Sandia National Laboratories

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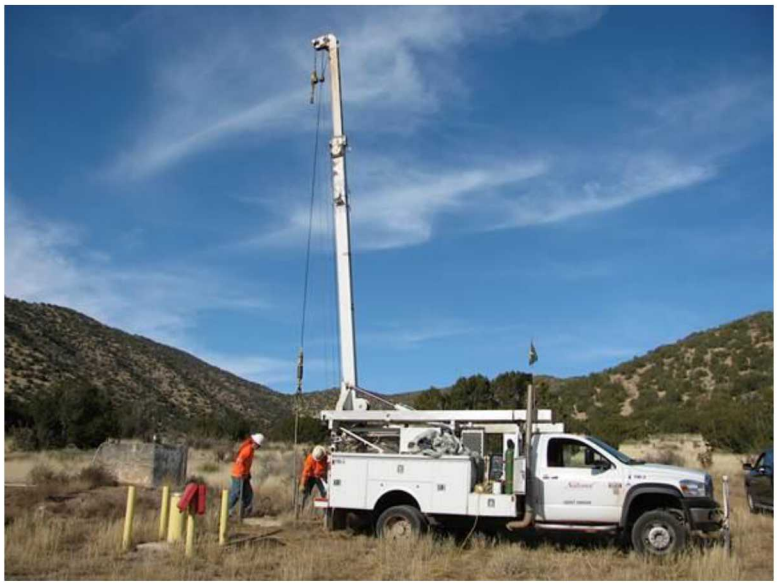
Sandia National Laboratories, New Mexico

Environmental Restoration Operations

A U.S. Department of Energy Environmental Cleanup Program

Consolidated Quarterly Report

October – December 2015



April 2016

U.S. DEPARTMENT OF ENERGY

United States Department of Energy
Sandia Field Office

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CONSOLIDATED QUARTERLY REPORT

April 2016

SANDIA NATIONAL LABORATORIES, NEW MEXICO

ENVIRONMENTAL RESTORATION OPERATIONS

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

NUMBER OF POTENTIAL RELEASE SITES SUBJECT TO RESOURCE CONSERVATION AND RECOVERY ACT FACILITY OPERATING PERMIT, AND THE COMPLIANCE ORDER ON CONSENT: 13

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

REPORTING PERIOD: October – December 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. This ER Quarterly Report presents activities and data in sections as follows:

SECTION I: Environmental Restoration Operations Consolidated Quarterly Report, October – December 2015

SECTION II: Perchlorate Screening Quarterly Groundwater Monitoring Report, October – December 2015

ABBREVIATIONS AND ACRONYMS

µg/L	microgram(s) per liter
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
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
FOP	Field Operating Procedure
GEL	GEL Laboratories LLC
HQ	hazard quotient
HWB	Hazardous Waste Bureau
ISB	in-situ bioremediation
LWDS	liquid waste disposal system
MCL	maximum contaminant level
MDL	method detection limit
MRN	Magazine Road North
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
OIG	Office of Inspector General
ORP	oxidation-reduction potential
PCCP	Post-Closure Care Permit
Permit	RCRA Facility Operating Permit
PGS	Parade Ground South
pH	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
TA	Technical Area
TA1-W	Technical Area-I (Well)
TA2-NW	Technical Area-II (Northwest)
TA2-SW	Technical Area-II (Southwest)
TA2-W	Technical Area-II (Well)
TAVG	Technical Area-V Groundwater
TAG	Tijeras Arroyo Groundwater
TAV	Technical Area-V (acronym used in tables only)
TA-V	Technical Area-V
TBD	to be determined
TJA	Tijeras Arroyo
The Consent Order	the Compliance Order on Consent
TSWP	Treatability Study Work Plan
WYO	Wyoming
VCA	voluntary corrective action

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SECTION I
ENVIRONMENTAL RESTORATION OPERATIONS CONSOLIDATED QUARTERLY REPORT, October – December 2015

1.0 Introduction

This Environmental Restoration Operations Consolidated Quarterly Report (ER Quarterly Report) provides the status of ongoing corrective action activities being implemented by Sandia National Laboratories, New Mexico (SNL/NM) for the October, November, and December 2015 quarterly reporting period.

The Solid Waste Management Units (SWMUs) and Areas of Concern (AOCs) identified for corrective action at SNL/NM are listed in Table I-1. The work completed during this quarter is reported below in Sections I.2.1 and I.2.2. Section I.2.1 summarizes the quarterly activities at sites undergoing corrective action *field* activities (six SWMUs 8 and 58, 68, 149, 154, and 502, and three groundwater AOCs). Section I.2.2 summarizes quarterly activities at sites where the New Mexico Environment Department (NMED) has issued a certificate of completion and the sites are in the corrective action complete (CAC) *regulatory* process. Currently, the Mixed Waste Landfill (MWL, SWMU 76) is the only site in the CAC regulatory process.

