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Date: AUG 2 8 2019
Refer To: N3B-19-0252

GROUND WATER
AUG 28 2019
BUREAU

Michelle Hunter, Chief
Ground Water Quality Bureau
New Mexico Environment Department
1190 S. St. Francis Drive
Santa Fe, NM 87505

Subject: Submittal of the Quarterly Report for 2019 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 (DOE) and Los Alamos National Security, LLC (LANS) for the discharge of treated groundwater to the regional aquifer through up to six Class V Underground Injection Control (UIC) wells. On July 21, 2017, NMED approved minor updates to DP-1835. During the second quarter of calendar 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 2019, April 1 through June 30 (Quarter 2), discharge of treated groundwater to the regional aquifer continued under DP-1835. The attached "Quarterly Report for the Discharge of Treated Groundwater to the Regional Aquifer – 2019 Quarter 2, DP-1835" provides the information required under DP-1835 for this reporting period.

If you have questions, please contact Christian Maupin at (505) 695-4281 (christian.maupin@em-la.doe.gov) or Cheryl Rodriguez at (505) 665-5330 (cheryl.rodriguez@em.doe.gov).

Sincerely,

Elizabeth Lowes
Program Manager
Environment, Safety, and Health
N3B-Los Alamos

Sincerely,

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

Enclosure(s): Two hard copies with electronic files (EM2019-0294):

1. Quarterly Report for the Discharge of Treated Groundwater to the Regional Aquifer – 2019 Quarter 2, DP-1835

Cy: (letter and enclosure[s] emailed)
Raymond Martinez, San Ildefonso Pueblo, NM
Dino Chavarria, Santa Clara Pueblo, NM
Shelly Lemon, NMED-SWQB
John Kieling, NMED-HWB
Steve Pullen, NMED-GWQB
Andrew Romero, NMED-GWQB
Steve Yanicak, NMED-DOE-OB
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August 2019
EM2019-0294

Quarterly Report for the Discharge of Treated Groundwater to the Regional Aquifer – 2019 Quarter 2, DP-1835

N3B Los Alamos

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1.0 INTRODUCTION

On August 31, 2016, the New Mexico Environment Department (NMED) issued Discharge Permit 1835 (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. On July 21, 2017, NMED approved minor updates to DP-1835. During the third quarter of fiscal year 2018, ownership of the discharge permit transferred from LANS to Newport News Nuclear BWXT-Los Alamos, LLC (N3B). Pursuant to Condition No. 10 of the above-referenced discharge permit, DOE/N3B are required to submit quarterly reports.

During the April 1 through June 30, 2019, reporting period (Quarter 2) for DP-1835, discharge of treated groundwater to the regional aquifer occurred predominantly at three UIC wells: CrIN-3, CrIN-4, and CrIN-5. Groundwater originated predominantly from three extraction wells: CrEX-1, CrEX-2, and CrEX-3. The groundwater was treated by chromium treatment unit A (CTUA) before injection at the UIC wells. During 2019 Quarter 2, injection well CrIN-6 was converted to extraction well CrEX-5. This conversion necessitated the reconfiguration of the CrIN-6 well manifold and controls, and installation of a new double wall pipe tied into the existing extraction well main pipeline. Minor pumping of CrEX-5 and minor injection at CrIN-1 and CrIN-2 occurred in June of Quarter 2 as a part of the system test following the CrIN-6/CrEX-5 conversion.

Condition No. 10 of DP-1835 requires submission of a quarterly report to NMED by September 1 for the April 1 through 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. 14)

15. Groundwater elevation contour map (Condition No. 15)

Each of the above requirements is addressed in this report.

2.0 REQUIREMENTS

2.1 Influent and Discharge Volumes for the IX Treatment Systems (Requirement 1)

Table 2.1-1 provides the influent and discharge volumes for IX treatment systems during 2019 Quarter 2 for activities completed under DP-1835. As previously identified, injection predominantly occurred at UIC wells CrIN-3, CrIN-4, and CrIN-5 during the quarter. Treated discharge, which originated from extraction wells CrEX-1, CrEX-2, CrEX-3, and CrEX-5 was treated with treatment unit CTUA.

Table 2.1-1
Total Influent and Discharge Volumes
for IX Treatment Systems – 2019 Quarter 2

Treatment Unit	Influent Volume[a] (gal.)	Effluent Volume[b] (gal.)
CTUA	8,435,000	8,427,000
CTUC[c]	n/a[d]	n/a

Note: Individual flow meter accurate to ±5%.

[a] Influent volume based on CrEX-1, CrEX-2, CrEX-3, and CrEX-5 extraction volumes.

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

[c] Treatment unit did not treat any groundwater that was subsequently injected during the quarter.

[d] n/a = Not applicable.

2.2 Quarterly Treated Effluent Sampling Results from Each IX Treatment System (Requirement 2)

Treated effluent analytical results from samples collected during 2019 Quarter 2 for activities completed under DP-1835 are summarized in Table 2.2-1. No results for total chromium, 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 screening levels established for tap water in Table A-1 of the 2019 NMED “Risk Assessment Guidance for Site Investigations and Remediation” for constituents not listed in 20.6.2.3103 NMAC. The 90% values for chromium, nitrate, perchlorate, sulfate, fluoride, chloride, and total dissolved solids are 45 µg/L, 9 mg/L, 12.4 µg/L, 540 mg/L, 1.44 mg/L, 225 mg/L, and 900 mg/L respectively. It should be noted that sample CTUA-19-166193, taken on April 2, 2019, had an elevated method detection limit (MDL) of 30.0 µg/L for chromium. This MDL is 10 times higher than the normal MDL for chromium. The sample was prepared with a 10-times dilution factor due to matrix interference and small sample volume. The convention for reporting data is that non-detect concentrations are reported at the MDL.

Table 2.2-1
Treated Effluent Analytical Results Summary Table – 2019 Quarter 2, DP-1835

Location ID	Sample ID	Sample Date*	Parameter Name	Result	Report Unit	Lab Qualifier	Detect Flag	Filtered	Lab Method	Method Detection Limit
CTUA	CTUA-19-166193	04/02/2019	Chloride	18.4	mg/L		Y	Y	EPA:300.0	0.335
CTUA	CTUA-19-174565	04/09/2019	Chloride	17.6	mg/L	J+	Y	Y	EPA:300.0	0.335
CTUA	CTUA-19-174566	04/17/2019	Chloride	20.2	mg/L		Y	Y	EPA:300.0	0.335
CTUA	CTUA-19-174567	04/24/2019	Chloride	22.1	mg/L		Y	Y	EPA:300.0	0.335
CTUA	CTUA-19-174568	04/30/2019	Chloride	17.4	mg/L		Y	Y	EPA:300.0	0.335
CTUA	CTUA-19-174569	05/08/2019	Chloride	17.6	mg/L		Y	Y	EPA:300.0	0.335
CTUA	CTUA-19-166193	04/02/2019	Chromium	30	µg/L	U	N	Y	SW-846:6020	30
CTUA	CTUA-19-174565	04/09/2019	Chromium	3	µg/L	U	N	Y	SW-846:6020	3
CTUA	CTUA-19-174566	04/17/2019	Chromium	3	µg/L	U	N	Y	SW-846:6020	3
CTUA	CTUA-19-174567	04/24/2019	Chromium	3	µg/L	U	N	Y	SW-846:6020	3
CTUA	CTUA-19-174568	04/30/2019	Chromium	3	µg/L	U	N	Y	SW-846:6020	3
CTUA	CTUA-19-174569	05/08/2019	Chromium	3	µg/L	U	N	Y	SW-846:6020	3
CTUA	CTUA-19-166193	04/02/2019	Fluoride	0.315	mg/L		Y	Y	EPA:300.0	0.033
CTUA	CTUA-19-174565	04/09/2019	Fluoride	0.239	mg/L		Y	Y	EPA:300.0	0.033
CTUA	CTUA-19-174566	04/17/2019	Fluoride	0.247	mg/L		Y	Y	EPA:300.0	0.033
CTUA	CTUA-19-174567	04/24/2019	Fluoride	0.250	mg/L		Y	Y	EPA:300.0	0.033
CTUA	CTUA-19-174568	04/30/2019	Fluoride	0.243	mg/L		Y	Y	EPA:300.0	0.033
CTUA	CTUA-19-174569	05/08/2019	Fluoride	0.243	mg/L		Y	Y	EPA:300.0	0.033
CTUA	CTUA-19-166193	04/02/2019	Nitrate-Nitrite as Nitrogen	2.73	mg/L		Y	Y	EPA:353.2	0.085
CTUA	CTUA-19-174565	04/09/2019	Nitrate-Nitrite as Nitrogen	2.68	mg/L		Y	Y	EPA:353.2	0.085
CTUA	CTUA-19-174566	04/17/2019	Nitrate-Nitrite as Nitrogen	4.49	mg/L		Y	Y	EPA:353.2	0.085
CTUA	CTUA-19-174567	04/24/2019	Nitrate-Nitrite as Nitrogen	2.93	mg/L		Y	Y	EPA:353.2	0.17
CTUA	CTUA-19-174568	04/30/2019	Nitrate-Nitrite as Nitrogen	2.61	mg/L		Y	Y	EPA:353.2	0.17
CTUA	CTUA-19-174569	05/08/2019	Nitrate-Nitrite as Nitrogen	2.57	mg/L		Y	Y	EPA:353.2	0.17
CTUA	CTUA-19-166193	04/02/2019	Perchlorate	0.391	µg/L		Y	Y	SW-846:6850	0.05

Table 2.2-1 (continued)

