EMID-700066

N3B – Los Alamos
600 6th Street
Los Alamos, New Mexico 87544
(303) 489-2471

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

Date: AUG 3 0 2018
Refer To: N3B-18-0177

Ms. Michelle Hunter, Chief
Ground Water Quality Bureau
New Mexico Environment Department
1190 S. St. Francis Drive
Santa Fe, NM 87502

GROUND WATER
AUG 31 2018
BUREAU

Subject: Submittal of the Quarterly Report for 2018 Quarter 2, 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, LLC (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 No. 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 reporting period for calendar year 2018, April 1 through June 30 (Quarter 2), discharge of treated groundwater to the regional aquifer continued under DP-1835. This treated discharge occurred at three UIC wells: CrIN-3, CrIN-4, and CrIN-5. Note that CrIN-2 was operated May 23 for purposes of testing during system restart. The Quarterly Report for the Discharge of Treated Groundwater to the Regional Aquifer – 2018 Quarter 2, 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,

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 (EM2018-0025):

1. Quarterly Report for the Discharge of Treated Groundwater to the Regional Aquifer – 2018 Quarter 2, DP-1835
2. Treated Effluent Analytical Results Summary Tables – 2018 Quarter 2, DP-1835
3. Groundwater Elevation Contour Map – 2018 Quarter 2, DP-1835
4. Groundwater Monitoring Wells Analytical Results Summary Table – 2018 Quarter 2, DP-1835
5. Treated Groundwater Injection and Extraction Summary Tables – 2018 Quarter 2, DP-1835
6. Facility Layout Map – 2018 Quarter 2, DP-1835

Cy: (letter and enclosure[s] emailed)
Shelly Lemon, NMED-SWQB
John E. Kieling, NMED-HWB
Steve Yanicak, NMED-DOE-OB
Steve Pullen, NMED-GWQB
Doug Hintze, DOE-EM-LA
David Rhodes, DOE-EM-LA
Cheryl Rodriguez, DOE-EM-LA
Ben Underwood, DOE-EM-LA
Annette Russell, DOE-EM-LA
Steve White, N3B, ER Program
Gerald Fordham, N3B, ER Program
Brinson Willis, N3B, ER Program
emla.docs@em.doe.gov
N3B Records
N3B Document Control
Public Reading Room (EPRR)
PRS Database

Cy: (letter emailed without enclosure[s])
David Nickless, DOE-EM-LA
Hai Shen, DOE-EM-LA
Nick Lombardo, N3B
Frazer Lockhart, N3B
Joe Legare, N3B, ER Program
Bruce Robinson, N3B, ER Program
Danny Katzman, N3B, ER Program
Frank Johns, N3B, ER Program

ENCLOSURE 1

Quarterly Report for the Discharge of
Treated Groundwater to the Regional Aquifer –
2018 Quarter 2, DP-1835

ENCLOSURE 1
Quarterly Report for the Discharge of Treated Groundwater to the Regional Aquifer – 2018 Quarter 2, 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 from LANS to Newport News Nuclear BWXT – Los Alamos (N3B). Pursuant to Condition No. 10 of the above-referenced discharge permit, DOE/N3B are required to submit quarterly reports.

During the 2018 April 1 through June 30 (Quarter 2) reporting period, discharge of treated groundwater to the regional aquifer occurred at three UIC wells: CrIN-3, CrIN-4, and CrIN-5, under DP-1835. Well CrIN-2 was tested on May 23. Groundwater originated from three extraction wells: CrEX-1, CrEX-2, and CrEX-3. Well CrEX-4 was tested on April 12. The 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 September 1 for the April 1–June 30 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), and*
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 – 2018 Quarter 2, DP-1835

Requirement 1: Influent and discharge volumes for the IX treatment systems. Table E1-1 provides the influent and discharge volumes for IX treatment systems during 2018 Quarter 2 for activities completed under DP-1835. As previously identified, injection occurred at UIC wells 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 E1-1
Total Influent and Discharge Volumes
for IX Treatment Systems – 2018 Quarter 2

Treatment Unit	Influent Volume[a] (gal.)	Effluent Volume[b] (gal.)
CTUA	13,360,375	13,011,000
CTUB	n/a[c]	n/a
CTUC	n/a	n/a

Note: Individual flow meter accurate to ±5%.

[a] Influent volume based on CrEX-1, CrEX-2, CrEX-3 and CrEX-4 extraction volumes.

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

[c] 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 2 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 New Mexico Administrative Code (NMAC) 6.2.3103 or 90% of the numeric standards established for tap water in Table A-1 for constituents not listed in 20 NMAC 6.2.3103. 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 2. 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 2 are provided in Enclosure 2. No results for iron, manganese, or arsenic exceeded 90% of the numeric standards of 20 NMAC 6.2.3103. The 90% values for iron, manganese, and arsenic are 900 µg/L, 180 µg/L, and 90 µg/L, respectively.

During 2018 Quarter 2, 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. Compliance samples for 2018 will be taken during the year.

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 E1-2 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 2 for the monitoring wells listed in Condition No. 14 are summarized in Table E1-3. Complete results related to these samples are provided in Enclosure 4.

Table E1-2
Groundwater Elevations Summary
for Groundwater Monitoring Wells – 2018 Quarter 2

Monitoring Well	Groundwater Elevation[a] (ft)
CrPZ-1	5834.66
CrPZ-2a	5832.29
CrPZ-2b	5832.24
CrPZ-3	5833.89
CrPZ-4	5835.46
CrPZ-5	5834.76
R-11	na[b]
R-13	5830.99
R-43 S1	5834.41
R-43 S2	5833.59
R-44 S1	5832.05
R-44 S2	5831.70
R-45 S1	5831.73
R-45 S2	5831.53
R-50 S1	5833.27
R-50 S2	5832.74
R-61 S1	5834.37
R-61 S2	5834.44
R-62	5837.80
SIMR-2[c]	5832.64

[a] Groundwater elevations provided are based on average May values from transducers.

[b] na = Not available. Well level transducer R-11 lost function during period.

[c] First Quarter 2018 SIMR-2 data is reported here in accordance with DP-1835 2018 Quarter 1 Report (EM2018-0006). Data was unavailable at the time of that report's preparation in accordance with the memorandum of agreement between San Ildefonso and DOE. Data from the current quarter is not available at this time and will be presented in the next quarterly report.

TableE1-3
Summary Table of Analytical Results for Groundwater Monitoring Wells – 2018 Quarter 2

ENCLOSURE 1
Quarterly Report for the Discharge of Treated Groundwater to the Regional Aquifer – 2018 Quarter 2, DP-1835

Location	Sample Date	Analyte*						
		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	05/18/2018	3.73	0.772	9.18	0.347	5.43	10.5	216
R-13	05/14/2018	2.44	0.409	3.9	0.215	0.803	3.38	173
R-43 S1	05/21/2018	8.67	0.81	187	0.259	5.10	17.6	197
R-43 S2	05/17/2018	6.19	0.875	21.5	0.281	3.63	9.15	167
R-44 S1	04/17/2018	2.37	0.433	13.7	0.296	1.20	3.50	136
R-44 S1	05/16/2018	2.34	0.426	13.4	0.291	1.21	3.42	147
R-44 S1	06/13/2018	2.37	0.46	13.8	0.284	1.11	3.37	150
R-44 S2	04/17/2018	2.24	0.339	6.92	0.348	0.765	2.75	149
R-44 S2	05/16/2018	2.21	0.35	6.69	0.339	0.797	2.68	139
R-44 S2	06/13/2018	2.23	0.364	6.86	0.339	0.750	2.64	163
R-45 S1	04/17/2018	5.85	0.55	42	0.267	3.00	9.00	177
R-45 S1	05/16/2018	5.92	0.582	45.9	0.287	3.11	9.14	144
R-45 S1	06/13/2018	5.89	0.649	46.4	0.324	2.93	8.88	196
R-45 S2	04/17/2018	4.37	0.394	22.4	0.394	0.915	5.25	160
R-45 S2	05/16/2018	4.36	0.404	23.2	0.385	0.944	5.18	146
R-45 S2	06/13/2018	4.41	0.422	28	0.376	0.845	5.22	176
R-50 S1	04/16/2018	9.59	0.602	136	0.313	2.01	14.6	126
R-50 S1	05/14/2018	9.73	0.618	135	0.232	2.21	14.8	216
R-50 S1	06/12/2018	9.82	0.651	150	0.299	2.08	14.5	180
R-50 S2	04/16/2018	2.10	0.31	3.98	0.357	0.567	2.58	113
R-50 S2	05/15/2018	2.08	0.33	3.79	0.371	0.594	2.57	156
R-50 S2	06/12/2018	2.12	0.329	4.33	0.413	0.610	2.56	163
R-62	05/22/2018	16.3	0.839	236	0.0868	1.88	28.5	201
SIMR-2	04/19/2018	2.21	0.39	5.31	0.204	0.732	2.84	133
SIMR-2	05/15/2018	2.16	0.395	5.09	0.238	0.772	2.82	154
SIMR-2	06/21/2018	Not Sampled. Area was inaccessible due to Stage 3 fire restrictions.						

* Reported results are dissolved constituents.

Requirement 4: Any operations/maintenance activities performed. Extraction, treatment, and injection operations continued during 2018 Quarter 2 with the exception of a hiatus from April 24 until May 23. These activities consisted of long-term functional testing primarily at CrEX-1, CrEX-2, CrEX-3, CrIN-3, CrIN-4 and CrIN-5. Maintenance of injection wells CrIN-3, CrIN-4, and CrIN-5 was also performed. Well CrIN-2 operated on May 23 for testing during system restart and well CrEX-4 was tested on April 12.

Operations and maintenance activities completed during 2018 Quarter 2 are listed in Table E1-4 for the extraction, treatment, and injection system.

