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Sandia National Laboratories, New Mexico

### **Environmental Restoration Operations**

A U.S. Department of Energy Environmental Cleanup Program

### **Consolidated Quarterly Report**

April – June 2015



October 2015



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**

October 2015

#### 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: 13

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

#### **REPORTING PERIOD:** April – June 2015

#### **OVERVIEW**

This Sandia National Laboratories, New Mexico Environmental Restoration Operations (ER) Consolidated Quarterly Report (ER Quarterly Report) fulfills all quarterly reporting requirements set forth in the Resource Conservation and Recovery Act Facility Operating Permit, and the Compliance Order on Consent. The 13 sites in the Corrective Action process are listed in Table I-1. Because the status of any Long-Term Stewardship (LTS) activity is detailed in other reports, Section I.3.0 (titled Long-Term Stewardship Work Completed) will not be presented in future ER Quarterly Reports. Section I.3.0 of this ER Quarterly Report identifies the other reports that detail LTS activities. This ER Quarterly Report presents activities and data in sections as follows:

<u>SECTION I</u> :	Environmental Restoration Operations Consolidated Quarterly Report, April – June 2015
<u>SECTION II</u> :	Perchlorate Screening Quarterly Groundwater Monitoring Report, April – June 2015

#### **ABBREVIATIONS AND ACRONYMS**

°C	degrees Celsius		
µg/L	microgram(s) per liter		
µmhos/cm	micromhos per centimeter		
% Sat	percent saturation		
AGMR	Annual Groundwater Monitoring Report		
ALTMM	Annual Long-Term Monitoring and Maintenance		
AOC	Area of Concern		
AR	Analysis Request		
AVN	Area V (North)		
BSG	Burn Site Groundwater		
BW	background well		
CAC	Corrective Action Complete		
CAMU	Corrective Action Management Unit		
CCBA	Coyote Canyon Blast Area		
CFR	Code of Federal Regulations		
CME	Corrective Measures Evaluation		
COA	certificates of analyses		
COC	Chain-of-Custody		
CTF	Coyote Test Field		
CWL	Chemical Waste Landfill		
CY	Calendar Year		
CYN	Canyons (Burn Site Groundwater Area of Concern)		
DO	dissolved oxygen		
DOE	U.S. Department of Energy		
EPA	U.S. Environmental Protection Agency		
ER	Environmental Restoration Operations		
ER Quarterly Report	Environmental Restoration Operations (ER) Consolidated Quarterly Report		
ET Cover	evapotranspirative cover		
FOP	Field Operating Procedure		
GEL	GEL Laboratories LLC		
HQ	hazard quotient		
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		
MDL	method detection limit		

mg/L	milligram(s) per liter
MRN	Magazine Road North
mV	millivolt
MW	monitoring well
MWL	Mixed Waste Landfill
NA	not applicable
ND	nondetect
NE	not established
NMED	New Mexico Environment Department
NNSA	National Nuclear Security Administration
NTU	nephelometric turbidity unit
NWTA	Northwest Technical Area
OBS	Old Burn Site
ORP	oxidation-reduction potential
PCCP	Post-Closure Care Permit
Permit	RCRA Facility Operating Permit
pН	potential of hydrogen
PQL	practical quantitation limit
QC	quality control
RCRA	Resource Conservation and Recovery Act
Sandia	Sandia Corporation
SAP	Sampling and Analysis Plan
SC	specific conductance
SNL/NM	Sandia National Laboratories, New Mexico
SWMU	Solid Waste Management Unit
SWTA	Southwest Technical Area
ТА	Technical Area
TAVG	Technical Area-V Groundwater
TAG	Tijeras Arroyo Groundwater
TAV	Technical Area-V
TJA	Tijeras Arroyo
The Consent Order	the Compliance Order on Consent
WYO	Wyoming

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#### SECTION I ENVIRONMENTAL RESTORATION OPERATIONS CONSOLIDATED QUARTERLY REPORT, April – June 2015

#### 1.0 Introduction

This Environmental Restoration Operations (ER) Consolidated Quarterly Report (ER Quarterly Report) provides the status of ongoing corrective action activities being implemented by Sandia National Laboratories, New Mexico (SNL/NM) ER for the April, May, and June 2015 quarterly reporting period. Section I.2.0 provides the status of ER Operations activities including closure activities for the Mixed Waste Landfill (MWL), project management and site closure, and groundwater sampling and analysis. Section I.3.0 provides the identification of other reports that detail the status of long-term stewardship (LTS) monitoring and maintenance activities related to the MWL, Chemical Waste Landfill (CWL), and Corrective Action Management Unit (CAMU). Because the status of any LTS activity is detailed in other reports, Section I.3.0 will not be presented in future ER Quarterly Reports. Section I.4.0 provides the references.

#### 2.0 Environmental Restoration Operations Work Completed

#### 2.1 Mixed Waste Landfill

The Long-Term Monitoring and Maintenance Plan (LTMMP) was submitted to the New Mexico Environment Department (NMED) in March 2012 (SNL/NM March 2012). NMED approved the LTMMP on January 8, 2014 (Blaine January 2014). Monitoring, inspections, maintenance/repair, and reporting activities required by the LTMMP were implemented upon NMED approval of the LTMMP and are presented in annual long-term monitoring and maintenance (LTMM) reports submitted to NMED by June 30 of each year. These annual reports address all activities performed and provide monitoring and inspection results for the reporting period of April 1 through March 31 of the prior year. Remaining ER activities at the MWL are presented below.

The U.S. Department of Energy/National Nuclear Security Administration (DOE/NNSA) and Sandia Corporation (Sandia) requested a Certificate of Completion for the MWL on September 25, 2014 (Beausoleil September 2014). NMED provided the Certification of Completion for the MWL on October 8, 2014 (Cobrain October 2014). The DOE/NNSA and Sandia subsequently submitted a request to NMED for a Class 3 Permit Modification to the Resource Conservation and Recovery Act (RCRA) Facility Operating Permit (Permit). The Class 3 Permit Modification Request was dated October 17, 2014 and petitioned the NMED

to change the MWL status to Corrective Action Complete (CAC) with Controls (Beausoleil October 2014). The request and associated legal notice initiated the DOE/NNSA and Sandia 60-day public comment period that was completed on January 5, 2015, and included a public meeting that was held on November 18, 2014. After DOE and Sandia completed their public comment period on January 5, 2015, NMED issued a public notice announcing their intent to approve the DOE and Sandia request for corrective action complete with controls status for the MWL and initiated a 60-day public comment period that started on January 12, 2015 (Cobrain January 2015). On March 17, 2015, NMED extended this public comment period an additional 30 days, to April 13, 2015.

In an attempt to resolve issues raised in opposition to the Permit modification request, NMED conducted two meetings on April 29 and May 4, 2015 at the NMED District 1 Office in Albuquerque. All public commenters who requested a public hearing were invited, and DOE/NNSA and Sandia representatives also attended. Agreement was not reached during the two meetings, so NMED proceeded with plans to conduct a public hearing on the matter starting on July 8, 2015. DOE/NNSA and Sandia participated in a pre-hearing teleconference with the hearing officer and other involved parties on May 7, 2015. DOE/NNSA and Sandia prepared direct testimony that was filed with the hearing officer on June 17, and prepared rebuttal testimony that was filed on June 30, 2015.

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

ER sites in the CAC regulatory process are addressed in this section. Currently, only the MWL is in the CAC regulatory process, as described in Section I.2.1.

#### 2.3 Groundwater Sampling and Analysis

The following sections summarize the reporting of groundwater monitoring activities conducted at three groundwater areas of concern (AOCs) (Technical Area-V Groundwater [TAVG], Burn Site Groundwater [BSG], and Tijeras Arroyo Groundwater [TAG]), the MWL, and the CWL.

Analytical results for groundwater monitoring at TAVG AOC, BSG AOC, TAG AOC, the MWL, and the CWL will be presented in the SNL/NM Calendar Year (CY) 2014 Annual Groundwater Monitoring Report, which is anticipated to be submitted to the NMED in the summer of 2015. The well identifications and the frequency that these wells are sampled are presented in Table I-2.

The analytical results for the MWL groundwater monitoring will be presented and discussed in the MWL LTMMP for the reporting period of April 1, 2015 to March 31, 2016, which will be submitted to NMED in June 2016. Groundwater monitoring results will be presented in the CWL Annual Post-Closure Care Report for CY 2015, which will be submitted to NMED in March 2016.

Perchlorate analysis of groundwater samples for BSG AOC is discussed in Section II of this ER Quarterly Report.

#### 2.3.1 **Technical Area-V Groundwater Area of Concern**

Groundwater sampling at TAVG AOC was conducted in April and May 2015.

#### 2.3.2 Burn Site Groundwater Area of Concern

Groundwater sampling at BSG AOC was conducted in June 2015.

#### 2.3.3 **Tijeras Arroyo Groundwater Area of Concern**

Groundwater sampling at TAG AOC was conducted in May 2015.

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

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

- The BSG Interim Measures Work Plan submitted to the NMED on May 26, 2005 (SNL/NM May 2005).
- The BSG Current Conceptual Model of Groundwater Flow and Contaminant Transport submitted to the NMED on April 9, 2008 (SNL/NM March 2008).
- The Technical Area (TA)-V Geophysical Logs and Slug Test Results Report submitted to the NMED on November 24, 2010 (SNL/NM November 2010).
- The MWL Groundwater Monitoring Report for CY 2010 submitted to the NMED on September 30, 2011 (SNL/NM September 2011).
- The Class 3 Permit modification request dated October 17, 2014 for Corrective Action Complete with Controls status for the MWL (Beausoleil October 2014).

#### 3.0 Long-Term Stewardship Work Completed

Because the status of any LTS activity is detailed in other reports, Section I.3.0 will not be presented in future ER Quarterly Reports. The subsections below identify the other reports that detail LTS activities.

#### 3.1 Mixed Waste Landfill

The MWL LTMMP was approved by the NMED on January 8, 2014 (Blaine January 2014). Monitoring, inspections, maintenance/repair, and reporting activities required by the LTMMP are presented in annual LTMM Reports submitted to NMED by June 30 of each year.

#### 3.2 Chemical Waste Landfill

The CWL Post-Closure Care Permit (PCCP) (NMED October 2009) became effective on June 2, 2011, when the NMED approved the CWL Final RCRA Closure Report (Kieling June 2011). Ongoing LTS activities, performed under the PCCP, are presented in annual reports submitted to the NMED in March of each year.

#### 3.3 Corrective Action Management Unit

The CAMU post-closure care requirements of vadose zone monitoring, leachate removal, inspections, maintenance/repair, and reporting activities are specified in the RCRA Facility Operating Permit that became effective on February 26, 2015. An annual report summarizing CAMU post-closure care activities is submitted to NMED by March 31 of each year.

#### 4.0 **References**

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

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

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

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

Cobrain, D. (New Mexico Environment Department), January 2015. Letter to G. Beausoleil (U.S. Department of Energy (NNSA)/Sandia Site Office) and P. Davies (Sandia Corporation), "Notice of Public Comment Period for Proposed Determination of Corrective Action Complete with Controls for Sandia National Laboratories Mixed Waste Landfill, Sandia National Laboratories, EPA ID# NM5890110518, HWB-SNL-14-014," January 12, 2015.

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

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

NMED, see New Mexico Environment Department.

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

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

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

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

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

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

### Tables

# Table I-1Solid Waste Management Units and Areas of ConcernWhere Corrective Action Is Not Complete

Solid Waste Management Units and Areas of Concern		
Site Number	Site Description	
8	Open Dump (CCBA)	
58	ССВА	
68	Old Burn Site	
76	MWL (TA-III)	
83	Long Sled Track	
84	Gun Facilities	
149	Building 9930 Septic System (CTF)	
154	Building 9960 Septic System and Seepage Pits (CTF)	
240	Short Sled Track	
	Tijeras Arroyo Groundwater Investigation (TAG AOC)	
	TA-V Groundwater Investigation (TAVG AOC)	
	Burn Site Groundwater Investigation (BSG AOC)	
502	Building 9938 Surface Discharge Site	
Total	13	

#### Notes

AOC	= Area of Concern.
BSG	= Burn Site Groundwater.
CCBA	= Coyote Canyon Blast Area.
CTF	= Coyote Test Field.
MWL	= Mixed Waste Landfill.
NA	= Not applicable. A site number was not assigned.
TA	= Technical Area.
TAG	= Tijeras Arroyo Groundwater.
TA-V	= Technical Area-V.
TAVG	= Technical Area-V Groundwater.

