ESHID-602739

Environmental Protection & Compliance Division
Los Alamos National Laboratory
PO Box 1663, K491
Los Alamos, New Mexico 87545
(505) 667-2211

Environmental Management
Los Alamos Field Office
3747 West Jemez Road, A316
Los Alamos, New Mexico 87544
(505) 665-5820/Fax (505) 665-5903

Date: NOV 2 2 2017
Symbol: EPC-DO: 17-449
LA-UR: 17-29751
Locates Action No.: U1601822

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: **Quarterly Report – 2017 Quarter 3, Discharge Permit DP-1835, Class V Underground Injection Control Wells**

Dear Ms. Hunter:

On August 31, 2016, the New Mexico Environment Department (NMED) issued Discharge Permit (DP) 1835 to the U.S. Department of Energy and Los Alamos National Security, LLC (DOE/LANS) for the discharge of treated groundwater to the regional aquifer through up to six Class V Underground Injection Control (UIC) wells. Pursuant to Condition No. 10 of the above-referenced discharge permit, DOE/LANS are required to submit quarterly reports for the previous quarter to document:

1. *Influent and discharge volumes from the treatment systems;*
2. *Quarterly groundwater and treated effluent sampling results; and*
3. *Operations/Maintenance activities.*

Pursuant to Condition Nos. 11, 12, and 13 of DP-1835, the quarterly reports shall also contain general information, performance information, and monitoring data of treated effluent from each ion-exchange (IX) treatment system, respectively. During the 2017 July 1st through September 30th (Quarter 3) reporting period, discharge of treated groundwater to the regional aquifer continued under DP-1835. This treated discharge occurred at five of the six UIC wells: CrIN-1, CrIN-2, CrIN-3, CrIN-4 and CrIN-5. The Quarterly Report – 2017 Quarter 3 (Enclosure 1) provides the information required under DP-1835 for this reporting period.

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Los Alamos, New Mexico 87545
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GROUND WATER
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BUREAU

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1. *Influent and discharge volumes from the treatment systems;*
2. *Quarterly groundwater and treated effluent sampling results; and*
3. *Operations/Maintenance activities.*

Pursuant to Condition Nos. 11, 12, and 13 of DP-1835, the quarterly reports shall also contain general information, performance information, and monitoring data of treated effluent from each ion-exchange (IX) treatment system, respectively. During the 2017 July 1st through September 30th (Quarter 3) reporting period, discharge of treated groundwater to the regional aquifer continued under DP-1835. This treated discharge occurred at five of the six UIC wells: CrIN-1, CrIN-2, CrIN-3, CrIN-4 and CrIN-5. The Quarterly Report – 2017 Quarter 3 (Enclosure 1) provides the information required under DP-1835 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,

John C. Bretzke
Division Leader

Sincerely,

Cheryl L. Rodriguez
Program Manager, FPD-II

JCB/CLR/MTS/WJF:am

Enclosures:
(1) Quarterly Report for the Discharge of Treated Groundwater to the Regional Aquifer – 2017 Quarter 3, DP-1835
(2) Treated Effluent Analytical Results Summary Tables – 2017 Quarter 3, DP-1835
(3) Groundwater Elevation Contour Map – 2017 Quarter 3, DP-1835
(4) Groundwater Monitoring Wells Analytical Results Summary Table – 2017 Quarter 3, DP-1835
(5) Distribution Piping/Initial Mechanical Integrity Test and Initial Injection Notification for CrIN-1, CrIN-2, CrIN-3
(6) Pilot Scale Molasses Amendment and Sodium Dithionite Amendment Studies NMED Conditional Approvals
(7) Treated Groundwater Injection and Extraction Summary Tables – 2017 Quarter 3, DP-1835
(8) Facility Layout Map – 2017 Quarter 3, DP-1835

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)
Douglas E. Hintze, EM-LA, (E-File)
David S. Rhodes, EM-LA, (E-File)
Cheryl L. Rodriguez, EM-LA, (E-File)
Paul B. Underwood, EM-LA, (E-File)
Annette E. Russell, EM-LA, (E-File)
Craig S. Leasure, PADOPS, (E-File)
William R. Mairson, PADOPS, (E-File)
Michael T. Brandt, ADESH, (E-File)
Randall Mark Erickson, ADEM, (E-File)
Enrique Torres, ADEM, (E-File)
Bruce Robinson, ADEM-PO, (E-File)
Stephani F. Swickley, ADEM-PO, (E-File)
Danny Katzman, ADEM-PO, (E-File)
Steve Paris, ADEM-PO, (E-File)
Michael T. Saladen, EPC-CP, (E-File)

Robert S. Beers, EPC-CP, (E-File)
William J. Foley, EPC-CP, (E-File)
Ellena I. Martinez, EPC-CP, (E-File)
lasomailbox@nnsa.doe.gov, (E-File)
emla.docs@em.doe.gov, (E-File)
locatesteam@lanl.gov, (E-File)
epc-correspondence@lanl.gov, (E-File)
adesh-records@lanl.gov, (E-File)

ENCLOSURE 1

Quarterly Report for the Discharge of
Treated Groundwater to the Regional Aquifer –
2017 Quarter 3, DP-1835

EPC-DO: 17-449

LA-UR-17-29751

U1601822

Date: NOV 2 2 2017

ENCLOSURE 1
Quarterly Report for the Discharge of Treated Groundwater to the Regional Aquifer – 2017 Quarter 3, DP-1835

Introduction. On August 31, 2016, the New Mexico Environment Department (NMED) issued Discharge Permit (DP) 1835 to the U.S. Department of Energy and Los Alamos National Security, LLC (DOE/LANS) for the discharge of treated groundwater to the regional aquifer through up to six Class V underground injection control (UIC) wells. Pursuant to Condition No. 10 of the above-referenced discharge permit, DOE/LANS are required to submit quarterly reports.

During the 2017 July 1 through September 30 (Quarter 3) reporting period, discharge of treated groundwater to the regional aquifer occurred at five of the six UIC wells, CrIN-1, CrIN-2, CrIN-3, CrIN-4 and CrIN-5, under DP-1835. Groundwater originated from three extraction wells, CrEX-1, CrEX-2, and CrEX-3. This groundwater was treated by chromium treatment unit (CTU) CTUA prior to injection at the UIC wells.

Condition No. 10 of DP-1835 required DOE/LANS to submit a quarterly report to NMED by December 1 for the July 1 – September 30 discharge period. Several conditions within the permit identify information to be submitted in the quarterly report. The following information, with condition references, are required in the quarterly report:

1. *Influent and discharge volumes for the ion exchange (IX) treatment systems (Condition No. 10);*
2. *Quarterly treated effluent sampling results from each IX treatment system (Condition Nos. 10 and 13);*
3. *Quarterly depth to groundwater and groundwater quality sampling results (Condition Nos. 10 and 14);*
4. *Any operations/maintenance activities performed (Condition No. 10);*
5. *Any periodic test of mechanical integrity conducted (Condition No. 11);*
6. *Any replacement of primary or secondary IX vessels or associated treatment system infrastructure (Condition No. 11);*
7. *Any well work-overs conducted (Condition No. 11);*
8. *Any additional operational changes with the potential to markedly affect the discharge (Condition No. 11);*
9. *Monthly average, maximum, and minimum values for flow rate and volume of treated effluent transferred to each UIC well (Condition No. 12);*
10. *Totalized monthly volume of treated effluent transferred to each UIC well (Condition No. 12);*
11. *Monthly average, maximum, and minimum values of injection water level, pressure head above static level for each UIC well (Condition No. 12);*
12. *Daily volume injected at each UIC well (Condition No. 12);*
13. *Daily volume pumped from each extraction well (Condition No. 12);*
14. *Facility layout map (Condition No. 12);*
15. *Groundwater Elevation Contour Map (Condition No. 15).*

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

ENCLOSURE 1
Quarterly Report for the Discharge of Treated Groundwater to the Regional Aquifer – 2017 Quarter 3, DP-1835

Requirement 1: Influent and discharge volumes for the IX treatment system. Table 1 provides the influent and discharge volumes for IX treatment systems during 2017 Quarter 3 for activities completed under DP-1835. As previously identified, injection occurred at UIC wells CrIN-1, CrIN-2, CrIN-3, CrIN-4 and CrIN-5 during the quarter. Treated discharge originated from extraction wells CrEX-1, CrEX-2, and CrEX-3 and was treated with treatment unit CTUA.

Table 1. Total Influent and Discharge Volumes for IX Treatment Systems – 2017 Quarter 3

Treatment Unit	Influent Volume[1,3] (gal)	Effluent Volume[2,3] (gal)
CTUA	95,471	95,799
CTUB	N/A	N/A
CTUC	N/A	N/A

Notes:
N/A - treatment unit did not treat any groundwater that was subsequently injected during the quarter.
[1] Influent volume based on CrEX-1, CrEX-2, and CrEX-3 extraction volumes.
[2] Effluent volume based on combined CrIN-1, CrIN-2, CrIN-3, CrIN-4, and CrIN-5 injection volumes.
[3] Individual flow meter accurate to ±5%

Requirement 2: Quarterly treated effluent sampling results from each IX treatment system. Treated effluent analytical results from samples collected during 2017 Quarter 3 for activities completed under DP-1835 are summarized in Enclosure 2. No results for total chromium, nitrate-nitrogen (NO_3-N), perchlorate, sulfate, total dissolved solids, fluoride, or chloride 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), perchlorate, sulfate, total dissolved solids, fluoride, or chloride are 45 µg/L, 9 mg/L, 12.4 µg/L, 540 mg/L, 900 mg/L, 1.44 mg/L, and 225 mg/L, respectively.

During 2017 Quarter 3 no annual compliance samples were obtained. As previously identified, all groundwater injected under DP-1835 was treated by CTUA. The CTUA annual compliance sample was obtained on February 6, 2017 with results reported in the 2017 Quarter 1 report (EPC-DO: 17-166) in accordance with Condition 13 of DP-1835.

Requirement 3: Quarterly depth to groundwater and groundwater quality sampling results. Table 2 provides the quarterly groundwater elevation measurements. Enclosure 3 provides a groundwater elevation contour map and an explanation of how this map was generated.

ENCLOSURE 1
Quarterly Report for the Discharge of Treated Groundwater to the Regional Aquifer – 2017 Quarter 3, DP-1835

Table 2. Groundwater Elevations Summary for Groundwater Monitoring Wells – 2017 Quarter 3

Monitoring Well	Groundwater Elevation[1] (ft)
CrCH-1[2]	5835.43
CrCH-2 S1	5832.78
CrCH-2 S2	5832.54
CrCH-3	5834.20
CrCH-4	5836.26
CrCH-5	5835.27
R-11	5833.05
R-13	5831.19
R-43 S1	5834.88
R-43 S2	5834.09
R-44 S1	5832.18
R-44 S2	5831.99
R-45 S1	5832.08
R-45 S2	5831.98
R-50 S1	5833.41
R-50 S2	5833.11
R-61 S1	5834.88
R-61 S2	5835.00
R-62	5838.42
SIMR-2[3]	5833.20
SIMR-2[4]	-

Notes
[1]Groundwater elevations provided is August 15 value from transducers, unless otherwise noted.
[2]Groundwater elevation provided is July 31 value from transducer.
[3]Second Quarter 2017 SIMR-2 data reported here in accordance with DP-1835 2017 Quarter 2 Report (EPC-DO: 17-274). Data was unavailable at the time of that report's preparation in accordance with the Memorandum of Agreement between Pueblo de San Ildefonso and DOE/LANS.
[4]Data has been collected but is unavailable at the time of this report's preparation in accordance with the Memorandum of Agreement between Pueblo de San Ildefonso and DOE/LANS. This data will be presented in the next quarterly report.