ENCLOSURE 1
Quarterly Report for the Discharge of Treated Groundwater to the Regional Aquifer – 2018 Quarter 2, DP-1835

Table E1-4
Operations and Maintenance Activity Summary Table – 2018 Quarter 2

Maintenance Date	Elements Impacted	Maintenance Description
4/1/18 through 4/23/18	CrEX-1, CrEX-2, CrEX-3, CTUA, CrIN-3, CrIN-4, CrIN-5	Extraction, treatment, and injection of treated groundwater occurred related to the system functional test.
4/4/18 through 4/5/18	CrIN-5	Maintenance back flushing of injection well with approximately 15,000 gal. of water produced. Back-flush water was transferred to land application system for treatment.
4/9/18 through 4/10/18	CrIN-4	Maintenance back flushing of injection well with approximately 12,000 gal. of water produced. Back-flush water was transferred to land application system for treatment.
4/11/18	CrIN-3	Maintenance back flushing of injection well with approximately 13,700 gal. of water produced. Back-flush water was transferred to land application system for treatment.
4/12/18	CrEX-4	Extraction well pump variable frequency drive was reset and tested.
4/18/18	CrIN-4	Additional maintenance back flushing of injection well with approximately 4000 gal. of water produced. Back-flush water was transferred to land application system for treatment.
4/19/18	CrIN-5	Additional maintenance back flushing of injection well with approximately 3000 gal. of water produced. Back-flush water was transferred to land application system for treatment.
4/23/18	CrEX-1, CrEX-2, CrEX-3, CTUA, CrIN-3, CrIN-4, CrIN-5	System was shut down and secured in preparation for LANS to N3B contract transition.
4/25/18	CTUA*	IX vessel exchanges were completed for treatment CTUA 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.
5/23/18 through 7/1/18	CrEX-1, CrEX-2, CrEX-3, CTUA, CrIN-3, CrIN-4, CrIN-5	Restart of extraction, treatment, and injection of treated groundwater occurred related to the system functional test following transition to N3B contract.
5/23/18	CrIN-2	Injection well briefly tested during system restart.
6/14/18	CTUA*	IX vessel exchanges were completed for treatment CTUA as follows: • Treatment train A – replaced primary IX vessel with the secondary IX vessel; new secondary IX vessel installed.
6/19/18	CTUA*	IX vessel exchanges were completed for treatment CTUA 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.

* 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 or reported to NMED during 2018 Quarter 2. In accordance with Condition No. 3, the next required integrity test of these items will occur within 5 years of the initial test unless a UIC well is reconfigured. Under this scenario, a mechanical integrity test before reinjection of treated effluent at that well will be completed pursuant to Condition No. 3.

Requirement 6: Any replacement of primary or secondary IX vessels or associated treatment system infrastructure. Installation of new primary and secondary IX vessels occurred at various times for treatment unit CTUA (all three treatment trains) 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 2.

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, analytical results from iron, manganese, and arsenic testing of 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 2 are provided in Enclosure 2.

No results for arsenic, iron, or manganese exceeded 90% of the numeric standards of 20 NMAC 6.2.3103 or 90% of the numeric standards established for tap water in Table A-1 for constituents not listed in 20 NMAC 6.2.3103. The 90% values for arsenic, iron, and 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.

Requirement 9: Monthly average, maximum, and minimum values for flow rate and volume of treated effluent transferred to each UIC well. Table E1-5 provides the monthly average, maximum, and minimum values for flow rate and volume of treated effluent transferred to each well in 2018 Quarter 2.

Table E1-5
Flows and Volumes of Treated Effluent Injected – 2018 Quarter 2

Injection Well	Flow rate (gpm[a])			Daily Volume (gal.)			Total Volume (gal.)
	Average[b]	Maximum	Minimum[c]	Average[b]	Maximum	Minimum[c]	
April 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	41.7	59.0	19.6	60,087	84,945	28,156	1,321,923
CrIN-4	32.7	59.7	15.9	47,137	85,963	22,930	989,876
CrIN-5	34.5	63.1	1.3	49,742	90,823	1,813	1,094,325
CrIN-6[d]	n/a[e]	n/a	n/a	n/a	n/a	n/a	n/a
May 2018							
CrIN-1	0.0	0.0	0.0	0	0	0	0
CrIN-2	0.0	0.1	0.0	14	124	0	124
CrIN-3	56.3	61.8	26.1	81,010	89,026	37,607	729,090
CrIN-4	60.6	65.7	33.6	87,198	94,552	48,446	784,786
CrIN-5	47.2	56.7	13.4	67,991	81,596	19,324	611,921
CrIN-6[d]	n/a	n/a	n/a	n/a	n/a	n/a	n/a
June 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	60.9	65.4	59.3	87,710	94,182	85,372	2,631,300
CrIN-4	64.4	65.2	63.6	92,773	93,833	91,539	2,783,200
CrIN-5	56.1	57.0	55.4	80,851	82,044	79,777	2,425,525
CrIN-6[d]	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 was 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 E1-5 provides total monthly volumes of treated effluent transferred to each well. As previously identified, injection occurred at UIC wells CrIN-3, CrIN-4, and CrIN-5 during the quarter. Well CrIN-2 was tested on May 23.

Requirement 11: Monthly average, maximum, and minimum values of injection water level (pressure head) above static level for each UIC well. Table E1-6 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-3, CrIN-4, and CrIN-5 during the quarter. Well CrIN-2 was tested on May 23.

Table E1-6
Water-Level Values Above Static Level by UIC Well – 2018 Quarter 2

UIC Well	April			May			June		
	Average[a] (ft)	Maximum (ft)	Minimum (ft)	Average[a] (ft)	Maximum (ft)	Minimum (ft)	Average[a] (ft)	Maximum (ft)	Minimum (ft)
CrIN-1	n/a[b]	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
CrIN-2	n/a	n/a	n/a	n/a[c]	n/a[c]	n/a[c]	n/a	n/a	n/a
CrIN-3	77.4	125.4	0.6	13.7	15.3	0.0	20.2	25.7	15.0
CrIN-4	72.6	126.7	1.6	21.7	28.5	0.4	29.9	36.2	24.7
CrIN-5	44.8	111.4	0.0	33.4	39.3	3.9	40.5	47.1	35.0
CrIN-6[d]	n/a	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] n/a = Not applicable. Treated groundwater not injected during the month at this location.

[c] A minimum of treated groundwater was injected into CrIN-2 on May 23 for testing during system restart.

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

Requirement 12: Daily volume injected at each UIC well. Daily volumes of treated groundwater injected at CrIN-2, CrIN-3, CrIN-4, and CrIN-5 during 2018 Quarter 2 are provided in Enclosure 5.

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 2, which was subsequently treated and injected under this permit, are provided in Enclosure 5.

Requirement 14: Facility layout map. The facility layout map for 2018 Quarter 2 showing the location and number of each well is provided in Enclosure 6.

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 2, DP-1835

Table E2-1
Treated Effluent Analytical Results Summary Table - 2018 Quarter 2, 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-17-151335	04/04/2018	Chloride	48.1	mg/L		Y	F	EPA:300.0	0.670
CTUA	CTUA-17-151333	04/11/2018	Chloride	21.0	mg/L		Y	F	EPA:300.0	0.335
CTUA	CTUA-17-151334	04/18/2018	Chloride	31.0	mg/L		Y	F	EPA:300.0	0.335
CTUA	CTUA-17-151332	04/23/2018	Chloride	22.9	mg/L		Y	F	EPA:300.0	0.335
CTUA	CTUA-18-40	05/24/2018	Chloride	59.2	mg/L		Y	F	EPA:300.0	0.670
CTUA	CTUA-18-41	05/30/2018	Chloride	22.1	mg/L		Y	F	EPA:300.0	0.268
CTUA	CTUA-18-42	06/06/2018	Chloride	22.6	mg/L		Y	F	EPA:300.0	0.335
CTUA	CTUA-18-43	06/13/2018	Chloride	22.7	mg/L		Y	F	EPA:300.0	0.268
CTUA	CTUA-18-44	06/20/2018	Chloride	56.8	mg/L		Y	F	EPA:300.0	0.670
CTUA	CTUA-18-45	06/26/2018	Chloride	22.2	mg/L		Y	F	EPA:300.0	0.670
CTUA	CTUA-17-151335	04/04/2018	Chromium	3.00	µg/L	U	N	F	SW-846:6020	3.00
CTUA	CTUA-17-151333	04/11/2018	Chromium	3.00	µg/L	U	N	F	SW-846:6020	3.00
CTUA	CTUA-17-151334	04/18/2018	Chromium	3.00	µg/L	U	N	F	SW-846:6020	3.00
CTUA	CTUA-17-151332	04/23/2018	Chromium	3.00	µg/L	U	N	F	SW-846:6020	3.00
CTUA	CTUA-18-40	05/24/2018	Chromium	3.00	µg/L	U	N	F	SW-846:6020	3.00
CTUA	CTUA-18-41	05/30/2018	Chromium	3.00	µg/L	U	N	F	SW-846:6020	3.00
CTUA	CTUA-18-42	06/06/2018	Chromium	3.00	µg/L	U	N	F	SW-846:6020	3.00
CTUA	CTUA-18-43	06/13/2018	Chromium	3.00	µg/L	U	N	F	SW-846:6020	3.00
CTUA	CTUA-18-44	06/20/2018	Chromium	3.00	µg/L	U	N	F	SW-846:6020	3.00
CTUA	CTUA-18-45	06/26/2018	Chromium	3.00	µg/L	U	N	F	SW-846:6020	3.00
CTUA	CTUA-17-151335	04/04/2018	Fluoride	0.152	mg/L		Y	F	EPA:300.0	0.033
CTUA	CTUA-17-151333	04/11/2018	Fluoride	0.467	mg/L		Y	F	EPA:300.0	0.033
CTUA	CTUA-17-151334	04/18/2018	Fluoride	0.274	mg/L		Y	F	EPA:300.0	0.066
CTUA	CTUA-17-151332	04/23/2018	Fluoride	0.250	mg/L		Y	F	EPA:300.0	0.033
CTUA	CTUA-18-40	05/24/2018	Fluoride	0.309	mg/L		Y	F	EPA:300.0	0.033
CTUA	CTUA-18-41	05/30/2018	Fluoride	0.256	mg/L		Y	F	EPA:300.0	0.033

Table E2-1
Treated Effluent Analytical Results Summary Table - 2018 Quarter 2, 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-18-42	06/06/2018	Fluoride	0.352	mg/L		Y	F	EPA:300.0	0.033
CTUA	CTUA-18-43	06/13/2018	Fluoride	0.326	mg/L		Y	F	EPA:300.0	0.033
CTUA	CTUA-18-44	06/20/2018	Fluoride	0.269	mg/L		Y	F	EPA:300.0	0.033
CTUA	CTUA-18-45	06/26/2018	Fluoride	0.168	mg/L		Y	F	EPA:300.0	0.033
CTUA	CTUA-17-151335	04/04/2018	Nitrate-Nitrite as Nitrogen	2.69	mg/L		Y	F	EPA:353.2	0.085
CTUA	CTUA-17-151333	04/11/2018	Nitrate-Nitrite as Nitrogen	3.10	mg/L		Y	F	EPA:353.2	0.085
CTUA	CTUA-17-151334	04/18/2018	Nitrate-Nitrite as Nitrogen	2.83	mg/L		Y	F	EPA:353.2	0.085
CTUA	CTUA-17-151332	04/23/2018	Nitrate-Nitrite as Nitrogen	3.14	mg/L		Y	F	EPA:353.2	0.170
CTUA	CTUA-18-40	05/24/2018	Nitrate-Nitrite as Nitrogen	0.0329	mg/L	J	Y	F	EPA:353.2	0.017
CTUA	CTUA-18-41	05/30/2018	Nitrate-Nitrite as Nitrogen	4.15	mg/L	J	Y	F	EPA:353.2	0.170
CTUA	CTUA-18-42	06/06/2018	Nitrate-Nitrite as Nitrogen	3.54	mg/L		Y	F	EPA:353.2	0.085
CTUA	CTUA-18-43	06/13/2018	Nitrate-Nitrite as Nitrogen	3.28	mg/L		Y	F	EPA:353.2	0.170
CTUA	CTUA-18-44	06/20/2018	Nitrate-Nitrite as Nitrogen	1.18	mg/L		Y	F	EPA:353.2	0.017
CTUA	CTUA-18-45	06/26/2018	Nitrate-Nitrite as Nitrogen	3.32	mg/L		Y	F	EPA:353.2	0.170
CTUA	CTUA-17-151335	04/04/2018	Perchlorate	0.050	µg/L	U	N	F	SW-846:6850	0.050
CTUA	CTUA-17-151333	04/11/2018	Perchlorate	0.0649	µg/L	J	Y	F	SW-846:6850	0.050
CTUA	CTUA-17-151334	04/18/2018	Perchlorate	NA*						
CTUA	CTUA-17-151332	04/23/2018	Perchlorate	0.0977	µg/L	J	Y	F	SW-846:6850	0.050
CTUA	CTUA-18-40	05/24/2018	Perchlorate	0.0529	µg/L	J	Y	F	SW-846:6850	0.050
CTUA	CTUA-18-41	05/30/2018	Perchlorate	0.172	µg/L	J	Y	F	SW-846:6850	0.050
CTUA	CTUA-18-42	06/06/2018	Perchlorate	0.17	µg/L	J	Y	F	SW-846:6850	0.050

