

Sandia National Laboratories, New Mexico

Environmental Restoration Operations

A U.S. Department of Energy Environmental Cleanup Program

Consolidated Quarterly Report

April – June 2018



Historic photograph above shows the excavation of weapon debris at SWMU 228A (Centrifuge Dump Site) in July 1998.

October 2018



United States Department of Energy
Sandia Field Office

CONSOLIDATED QUARTERLY REPORT

October 2018

SANDIA NATIONAL LABORATORIES, NEW MEXICO

ENVIRONMENTAL RESTORATION OPERATIONS

U.S. DEPARTMENT OF ENERGY:
CONTRACTOR:

SANDIA FIELD OFFICE
NATIONAL TECHNOLOGY AND
ENGINEERING SOLUTIONS OF SANDIA
John R. Cochran

PROJECT MANAGER:

NUMBER OF POTENTIAL RELEASE SITES SUBJECT TO CORRECTIVE ACTION: 12

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

REPORTING PERIOD: April – June 2018

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 Compliance Order on Consent. Table I-2 lists the 12 sites in the corrective action process. This ER Quarterly Report presents activities and data as follows:

SECTION I: Environmental Restoration Operations Consolidated Quarterly Report,
April – June 2018

SECTION II: Perchlorate Screening Quarterly Groundwater Monitoring Report,
April – June 2018

SECTION III: Technical Area (TA)-V In-Situ Bioremediation Treatability Study Pilot Test
Results

ABBREVIATIONS AND ACRONYMS

AGMR	Annual Groundwater Monitoring Report
AOC	Area of Concern
AVN	Area V (North) (acronym used for well identification numbers in tables only)
BSG	Burn Site Groundwater
CAC	corrective action complete
CCBA	Coyote Canyon Blast Area
CCM	Current Conceptual Model
CME	Corrective Measures Evaluation
COA	certificates of analysis
COC	constituent of concern
Consent Order	Compliance Order on Consent
CTF	Coyote Test Field
CY	Calendar Year
CYN	Canyons (acronym used for well identification numbers in tables only at Burn Site Groundwater Area of Concern)
DO	dissolved oxygen
DOE	U.S. Department of Energy
DP	Discharge Permit
EPA	U.S. Environmental Protection Agency
ER	Environmental Restoration Operations
ER Quarterly Report	Environmental Restoration Operations Consolidated Quarterly Report
FOP	Field Operating Procedure
GEL	GEL Laboratories LLC
GWQB	Ground Water Quality Bureau
HQ	hazard quotient
HWB	Hazardous Waste Bureau
INJ	injection (acronym used for well identification only)
ISB	in-situ bioremediation
LWDS	liquid waste disposal system (acronym used for well identification only)
MCL	maximum contaminant level
MDL	method detection limit
mg/L	milligrams per liter
µg/L	microgram(s) per liter
MW	monitoring well (acronym used for well identification only)
NA	not applicable
ND	nondetect
NMED	New Mexico Environment Department

NNSA	National Nuclear Security Administration
NPN	nitrate plus nitrite
NTU	nephelometric turbidity unit
ORP	oxidation-reduction potential
Permit	Resource Conservation and Recovery Act Facility Operating Permit
PGS	Parade Ground South (acronym used for well identification only)
pH	potential of hydrogen (negative logarithm of the hydrogen ion concentration)
QC	quality control
SAP	sampling and analysis plan
SC	specific conductivity
SNL/NM	Sandia National Laboratories, New Mexico
SWMU	Solid Waste Management Unit
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)
TAG	Tijeras Arroyo Groundwater
TAV	Technical Area-V (acronym used for well identification numbers in tables only)
TA-V	Technical Area-V
TAVG	Technical Area-V Groundwater
TCE	trichloroethene
TJA	Tijeras Arroyo (acronym used for well identification numbers in tables only)
TS/IM	Treatability Study/Interim Measure
TSWP	Treatability Study Work Plan
WYO	Wyoming (acronym used for well identification numbers in tables only)

SECTION I

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SECTION I

ENVIRONMENTAL RESTORATION OPERATIONS CONSOLIDATED

QUARTERLY REPORT, April – June 2018

1.0 Introduction

This Environmental Restoration Operations (ER) Consolidated Quarterly Report provides the status of ongoing corrective action activities being implemented at Sandia National Laboratories, New Mexico (SNL/NM) during the April, May, and June 2018 quarterly reporting period.

Table I-1 lists the Solid Waste Management Units (SWMUs) and Areas of Concern (AOCs) identified for corrective action at SNL/NM. Sections I.2.1 and I.2.2 summarize the work completed during this quarter. Section I.2.1 summarizes the quarterly activities at sites undergoing corrective action *field* activities. Field activities are conducted at the three groundwater AOCs (Burn Site Groundwater [BSG AOC], Technical Area [TA]-V [TA-V] Groundwater [TAVG AOC], and Tijeras Arroyo Groundwater [TAG AOC]). Section I.2.2 summarizes quarterly activities at sites where the New Mexico Environment Department (NMED) Hazardous Waste Bureau (HWB) has issued a certificate of completion and the sites are in the corrective action complete (CAC) *regulatory* process. During the second quarter of 2018, SWMUs 8 and 58, 68, 149, 154, and 502 were in the CAC regulatory process.

Corrective action activities are 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. These three active mission sites are located in TA-III.

2.0 Environmental Restoration Operations Work Completed

The following subsections describe the ER work completed during the second quarter 2018.

2.1 Sites Undergoing Corrective Action

In a letter dated April 14, 2016, the NMED HWB defined the scope and milestones for corrective action at three groundwater AOCs (BSG AOC, TAVG AOC, and TAG AOC)

(NMED April 2016). Sections 2.1.1 through 2.1.3 discuss the specific milestones from this letter.

2.1.1 Burn Site Groundwater Area of Concern

Nitrate has been identified as a constituent of concern (COC) in groundwater at the BSG AOC based on detections above the U.S. Environmental Protection Agency (EPA) maximum contaminant level (MCL) in samples collected from monitoring wells. The EPA MCL and State of New Mexico drinking water standard for nitrate is 10 milligrams per liter (mg/L) (as nitrogen).

The U.S. Department of Energy/National Nuclear Security Administration (DOE/NNSA) and SNL/NM personnel met with the NMED HWB on July 20, 2015 to discuss the status of sites currently undergoing corrective action. For the 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 whether the groundwater is unconfined, semi-confined, or confined; and (3) to conduct an aquifer pumping test to help determine the origin of the elevated nitrates in the groundwater.

Semiannual sampling at the BSG AOC currently includes perchlorate analyses at one groundwater monitoring well.

The following activities occurred at BSG AOC during April, May, and June 2018:

- Groundwater sampling was conducted in April 2018. Table I-3 presents the identification and the sampling frequency for these monitoring wells. The analytical results for Calendar Year (CY) 2018 groundwater monitoring will be presented in the SNL/NM CY 2018 Annual Groundwater Monitoring Report (AGMR), which is anticipated to be submitted to the NMED HWB in the summer of 2019.
- Perchlorate analysis of groundwater samples from the BSG AOC is discussed in Section II of this ER Quarterly Report.
- Submitted a letter titled “Recommendations for Additional Characterization Activities at the Burn Site Groundwater Area of Concern (AOC)” to the NMED HWB on June 5 (DOE June 2018a).

- Received a letter titled “Disapproval: Recommendations for Additional Characterization Activities at the Burn Site Groundwater Area of Concern (AOC), June 2018” from the NMED HWB on June 29 (NMED June 2018). NMED HWB requires installation of a minimum of four new groundwater monitoring wells to characterize the AOC.

2.1.2 **Technical Area-V Groundwater Area of Concern**

Trichloroethene (TCE) and nitrate have been identified as COCs in groundwater at the TAVG AOC based on detections above the EPA MCLs in samples collected from monitoring wells. The EPA MCLs and the State of New Mexico drinking water standards for TCE and nitrate are 5 micrograms per liter (µg/L) and 10 mg/L (as nitrogen), respectively.

Personnel from the DOE/NNSA, DOE Headquarters Office of Environmental Management, SNL/NM, and NMED HWB worked together to address the groundwater contamination at TAVG AOC. A meeting was held with the NMED HWB on July 20, 2015 and all parties agreed on a phased Treatability Study/Interim Measure (TS/IM) of in-situ bioremediation (ISB) to evaluate the effectiveness of ISB as a potential technology to treat the groundwater contamination at the TAVG AOC.

For the TS/IM, SNL/NM personnel plan to install up to three injection wells (TAV-INJ1, TAV-INJ2, and TAV-INJ3) at TA-V near 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 biodegradation bacteria to groundwater. The substrate solution containing essential food and nutrients for biostimulation will be prepared in aboveground tanks. The substrate solution, along with the biodegradation bacteria, will be gravity-injected to groundwater via injection wells.

The NMED HWB approved the Revised Treatability Study Work Plan (TSWP) (SNL/NM March 2016) on May 10, 2016 (NMED May 2016). In accordance with the Revised TSWP, the Treatability Study will be conducted in two phases. Phase 1 includes a pilot test followed by full-scale injection at the first injection well; Phase II includes full-scale injections at the second and third injection wells.

In addition to the Revised TSWP, the NMED Ground Water Quality Bureau (GWQB) requires a groundwater Discharge Permit (DP) for the operation of injection wells. NMED GWQB issued DP-1845 to DOE/NNSA for the SNL/NM TA-V Treatability Study injection wells on May 26, 2017 (NMED May 2017a). The DP-1845 term starts on May 30, 2017 and

ends on May 30, 2022. DOE/NNSA and SNL/NM personnel submit quarterly reports for DP-1845 to NMED GWQB as required by the DP.

The following activities occurred at TAVG AOC during April, May, and June 2018:

- The pilot test of the TS/IM began in November 2017 at injection well TAV-INJ1 and two nearby monitoring wells, TAV-MW6 and TAV-MW7. Performance monitoring of the pilot test was conducted this quarter with in-situ monitoring of water quality parameters and groundwater sampling at wells TAV-INJ1, TAV-MW6, and TAV-MW7. The Revised TSWP stated that there would be four months of performance monitoring (SNL/NM March 2016), which would begin after injection, and go through March 2018. Groundwater sampling conducted in June 2018 was an extra round of monitoring and the June monitoring will be the last for the pilot test performance monitoring. Pilot test monitoring results are presented in Section III of this ER Quarterly Report.
- The TA-V groundwater monitoring network comprises 18 active wells. With the start of the TS/IM, monitoring wells TAV-MW6 and TAV-MW7 became monitoring wells for the ISB Treatability Study. Groundwater sampling at these two wells follows the frequency and analytes specified in the Revised TSWP (SNL/NM March 2016).
- Table I-2 presents the sampling frequency for the monitoring wells at TAVG AOC for the remaining 16 wells in the TA-V groundwater monitoring network. Groundwater sampling was conducted in May and June 2018. The SNL/NM CY 2018 AGMR will present the analytical results for CY 2018 groundwater monitoring, which is scheduled for submittal to the NMED HWB in the summer of 2019.
- The “Installation of Injection Well TAV-INJ1 at the Technical Area-V Groundwater Area of Concern” report (SNL/NM June 2018) was submitted to the NMED HWB on June 26, 2018 (DOE June 2018b).

2.1.3 **Tijeras Arroyo Groundwater Area of Concern**

Nitrate has been identified as a COC in groundwater for the TAG AOC based on exceedances of the EPA MCL in samples collected from monitoring wells completed in the Perched Groundwater System and in the Regional Aquifer. TCE has been identified as a COC for the Perched Groundwater System. However, the area where TCE exceedances occurred has naturally dewatered and the last reported TCE concentration was 3.82 µg/L,

occurring in November 2015, which is less than the EPA MCL of 5 µg/L (SNL/NM June 2016). No TCE concentrations in Regional Aquifer samples have exceeded the EPA MCL. The EPA MCLs and State of New Mexico drinking water standards for TCE and nitrate (as nitrogen) are 5 µg/L and 10 mg/L, respectively.

In May 2017, NMED HWB completed its review of the Current Conceptual Model (CCM) and Corrective Measures Evaluation (CME) Report for the TAG AOC (SNL/NM December 2016), which was submitted to the NMED HWB on November 23, 2016 (DOE November 2016). The report was submitted in accordance with NMED's "Agreements and Proposed Milestones" letter of April 14, 2016 (NMED April 2016). The subsequent disapproval letter issued by the NMED HWB (NMED May 2017b) requested additional information with a revised report to be submitted on or before November 30, 2017. However, NMED, DOE/NNSA, and SNL/NM personnel identified additional issues during an August 2017 meeting. In order to address the additional issues, DOE/NNSA and SNL/NM personnel requested extending the submittal date to February 15, 2018 (DOE September 2017). NMED HWB approved this extension request on October 13, 2017 (NMED October 2017). The Revised TAG CCM/CME Report was submitted to the NMED HWB in February 2018 and addresses the issues discussed in the August 2017 meeting, including the status of monitoring well WYO-4. This well is screened in the Perched Groundwater System in a location upgradient of SNL/NM operations. In the meeting, NMED management stated that DOE/NNSA personnel and its prime contractor for SNL/NM no longer have responsibility for monitoring well WYO-4 and the surrounding area.

The following events occurred at TAG AOC during April, May, and June 2018:

- Groundwater sampling at the TAG AOC was conducted in June 2018. Samples were collected from all seven monitoring wells (TA2-W-19, TA2-W-26, TA2-W-28, TJA-2, TJA-3, TJA-4, and TJA-7) scheduled for quarterly sampling. Samples were also collected from monitoring wells TJA-5 and TJA-6 in anticipation of a revised sampling schedule. Table I-2 presents the CY 2018 sampling frequency for the TAG monitoring wells. The analytical results for the TAG CY 2018 groundwater monitoring will be included in the SNL/NM CY 2018 AGMR, which is scheduled for submittal to the NMED HWB in the summer of 2019.
- Slug testing was conducted on April 5, 2018. Slug testing results for replacement well TA2-W-28 will be reported in the next AGMR.

- The Revised TAG CCM/CME Report was submitted to the NMED HWB on February 13, 2018 (SNL/NM February 2018). During a June 20, 2018 meeting, NMED HWB personnel stated that they will complete their review of the report in 2019.

2.2 **Sites in Corrective Action Complete Regulatory Process**

After NMED HWB certifies completion of corrective action activities at a SWMU or an AOC, DOE/NNSA will request a Class 3 Modification to the Resource Conservation and Recovery Act Facility Operating Permit (Permit) to formally change the status of the SWMU or AOC from corrective action required to either CAC without Controls or CAC with Controls. The Class 3 Permit Modification is a regulatory process.

2.2.1 **Solid Waste Management Units 8 and 58, 68, 149, and 154**

In February 2015, the NMED HWB 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 the NMED HWB on September 4, 2015 (DOE September 2015). In January 2016, NMED HWB granted the certificates of completion for these SWMUs (NMED January 2016). Section I.2.2.3 describes the Class 3 Permit Modification request for CAC status, which was prepared and submitted to the NMED HWB on May 16, 2016 (DOE May 2016). On June 15, 2018 the NMED HWB approved the Class 3 Permit Modification request for CAC status for SWMUs 8 and 58, 68, 149, and 154 (NMED June 2018).

2.2.2 **Solid Waste Management Unit 502**

On February 29, 2016, the NMED HWB approved the November 2013 SWMU 502 Voluntary Corrective Action Report and noted that a Permit Modification for CAC status for SWMU 502 could be requested (NMED February 2016). Section I.2.2.3 describes the Class 3 Permit Modification request for CAC status, which was prepared and submitted to the NMED HWB on May 16, 2016 (DOE May 2016). On June 15, 2018 the NMED HWB approved the Class 3 Permit Modification request for CAC status for SWMU 502 (NMED June 2018).

2.2.3 **Class 3 Permit Modification Request**

A Class 3 Permit Modification to designate six SWMUs as approved for CAC status (DOE May 2016) was requested in a letter dated May 16, 2016. The following SWMUs were included in the request:

- SWMU 8 Open Dump (Coyote Canyon Blast Area)
- SWMU 58 Coyote Canyon Blast Area
- SWMU 68 Old Burn Site
- SWMU 149 Building 9930 Septic System (Coyote Test Field)
- SWMU 154 Building 9960 Septic System and Seepage Pits (Coyote Test Field)
- SWMU 502 Building 9938 Surface Discharge Site

The DOE/NNSA and SNL/NM personnel held a 60-day public comment period from May 25 through July 24, 2016 and hosted a public meeting with information about the SWMUs on June 21, 2016. Information about the public notices, public meeting, meeting attendance list, and summary information about the six SWMUs was provided to the NMED HWB in a letter transmitted on September 8, 2016 (DOE September 2016). On November 17, 2017 the NMED HWB notified the DOE/NNSA and SNL/NM personnel of their intent to modify the Permit (NMED November 2017), by changing the status of SWMUs 8/58, 68, 149, 154, and 502 from corrective action required to CAC. The NMED HWB also began a 60-day public comment period ending on January 16, 2018.

The DOE/NNSA and SNL/NM personnel submitted a letter to the NMED HWB on January 11, 2018 (DOE January 2018) stating the following three objections to the proposed approval:

- NMED HWB's risk analysis methodology for Feature 58B/8Y, and Feature 58FF,
- The imposition of long-term controls for Feature 58B/8Y,
- The imposition of long-term controls at SWMU 68 based solely on the presence of radiological constituents.

The DOE/NNSA and SNL/NM personnel requested a public hearing and meetings to resolve the issues in advance of any public hearing. The NMED HWB met with DOE/NNSA and SNL/NM personnel in February 2018 to discuss the issues. Following the meeting, the issues were resolved to the satisfaction of all parties. The NMED HWB

proposed changes to the Permit language; the DOE/NNSA and SNL/NM personnel documented agreement with the proposed changes in a letter dated June 6, 2018 (DOE June 2018c). The NMED HWB issued final approval of CAC status and modifications to the Permit on June 15, 2018 (NMED June 2018a). These Permit modifications take effect July 15, 2018.

As a result of the Permit Modification, the following SWMUs have been designated CAC without Controls:

- SWMU 8 Open Dump (Coyote Canyon Blast Area)
- SWMU 58 Coyote Canyon Blast Area
- SWMU 68 Old Burn Site
- SWMU 149 Building 9930 Septic System (Coyote Test Field)
- SWMU 502 Building 9938 Surface Discharge Site

As a result of the Permit Modification, the following two features and a single entire SWMU have been designated CAC with Controls:

- Feature 58FF Fire Bricks Feature (Coyote Canyon Blast Area)
- Feature 58B/8Y Debris Pile and Pit Area (Coyote Canyon Blast Area)
- SWMU 154 Building 9960 Septic System and Seepage Pits (Coyote Test Field)

Table I-3 lists the three SWMUs and the three AOCs that remain identified for corrective action at SNL/NM after the June 2018 Permit Modification takes effect.

Section 2.2 (Sites in CAC regulatory process) will not be present in future ER Quarterly Reports; until additional sites enter the CAC regulatory process.

3.0 References

New Mexico Environment Department (NMED), February 2015. Letter to G. Beausoleil (U.S. Department of Energy NNSA/Sandia Field 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, NMED, Hazardous Waste Bureau, Santa Fe, New Mexico*, February 4, 2015.

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New Mexico Environment Department (NMED), November 2017. Letter to J.P. Harrell (U.S. Department of Energy NNSA/Sandia Field Office) and Jaime Moya (Sandia National Laboratories), “Intent to Approve a Permit Modification, Corrective Action Complete Determination, Six Solid Waste Management Units, Resource Conservation and Recovery Act Hazardous Waste Permit, Sandia National Laboratories/New Mexico, EPA ID#NM5890110518, HWB-SNL-16-009,” November 17, 2017.

New Mexico Environment Department (NMED), January 2018. Letter to J.W. Todd (U.S. Department of Energy NNSA/Sandia Field Office) and R.O. Griffith (Sandia National Laboratories), “Approval, Aquifer Pumping Test Report for the Burn Site Groundwater Area of Concern, December 2017, Sandia National Laboratories/New Mexico, EPA ID#NM5890110518, HWB-SNL-17-015,” January 30, 2018.

New Mexico Environment Department (NMED), June 2018. Letter to J.P. Harrell (U.S. Department of Energy NNSA/Sandia Field Office) and Jaime Moya (Sandia National Laboratories), “Approval for Corrective Action Status for Six Solid Waste Management Units, May 2016, Sandia National Laboratories, EPA ID#NM5890110518, HWB-SNL-16-009,” June 2018 15, 2017.

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Tables

Table I-1
Solid Waste Management Units and Areas of Concern
Where Corrective Action was Not Complete on April 1, 2018

Solid Waste Management Units and Areas of Concern	
Site Number	Site Description
8	Open Dump (CCBA)
58	CCBA
68	Old Burn Site
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
502	Building 9938 Surface Discharge Site
NA	Tijeras Arroyo Groundwater Investigation (TAG AOC)
NA	TA-V Groundwater Investigation (TAVG AOC)
NA	Burn Site Groundwater Investigation (BSG AOC)
Total	12

Notes:

AOC = Area of Concern.
 BSG = Burn Site Groundwater.
 CCBA = Coyote Canyon Blast Area.
 CTF = Coyote Test Field.
 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 2018	Quarter of Sampling in CY 2018	Location of Analytical Results	Location of Perchlorate Analytical Results	Monitoring Wells in Network
TAVG AOC ^a	Quarterly	1,2,3,4	AGMR	NA	LWDS-MW1, TAV-MW2, TAV-MW4, TAV-MW8, TAV-MW10, TAV-MW11, TAV-MW12, TAV-MW14, TAV-MW15, TAV-MW16
	Annually	2	AGMR	NA	AVN-1, LWDS-MW2, TAV-MW3, TAV-MW5, TAV-MW9, TAV-MW13
BSG AOC ^b	Semiannually	2,4	AGMR	Section II of ER Consolidated Quarterly Report	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	TA2-W-19, TA2-W-26, TA2-W-28, TJA-2, TJA-3, TJA-4, TJA-7
	Semiannually	1,3	AGMR	NA	TA1-W-06, TA2-W-01, TA2-W-27, TJA-6
	Annually	3	AGMR	NA	PGS-2, TA1-W-01, TA1-W-02, TA1-W-03, TA1-W-04, TA1-W-05, TA1-W-08, TA2-NW1-595, WYO-3

Notes:

^aTAVG AOC monitoring network comprises 18 active wells: 16 wells are listed here; wells TAV-MW6 and TAV-MW7 currently are part of the Treatability Study and follow a separate monitoring plan (see Section 2.1.2).

^b Monitoring well WYO-4 was deleted from the sampling schedule in response to the August 2017 meeting with NMED HWB personnel.

AGMR = Annual Groundwater Monitoring Report.
AOC = Area of Concern.
AVN = Area V (North).
BSG = Burn Site Groundwater (Area of Concern).
CY = Calendar Year.
CYN = Canyons (Burn Site Groundwater Area of Concern).
ER = Environmental Restoration Operations.
LWDS = Liquid waste disposal system (acronym used for well identification only).
MW = Monitoring well.
NA = Not applicable. No wells in the site network are currently being sampled and analyzed for perchlorate.
PGS = Parade Ground South.
TA1-W = Technical Area-I (Well).
TA2-NW = Technical Area-II (Northwest).
TA2-W = Technical Area-II (Well).
TAG = Tijeras Arroyo Groundwater (Area of Concern).
TAV = Technical Area-V (acronym used for well identification only).
TAVG = Technical Area-V Groundwater (Area of Concern).
TJA = Tijeras Arroyo (acronym used for well identification only).
WYO = Wyoming (acronym used for well identification only).

Table I-3
Solid Waste Management Units and Areas of Concern
Where Corrective Action is Not Complete on June 30, 2018

Solid Waste Management Units and Areas of Concern	
Site Number	Site Description
83	Long Sled Track
84	Gun Facilities
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)
Total	6

Notes:

AOC = Area of Concern.
BSG = Burn Site Groundwater.
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.

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SECTION II

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SECTION II

PERCHLORATE SCREENING QUARTERLY GROUNDWATER MONITORING REPORT, April – June 2018

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 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) 2018 (April, May, and June 2018) 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/National Nuclear Security Administration (NNSA) and SNL/NM personnel submitted a letter report on the status of perchlorate screening in groundwater at SNL/NM monitoring wells (SNL/NM November 2005). The letter report summarized previous correspondence and sampling results and outlined proposed future work to comply with NMED Hazardous Waste Bureau (HWB) requirements for perchlorate screening of groundwater. As specified in the letter report, quarterly reports are submitted for wells active in the perchlorate screening monitoring well network.

Based on the NMED HWB response (NMED January 2006), DOE/NNSA and SNL/NM personnel submit each quarterly report within 90 days following the quarter that the data represent. In November 2008, DOE/NNSA and SNL/NM personnel received approval from the NMED HWB to proceed to semiannual reporting (NMED November 2008); however, upon further consideration, the NMED HWB 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 the replacement well.

In September 2011, DOE/NNSA and SNL/NM personnel requested an extension of the submittal dates by one month for ER Quarterly Reports (SNL/NM September 2011). The NMED HWB approved the request (NMED September 2011), which allows DOE/NNSA and SNL/NM personnel to submit perchlorate quarterly reports within 120 days following the quarter that the data represent.

This report is the forty-sixth perchlorate screening quarterly report submitted since the November 2005 letter report; the previous reports were submitted for fourth quarter of CY 2005 through the fourth quarter of CY 2017 (SNL/NM February 2006 and April 2018a).

Groundwater at BSG AOC monitoring well CYN-MW15 was sampled semiannually for the eighth 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 second quarter of CY 2018 (April, May, and June 2018) perchlorate screening groundwater monitoring analytical results for the well CYN-MW15, the only well currently active in the perchlorate screening program (Figure II-1, 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 ($\mu\text{g/L}$) 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. Previous reports provided perchlorate results for these wells and are not discussed in this current report. Table II-2 lists the wells discussed in previous perchlorate screening reports.

SNL/NM personnel performed groundwater sampling for perchlorate at monitoring well CYN-MW15 in April 2018 (Table II-1). Groundwater sampling activities were conducted in accordance with procedures outlined in the *Burn Site Groundwater Monitoring, Mini-SAP for Third Quarter, Fiscal Year 2018* (SNL/NM April 2018b).

As described in the Mini-Sampling and Analysis Plan (SAP), groundwater sampling was performed in accordance with current SNL/NM Environmental Management, Long-Term Stewardship Project Field Operating Procedures (FOPs). A portable BennettTM 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 2018a). The wells were 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 2018b). Field water quality measurements for turbidity, potential of hydrogen (pH), temperature, specific conductivity (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 In-Situ Incorporated Aqua TROLL® 600 Multiparameter 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.

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). Table II-3 provides the sample identification, Analysis Request/Chain-of-Custody form number, and the associated groundwater investigation. The analytical report from GEL, including certificates of analysis (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 HWB 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 detections equal to or greater than 4 µg/L be evaluated by DOE/NNSA and SNL/NM personnel to determine 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. The Consent Order, Section VII.C 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, NMED HWB sent a letter of approval, which required DOE/NNSA and SNL/NM personnel to “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 and SNL/NM personnel submitted a letter to the NMED HWB in April 2007 (SNL/NM April 2007) recommending further characterization through continued quarterly monitoring of monitoring well CYN-MW6 for an additional four quarters, ending in December 2007, to ensure appropriate characterization of this well. In January 2008, DOE/NNSA and SNL/NM personnel requested a meeting with the NMED HWB 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) had been met, DOE/NNSA and SNL/NM personnel provided supporting information to the NMED HWB (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/NNSA and SNL/NM personnel consider 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 HWB 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 HWB risk assessment guidance lists a tap water standard of 13.8 µg/L for perchlorate (NMED March 2015); therefore, the historical maximum concentration detected is 35 percent less than the NMED HWB tap water standard.

Because perchlorate concentrations in samples from monitoring well CYN-MW6 have exceeded the screening level, DOE/NNSA and SNL/NM personnel initiated a negotiation process with the NMED HWB (SNL/NM March 2007) to determine the frequency of continued monitoring. In November 2008, DOE/NNSA and SNL/NM personnel received approval from the NMED HWB 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 HWB once more required that DOE/NNSA and SNL/NM personnel 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 last sample collected at CYN-MW6 was on October 15, 2012. The replacement monitoring well (CYN-MW15) was installed in December 2014 and assumed the negotiated semiannual monitoring frequency. Monitoring well CYN-MW14A was also installed in December 2014; this well was considered a new monitoring well that requires quarterly sampling due to its deep screen interval.

In April 2009, NMED HWB sent a letter that required DOE/NNSA and SNL/NM personnel 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 HWB (SNL/NM November 2009), approved by the NMED HWB (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 HWB to DOE/NNSA and SNL/NM personnel was not limited to the BSG AOC (NMED April 2009). In the April 2009 letter, the NMED HWB had also requested that DOE/NNSA and SNL/NM personnel 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 TAVG 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 monitoring network. 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 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**

Four monitoring wells were added to the perchlorate monitoring network based on the NMED HWB 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) during the first quarter of CY 2011. Section I.2.2 describes the sites and the corresponding requests of this ER Quarterly Report. The NMED HWB 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 HWB letter, DOE/NNSA and SNL/NM personnel submitted a SAP for monitoring wells CTF-MW2 and CTF-MW3 (SNL/NM June 2010) that was subsequently approved with modifications by the NMED HWB (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 monitoring network.

The April 2010 NMED HWB letter 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 requirements of the April 2010 NMED HWB letter, DOE/NNSA and SNL/NM personnel 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 HWB (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 monitoring network.

4.0 **Monitoring Results**

Table II-3 summarizes the details of samples collected from monitoring well CYN-MW15 in the second quarter of CY 2018. Table II-4 summarizes the current and historical perchlorate results for this well. Appendix A provides the analytical laboratory COA for the second quarter of CY 2018 perchlorate data. For the fourth time in eight sampling events (since December 2014), perchlorate was detected above the screening level/MDL of 4.0 µg/L in the CYN-MW15 groundwater sample at a concentration of 4.60 µg/L.

Figure II-2 shows the April 2018 perchlorate concentration reported for monitoring well CYN-MW15 is just above the perchlorate screening level/MDL of 4.0 µg/L. The hydrograph for monitoring well CYN-MW15 (Figure II-2) shows that the water table elevation has been consistent over the past year.