Quarterly groundwater analytical results from samples collected during 2017 Quarter 2 for the monitoring wells listed in Condition No. 14 are summarized in Table 3. Complete results related to these samples are provided in Enclosure 4.

ENCLOSURE 1
Quarterly Report for the Discharge of Treated Groundwater to the Regional Aquifer – 2017 Quarter 3, DP-1835

Table 3. Summary Table of Analytical Results for Groundwater Monitoring Wells – 2017 Quarter 3

Location	Sample Date	Analyte[1]						
		Chloride (mg/L)	Perchlorate (µg/L)	Chromium (µg/L)	Fluoride (mg/L)	Nitrate-Nitrite as Nitrogen (mg/L)	Sulfate (mg/L)	Total Dissolved Solids (mg/L)
R-11	8/1/2017	3.97	0.818	11.5	0.315	5.35	10.5	217
R-13	8/3/2017	2.44	0.447	3.70	0.213	0.670	3.38	144
R-43 S1	8/9/2017	8.37	0.897	176	0.281	4.90	17.1	187
R-43 S2	8/4/2017	5.79	0.873	14.9	0.237	3.54	8.54	177
R-44 S1	8/3/2017	2.31	0.410	13.6	0.231	1.07	3.38	137
R-44 S2	8/3/2017	2.19	0.349	5.95	0.276	0.668	2.66	150
R-45 S1	8/2/2017	5.61	0.598	42.7	0.262	3.06	8.77	164
R-45 S1	8/2/2017	5.62	0.611	43.0	0.237	3.03	8.77	167
R-45 S2	8/2/2017	4.02	0.417	21.6	0.311	0.887	4.81	160
R-50 S1	7/28/2017	9.15	0.625	131	0.241	1.99	13.1	177
R-50 S2	7/28/2017	2.13	0.339	3.99	0.296	0.537	2.63	160
R-62	8/4/2017	12.2	0.860	232	0.106	1.52	22.1	191
SIMR-2[2]	5/16/2017	2.36	0.397	4.76	0.231	0.660	3.02	130
SIMR-2[2]	3/30/2017	-	-	4.56	-	-	-	-
SIMR-2[3]	-	N/A	N/A	N/A	N/A	N/A	N/A	N/A

[1] Reported results are dissolved constituents

[2] 2017 Quarter 2 SIMR-2 data reported here in accordance with DP-1835 2017 Quarter 2 Report (EPC-DO: 17-274). Data was unavailable at the time of that report's preparation in accordance with the Memorandum of Agreement between Pueblo de San Ildefonso and DOE/LANS.

[3] Data has been collected but is unavailable at the time of this report's preparation in accordance with the Memorandum of Agreement between Pueblo de San Ildefonso and DOE/LANS. This data will be presented in the next quarterly report, if available.

NA - Not Available

Requirement 4: Any operations/maintenance activities performed. Limited operations occurred during 2017 Quarter 3 due to the activities listed in Table 4 for the extraction, treatment and injection system. The limited system operations which occurred during 2017 Quarter 3 consisted of the following:

- On August 1 and August 2 limited extraction of water from CrEX-2 occurred in preparation for an 8-hour test of the pipeline and treatment system which took place on August 2 with injection occurring into CrIN-4 and CrIN-5,
- On September 5 limited extraction of water from CrEX-3 occurred related to testing portions of the booster tanks,
- On September 29 limited extraction from CrEX-1 and CrEX-3 occurred related to limited testing of the distribution system and CrIN-1, CrIN-2, CrIN-3, CrIN-4, and CrIN-5.

Table 4. Operations and Maintenance Activity Summary Table – 2017 Quarter 3

Maintenance Time Period	Elements Impacted	Maintenance Description
Beginning of reporting period through 7/12	CrEX-1, CTUA[1], CrIN-4, and CrIN-5	Injection of treated groundwater did not occur to allow re-location of the CTUA treatment skid to centralized location and CrEX-2 aquifer testing.
7/12 through end of reporting period	CrEX-1, CrEX-2, CrEX-3, CTUA, CrIN-1, CrIN-2, CrIN-3, CrIN-4, and CrIN-5	Injection of treated groundwater did not occur due to: 1. Install treatment train B IX units in CTUA. 2. System buildout and testing activities related to bringing CrEX-2, CrEX-3, CrIN-1, CrIN-2, and CrIN-3 online.

[1] Treatment unit CTUA contains three treatment trains: train A, train B, and train C.

Requirement 5: Any periodic test of mechanical integrity conducted. Periodic testing of mechanical integrity was not conducted during 2017 Quarter 3. In accordance with Condition No. 3 the next required integrity test of these items will occur within 5 yr of the initial test unless an UIC well is reconfigured. In this scenario, a mechanical integrity test before reinjection of treated effluent at that well will be completed pursuant to Condition No. 3.

DOE/LANS submitted documentation demonstrating mechanical integrity of the distribution piping and UIC wells related to CrEX-2, CrIN-1, CrIN-2, and CrIN-3. Enclosure 5 contains the submittal letters for this documentation. Before discharge to CrIN-1, CrIN-2 and CrIN-3, DOE/LANS submitted written notification of the initial injection date to NMED in accordance with Condition 4 (Enclosure 5).

Requirement 6: Any replacement of primary or secondary IX vessels or associated treatment system infrastructure. Installation of new primary and secondary IX vessels occurred for treatment unit CTUA treatment train B during the reporting period as cited in Requirement 4.

Requirement 7: Any well work-overs conducted. Well work-overs did not occur during 2017 Quarter 3.

Requirement 8: Any additional operational changes with the potential to markedly affect the discharge. During the reporting period the pilot scale molasses amendment and sodium dithionite amendment studies began. The molasses amendment study received NMED conditional approval on June 27, 2017 while the sodium dithionite amendment study received NMED conditional approval on July 18, 2017. Enclosure 6 contains NMED's conditional approval for these studies. The conditional approvals require iron, manganese, and arsenic sampling in the treated water from extraction wells CrEX-1, CrEX-2, and CrEX-3 prior to and during the study with these results to be provided in the quarterly monitoring reports under DP-1835. These results for 2017 Quarter 3 are provided in Enclosure 2.

Due to the limited operations completed during the quarter, the annual sample for CTUA obtained in February 2017 represents the treated water prior to deployment sample, as required in the conditional approval for both pilot scale amendment studies. No results for arsenic, iron, or

manganese exceeded 90% of the numeric standards of 20.6.2.3103 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 arsenic, iron, or manganese are 90 µg/L, 900 µg/L, and 180 µg/L, respectively.

Other than when the activities cited in Requirement 4, no additional operational changes occurred during the reporting period.

Requirement 9: Monthly average, maximum, and minimum values for flow rate and volume of treated effluent transferred to each UIC well. Table 5 provides the monthly average, maximum, and minimum values for flow rate and volume of treated effluent transferred to each well in 2017 Quarter 3.

Table 5. Flows and Volumes of Treated Effluent Injected – 2017 Quarter 3

UIC Well	Flow rate (gpm)			Volume (gal)		
	Average	Maximum	Minimum	Average	Maximum	Minimum
	July					
CrIN-1	N/A	N/A	N/A	N/A	N/A	N/A
CrIN-2	N/A	N/A	N/A	N/A	N/A	N/A
CrIN-3	N/A	N/A	N/A	N/A	N/A	N/A
CrIN-4	N/A	N/A	N/A	N/A	N/A	N/A
CrIN-5	N/A	N/A	N/A	N/A	N/A	N/A
CrIN-6[1]	N/A	N/A	N/A	N/A	N/A	N/A
	August					
CrIN-1	N/A	N/A	N/A	N/A	N/A	N/A
CrIN-2	N/A	N/A	N/A	N/A	N/A	N/A
CrIN-3	N/A	N/A	N/A	N/A	N/A	N/A
CrIN-4	43.0[2]	43.0	0	39,029[2]	39,029	0
CrIN-5	48.0[2]	48.0	0	43,568[2]	43,568	0
CrIN-6[1]	N/A	N/A	N/A	N/A	N/A	N/A
	September					
CrIN-1	66.2[2]	66.2	0	2,646[2]	2,646	0
CrIN-2	80.7[2]	80.7	0	3,226[2]	3,226	0
CrIN-3	73.6[2]	73.6	0	2,943[2]	2,943	0
CrIN-4	54.7[2]	54.7	0	2,187[2]	2,187	0
CrIN-5	55.0[2]	55.0	0	2,200[2]	2,200	0
CrIN-6[1]	N/A	N/A	N/A	N/A	N/A	N/A

Notes:
N/A = Treated groundwater not injected during the month at this location.
[1] UIC well constructed, but connections not completed to begin injection of treated groundwater.
[2] Average values represent average values which occurred during the month during periods of injection. During 2017 Quarter 3 the average and maximum values are the same since only one day of injection occurred per UIC in the reporting month.

ENCLOSURE 1
Quarterly Report for the Discharge of Treated Groundwater to the Regional Aquifer – 2017 Quarter 3, DP-1835

Requirement 10: Totalized monthly volume of treated effluent transferred to each UIC well. Table 6 provides totalized monthly volumes of treated effluent transferred to each well. As previously identified, injection occurred at UIC wells CrIN-1, CrIN-2, CrIN-3, CrIN-4 and CrIN-5 during the quarter.

Table 6. Totalized Monthly Volumes Injected by Well – 2017 Quarter 3

UIC Well	July (gal)	August (gal)	September (gal)
CrIN-1	N/A	N/A	2,646
CrIN-2	N/A	N/A	3,226
CrIN-3	N/A	N/A	2,943
CrIN-4	N/A	39,029	2,187
CrIN-5	N/A	43,568	2,200
CrIN-6[1]	N/A	N/A	N/A

Notes:
N/A = Treated groundwater not injected during the month at this location.
[1] UIC well constructed, but connections not completed to begin injection of treated groundwater.

Requirement 11: Monthly average, maximum, and minimum values of injection water level (pressure) head above static level for each UIC well. Table 7 provides the monthly average, maximum, and minimum values for injection water level above static level for each UIC well. As previously indicated, injection occurred at UIC wells CrIN-1, CrIN-2, CrIN-3, CrIN-4 and CrIN-5 during the quarter.