Table E2-1
Treated Effluent Analytical Results Summary Table - 2018 Quarter 2, 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-18-43	06/13/2018	Perchlorate	0.176	µg/L	J	Y	F	SW-846:6850	0.050
CTUA	CTUA-18-44	06/20/2018	Perchlorate	0.124	µg/L	J	Y	F	SW-846:6850	0.050
CTUA	CTUA-18-45	06/26/2018	Perchlorate	0.333	µg/L		Y	F	SW-846:6850	0.050
CTUA	CTUA-17-151335	04/04/2018	Sulfate	19.9	mg/L		Y	F	EPA:300.0	0.133
CTUA	CTUA-17-151333	04/11/2018	Sulfate	27.7	mg/L		Y	F	EPA:300.0	0.665
CTUA	CTUA-17-151334	04/18/2018	Sulfate	25.0	mg/L		Y	F	EPA:300.0	0.665
CTUA	CTUA-17-151332	04/23/2018	Sulfate	31.7	mg/L		Y	F	EPA:300.0	0.665
CTUA	CTUA-18-40	05/24/2018	Sulfate	0.217	mg/L	J	Y	F	EPA:300.0	0.133
CTUA	CTUA-18-41	05/30/2018	Sulfate	30.5	mg/L		Y	F	EPA:300.0	0.532
CTUA	CTUA-18-42	06/06/2018	Sulfate	31.8	mg/L		Y	F	EPA:300.0	0.665
CTUA	CTUA-18-43	06/13/2018	Sulfate	32.3	mg/L		Y	F	EPA:300.0	0.532
CTUA	CTUA-18-44	06/20/2018	Sulfate	10.8	mg/L		Y	F	EPA:300.0	0.133
CTUA	CTUA-18-45	06/26/2018	Sulfate	32.3	mg/L		Y	F	EPA:300.0	1.33
CTUA	CTUA-17-151335	04/04/2018	Total Dissolved Solids	273	mg/L		Y	F	EPA:160.1	3.40
CTUA	CTUA-17-151333	04/11/2018	Total Dissolved Solids	244	mg/L		Y	F	EPA:160.1	3.40
CTUA	CTUA-17-151334	04/18/2018	Total Dissolved Solids	244	mg/L		Y	F	EPA:160.1	3.40
CTUA	CTUA-17-151332	04/23/2018	Total Dissolved Solids	279	mg/L		Y	F	EPA:160.1	3.40
CTUA	CTUA-18-40	05/24/2018	Total Dissolved Solids	280	mg/L		Y	F	EPA:160.1	3.40
CTUA	CTUA-18-41	05/30/2018	Total Dissolved Solids	260	mg/L		Y	F	EPA:160.1	3.40
CTUA	CTUA-18-42	06/06/2018	Total Dissolved Solids	257	mg/L		Y	F	EPA:160.1	3.40

Table E2-1
Treated Effluent Analytical Results Summary Table - 2018 Quarter 2, 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-18-43	06/13/2018	Total Dissolved Solids	254	mg/L		Y	F	EPA:160.1	3.40
CTUA	CTUA-18-44	06/20/2018	Total Dissolved Solids	304	mg/L		Y	F	EPA:160.1	3.40
CTUA	CTUA-18-45	06/26/2018	Total Dissolved Solids	229	mg/L		Y	F	EPA:160.1	3.40

***** NA = Not analyzed. Sample for perchlorate was collected but not analyzed because when the sample arrived at the laboratory, it was outside of the recommended temperature range.

Table E2-2
Treated Effluent Analytical Results Summary Table Related to Molasses and Sodium Dithionate Pilot Studies NMED Conditional Approval - 2018 Quarter 2, 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-17-151335	04/04/2018	Arsenic	2.00	µg/L	U	N	F	SW-846:6020	2.00
CTUA	CTUA-17-151333	04/11/2018	Arsenic	3.02	µg/L	J	Y	F	SW-846:6020	2.00
CTUA	CTUA-17-151334	04/18/2018	Arsenic	4.3	µg/L	J	Y	F	SW-846:6020	2.00
CTUA	CTUA-17-151332	04/23/2018	Arsenic	2.27	µg/L	J	Y	F	SW-846:6020	2.00
CTUA	CTUA-18-40	05/24/2018	Arsenic	2.00	µg/L	U	N	F	SW-846:6020	2.00
CTUA	CTUA-18-41	05/30/2018	Arsenic	3.33	µg/L	J	Y	F	SW-846:6020	2.00
CTUA	CTUA-18-42	06/06/2018	Arsenic	2.72	µg/L	J	Y	F	SW-846:6020	2.00
CTUA	CTUA-18-43	06/13/2018	Arsenic	3.53	µg/L	J	Y	F	SW-846:6020	2.00
CTUA	CTUA-18-44	06/20/2018	Arsenic	3.45	µg/L	J	Y	F	SW-846:6020	2.00
CTUA	CTUA-18-45	06/26/2018	Arsenic	2.65	µg/L	J	Y	F	SW-846:6020	2.00
CTUA	CTUA-17-151335	04/04/2018	Iron	30.0	µg/L	U	N	F	SW-846:6010C	30.0
CTUA	CTUA-17-151333	04/11/2018	Iron	30.0	µg/L	U	N	F	SW-846:6010C	30.0
CTUA	CTUA-17-151334	04/18/2018	Iron	30.0	µg/L	U	N	F	SW-846:6010C	30.0
CTUA	CTUA-17-151332	04/23/2018	Iron	30.0	µg/L	U	N	F	SW-846:6010C	30.0
CTUA	CTUA-18-40	05/24/2018	Iron	30.0	µg/L	U	N	F	SW-846:6010C	30.0

Table E2-2
Treated Effluent Analytical Results Summary Table Related to Molasses and Sodium Dithionate Pilot Studies NMED Conditional Approval - 2018 Quarter 2, 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-18-41	05/30/2018	Iron	30.0	µg/L	U	N	F	SW-846:6010C	30.0
CTUA	CTUA-18-42	06/06/2018	Iron	30.0	µg/L	U	N	F	SW-846:6010C	30.0
CTUA	CTUA-18-43	06/13/2018	Iron	30.0	µg/L	U	N	F	SW-846:6010C	30.0
CTUA	CTUA-18-44	06/20/2018	Iron	30.0	µg/L	U	N	F	SW-846:6010C	30.0
CTUA	CTUA-18-45	06/26/2018	Iron	30.0	µg/L	U	N	F	SW-846:6010C	30.0
CTUA	CTUA-17-151335	04/04/2018	Manganese	3.09	µg/L	J	Y	F	SW-846:6010C	2.00
CTUA	CTUA-17-151333	04/11/2018	Manganese	2.00	µg/L	U	N	F	SW-846:6010C	2.00
CTUA	CTUA-17-151334	04/18/2018	Manganese	2.00	µg/L	U	N	F	SW-846:6010C	2.00
CTUA	CTUA-17-151332	04/23/2018	Manganese	2.00	µg/L	U	N	F	SW-846:6010C	2.00
CTUA	CTUA-18-40	05/24/2018	Manganese	2.00	µg/L	U	N	F	SW-846:6010C	2.00
CTUA	CTUA-18-41	05/30/2018	Manganese	2.00	µg/L	U	N	F	SW-846:6010C	2.00
CTUA	CTUA-18-42	06/06/2018	Manganese	2.00	µg/L	U	N	F	SW-846:6010C	2.00
CTUA	CTUA-18-43	06/13/2018	Manganese	2.00	µg/L	U	N	F	SW-846:6010C	2.00
CTUA	CTUA-18-44	06/20/2018	Manganese	2.00	µg/L	U	N	F	SW-846:6010C	2.00
CTUA	CTUA-18-45	06/26/2018	Manganese	2.00	µg/L	U	N	F	SW-846:6010C	2.00

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 2, DP-1835

ENCLOSURE 3
Groundwater Elevation Contour Map –
2018 Quarter 2, 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, including the chromium plume area beneath Mortandad Canyon, is predominantly under phreatic conditions (i.e., unconfined water table conditions). The shape of the regional water table beneath the Pajarito Plateau is predominantly controlled by the areas of recharge to the west (i.e., the flanks of the Sierra de los Valles and the Pajarito fault zone) and discharge to the east (i.e., the Rio Grande and the White Rock Canyon Springs). At more local scales such as the chromium area, the structure of the regional water table and groundwater flow is also expected to be influenced by (1) local infiltration zones and recharge areas (e.g., beneath canyons), (2) heterogeneity and anisotropy in the aquifer properties, and (3) discharge locations (municipal water-supply wells and extraction wells within the chromium project area).

Long-term water level data, contaminant transport observations (travel times and direction of migration), and calibrated model results are all lines of evidence suggesting that the water table is relatively flat in the area of the chromium plume. Steeper gradients are found to the west due to the mountain-front recharge and to the east towards the Rio Grande. The low gradient in the chromium site area could be related to the relatively high permeability of the Puye Formation and Miocene pumiceous sediments, anisotropy of the regional aquifer, localized recharge along the canyons above the regional aquifer, faults or other lineaments that affect regional-scale hydraulic conductivity, and nearby water-supply pumping. Although it is difficult to infer absolute groundwater flow directions from the relatively flat contours in the chromium plume area, groundwater elevation data and contaminant transport observations indicate that flow direction is generally to the east-southeast. Any southerly component to the inferred groundwater flow direction may be related to the effects of stratigraphy.

