N3B-Los Alamos
1200 Trinity Drive, Suite 150
Los Alamos, New Mexico 87544
(505) 661-5918

Environmental Management
Los Alamos Field Office
P.O. Box 1663, MS M984
Los Alamos, New Mexico 87545
(505) 257-7950/FAX (505) 606-2132

Date: NOV 25 2019
Refer To: N3B-19-0339

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 the Discharge of Treated Groundwater to the Regional Aquifer under Discharge Permit 1835, Calendar Year 2019 Quarter 3, 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, July 1 through September 30 (Quarter 3), discharge of treated groundwater to the regional aquifer continued under DP-1835. The attached "Quarterly Report for the Discharge of Treated Groundwater to the Regional Aquifer under Discharge Permit 1835, Calendar Year 2019 Quarter 3" 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) 257-7941 (cheryl.rodriguez@em.doe.gov).

Sincerely,

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

Sincerely,

Arturo Q. Duran
Compliance and Permitting Manager
Environmental Management
Los Alamos Field Office

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 2019 Quarter 3 (EM2019-0422)

cc (letter and enclosure[s] emailed):
Raymond Martinez, San Ildefonso Pueblo, NM
Dino Chavarria, Santa Clara Pueblo, NM
Shelly Lemon, NMED-SWQB
David Cobrain, NMED-HWB
Neelam Dhawan, NMED-HWB
Steve Pullen, NMED-GWQB
Andrew Romero, NMED-GWQB
Steve Yanicak, NMED-DOE-OB
Douglas Hintze, EM-LA
Thomas McCrory, EM-LA
David Nickless, EM-LA
Cheryl Rodriguez, EM-LA
Hai Shen, EM-LA
Ben Underwood, EM-LA
William Alexander, N3B
Emily Day, N3B
Mary Erwin, N3B
Erich Evered, N3B
Gerald Fordham, N3B
Debby Holgerson, N3B
Danny Katzman, N3B
Kim Lebak, N3B
Joseph Legare, N3B
Dana Lindsay, N3B
Frazer Lockhart, N3B
Elizabeth Lowes, N3B
Pamela Maestas, N3B
Christian Maupin, N3B

Jason Moore, N3B
Glenn Morgan, N3B
Lester Patten, N3B
Ashley Pryor, N3B
Bruce Robinson, N3B
Tashia Vigil, N3B
Steve White, N3B
Brinson Willis, N3B
Jeff Yarbrough, N3B
emla.docs@em.doe.gov
N3Brecords@em-la.doe.gov
Public Reading Room (EPRR)
PRS Website

November 2019
EM2019-0422

Quarterly Report for the Discharge of Treated Groundwater to the Regional Aquifer under Discharge Permit 1835, Calendar Year 2019 Quarter 3

N3B Los Alamos

CONTENTS

Figures

Tables

1.0 INTRODUCTION

On August 31, 2016, the New Mexico Environment Department (NMED) issued Discharge Permit 1835 (DP-1835) to the U.S. Department of Energy and Los Alamos National Security, LLC (DOE/LANS) for the discharge of treated groundwater to the regional aquifer through 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 July 1 through September 30, 2019, reporting period (Quarter 3) for DP-1835, discharge of treated groundwater to the regional aquifer occurred predominantly at three UIC wells: CrIN-3, CrIN-4, and CrIN-5. Groundwater originated predominantly from two extraction wells: CrEX-1 and CrEX-2. 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 December 1 for the July 1 through September 30 discharge period. Several conditions within the permit identify information to be submitted in the quarterly report. The following information, with condition references, is required in the quarterly report:

1. Influent and discharge volumes for the ion exchange (IX) treatment systems (Condition No. 10)
2. Quarterly treated effluent sampling results from each IX treatment system (Condition Nos. 10 and 13)
3. Quarterly depth-to-groundwater and groundwater-quality sampling results (Condition Nos. 10 and 14)
4. Any operations/maintenance activities performed (Condition No. 10)
5. Any periodic test of mechanical integrity conducted (Condition No. 11)
6. Any replacement of primary or secondary IX vessels or associated treatment system infrastructure (Condition No. 11)
7. Any well work-overs conducted (Condition No. 11)
8. Any additional operational changes with the potential to markedly affect the discharge (Condition No. 11)
9. Monthly average, maximum, and minimum values for flow rate and volume of treated effluent transferred to each UIC well (Condition No. 12)
10. Total monthly volume of treated effluent transferred to each UIC well (Condition No. 12)
11. Monthly average, maximum, and minimum values of injection water level (pressure head) above static level for each UIC well (Condition No. 12)
12. Daily volume injected at each UIC well (Condition No. 12)
13. Daily volume pumped from each extraction well (Condition No. 12)
14. Facility layout map (Condition No. 14)
15. Groundwater elevation contour map (Condition No. 15)

Each of the above requirements is addressed in this report.

2.0 REQUIREMENTS

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

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

Table 2.1-1
Total Influent and Discharge Volumes
for IX Treatment Systems – 2019 Quarter 3

Treatment Unit	Influent Volume[a] (gal.)	Effluent Volume[b] (gal.)
CTUA	15,574,000	15,571,000
CTUC[c]	n/a[d]	n/a

Note: Individual flow meter accurate to ±5%.

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

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

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

[d] n/a = Not applicable.

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

Treated effluent analytical results from samples collected during 2019 Quarter 3 for activities completed under DP-1835 are summarized in Table 2.2-1. No results for total chromium, perchlorate, sulfate, total dissolved solids, fluoride, or chloride exceeded 90% of the numeric standards of 20.6.2.3103 New Mexico Administrative Code (NMAC) or 90% of the numeric screening levels established for tap water in Table A-1 of the 2019 NMED “Risk Assessment Guidance for Site Investigations and Remediation” for constituents not listed in 20.6.2.3103 NMAC. The 90% values for chromium, nitrate, perchlorate, sulfate, fluoride, chloride, and total dissolved solids are 45 µg/L, 9 mg/L, 12.4 µg/L, 540 mg/L, 1.44 mg/L, 225 mg/L, and 900 mg/L, respectively.

Table 2.2-1
Treated Effluent Analytical Results Summary Table – 2019 Quarter 3, 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-19-174570	07/02/2019	Chloride	63.8	mg/L		Y	Y	EPA:300.0	0.670
CTUA	CTUA-19-174571	07/17/2019	Chloride	45.6	mg/L		Y	Y	EPA:300.0	0.670
CTUA	CTUA-19-174572	07/24/2019	Chloride	23.2	mg/L		Y	Y	EPA:300.0	0.335
CTUA	CTUA-19-174573	08/01/2019	Chloride	18.7	mg/L		Y	Y	EPA:300.0	0.335
CTUA	CTUA-19-174574	08/07/2019	Chloride	17.9	mg/L		Y	Y	EPA:300.0	0.335
CTUA	CTUA-19-174575	08/14/2019	Chloride	18.8	mg/L		Y	Y	EPA:300.0	0.335
CTUA	CTUA-19-174576	08/20/2019	Chloride	17.8	mg/L		Y	Y	EPA:300.0	0.335
CTUA	CTUA-19-174577	08/28/2019	Chloride	48.2	mg/L		Y	Y	EPA:300.0	0.670
CTUA	CTUA-19-184582	09/05/2019	Chloride	19.9	mg/L		Y	Y	EPA:300.0	0.134
CTUA	CTUA-19-184583	09/10/2019	Chloride	18.6	mg/L		Y	Y	EPA:300.0	0.670
CTUA	CTUA-19-184584	09/18/2019	Chloride	18.7	mg/L		Y	Y	EPA:300.0	0.268
CTUA	CTUA-19-184585	09/25/2019	Chloride	18.0	mg/L		Y	Y	EPA:300.0	0.335
CTUA	CTUA-19-174570	07/02/2019	Chromium	3.0	µg/L	U	N	Y	SW-846:6020	3
CTUA	CTUA-19-174571	07/17/2019	Chromium	3.0	µg/L	U	N	Y	SW-846:6020	3
CTUA	CTUA-19-174572	07/24/2019	Chromium	3.0	µg/L	U	N	Y	SW-846:6020	3
CTUA	CTUA-19-174573	08/01/2019	Chromium	3.0	µg/L	U	N	Y	SW-846:6020	3
CTUA	CTUA-19-174574	08/07/2019	Chromium	3.0	µg/L	U	N	Y	SW-846:6020	3
CTUA	CTUA-19-174575	08/14/2019	Chromium	3.0	µg/L	U	N	Y	SW-846:6020	3
CTUA	CTUA-19-174576	08/20/2019	Chromium	3.0	µg/L	U	N	Y	SW-846:6020	3
CTUA	CTUA-19-174577	08/28/2019	Chromium	3.0	µg/L	U	N	Y	SW-846:6020	3
CTUA	CTUA-19-184582	09/05/2019	Chromium	3.0	µg/L	U	N	Y	SW-846:6020	3
CTUA	CTUA-19-184583	09/10/2019	Chromium	3.0	µg/L	U	N	Y	SW-846:6020	3
CTUA	CTUA-19-184584	09/18/2019	Chromium	3.0	µg/L	U	N	Y	SW-846:6020	3
CTUA	CTUA-19-184585	09/25/2019	Chromium	3.0	µg/L	U	N	Y	SW-846:6020	3
CTUA	CTUA-19-174570	07/02/2019	Fluoride	0.409	mg/L		Y	Y	EPA:300.0	0.033

