Mo. Fraction	4º Celsius
Tech Area:         P.O. Box 5800, MS- Albuquerque, NM 8           Building:         Room:         Operational Site:         Sample No.         Fraction         Sample Location Detail         Depth (ft)         Date/Time Collected         Sample Matrix         Container         Preserv- ative         Collection         Sample Method         Parameter Type           094368         -001         OBS-MW3         208         7/11/13         9:20         GW         G         3x40ml         HCL         G         SA         TCL VOC (SW84           094368         -002         OBS-MW3         208         7/11/13         9:22         GW         AG         4x1L         None         G         SA         TCL SVOC (SW84           094368         -002         OBS-MW3         208         7/11/13         9:22         GW         AG         4x1L         None         G         SA         TCL SVOC (SW84           094368         -009         OBS-MW3         208         7/11/13         9:23         GW         P         500 ml         HNO3         G         SA         TAL Metals+U(SW84           094368         -014         OBS-MW3         208         7/11/13         9:25         GW         P         125 ml         <	al Laboratories (Accounts Pavable).
Building:       Room:       Operational Site:       Albuquerque, NM 8         Sample No.       Fraction       Sample Location Detail       Depth (ft)       Date/Time Collected       Sample Matrix       Container       Preserv- ative       Collection       Sample Method       Parameter Type         094368       -001       OBS-MW3       208       7/11/13       9:20       GW       G       3x40ml       HCL       G       SA       TCL VOC (SW84         094368       -002       OBS-MW3       208       7/11/13       9:22       GW       AG       4x1L       None       G       SA       TCL SVOC (SW84         094368       -009       OBS-MW3       208       7/11/13       9:23       GW       P       500 ml       HNO3       G       SA       TAL Metals+U(SW84         094368       -014       OBS-MW3       208       7/11/13       9:24       GW       P       250 ml       None       G       SA       Hexavalent Chron         094368       -016       OBS-MW3       208       7/11/13       9:25       GW       P       125 ml       None       G       SA       Anions(SW846-9         094368       -016       OBS-MW3       208       7/11/13 <t< td=""><th>(</th></t<>	(
Sample No.FractionSample Location DetailDepth (ft)Date/Time CollectedSample MatrixContainer TypePreserv- ativeCollectionSample MethodParameter Req0094368-001OBS-MW32087/11/139:20GWG3x40mlHCLGSATCL VOC (SW840094368-002OBS-MW32087/11/139:22GWAG4x1LNoneGSATCL VOC (SW840094368-009OBS-MW32087/11/139:23GWP500 mlHNO3GSATAL Metals+U(SW840094368-014OBS-MW32087/11/139:24GWP250 mlNoneGSAHexavalent Chron094368-016OBS-MW32087/11/139:25GWP125 mlNoneGSAAnions(SW846-9094368-016OBS-MW32087/11/139:25GWP125 mlNoneGSAAnions(SW846-9094368-016OBS-MW32087/11/139:25GWP125 mlNoneGSAAnions(SW846-9094368-016OBS-MW32087/11/139:25GWP125 mlNoneGSAAnions(SW846-9094368-016OBS-MW32087/11/139:25GWP125 mlNoneGSAAnions(SW846-9094368-016	
Sample No.         Fraction         Sample Location Detail         (ft)         Collected         Matrix         Type         Volume         ative         Method         Type         Req           094368         -001         OBS-MW3         208         7/11/13         9:20         GW         G         3x40ml         HCL         G         SA         TCL VOC (SW84           094368         -002         OBS-MW3         208         7/11/13         9:22         GW         AG         4x1L         None         G         SA         TCL SVOC (SW84           094368         -009         OBS-MW3         208         7/11/13         9:23         GW         P         500 ml         HNO3         G         SA         TAL Metals+U(SW84           094368         -014         OBS-MW3         208         7/11/13         9:24         GW         P         250 ml         None         G         SA         Hexavalent Chron           094368         -016         OBS-MW3         208         7/11/13         9:25         GW         P         250 ml         None         G         SA         Anions(SW846-9)           094368         -016         OBS-MW3         208         7/11/13         9:25	
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094368         -002         OBS-MW3         208         7/11/13         9:22         GW         AG         4x1L         None         G         SA         TCL VOC (SW84           094368         -002         OBS-MW3         208         7/11/13         9:22         GW         AG         4x1L         None         G         SA         TCL SVOC (SW84           094368         -009         OBS-MW3         208         7/11/13         9:23         GW         P         500 ml         HNO3         G         SA         TAL Metals+U(SW84           094368         -014         OBS-MW3         208         7/11/13         9:24         GW         P         250 ml         None         G         SA         Hexavalent Chrone           094368         -016         OBS-MW3         208         7/11/13         9:25         GW         P         125 ml         None         G         SA         Anions(SW846-9           094368         -016         OBS-MW3         208         7/11/13         9:25         GW         P         125 ml         None         G         SA         Anions(SW846-9	Jested Sample ID
094368         -009         OBS-MW3         208         7/11/13         9:23         GW         P         500 ml         HNO3         G         SA         TAL Metals+U(SW8           094368         -014         OBS-MW3         208         7/11/13         9:24         GW         P         250 ml         None         G         SA         Hexavalent Chron           094368         -016         OBS-MW3         208         7/11/13         9:25         GW         P         125 ml         None         G         SA         Anions(SW846-9)           094368         -016         OBS-MW3         208         7/11/13         9:25         GW         P         125 ml         None         G         SA         Anions(SW846-9)	5-8260B)
094368         -014         OBS-MW3         208         7/11/13         9:24         GW         P         250 ml         None         G         SA         Hexavalent Chron           094368         -016         OBS-MW3         208         7/11/13         9:25         GW         P         125 ml         None         G         SA         Hexavalent Chron           094368         -016         OBS-MW3         208         7/11/13         9:25         GW         P         125 ml         None         G         SA         Anions(SW846-9	46-8270C)
094368         -016         OBS-MW3         208         7/11/13         9:25         GW         P         125 ml         None         G         SA         Anions(SW846-9	6-6010/6020/7470)
	nium(SW846-7196A
	(56))
© 094368 -017 OBS-MW3 208 7/11/13 9:26 FGW P 250 ml HNO3 G SA Metals-Ca,Mg,K,I	la(SW846-6020)
094368         -018         OBS-MW3         208         7/11/13         9:27         GW         P         125 ml         H2SO4         G         SA         NPN (EPA 353.2)	
O94368 -020 OBS-MW3     208 7/11/13 9:28 GW P 250 ml None G SA Perchlorate (EPA	314.0)
094368         -022         OBS-MW3         208         7/11/13         9:29         GW         P         500 ml         None         G         SA         Alkalinity (SM232)	)B)
A 094368 -024 OBS-MW3 208 7/11/13 9:30 GW AG 4x1L None G SA High Explosives (	SW846-8321A)
Last Chain: Ves Sample Tracking SMO Use Special Instructions/QC Requirements:	Conditions on
Validation Req'd: Ves Date Entered: EDD Ves No	Receipt
Background: Yes Entered by: Turnaround Time 7 Day* 15 Day*	30 Day
Confirmatory: Yes QC inits.: Negotiated TAT	
Sample Name Signature Init. Company/Organization/Phone/Cell Sample Disposal Return to Client Dispo	sal by Lab
Team Robert Lynch 7019 not Rt SNL/4142/505-844-4013/505-250-7090 Return Samples By:	
Members Tim Jackson 7:4/16- 71 SNL/4142/505-284-2547/505-263-6639 Comments: Send report to Tim Jackson/4142/MS 0729/284-254	7
FGW(filtered in field w/0.45 micron filter) Anions(Br,CI,F,SO4)Alkalinity	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
CaCO3,HCO3,CO3) if perchlorate detected,perform Verification analys	
SW846-6850M. Gamma Spectroscopy as short list isotopes.	
1.Relinquished by T=1-4/45 Org. Org. 4142 Date 7/11/13 Time 1006 3.Relinquished by Org. Date	Lab Use
old a state of the	Time
1. Received by Langer 4. 4. Source of the second by Org. Org. Date 7/11/13 Time 100/6 3. Received by Org. Date	
2.Relinquished by Org. Date Time 4.Relinquished by Org. Date Date	Time
2. Received by     Org.     Date     Time     4. Received by     Org.     Date       *Prior confirmation with SMO required for 7 and 15 day TAT	Time Time Time

Page <u>2 of 2</u> AR/COC 614936

														AR/COC 61	4936
	Project Nam	e:	SWMU 68 GWM	Project/Tas	sk Mana	ger:	Clinton Lur	n		Project/Tas	sk No.:	980	026.01.13		
[	Tech Area:														
	Building:		Room:												Lab use
	A contract of the second				Depth	Date/		Sample		ntainer		Collection		Parameter & Method	Lab
ł	Sample No.		Sample Location D	Detail	(ft)	Colle	cted	Matrix	Туре	Volume	ative	Method	Туре	Requested	Sample ID
/	094368	-027	OBS-MW3		208	7/11/13	9:31	GW	Р	250 ml	NaOH	G	SA	Total Cyanide (SW846-9012	
1	094368	-033	OBS-MW3		208	7/11/13	9:32	GW	Р	1 L	HNO3	G	SA	Gamma Spectroscopy (EPA 901.0)	
1	094368	-034	OBS-MW3		208	7/11/13	9:33	GW	Р	1 L	HNO3	G	SA	Gross Alpha and Beta (EPA 900.0)	
0	094368	-035	OBS-MW3		208	7/11/13	9:34	GW	Р	1 L	HNO3	G	SA	Isotopic Uranium (HASL 300)	
1	094369	-001	OBS-TB4		NA	7/11/13	9:19	DIW	G	3x40ml	HCL	G	ТВ	TCL VOC (SW846-8260B)	
/	094370	-001	OBS-FB1		NA	7/11/13	9:19	DIW	G	3x40ml	HCL	G	FB	TCL VOC (SW846-8260B)	
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# CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY

Internal Lab	- 4													Page <u>1</u> of <u>2</u>
Batch No.	NR				SMO Use								AR/COC	614934
Project Name	):	SWMU 68 GWM	Date Samples S	Shipped:				SMO AL	thorization:	Down	Jala	~	Waste Characterization	
Project/Task	Manager:	Clinton Lum	Carrier/Waybill	No.					ontact Phone					
Project/Task	Number:	98026.01.13	Lab Contact:		Edie Kent/	803-556-8	171		Lorraine H	lerrera/50	5-844-3199		Released by COC No.	
Service Order	r:	CF 263-13	Lab Destination:		GEL		1.1.1.2.44	Send Re	eport to SMC	):				✓ 4º Celsius
			Contract No.:		PO 13038	73			Rita Kava	naugh/505	5-284-2553		Bill to:Sandia National Laboratories (	and the second se
Tech Area:													P.O. Box 5800, MS-0154	
Building:		Room:	Operational S	Site:									Albuquerque, NM 87185-0154	
			[	Depth	Date/	Time	Sample	Co	ontainer	Preserv-	Collection	Sample	Parameter & Method	Lab
Sample No.	Fraction	Sample Location D	Detail	(ft)	Colle	cted	Matrix	Туре	Volume	ative	Method	Туре	Requested	Sample ID
094363	-001	OBS-EB1		NA	7/9/13	11:15	DIW	G	3x40ml	HCL	G	SA	TCL VOC (SW846-8260B)	
094363	-002 1	OBS-EB1		NA	7/9/13	11:20	DIW	AG	4x1L -	None	G	SA	TCL SVOC (SW846-8270C)	
094363	-009 /	OBS-EB1		NA	7/9/13	11:21 1	DIW	Р	500 ml	HNO3	G	SA	TAL Metals+U(SW846-6010/6020/74	170)
094363	-014 1	OBS-EB1		NA	7/9/13	11:22	DIW -	P	250 ml -	None	G	SA	Hexavalent Chromium(SW846-	7196A
094363	-016	OBS-EB1		NA	7/9/13	11:23	DIW	P۰	125 ml	None	G	SA	Anions(SW846-9056))	
094363	-017	OBS-EB1		NA	7/9/13	11:24	FDIW	P	250 ml	HNO3	G	SA	Metals-Ca,Mg,K,Na(SW846-60)	20)
094363	-018	OBS-EB1		NA	7/9/13	11:25 -	DIW	P	125 ml	H2SO4	G	SA	NPN (EPA 353.2)	
094363	-020 1	OBS-EB1		NA	7/9/13	11:26	DIW	Р	250 ml	None	G	SA	Perchlorate (EPA 314.0)	
094363	-022	OBS-EB1		NA	7/9/13	11:27	DIW	P١	500 ml	None	G	SA	Alkalinity (SM2320B)	
094363	-024	OBS-EB1		NA	7/9/13	11:30	DIW	AG	4x1L	None	G	SA	High Explosives (SW846-8321A	N)
Last Chain:		Yes	S	ample	Tracking		SMC	) Use	Special Ins	tructions	/QC Requir	rements:		Conditions on
Validation I		✓ Yes	D	ate Ent	ered:			1.	EDD		🗹 Yes		No	Receipt
Backgroun		Yes		intered					Turnaroun	d Time	<u>7 Da</u>	у* 🗌	15 Day* 30 Day	
Confirmato	· · · · · · · · · · · · · · · · · · ·	L Yes	Q	C inits.	:				Negotiated	TAT				
Sample	N	ame Signat		Init.	Compan	y/Organizat	ion/Phon	e/Cell	Sample Dis	sposal	Return	n to Client	Disposal by Lab	
	Robert L			pe	SNL/4142/5	05-844-401	3/505-25	0-7090	Return Sar	nples By:				
Members	Tim Jack	son TEAM	les -	11	SNL/4142/5	05-284-254	7/505-26	3-6639	Comments				/4142/MS 0729/284-2547	
				′									Br,CI,F,SO4)Alkalinity(total	
									SW846-6850				rm Verification analysis using t isotopes.	
							+ 11 -					×1		Lab Use
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1. Received b	1	in waland	Org. 414 2		7/9/17		146	3. Rece	ived by			Org.	Date	Time
2.Relinquishe			Org.	Date		Time			uished by			Org.	Date	Time
2. Received b		ith SMO required for 7 and	Org.	Date		Time		4. Rece	ived by			Org.	Date	Time

