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GROUND WATER
MAY 31 2018
BUREAU

Date: MAY 31 2018
Refer To: N3B-18-0119

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 – 2018 Quarter 1, 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. During the third quarter of fiscal year 2018, ownership of the discharge permit transferred to Newport News Nuclear BWXT – Los Alamos (N3B) from LANS. Pursuant to Condition No. 10 of the above-referenced discharge permit, DOE/N3B 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 2018 January 1 through March 31 (Quarter 1) reporting period, discharge of treated groundwater to the regional aquifer continued under DP-1835. This treated discharge occurred at five UIC wells: CrIN-1, CrIN-2, CrIN-3, CrIN-4, and CrIN-5. The Quarterly Report for the Discharge of Treated Groundwater to the Regional Aquifer – 2018 Quarter 1, DP-1835 (Enclosure 1) provides the information required under DP-1835 for this reporting period.

If you have questions, please contact Steve White at (505) 309-1370 (steve.white@em-la.doe.gov) or Cheryl Rodriguez at (505) 665-5330 (cheryl.rodriguez@em.doe.gov).

Sincerely,

for Dana C. Lindsay

Joseph A. Legare
Program Manager
Environmental Remediation Program

Sincerely,

David S. Rhodes, Director
Office of Quality and Regulatory Compliance
Environmental Management
Los Alamos Field Office

JL/DR/SW

Enclosure(s): Two hard copies with electronic files

1. Quarterly Report for the Discharge of Treated Groundwater to the Regional Aquifer – 2018 Quarter 1, DP-1835 (EM2018-0006)
2. Treated Effluent Analytical Results Summary Tables – 2018 Quarter 1, DP-1835
3. Groundwater Elevation Contour Map – 2018 Quarter 1, DP-1835
4. Groundwater Monitoring Wells Analytical Results Summary Table – 2018 Quarter 1, DP-1835
5. Distribution Piping/Initial Mechanical Integrity Test Results Submittal Letter and Notification of Extraction, Treatment, and Injection of Groundwater from CrEX-4
6. Treated Groundwater Injection and Extraction Summary Tables – 2018 Quarter 1, DP-1835
7. Facility Layout Map – 2018 Quarter 1, DP-1835

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ENCLOSURE 1

Quarterly Report for the Discharge of
Treated Groundwater to the Regional Aquifer –
2018 Quarter 1, 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. During the third quarter of fiscal year 2018, ownership of the discharge permit transferred to Newport News Nuclear BWXT – Los Alamos (N3B) from LANS. Pursuant to Condition No. 10 of the above-referenced discharge permit, DOE/N3B are required to submit quarterly reports.

During the 2018 January 1 through March 31 (Quarter 1) reporting period, discharge of treated groundwater to the regional aquifer occurred at five UIC wells: CrIN-1, CrIN-2, CrIN-3, CrIN-4, and CrIN-5, under DP-1835. Groundwater originated from four extraction wells: CrEX-1, CrEX-2, CrEX-3, and CrEX-4. This groundwater was treated by chromium treatment unit (CTU) CTUA before injection at the UIC wells.

Condition No. 10 of DP-1835 required submission of a quarterly report to NMED by June 1 for the January 1–March 31 discharge period. Several conditions within the permit identify information to be submitted in the quarterly report. The following information, with condition references, is 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. *Total 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.

Requirement 1: Influent and discharge volumes for the IX treatment systems. Table 1 provides the influent and discharge volumes for IX treatment systems during 2018 Quarter 1 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, CrEX-3, and CrEX-4 and was treated with treatment unit CTUA.

Table 1
Total Influent and Discharge Volumes
for IX Treatment Systems – 2018 Quarter 1

Treatment Unit	Influent Volume[a] (gal.)	Effluent Volume [b, c] (gal.)
CTUA	3,045,820	3,420,631
CTUB	n/a[d]	n/a
CTUC	n/a	n/a

Note: Individual flow meter accurate to ±5%.

[a] Influent volume based on CrEX-1, CrEX-2, and CrEX-3 extraction volumes.

[b] Effluent volume based on CTU flow meter reading.

[c] During the quarter the booster tank volume increased by approximately 50,000 gal., which represents treated groundwater that has not been injected.

[d] n/a = Not applicable. Treatment unit did not treat any groundwater that was subsequently injected during the quarter.

Requirement 2: Quarterly treated effluent sampling results from each IX treatment system. Treated effluent analytical results from samples collected during 2018 Quarter 1 for activities completed under DP-1835 are summarized in Enclosure 2. No results for total chromium, nitrate-nitrogen, 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, perchlorate, sulfate, total dissolved solids, fluoride, and 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.

The pilot scale molasses and sodium dithionite amendment studies continued during 2018 Quarter 1. NMED determined that no permit was required for the deployment of these amendments and these studies began with NMED conditional approvals during 2017 Quarter 3. In accordance with the NMED conditional approvals, iron, manganese, and arsenic sampling in the treated water from extraction wells CrEX-1, CrEX-2, CrEX-3, and CrEX-4 was completed, with the results being submitted in the quarterly monitoring reports under DP-1835. These results for 2018 Quarter 1 are provided in Enclosure 2. No results for iron, manganese, or arsenic exceeded 90% of the numeric standards of 20.6.2.3103 NMAC. The 90% values for iron, manganese, and arsenic are 900 µg/L, 180 µg/L, and 90 µg/L, respectively.

During 2018 Quarter 1 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.

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

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.

Quarterly groundwater analytical results from samples collected during 2018 Quarter 1 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.

Table 2
Groundwater Elevations Summary
for Groundwater Monitoring Wells – 2018 Quarter 1

Monitoring Well	Groundwater Elevation[a] (ft)
CrCH-1	5835.22
CrCH-2 S1	5832.57
CrCH-2 S2	5832.49
CrCH-3	5833.97
CrCH-4	5835.69
CrCH-5	5834.95
R-11	5832.72
R-13	5831.03
R-43 S1	5834.52
R-43 S2	5833.82
R-44 S1	5831.95
R-44 S2	5831.83
R-45 S1	5831.72
R-45 S2	5831.62
R-50 S1	5833.18
R-50 S2	5832.97
R-61 S1	5834.53

Table 2 (continued)

Monitoring Well	Groundwater Elevation[a] (ft)
R-61 S2	5834.69
R-62	5837.95
SIMR-2[b]	5832.15

[a] Groundwater elevations provided are based on February 14 values from transducers.

[b] Fourth Quarter 2017 SIMR-2 data reported here in accordance with DP-1835 2017 Quarter 4 Report (EPC-DO: 18-075). 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. Data from the current quarter is not available at this time and will be presented in the next quarterly report.

Table 3
Summary Table of Analytical Results for Groundwater Monitoring Wells – 2018 Quarter 1

Location	Sample Date	Analyte[a]						
		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	1/10/2018	4.48	0.779	12.0	0.349	5.45	11.3	166
R-13	1/19/2018	2.44	0.395	4.56	0.200	0.724	3.39	201
R-43 S1	1/23/2018	8.45	0.827	179	0.270	5.44	17.4	177
R-43 S1	1/23/2018	8.44	0.822	184	0.265	5.36	17.3	163
R-43 S2	1/24/2018	5.94	0.857	18.7	0.211	3.51	8.81	147
R-44 S1	2/14/2018	2.33	0.435	13.0	0.278	1.10	3.41	147
R-44 S1	1/16/2018	2.33	0.449	13.6	0.248	1.23	3.38	111
R-44 S1	3/12/2018	2.34	0.450	15.00	0.323	1.16	3.45	137
R-44 S2	1/16/2018	2.20	0.368	7.21	0.252	0.671	2.74	123
R-44 S2	3/13/2018	2.24	0.338	6.58	0.330	0.741	2.72	110
R-44 S2	3/13/2018	2.24	0.347	7.13	0.321	0.744	2.71	119
R-44 S2	2/14/2018	2.26	0.325	7.58	0.383	0.802	2.74	153
R-45 S1	1/17/2018	5.87	0.588	43.4	0.191	2.80	9.10	137
R-45 S1	3/14/2018	5.94	0.567	44.6	0.308	3.34	9.08	136

Table 3 (continued)

Location	Sample Date	Analyte[a]						
		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-45 S1	2/14/2018	6.03	0.567	44.9	0.272	3.29	9.21	167
R-45 S2	2/14/2018	4.24	0.401	21.8	0.373	0.851	5.05	167
R-45 S2	1/17/2018	4.22	0.429	22.6	0.274	0.865	5.20	104
R-45 S2	3/15/2018	4.33	0.425	21.0	0.363	0.854	5.2	137
R-50 S1	2/15/2018	9.22	0.596	123	0.236	2.52	13.9	180
R-50 S1	1/12/2018	9.81	0.629	126	0.201	1.94	14.2	217
R-50 S1	3/19/2018	9.38	0.607	132	0.478	2.10	14.2	191
R-50 S2	1/16/2018	2.03	0.324	4.10	0.298	0.519	2.55	120
R-50 S2	3/20/2018	2.08	0.308	3.94	0.369	1.36	2.55	141
R-50 S2	2/20/2018	2.12	0.311	4.21	0.411	0.489	2.62	143
R-62	1/17/2018	15.7	0.838	272	0.109	1.70	28.6	154
R-62	1/17/2018	22.0	NA[b]	348	0.410	NA	36.1	NA
R-62	1/17/2018	19.7	NA	323	0.354	NA	32.1	NA
R-62	1/17/2018	17.8	NA	265	0.418	NA	27.8	NA
R-62	1/17/2018	22.1	NA	368	0.429	NA	36.1	NA
R-62	1/17/2018	21.1	NA	352	0.451	NA	34.0	NA
R-62	1/17/2018	22.4	NA	369	0.414	NA	36.3	NA
R-62	1/17/2018	21.1	NA	344	0.278	NA	35.8	NA
SIMR-2[c]	10/30/2017	2.24	0.399	5.45	0.191	0.679	2.88	166
SIMR-2	11/15/2017	2.13	0.390	9.41	0.139	0.684	2.85	156
SIMR-2	12/14/2017	2.19	0.434	5.36	0.174	0.712	3.02	153
SIMR-2	1/18/2018	2.19	0.4.13	5.43	0.378	0.691	2.87	121
SIMR-2	2/15/2018	2.19	0.403	4.99	0.192	0.682	2.83	163
SIMR-2	3/15/2018	2.19	0.402	4.74	0.204	0.688	2.86	126

[a] Reported results are dissolved constituents.

[b] NA = Not analyzed as part of extended purge sampling event.

[c] SIMR-2 data reported here in accordance with the memorandum of agreement and protocol agreement between Pueblo de San Ildefonso and DOE.

Requirement 4: Any operations/maintenance activities performed. Limited operations occurred during 2018 Quarter 1 for the extraction, treatment, and injection system. These activities consisted of CrEX-4, 72-hour system acceptance testing and long–term functional testing.

Operations and maintenance activities completed during 2017 Quarter 4 are listed in Table 4 for the extraction, treatment, and injection system.