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-19-174571	07/17/2019	Fluoride	0.281	mg/L		Y	Y	EPA:300.0	0.033
CTUA	CTUA-19-174572	07/24/2019	Fluoride	0.465	mg/L		Y	Y	EPA:300.0	0.033
CTUA	CTUA-19-174573	08/01/2019	Fluoride	0.329	mg/L		Y	Y	EPA:300.0	0.033
CTUA	CTUA-19-174574	08/07/2019	Fluoride	0.436	mg/L		Y	Y	EPA:300.0	0.033
CTUA	CTUA-19-174575	08/14/2019	Fluoride	0.439	mg/L		Y	Y	EPA:300.0	0.033
CTUA	CTUA-19-174576	08/20/2019	Fluoride	0.398	mg/L		Y	Y	EPA:300.0	0.033
CTUA	CTUA-19-174577	08/28/2019	Fluoride	0.381	mg/L		Y	Y	EPA:300.0	0.033
CTUA	CTUA-19-184582	09/05/2019	Fluoride	0.357	mg/L		Y	Y	EPA:300.0	0.033
CTUA	CTUA-19-184583	09/10/2019	Fluoride	0.313	mg/L		Y	Y	EPA:300.0	0.033
CTUA	CTUA-19-184584	09/18/2019	Fluoride	0.386	mg/L		Y	Y	EPA:300.0	0.033
CTUA	CTUA-19-184585	09/25/2019	Fluoride	0.360	mg/L		Y	Y	EPA:300.0	0.033
CTUA	CTUA-19-174570	07/02/2019	Nitrate-Nitrite as Nitrogen	0.0883	mg/L		Y	Y	EPA:353.2	0.017
CTUA	CTUA-19-174571	07/17/2019	Nitrate-Nitrite as Nitrogen	2.11	mg/L		Y	Y	EPA:353.2	0.085
CTUA	CTUA-19-174572	07/24/2019	Nitrate-Nitrite as Nitrogen	3.65	mg/L		Y	Y	EPA:353.2	0.085
CTUA	CTUA-19-174573	08/01/2019	Nitrate-Nitrite as Nitrogen	2.69	mg/L		Y	Y	EPA:353.2	0.085
CTUA	CTUA-19-174574	08/07/2019	Nitrate-Nitrite as Nitrogen	2.64	mg/L		Y	Y	EPA:353.2	0.085
CTUA	CTUA-19-174575	08/14/2019	Nitrate-Nitrite as Nitrogen	2.66	mg/L		Y	Y	EPA:353.2	0.085
CTUA	CTUA-19-174576	08/20/2019	Nitrate-Nitrite as Nitrogen	2.55	mg/L		Y	Y	EPA:353.2	0.170
CTUA	CTUA-19-174577	08/28/2019	Nitrate-Nitrite as Nitrogen	0.0522	mg/L		Y	Y	EPA:353.2	0.017
CTUA	CTUA-19-184582	09/05/2019	Nitrate-Nitrite as Nitrogen	2.63	mg/L		Y	Y	EPA:353.2	0.170
CTUA	CTUA-19-184583	09/10/2019	Nitrate-Nitrite as Nitrogen	2.48	mg/L		Y	Y	EPA:353.2	0.17
CTUA	CTUA-19-184584	09/18/2019	Nitrate-Nitrite as Nitrogen	2.50	mg/L		Y	Y	EPA:353.2	0.17
CTUA	CTUA-19-184585	09/25/2019	Nitrate-Nitrite as Nitrogen	2.91	mg/L		Y	Y	EPA:353.2	0.085
CTUA	CTUA-19-174570	07/02/2019	Perchlorate	0.0824	µg/L	J	Y	Y	SW-846:6850	0.05
CTUA	CTUA-19-174571	07/17/2019	Perchlorate	0.181	µg/L	J	Y	Y	SW-846:6850	0.05
CTUA	CTUA-19-174572	07/24/2019	Perchlorate	0.263	µg/L		Y	Y	SW-846:6850	0.05

Table 2.2-1 (continued)

Location ID	Sample ID	Sample Date*	Parameter Name	Result	Report Unit	Lab Qualifier	Detect Flag	Filtered	Lab Method	Method Detection Limit
CTUA	CTUA-19-174573	08/01/2019	Perchlorate	0.273	µg/L		Y	Y	SW-846:6850	0.05
CTUA	CTUA-19-174574	08/07/2019	Perchlorate	0.278	µg/L		Y	Y	SW-846:6850	0.05
CTUA	CTUA-19-174575	08/14/2019	Perchlorate	0.238	µg/L		Y	Y	SW-846:6850	0.05
CTUA	CTUA-19-174576	08/20/2019	Perchlorate	0.228	µg/L		Y	Y	SW-846:6850	0.05
CTUA	CTUA-19-174577	08/28/2019	Perchlorate	0.146	µg/L	J	Y	Y	SW-846:6850	0.05
CTUA	CTUA-19-184582	09/05/2019	Perchlorate	0.754	µg/L		Y	Y	SW-846:6850	0.05
CTUA	CTUA-19-184583	09/10/2019	Perchlorate	0.814	µg/L		Y	Y	SW-846:6850	0.05
CTUA	CTUA-19-184584	09/18/2019	Perchlorate	0.77	µg/L		Y	Y	SW-846:6850	0.05
CTUA	CTUA-19-184585	09/25/2019	Perchlorate	0.793	µg/L		Y	Y	SW-846:6850	0.05
CTUA	CTUA-19-174570	07/02/2019	Sulfate	0.133	mg/L	U	N	Y	EPA:300.0	0.133
CTUA	CTUA-19-174571	07/17/2019	Sulfate	0.166	mg/L	J	Y	Y	EPA:300.0	0.133
CTUA	CTUA-19-174572	07/24/2019	Sulfate	16.2	mg/L		Y	Y	EPA:300.0	0.133
CTUA	CTUA-19-174573	08/01/2019	Sulfate	27.9	mg/L		Y	Y	EPA:300.0	0.665
CTUA	CTUA-19-174574	08/07/2019	Sulfate	25.2	mg/L		Y	Y	EPA:300.0	0.665
CTUA	CTUA-19-174575	08/14/2019	Sulfate	26.1	mg/L		Y	Y	EPA:300.0	0.665
CTUA	CTUA-19-174576	08/20/2019	Sulfate	25.6	mg/L		Y	Y	EPA:300.0	0.665
CTUA	CTUA-19-174577	08/28/2019	Sulfate	0.133	mg/L	U	N	Y	EPA:300.0	0.133
CTUA	CTUA-19-184582	09/05/2019	Sulfate	25.9	mg/L		Y	Y	EPA:300.0	0.266
CTUA	CTUA-19-184583	09/10/2019	Sulfate	26.1	mg/L		Y	Y	EPA:300.0	1.33
CTUA	CTUA-19-184584	09/18/2019	Sulfate	25.5	mg/L		Y	Y	EPA:300.0	0.532
CTUA	CTUA-19-184585	09/25/2019	Sulfate	26.8	mg/L		Y	Y	EPA:300.0	0.665
CTUA	CTUA-19-174570	07/02/2019	Total Dissolved Solids	259	mg/L		Y	Y	EPA:160.1	3.4
CTUA	CTUA-19-174571	07/17/2019	Total Dissolved Solids	243	mg/L		Y	Y	EPA:160.1	3.4
CTUA	CTUA-19-174572	07/24/2019	Total Dissolved Solids	257	mg/L		Y	Y	EPA:160.1	3.4
CTUA	CTUA-19-174573	08/01/2019	Total Dissolved Solids	209	mg/L		Y	Y	EPA:160.1	3.4
CTUA	CTUA-19-174574	08/07/2019	Total Dissolved Solids	217	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-19-174575	08/14/2019	Total Dissolved Solids	229	mg/L		Y	Y	EPA:160.1	3.4
CTUA	CTUA-19-174576	08/20/2019	Total Dissolved Solids	237	mg/L		Y	Y	EPA:160.1	3.4
CTUA	CTUA-19-174577	08/28/2019	Total Dissolved Solids	270	mg/L		Y	Y	EPA:160.1	3.4
CTUA	CTUA-19-184582	09/05/2019	Total Dissolved Solids	250	mg/L		Y	Y	EPA:160.1	3.4
CTUA	CTUA-19-184583	09/10/2019	Total Dissolved Solids	197	mg/L		Y	Y	EPA:160.1	3.4
CTUA	CTUA-19-184584	09/18/2019	Total Dissolved Solids	240	mg/L		Y	Y	EPA:160.1	3.4
CTUA	CTUA-19-184585	09/25/2019	Total Dissolved Solids	201	mg/L		Y	Y	EPA:160.1	3.4

* In accordance with condition 13 of DP-1835, analysis of the treated effluent from each IX unit is required only once every month for the 2019 Quarter 3 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.

The pilot scale molasses and sodium dithionite amendment studies continued during 2019 Quarter 3. 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 was completed, and the results were submitted in the quarterly monitoring reports under DP-1835. These results for 2019 Quarter 3 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 3, the annual sample for all water contaminants listed in 20.6.2.3103 NMAC and all toxic pollutants defined in 20.6.2.7.T(2) NMAC was not obtained for CTUA. The annual sample is expected to be obtained during 2019 Quarter 4.

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

Depth-to-groundwater is expressed as the elevation of the groundwater above sea level. Figure 2.3-1 is the groundwater elevation map, and Table 2.3-1 provides the quarterly groundwater elevation measurements. An explanation of how the groundwater elevation map was generated is provided below. Quarterly groundwater analytical results from samples collected during 2019 Quarter 3 for the monitoring wells listed in Condition No. 14 are summarized in Table 2.3-2.

The regional aquifer beneath Los Alamos National Laboratory (LANL or the Laboratory) is a complex hydrogeological system. The shape of the regional water table beneath the Pajarito Plateau is predominantly controlled by the areas of recharge to the west (i.e., the flanks of the Sierra de los Valles and the Pajarito fault zone) and discharge to the east (i.e., the Rio Grande and the White Rock Canyon Springs). At a more local scale, such as the chromium plume area, the structure of the regional water table and groundwater flow is also expected to be influenced by (1) local infiltration zones and recharge areas (e.g., beneath canyons), (2) heterogeneity and anisotropy in the aquifer properties, and (3) extraction and injection locations (municipal water-supply wells and chromium interim measure extraction/injection wells).