Location ID	Sample ID	Sample Date*	Parameter Name	Result	Report Unit	Lab Qualifier	Detect Flag	Filtered	Lab Method	Method Detection Limit
CTUA	CTUA-19-174565	04/09/2019	Perchlorate	0.392	µg/L		Y	Y	SW-846:6850	0.05
CTUA	CTUA-19-174566	04/17/2019	Perchlorate	0.392	µg/L		Y	Y	SW-846:6850	0.05
CTUA	CTUA-19-174567	04/24/2019	Perchlorate	0.718	µg/L		Y	Y	SW-846:6850	0.05
CTUA	CTUA-19-174568	04/30/2019	Perchlorate	0.616	µg/L		Y	Y	SW-846:6850	0.05
CTUA	CTUA-19-174569	05/08/2019	Perchlorate	0.537	µg/L		Y	Y	SW-846:6850	0.05
CTUA	CTUA-19-166193	04/02/2019	Sulfate	25.4	mg/L		Y	Y	EPA:300.0	0.665
CTUA	CTUA-19-174565	04/09/2019	Sulfate	24.6	mg/L		Y	Y	EPA:300.0	0.665
CTUA	CTUA-19-174566	04/17/2019	Sulfate	2.55	mg/L		Y	Y	EPA:300.0	0.133
CTUA	CTUA-19-174567	04/24/2019	Sulfate	30.5	mg/L		Y	Y	EPA:300.0	0.665
CTUA	CTUA-19-174568	04/30/2019	Sulfate	25.0	mg/L		Y	Y	EPA:300.0	0.665
CTUA	CTUA-19-174569	05/08/2019	Sulfate	25.8	mg/L		Y	Y	EPA:300.0	0.665
CTUA	CTUA-19-166193	04/02/2019	Total Dissolved Solids	226	mg/L		Y	Y	EPA:160.1	3.4
CTUA	CTUA-19-174565	04/09/2019	Total Dissolved Solids	193	mg/L		Y	Y	EPA:160.1	3.4
CTUA	CTUA-19-174566	04/17/2019	Total Dissolved Solids	200	mg/L	J+	Y	Y	EPA:160.1	3.4
CTUA	CTUA-19-174567	04/24/2019	Total Dissolved Solids	197	mg/L		Y	Y	EPA:160.1	3.4
CTUA	CTUA-19-174568	04/30/2019	Total Dissolved Solids	223	mg/L	J+	Y	Y	EPA:160.1	3.4
CTUA	CTUA-19-174569	05/08/2019	Total Dissolved Solids	239	mg/L	J+	Y	Y	EPA:160.1	3.4

* In accordance with condition 13 of DP-1835, analysis of the treated effluent from each IX unit is required only once every month for the 2019 Quarter 2 reporting period. Analysis of the treated effluent from each IX unit was not obtained for the month of June. Extraction, treatment, and injection operations were shut down from May 9 to June 30, 2019, to allow for the conversion of CrIN-6 to extraction well CrEX-5 and the installation of associated piping to the treatment system.

Notes:

U in the Lab Qualifier column means analyte is classified as not detected.

J+ in the Lab Qualifier column means that the analyte is considered estimated and biased high because the analyte was detected in the method blank.

Y in the Detect Flag column means the analyte was detected.

N in the Detect Flag column means the analyte was not detected.

Y in the Filtered column means the sample was filtered.

N in the Filtered column means the sample was not filtered.

A blank cell in the Lab Qualifier column indicates the corresponding parameter was detected and no qualifier is applicable to the result.

The pilot scale molasses and sodium dithionite amendment studies continued during 2019 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 (NMED 2017a, NMED 2017b). In accordance with the NMED conditional approvals, iron, manganese, and arsenic sampling in the treated water from extraction wells CrEX-1, CrEX-2, and CrEX-3 was completed, and the results were submitted in the quarterly monitoring reports under DP-1835. These results for 2019 Quarter 2 are provided in Table 2.2-2. 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 9 µg/L, respectively. It should be noted that sample CTUA-19-166193 taken on April 2, 2019, had elevated MDLs of 300 µg/L for iron, 20.0 µg/L for manganese, and 20.0 µg/L for arsenic. These MDLs are 10 times higher than the normal MDLs for these constituents. The sample was prepared with a 10-times dilution factor due to matrix interference and small sample volume. The convention for reporting data is that non-detect concentrations are reported at the MDL. The elevated MDLs, therefore, gave an elevated non-detect concentration that was above the regulatory reporting level for arsenic.

During 2019 Quarter 2, the annual sample for all water contaminants listed in 20.6.2.3103 NMAC and all toxic pollutants defined in 20.6.2.7.T(2) NMAC was not obtained for CTUA. The annual sample is expected to be obtained during 2019 Quarter 4.

2.3 Quarterly Depth-to-Groundwater and Groundwater-Quality Sampling Results (Requirement 3)

Depth-to-groundwater is expressed as the elevation of the groundwater above sea level. Figure 2.3-1 is the groundwater elevation map, and Table 2.3-1 provides the quarterly groundwater elevation measurements. An explanation of how the groundwater elevation map was generated is provided below. Quarterly groundwater analytical results from samples collected during 2019 Quarter 2 for the monitoring wells listed in Condition No. 14 are summarized in Table 2.3-2.

The regional aquifer beneath Los Alamos National Laboratory (LANL or the Laboratory) is a complex hydrogeological system. 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 a more local scale, such as the chromium plume 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) extraction and injection locations (municipal water-supply wells and chromium interim measure extraction/injection wells).

Long-term water-level data, contaminant transport observations (travel times and direction of migration), and calibrated model results are all lines of evidence that suggest that the water table was relatively flat in the area of the chromium plume before the implementation of CrEX extraction and CrIN injection wells. Steeper gradients are found to the west because of the mountain-front recharge and to the east towards the Rio Grande. The low ambient gradient in the chromium plume 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 towards the east-southeast.

Table 2.2-2
Treated Effluent Analytical Results Summary Table Related to Molasses and Sodium Dithionite Pilot Studies Under NMED Conditional Approval – 2019 Quarter 2, DP-1835

Location ID	Sample ID	Sample Date*	Parameter Name	Result	Report Unit	Lab Qualifier	Detect Flag	Filtered	Lab Method	Method Detection Limit
CTUA	CTUA-19-166193	04/02/2019	Arsenic	20.0	µg/L	U	N	Y	SW-846:6020	20.0
CTUA	CTUA-19-174565	04/09/2019	Arsenic	3.48	µg/L	J	Y	Y	SW-846:6020	2
CTUA	CTUA-19-174566	04/17/2019	Arsenic	2.00	µg/L	U	N	Y	SW-846:6020	2
CTUA	CTUA-19-174567	04/24/2019	Arsenic	3.38	µg/L	J	Y	Y	SW-846:6020	2
CTUA	CTUA-19-174568	04/30/2019	Arsenic	3.37	µg/L	J	Y	Y	SW-846:6020	2
CTUA	CTUA-19-174569	05/08/2019	Arsenic	2.52	µg/L	J	Y	Y	SW-846:6020	2
CTUA	CTUA-19-166193	04/02/2019	Iron	300	µg/L	U	N	Y	SW-846:6010C	300
CTUA	CTUA-19-174565	04/09/2019	Iron	30	µg/L	U	N	Y	SW-846:6010C	30
CTUA	CTUA-19-174566	04/17/2019	Iron	30	µg/L	U	N	Y	SW-846:6010C	30
CTUA	CTUA-19-174567	04/24/2019	Iron	30	µg/L	U	N	Y	SW-846:6010C	30
CTUA	CTUA-19-174568	04/30/2019	Iron	30	µg/L	U	N	Y	SW-846:6010C	30
CTUA	CTUA-19-174569	05/08/2019	Iron	30	µg/L	U	N	Y	SW-846:6010C	30
CTUA	CTUA-19-166193	04/02/2019	Manganese	20	µg/L	U	N	Y	SW-846:6010C	20
CTUA	CTUA-19-174565	04/09/2019	Manganese	2	µg/L	U	N	Y	SW-846:6010C	2
CTUA	CTUA-19-174566	04/17/2019	Manganese	2	µg/L	U	N	Y	SW-846:6010C	2
CTUA	CTUA-19-174567	04/24/2019	Manganese	5.52	µg/L	J	Y	Y	SW-846:6010C	2
CTUA	CTUA-19-174568	04/30/2019	Manganese	2	µg/L	U	N	Y	SW-846:6010C	2
CTUA	CTUA-19-174569	05/08/2019	Manganese	2	µg/L	U	N	Y	SW-846:6010C	2

* In accordance with condition 13 of DP-1835, analysis of the treated effluent from each IX unit is required only once every month for the 2019 Quarter 2 reporting period. Analysis of the treated effluent from each IX unit was not obtained for the month of June. Extraction, treatment, and injection operations were shut down from May 9 to June 30, 2019 to allow for the conversion of CrIN-6 to extraction well CrEX-5 and the installation of associated piping to the treatment system.

Notes:

U in the Lab Qualifier column means analyte is classified as not detected.

J in the Lab Qualifier column means the analyte is classified as estimated.

Y in the Detect Flag column means the analyte was detected.

N in the Detect Flag column means the analyte was not detected.

Y in the Filtered column means the sample was filtered.

N in the Filtered column means the sample was not filtered.

A blank cell in the Lab Qualifier column indicates the corresponding parameter was detected and no qualifier is applicable to the result.

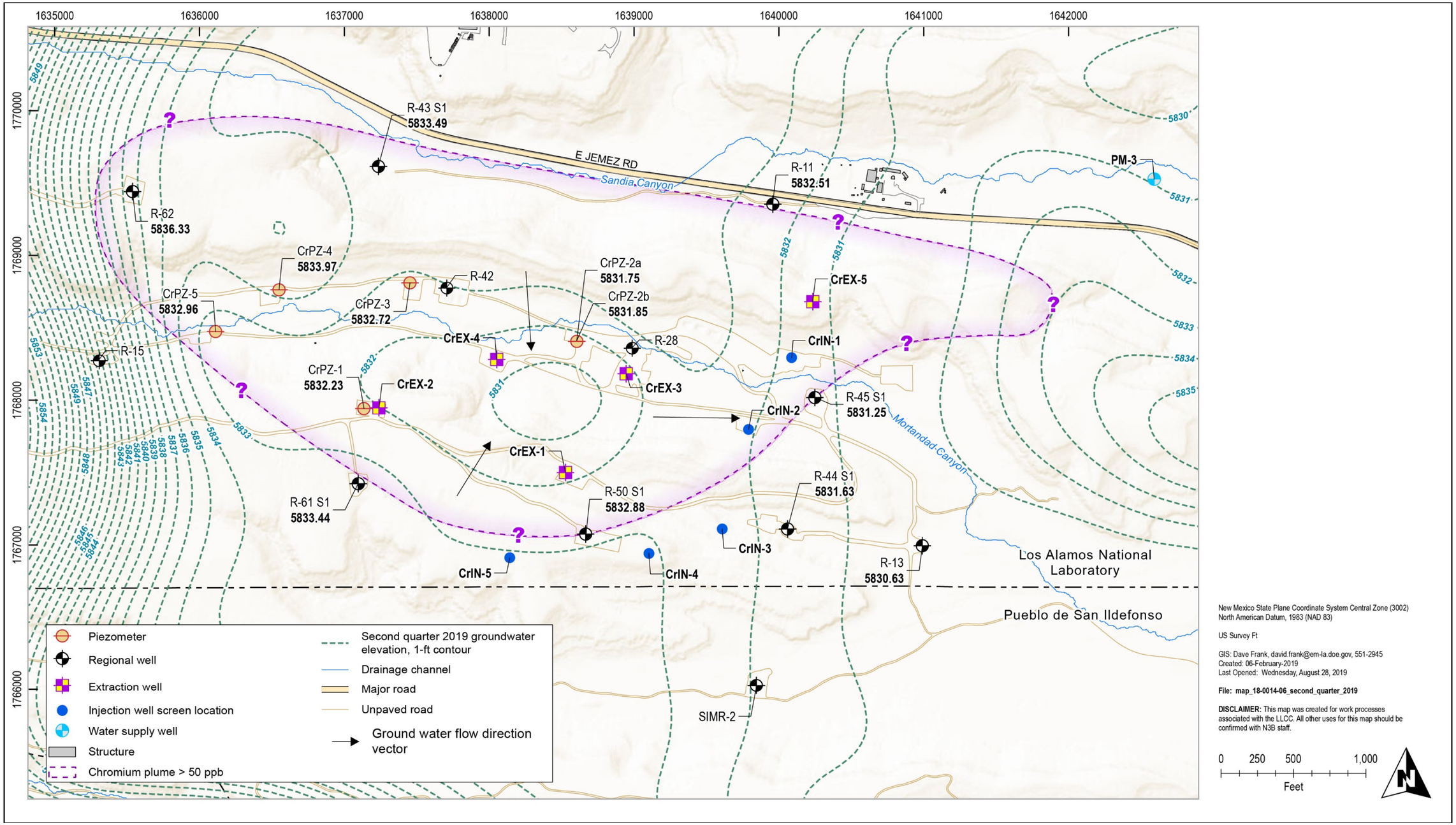

Figure 2.3-1 Groundwater elevation contour map – 2019 Quarter 2, DP-1835

Table 2.3-1
Groundwater Elevations Summary
for Groundwater Monitoring Wells – 2019 Quarter 2

