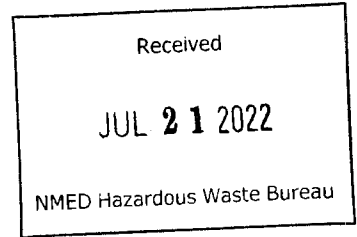




Department of Energy
National Nuclear Security Administration
Sandia Field Office
P.O. Box 5400
Albuquerque, NM 87185



JUL 19 2022



Mr. Rick Shean
Chief, Hazardous Waste Bureau
New Mexico Environment Department
2905 Rodeo Park Drive East, Bldg. 1
Santa Fe, New Mexico 87505

Subject: Submittal of Environmental Restoration Operations Consolidated Quarterly Report, July 2022, Referenced in the Resource Conservation and Recovery Act Facility Operating Permit for Sandia National Laboratories, New Mexico, Environmental Protection Agency Identification Number NM5890110518

Dear Mr. Shean:

The Department of Energy, National Nuclear Security Administration, Sandia Field Office, and National Technology & Engineering Solutions of Sandia, LLC, submit the Subject document dated July 2022. This report addresses all quarterly reporting from January 1 through March 31, 2022, in accordance with the Compliance Order on Consent for Sandia National Laboratories, New Mexico.

If you should have any questions, please contact me at (505) 845-6036 or Dr. Adria Bodour of our staff at (505) 845-6930, or adria.bodour@nnsa.doe.gov.

Sincerely,

Daryl J. Hauck, Ph.D.
Manager

cc's: Page 2

cc w/enclosure:

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NNSA-2022-005144

ENVIRONMENTAL RESTORATION OPERATIONS CONSOLIDATED
QUARTERLY REPORT, JULY 2022

CERTIFICATION STATEMENT

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

Paul E. Shoemaker Digitally signed by Paul E. Shoemaker
Date: 2022.07.07 15:58:51 -06'00'

Signature

Date

Paul E. Shoemaker
Defense Waste Management Programs
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Operator

and

Signature

Date

Daryl J. Hauck, Ph.D., Manager
U.S. Department of Energy
National Nuclear Security Administration
Sandia Field Office
Owner

7/19/2022

Sandia National Laboratories, New Mexico

Environmental Restoration Operations

A U.S. Department of Energy Environmental Cleanup Program

Consolidated Quarterly Report

January – March 2022



July 2022



United States Department of Energy
Sandia Field Office

Sandia National Laboratories is a multimission laboratory managed and operated by National Technology & Engineering Solutions of Sandia, LLC, a wholly owned subsidiary of Honeywell International Inc., for the U.S. Department of Energy's National Nuclear Security Administration under contract DE-NA-0003525.

CONSOLIDATED QUARTERLY REPORT

July 2022

SANDIA NATIONAL LABORATORIES, NEW MEXICO

ENVIRONMENTAL RESTORATION OPERATIONS

U.S. DEPARTMENT OF ENERGY: SANDIA FIELD OFFICE
CONTRACTOR: NATIONAL TECHNOLOGY AND
ENGINEERING SOLUTIONS OF SANDIA, LLC
PROJECT MANAGER: Michael D. Barthel

NUMBER OF POTENTIAL RELEASE SITES SUBJECT TO CORRECTIVE ACTION: 6

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

REPORTING PERIOD: January – March 2022

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-1 lists the six sites remaining in the corrective action process. This ER Quarterly Report presents activities and data as follows:

SECTION I: Environmental Restoration Operations Consolidated Quarterly Report, January – March 2022

SECTION II: Because there is no perchlorate sampling collection to report this quarter, this edition of the ER Quarterly Report does not include any analysis of data in Section II “Perchlorate Screening Quarterly Groundwater Monitoring Report.”

SECTION III: Additional Sampling at Technical Area-V Groundwater Monitoring Wells TAV-INJ1 and TAV-MW6, January – March 2022

ABBREVIATIONS AND ACRONYMS

µg/L	microgram(s) per liter
AGMR	Annual Groundwater Monitoring Report
AOC	Area of Concern
AVN	Area-V (North) (acronym used for well identification only)
BSG	Burn Site Groundwater
CCM	Current Conceptual Model
CME	Corrective Measures Evaluation
COC	constituent of concern
CY	Calendar Year
CYN	Canyons (acronym used for well identification only)
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
GWQB	Ground Water Quality Bureau
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
mg/L	milligrams per liter
MW	monitoring well (acronym used for well identification only)
NMED	New Mexico Environment Department
NNSA	National Nuclear Security Administration
NPN	nitrate plus nitrite
PGWS	Perched Groundwater System
SNL/NM	Sandia National Laboratories, New Mexico
SWMU	Solid Waste Management Unit
TA1-W	Technical Area-I (Well) (acronym used for well identification only)
TA2-W	Technical Area-II (Well) (acronym used for well identification only)TAG Tijeras Arroyo Groundwater
TAV	Technical Area-V (acronym used for well identification only)
TA-V	Technical Area-V
TAVG	Technical Area-V Groundwater
TCE	trichloroethene
TJA	Tijeras Arroyo (acronym used for well identification only)TSWP Treatability Study Work Plan
VOC	volatile organic compound

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SECTION I
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ENVIRONMENTAL RESTORATION OPERATIONS CONSOLIDATED QUARTERLY
REPORT, January– March 2022

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SECTION I

ENVIRONMENTAL RESTORATION OPERATIONS CONSOLIDATED

QUARTERLY REPORT, January – March 2022

1.0 Introduction

This Environmental Restoration Operations (ER) Consolidated Quarterly Report (ER Quarterly Report) provides the status of ongoing corrective action activities being implemented at Sandia National Laboratories, New Mexico (SNL/NM) during the January - March 2022 reporting period.

Table I-1 lists the Solid Waste Management Units (SWMUs) and Areas of Concern (AOCs) currently identified for corrective action at SNL/NM. This section of the ER Quarterly Report summarizes the work completed during this reporting period at sites undergoing corrective action. Corrective action activities were conducted during this reporting period at the three groundwater AOCs:

- Burn Site Groundwater (BSG) AOC,
- Technical Area-V (TA-V) Groundwater (TAVG) AOC, and
- Tijeras Arroyo Groundwater (TAG) AOC.

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 Technical Area-III.

There were no SWMUs or AOCs in the corrective action complete regulatory process during this reporting period. Corrective action complete status has been approved for all SWMUs within the surface boundaries of each of the three groundwater AOCs.

