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Date: February 24, 2022
Refer To: N3B-2022-0052

Justin Ball, Chief
Ground Water Quality Bureau
New Mexico Environment Department
1190 S. St. Francis Drive
Santa Fe, NM 87502-5469

Subject: Submittal of the Quarterly Report for the Discharge of Treated Groundwater to the Regional Aquifer under Discharge Permit 1835, Calendar Year 2021 Quarter 4, Class V Underground Injection Control Wells

Dear Mr. Ball:

On August 31, 2016, the New Mexico Environment Department (NMED) issued Discharge Permit 1835 (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 from 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 (CY) 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 the following:

1. influent and discharge volumes from the treatment systems,
2. quarterly groundwater and treated effluent sampling results, and
3. operations and maintenance activities.

Pursuant to Conditions No. 11, 12, and 13 of DP-1835, the quarterly reports shall also contain general information, performance information, and monitoring data for treated effluent from each ion exchange treatment system. Condition No. 10 requires submission of a quarterly report to NMED by March 1 for the October 1 through December 31 discharge period.

During the CY 2021 Quarter 4 reporting period for DP-1835, discharge of treated groundwater to the regional aquifer occurred at four UIC wells: CrIN-1, CrIN-2, CrIN-4, and CrIN-5. Groundwater originated predominantly from four extraction wells: CrEX-2 through CrEX-5. The groundwater was treated by chromium treatment unit A (CTUA) and chromium treatment unit C (CTUC) before injection at the UIC wells.

The enclosed "Quarterly Report for the Discharge of Treated Groundwater to the Regional Aquifer under Discharge Permit 1835, Calendar Year 2021 Quarter 4," 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) 414-0450 (cheryl.rodriguez@em.doe.gov).

Sincerely,

Joseph Murdock
Program Manager
Environment, Safety and Health
N3B-Los Alamos

Sincerely,

ARTURO DURAN
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Arturo Q. Duran
Office of Quality and Regulatory Compliance
U.S. Department of Energy
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Enclosure(s):
1. Two hard copies with electronic files – Quarterly Report for the Discharge of Treated Groundwater to the Regional Aquifer under Discharge Permit 1835, Calendar Year 2021 Quarter 4 (EM2022-0079)

cc (letter and enclosure[s] emailed):
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March 2022
EM2022-0079

Quarterly Report for the Discharge of Treated Groundwater to the Regional Aquifer under Discharge Permit 1835, Calendar Year 2021 Quarter 4

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 (DOE) and Los Alamos National Security, LLC (LANS) for the discharge of treated groundwater to the regional aquifer through Class V underground injection control (UIC) wells. On July 21, 2017, NMED approved minor updates to DP-1835. During Quarter 2 of calendar year (CY) 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 and N3B are required to submit quarterly reports.

During the 2021 Quarter 4 reporting period for DP-1835, discharge of treated groundwater to the regional aquifer occurred at four UIC wells: CrIN-1, CrIN-2, CrIN-4, and CrIN-5. Groundwater originated predominantly from four extraction wells: CrEX-2 through CrEX-5. The groundwater was treated by chromium treatment unit A (CTUA) and chromium treatment unit C (CTUC) before injection at the UIC wells.

Condition No. 10 of DP-1835 requires submission of a quarterly report to NMED by March 1 for the October 1 through December 31 discharge period. Several conditions within the permit identify information to be submitted in the quarterly report, as follows:

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 (Conditions No. 10 and 13)
3. Quarterly depth-to-groundwater and groundwater-quality sampling results (Conditions No. 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 workovers 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)

This report addresses each of these requirements.

2.0 REQUIREMENTS

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

Table 2.1-1 provides the influent and discharge volumes for IX treatment systems during 2021 Quarter 4 for activities completed under DP-1835. As previously identified, injection occurred at UIC wells CrIN-1, CrIN-2, CrIN-4 and CrIN-5 during the quarter. Discharge, which originated from extraction wells CrEX-2 through CrEX-5, was treated with treatment units CTUA and CTUC.

Table 2.1-1
Total Influent and Discharge Volumes
for IX Treatment Systems – CY 2021 Quarter 4, DP-1835

Treatment Unit	Influent Volume[a] (gal.)	Effluent Volume[b] (gal.)
CTUA	26,866,170	15,7163,257
CTUC		11,153,741

Note: Individual flow meter accurate to ±5%.

[a] Influent volume based on CrEX-2 through CrEX-5 extraction volumes.

[b] Effluent volume based on CTUA and CTUC flow-meter readings.

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

Treated effluent analytical results from samples collected during 2021 Quarter 4 for activities completed under DP-1835 are summarized in Table 2.2-1. No sample results for total chromium, nitrate, perchlorate, sulfate, fluoride, chloride, or total dissolved solids exceeded 90% of the numeric standards of 20.6.2.3103 New Mexico Administrative Code (NMAC) or, for constituents not listed in 20.6.2.3103 NMAC, 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 Volume 1, Soil Screening Guidance for Human Health Risk Assessments" (NMED 2019). The 90% values for these seven analytes are as follows:

- Chromium 45 µg/L
- Nitrate 9 mg/L
- Perchlorate 12.4 µg/L
- Sulfate 540 mg/L
- Fluoride 1.44 mg/L
- Chloride 225 mg/L
- Total dissolved solids 900 mg/L

Table 2.2-1
Treated Effluent Analytical Results Summary Table – CY 2021 Quarter 4, DP-1835

Location ID	Sample ID	Sample Date[a]	Parameter Name	Result	Report Unit	90% of Standard or Screening Level	Lab Qualifier	Detect Flag	Filtered	Method Detection Limit
CTUA	CTUA-22-235050	10/5/2021	Chloride	21.5	mg/L	225	n/a[b]	Y[c]	Y[d]	0.335
CTUA	CTUA-22-235051	10/14/2021	Chloride	19.7	mg/L	225	n/a	Y	Y	0.335
CTUA	CTUA-22-235052	10/19/2021	Chloride	19.3	mg/L	225	n/a	Y	Y	0.335
CTUA	CTUA-22-235054	10/26/2021	Chloride	19.2	mg/L	225	n/a	Y	Y	0.335
CTUA	CTUA-22-235053	11/2/2021	Chloride	18.6	mg/L	225	n/a	Y	Y	0.335
CTUA	CTUA-22-235055	11/8/2021	Chloride	18.3	mg/L	225	n/a	Y	Y	0.335
CTUA	CTUA-22-235056	11/15/2021	Chloride	18.9	mg/L	225	n/a	Y	Y	0.335
CTUA	CTUA-22-235057	11/22/2021	Chloride	22.8	mg/L	225	n/a	Y	Y	0.335
CTUA	CTUA-22-235058	11/29/2021	Chloride	19.8	mg/L	225	n/a	Y	Y	0.335
CTUA	CTUA-22-235059	12/7/2021	Chloride	18.3	mg/L	225	n/a	Y	Y	0.335
CTUA	CTUA-22-235060	12/13/2021	Chloride	19.8	mg/L	225	n/a	Y	Y	0.335
CTUA	CTUA-22-235061	12/20/2021	Chloride	17.9	mg/L	225	n/a	Y	Y	0.335
CTUC	CTUC-22-235311	10/5/2021	Chloride	19.7	mg/L	225	n/a	Y	Y	0.335
CTUC	CTUC-22-235312	10/14/2021	Chloride	19.5	mg/L	225	n/a	Y	Y	0.335
CTUC	CTUC-22-235313	10/19/2021	Chloride	19.5	mg/L	225	n/a	Y	Y	0.335
CTUC	CTUC-22-235315	10/26/2021	Chloride	19.1	mg/L	225	n/a	Y	Y	0.335
CTUC	CTUC-22-235314	11/2/2021	Chloride	19.6	mg/L	225	n/a	Y	Y	0.335
CTUC	CTUC-22-235316	11/8/2021	Chloride	18.2	mg/L	225	n/a	Y	Y	0.335
CTUC	CTUC-22-235317	11/15/2021	Chloride	19	mg/L	225	n/a	Y	Y	0.335
CTUC	CTUC-22-235318	11/22/2021	Chloride	19.9	mg/L	225	n/a	Y	Y	0.335
CTUC	CTUC-22-235319	11/29/2021	Chloride	19.3	mg/L	225	n/a	Y	Y	0.335
CTUC	CTUC-22-235320	12/7/2021	Chloride	18.6	mg/L	225	n/a	Y	Y	0.335
CTUC	CTUC-22-235321	12/13/2021	Chloride	21	mg/L	225	n/a	Y	Y	0.335
CTUC	CTUC-22-235322	12/20/2021	Chloride	17.9	mg/L	225	n/a	Y	Y	0.335

Table 2.2-1 (continued)

Location ID	Sample ID	Sample Date[a]	Parameter Name	Result	Report Unit	90% of Standard or Screening Level	Lab Qualifier	Detect Flag	Filtered	Method Detection Limit
CTUA	CTUA-22-235050	10/5/2021	Chromium	3	µg/L	45	U[e]	N[f]	Y	3
CTUA	CTUA-22-235051	10/14/2021	Chromium	3	µg/L	45	U	N	Y	3
CTUA	CTUA-22-235052	10/19/2021	Chromium	3	µg/L	45	U	N	Y	3
CTUA	CTUA-22-235054	10/26/2021	Chromium	3	µg/L	45	U	N	Y	3
CTUA	CTUA-22-235053	11/2/2021	Chromium	3	µg/L	45	U	N	Y	3
CTUA	CTUA-22-235055	11/8/2021	Chromium	3	µg/L	45	U	N	Y	3
CTUA	CTUA-22-235056	11/15/2021	Chromium	3	µg/L	45	U	N	Y	3
CTUA	CTUA-22-235057	11/22/2021	Chromium	3	µg/L	45	U	N	Y	3
CTUA	CTUA-22-235058	11/29/2021	Chromium	3	µg/L	45	U	N	Y	3
CTUA	CTUA-22-235059	12/7/2021	Chromium	3	µg/L	45	U	N	Y	3
CTUA	CTUA-22-235060	12/13/2021	Chromium	3	µg/L	45	U	N	Y	3
CTUA	CTUA-22-235061	12/20/2021	Chromium	3	µg/L	45	U	N	Y	3
CTUC	CTUC-22-235311	10/5/2021	Chromium	3	µg/L	45	U	N	Y	3
CTUC	CTUC-22-235312	10/14/2021	Chromium	3	µg/L	45	U	N	Y	3
CTUC	CTUC-22-235313	10/19/2021	Chromium	3	µg/L	45	U	N	Y	3
CTUC	CTUC-22-235315	10/26/2021	Chromium	3	µg/L	45	U	N	Y	3
CTUC	CTUC-22-235314	11/2/2021	Chromium	3	µg/L	45	U	N	Y	3
CTUC	CTUC-22-235316	11/8/2021	Chromium	3	µg/L	45	U	N	Y	3
CTUC	CTUC-22-235317	11/15/2021	Chromium	3	µg/L	45	U	N	Y	3
CTUC	CTUC-22-235318	11/22/2021	Chromium	3	µg/L	45	U	N	Y	3
CTUC	CTUC-22-235319	11/29/2021	Chromium	3	µg/L	45	U	N	Y	3
CTUC	CTUC-22-235320	12/7/2021	Chromium	3	µg/L	45	U	N	Y	3
CTUC	CTUC-22-235321	12/13/2021	Chromium	3	µg/L	45	U	N	Y	3
CTUC	CTUC-22-235322	12/20/2021	Chromium	3	µg/L	45	U	N	Y	3
CTUA	CTUA-22-235050	10/5/2021	Fluoride	0.17	mg/L	1.44	n/a	Y	Y	0.033
CTUA	CTUA-22-235051	10/14/2021	Fluoride	0.244	mg/L	1.44	n/a	Y	Y	0.033

Table 2.2-1 (continued)

