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GROUND WATER

MAY 30 2019

BUREAU

Date: MAY 30 2019  
Refer To: N3B-19-0155

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 1, Discharge Permit DP-1835, Class V Underground Injection Control Wells**

Dear Ms. Hunter:

On August 31, 2016, the New Mexico Environment Department (NMED) issued Discharge Permit (DP) 1835 to the U.S. Department of Energy (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, January 1 through March 31 (Quarter 1), 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. The attached "Quarterly Report for the Discharge of Treated Groundwater to the Regional Aquifer – 2019 Quarter 1, 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,



Frazer Lockhart  
Program Manager  
Regulatory and Stakeholder Interface  
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 (EM2019-0184):


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

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May 2019  
EM2019-0184

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





Newport News Nuclear BWXT-Los Alamos, LLC (N3B), under the U.S. Department of Energy Office of Environmental Management Contract No. 89303318CEM000007 (the Los Alamos Legacy Cleanup Contract), has prepared this document. The public may copy and use this document without charge, provided that this notice and any statement of authorship are reproduced on all copies.

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## 1.0 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. 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 2019 January 1 through March 31 (Quarter 1) reporting period for DP-1835, discharge of treated groundwater to the regional aquifer occurred at three UIC wells: CrIN-3, CrIN-4, and CrIN-5. Groundwater originated 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.

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

1. Influent and discharge volumes for the ion exchange (IX) treatment systems (Condition No. 10),
2. Quarterly treated effluent sampling results from each IX treatment system (Condition Nos. 10 and 13),
3. Quarterly depth-to-groundwater and groundwater-quality sampling results (Condition Nos. 10 and 14),
4. Any operations/maintenance activities performed (Condition No. 10),
5. Any periodic test of mechanical integrity conducted (Condition No. 11),
6. Any replacement of primary or secondary IX vessels or associated treatment system infrastructure (Condition No. 11),
7. Any well work-overs conducted (Condition No. 11),
8. Any additional operational changes with the potential to markedly affect the discharge (Condition No. 11),
9. Monthly average, maximum, and minimum values for flow rate and volume of treated effluent transferred to each UIC well (Condition No. 12),
10. Total monthly volume of treated effluent transferred to each UIC well (Condition No. 12),
11. Monthly average, maximum, and minimum values of injection water level (pressure head) above static level for each UIC well (Condition No. 12),
12. Daily volume injected at each UIC well (Condition No. 12),
13. Daily volume pumped from each extraction well (Condition No. 12),
14. Facility layout map (Condition No. 14), and
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 1 for activities completed under DP-1835. As previously identified, injection 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, and CrEX-3, was treated with treatment unit CTUA.

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

Treatment Unit	Influent Volume <sup>a</sup> (gal.)	Effluent Volume <sup>b</sup> (gal.)
CTUA	19,554,000	19,550,000
CTUB <sup>c</sup>	n/a <sup>d</sup>	n/a
CTUC <sup>c</sup>	n/a	n/a

Note: Individual flow meter accurate to ±5%.

<sup>a</sup> Influent volume based on CrEX-1, CrEX-2 and CrEX-3 extraction volumes.

<sup>b</sup> Effluent volume based on CTUA flow meter reading.

<sup>c</sup> Treatment unit did not treat any groundwater that was subsequently injected during the quarter.

<sup>d</sup> 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 1 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 2017 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.

The pilot scale molasses and sodium dithionite amendment studies continued during 2019 Quarter 1. NMED determined that no permit was required for the deployment of these amendments and these studies began with NMED conditional approvals during 2017 Quarter 3 (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, with the results being submitted in the quarterly monitoring reports under DP-1835. These results for 2019 Quarter 1 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.

During 2019 Quarter 1, 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.



**Table 2.2-1  
Treated Effluent Analytical Results Summary Table – 2019 Quarter 1, 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-19-163393	1/4/2019	Chloride	19	mg/L		Y	Y	EPA:300.0	0.335
CTUA	CTUA-19-163394	1/9/2019	Chloride	45.6	mg/L		Y	Y	EPA:300.0	0.67
CTUA	CTUA-19-166183	1/16/2019	Chloride	18.6	mg/L		Y	Y	EPA:300.0	0.268
CTUA	CTUA-19-166184	1/24/2019	Chloride	18.5	mg/L		Y	Y	EPA:300.0	0.335
CTUA	CTUA-19-166185	1/30/2019	Chloride	17.7	mg/L		Y	Y	EPA:300.0	0.335
CTUA	CTUA-19-166186	2/6/2019	Chloride	68.3	mg/L		Y	Y	EPA:300.0	0.67
CTUA	CTUA-19-166187	2/13/2019	Chloride	17.8	mg/L		Y	Y	EPA:300.0	0.335
CTUA	CTUA-19-166188	2/27/2019	Chloride	22.8	mg/L		Y	Y	EPA:300.0	0.335
CTUA	CTUA-19-166189	3/6/2019	Chloride	17.7	mg/L		Y	Y	EPA:300.0	0.134
CTUA	CTUA-19-166190	3/13/2019	Chloride	23.9	mg/L		Y	Y	EPA:300.0	0.335
CTUA	CTUA-19-166191	3/20/2019	Chloride	19.5	mg/L		Y	Y	EPA:300.0	0.335
CTUA	CTUA-19-166192	3/28/2019	Chloride	18.4	mg/L		Y	Y	EPA:300.0	0.335
CTUA	CTUA-19-163393	1/4/2019	Chromium	3	µg/L	U	N	Y	SW-846:6020	3
CTUA	CTUA-19-163394	1/9/2019	Chromium	3	µg/L	U	N	Y	SW-846:6020	3
CTUA	CTUA-19-166183	1/16/2019	Chromium	3	µg/L	U	N	Y	SW-846:6020	3
CTUA	CTUA-19-166184	1/24/2019	Chromium	3	µg/L	U	N	Y	SW-846:6020	3
CTUA	CTUA-19-166185	1/30/2019	Chromium	3	µg/L	U	N	Y	SW-846:6020	3
CTUA	CTUA-19-166186	2/6/2019	Chromium	3	µg/L	U	N	Y	SW-846:6020	3
CTUA	CTUA-19-166187	2/13/2019	Chromium	3	µg/L	U	N	Y	SW-846:6020	3
CTUA	CTUA-19-166188	2/27/2019	Chromium	3	µg/L	U	N	Y	SW-846:6020	3
CTUA	CTUA-19-166189	3/6/2019	Chromium	3	µg/L	U	N	Y	SW-846:6020	3
CTUA	CTUA-19-166190	3/13/2019	Chromium	3	µg/L	U	N	Y	SW-846:6020	3
CTUA	CTUA-19-166191	3/20/2019	Chromium	3	µg/L	U	N	Y	SW-846:6020	3
CTUA	CTUA-19-166192	3/28/2019	Chromium	3	µg/L	U	N	Y	SW-846:6020	3