Corrective action activities have been deferred at the Long Sled Track (SWMU 83), the Gun Facilities (SWMU 84), and the Short Sled Track (SWMU 240) because these three sites are active mission facilities.

2.0 Environmental Restoration Operations Work Completed

2.1 Sites Undergoing Corrective Action

2.1.1 Solid Waste Management Units 8 and 58, 68, 149, and 154

In February 2015, NMED agreed that corrective action activities at SWMUs 8 and 58, 68, 149, and 154 had been completed, and that certificates of completion could be requested (NMED February 2015). A letter requesting Certificates of Completion for these SWMUs was submitted to NMED on September 9, 2015 (DOE September 2015).

2.1.2 Solid Waste Management Unit 502

The U.S. Department of Energy/National Nuclear Security Administration (DOE/NNSA) and Sandia Corporation (Sandia) formally notified the NMED of this newly identified or suspected SWMU by letter dated December 19, 2012 (DOE December 2012). A January 2013 inspection of the discharge area, with assistance from personnel associated with the processes that generated the wastewater, identified several small zones of discolored soil within a total area approximately 10 feet wide by 25 feet long. Subsequent actions are described in the ER Quarterly Report for July/August/September, 2015.

On June 7, 2013, the DOE/NNSA and Sandia submitted a Voluntary Corrective Action (VCA) Plan to NMED. On July 23, 2013, all field activities were completed in accordance with the VCA Plan.

Results of the VCA were reported to the NMED under a cover letter dated November 12, 2013 (DOE November 2013). DOE/NNSA and Sandia recommended a determination of CAC without controls for SWMU 502, based upon the field investigation results, soil sample analytical data, and the human health and ecological risk assessment analyses.

2.1.3 Burn Site Groundwater Area of Concern

The DOE/NNSA and Sandia met with the NMED Hazardous Waste Bureau (HWB) on July 20, 2015 to discuss the status of sites currently undergoing corrective action. For the Burn Site Groundwater (BSG) AOC, all parties agreed to a weight-of-evidence characterization program: (1) to conduct additional isotopic analyses/nitrate fingerprinting and age-dating of the groundwater; (2) to conduct a transducer study using existing wells to determine if the groundwater is unconfined, semi-confined, or confined; and (3) to conduct a detailed aquifer pumping test to help determine the origin of the elevated nitrates in the groundwater. Activities (1) and (2) will be completed using Sandia-internal work plans. For activity (3), the Aquifer Pumping Test Work Plan for the BSG AOC will be transmitted to the NMED by June 8, 2016 for review and approval.

The following activities occurred at BSG AOC during October, November, and December 2015:

- Groundwater sampling was conducted in October and November 2015. The well identifications and the frequency that these wells are sampled are presented in Table I-2. Perchlorate analysis of groundwater samples for BSG AOC is discussed in Section II

of this ER Quarterly Report. The analytical results for Calendar Year (CY) 2015 groundwater monitoring will be presented in the SNL/NM CY 2015 Annual Groundwater Monitoring Report, which is anticipated to be submitted to the NMED in the summer of 2016.

- Groundwater samples for isotope analyses were collected in October and November 2015.

- A vertical profiling log was conducted at the Burn Site Well and CYN-MW11 that measured water temperature and conductivity versus depth in the well.

- The DOE/NNSA and Sandia met with the NMED HWB on December 8, 2015 to further discuss the status of the BSG AOC weight-of-evidence characterization program.

2.1.4 Technical Area-V Groundwater Area of Concern

Trichloroethene (TCE) and nitrate have been identified as constituents of concern in groundwater at the Technical Area-V Groundwater (TAVG) AOC based on detections above the U.S. Environmental Protection Agency (EPA) maximum contaminant levels (MCLs) in samples collected from monitoring wells. The EPA MCLs and State of New Mexico drinking water standards for TCE and nitrate are 5 micrograms per liter (µg/L) and 10 milligrams per liter (as nitrogen), respectively.