2.0 Environmental Restoration Operations Work Completed

The following subsections identify the constituents of concern (COCs), summarize the corrective action milestones, and describe the ER work completed during the January – March 2022 reporting period at the three groundwater AOCs.

2.1 **Sites Undergoing Corrective Action**

In a letter dated April 14, 2016, the New Mexico Environment Department (NMED) Hazardous Waste Bureau (HWB) defined the scope and milestones for corrective action at three groundwater AOCs (BSG AOC, TAVG AOC, and TAG AOC) (NMED April 2016). Sections I.2.1.1 through I.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 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 groundwater monitoring wells (NMED April 2004). The EPA MCL and State of New Mexico groundwater standard for nitrate (as nitrogen) is 10 milligrams per liter (mg/L). SNL/NM personnel are preparing a Current Conceptual Model (CCM) and Corrective Measures Evaluation (CME) Report for delivery to NMED HWB in 2023.

The following activities occurred at the BSG AOC during the January - March 2022 reporting period:

- No groundwater sampling was conducted at the BSG AOC groundwater monitoring wells during this reporting period. Table I-2 presents the identification and the sampling frequency for BSG AOC groundwater monitoring wells. The complete analytical results for Calendar Year (CY) 2022 groundwater monitoring will be presented in the SNL/NM CY 2022 Annual Groundwater Monitoring Report (AGMR), which is anticipated to be submitted to the NMED HWB in the summer of 2023.
- Aquifer slug tests were performed at groundwater monitoring wells CYN-MW16, CYN-MW17, CYN-MW18, and CYN-MW19 in March 2022. These four wells were installed during CY 2019 and the aquifer test analyses will be used to revise the CCM.

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 EPA MCLs in samples collected from monitoring wells (NMED April 2004). The EPA MCLs and the State of New Mexico groundwater standards for TCE and nitrate (as nitrogen) are 5 micrograms per liter ($\mu\text{g/L}$) and 10 mg/L, respectively.

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

To implement the ISB Treatability Study, SNL/NM personnel planned 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 TAV-MW6, TAV-MW10, and LWDS-MW1, respectively. The substrate solution containing essential food and nutrients for biostimulation was prepared in aboveground tanks. This substrate solution, along with the biodegradation bacteria, was gravity-injected to groundwater via the injection well.

The NMED HWB approved the Revised Treatability Study Work Plan (TSWP) (SNL/NM March 2016) in May 2016 (NMED May 2016). In accordance with the Revised TSWP, Phase I of the ISB Treatability Study included a pilot test, followed by a full-scale test at the first injection well (TAV-INJ1). If implemented, Phase II of the ISB Treatability Study would have included well installation and full-scale tests at the second and third injection wells (TAV-INJ2 and TAV-INJ3). The decision to install the Phase II injection wells would be dependent upon the findings of the Phase I full-scale test.

The NMED Ground Water Quality Bureau (GWQB) required a groundwater Discharge Permit (DP) for operation of the injection wells. The NMED GWQB issued DP-1845 to DOE/NNSA for the SNL/NM ISB Treatability Study injection wells on May 26, 2017 (NMED May 2017a). The term of DP-1845 is from May 30, 2017 to May 29, 2022. As required by DP-1845, DOE/NNSA and SNL/NM personnel submit separate quarterly reports to the NMED GWQB.

SNL/NM personnel started the Phase I Treatability Study at injection well TAV-INJ1 and monitoring well TAV-MW6 in November 2017 and completed the Phase I Treatability Study in May 2021. The operation and results of the Phase I Treatability Study were summarized in the Phase I Treatability Study Report to be submitted to the NMED HWB in April 2022.

In a multi-agency meeting held on September 23, 2020, DOE/NNSA, SNL/NM, and NMED HWB personnel jointly agreed that continuing to Phase II of the ISB Treatability Study was not warranted based on the results of the Phase I full-scale test. With the conclusion of the Phase I Treatability Study in May 2021, injection well TAV-INJ1 was re-designated as a groundwater monitoring well starting in the third quarter of CY 2021 (DOE August 2021; NMED October 2021). It became the 19th well of the TAVG monitoring network (18 active monitoring wells plus well TAV-INJ1). Well TAV-MW6 also reverted to the TAVG monitoring network from being the performance monitoring well for the Phase I Treatability Study (DOE August 2021; NMED October 2021).

DOE/NNSA and SNL/NM personnel proposed to continue quarterly monitoring of wells TAV-INJ1 and TAV-MW6 (i.e., treatment zone of the Phase I Treatability Study) for one year from July 2021 to June 2022 (DOE August 2021). These monitoring results will be incorporated in the future CME Report and support the NMED HWB's selection of a final remedy for the TAVG AOC Corrective Action. Monitoring results at these two wells continue to be presented in ER Quarterly Reports and submitted to the NMED HWB.

The following activities occurred at the TAVG AOC during the January - March 2022 reporting period:

- Groundwater sampling at wells TAV-INJ1 and TAV-MW6 was conducted on January 25 and 26, 2022, respectively. Section III of this ER Quarterly Report presents the monitoring results collected at these two wells for this reporting period.
- DOE/NNSA and SNL/NM personnel submitted the termination request for DP-1845 to the NMED GWQB in November 2021 (DOE November 2021). The NMED GWQB granted the termination request in February 2022 (NMED February 2022).
- Table I-2 presents the sampling frequency for the 19 wells currently in the TAVG monitoring network. Groundwater sampling was conducted at 12 wells in January and February 2022 for this reporting period. The analytical results for CY 2022 groundwater monitoring (other than the results for wells TAV-INJ1 and TAV-MW6 up to June 2022) will be presented in the SNL/NM CY 2022 AGMR, which is anticipated to be submitted to the NMED HWB in the summer of 2023.

2.1.3 Tijeras Arroyo Groundwater Area of Concern

Two COCs, nitrate and TCE, were identified for the TAG AOC (NMED April 2004). Nitrate was identified as a COC based on exceedances of the EPA MCL in samples

collected from monitoring wells completed in the Perched Groundwater System (PGWS) and in the Merging Zone above the Regional Aquifer. TCE was identified as a COC for only the PGWS. No TCE concentrations in Regional Aquifer samples have exceeded the EPA MCL. The EPA MCLs and State of New Mexico groundwater 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 CCM/ CME Report for the TAG AOC (SNL/NM December 2016), which was submitted to the NMED HWB on November 23, 2016 (DOE November 2016). This report was submitted in accordance with NMED’s “Summary of 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 the inclusion of additional information in a revised report. The Revised TAG CCM/CME Report was submitted to the NMED HWB on February 13, 2018 (SNL/NM February 2018).