Monitoring Well	Groundwater Elevation[a] (ft)
CrPZ-1 (CrCH-1)	5832.23
CrPZ-2a (CrCH-2a)	5831.75
CrPZ-2b (CrCH-2b)	5831.85
CrPZ-3 (CrCH-3)	5832.72
CrPZ-4 (CrCH-4)	5833.97
CrPZ-5 (CrCH-5)	5832.96
R-11	5832.51
R-13	5830.63
R-43 S1[b]	5833.49
R-43 S2[c]	5832.82
R-44 S1	5831.63
R-44 S2	5831.13
R-45 S1	5831.25
R-45 S2	5831.09
R-50 S1	5832.88
R-50 S2	5832.41
R-61 S1	5833.44
R-61 S2	5833.46
R-62	5836.33
SIMR-2[d]	5832.05

[a] Groundwater elevations provided are based on average May 2019 values from transducers.

[b] S1 = Screen 1.

[c] S2 = Screen 2.

[d] First quarter average February 2019 SIMR-2 data are reported here in accordance with the DP-1835 2019 Quarter 1 report (N3B 2019). Data were unavailable at the time of that report's preparation in accordance with the memorandum of agreement between San Ildefonso Pueblo and DOE. Data from the current quarter are not available at this time and will be presented in the next quarterly report.

Table 2.3-2
Groundwater Monitoring Wells Analytical Results Summary Table – 2019 Quarter 2, DP-1835

Field Sample ID	Location ID	Sample Date	Parameter Name	Report Result	Report Unit	Lab Qualifier	Detect Flag	Filtered	Lab Method	Method Detection Limit
CASA-19-174796	R-11	4/17/2019	Chloride	3.9	mg/L		Y	Y	EPA:300.0	0.067
CASA-19-174796	R-11	4/17/2019	Perchlorate	0.776	µg/L		Y	Y	SW-846:6850	0.050
CASA-19-174796	R-11	4/17/2019	Chromium	9.62	µg/L	J	Y	Y	SW-846:6020	3.00
CASA-19-174796	R-11	4/17/2019	Fluoride	0.37	mg/L		Y	Y	EPA:300.0	0.033
CASA-19-174796	R-11	4/17/2019	Nitrate-Nitrite as Nitrogen	6.41	mg/L		Y	Y	EPA:353.2	0.170
CASA-19-174796	R-11	4/17/2019	Sulfate	10.3	mg/L		Y	Y	EPA:300.0	0.133
CASA-19-174796	R-11	4/17/2019	Total Dissolved Solids	219	mg/L	J+	Y	Y	EPA:160.1	3.40
CASA-19-175182	R-11	5/17/2019	Chloride	3.89	mg/L		Y	Y	EPA:300.0	0.067
CASA-19-175182	R-11	5/17/2019	Perchlorate	0.768	µg/L		Y	Y	SW-846:6850	0.050
CASA-19-175182	R-11	5/17/2019	Chromium	9.81	µg/L	J	Y	Y	SW-846:6020	3.00
CASA-19-175182	R-11	5/17/2019	Fluoride	0.436	mg/L		Y	Y	EPA:300.0	0.033
CASA-19-175182	R-11	5/17/2019	Nitrate-Nitrite as Nitrogen	5.6	mg/L		Y	Y	EPA:353.2	0.170
CASA-19-175182	R-11	5/17/2019	Sulfate	10.1	mg/L		Y	Y	EPA:300.0	0.133
CASA-19-175182	R-11	5/17/2019	Total Dissolved Solids	299	mg/L		Y	Y	EPA:160.1	3.40
CASA-19-181661	R-11	6/14/2019	Chloride	3.72	mg/L		Y	Y	EPA:300.0	0.067
CASA-19-181661	R-11	6/14/2019	Perchlorate	0.752	µg/L		Y	Y	SW-846:6850	0.050
CASA-19-181661	R-11	6/14/2019	Chromium	7.91	µg/L	J	Y	Y	SW-846:6020	3.00
CASA-19-181661	R-11	6/14/2019	Fluoride	0.443	mg/L		Y	Y	EPA:300.0	0.033
CASA-19-181661	R-11	6/14/2019	Nitrate-Nitrite as Nitrogen	5.71	mg/L		Y	Y	EPA:353.2	0.170
CASA-19-181661	R-11	6/14/2019	Sulfate	10.1	mg/L		Y	Y	EPA:300.0	0.133
CASA-19-181661	R-11	6/14/2019	Total Dissolved Solids	163	mg/L		Y	Y	EPA:160.1	3.40
CAMO-19-175138	R-13	5/09/2019	Chloride	2.58	mg/L		Y	Y	EPA:300.0	0.067
CAMO-19-175138	R-13	5/09/2019	Perchlorate	0.42	µg/L		Y	Y	SW-846:6850	0.050
CAMO-19-175138	R-13	5/09/2019	Chromium	4.02	µg/L	J	Y	Y	SW-846:6020	3.00

Table 2.3-2 (continued)

Field Sample ID	Location ID	Sample Date	Parameter Name	Report Result	Report Unit	Lab Qualifier	Detect Flag	Filtered	Lab Method	Method Detection Limit
CAMO-19-175138	R-13	5/09/2019	Fluoride	0.463	mg/L		Y	Y	EPA:300.0	0.033
CAMO-19-175138	R-13	5/09/2019	Nitrate-Nitrite as Nitrogen	0.76	mg/L		Y	Y	EPA:353.2	0.017
CAMO-19-175138	R-13	5/09/2019	Sulfate	3.38	mg/L		Y	Y	EPA:300.0	0.133
CAMO-19-175138	R-13	5/09/2019	Total Dissolved Solids	103	mg/L		Y	Y	EPA:160.1	3.40
CASA-19-175195	R-43 S1[a]	5/10/2019	Chloride	9.03	mg/L		Y	Y	EPA:300.0	0.067
CASA-19-175195	R-43 S1	5/10/2019	Perchlorate	0.856	µg/L		Y	Y	SW-846:6850	0.050
CASA-19-175195	R-43 S1	5/10/2019	Chromium	197	µg/L		Y	Y	SW-846:6020	3.00
CASA-19-175195	R-43 S1	5/10/2019	Fluoride	0.475	mg/L		Y	Y	EPA:300.0	0.033
CASA-19-175195	R-43 S1	5/10/2019	Nitrate-Nitrite as Nitrogen	5.09	mg/L		Y	Y	EPA:353.2	0.170
CASA-19-175195	R-43 S1	5/10/2019	Sulfate	18.5	mg/L		Y	Y	EPA:300.0	0.133
CASA-19-175195	R-43 S1	5/10/2019	Total Dissolved Solids	193	mg/L		Y	Y	EPA:160.1	3.40
CASA-19-175197	R-43 S2[b]	5/16/2019	Chloride	6.47	mg/L		Y	Y	EPA:300.0	0.067
CASA-19-175197	R-43 S2	5/16/2019	Perchlorate	0.953	µg/L		Y	Y	SW-846:6850	0.050
CASA-19-175197	R-43 S2	5/16/2019	Chromium	29.6	µg/L		Y	Y	SW-846:6020	3.00
CASA-19-175197	R-43 S2	5/16/2019	Fluoride	0.376	mg/L		Y	Y	EPA:300.0	0.033
CASA-19-175197	R-43 S2	5/16/2019	Nitrate-Nitrite as Nitrogen	3.9	mg/L		Y	Y	EPA:353.2	0.170
CASA-19-175197	R-43 S2	5/16/2019	Sulfate	9.53	mg/L		Y	Y	EPA:300.0	0.133
CASA-19-175197	R-43 S2	5/16/2019	Total Dissolved Solids	184	mg/L		Y	Y	EPA:160.1	3.40
CAMO-19-174813	R-44 S1	4/30/2019	Chloride	18.2	mg/L		Y	Y	EPA:300.0	0.335
CAMO-19-174813	R-44 S1	4/30/2019	Perchlorate	0.362	µg/L		Y	Y	SW-846:6850	0.050
CAMO-19-174813	R-44 S1	4/30/2019	Chromium	6.66	µg/L	J	Y	Y	SW-846:6020	3.00
CAMO-19-174813	R-44 S1	4/30/2019	Fluoride	0.32	mg/L		Y	Y	EPA:300.0	0.033
CAMO-19-174813	R-44 S1	4/30/2019	Nitrate-Nitrite as Nitrogen	2.32	mg/L		Y	Y	EPA:353.2	0.170
CAMO-19-174813	R-44 S1	4/30/2019	Sulfate	18.9	mg/L		Y	Y	EPA:300.0	0.133
CAMO-19-174813	R-44 S1	4/30/2019	Total Dissolved Solids	157	mg/L		Y	Y	EPA:160.1	3.40
CAMO-19-175148	R-44 S1	5/15/2019	Chloride	16.3	mg/L		Y	Y	EPA:300.0	0.335

Table 2.3-2 (continued)