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

Table 2.2-2
Treated Effluent Analytical Results Summary Table Related to Molasses and Sodium Dithionite Pilot Studies Under NMED Conditional Approval – 2019 Quarter 3, 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-19-174570	07/02/2019	Arsenic	2.02	µg/L	J	Y	Y	SW-846:6020	2
CTUA	CTUA-19-174571	07/17/2019	Arsenic	2	µg/L	U	N	Y	SW-846:6020	2
CTUA	CTUA-19-174572	07/24/2019	Arsenic	2	µg/L	U	N	Y	SW-846:6020	2
CTUA	CTUA-19-174573	08/01/2019	Arsenic	2	µg/L	U	N	Y	SW-846:6020	2
CTUA	CTUA-19-174574	08/07/2019	Arsenic	2.86	µg/L	J	Y	Y	SW-846:6020	2
CTUA	CTUA-19-174575	08/14/2019	Arsenic	2.63	µg/L	J	Y	Y	SW-846:6020	2
CTUA	CTUA-19-174576	08/20/2019	Arsenic	2.37	µg/L	J	Y	Y	SW-846:6020	2
CTUA	CTUA-19-174577	08/28/2019	Arsenic	2	µg/L	U	N	Y	SW-846:6020	2
CTUA	CTUA-19-184582	09/05/2019	Arsenic	2.1	µg/L	J	Y	Y	SW-846:6020	2
CTUA	CTUA-19-184583	09/10/2019	Arsenic	2	µg/L	J	Y	Y	SW-846:6020	2
CTUA	CTUA-19-184584	09/18/2019	Arsenic	2.75	µg/L	J	Y	Y	SW-846:6020	2
CTUA	CTUA-19-184585	09/25/2019	Arsenic	2.32	µg/L	J	Y	Y	SW-846:6020	2
CTUA	CTUA-19-174570	07/02/2019	Iron	30.0	µg/L	U	N	Y	SW-846:6010C	30
CTUA	CTUA-19-174571	07/17/2019	Iron	30.0	µg/L	U	N	Y	SW-846:6010C	30
CTUA	CTUA-19-174572	07/24/2019	Iron	30.0	µg/L	U	N	Y	SW-846:6010C	30
CTUA	CTUA-19-174573	08/01/2019	Iron	30.0	µg/L	U	N	Y	SW-846:6010C	30
CTUA	CTUA-19-174574	08/07/2019	Iron	30.0	µg/L	U	N	Y	SW-846:6010C	30
CTUA	CTUA-19-174575	08/14/2019	Iron	30.0	µg/L	U	N	Y	SW-846:6010C	30
CTUA	CTUA-19-174576	08/20/2019	Iron	30.0	µg/L	U	N	Y	SW-846:6010C	30
CTUA	CTUA-19-174577	08/28/2019	Iron	30.0	µg/L	U	N	Y	SW-846:6010C	30
CTUA	CTUA-19-184582	09/05/2019	Iron	30.0	µg/L	U	N	Y	SW-846:6010C	30
CTUA	CTUA-19-184583	09/10/2019	Iron	30.0	µg/L	U	N	Y	SW-846:6010C	30
CTUA	CTUA-19-184584	09/18/2019	Iron	30.0	µg/L	U	N	Y	SW-846:6010C	30
CTUA	CTUA-19-184585	09/25/2019	Iron	30.0	µg/L	U	N	Y	SW-846:6010C	30
CTUA	CTUA-19-174570	07/02/2019	Manganese	4.28	µg/L	J	Y	Y	SW-846:6010C	2
CTUA	CTUA-19-174571	07/17/2019	Manganese	12.5	µg/L		Y	Y	SW-846:6010C	2

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-19-174572	07/24/2019	Manganese	3.15	µg/L	J	Y	Y	SW-846:6010C	2
CTUA	CTUA-19-174573	08/01/2019	Manganese	2	µg/L	U	N	Y	SW-846:6010C	2
CTUA	CTUA-19-174574	08/07/2019	Manganese	2	µg/L	U	N	Y	SW-846:6010C	2
CTUA	CTUA-19-174575	08/14/2019	Manganese	2	µg/L	U	N	Y	SW-846:6010C	2
CTUA	CTUA-19-174576	08/20/2019	Manganese	2	µg/L	U	N	Y	SW-846:6010C	2
CTUA	CTUA-19-174577	08/28/2019	Manganese	2	µg/L	U	N	Y	SW-846:6010C	2
CTUA	CTUA-19-184582	09/05/2019	Manganese	2	µg/L	U	N	Y	SW-846:6010C	2
CTUA	CTUA-19-184583	09/10/2019	Manganese	2	µg/L	U	N	Y	SW-846:6010C	2
CTUA	CTUA-19-184584	09/18/2019	Manganese	2	µg/L	U	N	Y	SW-846:6010C	2
CTUA	CTUA-19-184585	09/25/2019	Manganese	2	µg/L	U	N	Y	SW-846:6010C	2

* In accordance with condition 13 of DP-1835, analysis of the treated effluent from each IX unit is required only once every month for the 2019 Quarter 3 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.

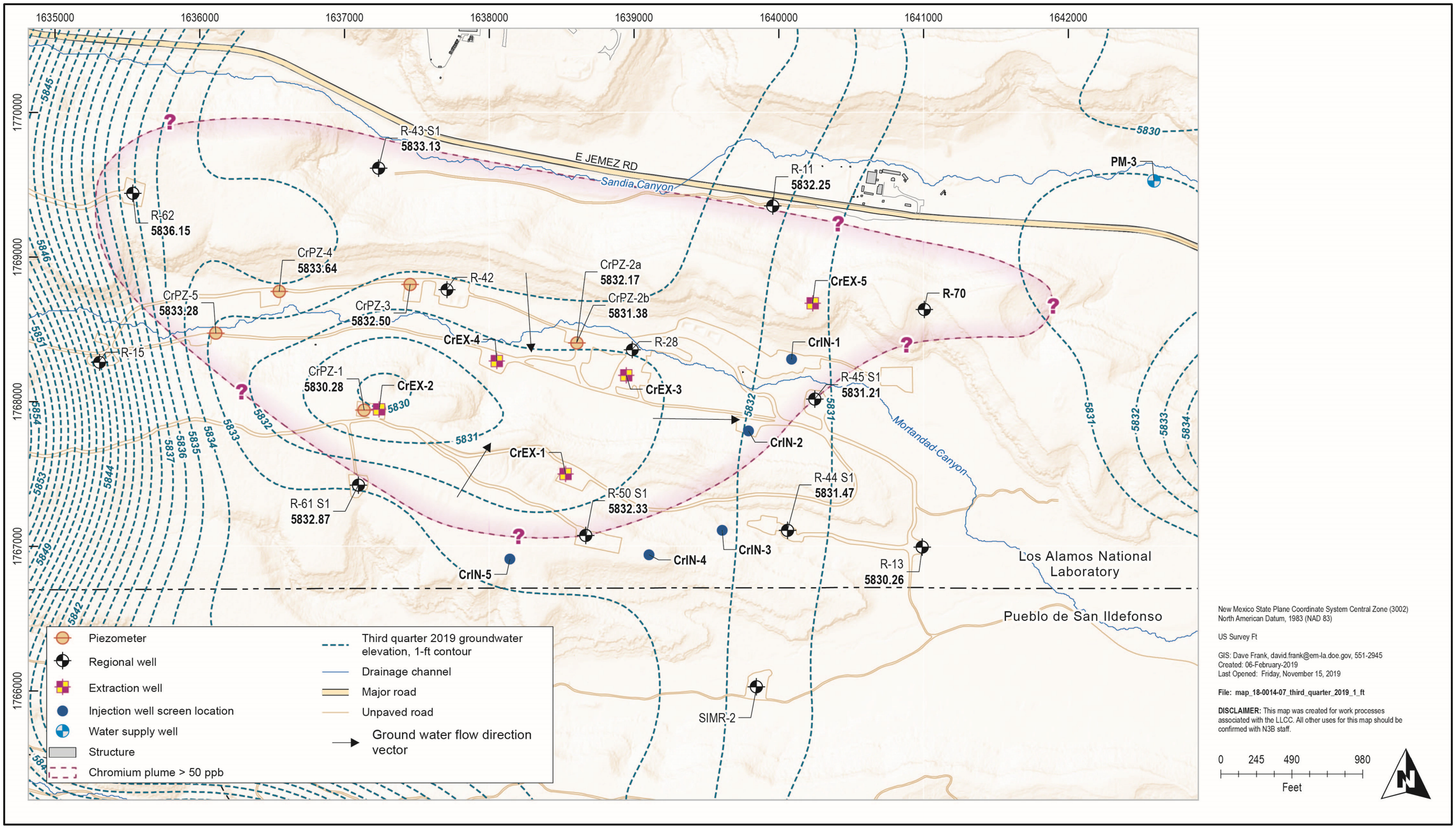

Figure 2.3-1 Groundwater elevation contour map – 2019 Quarter 3, DP-1835

Table 2.3-1
Groundwater Elevations Summary
for Groundwater Monitoring Wells – 2019 Quarter 3

Monitoring Well	Groundwater Elevation[a] (ft)
CrPZ-1 (CrCH-1)	5830.28
CrPZ-2a (CrCH-2a)	5832.17
CrPZ-2b (CrCH-2b)	5831.38
CrPZ-3 (CrCH-3)	5832.50
CrPZ-4 (CrCH-4)	5833.64
CrPZ-5 (CrCH-5)	5833.28
R-11	5832.25
R-13	5830.26
R-43 S1[b]	5833.13
R-43 S2[c]	5831.53
R-44 S1	5831.47
R-44 S2	5831.3
R-45 S1	5831.21
R-45 S2	5831.5
R-50 S1	5832.33
R-50 S2	5831.86
R-61 S1	5832.87
R-61 S2	5833.49
R-62	5836.15
SIMR-2[d]	5831.93

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

[b] S1 = Screen 1.

[c] S2 = Screen 2.

[d] Second quarter average May 2019 SIMR-2 data are reported here in accordance with the DP-1835 2019 Quarter 2 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 3, DP-1835

Field Sample ID	Location ID	Sample Date	Parameter Name	Report Result	Report Unit	Lab Qualifier	Detect Flag	Filtered	Lab Method	Method Detection Limit
CASA-19-182098	R-11	07/11/2019	Chloride	8.65	mg/L		Y	Y	EPA:300.0	0.067
CASA-19-182098	R-11	07/11/2019	Perchlorate	0.75	µg/L		Y	Y	SW-846:6850	0.050
CASA-19-182098	R-11	07/11/2019	Chromium	7.08	µg/L	J	Y	Y	SW-846:6020	3.00
CASA-19-182098	R-11	07/11/2019	Fluoride	3.02	mg/L		Y	Y	EPA:300.0	0.033
CASA-19-182098	R-11	07/11/2019	Nitrate-Nitrite as Nitrogen	5.51	mg/L		Y	Y	EPA:353.2	0.170
CASA-19-182098	R-11	07/11/2019	Sulfate	20.2	mg/L		Y	Y	EPA:300.0	0.532
CASA-19-182098	R-11	07/11/2019	Total Dissolved Solids	217	mg/L		Y	Y	EPA:160.1	3.40
CASA-19-184709	R-11	08/14/2019	Chloride	3.78	mg/L		Y	Y	EPA:300.0	0.067
CASA-19-184709	R-11	08/14/2019	Perchlorate	0.754	µg/L		Y	Y	SW-846:6850	0.050
CASA-19-184709	R-11	08/14/2019	Chromium	7.46	µg/L	J	Y	Y	SW-846:6020	3.00
CASA-19-184709	R-11	08/14/2019	Fluoride	0.564	mg/L		Y	Y	EPA:300.0	0.033
CASA-19-184709	R-11	08/14/2019	Nitrate-Nitrite as Nitrogen	5.7	mg/L		Y	Y	EPA:353.2	0.085
CASA-19-184709	R-11	08/14/2019	Sulfate	10.6	mg/L		Y	Y	EPA:300.0	0.133
CASA-19-184709	R-11	08/14/2019	Total Dissolved Solids	187	mg/L		Y	Y	EPA:160.1	3.40
CASA-19-186479	R-11	09/16/2019	Chloride	3.74	mg/L		Y	Y	EPA:300.0	0.067
CASA-19-186479	R-11	09/16/2019	Perchlorate	0.778	µg/L		Y	Y	SW-846:6850	0.050
CASA-19-186479	R-11	09/16/2019	Chromium	6.67	µg/L	J	Y	Y	SW-846:6020	3.00
CASA-19-186479	R-11	09/16/2019	Fluoride	0.460	mg/L		Y	Y	EPA:300.0	0.033
CASA-19-186479	R-11	09/16/2019	Nitrate-Nitrite as Nitrogen	5.67	mg/L		Y	Y	EPA:353.2	0.170
CASA-19-186479	R-11	09/16/2019	Sulfate	10.5	mg/L		Y	Y	EPA:300.0	0.133
CASA-19-186479	R-11	09/16/2019	Total Dissolved Solids	219	mg/L		Y	Y	EPA:160.1	3.40
CAMO-19-181826	R-13	07/09/2019	Chloride	2.66	mg/L		Y	Y	EPA:300.0	0.067
CAMO-19-181826	R-13	07/09/2019	Perchlorate	0.396	µg/L		Y	Y	SW-846:6850	0.050
CAMO-19-181826	R-13	07/09/2019	Chromium	4.13	µg/L	J	Y	Y	SW-846:6020	3.00