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-19-163393	1/4/2019	Fluoride	0.265	mg/L		Y	Y	EPA:300.0	0.033
CTUA	CTUA-19-163394	1/9/2019	Fluoride	0.268	mg/L		Y	Y	EPA:300.0	0.033
CTUA	CTUA-19-166183	1/16/2019	Fluoride	0.2	mg/L		Y	Y	EPA:300.0	0.033
CTUA	CTUA-19-166184	1/24/2019	Fluoride	0.352	mg/L	J	Y	Y	EPA:300.0	0.165
CTUA	CTUA-19-166185	1/30/2019	Fluoride	0.218	mg/L		Y	Y	EPA:300.0	0.033
CTUA	CTUA-19-166186	2/6/2019	Fluoride	0.256	mg/L		Y	Y	EPA:300.0	0.033
CTUA	CTUA-19-166187	2/13/2019	Fluoride	0.231	mg/L		Y	Y	EPA:300.0	0.033
CTUA	CTUA-19-166188	2/27/2019	Fluoride	0.274	mg/L		Y	Y	EPA:300.0	0.033
CTUA	CTUA-19-166189	3/6/2019	Fluoride	0.277	mg/L		Y	Y	EPA:300.0	0.033
CTUA	CTUA-19-166190	3/13/2019	Fluoride	0.336	mg/L		Y	Y	EPA:300.0	0.033
CTUA	CTUA-19-166191	3/20/2019	Fluoride	0.279	mg/L		Y	Y	EPA:300.0	0.033
CTUA	CTUA-19-166192	3/28/2019	Fluoride	0.338	mg/L		Y	Y	EPA:300.0	0.033
CTUA	CTUA-19-163393	1/4/2019	Nitrate-Nitrite as Nitrogen	3.2	mg/L		Y	Y	EPA:353.2	0.085
CTUA	CTUA-19-163394	1/9/2019	Nitrate-Nitrite as Nitrogen	0.0349	mg/L	J	Y	Y	EPA:353.2	0.017
CTUA	CTUA-19-166183	1/16/2019	Nitrate-Nitrite as Nitrogen	2.59	mg/L		Y	Y	EPA:353.2	0.17
CTUA	CTUA-19-166184	1/24/2019	Nitrate-Nitrite as Nitrogen	2.67	mg/L		Y	Y	EPA:353.2	0.085
CTUA	CTUA-19-166185	1/30/2019	Nitrate-Nitrite as Nitrogen	2.54	mg/L		Y	Y	EPA:353.2	0.17
CTUA	CTUA-19-166186	2/6/2019	Nitrate-Nitrite as Nitrogen	0.054	mg/L		Y	Y	EPA:353.2	0.017
CTUA	CTUA-19-166187	2/13/2019	Nitrate-Nitrite as Nitrogen	2.82	mg/L		Y	Y	EPA:353.2	0.17
CTUA	CTUA-19-166188	2/27/2019	Nitrate-Nitrite as Nitrogen	3.19	mg/L		Y	Y	EPA:353.2	0.085
CTUA	CTUA-19-166189	3/6/2019	Nitrate-Nitrite as Nitrogen	2.49	mg/L		Y	Y	EPA:353.2	0.17
CTUA	CTUA-19-166190	3/13/2019	Nitrate-Nitrite as Nitrogen	4.21	mg/L		Y	Y	EPA:353.2	0.085
CTUA	CTUA-19-166191	3/20/2019	Nitrate-Nitrite as Nitrogen	3.64	mg/L		Y	Y	EPA:353.2	0.085
CTUA	CTUA-19-166192	3/28/2019	Nitrate-Nitrite as Nitrogen	2.74	mg/L		Y	Y	EPA:353.2	0.085
CTUA	CTUA-19-163393	1/4/2019	Perchlorate	0.05	µg/L	U	N	Y	SW-846:6850	0.05
CTUA	CTUA-19-163394	1/9/2019	Perchlorate	0.05	µg/L	U	N	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-19-166183	1/16/2019	Perchlorate	0.0958	µg/L	J	Y	Y	SW-846:6850	0.05
CTUA	CTUA-19-166184	1/24/2019	Perchlorate	0.111	µg/L	J	Y	Y	SW-846:6850	0.05
CTUA	CTUA-19-166185	1/30/2019	Perchlorate	0.108	µg/L	J	Y	Y	SW-846:6850	0.05
CTUA	CTUA-19-166186	2/6/2019	Perchlorate	0.0885	µg/L	J	Y	Y	SW-846:6850	0.05
CTUA	CTUA-19-166187	2/13/2019	Perchlorate	0.355	µg/L		Y	Y	SW-846:6850	0.05
CTUA	CTUA-19-166188	2/27/2019	Perchlorate	0.368	µg/L		Y	Y	SW-846:6850	0.05
CTUA	CTUA-19-166189	3/6/2019	Perchlorate	0.377	µg/L		Y	Y	SW-846:6850	0.05
CTUA	CTUA-19-166190	3/13/2019	Perchlorate	0.248	µg/L		Y	Y	SW-846:6850	0.05
CTUA	CTUA-19-166191	3/20/2019	Perchlorate	0.412	µg/L		Y	Y	SW-846:6850	0.05
CTUA	CTUA-19-166192	3/28/2019	Perchlorate	0.371	µg/L		Y	Y	SW-846:6850	0.05
CTUA	CTUA-19-163393	1/4/2019	Sulfate	27.2	mg/L		Y	Y	EPA:300.0	0.665
CTUA	CTUA-19-163394	1/9/2019	Sulfate	0.238	mg/L	J	Y	Y	EPA:300.0	0.133
CTUA	CTUA-19-166183	1/16/2019	Sulfate	25.1	mg/L		Y	Y	EPA:300.0	0.532
CTUA	CTUA-19-166184	1/24/2019	Sulfate	24.1	mg/L		Y	Y	EPA:300.0	0.665
CTUA	CTUA-19-166185	1/30/2019	Sulfate	23.2	mg/L		Y	Y	EPA:300.0	0.665
CTUA	CTUA-19-166186	2/6/2019	Sulfate	0.222	mg/L	J	Y	Y	EPA:300.0	0.133
CTUA	CTUA-19-166187	2/13/2019	Sulfate	23.6	mg/L		Y	Y	EPA:300.0	0.665
CTUA	CTUA-19-166188	2/27/2019	Sulfate	31.4	mg/L		Y	Y	EPA:300.0	0.665
CTUA	CTUA-19-166189	3/6/2019	Sulfate	25	mg/L		Y	Y	EPA:300.0	0.266
CTUA	CTUA-19-166190	3/13/2019	Sulfate	1.89	mg/L		Y	Y	EPA:300.0	0.133
CTUA	CTUA-19-166191	3/20/2019	Sulfate	31.1	mg/L		Y	Y	EPA:300.0	0.665
CTUA	CTUA-19-166192	3/28/2019	Sulfate	26.4	mg/L		Y	Y	EPA:300.0	0.665
CTUA	CTUA-19-163393	1/4/2019	Total Dissolved Solids	216	mg/L		Y	Y	EPA:160.1	3.4
CTUA	CTUA-19-163394	1/9/2019	Total Dissolved Solids	231	mg/L		Y	Y	EPA:160.1	3.4
CTUA	CTUA-19-166183	1/16/2019	Total Dissolved Solids	227	mg/L		Y	Y	EPA:160.1	3.4
CTUA	CTUA-19-166184	1/24/2019	Total Dissolved Solids	317	mg/L		Y	Y	EPA:160.1	3.4

**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-19-166185	1/30/2019	Total Dissolved Solids	224	mg/L		Y	Y	EPA:160.1	3.4
CTUA	CTUA-19-166186	2/6/2019	Total Dissolved Solids	261	mg/L		Y	Y	EPA:160.1	3.4
CTUA	CTUA-19-166187	2/13/2019	Total Dissolved Solids	249	mg/L		Y	Y	EPA:160.1	3.4
CTUA	CTUA-19-166188	2/27/2019	Total Dissolved Solids	233	mg/L		Y	Y	EPA:160.1	3.4
CTUA	CTUA-19-166189	3/6/2019	Total Dissolved Solids	200	mg/L		Y	Y	EPA:160.1	3.4
CTUA	CTUA-19-166190	3/13/2019	Total Dissolved Solids	161	mg/L		Y	Y	EPA:160.1	3.4
CTUA	CTUA-19-166191	3/20/2019	Total Dissolved Solids	229	mg/L		Y	Y	EPA:160.1	3.4
CTUA	CTUA-19-166192	3/28/2019	Total Dissolved Solids	229	mg/L		Y	Y	EPA:160.1	3.4

\* In accordance with permit condition 13 of DP-1835, analysis of the treated effluent from each IX unit is required only once every month for the Quarter 1 reporting period.

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.

**Table 2.2-2  
Treated Effluent Analytical Results Summary Table Related to Molasses and  
Sodium Dithionite Pilot Studies Under NMED Conditional Approval – 2019 Quarter 1, 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-19-163393	1/4/2019	Arsenic	2.29	µg/L	J	Y	Y	SW-846:6020	2
CTUA	CTUA-19-163394	1/9/2019	Arsenic	2	µg/L	U	N	Y	SW-846:6020	2
CTUA	CTUA-19-166183	1/16/2019	Arsenic	2.46	µg/L	J	Y	Y	SW-846:6020	2
CTUA	CTUA-19-166184	1/24/2019	Arsenic	3.51	µg/L	J	Y	Y	SW-846:6020	2
CTUA	CTUA-19-166185	1/30/2019	Arsenic	2.49	µg/L	J	Y	Y	SW-846:6020	2
CTUA	CTUA-19-166186	2/6/2019	Arsenic	2	µg/L	U	N	Y	SW-846:6020	2
CTUA	CTUA-19-166187	2/13/2019	Arsenic	6.41	µg/L		Y	Y	SW-846:6020	2
CTUA	CTUA-19-166188	2/27/2019	Arsenic	4.2	µg/L	J	Y	Y	SW-846:6020	2
CTUA	CTUA-19-166189	3/6/2019	Arsenic	2.7	µg/L	J	Y	Y	SW-846:6020	2
CTUA	CTUA-19-166190	3/13/2019	Arsenic	2.64	µg/L	J	Y	Y	SW-846:6020	2
CTUA	CTUA-19-166191	3/20/2019	Arsenic	4.11	µg/L	J	Y	Y	SW-846:6020	2
CTUA	CTUA-19-166192	3/28/2019	Arsenic	2	µg/L	J	Y	Y	SW-846:6020	2
CTUA	CTUA-19-163393	1/4/2019	Iron	30	µg/L	U	N	Y	SW-846:6010C	30
CTUA	CTUA-19-163394	1/9/2019	Iron	30	µg/L	U	N	Y	SW-846:6010C	30
CTUA	CTUA-19-166183	1/16/2019	Iron	30	µg/L	U	N	Y	SW-846:6010C	30
CTUA	CTUA-19-166184	1/24/2019	Iron	30	µg/L	U	N	Y	SW-846:6010C	30
CTUA	CTUA-19-166185	1/30/2019	Iron	30	µg/L	U	N	Y	SW-846:6010C	30
CTUA	CTUA-19-166186	2/6/2019	Iron	30	µg/L	U	N	Y	SW-846:6010C	30
CTUA	CTUA-19-166187	2/13/2019	Iron	30	µg/L	U	N	Y	SW-846:6010C	30
CTUA	CTUA-19-166188	2/27/2019	Iron	30	µg/L	U	N	Y	SW-846:6010C	30
CTUA	CTUA-19-166189	3/6/2019	Iron	30	µg/L	U	N	Y	SW-846:6010C	30
CTUA	CTUA-19-166190	3/13/2019	Iron	30	µg/L	U	N	Y	SW-846:6010C	30
CTUA	CTUA-19-166191	3/20/2019	Iron	30	µg/L	U	N	Y	SW-846:6010C	30

Table 2.2-2 (continued)

Location ID	Sample ID	Sample Date*	Parameter Name	Result	Report Unit	Lab Qualifier	Detect Flag	Filtered	Lab Method	Method Detection Limit
CTUA	CTUA-19-166192	3/28/2019	Iron	30	µg/L	U	N	Y	SW-846:6010C	30
CTUA	CTUA-19-163393	1/4/2019	Manganese	2	µg/L	U	N	Y	SW-846:6010C	2
CTUA	CTUA-19-163394	1/9/2019	Manganese	2	µg/L	U	N	Y	SW-846:6010C	2
CTUA	CTUA-19-166183	1/16/2019	Manganese	2	µg/L	U	N	Y	SW-846:6010C	2
CTUA	CTUA-19-166184	1/24/2019	Manganese	2	µg/L	U	N	Y	SW-846:6010C	2
CTUA	CTUA-19-166185	1/30/2019	Manganese	2	µg/L	U	N	Y	SW-846:6010C	2
CTUA	CTUA-19-166186	2/6/2019	Manganese	2	µg/L	U	N	Y	SW-846:6010C	2
CTUA	CTUA-19-166187	2/13/2019	Manganese	2	µg/L	U	N	Y	SW-846:6010C	2
CTUA	CTUA-19-166188	2/27/2019	Manganese	6.5	µg/L	J	Y	Y	SW-846:6010C	2
CTUA	CTUA-19-166189	3/6/2019	Manganese	2	µg/L	U	N	Y	SW-846:6010C	2
CTUA	CTUA-19-166190	3/13/2019	Manganese	2	µg/L	U	N	Y	SW-846:6010C	2
CTUA	CTUA-19-166191	3/20/2019	Manganese	5	µg/L	J	Y	Y	SW-846:6010C	2
CTUA	CTUA-19-166192	3/28/2019	Manganese	2	µg/L	U	N	Y	SW-846:6010C	2

\* In accordance with permit condition 13 of DP-1835, analysis of the treated effluent from each IX unit is required only once every month for the Quarter 1 reporting period.