Personnel from the DOE/NNSA, DOE Headquarters Office of Environmental Management, Sandia, and NMED have worked together to address the groundwater contamination at TAVG AOC. A meeting was held at the NMED HWB on July 20, 2015, and all parties agreed on a phased treatability study for in-situ bioremediation (ISB) to treat the groundwater contamination at TAVG AOC. For the treatability study, up to three injection wells will be installed at TA-V in the vicinity of the highest contaminant concentrations in groundwater detected in monitoring wells LWDS-MW1, TAV-MW6, and TAV-MW10. The proposed injection wells will be used to deliver substrate solution and bioaugmentation culture to the contaminated groundwater. The substrate solution containing essential food and nutrients for biostimulation will be prepared in aboveground tanks. The substrate solution will be gravity-injected along with bioaugmentation culture to the groundwater via injection wells. The overall objective is to assess the feasibility of using ISB to remediate groundwater contamination at TA-V.

The following activities occurred at TAVG AOC during October, November, and December 2015:

- DOE/NNSA completed its review of the National Environmental Policy Act Checklist for the ISB treatability study at TAVG AOC on October 30, 2015.

- DOE/NNSA and Sandia updated the 2004 Current Conceptual Model (CCM) (SNL/NM April 2004) and submitted it to the NMED on October 20, 2015 (DOE October 2015). NMED approved the CCM on November 30, 2015 (NMED November 2015). A summary of the CCM is provided below.

  The conceptual site model of contaminant transport at TA-V includes contaminant releases from the two primary sources, migration through the vadose zone, and movement into and along with groundwater. TCE was presumably present in wastewater that was discharged to the underground Liquid Waste Disposal System drain field during the period from 1962 to 1967, and to the buried TA-V seepage pits from the 1960s until the early 1980s. Wastewater discharged to the seepage pits from the early 1980s until 1992 contained no TCE.

  Wastewater containing dissolved TCE and other organic solvents moved downward through the alluvial-fan sediments and into the regional aquifer. Wastewater from the early 1980s containing no TCE continued to flush the vadose zone beneath the seepage pits until 1992, which most likely removed a significant portion of secondary contaminant sources. Upon cessation of wastewater disposal, drainage diminished through vertical pathways in the vadose zone. Low concentrations of TCE present in the regional aquifer today represent the wastewater releases before 1992. The combined effect of low groundwater flow velocities, dispersion, diffusion, and sorption are responsible for the current distribution of TCE in the regional aquifer.

  Nitrate was present in sanitary waste disposed to TA-V seepage pits till 1992. The distribution of nitrate concentrations is laterally widespread in the area, both inside and outside the TA-V boundary. An upgradient source of nitrate may also be present based on nitrate concentrations exceeding MCL in monitoring wells upgradient of TA-V.

  Groundwater contamination at TA-V is monitored through a 16-well network, in place since November 2010. The distribution of TCE and nitrate in groundwater have been relatively stagnant with the highest concentrations of TCE and nitrate remaining in the central area of TA-V near monitoring wells LWDS-MW1, TAV-MW6, and TAV-MW10. The CCM recommends two additional groundwater monitoring wells be installed south of TA-V to define the extent of TCE contamination on the southern boundary.

- DOE/NNSA and Sandia prepared a Treatability Study Work Plan (TSWP) to implement ISB at TAVG AOC and submitted it to NMED on October 20, 2015 (DOE October 2015). NMED disapproved the TSWP on December 3, 2015 and requested a revised TSWP and a response letter to the disapproval comments by January 29, 2016 (NMED December 2015). DOE/NNSA and Sandia are revising the TSWP and responding to NMED's comments.

- Groundwater sampling was conducted in November and December 2015. The well identification and the frequency that these wells were sampled are presented in Table I-2. The analytical results for groundwater monitoring will be presented in the SNL/NM CY 2015 Annual Groundwater Monitoring Report, which is anticipated to be submitted to the NMED in the summer of 2016.

2.1.5 Tijeras Arroyo Groundwater Area of Concern

Groundwater sampling at the Tijeras Arroyo Groundwater (TAG) AOC was conducted in November 2015.

All quarterly groundwater monitoring data from the TAG AOC will be presented in the SNL/NM CY 2015 Annual Groundwater Monitoring Report, which is anticipated to be submitted to the NMED in the summer of 2016.

2.2 Sites in Corrective Action Complete Regulatory Process

After NMED certifies completion of corrective action activities at a SWMU or an AOC, a Class 3 Permit Modification to the Resource Conservation and Recovery Act (RCRA) Facility Operating Permit (Permit) is requested, to formally change the status of the SWMU or AOC to that of CAC. The Class 3 CAC Permit Modification process is a regulatory process. Currently, the MWL is the only site in the CAC regulatory process.