Table 4
Operations and Maintenance Activity Summary Table – 2018 Quarter 1

Maintenance Date	Elements Impacted	Maintenance Description
2/14 through 2/16	CrEX-1, CrEX-2, CrEX-4 CTUA[a], CrIN-1, CrIN-2, CrIN-3, CrIN-4, and CrIN-5	Extraction, treatment, and injection of treated groundwater occur related to the CrEX-4 acceptance test.
2/20, 2/21, 2/28, 3/1, 3/5 through 3/9, 3/15, and 3/16	CrEX-1, CrEX-2, CrEX-3, CrEX-4 CTUA[a], CrIN-1, CrIN-2, CrIN-3, CrIN-4, and CrIN-5	Extraction, treatment, and injection of treated groundwater occur related to the system acceptance test.
3/14	CTUA[1]	IX vessel exchanges were completed for treatment train B and C as follows: • Treatment train B – replaced primary IX vessel with the secondary IX vessel; new secondary IX vessel installed. • Treatment train C – replaced primary IX vessel with the secondary IX vessel; new secondary IX vessel installed.
3/19 through end of reporting period	CrEX-1, CrEX-2, CrEX-3, CrEX-4, CTUA, CrIN-1[b], CrIN-2, CrIN-3, CrIN-4, CrIN-5	Extraction, treatment, and injection of treated groundwater occur related to the system functional test.
3/25	CTUA[1]	IX vessel exchanges were completed for treatment A as follows: • Treatment train A – replaced primary IX vessel with the secondary IX vessel; new secondary IX vessel installed.

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

[b] In accordance with DOE/LANS October 19, 2017, correspondence (EPC-DO-17-392) and NMED's November 21, 2017 correspondence, a recommendation for the final configuration of system operation for the interim measure will be submitted to NMED.

Requirement 5: Any periodic test of mechanical integrity conducted. Periodic testing of mechanical integrity was not conducted during 2018 Quarter 1. In accordance with Condition No. 3, the next required integrity test of these items will occur within 5 yr of the initial test unless a 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 pipelines connecting extraction wells CrEX-1, CrEX-2, CrEX-3, and CrEX-4 to the groundwater treatment system on March 21, 2018. This documentation also included the documentation demonstrating the mechanical integrity of the pipelines connecting the groundwater treatment system with UIC wells CrIN-1, CrIN-2, CrIN-3, CrIN-4, CrIN-5, and CrIN-6, which were completed after and not included in either the November 15, 2016, August 28, 2017, or November 22, 2017, submittals. In addition, integrity testing documentation for extraction well CrEX-4 was also included. Enclosure 5 contains the submittal letter for this documentation and the initial notification of extraction from CrEX-4.

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 trains B and C during the reporting period as cited in Requirement 4.

Requirement 7: Any well work-overs conducted. Well work-overs did not occur during 2018 Quarter 1.

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 continued. In accordance with NMED's conditional approval for these studies, results from iron, manganese, and arsenic sampling in the treated water from the extraction wells during the study are being provided in the quarterly monitoring reports under DP-1835. These results for 2018 Quarter 1 are provided in Enclosure 2.

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

In accordance with DOE/LANS October 19, 2017, correspondence (EPC-DO-17-392); NMED's November 21, 2017, correspondence; and DOE/LANS March 22, 2018, correspondence (ADEM-18-0029), a recommendation for the final configuration of system operation for the interim measure will be submitted to NMED during the 2018 Quarter 2 reporting period, along with recommendations for operation of the interim measure. A copy of the March 22, 2018, correspondence is included in Enclosure 5.

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 2018 Quarter 1.

Table 5
Flows and Volumes of Treated Effluent Injected – 2018 Quarter 1

Injection Well	Flow rate (gpm[a])			Daily Volume (gal.)			Total Volume (gal.)
	Average[b]	Maximum	Minimum[c]	Average	Maximum	Minimum[c]	
January 2018							
CrIN-1	0.0	0.0	0.0	0	0	0	0
CrIN-2	0.0	0.0	0.0	0	0	0	0
CrIN-3	0.0	0.0	0.0	0	0	0	0
CrIN-4	0.0	0.0	0.0	0	0	0	0
CrIN-5	0.0	0.0	0.0	0	0	0	0
CrIN-6[d]	n/a[e]	n/a	n/a	n/a	n/a	n/a	n/a
February 2018							
CrIN-1	5.2	9.4	2.5	7,504	13,593	3,606	22,512
CrIN-2	3.0	4.7	1.7	4,279	6,706	2,381	12,836
CrIN-3	4.6	8.8	1.6	6,557	12,640	2,281	19,672
CrIN-4	2.1	3.4	1.0	3,032	4,866	1,470	9,096
CrIN-5	2.1	2.6	1.6	2,970	3,811	2,272	8,909
CrIN-6[4]	n/a	n/a	n/a	n/a	n/a	n/a	n/a
March 2018							
CrIN-1	8.2	16.4	0.1	11,837	23,580	94	23,673
CrIN-2	9.0	17.8	0.1	12,915	25,688	141	25,829
CrIN-3	51.9	105.3	1.6	74,695	151,605	2,272	1,269,821
CrIN-4	28.9	51.1	0.0	41,623	73,604	65	749,207
CrIN-5	33.1	102.2	0.1	47,653	147,106	129	857,757
CrIN-6[4]	n/a	n/a	n/a	n/a	n/a	n/a	n/a

[a] gpm = Gallons per minute.

[b] Average flow rate and daily volume represents arithmetic mean values of results provided during periods when injection of treated groundwater was occurring.

[c] Minimum values represent the minimum daily value which occurred during days when pumping occurred.

[d] UIC well constructed and injection of treated groundwater did not occur during the quarter in accordance with NMED's September 25, 2017 correspondence.

[e] n/a = Not applicable. Treated groundwater not injected during the month at this location.

Requirement 10: Total monthly volume of treated effluent transferred to each UIC well. Table 5 provides total 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.

Requirement 11: Monthly average, maximum, and minimum values of injection water, (pressure) head above static level for each UIC well. Table 6 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 6
Water-Level Values Above Static Level by UIC Well – 2018 Quarter 1

UIC Well	January			February			March		
	Average[a] (ft)	Maximum (ft)	Minimum (ft)	Average[a] (ft)	Maximum (ft)	Minimum (ft)	Average[a] (ft)	Maximum (ft)	Minimum (ft)
CrIN-1	0.0	0.0	0.0	4.8	6.2	3.4	2.7	4.0	1.4
CrIN-2	0.0	0.0	0.0	0.0	0.0	0.0	0.9	1.8	0.0
CrIN-3	0.0	0.0	0.0	0.8	2.4	0.0	74.1	115.9	5.6
CrIN-4	0.0	0.0	0.0	15.5	46.5	0.0	95.7	131.7	0.0
CrIN-5	0.0	0.0	0.0	—[b]	—	—	75.6	172.4	0.0
CrIN-6[c]	n/a[d]	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a

[a] Average values provided represent arithmetic mean values of maximum daily values during periods when injection of treated groundwater was occurring.

[b] — = Data not collected for this location during the period.

[c] UIC well constructed but not approved for injection of treated groundwater.

[4] n/a = Not applicable. Treated groundwater not injected during the month at this location.

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 2018 Quarter 1 are provided in Enclosure 6.

Requirement 13: Daily volume pumped from each extraction well. Daily volumes of groundwater pumped from CrEX-1, CrEX-2, CrEX-3, and CrEX-4 during 2018 Quarter 1 which was subsequently treated and injected under this permit, are provided in Enclosure 6.

Requirement 14: Facility layout map. The facility layout map for 2018 Quarter 1 showing the location and number of each well is provided in Enclosure 7.

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 –
2018 Quarter 1, DP-1835

Table E2-1
Treated Effluent Analytical Results Summary Table - 2018 Quarter 1, 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-17-151326	02/14/18	Chloride	21.1	mg/L		Y	Y	EPA:300.0	1.34
CTUA	CTUA-17-151327	02/21/18	Chloride	22.9	mg/L		Y	Y	EPA:300.0	1.34
CTUA	CTUA-17-151328	02/28/18	Chloride	21.7	mg/L		Y	Y	EPA:300.0	1.34
CTUA	CTUA-17-151330	03/06/18	Chloride	24.8	mg/L		Y	Y	EPA:300.0	1.34
CTUA	CTUA-17-151329	03/20/18	Chloride	69.5	mg/L		Y	Y	EPA:300.0	1.34
CTUA	CTUA-17-151331	03/28/18	Chloride	24.1	mg/L		Y	Y	EPA:300.0	0.335
CTUA	CTUA-17-151326	02/14/18	Chromium	3.00	ug/L	U	N	Y	EPA:300.0	0.335
CTUA	CTUA-17-151327	02/21/18	Chromium	3.00	ug/L	U	N	Y	EPA:300.0	0.670
CTUA	CTUA-17-151328	02/28/18	Chromium	3.00	ug/L	U	N	Y	EPA:300.0	0.335
CTUA	CTUA-17-151330	03/06/18	Chromium	3.00	ug/L	U	N	Y	SW-846:6020	3.00
CTUA	CTUA-17-151329	03/20/18	Chromium	3.00	ug/L	U	N	Y	SW-846:6020	3.00
CTUA	CTUA-17-151331	03/28/18	Chromium	3.00	ug/L	U	N	Y	SW-846:6020	3.00
CTUA	CTUA-17-151326	02/14/18	Fluoride	0.300	mg/L		Y	Y	SW-846:6020	3.00
CTUA	CTUA-17-151327	02/21/18	Fluoride	0.259	mg/L		Y	Y	SW-846:6020	3.00
CTUA	CTUA-17-151328	02/28/18	Fluoride	0.524	mg/L		Y	Y	SW-846:6020	3.00
CTUA	CTUA-17-151330	03/06/18	Fluoride	0.280	mg/L		Y	Y	SW-846:6020	3.00
CTUA	CTUA-17-151329	03/20/18	Fluoride	0.109	mg/L		Y	Y	SW-846:6020	3.00
CTUA	CTUA-17-151331	03/28/18	Fluoride	0.381	mg/L		Y	Y	SW-846:6020	3.00
CTUA	CTUA-17-151326	02/14/18	Nitrate-Nitrite as Nitrogen	3.84	mg/L		Y	Y	SW-846:6020	3.00
CTUA	CTUA-17-151327	02/21/18	Nitrate-Nitrite as Nitrogen	3.17	mg/L		Y	Y	SW-846:6020	3.00
CTUA	CTUA-17-151328	02/28/18	Nitrate-Nitrite as Nitrogen	2.92	mg/L		Y	Y	SW-846:6020	3.00
CTUA	CTUA-17-151330	03/06/18	Nitrate-Nitrite as Nitrogen	3.84	mg/L		Y	Y	SW-846:6020	3.00
CTUA	CTUA-17-151329	03/20/18	Nitrate-Nitrite as Nitrogen	1.08	mg/L		Y	Y	SW-846:6020	3.00
CTUA	CTUA-17-151331	03/28/18	Nitrate-Nitrite as Nitrogen	3.88	mg/L		Y	Y	SW-846:6020	3.00
CTUA	CTUA-17-151326	02/14/18	Perchlorate	0.459	ug/L		Y	Y	SW-846:6020	3.00
CTUA	CTUA-17-151327	02/21/18	Perchlorate	0.579	ug/L		Y	Y	SW-846:6020	3.00
CTUA	CTUA-17-151328	02/28/18	Perchlorate	0.541	ug/L		Y	Y	SW-846:6020	3.00
CTUA	CTUA-17-151330	03/06/18	Perchlorate	0.576	ug/L		Y	Y	EPA:300.0	0.033
CTUA	CTUA-17-151329	03/20/18	Perchlorate	0.050	ug/L	U	N	Y	EPA:300.0	0.033
CTUA	CTUA-17-151331	03/28/18	Perchlorate	0.0562	ug/L	J	Y	Y	EPA:300.0	0.033
CTUA	CTUA-17-151326	02/14/18	Sulfate	30.0	mg/L		Y	Y	EPA:300.0	0.033
CTUA	CTUA-17-151327	02/21/18	Sulfate	31.5	mg/L		Y	Y	EPA:300.0	0.033