Table 7. Water Level Values Above Static Level by UIC Well – 2017 Quarter 3

UIC Well	July			August			September		
	Average (ft)	Maximum (ft)	Minimum (ft)	Average (ft)	Maximum (ft)	Minimum (ft)	Average (ft)	Maximum (ft)	Minimum (ft)
CrIN-1	N/A	N/A	N/A	N/A	N/A	N/A	0.00	0.00	0.00
CrIN-2	N/A	N/A	N/A	N/A	N/A	N/A	0.00	0.00	0.00
CrIN-3	N/A	N/A	N/A	N/A	N/A	N/A	0.00	0.00	0.00
CrIN-4	N/A	N/A	N/A	0.17	1.37	0.00	0.00	0.00	0.00
CrIN-5	N/A	N/A	N/A	0.19	1.47	0.00	0.00	0.00	0.00
CrIN-6[1]	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Notes:
N/A = Treated groundwater not injected during the month at this location.
[1] UIC well constructed, but connections not completed/approved to begin injection of treated groundwater.

ENCLOSURE 1
Quarterly Report for the Discharge of Treated Groundwater to the Regional Aquifer – 2017 Quarter 3, DP-1835

Requirement 12: Daily volume injected at each UIC well. Daily volumes of treated groundwater injected at CrIN-1, CrIN-2, CrIN-3, CrIN-4 and CrIN-5 during 2017 Quarter 3 are provided in Enclosure 7.

Requirement 13: Daily volume pumped from each extraction well. Daily volumes of groundwater pumped from CrEX-1, CrEX-2, and CrEX-3 during 2017 Quarter 3 which was subsequently treated and injected under this permit, are provided in Enclosure 7.

Requirement 14: Facility layout map. The facility layout map for 2017 Quarter 3 showing the location and number of each well is provided in Enclosure 8.

Requirement 15: Groundwater Elevation Contour Map. Enclosure 3 provides the groundwater elevation contour map and an explanation of how this map was generated.

ENCLOSURE 2

Treated Effluent Analytical
Results Summary Tables –
2017 Quarter 3, DP-1835

EPC-DO: 17-449

LA-UR-17-29751

U1601822

Date: NOV 2 2 2017

ENCLOSURE 2

Table E2-1

Treated Effluent Analytical Results Summary Table - 2017 Quarter 3, DP-1835

Location ID	Sample ID	Sample Date	Parameter Name	Result	Report Units	Lab Qualifier	Detect Flag	Filtered	Lab Method	Report Detection Limit
CTUA	CTUA-17-142751	08/01/17	Chloride	109	mg/L		Y	Y	EPA:300.0	5.0
CTUA	CTUA-17-142750	08/02/17	Chloride	102	mg/L		Y	Y	EPA:300.0	5.0
CTUA	CTUA-17-142752	09/05/17	Chloride	93.4	mg/L		Y	Y	EPA:300.0	4.0
CTUA	CTUA-17-142751	08/01/17	Chromium	3	ug/L	U	N	Y	SW-846:6020	10
CTUA	CTUA-17-142750	08/02/17	Chromium	3	ug/L	U	N	Y	SW-846:6020	10
CTUA	CTUA-17-142752	09/05/17	Chromium	3	ug/L	U	N	Y	SW-846:6020	10
CTUA	CTUA-17-146432	09/05/17	Chromium	3	ug/L	U	N	Y	SW-846:6020	10
CTUA	CTUA-17-142751	08/01/17	Fluoride	0.201	mg/L		Y	Y	EPA:300.0	0.1
CTUA	CTUA-17-142750	08/02/17	Fluoride	0.214	mg/L		Y	Y	EPA:300.0	0.1
CTUA	CTUA-17-142752	09/05/17	Fluoride	0.177	mg/L		Y	Y	EPA:300.0	0.1
CTUA	CTUA-17-142751	08/01/17	Nitrate-Nitrite as Nitrogen	0.065	mg/L		Y	Y	EPA:353.2	0.05
CTUA	CTUA-17-142750	08/02/17	Nitrate-Nitrite as Nitrogen	0.0438	mg/L	J	Y	Y	EPA:353.2	0.05
CTUA	CTUA-17-142752	09/05/17	Nitrate-Nitrite as Nitrogen	0.0558	mg/L		Y	Y	EPA:353.2	0.05
CTUA	CTUA-17-142751	08/01/17	Perchlorate	0.118	ug/L	J	Y	Y	SW-846:6850	0.2
CTUA	CTUA-17-142750	08/02/17	Perchlorate	0.105	ug/L	J	Y	Y	SW-846:6850	0.2
CTUA	CTUA-17-142752	09/05/17	Perchlorate	0.106	ug/L	J	Y	Y	SW-846:6850	0.2
CTUA	CTUA-17-142751	08/01/17	Sulfate	0.507	mg/L		Y	Y	EPA:300.0	0.4
CTUA	CTUA-17-142750	08/02/17	Sulfate	0.449	mg/L		Y	Y	EPA:300.0	0.4
CTUA	CTUA-17-142752	09/05/17	Sulfate	0.362	mg/L	J	Y	Y	EPA:300.0	0.4
CTUA	CTUA-17-142751	08/01/17	Total Dissolved Solids	419	mg/L		Y	Y	EPA:160.1	14.3
CTUA	CTUA-17-142750	08/02/17	Total Dissolved Solids	406	mg/L		Y	Y	EPA:160.1	14.3
CTUA	CTUA-17-142752	09/05/17	Total Dissolved Solids	326	mg/L		Y	Y	EPA:160.1	14.3

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.

N - in the detect flag column means the analyte was undetected.

Y - in the detect flag column means the analyte was detected.

Table E2-2

Treated Effluent Analytical Results Summary Table Related To Molasses and Sodium Dithionate Pilot Studies NMED Conditional Approval - 2017 Quarter 3, DP-1835

Location ID	Sample ID	Sample Date	Parameter Name	Result	Report Units	Lab Qualifier	Detect Flag	Filtered	Lab Method	Report Detection Limit
CTUA	CTU6A-17-130110	02/06/17	Arsenic	2.0	ug/L	U	N	Y	SW-846:6020	5.00
CTUA	CTUA-17-146432	09/05/17	Arsenic	2.0	ug/L	U	N	Y	SW-846:6020	5.00
CTUA	CTU6A-17-130110	02/06/17	Iron	30.0	ug/L	U	N	Y	SW-846:6010C	100
CTUA	CTUA-17-146432	09/05/17	Iron	33	ug/L	J	Y	Y	SW-846:6010C	100
CTUA	CTU6A-17-130110	02/06/17	Manganese	2.0	ug/L	U	N	Y	SW-846:6010C	10.0
CTUA	CTUA-17-146432	09/05/17	Manganese	7.58	ug/L	J	Y	Y	SW-846:6010C	10.0

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.

N - in the detect flag column means the analyte was undetected.

Y - in the detect flag column means the analyte was detected.

ENCLOSURE 3

Groundwater Elevation Contour Map –
2017 Quarter 3, DP-1835

EPC-DO: 17-449

LA-UR-17-29751

U1601822

Date: NOV 2 2 2017

ENCLOSURE 3

Explanation of groundwater elevation contour map. The regional aquifer beneath Los Alamos National Laboratory (LANL) is a complex hydrogeological system. The top of the aquifer is predominantly under phreatic (water-table) conditions, including in the area of the chromium plume beneath Mortandad Canyon. Groundwater flow directions and fluxes that control contaminant transport in the aquifer are generally dictated by the shape of the regional water table. The general shape of the regional water table beneath Pajarito Plateau is predominantly controlled by the areas of regional recharge to the west (the flanks of Sierra de los Valles and the Pajarito fault zone) and discharge to the east (the Rio Grande and the White Rock Canyon Springs). At more local scales such as the chromium site, the structure of the regional phreatic flow is also expected to be influenced by (1) local infiltration zones (e.g., beneath canyons); (2) heterogeneity and anisotropy in the aquifer properties; and (3) discharge zones (municipal water-supply wells, springs, and extraction wells within the chromium project area).

At the chromium site, the water-table elevations vary in time as a result of transient effects that include (1) extraction-well pumping in the chromium project area from extraction wells, (2) injection wells, and pumping of Los Alamos County's water-supply wells. The effects of water-supply pumping are very small compared to the local effect that may be caused by extraction and injection at project wells. Furthermore, a long-term water decline of about 0.5-1 ft/yr is observed in the regional water levels throughout the aquifer beneath the Pajarito Plateau. The decline might be caused by long-term changes in the aquifer recharge and discharge conditions.

Because of the long-term declines and pumping transients described above, the water-level data and the respective water-table maps are time dependent and representative of specific periods of time. This water-table map uses the average water-level data for August 2017. The averaged water levels are computed for the well screens near the water table in the chromium project area. Well screens deeper in the aquifer (>~75 ft) such as R-35a, R-44 Screen 2 and R-45 Screen 2 are not included in the analysis. The averaged water levels applied in the contouring process are shown next to each well in Figure E3-1.

The process of water-table contouring is theoretically constrained by conformity rules: (1) the contour lines should be perpendicular to the flowpaths and (2) the length and the width of the flownet cells formed by the contour lines between two adjacent flowpaths should have the same ratios. These rules are theoretically valid only for the case of two-dimensional (lateral) groundwater flow in a uniform, isotropic aquifer with no recharge/discharge sources within flownet cells. Deviations from the conformity rules are caused by three-dimensional flow effects, aquifer heterogeneity and anisotropy as well as groundwater recharge/discharge wells/zones. This water table map, Figure E3-1, is contoured by attempting to satisfy the following goals simultaneously: (1) to match the water-level data at the monitoring wells, (2) to generally preserve flownet conformity, (3) to account for pumping effects, (4) to account for injection effects, and (5) to account for conceptual models of groundwater flow in the regional aquifer. The contouring is performed using a combination of manual and automated techniques; the automated contouring is done using the Minimum Curvature Surface method.