Table 2.3-2 (continued)

Field Sample ID	Location ID	Sample Date	Parameter Name	Report Result	Report Unit	Lab Qualifier	Detect Flag	Filtered	Lab Method	Method Detection Limit
CAMO-19-181826	R-13	07/09/2019	Fluoride	0.24	mg/L		Y	Y	EPA:300.0	0.033
CAMO-19-181826	R-13	07/09/2019	Nitrate-Nitrite as Nitrogen	0.76	mg/L		Y	Y	EPA:353.2	0.017
CAMO-19-181826	R-13	07/09/2019	Sulfate	3.48	mg/L		Y	Y	EPA:300.0	0.133
CAMO-19-181826	R-13	07/09/2019	Total Dissolved Solids	154	mg/L		Y	Y	EPA:160.1	3.40
CASA-19-182709	R-43 S1[a]	07/11/2019	Chloride	9.11	mg/L		Y	Y	EPA:300.0	0.067
CASA-19-182709	R-43 S1	07/11/2019	Perchlorate	0.783	µg/L		Y	Y	SW-846:6850	0.050
CASA-19-182709	R-43 S1	07/11/2019	Chromium	205	µg/L		Y	Y	SW-846:6020	3.00
CASA-19-182709	R-43 S1	07/11/2019	Fluoride	0.535	mg/L		Y	Y	EPA:300.0	0.033
CASA-19-182709	R-43 S1	07/11/2019	Nitrate-Nitrite as Nitrogen	4.9	mg/L		Y	Y	EPA:353.2	0.170
CASA-19-182709	R-43 S1	07/11/2019	Sulfate	18.6	mg/L		Y	Y	EPA:300.0	0.133
CASA-19-182709	R-43 S1	07/11/2019	Total Dissolved Solids	216	mg/L		Y	Y	EPA:160.1	3.40
CASA-19-182711	R-43 S2[b]	07/11/2019	Chloride	6.97	mg/L		Y	Y	EPA:300.0	0.067
CASA-19-182711	R-43 S2	07/11/2019	Perchlorate	0.918	µg/L		Y	Y	SW-846:6850	0.050
CASA-19-182711	R-43 S2	07/11/2019	Chromium	31.6	µg/L		Y	Y	SW-846:6020	3.00
CASA-19-182711	R-43 S2	07/11/2019	Fluoride	0.576	mg/L		Y	Y	EPA:300.0	0.033
CASA-19-182711	R-43 S2	07/11/2019	Nitrate-Nitrite as Nitrogen	3.79	mg/L		Y	Y	EPA:353.2	0.170
CASA-19-182711	R-43 S2	07/11/2019	Sulfate	10.1	mg/L		Y	Y	EPA:300.0	0.133
CASA-19-182711	R-43 S2	07/11/2019	Total Dissolved Solids	163	mg/L		Y	Y	EPA:160.1	3.40
CAMO-19-181836	R-44 S1	07/15/2019	Chloride	17.1	mg/L		Y	Y	EPA:300.0	0.335
CAMO-19-181836	R-44 S1	07/15/2019	Perchlorate	0.328	µg/L		Y	Y	SW-846:6850	0.050
CAMO-19-181836	R-44 S1	07/15/2019	Chromium	6.61	µg/L	J	Y	Y	SW-846:6020	3.00
CAMO-19-181836	R-44 S1	07/15/2019	Fluoride	0.363	mg/L	J-	Y	Y	EPA:300.0	0.033
CAMO-19-181836	R-44 S1	07/15/2019	Nitrate-Nitrite as Nitrogen	2.33	mg/L		Y	Y	EPA:353.2	0.085
CAMO-19-181836	R-44 S1	07/15/2019	Sulfate	17.7	mg/L	J-	Y	Y	EPA:300.0	0.133
CAMO-19-181836	R-44 S1	07/15/2019	Total Dissolved Solids	197	mg/L		Y	Y	EPA:160.1	3.40
CAMO-19-184722	R-44 S1	08/27/2019	Chloride	18.2	mg/L		Y	Y	EPA:300.0	0.335

Table 2.3-2 (continued)

Field Sample ID	Location ID	Sample Date	Parameter Name	Report Result	Report Unit	Lab Qualifier	Detect Flag	Filtered	Lab Method	Method Detection Limit
CAMO-19-184722	R-44 S1	08/27/2019	Perchlorate	0.32	µg/L		Y	Y	SW-846:6850	0.050
CAMO-19-184722	R-44 S1	08/27/2019	Chromium	6.24	µg/L	J	Y	Y	SW-846:6020	3.00
CAMO-19-184722	R-44 S1	08/27/2019	Fluoride	0.159	mg/L		Y	Y	EPA:300.0	0.033
CAMO-19-184722	R-44 S1	08/27/2019	Nitrate-Nitrite as Nitrogen	2.32	mg/L		Y	Y	EPA:353.2	0.085
CAMO-19-184722	R-44 S1	08/27/2019	Sulfate	19.4	mg/L		Y	Y	EPA:300.0	0.133
CAMO-19-184722	R-44 S1	08/27/2019	Total Dissolved Solids	251	mg/L		Y	Y	EPA:160.1	3.40
CAMO-19-186511	R-44 S1	09/12/2019	Chloride	19	mg/L		Y	Y	EPA:300.0	0.335
CAMO-19-186511	R-44 S1	09/12/2019	Perchlorate	0.313	µg/L		Y	Y	SW-846:6850	0.050
CAMO-19-186511	R-44 S1	09/12/2019	Chromium	6.04	µg/L	J	Y	Y	SW-846:6020	3.00
CAMO-19-186511	R-44 S1	09/12/2019	Fluoride	0.339	mg/L		Y	Y	EPA:300.0	0.033
CAMO-19-186511	R-44 S1	09/12/2019	Nitrate-Nitrite as Nitrogen	2.36	mg/L		Y	Y	EPA:353.2	0.085
CAMO-19-186511	R-44 S1	09/12/2019	Sulfate	19.4	mg/L		Y	Y	EPA:300.0	0.133
CAMO-19-186511	R-44 S1	09/12/2019	Total Dissolved Solids	214	mg/L		Y	Y	EPA:160.1	3.40
CAMO-19-181850	R-44 S2	07/15/2019	Chloride	2.17	mg/L		Y	Y	EPA:300.0	0.067
CAMO-19-181850	R-44 S2	07/15/2019	Perchlorate	0.329	µg/L		Y	Y	SW-846:6850	0.050
CAMO-19-181850	R-44 S2	07/15/2019	Chromium	5.76	µg/L	J	Y	Y	SW-846:6020	3.00
CAMO-19-181850	R-44 S2	07/15/2019	Fluoride	0.453	mg/L		Y	Y	EPA:300.0	0.033
CAMO-19-181850	R-44 S2	07/15/2019	Nitrate-Nitrite as Nitrogen	0.644	mg/L		Y	Y	EPA:353.2	0.017
CAMO-19-181850	R-44 S2	07/15/2019	Sulfate	2.43	mg/L		Y	Y	EPA:300.0	0.133
CAMO-19-181850	R-44 S2	07/15/2019	Total Dissolved Solids	321	mg/L		Y	Y	EPA:160.1	3.40
CAMO-19-184725	R-44 S2	08/27/2019	Chloride	2.1	mg/L		Y	Y	EPA:300.0	0.067
CAMO-19-184725	R-44 S2	08/27/2019	Perchlorate	0.352	µg/L		Y	Y	SW-846:6850	0.050
CAMO-19-184725	R-44 S2	08/27/2019	Chromium	5.88	µg/L	J	Y	Y	SW-846:6020	3.00
CAMO-19-184725	R-44 S2	08/27/2019	Fluoride	0.418	mg/L		Y	Y	EPA:300.0	0.033
CAMO-19-184725	R-44 S2	08/27/2019	Nitrate-Nitrite as Nitrogen	0.63	mg/L		Y	Y	EPA:353.2	0.085
CAMO-19-184725	R-44 S2	08/27/2019	Sulfate	2.4	mg/L		Y	Y	EPA:300.0	0.133

Table 2.3-2 (continued)