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.

### 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. Table 2.3-1 provides the quarterly groundwater elevation measurements. The groundwater elevation contour map (Figure 2.3-1) and an explanation of how this map was generated is provided below. Quarterly groundwater analytical results from samples collected during 2019 Quarter 1 for the monitoring wells listed in Condition No. 14 are summarized in Table 2.3-2.

**Explanation of groundwater elevation contour map.** The regional aquifer beneath Los Alamos National Laboratory (LANL) 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 more local scales 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. 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. This is discussed for the case of 2019 Quarter 1 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 February 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. 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. At locations with a history of water-level data for which there are no data for the present quarter, values can be estimated using linear regression based on relationships with other nearby wells. For 2019 Quarter 1, 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 consistently operated: CrEX-1, CrEX-2, CrIN-3, CrIN-4, and CrIN-5. CrEX-3 was operated intermittently as described in Section 2.4. 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 1, 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 and CrEX-3 (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, 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 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.



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

Monitoring Well	Groundwater Elevation <sup>a</sup> (ft)
CrPZ-1 (CrCH-1)	5832.28
CrPZ-2a (CrCH-2a)	5832.31
CrPZ-2b (CrCH-2b)	5832.35
CrPZ-3 (CrCH-3)	5832.45
CrPZ-4 (CrCH-4)	5832.43
CrPZ-5 (CrCH-5)	5832.31
R-11	5832.22
R-13	5832.19
R-43 S1 <sup>b</sup>	5832.28
R-43 S2 <sup>c</sup>	5832.2
R-44 S1	5832.16
R-44 S2	5832.18
R-45 S1	5832.27
R-45 S2	5832.6
R-50 S1	5833.36
R-50 S2	5833.4
R-61 S1	5833.68
R-61 S2	5833.85
R-62	5834.25
SIMR-2 <sup>d</sup>	5832.03

<sup>a</sup> Groundwater elevations provided are based on average February 2019 values from transducers.

<sup>b</sup> S1 = Screen 1.

<sup>c</sup> S2 = Screen 2.

<sup>d</sup> Fourth quarter average November 2018 SIMR-2 data are reported here in accordance with the DP-1835 2018 Quarter 4 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 1, DP-1835**

Field Sample ID	Location ID	Sample Date	Parameter Name	Report Result	Report Unit	Lab Qualifier	Detect Flag	Filtered	Lab Method	Report Detection Limit
CASA-19-166010	R-11	1-16-2019	Chloride	3.82	mg/L		Y	Y	EPA:300.0	0.067
CASA-19-166010	R-11	1-16-2019	Perchlorate	0.824	µg/L		Y	Y	SW-846:6850	0.050
CASA-19-166010	R-11	1-16-2019	Chromium	9.77	µg/L	J	Y	Y	SW-846:6020	3.00
CASA-19-166010	R-11	1-16-2019	Fluoride	0.365	mg/L		Y	Y	EPA:300.0	0.033
CASA-19-166010	R-11	1-16-2019	Nitrate-Nitrite as Nitrogen	5.11	mg/L		Y	Y	EPA:353.2	0.170
CASA-19-166010	R-11	1-16-2019	Sulfate	10.2	mg/L		Y	Y	EPA:300.0	0.133
CASA-19-166010	R-11	1-16-2019	Total Dissolved Solids	233	mg/L		Y	Y	EPA:160.1	3.40
CASA-19-166431	R-11	2-14-2019	Chloride	3.69	mg/L		Y	Y	EPA:300.0	0.067
CASA-19-166431	R-11	2-14-2019	Perchlorate	0.728	µg/L		Y	Y	SW-846:6850	0.050
CASA-19-166431	R-11	2-14-2019	Chromium	9.03	µg/L	J	Y	Y	SW-846:6020	3.00
CASA-19-166431	R-11	2-14-2019	Fluoride	0.389	mg/L		Y	Y	EPA:300.0	0.033
CASA-19-166431	R-11	2-14-2019	Nitrate-Nitrite as Nitrogen	4.11	mg/L		Y	Y	EPA:353.2	0.170
CASA-19-166431	R-11	2-14-2019	Sulfate	9.97	mg/L		Y	Y	EPA:300.0	0.133
CASA-19-166431	R-11	2-14-2019	Total Dissolved Solids	149	mg/L		Y	Y	EPA:160.1	3.40
CASA-19-167685	R-11	3-21-2019	Chloride	3.7	mg/L		Y	Y	EPA:300.0	0.067
CASA-19-167685	R-11	3-21-2019	Perchlorate	0.744	µg/L		Y	Y	SW-846:6850	0.050
CASA-19-167685	R-11	3-21-2019	Chromium	9.04	µg/L	J	Y	Y	SW-846:6020	3.00
CASA-19-167685	R-11	3-21-2019	Fluoride	0.328	mg/L		Y	Y	EPA:300.0	0.033
CASA-19-167685	R-11	3-21-2019	Nitrate-Nitrite as Nitrogen	6.26	mg/L		Y	Y	EPA:353.2	0.170
CASA-19-167685	R-11	3-21-2019	Sulfate	10.2	mg/L		Y	Y	EPA:300.0	0.133
CASA-19-167685	R-11	3-21-2019	Total Dissolved Solids	179	mg/L		Y	Y	EPA:160.1	3.40
CAMO-19-165960	R-13	1-10-2019	Chloride	2.42	mg/L		Y	Y	EPA:300.0	0.067
CAMO-19-165960	R-13	1-10-2019	Perchlorate	0.459	µg/L		Y	Y	SW-846:6850	0.050
CAMO-19-165960	R-13	1-10-2019	Chromium	4.54	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	Report Detection Limit
CAMO-19-165960	R-13	1-10-2019	Fluoride	0.323	mg/L		Y	Y	EPA:300.0	0.033
CAMO-19-165960	R-13	1-10-2019	Nitrate-Nitrite as Nitrogen	0.865	mg/L		Y	Y	EPA:353.2	0.085
CAMO-19-165960	R-13	1-10-2019	Sulfate	3.31	mg/L		Y	Y	EPA:300.0	0.133
CAMO-19-165960	R-13	1-10-2019	Total Dissolved Solids	201	mg/L		Y	Y	EPA:160.1	3.40
CASA-19-166001	R-43 S1 <sup>a</sup>	1-18-2019	Chloride	8.68	mg/L		Y	Y	EPA:300.0	0.067
CASA-19-166001	R-43 S1	1-18-2019	Perchlorate	0.782	µg/L		Y	Y	SW-846:6850	0.050
CASA-19-166001	R-43 S1	1-18-2019	Chromium	199	µg/L		Y	Y	SW-846:6020	3.00
CASA-19-166001	R-43 S1	1-18-2019	Fluoride	0.3	mg/L		Y	Y	EPA:300.0	0.033
CASA-19-166001	R-43 S1	1-18-2019	Nitrate-Nitrite as Nitrogen	5.5	mg/L		Y	Y	EPA:353.2	0.850
CASA-19-166001	R-43 S1	1-18-2019	Sulfate	18.1	mg/L		Y	Y	EPA:300.0	0.133
CASA-19-166001	R-43 S1	1-18-2019	Total Dissolved Solids	187	mg/L		Y	Y	EPA:160.1	3.40
CASA-19-166003	R-43 S2 <sup>b</sup>	1-22-2019	Chloride	6.37	mg/L		Y	Y	EPA:300.0	0.067
CASA-19-166003	R-43 S2	1-22-2019	Perchlorate	0.877	µg/L		Y	Y	SW-846:6850	0.050
CASA-19-166003	R-43 S2	1-22-2019	Chromium	24.6	µg/L		Y	Y	SW-846:6020	3.00
CASA-19-166003	R-43 S2	1-22-2019	Fluoride	0.256	mg/L		Y	Y	EPA:300.0	0.033
CASA-19-166003	R-43 S2	1-22-2019	Nitrate-Nitrite as Nitrogen	3.81	mg/L		Y	Y	EPA:353.2	0.170
CASA-19-166003	R-43 S2	1-22-2019	Sulfate	9.44	mg/L		Y	Y	EPA:300.0	0.133
CASA-19-166003	R-43 S2	1-22-2019	Total Dissolved Solids	136	mg/L		Y	Y	EPA:160.1	3.40
CAMO-19-165972	R-44 S1	1-22-2019	Chloride	13.9	mg/L		Y	Y	EPA:300.0	0.134
CAMO-19-165972	R-44 S1	1-22-2019	Perchlorate	0.363	µg/L		Y	Y	SW-846:6850	0.050
CAMO-19-165972	R-44 S1	1-22-2019	Chromium	9.12	µg/L	J	Y	Y	SW-846:6020	3.00
CAMO-19-165972	R-44 S1	1-22-2019	Fluoride	0.203	mg/L		Y	Y	EPA:300.0	0.033
CAMO-19-165972	R-44 S1	1-22-2019	Nitrate-Nitrite as Nitrogen	2.01	mg/L		Y	Y	EPA:353.2	0.170
CAMO-19-165972	R-44 S1	1-22-2019	Sulfate	13.8	mg/L		Y	Y	EPA:300.0	0.133
CAMO-19-165972	R-44 S1	1-22-2019	Total Dissolved Solids	156	mg/L		Y	Y	EPA:160.1	3.40
CAMO-19-166449	R-44 S1	2-11-2019	Chloride	14.9	mg/L		Y	Y	EPA:300.0	0.134