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 5 (SNL/NM June 2017). 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. Appendix B provides the data validation sample findings summary sheets for the perchlorate data.

No variances or nonconformances in perchlorate sampling field activities, or field conditions from requirements in the groundwater monitoring Mini-SAP (SNL/NM April 2018b), were identified during the second quarter of CY 2018 sampling activities.

5.0 **Summary and Conclusions**

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

- The perchlorate concentration for monitoring well CYN-MW15 for the second quarter of CY 2018 sampling event was 4.60 µg/L, which is the fourth sampling event that perchlorate was detected at this well (Figure II-2). However, this result was not unexpected as CYN-MW15 was installed to replace CYN-MW6, a well with historical perchlorate detections that ranged up to 8.93 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 well (CYN-MW6) and its replacement well (CYN-MW15) in the perchlorate monitoring network.
- DOE/NNSA and SNL/NM personnel will continue semiannual monitoring of perchlorate for monitoring well CYN-MW15.

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

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

Figures

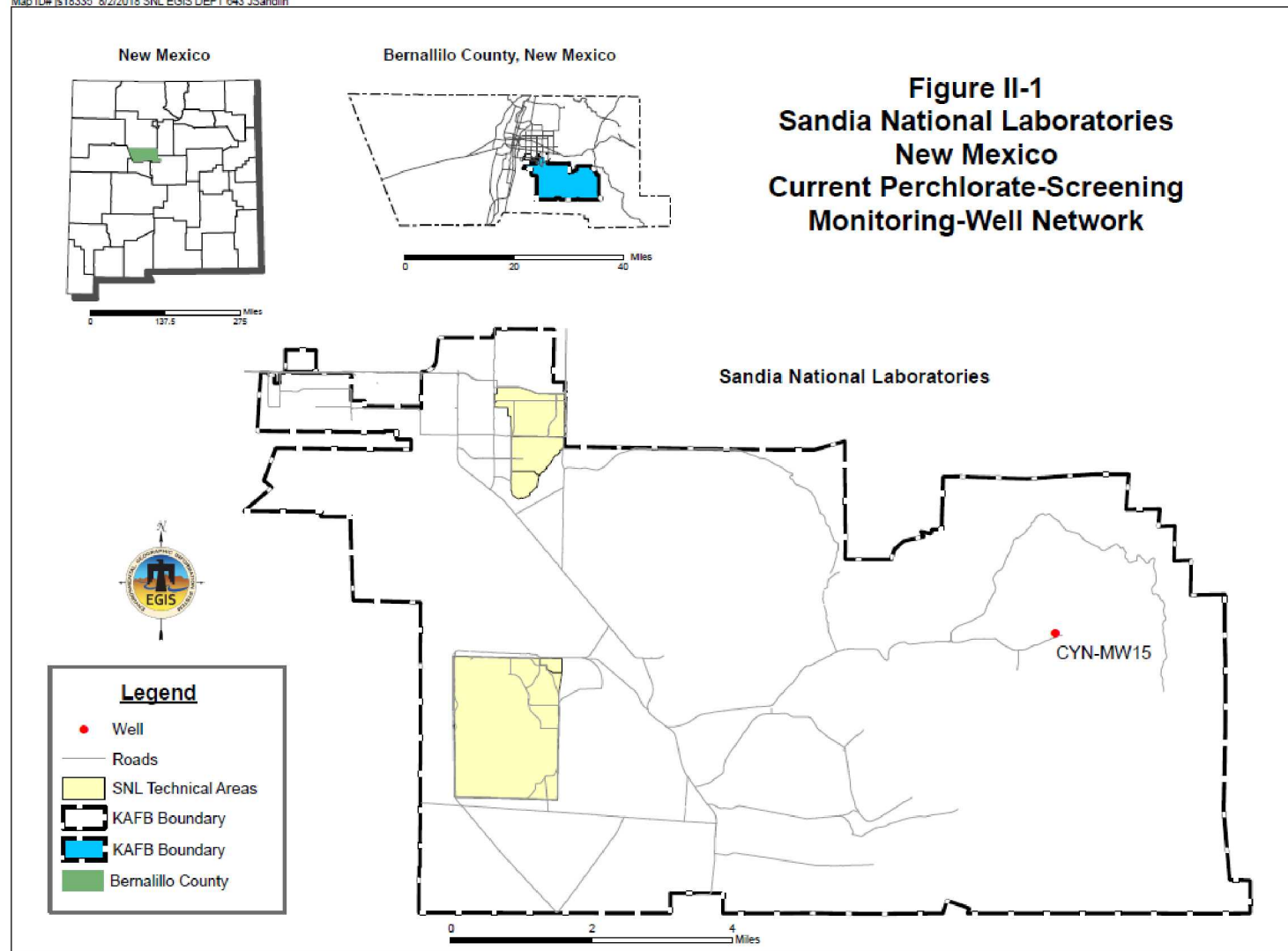


Figure II-1
Sandia National Laboratories, New Mexico
Current Perchlorate Screening Monitoring Well Network, April – June 2018

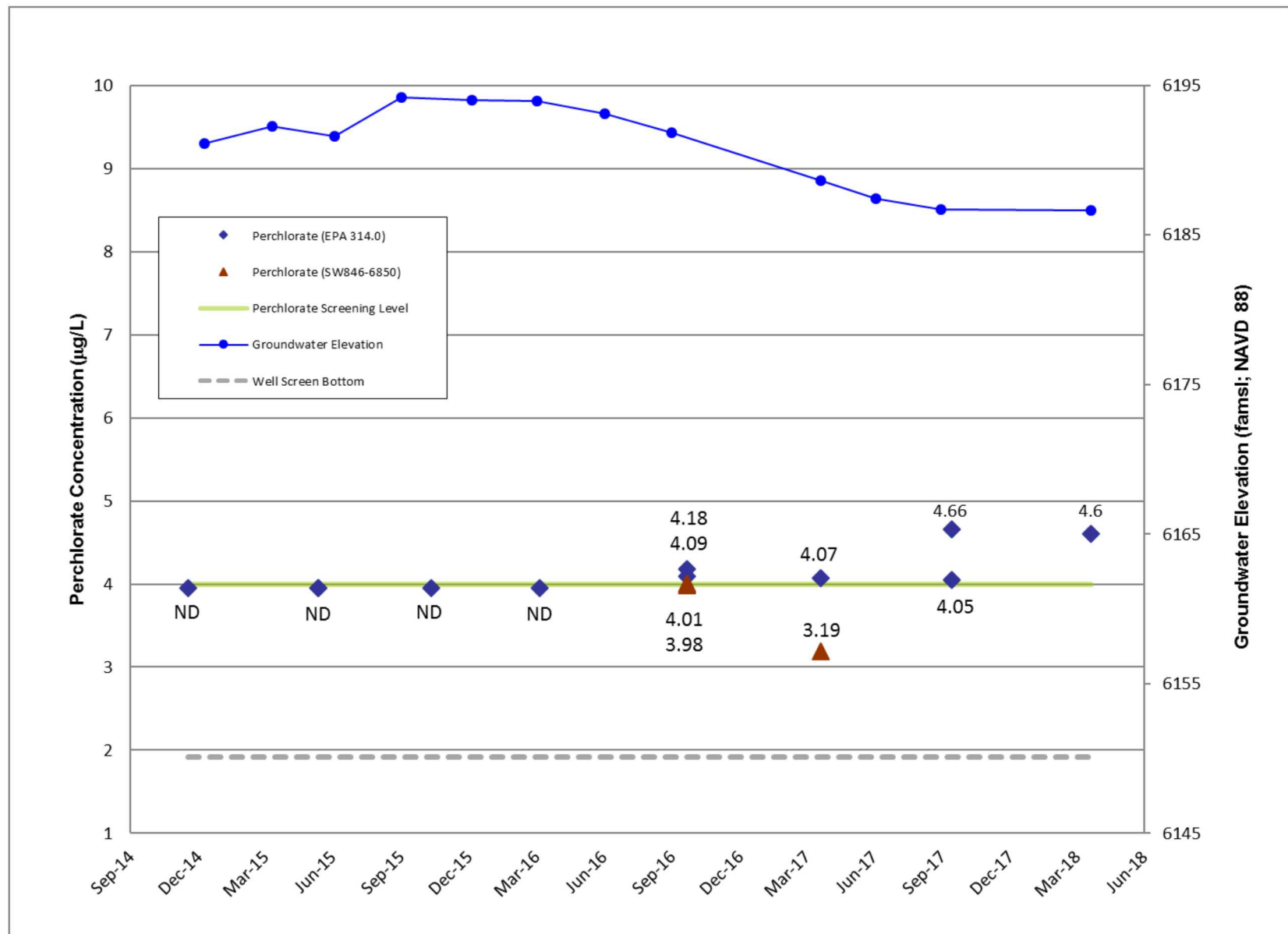


Figure II-2
Groundwater Elevations and Perchlorate Concentrations Over Time in CYN-MW15

Tables

Table II-1
Current Perchlorate Screening Monitoring Well Network
Second Quarter, CY 2018

Well	Date Sampled	Number of Consecutive Sampling Events^a	Remaining Number of Sampling Events	Sampling Equipment
CYN-MW15	19-Apr-18	8	TBD ^b	Bennett™ Pump

Notes

^aIncludes this sampling event.

^bThis well was installed as a replacement well for CYN-MW6. Because perchlorate concentrations in CYN-MW6 have exceeded the screening level/MDL, DOE/NNSA, SNL/NM, and the NMED HWB have agreed to further characterization through continued monitoring in the Burn Site Groundwater Area of Concern (NMED February 2010).

CY = Calendar Year.

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

DOE = U.S. Department of Energy.

HWB = Hazardous Waste Bureau.

MDL = Method detection limit.

MW = Monitoring well.

NMED = New Mexico Environment Department.

NNSA = National Nuclear Security Administration.

SNL/NM = Sandia National Laboratories, New Mexico.

TBD = To be determined.

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

Well	
CCBA-MW1	MWL-MW1
CCBA-MW2	MWL-MW7
CTF-MW1	MWL-MW8
CTF-MW2	MWL-MW9
CTF-MW3	NWTA3-MW2
CYN-MW1D	OBS-MW1
CYN-MW5	OBS-MW2
CYN-MW6	OBS-MW3
CYN-MW7	SWTA3-MW4
CYN-MW8	TA1-W-03
CYN-MW9	TA1-W-06
CYN-MW10	TA1-W-08
CYN-MW11	TA2-W-01
CYN-MW12	TA2-W-27
CYN-MW14A	TAV-MW11
LWDS-MW1	TAV-MW12
MRN-2	TAV-MW13
MRN-3D	TAV-MW14
MWL-BW1	TAV-MW15
MWL-BW2	TAV-MW16

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 Second Quarter, CY 2018 Perchlorate Sampling

Well	Sample Identification	AR/COC Number	Associated Groundwater Investigation
CYN-MW15	105068-008	618667	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 Second Quarter, CY 2018

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	
	05-Apr-16	616862	099139-008	ND	4.0	12	NE	U		EPA 314.0	
	21-Oct-16	617385	100705-004	4.09	4.0	12	NE	J		EPA 314.0	
			100705-R04	3.98	0.25	1	NE			SW846 6850	
			100706-004	4.18	4.0	12	NE	J		EPA 314.0	Duplicate sample
			100706-R04	4.01	0.25	1	NE			SW846 6850	Duplicate sample
	19-Apr-17	617823	102400-013	4.07	4.0	12	NE	J		EPA 314.0	
			102400-R13	3.19	0.1	0.4	NE	Hh	J-	SW846 6850	
	13-Oct-17	618205	103748-004	4.05	4.0	12	NE	J		EPA 314.0	
			103749-004	4.66	4.0	12	NE	J		EPA 314.0	Duplicate sample
	19-Apr-18	618667	105068-008	4.60	4.0	12	NE	J		EPA 314.0	

Notes

^aLaboratory Qualifier

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

H = Analytical holding time was exceeded.

h = Prep holding time exceeded.

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

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

^bValidation Qualifier

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

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

Table II-4 (concluded)
Summary of Perchlorate Screening Analytical Results for the
Current Monitoring Well Network as of Second Quarter, CY 2018

Notes (continued)

***Analytical Method**

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

SW846 6850: EPA, 1986 (and updates), "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods," SW-846, 3rd ed., EPA, Washington, D.C.

% = Percent.

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 EPA 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, Second Quarter, CY 2018

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	19-Apr-17	15.93	1167.7	177.8	7.16	0.11	14.7	1.15

Notes

^aField 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).

Appendix A

Analytical Laboratory Certificates of
Analysis for the Perchlorate Data

CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY

ORIGINAL
~~XXXXXXXXXX~~

Internal Lab

Page 1 of 2

Batch No.

M/A

SMO Use

AR/COC

618667

Project Name: BSG	Date Samples Shipped: 4/19/18	SMO Authorization: [Signature]	☐ Waste Characterization
Project/Task Manager: Michael Skelly	Carrier/Waybill No. 281210	SMO Contact Phone: [Signature]	☐ RMA
Project/Task Number: 195122.10.11.01	Lab Contact: Edie Kent/843-769-7385	Wendy Palencia/505-844-3132	☐ Released by COC No.
Service Order: CF058-18	Lab Destination: GEL	Send Report to SMO:	☒ 4° Celsius
	Contract No. 1303873	Michael Skelly/505-284-2483	

Tech Area:

Building:

Room:

Operational Site:

Bill to: Sandia National Laboratories (Accounts Payable),

P.O. Box 5800, MS-0154

Albuquerque, NM 87185-0154

448581

Sample No.	Fraction	Sample Location Detail	Depth (ft)	Date/Time Collected	Sample Matrix	Container Type	Volume	Preservative	Collection Method	Sample Type	Parameter & Method Requested	Lab Sample ID
105068	001	BSG CYN-MW15	182	4/19/18 10:06	GW	G	3x40 ml	HCl	G	SA	VOC, TCL (SW846-8260B)	001
105068	002	BSG CYN-MW15	182	4/19/18 10:08	GW	AG	4x1 L	None	G	SA	HE (SW846-8330B LC/MS/MS)	002
105068	003	BSG CYN-MW15	182	4/19/18 10:10	GW	AG	4x1 L	NONE	G	SA	TPH-DRO (SW846-8015)	003
105068	004	BSG CYN-MW15	182	4/19/18 10:07	GW	AG	3x40 ml	NONE	G	SA	TPH-GRO (SW846-8015)	004
105068	005	BSG CYN-MW15	182	4/19/18 10:12	GW	P	125 ml	H2SO4	G	SA	NPN (EPA 353.2)	005
105068	006	BSG CYN-MW15	182	4/19/18 10:13	GW	P	125 ml	None	G	SA	ANIONS-Br, Cl, F, SO4 (SW846-9056)	006
105068	007	BSG CYN-MW15	182	4/19/18 10:14	GW	P	500 ml	None	G	SA	Alk TOT as CaCO3, HCO3-, and CO3-2 (SM2320B)	007
105068	008	BSG CYN-MW15	182	4/19/18 10:15	GW	P	250 ml	None	G	SA	PERCHLORATE (EPA 314.0)	008
105068	009	BSG CYN-MW15	182	4/19/18 10:16	GW	P	500 ml	HNO3	G	SA	METALS, TAL (SW846-6020/7470)	009
105068	010	BSG CYN-MW15	182	4/19/18 10:17	GW	P	1 L	HNO3	G	SA	GAMMA SPEC, SHORT LIST (EPA 901)	010

Last Chain: ☐ Yes		Sample Tracking		SMO Use		Special Instructions/QC Requirements:		Conditions on Receipt
Validation Req'd: ☒ Yes		Date Entered:				EDD ☒ Yes		
Background: ☐ Yes		Entered by:				Turnaround Time ☐ 7-Day* ☐ 15-Day* ☒ 30-Day		
Confirmatory: ☐ Yes		QC initials:				Negotiated TAT ☐		
Sample Team Members	Name	Signature	Init.	Company/Organization/Phone/Cell		Sample Disposal ☐ Return to Client ☒ Disposal by Lab		Lab Use
	Robert Lynch	[Signature]	RL	SNL/00641/505-844-4013/505-250-7090		Return Samples By:		
	William Gibson	[Signature]	WG	SNL/00641/505-284-3307/505-239-7367		Comments: Received Trip Blanks for VOC TCL from lab with bubbles.		
	Christopher Hulliger	[Signature]	CH	SNL/00641/505-284-3309/505-382-0353				

Relinquished by [Signature]	Org. 00641	Date 4/19/18	Time 1055	Relinquished by	Org.	Date	Time
Received by [Signature]	Org. 00641	Date 4/19/18	Time 1055	Received by	Org.	Date	Time
Relinquished by [Signature]	Org. 00641	Date 4/19/18	Time 125	Relinquished by	Org.	Date	Time
Received by [Signature]	Org.	Date 4/21/18	Time 905	Received by	Org.	Date	Time

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

618667

[illegible]

GEL LABORATORIES LLC

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

Certificate of Analysis

Report Date: May 15, 2018

Company : Sandia National Laboratories
Address : 1515 Eubank SE, ORG 4142
BLDG. 1090/120, MS 1103
Albuquerque, New Mexico 87123
Contact: Ms. Wendy Palencia
Project: Groundwater, Level C Package

Client Sample ID: 105068-008
Sample ID: 448581008
Matrix: AQUEOUS
Collect Date: 19-APR-18 10:15
Receive Date: 21-APR-18
Collector: Client

Project: SNLSGWater
Client ID: SNLS004

Client Desc.: BSG CYN-MW15
Vol. Recv.:

Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
Ion Chromatography												
EPA 314.0 Perchlorate by IC "As Received"												
Perchlorate	J	0.0046	0.004	0.012	mg/L		1	MARI	05/01/18	2357	1757920	1
The following Analytical Methods were performed:												
Method	Description		Analyst Comments									
1	EPA 314.0 DOE-AL											

Notes:

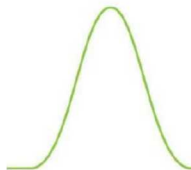
Column headers are defined as follows:

DF: Dilution Factor	Lc/LC: Critical Level
DL: Detection Limit	PF: Prep Factor
MDA: Minimum Detectable Activity	RL: Reporting Limit
MDC: Minimum Detectable Concentration	SQL: Sample Quantitation Limit

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: June 7, 2018
To: File
From: Linda Thal
Subject: Inorganic Data Review and Validation – SNL
Site: BSG
ARCO: 618667
SDG: 448581
Laboratory: GEL
Project/Task: 195122.10.11.01
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 SMO Procedure AOP 00-03 Rev 5.

Summary

One sample was prepared and analyzed with accepted procedures using methods EPA 9056 (anions), SM 2320B (total alkalinity), EPA 353.2 (nitrate/nitrite) and 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 sample was prepared and analyzed within the prescribed holding times and was properly preserved.

Calibration

All initial and continuing calibration met QC acceptance criteria.

Blanks

No target analytes were detected in the blanks.

Laboratory Control Sample (LCS)

All LCS acceptance criteria were met.

Matrix Spike and Matrix Spike Duplicate (MS/MSD)

All MS/PS recoveries met QC acceptance criteria. It should be noted that the PS analysis for nitrate/nitrite was performed on an SNL sample of similar matrix from another SDG. No data will be qualified.

Laboratory Replicate

The replicate analyses met all QC acceptance criteria. It should be noted that the replicate analysis for nitrate/nitrite was performed on an SNL sample of similar matrix from another SDG. No data will be qualified.

Detection Limits/Dilutions

All detection limits were properly reported and were correctly adjusted for dilutions. The following dilutions were performed due to high amounts of target analyte present in the sample.

Anions

Sample -006 was diluted 20X for chloride and sulfate.

Nitrate/Nitrite

Sample -005 was diluted 50X.

Other QC

No other specific issues that affect data quality were identified.

Reviewed by: Mary Donovan

Level: I

Date: 06/07/18



Sample Findings Summary



AR/COC: 618667

Page 1 of 1

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
EPA 900.0/SW846 9310			
	105068-011/BSG CYN-MW15	ALPHA (12587-46-1)	J, FR7
EPA 901.1			
	105068-010/BSG CYN-MW15	Americium-241 (14596-10-2)	BD, FR3
	105068-010/BSG CYN-MW15	Cesium-137 (10045-97-3)	BD, FR3
	105068-010/BSG CYN-MW15	Cobalt-60 (10198-40-0)	BD, FR3
	105068-010/BSG CYN-MW15	Potassium-40 (13966-00-2)	BD, FR3
EPA 906.0 Modified			
	105068-013/BSG CYN-MW15	Tritium (10028-17-8)	BD, FR3
SW846 3005/6020 DOE-AL			
	105068-009/BSG CYN-MW15	Copper (7440-50-8)	J+, B,RP2,CK2
SW846 3535A/8330B			
	105068-002/BSG CYN-MW15	m-Nitrotoluene (99-08-1)	UJ, I4
	105068-002/BSG CYN-MW15	Nitrobenzene (98-95-3)	UJ, I4,RP2
	105068-002/BSG CYN-MW15	o-Nitrotoluene (88-72-2)	UJ, I4
	105068-002/BSG CYN-MW15	p-Nitrotoluene (99-99-0)	UJ, I4
SW846 8260B DOE-AL			
	105068-001/BSG CYN-MW15	Acetone (67-64-1)	10U, B1
	105068-001/BSG CYN-MW15	Methylene chloride (75-09-2)	UJ, I5
	105069-001/BSG TB-23	Methylene chloride (75-09-2)	UJ, I5

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

SECTION III

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III-5	Analytical Results of Groundwater Sampling at Wells TAV-INJ1, TAV-MW6, and TAV-MW7
III-6	Field Water Quality Measurements before Pilot Test Groundwater Sampling

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SECTION III

TA-V IN-SITU BIOREMEDIATION TREATABILITY STUDY PILOT TEST RESULTS

1.0 Background

The pilot test of the in-situ bioremediation (ISB) Treatability Study was conducted at injection well TAV-INJ1 and two nearby monitoring wells TAV-MW6 and TAV-MW7. Two discharges/injections of approximately 4,500 gallons each were completed on November 22 and 27, respectively. Post-injection groundwater sampling began on November 28, 2017 and followed the frequency and analytes specified in the Revised Treatability Study Work Plan ([TSWP], SNL/NM March 2016).

This section provides a summary of the pilot test activities and associated results. A full report on the ISB Treatability Study, including both the pilot test and the anticipated full-scale test, will be produced at the end of the ISB Treatability Study, in accordance with the Revised TSWP (SNL/NM March 2016). Detailed discussions of the test results will be presented in the final Treatability Study report.

2.0 Baseline Sampling for Pilot Test

Baseline sampling was conducted prior to the pilot test. Analytical parameters for baseline sampling are listed in Table 5-4 of the Revised TSWP (SNL/NM March 2016).

Groundwater samples were collected from wells TAV-INJ, TAV-MW6, and TAV-MW7 prior to discharge at well TAV-INJ1 in November 2017. Methane, ethane, and ethene (MEE) were analyzed for samples collected from wells TAV-MW6 and TAV-MW7 in June and May 2017, respectively; therefore, they were not analyzed in November. Table III-1 provides the analytical results of the baseline sampling. Table III-2 summarizes the stabilized water quality parameters measured before each groundwater sample was collected.

3.0 **Pilot Test Operational Activities**

For the pilot test of the ISB Treatability Study, the injection well TAV-INJ1 was used to deliver substrate solution and biodegradation bacteria to groundwater. The substrate solution was prepared using potable water mixed with ethyl lactate (as the electron donor) and essential food and nutrients in two aboveground 5,000-gallon poly tanks. The substrate solution (ethyl lactate, essential food and nutrients), along with the biodegradation bacteria (KB-1 dechlorinator purchased through SiREM), was gravity-injected to groundwater via the injection well.

Pilot test injections were conducted between November 21 and November 27, 2017. Effluent was discharged to groundwater in two injection events on three separate days: the first injection was conducted over the course of two days (November 21-22, 2017) and included substrate solution and sodium bromide (as an inert tracer), but not the KB-1 dechlorinator; the second injection was conducted on November 27 and included the substrate solution without the tracer, and included the KB-1 dechlorinator. The total volume of each injection was approximately 4,500 gallons. Additional details of the pilot test operational activities are provided in the Discharge Permit DP-1845 October – December 2017 and January – March 2018 quarterly reports (SNL/NM April 2018 and July 2018).

Samples of the substrate solution including a duplicate sample were collected during injection on November 21 and November 27, 2017, and analyzed for the parameters listed in Table 5-4 of the Revised TSWP (SNL/NM March 2016). Table III-3 provides the analytical results of the injection stream on November 21 and November 27, 2017. Microbial analysis was not performed for the sample, nor duplicate collected on November 21 because the injected solution did not contain KB-1 dechlorinator. Field parameters were also measured as specified in the Revised TSWP and presented in Table III-4.

3.1 **Fluoride**

Reported concentrations of fluoride in the sample and its duplicate collected on November 21, 2017 were abnormally high, at 24.9 and 24.4 milligram per liter (mg/L), respectively, exceeding the U.S. Environmental Protection Agency (EPA) maximum contaminant level of 4 mg/L (Table III-3). However, fluoride was not a component of the ingredients used to prepare the substrate solution. Fluoride was analyzed by Method SW846 9056 using ion chromatography. The method document (EPA February 2007) indicates that organic acids can interfere with fluoride quantification with similar eluting time, creating a

false positive for fluoride result. Ethyl lactate was a primary ingredient of the substrate solution and hydrolyzes to lactic acid and ethanol when dissolved in water; its interference with fluoride was suspected.

The project team prepared the same solution that was sampled on November 21, 2017, and analyzed the sample by Method SM4500 F-C using ion selective electrode. This method is not susceptible to organic acid interference. A potable water sample was also collected and analyzed by Method SM4500 F-C. Fluoride concentration of the substrate solution was 0.52 mg/L, similar to that of tap water (0.56 mg/L). This indicates that the reported fluoride concentrations of the injected solution sampled on November 21, 2017 using Method SW846 9056 were most likely false positives caused by interference from ethyl lactate.

The injected solution sampled on November 27, 2017 was similarly prepared as that sampled on November 21, 2017. However, fluoride concentrations in the sample and its duplicate collected on November 27, 2017 were 0.69 and 0.792 mg/L respectively, significantly lower than those collected on November 21, 2017 (Table III-3). The November 21 samples were collected from the sampling port at the outfall of the aboveground poly tank (because the injection did not contain KB-1 dechlorinator); the November 27 samples were collected from the sampling port downstream of the side-stream of the KB-1 dechlorinator in the injection line. Strong vacuum in the injection line was observed during sampling of the November 27 samples when the sampling port was opened. Even though the project team managed to collect samples from the sampling port by turning down the flow rate, the samples were not considered as representative as those collected on November 21. These lessons learned will be incorporated into the anticipated full-scale operation.

4.0 **Groundwater Monitoring for Pilot Test**

The injection well TAV-INJ1 serves as the ISB treatment location. Two nearby monitoring wells TAV-MW6 and TAV-MW7 were monitored for impact on groundwater quality from the injections at well TAV-INJ1. The low volume injected for the pilot test at well TAV-INJ1 did not impact the groundwater in wells TAV-MW6 and TAV-MW7. Figure III-1 shows the locations of the injection well TAV-INJ1 and monitoring wells TAV-MW6 and TAV-MW7, along with the potentiometric surface contour as of April 2018.

Groundwater sampling began on November 28, 2017, the day after the second injection was completed. The Revised TSWP planned four months of post-injection performance monitoring (SNL/NM March 2016), which would begin after injection and continue through March 2018. Sampling frequency and analytes are specified in the Revised TSWP. An additional round of sampling was conducted in June 2018, which would complete the performance monitoring for the pilot test.

Table III-5 provides the analytical results of the groundwater samples collected from wells TAV-INJ1, TAV-MW6, and TAV-MW7. A total of 14 sampling events were conducted for well TAV-INJ1, and seven sampling events each for wells TAV-MW6 and TAV-MW7 from November 2017 through June 2018. Duplicate samples were collected at well TAV-MW6 on December 13, 2017 and January 30, 2018 and at TAV-MW7 on March 28, 2018. Table III-6 summarizes the stabilized water quality parameters measured before each groundwater sample was collected.

5.0 **Deviations**

Table 5-4 of the Revised TSWP specifies nitrate plus nitrite (NPN) to be analyzed for all samples collected for Treatability Study (SNL/NM March 2016). The samples of the injected solutions were inadvertently analyzed for nitrate as nitrogen, instead of NPN as nitrogen (Table III-3). NPN was analyzed for all other samples.

Table 5-4 of the Revised TSWP specifies Method SW846-9034 for sulfide analysis (SNL/NM March 2016). The project team made a decision to measure reactive sulfide using Method SW846 Chapter 7.3.4 – Titration, hoping to see any intermediate product during the degradation process. However, aquifer conditions during the pilot test indicated that sulfide was not expected to persist in a dissolved state. Sulfide was analyzed by Method SW846-9034 (acid soluble sulfides) for the samples collected in June 2018 as originally specified in the Revised TSWP (Table III-5).

Table 5-4 of the Revised TSWP specifies RSK-175 for MEE analysis (SNL/NM March 2016). The contracted laboratory, Pace Analytical Energy Services, has since updated the analytical method to AM20GAX with a method detection limit of 0.005 µg/L. AM20GAX is the method used for MEE analysis in the Treatability Study.

6.0 References

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Sandia National Laboratories, New Mexico (SNL/NM), April 2018. *Discharge Permit DP-1845 Quarterly Report, October – December 2017*, Sandia National Laboratories, Albuquerque, New Mexico.

Sandia National Laboratories, New Mexico (SNL/NM), July 2018. *Discharge Permit DP-1845 Quarterly Report, January – March 2018*, Sandia National Laboratories, Albuquerque, New Mexico.

U.S. Environmental Protection Agency (EPA), February 2007. SW-846 Test Method 9056A: Determination of Inorganic Anions by Ion Chromatography.