Page <u>2</u> of <u>2</u>

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Project Nam	e:	SWMU 68 GWM	Project/Ta	sk Manag	ger:	Clinton Lun	n		Project/Tas	sk No.:	980	026.01.13		
Tech Area: Building:		Room:	-									2		Lab u
sunung.		Room.		Depth	Date	Time	Sample	Co	ntainer	Drocom	Collection	Sample	Parameter & Method	Lab
Sample No.	Fraction	Sample Location	Detail	(ft)		ected	Matrix	Туре	Volume	ative	Method	Туре	Requested	Sampl
094363	-027	OBS-EB1		NA	7/9/13	11:31	DIW	P'	250 mł	NaOH	G		Total Cyanide (SW846-9012	
094363	-033	OBS-EB1		NA	7/9/13	11:32 -	DIW	Р	1 L	HNO3	G		Gamma Spectroscopy (EPA 901.0)	
094363	-034	OBS-EB1		NA	7/9/13	11:33	DIW	Р	1 L	HNO3	G	SA	Gross Alpha and Beta (EPA 900.0)	
094363	-035/	OBS-EB1		NA	7/9/13	11:34	DIW	Р	1 L ~	HNO3	G	SA	ľsotopic Uranium (HASL 300)	
094364	-001	OBS-TB2 🖍		NA	7/9/13	11:15	DIW	G	3x40ml	HCL	G	TB	TCL VOC (SW846-8260B)	
														-

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



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

#### Memorandum

Date: September 17, 2013

To: File

From: Linda Thal

Subject: LC/MS/MS Organic Data Review and Validation – SNL Site: SWMU 8/58 GWM AR/COC: 614937, 614938 and 614939 SDG: 329541 Laboratory: GEL Project/Task: 98026.01.12 Analysis: High Explosives (HE)

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

#### **Summary**

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

1. The initial calibration RFs for m-nitrotoluene, o-nitrotoluene and p-nitrotoluene were <0.05 but  $\ge 0.01$ . All associated sample results were NDs and will be **qualified UJ,I4**.

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

## **Holding Times**

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

#### **Instrument Tune**

The instrument tune was not reported or evaluated.

## **Calibration**

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

# **Reporting Limit Verification**

All CRI recoveries met QC acceptance criteria.

# <u>Blanks</u>

No target analytes were detected in the blanks.

# **Surrogates**

All surrogate recoveries met QC acceptance criteria.

# **Internal Standards**

All internal standards met QC acceptance criteria.

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

The MS/MSD analyses met all QC acceptance criteria.

## Laboratory Control Sample (LCS)

All LCS recoveries met QC acceptance criteria.

## **Detection Limits/Dilutions**

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

## Other QC

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

No other specific issues that affect data quality were identified.

Reviewed by: Mar	y Donivan	Level: I	Date: 09/20/13



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

Memorandum

Date: September 17, 2013

To: File

From: Linda Thal

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

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

## <u>Summary</u>

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

#### Gross Alpha/Beta:

1. The relative dilution factor between the parent sample and the gross alpha/beta MS/MSD QC samples was >5 and, as a result, the MS/MSD analyses were not used to evaluate gross alpha and gross beta sample data. The associated sample results will be **qualified J,MS1**.

## All analyses:

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

Gross alpha/beta and alphaspec U:

1. All sample results that were > the MDA but  $\leq 3X$  the MDA will be **qualified J,FR7.** 

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

## **Holding Times and Preservation**

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

# **Quantification**

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

# **Calibration**

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

# <u>Blanks</u>

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

# **Tracer/Carrier Recovery**

The tracer/carrier recoveries met QC acceptance criteria.

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

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

# Laboratory Replicate

All replicate error ratio acceptance criteria were met.

# Laboratory Control Sample (LCS)

All LCS recoveries met QC acceptance criteria.

## **Detection Limits/Dilutions**

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

# Other QC

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

No other specific issues that affect data quality were identified.

Reviewed by: Mary Donivan Level: I Date: 09/20
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PO Box 21987 Albuquerque, NM 87154 1-888-678-5447 www.againc.net

Memorandum

Date: September 17, 2013
To: File
From: Linda Thal
Subject: GC/MS Organic Data Review and Validation – SNL Site: SWMU 8/58 GWM AR/COC: 614937, 614938 and 614939 SDG: 329541 Laboratory: GEL Project/Task: 98026.01.12 Analysis: SVOCs

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

#### **Summary**

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

1. The MS/MSD RPD was > 30% for 1,2,4-trichlorobenzene; hexachlorobutadiene and hexachloroethane. The associated sample results were NDs and will be **qualified UJ,MS5**.

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

#### **Holding Times**

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

#### **Instrument Tune**

All instrument tune requirements were met.

## **Calibration**

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

The initial calibration intercept for p-nitroaniline was positive and > the MDL. The associated sample results were NDs and will not be qualified.

The ICV %D was >20% but  $\leq$ 40% with negative bias for hexachlorocyclopentadiene. The associated sample results were NDs and since no other calibration infractions occurred for this compound, will not be qualified.

The ICV or CCV %Ds were >20% with positive bias for nitrobenzene; isophorone; 2,6-dinitrotoluene; 2,4-dinitrotoluene; carbazole; indeno(1,2,3-cd)pyrene; dibenzo(a,h)anthracene and benzo(g,h,i)perylene. The associated sample results were NDs and will not be qualified.

## <u>Blanks</u>

No target analytes were detected in the blank.

#### **Surrogates**

All surrogate recoveries met QC acceptance criteria.

#### **Internal Standards**

All internal standards met QC acceptance criteria.

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

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

The MS/MSD was performed on a sample of similar matrix from another SNL SDG. No sample data will be qualified as a result.

#### Laboratory Control Sample (LCS)

All LCS acceptance criteria were met.

#### **Detection Limits/Dilutions**

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

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

TIC reports were not required.

#### Other QC

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

No other specific issues that affect data quality were identified.

Reviewed by: Mary Donivan Level: I Date: 09/
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Memorandum

Date:September 17, 2013To:FileFrom:Linda ThalSubject:GC/MS Organic Data Review and Validation – SNL<br/>Site: SWMU 8/58 GWM<br/>AR/COC: 614937, 614938 and 614939<br/>SDG: 329541

SDG: 329541 Laboratory: GEL Project/Task: 98026.01.12 Analysis: VOCs

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

#### **Summary**

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

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

#### **Holding Times**

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

#### **Instrument Tune**

All instrument tune requirements were met.

#### **Calibration**

The initial calibration and continuing calibration data met QC acceptance criteria with the following exceptions.

The ICAL %RSDs were >15% but  $\leq$ 40% and the associated CCV %Ds were >20% with positive bias for bromoform and 1,2-dibromo-3-chloropropane. The associated sample results were NDs, and since a positive CCV is not considered to be a second calibration infraction, will not be qualified.

The ICV %D was  $\geq$ 20% but  $\leq$ 40% with negative bias for dichlorodifluoromethane. The associated sample results were NDs and since no other calibration infraction occurred, will not be qualified.

The CCV %D was >20% with positive bias for dibromochloromethane. The associated sample results were NDs and will not be qualified.

## **Blanks**

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

Chloroform was detected in the FB, (sample 329541014) and the EB, (sample -015). The associated sample results were NDs and will not be qualified.

#### **Surrogates**

All surrogate recoveries met QC acceptance criteria.

#### **Internal Standards**

All internal standards met QC acceptance criteria.

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

All MS/MSD acceptance criteria were met.

#### Laboratory Control Sample (LCS)

All LCS acceptance criteria were met with the following exceptions.

The %Rs were > the UAL for 1,2-dibromo-3-chloropropane and bromoform for the LCS associated with samples -052, -028 and -040. The associated sample results were NDs and will not be qualified.

#### **Detection Limits/Dilutions**

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

It should be noted that methylene chloride was reported as ND at an MDL of 3.0ug/L.

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

TIC reports were not required.

#### Other QC

Three TBs were submitted, one with each AR/COC. One FB was submitted with AR/COC 614937. An EB was submitted with AR/COC 614938 to be applied to the samples on AR/COC 614939. A field duplicate pair was submitted with AR/COC 614939. There are no "required" review criteria for field duplicate analyses comparability; no data will be qualified as a result.

No other specific issues that affect data quality were identified.

<b>Reviewed by</b> : Mary Donivan Level: I Date: 09/20/13
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#### Memorandum - Revised

Date:	September 18, 2013
To:	File
From:	Linda Thal
Subject:	Inorganic Data Review and Val Site: SWMU 8/58 GWM

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

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

#### **Summary**

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

#### Total cyanide:

- 1. The intercept for total cyanide was negative with an absolute value > the MDL but  $\leq 3X$  the MDL. The associated sample results were NDs and will be **qualified UJ,15**.
- 2. Total cyanide was detected in the ICB/CCB at negative values with absolute values < the PQL. The associated sample results were NDs and will be **qualified UJ,B4**.

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

#### **Holding Times and Preservation**

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

#### **Calibration**

All initial and continuing calibration met QC acceptance criteria.

#### **Blanks**

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

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

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

## Laboratory Control Sample (LCS)

All LCS acceptance criteria were met.

## Matrix Spike (MS)

All MS/PS recoveries met QC acceptance criteria.

## Laboratory Replicate

The replicate analyses met all QC acceptance criteria.

#### **Detection Limits/Dilutions**

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

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

Anions:

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

## Other QC

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

No other specific issues that affect data quality were identified.

Reviewed by: Monical	Dymerski	Level: I	Date: 10/07/13



Memorandum

Date:	September 18, 2013
То:	File
From:	Linda Thal
Subject:	Inorganic Data Review and Validation – SNL Site: SWMU 8/58 GWM AR/COC: 614937, 614938 and 614939 SDG: 329541 and 329549 Laboratory: GEL Project/Task: 98026.01.12 Analysis: Metals

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

#### Summary

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

#### ICP-MS:

1. Cu was detected at < the PQL in the unfiltered EB, sample 329541017. The associated results for samples -030 and -042 were detects <5X the EB value and will be **qualified 0.0047U,B2** at 5X the EB value.

#### ICP-AES:

1. V was detected at a negative value with an absolute value < the PQL in the CCBs bracketing all samples. The associated results for samples 329541017, -030 and -042 were NDs and will be **qualified UJ,B4**.

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

#### **Holding Times and Preservation**

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

#### **ICP-MS Instrument Tune**

The ICP-MS tunes met QC acceptance criteria.