Location ID	Sample ID	Sample Date[a]	Parameter Name	Result	Report Unit	90% of Standard or Screening Level	Lab Qualifier	Detect Flag	Filtered	Method Detection Limit
CTUA	CTUA-22-235052	10/19/2021	Fluoride	0.167	mg/L	1.44	n/a	Y	Y	0.033
CTUA	CTUA-22-235054	10/26/2021	Fluoride	0.309	mg/L	1.44	n/a	Y	Y	0.033
CTUA	CTUA-22-235053	11/2/2021	Fluoride	0.336	mg/L	1.44	n/a	Y	Y	0.033
CTUA	CTUA-22-235055	11/8/2021	Fluoride	0.472	mg/L	1.44	n/a	Y	Y	0.033
CTUA	CTUA-22-235056	11/15/2021	Fluoride	0.29	mg/L	1.44	n/a	Y	Y	0.033
CTUA	CTUA-22-235057	11/22/2021	Fluoride	0.314	mg/L	1.44	n/a	Y	Y	0.033
CTUA	CTUA-22-235058	11/29/2021	Fluoride	0.317	mg/L	1.44	n/a	Y	Y	0.033
CTUA	CTUA-22-235059	12/7/2021	Fluoride	0.191	mg/L	1.44	n/a	Y	Y	0.033
CTUA	CTUA-22-235060	12/13/2021	Fluoride	0.329	mg/L	1.44	n/a	Y	Y	0.033
CTUA	CTUA-22-235061	12/20/2021	Fluoride	0.267	mg/L	1.44	n/a	Y	Y	0.033
CTUC	CTUC-22-235311	10/5/2021	Fluoride	0.17	mg/L	1.44	n/a	Y	Y	0.033
CTUC	CTUC-22-235312	10/14/2021	Fluoride	0.247	mg/L	1.44	n/a	Y	Y	0.033
CTUC	CTUC-22-235313	10/19/2021	Fluoride	0.169	mg/L	1.44	n/a	Y	Y	0.033
CTUC	CTUC-22-235315	10/26/2021	Fluoride	0.285	mg/L	1.44	n/a	Y	Y	0.033
CTUC	CTUC-22-235314	11/2/2021	Fluoride	0.405	mg/L	1.44	n/a	Y	Y	0.033
CTUC	CTUC-22-235316	11/8/2021	Fluoride	0.4	mg/L	1.44	n/a	Y	Y	0.033
CTUC	CTUC-22-235317	11/15/2021	Fluoride	0.196	mg/L	1.44	n/a	Y	Y	0.033
CTUC	CTUC-22-235318	11/22/2021	Fluoride	0.315	mg/L	1.44	n/a	Y	Y	0.033
CTUC	CTUC-22-235319	11/29/2021	Fluoride	0.314	mg/L	1.44	n/a	Y	Y	0.033
CTUC	CTUC-22-235320	12/7/2021	Fluoride	0.193	mg/L	1.44	n/a	Y	Y	0.033
CTUC	CTUC-22-235321	12/13/2021	Fluoride	0.331	mg/L	1.44	n/a	Y	Y	0.033
CTUC	CTUC-22-235322	12/20/2021	Fluoride	0.266	mg/L	1.44	n/a	Y	Y	0.033
CTUA	CTUA-22-235050	10/5/2021	Nitrate-Nitrite as Nitrogen	6.04	mg/L	9	n/a	Y	Y	0.17
CTUA	CTUA-22-235051	10/14/2021	Nitrate-Nitrite as Nitrogen	3.57	mg/L	9	n/a	Y	Y	0.17
CTUA	CTUA-22-235052	10/19/2021	Nitrate-Nitrite as Nitrogen	3.69	mg/L	9	n/a	Y	Y	0.17
CTUA	CTUA-22-235054	10/26/2021	Nitrate-Nitrite as Nitrogen	3.71	mg/L	9	n/a	Y	Y	0.085

Table 2.2-1 (continued)

Location ID	Sample ID	Sample Date[a]	Parameter Name	Result	Report Unit	90% of Standard or Screening Level	Lab Qualifier	Detect Flag	Filtered	Method Detection Limit
CTUA	CTUA-22-235053	11/2/2021	Nitrate-Nitrite as Nitrogen	3.83	mg/L	9	n/a	Y	Y	0.17
CTUA	CTUA-22-235055	11/8/2021	Nitrate-Nitrite as Nitrogen	3.76	mg/L	9	n/a	Y	Y	0.17
CTUA	CTUA-22-235056	11/15/2021	Nitrate-Nitrite as Nitrogen	3.6	mg/L	9	n/a	Y	Y	0.085
CTUA	CTUA-22-235057	11/22/2021	Nitrate-Nitrite as Nitrogen	5.58	mg/L	9	n/a	Y	Y	0.425
CTUA	CTUA-22-235058	11/29/2021	Nitrate-Nitrite as Nitrogen	3.66	mg/L	9	n/a	Y	Y	0.17
CTUA	CTUA-22-235059	12/7/2021	Nitrate-Nitrite as Nitrogen	3.45	mg/L	9	n/a	Y	Y	0.17
CTUA	CTUA-22-235060	12/13/2021	Nitrate-Nitrite as Nitrogen	3.53	mg/L	9	n/a	Y	Y	0.17
CTUA	CTUA-22-235061	12/20/2021	Nitrate-Nitrite as Nitrogen	4.16	mg/L	9	n/a	Y	Y	0.85
CTUC	CTUC-22-235311	10/5/2021	Nitrate-Nitrite as Nitrogen	3.76	mg/L	9	n/a	Y	Y	0.17
CTUC	CTUC-22-235312	10/14/2021	Nitrate-Nitrite as Nitrogen	3.53	mg/L	9	n/a	Y	Y	0.17
CTUC	CTUC-22-235313	10/19/2021	Nitrate-Nitrite as Nitrogen	3.64	mg/L	9	n/a	Y	Y	0.17
CTUC	CTUC-22-235315	10/26/2021	Nitrate-Nitrite as Nitrogen	3.64	mg/L	9	U	N	Y	0.085
CTUC	CTUC-22-235314	11/2/2021	Nitrate-Nitrite as Nitrogen	5.61	mg/L	9	n/a	Y	Y	0.17
CTUC	CTUC-22-235316	11/8/2021	Nitrate-Nitrite as Nitrogen	3.74	mg/L	9	n/a	Y	Y	0.17
CTUC	CTUC-22-235317	11/15/2021	Nitrate-Nitrite as Nitrogen	3.58	mg/L	9	n/a	Y	Y	0.085
CTUC	CTUC-22-235318	11/22/2021	Nitrate-Nitrite as Nitrogen	3.43	mg/L	9	n/a	Y	Y	0.17
CTUC	CTUC-22-235319	11/29/2021	Nitrate-Nitrite as Nitrogen	3.85	mg/L	9	n/a	Y	Y	0.17
CTUC	CTUC-22-235320	12/7/2021	Nitrate-Nitrite as Nitrogen	3.64	mg/L	9	n/a	Y	Y	0.17
CTUC	CTUC-22-235321	12/13/2021	Nitrate-Nitrite as Nitrogen	4.9	mg/L	9	n/a	Y	Y	0.17
CTUC	CTUC-22-235322	12/20/2021	Nitrate-Nitrite as Nitrogen	3	mg/L	9	n/a	Y	Y	0.85
CTUA	CTUA-22-235050	10/5/2021	Perchlorate	0.42	µg/L	12.4	n/a	Y	Y	0.05
CTUA	CTUA-22-235051	10/14/2021	Perchlorate	0.561	µg/L	12.4	n/a	Y	Y	0.05
CTUA	CTUA-22-235052	10/19/2021	Perchlorate	0.51	µg/L	12.4	n/a	Y	Y	0.05
CTUA	CTUA-22-235054	10/26/2021	Perchlorate	0.475	µg/L	12.4	n/a	Y	Y	0.05
CTUA	CTUA-22-235053	11/2/2021	Perchlorate	0.453	µg/L	12.4	n/a	Y	Y	0.05
CTUA	CTUA-22-235055	11/8/2021	Perchlorate	0.449	µg/L	12.4	n/a	Y	Y	0.05

Table 2.2-1 (continued)

Location ID	Sample ID	Sample Date[a]	Parameter Name	Result	Report Unit	90% of Standard or Screening Level	Lab Qualifier	Detect Flag	Filtered	Method Detection Limit
CTUA	CTUA-22-235056	11/15/2021	Perchlorate	0.432	µg/L	12.4	n/a	Y	Y	0.05
CTUA	CTUA-22-235057	11/22/2021	Perchlorate	0.42	µg/L	12.4	J[g]	Y	Y	0.05
CTUA	CTUA-22-235058	11/29/2021	Perchlorate	0.737	µg/L	12.4	n/a	Y	Y	0.05
CTUA	CTUA-22-235059	12/7/2021	Perchlorate	0.714	µg/L	12.4	n/a	Y	Y	0.05
CTUA	CTUA-22-235060	12/13/2021	Perchlorate	0.77	µg/L	12.4	n/a	Y	Y	0.05
CTUA	CTUA-22-235061	12/20/2021	Perchlorate	0.791	µg/L	12.4	n/a	Y	Y	0.05
CTUC	CTUC-22-235311	10/5/2021	Perchlorate	0.665	µg/L	12.4	n/a	Y	Y	0.05
CTUC	CTUC-22-235312	10/14/2021	Perchlorate	0.605	µg/L	12.4	n/a	Y	Y	0.05
CTUC	CTUC-22-235313	10/19/2021	Perchlorate	0.573	µg/L	12.4	J	Y	Y	0.05
CTUC	CTUC-22-235315	10/26/2021	Perchlorate	0.672	µg/L	12.4	J	Y	Y	0.05
CTUC	CTUC-22-235314	11/2/2021	Perchlorate	0.43	µg/L	12.4	n/a	Y	Y	0.05
CTUC	CTUC-22-235316	11/8/2021	Perchlorate	0.528	µg/L	12.4	n/a	Y	Y	0.05
CTUC	CTUC-22-235317	11/15/2021	Perchlorate	0.53	µg/L	12.4	n/a	Y	Y	0.05
CTUC	CTUC-22-235318	11/22/2021	Perchlorate	0.639	µg/L	12.4	n/a	Y	Y	0.05
CTUC	CTUC-22-235319	11/29/2021	Perchlorate	0.524	µg/L	12.4	n/a	Y	Y	0.05
CTUC	CTUC-22-235320	12/7/2021	Perchlorate	0.513	µg/L	12.4	n/a	Y	Y	0.05
CTUC	CTUC-22-235321	12/13/2021	Perchlorate	0.356	µg/L	12.4	n/a	Y	Y	0.05
CTUC	CTUC-22-235322	12/20/2021	Perchlorate	0.452	µg/L	12.4	n/a	Y	Y	0.05
CTUA	CTUA-22-235050	10/5/2021	Sulfate	1.94	mg/L	540	n/a	Y	Y	0.133
CTUA	CTUA-22-235051	10/14/2021	Sulfate	28.9	mg/L	540	n/a	Y	Y	0.665
CTUA	CTUA-22-235052	10/19/2021	Sulfate	29	mg/L	540	n/a	Y	Y	0.665
CTUA	CTUA-22-235054	10/26/2021	Sulfate	27.9	mg/L	540	n/a	Y	Y	0.665
CTUA	CTUA-22-235053	11/2/2021	Sulfate	28.3	mg/L	540	n/a	Y	Y	0.266
CTUA	CTUA-22-235055	11/8/2021	Sulfate	27	mg/L	540	n/a	Y	Y	0.665
CTUA	CTUA-22-235056	11/15/2021	Sulfate	28.3	mg/L	540	n/a	Y	Y	0.665
CTUA	CTUA-22-235057	11/22/2021	Sulfate	1.21	mg/L	540	n/a	Y	Y	0.133

Table 2.2-1 (continued)

Location ID	Sample ID	Sample Date[a]	Parameter Name	Result	Report Unit	90% of Standard or Screening Level	Lab Qualifier	Detect Flag	Filtered	Method Detection Limit
CTUA	CTUA-22-235058	11/29/2021	Sulfate	27.8	mg/L	540	n/a	Y	Y	0.665
CTUA	CTUA-22-235059	12/7/2021	Sulfate	26.9	mg/L	540	n/a	Y	Y	0.665
CTUA	CTUA-22-235060	12/13/2021	Sulfate	28.7	mg/L	540	n/a	Y	Y	0.665
CTUA	CTUA-22-235061	12/20/2021	Sulfate	26.4	mg/L	540	n/a	Y	Y	0.665
CTUC	CTUC-22-235311	10/5/2021	Sulfate	29.6	mg/L	540	n/a	Y	Y	0.665
CTUC	CTUC-22-235312	10/14/2021	Sulfate	28.7	mg/L	540	n/a	Y	Y	0.665
CTUC	CTUC-22-235313	10/19/2021	Sulfate	29.3	mg/L	540	n/a	Y	Y	0.665
CTUC	CTUC-22-235315	10/26/2021	Sulfate	28.1	mg/L	540	n/a	N	Y	0.665
CTUC	CTUC-22-235314	11/2/2021	Sulfate	8.18	mg/L	540	n/a	Y	Y	0.133
CTUC	CTUC-22-235316	11/8/2021	Sulfate	26.7	mg/L	540	n/a	Y	Y	0.665
CTUC	CTUC-22-235317	11/15/2021	Sulfate	28.7	mg/L	540	n/a	Y	Y	0.665
CTUC	CTUC-22-235318	11/22/2021	Sulfate	27.8	mg/L	540	n/a	Y	Y	0.665
CTUC	CTUC-22-235319	11/29/2021	Sulfate	27.4	mg/L	540	n/a	Y	Y	0.665
CTUC	CTUC-22-235320	12/7/2021	Sulfate	27.8	mg/L	540	n/a	Y	Y	0.665
CTUC	CTUC-22-235321	12/13/2021	Sulfate	8.79	mg/L	540	n/a	Y	Y	0.133
CTUC	CTUC-22-235322	12/20/2021	Sulfate	26.3	mg/L	540	n/a	Y	Y	0.665
CTUA	CTUA-22-235050	10/5/2021	Total Dissolved Solids	240	mg/L	900	n/a	Y	Y	3.4
CTUA	CTUA-22-235051	10/14/2021	Total Dissolved Solids	244	mg/L	900	n/a	Y	Y	3.4
CTUA	CTUA-22-235052	10/19/2021	Total Dissolved Solids	234	mg/L	900	n/a	Y	Y	3.4
CTUA	CTUA-22-235054	10/26/2021	Total Dissolved Solids	257	mg/L	900	n/a	Y	Y	3.4
CTUA	CTUA-22-235053	11/2/2021	Total Dissolved Solids	236	mg/L	900	n/a	Y	Y	3.4
CTUA	CTUA-22-235055	11/8/2021	Total Dissolved Solids	233	mg/L	900	n/a	Y	Y	3.4
CTUA	CTUA-22-235056	11/15/2021	Total Dissolved Solids	231	mg/L	900	n/a	Y	Y	3.4
CTUA	CTUA-22-235057	11/22/2021	Total Dissolved Solids	240	mg/L	900	n/a	Y	Y	3.4
CTUA	CTUA-22-235058	11/29/2021	Total Dissolved Solids	227	mg/L	900	n/a	Y	Y	3.4
CTUA	CTUA-22-235059	12/7/2021	Total Dissolved Solids	213	mg/L	900	n/a	Y	Y	3.4

