EMID-701777

DEPARTMENT OF ENERGY

Environmental Management Los Alamos Field Office (EM-LA)
Los Alamos, New Mexico 87544

EMLA-2022-BF015-02-001

November 30, 2021

RECEIVED
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NMED Hazardous Waste Bureau

Mr. Rick Shean
Bureau Chief
Hazardous Waste Bureau
New Mexico Environment Department
2905 Rodeo Park Drive East, Building 1
Santa Fe, NM 87505-6313

Subject: Submittal of the 2021 Annual Progress Report for the Corrective Measures Evaluation for Royal Demolition Explosive in Deep Groundwater

Dear Mr. Shean:

Enclosed please find two hard copies with electronic files of the "2021 Annual Progress Report for the Corrective Measures Evaluation for Royal Demolition Explosive in Deep Groundwater." This report summarizes activities completed by Newport News Nuclear BWXT-Los Alamos, LLC, from October 1, 2020, through September 30, 2021, related to Royal Demolition Explosive in deep groundwater.

If you have any questions, please contact Patrick McGuire at (505) 709-7918 (patrick.mcguire@em-la.doe.gov) or Cheryl Rodriguez at (505) 414-0450 (cheryl.rodriguez@em.doe.gov).

Sincerely,

ARTURO DURAN

Digitally signed by ARTURO DURAN
Date: 2021.11.30 09:01:07 -07'00'

Arturo Q. Duran
Compliance and Permitting Manager
Environmental Management
Los Alamos Field Office

Enclosure(s):

1. Two hard copies with electronic files:
   2021 Annual Progress Report for the Corrective Measures Evaluation for Royal Demolition Explosive in Deep Groundwater (EM2021-0723)

cc (letter and enclosure[s] emailed):
Laurie King, EPA Region 6, Dallas, TX
Raymond Martinez, San Ildefonso Pueblo, NM
Dino Chavarria, Santa Clara Pueblo, NM
Chris Catechis, NMED-DOE-OB/-RPD
Steve Yanicak, NMED-DOE-OB
Jennifer Payne, LANL
Stephen Hoffman, NA-LA
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William Alexander, N3B
Emily Day, N3B
Jeff Holland, N3B
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November 2021
EM2021-0723

2021 Annual Progress Report for the Corrective Measures Evaluation for Royal Demolition Explosive in Deep Groundwater

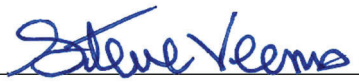
N3B Los Alamos

EM2021-0723

2021 Annual Progress Report for the Corrective Measures Evaluation for Royal Demolition Explosive in Deep Groundwater

November 2021

Responsible program director:

Steve Veenis		Program Director	Water Program	11/17/21
Printed Name	Signature	Title	Organization	Date

Responsible N3B representative:

Troy Thomson		Program Manager	N3B Environmental Remediation Program	11/17/21
Printed Name	Signature	Title	Organization	Date

Responsible DOE EM-LA representative:

Arturo Q. Duran	ARTURO DURAN Digitally signed by ARTURO DURAN Date: 2021.11.30 09:01:39 -07'00'	Compliance and Permitting Manager	Office of Quality and Regulatory Compliance	
Printed Name	Signature	Title	Organization	Date

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Figure

1.0 INTRODUCTION

This report serves as the sixth annual progress report for the corrective measures evaluation (CME) of Royal Demolition Explosive (RDX) in deep groundwater. The report summarizes activities the U.S. Department of Energy (DOE) Environmental Management Los Alamos Field Office and Newport News Nuclear BWXT-Los Alamos, LLC (N3B) completed from October 2020 through September 2021 (fiscal year [FY] 2021) related to the RDX deep groundwater investigation for the Technical Area 16 (TA-16) 260 Outfall (Figure 1.0-1).

DOE and Los Alamos National Security, LLC, submitted the "Corrective Measures Evaluation Report, Intermediate and Regional Groundwater, Consolidated Unit 16-021(c)-99" (hereafter, the CME report) in August 2007 (LANL 2007, 098734). The New Mexico Environment Department (NMED) issued a notice of disapproval in April 2008 (NMED 2008, 101311), requesting additional characterization to evaluate the feasibility of the remedial alternatives proposed in the groundwater CME report and to assess the extent of contamination in perched-intermediate groundwater and in the regional aquifer.

The deep groundwater investigation activities conducted during FY 2021 are discussed in this report.