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Figures

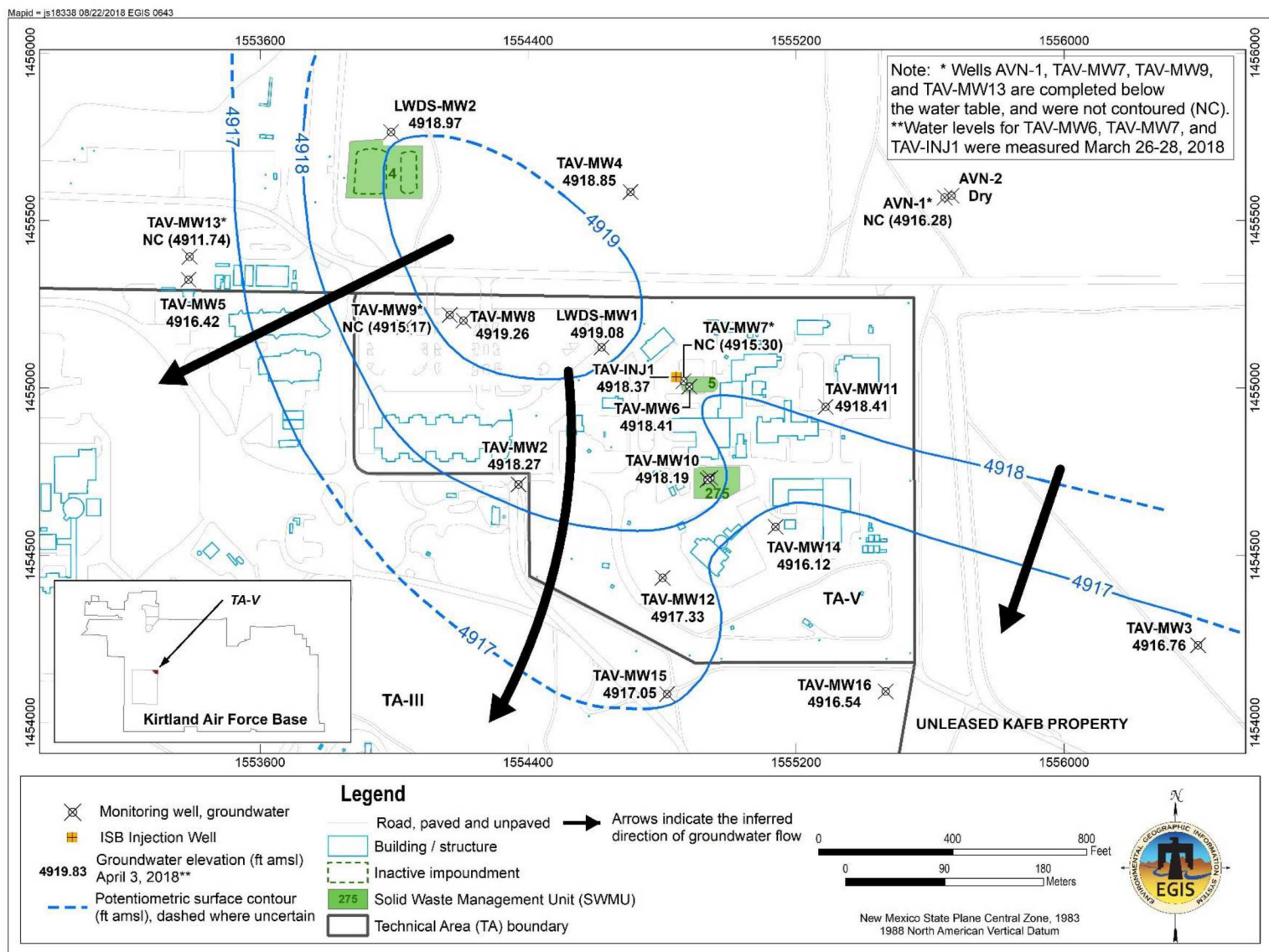


Figure III-1
Locations of TAV-INJ1, TAV-MW6, and TAV-MW7 and Potentiometric Surface Contour as of April 2018

Tables

Table III-1
Analytical Results of Baseline Sampling at Wells TAV-INJ1, TAV-MW6, and TAV-MW7

Analyses	Analyte	Result ^a	MDL ^b	PQL ^c	MCL ^d	Units	Lab Qual ^e	Val Qual ^f	Sample No.	Analytical Method ^g	Lab ^h
TAV-INJ1, 13-Nov-17											
Alkalinity	Alkalinity as CaCO ₃	188	1.45	4	NE	mg/L		-	103993-009	SM 2320B	GEL
Alkalinity	Alkalinity, bicarb as CaCO ₃	188	1.45	4	NE	mg/L		-	103993-009	SM 2320B	GEL
Alkalinity	Alkalinity, carb as CaCO ₃	ND	1.45	4	NE	mg/L	U	-	103993-009	SM 2320B	GEL
Ammonia	Ammonia	0.076	0.017	0.05	NE	mg/L		J-	103993-002	EPA 350.1	GEL
Anions	Bromide	1.3	0.067	0.2	NE	mg/L			103993-008	SW846 9056	GEL
Anions	Chloride	114	1.34	4	NE	mg/L			103993-008	SW846 9056	GEL
Anions	Fluoride	0.964	0.033	0.1	4	mg/L			103993-008	SW846 9056	GEL
Anions	Nitrite	0.126	0.033	0.1	1	mg/L			103993-006	SW846 9056	GEL
Anions	Orthophosphate as Phosphorus	ND	0.067	0.2	NE	mg/L	U		103993-003	SW846 9056	GEL
Anions	Sulfate	31.9	2.66	8	NE	mg/L			103993-008	SW846 9056	GEL
Dissolved Metals	Arsenic	ND	0.002	0.005	0.010	mg/L	U		103993-010	SW846 3005/6020	GEL
Dissolved Metals	Calcium	67.8	0.8	2	NE	mg/L			103993-010	SW846 3005/6020	GEL
Dissolved Metals	Iron	ND	0.033	0.1	NE	mg/L	U		103993-010	SW846 3005/6020	GEL
Dissolved Metals	Magnesium	20.2	0.01	0.03	NE	mg/L			103993-010	SW846 3005/6020	GEL
Dissolved Metals	Manganese	0.0931	0.001	0.005	NE	mg/L			103993-010	SW846 3005/6020	GEL
Dissolved Metals	Potassium	3.77	0.08	0.3	NE	mg/L			103993-010	SW846 3005/6020	GEL
Dissolved Metals	Sodium	61.5	0.8	2.5	NE	mg/L			103993-010	SW846 3005/6020	GEL
MEE	Methane	ND	0.016	0.5	NE	µg/L	U	UJ	103996-001	AM20GAX	PACE
MEE	Ethane	ND	0.003	0.1	NE	µg/L	U	UJ	103996-001	AM20GAX	PACE
MEE	Ethene	0.21	0.004	0.1	NE	µg/L		J	103996-001	AM20GAX	PACE
Microbial	Dehalococcoides	ND	900	900	NE	Enumeration/L	U		104002-001	Gene-Trac Dhc	SiREM
NPN	Nitrate plus nitrite as Nitrogen	6.48	0.17	0.5	10	mg/L			103993-007	EPA 353.2	GEL
Sulfide	Sulfide, Reactive	ND	500	500	NE	mg/L	<	R	103993-005	SW846 Chpt. 7.3.4-TI	GEL
TOC	Total Organic Carbon #1	0.579	0.33	1	NE	mg/L	J		103993-004	SW846 9060A	GEL
TOC	Total Organic Carbon #2	0.658	0.33	1	NE	mg/L	J		103993-004	SW846 9060A	GEL
TOC	Total Organic Carbon #3	0.683	0.33	1	NE	mg/L	J		103993-004	SW846 9060A	GEL
TOC	Total Organic Carbon #4	0.688	0.33	1	NE	mg/L	J		103993-004	SW846 9060A	GEL
TOC	Total Organic Carbon Average	0.652	0.33	1	NE	mg/L	J		103993-004	SW846 9060A	GEL
VOC	Dichloroethene, cis-1,2-	0.87	0.3	1	70	µg/L	J		103993-001	SW846 8260B	GEL
VOC	Trichloroethene	8.33	0.3	1	5	µg/L			103993-001	SW846 8260B	GEL

Table III-1 (continued)
Analytical Results of Baseline Sampling at Wells TAV-INJ1, TAV-MW6, and TAV-MW7

Analyses	Analyte	Result ^a	MDL ^b	PQL ^c	MCL ^d	Units	Lab Qual ^e	Val Qual ^f	Sample No.	Analytical Method ^g	Lab ^h
TAV-MW6, 14-Nov-17											
Alkalinity	Alkalinity as CaCO ₃	195	1.45	4	NE	mg/L			103988-007	SM 2320B	GEL
Alkalinity	Alkalinity, bicarb as CaCO ₃	195	1.45	4	NE	mg/L			103988-007	SM 2320B	GEL
Alkalinity	Alkalinity, carb as CaCO ₃	ND	1.45	4	NE	mg/L	U		103988-007	SM 2320B	GEL
Ammonia	Ammonia	0.0462	0.017	0.05	NE	mg/L	JB	0.050UJ	103988-001	EPA 350.1	GEL
Anions	Bromide	0.799	0.067	0.2	NE	mg/L			103988-006	SW846 9056	GEL
Anions	Chloride	75.1	0.67	2	NE	mg/L			103988-006	SW846 9056	GEL
Anions	Fluoride	1.16	0.033	0.1	4	mg/L			103988-006	SW846 9056	GEL
Anions	Nitrite	ND	0.033	0.1	1	mg/L	U		103988-005	SW846 9056	GEL
Anions	Orthophosphate as Phosphorus	ND	0.067	0.2	NE	mg/L	U		103988-002	SW846 9056	GEL
Anions	Sulfate	43.5	1.33	4	NE	mg/L			103988-006	SW846 9056	GEL
Dissolved Metals	Arsenic	ND	0.002	0.005	0.010	mg/L	U		103988-008	SW846 3005/6020	GEL
Dissolved Metals	Calcium	64.4	0.4	1	NE	mg/L			103988-008	SW846 3005/6020	GEL
Dissolved Metals	Iron	0.0902	0.033	0.1	NE	mg/L	J		103988-008	SW846 3005/6020	GEL
Dissolved Metals	Magnesium	18.5	0.01	0.03	NE	mg/L			103988-008	SW846 3005/6020	GEL
Dissolved Metals	Manganese	ND	0.001	0.005	NE	mg/L	U		103988-008	SW846 3005/6020	GEL
Dissolved Metals	Potassium	3.66	0.08	0.3	NE	mg/L			103988-008	SW846 3005/6020	GEL
Dissolved Metals	Sodium	61	0.4	1.25	NE	mg/L			103988-008	SW846 3005/6020	GEL
Microbial	Dehalococcoides	ND	1000	1000	NE	Enumeration/L	U		103998-001	Gene-Trac Dhc	SiREM
NPN	Nitrate plus nitrite as Nitrogen	8.15	0.425	1.25	10	mg/L			103946-002	EPA 353.2	GEL
Sulfide	Sulfide, Reactive	ND	500	500	NE	mg/L	<	R	103988-004	SW846 Chpt. 7.3.4-TI	GEL
TOC	Total Organic Carbon #1	0.452	0.33	1	NE	mg/L	J		103988-003	SW846 9060A	GEL
TOC	Total Organic Carbon #2	0.471	0.33	1	NE	mg/L	J		103988-003	SW846 9060A	GEL
TOC	Total Organic Carbon #3	0.493	0.33	1	NE	mg/L	J		103988-003	SW846 9060A	GEL
TOC	Total Organic Carbon #4	0.481	0.33	1	NE	mg/L	J		103988-003	SW846 9060A	GEL
TOC	Total Organic Carbon Average	0.474	0.33	1	NE	mg/L	J		103988-003	SW846 9060A	GEL
VOC	Dichloroethene, cis-1,2-	1.19	0.3	1	70	µg/L			103946-001	SW846 8260B	GEL
VOC	Trichloroethene	9.34	0.3	1	5	µg/L			103946-001	SW846 8260B	GEL
TAV-MW6, 7-Jun-17											
MEE	Methane	ND	0.027	0.5	NE	µg/L	U	UJ	102724-002	AM20GAX	PACE
MEE	Ethane	ND	0.003	0.1	NE	µg/L	U	UJ	102724-002	AM20GAX	PACE
MEE	Ethene	ND	0.001	0.1	NE	µg/L	U	UJ	102724-002	AM20GAX	PACE

Table III-1 (continued)
Analytical Results of Baseline Sampling at Wells TAV-INJ1, TAV-MW6, and TAV-MW7

Analyses	Analyte	Result ^a	MDL ^b	PQL ^c	MCL ^d	Units	Lab Qual ^e	Val Qual ^f	Sample No.	Analytical Method ^g	Lab ^h
TAV-MW7, 7-Nov-17											
Alkalinity	Alkalinity as CaCO ₃	230	1.45	4	NE	mg/L			103990-007	SM 2320B	GEL
Alkalinity	Alkalinity, bicarb as CaCO ₃	230	1.45	4	NE	mg/L			103990-007	SM 2320B	GEL
Alkalinity	Alkalinity, carb as CaCO ₃	ND	1.45	4	NE	mg/L	U		103990-007	SM 2320B	GEL
Ammonia	Ammonia	0.107	0.017	0.05	NE	mg/L		J+	103990-001	EPA 350.1	GEL
Anions	Bromide	0.231	0.067	0.2	NE	mg/L			103990-006	SW846 9056	GEL
Anions	Chloride	26.1	0.67	2	NE	mg/L			103990-006	SW846 9056	GEL
Anions	Fluoride	1.1	0.033	0.1	4	mg/L			103990-006	SW846 9056	GEL
Anions	Nitrite	0.0363	0.033	0.1	1	mg/L	J		103990-005	SW846 9056	GEL
Anions	Orthophosphate as Phosphorus	ND	0.067	0.2	NE	mg/L	U		103990-002	SW846 9056	GEL
Anions	Sulfate	59.6	1.33	4	NE	mg/L			103990-006	SW846 9056	GEL
Dissolved Metals	Arsenic	0.00202	0.002	0.005	0.010	mg/L	J		103990-008	SW846 3005/6020	GEL
Dissolved Metals	Calcium	58.8	0.8	2	NE	mg/L			103990-008	SW846 3005/6020	GEL
Dissolved Metals	Iron	ND	0.033	0.1	NE	mg/L	U		103990-008	SW846 3005/6020	GEL
Dissolved Metals	Magnesium	19.5	0.01	0.03	NE	mg/L			103990-008	SW846 3005/6020	GEL
Dissolved Metals	Manganese	ND	0.001	0.005	NE	mg/L	U		103990-008	SW846 3005/6020	GEL
Dissolved Metals	Potassium	4.23	0.08	0.3	NE	mg/L			103990-008	SW846 3005/6020	GEL
Dissolved Metals	Sodium	57.6	0.8	2.5	NE	mg/L			103990-008	SW846 3005/6020	GEL
Microbial	Dehalococcoides	ND	3000	3000	NE	Enumeration/L	U		104000-001	Gene-Trac Dhc	SiREM
NPN	Nitrate plus nitrite as Nitrogen	4.64	0.17	0.5	10	mg/L			103948-002	EPA 353.2	GEL
Sulfide	Sulfide, Reactive	ND	500	500	NE	mg/L	<	UJ	103990-004	SW846 Chpt. 7.3.4-TI	GEL
TOC	Total Organic Carbon #1	0.476	0.33	1	NE	mg/L	J		103990-003	SW846 9060A	GEL
TOC	Total Organic Carbon #2	0.572	0.33	1	NE	mg/L	J		103990-003	SW846 9060A	GEL
TOC	Total Organic Carbon #3	0.586	0.33	1	NE	mg/L	J		103990-003	SW846 9060A	GEL
TOC	Total Organic Carbon #4	0.579	0.33	1	NE	mg/L	J		103990-003	SW846 9060A	GEL
TOC	Total Organic Carbon Average	0.553	0.33	1	NE	mg/L	J		103990-003	SW846 9060A	GEL

Table III-1 (concluded)
Analytical Results of Baseline Sampling at Wells TAV-INJ1, TAV-MW6, and TAV-MW7

Analyses	Analyte	Result ^a	MDL ^b	PQL ^c	MCL ^d	Units	Lab Qual ^e	Val Qual ^f	Sample No.	Analytical Method ^g	Lab ^h
TAV-MW7 (Duplicate), 7-Nov-17											
Alkalinity	Alkalinity as CaCO ₃	228	1.45	4	NE	mg/L			103991-007	SM 2320B	GEL
Alkalinity	Alkalinity, bicarb as CaCO ₃	228	1.45	4	NE	mg/L			103991-007	SM 2320B	GEL
Alkalinity	Alkalinity, carb as CaCO ₃	ND	1.45	4	NE	mg/L	U		103991-007	SM 2320B	GEL
Ammonia	Ammonia	0.0248	0.017	0.05	NE	mg/L	J	0.05U	103991-001	EPA 350.1	GEL
Anions	Bromide	0.235	0.067	0.2	NE	mg/L			103991-006	SW846 9056	GEL
Anions	Chloride	26.3	0.67	2	NE	mg/L			103991-006	SW846 9056	GEL
Anions	Fluoride	1.1	0.033	0.1	4	mg/L			103991-006	SW846 9056	GEL
Anions	Nitrite	0.0358	0.033	0.1	1	mg/L	J		103991-005	SW846 9056	GEL
Anions	Orthophosphate as Phosphorus	ND	0.067	0.2	NE	mg/L	U		103991-002	SW846 9056	GEL
Anions	Sulfate	60.3	1.33	4	NE	mg/L			103991-006	SW846 9056	GEL
Dissolved Metals	Arsenic	0.002	0.002	0.005	0.010	mg/L	J		103991-008	SW846 3005/6020	GEL
Dissolved Metals	Calcium	57.8	0.8	2	NE	mg/L			103991-008	SW846 3005/6020	GEL
Dissolved Metals	Iron	ND	0.033	0.1	NE	mg/L	U		103991-008	SW846 3005/6020	GEL
Dissolved Metals	Magnesium	18.8	0.01	0.03	NE	mg/L			103991-008	SW846 3005/6020	GEL
Dissolved Metals	Manganese	ND	0.001	0.005	NE	mg/L	U		103991-008	SW846 3005/6020	GEL
Dissolved Metals	Potassium	4.18	0.08	0.3	NE	mg/L			103991-008	SW846 3005/6020	GEL
Dissolved Metals	Sodium	56.3	0.8	2.5	NE	mg/L			103991-008	SW846 3005/6020	GEL
Microbial	Dehalococcoides	ND	3000	3000	NE	Enumeration/L	U		104001-001	Gene-Trac Dhc	SiREM
NPN	Nitrate plus nitrite as Nitrogen	4.41	0.17	0.5	10	mg/L			103949-002	EPA 353.2	GEL
Sulfide	Sulfide, Reactive	ND	500	500	NE	mg/L	<	UJ	103991-004	SW846 Chpt. 7.3.4-TI	GEL
TOC	Total Organic Carbon #1	0.522	0.33	1	NE	mg/L	J		103991-003	SW846 9060A	GEL
TOC	Total Organic Carbon #2	0.63	0.33	1	NE	mg/L	J		103991-003	SW846 9060A	GEL
TOC	Total Organic Carbon #3	0.607	0.33	1	NE	mg/L	J		103991-003	SW846 9060A	GEL
TOC	Total Organic Carbon #4	0.597	0.33	1	NE	mg/L	J		103991-003	SW846 9060A	GEL
TOC	Total Organic Carbon Average	0.589	0.33	1	NE	mg/L	J		103991-003	SW846 9060A	GEL
TAV-MW7, 16-May-17											
MEE	Methane	0.61	0.027	0.5	NE	µg/L		J	102720-002	AM20GAX	PACE
MEE	Ethane	ND	0.003	0.1	NE	µg/L	U	UJ	102720-002	AM20GAX	PACE
MEE	Ethene	ND	0.001	0.1	NE	µg/L	U	UJ	102720-002	AM20GAX	PACE

Refer to general footnotes at the end of tables.

Table III-2
Field Water Quality Measurementsⁱ before Baseline Sampling

Well ID	Sample Date	Temperature (°C)	Specific Conductivity (µmho/cm)	Oxidation Reduction Potential (mV)	pH	Turbidity (NTU)	Dissolved Oxygen (% Sat)	Dissolved Oxygen (mg/L)
TAV-INJ1	13-Nov-17	21.40	825.2	263.6	7.59	4.04	45.2	3.99
TAV-MW6	7-Jun-17	21.42	698.2	160.4	7.54	5.71	78.1	6.89
TAV-MW6	14-Nov-17	20.87	726.9	282.8	7.42	4.44	75.9	6.82
TAV-MW7	16-May-17	20.47	608.6	119.4	7.55	3.93	1.4	0.13
TAV-MW7	07-Nov-17	20.34	615.8	141.2	7.33	2.30	3.6	0.32

Refer to general footnotes at the end of tables.

Table III-3
Analytical Results of the Injected Solution before Discharge

Analyses	Analyte	Result ^a	MDL ^b	PQL ^c	MCL ^d	Units	Lab Qual ^e	Val Qual ^f	Sample No.	Analytical Method ^g	Lab ^h
21-Nov-17											
Alkalinity	Alkalinity as CaCO ₃	669	1.45	4	NE	mg/L			104065-009	SM 2320B	GEL
Alkalinity	Alkalinity, bicarb as CaCO ₃	669	1.45	4	NE	mg/L			104065-009	SM 2320B	GEL
Alkalinity	Alkalinity, carb as CaCO ₃	ND	1.45	4	NE	mg/L	U		104065-009	SM 2320B	GEL
Ammonia	Ammonia	141	4.25	12.5	NE	mg/L	B	J	104065-002	EPA 350.1	GEL
Anions	Bromide	195	13.4	40	NE	mg/L			104065-008	SW846 9056	GEL
Anions	Chloride	19.1	0.67	2	NE	mg/L			104065-008	SW846 9056	GEL
Anions	Fluoride	24.9	6.6	20	4	mg/L			104065-008	SW846 9056	GEL
Anions	Nitrate	0.761	0.33	1	10	mg/L	HJ	J	104065-007	EPA 300.0	GEL
Anions	Nitrite	ND	3.3	10	1	mg/L	UH	R	104065-006	SW846 9056	GEL
Anions	Orthophosphate as Phosphorus	92.8	6.7	20	NE	mg/L			104065-003	SW846 9056	GEL
Anions	Sulfate	112	26.6	80	NE	mg/L		J	104065-008	SW846 9056	GEL
Dissolved Metals	Arsenic	0.118	0.002	0.005	0.010	mg/L			104065-010	SW846 3005/6020	GEL
Dissolved Metals	Calcium	34.4	0.08	0.2	NE	mg/L			104065-010	SW846 3005/6020	GEL
Dissolved Metals	Iron	0.0604	0.033	0.1	NE	mg/L	J		104065-010	SW846 3005/6020	GEL
Dissolved Metals	Magnesium	5.34	0.01	0.03	NE	mg/L			104065-010	SW846 3005/6020	GEL
Dissolved Metals	Manganese	ND	0.001	0.005	NE	mg/L	U		104065-010	SW846 3005/6020	GEL
Dissolved Metals	Potassium	269	1.6	6	NE	mg/L			104065-010	SW846 3005/6020	GEL
Dissolved Metals	Sodium	155	1.6	5	NE	mg/L			104065-010	SW846 3005/6020	GEL
MEE	Methane	ND	0.02	0.5	NE	µg/L	U	R	104073-001	AM20GAX	PACE
MEE	Ethane	0.23	0.007	0.1	NE	µg/L		J	104073-001	AM20GAX	PACE
MEE	Ethene	ND	0.005	0.1	NE	µg/L	U	R	104073-001	AM20GAX	PACE
Sulfide	Sulfide, Reactive	ND	500	500	NE	mg/L	<	UJ	104065-005	SW846 Chpt. 7.3.4-TI	GEL
TOC	Total Organic Carbon #1	1270	82.5	250	NE	mg/L			104065-004	SW846 9060A	GEL
TOC	Total Organic Carbon #2	1270	82.5	250	NE	mg/L			104065-004	SW846 9060A	GEL
TOC	Total Organic Carbon #3	1270	82.5	250	NE	mg/L			104065-004	SW846 9060A	GEL
TOC	Total Organic Carbon #4	1270	82.5	250	NE	mg/L			104065-004	SW846 9060A	GEL
TOC	Total Organic Carbon Average	1270	82.5	250	NE	mg/L			104065-004	SW846 9060A	GEL
VOC	Acetone	4.25	1.5	10	NE	µg/L	J	10U	104065-001	SW846 8260B	GEL
VOC	Bromodichloromethane	0.73	0.3	1	80	µg/L	J		104065-001	SW846 8260B	GEL
VOC	Bromoform	1.15	0.3	1	80	µg/L		J+	104065-001	SW846 8260B	GEL
VOC	Chloroform	0.32	0.3	1	80	µg/L	J		104065-001	SW846 8260B	GEL
VOC	Dibromochloromethane	1.6	0.3	1	80	µg/L		J+	104065-001	SW846 8260B	GEL

Table III-3 (continued)
Analytical Results of the Injected Solution before Discharge

Analyses	Analyte	Result ^a	MDL ^b	PQL ^c	MCL ^d	Units	Lab Qual ^e	Val Qual ^f	Sample No.	Analytical Method ^g	Lab ^h
11/21/2017 (Duplicate)											
Alkalinity	Alkalinity as CaCO ₃	647	1.45	4	NE	mg/L			104066-009	SM 2320B	GEL
Alkalinity	Alkalinity, bicarb as CaCO ₃	647	1.45	4	NE	mg/L			104066-009	SM 2320B	GEL
Alkalinity	Alkalinity, carb as CaCO ₃	ND	1.45	4	NE	mg/L	U		104066-009	SM 2320B	GEL
Ammonia	Ammonia	98.8	4.25	12.5	NE	mg/L	B	J	104066-002	EPA 350.1	GEL
Anions	Bromide	175	13.4	40	NE	mg/L			104066-008	SW846 9056	GEL
Anions	Chloride	19	0.67	2	NE	mg/L			104066-008	SW846 9056	GEL
Anions	Fluoride	24.4	6.6	20	4	mg/L			104066-008	SW846 9056	GEL
Anions	Nitrate	1.02	0.033	0.1	10	mg/L		J	104066-007	EPA 300.0	GEL
Anions	Nitrite	ND	3.3	10	1	mg/L	UH	R	104066-006	SW846 9056	GEL
Anions	Orthophosphate as Phosphorus	78.2	6.7	20	NE	mg/L			104066-003	SW846 9056	GEL
Anions	Sulfate	69.3	26.6	80	NE	mg/L	J	J	104066-008	SW846 9056	GEL
Dissolved Metals	Arsenic	0.108	0.002	0.005	0.010	mg/L			104066-010	SW846 3005/6020	GEL
Dissolved Metals	Calcium	35.2	0.08	0.2	NE	mg/L			104066-010	SW846 3005/6020	GEL
Dissolved Metals	Iron	0.058	0.033	0.1	NE	mg/L	J		104066-010	SW846 3005/6020	GEL
Dissolved Metals	Magnesium	5.55	0.01	0.03	NE	mg/L			104066-010	SW846 3005/6020	GEL
Dissolved Metals	Manganese	ND	0.001	0.005	NE	mg/L	U		104066-010	SW846 3005/6020	GEL
Dissolved Metals	Potassium	268	1.6	6	NE	mg/L			104066-010	SW846 3005/6020	GEL
Dissolved Metals	Sodium	153	1.6	5	NE	mg/L			104066-010	SW846 3005/6020	GEL
MEE	Methane	ND	0.02	0.5	NE	µg/L	U	R	104074-001	AM20GAX	PACE
MEE	Ethane	0.23	0.007	0.1	NE	µg/L		J	104074-001	AM20GAX	PACE
MEE	Ethene	ND	0.005	0.1	NE	µg/L	U	R	104074-001	AM20GAX	PACE
Sulfide	Sulfide, Reactive	ND	500	500	NE	mg/L	<	UJ	104066-005	SW846 Chpt. 7.3.4-TI	GEL
TOC	Total Organic Carbon #1	1230	82.5	250	NE	mg/L			104066-004	SW846 9060A	GEL
TOC	Total Organic Carbon #2	1260	82.5	250	NE	mg/L			104066-004	SW846 9060A	GEL
TOC	Total Organic Carbon #3	1230	82.5	250	NE	mg/L			104066-004	SW846 9060A	GEL
TOC	Total Organic Carbon #4	1250	82.5	250	NE	mg/L			104066-004	SW846 9060A	GEL
TOC	Total Organic Carbon Average	1240	82.5	250	NE	mg/L			104066-004	SW846 9060A	GEL
VOC	Bromodichloromethane	0.74	0.3	1	80	µg/L	J		104066-001	SW846 8260B	GEL
VOC	Bromoform	1.17	0.3	1	80	µg/L		J+	104066-001	SW846 8260B	GEL
VOC	Chloroform	0.34	0.3	1	80	µg/L	J		104066-001	SW846 8260B	GEL
VOC	Dibromochloromethane	1.65	0.3	1	80	µg/L		J+	104066-001	SW846 8260B	GEL

Table III-3 (continued)
Analytical Results of the Injected Solution before Discharge