Field Sample ID	Location ID	Sample Date	Parameter Name	Report Result	Report Unit	Lab Qualifier	Detect Flag	Filtered	Lab Method	Method Detection Limit
CAMO-19-175148	R-44 S1	5/15/2019	Perchlorate	0.355	µg/L	J-	Y	Y	SW-846:6850	0.050
CAMO-19-175148	R-44 S1	5/15/2019	Chromium	6.79	µg/L	J	Y	Y	SW-846:6020	3.00
CAMO-19-175148	R-44 S1	5/15/2019	Fluoride	0.268	mg/L		Y	Y	EPA:300.0	0.033
CAMO-19-175148	R-44 S1	5/15/2019	Nitrate-Nitrite as Nitrogen	2.46	mg/L		Y	Y	EPA:353.2	0.085
CAMO-19-175148	R-44 S1	5/15/2019	Sulfate	17	mg/L		Y	Y	EPA:300.0	0.133
CAMO-19-175148	R-44 S1	5/15/2019	Total Dissolved Solids	231	mg/L		Y	Y	EPA:160.1	3.40
CAMO-19-181675	R-44 S1	6/18/2019	Chloride	17.6	mg/L		Y	Y	EPA:300.0	0.335
CAMO-19-181675	R-44 S1	6/18/2019	Perchlorate	0.378	µg/L		Y	Y	SW-846:6850	0.050
CAMO-19-181675	R-44 S1	6/18/2019	Chromium	6.36	µg/L	J	Y	Y	SW-846:6020	3.00
CAMO-19-181675	R-44 S1	6/18/2019	Fluoride	0.235	mg/L		Y	Y	EPA:300.0	0.033
CAMO-19-181675	R-44 S1	6/18/2019	Nitrate-Nitrite as Nitrogen	2.57	mg/L		Y	Y	EPA:353.2	0.085
CAMO-19-181675	R-44 S1	6/18/2019	Sulfate	17.7	mg/L		Y	Y	EPA:300.0	0.133
CAMO-19-181675	R-44 S1	6/18/2019	Total Dissolved Solids	217	mg/L		Y	Y	EPA:160.1	3.40
CAMO-19-174819	R-44 S2	4/30/2019	Chloride	2.03	mg/L		Y	Y	EPA:300.0	0.067
CAMO-19-174819	R-44 S2	4/30/2019	Perchlorate	0.325	µg/L		Y	Y	SW-846:6850	0.050
CAMO-19-174819	R-44 S2	4/30/2019	Chromium	5.15	µg/L	J	Y	Y	SW-846:6020	3.00
CAMO-19-174819	R-44 S2	4/30/2019	Fluoride	0.328	mg/L		Y	Y	EPA:300.0	0.033
CAMO-19-174819	R-44 S2	4/30/2019	Nitrate-Nitrite as Nitrogen	0.626	mg/L		Y	Y	EPA:353.2	0.017
CAMO-19-174819	R-44 S2	4/30/2019	Sulfate	2.61	mg/L		Y	Y	EPA:300.0	0.133
CAMO-19-174819	R-44 S2	4/30/2019	Total Dissolved Solids	114	mg/L		Y	Y	EPA:160.1	3.40
CAMO-19-175152	R-44 S2	5/15/2019	Chloride	2.04	mg/L		Y	Y	EPA:300.0	0.067
CAMO-19-175152	R-44 S2	5/15/2019	Perchlorate	0.332	µg/L	J-	Y	Y	SW-846:6850	0.050
CAMO-19-175152	R-44 S2	5/15/2019	Chromium	5.41	µg/L	J	Y	Y	SW-846:6020	3.00
CAMO-19-175152	R-44 S2	5/15/2019	Fluoride	0.416	mg/L		Y	Y	EPA:300.0	0.033
CAMO-19-175152	R-44 S2	5/15/2019	Nitrate-Nitrite as Nitrogen	0.644	mg/L		Y	Y	EPA:353.2	0.017
CAMO-19-175152	R-44 S2	5/15/2019	Sulfate	2.36	mg/L		Y	Y	EPA:300.0	0.133

Table 2.3-2 (continued)

Field Sample ID	Location ID	Sample Date	Parameter Name	Report Result	Report Unit	Lab Qualifier	Detect Flag	Filtered	Lab Method	Method Detection Limit
CAMO-19-175152	R-44 S2	5/15/2019	Total Dissolved Solids	274	mg/L		Y	Y	EPA:160.1	3.40
CAMO-19-181678	R-44 S2	6/18/2019	Chloride	2.08	mg/L		Y	Y	EPA:300.0	0.067
CAMO-19-181678	R-44 S2	6/18/2019	Perchlorate	0.366	µg/L		Y	Y	SW-846:6850	0.050
CAMO-19-181678	R-44 S2	6/18/2019	Chromium	5.45	µg/L	J	Y	Y	SW-846:6020	3.00
CAMO-19-181678	R-44 S2	6/18/2019	Fluoride	0.391	mg/L		Y	Y	EPA:300.0	0.033
CAMO-19-181678	R-44 S2	6/18/2019	Nitrate-Nitrite as Nitrogen	0.634	mg/L		Y	Y	EPA:353.2	0.017
CAMO-19-181678	R-44 S2	6/18/2019	Sulfate	2.34	mg/L		Y	Y	EPA:300.0	0.133
CAMO-19-181678	R-44 S2	6/18/2019	Total Dissolved Solids	109	mg/L		Y	Y	EPA:160.1	3.40
CAMO-19-174822	R-45 S1	4/26/2019	Chloride	5.1	mg/L		Y	Y	EPA:300.0	0.067
CAMO-19-174822	R-45 S1	4/26/2019	Perchlorate	0.55	µg/L		Y	Y	SW-846:6850	0.050
CAMO-19-174822	R-45 S1	4/26/2019	Chromium	30.7	µg/L		Y	Y	SW-846:6020	3.00
CAMO-19-174822	R-45 S1	4/26/2019	Fluoride	0.491	mg/L		Y	Y	EPA:300.0	0.033
CAMO-19-174822	R-45 S1	4/26/2019	Nitrate-Nitrite as Nitrogen	2.57	mg/L		Y	Y	EPA:353.2	0.170
CAMO-19-174822	R-45 S1	4/26/2019	Sulfate	7.68	mg/L		Y	Y	EPA:300.0	0.133
CAMO-19-174822	R-45 S1	4/26/2019	Total Dissolved Solids	141	mg/L		Y	Y	EPA:160.1	3.40
CAMO-19-175155	R-45 S1	5/15/2019	Chloride	4.48	mg/L		Y	Y	EPA:300.0	0.067
CAMO-19-175155	R-45 S1	5/15/2019	Perchlorate	0.54	µg/L	J-	Y	Y	SW-846:6850	0.050
CAMO-19-175155	R-45 S1	5/15/2019	Chromium	30	µg/L		Y	Y	SW-846:6020	3.00
CAMO-19-175155	R-45 S1	5/15/2019	Fluoride	0.386	mg/L		Y	Y	EPA:300.0	0.033
CAMO-19-175155	R-45 S1	5/15/2019	Nitrate-Nitrite as Nitrogen	2.62	mg/L		Y	Y	EPA:353.2	0.085
CAMO-19-175155	R-45 S1	5/15/2019	Sulfate	6.7	mg/L		Y	Y	EPA:300.0	0.133
CAMO-19-175155	R-45 S1	5/15/2019	Total Dissolved Solids	214	mg/L		Y	Y	EPA:160.1	3.40
CAMO-19-181681	R-45 S1	6/13/2019	Chloride	4.59	mg/L		Y	Y	EPA:300.0	0.067
CAMO-19-181681	R-45 S1	6/13/2019	Perchlorate	0.61	µg/L		Y	Y	SW-846:6850	0.050
CAMO-19-181681	R-45 S1	6/13/2019	Chromium	35.4	µg/L		Y	Y	SW-846:6020	3.00
CAMO-19-181681	R-45 S1	6/13/2019	Fluoride	0.378	mg/L		Y	Y	EPA:300.0	0.033

Table 2.3-2 (continued)

Field Sample ID	Location ID	Sample Date	Parameter Name	Report Result	Report Unit	Lab Qualifier	Detect Flag	Filtered	Lab Method	Method Detection Limit
CAMO-19-181681	R-45 S1	6/13/2019	Nitrate-Nitrite as Nitrogen	2.78	mg/L		Y	Y	EPA:353.2	0.085
CAMO-19-181681	R-45 S1	6/13/2019	Sulfate	6.84	mg/L		Y	Y	EPA:300.0	0.133
CAMO-19-181681	R-45 S1	6/13/2019	Total Dissolved Solids	183	mg/L		Y	Y	EPA:160.1	3.40
CAMO-19-174825	R-45 S2	4/26/2019	Chloride	5.25	mg/L		Y	Y	EPA:300.0	0.067
CAMO-19-174825	R-45 S2	4/26/2019	Perchlorate	0.439	µg/L		Y	Y	SW-846:6850	0.050
CAMO-19-174825	R-45 S2	4/26/2019	Chromium	28.2	µg/L		Y	Y	SW-846:6020	3.00
CAMO-19-174825	R-45 S2	4/26/2019	Fluoride	0.56	mg/L		Y	Y	EPA:300.0	0.033
CAMO-19-174825	R-45 S2	4/26/2019	Nitrate-Nitrite as Nitrogen	0.95	mg/L		Y	Y	EPA:353.2	0.085
CAMO-19-174825	R-45 S2	4/26/2019	Sulfate	6.24	mg/L		Y	Y	EPA:300.0	0.133
CAMO-19-174825	R-45 S2	4/26/2019	Total Dissolved Solids	189	mg/L		Y	Y	EPA:160.1	3.40
CAMO-19-175162	R-45 S2	5/15/2019	Chloride	4.57	mg/L		Y	Y	EPA:300.0	0.067
CAMO-19-175162	R-45 S2	5/15/2019	Perchlorate	0.421	µg/L	J-	Y	Y	SW-846:6850	0.050
CAMO-19-175162	R-45 S2	5/15/2019	Chromium	29	µg/L		Y	Y	SW-846:6020	3.00
CAMO-19-175162	R-45 S2	5/15/2019	Fluoride	0.452	mg/L		Y	Y	EPA:300.0	0.033
CAMO-19-175162	R-45 S2	5/15/2019	Nitrate-Nitrite as Nitrogen	0.955	mg/L		Y	Y	EPA:353.2	0.017
CAMO-19-175162	R-45 S2	5/15/2019	Sulfate	5.39	mg/L		Y	Y	EPA:300.0	0.133
CAMO-19-175162	R-45 S2	5/15/2019	Total Dissolved Solids	197	mg/L		Y	Y	EPA:160.1	3.40
CAMO-19-181688	R-45 S2	6/13/2019	Chloride	4.76	mg/L		Y	Y	EPA:300.0	0.067
CAMO-19-181688	R-45 S2	6/13/2019	Perchlorate	0.497	µg/L		Y	Y	SW-846:6850	0.050
CAMO-19-181688	R-45 S2	6/13/2019	Chromium	31.3	µg/L		Y	Y	SW-846:6020	3.00
CAMO-19-181688	R-45 S2	6/13/2019	Fluoride	0.433	mg/L		Y	Y	EPA:300.0	0.033
CAMO-19-181688	R-45 S2	6/13/2019	Nitrate-Nitrite as Nitrogen	1.17	mg/L		Y	Y	EPA:353.2	0.085
CAMO-19-181688	R-45 S2	6/13/2019	Sulfate	5.62	mg/L		Y	Y	EPA:300.0	0.133
CAMO-19-181688	R-45 S2	6/13/2019	Total Dissolved Solids	123	mg/L		Y	Y	EPA:160.1	3.40
CAMO-19-174828	R-50 S1	4/29/2019	Chloride	18.3	mg/L		Y	Y	EPA:300.0	0.335
CAMO-19-174828	R-50 S1	4/29/2019	Perchlorate	0.403	µg/L		Y	Y	SW-846:6850	0.050