2.0 DEEP GROUNDWATER INVESTIGATION ACTIVITIES

During the FY 2021 reporting period, the ongoing investigation of the nature and extent of RDX contamination in perched-intermediate groundwater and the regional aquifer included the following activities:

- Sampling of TA-16 260 monitoring group wells in accordance with the Interim Facility-Wide Groundwater Monitoring Plan (IFGMP)
- Continued sampling to monitor tracer breakthrough in the perched-intermediate zones
- Receipt of NMED draft comments for the "Investigation Report for Royal Demolition Explosive in Deep Groundwater" (hereafter, the deep groundwater IR) (N3B 2019, 700561; Krambis 2020, 701088) and for the "Fate and Transport Modeling and Risk Assessment Report for RDX Contamination in Deep Groundwater" (hereafter, the risk assessment report) (N3B 2020, 700925; Krambis 2020, 701140).
- Submission of draft comment responses to NMED's comments on the deep groundwater IR (Krambis 2020, 701088; Maupin 2021, 701363) and the risk assessment report (Krambis 2020, 701140; Maupin 2021, 701363)
- Two meetings to discuss comment responses for the deep groundwater IR and the risk assessment report (Maupin 2021, 701363)

These activities are discussed below.

2.1 IFGMP Sampling

Four groundwater sampling campaigns were conducted for the TA-16 260 monitoring group (Figure 1.0-1) during FY 2021 in accordance with the "Interim Facility-Wide Groundwater Monitoring Plan for the 2021 Monitoring Year, October 2020–September 2021, Revision 1" (N3B 2020, 701041). The IFGMP sampling campaigns were conducted November 11–December 18, 2020; March 9–March 29, 2021; May 25–June 14, 2021; and September 8–September 25, 2021. The analytical data from these sampling

campaigns are available on the Intellus New Mexico website (https://www.intellusnm.com) and are presented in the TA-16 260 monitoring group and base flow sampling annual periodic monitoring reports.

2.2 Tracer Test Update

Tracer deployments were conducted in October and November 2015. Review of available FY 2021 tracer data for breakthrough at downgradient wells indicated that the tracers had not yet fully moved beyond the vicinity of the screens where they were deployed and no cross-well detections had occurred. However, long-term tracer breakthrough monitoring will continue, and the results of the tracer tests will be reported on an annual basis in future CME progress reports.

2.3 Investigation Report for Royal Demolition Explosive in Deep Groundwater

To address the data needs identified by NMED, Los Alamos National Laboratory and N3B have conducted additional characterization of perched-intermediate and regional groundwater in recent years by installing additional wells; conducting single- and multi-well aquifer tests and tracer tests; and conducting geochemical, bioremediation, and natural attenuation studies. The data obtained from these activities were summarized in the deep groundwater IR, which was submitted to NMED on August 29, 2019 (N3B 2019, 700561). NMED provided draft comments to DOE on November 3, 2020 (Krambis 2020, 701088). DOE submitted comment responses to NMED by email on March 1, 2021 (Maupin 2021, 701363).

2.4 Fate and Transport Modeling and Risk Assessment Report

The deep groundwater IR identified uncertainties regarding potential risk to human health (N3B 2019, 700561). To address these uncertainties and to maintain consistency with NMED risk assessment guidance (NMED 2019, 700550), the deep groundwater IR recommended that a risk assessment be developed for the RDX contamination in groundwater that would incorporate a fate and transport modeling analysis as input to the evaluation. The risk assessment report, which became 2020 Milestone 7 of Appendix B of the 2016 Compliance Order on Consent, was submitted to NMED on May 29, 2020 (N3B 2020, 700925). NMED provided draft comments to DOE on November 25, 2020 (Krambis 2020, 701140). DOE submitted comment responses to NMED by email on March 1, 2021 (Maupin 2021, 701363).

3.0 REGULATORY, PUBLIC, AND STAKEHOLDER INVOLVEMENT

Activities to characterize the perched-intermediate and regional groundwater continued to be performed in FY 2021. Communication with the NMED Hazardous Waste Bureau, the NMED DOE Oversight Bureau, and the U.S. Environmental Protection Agency were held April 8 and April 29, 2021, to discuss the risk assessment report comment responses (Maupin 2021, 701363).

4.0 WORK PLANNED FOR FY 2021

In FY 2022, deep groundwater CME activities will include the following:

- Performing IFGMP sampling
- Addressing NMED comments concerning the deep groundwater IR (N3B 2019, 700561) and the risk assessment report (N3B 2020, 700925)

- Preparing Revision 1 to the risk assessment report, submitted to NMED in May 2020 (N3B 2020, 700925). The revision will incorporate updates to the risk assessment and groundwater model that reflect discussions with NMED and draft comments received from NMED in November 2020 (Krambis 2020, 701140).

- Preparing a drilling work plan for regional groundwater monitoring well R-74

A summary of the FY 2022 CME activities for RDX in deep groundwater will be reported in the seventh annual progress report and submitted to NMED by November 30, 2022.