2.2.1 Mixed Waste Landfill

The NMED issued the Certificate of Completion for the MWL on October 8, 2014 (NMED October 2014). The DOE/NNSA and Sandia subsequently submitted a Class 3 Permit Modification Request to NMED to change the MWL status to CAC with controls on October 17, 2014 (DOE 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. NMED issued a

public notice announcing their intent to approve the DOE/NNSA and Sandia request for CAC with controls status for the MWL and initiated a 60-day public comment period that started on January 12, 2015 (NMED January 2015). On March 17, 2015, NMED extended this public comment period an additional 30 days, to April 13, 2015. On April 29 and May 4, 2015, NMED conducted informal negotiations to avoid a public hearing with all parties that requested a hearing during the public comment period. These meetings were unsuccessful, so the NMED proceeded with a public hearing from July 8 through 11, 2015. During the hearing, Sandia staff provided direct and rebuttal testimony, as well as being subjected to cross-examination.

During this reporting period, the Hearing Officer's Report was issued in October recommending CAC with controls status be granted for the MWL. As of December 31, 2015 the NMED Secretary had not issued a final decision. The DOE Office of Inspector General (OIG) special investigation of the MWL that was triggered by requests to their hotline in late 2014 and early 2015 was ongoing during the reporting period. The draft OIG report was issued on November 4, 2015 and DOE/NNSA and Sandia submitted consolidated comments on November 10, 2015. A final OIG special investigation report had not been issued as of December 31, 2015.

2.3 Environmental Restoration Operations Documents Submitted to the New Mexico Environment Department Pending Regulatory Review and Approval

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

- The BSG Interim Measures Work Plan submitted to the NMED on May 26, 2005 (SNL/NM May 2005).

- The BSG Current Conceptual Model of Groundwater Flow and Contaminant Transport submitted to the NMED on April 9, 2008 (SNL/NM March 2008).

- The TA-V Geophysical Logs and Slug Test Results Report submitted to the NMED on November 24, 2010 (SNL/NM November 2010).

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

- The Investigation Report for Voluntary Corrective Action at SWMU 502 Building 9938 Surface Discharge Site submitted to the NMED on November 12, 2013 (DOE November 2013).

- The Class 3 Permit Modification Request dated October 17, 2014 for CAC with controls status for the MWL (DOE October 2014).

- Request for Certificates of Completion for SWMUs 8 and 58, 68, 149, and 154 (DOE September 2015).

3.0 References

New Mexico Environment Department, April 2013. Letter to G.L. Beausoleil (U.S. Department of Energy (NNSA)/Sandia Site Office) and Stanley A. Orrell (Sandia National Laboratories, New Mexico). "Approval SWMU Assessment Report for Building 9938 Surface Discharge Site, February 2013. Sandia National Laboratories, EPA ID# NM5890110518 HWB-SNL-MISC," April 3, 2013.

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.

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.

New Mexico Environment Department (NMED), February 2015. Letter to G. Beausoleil (U.S. Department of Energy (NNSA)/Sandia Site Office) and P. Davies (Sandia National Laboratories, New Mexico). "Approval Annual Groundwater Monitoring Report, Calendar Year 2013, June 2014. Sandia National Laboratories, EPA ID# NM5890110518, HWB SNL 14 013." Hazardous Waste Bureau, New Mexico Environment Department, Santa Fe, New Mexico, February 4, 2015.

New Mexico Environment Department (NMED), November 2015. Approval Current Conceptual Model for Technical Area-V Groundwater Area of Concern at Sandia National Laboratories, September 2015, Sandia National Laboratories, EPA ID# NM5890110518, HWB-SNL-15-021, New Mexico Environment Department, Santa Fe, New Mexico, November 30, 2015.

New Mexico Environment Department (NMED), December 2015. Disapproval Treatability Study Work Plan for In-Situ Bioremediation at the Technical Area-V Groundwater Area of Concern, September 2015, Sandia National Laboratories, EPA ID# NM5890110518, HWB-SNL-15-020, New Mexico Environment Department, Santa Fe, New Mexico, December 3, 2015.

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Sandia National Laboratories, New Mexico (SNL/NM), April 2004. "Current Conceptual Model of Groundwater Flow and Contaminant Transport at Sandia National Laboratories/New Mexico Technical Area-V," SAND Report SAND2004-1470, Sandia National Laboratories, Albuquerque, New Mexico.

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.

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

U.S. Department of Energy (NNSA/Sandia Field Office), December 2012. Letter to J. Kieling (New Mexico Environment Department). "Notification of Newly Identified or Suspected Solid Waste Management Unit/Area of Concern at Sandia National Laboratories/New Mexico," December 19, 2012.