Table 2.3-2 (continued)

Field Sample ID	Location ID	Sample Date	Parameter Name	Report Result	Report Unit	Lab Qualifier	Detect Flag	Filtered	Lab Method	Method Detection Limit
CAMO-19-174828	R-50 S1	4/29/2019	Chromium	52.6	µg/L		Y	Y	SW-846:6020	3.00
CAMO-19-174828	R-50 S1	4/29/2019	Fluoride	0.348	mg/L		Y	Y	EPA:300.0	0.033
CAMO-19-174828	R-50 S1	4/29/2019	Nitrate-Nitrite as Nitrogen	2.46	mg/L		Y	Y	EPA:353.2	0.170
CAMO-19-174828	R-50 S1	4/29/2019	Sulfate	19.6	mg/L		Y	Y	EPA:300.0	0.665
CAMO-19-174828	R-50 S1	4/29/2019	Total Dissolved Solids	167	mg/L	J+	Y	Y	EPA:160.1	3.40
CAMO-19-175165	R-50 S1	5/09/2019	Chloride	17.2	mg/L		Y	Y	EPA:300.0	0.335
CAMO-19-175165	R-50 S1	5/09/2019	Perchlorate	0.364	µg/L		Y	Y	SW-846:6850	0.050
CAMO-19-175165	R-50 S1	5/09/2019	Chromium	51.2	µg/L		Y	Y	SW-846:6020	3.00
CAMO-19-175165	R-50 S1	5/09/2019	Fluoride	0.369	mg/L		Y	Y	EPA:300.0	0.033
CAMO-19-175165	R-50 S1	5/09/2019	Nitrate-Nitrite as Nitrogen	2.49	mg/L		Y	Y	EPA:353.2	0.085
CAMO-19-175165	R-50 S1	5/09/2019	Sulfate	18.4	mg/L		Y	Y	EPA:300.0	0.665
CAMO-19-175165	R-50 S1	5/09/2019	Total Dissolved Solids	194	mg/L		Y	Y	EPA:160.1	3.40
CAMO-19-181691	R-50 S1	6/17/2019	Chloride	17.9	mg/L	J-	Y	Y	EPA:300.0	0.335
CAMO-19-181691	R-50 S1	6/17/2019	Perchlorate	0.436	µg/L		Y	Y	SW-846:6850	0.050
CAMO-19-181691	R-50 S1	6/17/2019	Chromium	44.9	µg/L		Y	Y	SW-846:6020	3.00
CAMO-19-181691	R-50 S1	6/17/2019	Fluoride	0.342	mg/L		Y	Y	EPA:300.0	0.033
CAMO-19-181691	R-50 S1	6/17/2019	Nitrate-Nitrite as Nitrogen	2.56	mg/L		Y	Y	EPA:353.2	0.085
CAMO-19-181691	R-50 S1	6/17/2019	Sulfate	19.1	mg/L	J-	Y	Y	EPA:300.0	0.665
CAMO-19-181691	R-50 S1	6/17/2019	Total Dissolved Solids	176	mg/L		Y	Y	EPA:160.1	3.40
CAMO-19-174831	R-50 S2	4/22/2019	Chloride	2.14	mg/L		Y	Y	EPA:300.0	0.067
CAMO-19-174831	R-50 S2	4/22/2019	Perchlorate	0.347	µg/L		Y	Y	SW-846:6850	0.050
CAMO-19-174831	R-50 S2	4/22/2019	Chromium	4.04	µg/L	J	Y	Y	SW-846:6020	3.00
CAMO-19-174831	R-50 S2	4/22/2019	Fluoride	0.371	mg/L		Y	Y	EPA:300.0	0.033
CAMO-19-174831	R-50 S2	4/22/2019	Nitrate-Nitrite as Nitrogen	0.572	mg/L		Y	Y	EPA:353.2	0.017
CAMO-19-174831	R-50 S2	4/22/2019	Sulfate	2.64	mg/L		Y	Y	EPA:300.0	0.133
CAMO-19-174831	R-50 S2	4/22/2019	Total Dissolved Solids	98.6	mg/L		Y	Y	EPA:160.1	3.40

Table 2.3-2 (continued)

Field Sample ID	Location ID	Sample Date	Parameter Name	Report Result	Report Unit	Lab Qualifier	Detect Flag	Filtered	Lab Method	Method Detection Limit
CAMO-19175168	R-50 S2	5/14/2019	Chloride	2.08	mg/L		Y	Y	EPA:300.0	0.067
CAMO-19175168	R-50 S2	5/14/2019	Perchlorate	0.342	µg/L		Y	Y	SW-846:6850	0.050
CAMO-19175168	R-50 S2	5/14/2019	Chromium	3.96	µg/L	J	Y	Y	SW-846:6020	3.00
CAMO-19175168	R-50 S2	5/14/2019	Fluoride	0.445	mg/L		Y	Y	EPA:300.0	0.033
CAMO-19175168	R-50 S2	5/14/2019	Nitrate-Nitrite as Nitrogen	0.548	mg/L		Y	Y	EPA:353.2	0.017
CAMO-19175168	R-50 S2	5/14/2019	Sulfate	2.45	mg/L		Y	Y	EPA:300.0	0.133
CAMO-19175168	R-50 S2	5/14/2019	Total Dissolved Solids	216	mg/L		Y	Y	EPA:160.1	3.40
CAMO-19-181694	R-50 S2	6/11/2019	Chloride	2.12	mg/L		Y	Y	EPA:300.0	0.067
CAMO-19-181694	R-50 S2	6/11/2019	Perchlorate	0.334	µg/L		Y	Y	SW-846:6850	0.050
CAMO-19-181694	R-50 S2	6/11/2019	Chromium	4.43	µg/L		Y	Y	SW-846:6020	3.00
CAMO-19-181694	R-50 S2	6/11/2019	Fluoride	0.605	mg/L		Y	Y	EPA:300.0	0.033
CAMO-19-181694	R-50 S2	6/11/2019	Nitrate-Nitrite as Nitrogen	0.532	mg/L		Y	Y	EPA:353.2	0.017
CAMO-19-181694	R-50 S2	6/11/2019	Sulfate	2.49	mg/L		Y	Y	EPA:300.0	0.133
CAMO-19-181694	R-50 S2	6/11/2019	Total Dissolved Solids	184	mg/L		Y	Y	EPA:160.1	3.40
CAMO-19-175173	R-62	5/14/2019	Chloride	18.8	mg/L	J-	Y	Y	EPA:300.0	0.335
CAMO-19-175173	R-62	5/14/2019	Perchlorate	0.871	µg/L		Y	Y	SW-846:6850	0.050
CAMO-19-175173	R-62	5/14/2019	Chromium	284	µg/L		Y	Y	SW-846:6020	3.00
CAMO-19-175173	R-62	5/14/2019	Fluoride	0.197	mg/L		Y	Y	EPA:300.0	0.033
CAMO-19-175173	R-62	5/14/2019	Nitrate-Nitrite as Nitrogen	2.25	mg/L		Y	Y	EPA:353.2	0.085
CAMO-19-175173	R-62	5/14/2019	Sulfate	33	mg/L	J-	Y	Y	EPA:300.0	0.665
CAMO-19-175173	R-62	5/14/2019	Total Dissolved Solids	271	mg/L		Y	Y	EPA:160.1	3.40
CAMO-19-165994	SIMR-2	1/17/2019	Chloride	2.11	mg/L		Y	Y	EPA:300.0	0.067
CAMO-19-165994	SIMR-2	1/17/2019	Perchlorate	0.477	µg/L		Y	Y	SW-846:6850	0.050
CAMO-19-165994	SIMR-2	1/17/2019	Chromium	5.05	µg/L	J	Y	Y	SW-846:6020	3.00
CAMO-19-165994	SIMR-2	1/17/2019	Fluoride	0.281	mg/L		Y	Y	EPA:300.0	0.033
CAMO-19-165994	SIMR-2	1/17/2019	Nitrate-Nitrite as Nitrogen	0.672	mg/L		Y	Y	EPA:353.2	0.017

Table 2.3-2 (continued)

Field Sample ID	Location ID	Sample Date	Parameter Name	Report Result	Report Unit	Lab Qualifier	Detect Flag	Filtered	Lab Method	Method Detection Limit
CAMO-19-165994	SIMR-2	1/17/2019	Sulfate	2.61	mg/L		Y	Y	EPA:300.0	0.133
CAMO-19-165994	SIMR-2	1/17/2019	Total Dissolved Solids	77.1	mg/L		Y	Y	EPA:160.1	3.40
CAMO-19-166469	SIMR-2	2/14/2019	Chloride	2.11	mg/L		Y	Y	EPA:300.0	0.067
CAMO-19-166469	SIMR-2	2/14/2019	Perchlorate	0.413	µg/L		Y	Y	SW-846:6850	0.050
CAMO-19-166469	SIMR-2	2/14/2019	Chromium	4.71	µg/L	J	Y	Y	SW-846:6020	3.00
CAMO-19-166469	SIMR-2	2/14/2019	Fluoride	0.26	mg/L		Y	Y	EPA:300.0	0.033
CAMO-19-166469	SIMR-2	2/14/2019	Nitrate-Nitrite as Nitrogen	0.714	mg/L		Y	Y	EPA:353.2	0.017
CAMO-19-166469	SIMR-2	2/14/2019	Sulfate	2.71	mg/L		Y	Y	EPA:300.0	0.133
CAMO-19-166469	SIMR-2	2/14/2019	Total Dissolved Solids	109	mg/L		Y	Y	EPA:160.1	3.40
CAMO-19-167716	SIMR-2	3/21/2019	Chloride	2.1	mg/L		Y	Y	EPA:300.0	0.067
CAMO-19-167716	SIMR-2	3/21/2019	Perchlorate	0.4	µg/L		Y	Y	SW-846:6850	0.050
CAMO-19-167716	SIMR-2	3/21/2019	Chromium	5.61	µg/L	J	Y	Y	SW-846:6020	3.00
CAMO-19-167716	SIMR-2	3/21/2019	Fluoride	0.181	mg/L		Y	Y	EPA:300.0	0.033
CAMO-19-167716	SIMR-2	3/21/2019	Nitrate-Nitrite as Nitrogen	0.719	mg/L		Y	Y	EPA:353.2	0.017
CAMO-19-167716	SIMR-2	3/21/2019	Sulfate	2.73	mg/L		Y	Y	EPA:300.0	0.133
CAMO-19-167716	SIMR-2	3/21/2019	Total Dissolved Solids	98.6	mg/L		Y	Y	EPA:160.1	3.40

Notes:

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

J in the Lab Qualifier column means the analyte is classified as estimated.

