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*Date*: FEB 2 6 2018
*Symbol*: EPC-DO: 18-042
*LA-UR*: 18-20567
*Locates Action No.*: *U1501760*

Ms. Michelle Hunter, Chief
Ground Water Quality Bureau
New Mexico Environment Department
Harold Runnels Building, Room N2261
1190 St. Francis Drive
P.O. Box 26110
Santa Fe, NM 87502

**Subject:** **Discharge Permit DP-1793 Annual Monitoring Report for 2017**

Dear Ms. Hunter:

This letter and enclosures from the U.S. Department of Energy and Los Alamos National Security, LLC (DOE/LANS) are the Annual Monitoring Report for Discharge Permit DP-1793 for 2017. The New Mexico Environment Department (NMED) issued discharge Permit DP-1793 on July 27, 2015, for the land application of groundwater associated with aquifer and pumping tests, well development and rehabilitation, groundwater tracer studies, and groundwater remediation activities.

Pursuant to Condition No. 9 of the above referenced discharge permit, DOE/LANS are required to submit annual reports by March 1 of each year for the previous calendar year. The annual reports are required to provide the quantity, source, and date of each individual discharge, water quality tables listing analytical results from samples collected under the water quality-sampling plan, a map(s) depicting discharge locations, and copies of laboratory analytical reports. The 2017 Annual Report (Enclosure 1) provides the information required under DP-1793 for this reporting period.

Please contact William J. Foley by telephone at (505) 665-8423 or by email at bfoley@lanl.gov if you have questions regarding this information.

Sincerely,

Benjamine B. Roberts
Division Leader

Sincerely,

Cheryl L. Rodriguez
Program Manager, FPD-II

WF: am

Enclosure(s):

Enclosure 1-Annual Report for the Land Application of Treated Groundwater - 2017, DP-1793
Enclosure 2-2017 Work Plan #5 Submittal Cover Letter, Work Plan #5 Amendment Requests, and NMED Response Letters, DP-1793
Enclosure 3-2017 Work Plan #6 Submittal Cover Letter, Work Plan #6 Amendment Request, and NMED Response Letters, DP-1793
Enclosure 4-2017 Daily Land Application Volumes, Locations, and Sources, DP-1793
Enclosure 5-2017 Analytical Results Summary Tables, DP-1793
Enclosure 6-Work Plan #5 Land Application Zones, DP-1793
Enclosure 7-Work Plan #6 Land Application Zones, DP-1793
Enclosure 8-Work Plan #5 2017 Analytical Reports (CD) from GEL Laboratories LLC (upon request)
Enclosure 9-Work Plan #6 2017 Analytical Reports (CD) from GEL Laboratories LLC (upon request)

Copy: Shelly Lemon, NMED/SWQB, Santa Fe, NM, (E-File)
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GROUND WATER
FEB 26 2018
BUREAU

Ms. Michelle Hunter, Chief
Ground Water Quality Bureau
New Mexico Environment Department
Harold Runnels Building, Room N2261
1190 St. Francis Drive
P.O. Box 26110
Santa Fe, NM 87502

**Subject:** **Discharge Permit DP-1793 Annual Monitoring Report for 2017**

Dear Ms. Hunter:

This letter and enclosures from the U.S. Department of Energy and Los Alamos National Security, LLC (DOE/LANS) are the Annual Monitoring Report for Discharge Permit DP-1793 for 2017. The New Mexico Environment Department (NMED) issued discharge Permit DP-1793 on July 27, 2015, for the land application of groundwater associated with aquifer and pumping tests, well development and rehabilitation, groundwater tracer studies, and groundwater remediation activities.

Pursuant to Condition No. 9 of the above referenced discharge permit, DOE/LANS are required to submit annual reports by March 1 of each year for the previous calendar year. The annual reports are required to provide the quantity, source, and date of each individual discharge, water quality tables listing analytical results from samples collected under the water quality-sampling plan, a map(s) depicting discharge locations, and copies of laboratory analytical reports. The 2017 Annual Report (Enclosure 1) provides the information required under DP-1793 for this reporting period.

# ENCLOSURE 1

Annual Report for the Land Application of Treated Groundwater - 2017, DP-1793

EPC-DO: 18-042

LA-UR-18-20567

U1501760

Date: FEB 2 6 2018

**ENCLOSURE 1**
**Annual Report for the Land Application of Treated Groundwater – 2017, DP-1793**

**Introduction**. On July 17, 2015, the New Mexico Environment Department (NMED) issued Discharge Permit (DP) 1793 to the U.S. Department of Energy and Los Alamos National Security, LLC (DOE/LANS) for the for the land application of groundwater associated with aquifer and pumping tests, well development and rehabilitation, groundwater tracer studies, and groundwater remediation activities. Before a discharge from an individual project or activity begins, DOE/LANS are required to submit a comprehensive work plan to NMED for its review and approval. In calendar year 2017, DOE/LANS submitted the following work plans.

1. **Work Plan #5**, March 16, 2017, *Multiple Activities Work Plan for the Treatment and Land Application of Groundwater from Mortandad and Sandia Canyons, DP-1793 Work Plan #5* (EPC-DO: 17-050). A copy of the cover letter is provided in Enclosure 2. Work Plan #5 was approved by NMED, with conditions, on May 31, 2017, subsequently revised on June 15, 2017. A copy of the May 31, 2017 and June 15, 2017 approval letters are provided in Enclosure 2.

   Work Plan #5 was implemented by DOE/LANS between June 1, 2017 through December 5, 2017. During implementation of Work Plan # 5 DOE/LANS submitted two amendment requests which were approved by NMED. These amendments were as follows:

   - Amendment 1 was an Extension Request to extend the project schedule end date of Work Plan #5 to match the term end date of DP-1793 (EPC-DO: 17-353). A copy of the Amendment 1 request cover letter is provided in Enclosure 2. This amendment did not change the daily or annual quantity, quality, or discharge location of treated groundwater to be land applied under Work Plan #5. In addition, DOE/LANS committed to ensuring the annual reports contain all of the information that is required under Condition #8 for Discharge Reports in each Annual Report. NMED approved this amendment request on November 22, 2017. A copy of the approval letter is provided in Enclosure 2.
   - Amendment 2 was a request to add an additional source, CrEX-4, to the proposed list of sources of groundwater to be treated and land applied under Work Plan #5. (EPC-DO: 17-422). A copy of the Amendment 2 request cover letter is provided in Enclosure 2. This amendment did not change the daily or annual quantity, quality, or discharge location of treated groundwater to be land applied under Work Plan #5. NMED approved this amendment request on November 22, 2017. A copy of the approval letter is provided in Enclosure 2.

2. **Work Plan #6,** March 16, 2016, *Work Plan for Treatment and Land Application of Groundwater from Technical Areas 09 and 16, DP-1793, Work Plan #6* (EPC-DO: 17-051). A copy of the cover letter is provided in Enclosure 3. Work Plan #6 was approved by NMED, with conditions, on June 23, 2017. A copy of the June 23, 2017 approval letter is provided in Enclosure 3.

   Work Plan #6 was implemented by DOE/LANS for a period of 7 days between July 13, 2017 to October 25, 2017. During implementation of Work Plan # 6 DOE/LANS submitted one amendment request which was approved by NMED. This amendment was:

- An Extension Request to extend the project schedule end date of Work Plan #6 to match the term end date of DP-1793 (EPC-DO: 17-353). A copy of the Amendment request cover letter is provided in Enclosure 3. This amendment did not change the daily or annual quantity, quality, or discharge location of treated groundwater to be land applied under Work Plan #6. In addition, DOE/LANS committed to ensuring the annual reports contain all of the information that is required under Condition #8 for Discharge Reports in each Annual Report. NMED approved this amendment request on November 22, 2017. A copy of the approval letter is provided in Enclosure 3.

Condition No. 9 of Discharge Permit DP-1793 requires that an annual report be submitted to NMED by March 1 of each year. The annual report is required to contain the following information:

*Requirement 1: Quantity, source, and date of each individual discharge;*
*Requirement 2: Water quality tables listing analytical results from samples collected under the water quality sampling plan;*
*Requirement 3: Map(s) depicting discharge locations; and*
*Requirement 4: Laboratory analytical reports.*

Based on the approved extension requests for Work Plans 5 and 6 the annual report shall also contain the information required in Condition No. 8 of Discharge Permit DP-1793. Condition No. 8 requires the following information to be submitted for each work plan:

*Requirement 5: The total volume of groundwater discharged;*
*Requirement 6: The estimated average application rate for the period of discharge;*
*Requirement 7: Analytical results from samples collected under the water quality sampling plan;*
*Requirement 8: Analytical reports for the samples collected under the water quality sampling plan;*
*Requirement 9: A map identifying the locations of discharge; and*

Each of the above requirements is addressed in this report and referenced enclosures.

**Requirement 1: Quantity, source and date of each individual discharge.** Enclosure 4 provides the quantity and source of individual discharges by date for Work Plans 5 and 6 completed during 2017.

**Requirement 2: Water quality tables listing analytical results from samples collected under the water quality sampling plan.** Enclosure 5 contains the water quality tables for compliance samples obtained under Work Plans 5 and 6 during 2017. In addition, Enclosure 5 contains the confirmation analysis results required in accordance with NMED's conditional approvals for both Work Plan #5 and Work Plan #6. The conditional approvals required these results be submitted as part of the final Discharge Report for each Work Plan. They are being supplied in this annual report the approved extension requests submitted by DOE/LANS. These confirmation

samples were obtained from the treated effluent lagoons under Work Plan #5 and the treated effluent tanks under Work Plan #6.

Under Work Plan #5 no results for total chromium, nitrate-nitrogen ($NO_3$-N), or perchlorate exceeded 90% of the numeric standards of 20.6.2.3103 New Mexico Administrative Code (NMAC) or 90% of the numeric standards established for tap water in Table A-1 for constituents not listed in 20.6.2.3103 NMAC. The 90% values for chromium, nitrate-nitrogen ($NO_3$-N), and perchlorate are 45 µg/L, 9 mg/L, and 12.4 µg/L, respectively.

Under Work Plan #6 no results for RDX exceeded 90% of the numeric standards established for tap water in Table A-1. The 90% values for RDX is 6.3 µg/L.

**Requirements 3 and 9: Map(s) depicting discharge locations.** This requirement is a duplicate requirement for both the annual report and the discharge report in the permit. It is identified as Requirement 3 above for Condition No. 9 and Requirement 9 for Condition No. 8.

During 2017 treated groundwater land applied under Work Plan #5 was applied to land application zones 1, 2, 3, and 4. These zones are depicted in the map provided in Enclosure 6.

During 2017 treated groundwater land applied under Work Plan #6 was land applied to land application zone 9. This zone is depicted in the map provided in Enclosure 7.

**Requirements 4 and 8: Laboratory analytical reports.** This requirement is a duplicate requirement for both the annual report and the discharge report in the permit. It is identified as Requirement 4 above for Condition No. 9 and Requirement 8 for Condition No. 8. Enclosure 8 (available upon request) contains the Work Plan #5 Analytical Reports. Enclosure 9 (available upon request) contains the Work Plan #6 Analytical Reports.

**Requirement 5: Total volume of groundwater discharged.** Table 1 below provides the total volume of groundwater discharged in 2017 under each work plan.

**Table 1. Volume of Treated Groundwater Discharged in 2017**

| Source | Discharge Start Date | Discharge End Date | # of Days of Active Discharge | Total Volume (gal.) | Average Volume (gal.) | Maximum Daily Volume (gal.) |
|---|---|---|---|---|---|---|
| Work Plan #5 (Chromium) | 6/8/2017 | 12/5/2017 | 29 | 1,614,461 | 55,671 | 209,923 |
| Work Plan #6 (RDX) | 7/18/2017 | 10/25/2017 | 7 | 40,632 | 5,805 | 10,632 |
| Total Volume of Discharge | | | | 1,655,093 | | |
| Average Volume of Discharge | | | | | 45,975 | |
| Maximum Daily Discharge | | | | | | 209,923 |

**Requirement 6: Estimated average application rate for the period of discharge.** Table 1 above provides the average application rates of groundwater discharged in 2017 under each work plan and under the overall discharge permit.

**Requirement 7: Analytical results from samples collected under the water quality sampling plan.** This requirement from Condition No. 8 is a duplicate of the requirement under Condition No. 9. Enclosure 5 contains the water quality tables for compliance samples obtained under Work Plans 5 and 6 during 2017.