5.0 REFERENCES AND MAP DATA SOURCES

5.1 References

The following reference list includes documents cited in this report. Parenthetical information following each reference provides the author(s), publication date, and ERID, ESHID, or EMID. This information is also included in text citations. ERIDs were assigned by the Laboratory's Associate Directorate for Environmental Management (IDs through 599999); ESHIDs were assigned by the Laboratory's Associate Directorate for Environment, Safety, and Health (IDs 600000 through 699999); and EMIDs are assigned by N3B (IDs 700000 and above). IDs are used to locate documents in N3B's Records Management System and in the Master Reference Set. The NMED Hazardous Waste Bureau and N3B maintain copies of the Master Reference Set. The set ensures that NMED has the references to review documents. The set is updated when new references are cited in documents.

Krambis, C., November 3, 2020. NMED Draft Comments on the Investigation Report for Royal Demolition Explosive in Deep Groundwater. E-mail message to A. Duran (EM-LA) from C. Krambis (NMED), Santa Fe, New Mexico. (Krambis 2020, 701088)

Krambis, C., November 25, 2020. Draft Comments on the 5/29/2020 submittal to NMED concerning the RDX Risk Assessment and Fate and Transport Modelling Report. E-mail message to E. Day (N3B), P. McGuire (N3B), B. Robinson (N3B), C. Rodriguez (EM-LA), and A. Duran (EM-LA) from C. Krambis (NMED), Santa Fe, New Mexico. (Krambis 2020, 701140)

LANL (Los Alamos National Laboratory), August 2007. "Corrective Measures Evaluation Report, Intermediate and Regional Groundwater, Consolidated Unit 16-021(c)-99," Los Alamos National Laboratory document LA-UR-07-5426, Los Alamos, New Mexico. (LANL 2007, 098734)

Maupin, C., March 1, 2021. RE: NMED Draft Comments on the Investigation Report for Royal Demolition Explosive in Deep Groundwater. E-mail message to C. Krambis (NMED) from C. Maupin (N3B), Los Alamos, New Mexico. (Maupin 2021, 701363)

N3B (Newport News Nuclear BWXT-Los Alamos, LLC), August 2019. "Investigation Report for Royal Demolition Explosive in Deep Groundwater," Newport News Nuclear BWXT-Los Alamos, LLC, document EM2019-0235, Los Alamos, New Mexico. (N3B 2019, 700561)

N3B (Newport News Nuclear BWXT-Los Alamos, LLC), May 2020. "Fate and Transport Modeling and Risk Assessment Report for RDX Contamination in Deep Groundwater," Newport News Nuclear BWXT-Los Alamos, LLC, document EM2020-0135, Los Alamos, New Mexico. (N3B 2020, 700925)

N3B (Newport News Nuclear BWXT-Los Alamos, LLC), September 2020. “Interim Facility-Wide Groundwater Monitoring Plan for the 2021 Monitoring Year, October 2020–September 2021, Revision 1,” Newport News Nuclear BWXT-Los Alamos, LLC, document EM2020-0404, Los Alamos, New Mexico. (N3B 2020, 701041)

NMED (New Mexico Environment Department), April 22, 2008. “Notice of Disapproval Corrective Measures Evaluation Report, Intermediate and Regional Groundwater Consolidated Unit 16-021(c)-99,” New Mexico Environment Department letter to D. Gregory (DOE-LASO) and D. McInroy (LANL) from J.P. Bearzi (NMED-HWB), Santa Fe, New Mexico. (NMED 2008, 101311)

NMED (New Mexico Environment Department), June 19, 2019. “Risk Assessment Guidance for Site Investigations and Remediation, Volume 1, Soil Screening Guidance for Human Health Risk Assessments,” February 2019 (Revision 2, 6/19/19), Hazardous Waste Bureau and Ground Water Quality Bureau, Santa Fe, New Mexico. (NMED 2019, 700550)

5.2 Map Data Sources

Hillshade; Los Alamos National Laboratory, ER-ES, As published; \\slip\gis\Data\HYP\LiDAR\2014Bare_Earth\BareEarth_DEM_Mosiac.gdb; 2014.

Structures; Los Alamos National Laboratory, KSL Site Support Services, Planning, Locating and Mapping Section; 06 January 2004; as published 29 November 2010.

Unpaved road; Los Alamos National Laboratory, ER-ES, As published, GIS projects folder; \\slip\GIS\Projects\14-Projects\14-0062\project_data.gdb; digitized_site_features; digitized_road; 2017.

Paved Road Arcs; Los Alamos National Laboratory, FWO Site Support Services, Planning, Locating and Mapping Section; 06 January 2004; as published 29 November 2010.