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	Report Detection Limit
CAMO-19-166449	R-44 S1	2-11-2019	Perchlorate	0.358	µg/L		Y	Y	SW-846:6850	0.050
CAMO-19-166449	R-44 S1	2-11-2019	Chromium	9.64	µg/L	J	Y	Y	SW-846:6020	3.00
CAMO-19-166449	R-44 S1	2-11-2019	Fluoride	0.205	mg/L		Y	Y	EPA:300.0	0.033
CAMO-19-166449	R-44 S1	2-11-2019	Nitrate-Nitrite as Nitrogen	2.3	mg/L		Y	Y	EPA:353.2	0.085
CAMO-19-166449	R-44 S1	2-11-2019	Sulfate	14.4	mg/L		Y	Y	EPA:300.0	0.133
CAMO-19-166449	R-44 S1	2-11-2019	Total Dissolved Solids	147	mg/L		Y	Y	EPA:160.1	3.40
CAMO-19-167696	R-44 S1	3-20-2019	Chloride	17.7	mg/L		Y	Y	EPA:300.0	0.134
CAMO-19-167696	R-44 S1	3-20-2019	Perchlorate	0.3	µg/L		Y	Y	SW-846:6850	0.050
CAMO-19-167696	R-44 S1	3-20-2019	Chromium	7.35	µg/L	J	Y	Y	SW-846:6020	3.00
CAMO-19-167696	R-44 S1	3-20-2019	Fluoride	0.213	mg/L		Y	Y	EPA:300.0	0.033
CAMO-19-167696	R-44 S1	3-20-2019	Nitrate-Nitrite as Nitrogen	2.53	mg/L		Y	Y	EPA:353.2	0.085
CAMO-19-167696	R-44 S1	3-20-2019	Sulfate	14.8	mg/L		Y	Y	EPA:300.0	0.133
CAMO-19-167696	R-44 S1	3-20-2019	Total Dissolved Solids	206	mg/L	J+	Y	Y	EPA:160.1	3.40
CAMO-19-165975	R-44 S2	1-22-2019	Chloride	2.15	mg/L		Y	Y	EPA:300.0	0.067
CAMO-19-165975	R-44 S2	1-22-2019	Perchlorate	0.302	µg/L		Y	Y	SW-846:6850	0.050
CAMO-19-165975	R-44 S2	1-22-2019	Chromium	5.43	µg/L	J	Y	Y	SW-846:6020	3.00
CAMO-19-165975	R-44 S2	1-22-2019	Fluoride	0.338	mg/L		Y	Y	EPA:300.0	0.033
CAMO-19-165975	R-44 S2	1-22-2019	Nitrate-Nitrite as Nitrogen	0.596	mg/L		Y	Y	EPA:353.2	0.017
CAMO-19-165975	R-44 S2	1-22-2019	Sulfate	2.54	mg/L		Y	Y	EPA:300.0	0.133
CAMO-19-165975	R-44 S2	1-22-2019	Total Dissolved Solids	114	mg/L		Y	Y	EPA:160.1	3.40
CAMO-19-166452	R-44 S2	2-11-2019	Chloride	2.05	mg/L		Y	Y	EPA:300.0	0.067
CAMO-19-166452	R-44 S2	2-11-2019	Perchlorate	0.329	µg/L		Y	Y	SW-846:6850	0.050
CAMO-19-166452	R-44 S2	2-11-2019	Chromium	6.07	µg/L	J	Y	Y	SW-846:6020	3.00
CAMO-19-166452	R-44 S2	2-11-2019	Fluoride	0.373	mg/L		Y	Y	EPA:300.0	0.033
CAMO-19-166452	R-44 S2	2-11-2019	Nitrate-Nitrite as Nitrogen	0.623	mg/L		Y	Y	EPA:353.2	0.017
CAMO-19-166452	R-44 S2	2-11-2019	Sulfate	2.49137	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	Report Detection Limit
CAMO-19-166452	R-44 S2	2-11-2019	Total Dissolved Solids	137	mg/L		Y	Y	EPA:160.1	3.40
CAMO-19-167699	R-44 S2	3-20-2019	Chloride	2.03	mg/L		Y	Y	EPA:300.0	0.067
CAMO-19-167699	R-44 S2	3-20-2019	Perchlorate	0.307	µg/L		Y	Y	SW-846:6850	0.050
CAMO-19-167699	R-44 S2	3-20-2019	Chromium	5.27	µg/L	J	Y	Y	SW-846:6020	3.00
CAMO-19-167699	R-44 S2	3-20-2019	Fluoride	0.328	mg/L		Y	Y	EPA:300.0	0.033
CAMO-19-167699	R-44 S2	3-20-2019	Nitrate-Nitrite as Nitrogen	0.633	mg/L		Y	Y	EPA:353.2	0.017
CAMO-19-167699	R-44 S2	3-20-2019	Sulfate	2.5	mg/L		Y	Y	EPA:300.0	0.133
CAMO-19-167699	R-44 S2	3-20-2019	Total Dissolved Solids	136	mg/L	J+	Y	Y	EPA:160.1	3.40
CAMO-19-165978	R-45 S1	1-15-2019	Chloride	5.17	mg/L		Y	Y	EPA:300.0	0.067
CAMO-19-165978	R-45 S1	1-15-2019	Perchlorate	0.61	µg/L		Y	Y	SW-846:6850	0.050
CAMO-19-165978	R-45 S1	1-15-2019	Chromium	38.9	µg/L		Y	Y	SW-846:6020	3.00
CAMO-19-165978	R-45 S1	1-15-2019	Fluoride	0.297	mg/L		Y	Y	EPA:300.0	0.033
CAMO-19-165978	R-45 S1	1-15-2019	Nitrate-Nitrite as Nitrogen	2.7	mg/L		Y	Y	EPA:353.2	0.085
CAMO-19-165978	R-45 S1	1-15-2019	Sulfate	7.7	mg/L		Y	Y	EPA:300.0	0.133
CAMO-19-165978	R-45 S1	1-15-2019	Total Dissolved Solids	231	mg/L		Y	Y	EPA:160.1	3.40
CAMO-19-166455	R-45 S1	2-12-2019	Chloride	4.84	mg/L		Y	Y	EPA:300.0	0.067
CAMO-19-166455	R-45 S1	2-12-2019	Perchlorate	0.591	µg/L		Y	Y	SW-846:6850	0.050
CAMO-19-166455	R-45 S1	2-12-2019	Chromium	37.4	µg/L		Y	Y	SW-846:6020	3.00
CAMO-19-166455	R-45 S1	2-12-2019	Fluoride	0.387	mg/L		Y	Y	EPA:300.0	0.033
CAMO-19-166455	R-45 S1	2-12-2019	Nitrate-Nitrite as Nitrogen	2.63	mg/L		Y	Y	EPA:353.2	0.085
CAMO-19-166455	R-45 S1	2-12-2019	Sulfate	7.31	mg/L		Y	Y	EPA:300.0	0.133
CAMO-19-166455	R-45 S1	2-12-2019	Total Dissolved Solids	114	mg/L		Y	Y	EPA:160.1	3.40
CAMO-19-167702	R-45 S1	3-14-2019	Chloride	5.06	mg/L		Y	Y	EPA:300.0	0.067
CAMO-19-167702	R-45 S1	3-14-2019	Perchlorate	0.555	µg/L		Y	Y	SW-846:6850	0.050
CAMO-19-167702	R-45 S1	3-14-2019	Chromium	35	µg/L		Y	Y	SW-846:6020	3.00
CAMO-19-167702	R-45 S1	3-14-2019	Fluoride	0.324	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	Report Detection Limit
CAMO-19-167702	R-45 S1	3-14-2019	Nitrate-Nitrite as Nitrogen	2.81	mg/L		Y	Y	EPA:353.2	0.085
CAMO-19-167702	R-45 S1	3-14-2019	Sulfate	7.54	mg/L		Y	Y	EPA:300.0	0.133
CAMO-19-167702	R-45 S1	3-14-2019	Total Dissolved Solids	167	mg/L		Y	Y	EPA:160.1	3.40
CAMO-19-165981	R-45 S2	1-15-2019	Chloride	4.91	mg/L		Y	Y	EPA:300.0	0.067
CAMO-19-165981	R-45 S2	1-15-2019	Perchlorate	0.504	µg/L		Y	Y	SW-846:6850	0.050
CAMO-19-165981	R-45 S2	1-15-2019	Chromium	29	µg/L		Y	Y	SW-846:6020	3.00
CAMO-19-165981	R-45 S2	1-15-2019	Fluoride	0.389	mg/L		Y	Y	EPA:300.0	0.033
CAMO-19-165981	R-45 S2	1-15-2019	Nitrate-Nitrite as Nitrogen	0.923	mg/L		Y	Y	EPA:353.2	0.017
CAMO-19-165981	R-45 S2	1-15-2019	Sulfate	5.78	mg/L		Y	Y	EPA:300.0	0.133
CAMO-19-165981	R-45 S2	1-15-2019	Total Dissolved Solids	230	mg/L		Y	Y	EPA:160.1	3.40
CAMO-19-166458	R-45 S2	2-12-2018	Chloride	4.77	mg/L		Y	Y	EPA:300.0	0.067
CAMO-19-166458	R-45 S2	2-12-2018	Perchlorate	0.423	µg/L		Y	Y	SW-846:6850	0.050
CAMO-19-166458	R-45 S2	2-12-2018	Chromium	32.2	µg/L		Y	Y	SW-846:6020	3.00
CAMO-19-166458	R-45 S2	2-12-2018	Fluoride	0.417	mg/L		Y	Y	EPA:300.0	0.033
CAMO-19-166458	R-45 S2	2-12-2018	Nitrate-Nitrite as Nitrogen	0.955	mg/L		Y	Y	EPA:353.2	0.085
CAMO-19-166458	R-45 S2	2-12-2018	Sulfate	5.68	mg/L		Y	Y	EPA:300.0	0.133
CAMO-19-166458	R-45 S2	2-12-2018	Total Dissolved Solids	130	mg/L		Y	Y	EPA:160.1	3.40
CAMO-19-167705	R-45 S2	3-14-2019	Chloride	4.98	mg/L		Y	Y	EPA:300.0	0.067
CAMO-19-167705	R-45 S2	3-14-2019	Perchlorate	0.434	µg/L		Y	Y	SW-846:6850	0.050
CAMO-19-167705	R-45 S2	3-14-2019	Chromium	30.8	µg/L		Y	Y	SW-846:6020	3.00
CAMO-19-167705	R-45 S2	3-14-2019	Fluoride	0.43	mg/L		Y	Y	EPA:300.0	0.033