#### **Calibration**

All initial and continuing calibration met QC acceptance criteria.

## **Reporting Limit Verification**

All CRA/CRI recoveries associated with the samples met QC acceptance criteria.

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

## <u>Blanks</u>

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

Cd was detected at < the PQL in the EB, sample 329541017. The associated sample results were NDs and will not be qualified.

U was detected at < the PQL in the ICB/CCB associated with all samples. The associated sample results were either ND or detects >5X the highest blank value and will not be qualified.

V was detected at a negative value with an absolute value < the PQL in the CCBs bracketing all samples. The associated result for sample 329541003 was a detect >5X the MDL and will not be qualified.

## **ICP -MS Internal Standards**

The ICP-MS internal standards met QC acceptance criteria.

#### Matrix Spike (MS)

The MS met all QC acceptance criteria.

#### ICP-MS:

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

#### **Laboratory Replicate**

The replicate met all QC acceptance criteria.

#### Laboratory Control Sample (LCS)

The LCS met all QC acceptance criteria.

#### **Detection Limits/Dilutions**

All detection limits were properly reported. Samples 329541003 and 329549001 were diluted 5X for Ca and samples 329541030 and -042; 329549003 and -004 were diluted 5X for Na.

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

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

## **ICP Serial Dilution**

The serial dilutions met all QC acceptance criteria.

## Other QC

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

No other specific issues that affect data quality were identified.

Reviewed by: Mary Donivan Level: I Date: 09/20/13





## AR/COC: 614937, 614938, 614939

Page 1 of 3

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

## AR/COC: 614937, 614938, 614939

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
	094376-033/CCBA-MW1	Americium-241 (14596-10-2)	BD, FR3
	094376-033/CCBA-MW1	Cesium-137 (10045-97-3)	BD, FR3
	094376-033/CCBA-MW1	Cobalt-60 (10198-40-0)	BD, FR3
	094376-033/CCBA-MW1	Potassium-40 (13966-00-2)	BD, FR3
	094377-033/CCBA-MW1	Americium-241 (14596-10-2)	BD, FR3
	094377-033/CCBA-MW1	Cesium-137 (10045-97-3)	BD, FR3
	094377-033/CCBA-MW1	Cobalt-60 (10198-40-0)	BD, FR3
	094377-033/CCBA-MW1	Potassium-40 (13966-00-2)	BD, FR3
SW846 3005/6010B			
	094374-009/CCBA-EB1	Vanadium (7440-62-2)	UJ, B4
	094376-009/CCBA-MW1	Vanadium (7440-62-2)	UJ, B4
	094377-009/CCBA-MW1	Vanadium (7440-62-2)	UJ, B4
SW846 3005/6020 DOE-AL			
	094376-009/CCBA-MW1	Copper (7440-50-8)	0.0047U, B2
	094377-009/CCBA-MW1	Copper (7440-50-8)	0.0047U, B2
SW846 3510C/8270D	094371-002/CCBA-MW2	1,2,4-Trichlorobenzene (120-82-1)	UJ, MS5
	094371-002/CCBA-MW2	Hexachlorobutadiene (87-68-3)	UJ, MS5
	094371-002/CCBA-MW2	Hexachloroethane (67-72-1)	UJ, MS5
	094374-002/CCBA-EB1	1,2,4-Trichlorobenzene (120-82-1)	UJ, MS5
	094374-002/CCBA-EB1	Hexachlorobutadiene (87-68-3)	UJ, MS5
	094374-002/CCBA-EB1	Hexachloroethane (67-72-1)	UJ, MS5
	094376-002/CCBA-MW1	1,2,4-Trichlorobenzene (120-82-1)	UJ, MS5
	094376-002/CCBA-MW1	Hexachlorobutadiene (87-68-3)	UJ, MS5
	094376-002/CCBA-MW1	Hexachloroethane (67-72-1)	UJ, MS5
	094377-002/CCBA-MW1	1,2,4-Trichlorobenzene (120-82-1)	UJ, MS5
	094377-002/CCBA-MW1	Hexachlorobutadiene (87-68-3)	UJ, MS5
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CW046 2525 (2224 - 14	094377-002/CCBA-MW1	Hexachloroethane (67-72-1)	UJ, MS5
SW846 3535/8321A Modifie	094371-024/CCBA-MW2	m-Nitrotoluene (99-08-1)	UJ, 14

## AR/COC: 614937, 614938, 614939

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
	094371-024/CCBA-MW2	o-Nitrotoluene (88-72-2)	UJ, 14
	094371-024/CCBA-MW2	p-Nitrotoluene (99-99-0)	UJ, 14
	094374-024/CCBA-EB1	m-Nitrotoluene (99-08-1)	UJ, 14
	094374-024/CCBA-EB1	o-Nitrotoluene (88-72-2)	UJ, 14
	094374-024/CCBA-EB1	p-Nitrotoluene (99-99-0)	UJ, 14
	094376-024/CCBA-MW1	m-Nitrotoluene (99-08-1)	UJ, 14
	094376-024/CCBA-MW1	o-Nitrotoluene (88-72-2)	UJ, 14
	094376-024/CCBA-MW1	p-Nitrotoluene (99-99-0)	UJ, 14
	094377-024/CCBA-MW1	m-Nitrotoluene (99-08-1)	UJ, 14
	094377-024/CCBA-MW1	o-Nitrotoluene (88-72-2)	UJ, 14
	094377-024/CCBA-MW1	p-Nitrotoluene (99-99-0)	UJ, 14
SW846 9012B			
	094371-027/CCBA-MW2	Cyanide, Total (57-12-5)	UJ, 15,B4
	094374-027/CCBA-EB1	Cyanide, Total (57-12-5)	UJ, 15,B4
	094376-027/CCBA-MW1	Cyanide, Total (57-12-5)	UJ, 15,B4
	094377-027/CCBA-MW1	Cyanide, Total (57-12-5)	UJ, 15,B4

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



#### Memorandum

Date: September 25, 2013

To: File

From: Linda Thal

Subject: LC/MS/MS Organic Data Review and Validation – SNL Site: SWMU 68 GWM AR/COC: 614933, 614934, 614935 and 614936 SDG: 329124 Laboratory: GEL Project/Task: 98026.01.13 Analysis: High Explosives (HE)

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

#### **Summary**

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

1. The initial calibration RFs for m-nitrotoluene, o-nitrotoluene and p-nitrotoluene were <0.05 but  $\ge 0.01$ . All associated sample results were NDs and will be **qualified UJ,I4**.

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

#### **Holding Times**

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

#### **Instrument Tune**

The instrument tune was not reported or evaluated.

#### **Calibration**

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

The CCV %D was >20% but  $\leq$ 40% with negative bias for nitrobenzene. The associated sample results were NDs and since no other calibration infraction occurred, will not be qualified.

## **Reporting Limit Verification**

All CRI recoveries met QC acceptance criteria.

## <u>Blanks</u>

No target analytes were detected in the blanks.

#### **Surrogates**

All surrogate recoveries met QC acceptance criteria.

#### **Internal Standards**

All internal standards met QC acceptance criteria.

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

The MS/MSD analyses met all QC acceptance criteria.

#### Laboratory Control Sample (LCS)

All LCS recoveries met QC acceptance criteria.

#### **Detection Limits/Dilutions**

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

## Other QC

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

No other specific issues that affect data quality were identified.

Reviewed by: Monica Dymerski	Level I	<b>Date:</b> 09/30/13
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Memorandum

Date:	September 25, 2013
To:	File
From:	Linda Thal
Subject:	GC/MS Organic Data Review and Validation – SNI Site: SWMU 68 GWM AR/COC: 614933, 614934, 614935 and 614936 SDG: 329124 Laboratory: GEL Project/Task: 98026.01.13 Analysis: SVOCs

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

#### **Summary**

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

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

#### **Holding Times**

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

#### **Instrument Tune**

All instrument tune requirements were met.

#### **Calibration**

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

The initial calibration intercept for p-nitroaniline was positive and > the MDL. The associated sample results were NDs and will not be qualified.

The ICV %D was >20% but  $\leq$ 40% with negative bias for hexachlorocyclopentadiene. The associated sample results were NDs and since no other calibration infractions occurred for this compound, will not be qualified.

The ICV %Ds were >20% with positive bias for nitrobenzene; isophorone; 2,6-dinitrotoluene; 2,4-dinitrotoluene and carbazole. The associated sample results were NDs and will not be qualified.

## <u>Blanks</u>

No target analytes were detected in the blank.

#### **Surrogates**

All surrogate recoveries met QC acceptance criteria.

#### **Internal Standards**

All internal standards met QC acceptance criteria.

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

All MS/MSD acceptance criteria were met.

#### Laboratory Control Sample (LCS)

All LCS acceptance criteria were met.

#### **Detection Limits/Dilutions**

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

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

TIC reports were not required.

#### Other QC

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

No other specific issues that affect data quality were identified.

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



Memorandum

Date:September 25, 2013To:FileFrom:Linda ThalSubject:GC/MS Organic Data Review and Validation – SNL<br/>Site: SWMU 68 GWM

Subject. Site: SWMU 68 GWM AR/COC: 614933, 614934, 614935 and 614936 SDG: 329124 Laboratory: GEL Project/Task: 98026.01.13 Analysis: VOCs

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

#### **Summary**

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

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

#### **Holding Times**

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

#### **Instrument Tune**

All instrument tune requirements were met.

#### **Calibration**

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

The ICAL %RSD was >15% but  $\leq$ 40% and the associated CCV %D was >20% with positive bias for bromoform. The ICAL %RSD was >15% but  $\leq$ 40% for 1,2-dibromo-3-chloropropane. The associated sample results were NDs, and since a positive CCV is not considered to be a second calibration infraction, will not be qualified.

The ICV %D was  $\geq$ 20% but  $\leq$ 40% with negative bias for dichlorodifluoromethane. The associated sample results were NDs and since no other calibration infraction occurred, will not be qualified.

## <u>Blanks</u>

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

Chloroform was detected in the FB, (sample 329124070) and the EB, (sample -015) at values > the PQL. Acetone was detected at < the PQL in the EB. The associated sample results were NDs and will not be qualified.

#### **Surrogates**

All surrogate recoveries met QC acceptance criteria.

#### **Internal Standards**

All internal standards met QC acceptance criteria.

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

All MS/MSD acceptance criteria were met.

#### Laboratory Control Sample (LCS)

All LCS acceptance criteria were met.

#### **Detection Limits/Dilutions**

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

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

TIC reports were not required.

#### Other QC

Four TBs were submitted, one with each AR/COC. One FB was submitted with AR/COC 614936. An EB was submitted with AR/COC 614934 to be applied to the samples on AR/COC 614935. A field duplicate pair was submitted with AR/COC 614935. There are no "required" review criteria for field duplicate analyses comparability; no data will be qualified as a result.

No other specific issues that affect data quality were identified.

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



Memorandum

Date:	September 26, 2013
То:	File
From:	Linda Thal
Subject:	Inorganic Data Review and Validation – SNL Site: SWMU 68 GWM AR/COC: 614933, 614934, 614935 and 614936 SDG: 329124 and 329205 Laboratory: GEL Project/Task: 98026.01.13 Analysis: Metals

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

#### Summary

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

#### ICP-MS:

- 1. Cu was detected at > the PQL in the unfiltered EB, sample 329124017. The associated results for samples -031 and -044 were detects <5X the EB value and will be **qualified 0.0080U,B2** at 5X the EB value.
- 2. The MS %R did not meet acceptance criteria for Ba. The parent sample result was >4X the spike amount and, therefore, the associated sample results will not be qualified for these failing recoveries. The associated sample results that were detects will be **qualified J,MS1** and those that were NDs will be **qualified UJ,MS1** due to lack of matrix specific accuracy information.
- 3. The original Mn result for the serial dilution parent sample was >50X the MDL and the serial dilution %D was >10%. All associated sample results that were detects will be **qualified J,D1** and those that were NDs will be **qualified UJ,D1**.

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

#### **Holding Times and Preservation**

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

## **ICP-MS Instrument Tune**

The ICP-MS tunes met QC acceptance criteria.

## **Calibration**

All initial and continuing calibration met QC acceptance criteria.

## **Reporting Limit Verification**

All CRA/CRI recoveries associated with the samples met QC acceptance criteria.

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

#### <u>Blanks</u>

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

## **ICP -MS Internal Standards**

The ICP-MS internal standards met QC acceptance criteria.