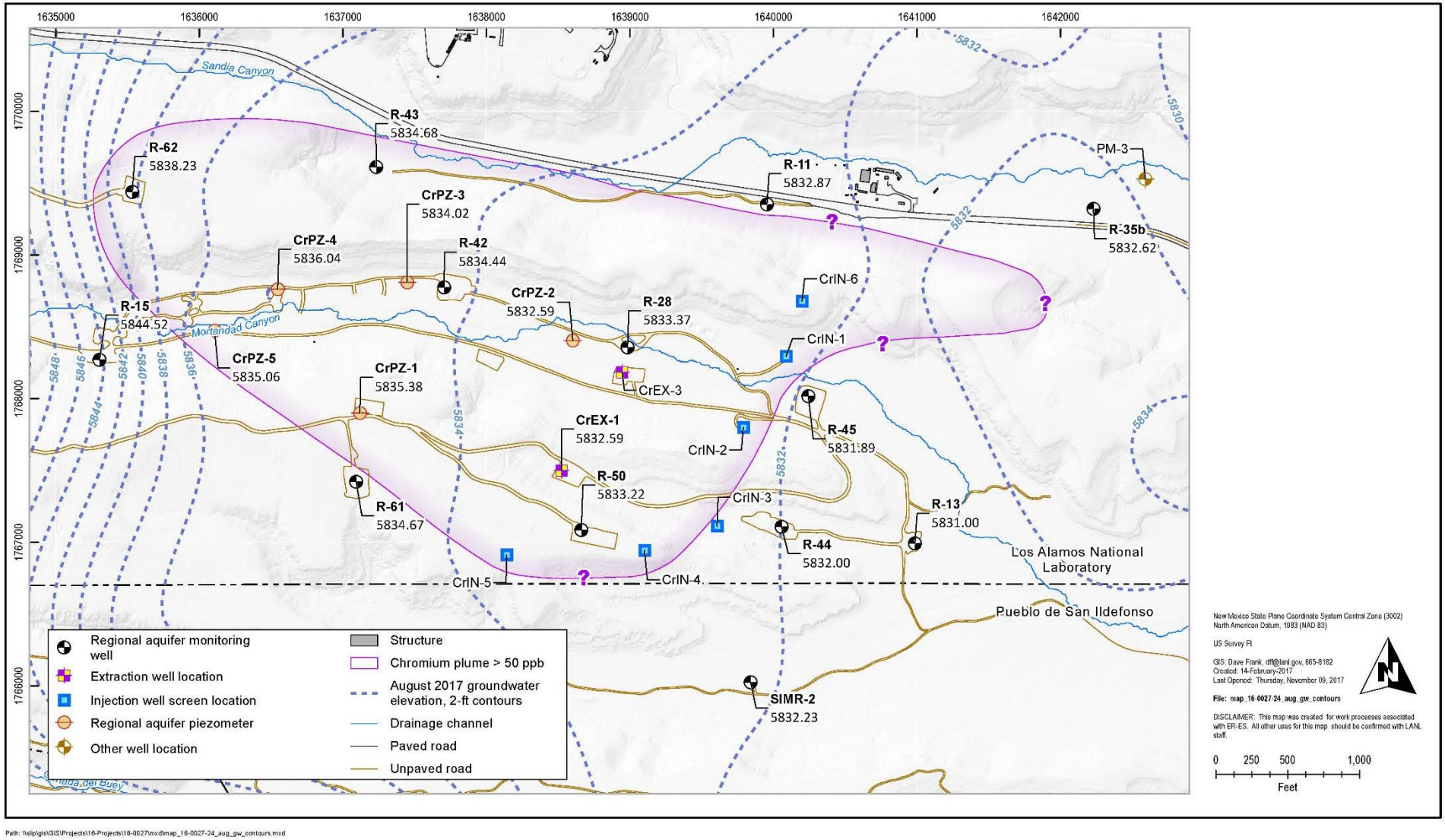
Long-term water-level data suggests that the water table is quite flat in the area of the chromium plume. The low gradient in this area may be related to: (1) the relatively high permeability of Puye Formation and Miocene pumiceous sediments, (2) anisotropy of the regional aquifer, (3) localized aquifer recharge along the canyons above the regional aquifer, (4) faults or other lineaments that affect regional-scale hydraulic conductivity, and (5) nearby water-supply

pumping. Note that observations of transients in the water levels observed at the monitoring wells within the plume (e.g., R-28, R-11, R-36, R-35b, R-42, R-43, and R-50) do not appear to be substantially affected by the water-supply pumping at the nearby production wells (PM-3, PM-5, PM-2, PM-4, and O-4) (LANL 2009, 107453).

During this reporting period limited pumping from CrEX-1, CrEX-2, and/or CrEX-3 occurred on August 2, September 5, and September 29. Injection wells CrIN-1, CrIN-2, CrIN-3, CrIN-4, and/or CrIN-5 received treated water on August 2 and September 29. The treated water generated on September 5 was directed to storage tanks, which are part of the treated water distribution system.

ENCLOSURE 3

Figure E3-1. Groundwater Elevation Contour Map – 2017 Quarter 3, DP-1835



ENCLOSURE 4

Groundwater Monitoring Wells
Analytical Results Summary Table –
2017 Quarter 3, DP-1835

EPC-DO: 17-449

LA-UR-17-29751

U1601822

Date: NOV 2 2 2017

Table E4-1
Groundwater Monitoring Wells Analytical Results Summary Table - 2017 Quarter 3, DP1835

Sample	Location ID	Sample Date	Parameter Name	Result	Report Units	Lab Qualifier	Detect Flag	Filtered	Lab Method	Report Detection Limit
CASA-17-142006	R-11	08-01-2017	Chloride	3.97	mg/L		Y	Y	EPA:300.0	0.2
CASA-17-142006	R-11	08-01-2017	Perchlorate	0.818	ug/L		Y	Y	SW-846:6850	0.2
CASA-17-142006	R-11	08-01-2017	Chromium	11.5	ug/L		Y	Y	SW-846:6020	10.0
CASA-17-142006	R-11	08-01-2017	Fluoride	0.315	mg/L		Y	Y	EPA:300.0	0.1
CASA-17-142006	R-11	08-01-2017	Nitrate-Nitrite as Nitrogen	5.35	mg/L		Y	Y	EPA:353.2	0.5
CASA-17-142006	R-11	08-01-2017	Sulfate	10.5	mg/L		Y	Y	EPA:300.0	0.4
CASA-17-142006	R-11	08-01-2017	Total Dissolved Solids	217	mg/L		Y	Y	EPA:160.1	14.3
CAMO-17-141974	R-13	08-03-2017	Chloride	2.44	mg/L		Y	Y	EPA:300.0	0.2
CAMO-17-141974	R-13	08-03-2017	Perchlorate	0.447	ug/L		Y	Y	SW-846:6850	0.2
CAMO-17-141974	R-13	08-03-2017	Chromium	3.70	ug/L	J	Y	Y	SW-846:6020	10.0
CAMO-17-141974	R-13	08-03-2017	Fluoride	0.213	mg/L		Y	Y	EPA:300.0	0.1
CAMO-17-141974	R-13	08-03-2017	Nitrate-Nitrite as Nitrogen	0.67	mg/L		Y	Y	EPA:353.2	0.25
CAMO-17-141974	R-13	08-03-2017	Sulfate	3.38	mg/L		Y	Y	EPA:300.0	0.4
CAMO-17-141974	R-13	08-03-2017	Total Dissolved Solids	144	mg/L		Y	Y	EPA:160.1	14.3
CASA-17-142776	R-43 S1	08-09-2017	Chloride	8.37	mg/L		Y	Y	EPA:300.0	0.2
CASA-17-142776	R-43 S1	08-09-2017	Perchlorate	0.897	ug/L		Y	Y	SW-846:6850	0.2
CASA-17-142776	R-43 S1	08-09-2017	Chromium	176	ug/L		Y	Y	SW-846:6020	10.0
CASA-17-142776	R-43 S1	08-09-2017	Fluoride	0.281	mg/L		Y	Y	EPA:300.0	0.1
CASA-17-142776	R-43 S1	08-09-2017	Nitrate-Nitrite as Nitrogen	4.90	mg/L		Y	Y	EPA:353.2	0.25
CASA-17-142776	R-43 S1	08-09-2017	Sulfate	17.1	mg/L		Y	Y	EPA:300.0	0.4
CASA-17-142776	R-43 S1	08-09-2017	Total Dissolved Solids	187	mg/L		Y	Y	EPA:160.1	14.3
CASA-17-142011	R-43 S2	08-04-2017	Chloride	5.79	mg/L		Y	Y	EPA:300.0	0.2
CASA-17-142011	R-43 S2	08-04-2017	Perchlorate	0.873	ug/L		Y	Y	SW-846:6850	0.2
CASA-17-142011	R-43 S2	08-04-2017	Chromium	14.9	ug/L		Y	Y	SW-846:6020	10.0
CASA-17-142011	R-43 S2	08-04-2017	Fluoride	0.237	mg/L		Y	Y	EPA:300.0	0.1
CASA-17-142011	R-43 S2	08-04-2017	Nitrate-Nitrite as Nitrogen	3.54	mg/L		Y	Y	EPA:353.2	0.25
CASA-17-142011	R-43 S2	08-04-2017	Sulfate	8.54	mg/L		Y	Y	EPA:300.0	0.4
CASA-17-142011	R-43 S2	08-04-2017	Total Dissolved Solids	177	mg/L		Y	Y	EPA:160.1	14.3
CAMO-17-141980	R-44 S1	08-03-2017	Chloride	2.31	mg/L		Y	Y	EPA:300.0	0.2
CAMO-17-141980	R-44 S1	08-03-2017	Perchlorate	0.41	ug/L		Y	Y	SW-846:6850	0.2
CAMO-17-141980	R-44 S1	08-03-2017	Chromium	13.6	ug/L		Y	Y	SW-846:6020	10.0
CAMO-17-141980	R-44 S1	08-03-2017	Fluoride	0.231	mg/L		Y	Y	EPA:300.0	0.1
CAMO-17-141980	R-44 S1	08-03-2017	Nitrate-Nitrite as Nitrogen	1.07	mg/L		Y	Y	EPA:353.2	0.05
CAMO-17-141980	R-44 S1	08-03-2017	Sulfate	3.38	mg/L		Y	Y	EPA:300.0	0.4
CAMO-17-141980	R-44 S1	08-03-2017	Total Dissolved Solids	137	mg/L		Y	Y	EPA:160.1	14.3

Table E4-1
Groundwater Monitoring Wells Analytical Results Summary Table - 2017 Quarter 3, DP1835

