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

Date: August 25, 2020
Refer To: N3B-2020-0285

Michelle Hunter, 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 2020 Quarter 2, Class V Underground Injection Control Wells

Dear Ms. Hunter:

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 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 April 1 through June 30, 2020, reporting period (Quarter 2) for DP-1835, discharge of treated groundwater to the regional aquifer did not occur at any of the UIC wells: CrIN-1 through CrIN-5. The DOE Environmental Management Los Alamos Field Office (EM-LA) transitioned to Essential Mission Critical Activities (EMCA) operational status on March 24, 2020, in response to the COVID-19 pandemic. NMED was notified of the transition to EMCA status on March 31, 2020. As a result of the EMCA status, fieldwork associated with extracting, treating, or discharging

regional aquifer groundwater did not occur during calendar year 2020 Quarter 2. In addition, sampling of the treatment effluent was not performed because of the EMCA status. In June 2020, some groundwater quality samples were obtained at monitoring wells as required by Condition 14 of DP-1835 as restrictions due to the COVID-19 pandemic were revised to allow resumption of certain field activities.

The attached "Quarterly Report for the Discharge of Treated Groundwater to the Regional Aquifer under Discharge Permit 1835, Calendar Year 2020 Quarter 2" provides the information required under DP-1835 for this reporting period, where available.

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
Digitally signed by Arturo Duran
Date: 2020.08.24 06:06:21 -06'00'

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

Enclosure(s):
1. Quarterly Report for the Discharge of Treated Groundwater to the Regional Aquifer under Discharge Permit 1835, Calendar Year 2020 Quarter 2 (EM2020-0374)

cc (letter and enclosure[s] emailed):
Raymond Martinez, San Ildefonso Pueblo, NM
Dino Chavarria, Santa Clara Pueblo, NM
Chris Catechis, NMED-DOE-OB
Steve Yanicak, NMED-DOE-OB
Patrick Longmire, NMED-GWQB
Steve Pullen, NMED-GWQB
Andrew Romero, NMED-GWQB
Neelam Dhawan, NMED-HWB
Kevin Pierard, NMED-HWB
Shelly Lemon, NMED-SWQB
M. Lee Bishop, EM-LA
Stephen Hoffman, EM-LA
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David Nickless, EM-LA
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Public Reading Room (EPRR)
PRS website

Pamela T. Maestas

From: Romero, Andrew C, NMENV <AndrewC.Romero@state.nm.us>
Sent: Tuesday, August 25, 2020 4:40 PM
To: Pamela T. Maestas; Hunter, Michelle, NMENV
Cc: Pullen, Steve, NMENV; Emily M. Day; Regulatory Documentation; Martinez, Cynthia, NMENV; Christian T. Maupin; cheryl.rodriguez@em.doe.gov
Subject: Re: Submittal to NMED on 8/25/2020 of 2QCY20 DP-1835 Quarterly Rpt

Hi Pamela,

GWQB acknowledges receipt of this document.
Regards,

Andrew Romero, Environmental Scientist
New Mexico Environment Department
Ground Water Quality Bureau
1190 St. Francis Dr, Santa Fe, NM 87505
(505) 827-0076
https://www.env.nm.gov/gwqb/

From: Pamela T. Maestas <pamela.maestas@em-la.doe.gov>
Sent: Tuesday, August 25, 2020 4:31 PM
To: Hunter, Michelle, NMENV
Cc: Pullen, Steve, NMENV; Romero, Andrew C, NMENV; Emily M. Day; Regulatory Documentation; Martinez, Cynthia, NMENV; Christian T. Maupin; cheryl.rodriguez@em.doe.gov
Subject: [EXT] Submittal to NMED on 8/25/2020 of 2QCY20 DP-1835 Quarterly Rpt

Attached for submittal is a pdf of the following:

- Submittal of the Quarterly Report for the Discharge of Treated Groundwater to the Regional Aquifer under Discharge Permit 1835, Calendar Year 2020 Quarter 2, Class V Underground Injection Control Wells (N3B-2020-0285)

Please acknowledge receipt of this submittal by responding to this email.
Let me know if you have any questions.
Thank you.