## Matrix Spike (MS)

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

#### ICP-MS:

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

#### All analyses:

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

#### Laboratory Replicate

The replicate met all QC acceptance criteria.

#### All analyses:

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

#### Laboratory Control Sample (LCS)

The LCS met all QC acceptance criteria.

#### **Detection Limits/Dilutions**

All detection limits were properly reported. All samples except the EB were diluted 5X for Ca.

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

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

#### **ICP Serial Dilution**

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

## All analyses:

The serial dilution was performed on a sample of similar matrix from another SNL SDG. No sample data will be qualified as a result.

## Other QC

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

No other specific issues that affect data quality were identified.

<b>Reviewed by:</b> Monica Dymerski Level 1 Date: 09/30/.	<b>Reviewed by:</b> Monica Dymerski	Level I	<b>Date:</b> 09/30/13
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Memorandum

Date:September 26, 2013To:File

From: Linda Thal

Subject: Inorganic Data Review and Validation – SNL Site: SWMU 68 GWM AR/COC: 614933, 614934, 614935 and 614936 SDG: 329124 and 331750 Laboratory: GEL Project/Task: 98026.01.13 Analysis: General Chemistry

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

#### **Summary**

Five samples were prepared and analyzed with accepted procedures using methods EPA 7196A (hexavalent chromium), EPA 9056 (anions by IC), EPA 353.2 (nitrate/nitrite), EPA 9012A (total cyanide), EPA 314.0 (perchlorate) and SM2320B (total alkalinity). Data were reported for all required analytes. Problems were identified with the data package that resulted in the qualification of data.

#### Total cyanide:

- 1. The intercept for total cyanide was negative with an absolute value > the MDL but  $\leq 3X$  the MDL. The associated sample results were NDs and will be **qualified UJ,I5**.
- 2. Total cyanide was detected in the ICB/CCB at negative values with absolute values < the PQL. The associated sample results were NDs and will be **qualified UJ,B4**.
- 3. The MS %R for total cyanide was <75% but ≥30%. The associated sample results were NDs and will be **qualified UJ,MS3**.

Anions:

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

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

#### **Holding Times and Preservation**

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

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

## **Calibration**

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

## <u>Blanks</u>

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

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

#### Laboratory Control Sample (LCS)

All LCS acceptance criteria were met.

#### Matrix Spike (MS)

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

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

#### Laboratory Replicate

The replicate analyses met all QC acceptance criteria.

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

#### **Detection Limits/Dilutions**

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

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

<u>Anions:</u> All samples <u>except</u> the EB were diluted 20X for chloride and sulfate.

## Other QC

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

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

No other specific issues that affect data quality were identified.

	<b>Reviewed by:</b> Monica Dymerski	Level I	<b>Date:</b> 09/30/13
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Memorandum

Date: September 27, 2013

To: File

From: Linda Thal

Subject: Radiochemical Data Review and Validation – SNL Site: SWMU 68 GWM AR/COC: 614933, 614934, 614935 and 614936 SDG: 329124 Laboratory: GEL Project/Task: 98026.01.13 Analysis: RAD

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

#### <u>Summary</u>

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

#### All analyses:

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

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

#### **Holding Times and Preservation**

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

#### **Quantification**

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

#### **Calibration**

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

## <u>Blanks</u>

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

#### **Tracer/Carrier Recovery**

The tracer recoveries met QC acceptance criteria.

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

The MS/MSD met all QC acceptance criteria.

#### Laboratory Replicate

All replicate error ratio acceptance criteria were met.

## Laboratory Control Sample (LCS)

All LCS recoveries met QC acceptance criteria.

#### **Detection Limits/Dilutions**

The samples were not diluted. All required detection limits were met except as follows.

Am-241 did not meet the required detection limit for sample 329124039.

#### Other QC

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

No other specific issues that affect data quality were identified.

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

# Data Validation Summary Worksheet

AR/COC #: 614933, 614934, 61493	35 and 614936	Site	e/Project: SV	VMU 68 GW	M	Validation Date: 09/25/2013					
SDG #: 329124, 329205 and 331750	0		Laborato	ory: GEL		Validator: Linda Thal					
Matrix: Aqueous		# of S	amples: 75	CVR pres	ent: Yes	Analysis Type: $X\square$ Organic $X\square$ Metals					
AR/COC(s) present: Yes		Sa	mple Contain	ner Integrity:	OK	$X\square$ Rad $X\square$ Gen Chem					
		Requ	ested Anal	yses Not R	eported						
Sample Number	Laboratory ID	organic	genchem	metals	rad	Comments					
None											

Hold Time/Preservation Outliers														
Sample Number	Laboratory ID	Analysis	Pres.	Coll. Date	Prep. Date	Anal. Date	Anal. within 2X HT	Anal. beyond 2X HT						
094361-014	329124004	7196A	0-6C	07/09/2013 9:51	07/10/2013 10.36	07/10/2013 10.36	Yes	Yes						
094365-014	329124032	7196A	0-6C	07/10/2013 9:26	07/11/2013 9.52	07/11/2013 9.52	Yes	Yes						
094366-014	329124045	7196A	0-6C	07/10/2013 9:26	07/11/2013 9.55	07/11/2013 9.55	Yes	Yes						
094368-014	329124059	7196A	0-6C	07/11/2013 9:24	07/12/2013 10.22	07/12/2013 10.22	Yes	Yes						
*094365-R16	331750001	9056	0-6C	07/10/2013	08/18/2013 14.51	08/18/2013 14.51	Yes	Yes						

Comments: Sampled 7/9 thru 7/11/2013

\*Note sample 094365-016 (329124033) from ARCOC 614935 was relogged and reanalyzed out of HT as 331750001 (Cl and SO<sub>4</sub>)

Validated by: K Mal

Revised 7/2007

## **Organic Worksheet (GC/MS)**

#### AR/COC #: 614933, 614934, 614935 and 614936

SDG #: 329124

Matrix: Aqueous

Laboratory Sample IDs: 329124001, -014, -015, -028, -029, -042, -055, -056, -069 and -070

Method/Batch #s: 8260B: 1315625

Tuning (pass/fail): Pass TICs Required? (yes/no): No

			Ca	libration			5X (10X)				MS/				EB
Anal (outlie		I	nt. RI	RSD/ R <sup>2</sup>	(ICV) CCV %D	Method Blank		LCS %R	MS %R	MSD %R	MSD RPD	FB -070	FB X5	EB -015	X5 (X10)
Acetone			<ul> <li>✓</li> </ul>	✓	✓	✓	NA	✓	~	~	✓	✓	NA	7.91J	(79.1)
Chloroform		Ν	VA 🗸	<ul> <li>✓</li> </ul>	~	✓	NA	✓	✓	✓	~	3.52	17.6	3.14	15.7
Bromoform		Ν	VA 🗸	21.6	+21	✓	NA	✓	✓	~	~	✓	NA	✓	NA
1,2-Dibromo-3-chlorop	propane	Ν	VA 🗸	16.9	~	✓	NA	✓	✓	✓	✓	✓	NA	✓	NA
Dichlorodifluorometha	ne	Ν	VA 🗸	<ul> <li>✓</li> </ul>	(-22)	✓	NA	✓	✓	✓	~	✓	NA	✓	NA
									/						
					Surrogate	Recovery	Outliers							<u> </u>	
Sample ID					- 8/10	J									
None															
					T	S Outliers									
Sample ID	Area	RT	Area	RT	Area		г	Area	RT		Area	RT	Ar	<b>'</b> ea	RT
None	Alta	NI	Alta	KI	Area		•	AIta	KI		AI CA	N1	AI	ca	NI
								1.	• .						

Comments: HTs OK: ICAL VOA9.I 7/01/2013; MS/MSD -056 spiked with trichlorotrifluoroethane; Acetone linear intercept < MDL;

# **Organic Worksheet (GC/MS)**

## AR/COC #: 614933, 614934, 614935 and 614936

SDG #: 329124

Matrix: Aqueous

Laboratory Sample IDs: 329124002, -016, -030, -043 and -057

Method/Batch #s: 8270D: 1314422/1314420 (prep)

Tuning (pass/fail): Pass

TICs Required? (yes/no): No

				Calib	ration			5X				MS/				
	alyte tliers)		Int.	RF	RSD/ R <sup>2</sup>	(ICV) CCV %D	Method Blank	(10X) Blank	LCS %R	MS %R	MSD %R	MSD RPD	EB -016			
1,2,4-Trichlorobenzen	e		NA	~	✓	✓	$\checkmark$	NA	✓	~	~	✓	✓			
Hexachlorobutadiene			NA	✓	✓	✓	~	NA	✓	✓	✓	~	✓			
Hexachloroethane			NA	✓	✓	✓	~	NA	✓	✓	✓	~	✓			
p-Nitroaniline			+7.1	~	✓	✓	$\checkmark$	NA	~	~	✓	~	✓			
Nitrobenzene			NA	~	✓	(+26)	✓	NA	✓	✓	✓	✓	✓			
Isophorone			NA	~	✓	(+25)	$\checkmark$	NA	✓	~	✓	~	✓			
Hexachlorocyclopenta	diene		NA	~	✓	(-29)	$\checkmark$	NA	✓	~	✓	~	✓			
2,6-Dinitrotoluene			NA	✓	✓	(+25)	~	NA	✓	✓	✓	✓	✓			
2,4-Dinitrotoluene			NA	✓	✓	(+23)	~	NA	✓	✓	✓	✓	✓			
Carbazole			NA	~	~	(+21)	~	NA	~	~	✓	✓	~			
					S	burrogate	e Recovery	Outliers								
Sample ID																
None																
						Ι	S Outliers									
Sample ID	Area	RT	Ar	ea	RT	Are	a R	RT	Area	RT		Area	RT	Ar	ea	RT
None																

Comments: HTs OK; MS/MSD on -002; ICAL MSD4.I 7/12/2013; p-nitroaniline linear

# High Explosives Worksheet (LC/MS/MS)

AR/COC #: 614933, 614934, 614935 and 614936

SDG #: 329124

Matrix: Aqueous

Laboratory Sample IDs: 329124009, -023, -037, -050 and -064

Method/Batch #s: 8321A: 1314714/1314712 (prep)

	Initi	ial Calib	oration	Cor	ntinuing	Calibra	tion	Method	5X	LCS	MS	MSD	MS/		EB		
Analyte (Outliers)	Int.	RF	COD RSD/R <sup>2</sup>	ICV	CCV %D	ICB	ССВ	Blank	(10X) Blank	%R	%R	%R	MSD RPD	CRI	-023		
m-Nitrotoluene	NA	.017	~	✓	~	✓	✓	~	NA	~	✓	~	~	~	~		
o-Nitrotoluene	NA	.022	✓	✓	~	✓	✓	✓	NA	~	✓	~	~	~	~		
p-Nitrotoluene	NA	.012	~	✓	✓	✓	✓	~	NA	~	~	~	~	~	~		
Nitrobenzene	NA	✓	~	~	-22.8	~	~	~	NA	~	~	~	~	~	~		
												<u> </u>					
						~											$\vdash$
						Surro	gate Re	covery O	utliers								
Sample ID																	
None																	
						Inter	nal Sta	ndard Ou	tliers								
Sample ID	Area	a	RT		Samp	le ID		Area	RT		Sa	ample ID	)	Ar	ea	RT	1
None																	

Comments: HTs OK; MS/MSD -009; primary analytes only; LCMSMS#3; all sample and QC extracts diluted 1:1

# **Inorganic Metals Worksheet**

#### AR/COC #: 614933, 614934, 614935 and 614936

SDG #: 329124 and 329205

Matrix: Aqueous

Laboratory Sample IDs: 329124003, -017, -031, -044 and -058(UF); 329205001 thru -005 (F)