U.S. Department of Energy (NNSA/Sandia Field Office), February 2013. Letter to J. Kieling (New Mexico Environment Department). "Submittal of Solid Waste Management Assessment report for Building 9938 Surface Discharge Site for Sandia National Laboratories/New Mexico, Environmental Protection Agency, Identification Number NM 5890110518," February 12, 2013.

U.S. Department of Energy (NNSA/Sandia Field Office), April 2013. Letter to J. Kieling (New Mexico Environment Department). "Submittal of Surface Soil Sampling Results for Building9938 Surface Discharge Site for Sandia National Laboratories/New Mexico," April 2, 2013

U.S. Department of Energy (NNSA/Sandia Field Office), June 2013. Letter to J. Kieling (New Mexico Environment Department). "Submittal of Long Term Stewardship Voluntary Corrective Action Plan for Building 9938 Surface Discharge Site for Sandia National Laboratories/New Mexico, Environmental Protection Agency, Identification Number NM 5890110518," June 7, 2013.

U.S. Department of Energy (NNSA/Sandia Field Office), November 2013. Letter to D. Cobrain (New Mexico Environment Department). "Submittal of Investigation Report for Voluntary Corrective Action at Solid Waste Management Unit 502 Building 9938 Surface Discharge Site for Sandia National Laboratories/New Mexico, EPA ID NM5890110518., November 2013.

U.S. Department of Energy (NNSA/Sandia Field Office), 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.

U.S. Department of Energy (NNSA/Sandia Field Office), September 2015. Letter to J.E. Keiling (New Mexico Environment Department) request for Certificates of Completion from the New Mexico Environment Department for Solid Waste Management Units (SWMUs) 68 and 149 (without controls) and SWMUs 154, 8, and 58 (with controls). EPA ID#5890110518, September 4, 2015.

U.S. Department of Energy (DOE), October 2015. Treatability Study Work Plan for In-Situ Bioremediation at the Technical Area-V Groundwater Area of Concern, and Current Conceptual Mode for Technical Area-V Groundwater Area of Concern at Sandia National Laboratories, New Mexico, U.S. Department of Energy, National Nuclear Security Administration, Sandia Field Office, Albuquerque, New Mexico, October 20, 2015.

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Tables

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

Solid Waste Management Units and Areas of Concern	
Site Number	**Site Description**
8	Open Dump (CCBA)
58	CCBA
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
NA	Tijeras Arroyo Groundwater Investigation (TAG AOC)
NA	TA-V Groundwater Investigation (TAVG AOC)
NA	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-2
Groundwater Sampling and Analysis

Investigation Site	Sampling Frequency in CY 2015[a]	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-MW11, TAV-MW12, TAV-MW13, TAV-MW14
BSG AOC	Semiannually	2,4	AGMR	Section II of ER Quarterly	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-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

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

AGMR = Annual Groundwater Monitoring Report.
ALTMM = Annual Long-Term Monitoring and Maintenance.
AOC = Area of Concern.
AVN = Area V (North).
BSG = Burn Site Groundwater (Area of Concern).
BW = Background well.
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 Arroyo.
WYO = Wyoming.

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SECTION II
PERCHLORATE SCREENING QUARTERLY GROUNDWATER MONITORING REPORT, October – December 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 fourth quarter of calendar year (CY) 2015 (October, November, and December 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; the negotiated semiannual sampling frequency transferred to this well.

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 fortieth to be submitted since the November 2005 letter report; the previous reports were submitted for fourth quarter of CY 2005 through the third quarter of CY 2015 (SNL/NM February 2006 and January 2016).

Groundwater at BSG AOC monitoring well CYN-MW15 was sampled semiannually and was sampled for the third 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 fourth quarter of CY 2015 (October, November, and December 2015) for the one well currently active in the perchlorate screening program (CYN-MW15) as shown on Figure II-1 and listed in Table II-1. In accordance with the requirements of Table XI-1 of the Consent Order, a well with four consecutive quarters of nondetects (NDs) for perchlorate at the screening level/method detection limit (MDL) of 4 micrograms per liter (µg/L) is removed from the requirement of continued monitoring for perchlorate.