## Table I-2Groundwater Sampling and Analysis

Investigation Site	Sampling Frequency in CY 2015 <sup>ª</sup>	Quarter of Sampling in CY 2015	Location of Analytical Results	Location of Perchlorate Analytical Results	Monitoring Wells in Network
TAVG AOC	Quarterly	1,2,3,4	AGMR	NA	AVN-1, LWDS-MW1, LWDS-MW2, TAV-MW2, TAV-MW3, TAV-MW4, TAV-MW5, TAV-MW6, TAV-MW7, TAV-MW8, TAV-MW9, TAV-MW10, TAV-MW9, TAV-MW10, TAV-MW11, TAV-MW12, TAV-MW13, TAV-MW14
BSG AOC	Semiannually	2,4	AGMR	NA	CYN-MW4, CYN-MW7, CYN-MW8, CYN-MW9, CYN-MW10, CYN-MW11, CYN-MW12, CYN-MW13, CYN-MW14A, CYN-MW15
TAG AOC	Quarterly	1,2,3,4	AGMR	NA	PGS-2, TA1-W-01, TA1-W-02, TA1-W-03, TA1-W-04, TA1-W-05, TA1-W-06, TA1-W-08, TA2-NW1-595, TA2-SW1-320, TA2-W-01, TA2-W-19, TA2-W-26, TA2-W-27, TA2-W-28, TJA-2, TJA-3, TJA-4, TJA-6, TJA-7, WYO-3, WYO-4
MWL Groundwater	Semiannually	2,4	AGMR, Section 4 of MWL ALTMM Report	NA	MWL-BW2, MWL-MW7, MWL-MW8, MWL-MW9
CWL Groundwater	Semiannually	1,3	AGMR, Section 4 CWL PCCP Report	NA	CWL-BW5, CWL-MW9, CWL-MW10, CWL-MW11

#### 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.

AGMR	= Annual Groundwater Monitoring Report.
ALTMM	= Annual Long-Term Monitoring and Maintenance.
AOC	= Area of Concern.
AVN	= Area V (North).
BSG	= Burn Site Groundwater (Area of Concern).
BW	= Background well.
CWL	= Chemical Waste Landfill.
CY	= Calendar Year.
CYN	= Lurance Canyon.
LWDS	= Liquid Waste Disposal System.
MW	= Monitoring Well.
MWL	= Mixed Waste Landfill.
NA	= Not applicable. No wells in the site network are currently being sampled and analyzed for perchlorate.
PCCP	= Post-Closure Care Permit.
PGS	= Parade Ground South.
TA1-W	= Technical Area-I (Well).
TA2-NW	= Technical Area-II (Northwest).
TA2-SW	= Technical Area-II (Southwest).
TA2-W	= Technical Area-II (Well).
TAG	= Tijeras Arroyo Groundwater (Area of Concern).
TAV	= Technical Area-V.
TAVG	= Technical Area-V Groundwater (Area of Concern).
TJA	= Tijeras Arrovo.
WYO	= Wyoming.
vv i O	- wyoning.

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#### SECTION II PERCHLORATE SCREENING QUARTERLY GROUNDWATER MONITORING REPORT, April – June 2015

#### 1.0 Introduction

Section IV.B of the Compliance Order on Consent (the Consent Order), between the New Mexico Environment Department (NMED), the U.S. Department of Energy (DOE), and Sandia Corporation (Sandia), jointly referred to as DOE/Sandia, for Sandia National Laboratories, New Mexico (SNL/NM), effective on April 29, 2004, stipulates that a select group of groundwater monitoring wells at SNL/NM be sampled for perchlorate (NMED April 2004). This section of the Environmental Restoration Operations (ER) Consolidated Quarterly Report (ER Quarterly Report) summarizes the perchlorate screening groundwater monitoring completed during the Second Quarter of Calendar Year (CY) 2015 (April, May, and June 2015) in response to the requirements of the Consent Order. The outline of this report is based on the required elements of a "Periodic Monitoring Report" described in Section X.D. of the Consent Order (NMED April 2004).

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

Based on the NMED response (NMED January 2006), DOE/Sandia will submit each quarterly report within 90 days following the quarter that the data represent. In November 2008, DOE/Sandia received approval from the NMED to proceed to semiannual reporting (NMED November 2008); however, upon further consideration, the NMED once more required quarterly reporting (NMED April 2009). This did not alter the previously negotiated frequency for monitoring well CYN-MW6, an existing Burn Site Groundwater (BSG) Area of Concern (AOC) monitoring well that has been under the sampling and reporting requirements of the Consent Order since the well was installed, which remains at a semiannual frequency for sampling and reporting. Due to declining water levels, CYN-MW6 has insufficient water to routinely sample and the replacement monitoring well (CYN-MW15) was installed in December 2014 and has assumed the negotiated semiannual frequency. In September 2011, DOE/Sandia requested an extension of the submittal dates by one month for ER Quarterly Reports (SNL/NM September 2011). The request was approved by the NMED (September 2011), which allows DOE/Sandia to submit perchlorate quarterly reports within 120 days following the quarter that the data represent.

This report is the thirty eighth to be submitted since the November 2005 letter report; the previous reports were submitted for Fourth Quarter of CY 2005 through the First Quarter of CY 2015 (SNL/NM February 2006 and June 2015).

Groundwater at BSG AOC monitoring well CYN-MW14A was sampled for the third time during the reporting period (Table II-1). This is in accordance with the Consent Order requirements that a new groundwater monitoring well be sampled for perchlorate for a minimum of four quarters (NMED April 2004). Groundwater at BSG AOC monitoring well CYN-MW15 is sampled semiannually and was sampled for the second time during the reporting period (Table II-1). The corresponding reporting will continue for as long as a well remains active in the perchlorate screening network, or unless otherwise negotiated with the NMED.

#### 2.0 Scope of Activities

This report provides perchlorate screening groundwater monitoring analytical results for the Second Quarter of CY 2015 (April, May, and June 2015) for the two wells currently active in the perchlorate screening program as shown on Figure II-1 and listed in Table II-1. In accordance with the requirements of Table XI-1 of the Consent Order, a well with four consecutive quarters of nondetects (NDs) for perchlorate at the screening level/method detection limit (MDL) of 4 micrograms per liter ( $\mu$ g/L) is removed from the requirement of continued monitoring for perchlorate.

Data for numerous wells identified in the Consent Order have satisfied this requirement; therefore, these wells have been removed from the perchlorate screening program. The perchlorate results for these wells have been provided in previous reports and are not discussed in this current report. Wells discussed in previous perchlorate screening reports are included in Table II-2.

SNL/NM personnel performed groundwater sampling for perchlorate at two wells (CYN-MW14A and CYN-MW15) on the dates listed in Table II-1. Groundwater sampling activities were conducted in accordance with procedures outlined in the following investigation-specific sampling and analysis plan (SAP) entitled:

 "Burn Site Groundwater Monitoring, Mini-SAP for Third Quarter, Fiscal Year 2015" (SNL/NM May 2015).

As described in the Mini-SAP, 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 the monitoring well in accordance with procedures described in FOP 05-03, "Groundwater Monitoring Equipment Decontamination" (SNL/NM January 2012a). The 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), oxidationreduction potential (ORP), and dissolved oxygen (DO) were obtained from the well prior to collecting the groundwater sample. Groundwater temperature, SC, ORP, DO, and pH were measured with an YSI<sup>TM</sup> Model EXO1 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 (NTUs), or within 10 percent for turbidity values greater than 5 NTUs.
- 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 Customer Funded Record 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 Customer Funded Record 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 Consent 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 Consent Order clarifies that the CME process will be initiated where there is a documented release to the environment, and where corrective measures are necessary to protect human health and the environment.

#### 3.1 Burn Site Groundwater Area of Concern

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

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

In accordance with the requirements of Section VI.K.1.b of the Consent Order (NMED April 2004), a human health risk assessment has been performed to evaluate the potential for adverse health effects from the concentrations of perchlorate detected in monitoring well CYN-MW6 groundwater samples. The maximum perchlorate concentration to date of 8.93  $\mu$ 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). Due to declining water levels, CYN-MW6 has insufficient water to routinely sample and the replacement monitoring well (CYN-MW15) was installed in December 2014 and has assumed the negotiated frequency. Monitoring well CYN-MW14A was also installed in December 2014; this well is considered to be a new monitoring well that requires quarterly sampling due to its deep screen interval.

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

# 3.2 Tijeras Arroyo Groundwater and Technical Area-V Groundwater Areas of Concern

The April 2009 letter from the NMED to DOE/Sandia was not limited to the BSG AOC (NMED April 2009). In the April 2009 letter, the NMED had also requested that DOE/Sandia monitor perchlorate concentrations for a minimum of four quarters at five monitoring wells in the Tijeras Arroyo Groundwater AOC and at four monitoring wells in the Technical Area-V AOC (NMED April 2009). All nine wells have been sampled for four consecutive monitoring events with no perchlorate detections being reported; therefore, these nine wells have been removed from the perchlorate sampling list. A replacement well, TA2-W-28, was installed in December 2014 for the purpose of monitoring the same depth interval as damaged well TA2-SW1-320. Because well TA2-SW1-320 was not one of the

four Tijeras Arroyo Groundwater wells selected for perchlorate sampling, well TA2-W-28 does not require perchlorate sampling.

#### 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 corresponding requests are described in Section I.2.2 of this ER Quarterly Report. The NMED letter required work plans and groundwater monitoring at the following SWMUs:

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

To fulfill the requirements of the April 2010 NMED letter, DOE/Sandia submitted a SAP for monitoring wells CTF-MW2 and CTF-MW3 (SNL/NM June 2010) that was subsequently approved (with modifications) by the NMED (December 2010). All of these wells have been sampled for the required number of monitoring events, with no perchlorate detections, and have since been removed from the perchlorate sampling list.

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 SWMU 68 and SWMUs 8/58 Groundwater Characterization Work Plans that included 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). All of these wells have been sampled for eight or more consecutive monitoring events with no perchlorate detections and have since been removed from the perchlorate sampling list.

#### 4.0 Monitoring Results

Table II-3 summarizes the details of samples collected from monitoring wells CYN-MW14A and CYN-MW15 in the Second Quarter of CY 2015. Table II-4 summarizes current and historical perchlorate results for the two wells currently in the perchlorate screening monitoring network. The analytical laboratory COA for the Second Quarter of CY 2015 perchlorate data is provided in Appendix A. Consistent with historical analytical results, no perchlorate was detected above the screening level in samples collected from monitoring wells CYN-MW14A and CYN-MW15.

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

The analytical data were reviewed and validated in accordance with Administrative Operating Procedure 00-03, "Data Validation Procedure for Chemical and Radiochemical Data," Revision 4 (SNL/NM June 2014). 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-SAP (SNL/NM May 2015), were identified during the Second Quarter of CY 2015 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 CYN-MW14A and CYN-MW15 at the screening level/MDL of 4 μg/L.
- Since June 2004 (the start of sampling as required by the Consent Order), perchlorate was detected above the screening level/MDL (4 µg/L) in groundwater samples from only one of the wells (CYN-MW6) in the perchlorate screening monitoring well network. However, no perchlorate was detected in the environmental samples from groundwater monitoring well CYN-MW15, the well that was installed to replace CYN-MW6.
- DOE/Sandia will continue periodic monitoring of perchlorate for monitoring wells CYN-MW14A (quarterly) and CYN-MW15 (semiannually).