Analyses	Analyte	Result ^a	MDL ^b	PQL ^c	MCL ^d	Units	Lab Qual ^e	Val Qual ^f	Sample No.	Analytical Method ^g	Lab ^h
27-Nov-17											
Alkalinity	Alkalinity as CaCO ₃	136	1.45	4	NE	mg/L			104069-009	SM 2320B	GEL
Alkalinity	Alkalinity, bicarb as CaCO ₃	136	1.45	4	NE	mg/L			104069-009	SM 2320B	GEL
Alkalinity	Alkalinity, carb as CaCO ₃	ND	1.45	4	NE	mg/L	U		104069-009	SM 2320B	GEL
Ammonia	Ammonia	2.36	0.085	0.25	NE	mg/L	N	J+	104069-002	EPA 350.1	GEL
Anions	Bromide	1.01	0.67	2	NE	mg/L	J		104069-008	SW846 9056	GEL
Anions	Chloride	18.4	0.67	2	NE	mg/L			104069-008	SW846 9056	GEL
Anions	Fluoride	0.69	0.33	1	4	mg/L	J	1.0U	104069-008	SW846 9056	GEL
Anions	Nitrate	0.399	0.033	0.1	10	mg/L		J	104069-007	EPA 300.0	GEL
Anions	Nitrite	ND	16.5	50	1	mg/L	UH	R	104069-006	SW846 9056	GEL
Anions	Orthophosphate as Phosphorus	1.65	0.067	0.2	NE	mg/L		J	104069-003	SW846 9056	GEL
Anions	Sulfate	32.1	1.33	4	NE	mg/L			104069-008	SW846 9056	GEL
Dissolved Metals	Arsenic	0.00314	0.002	0.005	0.010	mg/L	J		104069-010	SW846 3005/6020	GEL
Dissolved Metals	Calcium	36.2	0.08	0.2	NE	mg/L			104069-010	SW846 3005/6020	GEL
Dissolved Metals	Iron	0.0674	0.033	0.1	NE	mg/L	J		104069-010	SW846 3005/6020	GEL
Dissolved Metals	Magnesium	5.76	0.01	0.03	NE	mg/L			104069-010	SW846 3005/6020	GEL
Dissolved Metals	Manganese	ND	0.001	0.005	NE	mg/L	U		104069-010	SW846 3005/6020	GEL
Dissolved Metals	Potassium	13.5	0.08	0.3	NE	mg/L			104069-010	SW846 3005/6020	GEL
Dissolved Metals	Sodium	27.6	0.08	0.25	NE	mg/L			104069-010	SW846 3005/6020	GEL
MEE	Methane	ND	0.02	0.5	NE	µg/L	U	UJ	104075-001	AM20GAX	PACE
MEE	Ethane	ND	0.007	0.1	NE	µg/L	U	UJ	104075-001	AM20GAX	PACE
MEE	Ethene	ND	0.005	0.1	NE	µg/L	U	UJ	104075-001	AM20GAX	PACE
Microbial	Dehalococcoides	1E+09	1000		NE	Enumeration/L			104078-001	Gene-Trac Dhc	SiREM
Sulfide	Sulfide, Reactive	ND	500	500	NE	mg/L	<, *	UJ	104069-005	SW846 Chpt. 7.3.4-TI	GEL
TOC	Total Organic Carbon #1	35.2	3.3	10	NE	mg/L			104069-004	SW846 9060A	GEL
TOC	Total Organic Carbon #2	35.6	3.3	10	NE	mg/L			104069-004	SW846 9060A	GEL
TOC	Total Organic Carbon #3	35.7	3.3	10	NE	mg/L			104069-004	SW846 9060A	GEL
TOC	Total Organic Carbon #4	35.8	3.3	10	NE	mg/L			104069-004	SW846 9060A	GEL
TOC	Total Organic Carbon Average	35.6	3.3	10	NE	mg/L			104069-004	SW846 9060A	GEL
VOC	Acetone	3.9	1.5	10	NE	µg/L	J		104069-001	SW846 8260B	GEL
VOC	Bromodichloromethane	1.13	0.3	1	80	µg/L			104069-001	SW846 8260B	GEL
VOC	Bromoform	1.76	0.3	1	80	µg/L		J+	104069-001	SW846 8260B	GEL
VOC	Chloroform	0.6	0.3	1	80	µg/L	J		104069-001	SW846 8260B	GEL
VOC	Dibromochloromethane	1.78	0.3	1	80	µg/L			104069-001	SW846 8260B	GEL

Table III-3 (concluded)
Analytical Results of the Injected Solution before Discharge

Analyses	Analyte	Result ^a	MDL ^b	PQL ^c	MCL ^d	Units	Lab Qual ^e	Val Qual ^f	Sample No.	Analytical Method ^g	Lab ^h
11/27/2017 (Duplicate)											
Alkalinity	Alkalinity as CaCO ₃	135	1.45	4	NE	mg/L			104070-009	SM 2320B	GEL
Alkalinity	Alkalinity, bicarb as CaCO ₃	135	1.45	4	NE	mg/L			104070-009	SM 2320B	GEL
Alkalinity	Alkalinity, carb as CaCO ₃	ND	1.45	4	NE	mg/L	U		104070-009	SM 2320B	GEL
Ammonia	Ammonia	2.2	0.17	0.5	NE	mg/L	N	J+	104070-002	EPA 350.1	GEL
Anions	Bromide	0.959	0.67	2	NE	mg/L	J		104070-008	SW846 9056	GEL
Anions	Chloride	18.3	0.67	2	NE	mg/L			104070-008	SW846 9056	GEL
Anions	Fluoride	0.792	0.33	1	4	mg/L	J	1.0U	104070-008	SW846 9056	GEL
Anions	Nitrate	0.399	0.033	0.1	10	mg/L		J	104070-007	EPA 300.0	GEL
Anions	Nitrite	ND	16.5	50	1	mg/L	UH	R	104070-006	SW846 9056	GEL
Anions	Orthophosphate as Phosphorus	1.67	0.067	0.2	NE	mg/L		J	104070-003	SW846 9056	GEL
Anions	Sulfate	31.7	1.33	4	NE	mg/L			104070-008	SW846 9056	GEL
Dissolved Metals	Arsenic	0.00347	0.002	0.005	0.010	mg/L	J		104070-010	SW846 3005/6020	GEL
Dissolved Metals	Calcium	36.4	0.08	0.2	NE	mg/L			104070-010	SW846 3005/6020	GEL
Dissolved Metals	Iron	0.0682	0.033	0.1	NE	mg/L	J		104070-010	SW846 3005/6020	GEL
Dissolved Metals	Magnesium	5.8	0.01	0.03	NE	mg/L			104070-010	SW846 3005/6020	GEL
Dissolved Metals	Manganese	ND	0.001	0.005	NE	mg/L	U		104070-010	SW846 3005/6020	GEL
Dissolved Metals	Potassium	13.5	0.08	0.3	NE	mg/L			104070-010	SW846 3005/6020	GEL
Dissolved Metals	Sodium	27.5	0.08	0.25	NE	mg/L			104070-010	SW846 3005/6020	GEL
MEE	Methane	ND	0.02	0.5	NE	µg/L	U	UJ	104076-001	AM20GAX	PACE
MEE	Ethane	ND	0.007	0.1	NE	µg/L	U	UJ	104076-001	AM20GAX	PACE
MEE	Ethene	ND	0.005	0.1	NE	µg/L	U	UJ	104076-001	AM20GAX	PACE
Sulfide	Sulfide, Reactive	ND	500	500	NE	mg/L	<, *	UJ	104070-005	SW846 Chpt. 7.3.4-TI	GEL
TOC	Total Organic Carbon #1	40.5	3.3	10	NE	mg/L			104070-004	SW846 9060A	GEL
TOC	Total Organic Carbon #2	41.3	3.3	10	NE	mg/L			104070-004	SW846 9060A	GEL
TOC	Total Organic Carbon #3	41.5	3.3	10	NE	mg/L			104070-004	SW846 9060A	GEL
TOC	Total Organic Carbon #4	41.7	3.3	10	NE	mg/L			104070-004	SW846 9060A	GEL
TOC	Total Organic Carbon Average	41.3	3.3	10	NE	mg/L			104070-004	SW846 9060A	GEL
VOC	Acetone	4.13	1.5	10	NE	µg/L	J		104070-001	SW846 8260B	GEL
VOC	Bromodichloromethane	1.17	0.3	1	80	µg/L			104070-001	SW846 8260B	GEL
VOC	Bromoform	1.86	0.3	1	80	µg/L		J+	104070-001	SW846 8260B	GEL
VOC	Chloroform	0.63	0.3	1	80	µg/L	J		104070-001	SW846 8260B	GEL
VOC	Dibromochloromethane	1.75	0.3	1	80	µg/L			104070-001	SW846 8260B	GEL

Notes:

Microbial sample was not collected on November 21, 2017 because no dehalococcoides were added in the substrate solution. Duplicate microbial sample was not collected on November 27, 2017. Refer to general footnotes at the end of tables.

Table III-4
Field Parametersⁱ of Injected Solution before Discharge

November 21, 2017

Treatability Study Tank Deoxygenation Log

Project Name: Technical Area-V Treatability Study

Technician Names: Peter Guerra / Jeff Cotter

Deoxygenation Tank (A, B, C, D): A

Date (MM/DD/YYYY): 11/21/2017

Time (24 hr)	Volume in tank (gal)	DO (mg/L)	ORP (mV)	pH	SC (μS/cm)	Temp (°C)
9:09	4500	7.51	236.1	7.91	321.8	15.6
9:10		12.61	78.1	8.21	6,210	15.7
9:12		60+	51.6	8.11	11,695	15.5
9:16		70+	18.2	8.06	15,122	15.3
9:20		60+	-77.3	8.10	9,320	15.2
9:30		60+	-122.3	8.02	6,091	15.3
9:40		70+	-74.5	8.05	1,830	14.9
9:50		70+	-70.6	8.06	1,633	15.0
9:55		60+	-69.5	8.16	1,721	15.1
10:00		60+	-88.8	8.12	1,800	14.9
10:05		60+	-103.6	8.33	1,729	15.1
10:15		60+	-113.6	8.39	1,630	15.1
10:30		60+	-107.0	8.36	1,598	14.9
10:45		60+	-118.0	8.40	1,575	14.8
11:00	4500	60+	-122.3	8.42	1,621	14.8
Ready to inject		< 0.5	< negative 75	6.0-8.5		

Notes: Fill includes groundwater sampling purge water (Y/N) If Yes, well names and volumes (gal): _____

Call to discuss w/ Jeff Roberts Confirms
that DO is not reasonable. ORP sufficient
evidence "ready to inject"

Page ____ of ____

November 27, 2017

Project Name: Technical Area-V Treatability Study

Project Name: Technical Area-V Treatability Study

Technician Names: Peter Guerra / Jeff Cotter

Deoxygenation Tank (A, B, C, D): B Date (MM/DD/YYYY): 11/27/2017

Deoxygenation Tank (A, B, C, D): 13

Date (MM/DD/YYYY): 11/27/2017

Time (24 hr)	Volume in tank (gal)	DO (mg/L)	ORP (mV)	pH	SC (μS/cm)	Temp (°C)
08:20	4,500	6.68	+208.6	7.88	303.6	15.5
08:35		17.25	77.5	7.91	1,203.4	15.6
08:45		60+	-10.6	7.92	16,600	15.4
09:00			-36.5	8.01	6,018	15.3
09:30			-101.2	8.05	1,718	15.3
10:10			-122.6	8.04	3,091.5	15.3
10:30			-107.1	8.24	1,971.6	15.2
11:00			-110.0	8.22	2,203.5	—
11:15	4,500		-126.2	8.31	2,006.4	15.2
Ready to inject		< 0.5	< negative 75	6.0-8.5		

Notes: Fill includes groundwater sampling purge water (Y/N) If Yes, well names and volumes (gal): ~30

~ 30 gallons of well development
water added as soil-core liquid

Page ____ of ____

Table III-5
Analytical Results of Groundwater Sampling at Wells TAV-INJ1, TAV-MW6, and TAV-MW7

Analyses	Analyte	Result ^a	MDL ^b	PQL ^c	MCL ^d	Units	Lab Qual ^e	Val Qual ^f	Sample No.	Analytical Method ^g	Lab ^h
TAV-INJ1, 28-Nov-17											
Alkalinity	Alkalinity as CaCO ₃	399	1.45	4	NE	mg/L			104104-009	SM 2320B	GEL
Alkalinity	Alkalinity, bicarb as CaCO ₃	399	1.45	4	NE	mg/L			104104-009	SM 2320B	GEL
Alkalinity	Alkalinity, carb as CaCO ₃	ND	1.45	4	NE	mg/L	U		104104-009	SM 2320B	GEL
Ammonia	Ammonia	37.8	0.85	2.5	NE	mg/L	N	J+	104104-002	EPA 350.1	GEL
Anions	Bromide	63.8	6.7	20	NE	mg/L			104104-008	SW846 9056	GEL
Anions	Chloride	19.6	0.67	2	NE	mg/L			104104-008	SW846 9056	GEL
Anions	Fluoride	ND	3.3	10	4	mg/L	U		104104-008	SW846 9056	GEL
Anions	Nitrite	ND	0.66	2	1	mg/L	U		104104-006	SW846 9056	GEL
Anions	Orthophosphate as Phosphorus	34	1.34	4	NE	mg/L			104104-003	SW846 9056	GEL
Anions	Sulfate	42.1	1.33	4	NE	mg/L			104104-008	SW846 9056	GEL
Dissolved Metals	Arsenic	0.0412	0.002	0.005	0.010	mg/L			104104-010	SW846 3005/6020	GEL
Dissolved Metals	Calcium	62.4	0.4	1	NE	mg/L			104104-010	SW846 3005/6020	GEL
Dissolved Metals	Iron	0.891	0.033	0.1	NE	mg/L			104104-010	SW846 3005/6020	GEL
Dissolved Metals	Magnesium	10	0.01	0.03	NE	mg/L			104104-010	SW846 3005/6020	GEL
Dissolved Metals	Manganese	0.87	0.001	0.005	NE	mg/L			104104-010	SW846 3005/6020	GEL
Dissolved Metals	Potassium	113	0.4	1.5	NE	mg/L			104104-010	SW846 3005/6020	GEL
Dissolved Metals	Sodium	83	0.4	1.25	NE	mg/L			104104-010	SW846 3005/6020	GEL
MEE	Methane	ND	0.02	0.5	NE	µg/L	U	UJ	104137-001	AM20GAX	PACE
MEE	Ethane	ND	0.007	0.1	NE	µg/L	U	UJ	104137-001	AM20GAX	PACE
MEE	Ethene	ND	0.005	0.1	NE	µg/L	U	UJ	104137-001	AM20GAX	PACE
Microbial	Dehalococcoides	3000000	1000		NE	Enumeration/L			104143-001	Gene-Trac Dhc	SiREM
NPN	Nitrate plus nitrite as Nitrogen	ND	0.017	0.05	10	mg/L	U	UJ	104104-007	EPA 353.2	GEL
Sulfide	Sulfide, Reactive	ND	500	500	NE	mg/L	<, *	UJ	104104-005	SW846 Chpt. 7.3.4-TI	GEL
TOC	Total Organic Carbon #1	421	33	100	NE	mg/L		J	104104-004	SW846 9060A	GEL
TOC	Total Organic Carbon #2	428	33	100	NE	mg/L		J	104104-004	SW846 9060A	GEL
TOC	Total Organic Carbon #3	429	33	100	NE	mg/L		J	104104-004	SW846 9060A	GEL
TOC	Total Organic Carbon #4	431	33	100	NE	mg/L		J	104104-004	SW846 9060A	GEL
TOC	Total Organic Carbon Average	427	33	100	NE	mg/L		J	104104-004	SW846 9060A	GEL
VOC	Acetone	6.02	1.5	10	NE	µg/L	J		104104-001	SW846 8260B	GEL
VOC	Bromodichloromethane	0.58	0.3	1	80	µg/L	J		104104-001	SW846 8260B	GEL
VOC	Bromoform	1.23	0.3	1	80	µg/L		J+	104104-001	SW846 8260B	GEL
VOC	Carbon disulfide	66	1.5	5	NE	µg/L		J-	104104-001	SW846 8260B	GEL
VOC	Chloroform	0.62	0.3	1	80	µg/L	J		104104-001	SW846 8260B	GEL
VOC	Dibromochloromethane	0.83	0.3	1	80	µg/L	J		104104-001	SW846 8260B	GEL

Table III-5 (continued)
Analytical Results of Groundwater Sampling at Wells TAV-INJ1, TAV-MW6, and TAV-MW7

Analyses	Analyte	Result ^a	MDL ^b	PQL ^c	MCL ^d	Units	Lab Qual ^e	Val Qual ^f	Sample No.	Analytical Method ^g	Lab ^h
TAV-INJ1, 29-Nov-17											
Alkalinity	Alkalinity as CaCO ₃	361	1.45	4	NE	mg/L			104106-009	SM 2320B	GEL
Alkalinity	Alkalinity, bicarb as CaCO ₃	361	1.45	4	NE	mg/L			104106-009	SM 2320B	GEL
Alkalinity	Alkalinity, carb as CaCO ₃	ND	1.45	4	NE	mg/L	U		104106-009	SM 2320B	GEL
Ammonia	Ammonia	27.1	0.85	2.5	NE	mg/L	N	J+	104106-002	EPA 350.1	GEL
Anions	Bromide	39.3	3.35	10	NE	mg/L			104106-008	SW846 9056	GEL
Anions	Chloride	18.9	0.67	2	NE	mg/L			104106-008	SW846 9056	GEL
Anions	Fluoride	ND	1.65	5	4	mg/L	U		104106-008	SW846 9056	GEL
Anions	Nitrite	ND	3.3	10	1	mg/L	U		104106-006	SW846 9056	GEL
Anions	Orthophosphate as Phosphorus	17.1	3.35	10	NE	mg/L			104106-003	SW846 9056	GEL
Anions	Sulfate	40.2	1.33	4	NE	mg/L			104106-008	SW846 9056	GEL
Dissolved Metals	Arsenic	0.0326	0.002	0.005	0.010	mg/L			104106-010	SW846 3005/6020	GEL
Dissolved Metals	Calcium	58.4	0.4	1	NE	mg/L			104106-010	SW846 3005/6020	GEL
Dissolved Metals	Iron	0.723	0.033	0.1	NE	mg/L			104106-010	SW846 3005/6020	GEL
Dissolved Metals	Magnesium	9.78	0.01	0.03	NE	mg/L			104106-010	SW846 3005/6020	GEL
Dissolved Metals	Manganese	0.913	0.001	0.005	NE	mg/L			104106-010	SW846 3005/6020	GEL
Dissolved Metals	Potassium	87	0.4	1.5	NE	mg/L			104106-010	SW846 3005/6020	GEL
Dissolved Metals	Sodium	66.9	0.4	1.25	NE	mg/L			104106-010	SW846 3005/6020	GEL
MEE	Methane	1.4	0.02	0.5	NE	µg/L		J	104139-001	AM20GAX	PACE
MEE	Ethane	ND	0.007	0.1	NE	µg/L	U	UJ	104139-001	AM20GAX	PACE
MEE	Ethene	0.13	0.005	0.1	NE	µg/L		J	104139-001	AM20GAX	PACE
Microbial	Dehalococcoides	20000000	1000		NE	Enumeration/L			104144-001	Gene-Trac Dhc	SiREM
NPN	Nitrate plus nitrite as Nitrogen	ND	0.017	0.05	10	mg/L	U	UJ	104106-007	EPA 353.2	GEL
Sulfide	Sulfide, Reactive	ND	500	500	NE	mg/L	<, *	UJ	104106-005	SW846 Chpt. 7.3.4-TI	GEL
TOC	Total Organic Carbon #1	395	82.5	250	NE	mg/L		J	104106-004	SW846 9060A	GEL
TOC	Total Organic Carbon #2	403	82.5	250	NE	mg/L		J	104106-004	SW846 9060A	GEL
TOC	Total Organic Carbon #3	403	82.5	250	NE	mg/L		J	104106-004	SW846 9060A	GEL
TOC	Total Organic Carbon #4	405	82.5	250	NE	mg/L		J	104106-004	SW846 9060A	GEL
TOC	Total Organic Carbon Average	401	82.5	250	NE	mg/L		J	104106-004	SW846 9060A	GEL
VOC	Acetone	4.22	1.5	10	NE	µg/L	J		104106-001	SW846 8260B	GEL
VOC	Bromochloromethane	0.47	0.3	1	80	µg/L	J		104106-001	SW846 8260B	GEL
VOC	Bromodichloromethane	0.39	0.3	1	80	µg/L	J		104106-001	SW846 8260B	GEL
VOC	Carbon disulfide	55.4	1.5	5	NE	µg/L		J-	104106-001	SW846 8260B	GEL
VOC	Chloroform	0.57	0.3	1	80	µg/L	J		104106-001	SW846 8260B	GEL
VOC	Dibromochloromethane	0.58	0.3	1	80	µg/L	J		104106-001	SW846 8260B	GEL

Table III-5 (continued)
Analytical Results of Groundwater Sampling at Wells TAV-INJ1, TAV-MW6, and TAV-MW7

Analyses	Analyte	Result ^a	MDL ^b	PQL ^c	MCL ^d	Units	Lab Qual ^e	Val Qual ^f	Sample No.	Analytical Method ^g	Lab ^h
TAV-INJ1, 1-Dec-17											
Alkalinity	Alkalinity as CaCO ₃	306	1.45	4	NE	mg/L			104108-009	SM 2320B	GEL
Alkalinity	Alkalinity, bicarb as CaCO ₃	306	1.45	4	NE	mg/L			104108-009	SM 2320B	GEL
Alkalinity	Alkalinity, carb as CaCO ₃	ND	1.45	4	NE	mg/L	U		104108-009	SM 2320B	GEL
Ammonia	Ammonia	18.5	0.425	1.25	NE	mg/L	N	J+	104108-002	EPA 350.1	GEL
Anions	Bromide	20.2	0.67	2	NE	mg/L			104108-008	SW846 9056	GEL
Anions	Chloride	19.6	0.67	2	NE	mg/L			104108-008	SW846 9056	GEL
Anions	Fluoride	0.769	0.33	1	4	mg/L	J	1.0U	104108-008	SW846 9056	GEL
Anions	Nitrite	ND	16.5	50	1	mg/L	U		104108-006	SW846 9056	GEL
Anions	Orthophosphate as Phosphorus	12	6.7	20	NE	mg/L	J		104108-003	SW846 9056	GEL
Anions	Sulfate	37.9	1.33	4	NE	mg/L			104108-008	SW846 9056	GEL
Dissolved Metals	Arsenic	0.0607	0.002	0.005	0.010	mg/L			104108-010	SW846 3005/6020	GEL
Dissolved Metals	Calcium	44.9	0.08	0.2	NE	mg/L			104108-010	SW846 3005/6020	GEL
Dissolved Metals	Iron	0.911	0.033	0.1	NE	mg/L			104108-010	SW846 3005/6020	GEL
Dissolved Metals	Magnesium	8.51	0.01	0.03	NE	mg/L			104108-010	SW846 3005/6020	GEL
Dissolved Metals	Manganese	1.28	0.005	0.025	NE	mg/L			104108-010	SW846 3005/6020	GEL
Dissolved Metals	Potassium	72.8	0.4	1.5	NE	mg/L			104108-010	SW846 3005/6020	GEL
Dissolved Metals	Sodium	55.9	0.4	1.25	NE	mg/L			104108-010	SW846 3005/6020	GEL
MEE	Methane	6.4	0.02	0.5	NE	µg/L		J	104141-001	AM20GAX	PACE
MEE	Ethane	ND	0.007	0.1	NE	µg/L	U	UJ	104141-001	AM20GAX	PACE
MEE	Ethene	0.17	0.005	0.1	NE	µg/L		J	104141-001	AM20GAX	PACE
Microbial	Dehalococcoides	10000000	3000		NE	Enumeration/L			104145-001	Gene-Trac Dhc	SiREM
NPN	Nitrate plus nitrite as Nitrogen	ND	0.017	0.05	10	mg/L	U		104108-007	EPA 353.2	GEL
Sulfide	Sulfide, Reactive	ND	500	500	NE	mg/L	<, *	UJ	104108-005	SW846 Chpt. 7.3.4-TI	GEL
TOC	Total Organic Carbon #1	190	6.6	20	NE	mg/L			104108-004	SW846 9060A	GEL
TOC	Total Organic Carbon #2	194	6.6	20	NE	mg/L			104108-004	SW846 9060A	GEL
TOC	Total Organic Carbon #3	195	6.6	20	NE	mg/L			104108-004	SW846 9060A	GEL
TOC	Total Organic Carbon #4	195	6.6	20	NE	mg/L			104108-004	SW846 9060A	GEL
TOC	Total Organic Carbon Average	193	6.6	20	NE	mg/L			104108-004	SW846 9060A	GEL
VOC	Acetone	3.9	1.5	10	NE	µg/L	J		104108-001	SW846 8260B	GEL
VOC	Bromochloromethane	0.56	0.3	1	80	µg/L	J		104108-001	SW846 8260B	GEL
VOC	Carbon disulfide	109	1.5	5	NE	µg/L		J-	104108-001	SW846 8260B	GEL
VOC	Chloroform	0.63	0.3	1	80	µg/L	J		104108-001	SW846 8260B	GEL

Table III-5 (continued)
Analytical Results of Groundwater Sampling at Wells TAV-INJ1, TAV-MW6, and TAV-MW7

Analyses	Analyte	Result ^a	MDL ^b	PQL ^c	MCL ^d	Units	Lab Qual ^e	Val Qual ^f	Sample No.	Analytical Method ^g	Lab ^h
TAV-INJ1, 6-Dec-17											
Alkalinity	Alkalinity as CaCO ₃	351	1.45	4	NE	mg/L			104097-009	SM 2320B	GEL
Alkalinity	Alkalinity, bicarb as CaCO ₃	351	1.45	4	NE	mg/L			104097-009	SM 2320B	GEL
Alkalinity	Alkalinity, carb as CaCO ₃	ND	1.45	4	NE	mg/L	U		104097-009	SM 2320B	GEL
Ammonia	Ammonia	17.2	0.425	1.25	NE	mg/L		J	104097-002	EPA 350.1	GEL
Anions	Bromide	20.3	1.34	4	NE	mg/L		J	104097-008	SW846 9056	GEL
Anions	Chloride	21	1.34	4	NE	mg/L			104097-008	SW846 9056	GEL
Anions	Fluoride	1.74	0.66	2	4	mg/L	J	J	104097-008	SW846 9056	GEL
Anions	Nitrite	ND	16.5	50	1	mg/L	UH	UJ	104097-006	SW846 9056	GEL
Anions	Orthophosphate as Phosphorus	ND	6.7	20	NE	mg/L	UH	UJ	104097-003	SW846 9056	GEL
Anions	Sulfate	35.6	2.66	8	NE	mg/L			104097-008	SW846 9056	GEL
Dissolved Metals	Arsenic	0.0983	0.002	0.005	0.010	mg/L			104097-010	SW846 3005/6020	GEL
Dissolved Metals	Calcium	55.3	0.8	2	NE	mg/L			104097-010	SW846 3005/6020	GEL
Dissolved Metals	Iron	0.974	0.033	0.1	NE	mg/L			104097-010	SW846 3005/6020	GEL
Dissolved Metals	Magnesium	11.3	0.01	0.03	NE	mg/L			104097-010	SW846 3005/6020	GEL
Dissolved Metals	Manganese	3.27	0.01	0.05	NE	mg/L		J	104097-010	SW846 3005/6020	GEL
Dissolved Metals	Potassium	81.9	0.8	3	NE	mg/L			104097-010	SW846 3005/6020	GEL
Dissolved Metals	Sodium	64.6	0.8	2.5	NE	mg/L			104097-010	SW846 3005/6020	GEL
MEE	Methane	15	0.02	0.5	NE	µg/L		J	104088-001	AM20GAX	PACE
MEE	Ethane	ND	0.007	0.1	NE	µg/L	U	UJ	104088-001	AM20GAX	PACE
MEE	Ethene	0.18	0.005	0.1	NE	µg/L		J	104088-001	AM20GAX	PACE
Microbial	Dehalococcoides	3000000	1000		NE	Enumeration/L			104101-001	Gene-Trac Dhc	SiREM
NPN	Nitrate plus nitrite as Nitrogen	ND	0.017	0.05	10	mg/L	U		104097-007	EPA 353.2	GEL
Sulfide	Sulfide, Reactive	ND	500	500	NE	mg/L	<, *	UJ	104097-005	SW846 Chpt. 7.3.4-TI	GEL
TOC	Total Organic Carbon #1	141	16.5	50	NE	mg/L		J	104097-004	SW846 9060A	GEL
TOC	Total Organic Carbon #2	147	16.5	50	NE	mg/L		J	104097-004	SW846 9060A	GEL
TOC	Total Organic Carbon #3	149	16.5	50	NE	mg/L		J	104097-004	SW846 9060A	GEL
TOC	Total Organic Carbon #4	149	16.5	50	NE	mg/L		J	104097-004	SW846 9060A	GEL
TOC	Total Organic Carbon Average	147	16.5	50	NE	mg/L		J	104097-004	SW846 9060A	GEL
VOC	Acetone	3.77	1.5	10	NE	µg/L	J		104097-001	SW846 8260B	GEL
VOC	Bromochloromethane	0.46	0.3	1	80	µg/L	J		104097-001	SW846 8260B	GEL
VOC	Carbon disulfide	349	1.5	5	NE	µg/L			104097-001	SW846 8260B	GEL
VOC	Chloroform	0.56	0.3	1	80	µg/L	J		104097-001	SW846 8260B	GEL
VOC	Trichloroethene	0.31	0.3	1	5	µg/L	J		104097-001	SW846 8260B	GEL

Table III-5 (continued)
Analytical Results of Groundwater Sampling at Wells TAV-INJ1, TAV-MW6, and TAV-MW7