Table 2.2-1 (continued)

Location ID	Sample ID	Sample Date[a]	Parameter Name	Result	Report Unit	90% of Standard or Screening Level	Lab Qualifier	Detect Flag	Filtered	Method Detection Limit
CTUA	CTUA-22-235060	12/13/2021	Total Dissolved Solids	229	mg/L	900	n/a	Y	Y	3.4
CTUA	CTUA-22-235061	12/20/2021	Total Dissolved Solids	230	mg/L	900	n/a	Y	Y	3.4
CTUC	CTUC-22-235311	10/5/2021	Total Dissolved Solids	236	mg/L	900	n/a	Y	Y	3.4
CTUC	CTUC-22-235312	10/14/2021	Total Dissolved Solids	260	mg/L	900	n/a	Y	Y	3.4
CTUC	CTUC-22-235313	10/19/2021	Total Dissolved Solids	217	mg/L	900	n/a	Y	Y	3.4
CTUC	CTUC-22-235315	10/26/2021	Total Dissolved Solids	226	mg/L	900	n/a	Y	Y	3.4
CTUC	CTUC-22-235314	11/2/2021	Total Dissolved Solids	290	mg/L	900	n/a	Y	Y	3.4
CTUC	CTUC-22-235316	11/8/2021	Total Dissolved Solids	233	mg/L	900	n/a	Y	Y	3.4
CTUC	CTUC-22-235317	11/15/2021	Total Dissolved Solids	239	mg/L	900	n/a	Y	Y	3.4
CTUC	CTUC-22-235318	11/22/2021	Total Dissolved Solids	241	mg/L	900	n/a	Y	Y	3.4
CTUC	CTUC-22-235319	11/29/2021	Total Dissolved Solids	237	mg/L	900	n/a	Y	Y	3.4
CTUC	CTUC-22-235320	12/7/2021	Total Dissolved Solids	220	mg/L	900	n/a	Y	Y	3.4
CTUC	CTUC-22-235321	12/13/2021	Total Dissolved Solids	243	mg/L	900	n/a	Y	Y	3.4
CTUC	CTUC-22-235322	12/20/2021	Total Dissolved Solids	234	mg/L	900	n/a	Y	Y	3.4

[a] In accordance with Condition No. 13 of DP-1835, analysis of the treated effluent from each IX unit is required only once every month for the CY 2021 Quarter 4 reporting period.

[b] n/a = Not applicable: no qualifiers applied.

[c] In the Detect Flag column, Y = detected.

[d] In the Filtered column, Y = filtered.

[e] U = Analyte is classified as not detected.

[f] N = No (not detected).

[g] J = Analyte is classified as estimated.

The pilot-scale molasses and sodium dithionite amendment studies continued during 2021 Quarter 4. NMED determined that no permit was required for the deployment of these amendments, and these studies began with NMED conditional approvals during 2017 Quarter 4 (NMED 2017a, NMED 2017b). In accordance with the NMED conditional approvals, iron, manganese, and arsenic sampling in the treated water from extraction wells was completed, and the results were submitted in the quarterly monitoring reports under DP-1835. These results for 2021 Quarter 4 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.

DP-1835 Permit Condition No. 13 requires treated effluent to be analyzed annually for all water contaminants listed in 20.6.2.3103 NMAC and all toxic pollutants defined in 20.6.2.7.T(2) NMAC. The annual sample for 2021 was obtained during Quarter 3.

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 for a non-exhaustive selection of wells. An explanation of how the groundwater elevation map was generated is provided below. Quarterly groundwater analytical results from samples collected during 2021 Quarter 4 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

- local infiltration zones and recharge areas (e.g., beneath canyons),
- heterogeneity and anisotropy in the aquifer properties, and
- extraction and injection locations (municipal water-supply wells and chromium interim measure [IM] 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 (far outside of the boundary depicted in Figure 2.3-1) because of the mountain-front recharge and to the east toward 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, the general flow of groundwater can be determined. Groundwater elevation data and contaminant transport observations indicated that prior to operation of the IM, the groundwater flowed generally toward the east-southeast. The current groundwater flows generally towards the southeast. This change in flow direction is due to the extraction and injection of groundwater.

Table 2.2-2
Treated Effluent Analytical Results Summary Table Related to Molasses and Sodium Dithionite Pilot Studies under NMED Conditional Approval – CY 2021 Quarter 4, DP-1835

Location ID	Sample ID	Sample Date[a]	Parameter Name	Result	Report Unit	90% of Standard or Screening Level	Lab Qualifier	Detect Flag	Filtered	Method Detection Limit
CTUA	CTUA-22-235050	10/5/2021	Arsenic	4.83	µg/L	9	J[b]	Y[c]	Y[d]	2
CTUA	CTUA-22-235051	10/14/2021	Arsenic	2.22	µg/L	9	J	Y	Y	2
CTUA	CTUA-22-235052	10/19/2021	Arsenic	2.51	µg/L	9	J	Y	Y	2
CTUA	CTUA-22-235054	10/26/2021	Arsenic	3.15	µg/L	9	J	Y	Y	2
CTUA	CTUA-22-235053	11/2/2021	Arsenic	3.25	µg/L	9	J	Y	Y	2
CTUA	CTUA-22-235055	11/8/2021	Arsenic	2	µg/L	9	U[e]	N[f]	Y	2
CTUA	CTUA-22-235056	11/15/2021	Arsenic	2	µg/L	9	U	N	Y	2
CTUA	CTUA-22-235057	11/22/2021	Arsenic	2	µg/L	9	U	N	Y	2
CTUA	CTUA-22-235058	11/29/2021	Arsenic	6.2	µg/L	9	n/a[g]	Y	Y	2
CTUA	CTUA-22-235059	12/7/2021	Arsenic	2	µg/L	9	U	N	Y	2
CTUA	CTUA-22-235060	12/13/2021	Arsenic	2.82	µg/L	9	J	Y	Y	2
CTUA	CTUA-22-235061	12/20/2021	Arsenic	2.27	µg/L	9	J	Y	Y	2
CTUC	CTUC-22-235311	10/5/2021	Arsenic	5.23	µg/L	9	n/a	Y	Y	2
CTUC	CTUC-22-235312	10/14/2021	Arsenic	2.37	µg/L	9	J	Y	Y	2
CTUC	CTUC-22-235313	10/19/2021	Arsenic	2.27	µg/L	9	J	Y	Y	2
CTUC	CTUC-22-235315	10/26/2021	Arsenic	2.92	µg/L	9	J	Y	Y	2
CTUC	CTUC-22-235314	11/2/2021	Arsenic	4.56	µg/L	9	J	Y	Y	2
CTUC	CTUC-22-235316	11/8/2021	Arsenic	2	µg/L	9	U	N	Y	2
CTUC	CTUC-22-235317	11/15/2021	Arsenic	2	µg/L	9	U	N	Y	2
CTUC	CTUC-22-235318	11/22/2021	Arsenic	2.09	µg/L	9	J	Y	Y	2
CTUC	CTUC-22-235319	11/29/2021	Arsenic	5.22	µg/L	9	n/a	Y	Y	2
CTUC	CTUC-22-235320	12/7/2021	Arsenic	2	µg/L	9	U	N	Y	2
CTUC	CTUC-22-235321	12/13/2021	Arsenic	5.01	µg/L	9	n/a	Y	Y	2
CTUC	CTUC-22-235322	12/20/2021	Arsenic	2.41	µg/L	9	J	Y	Y	2
CTUA	CTUA-22-235050	10/5/2021	Iron	30	µg/L	900	U	N	Y	30

Table 2.2-2 (continued)

Location ID	Sample ID	Sample Date[a]	Parameter Name	Result	Report Unit	90% of Standard or Screening Level	Lab Qualifier	Detect Flag	Filtered	Method Detection Limit
CTUA	CTUA-22-235051	10/14/2021	Iron	30	µg/L	900	U	N	Y	30
CTUA	CTUA-22-235052	10/19/2021	Iron	30	µg/L	900	U	N	Y	30
CTUA	CTUA-22-235054	10/26/2021	Iron	30	µg/L	900	U	N	Y	30
CTUA	CTUA-22-235053	11/2/2021	Iron	30	µg/L	900	U	N	Y	30
CTUA	CTUA-22-235055	11/8/2021	Iron	30	µg/L	900	U	N	Y	30
CTUA	CTUA-22-235056	11/15/2021	Iron	30	µg/L	900	U	N	Y	30
CTUA	CTUA-22-235057	11/22/2021	Iron	30	µg/L	900	U	N	Y	30
CTUA	CTUA-22-235058	11/29/2021	Iron	30	µg/L	900	U	N	Y	30
CTUA	CTUA-22-235059	12/7/2021	Iron	30	µg/L	900	U	N	Y	30
CTUA	CTUA-22-235060	12/13/2021	Iron	30	µg/L	900	U	N	Y	30
CTUA	CTUA-22-235061	12/20/2021	Iron	30	µg/L	900	U	N	Y	30
CTUC	CTUC-22-235311	10/5/2021	Iron	30	µg/L	900	U	N	Y	30
CTUC	CTUC-22-235312	10/14/2021	Iron	30	µg/L	900	U	N	Y	30
CTUC	CTUC-22-235313	10/19/2021	Iron	30	µg/L	900	U	N	Y	30
CTUC	CTUC-22-235315	10/26/2021	Iron	30	µg/L	900	U	N	Y	30
CTUC	CTUC-22-235314	11/2/2021	Iron	30	µg/L	900	U	N	Y	30
CTUC	CTUC-22-235316	11/8/2021	Iron	30	µg/L	900	U	N	Y	30
CTUC	CTUC-22-235317	11/15/2021	Iron	30	µg/L	900	U	N	Y	30
CTUC	CTUC-22-235318	11/22/2021	Iron	30	µg/L	900	U	N	Y	30
CTUC	CTUC-22-235319	11/29/2021	Iron	30	µg/L	900	U	N	Y	30
CTUC	CTUC-22-235320	12/7/2021	Iron	30	µg/L	900	U	N	Y	30
CTUC	CTUC-22-235321	12/13/2021	Iron	30	µg/L	900	U	N	Y	30
CTUC	CTUC-22-235322	12/20/2021	Iron	30	µg/L	900	U	N	Y	30
CTUA	CTUA-22-235050	10/5/2021	Manganese	2	µg/L	180	U	N	Y	2
CTUA	CTUA-22-235051	10/14/2021	Manganese	2	µg/L	180	U	N	Y	2
CTUA	CTUA-22-235052	10/19/2021	Manganese	2	µg/L	180	U	N	Y	2
CTUA	CTUA-22-235054	10/26/2021	Manganese	2	µg/L	180	U	N	Y	2

Table 2.2-2 (continued)

Location ID	Sample ID	Sample Date[a]	Parameter Name	Result	Report Unit	90% of Standard or Screening Level	Lab Qualifier	Detect Flag	Filtered	Method Detection Limit
CTUA	CTUA-22-235053	11/2/2021	Manganese	2	µg/L	180	U	N	Y	2
CTUA	CTUA-22-235055	11/8/2021	Manganese	2	µg/L	180	U	N	Y	2
CTUA	CTUA-22-235056	11/15/2021	Manganese	2	µg/L	180	U	N	Y	2
CTUA	CTUA-22-235057	11/22/2021	Manganese	2	µg/L	180	U	N	Y	2
CTUA	CTUA-22-235058	11/29/2021	Manganese	2	µg/L	180	U	N	Y	2
CTUA	CTUA-22-235059	12/7/2021	Manganese	2	µg/L	180	U	N	Y	2
CTUA	CTUA-22-235060	12/13/2021	Manganese	2	µg/L	180	U	N	Y	2
CTUA	CTUA-22-235061	12/20/2021	Manganese	2	µg/L	180	U	N	Y	2
CTUC	CTUC-22-235311	10/5/2021	Manganese	2	µg/L	180	U	N	Y	2
CTUC	CTUC-22-235312	10/14/2021	Manganese	2	µg/L	180	U	N	Y	2
CTUC	CTUC-22-235313	10/19/2021	Manganese	2	µg/L	180	U	N	Y	2
CTUC	CTUC-22-235315	10/26/2021	Manganese	2	µg/L	180	U	N	Y	2
CTUC	CTUC-22-235314	11/2/2021	Manganese	2	µg/L	180	U	N	Y	2
CTUC	CTUC-22-235316	11/8/2021	Manganese	2	µg/L	180	U	N	Y	2
CTUC	CTUC-22-235317	11/15/2021	Manganese	2	µg/L	180	U	N	Y	2
CTUC	CTUC-22-235318	11/22/2021	Manganese	2	µg/L	180	U	N	Y	2
CTUC	CTUC-22-235319	11/29/2021	Manganese	2	µg/L	180	U	N	Y	2
CTUC	CTUC-22-235320	12/7/2021	Manganese	2	µg/L	180	U	N	Y	2
CTUC	CTUC-22-235321	12/13/2021	Manganese	2	µg/L	180	U	N	Y	2
CTUC	CTUC-22-235322	12/20/2021	Manganese	2	µg/L	180	U	N	Y	2

[a] In accordance with Condition No. 13 of DP-1835, analysis of the treated effluent from each IX unit is required only once every month for the CY 2021 Quarter 4 reporting period.