Pamela T. Maestas
Regulatory Documentation Manager
Newport News Nuclear BWXT-Los Alamos, LLC
c. 505-927-7882
regdocs@em-la.doe.gov

N3B Los Alamos
1200 Trinity Drive, Suite 150

Los Alamos, NM 87544

August 2020
EM2020-0374

Quarterly Report for the Discharge of Treated Groundwater to the Regional Aquifer under Discharge Permit 1835, Calendar Year 2020 Quarter 2

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 (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 the second quarter of calendar year 2018, ownership of the discharge permit transferred from LANS to Newport News Nuclear BWXT-Los Alamos, LLC (N3B). Pursuant to Condition No. 10 of the above-referenced discharge permit, DOE/N3B are required to submit quarterly reports.

During the April 1 through June 30, 2020, reporting period (Quarter 2) for DP-1835, discharge of treated groundwater to the regional aquifer did not occur at any of the UIC wells: CrIN-1 through CrIN-5. The DOE Environmental Management Los Alamos Field Office (EM-LA) transitioned to Essential Mission Critical Activities (EMCA) operational status on March 24, 2020, in response to the COVID-19 pandemic. NMED was notified of the transition to EMCA status on March 31, 2020 (DOE 2020). As a result of the EMCA status, fieldwork associated with extracting, treating, or discharging regional aquifer groundwater did not occur during 2020 Quarter 2. In addition, sampling of the treatment effluent was not performed because of the EMCA status. In June 2020, some groundwater quality samples were able to be obtained at monitoring wells as required by Condition 14 of DP-1835 as restrictions due to the COVID-19 pandemic were revised to allow resumption of certain field activities.

Condition No. 10 of DP-1835 requires submission of a quarterly report to NMED by September 1 for the April 1 through June 30 discharge period. Several conditions within the permit identify information to be submitted in the quarterly report. The following information, with condition references, is required in the quarterly report:

1. Influent and discharge volumes for the ion exchange (IX) treatment systems (Condition No. 10)
2. Quarterly treated effluent sampling results from each IX treatment system (Condition No. 10 and 13)
3. Quarterly depth-to-groundwater and groundwater-quality sampling results (Condition 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)

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)

As discussed in section 1.0, extraction, treatment, and discharge into the regional aquifer did not occur during 2020 Quarter 2 because of the EMCA operational status.

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

As discussed in section 1.0, extraction, treatment, and discharge into the regional aquifer did not occur during 2020 Quarter 2 because of the EMCA operational status.

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 2020 Quarter 2 for the monitoring wells listed in Condition No. 14 are summarized in Table 2.3-2. Because of the EMCA operational status, the only monitoring wells that were able to be sampled are R-11, R-44, R-45, and R-50. Groundwater quality samples were not able to be obtained for R-13, R-43, and R-62.

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.