Field Sample ID	Location ID	Sample Date	Parameter Name	Report Result	Report Unit	Lab Qualifier	Detect Flag	Filtered	Lab Method	Method Detection Limit
CAMO-19-184725	R-44 S2	08/27/2019	Total Dissolved Solids	179	mg/L		Y	Y	EPA:160.1	3.40
CAMO-19-186518	R-44 S2	09/12/2019	Chloride	2.2	mg/L		Y	Y	EPA:300.0	0.067
CAMO-19-186518	R-44 S2	09/12/2019	Perchlorate	0.344	µg/L		Y	Y	SW-846:6850	0.050
CAMO-19-186518	R-44 S2	09/12/2019	Chromium	5.81	µg/L	J	Y	Y	SW-846:6020	3.00
CAMO-19-186518	R-44 S2	09/12/2019	Fluoride	0.557	mg/L		Y	Y	EPA:300.0	0.033
CAMO-19-186518	R-44 S2	09/12/2019	Nitrate-Nitrite as Nitrogen	0.646	mg/L		Y	Y	EPA:353.2	0.017
CAMO-19-186518	R-44 S2	09/12/2019	Sulfate	2.45	mg/L		Y	Y	EPA:300.0	0.133
CAMO-19-186518	R-44 S2	09/12/2019	Total Dissolved Solids	133	mg/L		Y	Y	EPA:160.1	3.40
CAMO-19-181853	R-45 S1	07/16/2019	Chloride	4.6	mg/L		Y	Y	EPA:300.0	0.067
CAMO-19-181853	R-45 S1	07/16/2019	Perchlorate	0.565	µg/L		Y	Y	SW-846:6850	0.050
CAMO-19-181853	R-45 S1	07/16/2019	Chromium	31.4	µg/L		Y	Y	SW-846:6020	3.00
CAMO-19-181853	R-45 S1	07/16/2019	Fluoride	0.504	mg/L		Y	Y	EPA:300.0	0.033
CAMO-19-181853	R-45 S1	07/16/2019	Nitrate-Nitrite as Nitrogen	2.69	mg/L		Y	Y	EPA:353.2	0.085
CAMO-19-181853	R-45 S1	07/16/2019	Sulfate	6.84	mg/L		Y	Y	EPA:300.0	0.133
CAMO-19-181853	R-45 S1	07/16/2019	Total Dissolved Solids	109	mg/L		Y	Y	EPA:160.1	3.40
CAMO-19-184728	R-45 S1	08/23/2019	Chloride	4.95	mg/L		Y	Y	EPA:300.0	0.067
CAMO-19-184728	R-45 S1	08/23/2019	Perchlorate	0.546	µg/L	J	Y	Y	SW-846:6850	0.050
CAMO-19-184728	R-45 S1	08/23/2019	Chromium	33.6	µg/L		Y	Y	SW-846:6020	3.00
CAMO-19-184728	R-45 S1	08/23/2019	Fluoride	0.518	mg/L		Y	Y	EPA:300.0	0.033
CAMO-19-184728	R-45 S1	08/23/2019	Nitrate-Nitrite as Nitrogen	2.46	mg/L		Y	Y	EPA:353.2	0.085
CAMO-19-184728	R-45 S1	08/23/2019	Sulfate	7.24	mg/L		Y	Y	EPA:300.0	0.133
CAMO-19-184728	R-45 S1	08/23/2019	Total Dissolved Solids	236	mg/L	J	Y	Y	EPA:160.1	3.40
CAMO-19-186521	R-45 S1	09/26/2019	Chloride	5.10	mg/L		Y	Y	EPA:300.0	0.067
CAMO-19-186521	R-45 S1	09/26/2019	Perchlorate	0.539	µg/L		Y	Y	SW-846:6850	0.050
CAMO-19-186521	R-45 S1	09/26/2019	Chromium	33	µg/L		Y	Y	SW-846:6020	3.00
CAMO-19-186521	R-45 S1	09/26/2019	Fluoride	0.0684	mg/L	J	Y	Y	EPA:300.0	0.033

Table 2.3-2 (continued)

Field Sample ID	Location ID	Sample Date	Parameter Name	Report Result	Report Unit	Lab Qualifier	Detect Flag	Filtered	Lab Method	Method Detection Limit
CAMO-19-186521	R-45 S1	09/26/2019	Nitrate-Nitrite as Nitrogen	2.82	mg/L		Y	Y	EPA:353.2	0.085
CAMO-19-186521	R-45 S1	09/26/2019	Sulfate	6.96	mg/L		Y	Y	EPA:300.0	0.133
CAMO-19-186521	R-45 S1	09/26/2019	Total Dissolved Solids	213	mg/L		Y	Y	EPA:160.1	3.40
CAMO-19-181856	R-45 S2	07/16/2019	Chloride	4.99	mg/L		Y	Y	EPA:300.0	0.067
CAMO-19-181856	R-45 S2	07/16/2019	Perchlorate	0.399	µg/L		Y	Y	SW-846:6850	0.050
CAMO-19-181856	R-45 S2	07/16/2019	Chromium	31.5	µg/L		Y	Y	SW-846:6020	3.00
CAMO-19-181856	R-45 S2	07/16/2019	Fluoride	0.589	mg/L		Y	Y	EPA:300.0	0.033
CAMO-19-181856	R-45 S2	07/16/2019	Nitrate-Nitrite as Nitrogen	1.05	mg/L		Y	Y	EPA:353.2	0.085
CAMO-19-181856	R-45 S2	07/16/2019	Sulfate	5.89	mg/L		Y	Y	EPA:300.0	0.133
CAMO-19-181856	R-45 S2	07/16/2019	Total Dissolved Solids	146	mg/L		Y	Y	EPA:160.1	3.40
CAMO-19-184731	R-45 S2	08/23/2019	Chloride	5.16	mg/L		Y	Y	EPA:300.0	0.067
CAMO-19-184731	R-45 S2	08/23/2019	Perchlorate	0.421	µg/L	J	Y	Y	SW-846:6850	0.050
CAMO-19-184731	R-45 S2	08/23/2019	Chromium	36.1	µg/L		Y	Y	SW-846:6020	3.00
CAMO-19-184731	R-45 S2	08/23/2019	Fluoride	0.588	mg/L		Y	Y	EPA:300.0	0.033
CAMO-19-184731	R-45 S2	08/23/2019	Nitrate-Nitrite as Nitrogen	0.969	mg/L		Y	Y	EPA:353.2	0.017
CAMO-19-184731	R-45 S2	08/23/2019	Sulfate	6.12	mg/L		Y	Y	EPA:300.0	0.133
CAMO-19-184731	R-45 S2	08/23/2019	Total Dissolved Solids	173	mg/L	J	Y	Y	EPA:160.1	3.40
CAMO-19-186527	R-45 S2	09/26/2019	Chloride	5.08	mg/L		Y	Y	EPA:300.0	0.067
CAMO-19-186527	R-45 S2	09/26/2019	Perchlorate	0.458	µg/L		Y	Y	SW-846:6850	0.050
CAMO-19-186527	R-45 S2	09/26/2019	Chromium	36.4	µg/L		Y	Y	SW-846:6020	3.00
CAMO-19-186527	R-45 S2	09/26/2019	Fluoride	0.0692	mg/L	J	Y	Y	EPA:300.0	0.033
CAMO-19-186527	R-45 S2	09/26/2019	Nitrate-Nitrite as Nitrogen	1.08	mg/L		Y	Y	EPA:353.2	0.017
CAMO-19-186527	R-45 S2	09/26/2019	Sulfate	6.16	mg/L		Y	Y	EPA:300.0	0.133
CAMO-19-186527	R-45 S2	09/26/2019	Total Dissolved Solids	176	mg/L		Y	Y	EPA:160.1	3.40
CAMO-19-181859	R-50 S1	07/17/2019	Chloride	15.7	mg/L	J-	Y	Y	EPA:300.0	0.335
CAMO-19-181859	R-50 S1	07/17/2019	Perchlorate	0.381	µg/L		Y	Y	SW-846:6850	0.050

Table 2.3-2 (continued)

Field Sample ID	Location ID	Sample Date	Parameter Name	Report Result	Report Unit	Lab Qualifier	Detect Flag	Filtered	Lab Method	Method Detection Limit
CAMO-19-181859	R-50 S1	07/17/2019	Chromium	54.9	µg/L		Y	Y	SW-846:6020	3.00
CAMO-19-181859	R-50 S1	07/17/2019	Fluoride	0.233	mg/L		Y	Y	EPA:300.0	0.033
CAMO-19-181859	R-50 S1	07/17/2019	Nitrate-Nitrite as Nitrogen	2.52	mg/L		Y	Y	EPA:353.2	0.085
CAMO-19-181859	R-50 S1	07/17/2019	Sulfate	18.2	mg/L		Y	Y	EPA:300.0	0.133
CAMO-19-181859	R-50 S1	07/17/2019	Total Dissolved Solids	161	mg/L		Y	Y	EPA:160.1	3.40
CAMO-19-184737	R-50 S1	08/22/2019	Chloride	1.14	mg/L		Y	Y	EPA:300.0	0.067
CAMO-19-184737	R-50 S1	08/22/2019	Perchlorate	0.406	µg/L		Y	Y	SW-846:6850	0.050
CAMO-19-184737	R-50 S1	08/22/2019	Chromium	57.4	µg/L		Y	Y	SW-846:6020	3.00
CAMO-19-184737	R-50 S1	08/22/2019	Fluoride	0.308	mg/L	J-	Y	Y	EPA:300.0	0.033
CAMO-19-184737	R-50 S1	08/22/2019	Nitrate-Nitrite as Nitrogen	2.38	mg/L		Y	Y	EPA:353.2	0.085
CAMO-19-184737	R-50 S1	08/22/2019	Sulfate	18.5	mg/L	J-	Y	Y	EPA:300.0	0.133
CAMO-19-184737	R-50 S1	08/22/2019	Total Dissolved Solids	216	mg/L	J+	Y	Y	EPA:160.1	3.40
CAMO-19-186530	R-50 S1	09/20/2019	Chloride	18.2	mg/L		Y	Y	EPA:300.0	0.134
CAMO-19-186530	R-50 S1	09/20/2019	Perchlorate	0.376	µg/L		Y	Y	SW-846:6850	0.050
CAMO-19-186530	R-50 S1	09/20/2019	Chromium	44.1	µg/L		Y	Y	SW-846:6020	3.00
CAMO-19-186530	R-50 S1	09/20/2019	Fluoride	0.368	mg/L		Y	Y	EPA:300.0	0.033
CAMO-19-186530	R-50 S1	09/20/2019	Nitrate-Nitrite as Nitrogen	2.25	mg/L		Y	Y	EPA:353.2	0.085
CAMO-19-186530	R-50 S1	09/20/2019	Sulfate	18.1	mg/L		Y	Y	EPA:300.0	0.133
CAMO-19-186530	R-50 S1	09/20/2019	Total Dissolved Solids	194	mg/L		Y	Y	EPA:160.1	3.40
CAMO-19-181863	R-50 S2	07/12/2019	Chloride	2.2	mg/L		Y	Y	EPA:300.0	0.067
CAMO-19-181863	R-50 S2	07/12/2019	Perchlorate	0.338	µg/L		Y	Y	SW-846:6850	0.050
CAMO-19-181863	R-50 S2	07/12/2019	Chromium	4.24	µg/L	J	Y	Y	SW-846:6020	3.00
CAMO-19-181863	R-50 S2	07/12/2019	Fluoride	0.665	mg/L		Y	Y	EPA:300.0	0.033
CAMO-19-181863	R-50 S2	07/12/2019	Nitrate-Nitrite as Nitrogen	0.525	mg/L		Y	Y	EPA:353.2	0.017
CAMO-19-181863	R-50 S2	07/12/2019	Sulfate	2.55	mg/L		Y	Y	EPA:300.0	0.133
CAMO-19-181863	R-50 S2	07/12/2019	Total Dissolved Solids	126	mg/L		Y	Y	EPA:160.1	3.40