Sample	Location ID	Sample Date	Parameter Name	Result	Report Units	Lab Qualifier	Detect Flag	Filtered	Lab Method	Report Detection Limit
CAMO-17-141981	R-44 S2	08-03-2017	Chloride	2.19	mg/L		Y	Y	EPA:300.0	0.2
CAMO-17-141981	R-44 S2	08-03-2017	Perchlorate	0.349	ug/L		Y	Y	SW-846:6850	0.2
CAMO-17-141981	R-44 S2	08-03-2017	Chromium	5.95	ug/L	J	Y	Y	SW-846:6020	10.0
CAMO-17-141981	R-44 S2	08-03-2017	Fluoride	0.276	mg/L		Y	Y	EPA:300.0	0.1
CAMO-17-141981	R-44 S2	08-03-2017	Nitrate-Nitrite as Nitrogen	0.668	mg/L		Y	Y	EPA:353.2	0.05
CAMO-17-141981	R-44 S2	08-03-2017	Sulfate	2.66	mg/L		Y	Y	EPA:300.0	0.4
CAMO-17-141981	R-44 S2	08-03-2017	Total Dissolved Solids	150	mg/L		Y	Y	EPA:160.1	14.3
CAMO-17-142778	R-45 S1	08-02-2017	Chloride	5.61	mg/L		Y	Y	EPA:300.0	0.2
CAMO-17-142778	R-45 S1	08-02-2017	Perchlorate	0.598	ug/L		Y	Y	SW-846:6850	0.2
CAMO-17-142778	R-45 S1	08-02-2017	Chromium	42.7	ug/L		Y	Y	SW-846:6020	10.0
CAMO-17-142778	R-45 S1	08-02-2017	Fluoride	0.262	mg/L		Y	Y	EPA:300.0	0.1
CAMO-17-142778	R-45 S1	08-02-2017	Nitrate-Nitrite as Nitrogen	3.06	mg/L		Y	Y	EPA:353.2	0.25
CAMO-17-142778	R-45 S1	08-02-2017	Sulfate	8.77	mg/L		Y	Y	EPA:300.0	0.4
CAMO-17-142778	R-45 S1	08-02-2017	Total Dissolved Solids	164	mg/L		Y	Y	EPA:160.1	14.3
CAMO-17-142781	R-45 S1	08-02-2017	Chloride	5.62	mg/L		Y	Y	EPA:300.0	0.2
CAMO-17-142781	R-45 S1	08-02-2017	Perchlorate	0.611	ug/L		Y	Y	SW-846:6850	0.2
CAMO-17-142781	R-45 S1	08-02-2017	Chromium	43.0	ug/L		Y	Y	SW-846:6020	10.0
CAMO-17-142781	R-45 S1	08-02-2017	Fluoride	0.237	mg/L		Y	Y	EPA:300.0	0.1
CAMO-17-142781	R-45 S1	08-02-2017	Nitrate-Nitrite as Nitrogen	3.03	mg/L		Y	Y	EPA:353.2	0.25
CAMO-17-142781	R-45 S1	08-02-2017	Sulfate	8.77	mg/L		Y	Y	EPA:300.0	0.4
CAMO-17-142781	R-45 S1	08-02-2017	Total Dissolved Solids	167	mg/L		Y	Y	EPA:160.1	14.3
CAMO-17-142779	R-45 S2	08-02-2017	Chloride	4.02	mg/L		Y	Y	EPA:300.0	0.2
CAMO-17-142779	R-45 S2	08-02-2017	Perchlorate	0.417	ug/L		Y	Y	SW-846:6850	0.2
CAMO-17-142779	R-45 S2	08-02-2017	Chromium	21.6	ug/L		Y	Y	SW-846:6020	10.0
CAMO-17-142779	R-45 S2	08-02-2017	Fluoride	0.311	mg/L		Y	Y	EPA:300.0	0.1
CAMO-17-142779	R-45 S2	08-02-2017	Nitrate-Nitrite as Nitrogen	0.887	mg/L		Y	Y	EPA:353.2	0.05
CAMO-17-142779	R-45 S2	08-02-2017	Sulfate	4.81	mg/L		Y	Y	EPA:300.0	0.4
CAMO-17-142779	R-45 S2	08-02-2017	Total Dissolved Solids	160	mg/L		Y	Y	EPA:160.1	14.3
CAMO-17-142780	R-50 S1	07-28-2017	Chloride	9.15	mg/L		Y	Y	EPA:300.0	0.2
CAMO-17-142780	R-50 S1	07-28-2017	Perchlorate	0.625	ug/L		Y	Y	SW-846:6850	0.2
CAMO-17-142780	R-50 S1	07-28-2017	Chromium	131	ug/L		Y	Y	SW-846:6020	10.0
CAMO-17-142780	R-50 S1	07-28-2017	Fluoride	0.241	mg/L		Y	Y	EPA:300.0	0.1
CAMO-17-142780	R-50 S1	07-28-2017	Nitrate-Nitrite as Nitrogen	1.99	mg/L		Y	Y	EPA:353.2	0.25
CAMO-17-142780	R-50 S1	07-28-2017	Sulfate	13.1	mg/L		Y	Y	EPA:300.0	0.4
CAMO-17-142780	R-50 S1	07-28-2017	Total Dissolved Solids	177	mg/L		Y	Y	EPA:160.1	14.3

Table E4-1
Groundwater Monitoring Wells Analytical Results Summary Table - 2017 Quarter 3, DP1835

Sample	Location ID	Sample Date	Parameter Name	Result	Report Units	Lab Qualifier	Detect Flag	Filtered	Lab Method	Report Detection Limit
CAMO-17-141985	R-50 S2	07-28-2017	Chloride	2.13	mg/L		Y	Y	EPA:300.0	0.2
CAMO-17-141985	R-50 S2	07-28-2017	Perchlorate	0.339	ug/L		Y	Y	SW-846:6850	0.2
CAMO-17-141985	R-50 S2	07-28-2017	Chromium	3.99	ug/L	J	Y	Y	SW-846:6020	10.0
CAMO-17-141985	R-50 S2	07-28-2017	Fluoride	0.296	mg/L		Y	Y	EPA:300.0	0.1
CAMO-17-141985	R-50 S2	07-28-2017	Nitrate-Nitrite as Nitrogen	0.537	mg/L		Y	Y	EPA:353.2	0.05
CAMO-17-141985	R-50 S2	07-28-2017	Sulfate	2.63	mg/L		Y	Y	EPA:300.0	0.4
CAMO-17-141985	R-50 S2	07-28-2017	Total Dissolved Solids	160	mg/L		Y	Y	EPA:160.1	14.3
CAMO-17-141986	R-62	08-04-2017	Chloride	12.2	mg/L		Y	Y	EPA:300.0	0.4
CAMO-17-141986	R-62	08-04-2017	Perchlorate	0.860	ug/L		Y	Y	SW-846:6850	0.2
CAMO-17-141986	R-62	08-04-2017	Chromium	232	ug/L		Y	Y	SW-846:6020	10.0
CAMO-17-141986	R-62	08-04-2017	Fluoride	0.106	mg/L		Y	Y	EPA:300.0	0.1
CAMO-17-141986	R-62	08-04-2017	Nitrate-Nitrite as Nitrogen	1.52	mg/L	H	Y	Y	EPA:353.2	0.25
CAMO-17-141986	R-62	08-04-2017	Sulfate	22.1	mg/L		Y	Y	EPA:300.0	0.8
CAMO-17-141986	R-62	08-04-2017	Total Dissolved Solids	191	mg/L		Y	Y	EPA:160.1	14.3
CAMO-17-132218	SIMR-2[2]	05-16-2017	Chloride	2.36	mg/L		Y	Y	EPA:300.0	0.2
CAMO-17-132218	SIMR-2[2]	05-16-2017	Perchlorate	0.397	ug/L		Y	Y	SW-846:6850	0.2
CAMO-17-132218	SIMR-2[2]	05-16-2017	Chromium	4.76	ug/L	J	Y	Y	SW-846:6020	10.0
CAMO-17-132218	SIMR-2[2]	05-16-2017	Fluoride	0.231	mg/L		Y	Y	EPA:300.0	0.1
CAMO-17-132218	SIMR-2[2]	05-16-2017	Nitrate-Nitrite as Nitrogen	0.660	mg/L		Y	Y	EPA:353.2	0.25
CAMO-17-132218	SIMR-2[2]	05-16-2017	Sulfate	3.02	mg/L		Y	Y	EPA:300.0	0.4
CAMO-17-132218	SIMR-2[2]	05-16-2017	Total Dissolved Solids	130	mg/L		Y	Y	EPA:160.1	14.3
CAMO-17-132661	SIMR-2[2]	04-27-2017	Chromium	4.5649	ug/L		Y	Y	SW-846:6020	-
-	SIMR-2[1]	-	-	-	-	-	-	-	-	-

Notes:

[1] Third Quarter 2017 data has been collected but is unavailable at the time of this report's preparation in accordance with the Memorandum of Agreement between Pueblo de San Ildefonso and DOE/LANS. This data will be presented in the next quarterly report.

[2] Second Quarter 2017 SIMR-2 data reported here in accordance with DP-1835 Second Quarter 2017 Report (EPC-DO: 17-274). Data was unavailable at the time of that report's preparation in accordance with the Memorandum of Agreement between Pueblo de San Ildefonso and DOE/LANS.

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

H - in the lab qualifier comment means the analytical holding time for the analyte was exceeded.

Y - in the detect flag column means the analyte was detected.

Y - in the filtered column means the sample was filtered.

ENCLOSURE 5

Distribution Piping/Initial Mechanical
Integrity Test and Initial Injection Notification for CrIN-1,
CrIN-2, CrIN-3

EPC-DO: 17-449

LA-UR-17-29751

U1601822

Date: NOV 2 2 2017

COPY

Los Alamos NATIONAL LABORATORY EST 1943

Environmental Protection & Compliance Division
Los Alamos National Laboratory
PO Box 1663, K491
Los Alamos, New Mexico 87545
(505) 667-2211

Environmental Management
Los Alamos Field Office
3747 West Jemez Road, A316
Los Alamos, New Mexico 87544
(505) 665-5820/Fax (505) 665-5903

Date: AUG 2 8 2017
Symbol: EPC-DO: 17-302
LA-UR: 17-27282
Locates Action No.: U1601822

GROUND WATER
AUG 2 8 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: **Integrity Testing of Distribution Piping from CrEX-1, CrEX-2, and CrEX-3 to CrIN-1, CrIN-2, CrIN-3, CrIN-4, and CrIN-5, Discharge Permit DP-1835, Class V Underground Injection Control Wells**

Dear Ms. Hunter:

In accordance with Condition No. 3 of Discharge Permit DP-1835, the U.S. Department of Energy and Los Alamos National Security, LLC (DOE/LANS) are submitting mechanical integrity test results to the New Mexico Environment Department (NMED) for the distribution piping installed as part of the Chromium Plume Control Interim Measure. This submittal includes the results for the distribution piping from CrEX-1, CrEX-2, and CrEX-3 to CrIN-1, CrIN-2, CrIN-3, CrIN-4, and CrIN-5.

On October 14, 2016 DOE/LANS submitted a mechanical integrity test method for review and approval by the NMED (EPC-DO-16-299). NMED approved the test method on October 17, 2016. Results for the distribution piping from CrEX-1 to CrIN-4 and CrIN-5 was submitted to NMED on November 15, 2016 (EPC-DO-16-345).

DOE/LANS has completed integrity testing of additional segments of piping in accordance with the NMED-approved test methods for the high-density polyethylene (HDPE) pipelines connecting extraction wells CrEX-1, CrEX-2, and CrEX-3 with injection wells CrIN-1, CrIN-2, CrIN-3, CrIN-4 and CrIN-5 which were not included in the November 15, 2016 submittal. Enclosure 1 provides a cross-reference of the integrity testing completed to date. Enclosure 2 contains the inspection reports

Los Alamos
NATIONAL LABORATORY
EST 1943

Environmental Protection & Compliance Division
Los Alamos National Laboratory
PO Box 1663, K491
Los Alamos, New Mexico 87545
(505) 667-2211

EM-LA

Environmental Management
Los Alamos Field Office
3747 West Jemez Road, A316
Los Alamos, New Mexico 87544
(505) 665-5820/Fax (505) 665-5903

Date: AUG 2 8 2017
Symbol: EPC-DO: 17-302
LA-UR: 17-27282
Locates Action No.: U1601822

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: **Integrity Testing of Distribution Piping from CrEX-1, CrEX-2, and CrEX-3 to CrIN-1, CrIN-2, CrIN-3, CrIN-4, and CrIN-5, Discharge Permit DP-1835, Class V Underground Injection Control Wells**

Dear Ms. Hunter:

In accordance with Condition No. 3 of Discharge Permit DP-1835, the U.S. Department of Energy and Los Alamos National Security, LLC (DOE/LANS) are submitting mechanical integrity test results to the New Mexico Environment Department (NMED) for the distribution piping installed as part of the Chromium Plume Control Interim Measure. This submittal includes the results for the distribution piping from CrEX-1, CrEX-2, and CrEX-3 to CrIN-1, CrIN-2, CrIN-3, CrIN-4, and CrIN-5.