Table E2-1

Treated Effluent Analytical Results Summary Table - 2018 Quarter 1, 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-17-151328	02/28/18	Sulfate	32.0	mg/L		Y	Y	EPA:300.0	0.033
CTUA	CTUA-17-151330	03/06/18	Sulfate	37.4	mg/L		Y	Y	EPA:300.0	0.033
CTUA	CTUA-17-151329	03/20/18	Sulfate	11.3	mg/L		Y	Y	EPA:300.0	0.033
CTUA	CTUA-17-151331	03/28/18	Sulfate	25.6	mg/L		Y	Y	EPA:300.0	0.033
CTUA	CTUA-17-151326	02/14/18	Total Dissolved Solids	240	mg/L		Y	Y	EPA:353.2	0.017
CTUA	CTUA-17-151327	02/21/18	Total Dissolved Solids	210	mg/L		Y	Y	EPA:353.2	0.017
CTUA	CTUA-17-151328	02/28/18	Total Dissolved Solids	233	mg/L		Y	Y	EPA:353.2	0.017
CTUA	CTUA-17-151330	03/06/18	Total Dissolved Solids	254	mg/L		Y	Y	EPA:353.2	0.017
CTUA	CTUA-17-151329	03/20/18	Total Dissolved Solids	296	mg/L		Y	Y	EPA:353.2	0.017
CTUA	CTUA-17-151331	03/28/18	Total Dissolved Solids	266	mg/L		Y	Y	EPA:353.2	0.170

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 - 2018 Quarter 1, 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-17-151326	02/14/18	Arsenic	2.00	ug/L	U	N	Y	SW-846:6020	5.00
CTUA	CTUA-17-151327	02/21/18	Arsenic	2.92	ug/L	J	Y	Y	SW-846:6020	5.00
CTUA	CTUA-17-151328	02/28/18	Arsenic	2.53	ug/L	J	Y	Y	SW-846:6020	5.00
CTUA	CTUA-17-151330	03/06/18	Arsenic	2.67	ug/L	J	Y	Y	SW-846:6020	5.00
CTUA	CTUA-17-151329	03/20/18	Arsenic	2.00	ug/L	U	N	Y	SW-846:6020	5.00
CTUA	CTUA-17-151331	03/28/18	Arsenic	2.16	ug/L	J	Y	Y	SW-846:6020	5.00
CTUA	CTUA-17-151326	02/14/18	Iron	30.0	ug/L	U	N	Y	SW-846:6010C	100
CTUA	CTUA-17-151327	02/21/18	Iron	30.0	ug/L	U	N	Y	SW-846:6010C	100
CTUA	CTUA-17-151328	02/28/18	Iron	30.0	ug/L	U	N	Y	SW-846:6010C	100
CTUA	CTUA-17-151330	03/06/18	Iron	30.0	ug/L	U	N	Y	SW-846:6010C	100
CTUA	CTUA-17-151329	03/20/18	Iron	30.0	ug/L	U	N	Y	SW-846:6010C	100
CTUA	CTUA-17-151331	03/28/18	Iron	30.0	ug/L	U	N	Y	SW-846:6010C	100
CTUA	CTUA-17-151326	02/14/18	Manganese	2.00	ug/L	U	N	Y	SW-846:6010C	10.0
CTUA	CTUA-17-151327	02/21/18	Manganese	2.00	ug/L	U	N	Y	SW-846:6010C	10.0
CTUA	CTUA-17-151328	02/28/18	Manganese	2.00	ug/L	U	N	Y	SW-846:6010C	10.0
CTUA	CTUA-17-151330	03/06/18	Manganese	2.00	ug/L	U	N	Y	SW-846:6010C	10.0
CTUA	CTUA-17-151329	03/20/18	Manganese	7.53	ug/L	J	Y	Y	SW-846:6010C	10.0
CTUA	CTUA-17-151331	03/28/18	Manganese	2.00	ug/L	U	N	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 –
2018 Quarter 1, DP-1835

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 February 2018. 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 CrEX-4 acceptance testing, 72-hour system acceptance testing, and long–term functional testing related to system operation occurred. Specifically, pumping from CrEX-1, CrEX-2, CrEX-3, and/or CrEX-4 occurred intermittently between February 14 and March 31. Injection wells CrIN-1, CrIN-2, CrIN-3, CrIN-4, and/or CrIN-5 received treated water during the reporting period.

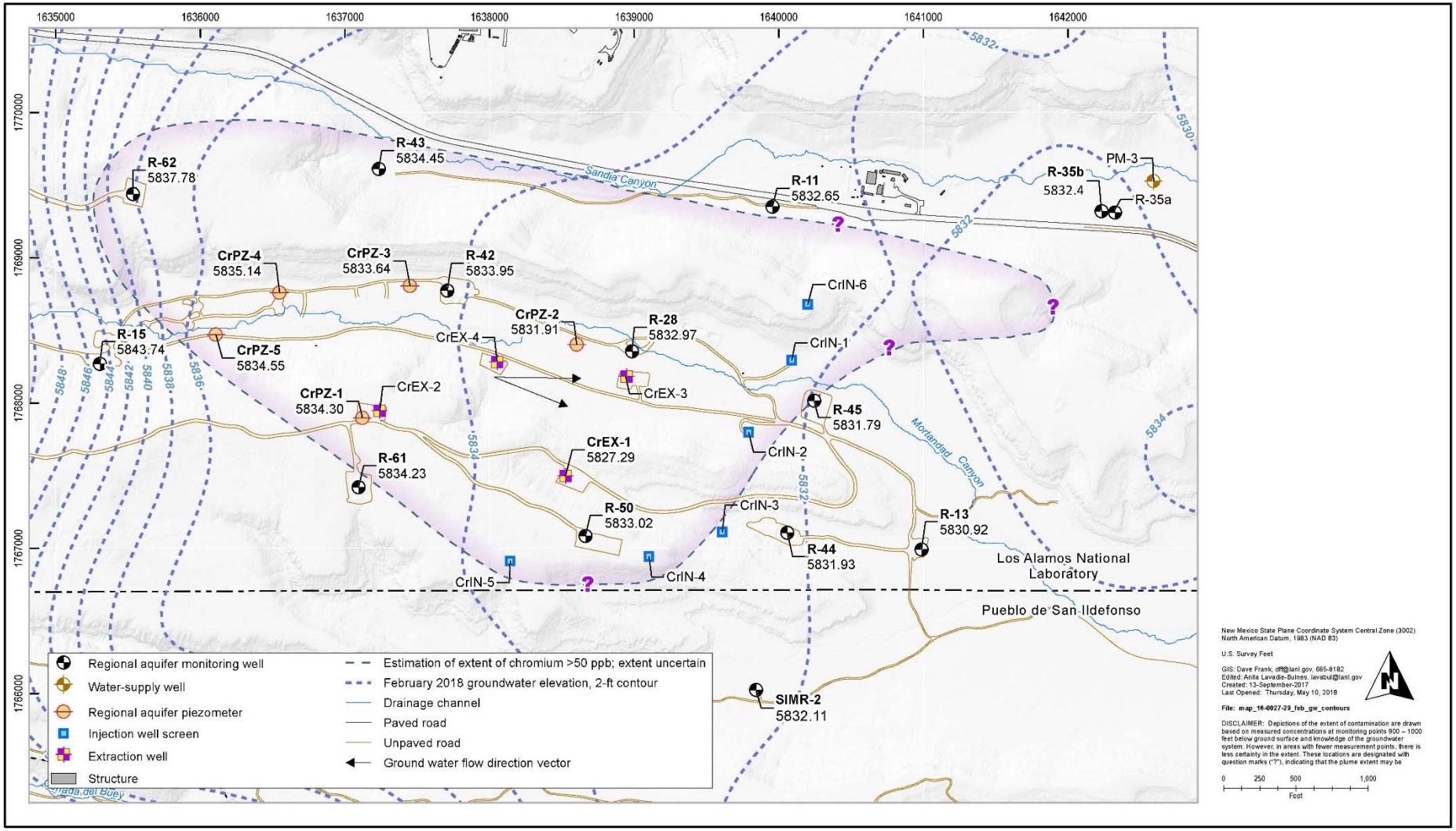

Figure E3-1 Groundwater Elevation Contour Map – 2018 Quarter 1, DP-1835

ENCLOSURE 4

Groundwater Monitoring Wells
Analytical Results Summary Table –
2018 Quarter 1, DP-1835

Table E4-1
Groundwater Monitoring Wells Analytical Results Summary Table - 2018 Quarter 1, DP1835