CAMO-19-167705	R-45 S2	3-14-2019	Nitrate-Nitrite as Nitrogen	0.968	mg/L		Y	Y	EPA:353.2	0.017
CAMO-19-167705	R-45 S2	3-14-2019	Sulfate	5.73	mg/L		Y	Y	EPA:300.0	0.133
CAMO-19-167705	R-45 S2	3-14-2019	Total Dissolved Solids	164	mg/L		Y	Y	EPA:160.1	3.40
CAMO-19-165984	R-50 S1	1-15-2019	Chloride	15.9	mg/L		Y	Y	EPA:300.0	0.134
CAMO-19-165984	R-50 S1	1-15-2019	Perchlorate	0.509	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	Report Detection Limit
CAMO-19-165984	R-50 S1	1-15-2019	Chromium	76.3	µg/L		Y	Y	SW-846:6020	3.00
CAMO-19-165984	R-50 S1	1-15-2019	Fluoride	0.228	mg/L		Y	Y	EPA:300.0	0.033
CAMO-19-165984	R-50 S1	1-15-2019	Nitrate-Nitrite as Nitrogen	2.29	mg/L		Y	Y	EPA:353.2	0.085
CAMO-19-165984	R-50 S1	1-15-2019	Sulfate	17.6	mg/L		Y	Y	EPA:300.0	0.133
CAMO-19-165984	R-50 S1	1-15-2019	Total Dissolved Solids	229	mg/L		Y	Y	EPA:160.1	3.40
CAMO-19-166461	R-50 S1	2-20-2019	Chloride	16.3	mg/L		Y	Y	EPA:300.0	0.134
CAMO-19-166461	R-50 S1	2-20-2019	Perchlorate	0.451	µg/L		Y	Y	SW-846:6850	0.050
CAMO-19-166461	R-50 S1	2-20-2019	Chromium	63.7	µg/L		Y	Y	SW-846:6020	3.00
CAMO-19-166461	R-50 S1	2-20-2019	Fluoride	0.234	mg/L		Y	Y	EPA:300.0	0.033
CAMO-19-166461	R-50 S1	2-20-2019	Nitrate-Nitrite as Nitrogen	2.56	mg/L		Y	Y	EPA:353.2	0.085
CAMO-19-166461	R-50 S1	2-20-2019	Sulfate	18.3	mg/L		Y	Y	EPA:300.0	0.133
CAMO-19-166461	R-50 S1	2-20-2019	Total Dissolved Solids	221	mg/L		Y	Y	EPA:160.1	3.40
CAMO-19-167708	R-50 S1	3-14-2019	Chloride	17.9	mg/L		Y	Y	EPA:300.0	0.134
CAMO-19-167708	R-50 S1	3-14-2019	Perchlorate	0.462	µg/L		Y	Y	SW-846:6850	0.050
CAMO-19-167708	R-50 S1	3-14-2019	Chromium	61.9	µg/L		Y	Y	SW-846:6020	3.00
CAMO-19-167708	R-50 S1	3-14-2019	Fluoride	0.255	mg/L		Y	Y	EPA:300.0	0.033
CAMO-19-167708	R-50 S1	3-14-2019	Nitrate-Nitrite as Nitrogen	2.77	mg/L		Y	Y	EPA:353.2	0.085
CAMO-19-167708	R-50 S1	3-14-2019	Sulfate	18.4	mg/L		Y	Y	EPA:300.0	0.266
CAMO-19-167708	R-50 S1	3-14-2019	Total Dissolved Solids	187	mg/L		Y	Y	EPA:160.1	3.40
CAMO-19-165987	R-50 S2	1-15-2019	Chloride	2.12	mg/L		Y	Y	EPA:300.0	0.067
CAMO-19-165987	R-50 S2	1-15-2019	Perchlorate	0.367	µg/L		Y	Y	SW-846:6850	0.050
CAMO-19-165987	R-50 S2	1-15-2019	Chromium	4.26	µg/L	J	Y	Y	SW-846:6020	3.00
CAMO-19-165987	R-50 S2	1-15-2019	Fluoride	0.357	mg/L		Y	Y	EPA:300.0	0.033
CAMO-19-165987	R-50 S2	1-15-2019	Nitrate-Nitrite as Nitrogen	0.516	mg/L		Y	Y	EPA:353.2	0.017
CAMO-19-165987	R-50 S2	1-15-2019	Sulfate	2.56	mg/L		Y	Y	EPA:300.0	0.133
CAMO-19-165987	R-50 S2	1-15-2019	Total Dissolved Solids	183	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	Report Detection Limit
CAMO-19-166464	R-50 S2	2-20-2019	Chloride	2.09	mg/L		Y	Y	EPA:300.0	0.067
CAMO-19-166464	R-50 S2	2-20-2019	Perchlorate	0.321	µg/L		Y	Y	SW-846:6850	0.050
CAMO-19-166464	R-50 S2	2-20-2019	Chromium	4.46	µg/L	J	Y	Y	SW-846:6020	3.00
CAMO-19-166464	R-50 S2	2-20-2019	Fluoride	0.413	mg/L		Y	Y	EPA:300.0	0.033
CAMO-19-166464	R-50 S2	2-20-2019	Nitrate-Nitrite as Nitrogen	0.539	mg/L		Y	Y	EPA:353.2	0.017
CAMO-19-166464	R-50 S2	2-20-2019	Sulfate	2.53	mg/L		Y	Y	EPA:300.0	0.133
CAMO-19-166464	R-50 S2	2-20-2019	Total Dissolved Solids	246	mg/L		Y	Y	EPA:160.1	3.40
CAMO-19-167711	R-50 S2	3-14-2019	Chloride	2.25	mg/L		Y	Y	EPA:300.0	0.067
CAMO-19-167711	R-50 S2	3-14-2019	Perchlorate	0.317	µg/L		Y	Y	SW-846:6850	0.050
CAMO-19-167711	R-50 S2	3-14-2019	Chromium	4.44	µg/L	J	Y	Y	SW-846:6020	3.00
CAMO-19-167711	R-50 S2	3-14-2019	Fluoride	0.39	mg/L		Y	Y	EPA:300.0	0.033
CAMO-19-167711	R-50 S2	3-14-2019	Nitrate-Nitrite as Nitrogen	0.554	mg/L		Y	Y	EPA:353.2	0.017
CAMO-19-167711	R-50 S2	3-14-2019	Sulfate	2.67	mg/L		Y	Y	EPA:300.0	0.133
CAMO-19-167711	R-50 S2	3-14-2019	Total Dissolved Solids	123	mg/L		Y	Y	EPA:160.1	3.40
CAMO-19-165970	R-62	1-23-2019	Chloride	17.6	mg/L		Y	Y	EPA:300.0	0.335
CAMO-19-165970	R-62	1-23-2019	Perchlorate	0.85	µg/L		Y	Y	SW-846:6850	0.050
CAMO-19-165970	R-62	1-23-2019	Chromium	311	µg/L		Y	Y	SW-846:6020	3.00
CAMO-19-165970	R-62	1-23-2019	Fluoride	0.11	mg/L	J+	Y	Y	EPA:300.0	0.033
CAMO-19-165970	R-62	1-23-2019	Nitrate-Nitrite as Nitrogen	2.23	mg/L		Y	Y	EPA:353.2	0.085
CAMO-19-165970	R-62	1-23-2019	Sulfate	30.2	mg/L		Y	Y	EPA:300.0	0.665
CAMO-19-165970	R-62	1-23-2019	Total Dissolved Solids	220	mg/L		Y	Y	EPA:160.1	3.40
CAMO-19-163730	SIMR-2	10-29-2018	Chloride	2.18	mg/L		Y	Y	EPA:300.0	0.067
CAMO-19-163730	SIMR-2	10-29-2018	Perchlorate	0.398	µg/L		Y	Y	SW-846:6850	0.050
CAMO-19-163730	SIMR-2	10-29-2018	Chromium	4.64	µg/L	J	Y	Y	SW-846:6020	3.00
CAMO-19-163730	SIMR-2	10-29-2018	Fluoride	0.267	mg/L		Y	Y	EPA:300.0	0.033
CAMO-19-163730	SIMR-2	10-29-2018	Nitrate-Nitrite as Nitrogen	0.741	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	Report Detection Limit
CAMO-19-163730	SIMR-2	10-29-2018	Sulfate	2.81	mg/L		Y	Y	EPA:300.0	0.133
CAMO-19-163730	SIMR-2	10-29-2018	Total Dissolved Solids	209	mg/L		Y	Y	EPA:160.1	3.40
CAMO-19-164008	SIMR-2	11-15-2018	Chloride	2.21	mg/L		Y	Y	EPA:300.0	0.067
CAMO-19-164008	SIMR-2	11-15-2018	Perchlorate	0.4	µg/L		Y	Y	SW-846:6850	0.050
CAMO-19-164872	SIMR-2	12-20-2018	Chromium	5.48	µg/L	J	Y	Y	SW-846:6020	3.00
CAMO-19-164008	SIMR-2	11-15-2018	Fluoride	0.24	mg/L		Y	Y	EPA:300.0	0.033
CAMO-19-164008	SIMR-2	11-15-2018	Nitrate-Nitrite as Nitrogen	0.714	mg/L		Y	Y	EPA:353.2	0.017
CAMO-19-164008	SIMR-2	11-15-2018	Sulfate	2.91	mg/L		Y	Y	EPA:300.0	0.133
CAMO-19-164008	SIMR-2	11-15-2018	Total Dissolved Solids	133	mg/L		Y	Y	EPA:160.1	3.40
CAMO-19-164872	SIMR-2	12-20-2018	Chloride	2.15	mg/L		Y	Y	EPA:300.0	0.067
CAMO-19-164872	SIMR-2	12-20-2018	Perchlorate	0.427	µg/L		Y	Y	SW-846:6850	0.050
CAMO-19-164872	SIMR-2	12-20-2018	Chromium	5.48	µg/L	J	Y	Y	SW-846:6020	3.00
CAMO-19-164872	SIMR-2	12-20-2018	Fluoride	0.356	mg/L		Y	Y	EPA:300.0	0.033
CAMO-19-164872	SIMR-2	12-20-2018	Nitrate-Nitrite as Nitrogen	0.632	mg/L		Y	Y	EPA:353.2	0.017
CAMO-19-164872	SIMR-2	12-20-2018	Sulfate	2.67	mg/L		Y	Y	EPA:300.0	0.133
CAMO-19-164872	SIMR-2	12-20-2018	Total Dissolved Solids	177	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.