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# Figures

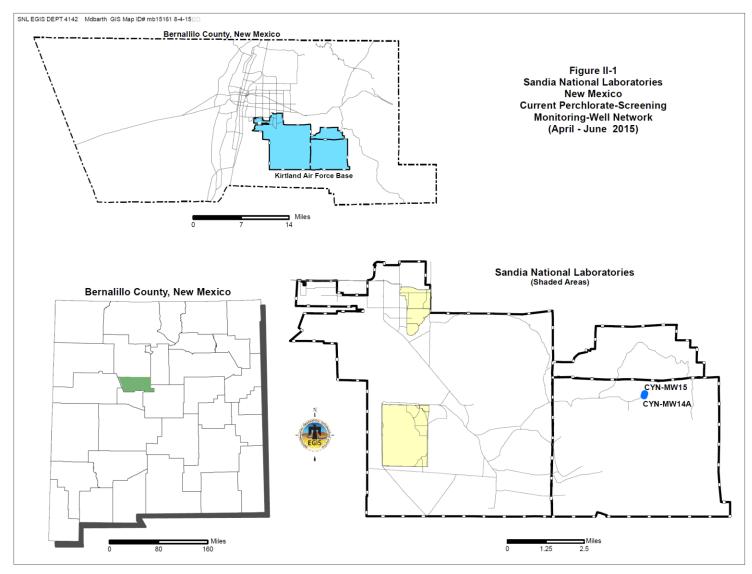


Figure II-1 Sandia National Laboratories, New Mexico Current Perchlorate Screening Monitoring Well Network, April – June 2015

### Tables

#### Table II-1

#### Current Perchlorate Screening Monitoring Well Network Second Quarter, CY 2015

Well	Date Sampled	Number of Consecutive Sampling Events <sup>a</sup>	Remaining Number of Sampling Events <sup>b</sup>	Sampling Equipment
CYN-MW14A	09-Jun-15	3	1	Bennett™ Pump
CYN-MW15	11-Jun-15	2	TBD℃	Bennett™ Pump

#### Notes

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

<sup>b</sup>Per the requirements of Table XI-1 of the Consent Order (NMED April 2004), a well will be removed from the perchlorate screening monitoring well network after four quarters unless perchlorate is detected above the screening level/MDL of 4 μg/L. <sup>c</sup>TBD = To be determined. This well was installed as a replacement well for CYN-MW6. Because perchlorate concentrations in CYN-MW6 have exceeded the screening level, DOE/Sandia and the NMED have agreed to further characterization requirements in the Burn Site Groundwater Area of Concern (NMED February 2010).

μg/L	= Microgram(s) per liter.
CY	= Calendar Year.
CYN	= Canyons (Burn Site Groundwater Area of Concern).
MDL	= Method Detection Limit.
MW	= Monitoring Well.
NMED	= New Mexico Environment Department.
The Consent Order	= The Compliance Order on Consent.

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

Well	
CCBA-MW1	
CCBA-MW2	
CTF-MW1	
CTF-MW2	
CTF-MW3	
CYN-MW1D	
CYN-MW5	
CYN-MW6	
CYN-MW7	
CYN-MW8	
CYN-MW9	
CYN-MW10	
CYN-MW11	
CYN-MW12	
LWDS-MW1	
MRN-2	
MRN-3D	
MWL-BW1	
MWL-BW2	
MWL-MW1	
MWL-MW7	
MWL-MW8	
MWL-MW9	
NWTA3-MW2	
OBS-MW1	
OBS-MW2	
OBS-MW3	
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.
CCBA	= Coyote Canyon Blast Area.
CTF	= Coyote Test Field.
CYN	= Canyons (Burn Site Groundwater Area of Concern).
LWDS	<ul> <li>Liquid Waste Disposal System.</li> </ul>
MRN	= Magazine Road North.
MW	= Monitoring Well.
MWL	= Mixed Waste Landfill.
NWTA	= Northwest Technical Area (III).
OBS	= Old Burn Site.
SWTA	= Southwest Technical Area (III).
TA1-W	= Technical Area I (Well).
TA2-W	= Technical Area II (Well).

TAV = Technical Area-V.

#### Table II-3

#### Sample Details for Second Quarter, CY 2015 Perchlorate Sampling

Well	Sample Identification	AR/COC Number	Associated Groundwater Investigation
CYN-MW14A	097836-020	616175	BSG AOC
CYN-MW15	097842-020	616179	BSG AOC
CYN-MW15 (Duplicate)	097843-020	616178	BSG AUC

#### Notes

AR/COC= Analysis Request/Chain-of-Custody.BSG AOC= Burn Site Groundwater Area of Concern.CY= Calendar Year.CYN= Canyons (Burn Site Groundwater Area of Concern).MW= Monitoring Well.

#### Table II-4

#### Summary of Perchlorate Screening Analytical Results for the Current Monitoring Well Network as of Second Quarter, CY 2015

Well	Sample Date	AR/COC Number	Sample Number	Result (µg/L)	MDL (μg/L)	PQL (μg/L)	MCL (μg/L)	Laboratory Qualifier <sup>a</sup>	Validation Qualifier <sup>b</sup>	Analytical Method <sup>c</sup>	Comments
Burn Site Grou	ndwater Area	a of Concern									
	17-Dec-14	615940	096977-020	ND	4.0	12	NE	U		EPA 314.0	
CYN-MW14A	27-Mar-15	616072	097522-020	ND	4.0	12	NE	U		EPA 314.0	
CTN-IVIV 14A	27-Wal-15	010072	097523-020	ND	4.0	12	NE	U		EPA 314.0	Duplicate sample
	09-Jun-15	616175	097836-020	ND	4.0	12	NE	U		EPA 314.0	
	17-Dec-14	615941	096979-020	ND	4.0	12	NE	U		EPA 314.0	
CYN-MW15	11 Jun 15	616178	097842-020	ND	4.0	12	NE	U		EPA 314.0	
	11-Jun-15	010170	097843-020	ND	4.0	12	NE	U		EPA 314.0	Duplicate sample

#### 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 meet acceptance criteria with respect to submitted samples and no qualifier was assigned.

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

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

- $\mu g/L$  = Micrograms per liter.
- AR/COC = Analysis Request/Chain-of-Custody.
- CFR = Code of Federal Regulations.
- CY = Calendar Year.
- CYN = Canyons (Burn Site Groundwater Area of Concern).
- EPA = U.S. Environmental Protection Agency.
- MCL = Maximum contaminant level. Established by the U.S. Environmental Protection Agency Primary Water Regulations (40 CFR 141.11, Subpart B) and subsequent amendments or Title 20, Chapter 7, Part 1 of the New Mexico Administrative Code, incorporating 40 CFR 141.
- MDL = Method Detection Limit. The minimum concentration that can be measured and reported with 99% confidence that the analyte is greater than zero; analyte is matrix-specific.
- MW = Monitoring Well.
- ND = Not detected (at MDL).
- NE = Not Established.
- 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.

# Table II-5Perchlorate Screening Groundwater MonitoringField Water Quality Measurements<sup>a</sup>, Second Quarter, CY 2015

Well	Sample Date	Temperature (°C)	Specific Conductivity (µmhos/cm)	Oxidation- Reduction Potential (mV)	рН	Turbidity (NTU)	Dissolved Oxygen (% Sat)	Dissolved Oxygen (mg/L)
Burn Site Grou	Indwater Area of	f Concern						
CYN-MW14A	09-Jun-15	19.49	1060.9	227.5	7.48	0.29	11.4	0.99
CYN-MW15	11-Jun-15	17.84	1220.6	322.8	7.24	0.41	13.2	1.24

#### 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.
CY	= Calendar Year.
CYN	= Canyons (Burn Site Groundwater Area of Concern).
mg/L	= Milligrams per liter.
mV	= Millivolt(s).
MW	= Monitoring Well.
NTU	= Nephelometric turbidity unit.

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

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Appendix A Analytical Laboratory Certificates of Analysis for the Perchlorate Data