[b] J = Analyte is classified as estimated.

[c] In the Detect Flag column, Y = detected.

[d] In the Filtered column, Y= filtered.

[e] U = Analyte is classified as not detected.

[f] N = No (not detected).

[g] n/a = Not applicable: no qualifiers applied.

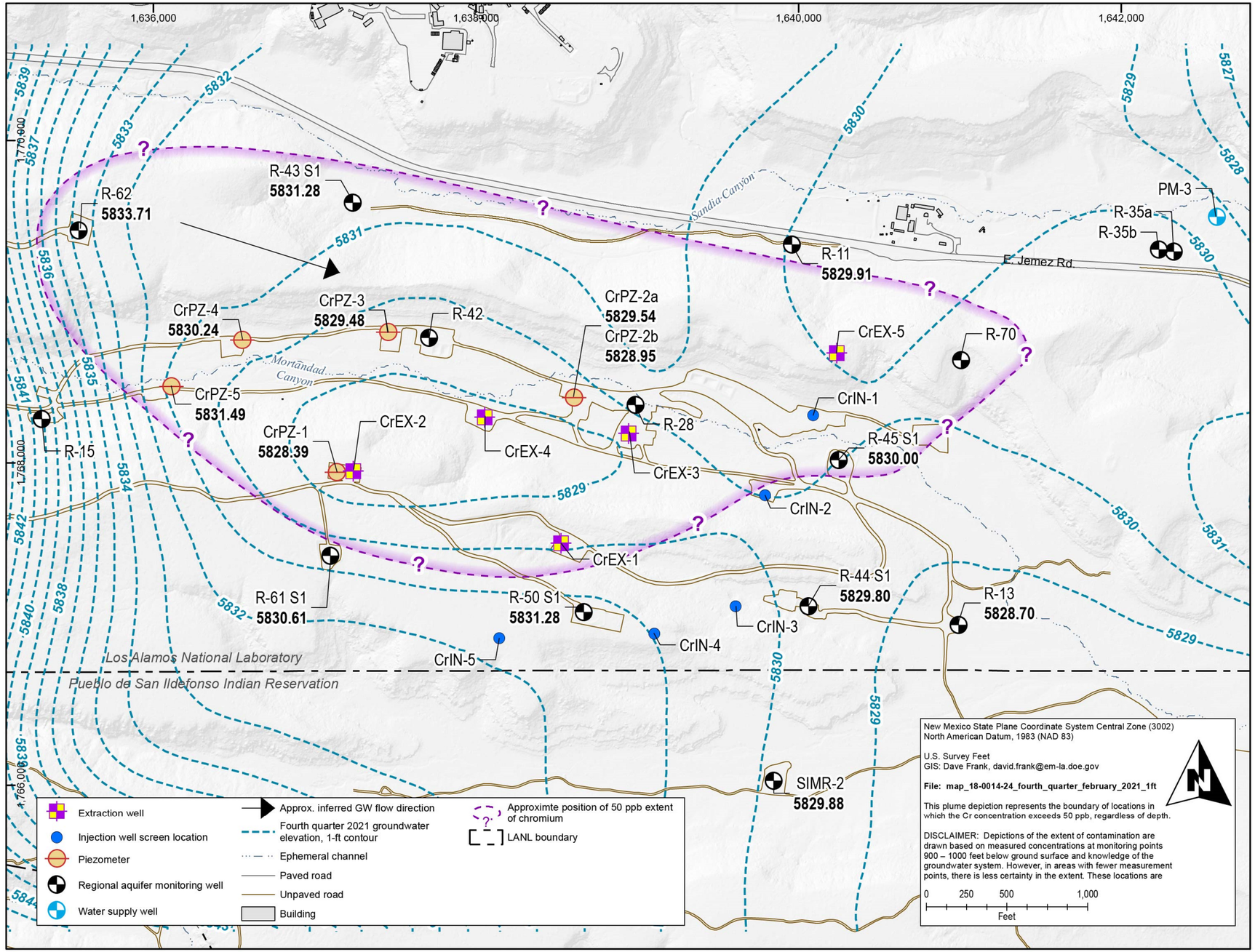

Figure 2.3-1 Groundwater elevation contour map – CY 2021 Quarter 4, DP-1835

Table 2.3-1
Groundwater Elevations Summary for
Groundwater Monitoring Wells – CY 2021 Quarter 4, DP-1835

Monitoring Well	Groundwater Elevation[a] (ft)
CrPZ-1 (CrCH-1)	5828.39
CrPZ-2a (CrCH-2a)	5829.54
CrPZ-2b (CrCH-2b)	5828.95
CrPZ-3 (CrCH-3)	5829.48
CrPZ-4 (CrCH-4)	5830.24
CrPZ-5 (CrCH-5)	5831.49
R-11	5829.91
R-13	5828.70
R-43 S1[b]	5831.28
R-43 S2[c]	5830.64
R-44 S1	5829.80
R-44 S2	5829.34
R-45 S1	5830.00
R-45 S2	5829.20
R-50 S1	5831.28
R-50 S2	5830.17
R-61 S1	5830.61
R-61 S2	5830.47
R-62	5833.71
SIMR-2[d]	5829.88

[a] Groundwater elevations provided are based on average November 2021 values from transducers.

[b] S1 = Screen 1.

[c] S2 = Screen 2.

[d] Third-quarter average August 2021 SIMR-2 data are reported here in accordance with the DP-1835 2021 Quarter 3 report (N3B 2021). Data were unavailable at the time of that report's preparation and are included in this report 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 – CY 2021 Quarter 4, DP-1835

Field Sample ID	Location ID	Sample Date	Parameter Name	Report Result	Report Unit	Lab Qualifier	Detect Flag	Filtered	Method Detection Limit
CASA-22-234999	R-11	10/12/2021	Chloride	4.13	mg/L	n/a[a]	Y[b]	Y[c]	0.0670
CASA-22-234999	R-11	10/12/2021	Perchlorate	0.778	µg/L	n/a	Y	Y	0.0500
CASA-22-234999	R-11	10/12/2021	Chromium	12.2	µg/L	n/a	Y	Y	3.00
CASA-22-234999	R-11	10/12/2021	Fluoride	0.350	mg/L	n/a	Y	Y	0.0330
CASA-22-234999	R-11	10/12/2021	Nitrate-Nitrite as Nitrogen	6.08	mg/L	n/a	Y	Y	0.425
CASA-22-234999	R-11	10/12/2021	Sulfate	9.37	mg/L	n/a	Y	Y	0.133
CASA-22-234999	R-11	10/12/2021	Total Dissolved Solids	180	mg/L	n/a	Y	Y	3.40
CASA-22-236420	R-11	11/02/2021	Chloride	3.59	mg/L	n/a	Y	Y	0.0670
CASA-22-236420	R-11	11/02/2021	Perchlorate	0.776	µg/L	n/a	Y	Y	0.0500
CASA-22-236420	R-11	11/02/2021	Chromium	12.7	µg/L	n/a	Y	Y	3.00
CASA-22-236420	R-11	11/02/2021	Fluoride	0.600	mg/L	n/a	Y	Y	0.0330
CASA-22-236420	R-11	11/02/2021	Nitrate-Nitrite as Nitrogen	6.21	mg/L	n/a	Y	Y	0.170
CASA-22-236420	R-11	11/02/2021	Sulfate	8.67	mg/L	n/a	Y	Y	0.133
CASA-22-236420	R-11	11/02/2021	Total Dissolved Solids	186	mg/L	n/a	Y	Y	3.40
CASA-22-237779	R-11	12/16/2021	Chloride	3.68	mg/L	n/a	Y	Y	0.0670
CASA-22-237779	R-11	12/16/2021	Perchlorate	0.782	µg/L	n/a	Y	Y	0.0500
CASA-22-237779	R-11	12/16/2021	Chromium	13.4	µg/L	n/a	Y	Y	3.00
CASA-22-237779	R-11	12/16/2021	Fluoride	0.476	mg/L	n/a	Y	Y	0.0330
CASA-22-237779	R-11	12/16/2021	Nitrate-Nitrite as Nitrogen	5.92	mg/L	n/a	Y	Y	0.170
CASA-22-237779	R-11	12/16/2021	Sulfate	8.81	mg/L	n/a	Y	Y	0.133
CASA-22-237779	R-11	12/16/2021	Total Dissolved Solids	191	mg/L	n/a	Y	Y	3.40
CAMO-22-236290	R-13	11/12/2021	Chloride	2.72	mg/L	n/a	Y	Y	0.0670
CAMO-22-236290	R-13	11/12/2021	Perchlorate	0.402	µg/L	n/a	Y	Y	0.0500
CAMO-22-236290	R-13	11/12/2021	Chromium	4.66	µg/L	J[d]	Y	Y	3.00
CAMO-22-236290	R-13	11/12/2021	Fluoride	0.221	mg/L	n/a	Y	Y	0.0330

Table 2.3-2 (continued)