Table 2.3-2 (continued)

Field Sample ID	Location ID	Sample Date	Parameter Name	Report Result	Report Unit	Lab Qualifier	Detect Flag	Filtered	Lab Method	Method Detection Limit
CAMO-19-184740	R-50 S2	08/20/2019	Chloride	2.19	mg/L		Y	Y	EPA:300.0	0.067
CAMO-19-184740	R-50 S2	08/20/2019	Perchlorate	0.354	µg/L		Y	Y	SW-846:6850	0.050
CAMO-19-184740	R-50 S2	08/20/2019	Chromium	4.23	µg/L	J	Y	Y	SW-846:6020	3.00
CAMO-19-184740	R-50 S2	08/20/2019	Fluoride	0.655	mg/L		Y	Y	EPA:300.0	0.033
CAMO-19-184740	R-50 S2	08/20/2019	Nitrate-Nitrite as Nitrogen	0.5	mg/L		Y	Y	EPA:353.2	0.085
CAMO-19-184740	R-50 S2	08/20/2019	Sulfate	2.55	mg/L		Y	Y	EPA:300.0	0.133
CAMO-19-184740	R-50 S2	08/20/2019	Total Dissolved Solids	149	mg/L		Y	Y	EPA:160.1	3.40
CAMO-19-186540	R-50 S2	09/19/2019	Chloride	2.28	mg/L		Y	Y	EPA:300.0	0.067
CAMO-19-186540	R-50 S2	09/19/2019	Perchlorate	0.345	µg/L		Y	Y	SW-846:6850	0.050
CAMO-19-186540	R-50 S2	09/19/2019	Chromium	4.01	µg/L	J	Y	Y	SW-846:6020	3.00
CAMO-19-186540	R-50 S2	09/19/2019	Fluoride	0.551	mg/L		Y	Y	EPA:300.0	0.033
CAMO-19-186540	R-50 S2	09/19/2019	Nitrate-Nitrite as Nitrogen	0.525	mg/L		Y	Y	EPA:353.2	0.017
CAMO-19-186540	R-50 S2	09/19/2019	Sulfate	2.58	mg/L		Y	Y	EPA:300.0	0.133
CAMO-19-186540	R-50 S2	09/19/2019	Total Dissolved Solids	119	mg/L		Y	Y	EPA:160.1	3.40
CAMO-19-181868	R-62	07/26/2019	Chloride	16.6	mg/L		Y	Y	EPA:300.0	0.335
CAMO-19-181868	R-62	07/26/2019	Perchlorate	0.87	µg/L		Y	Y	SW-846:6850	0.050
CAMO-19-181868	R-62	07/26/2019	Chromium	270	µg/L		Y	Y	SW-846:6020	3.00
CAMO-19-181868	R-62	07/26/2019	Fluoride	0.306	mg/L		Y	Y	EPA:300.0	0.033
CAMO-19-181868	R-62	07/26/2019	Nitrate-Nitrite as Nitrogen	2.02	mg/L		Y	Y	EPA:353.2	0.085
CAMO-19-181868	R-62	07/26/2019	Sulfate	28.7	mg/L		Y	Y	EPA:300.0	0.665
CAMO-19-181868	R-62	07/26/2019	Total Dissolved Solids	236	mg/L		Y	Y	EPA:160.1	3.40
CAMO-19-174836	SIMR-2	04/29/2019	Chloride	2.35	mg/L		Y	Y	EPA:300.0	0.067
CAMO-19-174836	SIMR-2	04/29/2019	Perchlorate	0.434	µg/L		Y	Y	SW-846:6850	0.050
CAMO-19-174836	SIMR-2	04/29/2019	Chromium	4.84	µg/L		Y	Y	SW-846:6020	3.00
CAMO-19-174836	SIMR-2	04/29/2019	Fluoride	0.421	mg/L		Y	Y	EPA:300.0	0.033
CAMO-19-174836	SIMR-2	04/29/2019	Nitrate-Nitrite as Nitrogen	0.73	mg/L		Y	Y	EPA:353.2	0.085

Table 2.3-2 (continued)

Field Sample ID	Location ID	Sample Date	Parameter Name	Report Result	Report Unit	Lab Qualifier	Detect Flag	Filtered	Lab Method	Method Detection Limit
CAMO-19-174836	SIMR-2	04/29/2019	Sulfate	3.01	mg/L		Y	Y	EPA:300.0	0.133
CAMO-19-174836	SIMR-2	04/29/2019	Total Dissolved Solids	78.6	mg/L	J+	Y	Y	EPA:160.1	3.40
CAMO-19-175175	SIMR-2	05/21/2019	Chloride	2.14	mg/L		Y	Y	EPA:300.0	0.067
CAMO-19-175175	SIMR-2	05/21/2019	Perchlorate	0.532	µg/L		Y	Y	SW-846:6850	0.050
CAMO-19-175175	SIMR-2	05/21/2019	Chromium	5.26	µg/L	J	Y	Y	SW-846:6020	3.00
CAMO-19-175175	SIMR-2	05/21/2019	Fluoride	0.3	mg/L		Y	Y	EPA:300.0	0.033
CAMO-19-175175	SIMR-2	05/21/2019	Nitrate-Nitrite as Nitrogen	0.725	mg/L		Y	Y	EPA:353.2	0.085
CAMO-19-175175	SIMR-2	05/21/2019	Sulfate	2.68	mg/L		Y	Y	EPA:300.0	0.133
CAMO-19-175175	SIMR-2	05/21/2019	Total Dissolved Solids	184	mg/L		Y	Y	EPA:160.1	3.40
CAMO-19-181699	SIMR-2	06/12/2019	Chloride	2.17	mg/L		Y	Y	EPA:300.0	0.067
CAMO-19-181699	SIMR-2	06/12/2019	Perchlorate	0.429	µg/L		Y	Y	SW-846:6850	0.050
CAMO-19-181699	SIMR-2	06/12/2019	Chromium	4.93	µg/L	J	Y	Y	SW-846:6020	3.00
CAMO-19-181699	SIMR-2	06/12/2019	Fluoride	0.301	mg/L		Y	Y	EPA:300.0	0.033
CAMO-19-181699	SIMR-2	06/12/2019	Nitrate-Nitrite as Nitrogen	0.71	mg/L		Y	Y	EPA:353.2	0.017
CAMO-19-181699	SIMR-2	06/12/2019	Sulfate	2.74	mg/L		Y	Y	EPA:300.0	0.133
CAMO-19-181699	SIMR-2	06/12/2019	Total Dissolved Solids	159	mg/L	J+	Y	Y	EPA:160.1	3.40

Notes:

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

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

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

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

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

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

Y in the Filtered column means the sample was filtered.

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

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

[a] S1 = Screen 1.

[b] S2 = Screen 2.

Water-table elevations in the chromium plume area can vary temporally as a result of transient effects that include injection into and extraction from the chromium interim measure infrastructure wells and pumping of Los Alamos County's water-supply wells. This is discussed for the case of 2019 Quarter 3 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 August 2019. General flow direction is indicated by vectors on Figure 2.3-1.

To generate this contour map, average water levels are calculated using values from the middle month of the 3-mo reporting period. Monitoring wells within and surrounding the plume are used, including wells not presented on the map (i.e., R-21, R-31, R-32, R-37, and R-40). Water levels in wells surrounding the plume provide useful control points for contouring along the edges of the area of interest for this report. Only well screens near the water table are used for contouring. At locations with a history of water-level data but with no data for the present quarter, values can be estimated using linear regression based on relationships with other nearby wells. For 2019 Quarter 3, the well levels data set was complete and therefore imputation was not required for any well.

During the current reporting period (2019 Quarter 3), transient groundwater elevation changes were observed because of injection and extraction at the chromium interim measure infrastructure wells. 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 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. 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 because of pumping at CrEX-1. Also, increased water levels were observed to the southwest of the cone of depression, possibly in response to injection at CrIN-4 and CrIN-5 (Figure 2.3-1). 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 (Figure 2.3-1).

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

Because of the spatial coverage of wells and piezometers available as control points and because of the regional structure of significantly steeper gradients to the east and west of the chromium plume area, the surrounding control points (i.e., R-21, R-31, R-32, R-37, and R-40) are used to provide estimated water-level elevations in areas that do not have sufficient data to provide constraints. As additional analysis is performed using historical and developing data sets from both existing wells and data from anticipated proposed wells, the use of these control points will be reanalyzed, adjusted, or discontinued based on additional supporting data.

2.4 Any Operations/Maintenance Activities Performed (Requirement 4)

Extraction, treatment, and injection operations continued during 2019 Quarter 3. During 2019 Quarter 3, 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 not being operated, and an evaluation of the water quality in this well is underway to assess filter plugging.

Operations and maintenance activities completed during 2019 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 – 2019 Quarter 3

Maintenance Date	Elements Impacted	Operation/Maintenance Description
7/1/19 through 7/3/19	CrEX-1, CrEX-2, CTUA, CrIN-3, CrIN-4, CrIN-5	Extraction, treatment, and injection of treated groundwater occurred per operational plan. Performance check of system from having been off for CrIN-6/CrEX-5 conversion project.
7/3/19 through 7/16/19	CrEX-1, CrEX-2, CTUA, CrIN-3, CrIN-4, CrIN-5	System shut down for controls issues with booster pump related to CrIN-6/CrEX-5 conversion.
7/9/19	CrIN-1	CrIN-1 aquifer test pumping event.
7/16/19 through 7/23/19	CrEX-3, CrIN-3	CrEX-3 diagnostic pumping. CrEX-3 only extracting; CrIN-3 only injecting.
7/23/19 through 7/25/19	CrEX-1, CrEX-2, CrEX-3, CTUA, CrIN-3, CrIN-4, CrIN-5	CrEX-3 diagnostic pumping. CrEX-1, 2, and 3 extracting; CrIN-3, 4, and 5 injecting.
7/25/19 through 7/28/19	CrEX-1, CrEX-2, CTUA, CrIN-3, CrIN-4, CrIN-5	Extraction, treatment, and injection of treated groundwater occurred per operational plan.
7/28/19 through 7/31/19	CrEX-1, CrEX-2, CTUA, CrIN-3, CrIN-4, CrIN-5	System shut down for controls issues with booster pump related to CrIN-6/CrEX-5 conversion.
7/31/19 through 8/12/19	CrEX-1, CrEX-2, CTUA, CrIN-1, CrIN-2, CrIN-3	Extraction, treatment, and injection of treated groundwater occurred per operational plan. Function testing of CrIN-1 and CrIN-2.
8/12/19 through 9/30/19	CrEX-1, CrEX-2, CTUA, CrIN-3, 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
8/26/19	CTUA	IX vessel exchanges were completed as follows because of an increase in the amount of hexavalent chromium at the primary IX vessel effluent as determined via Hach instrument analysis: • Treatment train A – replaced primary IX vessel with the secondary IX vessel; new secondary IX vessel installed. • Treatment train B – replaced primary IX vessel with the secondary IX vessel; new secondary IX vessel installed. • Treatment train C – replaced primary IX vessel with the secondary IX vessel; new secondary IX vessel installed. Both influent and all three effluent filter bags replaced.
9/13/19	CrEX-1, CrEX-2, CTUA, CrIN-3, CrIN-4, CrIN-5	System shut down for approximately one hour to install updates on SCADA computer.
9/21/19 through 9/23/19	CrEX-2	CrEX-2 shut down due to leak detection alarm; CrEX-2 returned to service 9/23/19.