# ENCLOSURE 2

2017 Work Plan #5 Submittal Cover Letter, Work Plan #5 Amendment Requests, and NMED Response Letters, DP-1793

EPC-DO: 18-042

LA-UR-18-20567

U1501760

Date: FEB 2 6 2018

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*Date*: MAR 16 2017
*Symbol*: EPC-DO: 17-050
*LA-UR*: 17-20362
*Locates Action No.*: U1501760

Ms. Michelle Hunter, Chief
Ground Water Quality Bureau
New Mexico Environment Department
Harold Runnels Building, Room N2261
1190 St. Francis Drive
P.O. Box 26110
Santa Fe, NM 87502

**Subject:** **Multiple Activities Work Plan for the Treatment and Land Application of Groundwater from Mortandad and Sandia Canyons, DP-1793 Work Plan #5**

Dear Ms. Hunter:

On July 27, 2015, the New Mexico Environment Department (NMED) issued a Discharge Permit (DP-1793) to the U.S. Department of Energy and Los Alamos National Security, LLC (DOE/LANS) for the land application of treated groundwater from covered activities. Pursuant to Condition No. 3 of the above-referenced discharge permit, DOE/LANS are required to submit detailed, project-specific work plans for approval by NMED before any activities are undertaken.

Chromium (Cr) concentrations exceed the New Mexico Water Quality Control Commission (NMWQCC) Regulation 3103 groundwater standard of 50 µg/L in regional aquifer groundwater beneath Mortandad and Sandia Canyons within Los Alamos National Laboratory. The enclosed work plan is for the proposed discharge of treated groundwater from four Chromium Project activities: (1) legacy water remaining from 2016 activities, (2) water generated from 2016/2017 well installations, (3) maintenance activities at injection wells including backflush/surge water, and (4) routine monitoring well purging during sampling and five-day pumping at monitoring wells/piezometers.

The activities listed above will be conducted as specified in the NMED-approved Interim *Measures Work Plan for the Evaluation of Chromium Mass Removal, Work Plan for Chromium Plume Center Characterization* and the *Interim Facility-Wide Groundwater Monitoring Plan for the 2017 Monitoring Year, October 2016-September 2017.* Produced groundwater will be treated and discharged in accordance with the enclosed work plan and supporting information.

Please contact William J. Foley by telephone at (505) 665-8423 or by email at bfoley@lanl.gov if you have questions regarding this work plan.

Sincerely,

John C. Bretzke
Division Leader

Sincerely,

Cheryl L. Rodriguez
Program Manager, FPD-II

JCB/CLR/MTS/WJF:tav

Enclosures:

1) Multiple Activities Work Plan for the Treatment and Land Application of Groundwater from Mortandad and Sandia Canyons, DP-1793, Work Plan #5
2) Interim Measures Work Plan for Chromium Plume Control and Work Plan for Chromium Plume Center Characterization
3) Topographic Map of the Project Site
4) Table 3.4-1 (Chromium Investigation Monitoring Group) from the Monitoring Year 2017 Interim Facility-Wide Groundwater Monitoring Plan
5) As-Built Specifications for CrEX-3, CrIN-1, CrIN-2, CrIN-3, CrIN-4, CrIN-5, R-15, R-61, and CrPZ-4
6) Water Quality Data from CrEX-1, CrEX-3, CrIN-1, CrIN-2, CrIN-3, CrIN-4, CrIN-5, R-15, R-28, R-42, R-43-S1, R-50-S1, R-61, R-62, CrPZ-1, CrPZ-2a, CrPZ-2b, CrPZ-3, CrPZ-4, and CrPZ-5
7) Schematic of the IX Treatment System and Technical Specifications of the IX Vessels and Resin

Copy: Shelly Lemon, NMED/SWQB, Santa Fe, NM, (E-File)
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GROUND WATER
MAR 16 2017
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New Mexico Environment Department
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**Subject:** **Multiple Activities Work Plan for the Treatment and Land Application of Groundwater from Mortandad and Sandia Canyons, DP-1793 Work Plan #5**

Dear Ms. Hunter:

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Chromium (Cr) concentrations exceed the New Mexico Water Quality Control Commission (NMWQCC) Regulation 3103 groundwater standard of 50 µg/L in regional aquifer groundwater beneath Mortandad and Sandia Canyons within Los Alamos National Laboratory. The enclosed work plan is for the proposed discharge of treated groundwater from four Chromium Project activities: (1) legacy water remaining from 2016 activities, (2) water generated from 2016/2017 well installations, (3) maintenance activities at injection wells including backflush/surge water, and (4) routine monitoring well purging during sampling and five-day pumping at monitoring wells/piezometers.

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**JOHN A. SANCHEZ**
Lieutenant Governor

**BUTCH TONGATE**
Cabinet Secretary

**J.C. BORREGO**
Deputy Secretary

**CERTIFIED MAIL – RETURN RECEIPT REQUESTED**

May 31, 2016

John C. Bretzke
Division Leader
Environmental Protection & Compliance Division
Los Alamos National Laboratory
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Los Alamos, NM 87545

Cheryl L. Rodriguez
Program Manager, FPD-II
Environmental Management
Los Alamos Field Office, A316
3747 West Jemez Road
Los Alamos, NM 87544

**RE: Approval with Modification of Work Plan #5 for Treatment and Land Application of Groundwater at TA-05, Los Alamos National Laboratory, Discharge Permit 1793**

Dear Mr. Bretzke and Ms. Rodriguez:

On March 16, 2017, the New Mexico Environment Department (NMED) Ground Water Quality Bureau (GWQB) received the *Multiple Activities Work Plan for the Treatment and Land Application of Groundwater for Mortandad and Sandia Canyons, DP-1793 Work Plan #5* (Work Plan) from DOE/LANS (Permittees) for the continued land application of treated groundwater at TA-05. The Work Plan is required by Condition 3 of Discharge Permit 1793 (DP-1793 or DP) for activities regulated under the DP and addresses the extraction, treatment, and land application of chromium contaminated groundwater from Mortandad and Sandia Canyons during calendar year 2017. Prior year discharges of a similar nature were authorized under Work Plans #2 and #3, which were approved by NMED on October 8, 2015, and May 24, 2016, respectively.

The Work Plan identifies the following chromium contaminated waters requiring treatment and discharge.

- Legacy waters from calendar year 2016 activities associated with extraction wells CrEX-1 and CrEX-3, injection wells CrIN-1 through CrIN-5, and monitoring wells associated with the Chromium Investigation Monitoring Group referenced in the *Interim Facility-Wide Groundwater Monitoring Plan* (IFGMP).
- Water generated from various activities associated with the installation of injection and extraction wells within the chromium plume in 2017.

- Groundwater brought to the surface during operation and maintenance activities at extraction and injection wells within the chromium plume in 2017.
- Groundwater extracted during routine sampling and pumping of monitoring wells and piezometers associated with the Chromium Investigation Monitoring Group.

The activities that produce these waters are conducted in coordination with, and as specified in, the *Interim Measures Work Plan for Chromium Plume Control*, dated May 26, 2015, and the *Work Plan for Chromium Plume Center Characterization,* dated July 28, 2015. NMED's Hazardous Waste Bureau approved these plans in a letter dated October 15, 2015.

A copy of the proposed Work Plan was posted on LANL's Electronic Public Reading Room on March 21, 2017. In accordance with DP Condition 3, the proposed Work Plan was subject to public comment for a period of 30 days. Comments received by NMED from Communities for Clean Water on April 20, 2017 have been considered in the preparation of this response.

Groundwater discharges associated with the Work Plan shall be performed in accordance with the Work Plan and are subject to all conditions of the DP. The Work Plan is approved as submitted, with the following modifications.

1. The Permittees shall measure total chromium in soils from a representative location in each land application zone. These measurements shall occur six months prior to the end of the term of the Discharge Permit (July 27, 2020) and at the termination of discharge and final closure under the requirements of DP-1793. The analyses of these soil samples shall be performed by an off-site, independent, NELAP-accredited analytical laboratory. The Permittees shall submit an associated work plan for NMED approval at least 60 days prior to the date of the required soil sampling. The Permittees shall report the results of those measurements, and all other historical chromium measurements in soils in all land application zones, in the final Discharge Report required by DP Condition 8.
2. The Permittees shall confirm that waters in lagoons do not exceed the numeric standards of 20.6.2.3103 NMAC for chromium and nitrate prior to land application. To perform this confirmation the Permittees shall collect a representative sample of the water in a lagoon and analyze the sample utilizing a NELAP-accredited analytical laboratory. The results of the confirmation analyses shall be reported to NMED in the final Discharge Report required by DP Condition 8.
3. NMED understands that the piping from the untreated water storage tanks at R-28 to the treatment system is not double-walled. The Permittees shall conduct daily inspections of all single-walled piping transferring untreated waters. A log of each inspection shall be kept on-site.

Within 60 days of cessation of the discharge authorized under this Work Plan, the Permittees shall submit a Discharge Report in accordance with DP Condition 8.

Approval of this Work Plan does not relieve the Permittees of the responsibility to comply with any other applicable federal, state, and/or local laws and regulations. This approval does not relieve the Permittees of liability should operations associated with this Work Plan result in actual pollution of ground or surface waters.

If you have any questions, please contact Steve Pullen at (505) 827-2962. Thank you for your cooperation.

Sincerely,

for

Michelle Hunter, Chief
Ground Water Quality Bureau

MH:sp

cc (e-version):
Shelly Lemon, NMED/SWQB
John Kieling, NMED/HWB
Steven Yanicak, NMED/DOEOB
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**BUTCH TONGATE**
Cabinet Secretary

**J.C. BORREGO**
Deputy Secretary

**Sent Via Electronic Mail**

June 15, 2017

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**RE: Approval with Modification of Work Plan #5 for Treatment and Land Application of Groundwater at TA-05, Los Alamos National Laboratory, Discharge Permit 1793**

Dear Mr. Bretzke and Ms. Rodriguez:

This letter replaces a previous letter on the topic inadvertently dated May 31, 2016.

On March 16, 2017, the New Mexico Environment Department (NMED) Ground Water Quality Bureau (GWQB) received the *Multiple Activities Work Plan for the Treatment and Land Application of Groundwater for Mortandad and Sandia Canyons, DP-1793 Work Plan #5* (Work Plan) from DOE/LANS (Permittees) for the continued land application of treated groundwater at TA-05. The Work Plan is required by Condition 3 of Discharge Permit 1793 (DP-1793 or DP) for activities regulated under the DP and addresses the extraction, treatment, and land application of chromium contaminated groundwater from Mortandad and Sandia Canyons during calendar year 2017. Prior year discharges of a similar nature were authorized under Work Plans #2 and #3, which were approved by NMED on October 8, 2015, and May 24, 2016, respectively.

The Work Plan identifies the following chromium contaminated waters requiring treatment and discharge.

- Legacy waters from calendar year 2016 activities associated with extraction wells CrEX-1 and CrEX-3, injection wells CrIN-1 through CrIN-5, and monitoring wells associated with the Chromium Investigation Monitoring Group referenced in the *Interim Facility-Wide Groundwater Monitoring Plan* (IFGMP).

- Water generated from various activities associated with the installation of injection and extraction wells within the chromium plume in 2017.
- Groundwater brought to the surface during operation and maintenance activities at extraction and injection wells within the chromium plume in 2017.
- Groundwater extracted during routine sampling and pumping of monitoring wells and piezometers associated with the Chromium Investigation Monitoring Group.

The activities that produce these waters are conducted in coordination with, and as specified in, the *Interim Measures Work Plan for Chromium Plume Control*, dated May 26, 2015, and the *Work Plan for Chromium Plume Center Characterization,* dated July 28, 2015. NMED's Hazardous Waste Bureau approved these plans in a letter dated October 15, 2015.

A copy of the proposed Work Plan was posted on LANL's Electronic Public Reading Room on March 21, 2017. In accordance with DP Condition 3, the proposed Work Plan was subject to public comment for a period of 30 days. Comments received by NMED from Communities for Clean Water on April 20, 2017 have been considered in the preparation of this response.

Groundwater discharges associated with the Work Plan shall be performed in accordance with the Work Plan and are subject to all conditions of the DP. The Work Plan is approved as submitted, with the following modifications.

1. The Permittees shall measure total chromium in soils from a representative location in each land application zone. These measurements shall occur six months prior to the end of the term of the Discharge Permit (July 27, 2020) and at the termination of discharge and final closure under the requirements of DP-1793. The analyses of these soil samples shall be performed by an off-site, independent, NELAP-accredited analytical laboratory. The Permittees shall submit an associated work plan for NMED approval at least 60 days prior to the date of the required soil sampling. The Permittees shall report the results of those measurements, and all other historical chromium measurements in soils in all land application zones, in the final Discharge Report required by DP Condition 8.
2. The Permittees shall confirm that waters in lagoons do not exceed the numeric standards of 20.6.2.3103 NMAC for chromium and nitrate prior to land application. To perform this confirmation the Permittees shall collect a representative sample of the water in a lagoon and analyze the sample utilizing the Hach method for real time field results. The results of the confirmation analyses shall be reported to NMED in the final Discharge Report required by DP Condition 8.
3. NMED understands that the piping from the untreated water storage tanks at R-28 to the treatment system is not double-walled. The Permittees shall conduct daily inspections of all single-walled piping transferring untreated waters. A log of each inspection shall be kept on-site.