Water-table elevations in the chromium plume area can vary temporally as a result of transient effects that include injection into and extraction from the chromium interim measure infrastructure wells and pumping of Los Alamos County's water-supply wells.

Effects on flow direction from water-supply pumping are very small compared with the local effect caused by extraction and injection at project wells. Observations of transients in the water levels observed at the monitoring wells within the plume area 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).

A long-term decline of approximately 0.5 to 1 ft/yr has been observed in the regional water levels throughout the aquifer beneath the Pajarito Plateau. The decline could 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 variable over time and, therefore, each one is representative of specific periods of time. Figure E3-1 depicts the average water-level data and water table contour map for May 2018. General flow direction is indicated by vectors on Figure E3-1, with potential variability indicated by the angle between the vectors.

ENCLOSURE 3
Groundwater Elevation Contour Map –
2018 Quarter 2, DP-1835

To generate this contour map, average water levels are calculated using values from the middle month of the 3-mo reporting period. Monitoring wells within and surrounding the plume are used, including wells not presented on the map. Those surrounding wells provide useful control points for contouring along the edges of the area of interest for this report. Only well screens near the water table are used for contouring. Most of the well screens selected are less than ~75 ft below the water table, with the exception of R-13, R-21, R-31 Screen #2, R-32, R-37 Screen #2, and R-40 Screen #2. There are no water-level data for R-11 for the period between April 10 and June 7. For the purposes of modelling, an estimate for R-11 was made. R-45 was found to be an excellent predictor for R-11; using linear regression, the adjusted R^2 for the relationship was 97%. Because R-11 provides an important control point on water-table elevation in that region of the site, the May 2018 data for R-45 were used to impute the average elevation for R-11 in May 2018 for use in the contour mapping. The imputed (estimated) value for R-11 is shown on Figure E3-1.

During this reporting period, some of the factors that occurred but are unlikely to affect the water table include limited pumping at CrEX-4 to test the variable frequency drive for the CrEX-4 pump, and testing at injection well CrIN-2 on May 23 as part of the general system restart. Pumping from CrEX-1, CrEX-2, and CrEX-3 occurred consistently from April 1 through April 23 and also from May 23 through June 30 (the end of the quarter). Injection wells CrIN-3, CrIN-4, and CrIN-5 received treated water during the reporting period.

Simple interpolation methods for water table data from a complex heterogeneous site could produce maps that do not represent physically realistic hydrological systems. This water table map is contoured by incorporating process knowledge of groundwater hydraulics (e.g., flownet conformity rules) as well as conceptual models of groundwater flow in the project area, as described above. Key inputs to the conceptual model include knowledge of long-term operations of extraction and injection wells, water-level elevations in monitoring wells near extraction and injection points, and cross-hole tracer data between injection wells and monitoring wells.

Because of the spatial coverage of wells and piezometers available as control points and because of the regional structure of significantly steeper gradients to the east and west of the chromium plume area, additional control points are used to provide estimated water-level elevations in areas that do not have sufficient data to provide constraints. As additional analysis is performed using historical and developing datasets from both existing wells and data from anticipated proposed wells, the use of these control points will be reanalyzed, adjusted, or discontinued based on additional supporting data.

Reference

LANL (Los Alamos National Laboratory), October 2009. "Investigation Report for Sandia Canyon," Los Alamos National Laboratory document LA-UR-09-6450, Los Alamos, New Mexico.

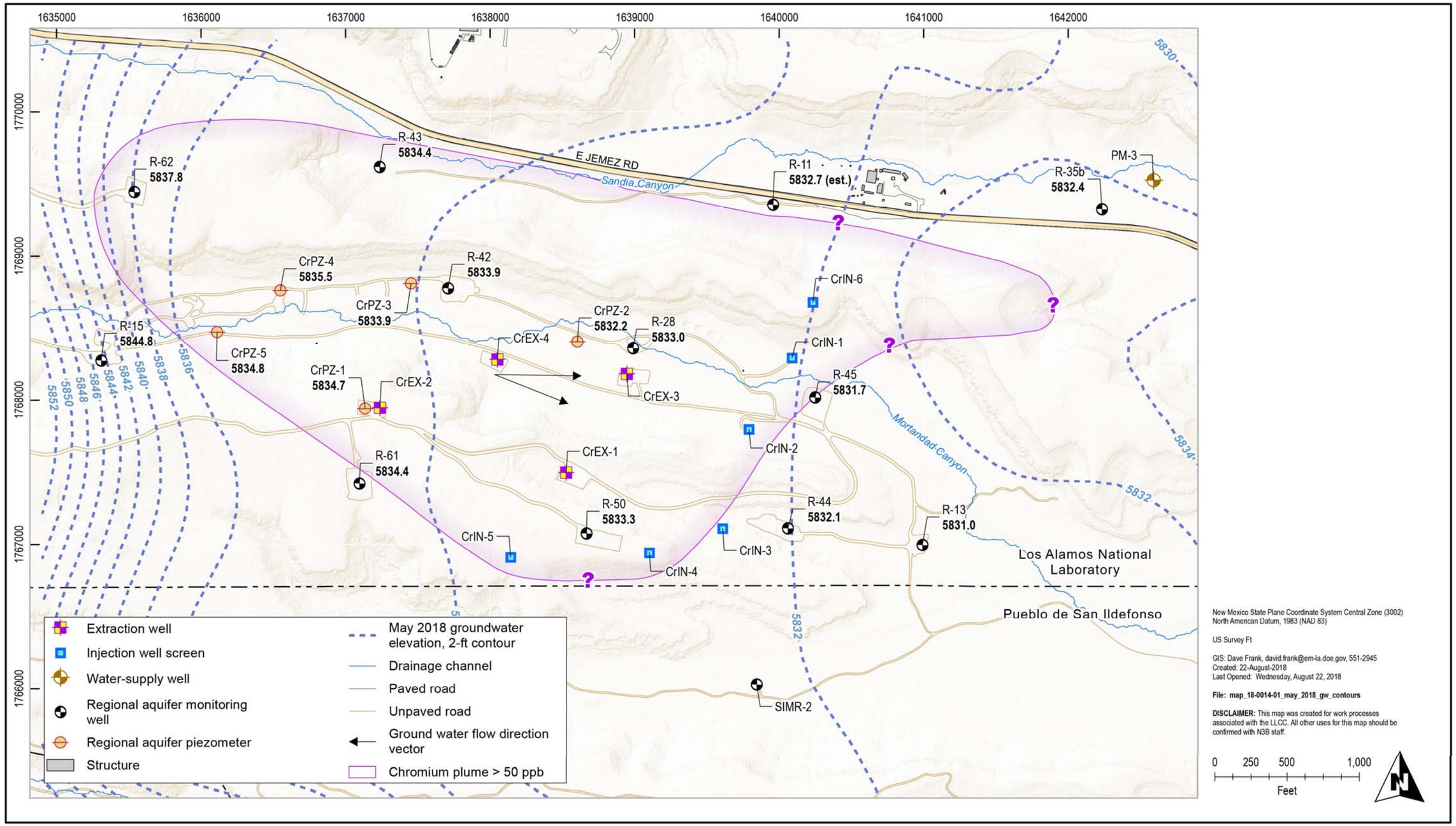


Figure E3-1 Groundwater elevation contour map – 2018 Quarter 2, DP-1835

ENCLOSURE 4

Groundwater Monitoring Wells
Analytical Results Summary Table –
2018 Quarter 2, DP-1835

Table E4-1
Groundwater Monitoring Wells Analytical Results Summary Table - 2018 Quarter 2, DP-1835

Field Sample ID	Location ID	Sample Date	Parameter Name	Report Result	Report Units	Lab Qualifier	Detect Flag	Filtered	Lab Method	Report Detection Limit
CASA-18-154764	R-11	05/18/2018	Chloride	3.73	mg/L		Y	Y	EPA:300.0	0.200
CASA-18-154764	R-11	05/18/2018	Perchlorate	0.772	µg/L		Y	Y	SW-846:6850	0.200
CASA-18-154764	R-11	05/18/2018	Chromium	9.18	µg/L	J	Y	Y	SW-846:6020	10.0
CASA-18-154764	R-11	05/18/2018	Fluoride	0.347	mg/L		Y	Y	EPA:300.0	0.100
CASA-18-154764	R-11	05/18/2018	Nitrate-Nitrite as Nitrogen	5.43	mg/L		Y	Y	EPA:353.2	1.25
CASA-18-154764	R-11	05/18/2018	Sulfate	10.5	mg/L		Y	Y	EPA:300.0	0.400
CASA-18-154764	R-11	05/18/2018	Total Dissolved Solids	216	mg/L		Y	Y	EPA:160.1	14.3
CAMO-18-153989	R-13	05/14/2018	Chloride	2.44	mg/L		Y	Y	EPA:300.0	0.200
CAMO-18-153989	R-13	05/14/2018	Perchlorate	0.409	µg/L		Y	Y	SW-846:6850	0.200
CAMO-18-153989	R-13	05/14/2018	Chromium	3.9	µg/L	J	Y	Y	SW-846:6020	10.0
CAMO-18-153989	R-13	05/14/2018	Fluoride	0.215	mg/L		Y	Y	EPA:300.0	0.100
CAMO-18-153989	R-13	05/14/2018	Nitrate-Nitrite as Nitrogen	0.803	mg/L		Y	Y	EPA:353.2	0.050
CAMO-18-153989	R-13	05/14/2018	Sulfate	3.38	mg/L		Y	Y	EPA:300.0	0.400
CAMO-18-153989	R-13	05/14/2018	Total Dissolved Solids	173	mg/L		Y	Y	EPA:160.1	14.3
CASA-18-154772	R-43 S1	05/21/2018	Chloride	8.67	mg/L		Y	Y	EPA:300.0	0.200
CASA-18-154772	R-43 S1	05/21/2018	Perchlorate	0.81	µg/L		Y	Y	SW-846:6850	0.200
CASA-18-154772	R-43 S1	05/21/2018	Chromium	187	µg/L		Y	Y	SW-846:6020	10.0
CASA-18-154772	R-43 S1	05/21/2018	Fluoride	0.259	mg/L		Y	Y	EPA:300.0	0.100
CASA-18-154772	R-43 S1	05/21/2018	Nitrate-Nitrite as Nitrogen	5.10	mg/L		Y	Y	EPA:353.2	0.250
CASA-18-154772	R-43 S1	05/21/2018	Sulfate	17.6	mg/L		Y	Y	EPA:300.0	0.400
CASA-18-154772	R-43 S1	05/21/2018	Total Dissolved Solids	197	mg/L		Y	Y	EPA:160.1	14.3
CASA-18-154774	R-43 S2	05/17/2018	Chloride	6.19	mg/L		Y	Y	EPA:300.0	0.200
CASA-18-154774	R-43 S2	05/17/2018	Perchlorate	0.875	µg/L		Y	Y	SW-846:6850	0.200
CASA-18-154774	R-43 S2	05/17/2018	Chromium	21.5	µg/L		Y	Y	SW-846:6020	10.0
CASA-18-154774	R-43 S2	05/17/2018	Fluoride	0.281	mg/L		Y	Y	EPA:300.0	0.100
CASA-18-154774	R-43 S2	05/17/2018	Nitrate-Nitrite as Nitrogen	3.63	mg/L		Y	Y	EPA:353.2	0.500