The following activities occurred at the TAG AOC during the January - March 2022 reporting period:

- Groundwater sampling was conducted at 11 monitoring wells in February and March 2022. Table I-2 presents the CY 2022 sampling frequency for the TAG monitoring wells.
- Analytical results for the groundwater samples were consistent with historical trends.
- The complete analytical results for the CY 2022 groundwater monitoring will be presented in the SNL/NM CY 2022 AGMR, which is anticipated to be submitted to the NMED HWB in the summer of 2023.

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

There are currently no SWMUs or AOCs at SNL/NM in the corrective action complete regulatory process.

3.0 References

DOE, see U.S. Department of Energy.

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

New Mexico Environment Department (NMED), April 2016. Letter to J.P. Harrell (U.S. Department of Energy, NNSA/Sandia Field Office) and M. W. Hazen (Sandia National Laboratories, New Mexico), “Summary of Agreements and Proposed Milestones Pursuant to the Meeting of July 20, 2015, March 30, 2016, Sandia National Laboratories, EPA ID# NM5890110518, HWB-SNL-16-MISC,” NMED Hazardous Waste Bureau, Santa Fe, New Mexico. April 14, 2016.

New Mexico Environment Department (NMED), May 2016. Letter to J. Harrell (U.S. Department of Energy NNSA/Sandia Field Office) and P. Davies (Sandia National Laboratories, New Mexico), “Approval Revised Treatability Study Work Plan for In-Situ Bioremediation at the Technical Area-V Groundwater Area of Concern, Sandia National Laboratories, EPA ID# NM5890110518, HWB-SNL-15-020,” NMED Hazardous Waste Bureau, Santa Fe, New Mexico. May 10, 2016.

New Mexico Environment Department (NMED), May 2017a. “Ground Water Discharge Permit, Sandia National Laboratories/New Mexico, Discharge Permit-1845,” NMED Ground Water Quality Bureau, Santa Fe, New Mexico. May 26, 2017.

New Mexico Environment Department (NMED), May 2017b. Letter to J.P. Harrell (U.S. Department of Energy NNSA/Sandia Field Office) and Carol Adkins (Sandia National Laboratories), “Disapproval Tijeras Arroyo Groundwater Current Conceptual Model and Corrective Measures Evaluation Report, December 2016, Sandia National Laboratories [*sic*] New Mexico, EPA ID# NM5890110518, HWB-SNL-16-020,” NMED Hazardous Waste Bureau, Santa Fe, New Mexico. May 18, 2017.

New Mexico Environment Department (NMED), August 2021. Letter to J.P. Harrell (U.S. Department of Energy NNSA/Sandia Field Office) and P. Shoemaker (Sandia National Laboratories), “Approval: Annual Groundwater Monitoring Report, Calendar Year 2020, June 2021, Sandia National Laboratories, EPA ID# NM5890110518, HWB-SNL-21-009,” NMED Hazardous Waste Bureau, Santa Fe, New Mexico. August 16, 2021.

New Mexico Environment Department (NMED), October 2021. Letter to D. Hauck (U.S. Department of Energy NNSA/Sandia Field Office) and P. Shoemaker (Sandia National Laboratories), “Approval with Modification: Transition of Five Groundwater Monitoring Wells as Condition to Terminate Discharge Permit (DP)-1845 under the New Mexico Environment Department (NMED) Ground Water Quality Bureau (GWQB) to NMED Hazardous Waste Bureau (HWB), Sandia National Laboratories, New Mexico, EPA ID# NM5890110518, HWB-SNL-21-MISC,” NMED Hazardous Waste Bureau, Santa Fe, New Mexico. October 12, 2021.

New Mexico Environment Department (NMED), November 2021. Letter to D. Hauck (U.S. Department of Energy NNSA/Sandia Field Office), “Response to Request for Transition of Five Groundwater Monitoring Wells under Discharge Permit 1845 from NMED Ground Water Quality Bureau to NMED Hazardous Waste Bureau,” NMED Ground Water Quality Bureau, Santa Fe, New Mexico. November 8, 2021.

New Mexico Environment Department (NMED), February 2022. Letter to D. Hauck (U.S. Department of Energy NNSA/Sandia Field Office), “Termination of Discharge Permit, DP-1845, Sandia National Laboratories/New Mexico Technical Area-V Groundwater Remediation Treatability Study,” NMED Ground Water Quality Bureau, Santa Fe, New Mexico. February 4, 2022.

NMED, see New Mexico Environment Department.

Sandia National Laboratories, New Mexico (SNL/NM), March 2016. *Revised Treatability Study Work Plan for In-Situ Bioremediation at the Technical Area-V Groundwater Area of Concern, Sandia National Laboratories, Albuquerque, New Mexico*, Environmental Restoration Operations, Sandia National Laboratories, Albuquerque, New Mexico.

Sandia National Laboratories, New Mexico (SNL/NM), December 2016. *Tijeras Arroyo Groundwater Current Conceptual Model and Corrective Measures Evaluation Report*, Environmental Restoration Operations, Sandia National Laboratories, Albuquerque, New Mexico.

Sandia National Laboratories, New Mexico (SNL/NM), February 2018. *Revised Tijeras Arroyo Groundwater Current Conceptual Model and Corrective Measures Evaluation Report*, Environmental Restoration Operations, Sandia National Laboratories, Albuquerque, New Mexico.

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

U.S. Department of Energy (DOE), November 2016. Letter to J.E. Kieling (New Mexico Environment Department), “Tijeras Arroyo Groundwater Current Conceptual Model and Corrective Measures Evaluation Report, December 2016.” November 23, 2016.

U.S. Department of Energy (DOE), August 2021. Letter to R. Maestas (New Mexico Environment Department), “Transition of Five Groundwater Monitoring Wells as Condition to Terminate Discharge Permit (DP)-1845 under New Mexico Environment Department (NMED) Ground Water Quality Bureau (GWQB) to NMED Hazardous Waste (HWB).” August 23, 2021.

U.S. Department of Energy (DOE), November 2021. Letter to A. Romero (New Mexico Environment Department), “Request to New Mexico Environment Department (NMED) Ground Water Quality Bureau (GWQB) to Terminate Discharge Permit (DP)-1845, U.S. Department of Energy, National Nuclear Security Administration, Sandia Field Office, Albuquerque, New Mexico.” November 18, 2021.

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Tables

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

Solid Waste Management Units and Areas of Concern	
Site Number	Site Description
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)

Notes:

- AOC = Area of Concern.
- BSG = Burn Site Groundwater.
- NA = Not applicable. A site number was not assigned.
- TAG = Tijeras Arroyo Groundwater.
- TA-V = Technical Area-V.
- TAVG = Technical Area-V Groundwater.