On October 14, 2016 DOE/LANS submitted a mechanical integrity test method for review and approval by the NMED (EPC-DO-16-299). NMED approved the test method on October 17, 2016. Results for the distribution piping from CrEX-1 to CrIN-4 and CrIN-5 was submitted to NMED on November 15, 2016 (EPC-DO-16-345).

DOE/LANS has completed integrity testing of additional segments of piping in accordance with the NMED-approved test methods for the high-density polyethylene (HDPE) pipelines connecting extraction wells CrEX-1, CrEX-2, and CrEX-3 with injection wells CrIN-1, CrIN-2, CrIN-3, CrIN-4 and CrIN-5 which were not included in the November 15, 2016 submittal. Enclosure 1 provides a cross-reference of the integrity testing completed to date. Enclosure 2 contains the inspection reports

(on CD) of all tests completed through August 8, 2017, including those submitted on November 15, 2016. All test results demonstrated satisfactory pipe integrity per the specified test method.

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,

John C. Bretzke
Division Leader

Sincerely,

Cheryl L. Rodriguez
Program Manager, FPD-II

JCB/CLR/MTS/WJF:am

Enclosure(s):
1) Summary Table of Distribution Piping Integrity Test Results
2) Distribution Piping Integrity Test Results (CD) for Pipelines Connecting Extraction Wells CrEX-1, CrEX-2, and CrEX-3 with injection wells CrIN-1, CrIN-2, CrIN-3, CrIN-4 and CrIN-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)
Douglas E. Hintze, EM-LA, (E-File)
David S. Rhodes, EM-LA, (E-File)
Cheryl L. Rodriguez, EM-LA, (E-File)
Paul B. Underwood, EM-LA, (E-File)
Annette E. Russell, EM-LA, (E-File)
Craig S. Leasure, PADOPS, (E-File)
William R. Mairson, PADOPS, (E-File)
Michael T. Brandt, ADESH, (E-File)
Randall Mark Erickson, ADEM, (E-File)
Enrique Torres, ADEM, (E-File)
Bruce Robinson, ADEM-PO, (E-File)
Stephani F. Swickley, ADEM-PO, (E-File)
Danny Katzman, ADEM-PO, (E-File)
Michael T. Saladen, EPC-CP, (E-File)
Robert S. Beers, EPC-CP, (E-File)
William J. Foley, EPC-CP, (E-File)
Ellena I. Martinez, EPC-CP, (E-File)
lasomailbox@nnsa.doe.gov, (E-File)
emla.docs@em.doe.gov, (E-File)
locatesteam@lanl.gov, (E-File)
epc-correspondence@lanl.gov, (E-File)
adesh-records@lanl.gov, (E-File)

Los Alamos NATIONAL LABORATORY EST 1943

COPY

EM-LA

Environmental Protection & Compliance Division
Los Alamos National Laboratory
PO Box 1663, K491
Los Alamos, New Mexico 87545
(505) 667-2211

Environmental Management
Los Alamos Field Office
3747 West Jemez Road, A316
Los Alamos, New Mexico 87544
(505) 665-5820/Fax (505) 665-5903

Date: JUL 13 2017
Symbol: EPC-DO: 17-264
LA-UR: 17-25211
Locates Action No.: U1601822

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: **Notification of Commencement of Injection at CrIN-1, CrIN-2, and CrIN-3, Discharge Permit DP-1835, Class V Underground Injection Control Wells**

Dear Ms. Hunter:

In accordance with Condition No. 4 of Discharge Permit DP-1835, the U.S. Department of Energy and Los Alamos National Security, LLC (DOE/LANS) are providing notification to the New Mexico Environment Department (NMED) that the discharge of treated groundwater to injection wells CrIN-1, CrIN-2, and CrIN-3 will commence on or after July 17, 2017. DOE/LANS will follow with an email notification to NMED 24 hrs before system startup at each well. Mechanical integrity test results for these three wells were previously submitted to NMED by DOE/LANS on December 9, 2016 (EPC-DO-16-365).

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,

John C. Bretzke
Division Leader

Sincerely,

Cheryl L. Rodriguez
Program Manager, FPD-II

Environmental Protection & Compliance Division
Los Alamos National Laboratory
PO Box 1663, K491
Los Alamos, New Mexico 87545
(505) 667-2211

Environmental Management
Los Alamos Field Office
3747 West Jemez Road, A316
Los Alamos, New Mexico 87544
(505) 665-5820/Fax (505) 665-5903

Date: JUL 13 2017
Symbol: EPC-DO: 17-264
LA-UR: 17-25211
Locates Action No.: U1601822

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: **Notification of Commencement of Injection at CrIN-1, CrIN-2, and CrIN-3, Discharge Permit DP-1835, Class V Underground Injection Control Wells**

Dear Ms. Hunter:

In accordance with Condition No. 4 of Discharge Permit DP-1835, the U.S. Department of Energy and Los Alamos National Security, LLC (DOE/LANS) are providing notification to the New Mexico Environment Department (NMED) that the discharge of treated groundwater to injection wells CrIN-1, CrIN-2, and CrIN-3 will commence on or after July 17, 2017. DOE/LANS will follow with an email notification to NMED 24 hrs before system startup at each well. Mechanical integrity test results for these three wells were previously submitted to NMED by DOE/LANS on December 9, 2016 (EPC-DO-16-365).

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,

John C. Bretzke
Division Leader

Sincerely,

Cheryl L. Rodriguez
Program Manager, FPD-II

JCB/CLR/MTS/WJF:am

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)
Kathryn Hayden, NMED/SWQB, Santa Fe, NM, (E-File)
Steve Pullen, NMED/SWQB, Santa Fe, NM, (E-File)
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Michael T. Brandt, ADESH, (E-File)
Randall Mark Erickson, ADEM, (E-File)
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Danny Katzman, ADEM-PO, (E-File)
Michael T. Saladen, EPC-CP, (E-File)
Robert S. Beers, EPC-CP, (E-File)
William J. Foley, EPC-CP, (E-File)
Ellena I. Martinez, EPC-CP, (E-File)
lasomailbox@nnsa.doe.gov, (E-File)
emla.docs@em.doe.gov, (E-File)
locatesteam@lanl.gov, (E-File)
epc-correspondence@lanl.gov, (E-File)
adesh-records@lanl.gov, (E-File)

From:	Foley, William Joseph
To:	Steve Pullen; Michelle Hunter
Cc:	Rhodes, David; Rodriguez, Cheryl; Swickley, Stephani Fuller; Katzman, Danny; Saladen, Michael Thomas; Beers, Bob; Garcia, Gary A
Subject:	Discharge Permit DP-1835: Notification of commencement of discharge from CrEX-1, CrEX-2, and CrEX-3 to injection wells CrIN-1, CrIN-2, CrIN-3, CrIN-4 and CrIN-5
Date:	Friday, September 1, 2017 7:50:00 AM

Dear Mr. Pullen and Ms. Hunter,

The U.S. Department of Energy and Los Alamos National Security, LLC (DOE/LANS) will begin discharging into injection wells CrIN-1, CrIN-2, and CrIN-3 on or after September 5, 2017 under Discharge Permit DP-1835. The initial discharge will be related to functional testing of the extraction, treatment and injection system. In accordance, with our July 13, 2017 correspondence (EPC-DO-17-264) we are providing NMED with email notification 24 hrs prior to commencing discharge. This notification is for injection of treated groundwater from extraction wells CrEX-1, CrEX-2, and CrEX-3 into injection wells CrIN-1, CrIN-2, CrIN-3, CrIN-4 and CrIN-5.

Please do not hesitate to contact me if you have questions regarding this notification.

Sincerely,

William Foley
Los Alamos National Security, LLC
505-665-8423

ENCLOSURE 6

Pilot Scale Molasses Amendment and Sodium Dithionite Amendment Studies NMED Conditional Approval

EPC-DO: 17-449

LA-UR-17-29751

U1601822

Date: NOV 2 2 2017

NEW MEXICO
ENVIRONMENT DEPARTMENT

Ground Water Quality Bureau
1190 South St. Francis Drive (87505)
P.O. Box 5469, Santa Fe, New Mexico 87502-5469
Phone (505) 827-2900 Fax (505) 827-2965
www.env.nm.gov

SUSANA MARTINEZ
Governor

JOHN A. SANCHEZ
Lieutenant Governor

BUTCH TONGATE
Cabinet Secretary

J. C. BORREGO
Deputy Secretary

July 18, 2017

John C. Bretzke, Division Leader
Environmental Protection & Compliance Division
Los Alamos National Security, LLC
PO Box 1663, K491
Los Alamos, NM 87545

Arturo Q. Duran, Permitting Manager
Environmental Management
Los Alamos Field Office
3747 West Jemez Road, A316
Los Alamos, NM 87544

RE: Response to Notice of Intent to Discharge; Discharge Permit Not Required for Los Alamos National Laboratory Pilot Scale Sodium Dithionite Amendment Study in Regional Aquifer Monitoring Well R-42, AI:856 PRD20170003

Dear Mr. Bretzke and Mr. Duran:

On May 22, 2017, the New Mexico Environment Department (NMED) Ground Water Quality Bureau received a Notice of Intent to Discharge (NOI) from the U.S. Department of Energy and Los Alamos National Security (DOE/LANS) for a pilot study involving the injection of sodium dithionite, sodium sulfate, and sodium bromide into a regional aquifer groundwater monitoring well. The proposed discharge is located at regional groundwater monitoring well, R-42, located in Los Alamos National Laboratory (LANL) Technical Area 05 (TA-05) in Section 24, Township 19N, Range 6E, Los Alamos County. Groundwater beneath the site is at a depth of approximately 900 feet.

The NOI satisfies the requirements of Subsection B of 20.6.2.1201 NMAC, Ground and Surface Water Protection regulations, (20.6.2 NMAC).

The proposed discharge is briefly described as follows.

> A sodium dithionite and sodium sulfate solution with a sodium bromide tracer will be injected into the regional aquifer beneath Mortandad Canyon via monitoring well R-42 during a pilot amendment study designed to evaluate the potential use of sodium dithionite as a chemical reductant to reduce hexavalent chromium (Cr(VI)) to trivalent chromium (Cr(III)).