J+ in the Lab Qualifier column means that the analyte is considered estimated and biased high because the analyte was detected in the method blank.

J- in the Lab Qualifier column means that the analyte is considered estimated and biased low.

Y in the Detect Flag column means the analyte was detected.

N in the Detect Flag column means the analyte was not detected.

Y in the Filtered column means the sample was filtered.

N in the Filtered column means the sample was not filtered.

A blank cell under the Lab Qualifier column indicates the corresponding parameter was detected and no qualifier is applicable to the result.

[a] S1 = Screen 1.

[b] S2 = Screen 2.

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. This is discussed for the case of 2019 Quarter 2 below.

Effects on flow direction from water-supply pumping are small compared with the local effects caused by extraction and injection at chromium interim measure 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-2, PM-3, PM-4, PM-5, 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 contour maps are variable over time; therefore, each map is representative of specific periods of time. Figure 2.3-1 depicts the average water-level data and water table contour map for May 2019. General flow direction is indicated by vectors on Figure 2.3-1.

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 (i.e., R-21, R-31, R-32, R-37, and R-40). Water levels in wells surrounding the plume 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. At locations with a history of water-level data but with no data for the present quarter, values can be estimated using linear regression based on relationships with other nearby wells. For 2019 Quarter 2, the well levels data set was complete and therefore imputation was not required for any well.

During this reporting period, transient groundwater elevation changes were observed because of injection and extraction at the chromium interim measure infrastructure wells. The following infrastructure wells were operated through May 9, 2019: CrEX-1, CrEX-2, CrIN-3, CrIN-4, and CrIN-5. CrEX-3 was operated intermittently as described in Section 2.4. The chromium interim measure infrastructure wells were shut down on May 9, 2019 to allow for the CrIN-6 to CrEX-5 conversion project to occur and the normal system operation remained off through the end of June. Regular pumping at these wells began on May 23, 2018, and therefore may have started to have a minor influence upon water levels as early as 2018 Quarter 2. During 2018 Quarter 3, an influence was readily recognized and was demonstrated by a cone of depression in the area of the extraction wells. In 2018 Quarter 4, the trend continued, with the cone of depression expanding slightly since the previous quarter. In 2019 Quarter 2, the cone of depression continued to expand in north and west/upstream directions, possibly in response to pumping at CrEX-2, and south and east/downstream directions, likely due to pumping at CrEX-1. Also, increased water levels were observed to the southwest of the cone of depression, possibly in response to injection at CrIN-4 and CrIN-5 (Figure 2.3-1).

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, the surrounding control points (i.e., R-21, R-31, R-32, R-37, and R-40) 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 data sets 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.

2.4 Any Operations/Maintenance Activities Performed (Requirement 4)

Extraction, treatment, and injection operations continued during 2019 Quarter 2. During 2019 Quarter 2, the operation of CrEX-3 continued to result in the plugging of the treatment system influent filters after approximately 3–4 days of operation. CrEX-3 is currently being operated intermittently, and an evaluation of the water quality in this well is underway to assess filter plugging. The system was shut down on May 9, 2019, to allow the CrIN-6 to CrEX-5 conversion project to take place, and the normal system operation remained off through the end of June.

Operations and maintenance activities completed during 2019 Quarter 2 are listed in Table 2.4-1 for the extraction, treatment, and injection system.

Table 2.4-1
Operations and Maintenance Activity Summary Table – 2019 Quarter 2

Maintenance Date	Elements Impacted	Operation/Maintenance Description
4/1/19 through 5/9/19	CrEX-1, CrEX-2, CTUA, CrIN-3, CrIN-4, CrIN-5	Extraction, treatment, and injection of treated groundwater occurred per operational plan.
4/23/19 and 4/24/19	CrEX-3	CrEX-3 was turned on for 24 hr to allow for monthly sample collection. Influent filter bags replaced following CrEX-3 shutdown.
5/9/19 through 6/30/19	CrEX-1, CrEX-2, CTUA, CrIN-3, CrIN-4, CrIN-5	System shut down for CrIN-6 to CrEX-5 conversion project. Project tied new double-walled piping into the main double-walled pipeline at the new CrEX5 manhole located adjacent to the R-28 basins.
6/11/19	CTUA	IX vessel exchanges were completed as follows because of an increase in the amount of hexavalent chromium at the primary IX vessel effluent as determined via Hach instrument analysis: • Treatment train A – replaced primary IX vessel with the secondary IX vessel; new secondary IX vessel installed. • 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. Both influent and all three effluent filter bags replaced.
6/13/19	CrIN-1, CrIN-2, CrIN-3, CrIN-4, CrIN-5	Booster pumps and injection wells were operated briefly to allow for in-service testing of the CrIN-1, CrIN-2, and CrIN-3 manifolds following the modification that moved each well's pressure transmitter to a position between the motor controlled globe valve and the injection well. All tests were successful.
6/25/19 and 6/26/19	CrEX-5	CrEX-5 extraction well was tested following completion of the CrIN-6 to CrEX-5 conversion modifications. All testing was successful.

2.5 Any Periodic Test of Mechanical Integrity Conducted (Requirement 5)

Mechanical integrity was conducted as part of the CrIN-6 to CrEX-5 conversion project. The mechanical integrity testing is discussed below in Section 2.7.3.

2.6 Any Replacement of Primary or Secondary IX Vessels or Associated Treatment System Infrastructure (Requirement 6)

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 Section 2.4.

2.7 Any Well Work-Overs Conducted (Requirement 7)

As previously mentioned, extraction, treatment, and injection operations were shut down from May 9 through June 30, 2019, to allow for the CrIN-6 to CrEX-5 conversion project to proceed forward. A summary of the conversion activities conducted at the well is provided below.

2.7.1 Removal of CrIN-6 Injection System

The transducer was initially removed from CrIN-6, followed by the removal of the vault lid. A short piece of well casing was welded onto the existing well casing, which extended above the ground surface, and a wooden platform was constructed above the well vault. A pump hoist was used to remove the injection system on April 9, 2019. The flow control valve (FCV) was removed from the pump column, and the pump and motor were removed from the shroud.

2.7.2 Installation of CrEX-5 Extraction System

For conversion of CrIN-6 to extraction service, pipeline pressure analyses were performed. Operating pressure at the pipeline tie-in was estimated at approximately 82 psi, or 189 ft of additional head. This estimated pressure predicts that the existing pump would have produced approximately 60 gallons per minute (gpm). To optimize production ability, the pump was replaced with a larger pump that is expected to produce approximately 85 gpm when operating together with other extraction wells.

The extraction system was installed between April 9 and 12, 2019. An extension piece was added to the CrIN-6 pump shroud to accommodate the new pump, and the pump and motor were assembled and installed into the shroud. The check valve above the pump shroud, the cross-over joint above the check valve, all stainless-steel pipe, and PVC tubing from the injection system were reinstalled. The pump wire from the injection system was reinstalled.

Before landing the extraction system on the well casing in the vault, the short piece of well casing that was welded to the existing well was removed, and the wooden platform above the vault was removed. After system installation, the vault lid was replaced. The bottom of the pump shroud was set at 1040.23 ft below the top of the well casing.

Electrical problems were encountered during the first attempt to start the pumping system on June 12, 2019. The problems were indicative of downhole issues with either the service cable or submersible motor. A pump hoist was mobilized to the site, and the pumping system was removed from the well on June 21 and 22, 2019. The problem was identified as the motor having a bad shaft seal and becoming water logged. The motor was replaced and reinstalled on June 22 and 23, 2019.

2.7.3 Pipeline and Infrastructure Conversion

To convert CrIN-6 to CrEX-5, the wellhead manifold required reconfiguration to allow the water extracted from the well to be conveyed to the chromium central treatment facility located near R-28. A new double-wall high-density polyethylene (HDPE) pipe was installed connecting CrEX-5 to the existing double-wall HDPE pipe in the Mortandad Canyon access road. This double-wall HDPE pipeline replaced the existing single-wall HDPE pipeline originally installed for injection service. The existing single-wall pipe extended to the east of the well vault and was capped with a blind flange.

Fieldwork started with potholing to locate existing utilities and excavating to expose existing infrastructure, such as treated and untreated water lines. Two new precast concrete manholes were installed in excavations and tied in to existing double-wall pipelines. The new double-wall pipe and associated fittings were fused together and pressure tested before performing subgrade installation. The pipeline was covered in bedding sand and low-strength flowable fill. Figure 2.7-1 shows the pipeline layout.

Electrical work included modifications at the panel rack and installation of new instrumentation and controls. Leak detection wiring and conduit were installed in the new manholes. Work at the panel rack included installation of a variable frequency drive for the pump motor and removal of the pneumatic control panel for the FCV.

CrEX-5 was operated as an extraction well for the first time on June 24, 2019, to test the pump. Approximately 2000 gal. of groundwater was pumped into a tank. Water was pumped and conveyed to the central treatment facility for a continuous duration of 2.5 hr on June 25, 2019, as a post-construction testing phase. Approximately 9700 gal. of water was extracted and treated at varying flow rates during this period.

Following demonstration of mechanical integrity and integration of the CrEX-5 well into the treatment system, CrEX-5 was shutdown.

2.8 Any Additional Operational Changes with the Potential to Markedly Affect the Discharge (Requirement 8)

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 2019 Quarter 2 are provided in Table 2.2-2.

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, and manganese are 9 µg/L, 900 µg/L, and 180 µg/L, respectively.

Other than the activities cited in Section 2.4, no additional operational changes occurred during the reporting period.