Table E4-1
Groundwater Monitoring Wells Analytical Results Summary Table - 2018 Quarter 2, DP-1835

Field Sample ID	Location ID	Sample Date	Parameter Name	Report Result	Report Units	Lab Qualifier	Detect Flag	Filtered	Lab Method	Report Detection Limit
CASA-18-154774	R-43 S2	05/17/2018	Sulfate	9.15	mg/L		Y	Y	EPA:300.0	0.400
CASA-18-154774	R-43 S2	05/17/2018	Total Dissolved Solids	167	mg/L		Y	Y	EPA:160.1	14.3
CAMO-18-152713	R-44 S1	04/17/2018	Chloride	2.37	mg/L		Y	Y	EPA:300.0	0.200
CAMO-18-152713	R-44 S1	04/17/2018	Perchlorate	0.433	µg/L		Y	Y	SW-846:6850	0.200
CAMO-18-152713	R-44 S1	04/17/2018	Chromium	13.7	µg/L		Y	Y	SW-846:6020	10.0
CAMO-18-152713	R-44 S1	04/17/2018	Fluoride	0.296	mg/L		Y	Y	EPA:300.0	0.100
CAMO-18-152713	R-44 S1	04/17/2018	Nitrate-Nitrite as Nitrogen	1.20	mg/L		Y	Y	EPA:353.2	0.250
CAMO-18-152713	R-44 S1	04/17/2018	Sulfate	3.50	mg/L		Y	Y	EPA:300.0	0.400
CAMO-18-152713	R-44 S1	04/17/2018	Total Dissolved Solids	136	mg/L		Y	Y	EPA:160.1	14.3
CAMO-18-154000	R-44 S1	05/16/2018	Chloride	2.34	mg/L		Y	Y	EPA:300.0	0.200
CAMO-18-154000	R-44 S1	05/16/2018	Perchlorate	0.426	µg/L		Y	Y	SW-846:6850	0.200
CAMO-18-154000	R-44 S1	05/16/2018	Chromium	13.4	µg/L		Y	Y	SW-846:6020	10.0
CAMO-18-154000	R-44 S1	05/16/2018	Fluoride	0.291	mg/L		Y	Y	EPA:300.0	0.100
CAMO-18-154000	R-44 S1	05/16/2018	Nitrate-Nitrite as Nitrogen	1.21	mg/L		Y	Y	EPA:353.2	0.050
CAMO-18-154000	R-44 S1	05/16/2018	Sulfate	3.42	mg/L		Y	Y	EPA:300.0	0.400
CAMO-18-154000	R-44 S1	05/16/2018	Total Dissolved Solids	147	mg/L		Y	Y	EPA:160.1	14.3
CAMO-18-154	R-44 S1	06/13/2018	Chloride	2.37	mg/L		Y	Y	EPA:300.0	0.200
CAMO-18-154	R-44 S1	06/13/2018	Perchlorate	0.46	µg/L		Y	Y	SW-846:6850	0.200
CAMO-18-154	R-44 S1	06/13/2018	Chromium	13.8	µg/L		Y	Y	SW-846:6020	10.0
CAMO-18-154	R-44 S1	06/13/2018	Fluoride	0.284	mg/L		Y	Y	EPA:300.0	0.100
CAMO-18-154	R-44 S1	06/13/2018	Nitrate-Nitrite as Nitrogen	1.11	mg/L		Y	Y	EPA:353.2	0.250
CAMO-18-154	R-44 S1	06/13/2018	Sulfate	3.37	mg/L		Y	Y	EPA:300.0	0.400
CAMO-18-154	R-44 S1	06/13/2018	Total Dissolved Solids	150	mg/L		Y	Y	EPA:160.1	14.3
CAMO-18-152722	R-44 S2	04/17/2018	Chloride	2.24	mg/L		Y	Y	EPA:300.0	0.200
CAMO-18-152722	R-44 S2	04/17/2018	Perchlorate	0.339	µg/L		Y	Y	SW-846:6850	0.200
CAMO-18-152722	R-44 S2	04/17/2018	Chromium	6.92	µg/L	J	Y	Y	SW-846:6020	10.0
CAMO-18-152722	R-44 S2	04/17/2018	Fluoride	0.348	mg/L		Y	Y	EPA:300.0	0.100

Table E4-1
Groundwater Monitoring Wells Analytical Results Summary Table - 2018 Quarter 2, DP-1835

Field Sample ID	Location ID	Sample Date	Parameter Name	Report Result	Report Units	Lab Qualifier	Detect Flag	Filtered	Lab Method	Report Detection Limit
CAMO-18-152722	R-44 S2	04/17/2018	Nitrate-Nitrite as Nitrogen	0.765	mg/L		Y	Y	EPA:353.2	0.250
CAMO-18-152722	R-44 S2	04/17/2018	Sulfate	2.75	mg/L		Y	Y	EPA:300.0	0.400
CAMO-18-152722	R-44 S2	04/17/2018	Total Dissolved Solids	149	mg/L		Y	Y	EPA:160.1	14.3
CAMO-18-154003	R-44 S2	05/16/2018	Chloride	2.21	mg/L		Y	Y	EPA:300.0	0.200
CAMO-18-154003	R-44 S2	05/16/2018	Perchlorate	0.35	µg/L		Y	Y	SW-846:6850	0.200
CAMO-18-154003	R-44 S2	05/16/2018	Chromium	6.69	µg/L	J	Y	Y	SW-846:6020	10.0
CAMO-18-154003	R-44 S2	05/16/2018	Fluoride	0.339	mg/L		Y	Y	EPA:300.0	0.100
CAMO-18-154003	R-44 S2	05/16/2018	Nitrate-Nitrite as Nitrogen	0.797	mg/L		Y	Y	EPA:353.2	0.050
CAMO-18-154003	R-44 S2	05/16/2018	Sulfate	2.68	mg/L		Y	Y	EPA:300.0	0.400
CAMO-18-154003	R-44 S2	05/16/2018	Total Dissolved Solids	139	mg/L		Y	Y	EPA:160.1	14.3
CAMO-18-157	R-44 S2	06/13/2018	Chloride	2.23	mg/L		Y	Y	EPA:300.0	0.200
CAMO-18-157	R-44 S2	06/13/2018	Perchlorate	0.364	µg/L		Y	Y	SW-846:6850	0.200
CAMO-18-157	R-44 S2	06/13/2018	Chromium	6.86	µg/L	J	Y	Y	SW-846:6020	10.0
CAMO-18-157	R-44 S2	06/13/2018	Fluoride	0.339	mg/L		Y	Y	EPA:300.0	0.100
CAMO-18-157	R-44 S2	06/13/2018	Nitrate-Nitrite as Nitrogen	0.750	mg/L		Y	Y	EPA:353.2	0.250
CAMO-18-157	R-44 S2	06/13/2018	Sulfate	2.64	mg/L		Y	Y	EPA:300.0	0.400
CAMO-18-157	R-44 S2	06/13/2018	Total Dissolved Solids	163	mg/L		Y	Y	EPA:160.1	14.3
CAMO-18-152731	R-45 S1	04/17/2018	Chloride	5.85	mg/L		Y	Y	EPA:300.0	0.200
CAMO-18-152731	R-45 S1	04/17/2018	Perchlorate	0.55	µg/L		Y	Y	SW-846:6850	0.200
CAMO-18-152731	R-45 S1	04/17/2018	Chromium	42	µg/L		Y	Y	SW-846:6020	10.0
CAMO-18-152731	R-45 S1	04/17/2018	Fluoride	0.267	mg/L		Y	Y	EPA:300.0	0.100
CAMO-18-152731	R-45 S1	04/17/2018	Nitrate-Nitrite as Nitrogen	3.00	mg/L		Y	Y	EPA:353.2	0.500
CAMO-18-152731	R-45 S1	04/17/2018	Sulfate	9.00	mg/L		Y	Y	EPA:300.0	0.400
CAMO-18-152731	R-45 S1	04/17/2018	Total Dissolved Solids	177	mg/L		Y	Y	EPA:160.1	14.3
CAMO-18-154739	R-45 S1	05/16/2018	Chloride	5.92	mg/L		Y	Y	EPA:300.0	0.200
CAMO-18-154739	R-45 S1	05/16/2018	Perchlorate	0.582	µg/L		Y	Y	SW-846:6850	0.200
CAMO-18-154739	R-45 S1	05/16/2018	Chromium	45.9	µg/L		Y	Y	SW-846:6020	10.0

Table E4-1
Groundwater Monitoring Wells Analytical Results Summary Table - 2018 Quarter 2, DP-1835