Field Sample ID	Location ID	Sample Date	Parameter Name	Report Result	Report Unit	Lab Qualifier	Detect Flag	Filtered	Method Detection Limit
CAMO-22-236290	R-13	11/12/2021	Nitrate-Nitrite as Nitrogen	0.810	mg/L	n/a	Y	Y	0.0170
CAMO-22-236290	R-13	11/12/2021	Sulfate	3.57	mg/L	n/a	Y	Y	0.133
CAMO-22-236290	R-13	11/12/2021	Total Dissolved Solids	131	mg/L	n/a	Y	Y	3.40
CASA-22-236445	R-43 S1[e]	11/18/2021	Chloride	7.97	mg/L	n/a	Y	Y	0.0670
CASA-22-236445	R-43 S1	11/18/2021	Perchlorate	0.724	µg/L	n/a	Y	Y	0.0500
CASA-22-236445	R-43 S1	11/18/2021	Chromium	199	µg/L	n/a	Y	Y	3.00
CASA-22-236445	R-43 S1	11/18/2021	Fluoride	0.241	mg/L	n/a	Y	Y	0.0330
CASA-22-236445	R-43 S1	11/18/2021	Nitrate-Nitrite as Nitrogen	5.18	mg/L	n/a	Y	Y	0.170
CASA-22-236445	R-43 S1	11/18/2021	Sulfate	17.5	mg/L	n/a	Y	Y	0.133
CASA-22-236445	R-43 S1	11/18/2021	Total Dissolved Solids	173	mg/L	n/a	Y	Y	3.40
CASA-22-236453	R-43 S2[f]	11/02/2021	Chloride	6.80	mg/L	n/a	Y	Y	0.0670
CASA-22-236453	R-43 S2	11/02/2021	Perchlorate	0.890	µg/L	n/a	Y	Y	0.0500
CASA-22-236453	R-43 S2	11/02/2021	Chromium	35.3	µg/L	n/a	Y	Y	3.00
CASA-22-236453	R-43 S2	11/02/2021	Fluoride	0.517	mg/L	n/a	Y	Y	0.0330
CASA-22-236453	R-43 S2	11/02/2021	Nitrate-Nitrite as Nitrogen	4.15	mg/L	n/a	Y	Y	0.170
CASA-22-236453	R-43 S2	11/02/2021	Sulfate	9.99	mg/L	n/a	Y	Y	0.133
CASA-22-236453	R-43 S2	11/02/2021	Total Dissolved Solids	174	mg/L	n/a	Y	Y	3.40
CAMO-22-235012	R-44 S1	10/19/2021	Chloride	20.4	mg/L	n/a	Y	Y	0.335
CAMO-22-235012	R-44 S1	10/19/2021	Perchlorate	0.425	µg/L	n/a	Y	Y	0.0500
CAMO-22-235012	R-44 S1	10/19/2021	Chromium	3.62	µg/L	J	Y	Y	3.00
CAMO-22-235012	R-44 S1	10/19/2021	Fluoride	0.104	mg/L	n/a	Y	Y	0.0330
CAMO-22-235012	R-44 S1	10/19/2021	Nitrate-Nitrite as Nitrogen	2.87	mg/L	n/a	Y	Y	0.170
CAMO-22-235012	R-44 S1	10/19/2021	Sulfate	20.7	mg/L	n/a	Y	Y	0.665
CAMO-22-235012	R-44 S1	10/19/2021	Total Dissolved Solids	226	mg/L	n/a	Y	Y	3.40
CAMO-22-236317	R-44 S1	11/16/2021	Chloride	20.4	mg/L	n/a	Y	Y	0.335
CAMO-22-236317	R-44 S1	11/16/2021	Perchlorate	0.427	µg/L	n/a	Y	Y	0.0500
CAMO-22-236317	R-44 S1	11/16/2021	Chromium	3.17	µg/L	J	Y	Y	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	Method Detection Limit
CAMO-22-236317	R-44 S1	11/16/2021	Fluoride	0.128	mg/L	n/a	Y	Y	0.0330
CAMO-22-236317	R-44 S1	11/16/2021	Nitrate-Nitrite as Nitrogen	2.88	mg/L	n/a	Y	Y	0.0850
CAMO-22-236317	R-44 S1	11/16/2021	Sulfate	20.7	mg/L	n/a	Y	Y	0.665
CAMO-22-236317	R-44 S1	11/16/2021	Total Dissolved Solids	217	mg/L	n/a	Y	Y	3.40
CAMO-22-237792	R-44 S1	12/13/2021	Chloride	20.3	mg/L	n/a	Y	Y	0.335
CAMO-22-237792	R-44 S1	12/13/2021	Perchlorate	0.424	µg/L	n/a	Y	Y	0.0500
CAMO-22-237792	R-44 S1	12/13/2021	Chromium	3.37	µg/L	J	Y	Y	3.00
CAMO-22-237792	R-44 S1	12/13/2021	Fluoride	0.282	mg/L	n/a	Y	Y	0.0330
CAMO-22-237792	R-44 S1	12/13/2021	Nitrate-Nitrite as Nitrogen	2.78	mg/L	n/a	Y	Y	0.170
CAMO-22-237792	R-44 S1	12/13/2021	Sulfate	19.8	mg/L	n/a	Y	Y	0.665
CAMO-22-237792	R-44 S1	12/13/2021	Total Dissolved Solids	226	mg/L	n/a	Y	Y	3.40
CAMO-22-235015	R-44 S2	10/19/2021	Chloride	2.55	mg/L	n/a	Y	Y	0.0670
CAMO-22-235015	R-44 S2	10/19/2021	Perchlorate	0.358	µg/L	n/a	Y	Y	0.0500
CAMO-22-235015	R-44 S2	10/19/2021	Chromium	10.3	µg/L	n/a	Y	Y	3.00
CAMO-22-235015	R-44 S2	10/19/2021	Fluoride	0.294	mg/L	n/a	Y	Y	0.0330
CAMO-22-235015	R-44 S2	10/19/2021	Nitrate-Nitrite as Nitrogen	0.960	mg/L	n/a	Y	Y	0.0850
CAMO-22-235015	R-44 S2	10/19/2021	Sulfate	3.14	mg/L	n/a	Y	Y	0.133
CAMO-22-235015	R-44 S2	10/19/2021	Total Dissolved Solids	139	mg/L	n/a	Y	Y	3.40
CAMO-22-236322	R-44 S2	11/16/2021	Chloride	2.66	mg/L	n/a	Y	Y	0.0670
CAMO-22-236322	R-44 S2	11/16/2021	Perchlorate	0.358	µg/L	n/a	Y	Y	0.0500
CAMO-22-236322	R-44 S2	11/16/2021	Chromium	10.3	µg/L	n/a	Y	Y	3.00
CAMO-22-236322	R-44 S2	11/16/2021	Fluoride	0.317	mg/L	n/a	Y	Y	0.0330
CAMO-22-236322	R-44 S2	11/16/2021	Nitrate-Nitrite as Nitrogen	0.975	mg/L	n/a	Y	Y	0.0850
CAMO-22-236322	R-44 S2	11/16/2021	Sulfate	3.19	mg/L	n/a	Y	Y	0.133
CAMO-22-236322	R-44 S2	11/16/2021	Total Dissolved Solids	133	mg/L	n/a	Y	Y	3.40
CAMO-22-237795	R-44 S2	12/13/2021	Chloride	2.64	mg/L	n/a	Y	Y	0.0670
CAMO-22-237795	R-44 S2	12/13/2021	Perchlorate	0.360	µg/L	n/a	Y	Y	0.0500

Table 2.3-2 (continued)

Field Sample ID	Location ID	Sample Date	Parameter Name	Report Result	Report Unit	Lab Qualifier	Detect Flag	Filtered	Method Detection Limit
CAMO-22-237795	R-44 S2	12/13/2021	Chromium	10.6	µg/L	n/a	Y	Y	3.00
CAMO-22-237795	R-44 S2	12/13/2021	Fluoride	0.441	mg/L	n/a	Y	Y	0.0330
CAMO-22-237795	R-44 S2	12/13/2021	Nitrate-Nitrite as Nitrogen	0.895	mg/L	n/a	Y	Y	0.0170
CAMO-22-237795	R-44 S2	12/13/2021	Sulfate	3.10	mg/L	n/a	Y	Y	0.133
CAMO-22-237795	R-44 S2	12/13/2021	Total Dissolved Solids	156	mg/L	n/a	Y	Y	3.40
CAMO-22-235018	R-45 S1	10/20/2021	Chloride	18.5	mg/L	n/a	Y	Y	0.335
CAMO-22-235018	R-45 S1	10/20/2021	Perchlorate	0.458	µg/L	n/a	Y	Y	0.0500
CAMO-22-235018	R-45 S1	10/20/2021	Chromium	5.24	µg/L	J	Y	Y	3.00
CAMO-22-235018	R-45 S1	10/20/2021	Fluoride	0.173	mg/L	n/a	Y	Y	0.0330
CAMO-22-235018	R-45 S1	10/20/2021	Nitrate-Nitrite as Nitrogen	3.23	mg/L	n/a	Y	Y	0.170
CAMO-22-235018	R-45 S1	10/20/2021	Sulfate	19.6	mg/L	n/a	Y	Y	0.665
CAMO-22-235018	R-45 S1	10/20/2021	Total Dissolved Solids	183	mg/L	n/a	Y	Y	3.40
CAMO-22-236362	R-45 S1	11/18/2021	Chloride	19.0	mg/L	n/a	Y	Y	0.335
CAMO-22-236362	R-45 S1	11/18/2021	Perchlorate	0.475	µg/L	n/a	Y	Y	0.0500
CAMO-22-236362	R-45 S1	11/18/2021	Chromium	4.63	µg/L	J	Y	Y	3.00
CAMO-22-236362	R-45 S1	11/18/2021	Fluoride	0.169	mg/L	n/a	Y	Y	0.0330
CAMO-22-236362	R-45 S1	11/18/2021	Nitrate-Nitrite as Nitrogen	3.02	mg/L	n/a	Y	Y	0.0850
CAMO-22-236362	R-45 S1	11/18/2021	Sulfate	19.7	mg/L	n/a	Y	Y	0.665
CAMO-22-236362	R-45 S1	11/18/2021	Total Dissolved Solids	216	mg/L	n/a	Y	Y	3.40
CAMO-22-237798	R-45 S1	12/07/2021	Chloride	19.2	mg/L	n/a	Y	Y	0.335
CAMO-22-237798	R-45 S1	12/07/2021	Perchlorate	0.476	µg/L	n/a	Y	Y	0.0500
CAMO-22-237798	R-45 S1	12/07/2021	Chromium	3.75	µg/L	J	Y	Y	3.00
CAMO-22-237798	R-45 S1	12/07/2021	Fluoride	0.172	mg/L	n/a	Y	Y	0.0330
CAMO-22-237798	R-45 S1	12/07/2021	Nitrate-Nitrite as Nitrogen	3.09	mg/L	n/a	Y	Y	0.170
CAMO-22-237798	R-45 S1	12/07/2021	Sulfate	19.6	mg/L	n/a	Y	Y	0.665
CAMO-22-237798	R-45 S1	12/07/2021	Total Dissolved Solids	216	mg/L	n/a	Y	Y	3.40
CAMO-22-235021	R-45 S2	10/20/2021	Chloride	6.93	mg/L	n/a	Y	Y	0.0670

Table 2.3-2 (continued)