**Table I-2
Groundwater Sampling and Analysis ^a**

Investigation Site	Sampling Frequency in CY 2022	Quarter of Sampling in CY 2022	Monitoring Wells in Network
TAVG AOC	Quarterly	1,2,3,4	LWDS-MW1, TAV-INJ1, TAV-MW2, TAV-MW4, TAV-MW6, TAV-MW8, TAV-MW10, TAV-MW11, TAV-MW12, TAV-MW14, TAV-MW15, TAV-MW16
	Semiannually	2,4	TAV-MW7
	Annually	2	AVN-1, LWDS-MW2, TAV-MW3, TAV-MW5, TAV-MW9, TAV-MW13
BSG AOC	Semiannually	2,4	CYN-MW4, CYN-MW7, CYN-MW8, CYN-MW9, CYN-MW10, CYN-MW11, CYN-MW12, CYN-MW13, CYN-MW14A, CYN-MW15, CYN-MW16, CYN-MW17, CYN-MW18, CYN-MW19
TAG AOC ^b	Quarterly	1,2,3,4	TA2-W-19, TA2-W-26, TA2-W-28, TJA-2, TJA-3, TJA-4, TJA-7
	Semiannually	1,3	TA1-W-06, TA2-W-01, TA2-W-27, TJA-6
	Annually	3	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
	Voluntarily	3	TA2-W-24, TA2-W-25, TJA-5

Notes:

^a All analytical results will be presented in subsequent Annual Groundwater Monitoring Reports, except for wells TAV-INJ1 and TAV-MW6. Results of these two wells will be presented in ER Quarterly Reports.

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

- AOC = Area of Concern.
- AVN = Area-V (North) (acronym used for well identification only).
- BSG = Burn Site Groundwater (Area of Concern).
- CY = Calendar Year.
- CYN = Canyons (Burn Site Groundwater Area of Concern; acronym used for well identification only).
- ER Quarterly Report = Environmental Restoration Operations Consolidated Quarterly Report
- HWB = Hazardous Waste Bureau.
- INJ = Injection well (acronym used for well identification only).
- LWDS = Liquid waste disposal system (acronym used for well identification only).
- MW = Monitoring well (acronym used for well identification only).
- NMED = New Mexico Environment Department.
- PGS = Parade Ground South (acronym used for well identification only).
- TA1-W = Technical Area-I (Well) (acronym used for well identification only).
- TA2-NW = Technical Area-II (Northwest) (acronym used for well identification only).
- TA2-W = Technical Area-II (Well) (acronym used for well identification only).
- 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).

SECTION II
PERCHLORATE SCREENING QUARTERLY GROUNDWATER MONITORING
REPORT, January – March 2022

Currently there are no wells in the perchlorate groundwater sampling and analysis program. Therefore, this edition of the Environmental Restoration Operations Consolidated Quarterly Report does not include any analysis of data in this section. When new groundwater monitoring wells are installed in the future, they will require perchlorate monitoring and the corresponding analytical results will be reported in subsequent Environmental Restoration Operations Consolidated Quarterly Reports.

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SECTION III
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APPENDIX

Appendix A	Letter from DOE/NNSA SFO to NMED HWB dated August 23, 2021
	Letter from NMED HWB to DOE/NNSA SFO and SNL/NM dated October 12, 2021

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SECTION III

ADDITIONAL SAMPLING AT TECHNICAL AREA-V GROUNDWATER MONITORING WELLS TAV-INJ1 AND TAV-MW6, January – March 2022

1.0 Background

Sandia National Laboratories, New Mexico (SNL/NM) personnel have completed Phase I of a Treatability Study of in-situ bioremediation (ISB) to address the groundwater contamination by nitrate and trichloroethene (TCE) at the Technical Area-V Groundwater (TAVG) Area of Concern (AOC). Based on the results of the Phase I Treatability Study, it was jointly determined by SNL/NM, U.S. Department of Energy/National Nuclear Security Administration (DOE/NNSA), and New Mexico Environment Department (NMED) Hazardous Waste Bureau (HWB) personnel that continuing to Phase II of the ISB Treatability Study is not warranted in a multi-agency meeting held on September 23, 2020. Therefore, Phase II of the ISB Treatability Study will not be implemented.

In a letter dated August 23, 2021 to the NMED HWB, the DOE/NNSA and SNL/NM personnel proposed to continue quarterly monitoring of wells TAV-INJ1 and TAV-MW6 (i.e., the injection well and the performance monitoring well of the Phase I Treatability Study) for one year from July 2021 to June 2022 (DOE August 2021). These monitoring results will be incorporated in the future Corrective Measures Evaluation Report and support the NMED HWB's selection of a final remedy for the TAVG AOC Corrective Action. The NMED HWB subsequently approved (with modification) the sampling plan for wells TAV-INJ1 and TAV-MW6 (NMED October 2021). Appendix A provides a copy of the DOE/NNSA's letter and the NMED HWB's approval with modification.

This Section III of the Environmental Restoration Operations (ER) Consolidated Quarterly Report (ER Quarterly Report) presents the monitoring results at wells TAV-INJ1 and TAV-MW6 for the January – March 2022 reporting period. Groundwater sampling was conducted by SNL/NM Long-Term Stewardship personnel as part of the TAVG AOC investigation.

2.0 **Groundwater Sampling at Wells TAV-INJ1 and TAV-MW6**

As the Phase I Treatability Study concluded, injection well TAV-INJ1 was re-designated as a groundwater monitoring well and well TAV-MW6 reverted to the TAVG monitoring network (Appendix A). Well TAV-MW6 is located approximately 50 feet from well TAV-INJ1 and served as the monitoring well for evaluating the effectiveness of ISB in the Phase I treatment zone. Currently, these two wells are monitored on a quarterly schedule for one year (July 2021 to June 2022) to support the Corrective Measures Evaluation for the TAVG AOC. Monitoring results of these two wells continue to be presented in Section III of the ER Quarterly Reports. A decision will be made after this one-year sampling period about whether to discontinue collecting this data. This one-year quarterly sampling at wells TAV-INJ1 and TAV-MW6 includes the following analytical parameters (Appendix A):

- Alkalinity (total, bicarbonate, and carbonate)
- Ammonia (as nitrogen)
- Anions (bromide, chloride, and sulfate)
- Dissolved metals (arsenic, iron, and manganese)
- Methane, ethene, and ethane
- Nitrate plus nitrite (NPN) as nitrogen
- Total organic carbon
- Volatile organic compounds

In addition, the analytical parameters that are currently monitored at all groundwater wells in the TAVG monitoring network on an annual basis are also sampled at these two wells: alkalinity, anions (bromide, chloride, fluoride, and sulfate), gamma spectroscopy short-list (americium-241, cesium-137, cobalt-60, and potassium-40), gross alpha/beta activity, tritium, and Target Analyte List metals plus total uranium (Appendix A). These annual parameters are scheduled to be sampled in the April – June 2022 reporting period.