Method/Batch #s: 6010: 1315153; 6020: 1315220 (F&UF); 7470A:1318877

ICPMS Mass Cal (pass/fail): Pass

ICPMS Resolution (pass/fail): Pass

Analyte (outliers)	Int.		Cali	bration	ІСВ	ССВ	Method Blank mg/L	5X Blank or (5X	LCS %R	MS %R	Lab Rep	Serial Dil.	ICS	ICS A ± MDL ug/L	CRA/ CRI	EB -017	EB X5	
(outliers)	mg/L	R <sup>2</sup>	ICV	CCV	ug/L	ug/L	mg/L	MDL) mg/L			RPD	%D	AB %R	x50 (mg/L)	%R	UF		
Cu	NA	$\checkmark$	~	✓	$\checkmark$	$\checkmark$	$\checkmark$	NA	✓	$\checkmark$	$\checkmark$	$\checkmark$	NA	NA	✓	.0016	.008	
Mn	NA	✓	~	~	~	✓	~	NA	~	$\checkmark$	✓	15	NA	NA	✓	~	NA	
Ba	NA	✓	~	~	✓	✓	✓	NA	~	68*	~	~	NA	NA	✓	$\checkmark$	NA	

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

Comments: HTs OK; Matrix QC on samples from other SNL SDGs (F&UF); ICS NA for All; \*Ba, Mn, Ca, Mg, Na >4X spike amount; F samples Mg, Ca, Na and K only. Ca diluted 5X for samples 329124003, -031, -044 and -058; Ca diluted 5X for samples 329205001, -003, -004 and -005

## **General Chemistry Worksheet**

AR/COC #: 614933, 614934, 614935 and 614936

SDG #: 329124 and 331750

Laboratory Sample IDs: 329124 - see below – and 331750001

Method/Batch #s: SW846 9012A (Total Cyanide): 1314809/04; -010, -024, -038, -051 and -065

Method/Batch #s: SW846 9056 (Anions): <sup>2</sup>1314371; -005, -019, -033, -046 and -060 <sup>3</sup>1323401; 33175001 (repeat of sample 329124033)

Method/Batch #s: EPA 353.2 (NO<sub>3</sub>/NO<sub>2</sub>):1314793; -006, -020, -034, -047 and -061

Method/Batch #s: SM 2320B (Total alkalinity):1314811; -008, -022 and -036 <sup>1</sup>1315566; -049 and -063

Method/Batch #s: EPA 314.0 (Perchlorate); 1314022; -007, -021, -035, -048 and -062

Method/Batch #s: SW846 7196A (Hexavalent Chromium); 1313522; -004, -018 1313959; -032, -045 1314351; -059

			C	alibration				5X			MSD	MS/	Lab	Partial/		
Analyte (outliers)	Int.	R <sup>2</sup>	ICV	CCV	ICB mg/L	CCB mg/L	Method Blank	Blank or 5X MDL	LCS %R	MS %R	%R	MSD RPD	Rep. RPD	Total RPD	EB	EB X5
Total cyanide	00257	✓	~	~	00185	00305	~	(.0084)	~	45.3	NA	NA	✓	✓	$\checkmark$	NA
Total Alk	NA	NA	NA	NA	NA	NA	1.04 <sup>1</sup>	5.2	✓	✓	NA	NA	✓	NA	$\checkmark$	NA
					/											

Comments: HTs OK; Matrix QC from this SDG for NO3/NO2 (-006), Perchl (-007); Alkalinity (-008 and -063); Hex Cr (-004, -032, -059); <sup>3</sup>Anions (331750001)

Matrix QC from another SNL SDG: TCN (2 MS – one passed and one was low), <sup>2</sup>Anions ; FD don't agree anions

Cl and SO4: 20X; All except EB

NO<sub>3</sub>/NO<sub>2</sub>: 5X; All except EB

Revised 7/2007

Matrix: Aqueous

# **Radiochemistry Worksheet**

AR/COC #: 614933, 614934, 614935 and 614936

SDG #: 329124

Matrix: Aqueous

Laboratory Sample IDs: see below

Method/Batch#s: DOE EML HASL 300: Alphaspec U/1314334; -013, -027, -041, -054 and -068

Method/Batch#s: EPA 901.1: Gammaspec /1314421; -011, -025, -039, -052 and -066

Method/Batch#s: EPA 900.0: Gross alpha/beta/1314877; -012, -026, -040, -053 and -067

Analyte (outliers)	Control Freq.	Control Eval.	Method Blank	5X Blank or 5X MDC	LCS %R	MS %R	MSD %R	N	MS/ /ISD RER	Lab Rep. RER	EB			
None														
						covery Out		c						-
Sample ID	Tracer/Ca	arrier %	R	Sample ID	1	Tracer/	Carrier	%R		Sample	ID	Trac	er/Carrier	%R
None														

Comments: Iso-U DUP -013, Gammaspec DUP -039; Gross A/B DUP and MS/MSD -012: Gross A/B parent and DUP =150ml, MS/MSD = 50ml 3X dilution - no qual.

Sample -039 did not meet Am-241 required DL

Data rejected due to peak not meeting identification criteria: K-40 MB. All samples ND.

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355	nternal Lab		

## CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY

Ŭ	Internal Lab	NA																	Pag	e <u>1</u> of <u>2</u>
	Batch No.	<u>~~</u>							SMO Use						•			AR/COC		4933
	Project Name			SWMU 6			Date Sample	es Shipped	1 7/9	113	<u> </u>	ISMO A	uthorization:	Am	1) to	a.t.			01	4933
	Project/Task						Carrier/Way	bill No.	206				ontact Phone		~~~		┫┝╡	Waste Characterization		
	Project/Task		er:		-		Lab Contact	:	Edie Kent		3171	1			5-844-3199					
	Service Orde	er:		CF 263-	13		Lab Destinat	tion:	GEL		·····	Send R	eport to SMC		0 0 1 1 0 1 0 0		┫╙	Released by COC No.		10 0 1 1
							Contract No.	.:	PO 13038	73		1			5-284-2553		Dill to	Condia Matiana ( )		4º Celsius
	Tech Area:			-								L.,		indugi i ooc	2042333			Sandia National Laboratorie	es (Accol	ints Payable),
	Building:			Room:			Operation	al Site:									1	Box 5800, MS-0154		
							•	Depth	Date	Time	Sample	C	ontainer	Preserv-	Collection	Comula		uerque, NM 87185-0154		
	Sample No.	Fract	ion	Sa	ample L	ocation D	etail	(ft)	, Colle		Matrix	Type	Volume	ative	Method	Sample Type		Parameter & Method	i	Lab
2	094361	-001	-	OBS-MV	V1			1	V	1		† <u> </u>		auve	method	туре		Requested		Sample ID
		001		000-1414	V I			153	7/9/13	9:44	GW	G.	3x40ml `	HCL	. G	SA	TCL	VOC (SW846-8260B)		329124
4	094361	-002	1	OBS-MV	V1			153	7/9/13	9:46 🐔	GW	AG	4x1L	None	G	SA				329129
	094361	-009	1	OBS-MV	14			450				<u> </u>		None		34	ICL	SVOC (SW846-8270C)		002
1	004001	-003		003-1010	<u>v i</u>			153	7/9/13	9:50	GW	<u>Р`</u>	500 ml	HNO3	G	SA	TAL	Metals+U(SW846-6010/6020	(7470)	329124
И	094361	-014		OBS-MV	V1			153	7/9/13	9:51	GW	P'	250 ml 1	None	G			1		329120
	094361	-016		OBS-MW	14	-	· · · · ·					<u> </u>	230 111	None		SA	Hexa	valent Chromium(SW84	6-7196/	
1	094301	-010		OBS-ININ	VI			153	7/9/13	9:52	GW	P۰	125 ml '	None	G	SA	Anio	ns(SW846-9056))		329/29
¥	094361	-017		OBS-MW	V1			153	7/9/13	9:53 r	FGW	Р	250 ml	HNO3	G					329205
	094361	-018		OBS-MV	14		·····					<u> </u>	230 111		G	SA	Meta	ls-Ca,Mg,K,Na(SW846-6	020)	001
P	094301	-010	-	062-1010	V I			153	7/9/13	9:54	GW	P	125 ml <sup>*</sup>	H2SO4	G	SA	NPN	(EPA 353.2)		329129
1	094361	-020	•	OBS-MW	/1			153	7/9/13	9:55	GW	Р	250 ml	None						329124
1	004264	000	4	000.000								F	250 mi	None	G	SA	Perc	hlorate (EPA 314.0)		007
H	094361	-022		OBS-MW	/1			153	7/9/13	9:56	GW	P'	500 ml <sup>-</sup>	None <sup>*</sup>	G	SA	Alkal	inity (SM2320B)		329129 008
ľ	094361	-024		OBS-MW	/1			153	7/9/13	10:00 -	GW	AG	4x1L -							329124
Π	ast Chain:			Yes					Tracking	10.00*				None	G	SA	High	Explosives (SW846-832	1A)	329124 009
٦	Validation F	Reg'd	1	⊻ Yes				Date Ent	-		SMO	Use	Special Ins	tructions/					Cond	itions on
	Background	_		Yes				Entered					EDD		Yes		No		Re	eceipt
	Confirmator			Ves				QC inits.					Turnaround		<u>7 Day</u>		<u>15 Da</u>	a <b>y</b> *		
F	Sample	<u> </u>	Na	me		Signatu							Negotiated							
	• •	Rober	<u> </u>		71	Signatu		Init.		//Organizati			Sample Dis	posal	Return	to Client		Disposal by Lab		
	r r				en	Type			SNL/4142/50				Return Sam	ples By:						
	Members	Tim Ja	icks	ion		£1/~e	the	7	SNL/4142/50	05-284-2547	7/505-263		Comments:		Send report to	Tim Jackson/	4142/M	S 0729/284-2547		
	ŀ		<u> </u>										FGW(filtered i	n field w/40	micron filter)	Anions(Br.(	LE SC	)4)Alkalinity/total		
	Ļ			<u></u>									ICaCO3,HCO3	,CO3) if per	chlorate deter	cted.perforr	n Verif	ication analysis using		
F													SW846-6850N	i.Gamma Sj	pectroscopy a	as short list	isotop	es.		
1	Relinquished		1-1	1-11-	-		Drg.4142	Date	7/9/13	Time 10	33	3.Relina	uished by			Org.		Date		Use
1	. Received by		[m	V L		(	Drg. 414.	2 Date	719/13	Time / Q		3. Recei				Org.			Time	
2	.Relinquished	by	han	Je	m	4	Drg. 4/4		7/ 6/13	Time //			uished by					Date	Time	
	. Received by			hh I	In		Drg. C.e.L.	Date	7-10-13	Time O		4. Receiv				Org.		Date	Time	
*	Prior confirm	ation	wit	h SMO re	quired f	or 7 and 1	15 day TAT		Level and	0	<u>/                                    </u>		iou by			Org.		Date	Time	

mirmation with SMO required for 7 and 15 day TAT Page MO 2012-ARCOC (4-2012) 7 of 1355

# CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY (Continuation)

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U																	ge <u>_ 2</u> 01 <u>_ 2</u>
	Project Nan	ne:	1	SWMU 68 GWM		Project/T	ask Manag		Clinton Lur			<b></b>					14933
	Tech Area:		1			i Tojeca n	ask mana	yer.		n	<u> </u>	Project/Ta	sk No.:	98	026.01.13		
	Building:			Room:													
					· · · · · ·	·	Depth	Date	Time	Sample	Co	ntainer	Preserv-	Collection	Sample	Demonstra de la cita de	Lab use
	Sample No	. Frac	tion	Sample Lo	ocation D	etail	(ft)		ected ,	Matrix	Туре	Volume	ative	Method	Туре	Parameter & Method Requested	Lab Sample ID
1	094361	-027	' <u>-</u>	OBS-MW1			153	7/9/13	10:01	GW	Р	250 ml	NaOH	G	SA	Total Cyanide (SW846-9012	Sample ID 329/24 610
4	094361	-033	r	OBS-MW1			153	7/9/13	10:02	GW	Р	1 L-	HN <sub>03</sub>	G		Gamma Spèctroscopy (EPA 901.0)	1274/1/1
Y	094361	-034	+	OBS-MW1			153	7/9/13	10:03 r	GW	Р	1 L	- HNO3	G		Gross Alpha and Beta (EPA 900.0)	011 329129 012 012 329129 013 329129 013
Y	094361	-035	<u> </u>	OBS-MW1			153	7/9/13	10:04	GW	Р·	1 L.	HNO3	G		Isotopic Uranium (HASL 300)	329124
1	094362	-001		OBS-TB1	<del></del>		NA	7/9/13	9:44	DIW	G	3x40mi	HCL	G		TCL VOC (SW846-8260B)	329124
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of		
13 55 Internal Lab		