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

SNL/NM personnel performed groundwater sampling for perchlorate at monitoring well CYN-MW15 on November 10, 2015 (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 First Quarter, Fiscal Year 2016" (SNL/NM September 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™ groundwater sampling system was used to collect the groundwater samples. The sampling pump and tubing bundle were decontaminated prior to placement into the monitoring well in accordance with procedures described in FOP 05-03, "Groundwater Monitoring Equipment Decontamination" (SNL/NM January 2015a). 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 2015b). Field water quality measurements for turbidity, pH, temperature, specific conductance (SC), oxidation-reduction potential (ORP), and dissolved oxygen (DO) were obtained from the well prior to collecting the groundwater sample. Groundwater temperature, SC, ORP, DO, and pH were measured with an YSI™ Model EXO1 water quality meter. Turbidity was measured with a HACH™ Model 2100Q turbidity meter. Purging continued until four stable measurements for turbidity, pH, temperature, and SC were obtained. Groundwater stability is considered acceptable when the following parameters are achieved:

- Turbidity measurements are less than 5 nephelometric turbidity units (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 µg/L are considered by the NMED as evidence of the absence of perchlorate, such that additional monitoring for perchlorate in that well is not required. If perchlorate is detected using the screening level/MDL of 4 µg/L in a specific well, then monitoring will continue at that well at a frequency negotiated with the NMED. The Consent Order (NMED April 2004) also requires that for detections equal to or greater than 4 µg/L, DOE/Sandia will evaluate the nature and extent of perchlorate contamination and incorporate the results of this evaluation into a Corrective Measures Evaluation (CME), based on a screening level/MDL of 4 µg/L. 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 µg/L was used in the risk assessment. The calculated hazard quotient (HQ) of 0.35 is less than the NMED target level of a hazard index (the sum of all HQs) of 1.0 (NMED June 2006, SNL/NM March 2008–Appendix E). For another point of comparison, NMED risk assessment guidance has a tap water standard for perchlorate of 13.8 µg/L (NMED March 2015); therefore, the historical maximum concentration detected is 35 percent less than the NMED standard.

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 was replaced. The replacement monitoring well (CYN-MW15) was installed in December 2014 and assumed the negotiated quarterly monitoring 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 (TAG) AOC and at four monitoring wells in the Technical Area-V Groundwater AOC (NMED April 2009). All nine wells from these two AOCs 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 TAG monitoring well (TA2-SW1-320) was damaged and was replaced by well, TA2-W-28 in December 2014. The replacement well was installed 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 TAG wells selected for perchlorate sampling, replacement 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 well CYN-MW15 in the fourth quarter of CY 2015. Table II-4 summarizes current and historical perchlorate results for CYN-MW15. The analytical laboratory COA for the fourth 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 well 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 September 2015), were identified during the fourth 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 well 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 semiannual monitoring of perchlorate for monitoring well CYN-MW15.