Approximately 9,000 gallons of untreated groundwater from monitoring well R-42 containing the following compounds will injected back into monitoring well R-42 via tremie during a single deployment.

Compound	Quantity	Purpose
Sodium Dithionite	300 kg	Chemical reductant
Sodium Sulfite	250 kg	Stabilization of sodium dithionite prior to and during injection
Sodium Bromide	5 kg	Tracer to quantify the recovery of the injected water

Following the injection of the amendments, 1,000-1,500 gallons of potable water from the Los Alamos County Water Supply System will be used as chase water.

Phase 1 continuous pumping of monitoring well R-42 will commence 2-3 days following the injection activities. During Phase 1 pumping, it is expected that 40,000 gallons of groundwater will be pumped and byproducts from the degradation of sodium dithionite will be recovered. Groundwater recovered during Phase 1 pumping will be collected in storage tanks and sampled for iron, manganese, sulfate, Cr(VI), nitrate, arsenic, and total dissolved solids. If analytical results exceed standards listed in 20.6.2.3103 NMAC, water will be shipped offsite for disposal at a permitted facility.

Following Phase 1 pumping, it is expected that the concentrations of iron, manganese, arsenic, sulfate, Cr(VI), and TDS will be below the standards listed in 20.6.3103 NMAC and Phase 2 pumping of monitoring well R-42 will begin. Phase 2 pumping will be continuous and is intended to closely monitor the treatment effects of the amendments and to determine when concentrations of nitrate and Cr(VI) return to pre-treatment concentrations. Phase 2 pumping is expected to last months to a year.

Groundwater pumped from monitoring well R-42 meeting the standards listed in 20.6.3103 NMAC will be managed under the Land Application Decision Tree approved by NMED on December 2, 2016.

Based on the information provided in your Notice of Intent, NMED has determined that a Discharge Permit is not required as long as the discharge is as described and the following requirements are met.

- No amendments outside of those described in this letter shall be injected into monitoring well R-42 during this pilot study.
- Copies of quarterly reports prepared for the NMED Hazardous Waste Bureau and a final report shall be submitted to the GWQB following completion of the pilot study. The reports should include monitoring results and interpretation of the results.

- Prior to and during the pilot study, groundwater sampling for iron, manganese, and arsenic shall be performed in the treated water from extraction wells CrEX-1, CrEX-2, and CrEX-3. Results shall be included in quarterly monitoring reports required by Discharge Permit, DP-1835.

A Discharge Permit is not required at this time because the information provided indicates it is unlikely that the discharge will adversely affect ground water quality.

Although a Discharge Permit is not being required for this pilot study at this time, you are not relieved of liability should your operation result in actual pollution of surface or ground waters. Further, this decision by NMED does not relieve you of your responsibility to comply with any other applicable federal, state, and/or local laws and regulations, zoning requirements, plumbing codes, and nuisance ordinances.

If at some time in the future you intend to change the amount, character or location of your discharge, or if observation or monitoring shows that the discharge is not as described in your Notice of Intent, you must file a revised Notice of Intent with the Ground Water Quality Bureau.

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

Sincerely,

Michelle Hunter, Chief
Ground Water Quality Bureau

MH:KH

cc: Steve Pullen, NMED/GWQB
Shelly Lemon, NMED/SWQB
John E. Kieling, NMEDHWB
Susan Lucas Kamat, NMED/DOEOB
Stephen M. Yanicak, NMED/DOEOB
Bob Beers, DOE/LANS (bbeers@LANL.gov)
Stephani F. Swickley, DOE/LANS (sfuller@LANL.gov)

NEW MEXICO
ENVIRONMENT DEPARTMENT

Ground Water Quality Bureau
1190 South St. Francis Drive (87505)
P.O. Box 5469, Santa Fe, New Mexico 87502-5469
Phone (505) 827-2900 Fax (505) 827-2965
www.env.nm.gov

SUSANA MARTINEZ
Governor

JOHN A. SANCHEZ
Lieutenant Governor

BUTCH TONGATE
Cabinet Secretary

J. C. BORREGO
Deputy Secretary

June 27, 2017

John C. Bretzke, Division Leader
Environmental Protection & Compliance Division
Los Alamos National Security, LLC
PO Box 1663, K491
Los Alamos, NM 87545

Arturo Q. Duran, Permitting Manager
Environmental Management
Los Alamos Field Office
3747 West Jemez Road, A316
Los Alamos, NM 87544

RE: Response to Notice of Intent to Discharge; Discharge Permit Not Required for Los Alamos National Laboratory Pilot Scale Molasses Amendment Study in Regional Aquifer Monitoring Well R-28, AI:856 PRD20170003

Dear Mr. Bretzke and Mr. Duran:

On May 22, 2017, the New Mexico Environment Department (NMED) Ground Water Quality Bureau (GWQB) received a Notice of Intent to Discharge (NOI) from the U.S. Department of Energy and Los Alamos National Security (DOE/LANS) for a pilot study involving the injection of a molasses solution containing sodium bromide into a regional aquifer groundwater monitoring well. The proposed discharge is located at regional groundwater monitoring well, R-28, located in Los Alamos National Laboratory (LANL) Technical Area 05 (TA-05) in Section 24, Township 19N, Range 6E, Los Alamos County. Groundwater beneath the site is at a depth of approximately 900 feet.

The NOI satisfies the requirements of Subsection B of 20.6.2.1201 NMAC, Ground and Surface Water Protection regulations (20.6.2 NMAC).

The proposed discharge is briefly described as follows.

> A molasses solution with a conservative, innocuous sodium bromide tracer will be injected into the regional aquifer beneath Mortandad Canyon via monitoring well R-28 during a pilot amendment study designed to evaluate the potential use of molasses as a biostimulant to reduce hexavalent chromium to trivalent chromium.
>
> Five thousand gallons of solution containing 20% food-grade molasses in untreated groundwater from R-28, 10 kilograms of sodium bromide, and 25,000 gallons of untreated

groundwater from monitoring well R-28 will be injected into monitoring well R-28 in a single deployment. Approximately 165 gallons of ethanol, or an equivalent alcohol, will be mixed with potable water from the Los Alamos County Water Supply System to create a total volumn of 500 gallons. The solution will be injected into monitoring well R-28 to reduce microbial populations in the well screen and filter pack.

It is expected that organic carbon from the molasses solution will provide a food source to enhance microbial activity, which will create reducing conditions in the aquifer. The resultant conditions are then expected to lead to the reduction of hexavalent chromium to stable, non-toxic trivalent chromium. To observe the effects of the molasses amendment, a closed circulation loop will be used to passively sample groundwater for total organic carbon, hexavalent chromium, nitrate, sulfate/sulfide, and dissolved iron, arsenic, and manganese. No water disposal will be required during passive sampling, as water will flow back into the well.

In the event that monitoring well R-28 is pumped after several months of passive sampling, groundwater pumped from R-28 will be managed under the Land Application Decision Tree approved by NMED on December 2, 2016.

Based on the information provided in your Notice of Intent, NMED has determined that a Discharge Permit is not required as long as the discharge is as described and the following requirements are met.

- No amendments outside of those described in this letter shall be injected into monitoring well R-28 during this pilot study.
- Copies of quarterly reports prepared for the NMED Hazardous Waste Bureau and a final report shall be submitted to the GWQB following completion of the pilot study. The reports should include monitoring results and interpretation of the results.
- Prior to and during the pilot study, groundwater sampling for iron, manganese, and arsenic shall be performed in the treated water from extraction wells CrEX-1, CrEX-2, and CrEX-3. Results shall be included in quarterly monitoring reports required by Discharge Permit, DP-1835.

A Discharge Permit is not required at this time because the information provided indicates it is unlikely that the discharge will adversely affect ground water quality.

Although a Discharge Permit is not being required for this pilot study at this time, you are not relieved of liability should your operation result in actual pollution of surface or ground waters. Further, this decision by NMED does not relieve you of your responsibility to comply with any other applicable federal, state, and/or local laws and regulations, zoning requirements, plumbing codes, and nuisance ordinances.

If at some time in the future you intend to change the amount, character or location of your discharge, or if observation or monitoring shows that the discharge is not as described in your Notice of Intent, you must file a revised Notice of Intent with the Ground Water Quality Bureau.

If you have any questions, please contact Kathryn Hayden at (505) 827-1046.

Sincerely,

Michelle Hunter, Chief
Ground Water Quality Bureau

MH:KH

cc: Steve Pullen, NMED/GWQB
Shelly Lemon, NMED/SWQB
John E. Kieling, NMEDHWB
Susan Lucas Kamat, NMED/DOEOB
Stephen M. Yanicak, NMED/DOEOB
Bob Beers, DOE/LANS (bbeers@LANL.gov)
Stephani F. Swickley, DOE/LANS (sfuller@LANL.gov)

ENCLOSURE 7

Treated Groundwater Injection and Extraction Summary Tables – 2017 Quarter 3, DP-1835

EPC-DO: 17-449

LA-UR-17-29751

U1601822

Date: NOV 2 2 2017

Table E7-1
Daily Extraction Summary Table -
2017 Quarter 3, DP1835

Date	CrEX-1 (gal)	CrEX-2 (gal)	CrEX-3 (gal)
7/1/2017	-	N/A	-
7/2/2017	-	N/A	-
7/3/2017	-	N/A	-
7/4/2017	-	N/A	-
7/5/2017	-	N/A	-
7/6/2017	-	N/A	-
7/7/2017	-	N/A	-
7/8/2017	-	N/A	-
7/9/2017	-	N/A	-
7/10/2017	-	N/A	-
7/11/2017	-	N/A	-
7/12/2017	-	N/A	-
7/13/2017	-	N/A	-
7/14/2017	-	N/A	-
7/15/2017	-	N/A	-
7/16/2017	-	N/A	-
7/17/2017	-	N/A	-
7/18/2017	-	N/A	-
7/19/2017	-	N/A	-
7/20/2017	-	N/A	-
7/21/2017	-	N/A	-
7/22/2017	-	N/A	-
7/23/2017	-	N/A	-
7/24/2017	-	N/A	-
7/25/2017	-	N/A	-
7/26/2017	-	N/A	-
7/27/2017	-	N/A	-
7/28/2017	-	N/A	-
7/29/2017	-	N/A	-
7/30/2017	-	N/A	-
7/31/2017	-	N/A	-
8/1/2017	-	15,277	-
8/2/2017	-	67,320	-
8/3/2017	-	-	-
8/4/2017	-	-	-
8/5/2017	-	-	-
8/6/2017	-	-	-
8/7/2017	-	-	-
8/8/2017	-	-	-
8/9/2017	-	-	-
8/10/2017	-	-	-