Field Sample ID	Location ID	Sample Date	Parameter Name	Report Result	Report Unit	Lab Qualifier	Detect Flag	Filtered	Method Detection Limit
CAMO-22-235021	R-45 S2	10/20/2021	Perchlorate	0.469	µg/L	n/a	Y	Y	0.0500
CAMO-22-235021	R-45 S2	10/20/2021	Chromium	58.1	µg/L	n/a	Y	Y	3.00
CAMO-22-235021	R-45 S2	10/20/2021	Fluoride	0.331	mg/L	n/a	Y	Y	0.0330
CAMO-22-235021	R-45 S2	10/20/2021	Nitrate-Nitrite as Nitrogen	1.58	mg/L	n/a	Y	Y	0.0850
CAMO-22-235021	R-45 S2	10/20/2021	Sulfate	8.91	mg/L	n/a	Y	Y	0.133
CAMO-22-235021	R-45 S2	10/20/2021	Total Dissolved Solids	163	mg/L	n/a	Y	Y	3.40
CAMO-22-236367	R-45 S2	11/18/2021	Chloride	7.02	mg/L	n/a	Y	Y	0.0670
CAMO-22-236367	R-45 S2	11/18/2021	Perchlorate	0.469	µg/L	n/a	Y	Y	0.0500
CAMO-22-236367	R-45 S2	11/18/2021	Chromium	57.4	µg/L	n/a	Y	Y	3.00
CAMO-22-236367	R-45 S2	11/18/2021	Fluoride	0.340	mg/L	n/a	Y	Y	0.0330
CAMO-22-236367	R-45 S2	11/18/2021	Nitrate-Nitrite as Nitrogen	1.49	mg/L	n/a	Y	Y	0.0850
CAMO-22-236367	R-45 S2	11/18/2021	Sulfate	9.01	mg/L	n/a	Y	Y	0.133
CAMO-22-236367	R-45 S2	11/18/2021	Total Dissolved Solids	167	mg/L	n/a	Y	Y	3.40
CAMO-22-237801	R-45 S2	12/07/2021	Chloride	7.08	mg/L	n/a	Y	Y	0.0670
CAMO-22-237801	R-45 S2	12/07/2021	Perchlorate	0.491	µg/L	n/a	Y	Y	0.0500
CAMO-22-237801	R-45 S2	12/07/2021	Chromium	59.0	µg/L	n/a	Y	Y	3.00
CAMO-22-237801	R-45 S2	12/07/2021	Fluoride	0.339	mg/L	n/a	Y	Y	0.0330
CAMO-22-237801	R-45 S2	12/07/2021	Nitrate-Nitrite as Nitrogen	1.48	mg/L	n/a	Y	Y	0.0850
CAMO-22-237801	R-45 S2	12/07/2021	Sulfate	9.19	mg/L	n/a	Y	Y	0.133
CAMO-22-237801	R-45 S2	12/07/2021	Total Dissolved Solids	159	mg/L	n/a	Y	Y	3.40
CAMO-22-236372	R-50 S1	11/12/2021	Chloride	21.7	mg/L	n/a	Y	Y	0.335
CAMO-22-236372	R-50 S1	11/12/2021	Perchlorate	0.392	µg/L	n/a	Y	Y	0.0500
CAMO-22-236372	R-50 S1	11/12/2021	Chromium	13.7	µg/L	n/a	Y	Y	3.00
CAMO-22-236372	R-50 S1	11/12/2021	Fluoride	0.146	mg/L	n/a	Y	Y	0.0330
CAMO-22-236372	R-50 S1	11/12/2021	Nitrate-Nitrite as Nitrogen	2.99	mg/L	n/a	Y	Y	0.0850
CAMO-22-236372	R-50 S1	11/12/2021	Sulfate	21.1	mg/L	n/a	Y	Y	0.665
CAMO-22-236372	R-50 S1	11/12/2021	Total Dissolved Solids	200	mg/L	n/a	Y	Y	3.40
CAMO-22-237804	R-50 S1	12/21/2021	Chloride	21.0	mg/L	n/a	Y	Y	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	Method Detection Limit
CAMO-22-237804	R-50 S1	12/21/2021	Perchlorate	0.411	µg/L	n/a	Y	Y	0.0500
CAMO-22-237804	R-50 S1	12/21/2021	Chromium	10.5	µg/L	n/a	Y	Y	3.00
CAMO-22-237804	R-50 S1	12/21/2021	Fluoride	0.196	mg/L	n/a	Y	Y	0.0330
CAMO-22-237804	R-50 S1	12/21/2021	Nitrate-Nitrite as Nitrogen	2.92	mg/L	n/a	Y	Y	0.170
CAMO-22-237804	R-50 S1	12/21/2021	Sulfate	19.9	mg/L	n/a	Y	Y	0.665
CAMO-22-237804	R-50 S1	12/21/2021	Total Dissolved Solids	204	mg/L	n/a	Y	Y	3.40
CAMO-22-236377	R-50 S2	11/12/2021	Chloride	2.09	mg/L	n/a	Y	Y	0.0670
CAMO-22-236377	R-50 S2	11/12/2021	Perchlorate	0.321	µg/L	n/a	Y	Y	0.0500
CAMO-22-236377	R-50 S2	11/12/2021	Chromium	4.56	µg/L	J	Y	Y	3.00
CAMO-22-236377	R-50 S2	11/12/2021	Fluoride	0.335	mg/L	n/a	Y	Y	0.0330
CAMO-22-236377	R-50 S2	11/12/2021	Nitrate-Nitrite as Nitrogen	0.580	mg/L	n/a	Y	Y	0.0170
CAMO-22-236377	R-50 S2	11/12/2021	Sulfate	2.57	mg/L	n/a	Y	Y	0.133
CAMO-22-236377	R-50 S2	11/12/2021	Total Dissolved Solids	113	mg/L	n/a	Y	Y	3.40
CAMO-22-237810	R-50 S2	12/21/2021	Chloride	2.08	mg/L	n/a	Y	Y	0.0670
CAMO-22-237810	R-50 S2	12/21/2021	Perchlorate	0.337	µg/L	n/a	Y	Y	0.0500
CAMO-22-237810	R-50 S2	12/21/2021	Chromium	4.19	µg/L	J	Y	Y	3.00
CAMO-22-237810	R-50 S2	12/21/2021	Fluoride	0.434	mg/L	n/a	Y	Y	0.0330
CAMO-22-237810	R-50 S2	12/21/2021	Nitrate-Nitrite as Nitrogen	0.575	mg/L	n/a	Y	Y	0.0850
CAMO-22-237810	R-50 S2	12/21/2021	Sulfate	2.40	mg/L	n/a	Y	Y	0.133
CAMO-22-237810	R-50 S2	12/21/2021	Total Dissolved Solids	139	mg/L	n/a	Y	Y	3.40
CAMO-22-236384	R-62	11/19/2021	Chloride	18.4	mg/L	n/a	Y	Y	0.335
CAMO-22-236384	R-62	11/19/2021	Perchlorate	0.931	µg/L	n/a	Y	Y	0.0500
CAMO-22-236384	R-62	11/19/2021	Chromium	288	µg/L	n/a	Y	Y	3.00
CAMO-22-236384	R-62	11/19/2021	Fluoride	0.0998	mg/L	J	Y	Y	0.0330
CAMO-22-236384	R-62	11/19/2021	Nitrate-Nitrite as Nitrogen	2.23	mg/L	n/a	Y	Y	0.0850
CAMO-22-236384	R-62	11/19/2021	Sulfate	33.2	mg/L	n/a	Y	Y	0.665
CAMO-22-236384	R-62	11/19/2021	Total Dissolved Solids	227	mg/L	n/a	Y	Y	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	Method Detection Limit
CAMO-21-231031	SIMR-2[g]	07/22/2021	Chloride	2.23	mg/L	n/a	Y	Y	0.0670
CAMO-21-231031	SIMR-2	07/22/2021	Perchlorate	0.493	µg/L	n/a	Y	Y	0.0500
CAMO-21-231031	SIMR-2	07/22/2021	Chromium	4.80	µg/L	J	Y	Y	3.00
CAMO-21-231031	SIMR-2	07/22/2021	Fluoride	0.209	mg/L	n/a	Y	Y	0.0330
CAMO-21-231031	SIMR-2	07/22/2021	Nitrate-Nitrite as Nitrogen	0.783	mg/L	n/a	Y	Y	0.0170
CAMO-21-231031	SIMR-2	07/22/2021	Sulfate	2.84	mg/L	n/a	Y	Y	0.133
CAMO-21-231031	SIMR-2	07/22/2021	Total Dissolved Solids	134	mg/L	n/a	Y	Y	3.40
CAMO-21-231482	SIMR-2	08/26/2021	Chloride	2.34	mg/L	n/a	Y	Y	0.0670
CAMO-21-231482	SIMR-2	08/26/2021	Perchlorate	0.506	µg/L	n/a	Y	Y	0.0500
CAMO-21-231482	SIMR-2	08/26/2021	Chromium	4.83	µg/L	J	Y	Y	3.00
CAMO-21-231482	SIMR-2	08/26/2021	Fluoride	0.289	mg/L	n/a	Y	Y	0.0330
CAMO-21-231482	SIMR-2	08/26/2021	Nitrate-Nitrite as Nitrogen	0.775	mg/L	n/a	Y	Y	0.0170
CAMO-21-231482	SIMR-2	08/26/2021	Sulfate	2.89	mg/L	n/a	Y	Y	0.133
CAMO-21-231482	SIMR-2	08/26/2021	Total Dissolved Solids	157	mg/L	n/a	Y	Y	3.40
CAMO-21-234190	SIMR-2	09/23/2021	Chloride	2.27	mg/L	n/a	Y	Y	0.0670
CAMO-21-234190	SIMR-2	09/23/2021	Perchlorate	0.502	µg/L	n/a	Y	Y	0.0500
CAMO-21-234190	SIMR-2	09/23/2021	Chromium	5.46	µg/L	J	Y	Y	3.00
CAMO-21-234190	SIMR-2	09/23/2021	Fluoride	0.285	mg/L	n/a	Y	Y	0.0330
CAMO-21-234190	SIMR-2	09/23/2021	Nitrate-Nitrite as Nitrogen	0.778	mg/L	n/a	Y	Y	0.0170
CAMO-21-234190	SIMR-2	09/23/2021	Sulfate	2.82	mg/L	n/a	Y	Y	0.133
CAMO-21-234190	SIMR-2	09/23/2021	Total Dissolved Solids	144	mg/L	n/a	Y	Y	3.40

[a] n/a = Not applicable: no qualifiers applied.

[b] In the Detect Flag column, Y = detected.

[c] In the Filtered column, Y = filtered.

[d] J = Analyte is classified as estimated.

[e] S1 = Screen 1.

[f] S2 = Screen 2.

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

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 IM infrastructure wells and pumping of Los Alamos County's water-supply wells. This is discussed for the case of 2021 Quarter 4 below.

Effects on flow direction from water-supply pumping are small compared with the local effects of extraction and injection at chromium IM wells. Transience in the water levels observed at the monitoring wells within the plume area does 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 0.2 to 0.5 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 transience described above, the water-level data and the respective water table contour maps are variable over time; each map therefore represents a specific period of time. Figure 2.3-1 depicts the average water-level data and water table contours for November 2021. General flow direction is indicated by the vector.

To generate this quarterly contour map, average water levels are calculated using values from the middle month of the 3-month reporting period. Monitoring wells within and surrounding the plume are used, including wells not presented on the map (e.g., R-21, R-31, R-32, R-37, and R-40) or in Table 2.3-1. 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.

In the remainder of this section, a quarter-by-quarter account of water table elevations near the chromium IM wells is presented, along with possible causes for water level variations. Regular pumping at wells CrEX-1, CrEX-2, CrEX-3, CrIN-4, and CrIN-5 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 as 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 over the previous quarter. The cone of depression continued to expand in northerly and westerly (upstream) directions, possibly in response to pumping at CrEX-2; and in southerly and easterly (downstream) directions, likely because of pumping at CrEX-1. In addition, comparing 2018 Quarter 4 with 2018 Quarter 3, increased water levels were observed to the southwest of the cone of depression, possibly in response to injection at CrIN-4 and CrIN-5. In 2019 Quarter 3, regular injection occurred at CrIN-3, CrIN-4, and CrIN-5, with regular extraction occurring at CrEX-1 and CrEX-2. The water table elevation appeared to respond strongly to extraction activities with a decrease in the center of the cone of depression near CrEX-2 and an extension of the cone further downstream from CrEX-1 as compared with the previous quarter. During 2019 Quarter 4, the cone of depression continued to expand, likely in response to regular pumping at CrEX-1 and CrEX-2 (N3B 2020). The largest injection rates in 2019 Quarter 4 occurred at CrIN-4 and CrIN-5, and an increase in water level at the nearest monitoring well (R-50) was observed. CrEX-5 (which was converted from CrIN-6), CrIN-1, and CrIN-2 began sustained operation in November 2019, and effects on water levels were not yet detectable in 2019 Quarter 4.

In 2020 Quarter 1, injection occurred regularly at CrIN-2, CrIN-4, and CrIN-5. A northward shift in the 5832-ft contour near CrIN-4 and CrIN-5 was evident, as was a westward shift in the 5831-ft contour around the cone of depression west of CrIN-2. The water table also appears to have responded to extraction at CrEX-1, CrEX-2, and CrEX-5. The cone of depression expanded toward CrEX-2, and the 5832-ft contour migrated toward CrEX-5. Consistent injection at CrIN-2, CrIN-4, and CrIN-5 and extraction at CrEX-1, CrEX-2, and CrEX-5 continued until late March 2020, when injection and extraction activities ceased because of the transition to essential mission critical activity (EMCA) status in response to the COVID-19 pandemic (DOE 2020). In 2020 Quarter 2, changes in the water-level elevations appeared to

be influenced more by seasonal variations than by injection/extraction, with the cone of depression shifting slightly downgradient toward the east/southeast. In the 2020 Quarter 3 reporting period, water levels declined across the area of the chromium plume, with multiple wells indicating a decline of approximately 1 ft since the previous quarter, likely due in part to seasonal variations and regional drought conditions. Also, pumping recommenced in July 2020 after shutdown in March 2020 due to the EMCA status (DOE 2020). Extraction at CrEX-2 appeared to have a strong impact, with the cone of depression becoming deeper and translating toward CrEX-2. In 2020 Quarter 4, the upstream (western) edge of the central depression appeared less pronounced than in prior periods. The change in the upstream edge of the depression may be a lingering effect of the EMCA shutoff and/or related in particular to the lack of extraction at CrEX-2 and CrEX-4. This interpretation is supported by the observed increase in water level at CrPZ-1, which is close to CrEX-2, and could be expected to exhibit decreased water levels if pumping at CrEX-2 was strongly impacting water levels, as noted in prior quarters.

In 2021 Quarter 1, a slight increase in average water levels was apparent across the site, as compared with 2020 Quarter 4, likely due to seasonal trends in water table elevation. An exception is the decrease in water level recorded at CrPZ-2, which caused the contour for the central depression to expand northward as compared with the previous quarters, and which is likely linked to extraction at CrEX-3 during February 2021.

In 2021 Quarter 2, pumping occurred at all extraction wells with intermittent extraction at CrEX-3 and regular pumping at the other four extraction wells. Injection occurred at all CrIN wells. The apparent response in the water table was a large increase in the area of the central 5830-ft contour relative to the prior quarter, to encompass CrEX-4 and CrEX-2 and approach CrEX-1.

For 2021 Quarter 3, monthly average data from August 2021 would normally be used for water table map generation since August is the middle month of the third quarter. However, a lightning storm caused a power outage that disrupted data acquisition at the CrIN and CrEX wells from August 2 to August 26. Therefore, a water table map for July 2021 was presented instead of August 2021 to allow interpretation of the map with recorded IM pumping data. In July 2021, regular extraction occurred at CrEX-1, CrEX-2, CrEX-4, and CrEX-5. Regular injection occurred at CrIN-2, CrIN-4, and CrIN-5 for the full month of July and at CrIN-1 and CrIN-3 until near the end of the month. In apparent response, a 5829-ft contour formed in the area of the central depression, encompassing CrPZ-1 and CrEX-2 and approaching CrEX-4. Also, the 5830-ft contour grew to encompass CrPZ-3 and CrPZ-2.

In the current reporting period of 2021 Quarter 4 (i.e., November 2021), extraction occurred consistently at CrEX-2 and CrEX-5. CrEX-4 was pumped in the first half of November. Extraction occurred at CrEX-3 throughout the month at lower levels than the other extraction wells, but at higher rates than typical of previous activity. Pumping stopped at CrEX-1 in late July 2021. No extraction occurred at CrEX-1 from that time through the current reporting period. CrIN-1, -2, -4, and -5 were used for injection in the first half of November. Injection continued at CrIN-1 and CrIN-5 to the end of the month. In previous quarters, dating back to the EMCA shutdown beginning in March 2020, the 5830-ft contour associated with the central depression was observed to respond to extraction and migrate in the southeasterly direction. The lack of pumping at CrEX-1 appeared to slow this effect. The 5829-ft contour noted in 2021 Q3 appeared to respond to pumping and extended downgradient (east) toward CrEX-3 and upgradient (west) with a water level decline of 0.4 ft at CrPZ-1, which is next to CrEX-2.