Within 60 days of cessation of the discharge authorized under this Work Plan, the Permittees shall submit a Discharge Report in accordance with DP Condition 8.

Approval of this Work Plan does not relieve the Permittees of the responsibility to comply with any other applicable federal, state, and/or local laws and regulations. This approval does not relieve the Permittees of liability should operations associated with this Work Plan result in actual pollution of ground or surface waters.

If you have any questions, please contact Steve Pullen at (505) 827-2962. Thank you for your cooperation.

Sincerely,

Pamela E Homer

for Michelle Hunter, Chief
Ground Water Quality Bureau

MH:sp

cc (e-version):
Shelly Lemon, NMED/SWQB
John Kieling, NMED/HWB
Steven Yanicak, NMED/DOEOB
Kathryn Hayden, NMED/GWQB
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William Foley, EPC-CP
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GROUND WATER
SEP 2 8 2017
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*Date*: SEP 2 8 2017
*Symbol*: EPC-DO: 17-353
*LA-UR*: 17-27940
*Locates Action No.*: U1501760

Ms. Michelle Hunter, Chief
Ground Water Quality Bureau
New Mexico Environment Department
Harold Runnels Building, Room N2261
1190 St. Francis Drive
P.O. Box 26110
Santa Fe, NM 87502

**Subject:** **Extension Request for Multiple Activities Work Plan for the Treatment and Land Application of Groundwater from Mortandad and Sandia Canyons, DP-1793 Work Plan #5**

Dear Ms. Hunter:

On July 27, 2015, the New Mexico Environment Department (NMED) issued a Discharge Permit (DP-1793) to the U.S. Department of Energy and Los Alamos National Security, LLC (DOE/LANS). DOE/LANS submitted Work Plan #5 on March 16, 2017 (EPC-DO: 17-050) for the continued land application of treated groundwater at Technical Area (TA)-05 (Enclosure 1). NMED approved Work Plan #5 with conditions on June 15, 2017 (Enclosure 2). Section 12 of Work Plan #5 identified a project schedule ending on December 31, 2017.

The purpose of this letter is to amend Work Plan #5 to extend the project schedule end date identified in Section 12 of Work Plan #5 to match the term end date of DP-1793. Based on experience gained by DOE/LANS from operating the extraction, treatment, and land application system for the groundwater in Mortandad and Sandia Canyon the quantity, quality, and discharge location of treated groundwater to be land applied will be consistent with the approved Work Plan #5 during this extension period. Each of these items is addressed separately below. In addition, a comparison of the reporting requirements for discharge reports, submitted at the completion of an approved work plan discharge per DP-1793 Condition 8, and annual reports, submitted annually per DP-1793 Condition 9, is provided.

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*Date*: SEP 2 8 2017
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Ms. Michelle Hunter, Chief
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P.O. Box 26110
Santa Fe, NM 87502

**Subject:** **Extension Request for Multiple Activities Work Plan for the Treatment and Land Application of Groundwater from Mortandad and Sandia Canyons, DP-1793 Work Plan #5**

Dear Ms. Hunter:

On July 27, 2015, the New Mexico Environment Department (NMED) issued a Discharge Permit (DP-1793) to the U.S. Department of Energy and Los Alamos National Security, LLC (DOE/LANS). DOE/LANS submitted Work Plan #5 on March 16, 2017 (EPC-DO: 17-050) for the continued land application of treated groundwater at Technical Area (TA)-05 (Enclosure 1). NMED approved Work Plan #5 with conditions on June 15, 2017 (Enclosure 2). Section 12 of Work Plan #5 identified a project schedule ending on December 31, 2017.

The purpose of this letter is to amend Work Plan #5 to extend the project schedule end date identified in Section 12 of Work Plan #5 to match the term end date of DP-1793. Based on experience gained by DOE/LANS from operating the extraction, treatment, and land application system for the groundwater in Mortandad and Sandia Canyon the quantity, quality, and discharge location of treated groundwater to be land applied will be consistent with the approved Work Plan #5 during this extension period. Each of these items is addressed separately below. In addition, a comparison of the reporting requirements for discharge reports, submitted at the completion of an approved work plan discharge per DP-1793 Condition 8, and annual reports, submitted annually per DP-1793 Condition 9, is provided.

Water Quality

Work Plan # 5 identifies four activities generating groundwater to be treated and land applied: (1) legacy water from 2016, (2) water generated from 2016/2017 well installations, (3) maintenance activities at injection wells, and (4) monitoring well purge water. These activities, except activity number 2, will remain consistent with the current approved work plan. Activity number 2 relates to water generated related to extraction/injection well installation(s). If during the amended period of performance for Work Plan #5, additional extraction/injection/monitoring well installations are planned separate amendment(s) will be submitted to NMED for approval. Those amendment(s) will demonstrate the additional source(s) are consistent in quality to the current sources included in Work Plan #5.

In addition to the compliance and operational samples included in Work Plan #5, NMED's June 15, 2017 conditional approval requires DOE/LANS to conduct confirmation sampling of the treated water in the lagoons prior to land application. This ensures that the quality of water being land applied will be consistent with the approved Work Plan #5.

Water Quantity

An increase in the maximum daily discharge identified in DP-1793 and Work Plan #5, Section 10 is not requested. DOE/LANS requests the total volume specified in Work Plan #5 (53,282,900 gal) be applied annually during the project schedule.

Based on this information the daily discharge quantity or the total annual volume will not increase.

Location of Land Application

The approved land application locations identified in Section 1 of Work Plan #5 are not being modified.

Comparison of Reporting Requirements

Table 1 provides a summary of the reporting requirements outlined in DP-1793 Conditions 8 and 9.

**Table 1**
**DP-1793 Conditions 8 and 9 Reporting Requirements**

| Item Description | Condition 8 (Discharge Report) | Condition 9 (Annual Report) |
|---|---|---|
| Total volume of discharge | X (for each work plan) | X (annual for all work plans) |
| Average application rate | X | |
| Analytical results | X | X (including copies of laboratory analytical reports) |
| Soil sampling results, if required by NMED | X | |
| Map of land application areas | X | X |
| Quantity, source and date of each discharge | | X |

The discharge reports and annual reports have many duplicate items. As part of this proposed amendment to Work Plan #5 DOE/LANS will ensure the annual reports contain all of the information that is required under the Discharge Reports (average application rates and soil sampling results). The only potential exception could be soil sample results, dependent upon when soil sampling was completed. If those results are available with sufficient time to meet annual report deadlines they will be included. If not these will be identified and submitted separately, when available.

Please contact William J. Foley by telephone at (505) 665-8423 or by email at bfoley@lanl.gov if you have questions regarding this request.

Sincerely,

John C. Bretzke
Division Leader

Sincerely,

Cheryl L. Rodriguez
Program Manager, FPD-II

JCB/CLR/MTS/WJF:am

Enclosures:

1) LANL March 16, 2017 Submittal Letter and Enclosure 1, DP-1793, Work Plan #5
2) NMED Letter Dated June 15, 2017, Approving Work Plan #5

Copy: Shelly Lemon, NMED/SWQB, Santa Fe, NM, (E-File)
John E. Kieling, NMED/HWB, Santa Fe, NM, (E-File)
Stephen M. Yanicak, NMED/DOE/OB, (E-File)
Steve Pullen, NMED/GWQB, Santa Fe, NM, (E-File)
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Deputy Secretary

November 22, 2017

John C. Bretzke
Division Leader
Environmental Protection & Compliance Division
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Cheryl L. Rodriguez
Program Manager, FPD-II
Environmental Management
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**RE: Approval of Extension Request for Multiple Activities Work Plan for the Treatment and Land Application of Groundwater at TA-05, Los Alamos National Laboratory, Discharge Permit 1793**

Dear Mr. Bretzke and Ms. Rodriguez:

On September 28, 2017, the New Mexico Environment Department (NMED) Ground Water Quality Bureau (GWQB) received the *Extension Request for Multiple Activities Work Plan for the Treatment and Land Application of Groundwater for Mortandad and Sandia Canyons, DP-1793 Work Plan #5* (Work Plan) from DOE/LANS (Permittees) for the continued land application of treated groundwater at Technical Area 05. The Work Plan is required by Condition 3 of Discharge Permit 1793 (DP-1793 or DP) for activities regulated under the DP and addresses the extraction, treatment, and land application of chromium contaminated groundwater from Mortandad and Sandia Canyons during calendar year 2017. The Extension Request is to amend Work Plan #5 to extend the project schedule end-date identified in Section 12 of the Work Plan to match the term end-date of DP-1793, i.e., July 27, 2020.

The Extension Request does not propose modifications to discharge location, water quantity, or water quality of treated groundwater to be land applied under the Work Plan. The Extension Request does propose to ensure that annual reports contain all information required in DP-1793 Conditions 8 and 9.

Groundwater discharges associated with the Work Plan shall be performed in accordance with the Work Plan and the Extension Request, and are subject to all conditions of the DP. The Extension Request for Work Plan #5 is hereby approved to match the term end date of DP-1793.

Approval of this Work Plan does not relieve the Permittees of the responsibility to comply with any other applicable federal, state, and/or local laws and regulations. This approval does not relieve the Permittees of liability should operations associated with this Work Plan result in actual pollution of ground or surface waters.

If you have any questions, please contact Steve Pullen at (505) 827-2962. Thank you for your cooperation.

Sincerely,

for

Michelle Hunter, Chief
Ground Water Quality Bureau

MH:sp

cc (e-version):
Shelly Lemon, NMED/SWQB
John Kieling, NMED/HWB
Steven Yanicak, NMED/DOEOB
Steve Pullen, NMED/GWQB
William Foley, EPC-CP
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*Date:* OCT 26 2017
*Symbol:* EPC-DO: 17-422
*LA-UR:* 17-29257
*Locates Action No.:* U1501760

Ms. Michelle Hunter, Chief
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**Subject:** **Amendment 2 - Additional Source (CrEX-4) for Multiple Activities Work Plan for the Treatment and Land Application of Groundwater from Mortandad and Sandia Canyons, DP-1793 Work Plan #5**

Dear Ms. Hunter:

On July 27, 2015, the New Mexico Environment Department (NMED) issued a Discharge Permit (DP-1793) to the U.S. Department of Energy and Los Alamos National Security, LLC (DOE/LANS). DOE/LANS submitted Work Plan #5 on March 16, 2017 (EPC-DO: 17-050) for the continued land application of treated groundwater at Technical Area (TA)-05 (Enclosure 1). NMED approved Work Plan #5 with conditions on June 15, 2017 (Enclosure 2). Subsequently, on September 28, 2017 DOE/LANS submitted an amendment (Amendment 1) to Work Plan #5 requesting to extend the project schedule end date for this work plan (Enclosure 3).

The purpose of this letter is to amend Work Plan #5 to add an additional groundwater source: extraction well CrEX-4. Work Plan # 5 identifies four activities generating groundwater to be treated and land applied:

(1) Legacy water remaining from CY2016 activities
(2) Water generated from well installations in 2017:
    a. Development, aquifer testing, and extended pumping at new extraction well(s);
    b. Development, aquifer testing, and injection capacity evaluation at new injection well(s); and
    c. Monthly sampling at injection wells before injection at these locations;

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**Subject:** **Amendment 2 - Additional Source (CrEX-4) for Multiple Activities Work Plan for the Treatment and Land Application of Groundwater from Mortandad and Sandia Canyons, DP-1793 Work Plan #5**

Dear Ms. Hunter:

On July 27, 2015, the New Mexico Environment Department (NMED) issued a Discharge Permit (DP-1793) to the U.S. Department of Energy and Los Alamos National Security, LLC (DOE/LANS). DOE/LANS submitted Work Plan #5 on March 16, 2017 (EPC-DO: 17-050) for the continued land application of treated groundwater at Technical Area (TA)-05 (Enclosure 1). NMED approved Work Plan #5 with conditions on June 15, 2017 (Enclosure 2). Subsequently, on September 28, 2017 DOE/LANS submitted an amendment (Amendment 1) to Work Plan #5 requesting to extend the project schedule end date for this work plan (Enclosure 3).

The purpose of this letter is to amend Work Plan #5 to add an additional groundwater source: extraction well CrEX-4. Work Plan # 5 identifies four activities generating groundwater to be treated and land applied:

(1) Legacy water remaining from CY2016 activities
(2) Water generated from well installations in 2017:
    a. Development, aquifer testing, and extended pumping at new extraction well(s);
    b. Development, aquifer testing, and injection capacity evaluation at new injection well(s); and
    c. Monthly sampling at injection wells before injection at these locations;

(3) Groundwater generated during operation and maintenance activities at extraction wells and injection wells in 2017; and
(4) Groundwater generated from routine purging during sampling of contaminant-affected monitoring wells under the NMED-approved 2017 Monitoring Year IFGMP and up to 5-d of pumping at additional piezometers/monitor wells associated with the Chromium Project.