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 3. 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 5 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)

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 3.

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 3 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 3.

Table 2.9-1
Flows and Volumes of Treated Effluent Injected – 2019 Quarter 3

Injection Well	Flow rate (gpm)			Daily Volume (gal.)			Total Volume (gal.)
	Average[a]	Maximum	Minimum[b]	Average[a]	Maximum	Minimum[b]	
July 2019							
CrIN-1	21.7	21.7	21.7	31,285	31,285	31,285	31,285
CrIN-2	24.0	24.0	24.0	34,593	34,593	34,593	34,593
CrIN-3	34.4	51.0	3.0	49,570	73,462	4353	842,696
CrIN-4	43.1	65.7	1.1	62,051	94,662	1637	620,512
CrIN-5	43.3	69.1	0.3	62,327	99,457	486	623,271
August 2019							
CrIN-1	47.9	53.0	28.4	68,948	76,328	40,919	827,374
CrIN-2	53.1	81.9	26.8	76,471	117,884	38,589	917,647
CrIN-3	47.1	66.0	33.0	67,892	95,085	47,578	2,104,664
CrIN-4	53.4	62.9	29.5	76,886	90,630	42,455	1,537,712
CrIN-5	56.3	59.6	30.3	81,109	85,832	43,608	1,622,175
September 2019							
CrIN-1	0.0	0.0	0.0	0	0	0	0
CrIN-2	0.0	0.0	0.0	0	0	0	0
CrIN-3	29.4	38.7	11.2	42,307	55,789	16,193	1,226,906
CrIN-4	60.1	64.0	52.1	86,612	92,151	74,959	2,598,358
CrIN-5	60.0	64.0	55.0	86,367	92,147	79,177	2,591,014

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

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

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

Table 2.9-1 provides total monthly volumes of treated effluent transferred to each well. As previously identified, injection occurred at UIC wells CrIN-1, CrIN-2, CrIN-3, CrIN-4, and CrIN-5 during the quarter.

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

Table 2.11-1 provides the monthly average, maximum, and minimum values for injection water level above static level for each UIC well.

Table 2.11-1
Water-Level Values Above Static Level by UIC Well – 2019 Quarter 3

UIC Well	July 2019			August 2019			September 2019		
	Average[a] (ft)	Maximum (ft)	Minimum (ft)	Average[a] (ft)	Maximum (ft)	Minimum (ft)	Average[a] (ft)	Maximum (ft)	Minimum (ft)
CrIN-1	4.5	4.6	4.4	4.8	5.7	4.3	n/a[b]	n/a	n/a
CrIN-2	3.8	12.6	2.1	6.5	11.3	2.9	n/a	n/a	n/a
CrIN-3	32.6	50.4	0.6	26.5	36.3	17.1	22.0	33.8	14.5
CrIN-4	14.4	16.1	8.0	12.1	14.3	4.8	13.5	15.0	10.0
CrIN-5	19.8	22.7	14.8	16.9	18.1	13.1	18.3	23.7	11.7

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

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

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

Daily volumes of groundwater injected (following treatment) during 2019 Quarter 3 are presented in Table 2.12-1.

Table 2.12-1
Daily Injection Summary Table – 2019 Quarter 3, DP-1835

Date	CrIN-1 (gal.)	CrIN-2 (gal.)	CrIN-3 (gal.)	CrIN-4 (gal.)	CrIN-5 (gal.)	Total (gal.)
7/1/2019	0	0	39,225	58,382	54,285	151,892
7/2/2019	0	0	60,024	87,836	85,967	233,827
7/3/2019	0	0	28,423	48,201	45,028	121,653
7/4/2019	0	0	0	0	0	0
7/5/2019	0	0	0	0	0	0
7/6/2019	0	0	0	0	0	0
7/7/2019	0	0	0	0	0	0
7/8/2019	0	0	0	0	0	0
7/9/2019	0	0	0	0	0	0
7/10/2019	0	0	0	0	0	0
7/11/2019	0	0	0	0	0	0
7/12/2019	0	0	0	0	0	0
7/13/2019	0	0	0	0	0	0
7/14/2019	0	0	0	0	0	0
7/15/2019	0	0	0	0	0	0
7/16/2019	0	0	42,731	0	0	42,731
7/17/2019	0	0	73,431	0	0	73,431
7/18/2019	0	0	73,462	0	0	73,462
7/19/2019	0	0	72,699	0	0	72,699

Table 2.12-1 (continued)

Date	CrIN-1 (gal.)	CrIN-2 (gal.)	CrIN-3 (gal.)	CrIN-4 (gal.)	CrIN-5 (gal.)	Total (gal.)
7/20/2019	0	0	56,633	0	0	56,633
7/21/2019	0	0	51,845	0	0	51,845
7/22/2019	0	0	51,861	0	0	51,861
7/23/2019	0	0	50,940	57,203	58,754	166,897
7/24/2019	0	0	50,388	94,662	99,457	244,508
7/25/2019	0	0	50,489	92,741	97,415	240,645
7/26/2019	0	0	50,430	87,487	86,934	224,850
7/27/2019	0	0	50,400	84,961	87,168	222,530
7/28/2019	0	0	4353	7402	7777	19,532
7/29/2019	0	0	0	0	0	0
7/30/2019	0	0	0	0	0	0
7/31/2019	31,285	34,593	35,362	1637	486	103,363
8/1/2019	69,175	71,911	75,150	0	0	216,236
8/2/2019	69,238	117,884	70,463	0	0	257,585
8/3/2019	69,092	85,651	70,560	0	0	225,303
8/4/2019	69,144	79,226	70,522	0	0	218,892
8/5/2019	69,098	79,173	70,566	0	0	218,837
8/6/2019	69,138	79,221	70,580	0	0	218,938
8/7/2019	69,106	76,090	62,119	0	0	207,314
8/8/2019	73,510	73,937	74,187	0	0	221,634
8/9/2019	76,302	71,985	80,750	0	0	229,038
8/10/2019	76,328	71,977	81,030	0	0	229,335
8/11/2019	76,324	72,003	81,379	0	0	229,706
8/12/2019	40,919	38,589	77,215	44,493	43,608	244,824
8/13/2019	0	0	75,153	75,984	75,903	227,040
8/14/2019	0	0	74,243	80,718	79,181	234,141
8/15/2019	0	0	77,956	63,905	80,368	222,229
8/16/2019	0	0	95,006	44,153	82,071	221,230
8/17/2019	0	0	95,085	42,455	82,489	220,029
8/18/2019	0	0	89,028	53,498	83,040	225,566
8/19/2019	0	0	59,226	89,277	80,660	229,163
8/20/2019	0	0	60,487	89,658	80,889	231,034
8/21/2019	0	0	59,756	90,630	81,125	231,512
8/22/2019	0	0	58,572	89,240	82,934	230,745
8/23/2019	0	0	59,038	85,728	85,582	230,348
8/24/2019	0	0	57,719	85,549	85,796	229,064
8/25/2019	0	0	55,941	85,619	85,104	226,664
8/26/2019	0	0	48,453	85,933	85,448	219,834

Table 2.12-1 (continued)

Date	CrIN-1 (gal.)	CrIN-2 (gal.)	CrIN-3 (gal.)	CrIN-4 (gal.)	CrIN-5 (gal.)	Total (gal.)
8/27/2019	0	0	47,578	86,405	85,142	219,125
8/28/2019	0	0	48,992	86,396	85,757	221,145
8/29/2019	0	0	51,344	85,945	85,589	222,877
8/30/2019	0	0	53,300	85,996	85,657	224,954
8/31/2019	0	0	53,266	86,130	85,832	225,228
9/1/2019	0	0	53,300	86,314	86,167	225,781
9/2/2019	0	0	53,239	86,218	85,788	225,246
9/3/2019	0	0	53,243	86,294	85,663	225,201
9/4/2019	0	0	53,179	86,323	85,581	225,083
9/5/2019	0	0	45,316	85,532	85,005	215,853
9/6/2019	0	0	30,654	84,165	84,029	198,848
9/7/2019	0	0	51,820	86,919	86,394	225,134
9/8/2019	0	0	49,678	87,293	86,477	223,448
9/9/2019	0	0	50,423	87,374	86,407	224,204
9/10/2019	0	0	50,379	87,536	86,423	224,338
9/11/2019	0	0	50,416	87,485	86,455	224,356
9/12/2019	0	0	55,789	85,042	85,655	226,486
9/13/2019	0	0	51,841	80,758	82,062	214,660
9/14/2019	0	0	44,822	90,622	92,139	227,583
9/15/2019	0	0	43,394	91,768	92,147	227,309
9/16/2019	0	0	43,196	90,901	91,594	225,690
9/17/2019	0	0	43,212	90,147	91,427	224,786
9/18/2019	0	0	43,191	90,088	91,541	224,820
9/19/2019	0	0	43,229	90,097	91,497	224,822
9/20/2019	0	0	43,167	90,062	91,532	224,761
9/21/2019	0	0	16,193	79,886	79,785	175,863
9/22/2019	0	0	0	74,959	79,177	154,136
9/23/2019	0	0	25,668	84,174	83,271	193,113
9/24/2019	0	0	47,536	91,922	82,818	222,276
9/25/2019	0	0	47,519	92,151	82,610	222,280
9/26/2019	0	0	38,578	89,278	83,761	211,618
9/27/2019	0	0	24,482	84,220	86,388	195,090
9/28/2019	0	0	24,486	83,839	86,384	194,709
9/29/2019	0	0	24,481	83,423	86,401	194,305
9/30/2019	0	0	24,475	83,568	86,436	194,479
Subtotal 15,578,207						

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

Daily volumes of groundwater pumped from extraction wells during 2019 Quarter 3, are presented in Table 2.13-1.