Field Sample ID	Location ID	Sample Date	Parameter Name	Report Result	Report Units	Lab Qualifier	Detect Flag	Filtered	Lab Method	Report Detection Limit
CAMO-18-154739	R-45 S1	05/16/2018	Fluoride	0.287	mg/L		Y	Y	EPA:300.0	0.100
CAMO-18-154739	R-45 S1	05/16/2018	Nitrate-Nitrite as Nitrogen	3.11	mg/L		Y	Y	EPA:353.2	0.250
CAMO-18-154739	R-45 S1	05/16/2018	Sulfate	9.14	mg/L		Y	Y	EPA:300.0	0.400
CAMO-18-154739	R-45 S1	05/16/2018	Total Dissolved Solids	144	mg/L		Y	Y	EPA:160.1	14.3
CAMO-18-160	R-45 S1	06/13/2018	Chloride	5.89	mg/L		Y	Y	EPA:300.0	0.200
CAMO-18-160	R-45 S1	06/13/2018	Perchlorate	0.649	µg/L		Y	Y	SW-846:6850	0.200
CAMO-18-160	R-45 S1	06/13/2018	Chromium	46.4	µg/L		Y	Y	SW-846:6020	10.0
CAMO-18-160	R-45 S1	06/13/2018	Fluoride	0.324	mg/L		Y	Y	EPA:300.0	0.100
CAMO-18-160	R-45 S1	06/13/2018	Nitrate-Nitrite as Nitrogen	2.93	mg/L		Y	Y	EPA:353.2	0.500
CAMO-18-160	R-45 S1	06/13/2018	Sulfate	8.88	mg/L		Y	Y	EPA:300.0	0.400
CAMO-18-160	R-45 S1	06/13/2018	Total Dissolved Solids	196	mg/L		Y	Y	EPA:160.1	14.3
CAMO-18-152740	R-45 S2	04/17/2018	Chloride	4.37	mg/L		Y	Y	EPA:300.0	0.200
CAMO-18-152740	R-45 S2	04/17/2018	Perchlorate	0.394	µg/L		Y	Y	SW-846:6850	0.200
CAMO-18-152740	R-45 S2	04/17/2018	Chromium	22.4	µg/L		Y	Y	SW-846:6020	10.0
CAMO-18-152740	R-45 S2	04/17/2018	Fluoride	0.394	mg/L		Y	Y	EPA:300.0	0.100
CAMO-18-152740	R-45 S2	04/17/2018	Nitrate-Nitrite as Nitrogen	0.915	mg/L		Y	Y	EPA:353.2	0.250
CAMO-18-152740	R-45 S2	04/17/2018	Sulfate	5.25	mg/L		Y	Y	EPA:300.0	0.400
CAMO-18-152740	R-45 S2	04/17/2018	Total Dissolved Solids	160	mg/L		Y	Y	EPA:160.1	14.3
CAMO-18-154742	R-45 S2	05/16/2018	Chloride	4.36	mg/L		Y	Y	EPA:300.0	0.200
CAMO-18-154742	R-45 S2	05/16/2018	Perchlorate	0.404	µg/L		Y	Y	SW-846:6850	0.200
CAMO-18-154742	R-45 S2	05/16/2018	Chromium	23.2	µg/L		Y	Y	SW-846:6020	10.0
CAMO-18-154742	R-45 S2	05/16/2018	Fluoride	0.385	mg/L		Y	Y	EPA:300.0	0.100
CAMO-18-154742	R-45 S2	05/16/2018	Nitrate-Nitrite as Nitrogen	0.944	mg/L		Y	Y	EPA:353.2	0.050
CAMO-18-154742	R-45 S2	05/16/2018	Sulfate	5.18	mg/L		Y	Y	EPA:300.0	0.400
CAMO-18-154742	R-45 S2	05/16/2018	Total Dissolved Solids	146	mg/L		Y	Y	EPA:160.1	14.3
CAMO-18-163	R-45 S2	06/13/2018	Chloride	4.41	mg/L		Y	Y	EPA:300.0	0.200
CAMO-18-163	R-45 S2	06/13/2018	Perchlorate	0.422	µg/L		Y	Y	SW-846:6850	0.200

Table E4-1
Groundwater Monitoring Wells Analytical Results Summary Table - 2018 Quarter 2, DP-1835

Field Sample ID	Location ID	Sample Date	Parameter Name	Report Result	Report Units	Lab Qualifier	Detect Flag	Filtered	Lab Method	Report Detection Limit
CAMO-18-163	R-45 S2	06/13/2018	Chromium	28	µg/L		Y	Y	SW-846:6020	10.0
CAMO-18-163	R-45 S2	06/13/2018	Fluoride	0.376	mg/L		Y	Y	EPA:300.0	0.100
CAMO-18-163	R-45 S2	06/13/2018	Nitrate-Nitrite as Nitrogen	0.845	mg/L		Y	Y	EPA:353.2	0.250
CAMO-18-163	R-45 S2	06/13/2018	Sulfate	5.22	mg/L		Y	Y	EPA:300.0	0.400
CAMO-18-163	R-45 S2	06/13/2018	Total Dissolved Solids	176	mg/L		Y	Y	EPA:160.1	14.3
CAMO-18-152749	R-50 S1	04/16/2018	Chloride	9.59	mg/L		Y	Y	EPA:300.0	0.400
CAMO-18-152749	R-50 S1	04/16/2018	Perchlorate	0.602	µg/L		Y	Y	SW-846:6850	0.200
CAMO-18-152749	R-50 S1	04/16/2018	Chromium	136	µg/L		Y	Y	SW-846:6020	10.0
CAMO-18-152749	R-50 S1	04/16/2018	Fluoride	0.313	mg/L		Y	Y	EPA:300.0	0.100
CAMO-18-152749	R-50 S1	04/16/2018	Nitrate-Nitrite as Nitrogen	2.01	mg/L		Y	Y	EPA:353.2	0.500
CAMO-18-152749	R-50 S1	04/16/2018	Sulfate	14.6	mg/L		Y	Y	EPA:300.0	0.400
CAMO-18-152749	R-50 S1	04/16/2018	Total Dissolved Solids	126	mg/L		Y	Y	EPA:160.1	14.3
CAMO-18-154745	R-50 S1	05/14/2018	Chloride	9.73	mg/L		Y	Y	EPA:300.0	0.400
CAMO-18-154745	R-50 S1	05/14/2018	Perchlorate	0.618	µg/L		Y	Y	SW-846:6850	0.200
CAMO-18-154745	R-50 S1	05/14/2018	Chromium	135	µg/L		Y	Y	SW-846:6020	10.0
CAMO-18-154745	R-50 S1	05/14/2018	Fluoride	0.232	mg/L		Y	Y	EPA:300.0	0.100
CAMO-18-154745	R-50 S1	05/14/2018	Nitrate-Nitrite as Nitrogen	2.21	mg/L		Y	Y	EPA:353.2	0.250
CAMO-18-154745	R-50 S1	05/14/2018	Sulfate	14.8	mg/L		Y	Y	EPA:300.0	0.400
CAMO-18-154745	R-50 S1	05/14/2018	Total Dissolved Solids	216	mg/L		Y	Y	EPA:160.1	14.3
CAMO-18-166	R-50 S1	06/12/2018	Chloride	9.82	mg/L		Y	Y	EPA:300.0	0.400
CAMO-18-166	R-50 S1	06/12/2018	Perchlorate	0.651	µg/L		Y	Y	SW-846:6850	0.200
CAMO-18-166	R-50 S1	06/12/2018	Chromium	150	µg/L		Y	Y	SW-846:6020	10.0
CAMO-18-166	R-50 S1	06/12/2018	Fluoride	0.299	mg/L		Y	Y	EPA:300.0	0.100
CAMO-18-166	R-50 S1	06/12/2018	Nitrate-Nitrite as Nitrogen	2.08	mg/L		Y	Y	EPA:353.2	0.250
CAMO-18-166	R-50 S1	06/12/2018	Sulfate	14.5	mg/L		Y	Y	EPA:300.0	0.400
CAMO-18-166	R-50 S1	06/12/2018	Total Dissolved Solids	180	mg/L		Y	Y	EPA:160.1	14.3
CAMO-18-152758	R-50 S2	04/16/2018	Chloride	2.10	mg/L		Y	Y	EPA:300.0	0.200

Table E4-1
Groundwater Monitoring Wells Analytical Results Summary Table - 2018 Quarter 2, DP-1835

Field Sample ID	Location ID	Sample Date	Parameter Name	Report Result	Report Units	Lab Qualifier	Detect Flag	Filtered	Lab Method	Report Detection Limit
CAMO-18-152758	R-50 S2	04/16/2018	Perchlorate	0.31	µg/L		Y	Y	SW-846:6850	0.200
CAMO-18-152758	R-50 S2	04/16/2018	Chromium	3.98	µg/L	J	Y	Y	SW-846:6020	10.0
CAMO-18-152758	R-50 S2	04/16/2018	Fluoride	0.357	mg/L		Y	Y	EPA:300.0	0.100
CAMO-18-152758	R-50 S2	04/16/2018	Nitrate-Nitrite as Nitrogen	0.567	mg/L		Y	Y	EPA:353.2	0.050
CAMO-18-152758	R-50 S2	04/16/2018	Sulfate	2.58	mg/L		Y	Y	EPA:300.0	0.400
CAMO-18-152758	R-50 S2	04/16/2018	Total Dissolved Solids	113	mg/L		Y	Y	EPA:160.1	14.3
CAMO-18-154748	R-50 S2	05/15/2018	Chloride	2.08	mg/L		Y	Y	EPA:300.0	0.200
CAMO-18-154748	R-50 S2	05/15/2018	Perchlorate	0.33	µg/L		Y	Y	SW-846:6850	0.200
CAMO-18-154748	R-50 S2	05/15/2018	Chromium	3.79	µg/L	J	Y	Y	SW-846:6020	10.0
CAMO-18-154748	R-50 S2	05/15/2018	Fluoride	0.371	mg/L		Y	Y	EPA:300.0	0.100
CAMO-18-154748	R-50 S2	05/15/2018	Nitrate-Nitrite as Nitrogen	0.594	mg/L		Y	Y	EPA:353.2	0.050
CAMO-18-154748	R-50 S2	05/15/2018	Sulfate	2.57	mg/L		Y	Y	EPA:300.0	0.400
CAMO-18-154748	R-50 S2	05/15/2018	Total Dissolved Solids	156	mg/L		Y	Y	EPA:160.1	14.3
CAMO-18-169	R-50 S2	06/12/2018	Chloride	2.12	mg/L		Y	Y	EPA:300.0	0.200
CAMO-18-169	R-50 S2	06/12/2018	Perchlorate	0.329	µg/L		Y	Y	SW-846:6850	0.200
CAMO-18-169	R-50 S2	06/12/2018	Chromium	4.33	µg/L	J	Y	Y	SW-846:6020	10.0
CAMO-18-169	R-50 S2	06/12/2018	Fluoride	0.413	mg/L		Y	Y	EPA:300.0	0.100
CAMO-18-169	R-50 S2	06/12/2018	Nitrate-Nitrite as Nitrogen	0.610	mg/L		Y	Y	EPA:353.2	0.250
CAMO-18-169	R-50 S2	06/12/2018	Sulfate	2.56	mg/L		Y	Y	EPA:300.0	0.400
CAMO-18-169	R-50 S2	06/12/2018	Total Dissolved Solids	163	mg/L		Y	Y	EPA:160.1	14.3
CAMO-18-153998	R-62	05/22/2018	Chloride	16.3	mg/L		Y	Y	EPA:300.0	0.400
CAMO-18-153998	R-62	05/22/2018	Perchlorate	0.839	µg/L		Y	Y	SW-846:6850	0.200
CAMO-18-153998	R-62	05/22/2018	Chromium	236	µg/L		Y	Y	SW-846:6020	10.0
CAMO-18-153998	R-62	05/22/2018	Fluoride	0.0868	mg/L	J	Y	Y	EPA:300.0	0.100
CAMO-18-153998	R-62	05/22/2018	Nitrate-Nitrite as Nitrogen	1.88	mg/L		Y	Y	EPA:353.2	0.250
CAMO-18-153998	R-62	05/22/2018	Sulfate	28.5	mg/L		Y	Y	EPA:300.0	0.800
CAMO-18-153998	R-62	05/22/2018	Total Dissolved Solids	201	mg/L		Y	Y	EPA:160.1	14.3

Table E4-1
Groundwater Monitoring Wells Analytical Results Summary Table - 2018 Quarter 2, DP-1835