Drainage Channel; Los Alamos National Laboratory, ER-ES, As published, GIS projects folder; \\slip\GIS\Projects\11-Projects\11-0108\\gdb\gdb_11-0108_generic.mdb; drainage; 2017.

TA-16 260 Outfall, As Published, GIS project folder: Q:\14-Projects\14-0080\project_data.gdb\ polygon\outfall_260

M Wall-PRB, As Published, GIS project folder: Q:\14-Projects\14-0080\project_data.gdb\line\wall_PRB

Connector piping, As Published, GIS project folder: Q:\14-Projects\14-0080\project_ data.gdb\line\connector_piping

Tech areas; Los Alamos National Laboratory, Database Connections\GIS.PUB.PRD1.sde\PUB.Boundaries\PUB.tecareas

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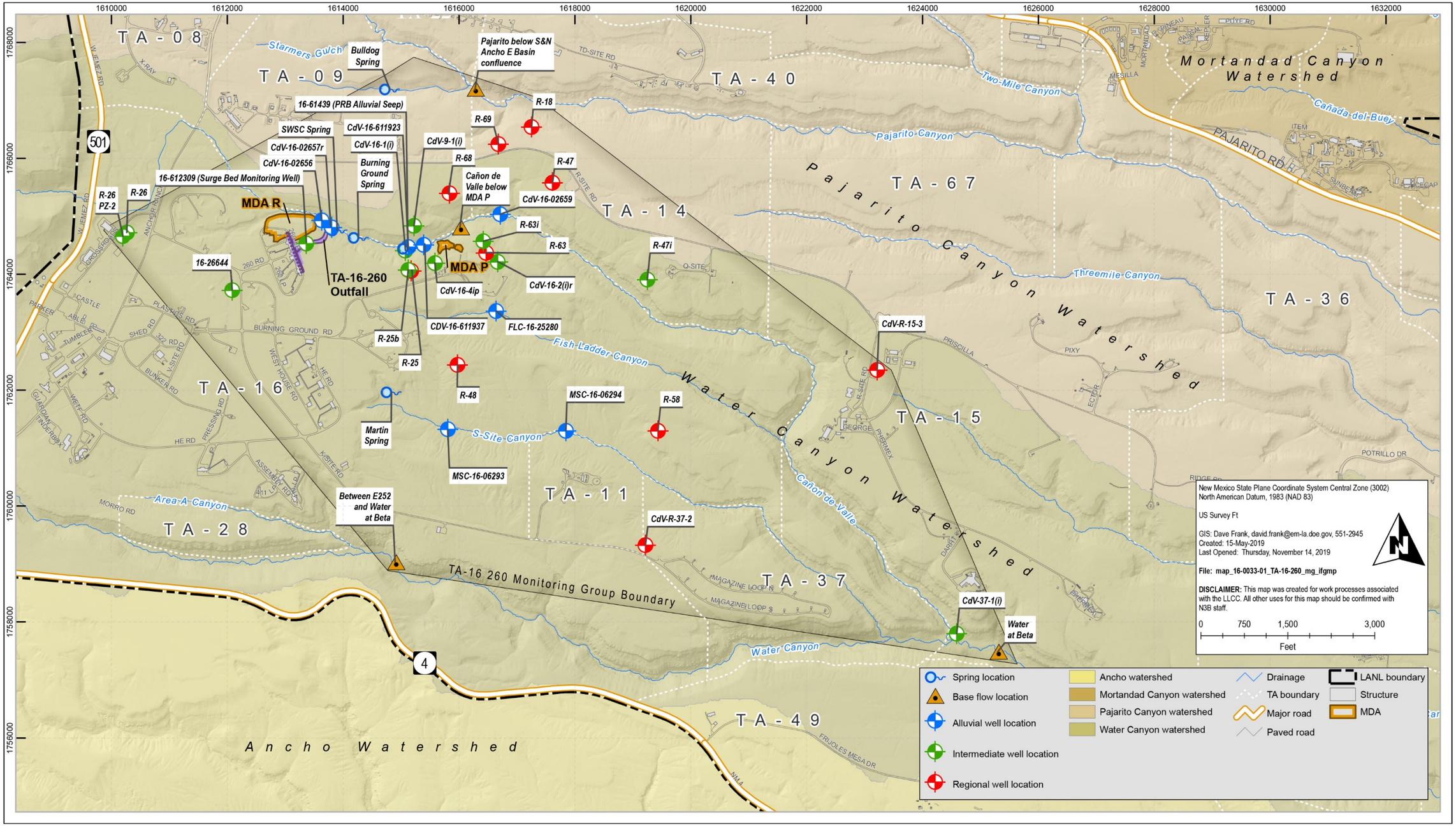

Figure 1.0-1 TA-16 260 monitoring group locations and 260 Outfall