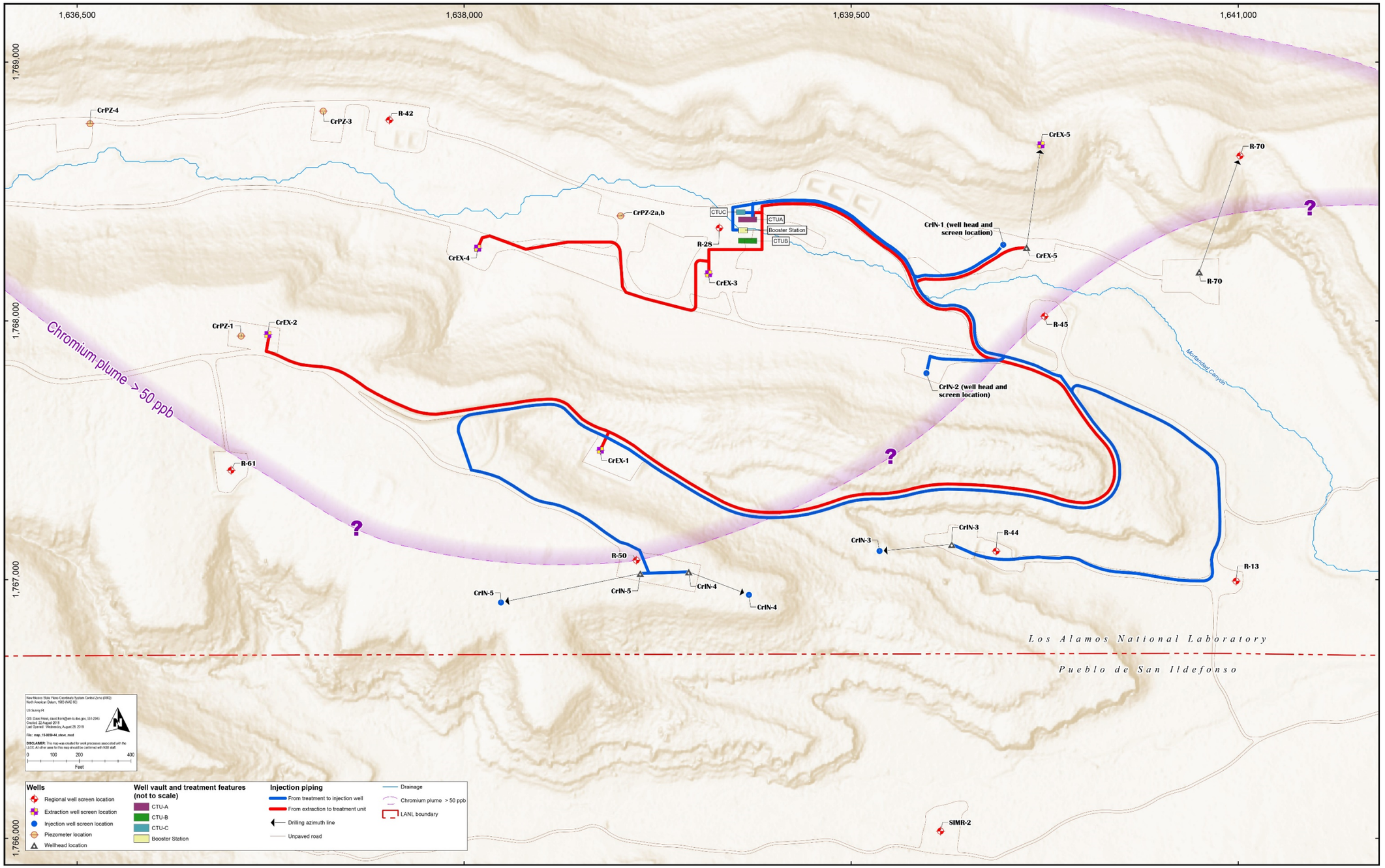

Figure 2.7-1 Facility Layout Map–2019 Quarter 2, DP-1835

2.9 Monthly Average, Maximum, and Minimum Values for Flow Rate and Volume of Treated Effluent Transferred to Each UIC Well (Requirement 9)

Table 2.9-1 provides the monthly average, maximum, and minimum values for flow rate and volume of treated effluent transferred to each well in 2019 Quarter 2.

Table 2.9-1
Flows and Volumes of Treated Effluent Injected – 2019 Quarter 2

Injection Well	Flow rate (gpm)			Daily Volume (gal.)			Total Volume (gal.)
	Average[a]	Maximum	Minimum[b]	Average[a]	Maximum	Minimum[b]	
April 2019							
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	31.4	37.2	21.0	45,223	53,568	30,211	1,356,686
CrIN-4	61.9	68.0	39.3	89,184	97,908	56,661	2,675,528
CrIN-5	59.1	67.0	32.0	85,175	96,516	46,023	2,555,253
CrIN-6[c]	n/a[d]	n/a	n/a	n/a	n/a	n/a	n/a
May 2019							
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	8.1	30.1	0.0	11,674	43,297	0	361,882
CrIN-4	17.6	65.8	0.0	25,366	94,692	0	786,344
CrIN-5	15.7	58.1	0.0	22,585	83,655	0	700,144
CrIN-6[c]	n/a	n/a	n/a	n/a	n/a	n/a	n/a
June 2019							
CrIN-1	0.0	0.2	0.0	10	293	0	293
CrIN-2	0.0	0.4	0.0	19	575	0	575
CrIN-3	0.0	0.7	0.0	36	966	0	966
CrIN-4	0.7	22.0	0.0	1,058	31,752	0	31,752
CrIN-5	0.0	0.2	0.0	11	317	0	317
CrIN-6[c]	n/a	n/a	n/a	n/a	n/a	n/a	n/a

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

[b] Minimum values represent the minimum daily value that occurred during days when pumping occurred.

[c] UIC well was constructed, and injection of treated groundwater did not occur during the quarter in accordance with NMED's correspondence on September 25, 2017 (NMED 2017c). CrIN-6 was converted to CrEX-5 in June 2019.

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

2.10 Total Monthly Volume of Treated Effluent Transferred to Each UIC Well (Requirement 10)

Table 2.9-1 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.

2.11 Monthly Average, Maximum, and Minimum Values of Injection Water Level (Pressure Head) Above Static Level for Each UIC Well (Requirement 11)

Table 2.11-1 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 2.11-1
Water-Level Values Above Static Level by UIC Well – 2019 Quarter 2

	April 2019			May 2019			June 2019		
UIC Well	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	0.3	16.6	0.0
CrIN-2	n/a	n/a	n/a	n/a	n/a	n/a	0.5	22.4	0.1
CrIN-3	11.8	21.2	1.3	10.4	10.6	10.3	n/a	n/a	n/a
CrIN-4	12.5	16.0	1.3	14.2	14.4	14.0	n/a	n/a	n/a
CrIN-5	18.5	20.7	1.1	17.6	17.8	17.5	n/a	n/a	n/a
CrIN-6[c]	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] UIC well was constructed and injection of treated groundwater did not occur during the quarter in accordance with NMED's correspondence on September 25, 2017. (NMED 2017c). CrIN-6 was converted to CrEX-5 in June 2019.

2.12 Daily Volume Injected at Each UIC Well (Requirement 12)

Daily volumes of groundwater injected (following treatment) during 2019 Quarter 2 are presented in Table 2.12-1.

Table 2.12-1
Daily Injection Summary Table – 2019 Quarter 2, DP-1835

Date	CrIN-1 (gal.)	CrIN-2 (gal.)	CrIN-3 (gal.)	CrIN-4 (gal.)	CrIN-5 (gal.)	CrIN-6* (gal.)	Total (gal.)
4/1/2019	0	0	46,077	93,044	89,303	0	228,424
4/2/2019	0	0	46,089	93,118	89,254	0	228,461
4/3/2019	0	0	46,045	93,582	89,296	0	228,922
4/4/2019	0	0	45,955	93,186	89,280	0	228,421
4/5/2019	0	0	45,869	93,602	89,263	0	228,734
4/6/2019	0	0	46,240	92,192	89,297	0	227,730
4/7/2019	0	0	47,570	87,685	89,491	0	224,746
4/8/2019	0	0	47,542	86,782	90,616	0	224,940
4/9/2019	0	0	47,557	86,483	90,705	0	224,746
4/10/2019	0	0	47,474	86,458	90,726	0	224,658
4/11/2019	0	0	47,525	86,348	90,721	0	224,594
4/12/2019	0	0	36,610	74,510	79,062	0	190,182

Table 2.12-1 (continued)

Date	CrIN-1 (gal.)	CrIN-2 (gal.)	CrIN-3 (gal.)	CrIN-4 (gal.)	CrIN-5 (gal.)	CrIN-6* (gal.)	Total (gal.)
4/13/2019	0	0	40,318	88,138	96,501	0	224,956
4/14/2019	0	0	41,528	88,129	96,473	0	226,129
4/15/2019	0	0	43,150	88,284	96,516	0	227,950
4/16/2019	0	0	44,086	88,118	90,546	0	222,750
4/17/2019	0	0	40,303	58,334	54,877	0	153,515
4/18/2019	0	0	30,211	56,661	46,023	0	132,896
4/19/2019	0	0	48,961	97,908	83,510	0	230,378
4/20/2019	0	0	49,020	96,955	83,539	0	229,514
4/21/2019	0	0	48,910	96,483	83,596	0	228,989
4/22/2019	0	0	48,953	96,463	83,586	0	229,002
4/23/2019	0	0	50,026	96,303	83,546	0	229,876
4/24/2019	0	0	53,568	94,012	83,699	0	231,279
4/25/2019	0	0	42,286	94,674	84,546	0	221,506
4/26/2019	0	0	50,460	93,765	84,058	0	228,284
4/27/2019	0	0	47,538	93,495	83,669	0	224,702
4/28/2019	0	0	41,710	93,618	84,374	0	219,703
4/29/2019	0	0	41,753	93,619	84,848	0	220,220
4/30/2019	0	0	43,355	93,578	84,331	0	221,264
5/1/2019	0	0	43,190	93,609	83,529	0	220,328
5/2/2019	0	0	43,191	93,579	83,501	0	220,271
5/3/2019	0	0	43,297	93,611	83,534	0	220,441
5/4/2019	0	0	43,108	93,598	83,520	0	220,225
5/5/2019	0	0	43,207	93,585	83,563	0	220,355
5/6/2019	0	0	43,204	94,015	83,613	0	220,832
5/7/2019	0	0	43,194	94,692	83,655	0	221,542
5/8/2019	0	0	43,200	94,271	83,585	0	221,056
5/9/2019	0	0	16,292	35,384	31,645	0	83,321
5/10/2019	0	0	0	0	0	0	0
5/11/2019	0	0	0	0	0	0	0
5/12/2019	0	0	0	0	0	0	0
5/13/2019	0	0	0	0	0	0	0
5/14/2019	0	0	0	0	0	0	0
5/15/2019	0	0	0	0	0	0	0
5/16/2019	0	0	0	0	0	0	0
5/17/2019	0	0	0	0	0	0	0
5/18/2019	0	0	0	0	0	0	0
5/19/2019	0	0	0	0	0	0	0
5/20/2019	0	0	0	0	0	0	0