Within Work Plan #5 two wells were identified under activity 2, CrEX-2 and CrIN-6. At this time additional extraction well, CrEX-4, will require land application of treated groundwater under Work Plan #5.

Water Quality

Work Plan #5, Table 3, identifies the anticipated water quality for activities under the work plan. Because the CrEX-4 well has not been completed, water quality from monitoring well R-42 represents the worst-case proxy for CrEX-4. The proxy well's maximum concentrations between January and November 2016 for chromium, nitrate+nitrite-N, and perchlorate were 836 μg/L, 6.3 mg/L, and 1.2 μg/L respectively.

Chromium is the only contaminant which exceeded the NMWQCC Regulation 3103 groundwater standards at the proxy well. The performance and removal efficiency of the proposed IX treatment system for chromium treatment was demonstrated previously during pumping tests and operations conducted under the following:

- NMED-issued temporary permissions in 2012, 2013, and 2014
- NMED-approved DP-1793 Work Plan #2 in 2015
- NMED-approved DP-1793 Work Plan #3 (as modified) in 2016
- NMED-approved DP-1793 Work Plan #5 (as modified) in 2017

In addition to the compliance and operational samples included in Work Plan #5, NMED's June 15, 2017 conditional approval requires DOE/LANS to conduct confirmation sampling of the treated water in the lagoons prior to land application. This ensures that the quality of water being land applied will be consistent with the approved Work Plan #5.

Water Quantity

An increase in the maximum daily discharge of 350,000 gpd, identified in DP-1793 and Work Plan #5, Section 10 is not requested. An increase in the total annual volume identified in DP-1793 and Work Plan #5, Section 10 is also not requested.

Based on this information the daily discharge quantity or the total annual volume will not increase.

Location of Land Application

The approved land application locations identified in Section 1 of Work Plan #5 are not being modified.

As part of this proposed amendment to Work Plan #5 DOE/LANS will ensure the annual reports and Discharge Reports include all the information related to CrEX-4 consistent with other information being provided for the other wells, treatment, and land application.

Please contact William J. Foley by telephone at (505) 665-8423 or by email at bfoley@lanl.gov if you have questions regarding this request.

Sincerely,

John C. Bretzke
Division Leader

Sincerely,

Cheryl L. Rodriguez
Program Manager, FPD-II

JCB/CLR/MTS/WJF:am

Enclosures:

1) LANL March 16, 2017 Submittal Letter and Enclosure 1, DP-1793, Work Plan #5
2) NMED Letter Dated June 15, 2017, Approving Work Plan #5
3) LANL September 28, 2017 Submittal Letter, DP-1793, Work Plan #5 – Amendment #1

Copy: Shelly Lemon, NMED/SWQB, Santa Fe, NM, (E-File)
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Lieutenant Governor

**BUTCH TONGATE**
Cabinet Secretary

**J.C. BORREGO**
Deputy Secretary

**CERTIFIED MAIL – RETURN RECEIPT REQUESTED**

November 22, 2017

John C. Bretzke
Division Leader
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Cheryl L. Rodriguez
Program Manager, FPD-II
Environmental Management
Los Alamos Field Office, A316
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Los Alamos, NM 87544

**RE: Approval of Amendment 2 – Additional Source (CrEX-4) for Multiple Activities Work Plan for the Treatment and Land Application of Groundwater from Mortandad and Sandia Canyons, DP-1793 Work Plan #5**

Dear Mr. Bretzke and Ms. Rodriguez:

On October 26, 2017, the New Mexico Environment Department (NMED) Ground Water Quality Bureau (GWQB) received *Amendment 2 – Additional Source (CrEX-4) for Multiple Activities Work Plan for the Treatment and Land Application of Groundwater for Mortandad and Sandia Canyons, DP-1793 Work Plan #5* (Work Plan) from DOE/LANS (Permittees). The Permittees' proposed Amendment 2 would add an additional groundwater source, extraction well CrEX-4.

The Work Plan is required by Condition 3 of Discharge Permit 1793 (DP-1793 or DP) for activities regulated under the DP and addresses the extraction, treatment, and land application of chromium contaminated groundwater from Mortandad and Sandia Canyons during calendar year 2017.

The proposed Amendment 2 does not suggest a change of discharge location, quantity, or quality. The maximum daily discharge volume of 350,000 gpd will remain as identified in Work Plan #5. The ion exchange treatment system will continue to remove chromium to concentrations below 45 µg/L, less than 90% of the New Mexico Water Quality Control Commission groundwater standard of 50 µg/L.

The activities that produce these waters are conducted in coordination with, and as specified in, the *Interim Measures Work Plan for Chromium Plume Control*, dated May 26, 2015, and the *Work*

*Plan for Chromium Plume Center Characterization,* dated July 28, 2015. NMED's Hazardous Waste Bureau approved these plans in a letter dated October 15, 2015.

Groundwater discharges associated with the Work Plan shall be performed in accordance with the Amended Work Plan and are subject to all conditions of the DP. The Work Plan Amendment is hereby approved as submitted.

Approval of this Work Plan Amendment does not relieve the Permittees of the responsibility to comply with any other applicable federal, state, and/or local laws and regulations. This approval does not relieve the Permittees of liability should operations associated with this Work Plan result in actual pollution of ground or surface waters.

If you have any questions, please contact Steve Pullen at (505) 827-2962. Thank you for your cooperation.

Sincerely,

Michelle Hunter, Chief
Ground Water Quality Bureau

MH:sp

cc (e-version):
Shelly Lemon, NMED/SWQB
John Kieling, NMED/HWB
Steven Yanicak, NMED/DOEOB
Steve Pullen, NMED/GWQB
William Foley, EPC-CP
Bob Beers, EPC-CP
Cheryl Rodriguez, EM-LA
Stephani Swickley, ADEM-PO
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Gerald Fordham, ER-ES

# ENCLOSURE 3

2017 Work Plan #6 Submittal Cover Letter, Work Plan #6 Amendment Requests, and NMED Response Letters, DP-1793

EPC-DO: 18-042

LA-UR-18-20567

U1501760

Date: FEB 2 6 2018

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*Date*: MAR 1 6 2017
*Symbol*: EPC-DO: 17-051
*LA-UR*: 17-20364
*Locates Action No.*: U1501760

Ms. Michelle Hunter, Chief
Ground Water Quality Bureau
New Mexico Environment Department
Harold Runnels Building, Room N2261
1190 St. Francis Drive
P.O. Box 26110
Santa Fe, NM 87502

**Subject:** **Work Plan for the Treatment and Land Application of Groundwater from Technical Areas 09 and 16, DP-1793, Work Plan #6**

Dear Ms. Hunter:

On July 27, 2015, the New Mexico Environment Department (NMED) issued a Discharge Permit (DP-1793) to the U.S. Department of Energy and Los Alamos National Security, LLC (DOE/LANS) for the land application of treated groundwater from covered activities. Pursuant to Condition No. 3 of the above-referenced discharge permit, DOE/LANS are required to submit a detailed, project-specific work plan for approval by NMED before any activities are undertaken.

The enclosed work plan is for the proposed discharge of treated groundwater from three activities: (1) legacy water remaining from 2016 activities, (2) calendar year (CY2017) water generated related to well installations, and (3) routine monitoring well purging during sampling at monitoring wells for the Technical Area (TA)-16-260 monitoring group.

The activities listed above will be conducted as specified in the NMED-approved *Groundwater Investigation Work Plan for Consolidated Unit 16-021(c)-99, Including Drilling Work Plans for Wells R-68 and R-69* and the *Interim Facility-Wide Groundwater Monitoring Plan for the 2017 Monitoring Year, October 2016-September 2017.* Produced groundwater will be treated and discharged in accordance with the enclosed work plan and supporting information.

Please contact William J. Foley by telephone at (505) 665-8423 or by email at bfoley@lanl.gov if you have questions regarding this work plan.

Sincerely,

John C. Bretzke
Division Leader

Sincerely,

Cheryl L. Rodriguez
Program Manager, FPD-II

JCB/CLR/MTS/WJF:tav

Enclosures:

1) Work Plan for Treatment and Land Application of Groundwater from Technical Areas 09 and 16, DP-1793, Work Plan #6
2) Figures
3) TA-16 260 Monitoring Group Excerpts from the Interim Facility-Wide Groundwater Monitoring Plan for the 2017 Monitoring Year, October 2016-September 2017
4) As-Built Specifications for TA-16 260 Monitoring Group Wells
5) Topographic Map of Project Site
6) Water Quality Data from TA-16 260 Monitoring Group Wells
7) Granulated Activated Carbon Groundwater Treatment System Details
8) Granulated Activated Carbon Groundwater Treatment System 2016 Effluent Results Summary

Copy: Shelly Lemon, NMED/SWQB, Santa Fe, NM, (E-File)
John E. Kieling, NMED/HWB, Santa Fe, NM, (E-File)
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*Date:* MAR 16 2017
*Symbol:* EPC-DO: 17-051
*LA-UR:* 17-20364
*Locates Action No.:* U1501760

GROUND WATER
MAR 16 2017
BUREAU

Ms. Michelle Hunter, Chief
Ground Water Quality Bureau
New Mexico Environment Department
Harold Runnels Building, Room N2261
1190 St. Francis Drive
P.O. Box 26110
Santa Fe, NM 87502

**Subject:** **Work Plan for the Treatment and Land Application of Groundwater from Technical Areas 09 and 16, DP-1793, Work Plan #6**

Dear Ms. Hunter:

On July 27, 2015, the New Mexico Environment Department (NMED) issued a Discharge Permit (DP-1793) to the U.S. Department of Energy and Los Alamos National Security, LLC (DOE/LANS) for the land application of treated groundwater from covered activities. Pursuant to Condition No. 3 of the above-referenced discharge permit, DOE/LANS are required to submit a detailed, project-specific work plan for approval by NMED before any activities are undertaken.

The enclosed work plan is for the proposed discharge of treated groundwater from three activities: (1) legacy water remaining from 2016 activities, (2) calendar year (CY2017) water generated related to well installations, and (3) routine monitoring well purging during sampling at monitoring wells for the Technical Area (TA)-16-260 monitoring group.

The activities listed above will be conducted as specified in the NMED-approved *Groundwater Investigation Work Plan for Consolidated Unit 16-021(c)-99, Including Drilling Work Plans for Wells R-68 and R-69* and the *Interim Facility-Wide Groundwater Monitoring Plan for the 2017 Monitoring Year, October 2016-September 2017.* Produced groundwater will be treated and discharged in accordance with the enclosed work plan and supporting information.

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**ENVIRONMENT DEPARTMENT**

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**J.C. BORREGO**
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**Sent Via Electronic Mail**

June 23, 2017

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**RE: Approval with Modification, Work Plan #6 for Treatment and Land Application of Groundwater at Technical Areas 09 and 16, Los Alamos National Laboratory, Discharge Permit 1793**

Dear Mr. Bretzke and Ms. Rodriguez:

On March 16, 2017, the New Mexico Environment Department (NMED) Ground Water Quality Bureau (GWQB) received the above referenced workplan (Work Plan) from the U.S. Department of Energy and Los Alamos National Security (DOE/LANS or Permittees) for the continued land application, or discharge, of treated groundwater at Technical Areas (TAs) 09 and 16 during calendar year (CY) 2017. The Work Plan is required by Condition 3 of Discharge Permit 1793 (DP-1793 or DP) for activities regulated under the DP and addresses the extraction, treatment, and land application of RDX (hexahydro-1,3,5-trinitro-1,3,5-triazine, a high explosive (HE) compound) contaminated groundwater from Cañon de Valle during calendar year 2017.

The proposed discharge is briefly described as follows.

The Work Plan proposes the discharge of treated groundwater during CY2017 from three activities:

- CY2017 groundwater generated during routine purging completed for sampling of contaminant-affected monitoring wells under the *Interim Facility Groundwater Monitoring Plan* (IFGMP) for TA-16 260 monitoring group.

- CY2017 water generated from the installation of monitoring well R-68 (and R-69 if required).
- Legacy water remaining from CY2016 activities generated in a similar manner to the waters generated in CY2017.

These CY2017 activities will be conducted in part as specified in the NMED approved *Interim Facility-Wide Groundwater Monitoring Plan for the 2017 Monitoring Year* and in part be conducted as specified in the NMED approved *Groundwater Investigation Work Plan for Consolidated Unit 16-021(c)-99, Including Drilling Work Plans for Wells R-68 and R-69*.