6.0 References

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Figures

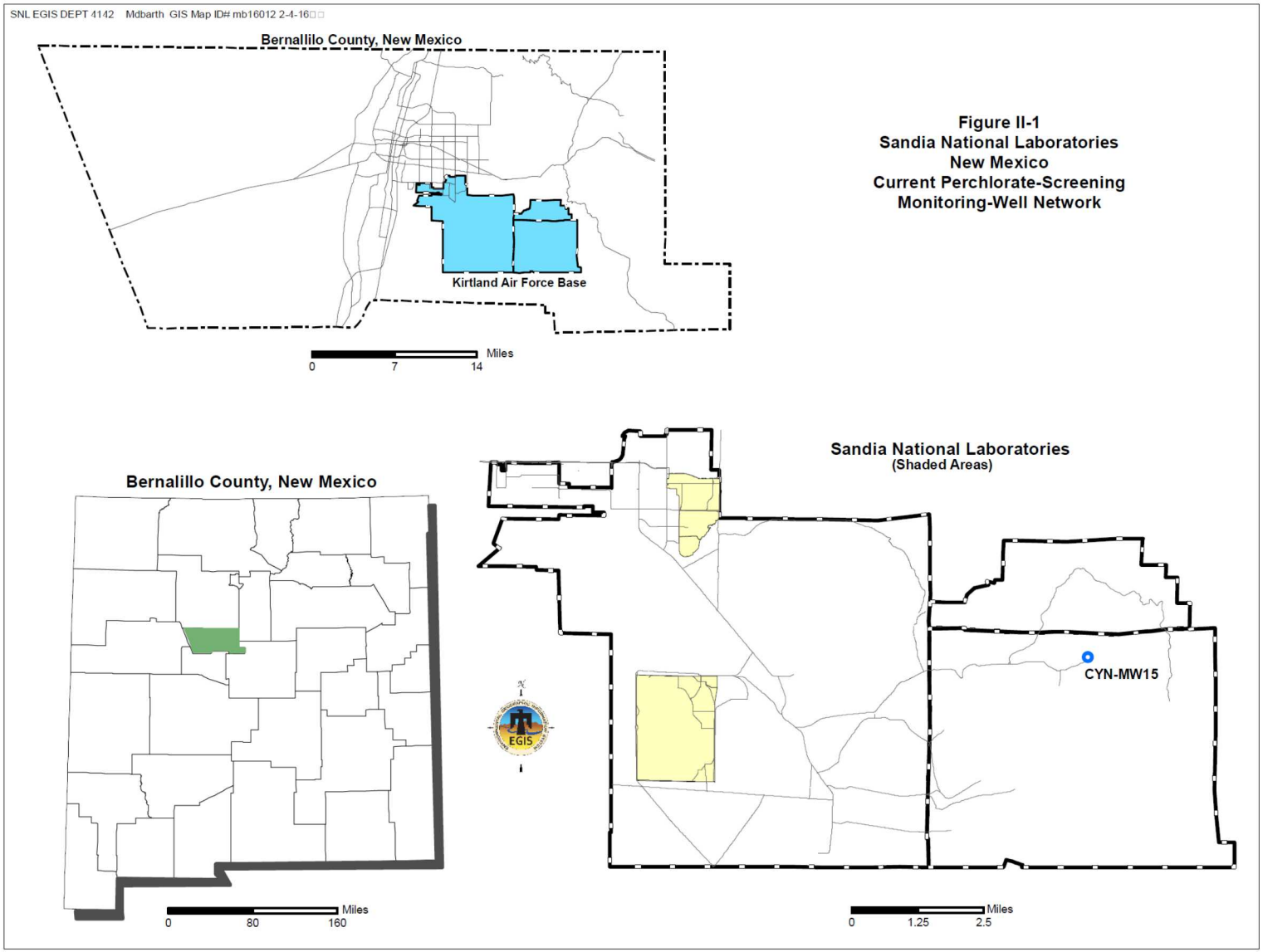

Figure II-1
Sandia National Laboratories, New Mexico
Current Perchlorate Screening Monitoring Well Network, October – December 2015

Tables

Table II-1
Current Perchlorate Screening Monitoring Well Network
Fourth Quarter, CY 2015

Well	Date Sampled	Number of Consecutive Sampling Events[a]	Remaining Number of Sampling Events	Sampling Equipment
CYN-MW15	10-Nov-15	3	TBD[b]	Bennett™ Pump

Notes

[a]Includes this sampling event.
[b]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-2
Monitoring 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
CYN-MW14A
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 = Liquid Waste Disposal System.
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 Fourth Quarter, CY 2015 Perchlorate Sampling

Well	Sample Identification	AR/COC Number	Associated Groundwater Investigation
CYN-MW15	098486-020	616396	BSG AOC

Notes

AOC = Area of Concern.
AR/COC = Analysis Request/Chain-of-Custody.
BSG = Burn Site Groundwater.
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 Fourth 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[a]	Validation Qualifier[b]	Analytical Method[c]	Comments
Burn Site Groundwater Area of Concern											
CYN-MW15	17-Dec-14	615941	096979-020	ND	4.0	12	NE	U		EPA 314.0	
	11-Jun-15	616178	097842-020	ND	4.0	12	NE	U		EPA 314.0	
			097843-020	ND	4.0	12	NE	U		EPA 314.0	Duplicate sample
	10-Nov-15	616396	098486-020	ND	4.0	12	NE	U		EPA 314.0	

Notes

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

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

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

µg/L = Micrograms per liter.
AR/COC = Analysis Request/Chain-of-Custody.
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 = Nondetect (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-5
Perchlorate Screening Groundwater Monitoring
Field Water Quality Measurements[a], Fourth Quarter, CY 2015

Well	Sample Date	Temperature (°C)	Specific Conductivity (µmhos/cm)	Oxidation-Reduction Potential (mV)	pH	Turbidity (NTU)	Dissolved Oxygen (% Sat)	Dissolved Oxygen (mg/L)
Burn Site Groundwater Area of Concern								
CYN-MW15	10-Nov-15	16.36	1122.4	365.1	7.00	0.27	14.8	1.44

Notes

[a]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

SMO 2012-ARCOC (4-2012)

AOP 95-16

CONTRACT LABORATORY
ANALYSIS REQUEST AND CHAIN OF CUSTODY

Internal Lab

Page 1 of 1

Batch No.