Table 2.13-1
Daily Extraction Summary Table – 2019 Quarter 3, DP-1835

Date	CrEX-1 (gal.)	CrEX-2 (gal.)	CrEX-3 (gal.)	CrEX-4 (gal.)	CrEX-5 (gal.)	Total (gal.)
7/1/2019	60,684	58,132	47,126	0	0	165,942
7/2/2019	102,327	94,343	44,915	0	0	241,585
7/3/2019	63,279	52,467	0	0	0	115,747
7/4/2019	0	0	0	0	0	0
7/5/2019	0	0	0	0	0	0
7/6/2019	0	0	0	0	0	0
7/7/2019	0	0	0	0	0	0
7/8/2019	0	0	0	0	0	0
7/9/2019	0	0	0	0	0	0
7/10/2019	0	0	0	0	0	0
7/11/2019	0	0	0	0	0	0
7/12/2019	0	0	0	0	0	0
7/13/2019	0	0	0	0	0	0
7/14/2019	0	0	0	0	0	0
7/15/2019	0	0	0	0	0	0
7/16/2019	0	0	34,233	0	0	34,233
7/17/2019	0	0	78,930	0	0	78,931
7/18/2019	0	0	80,343	0	0	80,343
7/19/2019	0	0	74,454	0	0	74,454
7/20/2019	0	0	46,924	0	0	46,924
7/21/2019	0	0	53,254	0	0	53,254
7/22/2019	6	4104	54,113	0	0	58,223
7/23/2019	68,379	53,468	53,094	0	0	174,941
7/24/2019	98,052	87,986	60,341	0	0	246,379
7/25/2019	100,269	91,362	35,301	0	0	226,932
7/26/2019	125,317	100,800	0	0	0	226,117
7/27/2019	125,329	100,820	0	0	0	226,149
7/28/2019	9143	8466	0	0	0	17,609
7/29/2019	0	0	0	0	0	0
7/30/2019	0	0	0	0	0	0
7/31/2019	58,987	48,657	0	0	0	107,644
8/1/2019	125,271	100,815	0	0	0	226,087
8/2/2019	124,401	100,179	0	0	14,046	238,626

Table 2.13-1 (continued)

Date	CrEX-1 (gal.)	CrEX-2 (gal.)	CrEX-3 (gal.)	CrEX-4 (gal.)	CrEX-5 (gal.)	Total (gal.)
8/3/2019	122,789	99,361	0	0	0	222,150
8/4/2019	121,829	98,948	0	0	0	220,777
8/5/2019	120,424	98,090	0	0	0	218,514
8/6/2019	118,086	97,100	0	0	0	215,186
8/7/2019	122,860	87,916	0	0	0	210,777
8/8/2019	126,702	100,784	0	0	0	227,485
8/9/2019	126,749	100,819	0	0	0	227,568
8/10/2019	126,687	100,762	0	0	0	227,449
8/11/2019	126,731	100,805	0	0	0	227,536
8/12/2019	126,732	100,793	0	0	0	227,525
8/13/2019	123,050	100,792	0	0	4942	228,783
8/14/2019	126,688	100,743	0	0	0	227,431
8/15/2019	126,746	100,770	0	0	0	227,516
8/16/2019	126,713	100,707	0	0	0	227,420
8/17/2019	126,729	100,667	0	0	0	227,396
8/18/2019	126,717	100,581	0	0	0	227,298
8/19/2019	126,689	100,560	0	0	0	227,250
8/20/2019	126,723	100,464	0	0	0	227,188
8/21/2019	126,600	100,365	0	0	0	226,966
8/22/2019	126,225	100,290	0	0	0	226,515
8/23/2019	125,764	100,235	0	0	0	225,999
8/24/2019	125,344	100,088	0	0	0	225,432
8/25/2019	125,306	99,897	0	0	0	225,203
8/26/2019	115,221	91,268	0	0	0	206,489
8/27/2019	128,435	95,102	0	0	0	223,537
8/28/2019	126,568	100,263	0	0	0	226,832
8/29/2019	126,540	100,221	0	0	0	226,761
8/30/2019	126,550	100,237	0	0	0	226,787
8/31/2019	126,631	100,282	0	0	0	226,913
9/1/2019	126,563	100,066	0	0	0	226,629
9/2/2019	126,669	100,055	0	0	0	226,724
9/3/2019	126,604	100,000	0	0	0	226,604
9/4/2019	126,582	99,876	0	0	0	226,458
9/5/2019	132,301	83,232	0	0	0	215,533
9/6/2019	140,924	60,459	0	0	0	201,383
9/7/2019	126,558	99,977	0	0	0	226,535
9/8/2019	126,543	99,998	0	0	0	226,542
9/9/2019	126,503	99,906	0	0	0	226,408

Table 2.13-1 (continued)

Date	CrEX-1 (gal.)	CrEX-2 (gal.)	CrEX-3 (gal.)	CrEX-4 (gal.)	CrEX-5 (gal.)	Total (gal.)
9/10/2019	126,292	99,801	0	0	0	226,093
9/11/2019	119,984	100,034	0	0	0	220,018
9/12/2019	126,679	99,440	0	0	0	226,119
9/13/2019	119,407	93,627	0	0	0	213,034
9/14/2019	126,272	99,386	0	0	0	225,658
9/15/2019	125,624	99,348	0	0	0	224,972
9/16/2019	125,381	99,363	0	0	0	224,745
9/17/2019	125,268	99,348	0	0	0	224,616
9/18/2019	125,302	99,372	0	0	0	224,674
9/19/2019	125,266	99,331	0	0	0	224,596
9/20/2019	125,287	99,337	0	0	0	224,624
9/21/2019	147,928	33,617	0	0	0	181,545
9/22/2019	159,881	0	0	0	0	159,881
9/23/2019	141,524	50,666	0	0	0	192,190
9/24/2019	122,804	98,003	0	0	0	220,807
9/25/2019	122,241	97,682	0	0	0	219,924
9/26/2019	111,661	97,624	0	0	0	209,285
9/27/2019	96,486	98,704	0	0	0	195,190
9/28/2019	96,291	98,133	0	0	0	194,424
9/29/2019	95,082	97,922	0	0	0	193,004
9/30/2019	95,084	97,958	0	0	0	193,043
Subtotal: 15,574,061						

2.14 Facility Layout Map (Requirement 14)

Figure 2.14-1 is the facility layout map for 2019 Quarter 3, showing the location and number of each well.

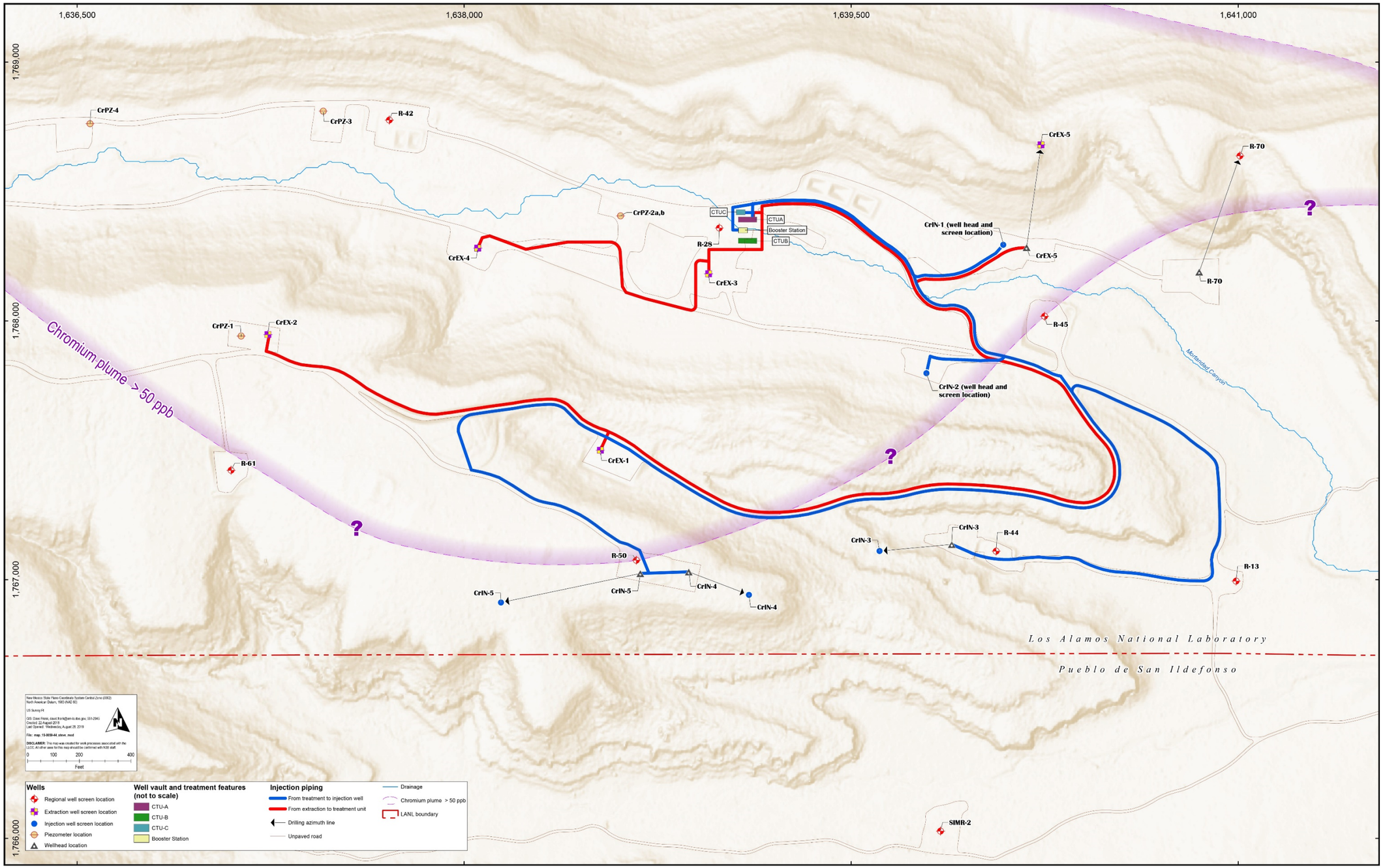

Figure 2.14-1 Facility layout map–2019 Quarter 3, DP-1835

2.15 Groundwater Elevation Contour Map (Requirement 15)

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

3.0 REFERENCES

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

N3B (Newport News Nuclear BWXT-Los Alamos, LLC) 2019. "Quarterly Report for the Discharge of Treated Groundwater to the Regional Aquifer –2019 Quarter 2, DP-1835," Newport News Nuclear BWXT-Los Alamos, LLC, document number EM2019-0050, Los Alamos, New Mexico (August 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).