The primary contaminant of concern associated with the subject groundwater, and the only contaminant expected to be above regulatory or permit standards, is RDX. Also present in the investigation area groundwater are low concentrations of multiple HE compounds and organic compounds, all measured to be significantly below associated New Mexico groundwater standards.

All groundwater subject to this Work Plan will be treated with granulated activated carbon (GAC) prior to being discharged to specific land application areas within TA-09 and TA-16 as permitted under DP-1793. Monitoring will ensure that treated groundwater contaminant concentrations do not exceed the DOE/LANS' self-imposed concentration of 90% of the 20.6.2.3103 NMAC numeric standards or do not exceed 90% of the numeric standards established for tap water in Table A-1 of NMED's *Risk Assessment Guidance for Site Investigation and Remediation* for 20.6.2.7.WW NMAC toxic pollutants, *e.g.*, RDX.

The subject groundwater wells are located in the Cañon de Valle watershed within T119N/R06E/S29, S30, S31, S32 and T119N/R05E/S36. The depth to the regional aquifer beneath the proposed land application sites is approximately 1200 feet below ground surface. The direction of groundwater flow beneath the site is generally to the southeast.

A copy of the proposed WP #6 was posted on LANL's Electronic Public Reading Room on March 21, 2017. In accordance with DP-1793 Condition 3, proposed WP #6 was subject to public comment for a period of 30 days. Comments received have been considered in the preparation of this response.

Groundwater discharges associated with the Work Plan shall be performed in accordance with the Work Plan and are subject to all conditions of DP-1793. The Work Plan is approved as submitted with the following modifications:

1. The Permittees shall confirm that waters in treated effluent tanks do not exceed 90% the *NMED Risk Assessment Guidance for Site Investigations and Remediation, Table A-1. Tap Water Soil Screening Level* for RDX, i.e., 6.3 µg/L, prior to land application. To perform this confirmation analysis the Permittees shall collect a representative sample of the water in a tank and shall analyze the sample utilizing the Geochemistry and Geomaterials Research Laboratory (GGRL). The results of the confirmation analyses shall be reported to NMED in the final Discharge Report required by DP Condition 8.

2. The Permittees shall ensure that the Sampling Plan contingencies include a notification to NMED should a RDX sample result associated with waters in treated effluent tanks exceed 6.3 µg/L. The Permittees shall notify NMED via email within 24 hours of confirming the original results and shall identify the actions necessary to address the exceedance.
3. The Permittees shall ensure that inspections of non-double walled piping or hoses transferring untreated water are conducted on a daily basis on days when waters are being transferred.
4. The Permittees shall ensure that a log is kept of all inspections performed in accordance with the Work Plan. Copies of the logs shall be readily available to NMED pursuant to Permit Conditions 21 and 22.

Within 60 days of cessation of the discharge authorized under this Work Plan, the Permittees shall submit a Discharge Report in accordance with DP-1793, Condition 8.

Approval of the Work Plan does not relieve the Permittees of the responsibility to comply with any other applicable federal, state, and/or local laws and regulations. This approval also does not relieve the Permittees of liability should operations associated with this Work Plan result in actual pollution of ground or surface waters.

If you have any questions, please contact Steve Pullen at (505) 827-2962. Thank you for your cooperation.

Sincerely,

Michelle Hunter, Chief
Ground Water Quality Bureau

MH:SP

cc (e-version):
Shelly Lemon, NMED/SWQB
John Kieling, NMED/HWB
Steven Yanicak, NMED/DOEOB
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GROUND WATER
SEP 28 2017
BUREAU

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*Date:* SEP 28 2017
*Symbol:* EPC-DO: 17-354
*LA-UR:* 17-27954
*Locates Action No.:* U1501760

Ms. Michelle Hunter, Chief
Ground Water Quality Bureau
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Harold Runnels Building, Room N2261
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Santa Fe, NM 87502

**Subject:** **Extension Request for Work Plan #6 for the Treatment and Land Application of Groundwater from Technical Areas 09 and 16, DP-1793**

Dear Ms. Hunter:

On July 27, 2015, the New Mexico Environment Department (NMED) issued a Discharge Permit (DP-1793) to the U.S. Department of Energy and Los Alamos National Security, LLC (DOE/LANS). DOE/LANS submitted Work Plan #6 on March 16, 2017 (EPC-DO: 17-051) for the continued land application of treated groundwater at Technical Areas (TAs)-09 and 16 (Enclosure 1). NMED approved Work Plan #6 with conditions on June 23, 2017 (Enclosure 2). Section 11 of Work Plan #6 identified a project schedule ending on December 31, 2017.

The purpose of this letter is to amend Work Plan #6 to extend the project schedule end date identified in Section 11 of Work Plan #6 to match the term end date of DP-1793. Based on experience gained by DOE/LANS from operating the extraction, treatment, and land application system for the groundwater in TAs 09 and 16 the quantity, quality, and discharge location of treated groundwater to be land applied will be consistent with the approved Work Plan #6 during this extension period. Each of these items is addressed separately below. In addition, a comparison of the reporting requirements for discharge reports, submitted at the completion of an approved work plan discharge per DP-1793 Condition 8, and annual reports, submitted annually per DP-1793 Condition 9, is provided.

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*Date*: SEP 2 8 2017
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*Locates Action No.*: U1501760

Ms. Michelle Hunter, Chief
Ground Water Quality Bureau
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Santa Fe, NM 87502

**Subject:** **Extension Request for Work Plan #6 for the Treatment and Land Application of Groundwater from Technical Areas 09 and 16, DP-1793**

Dear Ms. Hunter:

On July 27, 2015, the New Mexico Environment Department (NMED) issued a Discharge Permit (DP-1793) to the U.S. Department of Energy and Los Alamos National Security, LLC (DOE/LANS). DOE/LANS submitted Work Plan #6 on March 16, 2017 (EPC-DO: 17-051) for the continued land application of treated groundwater at Technical Areas (TAs)-09 and 16 (Enclosure 1). NMED approved Work Plan #6 with conditions on June 23, 2017 (Enclosure 2). Section 11 of Work Plan #6 identified a project schedule ending on December 31, 2017.

The purpose of this letter is to amend Work Plan #6 to extend the project schedule end date identified in Section 11 of Work Plan #6 to match the term end date of DP-1793. Based on experience gained by DOE/LANS from operating the extraction, treatment, and land application system for the groundwater in TAs 09 and 16 the quantity, quality, and discharge location of treated groundwater to be land applied will be consistent with the approved Work Plan #6 during this extension period. Each of these items is addressed separately below. In addition, a comparison of the reporting requirements for discharge reports, submitted at the completion of an approved work plan discharge per DP-1793 Condition 8, and annual reports, submitted annually per DP-1793 Condition 9, is provided.

Water Quality

Work Plan #6 identifies three activities generating groundwater to be treated and land applied: (1) legacy water from 2016, (2) CY2017 water from well installations, and (3) monitoring well purge water. These activities, except activity number 2, will remain consistent with the current approved work plan. Activity number 2 relates to water generated during well installation(s). If during the amended period of performance for Work Plan #6, additional well installation(s) are planned separate amendment(s) will be submitted to NMED for approval. Those amendment(s) will demonstrate the additional source(s) are consistent in quality to the current sources included in Work Plan #6. At this time no additional source(s) have been identified.

In addition to the compliance and operational samples included in Work Plan #6, NMED's June 23, 2017 conditional approval requires DOE/LANS to conduct confirmation sampling of the treated water in the treated effluent tanks prior to land application. This ensures that the quality of water being land applied will be consistent with the approved Work Plan #6.

Water Quantity

An increase in the maximum daily discharge identified in DP-1793 and Work Plan #6, Section 8 is not requested. In addition, an increase in the total estimated volume proposed under Work Plan #6 for 2017, 1,076,300 gal., is not being requested. DOE/LANS requests the total volume specified in Work Plan #6 (1,076,300 gal) be applied annually each year during the project schedule.

Based on this information the daily discharge quantity or the total annual volume will not increase.

Location of Land Application

The approved land application locations identified in Section 1 of Work Plan #6 are not being modified.

Comparison of Reporting Requirements

Table 1 provides a summary of the reporting requirements outlined in DP-1793 Conditions 8 and 9.

**Table 1**
**DP-1793 Conditions 8 and 9 Reporting Requirements**

| Item Description | Condition 8 (Discharge Report) | Condition 9 (Annual Report) |
|---|---|---|
| Total volume of discharge | X (for each work plan) | X (annual for all work plans) |
| Average application rate | X | |
| Analytical results | X | X (including copies of laboratory analytical reports) |
| Soil sampling results, if required by NMED | X | |
| Map of land application areas | X | X |
| Quantity, source and date of each discharge | | X |

The discharge reports and annual reports have many duplicate items. As part of this proposed amendment to Work Plan #6 DOE/LANS will ensure the annual reports contain all of the information that is required under the Discharge Reports (average application rates and soil sampling results). The only potential exception could be soil sample results, dependent upon when soil sampling was completed. If those results are available with sufficient time to meet annual report deadlines they will be included. If not these will be identified and submitted separately, when available.

Please contact William J. Foley by telephone at (505) 665-8423 or by email at bfoley@lanl.gov if you have questions regarding this request.

Sincerely,

John C. Bretzke
Division Leader

Sincerely,

Cheryl L. Rodriguez
Program Manager, FPD-II

JCB/CLR/MTS/WJF:am

Enclosures:

1) LANL March 16, 2017 Submittal Letter and Enclosure 1, DP-1793, Work Plan #6
2) NMED Letter Dated June 23, 2017, Approving Work Plan #6

Copy: Shelly Lemon, NMED/SWQB, Santa Fe, NM, (E-File)
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November 22, 2017

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Cheryl L. Rodriguez
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**RE: Approval of Extension Request for Work Plan #6 for the Treatment and Land Application of Groundwater from Technical Areas 09 and 16, DP-1793**

Dear Mr. Bretzke and Ms. Rodriguez:

On September 28, 2017, the New Mexico Environment Department (NMED) Ground Water Quality Bureau (GWQB) received the *Extension Request for Work Plan #6 for the Treatment and Land Application of Groundwater from Technical Areas 09 and 16, DP-1793* (Work Plan) from DOE/LANS (Permittees) for the continued land application of treated groundwater at Technical Areas 09 and 16. The Work Plan is required by Condition 3 of Discharge Permit 1793 (DP-1793) for activities regulated under the Discharge Permit and addresses the extraction, treatment, and land application of RDX (hexahydro-1,3,5-trinitro-1,3,5-triazine, a high explosive (HE) compound) contaminated groundwater from Cañon de Valle during calendar year 2017. The Extension Request is to amend Work Plan #6 to extend the project schedule end-date identified in Section 11 of the Work Plan to match the term end-date of DP-1793, i.e., July 27, 2020.

The Extension Request does not propose modifications to the water quantity, water quality, or discharge location of treated groundwater to be land applied under the Work Plan. The Extension Request does propose to ensure that annual reports contain all information required in DP-1793 Conditions 8 and 9.

Groundwater discharges associated with the Work Plan shall be performed in accordance with the Work Plan and the Extension Request, and are subject to all conditions of the DP. The Extension Request for Work Plan #6 is hereby approved to match the term end-date of DP-1793.

Approval of this Work Plan does not relieve the Permittees of the responsibility to comply with any other applicable federal, state, and/or local laws and regulations. This approval does not relieve the Permittees of liability should operations associated with this Work Plan result in actual pollution of ground or surface waters.

If you have any questions, please contact Steve Pullen at (505) 827-2962. Thank you for your cooperation.