The sampling protocol at well TAV-INJ1 was described in more detail in Section III of previous ER Quarterly Reports (e.g., in 2019). SNL/NM personnel used a bailer to remove groundwater on the day before sampling to prevent sediment from clogging the sampling pump, allowed the well to recharge overnight, and collected samples the next day. The sampling protocol at well TAV-MW6 follows the standard field operating procedures adopted by SNL/NM Long-Term Stewardship personnel.

Groundwater sampling at wells TAV-INJ1 and TAV-MW6 was conducted on January 25 and 26, 2022, respectively. Before each well was sampled, field water quality parameters were collected using an aboveground Aqua TROLL[®] 600 multi-parameter sonde. Tables III-1 and III-2 present the analytical results at wells TAV-INJ1 and TAV-MW6, respectively, for the January – March 2022 reporting period. Table III-3 summarizes the stabilized field water quality parameters measured immediately before sample collection at each well. Concentration profiles for the additional one-year sampling (July 2021 to June 2022) at wells TAV-INJ1 and TAV-MW6 will be generated at the end of this one-year sampling period.

2.1 **Groundwater Sampling Results at Well TAV-INJ1**

Results in Table III-1 show that for the January – March 2022 reporting period at well TAV-INJ1:

- The two constituents of concern at the TAVG AOC, nitrate (analyzed as NPN) and TCE, were not detected. Note that NPN concentration is representative of nitrate concentration because historical groundwater sampling results have demonstrated that nitrite concentration is negligible in the groundwater at TA-V.
- Bromide was the inert tracer that was used as part of the treatment solution in the Phase I Treatability Study. Its concentration was 17.1 milligrams per liter (mg/L), comparable to 17.9 mg/L measured in November 2021 (SNL/NM April 2022).
- Arsenic concentration was 0.0236 mg/L and continued to exceed the U.S. Environmental Protection Agency maximum contaminant level of 0.010 mg/L.
- Methane concentration remained high at 10,000 micrograms per liter (µg/L), comparable to 12,000 µg/L measured in November 2021 (SNL/NM April 2022).
- Ethane was detected at an estimated concentration (J-qualified) of 0.48 µg/L.

There was no concentration rebound of either nitrate or TCE at well TAV-INJ1. The bromide concentration at well TAV-INJ1, although decreased slightly from last quarterly sampling, has not shown significant effect from natural advection, dispersion, and diffusion forces in the saturated zone. The elevated arsenic concentration was the result of the ISB process where anaerobic and reduced conditions were generated in the aquifer, which is only in the vicinity of well TAV-INJ1. The level of methane remained high, indicating sustained methanogenic conditions at well TAV-INJ1. Small but consistent amounts of ethane production suggest complete dechlorination is occurring at well TAV-INJ1.

2.2 Groundwater Sampling Results at Well TAV-MW6

Results in Table III-2 show that for the January – March 2022 reporting period at well TAV-MW6:

- There was no significant change in the concentrations of nitrate (analyzed as NPN) and TCE, compared to results from the previous quarter (SNL/NM April 2022), with TCE staying above the U.S. Environmental Protection Agency maximum contaminant level of 5 µg/L.
- Bromide concentration remained at the baseline level (approximately 1 mg/L).
- Methane concentration was estimated (J-qualified) at 48 µg/L, decreased from 88 µg/L measured in December 2021 (SNL/NM April 2022).

Dechlorination is not occurring at well TAV-MW6 and the concentration of TCE remains unchanged. The bromide concentration at well TAV-MW6 decreased to the baseline level of approximately 1 mg/L since April 2020. Although low levels of methane have been measured at well TAV-MW6, methane was not produced at this well, as indicated by the water quality parameters (Table III-3). Rather, methane could have migrated to well TAV-MW6 from the injection well or from small pockets of methanogenic zones that formed between these two wells.

3.0 **References**

DOE, see U.S. Department of Energy.

New Mexico Environment Department (NMED), October 2021. Letter to D. Hauck (U.S. Department of Energy NNSA/Sandia Field Office) and P. Shoemaker (Sandia National Laboratories), “Approval with Modification: Transition of Five Groundwater Monitoring Wells as Condition to Terminate Discharge Permit (DP)-1845 under the New Mexico Environment Department (NMED) Ground Water Quality Bureau (GWQB) to NMED Hazardous Waste Bureau (HWB), Sandia National Laboratories, New Mexico, EPA ID# NM5890110518, HWB-SNL-21-MISC,” NMED Hazardous Waste Bureau, Santa Fe, New Mexico. October 12, 2021.

Sandia National Laboratories, New Mexico (SNL/NM), April 2022. *Environmental Restoration Operations Consolidated Quarterly Report October – December 2021*, Sandia National Laboratories, Albuquerque, New Mexico, Environmental Restoration Operations, Sandia National Laboratories, Albuquerque, New Mexico.

U.S. Department of Energy (DOE), August 2021. Letter to R. Maestas (New Mexico Environment Department), “Transition of Five Groundwater Monitoring Wells as Condition to Terminate Discharge Permit (DP)-1845 under New Mexico Environment Department (NMED) Ground Water Quality Bureau (GQWB) to NMED Hazardous Waste Bureau (HWB).” August 23, 2021.