AOP 95-16

CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY

Internal Lab

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$ \begin{array}{ c c c c c c c c c c c c c c c c c c c$	097836		CYN-MW14A	2	-		52	GW		4x1 L	None	C	SA SA	TEH DEO (SIMPLO STORE)	101
286         16/9/15         9:53         GW         P         500 ml         HNO3         G         SA         TAL Metals-U (SW846-6020/7470)           286         ' 6/9/15         9:54         GW         P         125 ml         None         G         SA         Anions (SW846-6020/7470)           286         ' 6/9/15         9:56         GW         P         125 ml         H2SO4         G         SA         Mitrate+Nitrite (EPA 353.2)           286         ' 6/9/15         9:57         GW         P         250 ml         None         G         SA         Mitrate-Nitrite (EPA 353.2)           286         ' 6/9/15         9:57         GW         P         250 ml         None         G         SA         Nitrate-Nitrite (EPA 353.2)           286         ' 6/9/15         9:57         GW         P         250 ml         None         G         SA         Nitrate-Nitrite (EPA 353.2)           286         ' 6/9/15         9:57         GW         P         250 ml         None         SA         Perchlorate (EPA 314.0)           284         Paterbered:         EDD         None         G         SA         Perchlorate (EPA 314.0)           284         Nutatatoound Time <td< td=""><td>097836</td><td></td><td>CYN-MW14A</td><td>2</td><td></td><td></td><td>50 1</td><td>GW</td><td></td><td>8x40 ml</td><td>None</td><td></td><td></td><td>(11G109-04-04-04-04-04-04-04-04-04-04-04-04-04-</td><td>11</td></td<>	097836		CYN-MW14A	2			50 1	GW		8x40 ml	None			(11G109-04-04-04-04-04-04-04-04-04-04-04-04-04-	11
286         ' 6/9/15         9:54         GW         P         125 ml         None         G         SA         IAL Metals+U (SW846-6020)           286         ' 6/9/15         9:55         FGW         P         125 ml         HNO3         G         SA         Anions (SW846-6020)           286         ' 6/9/15         9:55         FGW         P         125 ml         H2S04         G         SA         Metals-Ca.Mg.K.Na (SW846-6020)           286         ' 6/9/15         9:57         GW         P         250 ml         None         G         SA         Nitrate+Nitrite (EPA 353.2)           286         ' 6/9/15         9:57         GW         P         250 ml         None         G         SA         Nitrate+Nitrite (EPA 353.2)           286         ' 6/9/15         9:57         GW         P         250 ml         None         G         SA         Nitrate+Nitrite (EPA 353.2)           284         Filtered IX:         Turacking         SMO Use         Special InstructionsGC Requirements:         InstructionsGC         Si         Cond           Date         Entered::         Turacking         SMO Use         Special InstructionsGC Requirements:         InstructionsGC         Si         Cond	097836		CYN-MW14A	2			53	GW		500 ml	HND3		Ho S	IPH GRU (SW846-8015A/B	
286         ' 6/9/15         9:55         Feaw         P         500 ml         HNO3         G         SA         Anions (SW846-9056)           286         ' 6/9/15         9:55         Feaw         P         125 ml         H2S04         G         SA         Metals-Ca.Mg, K.Na (SW846-6020)           286         ' 6/9/15         9:57         GW         P         250 ml         None         G         SA         Nitrate+Nitrite (EPA 353.2)           286         ' 6/9/15         9:57         GW         P         250 ml         None         G         SA         Nitrate+Nitrite (EPA 353.2)           286         ' 6/9/15         9:57         GW         P         250 ml         None         G         SA         Nitrate+Nitrite (EPA 353.2)           286         ' 6/9/15         9:57         GW         P         250 ml         None         G         SA         Nitrate+Nitrite (EPA 353.2)           Date Entered:         Entered:         No         G         SA         Perchlorate (EPA 314.0)         Condit           Date Entered:         Nutatation/Phone/Cell         Samples By:         Ves         Nutatation/Phone/Cell         Samples By:         Condit           Company/Organization/Phone/Cell	097836		CYN-MW14A	28			$\left \right\rangle$	GW	-	125 ml	Non		Τ	IAL Metals+U (SW846-6020	
286         ' 6/9/15         9:56         GW         P         350 min         HN03         G         SA         Metals-Ca.Mg, K,Na (SW846-6020)           286         ' 6/9/15         9:57         GW         P         256 min         H033         G         SA         Mitrate+Nitrite (EPA 353.2)         P           286         ' 6/9/15         9:57         GW         P         250 min         None         G         SA         Perchlorate (EPA 314.0)         P           28ample Tracking         SMO Use         Special Instructions/OC Requirements:         None         C         SA         Perchlorate (EPA 314.0)         P           Date Entered:         Entered by:         Intracound Time         7 Pay*         No         No         Perchlorate (EPA 314.0)           Date Entered:         Entered by:         Intracound Time         7 Pay*         15 Day*         20 Day         Rei           Init:         Company/Organization/Phone/Cell         Samples By:         No         Samoles By:         Sand report to Tim Joshen/Ala/Sto5-284-3307505-232-3507         Alkalinity(total as CaCO3,HCO3, and CO3). If Perchlorate detected           Mut         Company/Organization/Phone/Cell         Samples By:         Sand report to Tim Joshen/Ala/Sto5-284-3307505-232-3307505         Alkalinity(total as CaCO3,HCO3, an	097836		CYN-MW14A		1000		$\uparrow$	UNIC.	+			9	Τ	Anions (SW846-9056)	337
∠ob         bW15         9:56         GW         P         125 mi         H2S04         G         SA         Nitrate+Nitrite (EPA 353.2)           286         '6/9/15         9:57         GW         P         250 mi         None         G         SA         Perchlorate (EPA 353.2)         South           Sample Tracking         SMO Use         Spectal Instructions/GC Requirements:         No         Gondi         South         Rei           Date Entered:         Entered by:         Tumaround Time         7 Day*         15 Day*         30 Day         Rei           Ocinits:         Nu/4142/505-844-4013/505-250-7090         Return Samples By:         Nu/4142/505-284-30710         Send report to Tim Jackson/414/MS 0728124-3547         Return to Client         Disposal by Lab           Mit         Company/Organization/Phone/Cell         Samples By:         Send report to Tim Jackson/414/MS 0728124-3547         Lab           Mit         Company/Organization/Phone/Cell         Samples By:         Send report to Tim Jackson/414/MS 07281424         Lab           Mit         Company/Organization/Phone/Cell         Samples By:         Send report to Tim Jackson/414/MS 07281424         Lab           Mit         Company/Organization/Phone/Cell         Samples By:         Send report to Tim Jackson/414/MS 0728144         Lab	097836		CYN-MW144		1		+	A D	+	im 000	HN03	υ		Metals-Ca,Mg,K,Na (SW846-	4
286         6/9/15         9:57         GW         P         250 ml         None         G         SA         Perchlorate (EPA 314.0)           Sample Tracking         SMO Use         Special Instructions/QC Requirements:         No         Condit           Date Entered:         Entered:         Entered:         ZDay*         15 Day*         20 Day           Contribution:         Nulse         Smo Use         Special Instructions/QC Requirements:         Condit           Date Entered:         Entered by:         Turnaround Time         Z Pay*         15 Day*         20 Day           Rector         Nul4142/9505-844-4013/505-228-0710         Sample Disposal         Return to Client         Disposal by Lab           K         SNU41412/9505-844-073/505-228-0710         Comments:         Send report to Tim Jackson/41/2/MS 07/29/284/267         Attalinity(total as CaCO3, HCO3, and CO3). If Perchlorate detected           K         SNU41412/9505-284-3307/505-228-0710         Comments:         Send report to Tim Jackson/41/2/MS 07/29/284/267         Lab           K         SNU41413/505-844-2507/505-228-0710         Comments:         Send report to Tim Jackson/41/2/MS 07/29/284/267         Lab           L         Date         A 1/5         Time         A 1/5         Lime         Lab           L <td< td=""><td>007836</td><td>1</td><td></td><td>N</td><td></td><td></td><td>(</td><td>GW</td><td>+</td><td>-+</td><td>H2SO4</td><td>υ</td><td></td><td>Nitrate+Nitrite (EPA 353.2)</td><td></td></td<>	007836	1		N			(	GW	+	-+	H2SO4	υ		Nitrate+Nitrite (EPA 353.2)	
Sample Tracking         SMO Use         Special Instructions/OC Requirements:         Commons (ET A 314, U)           Date Entered:         Entered:         Entered:         Yes         No           Entered by:         Turnaround Time         Yes         No         Ondi           Contrins:         No         No         Yes         Solution         Condi           Init:         Company/Organization/Phone/Cell         Sample Disposal         Return to Client         Disposal by Lab           Init:         Company/Organization/Phone/Cell         Sample Disposal         Return to Client         Disposal by Lab           K         SNU41412505-284-807/050-228-0710         Return Samples By:         Send report to Tim Jackson/412/MS 0729284-2847         Lab           K         SNU41412505-284-3307/505-228-0710         Comments:         Send report to Tim Jackson/412/MS 0729284-2847         Lab           K         SNU41412505-284-3307/505-228-0710         Comments:         Send report to Tim Jackson/412/MS 0729284-2847         Lab           Z         Date         A         A         A         Cli Fiston region	Last Cha	-120	CTIV-IVIV 14A	58	36		-	GW		50 ml	None	U	Contractor of	Darchlarata /EDA 344 0	374620
Uate Enterect:         EDD         Yes         No           Entered:         Entered:         Turnaround Time         Z Day*         15 Day*         30 Day           OC inits::         Negotiated TAT         Imit         Company/Organization/Phone/Cell         Sample Disposal         Z Day*         30 Day           Init.         Company/Organization/Phone/Cell         Sample Disposal         Return to Client         Disposal by Lab           R         SNU4142/505-844.4013/505-228-0710         Return Samples By:         Send report to Tm. Jackson/4142/85         Disposal by Lab           R         SNU4142/505-844.2015/505-228-0710         Comments:         Send report to Tm. Jackson/4142/85         Disposal by Lab           R         SNU4142/505-844-2015/505-228-30710         Comments:         Send report to Tm. Jackson/4142/85         Disposal by Lab           E         Date         6/1         If         Time         10/1         Disposal           Z         Date         6/1         If         Disposal         Disposal         Disposal           Z         Date         6/1         If         Disposal         Disposal         Disposal           Z         Date         6/1         If         Stephone/Finitic Disposal         Disposal         Disposal	Validatio	n Rea'd:	/ Yes	Sam	The Tra	acking		SMO U		ecial Instr	uctions/C	C Require			Condition 1
Entered by:         Turnaround Time         ZDay*         15 Day*         30 Day           Init:         Company/Organization/Phone/Cell         Sample Disposal         Zampe	Backgrou	:put	Vac	Date	e Entere	:D			ED	D		۲ Yes		No	
OC inits.:     Negotiated TAT     Disposal by Lab       Init.     Company/Organization/Phone/Celi     Sample Disposal     Return to Client     Disposal by Lab       XNU4142/505-844-013/505-228-0710     Return samples By:     Send report to Tim Jackson/4142/505-284-567     Disposal by Lab       XNU4142/505-844-013/505-228-0710     Comments:     Send report to Tim Jackson/4142/505-284-3307/505-228-2606     Perchination required using method SW846-6850. Report Anions as       XNU41412/505-844-2507/505-228-2606     Varification required using method SW846-6850. Report Anions as     Br.C.I.F.SO4. Report short list isotopes for gamma spec analysis.       Z     Date     Ø     1/5 <time<t td="">     1/9     3. Received by     Org.     Date     Tim       Z     Date     Ø     1/5<time< td="">     1/1     0     9     4. Reinquished by     Org.     Date     Tim       Z     Date     Ø     1/5<time< td="">     1/3     7     Received by     Org.     Date     Tim       Date     Ø     1/5<time< td="">     0     4. Reinquished by     Org.     Date     Tim</time<></time<></time<></time<t>	Confirma	toru-		Ente	ered by:	2 8 2 8 . E (8 1			Tur	naround	Time	7 Dav		Dav*	Idianau
Intt.         Company/Organization/Phone/Cell         Sample Disposal         Return to Client         Disposal by Lab           K         SNU4142/505-844.4013/505-2260-7090         Return Samples By:         Send report to Tim Jackson/412/805-228-0710         Disposal by Lab           K         SNU4142/505-844.4013/505-228-0710         Comments:         Send report to Tim Jackson/412/805-228-401         Send report to Tim Jackson/412/805-228-401           K         SNU4142/505-284-3307/505-228-2606         Verification required using method SW846-6850. Report Anions as Br.CI.F.SO4. Report short list isotopes for gamma spec analysis.           Z         Date         Ø 1 1/5 Time 1 Ø 1 Y 3. Relinquished by         Org.         Date         Tim           Z         Date         Ø 1 1/5 Time 1 Ø 1 Y 3. Relinquished by         Org.         Date         Tim           Z         Date         Ø 1 1/5 Time 1 Ø 1 Y 3. Relinquished by         Org.         Date         Tim           Z         Date         Ø 1 1/5 Time 1 Ø 1 Y 3. Received by         Org.         Date         Tim           Date         Ø 1 1/5 Time 1 Ø 1 Y 3. Time 1 Ø 1 Y 3. Time 1 Ø 1 Y 3. Time 1 Ø 1 Ø 4. Relinquished by         Org.         Date         Tim	Sample		1es		inits.:					gotiated T	AT		ן		
Control         SNU41472/505-844-013/505-250-7090         Return Samples By:         Control         Contro         Contro         Control <td>Team</td> <td>Robert</td> <td>the All Som</td> <td></td> <td></td> <td>Company/Org</td> <td>anization</td> <td>/Phone/C</td> <td></td> <td>nple Disp</td> <td>osal</td> <td>Return</td> <td>to Client</td> <td>/ Disnocal hit 1 ah</td> <td></td>	Team	Robert	the All Som			Company/Org	anization	/Phone/C		nple Disp	osal	Return	to Client	/ Disnocal hit 1 ah	
Constraint     Sinulation     Second report to Tim Jackson/4142/BGS-228-0710     Comments:     Send report to Tim Jackson/4142/BGS-444-2507/1505-228-2666       A     SNU41412/505-844-2507/505-228-2666     Verification required using method SN0846-6850. Report Anions as BR.CLF, SO4. Report short list isotopes for gamma spec analysis.       Z     Date     Ø     1     Time     1.0 44     3. Relinquished by     Org.     Date     Tim       Z     Date     Ø     1.5 Time     1.0 44     3. Received by     Org.     Date     Tim       Z     Date     Ø     1.5 Time     1.0 44     3. Received by     Org.     Date     Tim       Z     Date     Ø     1.5 Time     1.0 44     3. Received by     Org.     Date     Tim       Date     Ø     1.0 Time     1.0 44     3. Received by     Org.     Date     Tim       Date     Ø     1.0 11     Time     0.7 4     A. Received by     Org.     Date     Tim	Member		ntillanes ADL State	a de		LU4142/505-84	4-4013/5	05-250-7		urn Samp	les By:				
2     Date     6     1     1     Time     1     1     1     1       2     Date     6     1     1     1     1     1     1     1       2     Date     6     1     1     1     1     1     1     1       2     Date     6     1     1     1     1     1     1     1       2     Date     6     1     1     1     1     0     0     0       2     Date     6     1     1     1     1     0     0     0       2     Date     6     1     1     1     0     1     0     0       2     Date     6     1     1     0     0     0     0       2     Date     6     1     1     0     0     0     0       2     Date     0     1     0     0     0     0     0			ibson Virillin 1	5. P. 1. 1.1		L/4142/505-28	4-6870/5	05-228-0		nments:	ŭ	and report to T	im Jackson/4	142/MS 0729/284-2547	
2     Date     6     9     1/5     Time     1/3     7     1/1     1/1     1/1     1/1       2     Date     6     9     1/5     Time     1/3     9     1/1     1/1     1/1     1/1       2     Date     6     9     1/5     Time     1/3     0     0     0     0     0       2     Date     6     9     1/5     Time     1/3     0     0     0     0     0       2     Date     6     9     1/5     Time     1/3     0     0     0     0     0       2     Date     6     9     1/5     Time     1/3     0     0     0     0     0		Gilbert Qu		the frain		1 14143/505 84	4-330//5	05-239-7	T	alinity(total	as CaCO	3,HCO3,al	nd CO3). I	f Perchlorate detected	
こ Date を月して Time 1044         3. Relinquished by         Org.         Date         Tim           こ Date を月して Time 1044         3. Received by         0.19.         Date         Tim           こ Date を月して Time 1030         4. Relinquished by         0.19.         Date         Tim           こ Date を月月して Time 1130         4. Relinquished by         0.19.         Date         Tim           こ Date を月月して Time 1130         4. Relinquished by         0.19.         Date         Tim			al fa	H B Serro			6//007-+	7-977-00		CI,F,SO4. F	Report sho	ig method ort list isoto	SW846-68	350. Report Anions as Imma spec analysis	
$\begin{array}{c c c c c c c c c c c c c c c c c c c $	1 Descine 1	In DA	175 malle	10 2414 D		19/15			Selinauishe	ed hv			6		Lab Use
C Date 6 タリゲ Time 113 0 4. Relinquished by 019. Date Date 6041011 5 Time 0335 4. Received by 019. Date Date 0041011 5 Time 0次35 4. Received by 019. Date	- L' L'ECEIVEC	A A	- 1	0 2414.61	ate 6	15		Г	Received				-Gio	Date	Time
Date 010/10/15 Time 0335 4. Received by Org. Date	Z.Kelinquist	ied by		19 JUZ DI	ate 6	E	7	T	Alinaniaho	1			Org.	Date	Time
variable of the second of the	2. Received	by (1 D	allellocal 2 0		ate Old	1 of	15	T	in singuisti	ka ps			Org.	Date	Time
	Prior confi	irmation wit	h SMO required for 7 and 1				000	1	nananav	AV A			Org.	Date	Time