Sample	Location ID	Sample Date	Parameter Name	Result	Report Units	Lab Qualifier	Detect Flag	Filtered	Lab Method	Report Detection Limit
CASA-18-150799	R-11	01-10-2018	Chloride	4.48	mg/L		Y	Y	EPA:300.0	0.200
CASA-18-150799	R-11	01-10-2018	Perchlorate	0.779	ug/L		Y	Y	SW-846:6850	0.200
CASA-18-150799	R-11	01-10-2018	Chromium	12	ug/L		Y	Y	SW-846:6020	10.0
CASA-18-150799	R-11	01-10-2018	Fluoride	0.349	mg/L		Y	Y	EPA:300.0	0.100
CASA-18-150799	R-11	01-10-2018	Nitrate-Nitrite as Nitrogen	5.45	mg/L		Y	Y	EPA:353.2	0.250
CASA-18-150799	R-11	01-10-2018	Sulfate	11.3	mg/L		Y	Y	EPA:300.0	0.400
CASA-18-150799	R-11	01-10-2018	Total Dissolved Solids	166	mg/L		Y	Y	EPA:160.1	14.3
CAMO-18-150801	R-13	01-19-2018	Chloride	2.44	mg/L		Y	Y	EPA:300.0	0.200
CAMO-18-150801	R-13	01-19-2018	Perchlorate	0.395	ug/L		Y	Y	SW-846:6850	0.200
CAMO-18-150801	R-13	01-19-2018	Chromium	4.56	ug/L	J	Y	Y	SW-846:6020	10.0
CAMO-18-150801	R-13	01-19-2018	Fluoride	0.200	mg/L		Y	Y	EPA:300.0	0.100
CAMO-18-150801	R-13	01-19-2018	Nitrate-Nitrite as Nitrogen	0.724	mg/L		Y	Y	EPA:353.2	0.050
CAMO-18-150801	R-13	01-19-2018	Sulfate	3.39	mg/L		Y	Y	EPA:300.0	0.400
CAMO-18-150801	R-13	01-19-2018	Total Dissolved Solids	201	mg/L		Y	Y	EPA:160.1	14.3
CASA-18-1	R-43 S1	01-23-2018	Chloride	8.45	mg/L		Y	Y	EPA:300.0	0.200
CASA-18-1	R-43 S1	01-23-2018	Perchlorate	0.827	ug/L		Y	Y	SW-846:6850	0.200
CASA-18-1	R-43 S1	01-23-2018	Chromium	179	ug/L		Y	Y	SW-846:6020	10.0
CASA-18-1	R-43 S1	01-23-2018	Fluoride	0.270	mg/L		Y	Y	EPA:300.0	0.100
CASA-18-1	R-43 S1	01-23-2018	Nitrate-Nitrite as Nitrogen	5.44	mg/L		Y	Y	EPA:353.2	0.500
CASA-18-1	R-43 S1	01-23-2018	Sulfate	17.4	mg/L		Y	Y	EPA:300.0	0.400
CASA-18-1	R-43 S1	01-23-2018	Total Dissolved Solids	177	mg/L		Y	Y	EPA:160.1	14.3
CASA-18-150819	R-43 S1	01-23-2018	Chloride	8.44	mg/L		Y	Y	EPA:300.0	0.200
CASA-18-150819	R-43 S1	01-23-2018	Perchlorate	0.822	ug/L		Y	Y	SW-846:6850	0.200
CASA-18-150819	R-43 S1	01-23-2018	Chromium	184	ug/L		Y	Y	SW-846:6020	10.0
CASA-18-150819	R-43 S1	01-23-2018	Fluoride	0.265	mg/L		Y	Y	EPA:300.0	0.100
CASA-18-150819	R-43 S1	01-23-2018	Nitrate-Nitrite as Nitrogen	5.36	mg/L		Y	Y	EPA:353.2	0.500
CASA-18-150819	R-43 S1	01-23-2018	Sulfate	17.3	mg/L		Y	Y	EPA:300.0	0.400
CASA-18-150819	R-43 S1	01-23-2018	Total Dissolved Solids	163	mg/L		Y	Y	EPA:160.1	14.3
CASA-18-150821	R-43 S2	01-24-2018	Chloride	5.94	mg/L		Y	Y	EPA:300.0	0.200
CASA-18-150821	R-43 S2	01-24-2018	Perchlorate	0.857	ug/L		Y	Y	SW-846:6850	0.200
CASA-18-150821	R-43 S2	01-24-2018	Chromium	18.7	ug/L		Y	Y	SW-846:6020	10.0
CASA-18-150821	R-43 S2	01-24-2018	Fluoride	0.211	mg/L		Y	Y	EPA:300.0	0.100
CASA-18-150821	R-43 S2	01-24-2018	Nitrate-Nitrite as Nitrogen	3.51	mg/L		Y	Y	EPA:353.2	0.500
CASA-18-150821	R-43 S2	01-24-2018	Sulfate	8.81	mg/L		Y	Y	EPA:300.0	0.400
CASA-18-150821	R-43 S2	01-24-2018	Total Dissolved Solids	147	mg/L		Y	Y	EPA:160.1	14.3

Table E4-1
Groundwater Monitoring Wells Analytical Results Summary Table - 2018 Quarter 1, DP1835

Sample	Location ID	Sample Date	Parameter Name	Result	Report Units	Lab Qualifier	Detect Flag	Filtered	Lab Method	Report Detection Limit
CAMO-18-1	R-44 S1	02-14-2018	Chloride	2.33	mg/L		Y	Y	EPA:300.0	0.200
CAMO-18-1	R-44 S1	02-14-2018	Perchlorate	0.435	ug/L		Y	Y	SW-846:6850	0.200
CAMO-18-1	R-44 S1	02-14-2018	Chromium	13	ug/L		Y	Y	SW-846:6020	10.0
CAMO-18-1	R-44 S1	02-14-2018	Fluoride	0.278	mg/L		Y	Y	EPA:300.0	0.100
CAMO-18-1	R-44 S1	02-14-2018	Nitrate-Nitrite as Nitrogen	1.10	mg/L		Y	Y	EPA:353.2	0.050
CAMO-18-1	R-44 S1	02-14-2018	Sulfate	3.41	mg/L		Y	Y	EPA:300.0	0.400
CAMO-18-1	R-44 S1	02-14-2018	Total Dissolved Solids	147	mg/L		Y	Y	EPA:160.1	14.3
CAMO-18-150823	R-44 S1	01-16-2018	Chloride	2.33	mg/L		Y	Y	EPA:300.0	0.200
CAMO-18-150823	R-44 S1	01-16-2018	Perchlorate	0.449	ug/L		Y	Y	SW-846:6850	0.200
CAMO-18-150823	R-44 S1	01-16-2018	Chromium	13.6	ug/L		Y	Y	SW-846:6020	10.0
CAMO-18-150823	R-44 S1	01-16-2018	Fluoride	0.248	mg/L		Y	Y	EPA:300.0	0.100
CAMO-18-150823	R-44 S1	01-16-2018	Nitrate-Nitrite as Nitrogen	1.23	mg/L		Y	Y	EPA:353.2	0.050
CAMO-18-150823	R-44 S1	01-16-2018	Sulfate	3.38	mg/L		Y	Y	EPA:300.0	0.400
CAMO-18-150823	R-44 S1	01-16-2018	Total Dissolved Solids	111	mg/L		Y	Y	EPA:160.1	14.3
CAMO-18-151452	R-44 S1	03-12-2018	Chloride	2.34	mg/L		Y	Y	EPA:300.0	0.200
CAMO-18-151452	R-44 S1	03-12-2018	Perchlorate	0.45	ug/L		Y	Y	SW-846:6850	0.200
CAMO-18-151452	R-44 S1	03-12-2018	Chromium	15	ug/L		Y	Y	SW-846:6020	10.0
CAMO-18-151452	R-44 S1	03-12-2018	Fluoride	0.323	mg/L		Y	Y	EPA:300.0	0.100
CAMO-18-151452	R-44 S1	03-12-2018	Nitrate-Nitrite as Nitrogen	1.16	mg/L		Y	Y	EPA:353.2	0.050
CAMO-18-151452	R-44 S1	03-12-2018	Sulfate	3.45	mg/L		Y	Y	EPA:300.0	0.400
CAMO-18-151452	R-44 S1	03-12-2018	Total Dissolved Solids	137	mg/L		Y	Y	EPA:160.1	14.3
CAMO-18-150826	R-44 S2	01-16-2018	Chloride	2.20	mg/L		Y	Y	EPA:300.0	0.200
CAMO-18-150826	R-44 S2	01-16-2018	Perchlorate	0.368	ug/L		Y	Y	SW-846:6850	0.200
CAMO-18-150826	R-44 S2	01-16-2018	Chromium	7.21	ug/L	J	Y	Y	SW-846:6020	10.0
CAMO-18-150826	R-44 S2	01-16-2018	Fluoride	0.252	mg/L		Y	Y	EPA:300.0	0.100
CAMO-18-150826	R-44 S2	01-16-2018	Nitrate-Nitrite as Nitrogen	0.671	mg/L		Y	Y	EPA:353.2	0.050
CAMO-18-150826	R-44 S2	01-16-2018	Sulfate	2.74	mg/L		Y	Y	EPA:300.0	0.400
CAMO-18-150826	R-44 S2	01-16-2018	Total Dissolved Solids	123	mg/L		Y	Y	EPA:160.1	14.3
CAMO-18-151455	R-44 S2	03-13-2018	Chloride	2.24	mg/L		Y	Y	EPA:300.0	0.200
CAMO-18-151455	R-44 S2	03-13-2018	Perchlorate	0.338	ug/L		Y	Y	SW-846:6850	0.200
CAMO-18-151455	R-44 S2	03-13-2018	Chromium	6.58	ug/L	J	Y	Y	SW-846:6020	10.0
CAMO-18-151455	R-44 S2	03-13-2018	Fluoride	0.330	mg/L		Y	Y	EPA:300.0	0.100
CAMO-18-151455	R-44 S2	03-13-2018	Nitrate-Nitrite as Nitrogen	0.741	mg/L		Y	Y	EPA:353.2	0.050
CAMO-18-151455	R-44 S2	03-13-2018	Sulfate	2.72	mg/L		Y	Y	EPA:300.0	0.400
CAMO-18-151455	R-44 S2	03-13-2018	Total Dissolved Solids	110	mg/L		Y	Y	EPA:160.1	14.3

Table E4-1
Groundwater Monitoring Wells Analytical Results Summary Table - 2018 Quarter 1, DP1835