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 and the regional structure of significantly steeper gradients to the east and west of the chromium plume area, surrounding wells (e.g., R-21, R-31, R-32, R-37, and R-40) and control points based on expert opinion 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 existing wells and data from proposed wells, the use of these control points is being reanalyzed, adjusted, or discontinued based on additional supporting data and contouring methods.

2.4 Any Operations/Maintenance Activities Performed (Requirement 4)

Extraction, treatment, and injection operations continued during 2021 Quarter 4. Operations and maintenance activities completed during 2021 Quarter 3 are listed in Table 2.4-1 for the extraction, treatment, and injection system.

Table 2.4-1
Operations and Maintenance Activity Summary Table – 2021 Quarter 4

Maintenance Date	Elements Impacted	Operation/Maintenance Description
10/1/2021 through 10/27/2021	CrEX-2, CrEX-3, CrEX-4, CrEX-5, CTUA, CTUC, CrIN-1, CrIN-2, CrIN-4, CrIN-5	Extraction, treatment, and injection of treated groundwater occurred per operational plan.
10/27/2021	CTUC	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. Both influent bags replaced.
10/27/2021 through 11/18/2021	CrEX-2, CrEX-3, CrEX-4, CrEX-5, CTUA, CTUC, CrIN-2, CrIN-3, CrIN-4, CrIN-5	Extraction, treatment, and injection of treated groundwater occurred per operational plan.
11/18/2021 through 12/1/2021	CrEX-4, CrIN-2 CrEX-2, CrEX-3, CrEX-5, CTUA, CTUC, CrIN-3, CrIN-4, CrIN-5	CrEX-4 turned off due to a dual-wall pipe containment alarm. CrIN-2 also turned off to balance flow. Extraction, treatment, and injection of treated groundwater occurred per operational plan.
12/1/2021	Entire system	Turned off all extraction wells, injection wells, and treatment units for cyber security remote updates. Reset CrEX-4 dual-wall pipe containment alarm.
12/2/2021 through 12/8/2021	CrEX-2, CrEX-3, CrEX-4, CrEX-5, CTUA, CTUC, CrIN-1, CrIN-2, CrIN-4, CrIN-5	Extraction, treatment, and injection of treated groundwater occurred per operational plan.

Table 2.4-1 (continued)

Maintenance Date	Elements Impacted	Operation/Maintenance Description
12/8/2021	CTUC	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. Both influent bags replaced.
12/8/2021 through 12/15/2021	CrEX-2, CrEX-3, CrEX-4, CrEX-5, CTUA, CTUC, CrIN-1, CrIN-2, CrIN-4, CrIN-5	Extraction, treatment, and injection of treated groundwater occurred per operational plan.
12/15/2021	CrIN-5	CrIN-5 turned off due to an uninterrupted power supply issue. All other wells remained operating.
12/15/2021 through 12/22/2021	CrEX-2, CrEX-3, CrEX-4, CrEX-5, CTUA, CTUC, CrIN-1, CrIN-2, CrIN-4	Extraction, treatment, and injection of treated groundwater occurred per operational plan.
12/22/2021	CrIN-5	CrIN-5 electrical issue repaired and well brought back online.
12/22/2021 through 12/28/2021	CrEX-2, CrEX-3, CrEX-4, CrEX-5, CTUA, CTUC, CrIN-1, CrIN-2, CrIN-4, CrIN-5	Extraction, treatment, and injection of treated groundwater occurred per operational plan.
12/28/2021	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.
12/28/2021 through 12/3120/21	CrEX-2, CrEX-3, CrEX-4, CrEX-5, CTUA, CTUC, CrIN-1, CrIN-2, CrIN-4, CrIN-5	Extraction, treatment, and injection of treated groundwater occurred per operational plan.

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

Periodic testing of mechanical integrity was not conducted or reported to NMED during 2021 Quarter 4. Mechanical integrity testing was performed and reported to NMED during the 2019 Quarter 2 reporting period. In accordance with Condition No. 3, mechanical integrity testing will occur at least once every five yr 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)

New primary and secondary IX vessels were installed at various times for treatment unit CTUA (all three treatment trains) and at CTUC (both treatment trains) during the reporting period, as cited in section 2.4.

2.7 Any Well Workovers Conducted (Requirement 7)

No well workovers were conducted during 2021 Quarter 4.

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 of 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 2021 Quarter 4 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 of the 2021 NMED risk assessment guidance (NMED 2021) 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 2021 Quarter 4.

Table 2.9-1
Flows and Volumes of Treated Effluent Injected – CY 2021 Quarter 4, DP-1835

Injection Well	Flow rate (gpm[a])			Daily Volume (gal.)			Total Volume (gal.)
	Average[b]	Maximum	Minimum[c]	Average	Maximum	Minimum	
October 2021							
CrIN-1	51.6	56.0	49.0	74,294	80,616	70,539	2,303,121
CrIN-2	52.7	56.7	50.3	75,914	81,717	72,370	2,353,337
CrIN-3	0.0	0.0	0.0	0	0	0	0
CrIN-4	49.5	52.3	48.0	71,280	75,332	69,117	2,209,693
CrIN-5	50.7	54.4	48.7	72,995	78,316	70,167	2,262,853

Table 2.9-1 (continued)

Injection Well	Flow rate (gpm[a])			Daily Volume (gal.)			Total Volume (gal.)
	Average[b]	Maximum	Minimum[c]	Average	Maximum	Minimum	
November 2021							
CrIN-1	53.1	59.0	31.8	76,409	84,984	45,758	2,292,259
CrIN-2	52.7	63.5	21.0	75,958	91,431	30,196	1,367,252
CrIN-3	0.0	0.0	0.0	0	0	0	0
CrIN-4	56.4	63.8	50.0	81,264	91,839	71,981	2,437,935
CrIN-5	55.6	64.5	45.4	80,028	92,869	65,412	2,400,830
December 2021							
CrIN-1	54.9	66.0	20.6	79,036	95,073	29,663	2,450,112
CrIN-2	55.8	71.4	0.2	80,391	102,834	235	2,492,118
CrIN-3	0.0	0.0	0.0	0	0	0	0
CrIN-4	53.5	66.0	21.5	76,981	95,026	30,964	2,386,400
CrIN-5	50.9	59.0	15.8	73,360	84,891	22,814	1,834,001

[a] gpm = Gallons per minute.

[b] Average flow rate and daily volume represent arithmetic mean values of results provided during periods when treated groundwater was being injected.

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

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-4, and CrIN-5 during 2021 Quarter 4.

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.

Table 2.11-1
Water-Level Values Above Static Level by UIC Well – CY 2021 Quarter 4, DP-1835

UIC Well	October 2021			November 2021			December 2021		
	Average[a] (ft)	Maximum (ft)	Minimum (ft)	Average (ft)	Maximum (ft)	Minimum (ft)	Average (ft)	Maximum (ft)	Minimum (ft)
CrIN-1	19.7	22.0	17.2	21.5	25.4	12.8	25.1	30.3	18.4
CrIN-2	9.5	10.6	8.5	10.2	13.1	6.1	11.9	14.9	5.5
CrIN-3	n/a[b]	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
CrIN-4	9.6	10.9	3.7	12.2	14.4	2.8	13.0	16.4	6.6
CrIN-5	18.0	20.2	9.0	22.1	27.2	4.4	23.1	26.6	11.2

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

[b] n/a – Water level data not available or treated groundwater not injected during the month at this location.

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

Daily volumes of groundwater injected (following treatment) during 2021 Quarter 4 are presented in Table 2.12-1.

Table 2.12-1
Daily Injection Summary Table – CY 2021 Quarter 4, DP-1835

Date	CrIN-1 (gal.)	CrIN-2 (gal.)	CrIN-3 (gal.)	CrIN-4 (gal.)	CrIN-5 (gal.)	Total (gal.)
10/1/2021	80,616	81,717	0	70,996	71,927	305,257
10/2/2021	74,461	78,345	0	70,601	72,325	295,733
10/3/2021	75,043	76,486	0	70,241	72,118	293,887
10/4/2021	73,987	76,536	0	69,442	72,936	292,900
10/5/2021	78,430	76,840	0	69,703	72,935	297,908
10/6/2021	73,850	76,652	0	71,904	72,292	294,698
10/7/2021	75,400	74,906	0	71,064	71,873	293,243
10/8/2021	76,179	75,764	0	72,646	71,468	296,056
10/9/2021	75,633	76,052	0	70,441	71,812	293,939
10/10/2021	74,867	76,475	0	70,521	71,966	293,829
10/11/2021	74,946	76,250	0	69,927	71,704	292,829
10/12/2021	75,712	76,153	0	69,802	71,996	293,662
10/13/2021	72,604	76,867	0	70,459	71,805	291,735
10/14/2021	73,421	76,867	0	71,837	71,293	293,419
10/15/2021	75,492	75,127	0	71,663	71,603	293,885
10/16/2021	75,794	77,678	0	69,117	71,373	293,963
10/17/2021	76,190	77,731	0	70,187	78,316	302,424
10/18/2021	76,327	77,779	0	72,341	76,334	302,781
10/19/2021	76,258	75,707	0	73,010	73,858	298,833
10/20/2021	75,836	73,615	0	71,484	70,167	291,101
10/21/2021	75,363	73,474	0	73,536	72,492	294,864
10/22/2021	74,454	73,721	0	71,662	73,219	293,056
10/23/2021	73,212	73,597	0	72,041	71,846	290,696
10/24/2021	70,588	76,254	0	72,011	70,646	289,500
10/25/2021	70,553	74,156	0	70,889	76,318	291,916
10/26/2021	70,567	74,704	0	70,601	76,365	292,236
10/27/2021	70,562	75,979	0	70,538	76,086	293,166
10/28/2021	71,446	73,972	0	70,649	73,462	289,529
10/29/2021	70,539	72,370	0	75,332	74,262	292,504
10/30/2021	70,567	75,854	0	72,398	74,971	293,790
10/31/2021	74,227	75,707	0	72,646	73,085	295,665
11/1/2021	79,803	77,920	0	73,251	74,315	305,289
11/2/2021	75,448	78,096	0	72,854	73,573	299,971
11/3/2021	76,366	77,343	0	76,128	71,755	301,592

Table 2.12-1 (continued)

Date	CrIN-1 (gal.)	CrIN-2 (gal.)	CrIN-3 (gal.)	CrIN-4 (gal.)	CrIN-5 (gal.)	Total (gal.)
11/4/2021	76,507	77,577	0	76,663	65,412	296,158
11/5/2021	75,989	79,745	0	75,955	66,975	298,664
11/6/2021	77,566	77,818	0	75,180	69,830	300,394
11/7/2021	75,943	74,636	0	72,721	73,208	296,508
11/8/2021	76,011	75,038	0	75,242	73,346	299,638
11/9/2021	50,638	82,829	0	79,708	76,928	290,103
11/10/2021	45,758	91,431	0	81,577	81,827	300,593
11/11/2021	76,069	84,627	0	76,791	76,421	313,907
11/12/2021	75,308	81,391	0	76,346	76,253	309,298
11/13/2021	76,520	75,588	0	75,548	76,430	304,086
11/14/2021	74,882	73,914	0	74,997	74,982	298,774
11/15/2021	74,883	73,996	0	72,749	73,588	295,215
11/16/2021	72,912	77,405	0	71,981	73,559	295,856
11/17/2021	64,450	77,704	0	72,187	73,447	287,788
11/18/2021	82,778	30,196	0	82,112	80,857	275,943
11/19/2021	84,984	0	0	89,859	87,008	261,851
11/20/2021	84,966	0	0	90,391	86,833	262,190
11/21/2021	83,987	0	0	90,672	86,266	260,926
11/22/2021	80,580	0	0	90,465	89,178	260,223
11/23/2021	83,041	0	0	90,736	89,406	263,182
11/24/2021	80,244	0	0	91,568	89,882	261,694
11/25/2021	81,936	0	0	91,839	90,075	263,850
11/26/2021	79,500	0	0	90,038	89,113	258,651
11/27/2021	79,564	0	0	87,916	92,869	260,349
11/28/2021	79,794	0	0	87,978	88,573	256,345
11/29/2021	82,435	0	0	87,478	86,671	256,584
11/30/2021	83,398	0	0	87,005	92,249	262,653
12/1/2021	29,663	235	0	30,964	32,554	93,416
12/2/2021	49,134	56,670	0	47,393	51,537	204,734
12/3/2021	69,465	85,032	0	72,263	76,654	303,414
12/4/2021	67,197	87,542	0	72,312	76,333	303,385
12/5/2021	73,705	84,103	0	74,866	75,910	308,584
12/6/2021	76,597	72,002	0	75,190	74,906	298,695
12/7/2021	81,683	51,055	0	75,394	80,645	288,777
12/8/2021	77,429	83,507	0	74,933	79,197	315,066
12/9/2021	77,617	81,964	0	74,924	79,241	313,746
12/10/2021	77,620	80,618	0	74,804	79,215	312,256
12/11/2021	78,729	79,126	0	74,870	78,366	311,090

Table 2.12-1 (continued)

Date	CrIN-1 (gal.)	CrIN-2 (gal.)	CrIN-3 (gal.)	CrIN-4 (gal.)	CrIN-5 (gal.)	Total (gal.)
12/12/2021	80,600	82,120	0	73,997	79,209	315,927
12/13/2021	80,613	81,512	0	74,880	79,298	316,303
12/14/2021	80,552	81,566	0	74,898	79,161	316,178
12/15/2021	84,201	85,199	0	81,556	22,814	273,770
12/16/2021	94,891	92,336	0	90,267	0	277,494
12/17/2021	95,073	92,951	0	91,964	0	279,988
12/18/2021	92,291	95,799	0	94,911	0	283,001
12/19/2021	94,440	97,690	0	95,026	0	287,157
12/20/2021	92,233	102,834	0	92,775	0	287,841
12/21/2021	92,287	100,622	0	93,590	0	286,499
12/22/2021	84,516	90,447	0	82,741	47,052	304,755
12/23/2021	80,703	82,984	0	73,389	83,951	321,028
12/24/2021	80,591	80,644	0	72,993	84,891	319,118
12/25/2021	80,680	79,221	0	72,825	84,257	316,983
12/26/2021	79,383	80,292	0	77,899	80,257	317,831
12/27/2021	77,478	81,513	0	80,866	78,707	318,565
12/28/2021	75,540	80,656	0	76,357	82,092	314,645
12/29/2021	80,646	80,645	0	76,899	82,393	320,583
12/30/2021	82,437	80,618	0	80,021	82,354	325,431
12/31/2021	82,118	80,614	0	80,633	83,006	326,371
Total 26,789,911						

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

Daily volumes of groundwater pumped from extraction wells during 2021 Quarter 4 are presented in Table 2.13-1.