Analyses	Analyte	Result ^a	MDL ^b	PQL ^c	MCL ^d	Units	Lab Qual ^e	Val Qual ^f	Sample No.	Analytical Method ^g	Lab ^h
TAV-INJ1, 11-Dec-17											
Alkalinity	Alkalinity as CaCO ₃	394	1.45	4	NE	mg/L			104156-009	SM 2320B	GEL
Alkalinity	Alkalinity, bicarb as CaCO ₃	394	1.45	4	NE	mg/L			104156-009	SM 2320B	GEL
Alkalinity	Alkalinity, carb as CaCO ₃	ND	1.45	4	NE	mg/L	U		104156-009	SM 2320B	GEL
Ammonia	Ammonia	17.9	0.425	1.25	NE	mg/L			104156-002	EPA 350.1	GEL
Anions	Bromide	27.7	1.34	4	NE	mg/L		J	104156-008	SW846 9056	GEL
Anions	Chloride	23.9	1.34	4	NE	mg/L			104156-008	SW846 9056	GEL
Anions	Fluoride	0.736	0.66	2	4	mg/L	J	J	104156-008	SW846 9056	GEL
Anions	Nitrite	ND	16.5	50	1	mg/L	U	UJ	104156-006	SW846 9056	GEL
Anions	Orthophosphate as Phosphorus	ND	6.7	20	NE	mg/L	U	UJ	104156-003	SW846 9056	GEL
Anions	Sulfate	32.9	2.66	8	NE	mg/L			104156-008	SW846 9056	GEL
Dissolved Metals	Arsenic	0.108	0.002	0.005	0.010	mg/L			104156-010	SW846 3005/6020	GEL
Dissolved Metals	Calcium	70.8	0.8	2	NE	mg/L	B		104156-010	SW846 3005/6020	GEL
Dissolved Metals	Iron	0.906	0.033	0.1	NE	mg/L			104156-010	SW846 3005/6020	GEL
Dissolved Metals	Magnesium	14.3	0.01	0.03	NE	mg/L			104156-010	SW846 3005/6020	GEL
Dissolved Metals	Manganese	5.02	0.01	0.05	NE	mg/L		J	104156-010	SW846 3005/6020	GEL
Dissolved Metals	Potassium	88.1	0.8	3	NE	mg/L			104156-010	SW846 3005/6020	GEL
Dissolved Metals	Sodium	76.5	0.8	2.5	NE	mg/L			104156-010	SW846 3005/6020	GEL
MEE	Methane	15	0.02	0.5	NE	µg/L		J	104168-001	AM20GAX	PACE
MEE	Ethane	ND	0.007	0.1	NE	µg/L	U	UJ	104168-001	AM20GAX	PACE
MEE	Ethene	0.17	0.005	0.1	NE	µg/L		J	104168-001	AM20GAX	PACE
Microbial	Dehalococcoides	2000000	1000		NE	Enumeration/L			104174-001	Gene-Trac Dhc	SiREM
NPN	Nitrate plus nitrite as Nitrogen	ND	0.017	0.05	10	mg/L	U		104156-007	EPA 353.2	GEL
Sulfide	Sulfide, Reactive	ND	500	500	NE	mg/L	<, *	UJ	104156-005	SW846 Chpt. 7.3.4-TI	GEL
TOC	Total Organic Carbon #1	181	16.5	50	NE	mg/L		J	104156-004	SW846 9060A	GEL
TOC	Total Organic Carbon #2	185	16.5	50	NE	mg/L		J	104156-004	SW846 9060A	GEL
TOC	Total Organic Carbon #3	187	16.5	50	NE	mg/L		J	104156-004	SW846 9060A	GEL
TOC	Total Organic Carbon #4	188	16.5	50	NE	mg/L		J	104156-004	SW846 9060A	GEL
TOC	Total Organic Carbon Average	185	16.5	50	NE	mg/L		J	104156-004	SW846 9060A	GEL
VOC	Acetone	3.34	1.5	10	NE	µg/L	J		104156-001	SW846 8260B	GEL
VOC	Bromochloromethane	0.36	0.3	1	80	µg/L	J		104156-001	SW846 8260B	GEL
VOC	Carbon disulfide	593	3	10	NE	µg/L			104156-001	SW846 8260B	GEL
VOC	Chloroform	0.47	0.3	1	80	µg/L	J		104156-001	SW846 8260B	GEL
VOC	Trichloroethene	0.35	0.3	1	5	µg/L	J		104156-001	SW846 8260B	GEL

Table III-5 (continued)
Analytical Results of Groundwater Sampling at Wells TAV-INJ1, TAV-MW6, and TAV-MW7

Analyses	Analyte	Result ^a	MDL ^b	PQL ^c	MCL ^d	Units	Lab Qual ^e	Val Qual ^f	Sample No.	Analytical Method ^g	Lab ^h
TAV-INJ1, 19-Dec-17											
Alkalinity	Alkalinity as CaCO ₃	481	1.45	4	NE	mg/L			104178-009	SM 2320B	GEL
Alkalinity	Alkalinity, bicarb as CaCO ₃	481	1.45	4	NE	mg/L			104178-009	SM 2320B	GEL
Alkalinity	Alkalinity, carb as CaCO ₃	ND	1.45	4	NE	mg/L	U		104178-009	SM 2320B	GEL
Ammonia	Ammonia	23.7	0.425	1.25	NE	mg/L	B	J	104178-002	EPA 350.1	GEL
Anions	Bromide	39.9	1.34	4	NE	mg/L		J	104178-008	SW846 9056	GEL
Anions	Chloride	30	1.34	4	NE	mg/L		J	104178-008	SW846 9056	GEL
Anions	Fluoride	0.782	0.66	2	4	mg/L	J	J	104178-008	SW846 9056	GEL
Anions	Nitrite	ND	0.66	2	1	mg/L	U	UJ	104178-006	SW846 9056	GEL
Anions	Orthophosphate as Phosphorus	3.43	0.67	2	NE	mg/L		J	104178-003	SW846 9056	GEL
Anions	Sulfate	15.6	2.66	8	NE	mg/L		J	104178-008	SW846 9056	GEL
Dissolved Metals	Arsenic	0.147	0.002	0.005	0.010	mg/L			104178-010	SW846 3005/6020	GEL
Dissolved Metals	Calcium	81.8	0.8	2	NE	mg/L			104178-010	SW846 3005/6020	GEL
Dissolved Metals	Iron	1.43	0.033	0.1	NE	mg/L			104178-010	SW846 3005/6020	GEL
Dissolved Metals	Magnesium	19.2	0.01	0.03	NE	mg/L			104178-010	SW846 3005/6020	GEL
Dissolved Metals	Manganese	7.62	0.01	0.05	NE	mg/L		J	104178-010	SW846 3005/6020	GEL
Dissolved Metals	Potassium	91.1	0.8	3	NE	mg/L			104178-010	SW846 3005/6020	GEL
Dissolved Metals	Sodium	80.4	0.8	2.5	NE	mg/L			104178-010	SW846 3005/6020	GEL
MEE	Methane	32	0.016	0.5	NE	µg/L		J	104176-001	AM20GAX	PACE
MEE	Ethane	ND	0.003	0.1	NE	µg/L	U	UJ	104176-001	AM20GAX	PACE
MEE	Ethene	0.26	0.004	0.1	NE	µg/L		J	104176-001	AM20GAX	PACE
Microbial	Dehalococcoides	1000000	1000		NE	Enumeration/L			104175-001	Gene-Trac Dhc	SiREM
NPN	Nitrate plus nitrite as Nitrogen	ND	0.017	0.05	10	mg/L	U		104178-007	EPA 353.2	GEL
Sulfide	Sulfide, Reactive	ND	500	500	NE	mg/L	<, *	UJ	104178-005	SW846 Chpt. 7.3.4-TI	GEL
TOC	Total Organic Carbon #1	247	6.6	20	NE	mg/L			104178-004	SW846 9060A	GEL
TOC	Total Organic Carbon #2	251	6.6	20	NE	mg/L			104178-004	SW846 9060A	GEL
TOC	Total Organic Carbon #3	253	6.6	20	NE	mg/L			104178-004	SW846 9060A	GEL
TOC	Total Organic Carbon #4	254	6.6	20	NE	mg/L			104178-004	SW846 9060A	GEL
TOC	Total Organic Carbon Average	251	6.6	20	NE	mg/L			104178-004	SW846 9060A	GEL
VOC	Carbon disulfide	548	75	250	NE	µg/L	H	J-	104178-001	SW846 8260B	GEL

Table III-5 (continued)
Analytical Results of Groundwater Sampling at Wells TAV-INJ1, TAV-MW6, and TAV-MW7

Analyses	Analyte	Result ^a	MDL ^b	PQL ^c	MCL ^d	Units	Lab Qual ^e	Val Qual ^f	Sample No.	Analytical Method ^g	Lab ^h
TAV-INJ1, 4-Jan-18											
Alkalinity	Alkalinity as CaCO ₃	526	1.45	4	NE	mg/L			104295-009	SM 2320B	GEL
Alkalinity	Alkalinity, bicarb as CaCO ₃	526	1.45	4	NE	mg/L			104295-009	SM 2320B	GEL
Alkalinity	Alkalinity, carb as CaCO ₃	ND	1.45	4	NE	mg/L	U		104295-009	SM 2320B	GEL
Ammonia	Ammonia	20.2	0.425	0.425	NE	mg/L	B	J	104295-002	EPA 350.1	GEL
Anions	Bromide	46	1.68	5	NE	mg/L		J	104295-008	SW846 9056	GEL
Anions	Chloride	40.3	0.67	2	NE	mg/L	B		104295-008	SW846 9056	GEL
Anions	Fluoride	0.403	0.33	1	4	mg/L	J	J	104295-008	SW846 9056	GEL
Anions	Nitrite	ND	16.5	50	1	mg/L	UH	R	104295-006	SW846 9056	GEL
Anions	Orthophosphate as Phosphorus	ND	6.7	20	NE	mg/L	UH	R	104295-003	SW846 9056	GEL
Anions	Sulfate	4.36	0.133	0.4	NE	mg/L		J	104295-008	SW846 9056	GEL
Dissolved Metals	Arsenic	0.149	0.002	0.005	0.010	mg/L			104295-010	SW846 3005/6020	GEL
Dissolved Metals	Calcium	105	0.8	2	NE	mg/L			104295-010	SW846 3005/6020	GEL
Dissolved Metals	Iron	4.88	0.033	0.1	NE	mg/L			104295-010	SW846 3005/6020	GEL
Dissolved Metals	Magnesium	25.5	0.01	0.03	NE	mg/L			104295-010	SW846 3005/6020	GEL
Dissolved Metals	Manganese	9.99	0.05	0.25	NE	mg/L		J	104295-010	SW846 3005/6020	GEL
Dissolved Metals	Potassium	100	0.8	3	NE	mg/L		J	104295-010	SW846 3005/6020	GEL
Dissolved Metals	Sodium	92.4	0.8	2.5	NE	mg/L			104295-010	SW846 3005/6020	GEL
MEE	Ethane	ND	0.003	0.1	NE	µg/L	U	UJ	104301-001	AM20GAX	PACE
MEE	Ethene	0.2	0.004	0.1	NE	µg/L		J	104301-001	AM20GAX	PACE
MEE	Methane	260	0.016	0.5	NE	µg/L		J	104301-001	AM20GAX	PACE
Microbial	Dehalococcoides	2000000	3000		NE	Enumeration/L			104305-001	Gene-Trac Dhc	SiREM
NPN	Nitrate plus nitrite as Nitrogen	ND	0.085	0.25	10	mg/L	U		104295-007	EPA 353.2	GEL
Sulfide	Sulfide, Reactive	ND	500	500	NE	mg/L	<	UJ	104295-005	SW846 Chpt. 7.3.4-TI	GEL
TOC	Total Organic Carbon #1	284	16.5	50	NE	mg/L		J	104295-004	SW846 9060A	GEL
TOC	Total Organic Carbon #2	289	16.5	50	NE	mg/L		J	104295-004	SW846 9060A	GEL
TOC	Total Organic Carbon #3	293	16.5	50	NE	mg/L		J	104295-004	SW846 9060A	GEL
TOC	Total Organic Carbon #4	290	16.5	50	NE	mg/L		J	104295-004	SW846 9060A	GEL
TOC	Total Organic Carbon Average	289	16.5	50	NE	mg/L		J	104295-004	SW846 9060A	GEL
VOC	Carbon disulfide	176	1.5	5	NE	µg/L			104295-001	SW846 8260B	GEL
VOC	Dichloroethene, cis-1,2-	0.51	0.3	1	70	µg/L	J		104295-001	SW846 8260B	GEL
VOC	Trichloroethene	1.12	0.3	1	5	µg/L			104295-001	SW846 8260B	GEL

Table III-5 (continued)
Analytical Results of Groundwater Sampling at Wells TAV-INJ1, TAV-MW6, and TAV-MW7

Analyses	Analyte	Result ^a	MDL ^b	PQL ^c	MCL ^d	Units	Lab Qual ^e	Val Qual ^f	Sample No.	Analytical Method ^g	Lab ^h
TAV-INJ1, 9-Jan-18											
Alkalinity	Alkalinity as CaCO ₃	494	1.45	4	NE	mg/L			104306-009	SM 2320B	GEL
Alkalinity	Alkalinity, bicarb as CaCO ₃	494	1.45	4	NE	mg/L			104306-009	SM 2320B	GEL
Alkalinity	Alkalinity, carb as CaCO ₃	ND	1.45	4	NE	mg/L	U		104306-009	SM 2320B	GEL
Ammonia	Ammonia	16.8	0.425	1.25	NE	mg/L	B		104306-002	EPA 350.1	GEL
Anions	Bromide	45.6	6.7	20	NE	mg/L		J	104306-008	SW846 9056	GEL
Anions	Chloride	50.7	6.7	20	NE	mg/L		J	104306-008	SW846 9056	GEL
Anions	Fluoride	ND	3.3	10	4	mg/L	U	UJ	104306-008	SW846 9056	GEL
Anions	Nitrite	ND	16.5	50	1	mg/L	U	UJ	104306-006	SW846 9056	GEL
Anions	Orthophosphate as Phosphorus	ND	6.7	20	NE	mg/L	U	UJ	104306-003	SW846 9056	GEL
Anions	Sulfate	30.5	13.3	40	NE	mg/L	J	J	104306-008	SW846 9056	GEL
Dissolved Metals	Arsenic	0.157	0.002	0.005	0.010	mg/L			104306-010	SW846 3005/6020	GEL
Dissolved Metals	Calcium	103	0.8	2	NE	mg/L			104306-010	SW846 3005/6020	GEL
Dissolved Metals	Iron	4.8	0.033	0.1	NE	mg/L			104306-010	SW846 3005/6020	GEL
Dissolved Metals	Magnesium	24.9	0.01	0.03	NE	mg/L			104306-010	SW846 3005/6020	GEL
Dissolved Metals	Manganese	11.2	0.05	0.25	NE	mg/L		J	104306-010	SW846 3005/6020	GEL
Dissolved Metals	Potassium	92.2	0.8	3	NE	mg/L			104306-010	SW846 3005/6020	GEL
Dissolved Metals	Sodium	90.9	0.8	2.5	NE	mg/L			104306-010	SW846 3005/6020	GEL
MEE	Ethane	ND	0.007	0.1	NE	µg/L	U	UJ	104308-001	AM20GAX	PACE
MEE	Ethene	0.21	0.005	0.1	NE	µg/L		J	104308-001	AM20GAX	PACE
MEE	Methane	410	0.02	0.5	NE	µg/L		J	104308-001	AM20GAX	PACE
Microbial	Dehalococcoides	1000000	3000		NE	Enumeration/L			104310-001	Gene-Trac Dhc	SiREM
NPN	Nitrate plus nitrite as Nitrogen	ND	0.085	0.25	10	mg/L	U		104306-007	EPA 353.2	GEL
Sulfide	Sulfide, Reactive	ND	500	500	NE	mg/L	<,*	UJ	104306-005	SW846 Chpt. 7.3.4-TI	GEL
TOC	Total Organic Carbon #1	215	16.5	50	NE	mg/L			104306-004	SW846 9060A	GEL
TOC	Total Organic Carbon #2	216	16.5	50	NE	mg/L			104306-004	SW846 9060A	GEL
TOC	Total Organic Carbon #3	217	16.5	50	NE	mg/L			104306-004	SW846 9060A	GEL
TOC	Total Organic Carbon #4	216	16.5	50	NE	mg/L			104306-004	SW846 9060A	GEL
TOC	Total Organic Carbon Average	216	16.5	50	NE	mg/L			104306-004	SW846 9060A	GEL
VOC	Carbon disulfide	284	1.5	5	NE	µg/L			104306-001	SW846 8260B	GEL
VOC	Dichloroethene, cis-1,2-	0.65	0.3	1	70	µg/L	J		104306-001	SW846 8260B	GEL
VOC	Trichloroethene	1.68	0.3	1	5	µg/L			104306-001	SW846 8260B	GEL

Table III-5 (continued)
Analytical Results of Groundwater Sampling at Wells TAV-INJ1, TAV-MW6, and TAV-MW7

Analyses	Analyte	Result ^a	MDL ^b	PQL ^c	MCL ^d	Units	Lab Qual ^e	Val Qual ^f	Sample No.	Analytical Method ^g	Lab ^h
TAV-INJ1, 16-Jan-18											
Alkalinity	Alkalinity as CaCO ₃	476	1.45	4	NE	mg/L			104377-009	SM 2320B	GEL
Alkalinity	Alkalinity, bicarb as CaCO ₃	476	1.45	4	NE	mg/L			104377-009	SM 2320B	GEL
Alkalinity	Alkalinity, carb as CaCO ₃	ND	1.45	4	NE	mg/L	U		104377-009	SM 2320B	GEL
Ammonia	Ammonia	15.7	0.425	1.25	NE	mg/L			104377-002	EPA 350.1	GEL
Anions	Bromide	48.8	3.35	10	NE	mg/L		J	104377-008	SW846 9056	GEL
Anions	Chloride	62.8	0.67	2	NE	mg/L		J	104377-008	SW846 9056	GEL
Anions	Fluoride	ND	0.33	1	4	mg/L	U	UJ	104377-008	SW846 9056	GEL
Anions	Nitrite	ND	0.66	2	1	mg/L	U	UJ	104377-006	SW846 9056	GEL
Anions	Orthophosphate as Phosphorus	2.64	1.68	5	NE	mg/L	J	J	104377-003	SW846 9056	GEL
Anions	Sulfate	8.4	1.33	4	NE	mg/L		J	104377-008	SW846 9056	GEL
Dissolved Metals	Arsenic	0.109	0.002	0.005	0.010	mg/L			104377-010	SW846 3005/6020	GEL
Dissolved Metals	Calcium	99.2	0.4	1	NE	mg/L			104377-010	SW846 3005/6020	GEL
Dissolved Metals	Iron	2.55	0.033	0.1	NE	mg/L			104377-010	SW846 3005/6020	GEL
Dissolved Metals	Magnesium	24.1	0.01	0.03	NE	mg/L			104377-010	SW846 3005/6020	GEL
Dissolved Metals	Manganese	11	0.05	0.25	NE	mg/L		J	104377-010	SW846 3005/6020	GEL
Dissolved Metals	Potassium	83.9	0.4	1.5	NE	mg/L			104377-010	SW846 3005/6020	GEL
Dissolved Metals	Sodium	91.8	0.4	1.25	NE	mg/L			104377-010	SW846 3005/6020	GEL
MEE	Ethane	ND	0.007	0.1	NE	µg/L	U	UJ	104379-001	AM20GAX	PACE
MEE	Ethene	0.18	0.005	0.1	NE	µg/L		J	104379-001	AM20GAX	PACE
MEE	Methane	340	0.02	0.5	NE	µg/L		J	104379-001	AM20GAX	PACE
Microbial	Dehalococcoides	500000	3000		NE	Enumeration/L			104381-001	Gene-Trac Dhc	SiREM
NPN	Nitrate plus nitrite as Nitrogen	ND	0.085	0.25	10	mg/L	U		104377-007	EPA 353.2	GEL
Sulfide	Sulfide, Reactive	ND	500	500	NE	mg/L	<, *	UJ	104377-005	SW846 Chpt. 7.3.4-TI	GEL
TOC	Total Organic Carbon #1	213	33	100	NE	mg/L			104377-004	SW846 9060A	GEL
TOC	Total Organic Carbon #2	214	33	100	NE	mg/L			104377-004	SW846 9060A	GEL
TOC	Total Organic Carbon #3	215	33	100	NE	mg/L			104377-004	SW846 9060A	GEL
TOC	Total Organic Carbon #4	216	33	100	NE	mg/L			104377-004	SW846 9060A	GEL
TOC	Total Organic Carbon Average	215	33	100	NE	mg/L			104377-004	SW846 9060A	GEL
VOC	Butanone, 2-	5.15	1.5	5	NE	µg/L		J+	104377-001	SW846 8260B	GEL
VOC	Carbon disulfide	187	1.5	5	NE	µg/L			104377-001	SW846 8260B	GEL
VOC	Dichloroethene, cis-1,2-	0.85	0.3	1	70	µg/L	J		104377-001	SW846 8260B	GEL
VOC	Trichloroethene	2.4	0.3	1	5	µg/L			104377-001	SW846 8260B	GEL

Table III-5 (continued)
Analytical Results of Groundwater Sampling at Wells TAV-INJ1, TAV-MW6, and TAV-MW7

Analyses	Analyte	Result ^a	MDL ^b	PQL ^c	MCL ^d	Units	Lab Qual ^e	Val Qual ^f	Sample No.	Analytical Method ^g	Lab ^h
TAV-INJ1, 23-Jan-18											
Alkalinity	Alkalinity as CaCO ₃	470	1.45	4	NE	mg/L			104425-009	SM 2320B	GEL
Alkalinity	Alkalinity, bicarb as CaCO ₃	470	1.45	4	NE	mg/L			104425-009	SM 2320B	GEL
Alkalinity	Alkalinity, carb as CaCO ₃	ND	1.45	4	NE	mg/L	U		104425-009	SM 2320B	GEL
Ammonia	Ammonia	14.2	0.425	1.25	NE	mg/L	B		104425-002	EPA 350.1	GEL
Anions	Bromide	43	1.34	4	NE	mg/L			104425-008	SW846 9056	GEL
Anions	Chloride	59	1.34	4	NE	mg/L			104425-008	SW846 9056	GEL
Anions	Fluoride	0.956	0.66	2	4	mg/L	J		104425-008	SW846 9056	GEL
Anions	Nitrite	ND	1.65	5	1	mg/L	U		104425-006	SW846 9056	GEL
Anions	Orthophosphate as Phosphorus	1.81	1.34	4	NE	mg/L	J		104425-003	SW846 9056	GEL
Anions	Sulfate	12.9	2.66	8	NE	mg/L			104425-008	SW846 9056	GEL
Dissolved Metals	Arsenic	0.101	0.002	0.005	0.010	mg/L			104425-010	SW846 3005/6020	GEL
Dissolved Metals	Calcium	101	1.6	4	NE	mg/L			104425-010	SW846 3005/6020	GEL
Dissolved Metals	Iron	2.47	0.033	0.1	NE	mg/L		J	104425-010	SW846 3005/6020	GEL
Dissolved Metals	Magnesium	25.3	0.01	0.03	NE	mg/L			104425-010	SW846 3005/6020	GEL
Dissolved Metals	Manganese	12.6	0.02	0.1	NE	mg/L		J	104425-010	SW846 3005/6020	GEL
Dissolved Metals	Potassium	80.8	1.6	6	NE	mg/L			104425-010	SW846 3005/6020	GEL
Dissolved Metals	Sodium	86	1.6	5	NE	mg/L			104425-010	SW846 3005/6020	GEL
MEE	Ethane	ND	0.003	0.1	NE	µg/L	U	UJ	104427-001	AM20GAX	PACE
MEE	Ethene	0.14	0.004	0.1	NE	µg/L		J	104427-001	AM20GAX	PACE
MEE	Methane	380	0.016	0.5	NE	µg/L		J	104427-001	AM20GAX	PACE
Microbial	Dehalococcoides	200000	3000		NE	Enumeration/L			104429-001	Gene-Trac Dhc	SiREM
NPN	Nitrate plus nitrite as Nitrogen	ND	0.085	0.25	10	mg/L	U		104425-007	EPA 353.2	GEL
Sulfide	Sulfide, Reactive	ND	500	500	NE	mg/L	<, *	R	104425-005	SW846 Chpt. 7.3.4-TI	GEL
TOC	Total Organic Carbon #1	178	16.5	50	NE	mg/L			104425-004	SW846 9060A	GEL
TOC	Total Organic Carbon #2	181	16.5	50	NE	mg/L			104425-004	SW846 9060A	GEL
TOC	Total Organic Carbon #3	182	16.5	50	NE	mg/L			104425-004	SW846 9060A	GEL
TOC	Total Organic Carbon #4	183	16.5	50	NE	mg/L			104425-004	SW846 9060A	GEL
TOC	Total Organic Carbon Average	181	16.5	50	NE	mg/L			104425-004	SW846 9060A	GEL
VOC	Carbon disulfide	126	1.5	5	NE	µg/L			104425-001	SW846 8260B	GEL
VOC	Dichloroethene, cis-1,2-	0.65	0.3	1	70	µg/L	J		104425-001	SW846 8260B	GEL
VOC	Trichloroethene	1.84	0.3	1	5	µg/L			104425-001	SW846 8260B	GEL

Table III-5 (continued)
Analytical Results of Groundwater Sampling at Wells TAV-INJ1, TAV-MW6, and TAV-MW7

Analyses	Analyte	Result ^a	MDL ^b	PQL ^c	MCL ^d	Units	Lab Qual ^e	Val Qual ^f	Sample No.	Analytical Method ^g	Lab ^h
TAV-INJ1, 31-Jan-18											
Alkalinity	Alkalinity as CaCO ₃	481	1.45	4	NE	mg/L			104548-009	SM 2320B	GEL
Alkalinity	Alkalinity, bicarb as CaCO ₃	481	1.45	4	NE	mg/L			104548-009	SM 2320B	GEL
Alkalinity	Alkalinity, carb as CaCO ₃	ND	1.45	4	NE	mg/L	U		104548-009	SM 2320B	GEL
Ammonia	Ammonia	14.7	0.425	1.25	NE	mg/L		J	104548-002	EPA 350.1	GEL
Anions	Bromide	39.1	0.67	2	NE	mg/L			104548-008	SW846 9056	GEL
Anions	Chloride	65.6	0.67	2	NE	mg/L			104548-008	SW846 9056	GEL
Anions	Fluoride	0.951	0.33	1	4	mg/L	J		104548-008	SW846 9056	GEL
Anions	Nitrite	ND	0.825	2.5	1	mg/L	U		104548-006	SW846 9056	GEL
Anions	Orthophosphate as Phosphorus	2.9	0.67	2	NE	mg/L			104548-003	SW846 9056	GEL
Anions	Sulfate	12.6	1.33	4	NE	mg/L			104548-008	SW846 9056	GEL
Dissolved Metals	Arsenic	0.0951	0.002	0.005	0.010	mg/L			104548-010	SW846 3005/6020	GEL
Dissolved Metals	Calcium	95.1	0.8	2	NE	mg/L			104548-010	SW846 3005/6020	GEL
Dissolved Metals	Iron	1.67	0.033	0.1	NE	mg/L			104548-010	SW846 3005/6020	GEL
Dissolved Metals	Magnesium	25.3	0.01	0.03	NE	mg/L			104548-010	SW846 3005/6020	GEL
Dissolved Metals	Manganese	11.7	0.05	0.25	NE	mg/L		J	104548-010	SW846 3005/6020	GEL
Dissolved Metals	Potassium	72.3	0.8	3	NE	mg/L			104548-010	SW846 3005/6020	GEL
Dissolved Metals	Sodium	81.6	0.8	2.5	NE	mg/L			104548-010	SW846 3005/6020	GEL
MEE	Ethane	ND	0.007	0.1	NE	µg/L	U	UJ	104557-001	AM20GAX	PACE
MEE	Ethene	0.21	0.005	0.1	NE	µg/L		J	104557-001	AM20GAX	PACE
MEE	Methane	1000	0.02	0.5	NE	µg/L		J	104557-001	AM20GAX	PACE
Microbial	Dehalococcoides	200000	3000		NE	Enumeration/L			104564-001	Gene-Trac Dhc	SiREM
NPN	Nitrate plus nitrite as Nitrogen	ND	0.017	0.05	10	mg/L	U	0.05UJ	104548-007	EPA 353.2	GEL
Sulfide	Sulfide, Reactive	ND	500	500	NE	mg/L	*	R	104548-005	SW846 Chpt. 7.3.4-TI	GEL
TOC	Total Organic Carbon #1	143	6.6	20	NE	mg/L			104548-004	SW846 9060A	GEL
TOC	Total Organic Carbon #2	144	6.6	20	NE	mg/L			104548-004	SW846 9060A	GEL
TOC	Total Organic Carbon #3	144	6.6	20	NE	mg/L			104548-004	SW846 9060A	GEL
TOC	Total Organic Carbon #4	145	6.6	20	NE	mg/L			104548-004	SW846 9060A	GEL
TOC	Total Organic Carbon Average	144	6.6	20	NE	mg/L			104548-004	SW846 9060A	GEL
VOC	Acetone	8.53	1.5	10	NE	µg/L	J		104548-001	SW846 8260B	GEL
VOC	Butanone, 2-	4.6	1.5	5	NE	µg/L	J	J+	104548-001	SW846 8260B	GEL
VOC	Carbon disulfide	141	1.5	5	NE	µg/L			104548-001	SW846 8260B	GEL
VOC	Dichloroethene, cis-1,2-	0.92	0.3	1	70	µg/L	J		104548-001	SW846 8260B	GEL
VOC	Trichloroethene	3.14	0.3	1	5	µg/L			104548-001	SW846 8260B	GEL

Table III-5 (continued)
Analytical Results of Groundwater Sampling at Wells TAV-INJ1, TAV-MW6, and TAV-MW7