Sample	Location ID	Sample Date	Parameter Name	Result	Report Units	Lab Qualifier	Detect Flag	Filtered	Lab Method	Report Detection Limit
CAMO-18-151458	R-44 S2	03-13-2018	Chloride	2.24	mg/L		Y	Y	EPA:300.0	0.200
CAMO-18-151458	R-44 S2	03-13-2018	Perchlorate	0.347	ug/L		Y	Y	SW-846:6850	0.200
CAMO-18-151458	R-44 S2	03-13-2018	Chromium	7.13	ug/L	J	Y	Y	SW-846:6020	10.0
CAMO-18-151458	R-44 S2	03-13-2018	Fluoride	0.321	mg/L		Y	Y	EPA:300.0	0.100
CAMO-18-151458	R-44 S2	03-13-2018	Nitrate-Nitrite as Nitrogen	0.744	mg/L		Y	Y	EPA:353.2	0.050
CAMO-18-151458	R-44 S2	03-13-2018	Sulfate	2.71	mg/L		Y	Y	EPA:300.0	0.400
CAMO-18-151458	R-44 S2	03-13-2018	Total Dissolved Solids	119	mg/L		Y	Y	EPA:160.1	14.3
CAMO-18-4	R-44 S2	02-14-2018	Chloride	2.26	mg/L		Y	Y	EPA:300.0	0.200
CAMO-18-4	R-44 S2	02-14-2018	Perchlorate	0.325	ug/L		Y	Y	SW-846:6850	0.200
CAMO-18-4	R-44 S2	02-14-2018	Chromium	7.58	ug/L	J	Y	Y	SW-846:6020	10.0
CAMO-18-4	R-44 S2	02-14-2018	Fluoride	0.383	mg/L		Y	Y	EPA:300.0	0.100
CAMO-18-4	R-44 S2	02-14-2018	Nitrate-Nitrite as Nitrogen	0.802	mg/L		Y	Y	EPA:353.2	0.050
CAMO-18-4	R-44 S2	02-14-2018	Sulfate	2.74	mg/L		Y	Y	EPA:300.0	0.400
CAMO-18-4	R-44 S2	02-14-2018	Total Dissolved Solids	153	mg/L		Y	Y	EPA:160.1	14.3
CAMO-18-150829	R-45 S1	01-17-2018	Chloride	5.87	mg/L		Y	Y	EPA:300.0	0.200
CAMO-18-150829	R-45 S1	01-17-2018	Perchlorate	0.588	ug/L		Y	Y	SW-846:6850	0.200
CAMO-18-150829	R-45 S1	01-17-2018	Chromium	43.4	ug/L		Y	Y	SW-846:6020	10.0
CAMO-18-150829	R-45 S1	01-17-2018	Fluoride	0.191	mg/L		Y	Y	EPA:300.0	0.100
CAMO-18-150829	R-45 S1	01-17-2018	Nitrate-Nitrite as Nitrogen	2.80	mg/L		Y	Y	EPA:353.2	0.500
CAMO-18-150829	R-45 S1	01-17-2018	Sulfate	9.10	mg/L		Y	Y	EPA:300.0	0.400
CAMO-18-150829	R-45 S1	01-17-2018	Total Dissolved Solids	137	mg/L		Y	Y	EPA:160.1	14.3
CAMO-18-151460	R-45 S1	03-14-2018	Chloride	5.94	mg/L		Y	Y	EPA:300.0	0.200
CAMO-18-151460	R-45 S1	03-14-2018	Perchlorate	0.567	ug/L		Y	Y	SW-846:6850	0.200
CAMO-18-151460	R-45 S1	03-14-2018	Chromium	44.6	ug/L		Y	Y	SW-846:6020	10.0
CAMO-18-151460	R-45 S1	03-14-2018	Fluoride	0.308	mg/L		Y	Y	EPA:300.0	0.100
CAMO-18-151460	R-45 S1	03-14-2018	Nitrate-Nitrite as Nitrogen	3.34	mg/L		Y	Y	EPA:353.2	0.250
CAMO-18-151460	R-45 S1	03-14-2018	Sulfate	9.08	mg/L		Y	Y	EPA:300.0	0.400
CAMO-18-151460	R-45 S1	03-14-2018	Total Dissolved Solids	136	mg/L		Y	Y	EPA:160.1	14.3
CAMO-18-7	R-45 S1	02-14-2018	Chloride	6.03	mg/L		Y	Y	EPA:300.0	0.200
CAMO-18-7	R-45 S1	02-14-2018	Perchlorate	0.567	ug/L		Y	Y	SW-846:6850	0.200
CAMO-18-7	R-45 S1	02-14-2018	Chromium	44.9	ug/L		Y	Y	SW-846:6020	10.0
CAMO-18-7	R-45 S1	02-14-2018	Fluoride	0.272	mg/L		Y	Y	EPA:300.0	0.100
CAMO-18-7	R-45 S1	02-14-2018	Nitrate-Nitrite as Nitrogen	3.29	mg/L		Y	Y	EPA:353.2	0.250
CAMO-18-7	R-45 S1	02-14-2018	Sulfate	9.21	mg/L		Y	Y	EPA:300.0	0.400
CAMO-18-7	R-45 S1	02-14-2018	Total Dissolved Solids	167	mg/L		Y	Y	EPA:160.1	14.3

Table E4-1
Groundwater Monitoring Wells Analytical Results Summary Table - 2018 Quarter 1, DP1835

Sample	Location ID	Sample Date	Parameter Name	Result	Report Units	Lab Qualifier	Detect Flag	Filtered	Lab Method	Report Detection Limit
CAMO-18-10	R-45 S2	02-14-2018	Chloride	4.24	mg/L		Y	Y	EPA:300.0	0.200
CAMO-18-10	R-45 S2	02-14-2018	Perchlorate	0.401	ug/L		Y	Y	SW-846:6850	0.200
CAMO-18-10	R-45 S2	02-14-2018	Chromium	21.8	ug/L		Y	Y	SW-846:6020	10.0
CAMO-18-10	R-45 S2	02-14-2018	Fluoride	0.373	mg/L		Y	Y	EPA:300.0	0.100
CAMO-18-10	R-45 S2	02-14-2018	Nitrate-Nitrite as Nitrogen	0.851	mg/L		Y	Y	EPA:353.2	0.050
CAMO-18-10	R-45 S2	02-14-2018	Sulfate	5.05	mg/L		Y	Y	EPA:300.0	0.400
CAMO-18-10	R-45 S2	02-14-2018	Total Dissolved Solids	167	mg/L		Y	Y	EPA:160.1	14.3
CAMO-18-150833	R-45 S2	01-17-2018	Chloride	4.22	mg/L		Y	Y	EPA:300.0	0.200
CAMO-18-150833	R-45 S2	01-17-2018	Perchlorate	0.429	ug/L		Y	Y	SW-846:6850	0.200
CAMO-18-150833	R-45 S2	01-17-2018	Chromium	22.6	ug/L		Y	Y	SW-846:6020	10.0
CAMO-18-150833	R-45 S2	01-17-2018	Fluoride	0.274	mg/L		Y	Y	EPA:300.0	0.100
CAMO-18-150833	R-45 S2	01-17-2018	Nitrate-Nitrite as Nitrogen	0.865	mg/L		Y	Y	EPA:353.2	0.250
CAMO-18-150833	R-45 S2	01-17-2018	Sulfate	5.20	mg/L		Y	Y	EPA:300.0	0.400
CAMO-18-150833	R-45 S2	01-17-2018	Total Dissolved Solids	104	mg/L		Y	Y	EPA:160.1	14.3
CAMO-18-151463	R-45 S2	03-15-2018	Chloride	4.33	mg/L		Y	Y	EPA:300.0	0.200
CAMO-18-151463	R-45 S2	03-15-2018	Perchlorate	0.425	ug/L		Y	Y	SW-846:6850	0.200
CAMO-18-151463	R-45 S2	03-15-2018	Chromium	21	ug/L		Y	Y	SW-846:6020	10.0
CAMO-18-151463	R-45 S2	03-15-2018	Fluoride	0.363	mg/L		Y	Y	EPA:300.0	0.100
CAMO-18-151463	R-45 S2	03-15-2018	Nitrate-Nitrite as Nitrogen	0.854	mg/L		Y	Y	EPA:353.2	0.050
CAMO-18-151463	R-45 S2	03-15-2018	Sulfate	5.19	mg/L		Y	Y	EPA:300.0	0.400
CAMO-18-151463	R-45 S2	03-15-2018	Total Dissolved Solids	137	mg/L		Y	Y	EPA:160.1	14.3
CAMO-18-13	R-50 S1	02-15-2018	Chloride	9.22	mg/L		Y	Y	EPA:300.0	0.400
CAMO-18-13	R-50 S1	02-15-2018	Perchlorate	0.596	ug/L		Y	Y	SW-846:6850	0.200
CAMO-18-13	R-50 S1	02-15-2018	Chromium	123	ug/L		Y	Y	SW-846:6020	10.0
CAMO-18-13	R-50 S1	02-15-2018	Fluoride	0.236	mg/L		Y	Y	EPA:300.0	0.100
CAMO-18-13	R-50 S1	02-15-2018	Nitrate-Nitrite as Nitrogen	2.52	mg/L		Y	Y	EPA:353.2	0.250
CAMO-18-13	R-50 S1	02-15-2018	Sulfate	13.9	mg/L		Y	Y	EPA:300.0	0.400
CAMO-18-13	R-50 S1	02-15-2018	Total Dissolved Solids	180	mg/L		Y	Y	EPA:160.1	14.3
CAMO-18-150836	R-50 S1	01-12-2018	Chloride	9.81	mg/L		Y	Y	EPA:300.0	0.200
CAMO-18-150836	R-50 S1	01-12-2018	Perchlorate	0.629	ug/L		Y	Y	SW-846:6850	0.200
CAMO-18-150836	R-50 S1	01-12-2018	Chromium	126	ug/L		Y	Y	SW-846:6020	10.0
CAMO-18-150836	R-50 S1	01-12-2018	Fluoride	0.201	mg/L		Y	Y	EPA:300.0	0.100
CAMO-18-150836	R-50 S1	01-12-2018	Nitrate-Nitrite as Nitrogen	1.94	mg/L		Y	Y	EPA:353.2	0.500
CAMO-18-150836	R-50 S1	01-12-2018	Sulfate	14.2	mg/L		Y	Y	EPA:300.0	0.400
CAMO-18-150836	R-50 S1	01-12-2018	Total Dissolved Solids	217	mg/L		Y	Y	EPA:160.1	14.3

Table E4-1
Groundwater Monitoring Wells Analytical Results Summary Table - 2018 Quarter 1, DP1835