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AOP 95-16

CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY (Continuation)

Project Name:		BSG	Project/Task Manager:	anager:	Mike Skelly	lly		Project/Tack No .	ek No .	146400	10 11 01		
Tech Area:								al poplar .	NON NO.	140422	140422.10.11.01		
Building:		Room:											
Sample No. Fraction	action	Sample Location Det	Depth (#)	oth	Date/Time	Sample			Preserv-	Preserv- Collection Sample	Sample	Parameter & Method	Lab use
097836 -022		CYN-MW14A		100 001 E	lected			-	ative	Method	Type	Requested	Sample ID
097836 -024		CVN-MIA114A	07		80:6		_	500 ml	None	U	SA	Alkalinity (SM2320B)	374620
	T		780	-	15 10:00	NGW	AG	4×L	None	ს	SA	High Explosives(SW846-8321A) mod	29628
	Т	UTIN-MW14A	286	6 · 6/9/15	15 10:01	GW	Р	1L	HN03	U	SA	Gamma Spectroscon, /EDA 001 0)	374620
		CYN-MW14A	286	6 . 6/9/15	15 10:02	+ GW	۵.	. 1L	HN03	U			37462
		CYN-MW14A	286	6 6/9/15	15 10:04	GW	٩	11	HN03	0 0	Τ	(0.00)	374626
	T	CYN-MW14A	286	6 - 6/9/15	15 10:05	GW	AG	250 ml	None	) (		ASL 300)	30000
	T	CYN-TB15	NA	V ' 6/9/15	15 9:49	MID	υ	3x40 ml	HC I	0 0			374620
097837 -006		CYN-TB16	NA	· 6/9/15	15 9-50	DIM	04	1-01-6		, ,			030
							ą	IIII 04XC	None	σ	18	TPH GRO (SW846-8015 A/B) VOC	029470
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#### **GEL LABORATORIES LLC**

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

Report Date: July 7, 2015

### **Certificate of Analysis**

	Company : Address :	MS-0756, Or 1515 Eubank	nal Laboratories g. 06765, Bldg. 8 SE , New Mexico 8		276							
	Contact:	Ms. Pamela M	A. Puissant									
	Project:	Groundwater	, Level C Packag	,e								
	Client Sample ID:	097836-020				Projec	t:	SNLSG	Water			
	Sample ID:	374620023				Client	ID:	SNLS0	04			
	Matrix:	AQUEOUS										
	Collect Date:	09-JUN-15 0	9:57									
	Receive Date:	10-JUN-15				Client	Desc.:	CYN-M	1W14A	A		
	Collector:	Client				Vol. R	ecv.:					
Parameter	Qualit	fier Result		DL	RL	Units	DF	Analyst	Date	Tim	e Batch	Method
Ion Chroma	atography											
EPA 314.0	Perchlorate by IC "A	As Received"										
Perchlorate		U ND		0.004	0.012	mg/L	1	MXL2 06	5/24/15	2143	1485796	1
The follow	ing Analytical Meth	ods were perfo	rmed:									
Method	Descri	ption				Anal	yst Co	mments				
1	EPA 31	4.0 DOE-AL										

Notes:

Page 1 of Mice Stelly         SM0 Ups         SM0 Ups         ARLOOC         616173           mere Stelly         construction         21,1,0,1         24,1,0,5         SM0 Authorization         ARLOOC         616173           mere Stelly         construction         construction         24,1,0,5         SM0 Authorization         ArLOOC         616173           mere Stelly         construction         construction         construction         ArLOO         ArLOO<				AP	IALY	ANALYSIS REQUEST AND CHAIN OF CUSTODY	QUES	TAN	D CH	EQUEST AND CHAIN O	F CUS	STOD)				AOP 95-16
Table Stelly         Date Stenges Stepace         1         4         SMAO Author/ration:         1         4         Masses Stepace         Avv.vov         Avv.vov </td <td>Internal Lab Batch No. <i>M</i></td> <td>1.</td> <td></td> <td></td> <td></td> <td>SMO Use</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>0</td> <td>0</td> <td></td> <td>Page 1</td> <td>of 2</td>	Internal Lab Batch No. <i>M</i>	1.				SMO Use						0	0		Page 1	of 2
mage:         Teles         Static         Contract Phone         Contret Phone         Co	Project Nam	le:	BSG	Date Samples	Shipped:	6 111	INC.		SMO Aut	horization.	101	4 4			1010	2
Trieded: 10.11.01         Locate: cleaner:         Edia Kenniford: 566 8171         wencip: Palencianges 644-3132         PM         Minimiser to the content.           CF056-15         Lob Destrinten:         Fei log Content         Stapping Instruction         Paration	Project/Task	k Manager	Mike Skelly	Carrier/Waybi	II No.	23	455	-5-	SMO Col	ntact Phone	the the	1.14		VVASIC Characterization		
CFOBS-15         Lueb Obstitution:         CEL         POINTENDE         Contract No.	Project/Task	k Number:	146422.10.11.01	Lab Contact:		Edie Kent/8	03-556-8	171		Wendy Pal	encia/505		Dra 6	Released by COC No.		
Room:         PO attaction attacts         Stephanie Montano/505-284-2553           Room:         Operational Site:         Collection         Stephanie         Preserv-Collection Sample           01         CYN-MW15         946         Cay         6         3x40 ml         Hcc.         6         5           05         CYN-MW15         183         6/11/15         9:46         Cay         6         3x40 ml         Hcc.         6         5           05         CYN-MW15         183         6/11/15         9:50         Cay         AG         4x1L         None         6         5         A           06         CYN-MW15         183         6/11/15         9:50         Cay         AG         4x1L         None         6         5         A           17         CYN-MW15         183         6/11/15         10:00         Cay         P         500 ml         Hous         6         5         A           17         CYN-MW15         183         6/11/15         10:00         Cay         P         10:00         6         SA         A         5         5           18         CYN-MW15         183         6/11/15         10:00         Cay	Service Ord	er:	CF058-15	Lab Destinatio	ü	GEL DO 420007			Send Re	port to SMC					✓ 4° C	elsi
Room:         Operational Site:           action         Sample Location Detail         (tt)         Detertion         Sample         Container         Preserv- collection Sample           01         CYN-MWV15         183         -6111/15         9.46         GW         G         3.40 ml         HCL         G         SA           05         CYN-MWV15         183         -6111/15         9.55         GW         A x1 L         None         G         SA           05         CYN-MWV15         183         -6111/15         9.56         GW         A x1 L         None         G         SA           05         CYN-MWV15         183         -6111/15         10:00         GW         P         125 ml         HNO3         G         SA           17         CYN-MWV15         183         -6111/15         10:00         GW         P         125 ml         HNO3         G         SA           17         CYN-MW15         183         -6111/15         10:00         GW         P         125 ml         HNO3         G         SA           17         CYN-MW15         183         -6111/15         10:00         GW         P         125 ml         HNO3 <td< td=""><td>Tech Area:</td><td></td><td></td><td>CONTRACT NO.:</td><td></td><td>FU 13U38/</td><td>2</td><td></td><td></td><td>Stephanie N</td><td>/ontano/5(</td><td>05-284-255</td><td></td><td>Bill to:Sandia National Laboratori</td><td>es (Accounts Pa</td><td>ayabl</td></td<>	Tech Area:			CONTRACT NO.:		FU 13U38/	2			Stephanie N	/ontano/5(	05-284-255		Bill to:Sandia National Laboratori	es (Accounts Pa	ayabl
Antime         Sample         Contrainer         Preserv.         Collection         Sample           01 $CVN-MW15$ 183 $6/11/15$ 9.46 $CW$ G         3x40 ml         HCL         G         SA           05 $CVN-MW15$ 183 $6/11/15$ 9.53 $CW$ AS $3x40$ ml         HCL         G         SA           05 $CVN-MW15$ 183 $6/11/15$ 9.53 $CW$ AS $3x40$ ml         HCL         G         SA           05 $CVN-MW15$ 183 $6/11/15$ 9.53 $CW$ AS $3x40$ ml         HCL         G         SA           17 $CVN-MW15$ 183 $6/11/15$ 10:00 $CW$ P         125 ml         None         G         SA           17 $CVN-MW15$ 183 $6/11/15$ 10:00 $CW$ P         125 ml         None         G         SA           17 $CVN-MW15$ 183 $6/11/15$ 10:00 $CW$ P         125 ml         None         G         SA	Building:		Room:	Operationa	I Site:									P.O. Box 5800, MS-0154 Albuqueratie NM 87185-0154	52483	d-
01         CYN-MW15         183 $6/11/15$ 9.46         GW         G $340$ mi         HCL         G         SA           06         CYN-MW15         183 $6/11/15$ 9.50         GW         AG $41'L$ None         G         SA           06         CYN-MW15         183 $6/11/15$ 9.50         GW         AG $41'L$ None         G         SA           17         CYN-MW15         183 $6/11/15$ 10:00         GW         P         25 mi         None         G         SA           17         CYN-MW15         183 $6/11/15$ 10:02         FGW         P         25 mi         None         G         SA           18         CYN-MW15         183 $6/11/15$ 10:02         FGW         P         25 mi         None         G         SA           20         CYN-MW15         183 $6/11/15$ 10:02         FGW         P         25 mi         None         G         SA           20         CYN-MW15         183 $6/11/15$ 10:02         FGW         P         25 mi         None         C	Sample No.	Fraction	Sample Location I	Detail	(ft)	Date/T Collec	ime ted	Sample Matrix	Type Col	Volume	Preserv- ative	Collection		Parameter & Method		Lab
05         CYN-MW15         183 $6/11/15$ 9:50 $CW$ AG $3x40$ ml         None         G         SA           06         CYN-MW15         183 $6/11/15$ 9:50 $CW$ AG $3x40$ ml         None         G         SA           09         CYN-MW15         183 $6/11/15$ 10:00 $CW$ P         500 ml         HNO3         G         SA           17         CYN-MW15         183 $6/11/15$ 10:00 $CW$ P         500 ml         HNO3         G         SA           18         CYN-MW15         183 $6/11/15$ 10:00 $CW$ P         500 ml         HNO3         G         SA           20         CYN-MW15         183 $6/11/15$ 10:00 $CW$ P         500 ml         HNO3         G         SA           20         CYN-MW15         183 $6/11/15$ 10:00 $CW$ P         250 ml         None         G         SA           21         CYN-MW15         183 $6/11/15$ 10:00         GW         P         250 ml         No	097842	-001	CYN-MW15		183	• 6/11/15	9:46 /	GW		3x40 ml	HCL	U	SA	TCI VOC (SWR46-8260)		
06         CYN-MW15         183 $[6/11/15$ 9:50         GW         AG         3x40 ml         None         G         SA           09         CYN-MW15         183 $[6/11/15$ 9:58         GW         P         500 ml         HNO3         G         SA           17         CYN-MW15         183 $[6/11/15$ 10:00         GW         P         125 ml         None         G         SA           18         CYN-MW15         183 $[6/11/15$ 10:00         GW         P         125 ml         None         G         SA           20         CYN-MW15         183 $[6/11/15$ 10:00         GW         P         125 ml         None         G         SA           20         CYN-MW15         183 $[6/11/15$ 10:00         GW         P         125 ml         None         G         SA           20         CYN-MW15         183 $[6/11/15$ 10:00         GW         P         125 ml         None         G         SA           20         CYN-MW15         183 $[6/11/15$ 10:00         GW         P         250 ml         None	097842	-005	CYN-MW15		183	.6/11/15	9:53	GW	AG	4x1 L	None	U	SA	TPH DRO (SWR46-8015D) S	+	1-
09         CYN-MW15         183 $6/11/15$ 0.00 $6$ $8$ 16         CYN-MW15         183 $6/11/15$ 10:00 $6$ $8$ $8$ 17         CYN-MW15         183 $6/11/15$ 10:02 $FGW$ $P$ $125$ ml $HNO3$ $G$ $8$ 17         CYN-MW15         183 $6/11/15$ 10:02 $FGW$ $P$ $500$ ml $HNO3$ $G$ $8A$ 20         CYN-MW15         183 $6/11/15$ 10:07 $GW$ $P$ $500$ ml $HNO3$ $G$ $8A$ 20         CYN-MW15         183 $6/11/15$ 10:07 $GW$ $P$ $500$ ml $None$ $G$ $SA$ 22         CYN-MW15         183 $6/11/15$ 10:07 $GW$ $A$ <t< td=""><td>097842</td><td>900-</td><td>CYN-MW15</td><td></td><td>183</td><td>6/11/15</td><td>9:50 ~</td><td>&lt; GW</td><td>AG</td><td>3x40 ml</td><td>None</td><td>U</td><td>SA</td><td>TPH GRO (SW846-8015A/B</td><td>+</td><td>一</td></t<>	097842	900-	CYN-MW15		183	6/11/15	9:50 ~	< GW	AG	3x40 ml	None	U	SA	TPH GRO (SW846-8015A/B	+	一
I6         CYN-MW15         133 $i_{6}$ (11/15         10:02 $r_{FGW}$ P         125         In         None         G         SA           17         CYN-MW15         183 $i_{6}$ (11/15         10:02 $r_{FGW}$ P         125         II         None         G         SA           20         CYN-MW15         183 $i_{6}$ (11/15         10:07 $GW$ P         125         II         None         G         SA           20         CYN-MW15         183 $i_{6}$ (11/15         10:07 $GW$ P         250         IN         None         G         SA           22         CYN-MW15         183 $i_{6}$ (11/15         10:07 $GW$ P         250         IN         None         G         SA           24         CYN-MW15         183 $i_{6}$ (11/15         10:07 $GW$ P         250         IN         None         G         SA           24         CYN-MW15         183 $i_{6}$ (11/15         10:07 $GW$ P         250         IN         None         G         SA           250         MU	097842	600-	CYN-MW15		183	6/11/15	9:58	GW	٩	500 ml	HNO3	U	SA	TAL Metals+U (SW846-6020	1	104
17       CYN-MW15       183       '6/11/15       10:02       FGW       P       500 ml       HN03       G       SA         18       CYN-MW15       183       '6/11/15       10:05       GW       P       125 ml       H2504       G       SA         20       CYN-MW15       183       '6/11/15       10:07       GW       P       250 ml       None       G       SA         22       CYN-MW15       183       '6/11/15       10:07       GW       P       500 ml       None       G       SA         24       CYN-MW15       183       '6/11/15       10:09       GW       AG       4x1 L       None       G       SA         24       CYN-MW15       183       '6/11/15       10:09       GW       AG       4x1 L       None       G       SA         24       CYN-MW15       183       '6/11/15       10:09       GW       AG       4x1 L       None       G       SA         24       CYN-MW15       183       '6/11/15       10:09       GW       AG       4x1 L       None       G       SA         25       Prescienterediments:       Date       Enterediments:       Date	097842	-016	CYN-MW15		183	10/11/15	10:00	GW	٩	125 ml	None	U		Anions (SW846-9056)	1-	10
18         CYN-MW15         183 <sup>1</sup> 6/11/15         10:04         CW         P         125 ml         H2SO4         G         SA           20         CYN-MW15         183 <sup>5</sup> 6/11/15         10:05         GW         P         250 ml         None         G         SA           22         CYN-MW15         183 <sup>5</sup> 6/11/15         10:07         GW         P         500 ml         None         G         SA           24         CYN-MW15         183 <sup>5</sup> 6/11/15         10:07         GW         P         500 ml         None         G         SA           24         CYN-MW15         183 <sup>5</sup> 6/11/15         10:07         GW         P         500 ml         None         G         SA           24         CYN-MW15         183 <sup>5</sup> 6/11/15         10:07         GW         P         500 ml         None         G         SA           24         CYN-MW15         183 <sup>5</sup> 6/11/15         10:07         GW         P         500 ml         None         G         SA           25         CV         SMO Use         Sport         Sport         C         Yes         Yes         Yes         Ye	097842	-017	CYN-MW15			6/11/15	1	FGW	٩	500 ml	HN03	υ		Metals-Ca.Mg.K.Na (SW846-	602014HAR	N
20         CYN-MW15         183         '6/11/15         10:05         CW         P         250 ml         None         G         SA         Perchlorate (EPA 314.0)           22         CYN-MW15         183         '6/11/15         10:07         CW         P         500 ml         None         G         SA         Attailinity (SM2320B)         1           24         CYN-MW15         183         '6/11/15         10:09         CW         AG         4x1 L         None         G         SA         Attailinity (SM2320B)         1           24         CYN-MW15         183         '6/11/15         10:09         CW         AG         4x1 L         None         G         SA         Attailinity (SM2320B)         1           21         Yes         Sample Tracking         SMO Use         Special InstructionsQC Requirements:         Conditit           21         Yes         Brance         Init.         Company/Organization/Phone/Cell         Sample tracking         SMO Use         Special InstructionsQC Requirements:         Conditit           21         Yes         Brance         Init.         Conditit         Tage: Yes         Attain         Seconditie         Etc         Attain         Conditit         Conditit	097842	-018	CYN-MW15		183	6/11/15	10:04	GW	٩	125 ml	H2SO4	თ		Nitrate+Nitrite (EPA 353.2)	38	10
22         CYN-MW15         183         6/11/15         10:07         GW         P         500 ml         None         G         SA         Alkalinity (SM2320B)         I           24         CYN-MW15         183         '6/11/15         10:09         GW         AG         4x1 L         None         G         SA         High Explosives (SW346-8321A) Mod         I           24         CYN-MW15         183         '6/11/15         10:09         GW         AG         4x1 L         None         G         SA         High Explosives (SW346-8321A) Mod         I <td>097842</td> <td>-020</td> <td>CYN-MW15</td> <td></td> <td>183</td> <td>6/11/15</td> <td>10:05</td> <td>GW</td> <td>٩</td> <td>250 ml</td> <td>None</td> <td>U</td> <td></td> <td>Perchlorate (EPA 314.0)</td> <td></td> <td>21</td>	097842	-020	CYN-MW15		183	6/11/15	10:05	GW	٩	250 ml	None	U		Perchlorate (EPA 314.0)		21
24         CVN-MW15         183         6/11/15         10:09         GW         AG         A/L         None         G         SA         High Explosives (SW946-8321A) Mod         A           1d:         Ves         Sample Tracking         SMO Use         Special Instructions/GC Requirements:         No         Conditional Conditent     Conditional Conditional Conditional Conditional	097842	-022	CYN-MW15		183	6/11/15	10:07	GW	٩	500 ml	None	თ		Alkalinity (SM2320B)		N
Yes       Sample Tracking       SMO Use       Special Instructions/QC Requirements:       No         1d:       ∨ res       Date Entered:       EDD       ∨ res       No         Yes       Entered by:       Turnaround Time       7 Day*       15 Day*       30 Day         Name       Signature       Init.       Companyorganization/Phone/Cell       Sample Disposal       Return to Client       20 Day       Reci         Name       Signature       Init.       Companyorganization/Phone/Cell       Sample Disposal       Return to Client       Disposal by Lab         bert Lynch       Return       Sample Disposal       Return to Client       Disposal by Lab         bert Lynch       Return Samples By:       Samd repot of Tim       Lab         Iam Gibson       Return Samples By:       Samd repot of Tim       Lab         Iam Gibson       Return Samples By:       Samd repot of Samd CO3, If Perchlorate detected         Iam Gibson       Return Samples By:       Samd repot of Samd Social Soc	097842	-024	CYN-MW15		183	6/11/15	10:09	GW	AG	4x1 L	None	U		High Explosives (SW846-832	1 -	10
10:     Yes     Date Entered:     EDD     Yes     No       Yes     Entered by:     Turnaround Time     7 Day*     15 Day*     3 0 Day       Name     Signature     Init.     CompanyOrganization/Phone/Cell     Sample Disposal     45 Day*     3 0 Day       Name     Signature     Init.     CompanyOrganization/Phone/Cell     Sample Disposal     Return to Client     Disposal by Lab       Name     Signature     Init.     CompanyOrganization/Phone/Cell     Sample Disposal     Return to Client     Disposal by Lab       Name     Signature     Init.     CompanyOrganization/Phone/Cell     Sample Disposal     Return to Client     Disposal by Lab       Name     Signature     Init.     CompanyOrganization/Phone/Cell     Sample Disposal     No     Disposal by Lab       Name     Signature     Init.     CompanyOrganization/Phone/Cell     Sample Disposal     No     Disposal by Lab       Name     Signature     Init.     Comments:     Samd report of the Client     Disposal by Lab       Name     Signature     No     No     No     Disposal by Lab       Name     Signature     No     Sample Disposal     No       Name     Signature     No     No     No     Disposal       Name <t< td=""><td>Last Chain</td><td></td><td></td><td></td><td>Sample</td><td>racking</td><td></td><td>SMO</td><td>-</td><td>pecial Inst</td><td>tructions/</td><td>QC Requir</td><td>1</td><td></td><td>13</td><td></td></t<>	Last Chain				Sample	racking		SMO	-	pecial Inst	tructions/	QC Requir	1		13	
Yes     Entered by:     Turnaround Time     I Day*     15 Day     30 Day       Name     Signature     Int.     Company/Organization/Phone/Cell     Sample Disposal     I Entern     I Signature     Int.       Name     Signature     Int.     Company/Organization/Phone/Cell     Sample Disposal     I Entern     I Day*	Valuation	req a:			Date Entr	ered:	1 1 1 2 1 1 2 1 1 1 1 1 1 1 1 1 1 1 1 1			QQ		لا Yes		No	Receip	÷
Name         Signature         Init.         Negotiated TAT           Name         Signature         Init.         Company/Organization/Phone/Cell         Sample Disposal         Return to Client         Disposal by Lab           Dert Lynch         RM         SNL4412/505-844-4013/505-228-0710         Return Samples By:         Send report to Tim Jackson/4142/MS 07/29/284-3307/505-228-0710           Ed Santillanes         MM & Samples By:         Send report to Tim Jackson/4142/MS 07/201505-228-0710         Comments:         Send report to Tim Jackson/4142/MS 07/201505-228-0710           Iam Gibson         MM & Samples By:         Send report to Tim Jackson/4142/MS 07/201505-228-0710         Comments:         Send report to Tim Jackson/4142/MS 07/201505-228-0710           Iam Gibson         MM & Samples By:         Send report to Tim Jackson/4142/MS 07/201505-228-0710         Comments:         Send report of Tim Jackson/4142/MS 07/201505-228-0710           Iam Gibson         MM & Samples By:         Send report Sont Ison tequired using method SW 046-6850. Report Anions as Bir CI, F, SO4. Report Sont Isi isotopes for gamma spec analysis.           Iam Gibson         MM & Samples By:         Send report Sont Isi isotopes for gamma spec analysis.           Iam Gibson         MM & Samples By:         Send report Sont Isi isotopes for gamma spec analysis.           Iam Gibson         MM & Samples By:         Send report Sont Isi isotopes for gamma spec analysis. </td <td>Confirmato</td> <td></td> <td>U Yes</td> <td></td> <td>Entered t</td> <td>×.</td> <td></td> <td></td> <td></td> <td>urnaround</td> <td>Time</td> <td>T Day</td> <td></td> <td></td> <td></td> <td></td>	Confirmato		U Yes		Entered t	×.				urnaround	Time	T Day				
Dert Lynch         Dut Mithanes         Dut Mithanes <td>Sample</td> <td></td> <td>,</td> <td></td> <td>Init.</td> <td>Company</td> <td>Organizati</td> <td>enolPhone</td> <td></td> <td>vegotiated</td> <td>IAI</td> <td></td> <td>1.01</td> <td></td> <td></td> <td></td>	Sample		,		Init.	Company	Organizati	enolPhone		vegotiated	IAI		1.01			
ed Santillanes     HM-MC Sent March     MSNL41421505-284-6870/505-228-0710     Comments:     Sand report to Tim Jackson/4120MS 072924-2547       liam Gibson     MM/ML     MM/ML     MM/ML     NM-41421505-284-3307/505-239-7367     Atkalinity(total as CaC03, HC03, and CO3). If Perchlorate detected verification required using method SW046-6850. Report Anions as Br, CJ, F, SO4. Report short list isotopes for gamma spec analysis.       Immon MM/ML     Send report of the caccos     Br, CJ, F, SO4. Report short list isotopes for gamma spec analysis.       Immon MM/ML     Send report short list isotopes for gamma spec analysis.     Br, CJ, F, SO4. Report short list isotopes for gamma spec analysis.       Immon MM/ML     Send report short list isotopes for gamma spec analysis.     Date     Time       Immon MM/ML     Send report short list isotopes for gamma spec analysis.     Date     Time       Immon MM/ML     Send report short list isotopes for gamma spec analysis.     Date     Time	Team	Robert Ly	nch Kell Mane	Y	2L	SNL/4142/50	5-844-4013	3/505-250		Return Sam	pusar ples Bv:		IO CIIENT	La Uisposal by Lab		
Item Gibson     Image: Construct of the construction of the	Members		tillanes Huldell Su	with	all	SNL/4142/50	5-284-6870	)/505-228		comments:		Send report to	Tim Jackson/	4142/MS 0729/284-2547		
In the second short list isotopes for gamma spec analysis.       In the second short short list isotopes for gamma spec analysis.       In the second short short list isotopes for gamma spec analysis.       In the second short short list isotopes for gamma spec analysis.       In the second short short list isotopes for gamma spec analysis.       In the second short short list isotopes for gamma spec analysis.       In the second short short short list isotopes for gamma spec analysis.       In the second short short short short short short short short list isotopes for gamma spec analysis.       In the second short		William C	ibson WWAAA	1 zult	XIN	SNL/4142/50	5-284-3307	//505-239		Vikalinity(tot	al as CaCo equired us	D3,HCO3,a ing method	nd CO3). SW846-6	If Perchlorate detected 850. Report Anions as		
Orthogram     Out     Out     Out     Out     Date     Th       Orthogram     Control     Contro     Control <t< td=""><td>Dolinoutoho</td><td>1</td><td>11 11 0 4 11</td><td></td><td></td><td></td><td></td><td>1 [</td><td><u> </u></td><td>sr,CI,F,SO4</td><td>Report sl</td><td>nort list isot</td><td>pes for ga</td><td>amma spec analysis.</td><td>Lab Us</td><td>đ</td></t<>	Dolinoutoho	1	11 11 0 4 11					1 [	<u> </u>	sr,CI,F,SO4	Report sl	nort list isot	pes for ga	amma spec analysis.	Lab Us	đ
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CHARTER CONTROL AT CLORE (LTTL) (11 Une ///S 4. Relinquished by Org. Date	Relinquishe	NA PA	AN N. I am	-		11.12	4	1	3. Receive	yd by			Org.	Date	Time	
	Received h	M. m	m. 2 + 2 /2/2		Cuale	11110	lime /	C	I.Relingui	shed by			20	Date	i	