SMO Use

AR/COC 616396

Project Name: BSG	Date Samples Shipped: 11/10/15	SMO Authorization:	☐ Waste Characterization
Project/Task Manager: Mike Skelly	Carrier/Waybill No. 241006	SMO Contact Phone:	☐ RMMA
Project/Task Number: 146422.10.11.01	Lab Contact: Edie Kent/843-556-8171	Wendy Palencia/505-844-3132	☐ Released by COC No.
Service Order: CF058-16	Lab Destination: X GEL	Send Report to SMO:	☑ 4° Celsius
	Contract No.: PO 1303873	Stephanie Montano/505-284-2553	Bill to:Sandia National Laboratories (Accounts Payable), P.O. Box 5800, MS-0154 Albuquerque, NM 87185-0154 385191
Tech Area:			
Building: Room:	Operational Site:		

Sample No.	Fraction	Sample Location Detail	Depth (ft)	Date/Time Collected	Sample Matrix	Container Type	Container Volume	Preservative	Collection Method	Sample Type	Parameter & Method Requested	Lab Sample ID
098486	-005	CYN-MW15	183	11/10/15 10:06	GW	AG	4x1 L	None	G	SA	TPH DRO (SW846-8015A/B) SVOC	001
098486	-006	CYN-MW15	183	11/10/15 10:04	GW	AG	3x40 ml	None	G	SA	TPH GRO (SW846-8015A/B) VOC	002
098486	-018	CYN-MW15	183	11/10/15 10:07	GW	P	125 ml	H2SO4	G	SA	Nitrate+Nitrite (EPA 353.2)	003
098486	-020	CYN-MW15	183	11/10/15 10:08	GW	P	250 ml	None	G	SA	Perchlorate (EPA 314.0)	004
098487	-006	CYN-TB13	NA	11/10/15 10:04	DIW	AG	3x40 ml	None	G	TB	TPH GRO (SW846-8015A/B) VOC	005

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

Sample Team Members	Name	Signature	Init.	Company/Organization/Phone/Cell
	Robert Lynch	Robert Lynch	RL	SNL/4142/505-844-4013/505-250-7090
	Alfred Santillanes	Alfred Santillanes	AS	SNL/4142/505-284-6870/505-228-0710
	William Gibson	William Gibson	WG	SNL/4142/505-284-3307/505-239-7367
	Tim Jackson	Tim Jackson	TJ	SNL/4142/505-284-2547/505-263-6639

Sample Disposal ☐ Return to Client ☑ Disposal by Lab

Return Samples By:

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

If perchlorate detected, then perform verification analysis using method SW846-6850

Lab Use

1.Relinquished by	Tim Jackson	Org. 4142	Date 11/10/15	Time 1056	3.Relinquished by		Org.	Date	Time
1. Received by	Robert Lynch	Org. 4142	Date 11/10/15	Time 1056	3. Received by		Org.	Date	Time
2.Relinquished by	Robert Lynch	Org. 4142	Date 11/10/15	Time 1125	4.Relinquished by		Org.	Date	Time
2. Received by		Org. CEL	Date 11-11-15	Time 0735	4. Received by		Org.	Date	Time

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

Certificate of Analysis

Report Date: December 8, 2015

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

Client Sample ID:	098486-020	Project:	SNLSGWater
Sample ID:	385191004	Client ID:	SNLS004
Matrix:	AQUEOUS		
Collect Date:	10-NOV-15 10:08		
Receive Date:	11-NOV-15	Client Desc.:	CYN-MW15
Collector:	Client	Vol. Recv.:	

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Ion Chromatography											
EPA 314.0 Perchlorate by IC "As Received"											
Perchlorate	U	ND	0.004	0.012	mg/L	1	MXL2	12/02/15	0015	1523035	1

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	EPA 314.0 DOE-AL	

Notes:

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

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

Memorandum

Date: December 15, 2015

To: File

From: Mary Donivan

Subject: Inorganic Data Review and Validation – SNL
Site: BSG
AR/COC: 616387 and 616396
SDG: 385191
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 method EPA 353.2 (nitrate/nitrite) and 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.

Calibration

All initial and continuing calibration met QC acceptance criteria.

Blanks

No target analytes were detected in the blanks.

Laboratory Control Sample (LCS)

All LCS acceptance criteria were met.

Matrix Spike (MS)

All MS/PS recoveries met QC acceptance criteria.

Laboratory Replicate

The replicate analyses met all QC acceptance criteria.

Detection Limits/Dilutions

All detection limits were properly reported. Sample -003was diluted 25X and sample -008 was diluted 50X to bring analyte concentrations within the linear range for nitrate/nitrite. MDLs and PQLs were adjusted accordingly

Other QC

No other specific issues that affect data quality were identified.

Reviewed by: Linda Thal **Level I** **Date:** 12/15/2015

Sample Findings Summary

AR/COC: 616387, 616396

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

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

Sandia National Laboratories