Sample	Location ID	Sample Date	Parameter Name	Result	Report Units	Lab Qualifier	Detect Flag	Filtered	Lab Method	Report Detection Limit
CAMO-18-151466	R-50 S1	03-19-2018	Chloride	9.38	mg/L		Y	Y	EPA:300.0	0.400
CAMO-18-151466	R-50 S1	03-19-2018	Perchlorate	0.607	ug/L		Y	Y	SW-846:6850	0.200
CAMO-18-151466	R-50 S1	03-19-2018	Chromium	132	ug/L		Y	Y	SW-846:6020	10.0
CAMO-18-151466	R-50 S1	03-19-2018	Fluoride	0.478	mg/L		Y	Y	EPA:300.0	0.100
CAMO-18-151466	R-50 S1	03-19-2018	Nitrate-Nitrite as Nitrogen	2.10	mg/L		Y	Y	EPA:353.2	0.500
CAMO-18-151466	R-50 S1	03-19-2018	Sulfate	14.2	mg/L		Y	Y	EPA:300.0	0.400
CAMO-18-151466	R-50 S1	03-19-2018	Total Dissolved Solids	191	mg/L		Y	Y	EPA:160.1	14.3
CAMO-18-150839	R-50 S2	01-16-2018	Chloride	2.03	mg/L		Y	Y	EPA:300.0	0.200
CAMO-18-150839	R-50 S2	01-16-2018	Perchlorate	0.324	ug/L		Y	Y	SW-846:6850	0.200
CAMO-18-150839	R-50 S2	01-16-2018	Chromium	4.1	ug/L	J	Y	Y	SW-846:6020	10.0
CAMO-18-150839	R-50 S2	01-16-2018	Fluoride	0.298	mg/L		Y	Y	EPA:300.0	0.100
CAMO-18-150839	R-50 S2	01-16-2018	Nitrate-Nitrite as Nitrogen	0.519	mg/L		Y	Y	EPA:353.2	0.050
CAMO-18-150839	R-50 S2	01-16-2018	Sulfate	2.55	mg/L		Y	Y	EPA:300.0	0.400
CAMO-18-150839	R-50 S2	01-16-2018	Total Dissolved Solids	120	mg/L		Y	Y	EPA:160.1	14.3
CAMO-18-151469	R-50 S2	03-20-2018	Chloride	2.08	mg/L		Y	Y	EPA:300.0	0.200
CAMO-18-151469	R-50 S2	03-20-2018	Perchlorate	0.308	ug/L		Y	Y	SW-846:6850	0.200
CAMO-18-151469	R-50 S2	03-20-2018	Chromium	3.94	ug/L	J	Y	Y	SW-846:6020	10.0
CAMO-18-151469	R-50 S2	03-20-2018	Fluoride	0.369	mg/L		Y	Y	EPA:300.0	0.100
CAMO-18-151469	R-50 S2	03-20-2018	Nitrate-Nitrite as Nitrogen	1.36	mg/L		Y	Y	EPA:353.2	0.250
CAMO-18-151469	R-50 S2	03-20-2018	Sulfate	2.55	mg/L		Y	Y	EPA:300.0	0.400
CAMO-18-151469	R-50 S2	03-20-2018	Total Dissolved Solids	141	mg/L		Y	Y	EPA:160.1	14.3
CAMO-18-16	R-50 S2	02-20-2018	Chloride	2.12	mg/L		Y	Y	EPA:300.0	0.200
CAMO-18-16	R-50 S2	02-20-2018	Perchlorate	0.311	ug/L		Y	Y	SW-846:6850	0.200
CAMO-18-16	R-50 S2	02-20-2018	Chromium	4.21	ug/L	J	Y	Y	SW-846:6020	10.0
CAMO-18-16	R-50 S2	02-20-2018	Fluoride	0.411	mg/L		Y	Y	EPA:300.0	0.100
CAMO-18-16	R-50 S2	02-20-2018	Nitrate-Nitrite as Nitrogen	0.489	mg/L		Y	Y	EPA:353.2	0.050
CAMO-18-16	R-50 S2	02-20-2018	Sulfate	2.62	mg/L		Y	Y	EPA:300.0	0.400
CAMO-18-16	R-50 S2	02-20-2018	Total Dissolved Solids	143	mg/L		Y	Y	EPA:160.1	14.3
CAMO-18-150844	R-62	01-17-2018	Chloride	15.7	mg/L		Y	Y	EPA:300.0	0.800
CAMO-18-150844	R-62	01-17-2018	Perchlorate	0.838	ug/L		Y	Y	SW-846:6850	0.200
CAMO-18-150844	R-62	01-17-2018	Chromium	272	ug/L		Y	Y	SW-846:6020	10.0
CAMO-18-150844	R-62	01-17-2018	Fluoride	0.109	mg/L		Y	Y	EPA:300.0	0.100
CAMO-18-150844	R-62	01-17-2018	Nitrate-Nitrite as Nitrogen	1.70	mg/L		Y	Y	EPA:353.2	0.250
CAMO-18-150844	R-62	01-17-2018	Sulfate	28.6	mg/L		Y	Y	EPA:300.0	1.60
CAMO-18-150844	R-62	01-17-2018	Total Dissolved Solids	154	mg/L		Y	Y	EPA:160.1	14.3

Table E4-1
Groundwater Monitoring Wells Analytical Results Summary Table - 2018 Quarter 1, DP1835

Sample	Location ID	Sample Date	Parameter Name	Result	Report Units	Lab Qualifier	Detect Flag	Filtered	Lab Method	Report Detection Limit
CAMO-18-150848	R-62	01-17-2018	Chloride	22.015	mg/L		Y	Y	EPA:300.0	-
CAMO-18-150848	R-62	01-17-2018	Chromium	348.37	ug/L		Y	Y	EPA:200.8	-
CAMO-18-150848	R-62	01-17-2018	Fluoride	0.40963	mg/L		Y	Y	EPA:300.0	-
CAMO-18-150848	R-62	01-17-2018	Sulfate	36.058	mg/L		Y	Y	EPA:300.0	-
CAMO-18-150849	R-62	01-17-2018	Chloride	19.654	mg/L		Y	Y	EPA:300.0	-
CAMO-18-150849	R-62	01-17-2018	Chromium	322.51	ug/L		Y	Y	EPA:200.8	-
CAMO-18-150849	R-62	01-17-2018	Fluoride	0.35449	mg/L		Y	Y	EPA:300.0	-
CAMO-18-150849	R-62	01-17-2018	Sulfate	32.09	mg/L		Y	Y	EPA:300.0	-
CAMO-18-150850	R-62	01-17-2018	Chloride	17.832	mg/L		Y	Y	EPA:300.0	-
CAMO-18-150850	R-62	01-17-2018	Chromium	265.02	ug/L		Y	Y	EPA:200.8	-
CAMO-18-150850	R-62	01-17-2018	Fluoride	0.41818	mg/L		Y	Y	EPA:300.0	-
CAMO-18-150850	R-62	01-17-2018	Sulfate	27.821	mg/L		Y	Y	EPA:300.0	-
CAMO-18-150851	R-62	01-17-2018	Chloride	22.052	mg/L		Y	Y	EPA:300.0	-
CAMO-18-150851	R-62	01-17-2018	Chromium	367.74	ug/L		Y	Y	EPA:200.8	-
CAMO-18-150851	R-62	01-17-2018	Fluoride	0.42911	mg/L		Y	Y	EPA:300.0	-
CAMO-18-150851	R-62	01-17-2018	Sulfate	36.117	mg/L		Y	Y	EPA:300.0	-
CAMO-18-150852	R-62	01-17-2018	Chloride	21.105	mg/L		Y	Y	EPA:300.0	-
CAMO-18-150852	R-62	01-17-2018	Chromium	351.52	ug/L		Y	Y	EPA:200.8	-
CAMO-18-150852	R-62	01-17-2018	Fluoride	0.45095	mg/L		Y	Y	EPA:300.0	-
CAMO-18-150852	R-62	01-17-2018	Sulfate	34.043	mg/L		Y	Y	EPA:300.0	-
CAMO-18-150853	R-62	01-17-2018	Chloride	22.407	mg/L		Y	Y	EPA:300.0	-
CAMO-18-150853	R-62	01-17-2018	Chromium	369.17	ug/L		Y	Y	EPA:200.8	-
CAMO-18-150853	R-62	01-17-2018	Fluoride	0.4136	mg/L		Y	Y	EPA:300.0	-
CAMO-18-150853	R-62	01-17-2018	Sulfate	36.3	mg/L		Y	Y	EPA:300.0	-
CAMO-18-150854	R-62	01-17-2018	Chloride	21.114	mg/L		Y	Y	EPA:300.0	-
CAMO-18-150854	R-62	01-17-2018	Chromium	343.61	ug/L		Y	Y	EPA:200.8	-
CAMO-18-150854	R-62	01-17-2018	Fluoride	0.27847	mg/L		Y	Y	EPA:300.0	-
CAMO-18-150854	R-62	01-17-2018	Sulfate	35.781	mg/L		Y	Y	EPA:300.0	-
CAMO-18-147648	SIMR-2[1]	10-30-2017	Chloride	2.24	mg/L		Y	Y	EPA:300.0	0.200
CAMO-18-147648	SIMR-2[1]	10-30-2017	Perchlorate	0.399	ug/L		Y	Y	SW-846:6850	0.200
CAMO-18-147648	SIMR-2[1]	10-30-2017	Chromium	5.45	ug/L	J	Y	Y	SW-846:6020	10.0
CAMO-18-147648	SIMR-2[1]	10-30-2017	Fluoride	0.191	mg/L		Y	Y	EPA:300.0	0.100
CAMO-18-147648	SIMR-2[1]	10-30-2017	Nitrate-Nitrite as Nitrogen	0.679	mg/L		Y	Y	EPA:353.2	0.050
CAMO-18-147648	SIMR-2[1]	10-30-2017	Sulfate	2.88	mg/L		Y	Y	EPA:300.0	0.400
CAMO-18-147648	SIMR-2[1]	10-30-2017	Total Dissolved Solids	166	mg/L		Y	Y	EPA:160.1	14.3

Table E4-1
Groundwater Monitoring Wells Analytical Results Summary Table - 2018 Quarter 1, DP1835

Sample	Location ID	Sample Date	Parameter Name	Result	Report Units	Lab Qualifier	Detect Flag	Filtered	Lab Method	Report Detection Limit
CAMO-18-148069	SIMR-2[1]	11-15-2017	Chloride	2.13	mg/L		Y	Y	EPA:300.0	0.200
CAMO-18-148069	SIMR-2[1]	11-15-2017	Perchlorate	0.39	ug/L		Y	Y	SW-846:6850	0.200
CAMO-18-148069	SIMR-2[1]	11-15-2017	Chromium	9.41	ug/L	J	Y	Y	SW-846:6020	10.0
CAMO-18-148069	SIMR-2[1]	11-15-2017	Fluoride	0.139	mg/L		Y	Y	EPA:300.0	0.100
CAMO-18-148069	SIMR-2[1]	11-15-2017	Nitrate-Nitrite as Nitrogen	0.684	mg/L		Y	Y	EPA:353.2	0.050
CAMO-18-148069	SIMR-2[1]	11-15-2017	Sulfate	2.85	mg/L		Y	Y	EPA:300.0	0.400
CAMO-18-148069	SIMR-2[1]	11-15-2017	Total Dissolved Solids	156	mg/L		Y	Y	EPA:160.1	14.3
CAMO-18-150347	SIMR-2[1]	12-14-2017	Chloride	2.19	mg/L		Y	Y	EPA:300.0	0.200
CAMO-18-150347	SIMR-2[1]	12-14-2017	Perchlorate	0.434	ug/L		Y	Y	SW-846:6850	0.200
CAMO-18-150347	SIMR-2[1]	12-14-2017	Chromium	5.36	ug/L	J	Y	Y	SW-846:6020	10.0
CAMO-18-150347	SIMR-2[1]	12-14-2017	Fluoride	0.174	mg/L		Y	Y	EPA:300.0	0.100
CAMO-18-150347	SIMR-2[1]	12-14-2017	Nitrate-Nitrite as Nitrogen	0.712	mg/L		Y	Y	EPA:353.2	0.050
CAMO-18-150347	SIMR-2[1]	12-14-2017	Sulfate	3.02	mg/L		Y	Y	EPA:300.0	0.400
CAMO-18-150347	SIMR-2[1]	12-14-2017	Total Dissolved Solids	153	mg/L		Y	Y	EPA:160.1	14.3
-	SIMR-2[2]	-	-	-	-	-	-	-	-	-

Notes:

[1] Fourth Quarter 2017 SIMR-2 data reported here in accordance with DP-1835 Fourth Quarter 2017 Report (EPC-DO: 18-057). 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.

[2] First Quarter 2018 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.