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.

<sup>a</sup> S1 = Screen 1.

<sup>b</sup> S2= Screen 2.



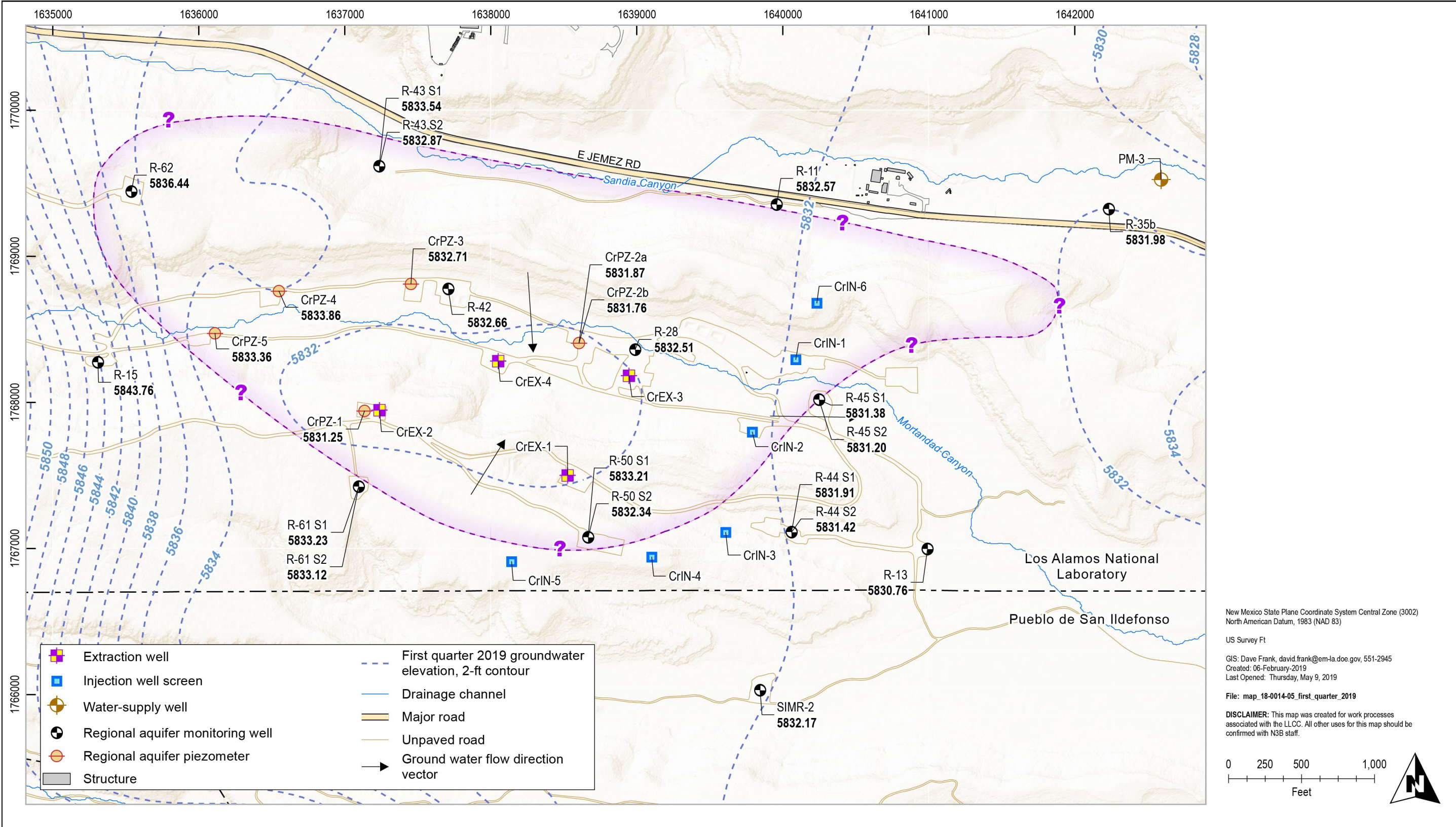


Figure 2.3-1 Groundwater elevation counter map – 2019 Quarter 1, DP-1835



**2.4 Any Operations/Maintenance Activities Performed (Requirement 4)**

Extraction, treatment, and injection operations continued during 2019 Quarter 1. During the first quarter of 2019, 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.

Operations and maintenance activities completed during 2019 Quarter 1 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 1**

Maintenance Date	Elements Impacted	Operation/Maintenance Description
1/1/19 through 3/4/19	CrEX-1, CrEX-2, CTUA, CrIN-3, CrIN-4, CrIN-5	Extraction, treatment, and injection of treated groundwater occurred per operational plan.
1/7/19	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: <ul style="list-style-type: none"> <li>• Treatment train A – replaced primary IX vessel with the secondary IX vessel; new secondary IX vessel installed.</li> <li>• Treatment train B – replaced primary IX vessel with the secondary IX vessel; new secondary IX vessel installed.</li> <li>• Treatment train C – replaced primary IX vessel with the secondary IX vessel; new secondary IX vessel installed.</li> </ul> Both influent and all three effluent filter bags replaced.
1/22/19 through 1/23/19	CrEX-3	CrEX-3 was turned on for 24 hr to allow for monthly sample collection. Influent filter bags replaced following CrEX-3 shutdown.
2/5/19	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: <ul style="list-style-type: none"> <li>• Treatment train A – replaced primary IX vessel with the secondary IX vessel; new secondary IX vessel installed.</li> <li>• Treatment train B – replaced primary IX vessel with the secondary IX vessel; new secondary IX vessel installed.</li> <li>• Treatment train C – replaced primary IX vessel with the secondary IX vessel; new secondary IX vessel installed.</li> </ul> Both influent and all three effluent filter bags replaced.
2/26/19 through 2/27/19	CrEX-3	CrEX-3 was turned on for 24 hr to allow for monthly sample collection. Influent filter bags replaced following CrEX-3 shutdown.
3/4/19 through 3/6/19	CrEX-1, CrEX-2, CTUA, CrIN-3, CrIN-4, CrIN-5	System shut down to allow CrEX-2 water to be diverted for tracer deployment at CrPZ-1. Problems with CrEX-2 variable frequency device (VFD) resulted in intermittent operation of system.

**Table 2.4-1 (continued)**

Maintenance Date	Elements Impacted	Operation/Maintenance Description
3/7/19	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: <ul style="list-style-type: none"> <li>• Treatment train A – replaced primary IX vessel with the secondary IX vessel; new secondary IX vessel installed.</li> <li>• Treatment train B – replaced primary IX vessel with the secondary IX vessel; new secondary IX vessel installed.</li> <li>• Treatment train C – replaced primary IX vessel with the secondary IX vessel; new secondary IX vessel installed.</li> </ul> Both influent and all three effluent filter bags replaced.
3/8/19 through 3/11/19	CrEX-1, CrEX-2, CTUA, CrIN-3, CrIN-4, CrIN-5	Sitewide power failure at 9:26 pm on 3/8/19 faulted CrEX-2 VFD, not allowing it to restart remotely. Remaining system was shut down remotely on 3/10/19 because of observed system flow imbalance.
3/11/19 through 4/1/19	CrEX-1, CrEX-2, CTUA, CrIN-3, CrIN-4, CrIN-5	Extraction, treatment, and injection of treated groundwater occurred per operational plan.
3/15/19	CrEX-2	Extraction well shut down briefly to allow testing and troubleshooting of the CrEX-2 VFD.
3/20/19 through 3/21/19	CrEX-3	CrEX-3 was turned on for 24 hr to allow for monthly sample collection. Influent filter bags replaced following CrEX-3 shutdown.
3/26/19	CrEX-3	CrEX-3 was turned on for several hours to allow collection of a sample for analyses of isotopic chromium.

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

Periodic testing of mechanical integrity was not conducted or reported to NMED during 2019 Quarter 1. In accordance with Condition No. 3, the next required integrity test will occur within 5 yr of the initial test unless a UIC well is reconfigured. Under this scenario, a mechanical integrity test before reinjection of treated effluent at a specific reconfigured well will be completed pursuant to Condition No. 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)**

Well work-overs did not occur during 2019 Quarter 1.

**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 1 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.

**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 1.

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

Injection Well	Flow rate (gpm <sup>a</sup> )			Daily Volume (gal.)			Total Volume (gal.)
	Average <sup>b</sup>	Maximum	Minimum <sup>c</sup>	Average <sup>b</sup>	Maximum	Minimum <sup>c</sup>	
<b>January 2019</b>							
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	34.4	44.3	31.9	49,466	63,817	46,004	1,533,432
CrIN-4	61.4	63.1	59.0	88,435	90,818	84,929	2,741,485
CrIN-5	61.1	62.0	60.6	87,961	89,300	87,222	2,726,780
CrIN-6 <sup>d</sup>	n/a <sup>e</sup>	n/a	n/a	n/a	n/a	n/a	n/a
<b>February 2019</b>							
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	33.5	41.4	27.9	48,192	59,570	40,211	1,349,389
CrIN-4	62.0	62.0	61.7	89,242	89,324	88,828	2,498,775
CrIN-5	61.4	62.0	61.0	88,358	89,298	87,826	2,474,027
CrIN-6 <sup>d</sup>	n/a	n/a	n/a	n/a	n/a	n/a	n/a

**Table 2.9-1 (continued)**

Injection Well	Flow rate (gpm <sup>a</sup> )			Daily Volume (gal.)			Total Volume (gal.)
	Average <sup>b</sup>	Maximum	Minimum <sup>c</sup>	Average <sup>b</sup>	Maximum	Minimum <sup>c</sup>	
<b>March 2019</b>							
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	28.4	43.5	7.0	40,871	62,711	10,037	1,144,390
CrIN-4	57.6	65.2	13.3	82,924	93,927	19,098	2,570,646
CrIN-5	56.3	65.0	12.7	81,112	93,587	18,296	2,514,479
CrIN-6 <sup>d</sup>	n/a	n/a	n/a	n/a	n/a	n/a	n/a

<sup>a</sup> gpm = Gallons per minute.