Sincerely,

for

Michelle Hunter, Chief
Ground Water Quality Bureau

MH:sp

cc (e-version):
Shelly Lemon, NMED/SWQB
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# ENCLOSURE 4

2017 Daily Land Application Volumes,
Locations, and Sources, DP-1793

EPC-DO: 18-042

LA-UR-18-20567

U1501760

Date: FEB 2 6 2018

# Table E4-1
## 2017 Daily Land Application Volumes, Locations, and Sources
## DP-1793

| | Land Application Volume (gal) | | | |
|---|---|---|---|---|
| Date | Work Plan #5 (CrEX) | Work Plan #6 (RDX) | Total | Source of Treated Groundwater and Land Application Location |
| 6/8/2017 | 5,065 | 0 | 5,065 | Legacy Water applied to Work Plan #5 Land Application Zone #4 (north/south sprinkler zones) from basins 4, 5, and 6 |
| 6/12/2017 | 54,701 | 0 | 54,701 | Legacy Water applied to Work Plan #5 Land Application Zone #4 (north/south sprinkler zones) from basins 4, 5, and 6 |
| 6/13/2017 | 92,100 | 0 | 92,100 | Legacy Water applied to Work Plan #5 Land Application Zone #4 (north/south sprinkler zones) from basins 4 and 6 |
| 6/15/2017 | 61,962 | 0 | 61,962 | Legacy Water applied to Work Plan #5 Land Application Zones #1, #2, #3 (road) and #4 (north/south sprinkler zones) from basins 4 and 5 |
| 6/19/2017 | 15,500 | 0 | 15,500 | Legacy Water applied to Work Plan #5 Land Application Zone #1, #2, #3 (road) from basin 5 |
| 6/20/2017 | 11,348 | 0 | 11,348 | Legacy Water applied to Work Plan #5 Land Application Zone #4 (north sprinkler zone) from basin 4 |
| 6/29/2017 | 29,840 | 0 | 29,840 | FY17 Purge Water applied to Work Plan #5 Land Application Zone #4 (north sprinkler zone) from basin 6 |
| 7/18/2017 | 0 | 5,000 | 5,000 | Legacy Water and FY17 Purge Water applied to Work Plan #6 Land Application Zone #9 |
| 7/19/2017 | 0 | 5,000 | 5,000 | Legacy Water and FY17 Purge Water applied to Work Plan #6 Land Application Zone #9 |
| 7/20/2017 | 0 | 5,000 | 5,000 | Legacy Water and FY17 Purge Water applied to Work Plan #6 Land Application Zone #9 |
| 7/21/2017 | 0 | 5,000 | 5,000 | Legacy Water and FY17 Purge Water applied to Work Plan #6 Land Application Zone #9 |
| 7/24/2017 | 0 | 5,000 | 5,000 | Legacy Water and FY17 Purge Water applied to Work Plan #6 Land Application Zone #9 |
| 7/25/2017 | 0 | 5,000 | 5,000 | Legacy Water and FY17 Purge Water applied to Work Plan #6 Land Application Zone #9 |

# Table E4-1
# 2017 Daily Land Application Volumes, Locations, and Sources
# DP-1793

| | Land Application Volume (gal) | | | Source of Treated Groundwater and Land Application Location |
|---|---|---|---|---|
| Date | Work Plan #5 (CrEX) | Work Plan #6 (RDX) | Total | |
| 7/26/2017 | 63,561 | 0 | 63,561 | FY17 Purge Water applied to Work Plan #5 Land Application Zone #4 (north/south sprinkler zones) from basin 6 |
| 7/27/2017 | 19,433 | 0 | 19,433 | FY17 Purge Water applied to Work Plan #5 Land Application Zone #4 (south sprinkler zone) from basin 6 |
| 8/3/2017 | 60,763 | 0 | 60,763 | FY17 Purge Water applied to Work Plan #5 Land Application Zone #4 (north sprinkler zone) from basin 6 |
| 8/9/2017 | 46,574 | 0 | 46,574 | FY17 Purge Water applied to Work Plan #5 Land Application Zone #4 (north/south sprinkler zones) from basin 6 |
| 8/14/2017 | 16,850 | 0 | 16,850 | FY17 Purge Water applied to Work Plan #5 Land Application Zone #4 (north sprinkler zone) from basin 6 |
| 8/15/2017 | 45,087 | 0 | 45,087 | FY17 Purge Water applied to Work Plan #5 Land Application Zone #4 (south sprinkler zone) from basin 6 |
| 8/16/2017 | 17,488 | 0 | 17,488 | FY17 Purge Water applied to Work Plan #5 Land Application Zone #4 (north sprinkler zone) from basin 6 |
| 8/18/2017 | 42,737 | 0 | 42,737 | FY17 Purge Water applied to Work Plan #5 Land Application Zone #4 (south sprinkler zone) from basin 5 |
| 8/22/2017 | 14,713 | 0 | 14,713 | FY17 Purge Water applied to Work Plan #5 Land Application Zone #4 (north sprinkler zone) from basin 5 |
| 10/25/2017 | 0 | 10,632 | 10,632 | FY17 Purge Water applied to Work Plan #6 Land Application Zone #9 |
| 10/30/2017 | 54,973 | 0 | 54,973 | FY17 Purge Water applied to Work Plan #5 Land Application Zone #4 (north/south sprinkler zones) from basins 4 and 5 |
| 10/31/2017 | 123,452 | 0 | 123,452 | FY17 Purge Water applied to Work Plan #5 Land Application Zone #4 (north/south sprinkler zones) from basins 4, 5 and 6 |
| 11/3/2017 | 83,319 | 0 | 83,319 | FY17 Purge Water applied to Work Plan #5 Land Application Zone #4 (north/south sprinkler zones) from basins 5 and 6 |
| 11/4/2017 | 209,923 | 0 | 209,923 | FY17 Purge Water applied to Work Plan #5 Land Application Zone #4 (north/south sprinkler zones) from basins 5 and 6 |

# Table E4-1
## 2017 Daily Land Application Volumes, Locations, and Sources
## DP-1793

| | Land Application Volume (gal) | | | |
|---|---|---|---|---|
| Date | Work Plan #5 (CrEX) | Work Plan #6 (RDX) | Total | Source of Treated Groundwater and Land Application Location |
| 11/5/2017 | 119,762 | 0 | 119,762 | FY17 Purge Water applied to Work Plan #5 Land Application Zone #4 (north/south sprinkler zones) from basins 4 and 5 |
| 11/6/2017 | 70,715 | 0 | 70,715 | FY17 Purge Water applied to Work Plan #5 Land Application Zone #4 (north/south sprinkler zones) from basins 4 and 5 |
| 11/7/2017 | 63,683 | 0 | 63,683 | FY17 Purge Water applied to Work Plan #5 Land Application Zone #4 (north/south sprinkler zones) from basins 4 and 6 |
| 11/9/2017 | 143,115 | 0 | 143,115 | FY17 Purge Water applied to Work Plan #5 Land Application Zone #4 (north/south sprinkler zones) from basins 4 and 5 |
| 11/13/2017 | 44,954 | 0 | 44,954 | CrIN-6 aquifer test water applied to Work Plan #5 Land Application Zone #4 (north/south sprinkler zones) from basins 4 and 5 |
| 11/14/2017 | 14,573 | 0 | 14,573 | CrIN-6 aquifer test water applied to Work Plan #5 Land Application Zone #4 (north/south sprinkler zones) from basin 5 |
| 11/15/2017 | 27,664 | 0 | 27,664 | CrIN-6 aquifer test water applied to Work Plan #5 Land Application Zone #4 (north/south sprinkler zones) from basin 5 |
| 11/20/2017 | 24,700 | 0 | 24,700 | CrIN-6 aquifer test water applied to Work Plan #5 Land Application Zone #4 (north/south sprinkler zones) from basin 5 |
| 12/5/2017 | 35,906 | 0 | 35,906 | CrEX-4 development water applied to Work Plan #5 Land Application Zone #4 (north sprinkler zone) from basin 4 |
| Total | 1,614,461 | 40,632 | 1,655,093 | |
| Total Planned Volume | 53,283,900 | 1,076,300 | 54,360,200 | |

# ENCLOSURE 5

2017 Analytical Results Summary Tables,
DP-1793

EPC-DO: 18-042

LA-UR-18-20567

U1501760

Date: FEB 2 6 2018

Table E5-1
2017 Work Plan #5 - Treatment Unit Effluent Data Summary

| Sample | Collection Date | Analyte | Result | Units | Lab Qualifier Code | Detect Flag | Sample Preparation | Lab | Method | Report Detection Limit |
|---|---|---|---|---|---|---|---|---|---|---|
| CTU6B-17-140790 | 06-23-2017 | Perchlorate | 0.18 | ug/L | J | Y | F | GELC | SW-846:6850 | 0.200 |
| CTU6B-17-140790 | 06-23-2017 | Chromium | 13.3 | ug/L | | Y | F | GELC | SW-846:6020 | 10.0 |
| CTU6B-17-140790 | 06-23-2017 | Nitrate-Nitrite as Nitrogen | 2.07 | mg/L | | Y | F | GELC | EPA:353.2 | 0.250 |
| CTU6B-17-140791 | 06-27-2017 | Perchlorate | 0.16 | ug/L | J | Y | F | GELC | SW-846:6850 | 0.200 |
| CTU6B-17-140791 | 06-27-2017 | Chromium | 8.9 | ug/L | J | Y | F | GELC | SW-846:6020 | 10.0 |
| CTU6B-17-140791 | 06-27-2017 | Nitrate-Nitrite as Nitrogen | 2.39 | mg/L | | Y | F | GELC | EPA:353.2 | 0.250 |
| CTU6B-17-140793 | 07-17-2017 | Perchlorate | 0.211 | ug/L | | Y | F | GELC | SW-846:6850 | 0.200 |
| CTU6B-17-140793 | 07-17-2017 | Chromium | 3.95 | ug/L | J | Y | F | GELC | SW-846:6020 | 10.0 |
| CTU6B-17-140793 | 07-17-2017 | Nitrate-Nitrite as Nitrogen | 2.86 | mg/L | | Y | F | GELC | EPA:353.2 | 0.250 |
| CTU6B-17-140786 | 07-18-2017 | Perchlorate | 0.215 | ug/L | | Y | F | GELC | SW-846:6850 | 0.200 |
| CTU6B-17-140786 | 07-18-2017 | Chromium | 4.87 | ug/L | J | Y | F | GELC | SW-846:6020 | 10.0 |
| CTU6B-17-140786 | 07-18-2017 | Nitrate-Nitrite as Nitrogen | 2.83 | mg/L | | Y | F | GELC | EPA:353.2 | 0.250 |
| CTU6B-17-140792 | 07-19-2017 | Perchlorate | 0.23 | ug/L | | Y | F | GELC | SW-846:6850 | 0.200 |
| CTU6B-17-140792 | 07-19-2017 | Chromium | 3.53 | ug/L | J | Y | F | GELC | SW-846:6020 | 10.0 |
| CTU6B-17-140792 | 07-19-2017 | Nitrate-Nitrite as Nitrogen | 3.30 | mg/L | | Y | F | GELC | EPA:353.2 | 0.250 |
| CTU6B-17-140789 | 07-20-2017 | Perchlorate | 0.211 | ug/L | | Y | F | GELC | SW-846:6850 | 0.200 |
| CTU6B-17-140789 | 07-20-2017 | Chromium | 4.05 | ug/L | J | Y | F | GELC | SW-846:6020 | 10.0 |
| CTU6B-17-140789 | 07-20-2017 | Nitrate-Nitrite as Nitrogen | 3.76 | mg/L | | Y | F | GELC | EPA:353.2 | 0.250 |
| CTU6B-17-140788 | 07-21-2017 | Perchlorate | 0.23 | ug/L | | Y | F | GELC | SW-846:6850 | 0.200 |
| CTU6B-17-140788 | 07-21-2017 | Chromium | 6.06 | ug/L | J | Y | F | GELC | SW-846:6020 | 10.0 |
| CTU6B-17-140788 | 07-21-2017 | Nitrate-Nitrite as Nitrogen | 4.41 | mg/L | | Y | F | GELC | EPA:353.2 | 0.500 |
| CTU6B-17-140787 | 07-25-2017 | Perchlorate | 0.238 | ug/L | | Y | F | GELC | SW-846:6850 | 0.200 |
| CTU6B-17-140787 | 07-25-2017 | Chromium | 3.00 | ug/L | U | N | F | GELC | SW-846:6020 | 10.0 |
| CTU6B-17-140787 | 07-25-2017 | Nitrate-Nitrite as Nitrogen | 4.65 | mg/L | | Y | F | GELC | EPA:353.2 | 0.500 |
| CTU6B-17-140785 | 07-26-2017 | Perchlorate | 0.235 | ug/L | | Y | F | GELC | SW-846:6850 | 0.200 |
| CTU6B-17-140785 | 07-26-2017 | Chromium | 3.00 | ug/L | U | N | F | GELC | SW-846:6020 | 10.0 |
| CTU6B-17-140785 | 07-26-2017 | Nitrate-Nitrite as Nitrogen | 5.13 | mg/L | | Y | F | GELC | EPA:353.2 | 0.500 |
| CTU6B-17-144706 | 08-17-2017 | Perchlorate | 0.209 | ug/L | | Y | F | GELC | SW-846:6850 | 0.200 |
| CTU6B-17-144706 | 08-17-2017 | Chromium | 3.00 | ug/L | U | N | F | GELC | SW-846:6020 | 10.000 |