Analyses	Analyte	Result ^a	MDL ^b	PQL ^c	MCL ^d	Units	Lab Qual ^e	Val Qual ^f	Sample No.	Analytical Method ^g	Lab ^h
TAV-INJ1, 28-Feb-18											
Alkalinity	Alkalinity as CaCO ₃	403	1.45	4	NE	mg/L			104664-009	SM 2320B	GEL
Alkalinity	Alkalinity, bicarb as CaCO ₃	403	1.45	4	NE	mg/L			104664-009	SM 2320B	GEL
Alkalinity	Alkalinity, carb as CaCO ₃	ND	1.45	4	NE	mg/L	U		104664-009	SM 2320B	GEL
Ammonia	Ammonia	13.1	0.425	1.25	NE	mg/L			104664-002	EPA 350.1	GEL
Anions	Bromide	30.3	1.34	4	NE	mg/L			104664-008	SW846 9056	GEL
Anions	Chloride	81.4	1.34	4	NE	mg/L			104664-008	SW846 9056	GEL
Anions	Fluoride	1.22	0.165	0.5	4	mg/L			104664-008	SW846 9056	GEL
Anions	Nitrite	ND	0.033	0.1	1	mg/L	U		104664-006	SW846 9056	GEL
Anions	Orthophosphate as Phosphorus	1.38	0.067	0.2	NE	mg/L	*N	J-	104664-003	SW846 9056	GEL
Anions	Sulfate	13.5	0.133	0.4	NE	mg/L			104664-008	SW846 9056	GEL
Dissolved Metals	Arsenic	0.0735	0.002	0.005	0.010	mg/L			104664-010	SW846 3005/6020	GEL
Dissolved Metals	Calcium	86.1	0.8	2	NE	mg/L			104664-010	SW846 3005/6020	GEL
Dissolved Metals	Iron	2.87	0.033	0.1	NE	mg/L			104664-010	SW846 3005/6020	GEL
Dissolved Metals	Magnesium	22	0.01	0.03	NE	mg/L			104664-010	SW846 3005/6020	GEL
Dissolved Metals	Manganese	9.5	0.01	0.05	NE	mg/L			104664-010	SW846 3005/6020	GEL
Dissolved Metals	Potassium	60.9	0.8	3	NE	mg/L			104664-010	SW846 3005/6020	GEL
Dissolved Metals	Sodium	73.9	0.8	2.5	NE	mg/L			104664-010	SW846 3005/6020	GEL
MEE	Ethane	ND	0.007	0.1	NE	µg/L	U	UJ	104673-001	AM20GAX	PACE
MEE	Ethene	0.23	0.005	0.1	NE	µg/L		J-	104673-001	AM20GAX	PACE
MEE	Methane	2300	0.02	0.5	NE	µg/L		J-	104673-001	AM20GAX	PACE
Microbial	Dehalococcoides	400000	3000		NE	Enumeration/L			104679-001	Gene-Trac Dhc	SiREM
NPN	Nitrate plus nitrite as Nitrogen	ND	0.085	0.25	10	mg/L	U		104664-007	EPA 353.2	GEL
Sulfide	Sulfide, Reactive	ND	500	500	NE	mg/L	<	UJ	104664-005	SW846 Chpt. 7.3.4-TI	GEL
TOC	Total Organic Carbon #1	87.4	16.5	50	NE	mg/L		J	104664-004	SW846 9060A	GEL
TOC	Total Organic Carbon #2	88.1	16.5	50	NE	mg/L		J	104664-004	SW846 9060A	GEL
TOC	Total Organic Carbon #3	89	16.5	50	NE	mg/L		J	104664-004	SW846 9060A	GEL
TOC	Total Organic Carbon #4	88.7	16.5	50	NE	mg/L		J	104664-004	SW846 9060A	GEL
TOC	Total Organic Carbon Average	88.3	16.5	50	NE	mg/L		J	104664-004	SW846 9060A	GEL
VOC	Acetone	8.68	1.5	10	NE	µg/L	J	J-	104664-001	SW846 8260B	GEL
VOC	Butanone, 2-	3.37	1.5	5	NE	µg/L	J		104664-001	SW846 8260B	GEL
VOC	Carbon disulfide	79.2	1.5	5	NE	µg/L			104664-001	SW846 8260B	GEL
VOC	Dichloroethene, cis-1,2-	1.12	0.3	1	70	µg/L			104664-001	SW846 8260B	GEL
VOC	Trichloroethene	3.51	0.3	1	5	µg/L			104664-001	SW846 8260B	GEL

Table III-5 (continued)
Analytical Results of Groundwater Sampling at Wells TAV-INJ1, TAV-MW6, and TAV-MW7

Analyses	Analyte	Result ^a	MDL ^b	PQL ^c	MCL ^d	Units	Lab Qual ^e	Val Qual ^f	Sample No.	Analytical Method ^g	Lab ^h
TAV-INJ1, 28-Mar-18											
Alkalinity	Alkalinity as CaCO ₃	345	1.45	4	NE	mg/L			104955-009	SM 2320B	GEL
Alkalinity	Alkalinity, bicarb as CaCO ₃	345	1.45	4	NE	mg/L			104955-009	SM 2320B	GEL
Alkalinity	Alkalinity, carb as CaCO ₃	ND	1.45	4	NE	mg/L	U		104955-009	SM 2320B	GEL
Ammonia	Ammonia	8.65	0.085	0.25	NE	mg/L			104955-002	EPA 350.1	GEL
Anions	Bromide	22.9	0.67	2	NE	mg/L			104955-008	SW846 9056	GEL
Anions	Chloride	96.1	0.67	2	NE	mg/L	N	J+	104955-008	SW846 9056	GEL
Anions	Fluoride	0.97	0.33	1	4	mg/L	JN	J+	104955-008	SW846 9056	GEL
Anions	Nitrite	ND	0.033	0.1	1	mg/L	U		104955-006	SW846 9056	GEL
Anions	Orthophosphate as Phosphorus	1.19	0.067	0.2	NE	mg/L			104955-003	SW846 9056	GEL
Anions	Sulfate	19.9	0.133	0.4	NE	mg/L			104955-008	SW846 9056	GEL
Dissolved Metals	Arsenic	0.0619	0.002	0.005	0.010	mg/L			104955-010	SW846 3005/6020	GEL
Dissolved Metals	Calcium	71.5	0.8	2	NE	mg/L			104955-010	SW846 3005/6020	GEL
Dissolved Metals	Iron	2.15	0.033	0.1	NE	mg/L			104955-010	SW846 3005/6020	GEL
Dissolved Metals	Magnesium	21.4	0.01	0.03	NE	mg/L			104955-010	SW846 3005/6020	GEL
Dissolved Metals	Manganese	7.62	0.01	0.05	NE	mg/L			104955-010	SW846 3005/6020	GEL
Dissolved Metals	Potassium	45	0.8	3	NE	mg/L			104955-010	SW846 3005/6020	GEL
Dissolved Metals	Sodium	65.7	0.8	2.5	NE	mg/L			104955-010	SW846 3005/6020	GEL
Microbial	Dehalococcoides	200000	4000		NE	Enumeration/L			104967-001	Gene-Trac DhC	SiREM
MEE	Ethane	ND	0.007	0.1	NE	µg/L	U	UJ	104962-001	AM20GAX	PACE
MEE	Ethene	0.16	0.005	0.1	NE	µg/L		J	104962-001	AM20GAX	PACE
MEE	Methane	3400	0.02	0.5	NE	µg/L		J	104962-001	AM20GAX	PACE
NPN	Nitrate plus nitrite as Nitrogen	ND	0.017	0.05	10	mg/L	U	UJ	104955-007	EPA 353.2	GEL
Sulfide	Sulfide, Reactive	-1.66712		500	NE	mg/L			104955-005	SW846 Chpt. 7.3.4-TI	GEL
TOC	Total Organic Carbon #1	27.3	0.66	2	NE	mg/L			104955-004	SW846 9060A	GEL
TOC	Total Organic Carbon #2	27.4	0.66	2	NE	mg/L			104955-004	SW846 9060A	GEL
TOC	Total Organic Carbon #3	27.5	0.66	2	NE	mg/L			104955-004	SW846 9060A	GEL
TOC	Total Organic Carbon #4	27.5	0.66	2	NE	mg/L			104955-004	SW846 9060A	GEL
TOC	Total Organic Carbon Average	27.4	0.66	2	NE	mg/L			104955-004	SW846 9060A	GEL
VOC	Acetone	10.6	1.5	10	NE	µg/L		J+	104955-001	SW846 8260B	GEL
VOC	Butanone, 2-	4.38	1.5	5	NE	µg/L	J	J+	104955-001	SW846 8260B	GEL
VOC	Carbon disulfide	16.4	1.5	5	NE	µg/L			104955-001	SW846 8260B	GEL
VOC	Dichloroethene, cis-1,2-	1.67	0.3	1	70	µg/L			104955-001	SW846 8260B	GEL
VOC	Methylene chloride	1.02	1	10	5	µg/L	JB	10U	104955-001	SW846 8260B	GEL
VOC	Trichloroethene	4.31	0.3	1	5	µg/L			104955-001	SW846 8260B	GEL

Table III-5 (continued)
Analytical Results of Groundwater Sampling at Wells TAV-INJ1, TAV-MW6, and TAV-MW7

Analyses	Analyte	Result ^a	MDL ^b	PQL ^c	MCL ^d	Units	Lab Qual ^e	Val Qual ^f	Sample No.	Analytical Method ^g	Lab ^h
TAV-INJ1, 13-Jun-18											
Alkalinity	Alkalinity as CaCO ₃	271	1.45	4	NE	mg/L			105572-009	SM 2320B	GEL
Alkalinity	Alkalinity, bicarb as CaCO ₃	271	1.45	4	NE	mg/L			105572-009	SM 2320B	GEL
Alkalinity	Alkalinity, carb as CaCO ₃	ND	1.45	4	NE	mg/L	U		105572-009	SM 2320B	GEL
Ammonia	Ammonia	5.35	0.085	0.25	NE	mg/L	*B	J	105572-002	EPA 350.1	GEL
Anions	Bromide	13.3	0.067	0.2	NE	mg/L			105572-008	SW846 9056	GEL
Anions	Chloride	107	1.34	4	NE	mg/L			105572-008	SW846 9056	GEL
Anions	Fluoride	1.46	0.033	0.1	4	mg/L			105572-008	SW846 9056	GEL
Anions	Nitrite	ND	0.33	1	1	mg/L	U		105572-006	SW846 9056	GEL
Anions	Orthophosphate as Phosphorus	0.632	0.335	1	NE	mg/L	J		105572-003	SW846 9056	GEL
Anions	Sulfate	40.3	2.66	8	NE	mg/L			105572-008	SW846 9056	GEL
Dissolved Metals	Arsenic	0.0613	0.002	0.005	0.010	mg/L			105572-010	SW846 3005/6020	GEL
Dissolved Metals	Calcium	71.1	0.8	2	NE	mg/L			105572-010	SW846 3005/6020	GEL
Dissolved Metals	Iron	1.82	0.033	0.1	NE	mg/L			105572-010	SW846 3005/6020	GEL
Dissolved Metals	Magnesium	21.8	0.01	0.03	NE	mg/L			105572-010	SW846 3005/6020	GEL
Dissolved Metals	Manganese	7.36	0.01	0.05	NE	mg/L		J	105572-010	SW846 3005/6020	GEL
Dissolved Metals	Potassium	33.8	0.08	0.3	NE	mg/L			105572-010	SW846 3005/6020	GEL
Dissolved Metals	Sodium	72.6	0.8	2.5	NE	mg/L			105572-010	SW846 3005/6020	GEL
Microbial	Dehalococcoides	100000	3000		NE	Enumeration/L			105582-001	Gene-Trac DhC	SiREM
MEE	Ethane	ND	0.007	0.1	NE	µg/L	U	UJ	104962-001	AM20GAX	PACE
MEE	Ethene	0.21	0.005	0.1	NE	µg/L		J	104962-001	AM20GAX	PACE
MEE	Methane	2900	0.02	0.5	NE	µg/L		J	104962-001	AM20GAX	PACE
NPN	Nitrate plus nitrite as Nitrogen	ND	0.017	0.05	10	mg/L	U	UJ	105572-007	EPA 353.2	GEL
Sulfide	Acid Soluble Sulfides	ND	1	2.5	NE	mg/L	U	UJ	105572-005	SW846 9030B/9034	GEL
TOC	Total Organic Carbon #1	3.63	0.33	1	NE	mg/L			105572-004	SW846 9060A	GEL
TOC	Total Organic Carbon #2	3.84	0.33	1	NE	mg/L			105572-004	SW846 9060A	GEL
TOC	Total Organic Carbon #3	3.92	0.33	1	NE	mg/L			105572-004	SW846 9060A	GEL
TOC	Total Organic Carbon #4	3.91	0.33	1	NE	mg/L			105572-004	SW846 9060A	GEL
TOC	Total Organic Carbon Average	3.83	0.33	1	NE	mg/L			105572-004	SW846 9060A	GEL
VOC	Butanone, 2-	2.17	1.5	5	NE	µg/L	J		105572-001	SW846 8260B	GEL
VOC	Carbon disulfide	3.25	1.5	5	NE	µg/L	J		105572-001	SW846 8260B	GEL
VOC	Dichloroethene, cis-1,2-	2.09	0.3	1	70	µg/L			105572-001	SW846 8260B	GEL
VOC	Trichloroethene	5.4	0.3	1	5	µg/L			105572-001	SW846 8260B	GEL

Table III-5 (continued)
Analytical Results of Groundwater Sampling at Wells TAV-INJ1, TAV-MW6, and TAV-MW7

Analyses	Analyte	Result ^a	MDL ^b	PQL ^c	MCL ^d	Units	Lab Qual ^e	Val Qual ^f	Sample No.	Analytical Method ^g	Lab ^h
TAV-MW6, 5-Dec-17											
Alkalinity	Alkalinity as CaCO ₃	196	1.45	4	NE	mg/L			104095-009	SM 2320B	GEL
Alkalinity	Alkalinity, bicarb as CaCO ₃	196	1.45	4	NE	mg/L			104095-009	SM 2320B	GEL
Alkalinity	Alkalinity, carb as CaCO ₃	ND	1.45	4	NE	mg/L	U		104095-009	SM 2320B	GEL
Ammonia	Ammonia	0.0584	0.017	0.05	NE	mg/L			104095-002	EPA 350.1	GEL
Anions	Bromide	0.795	0.067	0.2	NE	mg/L			104095-008	SW846 9056	GEL
Anions	Chloride	72.1	0.67	2	NE	mg/L			104095-008	SW846 9056	GEL
Anions	Fluoride	1.19	0.033	0.1	4	mg/L			104095-008	SW846 9056	GEL
Anions	Nitrite	ND	0.033	0.1	1	mg/L	U		104095-006	SW846 9056	GEL
Anions	Orthophosphate as Phosphorus	ND	0.067	0.2	NE	mg/L	U		104095-003	SW846 9056	GEL
Anions	Sulfate	42.2	1.33	4	NE	mg/L			104095-008	SW846 9056	GEL
Dissolved Metals	Arsenic	ND	0.002	0.005	0.010	mg/L	U		104095-010	SW846 3005/6020	GEL
Dissolved Metals	Calcium	66.7	0.4	1	NE	mg/L			104095-010	SW846 3005/6020	GEL
Dissolved Metals	Iron	0.0914	0.033	0.1	NE	mg/L	J		104095-010	SW846 3005/6020	GEL
Dissolved Metals	Magnesium	20.2	0.01	0.03	NE	mg/L			104095-010	SW846 3005/6020	GEL
Dissolved Metals	Manganese	0.00162	0.001	0.005	NE	mg/L	J		104095-010	SW846 3005/6020	GEL
Dissolved Metals	Potassium	3.85	0.08	0.3	NE	mg/L			104095-010	SW846 3005/6020	GEL
Dissolved Metals	Sodium	63.8	0.4	1.25	NE	mg/L			104095-010	SW846 3005/6020	GEL
MEE	Methane	ND	0.02	0.5	NE	µg/L	U	UJ	104093-001	AM20GAX	PACE
MEE	Ethane	ND	0.007	0.1	NE	µg/L	U	UJ	104093-001	AM20GAX	PACE
MEE	Ethene	ND	0.005	0.1	NE	µg/L	U	UJ	104093-001	AM20GAX	PACE
Microbial	Dehalococcoides	ND	1000		NE	Enumeration/L	U		104201-001	Gene-Trac Dhc	SiREM
NPN	Nitrate plus nitrite as Nitrogen	9.15	0.425	1.25	10	mg/L			104095-007	EPA 353.2	GEL
Sulfide	Sulfide, Reactive	ND	500	500	NE	mg/L	<, *	UJ	104095-005	SW846 Chpt. 7.3.4-TI	GEL
TOC	Total Organic Carbon #1	0.479	0.33	1	NE	mg/L	J		104095-004	SW846 9060A	GEL
TOC	Total Organic Carbon #2	0.568	0.33	1	NE	mg/L	J		104095-004	SW846 9060A	GEL
TOC	Total Organic Carbon #3	0.546	0.33	1	NE	mg/L	J		104095-004	SW846 9060A	GEL
TOC	Total Organic Carbon #4	0.534	0.33	1	NE	mg/L	J		104095-004	SW846 9060A	GEL
TOC	Total Organic Carbon Average	0.532	0.33	1	NE	mg/L	J		104095-004	SW846 9060A	GEL
VOC	Dichloroethene, cis-1,2-	1.44	0.3	1	70	µg/L			104095-001	SW846 8260B	GEL
VOC	Trichloroethene	9.3	0.3	1	5	µg/L			104095-001	SW846 8260B	GEL

Table III-5 (continued)
Analytical Results of Groundwater Sampling at Wells TAV-INJ1, TAV-MW6, and TAV-MW7

Analyses	Analyte	Result ^a	MDL ^b	PQL ^c	MCL ^d	Units	Lab Qual ^e	Val Qual ^f	Sample No.	Analytical Method ^g	Lab ^h
TAV-MW6, 13-Dec-17											
Alkalinity	Alkalinity as CaCO ₃	191	1.45	4	NE	mg/L			104150-009	SM 2320B	GEL
Alkalinity	Alkalinity, bicarb as CaCO ₃	191	1.45	4	NE	mg/L			104150-009	SM 2320B	GEL
Alkalinity	Alkalinity, carb as CaCO ₃	ND	1.45	4	NE	mg/L	U		104150-009	SM 2320B	GEL
Ammonia	Ammonia	0.0997	0.017	0.05	NE	mg/L		J	104150-002	EPA 350.1	GEL
Anions	Bromide	0.799	0.067	0.2	NE	mg/L			104150-008	SW846 9056	GEL
Anions	Chloride	72.2	0.67	2	NE	mg/L			104150-008	SW846 9056	GEL
Anions	Fluoride	1.15	0.033	0.1	4	mg/L			104150-008	SW846 9056	GEL
Anions	Nitrite	ND	0.033	0.1	1	mg/L	U	UJ	104150-006	SW846 9056	GEL
Anions	Orthophosphate as Phosphorus	ND	0.067	0.2	NE	mg/L	U	UJ	104150-003	SW846 9056	GEL
Anions	Sulfate	42.7	1.33	4	NE	mg/L			104150-008	SW846 9056	GEL
Dissolved Metals	Arsenic	ND	0.002	0.005	0.010	mg/L	U		104150-010	SW846 3005/6020	GEL
Dissolved Metals	Calcium	67.2	0.8	2	NE	mg/L	B		104150-010	SW846 3005/6020	GEL
Dissolved Metals	Iron	ND	0.033	0.1	NE	mg/L	U		104150-010	SW846 3005/6020	GEL
Dissolved Metals	Magnesium	19.9	0.01	0.03	NE	mg/L			104150-010	SW846 3005/6020	GEL
Dissolved Metals	Manganese	ND	0.001	0.005	NE	mg/L	U	UJ	104150-010	SW846 3005/6020	GEL
Dissolved Metals	Potassium	3.93	0.08	0.3	NE	mg/L		J	104150-010	SW846 3005/6020	GEL
Dissolved Metals	Sodium	66.2	0.8	2.5	NE	mg/L			104150-010	SW846 3005/6020	GEL
Microbial	Dehalococcoides	ND	1000		NE	Enumeration/L	U		104171-001	Gene-Trac Dhc	SiREM
NPN	Nitrate plus nitrite as Nitrogen	8.15	0.425	1.25	10	mg/L		J	104150-007	EPA 353.2	GEL
MEE	Methane	ND	0.02	0.5	NE	µg/L	U	UJ	104162-001	AM20GAX	PACE
MEE	Ethane	ND	0.007	0.1	NE	µg/L	U	UJ	104162-001	AM20GAX	PACE
MEE	Ethene	ND	0.005	0.1	NE	µg/L	U	UJ	104162-001	AM20GAX	PACE
Sulfide	Sulfide, Reactive	ND	500	500	NE	mg/L	<, *	UJ	104150-005	SW846 Chpt. 7.3.4-TI	GEL
TOC	Total Organic Carbon #1	0.519	0.33	1	NE	mg/L	J	1.0U	104150-004	SW846 9060A	GEL
TOC	Total Organic Carbon #2	0.572	0.33	1	NE	mg/L	J	1.0U	104150-004	SW846 9060A	GEL
TOC	Total Organic Carbon #3	0.585	0.33	1	NE	mg/L	J	1.0U	104150-004	SW846 9060A	GEL
TOC	Total Organic Carbon #4	0.58	0.33	1	NE	mg/L	J	1.0U	104150-004	SW846 9060A	GEL
TOC	Total Organic Carbon Average	0.564	0.33	1	NE	mg/L	J	1.0U	104150-004	SW846 9060A	GEL
VOC	Carbon disulfide	4.72	1.5	5	NE	µg/L	J	5.0U	104150-001	SW846 8260B	GEL
VOC	Dichloroethene, cis-1,2-	1.31	0.3	1	70	µg/L			104150-001	SW846 8260B	GEL
VOC	Trichloroethene	8.93	0.3	1	5	µg/L			104150-001	SW846 8260B	GEL

Table III-5 (continued)
Analytical Results of Groundwater Sampling at Wells TAV-INJ1, TAV-MW6, and TAV-MW7

Analyses	Analyte	Result ^a	MDL ^b	PQL ^c	MCL ^d	Units	Lab Qual ^e	Val Qual ^f	Sample No.	Analytical Method ^g	Lab ^h
TAV-MW6 (Duplicate), 13-Dec-17											
Alkalinity	Alkalinity as CaCO ₃	193	1.45	4	NE	mg/L			104151-009	SM 2320B	GEL
Alkalinity	Alkalinity, bicarb as CaCO ₃	193	1.45	4	NE	mg/L			104151-009	SM 2320B	GEL
Alkalinity	Alkalinity, carb as CaCO ₃	ND	1.45	4	NE	mg/L	U		104151-009	SM 2320B	GEL
Ammonia	Ammonia	0.0854	0.017	0.05	NE	mg/L		J	104151-002	EPA 350.1	GEL
Anions	Bromide	0.806	0.067	0.2	NE	mg/L			104151-008	SW846 9056	GEL
Anions	Chloride	72.1	0.67	2	NE	mg/L			104151-008	SW846 9056	GEL
Anions	Fluoride	1.14	0.033	0.1	4	mg/L			104151-008	SW846 9056	GEL
Anions	Nitrite	ND	0.033	0.1	1	mg/L	U	UJ	104151-006	SW846 9056	GEL
Anions	Orthophosphate as Phosphorus	ND	0.067	0.2	NE	mg/L	U	UJ	104151-003	SW846 9056	GEL
Anions	Sulfate	43.2	1.33	4	NE	mg/L			104151-008	SW846 9056	GEL
Dissolved Metals	Arsenic	ND	0.002	0.005	0.010	mg/L	U		104151-010	SW846 3005/6020	GEL
Dissolved Metals	Calcium	62.9	0.8	2	NE	mg/L	B		104151-010	SW846 3005/6020	GEL
Dissolved Metals	Iron	ND	0.033	0.1	NE	mg/L	U		104151-010	SW846 3005/6020	GEL
Dissolved Metals	Magnesium	20.2	0.01	0.03	NE	mg/L			104151-010	SW846 3005/6020	GEL
Dissolved Metals	Manganese	ND	0.001	0.005	NE	mg/L	U	UJ	104151-010	SW846 3005/6020	GEL
Dissolved Metals	Potassium	4.04	0.08	0.3	NE	mg/L		J	104151-010	SW846 3005/6020	GEL
Dissolved Metals	Sodium	62	0.8	2.5	NE	mg/L			104151-010	SW846 3005/6020	GEL
MEE	Methane	ND	0.02	0.5	NE	µg/L	U	UJ	104163-001	AM20GAX	PACE
MEE	Ethane	ND	0.007	0.1	NE	µg/L	U	UJ	104163-001	AM20GAX	PACE
MEE	Ethene	ND	0.005	0.1	NE	µg/L	U	UJ	104163-001	AM20GAX	PACE
Microbial	Dehalococcoides	ND	1000		NE	Enumeration/L	U		104172-001	Gene-Trac Dhc	SiREM
NPN	Nitrate plus nitrite as Nitrogen	8.28	0.425	1.25	10	mg/L		J	104151-007	EPA 353.2	GEL
Sulfide	Sulfide, Reactive	ND	500	500	NE	mg/L	<, *	UJ	104151-005	SW846 Chpt. 7.3.4-TI	GEL
TOC	Total Organic Carbon #1	0.529	0.33	1	NE	mg/L	J	1.0U	104151-004	SW846 9060A	GEL
TOC	Total Organic Carbon #2	0.579	0.33	1	NE	mg/L	J	1.0U	104151-004	SW846 9060A	GEL
TOC	Total Organic Carbon #3	0.58	0.33	1	NE	mg/L	J	1.0U	104151-004	SW846 9060A	GEL
TOC	Total Organic Carbon #4	0.593	0.33	1	NE	mg/L	J	1.0U	104151-004	SW846 9060A	GEL
TOC	Total Organic Carbon Average	0.57	0.33	1	NE	mg/L	J	1.0U	104151-004	SW846 9060A	GEL
VOC	Carbon disulfide	5.09	1.5	5	NE	µg/L		J+	104151-001	SW846 8260B	GEL
VOC	Dichloroethene, cis-1,2-	1.31	0.3	1	70	µg/L			104151-001	SW846 8260B	GEL
VOC	Trichloroethene	9.33	0.3	1	5	µg/L			104151-001	SW846 8260B	GEL

Table III-5 (continued)
Analytical Results of Groundwater Sampling at Wells TAV-INJ1, TAV-MW6, and TAV-MW7

Analyses	Analyte	Result ^a	MDL ^b	PQL ^c	MCL ^d	Units	Lab Qual ^e	Val Qual ^f	Sample No.	Analytical Method ^g	Lab ^h
TAV-MW6, 3-Jan-18											
Alkalinity	Alkalinity as CaCO ₃	195	1.45	4	NE	mg/L			104291-009	SM 2320B	GEL
Alkalinity	Alkalinity, bicarb as CaCO ₃	195	1.45	4	NE	mg/L			104291-009	SM 2320B	GEL
Alkalinity	Alkalinity, carb as CaCO ₃	ND	1.45	4	NE	mg/L	U		104291-009	SM 2320B	GEL
Ammonia	Ammonia	ND	0.017	0.05	NE	mg/L	U	UJ	104291-002	EPA 350.1	GEL
Anions	Bromide	0.794	0.067	0.2	NE	mg/L			104291-008	SW846 9056	GEL
Anions	Chloride	73.1	0.67	2	NE	mg/L	B		104291-008	SW846 9056	GEL
Anions	Fluoride	1.03	0.033	0.1	4	mg/L			104291-008	SW846 9056	GEL
Anions	Nitrite	ND	16.5	50	1	mg/L	UH	R	104291-006	SW846 9056	GEL
Anions	Orthophosphate as Phosphorus	ND	6.7	20	NE	mg/L	UH	R	104291-003	SW846 9056	GEL
Anions	Sulfate	43.2	1.33	4	NE	mg/L			104291-008	SW846 9056	GEL
Dissolved Metals	Arsenic	ND	0.002	0.005	0.010	mg/L	U		104291-010	SW846 3005/6020	GEL
Dissolved Metals	Calcium	64.7	0.8	2	NE	mg/L			104291-010	SW846 3005/6020	GEL
Dissolved Metals	Iron	0.0714	0.033	0.1	NE	mg/L	J		104291-010	SW846 3005/6020	GEL
Dissolved Metals	Magnesium	19.3	0.01	0.03	NE	mg/L			104291-010	SW846 3005/6020	GEL
Dissolved Metals	Manganese	ND	0.001	0.005	NE	mg/L	U		104291-010	SW846 3005/6020	GEL
Dissolved Metals	Potassium	3.8	0.08	0.3	NE	mg/L			104291-010	SW846 3005/6020	GEL
Dissolved Metals	Sodium	63.8	0.8	2.5	NE	mg/L			104291-010	SW846 3005/6020	GEL
MEE	Ethane	ND	0.003	0.1	NE	µg/L	U	UJ	104297-001	AM20GAX	PACE
MEE	Ethene	ND	0.004	0.1	NE	µg/L	U	UJ	104297-001	AM20GAX	PACE
MEE	Methane	ND	0.016	0.5	NE	µg/L	U	UJ	104297-001	AM20GAX	PACE
Microbial	Dehalococcoides	ND	3000		NE	Enumeration/L	U		104303-001	Gene-Trac Dhc	SiREM
NPN	Nitrate plus nitrite as Nitrogen	7.42	0.17	0.5	10	mg/L			104291-007	EPA 353.2	GEL
Sulfide	Sulfide, Reactive	ND	500	500	NE	mg/L	<	UJ	104291-005	SW846 Chpt. 7.3.4-TI	GEL
TOC	Total Organic Carbon #1	0.614	0.33	1	NE	mg/L	J		104291-004	SW846 9060A	GEL
TOC	Total Organic Carbon #2	0.635	0.33	1	NE	mg/L	J		104291-004	SW846 9060A	GEL
TOC	Total Organic Carbon #3	0.628	0.33	1	NE	mg/L	J		104291-004	SW846 9060A	GEL
TOC	Total Organic Carbon #4	0.621	0.33	1	NE	mg/L	J		104291-004	SW846 9060A	GEL
TOC	Total Organic Carbon Average	0.625	0.33	1	NE	mg/L	J		104291-004	SW846 9060A	GEL
VOC	Carbon disulfide	4.91	1.5	5	NE	µg/L	J		104291-001	SW846 8260B	GEL
VOC	Dichloroethene, cis-1,2-	1.76	0.3	1	70	µg/L			104291-001	SW846 8260B	GEL
VOC	Trichloroethene	10.7	0.3	1	5	µg/L			104291-001	SW846 8260B	GEL

Table III-5 (continued)
Analytical Results of Groundwater Sampling at Wells TAV-INJ1, TAV-MW6, and TAV-MW7