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Tables

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Table III-1
Analytical Results for Groundwater Samples Collected at Well TAV-INJ1, January – March 2022

Sample Date	Analyses	Analyte	Result ^a	MDL ^b	PQL ^c	MCL ^d	Units	Lab Qual ^e	Val Qual ^f	Sample No.	Analytical Method ^g	Lab ^h
25-Jan-22	Alkalinity	Alkalinity as CaCO ₃	974	1.45	4	NE	mg/L			116639-005	SM 2320B	GEL
25-Jan-22	Alkalinity	Alkalinity, bicarb as CaCO ₃	974	1.45	4	NE	mg/L			116639-005	SM 2320B	GEL
25-Jan-22	Alkalinity	Alkalinity, carb as CaCO ₃	ND	1.45	4	NE	mg/L	U		116639-005	SM 2320B	GEL
25-Jan-22	Ammonia	Ammonia	35.8	0.425	1.25	NE	mg/L	B		116639-001	EPA 350.1	GEL
25-Jan-22	Anions	Bromide	17.1	0.67	2	NE	mg/L			116639-003	SW846 9056A	GEL
25-Jan-22	Anions	Chloride	27.2	0.335	1	NE	mg/L			116639-003	SW846 9056A	GEL
25-Jan-22	Anions	Sulfate	25.6	0.665	2	NE	mg/L			116639-003	SW846 9056A	GEL
25-Jan-22	Dissolved Metals	Arsenic	0.0236	0.002	0.005	0.01	mg/L			116639-006	SW846 3005A/6020B	GEL
25-Jan-22	Dissolved Metals	Iron	1.52	0.033	0.1	NE	mg/L			116639-006	SW846 3005A/6020B	GEL
25-Jan-22	Dissolved Metals	Manganese	1.19	0.02	0.1	NE	mg/L		J	116639-006	SW846 3005A/6020B	GEL
25-Jan-22	MEE	Methane	10000	2	5	NE	µg/L		J	116642-001	AM20GAX	PACE-GC
25-Jan-22	MEE	Ethane	0.48	0.17	1	NE	µg/L	J	J	116642-001	AM20GAX	PACE-GC
25-Jan-22	MEE	Ethene	ND	0.24	1	NE	µg/L	U	UJ	116642-001	AM20GAX	PACE-GC
25-Jan-22	NPN	Nitrate plus nitrite as N	ND	0.17	0.5	10	mg/L	U		116639-004	EPA 353.2	GEL
25-Jan-22	TOC	Total Organic Carbon Average	5.67	0.33	1	NE	mg/L			116639-002	SW846 9060A	GEL
25-Jan-22	VOC	Dichloroethene, cis-1,2-	ND	0.333	1	70	µg/L	U		116637-001	SW846 8260D	GEL
25-Jan-22	VOC	Trichloroethene	ND	0.333	1	5	µg/L	U		116637-001	SW846 8260D	GEL

Note: Header nomenclature is explained in the "Footnotes for Analytical Results Tables" following Table III-3.

**Table III-2
Analytical Results for Groundwater Samples Collected at Well TAV-MW6, January – March 2022**

Sample Date	Analyses	Analyte	Result ^a	MDL ^b	PQL ^c	MCL ^d	Units	Lab Qual ^e	Val Qual ^f	Sample No.	Analytical Method ^g	Lab ^h
26-Jan-22	Alkalinity	Alkalinity as CaCO ₃	200	1.45	4	NE	mg/L			116640-006	SM 2320B	GEL
26-Jan-22	Alkalinity	Alkalinity, bicarb as CaCO ₃	200	1.45	4	NE	mg/L			116640-006	SM 2320B	GEL
26-Jan-22	Alkalinity	Alkalinity, carb as CaCO ₃	ND	1.45	4	NE	mg/L	U		116640-006	SM 2320B	GEL
26-Jan-22	Ammonia	Ammonia	ND	0.017	0.05	NE	mg/L	U	UJ	116640-002	EPA 350.1	GEL
26-Jan-22	Anions	Bromide	0.892	0.067	0.2	NE	mg/L			116640-004	SW846 9056A	GEL
26-Jan-22	Anions	Chloride	88.2	1.34	4	NE	mg/L			116640-004	SW846 9056A	GEL
26-Jan-22	Anions	Sulfate	39.9	2.66	8	NE	mg/L			116640-004	SW846 9056A	GEL
26-Jan-22	Dissolved Metals	Arsenic	ND	0.002	0.005	0.01	mg/L	U		116640-007	SW846 3005A/6020B	GEL
26-Jan-22	Dissolved Metals	Iron	ND	0.033	0.1	NE	mg/L	U		116640-007	SW846 3005A/6020B	GEL
26-Jan-22	Dissolved Metals	Manganese	0.00658	0.001	0.005	NE	mg/L		J	116640-007	SW846 3005A/6020B	GEL
26-Jan-22	MEE	Methane	48	2	5	NE	µg/L		J	116643-001	AM20GAX	PACE-GC
26-Jan-22	MEE	Ethane	ND	0.17	1	NE	µg/L	U	UJ	116643-001	AM20GAX	PACE-GC
26-Jan-22	MEE	Ethene	ND	0.24	1	NE	µg/L	U	UJ	116643-001	AM20GAX	PACE-GC
26-Jan-22	NPN	Nitrate plus nitrite as N	5.25	0.17	0.5	10	mg/L			116640-005	EPA 353.2	GEL
26-Jan-22	TOC	Total Organic Carbon Average	0.778	0.33	1	NE	mg/L	J		116640-003	SW846 9060A	GEL
26-Jan-22	VOC	Dichloroethene, cis-1,2-	1.11	0.333	1	70	µg/L			116640-001	SW846 8260D	GEL
26-Jan-22	VOC	Trichloroethene	9.58	0.333	1	5	µg/L			116640-001	SW846 8260D	GEL

Note: Header nomenclature is explained in the "Footnotes for Analytical Results Tables" following Table III-3.

**Table III-3
Field Water Quality Measurementsⁱ, January – March 2022**

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	25-Jan-22	19.16	1730.37	-160.2	6.90	10.5	11.74	0.82
TAV-MW6	26-Jan-22	17.98	700.42	59.1	7.52	0.69	29.20	2.13

Note: Header nomenclature is explained in the "Footnotes for Analytical Results Tables" following Table III-3.

Footnotes for Analytical Results Tables

%	= Percent.
CaCO ₃	= Calcium carbonate.
EPA	= U.S. Environmental Protection Agency.
ID	= Identifier.
INJ	= Injection well (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.
TAV	= Technical Area-V (acronym used for well identification only).
TOC	= Total organic carbon.
VOC	= Volatile organic compound.

^aResult

Detected VOCs are presented in the tables.

Bold	= Concentration exceeds the EPA MCL.
ND	= Not detected (at MDL).

^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.
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^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.
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^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, D.C., March 2018.
-----	--

NE	= Not established.
----	--------------------

^eLab Qualifier

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

B	= The analyte was found in the blank above the effective MCL.
J	= Estimated value, the analyte concentration fell above the MDL and below the PQL.
U	= Analyte is absent or below the MDL.

Footnotes for Analytical Results Tables (Concluded)

^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.

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 Services, LLC.

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.

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

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

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 Road, Charleston, South Carolina 29407.

PACE-GC = Pace Analytical Gulf Coast, 7979 Innovation Park Drive, Baton Rouge, Louisiana 70820.