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

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 Results Submittal Letter and
Notification of Extraction, Treatment, and Injection of
Groundwater from CrEX-4

Los Alamos NATIONAL LABORATORY EST 1943

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GROUND WATER
MAR 21 2018
BUREAU

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Date: MAR 2 1 2018
Symbol: EPC-DO: 18-090
LA-UR: 18-21767
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: **As-Built Specifications for CrEX-4 and Integrity Testing of Distribution Piping from CrEX-1, CrEX-2, CrEX-3, and CrEX-4 to CrIN-1, CrIN-2, CrIN-3, CrIN-4, CrIN-5, and CrIN-6, 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 Chromium Pipeline and Infrastructure Project. This submittal includes the results for the remaining portions of the piping from CrEX-1, CrEX-2, CrEX-3, and CrEX-4 to the groundwater treatment system and the distribution piping connecting the groundwater system to underground injection wells CrIN-1, CrIN-2, CrIN-3, CrIN-4, CrIN-5, and CrIN-6. In addition, this submittal contains the as-built specifications for CrEX-4.

Environmental Protection & Compliance Division
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Environmental Management
Los Alamos Field Office
3747 West Jemez Road, A316
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(505) 665-5820/Fax (505) 665-5903

Date: MAR 2 1 2018
Symbol: EPC-DO: 18-090
LA-UR: 18-21767
Locates Action No.: U1601822

Ms. Michelle Hunter, Chief
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Harold Runnels Building, Room N2261
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Subject: **As-Built Specifications for CrEX-4 and Integrity Testing of Distribution Piping from CrEX-1, CrEX-2, CrEX-3, and CrEX-4 to CrIN-1, CrIN-2, CrIN-3, CrIN-4, CrIN-5, and CrIN-6, 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 Chromium Pipeline and Infrastructure Project. This submittal includes the results for the remaining portions of the piping from CrEX-1, CrEX-2, CrEX-3, and CrEX-4 to the groundwater treatment system and the distribution piping connecting the groundwater system to underground injection wells CrIN-1, CrIN-2, CrIN-3, CrIN-4, CrIN-5, and CrIN-6. In addition, this submittal contains the as-built specifications for CrEX-4.

Integrity Testing of Distribution Piping

On October 14, 2016 DOE/LANS submitted a mechanical integrity test method to NMED for the Chromium Pipeline and Infrastructure Project (EPC-DO-16-299). NMED approved the test method on October 17, 2016. Results of integrity testing for different portions of the system have been submitted as follows:

- November 15, 2016 (EPC-DO: 16-345): Pipelines connecting extraction well CrEX-1 to the groundwater treatment system and the distribution piping from the groundwater treatment system to CrIN-4 and CrIN-5;
- August 28, 2017 (EPC-DO: 17-302): Pipelines connecting extraction wells CrEX-1, CrEX-2, and CrEX-3 to the groundwater treatment system and the distribution piping connecting the groundwater treatment system with injection wells CrIN-1, CrIN-2, CrIN-3, CrIN-4 and CrIN-5;
- November 22, 2017 (EPC-DO: 17-465): Remaining segments of pipelines connecting extraction wells CrEX-1, CrEX-2, and CrEX-3 to the groundwater treatment system and the distribution piping connecting the groundwater treatment system with injection wells CrIN-1, CrIN-2, CrIN-3, CrIN-4 and CrIN-5.

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 to the groundwater treatment system and for the distribution piping connecting the groundwater treatment system with injection wells CrIN-1, CrIN-2, CrIN-3, CrIN-4, CrIN-5, and CrIN-6 which were not included in any previous submittal. Enclosure 1 provides a cross-reference of the integrity testing completed to date. Enclosure 2 contains the inspection reports (on CD) of these tests. All test results demonstrated satisfactory pipe integrity per the specified test method.

As-Built Specifications for Extraction Well CrEX-4

Four extraction wells have been constructed. Enclosure 3 contains the as-built specifications for extraction well CrEX-4. As-built specifications for all extraction and injection wells have been submitted as follows:

- CrEX-1 as-built specifications submitted in the April 9, 2015 Groundwater Discharge Permit Application (ENV-DO-15-0085) for DP-1835;
- CrEX-2 as-built specifications submitted on July 13, 2017 (EPC-DO: 17-265);
- CrEX-3 as-built specifications submitted on December 9, 2016 (EPC-DO: 16-358);
- CrIN-1, CrIN-2, CrIN-3, CrIN-4, and CrIN-5 as-built specifications/integrity testing submitted on December 9, 2016 (EPC-DO: 16-358);
- CrIN-6 as-built specifications/integrity testing submitted on November 22, 2017 (EPC-DO: 17-465).

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):
(1) Summary Table of Distribution Piping Integrity Test Results
(2) Distribution Piping Integrity Test Results (CD) for Pipelines Connecting Extraction Wells With Injection Wells (available upon request)
(3) As-Built Specifications for CrEX-4

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, ADESH, (E-File)
Randall Mark Erickson, ADEM, (E-File)
Enrique Torres, ADEM, (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)
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epc-correspondence@lanl.gov, (E-File)
adesh-records@lanl.gov, (E-File)

From:	Foley, William Joseph
To:	Steve Pullen
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 extraction, treatment, and injection of groundwater from CrEX-4
Date:	Wednesday, February 14, 2018 4:49:00 PM

Dear Mr. Pullen,

Following up to my voice mail this morning, the U.S. Department of Energy and Los Alamos National Security, LLC (DOE/LANS) will begin extracting from CrEX-4 on or after February 14, 2018 under Discharge Permit DP-1835. At this time water being extracted will be related to testing of the extraction, treatment and injection system as it relates to this well.

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

Los Alamos
NATIONAL LABORATORY
EST. 1943

Associate Directorate for Environmental Management
P.O. Box 1663, MS M992
Los Alamos, New Mexico 87545
(505) 606-2337

Environmental Management
P. O. Box 1663, MS M984
Los Alamos, New Mexico 87545
(505) 665-5658/FAX (505) 606-2132

Date: MAR 2 2 2018
Refer To: ADEM-18-0029

John Kieling, Bureau Chief
Hazardous Waste Bureau
New Mexico Environment Department
2905 Rodeo Park Drive East, Building 1
Santa Fe, NM 87505-6303

Subject: Notice of New Date for Submittal of the "CrIN-6 Evaluation Report"

Dear Mr. Kieling:

This letter documents recent discussions held between the U.S. Department of Energy Environmental Management, Los Alamos Field Office/Los Alamos National Security, LLC (DOE EM-LA/LANS) and the New Mexico Environment Department (NMED) staff regarding the new schedule for submittal of the "CrIN-6 Evaluation Report." The current date for document submittal is March 30, 2018 (NMED letter dated November 21, 2018). This letter serves to formally notify that DOE EM-LA/LANS will now submit the report to NMED by April 30, 2018. The report will provide an operational analysis and recommendation for CrIN-6, as well as, recommendations for additional monitoring that may be necessary to support operation of CrIN-6 for the interim measure.

DOE EM-LA/LANS have experienced delays processing hydraulic testing data that was obtained in November and December of 2017. A key part of processing cross-hole pressure-response data from aquifer tests includes removing barometric pressure responses and pressures induced by pumping at nearby Los Alamos County water-supply wells. The absence of a significant amount of barometric pressure data from one of the Laboratory's meteorological stations at Technical Area 54 has caused difficulties and delays in data processing. Approximately 1 month of data was unavailable from July 2017. An alternate approach for processing barometric pressure corrections is being used, but it is requiring additional time.

DOE EM-LA/LANS will schedule a meeting with NMED staff to discuss the technical approach and findings before submittal of the report in April.

If you have any questions, please contact Danny Katzman at (505) 667-6333 (katzman@lanl.gov) or Cheryl Rodriguez at (505) 665-5330 (cheryl.rodriguez@em.doe.gov).

Sincerely,

Enrique Torres, Program Director
Environmental Remediation Program
Los Alamos National Laboratory

Sincerely,

David S. Rhodes, Director
Office of Quality and Regulatory Compliance
Environmental Management
Los Alamos Field Office

ET/DR/DK:sm

Cy: (date-stamped letter emailed)
Cheryl Rodriguez, DOE-EM-LA
David Rhodes, DOE-EM-LA
Dave Nickless, DOE EM-LA
Peter Maggiore, DOE-NA-LA
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ENCLOSURE 6

Treated Groundwater Injection and Extraction Summary
Tables – 2018 Quarter 1, DP-1835

Table E6-1
Daily Extraction Summary Table -
2018 Quarter 1, DP1835

Date	CrEX-1 (gal)	CrEX-2 (gal)	CrEX-3 (gal)	CrEX-4 (gal)
1/1/2018	-	-	-	-
1/2/2018	-	-	-	-
1/3/2018	-	-	-	-
1/4/2018	-	-	-	-
1/5/2018	-	-	-	-
1/6/2018	-	-	-	-
1/7/2018	-	-	-	-
1/8/2018	-	-	-	-
1/9/2018	-	-	-	-
1/10/2018	-	-	-	-
1/11/2018	-	-	-	-
1/12/2018	-	-	-	-
1/13/2018	-	-	-	-
1/14/2018	-	-	-	-
1/15/2018	-	-	-	-
1/16/2018	-	-	-	-
1/17/2018	-	-	-	-
1/18/2018	-	-	-	-
1/19/2018	-	-	-	-
1/20/2018	-	-	-	-
1/21/2018	-	-	-	-
1/22/2018	-	-	-	-
1/23/2018	-	-	-	-
1/24/2018	-	-	-	-
1/25/2018	-	-	-	-
1/26/2018	-	-	-	-
1/27/2018	-	-	-	-
1/28/2018	-	-	-	-
1/29/2018	-	-	-	-
1/30/2018	-	-	-	-
1/31/2018	-	-	-	-
2/1/2018	-	-	-	-
2/2/2018	-	-	-	-
2/3/2018	-	-	-	-
2/4/2018	-	-	-	-
2/5/2018	-	-	-	-
2/6/2018	-	-	-	-
2/7/2018	-	-	-	-
2/8/2018	-	-	-	-
2/9/2018	-	-	-	-
2/10/2018	-	-	-	-

Table E6-1
Daily Extraction Summary Table -
2018 Quarter 1, DP1835

Date	CrEX-1 (gal)	CrEX-2 (gal)	CrEX-3 (gal)	CrEX-4 (gal)
2/11/2018	-	-	-	-
2/12/2018	-	-	-	-
2/13/2018	-	-	-	-
2/14/2018	26,287	19,350	-	29
2/15/2018	13,779	24,188	-	88
2/16/2018	-	-	-	-
2/17/2018	-	-	-	-
2/18/2018	-	-	-	-
2/19/2018	-	-	-	-
2/20/2018	-	-	-	-
2/21/2018	-	-	8,859	97
2/22/2018	-	-	-	-
2/23/2018	-	-	-	-
2/24/2018	-	-	-	-
2/25/2018	-	-	-	-
2/26/2018	-	-	-	-
2/27/2018	-	-	-	-
2/28/2018	7,497	7,031	3,981	421
3/1/2018	-	-	-	-
3/2/2018	-	-	-	-
3/3/2018	-	-	-	-
3/4/2018	-	-	-	-
3/5/2018	48,964	52,774	36,685	34,096
3/6/2018	90,056	98,745	76,453	71,706
3/7/2018	54,685	85,572	77,467	71,476
3/8/2018	51,586	54,751	41,982	38,858
3/9/2018	-	-	-	-
3/10/2018	-	-	-	-
3/11/2018	-	-	-	-
3/12/2018	-	-	-	-
3/13/2018	-	-	-	-
3/14/2018	-	-	-	-
3/15/2018	4,490	2,460	2,512	-
3/16/2018	-	-	-	-
3/17/2018	-	-	-	-
3/18/2018	-	-	-	-
3/19/2018	1,677	1,044	916	-
3/20/2018	40,141	34,284	27,022	-
3/21/2018	63,078	54,897	43,037	-
3/22/2018	71,159	62,121	48,905	-
3/23/2018	67,341	59,960	50,342	-

Table E6-1
Daily Extraction Summary Table -
2018 Quarter 1, DP1835

Date	CrEX-1 (gal)	CrEX-2 (gal)	CrEX-3 (gal)	CrEX-4 (gal)
3/24/2018	69,481	62,746	56,526	-
3/25/2018	56,486	51,256	47,427	-
3/26/2018	61,153	55,287	51,080	-
3/27/2018	62,295	56,333	50,480	-
3/28/2018	54,858	49,594	44,898	-
3/29/2018	54,811	49,291	44,792	-
3/30/2018	60,142	54,812	50,645	-
3/31/2018	61,978	55,645	50,953	-

Notes:
"- If groundwater was extracted on this day"
from this location it was not treated and
injected through the UIC wells.