Table E5-1
2017 Work Plan #5 - Treatment Unit Effluent Data Summary

| Sample | Collection Date | Analyte | Result | Units | Lab Qualifier Code | Detect Flag | Sample Preparation | Lab | Method | Report Detection Limit |
|---|---|---|---|---|---|---|---|---|---|---|
| CTU6B-17-144706 | 08-17-2017 | Nitrate-Nitrite as Nitrogen | 4.72 | mg/L | | Y | F | GELC | EPA:353.2 | 0.250 |
| CTU6B-18-147901 | 10-05-2018 | Perchlorate | 0.21 | ug/L | | Y | F | GELC | SW-846:6850 | 0.200 |
| CTU6B-18-147901 | 10-05-2018 | Chromium | 3.00 | ug/L | U | N | F | GELC | SW-846:6020 | 10.0 |
| CTU6B-18-147901 | 10-05-2018 | Nitrate-Nitrite as Nitrogen | 5.30 | mg/L | | Y | F | GELC | EPA:353.2 | 0.250 |
| CTUC-18-148552 | 11-01-2017 | Perchlorate | 0.202 | ug/L | | Y | F | GELC | SW-846:6850 | 0.200 |
| CTUC-18-148552 | 11-01-2017 | Chromium | 3.00 | ug/L | U | N | F | GELC | SW-846:6020 | 10.0 |
| CTUC-18-148552 | 11-01-2017 | Nitrate-Nitrite as Nitrogen | 3.06 | mg/L | | Y | F | GELC | EPA:353.2 | 0.250 |
| CTUC-18-148550 | 11-07-2017 | Perchlorate | 0.26 | ug/L | | Y | F | GELC | SW-846:6850 | 0.200 |
| CTUC-18-148550 | 11-07-2017 | Chromium | 3.00 | ug/L | U | N | F | GELC | SW-846:6020 | 10.0 |
| CTUC-18-148550 | 11-07-2017 | Nitrate-Nitrite as Nitrogen | 4.35 | mg/L | | Y | F | GELC | EPA:353.2 | 0.250 |
| CTU6B-18-149986 | 11-28-2017 | Perchlorate | 0.184 | ug/L | J | Y | F | GELC | SW-846:6850 | 0.200 |
| CTU6B-18-149986 | 11-28-2017 | Chromium | 22.4 | ug/L | | Y | F | GELC | SW-846:6020 | 10.0 |
| CTU6B-18-149986 | 11-28-2017 | Nitrate-Nitrite as Nitrogen | 5.77 | mg/L | | Y | F | GELC | EPA:353.2 | 0.500 |
| CTU6B-18-149981 | 12-01-2017 | Perchlorate | 0.232 | ug/L | | Y | F | GELC | SW-846:6850 | 0.200 |
| CTU6B-18-149981 | 12-01-2017 | Chromium | 13.2 | ug/L | | Y | F | GELC | SW-846:6020 | 10.0 |
| CTU6B-18-149981 | 12-01-2017 | Nitrate-Nitrite as Nitrogen | 7.79 | mg/L | | Y | F | GELC | EPA:353.2 | 0.500 |
| CTU6B-18-149985 | 12-06-2017 | Perchlorate | 0.18 | ug/L | J | Y | F | GELC | SW-846:6850 | 0.200 |
| CTU6B-18-149985 | 12-06-2017 | Chromium | 7.65 | ug/L | J | Y | F | GELC | SW-846:6020 | 10.0 |
| CTU6B-18-149985 | 12-06-2017 | Nitrate-Nitrite as Nitrogen | 4.45 | mg/L | | Y | F | GELC | EPA:353.2 | 0.500 |
| CTU6B-18-147900 | 12-12-2017 | Perchlorate | 0.14 | ug/L | J | Y | F | GELC | SW-846:6850 | 0.200 |
| CTU6B-18-147900 | 12-12-2017 | Chromium | 9.27 | ug/L | J | Y | F | GELC | SW-846:6020 | 10.0 |
| CTU6B-18-147900 | 12-12-2017 | Nitrate-Nitrite as Nitrogen | 3.89 | mg/L | | Y | F | GELC | EPA:353.2 | 0.500 |

Notes:
F - filtered.
N - in the detect flag column means the analyte was undetected.
Y - in the detect flag column means the analyte was detected.
U - in the lab qualifier column means analyte is classified as not detected.
J - in the lab qualifier comment means the analyte is classified as estimated.

ENCLOSURE 5

Table E5-2

2017 Work Plan #5 - Confirmation Analysis Results

| Sample | Collection Date | Analyte | Result | Units | Lab Qualifier Code | Lab | Method | Basin |
|---|---|---|---|---|---|---|---|---|
| CRDRPIT-17-139114 | 06-01-2017 | Chromium | 3.00 | ug/L | U | GELC | SW-846:6020 | 6 |
| CRDRPIT-17-139114 | 06-01-2017 | Nitrate-Nitrite as Nitrogen | 0.05 | mg/L | J | GELC | EPA:353.2 | 6 |
| CRDRPIT-17-139115 | 06-01-2017 | Chromium | 3.00 | ug/L | U | GELC | SW-846:6020 | 5 |
| CRDRPIT-17-139115 | 06-01-2017 | Nitrate-Nitrite as Nitrogen | 0.04 | mg/L | J | GELC | EPA:353.2 | 5 |
| CRDRPIT-17-139116 | 06-01-2017 | Chromium | 4.78 | ug/L | J | GELC | SW-846:6020 | 1 |
| CRDRPIT-17-139116 | 06-01-2017 | Nitrate-Nitrite as Nitrogen | 0.78 | mg/L | | GELC | EPA:353.2 | 1 |
| CRDRPIT-17-139117 | 06-01-2017 | Chromium | 3.00 | ug/L | U | GELC | SW-846:6020 | 4 |
| CRDRPIT-17-139117 | 06-01-2017 | Nitrate-Nitrite as Nitrogen | 0.09 | mg/L | | GELC | EPA:353.2 | 4 |
| HA-B-6-01-17 | 06-28-2017 | Chromium | 0.00 | mg/L | | N/A | HACH | 6 |
| HA-B-6-01-17 | 06-28-2017 | Nitrate-Nitrite as Nitrogen | 1.375 | mg/L | | N/A | HACH | 6 |
| HA-B-6-02 | 07-25-2017 | Chromium | 0.00 | mg/L | | N/A | HACH | 6 |
| HA-B-6-02 | 07-25-2017 | Nitrate-Nitrite as Nitrogen | 3.95 | mg/L | | N/A | HACH | 6 |
| HA-B-5-001-17 | 08-17-2017 | Chromium | 0.00 | mg/L | | N/A | HACH | 5 |
| HA-B-5-001-17 | 08-17-2017 | Nitrate-Nitrite as Nitrogen | 2.45 | mg/L | | N/A | HACH | 5 |
| HA-B-04-01-17 | 10-30-2017 | Chromium | 0.01 | mg/L | | N/A | HACH | 4 |
| HA-B-04-01-17 | 10-30-2017 | Nitrate-Nitrite as Nitrogen | 1.20 | mg/L | | N/A | HACH | 4 |
| HA-B-05-02-17 | 10-30-2017 | Chromium | 0.00 | mg/L | | N/A | HACH | 5 |
| HA-B-05-02-17 | 10-30-2017 | Nitrate-Nitrite as Nitrogen | 0.35 | mg/L | | N/A | HACH | 5 |
| HA-B-06-03-17 | 10-30-2017 | Chromium | 1.00 | mg/L | | N/A | HACH | 6 |
| HA-B-06-03-17 | 10-30-2017 | Nitrate-Nitrite as Nitrogen | 3.95 | mg/L | | N/A | HACH | 6 |
| HA-B-04-02-17 | 11-02-2017 | Chromium | 1.00 | mg/L | | N/A | HACH | 4 |
| HA-B-04-02-17 | 11-02-2017 | Nitrate-Nitrite as Nitrogen | 3.95 | mg/L | | N/A | HACH | 4 |
| HA-B-05-03-17 | 11-03-2017 | Chromium | 1.00 | mg/L | | N/A | HACH | 5 |
| HA-B-05-03-17 | 11-03-2017 | Nitrate-Nitrite as Nitrogen | 3.95 | mg/L | | N/A | HACH | 5 |
| HA-B-04-03-17 | 11-04-2017 | Chromium | 1.00 | mg/L | | N/A | HACH | 4 |
| HA-B-04-03-17 | 11-04-2017 | Nitrate-Nitrite as Nitrogen | 3.95 | mg/L | | N/A | HACH | 4 |
| HA-B-06-04-17 | 11-05-2017 | Chromium | 1.00 | mg/L | | N/A | HACH | 6 |
| HA-B-06-04-17 | 11-05-2017 | Nitrate-Nitrite as Nitrogen | 3.95 | mg/L | | N/A | HACH | 6 |
| HA-B-4-05-17 | 11-30-2017 | Chromium | 1.00 | mg/L | | N/A | HACH | 4 |
| HA-B-4-05-17 | 11-30-2017 | Nitrate-Nitrite as Nitrogen | 3.95 | mg/L | | N/A | HACH | 4 |

Notes:

U - in the lab qualifier column means analyte is classified as not detected.

J - in the lab qualifier comment means the analyte is classified as estimated.

Table E5-3
2017 Work Plan #6 - Treatment Unit Effluent Data Summary

| Sample ID | Collection Date | Analyte | Result | Units | Lab Qualifier Code | Detect Flag | Sample Preparation | Lab | Method | Report Detection Limit |
|---|---|---|---|---|---|---|---|---|---|---|
| VS-HE-4-17-141946 | 07-13-2017 | RDX | 0.09 | ug/L | U | N | N | GELC | SW-846:8330B | 0.278 |
| VS-HE-4-17-141949 | 07-18-2017 | RDX | 0.09 | ug/L | U | N | N | GELC | SW-846:8330B | 0.266 |
| VS-HE-4-17-141952 | 07-24-2017 | RDX | 0.09 | ug/L | U | N | N | GELC | SW-846:8330B | 0.269 |
| VS-HE-4-17-141955 | 08-10-2017 | RDX | 0.09 | ug/L | U | N | N | GELC | SW-846:8330B | 0.275 |
| VS-HE-4-17-144559 | 10-19-2017 | RDX | 0.09 | ug/L | U | N | N | GELC | SW-846:8330B | 0.266 |

Notes:
N - in the sample preparation column means the sample was not filtered.
N - in the detect flag column means the analyte was undetected.
U - in the lab qualifier column means analyte is classified as not detected.

Table E5-4

2017 Work Plan #6 - Confirmation Analysis Results

| Sample | Collection Date | Analyte | Result | Units | Lab Qualifier Code | Lab | Method | Tank |
|---|---|---|---|---|---|---|---|---|
| TK-3-17-141957 | 07-17-2017 | RDX | 2 | ug/L | U | EES6 | SW-846:8330 | 3 |
| TK-4-17-141965 | 07-18-2017 | RDX | 2 | ug/L | U | EES6 | SW-846:8330 | 4 |
| TK-3-17-141956 | 07-19-2017 | RDX | 2 | ug/L | U | EES6 | SW-846:8330 | 3 |
| TK-4-17-141966 | 07-20-2017 | RDX | 2 | ug/L | U | EES6 | SW-846:8330 | 4 |
| TK-3-17-141958 | 07-21-2017 | RDX | 2 | ug/L | U | EES6 | SW-846:8330 | 3 |
| TK-4-17-141964 | 07-24-2017 | RDX | 2 | ug/L | U | EES6 | SW-846:8330 | 4 |
| TK-3-17-141961 | 07-25-2017 | RDX | 2 | ug/L | U | EES6 | SW-846:8330 | 3 |
| TK-3-17-141960 | 07-25-2017 | RDX | 2 | ug/L | U | EES6 | SW-846:8330 | 3 |
| TK-4-17-141967 | 07-31-2017 | RDX | 2 | ug/L | U | EES6 | SW-846:8330 | 4 |
| TK-3-17-141959 | 08-22-2017 | RDX | 2 | ug/L | U | EES6 | SW-846:8330 | 3 |
| TK-3-17-141962 | 10-20-2017 | RDX | 2 | ug/L | U | EES6 | SW-846:8330 | 3 |

Notes:

U - in the lab qualifier column means analyte is classified as not detected.