ⁱField Water Quality Measurements

Field measurements collected prior to sampling.

°C = Degrees Celsius.

% Sat = Percent saturation.

µmho/cm = Micromhos per centimeter.

mg/L = Milligrams per liter.

mV = Millivolts.

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

NTU = Nephelometric turbidity units.

Appendix A

Letter from DOE/NNSA SFO to NMED HWB, dated August 23, 2021; Subject: *Transition of Five Groundwater Monitoring Wells as Condition to Terminate Discharge Permit (DP)-1845 under New Mexico Environment Department (NMED) Ground Water Quality Bureau (GWQB) to NMED Hazardous Waste (HWB).*

Letter from NMED HWB to DOE/NNSA SFO and SNL/NM, dated October 12, 2021; Subject: *Approval with Modification, Transition of Five Groundwater Monitoring Wells as Condition to Terminate Discharge Permit (DP)-1845 under New Mexico Environment Department (NMED) Ground Water Quality Bureau (GWQB) to NMED Hazardous Waste Bureau (HWB).*



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



AUG 23 2021

Mr. Ricardo Maestas
Acting Chief, Hazardous Waste Bureau
New Mexico Environment Department
2905 Rodeo Park Drive East, Bldg. 1
Santa Fe, New Mexico 87505

Subject: Transition of Five Groundwater Monitoring Wells as Condition to Terminate Discharge Permit (DP)-1845 under New Mexico Environment Department (NMED) Ground Water Quality Bureau (GQWB) to NMED Hazardous Waste Bureau (HWB)

Dear Mr. Maestas:

On June 29, 2021, the Department of Energy, National Nuclear Security Administration (DOE/NNSA), Sandia Field Office (SFO) convened a virtual meeting with personnel from the Sandia National Laboratories, New Mexico (SNL/NM) and the NMED GQWB to discuss a proposal for terminating DP-1845. NMED GWQB agreed with the DOE/NNSA SFO proposal to submit a termination request for DP-1845 with the condition that regulatory oversight of the five groundwater wells monitored under DP-1845 will be transitioned to NMED HWB. DOE/NNSA SFO and SNL/NM personnel hereby request that NMED HWB provide regulatory oversight of the five groundwater monitoring wells, for reasons contained herein.

NMED GWQB issued DP-1845 to DOE/NNSA SFO for discharges via up to three Class V underground injection control wells in a phased In-Situ Bioremediation (ISB) Treatability Study at the SNL/NM Technical Area-V (TA-V) Groundwater (TAVG) Area of Concern (AOC). The term of DP-1845 is from May 30, 2017, to May 29, 2022.

SNL/NM personnel have completed Phase I of the Treatability Study using injection well TAV-INJ1. Based on the Phase I Treatability Study results, DOE/NNSA SFO, SNL/NM, and NMED HWB personnel have jointly agreed that continuing to Phase II of the Treatability Study is not warranted. Consequently, the ISB Treatability Study at TAVG AOC concluded in May 2021.

The five groundwater wells monitored under DP-1845 are: TAV-INJ1, TAV-MW6, TAV-MW7, TAV-MW10, and LWDS-MW1. Injection well TAV-INJ1 was installed to deliver bioremediation treatment solution to the aquifer during the Phase I Treatability Study. The other four wells were preexisting wells in the TAVG monitoring network. Figure 1 shows the locations of the five wells monitored under DP-1845 and the other TAVG AOC monitoring wells. Injection well TAV-INJ1 and monitoring wells TAV-MW6 and TAV-MW7 represent the Phase I treatment zone. The well screens of both TAV-INJ1 and TAV-MW6 are across the water table, whereas the midpoint of TAV-MW7 well screen is 90 feet below the water table. Wells TAV-MW10 and LWDS-MW1 were the nearest monitoring points outside the Phase I treatment zone and were the planned locations for the proposed Phase II treatment zones.

In the Phase I Treatability Study, discharges of the treatment solution were completed in April 2019 and the five wells were monitored for two years from May 2019 to May 2021. DP-1845 requires only quarterly sampling of these wells. However, per the monitoring requirements of the Revised Treatability Study Work Plan approved by NMED HWB, from May 2019 to May 2021, wells TAV-INJ1 and TAV-MW6 were sampled monthly for three months followed by quarterly sampling, totaling ten sampling events per well; and wells TAV-MW7, TAV-MW10, and LWDS-MW1 were sampled quarterly, totaling nine sampling events per well. Groundwater monitoring results at these five wells have been provided in the DP-1845 Quarterly Reports to NMED GWQB as well as in Section III of the Environmental Restoration Consolidated Quarterly Reports to NMED HWB.

As the Phase I Treatability Study has concluded and the decision has been made not to conduct the Phase II Treatability Study, DOE/NNSA SFO and SNL/NM personnel request that NMED HWB provide regulatory oversight of the five wells monitored under DP-1845 with the following sampling plan.

- Groundwater monitoring results at wells TAV-MW7, TAV-MW10, and LWDS-MW1 have been consistent with historical values, indicating no impact on groundwater chemistry at these wells during the Phase I Treatability Study. Therefore, these three wells can be reverted to the TAVG monitoring network. They will be monitored for the same parameters as the other TAVG wells and on the same schedule as before the Treatability Study. Specifically, well TA-MW7 will resume the semiannual monitoring schedule and wells TAV-MW10 and LWDS-MW1 will resume the quarterly monitoring schedule. Results of all TAVG wells will be provided in the Annual Groundwater Monitoring Reports.
- DOE/NNSA SFO and SNL/NM personnel propose continued quarterly monitoring of the Phase I treatment wells TAV-INJ1 and TAV-MW6 for one year ending June 2022. The parameters proposed for this one-year monitoring will be the same as those for the Phase I Treatability Study, except for discontinuing monitoring for *Dehalococcoides*. The parameter list includes volatile organic compounds, ammonia, total organic carbon, anions (bromide, chloride, and sulfate), nitrate plus nitrite, alkalinity, dissolved metals (arsenic, iron, and manganese), methane, ethane, and ethene. The discontinuation of *Dehalococcoides* analysis is based on non-detection since October 2019 in well TAV-INJ1 and non-detection in well TAV-MW6 for the entire Phase I Treatability Study. The new monitoring data will be incorporated into the forthcoming Corrective Measures Evaluation Report and further support the NMED HWB selection of a final remedy for the TAVG AOC Corrective Action. Results of wells TAV-INJ1 and TAV-MW6 will continue to be provided in Section III of the Environmental Restoration Consolidated Quarterly Reports.