Table E7-1
Daily Extraction Summary Table -
2017 Quarter 3, DP1835

Date	CrEX-1 (gal)	CrEX-2 (gal)	CrEX-3 (gal)
8/11/2017	-	-	-
8/12/2017	-	-	-
8/13/2017	-	-	-
8/14/2017	-	-	-
8/15/2017	-	-	-
8/16/2017	-	-	-
8/17/2017	-	-	-
8/18/2017	-	-	-
8/19/2017	-	-	-
8/20/2017	-	-	-
8/21/2017	-	-	-
8/22/2017	-	-	-
8/23/2017	-	-	-
8/24/2017	-	-	-
8/25/2017	-	-	-
8/26/2017	-	-	-
8/27/2017	-	-	-
8/28/2017	-	-	-
8/29/2017	-	-	-
8/30/2017	-	-	-
8/31/2017	-	-	-
9/1/2017	-	-	-
9/2/2017	-	-	-
9/3/2017	-	-	-
9/4/2017	-	-	-
9/5/2017	-	-	1,959
9/6/2017	-	-	-
9/7/2017	-	-	-
9/8/2017	-	-	-
9/9/2017	-	-	-
9/10/2017	-	-	-
9/11/2017	-	-	-
9/12/2017	-	-	-
9/13/2017	-	-	-
9/14/2017	-	-	-
9/15/2017	-	-	-
9/16/2017	-	-	-
9/17/2017	-	-	-
9/18/2017	-	-	-
9/19/2017	-	-	-
9/20/2017	-	-	-

Table E7-1
Daily Extraction Summary Table -
2017 Quarter 3, DP1835

Date	CrEX-1 (gal)	CrEX-2 (gal)	CrEX-3 (gal)
9/21/2017	-	-	-
9/22/2017	-	-	-
9/23/2017	-	-	-
9/24/2017	-	-	-
9/25/2017	-	-	-
9/26/2017	-	-	-
9/27/2017	-	-	-
9/28/2017	-	-	-
9/29/2017	3,917	-	6,998
9/30/2017	-	-	-

Notes:
"- If groundwater was extracted on this day"
from this location it was not treated and
injected through the UIC wells.
N/A Extraction well not operational.

Table E7-2
Daily Injection Summary Table -
2017 Quarter 3, DP1835

Date	CrIN-1 (gal)	CrIN-2 (gal)	CrIN-3 (gal)	CrIN-4 (gal)	CrIN-5 (gal)	CrIN-6[1] (gal)
7/1/2017	0	0	0	0	0	0
7/2/2017	0	0	0	0	0	0
7/3/2017	0	0	0	0	0	0
7/4/2017	0	0	0	0	0	0
7/5/2017	0	0	0	0	0	0
7/6/2017	0	0	0	0	0	0
7/7/2017	0	0	0	0	0	0
7/8/2017	0	0	0	0	0	0
7/9/2017	0	0	0	0	0	0
7/10/2017	0	0	0	0	0	0
7/11/2017	0	0	0	0	0	0
7/12/2017	0	0	0	0	0	0
7/13/2017	0	0	0	0	0	0
7/14/2017	0	0	0	0	0	0
7/15/2017	0	0	0	0	0	0
7/16/2017	0	0	0	0	0	0
7/17/2017	0	0	0	0	0	0
7/18/2017	0	0	0	0	0	0
7/19/2017	0	0	0	0	0	0
7/20/2017	0	0	0	0	0	0
7/21/2017	0	0	0	0	0	0
7/22/2017	0	0	0	0	0	0
7/23/2017	0	0	0	0	0	0
7/24/2017	0	0	0	0	0	0
7/25/2017	0	0	0	0	0	0
7/26/2017	0	0	0	0	0	0
7/27/2017	0	0	0	0	0	0
7/28/2017	0	0	0	0	0	0
7/29/2017	0	0	0	0	0	0
7/30/2017	0	0	0	0	0	0
7/31/2017	0	0	0	0	0	0
8/1/2017	0	0	0	0	0	0
8/2/2017	0	0	0	39,029	43,568	0
8/3/2017	0	0	0	0	0	0
8/4/2017	0	0	0	0	0	0
8/5/2017	0	0	0	0	0	0
8/6/2017	0	0	0	0	0	0
8/7/2017	0	0	0	0	0	0
8/8/2017	0	0	0	0	0	0
8/9/2017	0	0	0	0	0	0

Table E7-2
Daily Injection Summary Table -
2017 Quarter 3, DP1835

Date	CrIN-1 (gal)	CrIN-2 (gal)	CrIN-3 (gal)	CrIN-4 (gal)	CrIN-5 (gal)	CrIN-6[1] (gal)
8/10/2017	0	0	0	0	0	0
8/11/2017	0	0	0	0	0	0
8/12/2017	0	0	0	0	0	0
8/13/2017	0	0	0	0	0	0
8/14/2017	0	0	0	0	0	0
8/15/2017	0	0	0	0	0	0
8/16/2017	0	0	0	0	0	0
8/17/2017	0	0	0	0	0	0
8/18/2017	0	0	0	0	0	0
8/19/2017	0	0	0	0	0	0
8/20/2017	0	0	0	0	0	0
8/21/2017	0	0	0	0	0	0
8/22/2017	0	0	0	0	0	0
8/23/2017	0	0	0	0	0	0
8/24/2017	0	0	0	0	0	0
8/25/2017	0	0	0	0	0	0
8/26/2017	0	0	0	0	0	0
8/27/2017	0	0	0	0	0	0
8/28/2017	0	0	0	0	0	0
8/29/2017	0	0	0	0	0	0
8/30/2017	0	0	0	0	0	0
8/31/2017	0	0	0	0	0	0
9/1/2017	0	0	0	0	0	0
9/2/2017	0	0	0	0	0	0
9/3/2017	0	0	0	0	0	0
9/4/2017	0	0	0	0	0	0
9/5/2017	0	0	0	0	0	0
9/6/2017	0	0	0	0	0	0
9/7/2017	0	0	0	0	0	0
9/8/2017	0	0	0	0	0	0
9/9/2017	0	0	0	0	0	0
9/10/2017	0	0	0	0	0	0
9/11/2017	0	0	0	0	0	0
9/12/2017	0	0	0	0	0	0
9/13/2017	0	0	0	0	0	0
9/14/2017	0	0	0	0	0	0
9/15/2017	0	0	0	0	0	0
9/16/2017	0	0	0	0	0	0
9/17/2017	0	0	0	0	0	0
9/18/2017	0	0	0	0	0	0

Table E7-2
Daily Injection Summary Table -
2017 Quarter 3, DP1835

Date	CrIN-1 (gal)	CrIN-2 (gal)	CrIN-3 (gal)	CrIN-4 (gal)	CrIN-5 (gal)	CrIN-6[1] (gal)
9/19/2017	0	0	0	0	0	0
9/20/2017	0	0	0	0	0	0
9/21/2017	0	0	0	0	0	0
9/22/2017	0	0	0	0	0	0
9/23/2017	0	0	0	0	0	0
9/24/2017	0	0	0	0	0	0
9/25/2017	0	0	0	0	0	0
9/26/2017	0	0	0	0	0	0
9/27/2017	0	0	0	0	0	0
9/28/2017	0	0	0	0	0	0
9/29/2017	2,646	3,226	2,943	2,187	2,200	0
9/30/2017	0	0	0	0	0	0

Notes:
[1] Treated groundwater not injected into UIC well during the reporting period.

ENCLOSURE 8

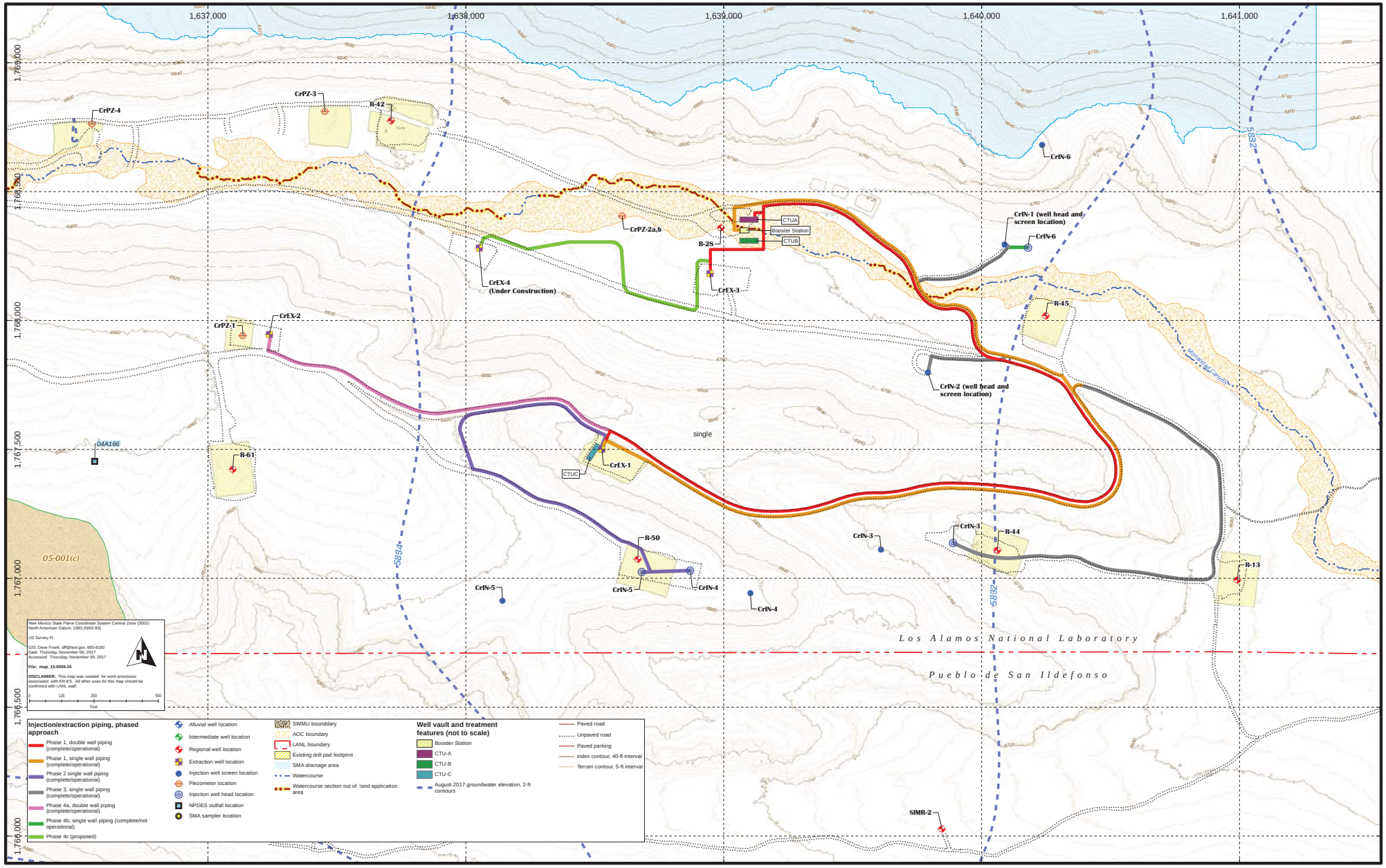
Facility Layout Map –
2017 Quarter 3, DP-1835

EPC-DO: 17-449

LA-UR-17-29751

U1601822

Date: NOV 2 2 2017



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