Table 2.12-1 (continued)

Date	CrIN-1 (gal.)	CrIN-2 (gal.)	CrIN-3 (gal.)	CrIN-4 (gal.)	CrIN-5 (gal.)	CrIN-6* (gal.)	Total (gal.)
5/21/2019	0	0	0	0	0	0	0
5/22/2019	0	0	0	0	0	0	0
5/23/2019	0	0	0	0	0	0	0
5/24/2019	0	0	0	0	0	0	0
5/25/2019	0	0	0	0	0	0	0
5/26/2019	0	0	0	0	0	0	0
5/27/2019	0	0	0	0	0	0	0
5/28/2019	0	0	0	0	0	0	0
5/29/2019	0	0	0	0	0	0	0
5/30/2019	0	0	0	0	0	0	0
5/31/2019	0	0	0	0	0	0	0
6/1/2019	0	0	0	0	0	0	0
6/2/2019	0	0	0	0	0	0	0
6/3/2019	0	0	0	0	0	0	0
6/4/2019	0	0	0	0	0	0	0
6/5/2019	0	0	0	0	0	0	0
6/6/2019	0	0	0	0	0	0	0
6/7/2019	0	0	0	0	0	0	0
6/8/2019	0	0	0	0	0	0	0
6/9/2019	0	0	0	0	0	0	0
6/10/2019	0	0	0	0	0	0	0
6/11/2019	0	0	0	0	0	0	0
6/12/2019	0	0	0	0	0	0	0
6/13/2019	293	575	966	31,752	317	0	33,904
6/14/2019	0	0	0	0	0	0	0
6/15/2019	0	0	0	0	0	0	0
6/16/2019	0	0	0	0	0	0	0
6/17/2019	0	0	0	0	0	0	0
6/18/2019	0	0	0	0	0	0	0
6/19/2019	0	0	0	0	0	0	0
6/20/2019	0	0	0	0	0	0	0
6/21/2019	0	0	0	0	0	0	0
6/22/2019	0	0	0	0	0	0	0
6/23/2019	0	0	0	0	0	0	0
6/24/2019	0	0	0	0	0	0	0
6/25/2019	0	0	0	0	0	0	0
6/26/2019	0	0	0	0	0	0	0
6/27/2019	0	0	0	0	0	0	0

Table 2.12-1 (continued)

Date	CrIN-1 (gal.)	CrIN-2 (gal.)	CrIN-3 (gal.)	CrIN-4 (gal.)	CrIN-5 (gal.)	CrIN-6* (gal.)	Total (gal.)
6/28/2019	0	0	0	0	0	0	0
6/29/2019	0	0	0	0	0	0	0
6/30/2019	0	0	0	0	0	0	0
Subtotal 8,469,741							

* UIC well was constructed and injection of treated groundwater did not occur during this quarter in accordance with the NMED's correspondence on September 25, 2017 (NMED 2017c). CrIN-6 was converted to CrEX-5 in June 2019.

2.13 Daily Volume Pumped from Each Extraction Well (Requirement 13)

Daily volumes of groundwater pumped from extraction wells during 2019 Quarter 2, are presented in Table 2.13-1.

Table 2.13-1
Daily Extraction Summary Table – 2019 Quarter 2, DP-1835

Date	CrEX-1 (gal.)	CrEX-2 (gal.)	CrEX-3 (gal.)	CrEX-4 (gal.)	CrEX-5 (gal.)	Total (gal.)
4/1/2019	120,952	103,595	0	0	0	224,547
4/2/2019	120,964	103,555	0	0	0	224,519
4/3/2019	120,985	103,505	0	0	0	224,490
4/4/2019	120,961	103,373	0	0	0	224,333
4/5/2019	120,939	103,322	0	0	0	224,261
4/6/2019	120,987	103,314	0	0	0	224,300
4/7/2019	120,960	103,194	0	0	0	224,154
4/8/2019	120,956	103,217	0	0	0	224,173
4/9/2019	120,942	103,116	0	0	0	224,058
4/10/2019	120,967	103,163	0	0	0	224,130
4/11/2019	120,961	103,105	0	0	0	224,067
4/12/2019	106,471	89,115	0	0	0	195,586
4/13/2019	127,899	102,225	0	0	0	230,124
4/14/2019	127,631	102,253	0	0	0	229,883
4/15/2019	127,701	102,196	0	0	0	229,898
4/16/2019	124,516	102,737	0	0	0	227,253
4/17/2019	79,017	66,562	0	0	0	145,579
4/18/2019	73,269	61,148	0	0	0	134,417
4/19/2019	122,311	103,078	0	0	0	225,390
4/20/2019	121,485	103,205	0	0	0	224,690
4/21/2019	120,964	103,303	0	0	0	224,267
4/22/2019	120,992	103,231	0	0	0	224,223
4/23/2019	103,985	93,392	46,584	0	0	243,961

Table 2.13-1 (continued)

Date	CrEX-1 (gal.)	CrEX-2 (gal.)	CrEX-3 (gal.)	CrEX-4 (gal.)	CrEX-5 (gal.)	Total (gal.)
4/24/2019	107,490	96,086	34,448	0	0	238,024
4/25/2019	119,573	102,249	0	0	0	221,822
4/26/2019	119,525	102,246	0	0	0	221,771
4/27/2019	119,512	102,232	0	0	0	221,744
4/28/2019	119,545	102,260	0	0	0	221,805
4/29/2019	119,498	102,221	0	0	0	221,719
4/30/2019	119,537	102,254	0	0	0	221,791
5/1/2019	119,494	102,216	0	0	0	221,710
5/2/2019	119,534	102,248	0	0	0	221,782
5/3/2019	119,531	102,245	0	0	0	221,776
5/4/2019	119,337	102,212	0	0	0	221,548
5/5/2019	118,694	102,142	0	0	0	220,837
5/6/2019	118,172	102,071	0	0	0	220,243
5/7/2019	118,066	101,962	0	0	0	220,028
5/8/2019	118,075	101,769	0	0	0	219,844
5/9/2019	44,190	38,120	0	0	0	82,311
5/10/2019	0	0	0	0	0	0
5/11/2019	0	0	0	0	0	0
5/12/2019	0	0	0	0	0	0
5/13/2019	0	0	0	0	0	0
5/14/2019	0	0	0	0	0	0
5/15/2019	0	0	0	0	0	0
5/16/2019	0	0	0	0	0	0
5/17/2019	0	0	0	0	0	0
5/18/2019	0	0	0	0	0	0
5/19/2019	0	0	0	0	0	0
5/20/2019	0	0	0	0	0	0
5/21/2019	0	0	0	0	0	0
5/22/2019	0	0	0	0	0	0
5/23/2019	0	0	0	0	0	0
5/24/2019	0	0	0	0	0	0
5/25/2019	0	0	0	0	0	0
5/26/2019	0	0	0	0	0	0
5/27/2019	0	0	0	0	0	0
5/28/2019	0	0	0	0	0	0
5/29/2019	0	0	0	0	0	0
5/30/2019	0	0	0	0	0	0
5/31/2019	0	0	0	0	0	0

Table 2.13-1 (continued)

Date	CrEX-1 (gal.)	CrEX-2 (gal.)	CrEX-3 (gal.)	CrEX-4 (gal.)	CrEX-5 (gal.)	Total (gal.)
6/1/2019	0	0	0	0	0	0
6/2/2019	0	0	0	0	0	0
6/3/2019	0	0	0	0	0	0
6/4/2019	0	0	0	0	0	0
6/5/2019	0	0	0	0	0	0
6/6/2019	0	0	0	0	0	0
6/7/2019	0	0	0	0	0	0
6/8/2019	0	0	0	0	0	0
6/9/2019	0	0	0	0	0	0
6/10/2019	0	0	0	0	0	0
6/11/2019	0	0	0	0	0	0
6/12/2019	0	0	0	0	0	0
6/13/2019	0	0	0	0	0	0
6/14/2019	0	0	0	0	0	0
6/15/2019	0	0	0	0	0	0
6/16/2019	0	0	0	0	0	0
6/17/2019	0	0	0	0	0	0
6/18/2019	0	0	0	0	0	0
6/19/2019	0	0	0	0	0	0
6/20/2019	0	0	0	0	0	0
6/21/2019	0	0	0	0	0	0
6/22/2019	0	0	0	0	0	0
6/23/2019	0	0	0	0	0	0
6/24/2019	0	0	0	0	0	0
6/25/2019	0	0	0	0	11,414	11,414
6/26/2019	0	0	0	0	2389	2389
6/27/2019	0	0	0	0	0	0
6/28/2019	0	0	0	0	0	0
6/29/2019	0	0	0	0	0	0
6/30/2019	0	0	0	0	0	0
Subtotal: 8,434,861						

2.14 Facility Layout Map (Requirement 14)

Figure 2.7-1 is the facility layout map for 2019 Quarter 2, showing the location and number of each well.

2.15 Groundwater Elevation Contour Map (Requirement 15)

Figure 2.3-1 provides the groundwater elevation contour map and Section 2.3 provides an explanation of how this map was generated.

3.0 REFERENCES

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

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NMED (New Mexico Environment Department) 2017a. "Response to Notice of Intent to Discharge; Discharge Permit Not Required for Los Alamos National Laboratory Pilot Scale Molasses Amendment Study in Regional Aquifer Monitoring Well R-28," New Mexico Environment Department letter to J.C. Bretzke (LANL) and A.Q. Duran (DOE EM-LA) from M. Hunter (NMED-GWQB), Santa Fe, New Mexico (June 27, 2017).

NMED (New Mexico Environment Department) 2017b. "Response to Notice of Intent to Discharge; Discharge Permit Not Required for Los Alamos National Laboratory Pilot Scale Sodium Dithionite Amendment Study in Regional Aquifer Monitoring Well R-42," New Mexico Environment Department letter to J.C. Bretzke (LANL) and A.Q. Duran (DOE EM-LA) from M. Hunter (NMED-GWQB), Santa Fe, New Mexico (July 18, 2017).

NMED (New Mexico Environment Department) 2017c. "NMED Response – Notification of Commencement of Injection at CrIN-6, Discharge Permit DP-1835, Class V Underground Injection Control Wells," New Mexico Environment Department letter to J.C. Bretzke (LANL) and C.L. Rodriguez (DOE EM-LA) from M. Hunter (NMED-GWQB), Santa Fe, New Mexico (September 25, 2017).