In summary, DOE/NNSA SFO and SNL/NM personnel request that NMED HWB provide regulatory oversight of the five wells monitored under DP-1845 (TAV-INJ1, TAV-MW6, TAV-MW7, TAV-MW10, and LWDS-MW1) with the proposed sampling plan, as described above. DOE/NNSA SFO will follow the NMED GWQB requirements to terminate DP-1845 and will continue to update NMED HWB on the progress of the termination process.

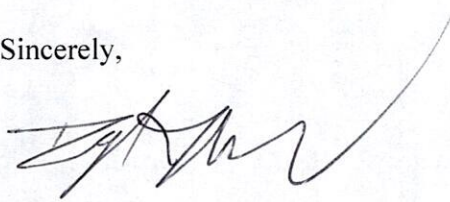
AUG 23 2021

Mr. Ricardo Maestas

3

If you have any questions, please contact me at (505) 845-6036, or have your staff contact Dr. Adria Bodour of our staff at (505) 845-6930 or adria.bodour@nnsa.doe.gov.

Sincerely,



Daryl J. Hauck, Ph.D.
Manager

cc w/enclosure:

Christopher (Chris) Catechis
NMED DOE OB

121 Tijeras Avenue, NE, Suite 1000, Albuquerque, New Mexico 87102

Naomi Davidson

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NNSA-2021-003763

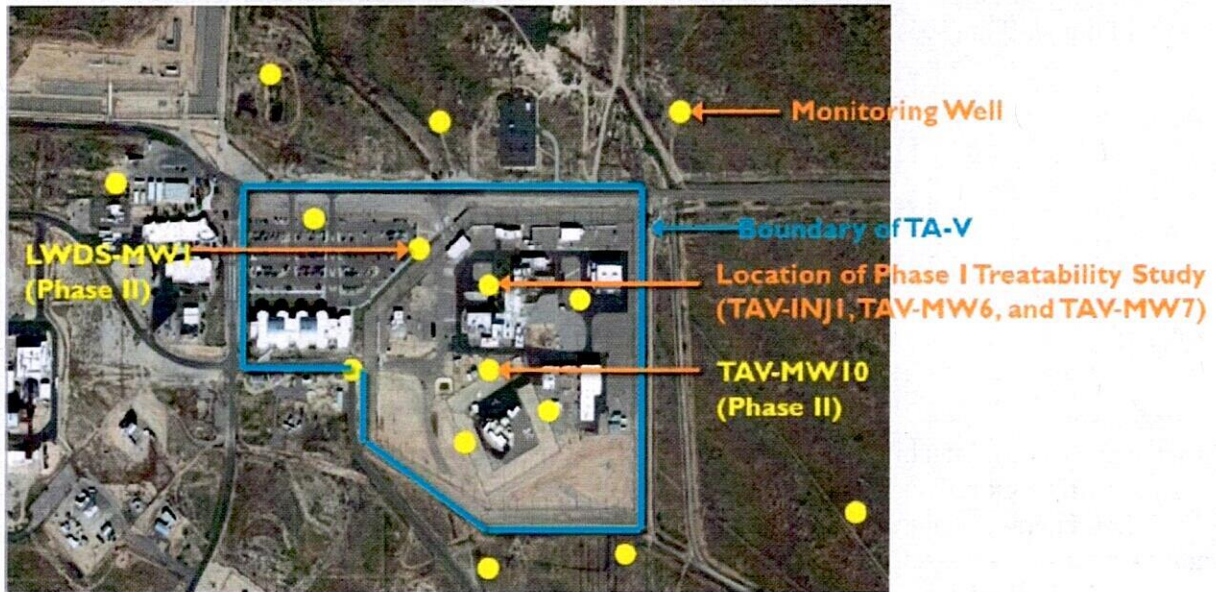


Figure 1. Locations of the Five Wells Monitored under DP-1845. Yellow dots represent the approximately locations of the wells in the TAVG monitoring network.



MICHELLE LUJAN GRISHAM
GOVERNOR

JAMES C. KENNEY
CABINET SECRETARY

Certified Mail - Return Receipt Requested

October 12, 2021

Daryl Hauck
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Paul Shoemaker
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**RE: APPROVAL WITH MODIFICATION
TRANSITION OF FIVE GROUNDWATER MONITORING WELLS AS CONDITION TO
TERMINATE DISCHARGE PERMIT (DP)-1845 UNDER THE NEW MEXICO ENVIRONMENT
DEPARTMENT (NMED) GROUND WATER QUALITY BUREAU (GWQB) TO NMED
HAZARDOUS WASTE BUREAU (HWB)
SANDIA NATIONAL LABORATORIES, NEW MEXICO
EPA ID#NM5890110518
HWB-SNL-21-MISC**

Dear Messrs. Hauck and Shoemaker,

The New Mexico Environment Department (NMED) received the August 23, 2021 dated letter titled *Transition of Five Groundwater Monitoring Wells as Condition to Terminate Discharge Permit (DP)-1845 under the New Mexico Environment Department (NMED) Ground Water Quality Bureau (GWQB) to NMED Hazardous Waste Bureau (HWB)*, submitted by the U.S. Department of Energy on behalf of itself and National Technology & Engineering Solutions of Sandia, LLC (collectively, the Permittees), on August 25, 2021.

NMED has reviewed the letter and hereby issues this Approval with the following modification:

1. Addition Of Annual Sampling Parameters

NMED Comment: The Permittees must continue to include the annual sampling parameters of alkalinity, anions (bromide, chloride, fluoride, and sulfate), gamma spectroscopy, gross alpha/beta activity, tritium, and TAL metals plus total uranium for the five groundwater monitoring wells.

SCIENCE | INNOVATION | COLLABORATION | COMPLIANCE

Hazardous Waste Bureau - 2905 Rodeo Park Drive East, Building 1, Santa Fe, New Mexico 87505-6313
Telephone (505) 476-6000 - www.env.nm.gov

Messrs. Hauck and Shoemaker

October 12, 2021

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If you have any questions regarding this letter, please contact Naomi Davidson at (505) 222-9504.

Sincerely,

A handwritten signature in blue ink, appearing to read "Ricardo Maestas".

Ricardo Maestas, Acting Chief
Hazardous Waste Bureau

cc: D. Cobrain, NMED HWB
B. Wear, NMED HWB
N. Davidson, NMED HWB
L. King, EPA Region 6 (6LCRRC)
B. Wechsler, DOE/NNSA/SFO, MS-0184
A. Bodour, DOE/NNSA/SFO, MS-0184
C. Leigh, SNL/NM, MS-0737

File: SNL 2021 and Reading