Field Sample ID	Location ID	Sample Date	Parameter Name	Report Result	Report Units	Lab Qualifier	Detect Flag	Filtered	Lab Method	Report Detection Limit
CAMO-18-152776	SIMR-2	04/19/2018	Chloride	2.21	mg/L		Y	Y	EPA:300.0	0.200
CAMO-18-152776	SIMR-2	04/19/2018	Perchlorate	0.39	µg/L		Y	Y	SW-846:6850	0.200
CAMO-18-152776	SIMR-2	04/19/2018	Chromium	5.31	µg/L	J	Y	Y	SW-846:6020	10.0
CAMO-18-152776	SIMR-2	04/19/2018	Fluoride	0.204	mg/L		Y	Y	EPA:300.0	0.100
CAMO-18-152776	SIMR-2	04/19/2018	Nitrate-Nitrite as Nitrogen	0.732	mg/L		Y	Y	EPA:353.2	0.050
CAMO-18-152776	SIMR-2	04/19/2018	Sulfate	2.84	mg/L		Y	Y	EPA:300.0	0.400
CAMO-18-152776	SIMR-2	04/19/2018	Total Dissolved Solids	133	mg/L		Y	Y	EPA:160.1	14.3
CAMO-18-154753	SIMR-2	05/15/2018	Chloride	2.16	mg/L		Y	Y	EPA:300.0	0.200
CAMO-18-154753	SIMR-2	05/15/2018	Perchlorate	0.395	µg/L		Y	Y	SW-846:6850	0.200
CAMO-18-154753	SIMR-2	05/15/2018	Chromium	5.09	µg/L	J	Y	Y	SW-846:6020	10.0
CAMO-18-154753	SIMR-2	05/15/2018	Fluoride	0.238	mg/L		Y	Y	EPA:300.0	0.100
CAMO-18-154753	SIMR-2	05/15/2018	Nitrate-Nitrite as Nitrogen	0.772	mg/L		Y	Y	EPA:353.2	0.050
CAMO-18-154753	SIMR-2	05/15/2018	Sulfate	2.82	mg/L		Y	Y	EPA:300.0	0.400
CAMO-18-154753	SIMR-2	05/15/2018	Total Dissolved Solids	154	mg/L		Y	Y	EPA:160.1	14.3
[a]	SIMR-2	06/21/2018	Chloride	na[b]	mg/L		na	na	EPA:300.0	0.200
[a]	SIMR-2	06/21/2018	Perchlorate	na	µg/L		na	na	SW-846:6850	0.200
[a]	SIMR-2	06/21/2018	Chromium	na	µg/L		na	na	SW-846:6020	10.0
[a]	SIMR-2	06/21/2018	Fluoride	na	mg/L		na	na	EPA:300.0	0.100
[a]	SIMR-2	06/21/2018	Nitrate-Nitrite as Nitrogen	na	mg/L		na.	na	EPA:353.2	0.050
[a]	SIMR-2	06/21/2018	Sulfate	na	mg/L		na	na	EPA:300.0	0.400
[a]	SIMR-2	06/21/2018	Total Dissolved Solids	na	mg/L		na	na	EPA:160.1	14.3

[a] Not sampled. Area was inaccessible due to Stage 3 fire restrictions.

[b] na = Not available.

ENCLOSURE 5

Treated Groundwater Injection and Extraction Summary Tables – 2018 Quarter 2, DP-1835

Table E5-1
Daily Extraction Summary Table
2018 Quarter 2, DP-1835

Date	CrEX-1 (gal.)	CrEX-2 (gal.)	CrEX-3 (gal.)	CrEX-4 (gal.)	Total (gal.)
4/1/2018	54,809	49,334	44,681	0	148,824
4/2/2018	55,049	49,089	44,712	0	148,850
4/3/2018	61,379	56,590	51,626	0	169,595
4/4/2018	48,107	46,095	43,061	0	137,262
4/5/2018	35,784	34,350	31,778	0	101,913
4/6/2018	62,211	60,811	56,676	0	179,698
4/7/2018	62,676	61,646	57,886	0	182,208
4/8/2018	51,869	48,429	47,249	0	147,546
4/9/2018	0	0	0	0	0
4/10/2018	12,882	12,371	11,730	0	36,983
4/11/2018	44,211	42,524	39,260	0	125,995
4/12/2018	44,355	42,885	40,197	632	128,069
4/13/2018	49,927	48,771	45,617	0	144,315
4/14/2018	49,801	48,017	44,773	0	142,591
4/15/2018	43,100	41,518	38,480	0	123,098
4/16/2018	59,517	57,900	54,220	13	171,651
4/17/2018	54,639	53,589	50,222	0	158,449
4/18/2018	54,762	52,978	49,748	0	157,488
4/19/2018	56,025	54,571	50,457	0	161,053
4/20/2018	71,157	70,916	65,515	0	207,587
4/21/2018	76,193	76,698	70,520	0	223,411
4/22/2018	83,519	84,957	77,091	0	245,568
4/23/2018	49,543	50,836	46,503	0	146,883
4/24/2018	0	0	0	0	0
4/25/2018	0	0	0	0	0
4/26/2018	0	0	0	0	0
4/27/2018	0	0	0	0	0
4/28/2018	0	0	0	0	0
4/29/2018	0	0	0	0	0
4/30/2018	0	0	0	0	0
5/1/2018	0	0	0	0	0
5/2/2018	0	0	0	0	0
5/3/2018	0	0	0	0	0
5/4/2018	0	0	0	0	0
5/5/2018	0	0	0	0	0
5/6/2018	0	0	0	0	0
5/7/2018	0	0	0	0	0
5/8/2018	0	0	0	0	0
5/9/2018	0	0	0	0	0

Table E5-1
Daily Extraction Summary Table
2018 Quarter 2, DP-1835

Date	CrEX-1 (gal.)	CrEX-2 (gal.)	CrEX-3 (gal.)	CrEX-4 (gal.)	Total (gal.)
5/10/2018	0	0	0	0	0
5/11/2018	0	0	0	0	0
5/12/2018	0	0	0	0	0
5/13/2018	0	0	0	0	0
5/14/2018	0	0	0	0	0
5/15/2018	0	0	0	0	0
5/16/2018	0	0	0	0	0
5/17/2018	0	0	0	0	0
5/18/2018	0	0	0	0	0
5/19/2018	0	0	0	0	0
5/20/2018	0	0	0	0	0
5/21/2018	0	0	0	0	0
5/22/2018	0	0	0	0	0
5/23/2018	57,143	1,014	38,973	0	97,130
5/24/2018	106,627	35,351	79,840	0	221,818
5/25/2018	92,176	86,783	80,650	0	259,609
5/26/2018	99,445	66,761	78,691	0	244,896
5/27/2018	93,921	79,779	81,838	0	255,538
5/28/2018	90,736	86,446	85,302	0	262,484
5/29/2018	90,743	86,491	85,303	0	262,536
5/30/2018	90,706	86,474	85,366	0	262,546
5/31/2018	90,711	86,464	85,247	0	262,422
6/1/2018	90,712	86,425	85,324	0	262,460
6/2/2018	90,740	86,403	85,301	0	262,444
6/3/2018	90,536	86,907	84,979	0	262,422
6/4/2018	88,877	90,708	84,958	0	264,543
6/5/2018	89,137	90,735	84,979	0	264,851
6/6/2018	89,108	90,713	84,962	0	264,783
6/7/2018	90,682	88,363	81,742	0	260,787
6/8/2018	99,285	72,729	80,631	0	252,645
6/9/2018	96,471	89,269	82,026	0	267,766
6/10/2018	94,181	89,749	81,558	0	265,488
6/11/2018	90,234	90,720	79,290	0	260,244
6/12/2018	90,721	90,718	76,341	0	257,780
6/13/2018	90,696	90,738	76,352	0	257,786
6/14/2018	86,387	86,073	75,138	0	247,598
6/15/2018	89,251	89,665	84,941	0	263,857
6/16/2018	89,290	89,728	84,976	0	263,994
6/17/2018	89,241	89,575	84,958	0	263,774

Table E5-1
Daily Extraction Summary Table
2018 Quarter 2, DP-1835

Date	CrEX-1 (gal.)	CrEX-2 (gal.)	CrEX-3 (gal.)	CrEX-4 (gal.)	Total (gal.)
6/18/2018	89,130	89,518	84,997	0	263,646
6/19/2018	84,163	83,638	79,661	0	247,462
6/20/2018	88,859	89,284	84,956	0	263,100
6/21/2018	91,788	90,702	84,227	0	266,717
6/22/2018	90,922	91,100	84,074	0	266,096
6/23/2018	87,834	90,482	81,974	0	260,290
6/24/2018	88,709	89,508	82,857	0	261,074
6/25/2018	92,176	87,832	84,950	0	264,959
6/26/2018	90,985	87,787	84,205	0	262,977
6/27/2018	89,398	86,938	83,516	0	259,852
6/28/2018	90,042	85,936	81,760	0	257,738
6/29/2018	94,086	88,735	81,931	0	264,752
6/30/2018	89,008	89,396	82,071	0	260,475
				Subtotal	**13,360,375**

Table E5-2
Daily Injection Summary Table 2018 Quarter 2, DP1835

Date	CrIN-1 (gal.)	CrIN-2 (gal.)	CrIN-3 (gal.)	CrIN-4 (gal.)	CrIN-5 (gal.)	CrIN-6* (gal.)	Total (gal.)
4/1/2018	0	0	84,930	37,447	36,633	0	159,010
4/2/2018	0	0	84,945	37,432	36,655	0	159,032
4/3/2018	0	0	79,314	41,741	35,465	0	156,520
4/4/2018	0	0	67,909	45,582	23,668	0	137,159
4/5/2018	0	0	66,745	46,761	1,813	0	115,319
4/6/2018	0	0	69,148	52,344	46,767	0	168,259
4/7/2018	0	0	69,128	51,866	52,985	0	173,979
4/8/2018	0	0	59,705	44,766	45,822	0	150,293
4/9/2018	0	0	0	0	0	0	0
4/10/2018	0	0	28,156	0	18,115	0	46,271
4/11/2018	0	0	43,246	22,930	46,763	0	112,939
4/12/2018	0	0	48,584	40,122	53,099	0	141,804
4/13/2018	0	0	45,281	40,319	53,605	0	139,206
4/14/2018	0	0	45,876	40,315	53,583	0	139,774
4/15/2018	0	0	46,088	40,292	48,244	0	134,624
4/16/2018	0	0	56,861	39,977	58,293	0	155,131
4/17/2018	0	0	65,560	39,111	66,602	0	171,273