Analyses	Analyte	Result ^a	MDL ^b	PQL ^c	MCL ^d	Units	Lab Qual ^e	Val Qual ^f	Sample No.	Analytical Method ^g	Lab ^h
TAV-MW6, 30-Jan-18											
Alkalinity	Alkalinity as CaCO ₃	195	1.45	4	NE	mg/L			104544-009	SM 2320B	GEL
Alkalinity	Alkalinity, bicarb as CaCO ₃	199	1.45	4	NE	mg/L			104543-009	SM 2320B	GEL
Alkalinity	Alkalinity, carb as CaCO ₃	ND	1.45	4	NE	mg/L	U		104544-009	SM 2320B	GEL
Ammonia	Ammonia	0.0557	0.017	0.05	NE	mg/L		J+	104543-002	EPA 350.1	GEL
Anions	Bromide	0.97	0.067	0.2	NE	mg/L		J	104543-008	SW846 9056	GEL
Anions	Chloride	70.4	1.34	4	NE	mg/L	B	J	104543-008	SW846 9056	GEL
Anions	Fluoride	1.04	0.033	0.1	4	mg/L		J	104543-008	SW846 9056	GEL
Anions	Nitrite	ND	0.033	0.1	1	mg/L	U	UJ	104544-006	SW846 9056	GEL
Anions	Orthophosphate as Phosphorus	ND	0.067	0.2	NE	mg/L	U	UJ	104543-003	SW846 9056	GEL
Anions	Sulfate	44.1	2.66	8	NE	mg/L		J	104543-008	SW846 9056	GEL
Dissolved Metals	Arsenic	0.00206	0.002	0.005	0.010	mg/L	J		104544-010	SW846 3005/6020	GEL
Dissolved Metals	Calcium	62.2	0.8	2	NE	mg/L			104544-010	SW846 3005/6020	GEL
Dissolved Metals	Iron	0.069	0.033	0.1	NE	mg/L	J		104544-010	SW846 3005/6020	GEL
Dissolved Metals	Magnesium	18	0.1	0.3	NE	mg/L			104543-010	SW846 3005/6020	GEL
Dissolved Metals	Manganese	ND	0.001	0.005	NE	mg/L	U		104543-010	SW846 3005/6020	GEL
Dissolved Metals	Potassium	3.67	0.08	0.3	NE	mg/L			104544-010	SW846 3005/6020	GEL
Dissolved Metals	Sodium	60	0.8	2.5	NE	mg/L			104544-010	SW846 3005/6020	GEL
MEE	Ethane	ND	0.007	0.1	NE	µg/L	U	UJ	104552-001	AM20GAX	PACE
MEE	Ethene	ND	0.005	0.1	NE	µg/L	U	UJ	104553-001	AM20GAX	PACE
MEE	Methane	ND	0.02	0.5	NE	µg/L	U	UJ	104553-001	AM20GAX	PACE
Microbial	Dehalococcoides	ND	3000		NE	Enumeration/L	U		104562-001	Gene-Trac Dhc	SiREM
NPN	Nitrate plus nitrite as Nitrogen	7.93	0.17	0.5	10	mg/L			104543-007	EPA 353.2	GEL
Sulfide	Sulfide, Reactive	ND	500	500	NE	mg/L	*	R	104543-005	SW846 Chpt. 7.3.4-TI	GEL
TOC	Total Organic Carbon #1	0.639	0.33	1	NE	mg/L	J	1.0UJ	104543-004	SW846 9060A	GEL
TOC	Total Organic Carbon #2	0.658	0.33	1	NE	mg/L	J	1.0UJ	104543-004	SW846 9060A	GEL
TOC	Total Organic Carbon #3	0.566	0.33	1	NE	mg/L	J	1.0UJ	104544-004	SW846 9060A	GEL
TOC	Total Organic Carbon #4	0.557	0.33	1	NE	mg/L	J	1.0UJ	104544-004	SW846 9060A	GEL
TOC	Total Organic Carbon Average	0.56	0.33	1	NE	mg/L	J	1.0UJ	104544-004	SW846 9060A	GEL
VOC	Carbon disulfide	2.23	1.5	5	NE	µg/L	J		104543-001	SW846 8260B	GEL
VOC	Dichloroethene, cis-1,2-	1.33	0.3	1	70	µg/L			104544-001	SW846 8260B	GEL
VOC	Trichloroethene	8.32	0.3	1	5	µg/L			104544-001	SW846 8260B	GEL

Table III-5 (continued)
Analytical Results of Groundwater Sampling at Wells TAV-INJ1, TAV-MW6, and TAV-MW7

Analyses	Analyte	Result ^a	MDL ^b	PQL ^c	MCL ^d	Units	Lab Qual ^e	Val Qual ^f	Sample No.	Analytical Method ^g	Lab ^h
TAV-MW6 (Duplicate), 30-Jan-18											
Alkalinity	Alkalinity as CaCO ₃	199	1.45	4	NE	mg/L			104543-009	SM 2320B	GEL
Alkalinity	Alkalinity, bicarb as CaCO ₃	195	1.45	4	NE	mg/L			104544-009	SM 2320B	GEL
Alkalinity	Alkalinity, carb as CaCO ₃	ND	1.45	4	NE	mg/L	U		104543-009	SM 2320B	GEL
Ammonia	Ammonia	0.117	0.017	0.05	NE	mg/L		J+	104544-002	EPA 350.1	GEL
Anions	Bromide	0.9	0.067	0.2	NE	mg/L		J	104544-008	SW846 9056	GEL
Anions	Chloride	68.4	1.34	4	NE	mg/L	B	J	104544-008	SW846 9056	GEL
Anions	Fluoride	1.03	0.033	0.1	4	mg/L		J	104544-008	SW846 9056	GEL
Anions	Nitrite	ND	0.033	0.1	1	mg/L	U	UJ	104543-006	SW846 9056	GEL
Anions	Orthophosphate as Phosphorus	ND	0.067	0.2	NE	mg/L	U	UJ	104544-003	SW846 9056	GEL
Anions	Sulfate	43.5	2.66	8	NE	mg/L		J	104544-008	SW846 9056	GEL
Dissolved Metals	Arsenic	0.00248	0.002	0.005	0.010	mg/L	J		104543-010	SW846 3005/6020	GEL
Dissolved Metals	Calcium	63.9	0.8	2	NE	mg/L			104543-010	SW846 3005/6020	GEL
Dissolved Metals	Iron	0.0699	0.033	0.1	NE	mg/L	J		104543-010	SW846 3005/6020	GEL
Dissolved Metals	Magnesium	17.7	0.1	0.3	NE	mg/L			104544-010	SW846 3005/6020	GEL
Dissolved Metals	Manganese	ND	0.001	0.005	NE	mg/L	U		104544-010	SW846 3005/6020	GEL
Dissolved Metals	Potassium	3.66	0.08	0.3	NE	mg/L			104543-010	SW846 3005/6020	GEL
Dissolved Metals	Sodium	60.2	0.8	2.5	NE	mg/L			104543-010	SW846 3005/6020	GEL
MEE	Ethane	ND	0.007	0.1	NE	µg/L	U	UJ	104553-001	AM20GAX	PACE
MEE	Ethene	ND	0.005	0.1	NE	µg/L	U	UJ	104552-001	AM20GAX	PACE
MEE	Methane	ND	0.02	0.5	NE	µg/L	U	UJ	104552-001	AM20GAX	PACE
Microbial	Dehalococcoides	ND	3000		NE	Enumeration/L	U		104561-001	Gene-Trac Dhc	SiREM
NPN	Nitrate plus nitrite as Nitrogen	7.9	0.17	0.5	10	mg/L			104544-007	EPA 353.2	GEL
Sulfide	Sulfide, Reactive	ND	500	500	NE	mg/L	*	R	104544-005	SW846 Chpt. 7.3.4-TI	GEL
TOC	Total Organic Carbon #1	0.552	0.33	1	NE	mg/L	J	1.0UJ	104544-004	SW846 9060A	GEL
TOC	Total Organic Carbon #2	0.564	0.33	1	NE	mg/L	J	1.0UJ	104544-004	SW846 9060A	GEL
TOC	Total Organic Carbon #3	0.652	0.33	1	NE	mg/L	J	1.0UJ	104543-004	SW846 9060A	GEL
TOC	Total Organic Carbon #4	0.647	0.33	1	NE	mg/L	J	1.0UJ	104543-004	SW846 9060A	GEL
TOC	Total Organic Carbon Average	0.649	0.33	1	NE	mg/L	J	1.0UJ	104543-004	SW846 9060A	GEL
VOC	Carbon disulfide	1.74	1.5	5	NE	µg/L	J		104544-001	SW846 8260B	GEL
VOC	Dichloroethene, cis-1,2-	1.48	0.3	1	70	µg/L			104543-001	SW846 8260B	GEL
VOC	Trichloroethene	10.2	0.3	1	5	µg/L			104543-001	SW846 8260B	GEL

Table III-5 (continued)
Analytical Results of Groundwater Sampling at Wells TAV-INJ1, TAV-MW6, and TAV-MW7

Analyses	Analyte	Result ^a	MDL ^b	PQL ^c	MCL ^d	Units	Lab Qual ^e	Val Qual ^f	Sample No.	Analytical Method ^g	Lab ^h
TAV-MW6, 27-Feb-18											
Alkalinity	Alkalinity as CaCO ₃	189	1.45	4	NE	mg/L			104681-009	SM 2320B	GEL
Alkalinity	Alkalinity, bicarb as CaCO ₃	189	1.45	4	NE	mg/L			104681-009	SM 2320B	GEL
Alkalinity	Alkalinity, carb as CaCO ₃	ND	1.45	4	NE	mg/L	U		104681-009	SM 2320B	GEL
Ammonia	Ammonia	0.126	0.017	0.05	NE	mg/L			104681-002	EPA 350.1	GEL
Anions	Bromide	0.819	0.067	0.2	NE	mg/L			104681-008	SW846 9056	GEL
Anions	Chloride	73.8	0.67	2	NE	mg/L			104681-008	SW846 9056	GEL
Anions	Fluoride	1.19	0.033	0.1	4	mg/L			104681-008	SW846 9056	GEL
Anions	Nitrite	1.02	0.165	0.5	1	mg/L			104681-006	SW846 9056	GEL
Anions	Orthophosphate as Phosphorus	ND	0.067	0.2	NE	mg/L	U		104681-003	SW846 9056	GEL
Anions	Sulfate	42.5	1.33	4	NE	mg/L			104681-008	SW846 9056	GEL
Dissolved Metals	Arsenic	ND	0.002	0.005	0.010	mg/L	U		104681-010	SW846 3005/6020	GEL
Dissolved Metals	Calcium	59.4	0.8	2	NE	mg/L			104681-010	SW846 3005/6020	GEL
Dissolved Metals	Iron	0.0782	0.033	0.1	NE	mg/L	J		104681-010	SW846 3005/6020	GEL
Dissolved Metals	Magnesium	18	0.01	0.03	NE	mg/L			104681-010	SW846 3005/6020	GEL
Dissolved Metals	Manganese	ND	0.001	0.005	NE	mg/L	U		104681-010	SW846 3005/6020	GEL
Dissolved Metals	Potassium	3.54	0.08	0.3	NE	mg/L			104681-010	SW846 3005/6020	GEL
Dissolved Metals	Sodium	56.6	0.8	2.5	NE	mg/L			104681-010	SW846 3005/6020	GEL
MEE	Ethane	ND	0.007	0.1	NE	µg/L	U	UJ	104671-001	AM20GAX	PACE
MEE	Ethene	ND	0.005	0.1	NE	µg/L	U	UJ	104671-001	AM20GAX	PACE
MEE	Methane	ND	0.02	0.5	NE	µg/L	U	UJ	104671-001	AM20GAX	PACE
Microbial	Dehalococcoides	ND	3000		NE	Enumeration/L	U		104678-001	Gene-Trac Dhc	SiREM
NPN	Nitrate plus nitrite as Nitrogen	7.98	0.17	0.5	10	mg/L			104681-007	EPA 353.2	GEL
Sulfide	Sulfide, Reactive	ND	500	500	NE	mg/L	<	R	104681-005	SW846 Chpt. 7.3.4-TI	GEL
TOC	Total Organic Carbon #1	0.562	0.33	1	NE	mg/L	J		104681-004	SW846 9060A	GEL
TOC	Total Organic Carbon #2	0.584	0.33	1	NE	mg/L	J		104681-004	SW846 9060A	GEL
TOC	Total Organic Carbon #3	0.585	0.33	1	NE	mg/L	J		104681-004	SW846 9060A	GEL
TOC	Total Organic Carbon #4	0.604	0.33	1	NE	mg/L	J		104681-004	SW846 9060A	GEL
TOC	Total Organic Carbon Average	0.584	0.33	1	NE	mg/L	J		104681-004	SW846 9060A	GEL
VOC	Dichloroethene, cis-1,2-	1.47	0.3	1	70	µg/L			104681-001	SW846 8260B	GEL
VOC	Trichloroethene	9.55	0.3	1	5	µg/L			104681-001	SW846 8260B	GEL

Table III-5 (continued)
Analytical Results of Groundwater Sampling at Wells TAV-INJ1, TAV-MW6, and TAV-MW7

Analyses	Analyte	Result ^a	MDL ^b	PQL ^c	MCL ^d	Units	Lab Qual ^e	Val Qual ^f	Sample No.	Analytical Method ^g	Lab ^h
TAV-MW6, 27-Mar-18											
Alkalinity	Alkalinity as CaCO ₃	191	1.45	4	NE	mg/L			104953-009	SM 2320B	GEL
Alkalinity	Alkalinity, bicarb as CaCO ₃	191	1.45	4	NE	mg/L			104953-009	SM 2320B	GEL
Alkalinity	Alkalinity, carb as CaCO ₃	ND	1.45	4	NE	mg/L	U		104953-009	SM 2320B	GEL
Ammonia	Ammonia	ND	0.017	0.05	NE	mg/L	U	0.05UJ	104953-002	EPA 350.1	GEL
Anions	Bromide	0.836	0.067	0.2	NE	mg/L			104953-008	SW846 9056	GEL
Anions	Chloride	78	0.67	2	NE	mg/L			104953-008	SW846 9056	GEL
Anions	Fluoride	1.1	0.033	0.1	4	mg/L			104953-008	SW846 9056	GEL
Anions	Nitrite	ND	0.033	0.1	1	mg/L	U		104953-006	SW846 9056	GEL
Anions	Orthophosphate as Phosphorus	ND	0.067	0.2	NE	mg/L	U	UJ	104953-003	SW846 9056	GEL
Anions	Sulfate	45.5	1.33	4	NE	mg/L			104953-008	SW846 9056	GEL
Dissolved Metals	Arsenic	ND	0.002	0.005	0.010	mg/L	U		104953-010	SW846 3005/6020	GEL
Dissolved Metals	Calcium	62.4	0.8	2	NE	mg/L			104953-010	SW846 3005/6020	GEL
Dissolved Metals	Iron	0.0716	0.033	0.1	NE	mg/L	J		104953-010	SW846 3005/6020	GEL
Dissolved Metals	Magnesium	19.9	0.1	0.3	NE	mg/L			104953-010	SW846 3005/6020	GEL
Dissolved Metals	Manganese	ND	0.001	0.005	NE	mg/L	U		104953-010	SW846 3005/6020	GEL
Dissolved Metals	Potassium	3.71	0.08	0.3	NE	mg/L			104953-010	SW846 3005/6020	GEL
Dissolved Metals	Sodium	64	0.8	2.5	NE	mg/L			104953-010	SW846 3005/6020	GEL
MEE	Ethane	ND	0.007	0.1	NE	µg/L	U	UJ	104960-001	AM20GAX	PACE
MEE	Ethene	ND	0.005	0.1	NE	µg/L	U	UJ	104960-001	AM20GAX	PACE
MEE	Methane	ND	0.02	0.5	NE	µg/L	U	UJ	104960-001	AM20GAX	PACE
Microbial	Dehalococcoides	ND	4000		NE	Enumeration/L	U		104966-001	Gene-Trac Dhc	SiREM
NPN	Nitrate plus nitrite as Nitrogen	9.18	0.17	0.5	10	mg/L			104953-007	EPA 353.2	GEL
Sulfide	Sulfide, Reactive	ND	500	500	NE	mg/L	<		104953-005	SW846 Chpt. 7.3.4-TI	GEL
TOC	Total Organic Carbon #1	0.394	0.33	1	NE	mg/L	J		104953-004	SW846 9060A	GEL
TOC	Total Organic Carbon #2	0.431	0.33	1	NE	mg/L	J		104953-004	SW846 9060A	GEL
TOC	Total Organic Carbon #3	0.452	0.33	1	NE	mg/L	J		104953-004	SW846 9060A	GEL
TOC	Total Organic Carbon #4	0.447	0.33	1	NE	mg/L	J		104953-004	SW846 9060A	GEL
TOC	Total Organic Carbon Average	0.431	0.33	1	NE	mg/L	J		104953-004	SW846 9060A	GEL
VOC	Acetone	3.23	1.5	10	NE	µg/L	J	10UJ	104953-001	SW846 8260B	GEL
VOC	Dichloroethene, cis-1,2-	1.56	0.3	1	70	µg/L			104953-001	SW846 8260B	GEL
VOC	Methylene chloride	1.01	1	10	5	µg/L	JB	10U	104953-001	SW846 8260B	GEL
VOC	Trichloroethene	9.22	0.3	1	5	µg/L			104953-001	SW846 8260B	GEL

Table III-5 (continued)
Analytical Results of Groundwater Sampling at Wells TAV-INJ1, TAV-MW6, and TAV-MW7

Analyses	Analyte	Result ^a	MDL ^b	PQL ^c	MCL ^d	Units	Lab Qual ^e	Val Qual ^f	Sample No.	Analytical Method ^g	Lab ^h
TAV-MW6, 12-Jun-18											
Alkalinity	Alkalinity as CaCO ₃	199	1.45	4	NE	mg/L			105570-009	SM 2320B	GEL
Alkalinity	Alkalinity, bicarb as CaCO ₃	199	1.45	4	NE	mg/L			105570-009	SM 2320B	GEL
Alkalinity	Alkalinity, carb as CaCO ₃		1.45	4	NE	mg/L	U		105570-009	SM 2320B	GEL
Ammonia	Ammonia	0.054	0.017	0.05	NE	mg/L	*B	J	105570-002	EPA 350.1	GEL
Anions	Bromide	0.811	0.067	0.2	NE	mg/L			105570-008	SW846 9056	GEL
Anions	Chloride	72.7	1.34	4	NE	mg/L			105570-008	SW846 9056	GEL
Anions	Fluoride	1.21	0.033	0.1	4	mg/L			105570-008	SW846 9056	GEL
Anions	Nitrite	ND	0.033	0.1	1	mg/L	U		105570-006	SW846 9056	GEL
Anions	Orthophosphate as Phosphorus	ND	0.067	0.2	NE	mg/L	U		105570-003	SW846 9056	GEL
Anions	Sulfate	45.4	2.66	8	NE	mg/L			105570-008	SW846 9056	GEL
Dissolved Metals	Arsenic	ND	0.002	0.005	0.010	mg/L	U		105570-010	SW846 3005/6020	GEL
Dissolved Metals	Calcium	64.2	0.8	2	NE	mg/L			105570-010	SW846 3005/6020	GEL
Dissolved Metals	Iron	ND	0.033	0.1	NE	mg/L	U		105570-010	SW846 3005/6020	GEL
Dissolved Metals	Magnesium	19.2	0.01	0.03	NE	mg/L			105570-010	SW846 3005/6020	GEL
Dissolved Metals	Manganese	ND	0.001	0.005	NE	mg/L	U		105570-010	SW846 3005/6020	GEL
Dissolved Metals	Potassium	3.85	0.08	0.3	NE	mg/L			105570-010	SW846 3005/6020	GEL
Dissolved Metals	Sodium	63	0.8	2.5	NE	mg/L			105570-010	SW846 3005/6020	GEL
MEE	Ethane	ND	0.007	0.1	NE	µg/L	U	UJ	104960-001	AM20GAX	PACE
MEE	Ethene	ND	0.005	0.1	NE	µg/L	U	UJ	104960-001	AM20GAX	PACE
MEE	Methane	ND	0.02	0.5	NE	µg/L	U	UJ	104960-001	AM20GAX	PACE
Microbial	Dehalococcoides	ND	3000		NE	Enumeration/L	U		105581-001	Gene-Trac Dhc	SiREM
NPN	Nitrate plus nitrite as Nitrogen	7.83	0.17	0.5	10	mg/L			105570-007	EPA 353.2	GEL
Sulfide	Acid Soluble Sulfides	ND	1	2.5	NE	mg/L	U	UJ	105570-005	SW846 9030B/9034	GEL
TOC	Total Organic Carbon #1	ND	0.33	1	NE	mg/L	U		105570-004	SW846 9060A	GEL
TOC	Total Organic Carbon #2	ND	0.33	1	NE	mg/L	U		105570-004	SW846 9060A	GEL
TOC	Total Organic Carbon #3	ND	0.33	1	NE	mg/L	U		105570-004	SW846 9060A	GEL
TOC	Total Organic Carbon #4	ND	0.33	1	NE	mg/L	U		105570-004	SW846 9060A	GEL
TOC	Total Organic Carbon Average	ND	0.33	1	NE	mg/L	U		105570-004	SW846 9060A	GEL
VOC	Dichloroethene, cis-1,2-	1.67	0.3	1	70	µg/L			105570-001	SW846 8260B	GEL
VOC	Trichloroethene	9.51	0.3	1	5	µg/L			105570-001	SW846 8260B	GEL

Table III-5 (continued)
Analytical Results of Groundwater Sampling at Wells TAV-INJ1, TAV-MW6, and TAV-MW7

Analyses	Analyte	Result ^a	MDL ^b	PQL ^c	MCL ^d	Units	Lab Qual ^e	Val Qual ^f	Sample No.	Analytical Method ^g	Lab ^h
TAV-MW7, 4-Dec-17											
Alkalinity	Alkalinity as CaCO ₃	232	1.45	4	NE	mg/L			104099-009	SM 2320B	GEL
Alkalinity	Alkalinity, bicarb as CaCO ₃	232	1.45	4	NE	mg/L			104099-009	SM 2320B	GEL
Alkalinity	Alkalinity, carb as CaCO ₃	ND	1.45	4	NE	mg/L	U		104099-009	SM 2320B	GEL
Ammonia	Ammonia	0.0428	0.017	0.05	NE	mg/L	J		104099-002	EPA 350.1	GEL
Anions	Bromide	0.244	0.067	0.2	NE	mg/L			104099-008	SW846 9056	GEL
Anions	Chloride	25.9	0.67	2	NE	mg/L			104099-008	SW846 9056	GEL
Anions	Fluoride	1.11	0.033	0.1	4	mg/L			104099-008	SW846 9056	GEL
Anions	Nitrite	ND	0.033	0.1	1	mg/L	U		104099-006	SW846 9056	GEL
Anions	Orthophosphate as Phosphorus	ND	0.067	0.2	NE	mg/L	U		104099-003	SW846 9056	GEL
Anions	Sulfate	62.4	1.33	4	NE	mg/L			104099-008	SW846 9056	GEL
Dissolved Metals	Arsenic	ND	0.002	0.005	0.010	mg/L	U		104099-010	SW846 3005/6020	GEL
Dissolved Metals	Calcium	61.1	0.4	1	NE	mg/L			104099-010	SW846 3005/6020	GEL
Dissolved Metals	Iron	0.0854	0.033	0.1	NE	mg/L	J		104099-010	SW846 3005/6020	GEL
Dissolved Metals	Magnesium	19.5	0.01	0.03	NE	mg/L			104099-010	SW846 3005/6020	GEL
Dissolved Metals	Manganese	ND	0.001	0.005	NE	mg/L	U		104099-010	SW846 3005/6020	GEL
Dissolved Metals	Potassium	4.37	0.08	0.3	NE	mg/L			104099-010	SW846 3005/6020	GEL
Dissolved Metals	Sodium	57.7	0.4	1.25	NE	mg/L			104099-010	SW846 3005/6020	GEL
MEE	Ethane	ND	0.007	0.1	NE	µg/L	U	UJ	104091-001	AM20GAX	PACE
MEE	Ethene	ND	0.005	0.1	NE	µg/L	U	UJ	104091-001	AM20GAX	PACE
MEE	Methane	ND	0.02	0.5	NE	µg/L	U	UJ	104091-001	AM20GAX	PACE
Microbial	Dehalococcoides	ND	3000		NE	Enumeration/L	U		104200-001	Gene-Trac Dhc	SiREM
NPN	Nitrate plus nitrite as Nitrogen	3.93	0.17	0.5	10	mg/L			104099-007	EPA 353.2	GEL
Sulfide	Sulfide, Reactive	ND	500	500	NE	mg/L	<, *	UJ	104099-005	SW846 Chpt. 7.3.4-TI	GEL
TOC	Total Organic Carbon #1	0.509	0.33	1	NE	mg/L	J		104099-004	SW846 9060A	GEL
TOC	Total Organic Carbon #2	0.539	0.33	1	NE	mg/L	J		104099-004	SW846 9060A	GEL
TOC	Total Organic Carbon #3	0.532	0.33	1	NE	mg/L	J		104099-004	SW846 9060A	GEL
TOC	Total Organic Carbon #4	0.529	0.33	1	NE	mg/L	J		104099-004	SW846 9060A	GEL
TOC	Total Organic Carbon Average	0.527	0.33	1	NE	mg/L	J		104099-004	SW846 9060A	GEL

Table III-5 (continued)
Analytical Results of Groundwater Sampling at Wells TAV-INJ1, TAV-MW6, and TAV-MW7

Analyses	Analyte	Result ^a	MDL ^b	PQL ^c	MCL ^d	Units	Lab Qual ^e	Val Qual ^f	Sample No.	Analytical Method ^g	Lab ^h
TAV-MW7, 12-Dec-17											
Alkalinity	Alkalinity as CaCO ₃	231	1.45	4	NE	mg/L			104153-009	SM 2320B	GEL
Alkalinity	Alkalinity, bicarb as CaCO ₃	231	1.45	4	NE	mg/L			104153-009	SM 2320B	GEL
Alkalinity	Alkalinity, carb as CaCO ₃	ND	1.45	4	NE	mg/L	U		104153-009	SM 2320B	GEL
Ammonia	Ammonia	0.0354	0.017	0.05	NE	mg/L	J	J-	104153-002	EPA 350.1	GEL
Anions	Bromide	0.239	0.067	0.2	NE	mg/L			104153-008	SW846 9056	GEL
Anions	Chloride	26.2	0.67	2	NE	mg/L			104153-008	SW846 9056	GEL
Anions	Fluoride	1.1	0.033	0.1	4	mg/L			104153-008	SW846 9056	GEL
Anions	Nitrite	ND	0.033	0.1	1	mg/L	U		104153-006	SW846 9056	GEL
Anions	Orthophosphate as Phosphorus	ND	0.067	0.2	NE	mg/L	U		104153-003	SW846 9056	GEL
Anions	Sulfate	63	1.33	4	NE	mg/L			104153-008	SW846 9056	GEL
Dissolved Metals	Arsenic	0.00206	0.002	0.005	0.010	mg/L	J		104153-010	SW846 3005/6020	GEL
Dissolved Metals	Calcium	63.5	0.8	2	NE	mg/L	B		104153-010	SW846 3005/6020	GEL
Dissolved Metals	Iron	ND	0.033	0.1	NE	mg/L	U		104153-010	SW846 3005/6020	GEL
Dissolved Metals	Magnesium	19.2	0.01	0.03	NE	mg/L			104153-010	SW846 3005/6020	GEL
Dissolved Metals	Manganese	ND	0.001	0.005	NE	mg/L	U	UJ	104153-010	SW846 3005/6020	GEL
Dissolved Metals	Potassium	4.4	0.08	0.3	NE	mg/L		J	104153-010	SW846 3005/6020	GEL
Dissolved Metals	Sodium	59.7	0.8	2.5	NE	mg/L			104153-010	SW846 3005/6020	GEL
MEE	Ethane	ND	0.007	0.1	NE	µg/L	U	UJ	104165-001	AM20GAX	PACE
MEE	Ethene	ND	0.005	0.1	NE	µg/L	U	UJ	104165-001	AM20GAX	PACE
MEE	Methane	5.9	0.02	0.5	NE	µg/L		J	104165-001	AM20GAX	PACE
Microbial	Dehalococcoides	ND	1000		NE	Enumeration/L	U		104173-001	Gene-Trac Dhc	SiREM
NPN	Nitrate plus nitrite as Nitrogen	4.09	0.17	0.5	10	mg/L		J	104153-007	EPA 353.2	GEL
Sulfide	Sulfide, Reactive	ND	500	500	NE	mg/L	<, *	UJ	104153-005	SW846 Chpt. 7.3.4-TI	GEL
TOC	Total Organic Carbon #1	0.408	0.33	1	NE	mg/L	J		104153-004	SW846 9060A	GEL
TOC	Total Organic Carbon #2	0.488	0.33	1	NE	mg/L	J		104153-004	SW846 9060A	GEL
TOC	Total Organic Carbon #3	0.512	0.33	1	NE	mg/L	J		104153-004	SW846 9060A	GEL
TOC	Total Organic Carbon #4	0.506	0.33	1	NE	mg/L	J		104153-004	SW846 9060A	GEL
TOC	Total Organic Carbon Average	0.479	0.33	1	NE	mg/L	J		104153-004	SW846 9060A	GEL
VOC	Acetone	1.53	1.5	10	NE	µg/L	J		104153-001	SW846 8260B	GEL
VOC	Carbon disulfide	8.28	1.5	5	NE	µg/L			104153-001	SW846 8260B	GEL

Table III-5 (continued)
Analytical Results of Groundwater Sampling at Wells TAV-INJ1, TAV-MW6, and TAV-MW7