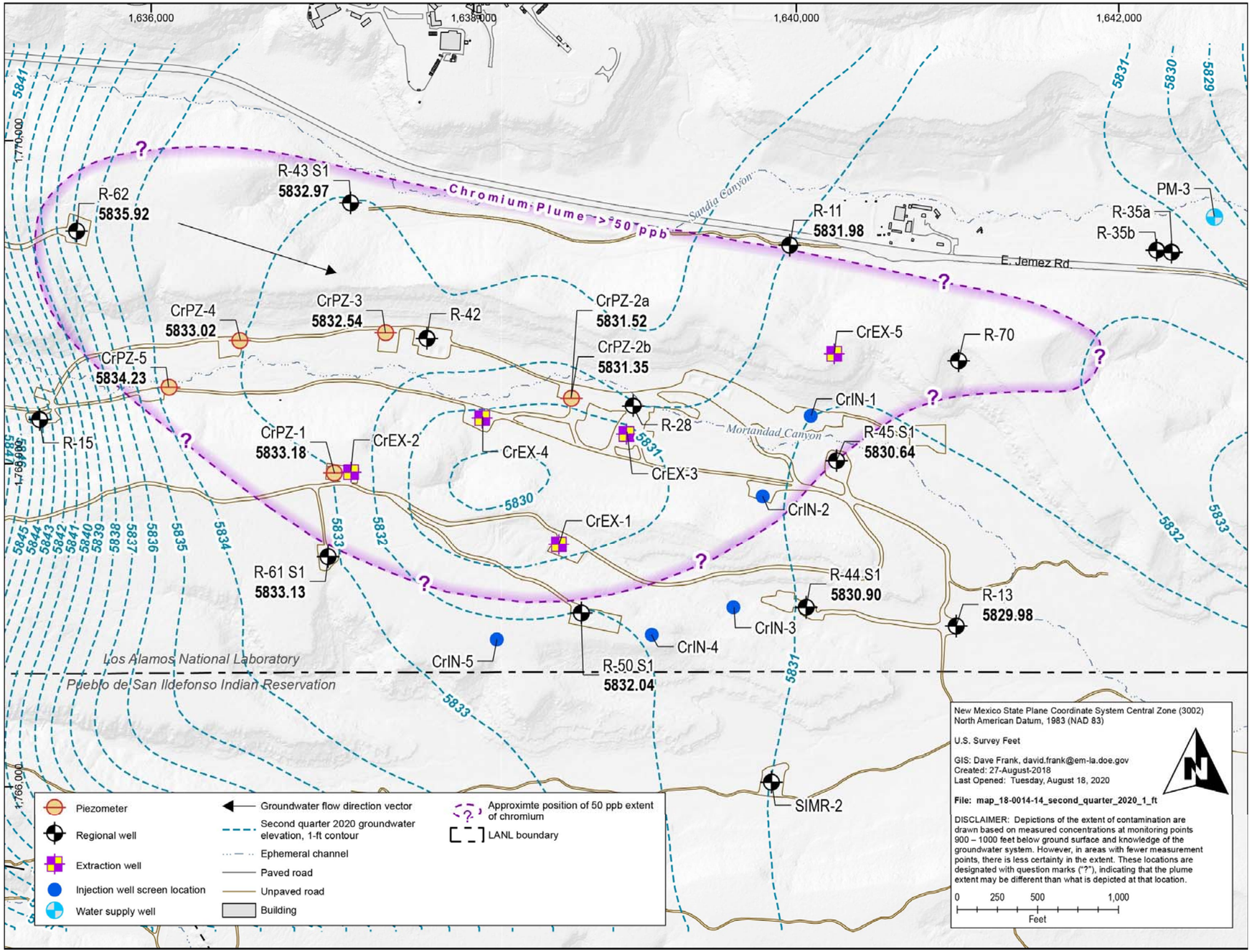

Figure 2.3-1 Groundwater elevation contour map – 2020 Quarter 2, DP-1835

Table 2.3-1
Groundwater Elevations Summary
for Groundwater Monitoring Wells – 2020 Quarter 2, DP-1835

Monitoring Well	Groundwater Elevation[a] (ft)
CrPZ-1 (CrCH-1)	5833.18
CrPZ-2a (CrCH-2a)	5831.52
CrPZ-2b (CrCH-2b)	5831.35
CrPZ-3 (CrCH-3)	5832.54
CrPZ-4 (CrCH-4)	5833.02
CrPZ-5 (CrCH-5)	5834.23
R-11	5831.98
R-13	5829.98
R-43 S1[b]	5832.97
R-43 S2[c]	5832.25
R-44 S1	5830.90
R-44 S2	5830.54
R-45 S1	5830.64
R-45 S2	5830.48
R-50 S1	5832.04
R-50 S2	5831.88
R-61 S1	5833.13
R-61 S2	5833.19
R-62	5835.92
SIMR-2[d]	5831.53

[a] Groundwater elevations provided are based on average May 2020 values from transducers.

[b] S1 = Screen 1.

[c] S2 = Screen 2.

[d] First-quarter average February 2020 SIMR-2 data are reported here in accordance with the DP-1835 2020 Quarter 1 report (N3B 2020). 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 – 2020 Quarter 2, DP-1835