Table E5-2
Daily Injection Summary Table 2018 Quarter 2, DP1835

Date	CrIN-1 (gal.)	CrIN-2 (gal.)	CrIN-3 (gal.)	CrIN-4 (gal.)	CrIN-5 (gal.)	CrIN-6* (gal.)	Total (gal.)
4/18/2018	0	0	60,622	33,128	67,594	0	161,344
4/19/2018	0	0	59,673	43,497	41,495	0	144,665
4/20/2018	0	0	65,135	69,245	70,946	0	205,327
4/21/2018	0	0	67,090	85,052	90,823	0	242,965
4/22/2018	0	0	67,980	85,963	90,721	0	244,664
4/23/2018	0	0	39,948	51,985	54,634	0	146,567
4/24/2018	0	0	0	0	0	0	0
4/25/2018	0	0	0	0	0	0	0
4/26/2018	0	0	0	0	0	0	0
4/27/2018	0	0	0	0	0	0	0
4/28/2018	0	0	0	0	0	0	0
4/29/2018	0	0	0	0	0	0	0
4/30/2018	0	0	0	0	0	0	0
5/1/2018	0	0	0	0	0	0	0
5/2/2018	0	0	0	0	0	0	0
5/3/2018	0	0	0	0	0	0	0
5/4/2018	0	0	0	0	0	0	0
5/5/2018	0	0	0	0	0	0	0
5/6/2018	0	0	0	0	0	0	0
5/7/2018	0	0	0	0	0	0	0
5/8/2018	0	0	0	0	0	0	0
5/9/2018	0	0	0	0	0	0	0
5/10/2018	0	0	0	0	0	0	0
5/11/2018	0	0	0	0	0	0	0
5/12/2018	0	0	0	0	0	0	0
5/13/2018	0	0	0	0	0	0	0
5/14/2018	0	0	0	0	0	0	0
5/15/2018	0	0	0	0	0	0	0
5/16/2018	0	0	0	0	0	0	0
5/17/2018	0	0	0	0	0	0	0
5/18/2018	0	0	0	0	0	0	0
5/19/2018	0	0	0	0	0	0	0
5/20/2018	0	0	0	0	0	0	0
5/21/2018	0	0	0	0	0	0	0
5/22/2018	0	0	0	0	0	0	0
5/23/2018	0	124	37,607	48,446	19,324	0	105,502
5/24/2018	0	0	89,026	94,552	30,925	0	214,503
5/25/2018	0	0	84,378	90,031	77,885	0	252,294
5/26/2018	0	0	86,293	90,581	78,809	0	255,683

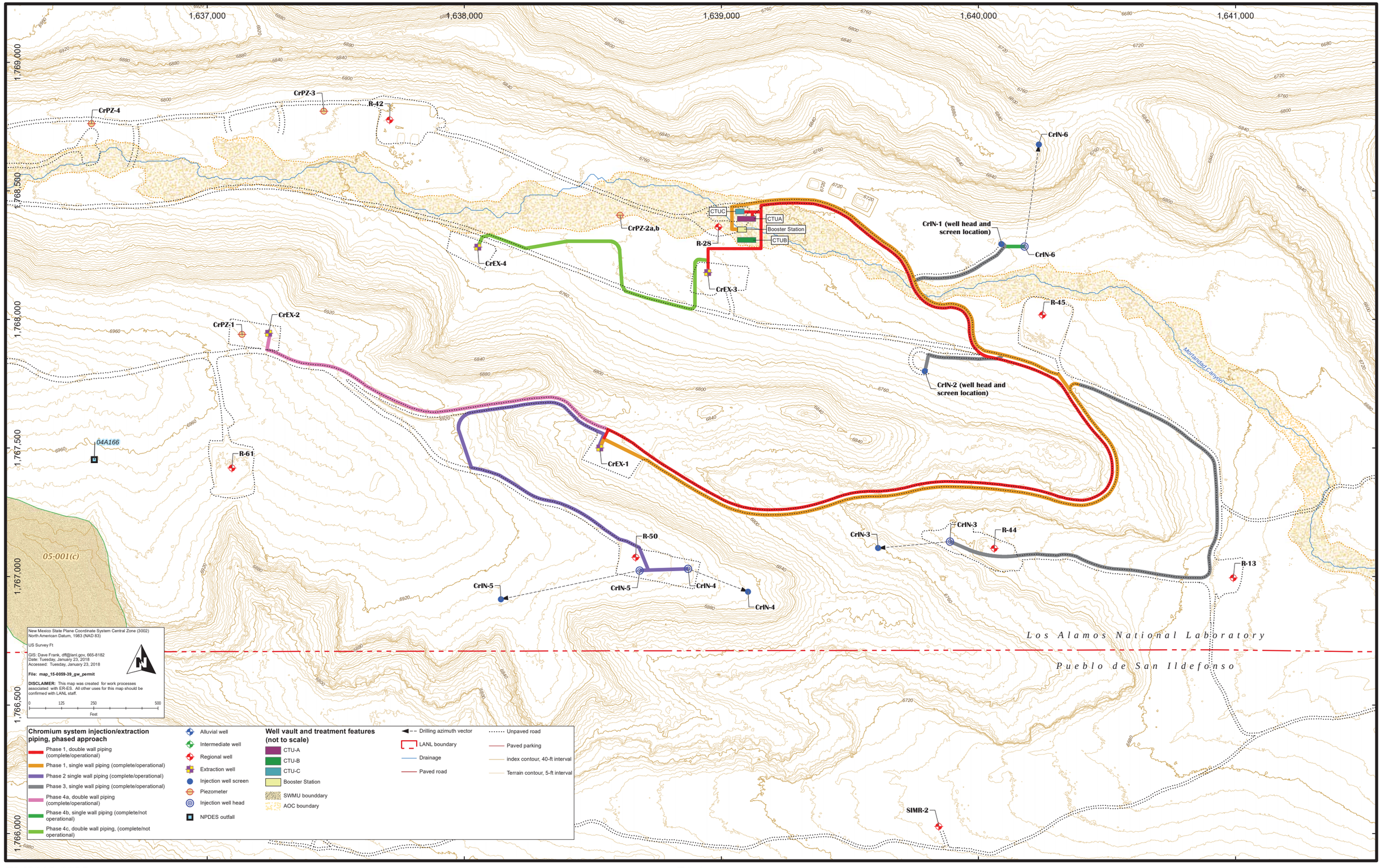
Table E5-2
Daily Injection Summary Table 2018 Quarter 2, DP1835

Date	CrIN-1 (gal.)	CrIN-2 (gal.)	CrIN-3 (gal.)	CrIN-4 (gal.)	CrIN-5 (gal.)	CrIN-6* (gal.)	Total (gal.)
5/27/2018	0	0	86,414	92,133	80,525	0	259,072
5/28/2018	0	0	86,414	92,137	80,617	0	259,168
5/29/2018	0	0	86,415	92,239	80,925	0	259,578
5/30/2018	0	0	86,352	92,512	81,315	0	260,179
5/31/2018	0	0	86,190	92,155	81,596	0	259,942
6/1/2018	0	0	85,372	91,686	81,012	0	258,070
6/2/2018	0	0	88,073	91,539	80,473	0	260,084
6/3/2018	0	0	94,182	92,143	80,624	0	266,949
6/4/2018	0	0	92,035	91,717	80,296	0	264,048
6/5/2018	0	0	93,237	92,106	80,565	0	265,907
6/6/2018	0	0	89,298	91,750	80,652	0	261,700
6/7/2018	0	0	88,490	91,904	79,923	0	260,317
6/8/2018	0	0	88,322	92,341	80,603	0	261,267
6/9/2018	0	0	87,886	92,283	81,377	0	261,546
6/10/2018	0	0	87,853	92,197	80,940	0	260,990
6/11/2018	0	0	87,834	91,911	80,565	0	260,310
6/12/2018	0	0	87,629	92,161	79,955	0	259,745
6/13/2018	0	0	87,393	92,132	79,777	0	259,303
6/14/2018	0	0	86,945	92,482	80,558	0	259,985
6/15/2018	0	0	87,342	92,677	80,919	0	260,938
6/16/2018	0	0	87,137	93,415	81,134	0	261,687
6/17/2018	0	0	86,936	93,126	80,913	0	260,975
6/18/2018	0	0	86,539	92,674	80,735	0	259,948
6/19/2018	0	0	86,655	93,051	81,233	0	260,939
6/20/2018	0	0	87,231	93,588	82,044	0	262,862
6/21/2018	0	0	87,346	93,590	81,962	0	262,897
6/22/2018	0	0	86,573	93,214	81,321	0	261,108
6/23/2018	0	0	86,418	93,642	81,446	0	261,505
6/24/2018	0	0	86,388	93,833	81,517	0	261,738
6/25/2018	0	0	86,395	93,781	81,389	0	261,565
6/26/2018	0	0	86,460	93,809	80,831	0	261,100
6/27/2018	0	0	86,309	93,535	80,654	0	260,497
6/28/2018	0	0	86,298	93,734	80,845	0	260,877
6/29/2018	0	0	86,376	93,582	80,625	0	260,582
6/30/2018	0	0	86,349	93,599	80,637	0	260,585
						Subtotal	**13,372,069**

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

ENCLOSURE 6

Facility Layout Map –
2018 Quarter 2, DP-1835


1,637,000
1,638,000
1,639,000
1,640,000
1,641,000
1,769,000
1,768,500
1,768,000
1,767,500
1,767,000
1,766,500
1,766,000
CrPZ-4
CrPZ-3
R-42
CrPZ-2a,b
CrEX-4
CrEX-3
R-28
CTUC
CTUA
Booster Station
CTUB
CrIN-6
CrIN-1 (well head and screen location)
CrIN-6
R-45
Mortandad Canyon
CrIN-2 (well head and screen location)
CrPZ-1
CrEX-2
04A166
R-61
CrEX-1
R-50
CrIN-5
CrIN-5
CrIN-4
CrIN-4
CrIN-3
CrIN-3
R-44
R-13
05-001(c)
Los Alamos National Laboratory
Pueblo de San Ildefonso
SIMR-2
New Mexico State Plane Coordinate System Central Zone (3002)
North American Datum, 1983 (NAD 83)
US Survey Ft
GIS: Dave Frank, dff@lanl.gov, 665-8182
Date: Tuesday, January 23, 2018
Accessed: Tuesday, January 23, 2018
File: map_15-0059-39_gw_permit
DISCLAIMER: This map was created for work processes associated with ER-ES. All other uses for this map should be confirmed with LANL staff.
0 125 250 500
Feet
Chromium system injection/extraction piping, phased approach
Phase 1, double wall piping (complete/operational)
Phase 1, single wall piping (complete/operational)
Phase 2 single wall piping (complete/operational)
Phase 3, single wall piping (complete/operational)
Phase 4a, double wall piping (complete/operational)
Phase 4b, single wall piping (complete/not operational)
Phase 4c, double wall piping, (complete/not operational)
Alluvial well
Intermediate well
Regional well
Extraction well
Injection well screen
Piezometer
Injection well head
NPDES outfall
Well vault and treatment features (not to scale)
CTU-A
CTU-B
CTU-C
Booster Station
SWMU bounddary
AOC boundary
Drilling azimuth vector
LANL boundary
Drainage
Paved road
Unpaved road
Paved parking
index contour, 40-ft interval
Terrain contour, 5-ft interval