### **CONTRACT LABORATORY** ANALYSIS REQUEST AND CHAIN OF CUSTODY

Interna	al Lab	NA																Page 1	of 2
Batch	No.	Nic							SMO Use								AR/COC	6149	
Projec	t Name	<b>)</b> :		SWMU 68 0	SWM		Date Sample	s Shipped:	7/9	1/13		SMO A	uthorization:	Dear	Jalon		Waste Characterization	0145	
Projec	t/Task	Mana	ger:	Clinton Lur	m		Carrier/Wayb		2067			4	ontact Phone		the second				
Projec	t/Task	Numt	er:	98026.01.1	13		Lab Contact:		Edie Kent/		171				5-844-3199		Released by COC No.		
Servic	e Orde	r:		CF 263-13			Lab Destinati	ion:	GEL			Send R	eport to SMC					⊡ 4º C	aleii
							Contract No.:		PO 130387	73			-		5-284-2553		Bill to:Sandia National Laboratories		
Tech A	Area:													<u> </u>			P.O. Box 5800, MS-0154	(1000011011	ayabic
Buildi	ng:			Room:			Operationa	al Site:									Albuquerque, NM 87185-0154		
		1						Depth	Date/	Гime	Sample	C	ontainer	Preserv-	Collection	Sample			Lab
Sampl	le No.	Frac	tion	Sam	ple L	ocation D	etail	(ft)	Colle	cted	Matrix	Туре	Volume	ative	Method	Туре	Requested		mple
K 094	363 1	-001		OBS-EB1				NA	7/9/13	11.15	DIM	-	0.40.1					32	912
<u> </u>								INA	119/13	11:15	DIW	G	3x40mi	HCL	G	SA	TCL VOC (SW846-8260B)	0	115
094	363	-002	Ĺ	OBS-EB1				NA	7/9/13	11:20	DIW	AG	4x1L 🖊	None	G	SA	TCL SVOC (SW846-8270C)	32	2912
094	363	-009	~	OBS-EB1				NA	7/9/13	11:21 1	DIW	Р	500 ml	UNICO		~		32	2912
									118/13	11.21*	DIVV		500 ml	HNO3	G	SA	TAL Metals+U(SW846-6010/6020/		27
094	363	-014		OBS-EB1				NA	7/9/13	11:22 1	DIW 1	P	250 ml-	None	G	SA	Hexavalent Chromium(SW846		2912
- 094	363	-016		OBS-EB1				NA	7/9/13	11:23	DIM	P,	405	NJ		~ ~ ~		32	912
<u> </u>							<u>.</u>				DIW	P •	125 ml	None	G	SA	Anions(SW846-9056))		019
094	363	-017		OBS-EB1				NA	7/9/13	11:24	FDIW	Ρ'	250 ml	HNO3	G	SA	Metals-Ca,Mg,K,Na(SW846-60		2920 90 Q
094	363	-018		OBS-EB1				NA	7/9/13	11:25 -	DIW	Р	125 ml	H2SO4	G	SA		32	912
											0.00	- 1	120 111	112304	6	54	NPN (EPA 353.2)		020 2912
094	363	-020	Ĺ	OBS-EB1				NA	7/9/13	11:26	DIW	Р	250 mľ	None	G	SA	Perchlorate (EPA 314.0)		21
1 094	363	-022		OBS-EB1				NA	7/9/13	11:27 🖍	DIW	P١	500 ml	None	G	SA			2912
- 00 L													500 mi	None	<u> </u>	5A	Alkalinity (SM2320B)	122	2912
094		-024		OBS-EB1				NA	7/9/13	11:30	DIW	AG	4x1L	None	G	SA	High Explosives (SW846-8321	A) 0	23
	Chain:		<u> </u>	Yes				•	Tracking		SMO	Use	Special Ins	tructions	QC Requir	ements:		Condition	is on
<u> </u>	ation F		:	⊻ Yes				Date Ent					EDD		✓ Yes		No	Receip	pt
Backe	-			<u> </u>				Entered	oy:				Turnaround	1 Time	<u>7 Da</u>	<u> </u>	15 Day*		
Confi		ry:	<u> </u>	└ Yes				QC inits.					Negotiated	TAT					
Sam	ple		Na	me		Signatu		Init.	Company	/Organizat	ion/Phone	e/Cell	Sample Dis	posal	Return	to Client	Disposal by Lab		
Tea	am	Robe	rt Ly	nch	Þe		rch	pe	SNL/4142/50	)5-844-401	3/505-250	0-7090	Return Sam	ples By:			······································		
Mem	bers	Tim .	acks	son	-7	<u>SAA</u>	en l	-11	SNL/4142/50	)5-284-254	7/505-263	3-6639	Comments	:	Send report to	Tim Jackson	/4142/MS 0729/284-2547		
						7		/					FGW(filtered i	n field w/0.4	15 micron filte	r) Anions(B	r,Cl,F,SO4)Alkalinitv(total		
	[			T							·		CaCO3,HCO3	3,CO3) if pe	rchlorate dete	cted, perfor	m Verification analysis using		
				,									SW846-6850	w.Gamma S	spectroscopy	as short list	t isotopes.	Lab Us	20
1.Relin	quishe	d by 1	1	4 des-	-		Org. 414	€ Date	1/9/13	Time	46	3.Relino	uished by			Org.	Date	Time	<u>, c</u>
1. Rece	eived b	y	Q.	nud	حبسا		Org. 414		7/9/17	Time /		3. Rece				Org.	Date	Time	
2.Relin	quishe	d by	D.	- Charl	len		Org. 4/4		7/9/17		10		uished by			Org.	Date	Time	
2. Rece	eived b	y		MLL			Org. Cer		7-10-13	Time 🔿		4. Rece				Org.	Date		
*Prior	confirm	natio	n wi	th SMO requ	uired											Ulg.		Time	

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

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of 1:			
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# CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY (Continuation)

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	-														14934
Project Nam Tech Area:	e:	SWMU 68 GWM		Project/Ta	ask Mana	ger:	Clinton Lur	n		Project/Ta	sk No.:	98	026.01.13		
Building:		Room:													Lab us
Sample No.	Fractior	Sample L	ocation [	Detail	Depth (ft)		/Time ected	Sample Matrix	Со Туре	ntainer Volume	Preserv- ative	Collection Method	Sample Type	Parameter & Method Requested	Lab
094363	-027	OBS-EB1		·····	NA	7/9/13	11:31	DIW	P	250 mł	NaOH	G	SA	Total Cyanide (SW846-9012	Sample 329/2
094363	-033	OBS-EB1		- 10	NA	7/9/13	11:32 -	DIW	Р	1L	HNO3	G	SA	Gamma Spectroscopy (EPA 901.0)	32912 024 32911 029
094363	-034	OBS-EB1			NA	7/9/13	11:33	DIW	Р	1 L	HNO3	G	SA	Gross Alpha and Beta (EPA 900.0)	32912
094363	-035	OBS-EB1		<u> </u>	NA	7/9/13	11:34	DIW	Р	1L ~	HNO3	G	SA	lsotopic Uranium (HASL 300)	32912
094364	-001	OBS-TB2 🖍			NA	7/9/13	11:15	DIW	G	3x40ml	HCL	G	TB	TCL VOC (SW846-8260B)	3291
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ecipient Init	ials M	K									·		1		<u> </u>
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AOP 95-16

## CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY

55	Internal Lab																Pag	e_1_of_2_
	Batch No. 7	VA						SMO Use	i						$\bigcap$	AR/COC	_	4935
	Project Name		SWMU 6			Date Sampl	es Shipped	7/1	012		SMO A	uthorization:	1	1.9		Waste Characterization		4333
	Project/Task					Carrier/Way	bill No.			71		ontact Phone	-IA	466	<u>La</u>			
	Project/Task					Lab Contact	t	Edie Kent	/803-556-	8171	1			5-844-3199	Sme			
	Service Orde	r:	CF 263-	13		Lab Destina	tion:	GEL			Send R	eport to SMC		5-044-0133		Released by COC No.		
						Contract No	.:	PO 13038	73		1			5-284-2553				4º Celsius
	Tech Area:										L	1001000	inaugn/500	-204-2003		Bill to:Sandia National Laboratori	es (Accol	ints Payable),
	Building:		Room:			Operation	al Site:									P.O. Box 5800, MS-0154		
					, l	•	Depth	Date	Time	Sample	<u> </u>	ontainer				Albuquerque, NM 87185-0154		
	Sample No.	Fractic	on Sa	ample L	ocation De	etail	(ft)	Colle		Matrix	Type	Volume	Preserv-	Collection	Sample		d	Lab
	004005	004	0.00				1			Mauix	Type	Volume	ative	Method	Туре	Requested		Sample ID
	094365	-001	OBS-MV	<u>v2</u>			252	7/10/13	9:19	GW	G	3x40ml	HCL	G	SA	TCL VOC (SW846-8260B)		329124
1	094365	-002	OBS-MV	v2			252	7/10/13	9:22	GW	AG	4.41						329124
						<u>, , , , , , , , , , , , , , , , , , , </u>		1110/10	0.22	GVV	AG	4x1L	None	G	SA	TCL SVOC (SW846-8270C)		030
•	094365	-009	OBS-MV	V2			252	7/10/13	9:25	GW	Р	500 ml	HNO3	G	SA	TAL Metals+U(SW846-6010/602	)/7470)	329124
1	094365	-014	OBS-MV	v2			252	7/10/13	9:26	0.44							· · · · · · · · · · · · · · · · · · ·	329124
l .†						- <u>-</u>	2.52	1/10/15	9.20	GW	Р	250 ml	None	G	SA	Hexavalent Chromium(SW84	16-7196/	0321
	094365	-016	OBS-MV	V2	_		252	7/10/13	9:27	GW	Р	125 ml	None	G	SA	Anions(SW846-9056))		329124
	094365	-017	OBS-MW	12			252	7/10/13	0.00		_				0.1	/ (1013(0140-3030))		033
			0000-1111	VZ		·	252	//10/13	9:28	FGW	Р	250 ml	HNO3	G	SA	Metals-Ca,Mg,K,Na(SW846-	6020)	003
<b>'</b>	094365	-018	OBS-MW	/2			252	7/10/13	9:29	GW	Р	125 ml	H2SO4	G	SA	NPN (EPA 353.2)		329124
	094365	-020	OBS-MV	12			050						1.2001	— × – I	- 0/	NFN (LFA 353.2)		034
ŀ	004000	-020	1003-1010	VZ			252	7/10/13	9:30	GW	P	250 ml	None	G	SA	Perchlorate (EPA 314.0)		035
· • [	094365	-022	OBS-MW	/2			252	7/10/13	9:31	GW	P	500 mi	None	G	~			329124
	094365	-024	OBS-MW	10		<u>, ,,,</u>					· · ·		None		SA	Alkalinity (SM2320B)		036
'H	ast Chain:	-024		12			252	7/9/13	9:33	GW	AG	4x1L	None	G	SA	High Explosives (SW846-832	21A)	329129
			Yes				Sample '	Tracking		SMO	Use	Special Inst	tructions/	QC Require		1		litions on
	/alidation F		Yes				Date Ente	ered:				EDD		🗹 Yes		No		eceipt
	Background		Yes				Entered b	oy:				Turnaround	I Time	7 Day		15 Day* 30 Day		
4	Confirmator	у:	Yes				QC inits.:					Negotiated	TAT		<u> </u>			
	Sample	1	Name		Signatur	e/	Init.	Company	//Organizat	tion/Phone	/Cell	Sample Dis		Return	to Client	Disposal by Lab		
	Team	Robert I	_ynch	Ker			RU	SNL/4142/50				Return Sam			to olient			
	Members [	Fim Jac	kson	1	Thatis	~		SNL/4142/50				Comments:		Cood ross of the				
	Γ				/f						. 0000			Sena report to 1 5 micron filter	I IM Jackson/	4142/MS 0729/284-2547 r,CI,F,SO4)Alkalinity(total		
	F											CaCO3,HCO3	,CO3) if per	chlorate deter	ted.perforr	m verification analysis using		
	F											SW846-6850N	I.Gamma S	pectroscopy a	s short list	isotopes.		
	.Relinguished	hy	-1-1a			Den Lelle		2/10/17									La	b Use
	. Received by		10			Drg. <u>419</u> Drg. <b>419</b>	Z Date		Time 1			uished by	···		Org.	Date	Time	
	Relinquished	hu	XX 4 Z	in				7 1 0 1 1 9			3. Recei		<u>.</u>		Org.	Date	Time	
			<del>~7.7</del>	An	Sug		Z Date			100					Org.	Date	Time	
	Received by		V IVA			Drg. Ge	🖌 Date 🐇	7-11-15	Time	0145	4. Recei	ved by			Org.	Date	Time	
	Prior confirm	ation w	vith SMO re	quired f	or 7 and 1	5 day TAT	•			•								