	94													AR/COC 61	616178
Projec	Project Name:		BSG	Project/Task Manager:	Manage		Mike Skelly			Project/Task No.:	sk No.:	146422	146422.10.11.01		
Tech Area:	Area:														
Building:	:Bu		Room:												Lab use
					Depth	Date/Time		Sample	Ĉ	Container	Preserv-	Preserv- Collection Sample	Sample	Parameter & Method	Lab
Samp	Sample No. Fraction	raction	Sample Location D	etail (	(£	Collected		Matrix	Type	Volume	ative	Method	Type	Requested	Sample ID
160	097842 -0	-033	CYN-MW15	-	183 •	•6/11/15	10:14	GW	٩	1 L	HN03	G	SA	Gamma Spectroscopy (EPA 901.0)	024
60	097842 -0	-034	CYN-MW15	-	183 •	6/11/15	10:16	GW	٩	1 L	HNO3	G	SA	Gross Alpha and Beta (EPA 900.0)	092
097	097842 -0	-035	CYN-MW15		183 1	6/11/15	10:18	GW	٩	1 L	HNO3	თ	SA	Isotopic Uranium (HASL 300)	036
160	097842 -0:	-036	CYN-MW15	1	183	6/11/15	10:20	GW	AG	250 ml	None	σ	SA	Tritium (EPA 906.0)	EEU
260	097843 -0	-001	CYN-MW15	. 1	183 .	<i>•</i> 6/11/15	9:46	GW	ს	3x40 ml	HCL	U	Ы	TCL VOC (SW846-8260)	228
097	097843 -0	-005	CYN-MW15	1	183 "(	•6/11/15	9:53	GW	AG	4x1 L	None	υ	na	TPH DRO (SW846-8015D) SVOC	PEd
160	097843 -0	-006	CYN-MW15		183 •	•6/11/15	9:50	GW	AG	3x40 ml	None	ი	na	TPH GRO (SW846-8015A/B) VOC	030
260	097843 -0	600-	CYN-MW15	-	183 .	- 6/11/15	9:58	GW	Р	500 ml	HN03	ი	na	TAL Metals+U (SW846-6020/7470)	031
4 097	097843 -0	-016	CYN-MW15		183 .	.6/11/15	10:00	GW	٩	125 ml	None	G	DU	Anions (SW846-9056)	032
160	097843 -0	-017	CYN-MW15	-	183	-6/11/15	10:02	FGW	٩	500 ml	HN03	g	DO	Metals-Ca,Mg,K,Na (SW846-6020)	003
<b>1</b> 001	097843 -0	-018	CYN-MW15		183 1	,6/11/15	10:04	GW	٩	125 ml	H2SO4	ຍ	na	Nitrate+Nitrite (EPA 353.2)	133
160	097843 -0	-020	CYN-MW15	-	183 •	• 6/11/15	10:05	GW	٩	250 ml	None	g	DU	Perchlorate (EPA 314.0)	134
60	097843 -0	-022	CYN-MW15	-	183 -1	- 6/11/15	10:07	GW	٩	500 ml	None	G	DU	Alkalinity (SM2320B)	035
160	097843 -0	-024	CYN-MW15	-	183 -	6/11/15	10:09 +	GW	AG	4x1 L	None	G	DU	High Explosives (SW846-8321A) Mod	
160	097843 -0	-033	CYN-MW15		183	+6/11/15	10:14	GW	٩	1L	HN03	υ	DU	Gamma Spectroscopy (EPA 901.0)	620
160	097843 -0	-034	CYN-MW15	-	183	•6/11/15	10:16	GW	٩	1 L	HNO3	g	DU	Gross Alpha and Beta (EPA 900.0)	03%
160	097843 -0	-035	CYN-MW15	-	183	6/11/15	10:18	GW	٩	1 L	HN03	G	DU	Isotopic Uranium (HASL 300)	039
160	097843 -0	-036	CYN-MW15	-	183 '	6/11/15	10:20 +	GW	AG	250 ml	None	g	DU	Tritium (EPA 906.0)	0 U U
60	097844 -0	-001	CYN-TB21	-	NA .	•6/11/15	9:46	DIW	U	3x40 ml	HCL	g	TB	TCL VOC (SW846-8260B)	170
1 097	097844 -0	-006	CYN-TB22		NIA -	6/11/1E	1 0:0	NIN	20	3~40 ml		C	f	JOW (a) A 3109 319/WS/ CIAD Hat	211

#### **GEL LABORATORIES LLC**

Report Date: July 9, 2015

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#### **Certificate of Analysis**

	Company : Address :	Sandia National L MS-0756, Org. 06 1515 Eubank SE Albuquerque, New	5765, Bldg. 823/Rm. 4	1276							
	Contact: Project:	Ms. Pamela M. Pu Groundwater, Lev									
	Client Sample ID:	097842-020	er er rackage		Projec	t.	SNLSG	Water	(		
	Sample ID:	374832021			Client		SNLS0				
	Matrix:	AQUEOUS									
	Collect Date:	11-JUN-15 10:05									
	Receive Date:	12-JUN-15			Client	Desc.:	CYN-M	IW15			
	Collector:	Client			Vol. R	ecv.:					
Parameter	Oualit	fier Result	DL	RL	Units	DF	Analyst	Date	Tim	e Batch	Method
Ion Chroma					Cinto		1 mary or	Bute	1 1111	e Buten	method
	Perchlorate by IC "A	As Received"									
Perchlorate		U ND	0.004	0.012	mg/L	1	MXL2 06	/24/15	2240	1485796	1
The follow	ing Analytical Meth	ods were performed	1:								
Method 1	Descri EPA 31-	ption 4.0 DOE-AL			Anal	yst Co	mments				

Notes:

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#### **Certificate of Analysis**

Report Date: July 9, 2015

	Company : Address :	MS-0 1515	a National Laborat 756, Org. 06765, E Eubank SE Juerque, New Mex	3ldg. 823/Rm. 4	276							
	Contact: Project:		amela M. Puissant idwater, Level C P									
	Client Sample ID:	09784		ackage		Proje	·t·	SNLSC	Water			
	Sample ID:	37483				Client		SNLS0				
	Matrix:	AQUI	EOUS									
	Collect Date:	11-JU	N-15 10:05									
	Receive Date:	12-JU	N-15			Client	Desc.:	CYN-M	1W15			
	Collector:	Client				Vol. I	Recv.:					
Denemator	Onali	C	D14	DI	DI	T T : 4 -	DE	A	Dete	<b>T</b> '	. D. (.1	Matha
Parameter	Quali	tier	Result	DL	RL	Units	DF	Analyst	Date	1 1m	e Batch	Method
Ion Chroma	0 1 7											
	Perchlorate by IC "A			0.004	0.012			1000 0		2200		
Perchlorate		U	ND	0.004	0.012	mg/L	1	MXL2 06	5/24/15	2300	1485796	1
-	ring Analytical Meth		re performed:									
Method	Descri					Ana	lyst Co	mments				
1	EPA 31	4.0 DOE-	AL									

Notes:

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



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#### Memorandum

Date: July 22, 2015

To: File

From: Linda Thal

Subject: Inorganic Data Review and Validation – SNL Site: BSG AR/COC: 616174 and 616175 SDG: 374620 Laboratory: GEL Project/Task: 146422.10.11.01 Analysis: General Chemistry

See the attached Data Validation Worksheets for supporting documentation on the data review and validation. This validation was performed according to SNL/NM ER Project AOP 00-03 Rev 4.

#### **Summary**

Two samples were prepared and analyzed with accepted procedures using methods EPA 9056 (anions by IC), EPA 353.2 (nitrate/nitrite) and SM 2320B (total alkalinity). One sample was prepared and analyzed with accepted procedures using method EPA 314.0 (perchlorate). Data were reported for all required analytes. No problems were identified with the data package that resulted in the qualification of data.

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

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

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

#### **Calibration**

All initial and continuing calibration met QC acceptance criteria except as follows. The intercept for chloride was positive and > the MDL. The associated sample results were detects >3X the value of the intercept and will not be qualified.

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

No target analytes were detected in the blanks.

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

#### Laboratory Control Sample (LCS)

All LCS acceptance criteria were met.

#### Matrix Spike (MS)

All MS/PS recoveries met QC acceptance criteria.

It should be noted that the MS analyses for alkalinity were performed on SNL samples of similar matrix from other SDGs. No data will be qualified.

#### Laboratory Replicate

The replicate analyses met all QC acceptance criteria.