# ENCLOSURE 6

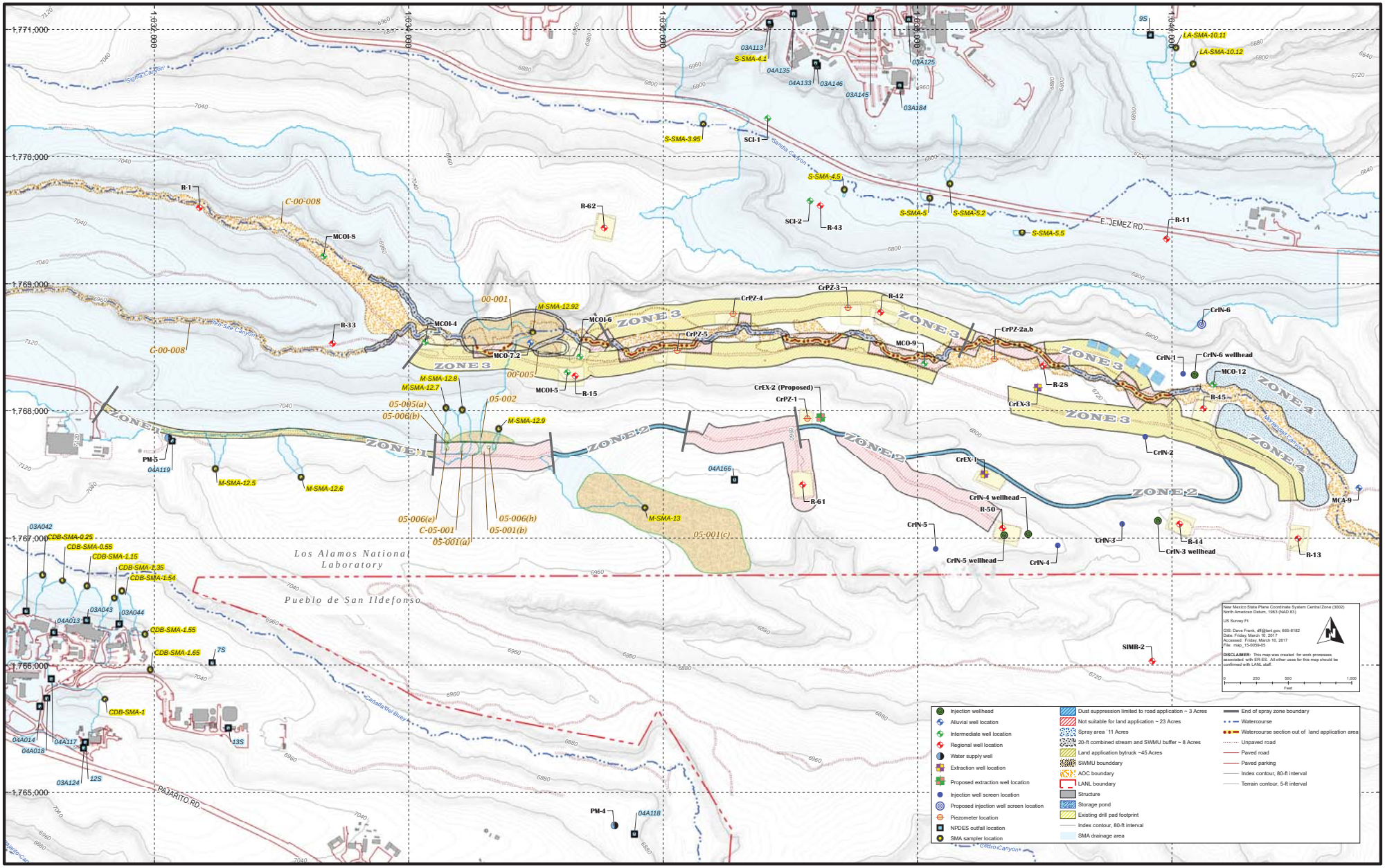
Work Plan #5 Land Application Zones,
DP-1793

EPC-DO: 18-042

LA-UR-18-20567

U1501760

Date: FEB 2 6 2018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1,630,000
1,632,000
ZONE 1
ZONE 2
ZONE 3
ZONE 4
Los Alamos National Laboratory
Pueblo de San Ildefonso
PAJARITO RD
E. JEMEZ RD.
Sigma Canyon
Canada del Buey
Pajarito Canyon
Mortandad Canyon
R-1
C-00-008
MCOI-S
R-33
MCOI-4
MCOI-6
MCO-7.2
MCOI-5
R-15
00-001
M-SMA-12.92
00-005
M-SMA-12.8
M-SMA-12.7
05-085(a)
05-006(b)
05-002
M-SMA-12.9
05-006(e)
C-05-001
05-001(a)
05-006(h)
05-001(b)
05-001(c)
M-SMA-13
PM-5
04A119
M-SMA-12.5
M-SMA-12.6
R-62
R-43
SCI-2
SCI-1
S-SMA-3.95
S-SMA-4.1
S-SMA-4.5
S-SMA-5
S-SMA-5.2
S-SMA-5.5
03A113
04A135
04A133
03A146
03A145
03A125
03A184
9S
LA-SMA-10.11
LA-SMA-10.12
R-11
R-42
CrPZ-3
CrPZ-4
CrPZ-5
CrPZ-2a,b
MCO-9
R-28
CrEX-3
CrEX-2 (Proposed)
CrPZ-1
CrEX-1
R-61
04A166
CrIN-6
CrIN-6 wellhead
CrIN-1
MCO-12
R-45
CrIN-2
MCA-9
CrIN-4 wellhead
R-50
CrIN-5
CrIN-5 wellhead
CrIN-4
CrIN-3
CrIN-3 wellhead
R-44
R-13
SIMR-2
03A042
CDB-SMA-0.25
CDB-SMA-0.55
CDB-SMA-1.15
CDB-SMA-2.35
CDB-SMA-1.54
03A043
03A044
04A013
CDB-SMA-1.55
CDB-SMA-1.65
7S
CDB-SMA-1
13S
04A014
04A018
04A117
12S
03A124
PM-4
04A118
Injection wellhead
Alluvial well location
Intermediate well location
Regional well location
Water supply well
Extraction well location
Proposed extraction well location
Injection well screen location
Proposed injection well screen location
Piezometer location
NPDES outfall location
SMA sampler location
Dust suppression limited to road application ~ 3 Acres
Not suitable for land application ~ 23 Acres
Spray area '11 Acres
20-ft combined stream and SWMU buffer ~ 8 Acres
Land application bytruck ~45 Acres
SWMU bounddary
AOC boundary
LANL boundary
Structure
Storage pond
Existing drill pad footprint
Index contour, 80-ft interval
SMA drainage area
End of spray zone boundary
Watercourse
Watercourse section out of land application area
Unpaved road
Paved road
Paved parking
Index contour, 80-ft interval
Terrain contour, 5-ft interval
New Mexico State Plane Coordinate System Central Zone (3002)
North American Datum, 1983 (NAD 83)
US Survey Ft
GIS: Dave Frank, dlf@lanl.gov, 665-8182
Date: Friday, March 10, 2017
Accessed: Friday, March 10, 2017
File: map_15-0059-05
DISCLAIMER: This map was created for work processes associated with ER-ES. All other uses for this map should be confirmed with LANL staff.
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Feet
Document Path: \\slip\gis\GIS\Projects\15-Projects\15-0059\mxd\map_15-0059-05.mxd

# ENCLOSURE 7

Work Plan #6 Land Application Zones,
DP-1793

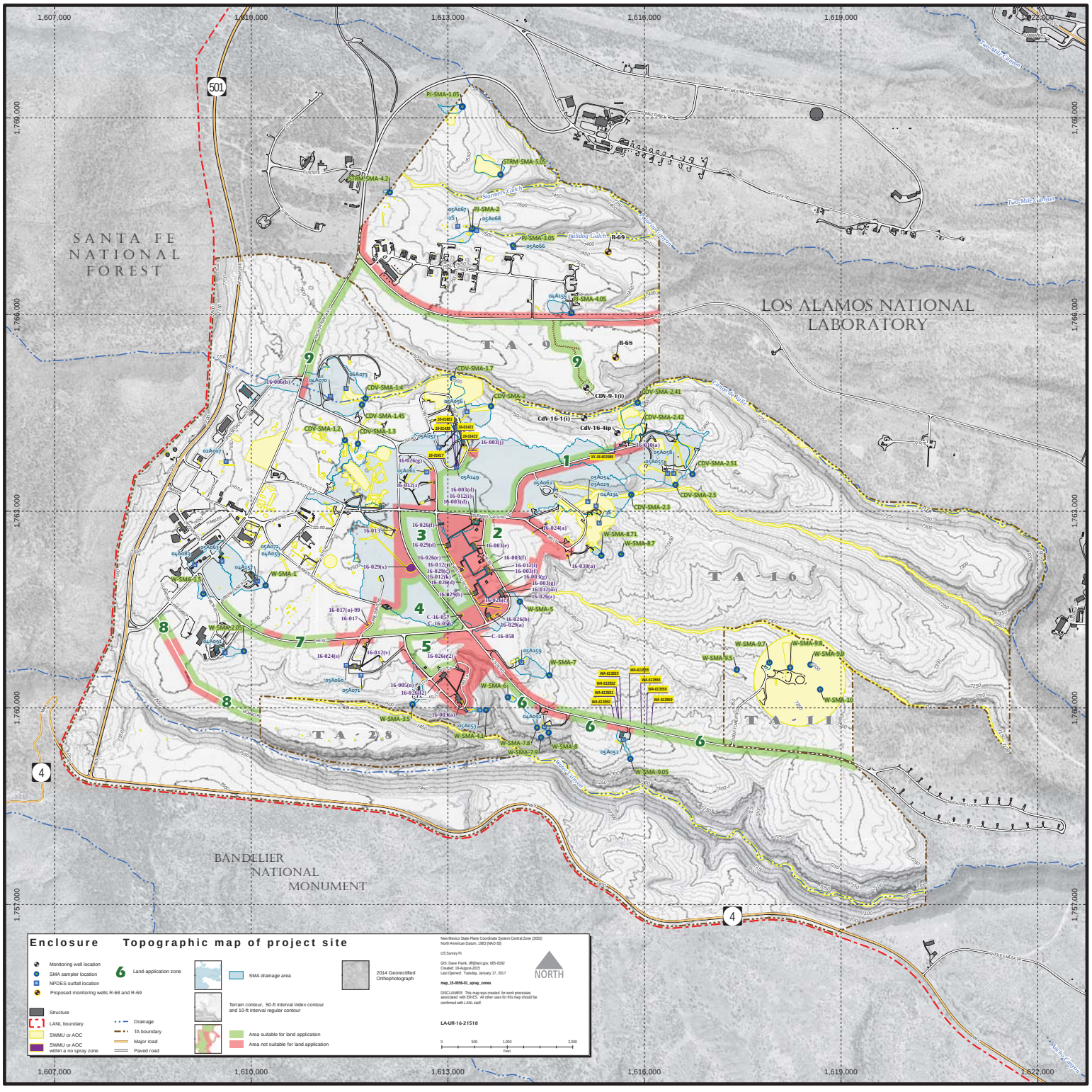
EPC-DO: 18-042

LA-UR-18-20567

U1501760

Date: FEB 2 6 2018

ENCLOSURE 7




**Enclosure** **Topographic map of project site**

Monitoring well location
SMA sampler location
NPDES outfall location
Proposed monitoring wells R-68 and R-69
6 Land-application zone
SMA drainage area
2014 Georectified Orthophotograph
Structure
LANL boundary
SWMU or AOC
SWMU or AOC within a no spray zone
Drainage
TA boundary
Major road
Paved road
Terrain contour, 50-ft interval index contour and 10-ft interval regular contour
Area suitable for land application
Area not suitable for land application

New Mexico State Plane Coordinate System Central Zone (3002)
North American Datum, 1983 (NAD 83)
US Survey Ft
GIS: Dave Frank, dff@lanl.gov, 665-8182
Created: 19-August-2015
Last Opened: Tuesday, January 17, 2017
map_15-0056-01_spray_zones
DISCLAIMER: This map was created for work processes associated with ER-ES. All other uses for this map should be confirmed with LANL staff.
LA-UR-16-21518
NORTH
0 500 1,000 2,000 Feet

Document Path: \\alilpigis\GIS\Projects\15-Projects\15-0056\mxd\map_15-0056-01_spray_zones.mxd

# ENCLOSURE 8

Work Plan #5 2017 Analytical Reports (CD) from GEL Laboratories LLC (upon request)

EPC-DO: 18-042

LA-UR-18-20567

U1501760

Date: FEB 2 6 2018

# ABSTRACT: ENCLOSURE 8 CD (1)

Enclosure 8 is one CD. This CD contains the analytical reports from compliance samples obtained in accordance with the Sampling Plan identified in DP-1793, Work Plan #5. These reports are for the samples collected and sent to the off-site independent National Environmental Laboratory Accreditation Program– (NELAP-)-accredited analytical laboratory.

# ENCLOSURE 9

Work Plan #6 2017 Analytical Reports (CD) from GEL Laboratories LLC (upon request)

EPC-DO: 18-042

LA-UR-18-20567

U1501760

Date: FEB 2 6 2018

# ABSTRACT: ENCLOSURE 9 CD (1)

Enclosure 9 is one CD. This CD contains the analytical reports from compliance samples obtained in accordance with the Sampling Plan identified in DP-1793, Work Plan #6. These are the reports are for the samples collected and sent to the off-site independent National Environmental Laboratory Accreditation Program– (NELAP-)-accredited analytical laboratory.