Analyses	Analyte	Result ^a	MDL ^b	PQL ^c	MCL ^d	Units	Lab Qual ^e	Val Qual ^f	Sample No.	Analytical Method ^g	Lab ^h
TAV-MW7, 2-Jan-18											
Alkalinity	Alkalinity as CaCO ₃	228	1.45	4	NE	mg/L			104293-009	SM 2320B	GEL
Alkalinity	Alkalinity, bicarb as CaCO ₃	228	1.45	4	NE	mg/L			104293-009	SM 2320B	GEL
Alkalinity	Alkalinity, carb as CaCO ₃	ND	1.45	4	NE	mg/L	U		104293-009	SM 2320B	GEL
Ammonia	Ammonia	0.0507	0.017	0.05	NE	mg/L	B	J	104293-002	EPA 350.1	GEL
Anions	Bromide	ND	6.7	20	NE	mg/L	U	UJ	104293-008	SW846 9056	GEL
Anions	Chloride	33.4	6.7	20	NE	mg/L		J	104293-008	SW846 9056	GEL
Anions	Fluoride	ND	3.3	10	4	mg/L	U	UJ	104293-008	SW846 9056	GEL
Anions	Nitrite	ND	16.5	50	1	mg/L	UH	R	104293-006	SW846 9056	GEL
Anions	Orthophosphate as Phosphorus	ND	6.7	20	NE	mg/L	UH	R	104293-003	SW846 9056	GEL
Anions	Sulfate	69.4	13.3	40	NE	mg/L		J+	104293-008	SW846 9056	GEL
Dissolved Metals	Arsenic	ND	0.002	0.005	0.010	mg/L	U		104293-010	SW846 3005/6020	GEL
Dissolved Metals	Calcium	57.7	0.8	2	NE	mg/L			104293-010	SW846 3005/6020	GEL
Dissolved Metals	Iron	0.065	0.033	0.1	NE	mg/L	J		104293-010	SW846 3005/6020	GEL
Dissolved Metals	Magnesium	18	0.01	0.03	NE	mg/L			104293-010	SW846 3005/6020	GEL
Dissolved Metals	Manganese	ND	0.001	0.005	NE	mg/L	U		104293-010	SW846 3005/6020	GEL
Dissolved Metals	Potassium	3.92	0.08	0.3	NE	mg/L			104293-010	SW846 3005/6020	GEL
Dissolved Metals	Sodium	53.7	0.8	2.5	NE	mg/L			104293-010	SW846 3005/6020	GEL
MEE	Ethane	ND	0.003	0.1	NE	µg/L	U	UJ	104299-001	AM20GAX	PACE
MEE	Ethene	ND	0.004	0.1	NE	µg/L	U	UJ	104299-001	AM20GAX	PACE
MEE	Methane	ND	0.016	0.5	NE	µg/L	U	UJ	104299-001	AM20GAX	PACE
Microbial	Dehalococcoides	ND	3000		NE	Enumeration/L	U		104304-001	Gene-Trac Dhc	SiREM
NPN	Nitrate plus nitrite as Nitrogen	3.62	0.17	0.5	10	mg/L		J	104293-007	EPA 353.2	GEL
Sulfide	Sulfide, Reactive	ND	500	500	NE	mg/L	<	UJ	104293-005	SW846 Chpt. 7.3.4-TI	GEL
TOC	Total Organic Carbon #1	0.5	0.33	1	NE	mg/L	J		104293-004	SW846 9060A	GEL
TOC	Total Organic Carbon #2	0.538	0.33	1	NE	mg/L	J		104293-004	SW846 9060A	GEL
TOC	Total Organic Carbon #3	0.561	0.33	1	NE	mg/L	J		104293-004	SW846 9060A	GEL
TOC	Total Organic Carbon #4	0.555	0.33	1	NE	mg/L	J		104293-004	SW846 9060A	GEL
TOC	Total Organic Carbon Average	0.538	0.33	1	NE	mg/L	J		104293-004	SW846 9060A	GEL
VOC	Carbon disulfide	5.88	1.5	5	NE	µg/L			104293-001	SW846 8260B	GEL

Table III-5 (continued)
Analytical Results of Groundwater Sampling at Wells TAV-INJ1, TAV-MW6, and TAV-MW7

Analyses	Analyte	Result ^a	MDL ^b	PQL ^c	MCL ^d	Units	Lab Qual ^e	Val Qual ^f	Sample No.	Analytical Method ^g	Lab ^h
TAV-MW7, 29-Jan-18											
Alkalinity	Alkalinity as CaCO ₃	230	1.45	4	NE	mg/L		J	104546-009	SM 2320B	GEL
Alkalinity	Alkalinity, bicarb as CaCO ₃	230	1.45	4	NE	mg/L		J	104546-009	SM 2320B	GEL
Alkalinity	Alkalinity, carb as CaCO ₃	ND	1.45	4	NE	mg/L	U	UJ	104546-009	SM 2320B	GEL
Ammonia	Ammonia	0.0609	0.017	0.05	NE	mg/L		J	104546-002	EPA 350.1	GEL
Anions	Bromide	0.235	0.067	0.2	NE	mg/L		J	104546-008	SW846 9056	GEL
Anions	Chloride	27.3	0.67	2	NE	mg/L		J	104546-008	SW846 9056	GEL
Anions	Fluoride	1.12	0.033	0.1	4	mg/L		J	104546-008	SW846 9056	GEL
Anions	Nitrite	ND	0.033	0.1	1	mg/L	U	UJ	104546-006	SW846 9056	GEL
Anions	Orthophosphate as Phosphorus	ND	0.067	0.2	NE	mg/L	U	UJ	104546-003	SW846 9056	GEL
Anions	Sulfate	62.7	1.33	4	NE	mg/L		J	104546-008	SW846 9056	GEL
Dissolved Metals	Arsenic	0.0025	0.002	0.005	0.010	mg/L	J		104546-010	SW846 3005/6020	GEL
Dissolved Metals	Calcium	61	0.8	2	NE	mg/L			104546-010	SW846 3005/6020	GEL
Dissolved Metals	Iron	0.0756	0.033	0.1	NE	mg/L	J		104546-010	SW846 3005/6020	GEL
Dissolved Metals	Magnesium	19.4	0.1	0.3	NE	mg/L			104546-010	SW846 3005/6020	GEL
Dissolved Metals	Manganese	ND	0.001	0.005	NE	mg/L	U		104546-010	SW846 3005/6020	GEL
Dissolved Metals	Potassium	4.04	0.08	0.3	NE	mg/L			104546-010	SW846 3005/6020	GEL
Dissolved Metals	Sodium	57.4	0.8	2.5	NE	mg/L			104546-010	SW846 3005/6020	GEL
MEE	Ethane	ND	0.007	0.1	NE	µg/L	U	UJ	104555-001	AM20GAX	PACE
MEE	Ethene	ND	0.005	0.1	NE	µg/L	U	UJ	104555-001	AM20GAX	PACE
MEE	Methane	ND	0.02	0.5	NE	µg/L	U	UJ	104555-001	AM20GAX	PACE
Microbial	Dehalococcoides	ND	3000		NE	Enumeration/L	U		104563-001	Gene-Trac Dhc	SiREM
NPN	Nitrate plus nitrite as Nitrogen	4.02	0.17	0.5	10	mg/L			104546-007	EPA 353.2	GEL
Sulfide	Sulfide, Reactive	ND	500	500	NE	mg/L	*	R	104546-005	SW846 Chpt. 7.3.4-TI	GEL
TOC	Total Organic Carbon #1	0.613	0.33	1	NE	mg/L	J	J	104546-004	SW846 9060A	GEL
TOC	Total Organic Carbon #2	0.598	0.33	1	NE	mg/L	J	J	104546-004	SW846 9060A	GEL
TOC	Total Organic Carbon #3	0.608	0.33	1	NE	mg/L	J	J	104546-004	SW846 9060A	GEL
TOC	Total Organic Carbon #4	0.586	0.33	1	NE	mg/L	J	J	104546-004	SW846 9060A	GEL
TOC	Total Organic Carbon Average	0.601	0.33	1	NE	mg/L	J	J	104546-004	SW846 9060A	GEL
VOC	Carbon disulfide	2.46	1.5	5	NE	µg/L	J		104546-001	SW846 8260B	GEL

Table III-5 (continued)
Analytical Results of Groundwater Sampling at Wells TAV-INJ1, TAV-MW6, and TAV-MW7

Analyses	Analyte	Result ^a	MDL ^b	PQL ^c	MCL ^d	Units	Lab Qual ^e	Val Qual ^f	Sample No.	Analytical Method ^g	Lab ^h
TAV-MW7, 26-Feb-18											
Alkalinity	Alkalinity as CaCO ₃	228	1.45	4	NE	mg/L			104660-009	SM 2320B	GEL
Alkalinity	Alkalinity, bicarb as CaCO ₃	228	1.45	4	NE	mg/L			104660-009	SM 2320B	GEL
Alkalinity	Alkalinity, carb as CaCO ₃	ND	1.45	4	NE	mg/L	U		104660-009	SM 2320B	GEL
Ammonia	Ammonia	0.0604	0.017	0.05	NE	mg/L			104660-002	EPA 350.1	GEL
Anions	Bromide	0.242	0.067	0.2	NE	mg/L			104660-008	SW846 9056	GEL
Anions	Chloride	27.9	0.335	1	NE	mg/L			104660-008	SW846 9056	GEL
Anions	Fluoride	1.1	0.033	0.1	4	mg/L			104660-008	SW846 9056	GEL
Anions	Nitrite	ND	0.033	0.1	1	mg/L	U		104660-006	SW846 9056	GEL
Anions	Orthophosphate as Phosphorus	ND	0.067	0.2	NE	mg/L	U		104660-003	SW846 9056	GEL
Anions	Sulfate	63	0.665	2	NE	mg/L			104660-008	SW846 9056	GEL
Dissolved Metals	Arsenic	ND	0.002	0.005	0.010	mg/L	U		104660-010	SW846 3005/6020	GEL
Dissolved Metals	Calcium	55	0.8	2	NE	mg/L			104660-010	SW846 3005/6020	GEL
Dissolved Metals	Iron	0.0782	0.033	0.1	NE	mg/L	J		104660-010	SW846 3005/6020	GEL
Dissolved Metals	Magnesium	17.5	0.01	0.03	NE	mg/L			104660-010	SW846 3005/6020	GEL
Dissolved Metals	Manganese	ND	0.001	0.005	NE	mg/L	U		104660-010	SW846 3005/6020	GEL
Dissolved Metals	Potassium	3.83	0.08	0.3	NE	mg/L			104660-010	SW846 3005/6020	GEL
Dissolved Metals	Sodium	52.2	0.8	2.5	NE	mg/L			104660-010	SW846 3005/6020	GEL
MEE	Ethane	ND	0.007	0.1	NE	µg/L	U	UJ	104669-001	AM20GAX	PACE
MEE	Ethene	ND	0.005	0.1	NE	µg/L	U	UJ	104669-001	AM20GAX	PACE
MEE	Methane	ND	0.02	0.5	NE	µg/L	U	UJ	104669-001	AM20GAX	PACE
Microbial	Dehalococcoides	ND	3000		NE	Enumeration/L	U		104677-001	Gene-Trac Dhc	SiREM
NPN	Nitrate plus nitrite as Nitrogen	4.14	0.085	0.25	10	mg/L			104660-007	EPA 353.2	GEL
Sulfide	Sulfide, Reactive	ND	500	500	NE	mg/L	<	R	104660-005	SW846 Chpt. 7.3.4-TI	GEL
TOC	Total Organic Carbon #1	0.567	0.33	1	NE	mg/L	J		104660-004	SW846 9060A	GEL
TOC	Total Organic Carbon #2	0.562	0.33	1	NE	mg/L	J		104660-004	SW846 9060A	GEL
TOC	Total Organic Carbon #3	0.543	0.33	1	NE	mg/L	J		104660-004	SW846 9060A	GEL
TOC	Total Organic Carbon #4	0.543	0.33	1	NE	mg/L	J		104660-004	SW846 9060A	GEL
TOC	Total Organic Carbon Average	0.554	0.33	1	NE	mg/L	J		104660-004	SW846 9060A	GEL

Table III-5 (continued)
Analytical Results of Groundwater Sampling at Wells TAV-INJ1, TAV-MW6, and TAV-MW7

Analyses	Analyte	Result ^a	MDL ^b	PQL ^c	MCL ^d	Units	Lab Qual ^e	Val Qual ^f	Sample No.	Analytical Method ^g	Lab ^h
TAV-MW7, 26-Mar-18											
Alkalinity	Alkalinity as CaCO ₃	230	1.45	4	NE	mg/L			104950-009	SM 2320B	GEL
Alkalinity	Alkalinity, bicarb as CaCO ₃	230	1.45	4	NE	mg/L			104950-009	SM 2320B	GEL
Alkalinity	Alkalinity, carb as CaCO ₃	ND	1.45	4	NE	mg/L	U		104951-009	SM 2320B	GEL
Ammonia	Ammonia	ND	0.017	0.05	NE	mg/L	U	0.05UJ	104951-002	EPA 350.1	GEL
Anions	Bromide	0.258	0.067	0.2	NE	mg/L			104950-008	SW846 9056	GEL
Anions	Chloride	28.5	0.67	2	NE	mg/L			104950-008	SW846 9056	GEL
Anions	Fluoride	1.02	0.033	0.1	4	mg/L			104951-008	SW846 9056	GEL
Anions	Nitrite	ND	0.033	0.1	1	mg/L	U		104951-006	SW846 9056	GEL
Anions	Orthophosphate as Phosphorus	ND	0.067	0.2	NE	mg/L	U	UJ	104950-003	SW846 9056	GEL
Anions	Sulfate	65.3	1.33	4	NE	mg/L			104950-008	SW846 9056	GEL
Dissolved Metals	Arsenic	ND	0.002	0.005	0.010	mg/L	U		104951-010	SW846 3005/6020	GEL
Dissolved Metals	Calcium	55.9	0.4	1	NE	mg/L			104951-010	SW846 3005/6020	GEL
Dissolved Metals	Iron	0.062	0.033	0.1	NE	mg/L	J		104951-010	SW846 3005/6020	GEL
Dissolved Metals	Magnesium	16.4	0.01	0.03	NE	mg/L			104950-010	SW846 3005/6020	GEL
Dissolved Metals	Manganese	ND	0.001	0.005	NE	mg/L	U		104950-010	SW846 3005/6020	GEL
Dissolved Metals	Potassium	3.81	0.08	0.3	NE	mg/L			104951-010	SW846 3005/6020	GEL
Dissolved Metals	Sodium	54	0.4	1.25	NE	mg/L			104951-010	SW846 3005/6020	GEL
MEE	Ethane	0.1	0.007	0.1	NE	µg/L		J	104957-001	AM20GAX	PACE
MEE	Ethene	ND	0.005	0.1	NE	µg/L	U	UJ	104958-001	AM20GAX	PACE
MEE	Methane	ND	0.02	0.5	NE	µg/L	U	UJ	104957-001	AM20GAX	PACE
Microbial	Dehalococcoides	ND	3000		NE	Enumeration/L	U		104965-001	Gene-Trac Dhc	SiREM
NPN	Nitrate plus nitrite as Nitrogen	4.09	0.17	0.5	10	mg/L			104951-007	EPA 353.2	GEL
Sulfide	Sulfide, Reactive	ND	500	500	NE	mg/L	<		104951-005	SW846 Chpt. 7.3.4-TI	GEL
TOC	Total Organic Carbon #1	0.453	0.33	1	NE	mg/L	J	1.0U	104951-004	SW846 9060A	GEL
TOC	Total Organic Carbon #2	0.591	0.33	1	NE	mg/L	J	1.0U	104950-004	SW846 9060A	GEL
TOC	Total Organic Carbon #3	0.492	0.33	1	NE	mg/L	J	1.0U	104951-004	SW846 9060A	GEL
TOC	Total Organic Carbon #4	0.504	0.33	1	NE	mg/L	J	1.0U	104951-004	SW846 9060A	GEL
TOC	Total Organic Carbon Average	0.576	0.33	1	NE	mg/L	J	1.0U	104950-004	SW846 9060A	GEL
VOC	Acetone	3.34	1.5	10	NE	µg/L	J	10UJ	104951-001	SW846 8260B	GEL

Table III-5 (continued)
Analytical Results of Groundwater Sampling at Wells TAV-INJ1, TAV-MW6, and TAV-MW7

Analyses	Analyte	Result ^a	MDL ^b	PQL ^c	MCL ^d	Units	Lab Qual ^e	Val Qual ^f	Sample No.	Analytical Method ^g	Lab ^h
TAV-MW7 (Duplicate), 26-Mar-18											
Alkalinity	Alkalinity as CaCO ₃	231	1.45	4	NE	mg/L			104951-009	SM 2320B	GEL
Alkalinity	Alkalinity, bicarb as CaCO ₃	231	1.45	4	NE	mg/L			104951-009	SM 2320B	GEL
Alkalinity	Alkalinity, carb as CaCO ₃	ND	1.45	4	NE	mg/L	U		104950-009	SM 2320B	GEL
Ammonia	Ammonia	ND	0.017	0.05	NE	mg/L	U	0.05UJ	104950-002	EPA 350.1	GEL
Anions	Bromide	0.264	0.067	0.2	NE	mg/L			104951-008	SW846 9056	GEL
Anions	Chloride	28.4	0.67	2	NE	mg/L			104951-008	SW846 9056	GEL
Anions	Fluoride	1.01	0.033	0.1	4	mg/L			104950-008	SW846 9056	GEL
Anions	Nitrite	ND	0.033	0.1	1	mg/L	U		104950-006	SW846 9056	GEL
Anions	Orthophosphate as Phosphorus	ND	0.067	0.2	NE	mg/L	U	UJ	104951-003	SW846 9056	GEL
Anions	Sulfate	65.2	1.33	4	NE	mg/L			104951-008	SW846 9056	GEL
Dissolved Metals	Arsenic	ND	0.002	0.005	0.010	mg/L	U		104950-010	SW846 3005/6020	GEL
Dissolved Metals	Calcium	55.7	0.4	1	NE	mg/L			104950-010	SW846 3005/6020	GEL
Dissolved Metals	Iron	0.0619	0.033	0.1	NE	mg/L	J		104950-010	SW846 3005/6020	GEL
Dissolved Metals	Magnesium	17	0.01	0.03	NE	mg/L			104951-010	SW846 3005/6020	GEL
Dissolved Metals	Manganese	ND	0.001	0.005	NE	mg/L	U		104951-010	SW846 3005/6020	GEL
Dissolved Metals	Potassium	3.64	0.08	0.3	NE	mg/L			104950-010	SW846 3005/6020	GEL
Dissolved Metals	Sodium	47.6	0.08	0.25	NE	mg/L			104950-010	SW846 3005/6020	GEL
MEE	Ethane	ND	0.007	0.1	NE	µg/L	U	UJ	104958-001	AM20GAX	PACE
MEE	Ethene	ND	0.005	0.1	NE	µg/L	U	UJ	104957-001	AM20GAX	PACE
MEE	Methane	ND	0.02	0.5	NE	µg/L	U	UJ	104958-001	AM20GAX	PACE
Microbial	Dehalococcoides	ND	3000		NE	Enumeration/L	U		104964-001	Gene-Trac Dhc	SiREM
NPN	Nitrate plus nitrite as Nitrogen	4.1	0.17	0.5	10	mg/L			104950-007	EPA 353.2	GEL
Sulfide	Sulfide, Reactive	ND	500	500	NE	mg/L	<		104950-005	SW846 Chpt. 7.3.4-TI	GEL
TOC	Total Organic Carbon #1	0.61	0.33	1	NE	mg/L	J	1.0U	104950-004	SW846 9060A	GEL
TOC	Total Organic Carbon #2	0.477	0.33	1	NE	mg/L	J	1.0U	104951-004	SW846 9060A	GEL
TOC	Total Organic Carbon #3	0.569	0.33	1	NE	mg/L	J	1.0U	104950-004	SW846 9060A	GEL
TOC	Total Organic Carbon #4	0.532	0.33	1	NE	mg/L	J	1.0U	104950-004	SW846 9060A	GEL
TOC	Total Organic Carbon Average	0.481	0.33	1	NE	mg/L	J	1.0U	104951-004	SW846 9060A	GEL

Table III-5 (concluded)
Analytical Results of Groundwater Sampling at Wells TAV-INJ1, TAV-MW6, and TAV-MW7

Analyses	Analyte	Result ^a	MDL ^b	PQL ^c	MCL ^d	Units	Lab Qual ^e	Val Qual ^f	Sample No.	Analytical Method ^g	Lab ^h
TAV-MW7, 11-Jun-18											
Alkalinity	Alkalinity as CaCO ₃	230	1.45	4	NE	mg/L			105568-009	SM 2320B	GEL
Alkalinity	Alkalinity, bicarb as CaCO ₃	230	1.45	4	NE	mg/L			105568-009	SM 2320B	GEL
Alkalinity	Alkalinity, carb as CaCO ₃		1.45	4	NE	mg/L	U		105568-009	SM 2320B	GEL
Ammonia	Ammonia	0.0895	0.017	0.05	NE	mg/L	*B	J+	105568-002	EPA 350.1	GEL
Anions	Bromide	0.238	0.067	0.2	NE	mg/L			105568-008	SW846 9056	GEL
Anions	Chloride	29.1	0.335	1	NE	mg/L			105568-008	SW846 9056	GEL
Anions	Fluoride	1.11	0.033	0.1	4	mg/L			105568-008	SW846 9056	GEL
Anions	Nitrite	ND	0.033	0.1	1	mg/L	U		105568-006	SW846 9056	GEL
Anions	Orthophosphate as Phosphorus	ND	0.067	0.2	NE	mg/L	U		105568-003	SW846 9056	GEL
Anions	Sulfate	66.3	0.665	2	NE	mg/L			105568-008	SW846 9056	GEL
Dissolved Metals	Arsenic	ND	0.002	0.005	0.010	mg/L	U		105568-010	SW846 3005/6020	GEL
Dissolved Metals	Calcium	62.6	0.8	2	NE	mg/L			105568-010	SW846 3005/6020	GEL
Dissolved Metals	Iron	ND	0.033	0.1	NE	mg/L	U		105568-010	SW846 3005/6020	GEL
Dissolved Metals	Magnesium	19	0.01	0.03	NE	mg/L			105568-010	SW846 3005/6020	GEL
Dissolved Metals	Manganese	ND	0.001	0.005	NE	mg/L	U		105568-010	SW846 3005/6020	GEL
Dissolved Metals	Potassium	4.17	0.08	0.3	NE	mg/L			105568-010	SW846 3005/6020	GEL
Dissolved Metals	Sodium	60	0.8	2.5	NE	mg/L			105568-010	SW846 3005/6020	GEL
MEE	Ethane	ND	0.007	0.1	NE	µg/L	U	UJ	104958-001	AM20GAX	PACE
MEE	Ethene	ND	0.005	0.1	NE	µg/L	U	UJ	104957-001	AM20GAX	PACE
MEE	Methane	ND	0.02	0.5	NE	µg/L	U	UJ	104958-001	AM20GAX	PACE
Microbial	Dehalococcoides	ND	3000		NE	Enumeration/L	U		105580-001	Gene-Trac Dhc	SiREM
NPN	Nitrate plus nitrite as Nitrogen	3.93	0.17	0.5	10	mg/L			105568-007	EPA 353.2	GEL
Sulfide	Acid Soluble Sulfides	ND	1	2.5	NE	mg/L	U	UJ	105568-005	SW846 9030B/9034	GEL
TOC	Total Organic Carbon #1	ND	0.33	1	NE	mg/L	U		105568-004	SW846 9060A	GEL
TOC	Total Organic Carbon #2	ND	0.33	1	NE	mg/L	U		105568-004	SW846 9060A	GEL
TOC	Total Organic Carbon #3	ND	0.33	1	NE	mg/L	U		105568-004	SW846 9060A	GEL
TOC	Total Organic Carbon #4	ND	0.33	1	NE	mg/L	U		105568-004	SW846 9060A	GEL
TOC	Total Organic Carbon Average	ND	0.33	1	NE	mg/L	U		105568-004	SW846 9060A	GEL

Refer to general footnotes at the end of tables.

Table III-6
Field Water Quality Measurementsⁱ before Pilot Test Groundwater Sampling

Well ID	Sample Date	Temperature (°C)	Specific Conductivity (µmho/cm)	Oxidation Reduction Potential (mV)	pH	Turbidity (NTU)	Dissolved Oxygen (% Sat)	Dissolved Oxygen (mg/L)
TAV-INJ1	28-Nov-17	20.04	1535.8	-399.7	6.06	13.2	0.76	0.05
TAV-INJ1	29-Nov-17	19.79	891.3	-306.9	6.97	33.9	0.61	0.04
TAV-INJ1	1-Dec-17	18.87	636.2	-322.6	7.23	9.88	0.29	0.02
TAV-MW7	4-Dec-17	19.68	634.38	88.33	7.40	1.31	29.65	2.22
TAV-MW6	5-Dec-17	18.88	852.65	179.58	7.61	9.73	83.09	6.21
TAV-INJ1	6-Dec-17	19.81	1015.31	-258.32	7.34	4.05	0.46	0.03
TAV-INJ1	11-Dec-17	20.28	1529.3	-312.9	6.69	10.8	0.47	0.04
TAV-MW7	12-Dec-17	20.13	565.7	67.1	7.23	1.45	2.80	0.20
TAV-MW6	13-Dec-17	19.62	675.6	152.7	7.77	1.52	80.0	6.03
TAV-INJ1	19-Dec-17	19.75	1266.75	-263.49	6.78	2.00	0.412	0.031
TAV-MW7	2-Jan-18	20.00	624.0	106.9	7.54	2.22	3.12	0.23
TAV-MW6	3-Jan-18	19.20	680.0	24.2	7.47	1.89	83.6	6.4
TAV-INJ1	4-Jan-18	19.00	1300.4	-280.5	6.97	5.45	0.42	0.03
TAV-INJ1	9-Jan-18	20.30	1370.2	-307.9	6.51	4.06	0.54	0.04
TAV-INJ1	16-Jan-18	18.40	1118.4	-272.3	6.54	4.92	0.70	0.06
TAV-INJ1	23-Jan-18	19.94	1157.6	-272.7	6.29	6.02	0.73	0.05
TAV-MW7	29-Jan-18	20.26	554.3	-5.35	10.69	2.54	2.26	0.17
TAV-MW6	30-Jan-18	19.33	663.5	171.9	7.64	6.19	88.7	6.77
TAV-INJ1	31-Jan-18	19.98	1164.5	-293.9	6.68	8.45	0.11	0.01
TAV-MW7	26-Feb-18	20.30	648.13	131.18	7.07	3.19	3.23	0.229
TAV-MW6	27-Feb-18	20.78	701.93	198.13	7.15	1.83	95.3	6.71
TAV-INJ1	28-Feb-18	20.55	1027.45	-301.81	6.63	10.96	0.13	0.009
TAV-MW7	26-Mar-18	20.60	623.9	73.6	7.46	1.71	2.89	0.21
TAV-MW6	27-Mar-18	20.21	689.5	164.8	7.51	0.74	90.3	6.49
TAV-INJ1	28-Mar-18	19.07	921.4	-252.1	7.10	3.26	10.40	0.92
TAV-MW7	11-Jun-18	21.72	900.7	74.8	7.38	1.61	2.32	0.17
TAV-MW6	12-Jun-18	21.71	766.65	155.12	7.09	1.29	88.7	6.68
TAV-INJ1	13-Jun-18	22.49	906.16	-247.4	7.09	2.08	0.97	0.07

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Footnotes for Technical Area-V Pilot Test Analytical Results Tables

%	= Percent.
DO	= Dissolved oxygen.
EPA	= U.S. Environmental Protection Agency.
ID	= Identifier.
INJ	= Injection (acronym used for well identification only).
µg/L	= Micrograms per liter.
mg/L	= Milligrams per liter.
MEE	= Methane, ethane, ethene.
MW	= Monitoring well (acronym used for well identification only).
No.	= Number.
NPN	= Nitrate plus nitrite as nitrogen.
ORP	= Oxidation-reduction potential.
SC	= Specific conductivity.
TAV	= Technical Area-V (acronym used for well identification only).
TOC	= Total organic carbon.
VOC	= Volatile organic carbon.

^aResult

Detected VOCs are presented in the tables.

Bold = Value exceed the established MCL.

ND = Not detected (at method detection limit).

^bMDL

MDL = Method detection limit. The minimum concentration or activity that can be measured and reported with 99% confidence that the analyte is greater than zero, analyte is matrix specific.

^cPQL

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

^dMCL

MCL = Maximum contaminant level. 2018 Edition of the Drinking Water Standards and Health Advisories Tables, EPA 822-F-18-001, Office of Water, U.S. Environmental Protection Agency, Washington, DC, March 2018.

NE = Not established.

^eLab Qualifier

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

< = Less than value for flashpoint.

* = Recovery of relative percent difference (%RPD) not within acceptance limits and/or spike amount not compatible with the sample or the duplicate RPD's are not applicable where the concentration falls below the effective PQL.

B = The analyte was found in the blank above the effective MDL.

H = Analytical holding time was exceeded.

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

N = Results associated with a spike analysis that was outside control limits.

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

Footnotes for Technical Area-V Pilot Test Analytical Results Tables (Continued)

^fValidation Qualifier

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

- J = The associated value is an estimated quantity.
- J- = Estimated value with a suspected negative bias.
- J+ = Estimated value with a suspected positive bias.
- R = The data are unusable, and resampling or reanalysis are necessary for verification.
- U = The analyte was analyzed for but was not detected. The associated numerical value is the sample quantitation limit.
- UJ = The analyte was analyzed for but was not detected. The associated value is an estimate and may be inaccurate or imprecise.

^gAnalytical Method

AM20GAX = Proprietary method of Pace Analytical Energy Services LLC.

Gene-Trac Dhc = Proprietary method of SiREM.

Clesceri, Rice, Baird, and Eaton, 2012, *Standard Methods for the Examination of Water and Wastewater*, 22nd ed., Method 2320B, published jointly by American Public Health Association, American Water Works Association, and Water Environment Federation. Washington, D.C.

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EPA, 1984, "Methods for Chemical Analysis of Water and Wastes." EPA 600-4-79-020.

EPA, 1993, "Method 350.1, Determination of Ammonia Nitrogen by Semi-Automated Colorimetry." Revision 2.0.

EPA, 1993, "Method 353.2, Determination of Nitrate-Nitrite Nitrogen by Automated Colorimetry." Revision 2.0.

^hLab

GEL = GEL Laboratories LLC, 2040 Savage Rd, Charleston, SC 29407.

PACE = Pace Analytical Energy Services LLC, 220 William Pitt Way, Pittsburgh, PA 15238.

SiREM = SiREM, 130 Stone Rd. W, Guelph, Ontario, N1G 3Z2, Canada.

ⁱField Water Quality Measurements

Field measurements collected prior to sampling.

°C = Degrees Celsius.

% Sat = Percent saturation.

Gal = Gallon.

µS/cm = Microseimens per centimeter.

µmho/cm = Micromhos per centimeter.

mg/L = Milligrams per liter.

mV = Millivolts.

NTU = Nephelometric turbidity units.

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