Table 2.13-1
Daily Extraction Summary Table – CY 2021 Quarter 4, DP-1835

Date	CrEX-1 (gal.)	CrEX-2 (gal.)	CrEX-3 (gal.)	CrEX-4 (gal.)	CrEX-5 (gal.)	Total (gal.)
10/1/2021	0	98,884	22,079	79,122	103,987	304,072
10/2/2021	0	98,840	21,623	79,165	103,279	302,907
10/3/2021	0	98,945	21,375	78,478	99,368	298,166
10/4/2021	0	98,944	20,178	77,781	97,045	293,948
10/5/2021	0	98,426	20,166	77,745	97,034	293,371
10/6/2021	0	98,371	21,005	78,080	101,929	299,385
10/7/2021	0	98,088	18,577	79,689	103,436	299,791

Table 2.13-1 (continued)

Date	CrEX-1 (gal.)	CrEX-2 (gal.)	CrEX-3 (gal.)	CrEX-4 (gal.)	CrEX-5 (gal.)	Total (gal.)
10/8/2021	0	98,160	18,228	79,265	100,651	296,304
10/9/2021	0	98,217	19,307	78,529	100,319	296,371
10/10/2021	0	96,651	19,333	79,036	102,609	297,629
10/11/2021	0	94,196	20,160	76,316	101,209	291,881
10/12/2021	0	96,382	20,157	75,710	101,077	293,326
10/13/2021	0	98,823	20,163	74,890	100,835	294,712
10/14/2021	0	98,884	20,156	74,865	100,778	294,683
10/15/2021	0	98,719	18,686	77,657	102,771	297,834
10/16/2021	0	98,725	20,679	77,622	100,302	297,327
10/17/2021	0	98,679	20,659	76,818	102,642	298,797
10/18/2021	0	98,524	20,152	76,351	105,590	300,617
10/19/2021	0	98,242	19,445	79,874	105,318	302,878
10/20/2021	0	97,903	19,000	81,209	105,198	303,310
10/21/2021	0	97,811	19,725	76,576	101,335	295,448
10/22/2021	0	97,651	19,081	77,365	100,238	294,335
10/23/2021	0	97,741	15,926	79,734	99,322	292,723
10/24/2021	0	97,676	16,342	79,984	97,630	291,632
10/25/2021	0	97,863	15,971	79,723	100,381	293,938
10/26/2021	0	97,914	14,601	79,214	103,676	295,405
10/27/2021	0	92,039	17,023	79,889	102,147	291,098
10/28/2021	0	98,075	17,825	78,060	101,113	295,072
10/29/2021	0	98,247	18,745	77,935	100,567	295,493
10/30/2021	0	98,941	19,352	70,104	104,081	292,478
10/31/2021	0	99,285	17,863	78,446	103,137	298,731
11/1/2021	0	99,146	26,926	78,851	102,906	307,829
11/2/2021	0	99,158	27,967	78,064	101,556	306,744
11/3/2021	0	98,337	25,047	79,035	99,308	301,727
11/4/2021	0	95,271	24,780	79,217	99,356	298,624
11/5/2021	0	96,086	24,455	78,214	101,328	300,084
11/6/2021	0	95,479	22,737	81,513	101,601	301,330
11/7/2021	0	96,497	21,627	81,903	100,559	300,586
11/8/2021	0	97,619	24,176	80,149	101,694	303,637
11/9/2021	0	97,486	17,558	77,964	100,961	293,970
11/10/2021	0	98,379	15,288	85,762	104,486	303,914
11/11/2021	0	98,459	24,372	90,687	107,922	321,441
11/12/2021	0	98,282	24,130	84,282	105,290	311,983
11/13/2021	0	98,400	24,490	79,675	103,643	306,208
11/14/2021	0	98,452	22,232	80,334	100,184	301,201

Table 2.13-1 (continued)

Date	CrEX-1 (gal.)	CrEX-2 (gal.)	CrEX-3 (gal.)	CrEX-4 (gal.)	CrEX-5 (gal.)	Total (gal.)
11/15/2021	0	98,354	23,038	80,123	99,340	300,853
11/16/2021	0	93,699	22,769	80,540	90,633	287,642
11/17/2021	0	97,988	27,364	69,344	102,707	297,402
11/18/2021	0	98,224	48,658	30,390	103,147	280,419
11/19/2021	0	98,280	64,451	0	100,980	263,710
11/20/2021	0	98,162	65,060	0	99,333	262,554
11/21/2021	0	98,242	63,721	0	101,572	263,536
11/22/2021	0	98,165	63,690	0	100,085	261,941
11/23/2021	0	98,124	62,367	0	102,725	263,216
11/24/2021	0	98,319	60,451	0	103,565	262,335
11/25/2021	0	98,425	60,445	0	103,483	262,353
11/26/2021	0	98,413	59,156	0	102,678	260,246
11/27/2021	0	98,570	58,578	0	102,089	259,237
11/28/2021	0	98,177	58,908	0	102,785	259,870
11/29/2021	0	97,660	61,268	0	102,464	261,392
11/30/2021	0	97,697	62,308	0	101,655	261,660
12/1/2021	0	34,668	22,216	146	35,006	92,035
12/2/2021	0	62,298	17,480	61,709	65,204	206,690
12/3/2021	0	93,938	24,845	87,441	98,120	304,344
12/4/2021	0	93,032	23,608	83,404	103,275	303,319
12/5/2021	0	88,469	34,994	80,559	104,324	308,345
12/6/2021	0	71,218	43,545	82,973	99,426	297,161
12/7/2021	0	54,725	46,755	82,880	103,066	287,427
12/8/2021	0	84,684	46,683	79,013	99,419	309,798
12/9/2021	0	92,036	48,954	78,595	98,574	318,159
12/10/2021	0	92,113	40,389	78,678	101,631	312,811
12/11/2021	0	92,093	34,256	79,189	103,783	309,321
12/12/2021	0	92,053	37,205	79,191	103,650	312,100
12/13/2021	0	92,020	39,180	78,609	103,386	313,195
12/14/2021	0	91,907	41,191	77,774	102,699	313,571
12/15/2021	0	88,855	23,624	83,711	77,873	274,064
12/16/2021	0	88,189	11,663	79,418	94,754	274,024
12/17/2021	0	89,641	27,031	68,172	92,994	277,837
12/18/2021	0	88,676	23,041	64,103	106,260	282,080
12/19/2021	0	90,700	21,040	58,175	114,336	284,251
12/20/2021	0	90,741	24,646	51,332	114,560	281,278
12/21/2021	0	90,578	25,918	51,602	114,299	282,397
12/22/2021	0	90,170	35,705	64,493	109,931	300,298

Table 2.13-1 (continued)

Date	CrEX-1 (gal.)	CrEX-2 (gal.)	CrEX-3 (gal.)	CrEX-4 (gal.)	CrEX-5 (gal.)	Total (gal.)
12/23/2021	0	90,647	44,640	74,621	105,246	315,155
12/24/2021	0	90,739	43,799	80,257	104,197	318,991
12/25/2021	0	90,690	43,186	84,138	103,484	321,497
12/26/2021	0	90,779	41,847	83,613	103,171	319,411
12/27/2021	0	90,716	35,105	82,036	107,143	315,000
12/28/2021	0	82,482	38,247	80,010	102,694	303,433
12/29/2021	0	90,787	50,401	81,149	100,313	322,648
12/30/2021	0	90,756	49,690	79,648	102,006	322,100
12/31/2021	0	90,886	49,353	78,588	103,296	322,123
Total 26,866,170						

2.14 Facility Layout Map (Requirement 14)

Figure 2.14-1 is the facility layout map for 2021 Quarter 4, 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

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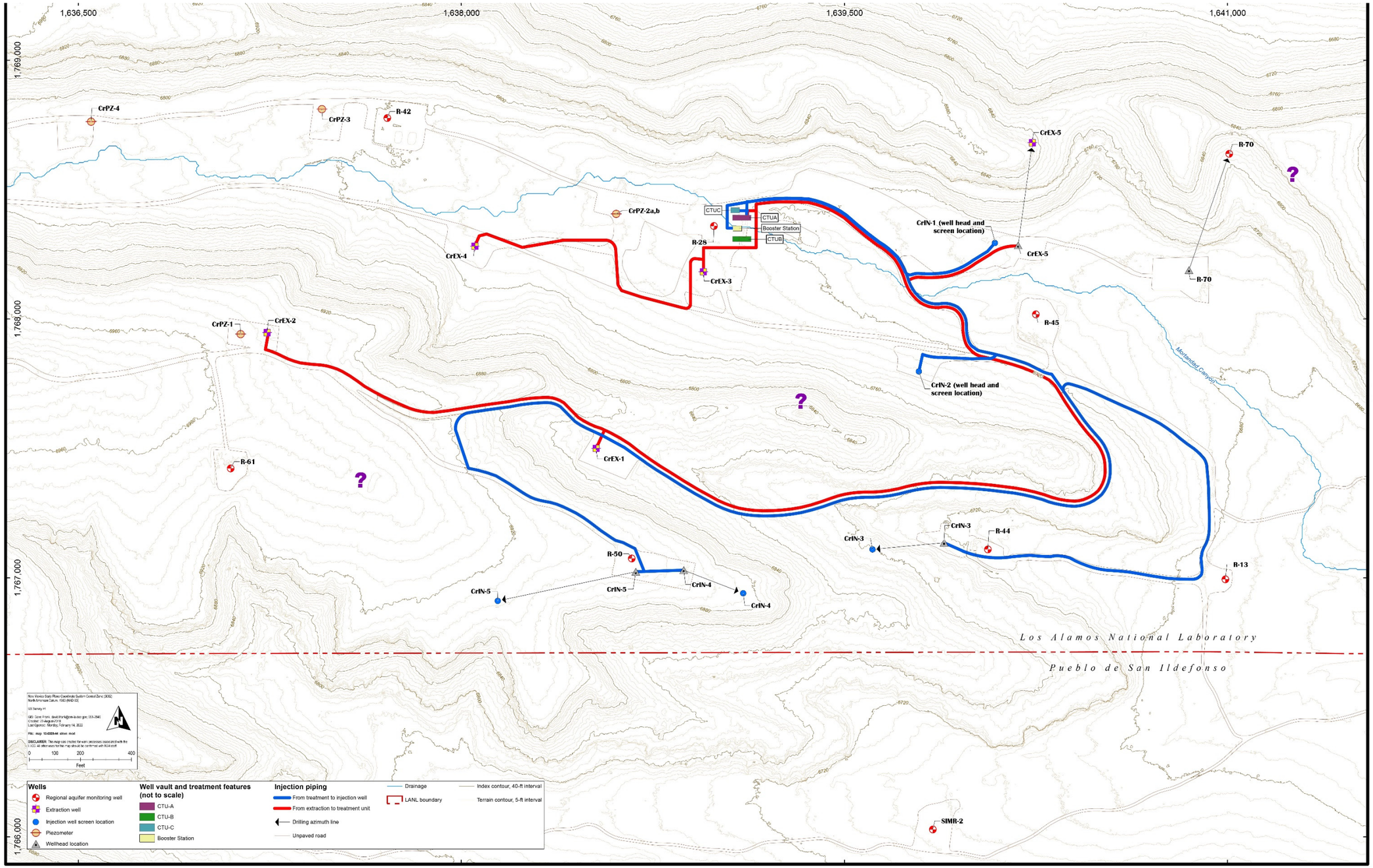

Figure 2.14-1 Facility layout map – CY 2021 Quarter 4, DP-1835