<sup>b</sup> Average flow rate and daily volume represent arithmetic mean values of results provided during periods when injection of treated groundwater was occurring.

<sup>c</sup> Minimum values represent the minimum daily value which occurred during days when pumping occurred.

<sup>d</sup> 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).

<sup>e</sup> 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-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-3, CrIN-4, and CrIN-5 during the quarter.

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

UIC Well	January 2019			February 2019			March 2019		
	Average <sup>a</sup> (ft)	Maximum (ft)	Minimum (ft)	Average <sup>a</sup> (ft)	Maximum (ft)	Minimum (ft)	Average <sup>a</sup> (ft)	Maximum (ft)	Minimum (ft)
CrIN-1	n/a <sup>b</sup>	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	n/a	n/a	n/a	n/a	n/a
CrIN-3	13.1	22.9	11.0	13.0	23.9	8.5	11.9	24.5	1.5
CrIN-4	10.3	11.1	9.3	10.5	10.9	10.2	10.8	12.0	6.3
CrIN-5	17.6	18.0	17.1	17.8	18.4	17.2	17.9	19.8	9.7
CrIN-6 <sup>c</sup>	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a

<sup>a</sup> Average values provided represent arithmetic mean values of maximum daily values during periods when injection of treated groundwater was occurring.

<sup>b</sup> n/a = Not applicable. Treated groundwater not injected during the month at this location.

<sup>c</sup> 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)



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

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

**Table 2.12-1  
Daily Extraction Summary Table – 2019 Quarter 1, DP-1835**

Date	CrEX-1 (gal.)	CrEX-2 (gal.)	CrEX-3 (gal.)	CrEX-4 (gal.)	Total (gal.)
1/1/2019	119,527	105,915	0	0	225,442
1/2/2019	119,514	105,762	0	0	225,276
1/3/2019	119,516	105,654	0	0	225,170
1/4/2019	119,520	105,667	0	0	225,187
1/5/2019	119,502	105,630	0	0	225,132
1/6/2019	119,514	105,673	0	0	225,188
1/7/2019	112,305	97,548	0	0	209,853
1/8/2019	120,107	105,152	0	0	225,259
1/9/2019	119,634	105,114	0	0	224,748
1/10/2019	119,545	105,098	0	0	224,643
1/11/2019	119,777	105,122	0	0	224,899
1/12/2019	119,744	105,138	0	0	224,882
1/13/2019	119,623	105,125	0	0	224,748
1/14/2019	119,585	105,096	0	0	224,681
1/15/2019	119,603	105,122	0	0	224,725
1/16/2019	119,658	105,141	0	0	224,800
1/17/2019	119,641	105,111	0	0	224,753
1/18/2019	119,716	105,101	0	0	224,818
1/19/2019	119,630	105,138	0	0	224,768
1/20/2019	119,714	105,126	0	0	224,840
1/21/2019	119,970	105,116	0	0	225,087
1/22/2019	106,727	99,464	33,216	0	239,406
1/23/2019	104,536	97,532	35,705	0	237,773
1/24/2019	120,921	105,085	0	0	226,006
1/25/2019	120,943	105,127	0	0	226,070
1/26/2019	120,935	105,085	0	0	226,020
1/27/2019	120,917	105,127	0	0	226,044
1/28/2019	120,956	105,079	0	0	226,035
1/29/2019	120,927	105,123	0	0	226,050
1/30/2019	120,958	105,080	0	0	226,038
1/31/2019	120,950	104,992	0	0	225,943
2/1/2019	120,945	104,935	0	0	225,880

**Table 2.12-1 (continued)**

Date	CrEX-1 (gal.)	CrEX-2 (gal.)	CrEX-3 (gal.)	CrEX-4 (gal.)	Total (gal.)
2/2/2019	120,982	104,896	0	0	225,879
2/3/2019	120,961	104,921	0	0	225,882
2/4/2019	120,926	104,884	0	0	225,810
2/5/2019	112,810	97,121	0	0	209,931
2/6/2019	120,668	104,345	0	0	225,013
2/7/2019	120,949	104,657	0	0	225,606
2/8/2019	120,772	104,582	0	0	225,354
2/9/2019	120,900	104,659	0	0	225,559
2/10/2019	120,888	104,619	0	0	225,508
2/11/2019	120,936	104,617	0	0	225,553
2/12/2019	120,809	104,559	0	0	225,368
2/13/2019	120,910	104,549	0	0	225,459
2/14/2019	120,904	104,568	0	0	225,472
2/15/2019	120,914	104,568	0	0	225,482
2/16/2019	120,927	104,571	0	0	225,498
2/17/2019	120,952	104,588	0	0	225,540
2/18/2019	120,926	104,579	0	0	225,505
2/19/2019	120,933	104,542	0	0	225,475
2/20/2019	120,960	104,502	0	0	225,462
2/21/2019	120,931	104,497	0	0	225,428
2/22/2019	120,936	104,471	0	0	225,407
2/23/2019	120,911	104,442	0	0	225,352
2/24/2019	120,881	104,386	0	0	225,267
2/25/2019	120,877	104,309	0	0	225,186
2/26/2019	103,580	94,513	43,309	0	241,401
2/27/2019	99,313	93,814	43,709	0	236,836
2/28/2019	116,651	103,244	0	0	219,895
3/1/2019	116,617	103,271	0	0	219,888
3/2/2019	116,670	103,444	0	0	220,114
3/3/2019	116,612	103,547	0	0	220,159
3/4/2019	59,255	57,662	0	0	116,917
3/5/2019	68,176	31,612	0	0	99,788
3/6/2019	110,959	54,187	0	0	165,145
3/7/2019	104,989	94,218	0	0	199,207
3/8/2019	124,431	92,906	0	0	217,337
3/9/2019	140,921	0	0	0	140,921
3/10/2019	4839	0	0	0	4839
3/11/2019	56,154	47,332	0	0	103,486

**Table 2.12-1 (continued)**

Date	CrEX-1 (gal.)	CrEX-2 (gal.)	CrEX-3 (gal.)	CrEX-4 (gal.)	Total (gal.)
3/12/2019	120,714	103,661	0	0	224,375
3/13/2019	120,932	103,693	0	0	224,626
3/14/2019	120,956	103,687	0	0	224,643
3/15/2019	118,804	100,726	0	0	219,530
3/16/2019	120,978	103,035	0	0	224,013
3/17/2019	120,924	102,791	0	0	223,715
3/18/2019	120,886	102,457	0	0	223,343
3/19/2019	120,321	102,292	0	0	222,613
3/20/2019	105,212	94,409	42,311	0	241,932
3/21/2019	102,870	91,929	45,737	0	240,537
3/22/2019	120,963	103,627	0	0	224,590
3/23/2019	120,973	103,567	0	0	224,540
3/24/2019	120,938	103,569	0	0	224,507
3/25/2019	120,963	103,489	0	0	224,452
3/26/2019	117,024	100,416	10,934	0	228,374
3/27/2019	123,397	102,154	0	0	225,551
3/28/2019	125,292	102,045	0	0	227,337
3/29/2019	125,566	102,101	0	0	227,668
3/30/2019	125,767	102,286	0	0	228,053
3/31/2019	124,731	102,532	0	0	227,264
<b>Subtotal: 19,553,753</b>					

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

Date	CrIN-1* (gal.)	CrIN-2* (gal.)	CrIN-3 (gal.)	CrIN-4 (gal.)	CrIN-5 (gal.)	CrIN-6* (gal.)	Total (gal.)
1/1/2019	0	0	47,493	90,818	87,842	0	226,153
1/2/2019	0	0	47,518	90,764	87,840	0	226,122
1/3/2019	0	0	47,532	90,788	87,836	0	226,156
1/4/2019	0	0	47,521	88,752	87,905	0	224,178
1/5/2019	0	0	47,513	85,061	88,918	0	221,493
1/6/2019	0	0	47,532	84,954	89,300	0	221,785
1/7/2019	0	0	47,518	84,986	88,668	0	221,172
1/8/2019	0	0	47,520	84,929	88,603	0	221,053
1/9/2019	0	0	47,502	85,280	88,488	0	221,270
1/10/2019	0	0	47,526	88,166	87,986	0	223,679