Field Sample ID	Location ID	Sample Date	Parameter Name	Report Result	Report Unit	Lab Qualifier	Detect Flag	Filtered	Method Detection Limit
CASA-20-198493	R-11	06/23/2020	Chloride	3.61	mg/L		Y	Y	0.20
CASA-20-198493	R-11	06/23/2020	Perchlorate	0.731	µg/L		Y	Y	0.200
CASA-20-198493	R-11	06/23/2020	Chromium	6.37	µg/L	J	Y	Y	10.0
CASA-20-198493	R-11	06/23/2020	Fluoride	0.616	mg/L		Y	Y	0.100
CASA-20-198493	R-11	06/23/2020	Nitrate-nitrite as nitrogen	5.76	mg/L		Y	Y	0.500
CASA-20-198493	R-11	06/23/2020	Sulfate	10.4	mg/L		Y	Y	0.400
CASA-20-198493	R-11	06/23/2020	Total dissolved solids	243	mg/L		Y	Y	14.3
CAMO-20-205255	R-44 S1[a]	06/25/2020	Chloride	18.5	mg/L		Y	Y	1.00
CAMO-20-205255	R-44 S1	06/25/2020	Perchlorate	0.314	µg/L		Y	Y	0.200
CAMO-20-205255	R-44 S1	06/25/2020	Chromium	5.60	µg/L	J	Y	Y	10.0
CAMO-20-205255	R-44 S1	06/25/2020	Fluoride	0.384	mg/L		Y	Y	0.100
CAMO-20-205255	R-44 S1	06/25/2020	Nitrate-nitrite as nitrogen	2.56	mg/L		Y	Y	0.250
CAMO-20-205255	R-44 S1	06/25/2020	Sulfate	19.4	mg/L		Y	Y	0.400
CAMO-20-205255	R-44 S1	06/25/2020	Total dissolved solids	217	mg/L		Y	Y	14.3
CAMO-20-198509	R-44 S2[b]	06/26/2020	Chloride	2.24	mg/L		Y	Y	0.200
CAMO-20-198509	R-44 S2	06/26/2020	Perchlorate	0.319	µg/L		Y	Y	0.200
CAMO-20-198509	R-44 S2	06/26/2020	Chromium	7.22	µg/L	J	Y	Y	10.0
CAMO-20-198509	R-44 S2	06/26/2020	Fluoride	0.573	mg/L		Y	Y	0.100
CAMO-20-198509	R-44 S2	06/26/2020	Nitrate-nitrite as nitrogen	0.758	mg/L		Y	Y	0.050
CAMO-20-198509	R-44 S2	06/26/2020	Sulfate	2.60	mg/L		Y	Y	0.400
CAMO-20-198509	R-44 S2	06/26/2020	Total dissolved solids	134	mg/L		Y	Y	14.3
CAMO-20-205242	R-45 S1	06/24/2020	Chloride	16.4	mg/L		Y	Y	1.00
CAMO-20-205242	R-45 S1	06/24/2020	Perchlorate	0.357	µg/L		Y	Y	0.200
CAMO-20-205242	R-45 S1	06/24/2020	Chromium	13.7	µg/L		Y	Y	10.0
CAMO-20-205242	R-45 S1	06/24/2020	Fluoride	0.451	mg/L		Y	Y	0.100

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-20-205242	R-45 S1	06/24/2020	Nitrate-nitrite as nitrogen	2.94	mg/L		Y	Y	0.250
CAMO-20-205242	R-45 S1	06/24/2020	Sulfate	17.2	mg/L		Y	Y	0.400
CAMO-20-205242	R-45 S1	06/24/2020	Total dissolved solids	201	mg/L		Y	Y	14.3
CAMO-20-205245	R-45 S2	06/24/2020	Chloride	5.67	mg/L		Y	Y	0.200
CAMO-20-205245	R-45 S2	06/24/2020	Perchlorate	0.426	µg/L		Y	Y	0.200
CAMO-20-205245	R-45 S2	06/24/2020	Chromium	42.1	µg/L		Y	Y	10.0
CAMO-20-205245	R-45 S2	06/24/2020	Fluoride	0.620	mg/L		Y	Y	0.100
CAMO-20-205245	R-45 S2	06/24/2020	Nitrate-nitrite as nitrogen	1.14	mg/L		Y	Y	0.050
CAMO-20-205245	R-45 S2	06/24/2020	Sulfate	6.79	mg/L		Y	Y	0.400
CAMO-20-205245	R-45 S2	06/24/2020	Total dissolved solids	193	mg/L		Y	Y	14.3
CAMO-20-198521	R-50 S1	06/26/2020	Chloride	18.1	mg/L		Y	Y	1.00
CAMO-20-198521	R-50 S1	06/26/2020	Perchlorate	0.363	µg/L		Y	Y	0.200
CAMO-20-198521	R-50 S1	06/26/2020	Chromium	30.3	µg/L		Y	Y	10.0
CAMO-20-198521	R-50 S1	06/26/2020	Fluoride	0.360	mg/L		Y	Y	0.100
CAMO-20-198521	R-50 S1	06/26/2020	Nitrate-nitrite as nitrogen	2.56	mg/L		Y	Y	0.250
CAMO-20-198521	R-50 S1	06/26/2020	Sulfate	19.3	mg/L		Y	Y	0.400
CAMO-20-198521	R-50 S1	06/26/2020	Total dissolved solids	183	mg/L		Y	Y	14.3
CAMO-20-198537	R-50 S2	06/26/2020	Chloride	2.14	mg/L		Y	Y	0.200
CAMO-20-198537	R-50 S2	06/26/2020	Perchlorate	0.314	µg/L		Y	Y	0.200
CAMO-20-198537	R-50 S2	06/26/2020	Chromium	4.60	µg/L	J	Y	Y	10.0
CAMO-20-198537	R-50 S2	06/26/2020	Fluoride	0.607	mg/L		Y	Y	0.100
CAMO-20-198537	R-50 S2	06/26/2020	Nitrate-nitrite as nitrogen	0.568	mg/L		Y	Y	0.050
CAMO-20-198537	R-50 S2	06/26/2020	Sulfate	2.50	mg/L		Y	Y	0.400
CAMO-20-198537	R-50 S2	06/26/2020	Total dissolved solids	153	mg/L		Y	Y	14.3
CAMO-20-192762	SIMR-2	01/16/2020	Chloride	2.18	mg/L		Y	Y	0.200
CAMO-20-192762	SIMR-2	01/16/2020	Perchlorate	0.450	µg/L		Y	Y	0.200