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# CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY (Continuation)

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				r						-					AR/COC 61	4935
Project N Tech Area		:	SWMU 68 GWM		Project/Ta	sk Mana	ger:	Clinton Lu	m		Project/Ta	sk No.:	98	026.01.13		
Building:			Room:													
						Depth	Date/	Time	le					r		Lab use
Sample N	lo. Fra	ctior	Sample Lo	cation D	etail	(ft)	Colle		Sample Matrix	Со Туре	ntainer Volume	Preserv- ative	Collection Method			Lab
094365	5 -02	7	OBS-MW2			252	7/10/13	9:36	GW	P	250 ml	NaOH	G	Туре	Requested	Sample I 329/2 038
094365	5 -03	3	OBS-MW2	<u> </u>		252	7/10/13	9:37	GW	P	1L	HNO3		SA	Total Cyanide (SW846-9012	32912
094365	5 -03	4	OBS-MW2			252	7/10/13	9:38	GW	P	1L		G	SA	Gamma Spectroscopy (EPA 901.0)	039
094365	-03	5	OBS-MW2			252	7/10/13	9:39	GW	P		HNO3	G	SA	Gross Alpha and Beta (EPA 900.0)	32912 040 32912
094366	-00	1	OBS-MW2	<u> </u>		252	7/10/13	9:20	GW	G F	1 L 3x40ml	HNO3	G		Isotopic Uranium (HASL 300)	32412
094366	-00	2	OBS-MW2	······		252	7/10/13	9:24	GW	AG		HCL	G		TCL VOC (SW846-8260B)	042
094366	-00	9	OBS-MW2		· · · · · ·	252	7/10/13	9:25	GW	P	4x1L	None	G	DU	TCL SVOC (SW846-8270C)	32912
094366	-01	4	OBS-MW2			252	7/10/13	9:26	GW		500 ml	HNO3	G	DU	TAL Metals+U(SW846-6010/6020/7470)	044
094366	-01	6	OBS-MW2			252	7/10/13	9:27		<u>Р</u>	250 ml	None	G		Hexavalent Chromium(SW846-7196A	
094366	-01	7	OBS-MW2			252	7/10/13	9:27	GW	<u>Р</u>	125 ml	None	G		Anions(SW846-9056))	32912 046 32920
094366			OBS-MW2	·		252	7/10/13		FGW	P	250 ml	HNO3	G		Metals-Ca,Mg,K,Na(SW846-6020)	004
094366			OBS-MW2			252	7/10/13	9:29	GW	P	125 ml	H2SO4	G	DU	NPN (EPA 353.2)	047
094366			OBS-MW2			252	· · · · · · · · · · · · · · · · · · ·	9:30	GW	P	250 ml	None	G	DU	Perchlorate (EPA 314.0)	048
094366			OBS-MW2				7/10/13	9:31	GW	P	500 ml	None	G	DU	Alkalinity (SM2320B)	32912
094366	<u> </u>		OBS-MW2			252	7/10/13	9:35	GW	AG	4x1L	None	G	DU	High Explosives (SW846-8321A)	32912
094366	-03		OBS-MW2	<del></del>		252	7/10/13	9:36	GW	P	250 ml	NaOH	G	DU	Total Cyanide (SW846-9012	32912 051
094366	-03			<u> </u>		252	7/10/13	9:37	GW		<u>1L</u>	HNO3	G	DU	Gamma Spectroscopy (EPA 901.0)	32912 052
094366	-03		OBS-MW2			252	7/10/13	9:38	GW	Р	<u>1L</u>	HNO3	G	DU	Gross Alpha and Beta (EPA 900.0)	32912 053
			OBS-MW2			252	7/10/13	9:39	GW	Р	1L	HNO3	G	DU	Isotopic Uranium (HASL 300)	32912
094367	-00		OBS-TB3	<del></del>		NA	7/10/13	9:19	DIW	G	3x40ml	HCL	G	тв	TCL VOC (SW846-8260B)	329129
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ecipient l	nitials	mi	K													1
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13 55 Internal Lab	

## **CONTRACT LABORATORY** ANALYSIS REQUEST AND CHAIN OF CUSTODY

Internal Lat	D j																	Pag	e _1_ of _
Batch No.	N	4						SMO Use	) 					10	A		AR/COC		4936
Project Nar			SWMU 6			Date Sample	es Shipped	- 71	11/13		SMO A	uthorization	20	191	nn	Wast	e Characterization		
Project/Tas		F				Carrier/Way	bill No.	3	068		]ѕмо с	ontact Phone	a: 77		Smo				
Project/Tas		iber:	98026.0			Lab Contact	:		t/803-556-	8171	1	Lorraine I	Herrera/50	5-844-3199	1.0	Relea	used by COC No.		
Service Ord	der:		CF 263-	13		Lab Destina	tion:	GEL			Send R	eport to SM0	D:				• • • • • • • • • • • • • • • • • • • •	7	4º Cels
		_				Contract No	.:	PO 13038	373			Rita Kava	naugh/50	5-284-2553		Bill to:Sandia	National Laboratorie		
Tech Area:		_				1										P.O. Box 580		<b>、</b>	
Building:	_,		Room:			Operation	al Site:	-									NM 87185-0154		
							Depth	Date	e/Time	Sample	C	ontainer	Preserv-	Collection	Sample		ameter & Method	1	Lab
Sample No	. Fra	ction	Sa	ample L	ocation D	)etail	(ft)	Coll	ected	Matrix	Туре	Volume	ative	Method	Type		Requested	-	Sample
094368	-00	1	OBS-MV	N3			208	7/11/13	9:20	GW	G	3x40ml	1101						3291
		_						111110	0.20	GW	<u> </u>	3x40mi	HCL	G	SA	ICL VOC (	SW846-8260B)		050
094368	-00	2	OBS-MV	V3			208	7/11/13	9:22	GW	AG	4x1L	None	G	SA	TCL SVOC	(SW846-8270C)		3291
094368	-00	9	OBS-MV	V3			208	7/11/13	9:23	GW	Р	500 ml	111100				·		3291
							<u> </u>	111113	9.25	GW	F	1 00C mi	HNO3	G	SA	TAL Metals+I	J(SW846-6010/6020	/7470)	05
094368	-01	4	OBS-MV	V3			208	7/11/13	9:24	GW	P	250 ml	None	G	SA	Hexavalent	Chromium(SW84	6-71964	3291
094368	-01	6	OBS-MV	V3			208	7/11/13	9:25	GW	Р	105						<u></u>	3291
	1							111113	9.20	GW	۲ 	125 ml	None	G	SA	Anions(SW	846-9056))		06
094368	-01	7	OBS-MV	V3			208	7/11/13	9:26	FGW	Р	250 ml	HNO3	G	SA	Metals-Ca,I	Mg,K,Na(SW846-6	6020)	3292
094368	-01	8	OBS-MV	V3			208	7/11/13	9:27	GW	Р	105 ml	110004						3291
							200	111110		- 600		125 ml	H2SO4	G	SA	NPN (EPA	353.2)		06
094368	-02	0	OBS-MV	V3			208	7/11/13	9:28	GW	Р	250 ml	None	G	SA	Perchlorate	(EPA 314.0)		3291.
094368	-02		OBS-MV	V3			208	7/11/13	9:29	GW	Р								3291
							200		9.29	GW	<u>Р</u>	500 ml	None	G	SA	Alkalinity (S	M2320B)		06
094368	-02	4	OBS-MV	V3			208	7/11/13	9:30	GW	AG	4x1L	None	G	SA	High Explos	ives (SW846-832	1A)	3291. 06
Last Chair			√ Yes				Sample	Tracking		SMO	Use	Special Ins	tructions	QC Requir		<u> </u>			ditions of
Validation	Req	d:	⊻ Yes			_	Date Ent	ered:				EDD		☑ Yes		No			eceipt
Backgrou	nd:		Yes				Entered	by:				Turnaroun	d Time	7 Day		15 Day*	✓ 30 Day		eceipt
Confirmat	ory:		Yes				QC inits.	:				Negotiated				<u>to Day</u>			
Sample		Na	ime	1	, Şignatı	ıre	Init.	Compar	ny/Organiza	tion/Phone	/Cell	Sample Dis		Return	to Client		Disposal by Lab		
Team	Rob	ert Ly	nch	120	1900		RL		505-844-401			Return San			to chefit		Disposal by Lab		
Members	Tim	Jack	son	17	4-11				505-284-254			Comments		<u> </u>					
	·				1- 11		4		207 207	+11303-200	5-0053	FGW(filtered				4142/MS 0729/2			
	<b>—</b>		····									CaCO3,HCO	3,CO3) if pe	rchlorate dete	cted.perform	n Verification	analysis using		
				+		· · · · ·					<u> </u>	SW846-6850	M.Gamma S	spectroscopy a	as short list	isotopes.			
1.Relinquish		1	A alle -			Org. 4147		17/11/1	• Time /	001	0.0				· · · · · · · · · · · · · · · · · · ·			La	b Use
1. Received		Tu		$\mathcal{A}$					3 Time /		-	uished by			Org.		Date	Time	
2.Relinguish			20	YAP -	7 Mi	Org. 4142	Date	7/11/13		<u> </u>	3. Recei				Org.		Date	Time	
2. Received	<u>کین</u>	- Les	Vy F	an,		Org. UY			3 Time 1			uished by			Org.		Date	Time	
			ma	p-l		Org. Cell 15 day TAT		7-124	3 Time	0735	4. Recei	ved by			Org.		Date	Time	

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## CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY (Continuation)

Page <u>2</u> of <u>2</u>

							·····	. <u></u>	1				AR/COC 6'	14936
:	Project Nam	e:	SWMU 68 GWM	Project/Task Man	ager:	Clinton L	um		Project/Ta	sk No.:	98	026.01.13		
	Tech Area: Building:		Room:	4										
	Dununy.			Depth		)ate/Time				T				Lab use
	Sample No.	Fractio	n Sample Location			Collected	Sample Matrix	Туре	ntainer Volume	Preserv- ative	Collection Method	Sample Type	Parameter & Method	Lab
,	094368	-027	OBS-MW3	208	7/11/		GW	P	250 ml	NaOH	G	SA	Requested	Sample ID 329/29 065
,	094368	-033	OBS-MW3	208	7/11/		GW	P	1 L	HNO3	G		Total Cyanide (SW846-9012	065' 329129 066
	094368	-034	OBS-MW3	208	7/11/		GW	P	1 L	HNO3	G	SA	Gamma Spectroscopy (EPA 901.0)	329124
¢	094368	-035	OBS-MW3	208	7/11/		GW	P	1 L	HNO3		SA	Gross Alpha and Beta (EPA 900.0)	329129 067 329129
•	094369	-001	OBS-TB4	NA	7/11/	······	DIW	G	3x40ml		G	SA	Isotopic Uranium (HASL 300)	329/24
-	094370	-001	OBS-FB1	NA	7/11/		DIW	G	3x40ml	HCL	G		TCL VOC (SW846-8260B)	329124
Ī						10 9.19	DIVV		3840111	HCL	G	FB	TCL VOC (SW846-8260B)	329124
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## CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY

Internal Lab

	Batch No.	NA				0										~		Pag	re _1_ of _2_
г	Project Nam		<u> </u>	SWMU 68	CIARA		<b>ID I D I</b>		SMO Use						10	$\square$	AR/COC	61	4935
	Project/Task		ner				Date Sample			0/13			uthorization:		191	10-	Waste Characterization		
	Project/Task Manager: Clinton Lum Carrier/Wayt Project/Task Number: 98026.01.13 Lab Contact:							SMO C	SMO Contact Phone:										
	Service Orde			CF 263-1	· · · · · · · · · · · · · · · · · · ·		Lab Contact	-		803-556-	8171	ļ			5-844-3199		Released by COC No.		
				01 200-1	· · ·		1		GEL			Send F	Report to SMC					Ī	4º Celsius
ŀ	Fech Area:		<u> </u>				Contract No.	:	PO 13038	/3		I	Rita Kava	naugh/50	5-284-2553		Bill to:Sandia National Laboratorio	es (Accou	ints Payable).
- H	Building:			Room:													P.O. Box 5800, MS-0154	-	<b>v</b> -7,
F	sunung:	1		Room:			Operation	al Site:									Albuquerque, NM 87185-0154		i
	Sample No.			0				Depth	Date/	Time	Sample	c	ontainer	Preserv-	Collection	Sample		1	Lab
F	bample No.	Irrac	lion	Sa	mple L	ocation D	etail	(ft)	Colle	cted	Matrix	Туре	Volume	ative	Method	Туре	Requested	-	Sample ID
	094365	-001		OBS-MW	12			252	7/10/13	9:19	GW	G	3x40mi	HCL		~ ~			329124
-	094365	000		000 100	in .							<u> </u>	3,40111		G	SA	TCL VOC (SW846-8260B)		029
·	094305	-002		OBS-MW	2			252	7/10/13	9:22	GW	AG	4x1L	None	G	SA	TCL SVOC (SW846-8270C)		329124
1	094365	-009		OBS-MW	2	1		252	7/10/13	9:25	GW	P	600 ml	LINO2					329124
	004065	044										· · · · · · · · · · · · · · · · · · ·	500 ml	HNO3	G	SA	TAL Metals+U(SW846-6010/6020	/7470)	031'
-	094365	-014		OBS-MW	2		··	252	7/10/13	9:26	GW	Р	250 ml	None	G	SA	Hexavalent Chromium(SW84	6-71964	329124
3	094365	-016		OBS-MW	2			252	7/10/13	9:27	GW	P	405				221750		329124
`.Г	004005	0.47			_				·	9.41	GW	<u>۳</u>	125 ml	None	G	SA	Anions(SW846-9056))		033
Ĺ	094365	-017	(	DBS-MW	2			252	7/10/13	9:28	FGW	Р	250 ml	HNO3	G	SA	Metals-Ca,Mg,K,Na(SW846-6	0201	329205
•	094365	-018		DBS-MW	2			252	7/10/13	9:29	GW		(07			_	······································		329124
. –									1/10/10	9.29	GVV	P	125 ml	H2SO4	G	SA	NPN (EPA 353.2)		034
<u>ٰ</u> ل_	094365	-020		DBS-MW2	2			252	7/10/13	9:30	GW	P	250 ml	None	G	SA	Perchlorate (EPA 314.0)		329124
,	094365	-022	6	DBS-MW2	,			252	74040	0.04		_							035'
		· · · · · · · · · · · · · · · · · · ·						-252	7/10/13	9:31	GW	<u> </u>	500 ml	None	G	SA	Alkalinity (SM2320B)		036'
}	094365	-024		DBS-MW2	2			252	7/9/13	9:33	GW	AG	4x1L	None	G	SA	High Explosives (SW846-832	4.4.5	329124
L	ast Chain:			Yes				Sample 1	Fracking	······	SMO		Special Inst			mente:	right Explosives (SVV646-632	ليستحدده	037'
V	alidation F	Req d		님 Yes				Date Ente	-				EDD		Yes	·	No		itions on
В	ackground	d:		Yes				Entered b	v:				Turnaround	I Timo	7 Day			Re	eceipt
С	onfirmator	ry:		Yes				QC inits.:					Negotiated			<u> </u>	<u>15 Day</u> * 🖓 30 Day		
	Sample		Nar	ne		Sigpatur		Init.	identification and the second second	/Organizat	ion/Phone			······					
1	• •	Rober			Par	17 Yre			SNL/4142/50				Sample Dis			to Client	L Disposal by Lab		
N	F	Tim Ja	· · ·		$\rho \rightarrow q$	Andis		<u> </u>					Return Sam						
1.4	ioninei a					10119		77 8	SNL/4142/50	0-284-254	//505-263	-6639	Comments:				1142/MS 0729/284-2547		· ·
	ŀ						<u> </u>				·		CaCO3 HCO3	1 field w/0.4	5 micron filter	Anions(Br	,CI,F,SO4)Alkalinity(total n verification analysis using		
			·										SW846-6850N	1.Gamma Si	ectroscoov a	s short list i	sotopes		
-	Delle suitette :			1 -10					<del> </del>									Lał	b Use
	Relinquished		1-	1 day					F/10/13			3.Relina	uished by		·	Org.	Date	Time	
	Received by		1	ty f	ip	SMO		(				8. Recei				Org.	Date	Time	
	Relinquished	×	2	A9	Fr.	Sugo	the second s	Date 🚽		Time /	1004	I.Reling	uished by			Org.	Date	Time	
	Received by		1	man	1-0		)rg. Gel	🖌 Date 🤈	7-11-13	Time (	7145 4	. Receiv	ved by			Org.	Date	Time	
*P	*Prior confirmation with SMO required for 7 and 15 day TAT																		

# CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY (Continuation)

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Page \_2\_ of \_2\_

Project Nan	ne:	SWMU 68 GWM		Project/Ta	sk Mana	/ier	Clinton Lu	·····					······		14935
Tech Area:				1.000010	SK IBABA	yei.	Ginton Lu	m		Project/Ta	isk No.:	98	026.01.13	3	
Building:		Room:		1											
Sample No.	Fract	on Sample L	ocation [	Detail	Depth (ft)	Date/ Colle		Sample Matrix	Co Type	ntainer Volume					Lab us Lab
094365	-027	OBS-MW2		····	252	7/10/13	9:36	GW	P	250 ml	ative NaOH	Method	Туре	Requested	Sample
094365	-033	OBS-MW2			252	7/10/13	9:37	GW	P	1L	HNO3	G	SA	Total Cyanide (SW846-9012	324/2 038
094365	-034	OBS-MW2			252	7/10/13	9:38	GW	p	1L	HNO3	G	SA	Gamma Spectroscopy (EPA 901.0)	32912
094365	-035	OBS-MW2			252	7/10/13	9:39	GW	P	1L		G	<u>SA</u>	Gross Alpha and Beta (EPA 900.0)	32972
094366	-001	OBS-MW2			252	7/10/13	9:20	GW	G	3x40ml	HNO3	G	SA	Isotopic Uranium (HASL 300)	32412
094366	-002	OBS-MW2			252	7/10/13	9:24	GW	AG		HCL	G		TCL VOC (SW846-8260B)	32912
094366	-009	OBS-MW2			252	7/10/13	9:25	GW	P	4x1L	None	G	DU	TCL SVOC (SW846-8270C)	3291
094366	-014	OBS-MW2			252	7/10/13	9:26	GW	P P	500 ml	HNO3	G		TAL Metals+U(SW846-6010/6020/7470)	1 044
094366	-016	OBS-MW2			252	7/10/13	9:27	GW	P	250 ml	None	G		Hexavalent Chromium(SW846-7196/	
094366	-017	OBS-MW2			252	7/10/13	9:28	FGW	Р 	125 ml	None	G		Anions(SW846-9056))	32912
094366	-018	OBS-MW2			252	7/10/13	9:29	GW	 Р	250 ml	HNO3	G		Metals-Ca,Mg,K,Na(SW846-6020)	004
094366	-020	OBS-MW2			252	7/10/13	9:30	GW	P P	125 mi	H2SO4	G		NPN (EPA 353.2)	3291
094366	-022	OBS-MW2			252	7/10/13	9:31			250 ml	None	G		Perchlorate (EPA 314.0)	045
094366	-024	OBS-MW2	······		252	7/10/13		GW	P	500 ml	None	G		Alkalinity (SM2320B)	3291
094366	-027	OBS-MW2			252		9:35	GW	AG	4x1L	None	G	DU	High Explosives (SW846-8321A)	32912 050 82912
094366	-033	OBS-MW2				7/10/13	9:36	GW	P	250 mi	NaOH	G	UU	Total Cyanide (SW846-9012	051
094366	-034	OBS-MW2			252 252	7/10/13	9:37	GW	P	<u>1L</u>	HNO3	G	DU	Gamma Spectroscopy (EPA 901.0)	32912 052
094366	-035	OBS-MW2			<u> </u>	7/10/13	9:38	GW	Р	<u>1L</u>	HNO3	G	DU	Gross Alpha and Beta (EPA 900.0)	32912
	-001	OBS-TB3			252	7/10/13	9:39	GW	Р	<u>1L</u>	HNO3	G		sotopic Uranium (HASL 300)	32912
00-1001		000-100			NA	7/10/13	9:19	DIW	G	3x40ml	HCL	G	ТВ	TCL VOC (SW846-8260B)	32912 055
							I								
ecipient Init	ials_/	MK													





### AR/COC: 614933, 614934, 614935, 614936

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

### AR/COC: 614933, 614934, 614935, 614936

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
	094368-033/OBS-MW3	Cesium-137 (10045-97-3)	BD, FR3
	094368-033/OBS-MW3	Cobalt-60 (10198-40-0)	BD, FR3
	094368-033/OBS-MW3	Potassium-40 (13966-00-2)	BD, FR3
SW846 3005/6020 DOE-AL			
	094361-009/OBS-MW1	Barium (7440-39-3)	J, MS1
	094361-009/OBS-MW1	Manganese (7439-96-5)	J, D1
	094363-009/OBS-EB1	Barium (7440-39-3)	UJ, MS1
	094363-009/OBS-EB1	Manganese (7439-96-5)	UJ, D1
	094365-009/OBS-MW2	Barium (7440-39-3)	J, MS1
	094365-009/OBS-MW2	Copper (7440-50-8)	0.0080U, B2
	094365-009/OBS-MW2	Manganese (7439-96-5)	UJ, D1
	094366-009/OBS-MW2	Barium (7440-39-3)	J, MS1
	094366-009/OBS-MW2	Copper (7440-50-8)	0.0080U, B2
	094366-009/OBS-MW2	Manganese (7439-96-5)	UJ, D1
	094368-009/OBS-MW3	Barium (7440-39-3)	J, MS1
	094368-009/OBS-MW3	Manganese (7439-96-5)	J, D1
SW846 3535/8321A Modifie	ed		
	094361-024/OBS-MW1	m-Nitrotoluene (99-08-1)	UJ, 14
	094361-024/OBS-MW1	o-Nitrotoluene (88-72-2)	UJ, 14
	094361-024/OBS-MW1	p-Nitrotoluene (99-99-0)	UJ, 14
	094363-024/OBS-EB1	m-Nitrotoluene (99-08-1)	UJ, 14
	094363-024/OBS-EB1	o-Nitrotoluene (88-72-2)	UJ, 14
	094363-024/OBS-EB1	p-Nitrotoluene (99-99-0)	UJ, 14
	094365-024/OBS-MW2	m-Nitrotoluene (99-08-1)	UJ, 14
	094365-024/OBS-MW2	o-Nitrotoluene (88-72-2)	UJ, 14
	094365-024/OBS-MW2	p-Nitrotoluene (99-99-0)	UJ, 14
	094366-024/OBS-MW2	m-Nitrotoluene (99-08-1)	UJ, 14
	094366-024/OBS-MW2	o-Nitrotoluene (88-72-2)	UJ, 14
	094366-024/OBS-MW2	p-Nitrotoluene (99-99-0)	UJ, 14

### AR/COC: 614933, 614934, 614935, 614936

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
	094368-024/OBS-MW3	m-Nitrotoluene (99-08-1)	UJ, 14
	094368-024/OBS-MW3	o-Nitrotoluene (88-72-2)	UJ, 14
	094368-024/OBS-MW3	p-Nitrotoluene (99-99-0)	UJ, 14
SW846 9012B			
	094361-027/OBS-MW1	Cyanide, Total (57-12-5)	UJ, 15,B4,MS3
	094363-027/OBS-EB1	Cyanide, Total (57-12-5)	UJ, 15,B4,MS3
	094365-027/OBS-MW2	Cyanide, Total (57-12-5)	UJ, 15,B4,MS3
	094366-027/OBS-MW2	Cyanide, Total (57-12-5)	UJ, 15,B4,MS3
	094368-027/OBS-MW3	Cyanide, Total (57-12-5)	UJ, 15,B4,MS3
SW846 9056			
	094365-R16/OBS-MW2	Chloride (16887-00-6)	J, H1
	094365-R16/OBS-MW2	Sulfate (14808-79-8)	J, H1

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