**Table 2.12-2 (continued)**

Date	CrIN-1* (gal.)	CrIN-2* (gal.)	CrIN-3 (gal.)	CrIN-4 (gal.)	CrIN-5 (gal.)	CrIN-6* (gal.)	Total (gal.)
1/11/2019	0	0	47,977	89,255	87,826	0	225,058
1/12/2019	0	0	50,704	88,803	87,859	0	227,366
1/13/2019	0	0	55,370	87,846	87,845	0	231,062
1/14/2019	0	0	54,696	87,851	87,820	0	230,367
1/15/2019	0	0	46,406	88,603	87,816	0	222,824
1/16/2019	0	0	46,004	89,232	87,857	0	223,093
1/17/2019	0	0	48,023	89,090	87,833	0	224,945
1/18/2019	0	0	50,390	89,094	87,849	0	227,333
1/19/2019	0	0	50,394	88,734	87,831	0	226,959
1/20/2019	0	0	50,419	88,675	87,846	0	226,940
1/21/2019	0	0	50,352	88,679	87,837	0	226,868
1/22/2019	0	0	63,817	88,584	87,235	0	239,637
1/23/2019	0	0	63,131	88,348	87,222	0	238,701
1/24/2019	0	0	46,054	89,244	87,844	0	223,143
1/25/2019	0	0	46,076	89,271	87,831	0	223,177
1/26/2019	0	0	46,082	89,284	87,848	0	223,214
1/27/2019	0	0	46,077	89,276	87,833	0	223,186
1/28/2019	0	0	46,486	89,287	87,848	0	223,621
1/29/2019	0	0	48,954	89,273	87,830	0	226,056
1/30/2019	0	0	49,579	89,285	87,846	0	226,709
1/31/2019	0	0	51,266	89,272	87,838	0	228,376
2/1/2019	0	0	50,410	89,261	88,285	0	227,956
2/2/2019	0	0	50,410	89,247	89,298	0	228,955
2/3/2019	0	0	50,385	89,252	89,281	0	228,919
2/4/2019	0	0	50,401	89,170	89,281	0	228,852
2/5/2019	0	0	47,238	89,282	89,259	0	225,779
2/6/2019	0	0	44,606	89,263	89,000	0	222,869
2/7/2019	0	0	40,622	89,283	88,861	0	218,766
2/8/2019	0	0	41,391	89,289	88,767	0	219,446
2/9/2019	0	0	40,211	89,060	88,519	0	217,790
2/10/2019	0	0	42,801	89,201	87,836	0	219,838
2/11/2019	0	0	48,957	89,299	88,261	0	226,516
2/12/2019	0	0	48,964	89,258	87,881	0	226,104
2/13/2019	0	0	48,954	89,266	87,877	0	226,096
2/14/2019	0	0	48,958	89,277	87,836	0	226,072
2/15/2019	0	0	48,965	89,285	87,844	0	226,095
2/16/2019	0	0	48,955	89,272	87,834	0	226,061
2/17/2019	0	0	48,980	89,289	87,846	0	226,116

Table 2.12-2 (continued)

Date	CrIN-1* (gal.)	CrIN-2* (gal.)	CrIN-3 (gal.)	CrIN-4 (gal.)	CrIN-5 (gal.)	CrIN-6* (gal.)	Total (gal.)
2/18/2019	0	0	48,946	89,280	87,842	0	226,068
2/19/2019	0	0	48,955	89,271	87,830	0	226,055
2/20/2019	0	0	48,993	89,288	87,849	0	226,130
2/21/2019	0	0	48,927	89,269	87,834	0	226,030
2/22/2019	0	0	48,967	89,321	87,829	0	226,118
2/23/2019	0	0	48,976	89,254	87,863	0	226,093
2/24/2019	0	0	48,965	89,234	87,826	0	226,025
2/25/2019	0	0	48,942	89,297	88,202	0	226,441
2/26/2019	0	0	52,305	89,156	89,136	0	230,597
2/27/2019	0	0	59,570	88,828	88,761	0	237,159
2/28/2019	0	0	44,633	89,324	89,288	0	223,245
3/1/2019	0	0	44,643	89,371	89,393	0	223,407
3/2/2019	0	0	39,118	90,172	90,541	0	219,831
3/3/2019	0	0	37,431	90,705	90,689	0	218,826
3/4/2019	0	0	18,637	56,100	56,200	0	130,938
3/5/2019	0	0	0	41,886	39,771	0	81,657
3/6/2019	0	0	0	79,476	76,956	0	156,433
3/7/2019	0	0	23,847	90,963	93,345	0	208,155
3/8/2019	0	0	38,878	92,016	93,587	0	224,481
3/9/2019	0	0	10,037	70,962	68,594	0	149,593
3/10/2019	0	0	0	19,098	18,296	0	37,394
3/11/2019	0	0	10,840	21,306	20,672	0	52,818
3/12/2019	0	0	47,537	90,825	87,910	0	226,271
3/13/2019	0	0	47,514	88,461	86,307	0	222,282
3/14/2019	0	0	47,510	87,853	85,564	0	220,927
3/15/2019	0	0	47,531	87,815	85,378	0	220,723
3/16/2019	0	0	47,541	89,629	86,639	0	223,809
3/17/2019	0	0	47,494	89,440	89,279	0	226,213
3/18/2019	0	0	47,525	89,262	89,264	0	226,052
3/19/2019	0	0	47,535	89,282	89,282	0	226,100
3/20/2019	0	0	54,879	89,079	89,018	0	232,976
3/21/2019	0	0	62,711	91,003	89,104	0	242,819
3/22/2019	0	0	41,748	93,591	89,672	0	225,011
3/23/2019	0	0	41,764	93,604	89,913	0	225,282
3/24/2019	0	0	41,754	93,588	89,834	0	225,176
3/25/2019	0	0	41,773	93,602	90,183	0	225,558
3/26/2019	0	0	41,751	93,609	89,857	0	225,217
3/27/2019	0	0	41,762	93,603	89,965	0	225,330

**Table 2.12-2 (continued)**

Date	CrIN-1* (gal.)	CrIN-2* (gal.)	CrIN-3 (gal.)	CrIN-4 (gal.)	CrIN-5 (gal.)	CrIN-6* (gal.)	Total (gal.)
3/28/2019	0	0	42,982	93,927	89,903	0	226,812
3/29/2019	0	0	44,605	93,632	89,432	0	227,669
3/30/2019	0	0	42,089	93,602	90,300	0	225,991
3/31/2019	0	0	42,954	93,183	89,630	0	225,767
<b>Subtotal 19,553,402</b>							

\* UIC well construction and injection of treated groundwater did not occur during this quarter in accordance with the New Mexico Environment Department’s correspondence on September 25, 2017 (NMED 2017c).

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

Daily volumes of groundwater pumped from CrEX-1, CrEX-2, and CrEX-3 during 2019 Quarter 1, which were subsequently treated and injected under DP-1835, are presented in Tables 2.12-1 and 2.12-2.

**2.14 Facility Layout Map (Requirement 14)**

The facility layout map for 2019 Quarter 1 showing the location and number of each well is shown in Figure 2.14-1.

**2.15 Groundwater Elevation Contour Map (Requirement 15)**

Figure 2.3-1 provides the groundwater elevation contour map and 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).

N3B (Newport News Nuclear BWXT-Los Alamos, LLC) 2019. “Quarterly Report for the Discharge of Treated Groundwater to the Regional Aquifer –2018 Quarter 4, DP-1835,” Newport News Nuclear BWXT-Los Alamos, LLC, document number EM2019-0050, Los Alamos, New Mexico (March 2019).

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).





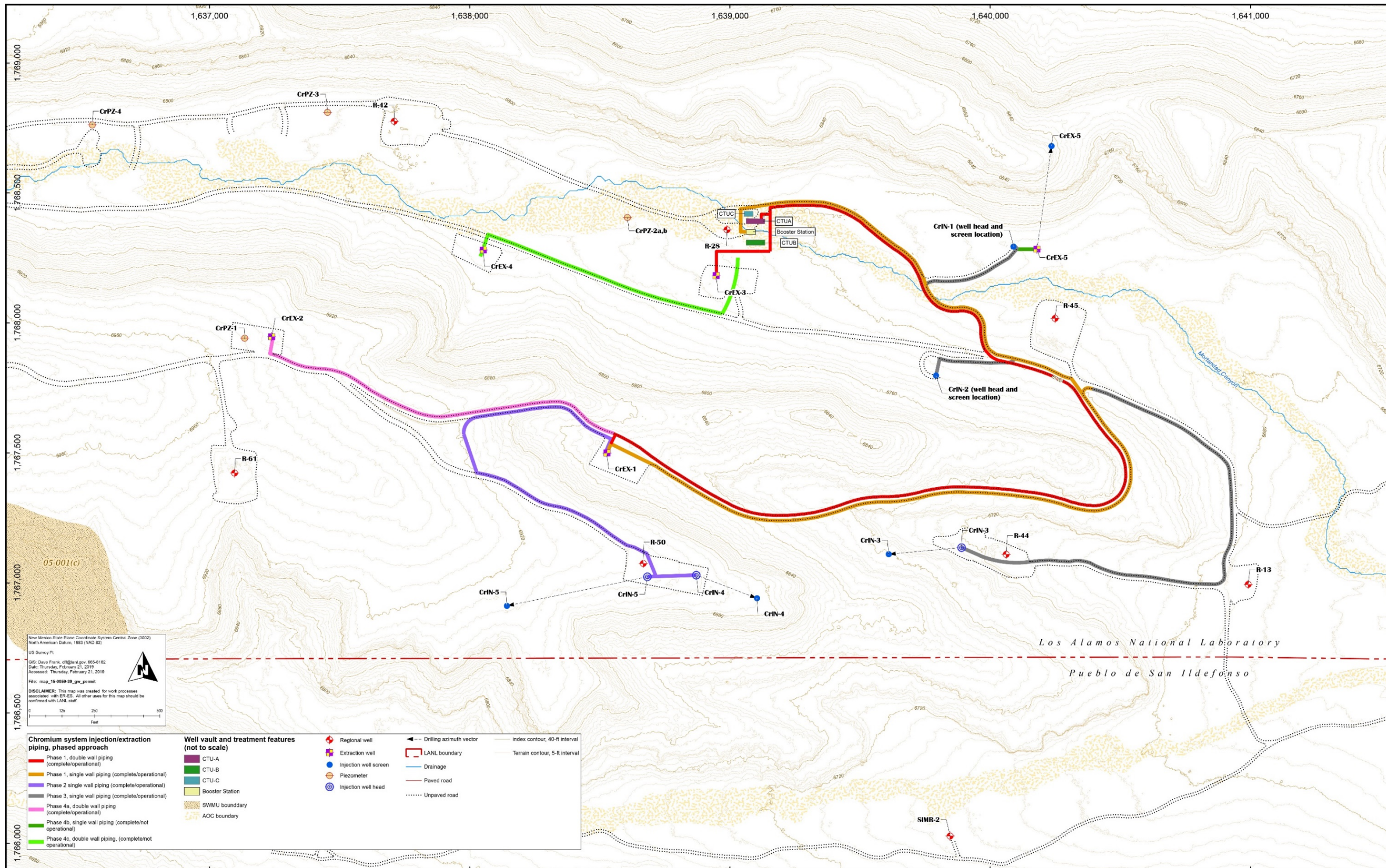


Figure 2.14-1 Facility Layout Map–2019 Quarter 1, DP-1835