Table E6-2
Daily Injection Summary Table -
2018 Quarter 1, DP1835

Date	CrIN-1 (gal)	CrIN-2 (gal)	CrIN-3 (gal)	CrIN-4 (gal)	CrIN-5 (gal)	CrIN-6[1] (gal)
1/1/2018	0	0	0	0	0	0
1/2/2018	0	0	0	0	0	0
1/3/2018	0	0	0	0	0	0
1/4/2018	0	0	0	0	0	0
1/5/2018	0	0	0	0	0	0
1/6/2018	0	0	0	0	0	0
1/7/2018	0	0	0	0	0	0
1/8/2018	0	0	0	0	0	0
1/9/2018	0	0	0	0	0	0
1/10/2018	0	0	0	0	0	0
1/11/2018	0	0	0	0	0	0
1/12/2018	0	0	0	0	0	0
1/13/2018	0	0	0	0	0	0
1/14/2018	0	0	0	0	0	0
1/15/2018	0	0	0	0	0	0
1/16/2018	0	0	0	0	0	0
1/17/2018	0	0	0	0	0	0
1/18/2018	0	0	0	0	0	0
1/19/2018	0	0	0	0	0	0
1/20/2018	0	0	0	0	0	0
1/21/2018	0	0	0	0	0	0
1/22/2018	0	0	0	0	0	0
1/23/2018	0	0	0	0	0	0
1/24/2018	0	0	0	0	0	0
1/25/2018	0	0	0	0	0	0
1/26/2018	0	0	0	0	0	0
1/27/2018	0	0	0	0	0	0
1/28/2018	0	0	0	0	0	0
1/29/2018	0	0	0	0	0	0
1/30/2018	0	0	0	0	0	0
1/31/2018	0	0	0	0	0	0
2/1/2018	0	0	0	0	0	0
2/2/2018	0	0	0	0	0	0
2/3/2018	0	0	0	0	0	0
2/4/2018	0	0	0	0	0	0
2/5/2018	0	0	0	0	0	0
2/6/2018	0	0	0	0	0	0
2/7/2018	0	0	0	0	0	0
2/8/2018	0	0	0	0	0	0
2/9/2018	0	0	0	0	0	0

Table E6-2
Daily Injection Summary Table -
2018 Quarter 1, DP1835

Date	CrIN-1 (gal)	CrIN-2 (gal)	CrIN-3 (gal)	CrIN-4 (gal)	CrIN-5 (gal)	CrIN-6[1] (gal)
2/10/2018	0	0	0	0	0	0
2/11/2018	0	0	0	0	0	0
2/12/2018	0	0	0	0	0	0
2/13/2018	0	0	0	0	0	0
2/14/2018	0	0	0	0	0	0
2/15/2018	13,593	6,706	12,640	1,470	2,825	0
2/16/2018	0	0	0	0	0	0
2/17/2018	0	0	0	0	0	0
2/18/2018	0	0	0	0	0	0
2/19/2018	0	0	0	0	0	0
2/20/2018	0	0	0	0	0	0
2/21/2018	3,606	2,381	2,281	2,760	2,272	0
2/22/2018	0	0	0	0	0	0
2/23/2018	0	0	0	0	0	0
2/24/2018	0	0	0	0	0	0
2/25/2018	0	0	0	0	0	0
2/26/2018	0	0	0	0	0	0
2/27/2018	0	0	0	0	0	0
2/28/2018	5,313	3,749	4,751	4,866	3,811	0
3/1/2018	0	0	0	0	0	0
3/2/2018	0	0	0	0	0	0
3/3/2018	0	0	0	0	0	0
3/4/2018	0	0	0	0	0	0
3/5/2018	23,580	25,688	40,854	36,373	44,719	0
3/6/2018	0	0	114,644	73,604	147,106	0
3/7/2018	0	0	151,605	67,613	133,369	0
3/8/2018	0	0	7,936	30,675	81,590	0
3/9/2018	0	0	0	0	0	0
3/10/2018	0	0	0	0	0	0
3/11/2018	0	0	0	0	0	0
3/12/2018	0	0	0	0	0	0
3/13/2018	0	0	0	0	0	0
3/14/2018	0	0	0	0	0	0
3/15/2018	0	0	0	65	129	0
3/16/2018	0	0	0	0	0	0
3/17/2018	0	0	0	0	0	0
3/18/2018	0	0	0	0	0	0
3/19/2018	94	141	2,272	2,728	2,190	0
3/20/2018	0	0	58,591	37,179	21,028	0
3/21/2018	0	0	54,103	56,823	46,927	0

Table E6-2
Daily Injection Summary Table -
2018 Quarter 1, DP1835

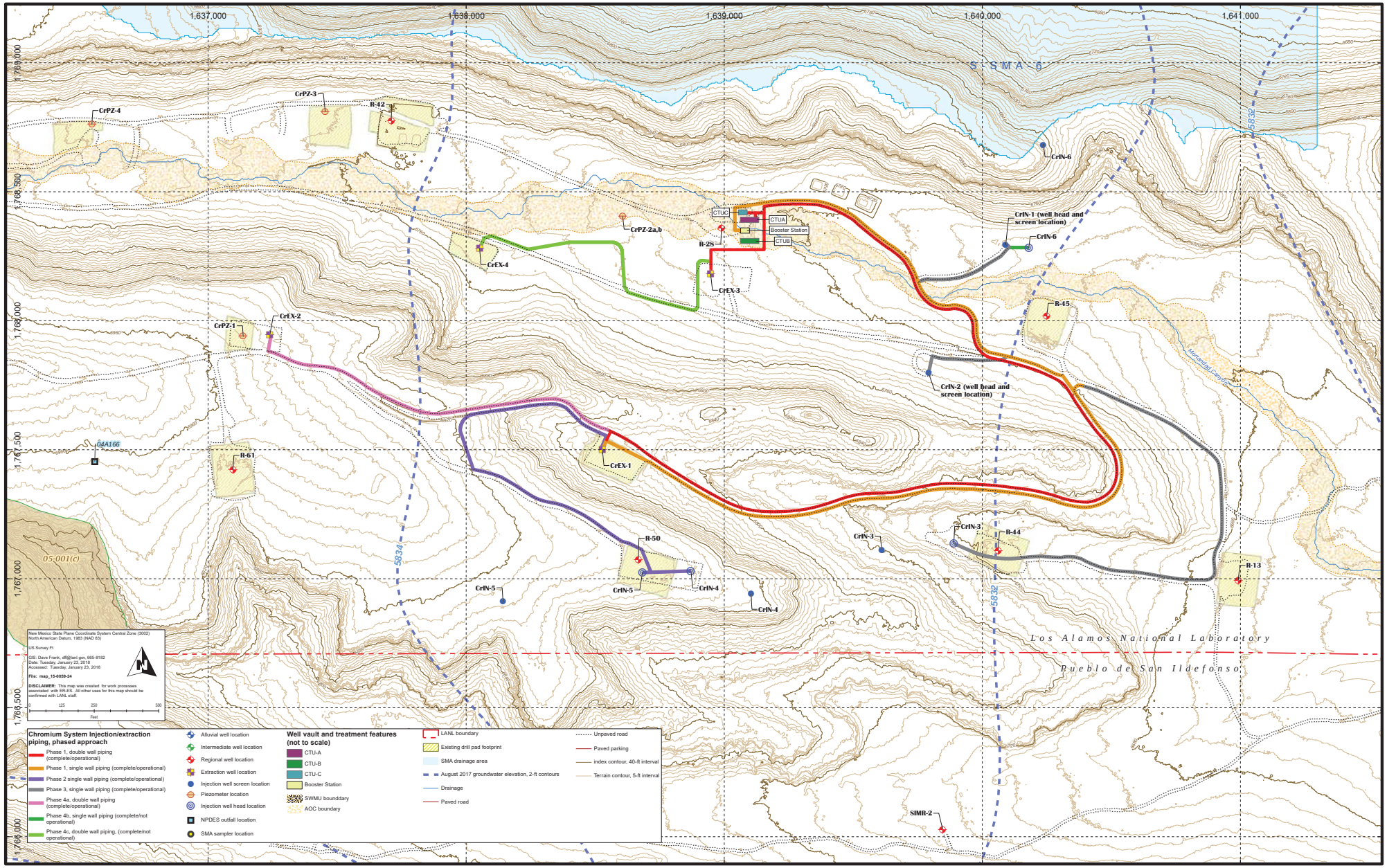
Date	CrIN-1 (gal)	CrIN-2 (gal)	CrIN-3 (gal)	CrIN-4 (gal)	CrIN-5 (gal)	CrIN-6[1] (gal)
3/22/2018	0	0	75,477	55,540	51,947	0
3/23/2018	0	0	84,975	58,745	36,144	0
3/24/2018	0	0	85,001	58,702	36,000	0
3/25/2018	0	0	84,927	46,624	36,290	0
3/26/2018	0	0	84,953	37,542	36,803	0
3/27/2018	0	0	84,937	37,326	36,829	0
3/28/2018	0	0	84,964	37,441	36,580	0
3/29/2018	0	0	84,997	37,439	36,843	0
3/30/2018	0	0	84,937	37,467	36,801	0
3/31/2018	0	0	84,648	37,321	36,461	0

Notes:

[1] UIC well constructed and injection of treated groundwater did not occur during this quarter in accordance with NMED's September 25, 2017 correspondence.

ENCLOSURE 7

Facility Layout Map –
2018 Quarter 1, DP-1835



Document Path: \\slip\gis\GIS\Projects\15-Projects\15-0059\mxd\map_15-0059-24.mxd