It should be noted that the replicate analyses for alkalinity were performed on SNL samples of similar matrix from other SDGs. No data will be qualified.

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

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

Nitrate/nitrite:

Samples -006 and -022 were diluted 25X; MDLs and PQLs were adjusted accordingly

Anions:

Samples -005 and -021 were diluted 20X for chloride and sulfate; MDLs and PQLs were adjusted accordingly.

#### Other QC

No other specific issues that affect data quality were identified.

Reviewed by:Mary DonivanLevel: IDate: 07/27/15



## Sample Findings Summary



#### AR/COC: 616174, 616175

#### Page 1 of 2

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
EPA 900.0/SW846 9310			
	097833-034/CYN-MW12	ALPHA (12587-46-1)	J, FR7
	097833-034/CYN-MW12	BETA (12587-47-2)	BD, FR3
	097836-034/CYN-MW14A	BETA (12587-47-2)	J, FR7
EPA 901.1			
	097833-033/CYN-MW12	Americium-241 (14596-10-2)	BD, FR3
	097833-033/CYN-MW12	Cesium-137 (10045-97-3)	BD, FR3
	097833-033/CYN-MW12	Cobalt-60 (10198-40-0)	BD, FR3
	097833-033/CYN-MW12	Potassium-40 (13966-00-2)	BD, FR3
	097836-033/CYN-MW14A	Americium-241 (14596-10-2)	BD, FR3
	097836-033/CYN-MW14A	Cesium-137 (10045-97-3)	BD, FR3
	097836-033/CYN-MW14A	Cobalt-60 (10198-40-0)	BD, FR3
	097836-033/CYN-MW14A	Potassium-40 (13966-00-2)	BD, FR3
EPA 906.0 Modified			
	097833-036/CYN-MW12	Tritium (10028-17-8)	BD, FR3
	097836-036/CYN-MW14A	Tritium (10028-17-8)	BD, FR3
SW846 3005/6020 DOE-AL			
	097833-009/CYN-MW12	Barium (7440-39-3)	J+, CK2
	097833-009/CYN-MW12	Cadmium (7440-43-9)	J-, CK3
	097833-009/CYN-MW12	Manganese (7439-96-5)	J, MS3,CK2
	097836-009/CYN-MW14A	Cadmium (7440-43-9)	R, CK3
	097836-009/CYN-MW14A	Manganese (7439-96-5)	J, MS3,CK2
SW846 3535/8321A Modifi	ed		
	097833-024/CYN-MW12	m-Nitrotoluene (99-08-1)	UJ, 14
	097833-024/CYN-MW12	Nitrobenzene (98-95-3)	UJ, 14
	097833-024/CYN-MW12	o-Nitrotoluene (88-72-2)	UJ, 14,MS5

#### AR/COC: 616174, 616175

#### Page 2 of 2

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
	097833-024/CYN-MW12	p-Nitrotoluene (99-99-0)	UJ, 14
	097836-024/CYN-MW14A	m-Nitrotoluene (99-08-1)	UJ, 14
	097836-024/CYN-MW14A	Nitrobenzene (98-95-3)	UJ, 14
	097836-024/CYN-MW14A	o-Nitrotoluene (88-72-2)	UJ, I4,MS5
	097836-024/CYN-MW14A	p-Nitrotoluene (99-99-0)	UJ, 14
SW846 8260B DOE-AL			
	097835-001/CYN-FB2	Acetone (67-64-1)	J+, C2

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



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Memorandum

Date:July 21, 2015To:FileFrom:Mary DonivanSubject:Inorganic Data Review and Validation – SNL<br/>Site: BSG<br/>AR/COC: 616176, 616177 and 616178<br/>SDG: 374832<br/>Laboratory: GEL<br/>Project/Task: 146422.10.11.01<br/>Analysis: General Chemistry

See the attached Data Validation Worksheets for supporting documentation on the data review and validation. This validation was performed according to SNL/NM ER Project AOP 00-03 Rev 4.

#### <u>Summary</u>

Four samples were prepared and analyzed with accepted procedures using methods EPA 9056 (anions by IC), EPA 353.2 (nitrate/nitrite), and SM 2320B (total alkalinity). Three samples were prepared and analyzed with accepted procedures using methods EPA 314.0 (perchlorate by IC). Data were reported for all required analytes. No problems were identified with the data package that resulted in the qualification of data.

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

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

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

#### **Calibration**

All initial and continuing calibration met QC acceptance criteria.

#### **Blanks**

No target analytes were detected in the blanks except as follows. Chloride was detected at < the PQL in the EB, sample -047, associated with samples -019 and -032. The associated sample results were detects >5X the EB value and will not be qualified.

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

#### Laboratory Control Sample (LCS)

All LCS acceptance criteria were met.

#### Matrix Spike (MS)

All MS/PS recoveries met QC acceptance criteria with the following exception. Sample -048 had a 25X relative dilution compared to the QC parent sample, -006. Because the sample is the EB, the result will not be qualified, based on professional judgment.

#### Perchlorate:

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

#### Laboratory Replicate

The replicate analyses met all QC acceptance criteria with the following exception. Sample -048 had a 25X relative dilution compared to the QC parent sample, -006. Because the sample is the EB, the result will not be qualified, based on professional judgment.

#### Perchlorate:

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

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

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

Nitrate/nitrite:

Sample -006 was diluted 25X and samples -020 and -033 were diluted 50X to bring analyte concentration within linear range.

Anions:

Samples -005, -019 and -032 were diluted 20X for chloride and sulfate to bring analyte concentrations within linear range.

#### Other QC

An EB was submitted with AR/COC 616177 and was associated with the samples on AR/COC 616178. A field duplicate pair was submitted with AR/COC 616178. 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: 07/22/15



# Sample Findings Summary



#### AR/COC: 616176, 616177, 616178, 616181

Page 1 of 3

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
DOE EML HASL-300, U-02-RO	c		
	097838-035/CYN-MW11	Uranium-235/236 (15117-96- 1/13982-70-)	J, FR7
	097840-035/CYN-EB3	Uranium-233/234 (13968-55- 3/13966-29-)	BD, FR3
	097840-035/CYN-EB3	Uranium-235/236 (15117-96- 1/13982-70-)	BD, FR3
	097840-035/CYN-EB3	Uranium-238 (7440-61-1)	BD, FR3
EPA 900.0/SW846 9310			
	097838-034/CYN-MW11	ALPHA (12587-46-1)	J, FR7
	097838-034/CYN-MW11	BETA (12587-47-2)	BD, FR3
	097840-034/CYN-EB3	ALPHA (12587-46-1)	BD, FR3
	097840-034/CYN-EB3	BETA (12587-47-2)	BD, FR3
	097842-034/CYN-MW15	BETA (12587-47-2)	J, FR7
	097843-034/CYN-MW15	ALPHA (12587-46-1)	J, FR7
	097843-034/CYN-MW15	BETA (12587-47-2)	BD, FR3
EPA 901.1			
	097838-033/CYN-MW11	Americium-241 (14596-10-2)	BD, FR3
	097838-033/CYN-MW11	Cesium-137 (10045-97-3)	BD, FR3
	097838-033/CYN-MW11	Cobalt-60 (10198-40-0)	BD, FR3
	097838-033/CYN-MW11	Potassium-40 (13966-00-2)	BD, FR3
	097840-033/CYN-EB3	Americium-241 (14596-10-2)	BD, FR3
	097840-033/CYN-EB3	Cesium-137 (10045-97-3)	BD, FR3
	097840-033/CYN-EB3	Cobalt-60 (10198-40-0)	BD, FR3
	097840-033/CYN-EB3	Potassium-40 (13966-00-2)	BD, FR3
	097842-033/CYN-MW15	Americium-241 (14596-10-2)	BD, FR3
	097842-033/CYN-MW15	Cesium-137 (10045-97-3)	BD, FR3

#### AR/COC: 616176, 616177, 616178, 616181

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
	097842-033/CYN-MW15	Cobalt-60 (10198-40-0)	BD, FR3
	097842-033/CYN-MW15	Potassium-40 (13966-00-2)	BD, FR3
	097843-033/CYN-MW15	Americium-241 (14596-10-2)	BD, FR3
	097843-033/CYN-MW15	Cesium-137 (10045-97-3)	BD, FR3
	097843-033/CYN-MW15	Cobalt-60 (10198-40-0)	BD, FR3
	097843-033/CYN-MW15	Potassium-40 (13966-00-2)	BD, FR3
EPA 906.0 Modified			
	097838-036/CYN-MW11	Tritium (10028-17-8)	BD, FR3
	097840-036/CYN-EB3	Tritium (10028-17-8)	BD, FR3
	097842-036/CYN-MW15	Tritium (10028-17-8)	BD, FR3
	097843-036/CYN-MW15	Tritium (10028-17-8)	BD, FR3
SW846 3005/6020 DOE-AL			
	097842-009/CYN-MW15	Copper (7440-50-8)	0.0027U, B2
	097843-009/CYN-MW15	Copper (7440-50-8)	0.0027U, B2
SW846 3535/8321A Modifie			
	097838-024/CYN-MW11	1,3,5-Trinitrobenzene (99-35-4)	UJ, IS1
	097838-024/CYN-MW11	2,4,6-Trinitrotoluene (118-96-7)	UJ, IS1
	097838-024/CYN-MW11	2,4-Dinitrotoluene (121-14-2)	UJ, IS1
	097838-024/CYN-MW11	2,6-Dinitrotoluene (606-20-2)	UJ, IS1
	097838-024/CYN-MW11	2-Amino-4,6-dinitrotoluene (35572- 78-2)	UJ, IS1
	097838-024/CYN-MW11	4-Amino-2,6-dinitrotoluene (19406- 51-0)	UJ, IS1
	097838-024/CYN-MW11	HMX (2691-41-0)	UJ, IS1
	097838-024/CYN-MW11	m-Dinitrobenzene (99-65-0)	UJ, IS1
	097838-024/CYN-MW11	m-Nitrotoluene (99-08-1)	UJ, 14,1S1
	097838-024/CYN-MW11	Nitrobenzene (98-95-3)	UJ, 14,1S1
	097838-024/CYN-MW11	o-Nitrotoluene (88-72-2)	UJ, 14,IS1,MS5
	097838-024/CYN-MW11	PETN (78-11-5)	UJ, IS1
	097838-024/CYN-MW11	p-Nitrotoluene (99-99-0)	UJ, 14,1S1

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
	097838-024/CYN-MW11	RDX (121-82-4)	UJ, IS1
	097838-024/CYN-MW11	Tetryl (479-45-8)	UJ, IS1
	097840-024/CYN-EB3	m-Nitrotoluene (99-08-1)	UJ, 14
	097840-024/CYN-EB3	Nitrobenzene (98-95-3)	UJ, 14
	097840-024/CYN-EB3	o-Nitrotoluene (88-72-2)	UJ, 14,MS5
	097840-024/CYN-EB3	p-Nitrotoluene (99-99-0)	UJ, 14
	097842-024/CYN-MW15	m-Nitrotoluene (99-08-1)	UJ, 14
	097842-024/CYN-MW15	Nitrobenzene (98-95-3)	UJ, 14
	097842-024/CYN-MW15	o-Nitrotoluene (88-72-2)	UJ, I4,MS5
	097842-024/CYN-MW15	p-Nitrotoluene (99-99-0)	UJ, 14
	097843-024/CYN-MW15	m-Nitrotoluene (99-08-1)	UJ, 14
	097843-024/CYN-MW15	Nitrobenzene (98-95-3)	UJ, 14
	097843-024/CYN-MW15	o-Nitrotoluene (88-72-2)	UJ, I4,MS5
	097843-024/CYN-MW15	p-Nitrotoluene (99-99-0)	UJ, 14
SW846 8260B DOE-AL			
	097840-001/CYN-EB3	Bromodichloromethane (75-27-4)	J+, C2
	097840-001/CYN-EB3	Methylene chloride (75-09-2)	10.0U, B
	097841-001/CYN-TB19	Methylene chloride (75-09-2)	10.0U, B
	097850-001/CYN-MW12	Methylene chloride (75-09-2)	10.0U, B
	097851-001/CYN-TB27	Methylene chloride (75-09-2)	10.0U, B

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