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-20-192762	SIMR-2	01/16/2020	Chromium	5.22	µg/L	J	Y	Y	10.0
CAMO-20-192762	SIMR-2	01/16/2020	Fluoride	0.319	mg/L		Y	Y	0.100
CAMO-20-192762	SIMR-2	01/16/2020	Nitrate-nitrite as nitrogen	0.754	mg/L		Y	Y	0.050
CAMO-20-192762	SIMR-2	01/16/2020	Sulfate	2.74	mg/L		Y	Y	0.400
CAMO-20-192762	SIMR-2	01/16/2020	Total dissolved solids	160	mg/L		Y	Y	14.3
CAMO-20-193979	SIMR-2	02/29/2020	Chloride	2.21	mg/L		Y	Y	0.200
CAMO-20-193979	SIMR-2	02/29/2020	Perchlorate	0.431	µg/L		Y	Y	0.200
CAMO-20-193979	SIMR-2	02/29/2020	Chromium	5.59	µg/L	J	Y	Y	10.0
CAMO-20-193979	SIMR-2	02/29/2020	Fluoride	0.245	mg/L		Y	Y	0.100
CAMO-20-193979	SIMR-2	02/29/2020	Nitrate-nitrite as nitrogen	0.715	mg/L		Y	Y	0.250
CAMO-20-193979	SIMR-2	02/29/2020	Sulfate	2.72	mg/L		Y	Y	0.400
CAMO-20-193979	SIMR-2	02/29/2020	Total dissolved solids	121	mg/L		Y	Y	14.3
CAMO-20-196260	SIMR-2	03/18/2020	Chloride	2.49	mg/L		Y	Y	0.200
CAMO-20-196260	SIMR-2	03/18/2020	Perchlorate	0.491	µg/L		Y	Y	0.200
CAMO-20-196260	SIMR-2	03/18/2020	Chromium	5.29	µg/L	J	Y	Y	10.0
CAMO-20-196260	SIMR-2	03/18/2020	Fluoride	0.351	mg/L		Y	Y	0.100
CAMO-20-196260	SIMR-2	03/18/2020	Nitrate-nitrite as nitrogen	0.705	mg/L		Y	Y	0.250
CAMO-20-196260	SIMR-2	03/18/2020	Sulfate	2.82	mg/L		Y	Y	0.400
CAMO-20-196260	SIMR-2	03/18/2020	Total dissolved solids	154	mg/L		Y	Y	14.3

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.

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 2020 Quarter 2 below.

Effects on flow direction from water-supply pumping are small compared with the local effects caused by extraction and injection at chromium interim measure wells. Observations of transients in the water levels observed at the monitoring wells within the plume area do not appear to be substantially affected by the water-supply pumping at the nearby production wells (PM-2, PM-3, PM-4, PM-5, and O-4) (LANL 2009).

A long-term decline of approximately 0.5 to 1 ft/yr has been observed in the regional water levels throughout the aquifer beneath the Pajarito Plateau. The decline could be caused by long-term changes in the aquifer recharge and discharge conditions. Because of the long-term declines and pumping transients described above, the water-level data and the respective water table contour maps are variable over time; therefore, each map is representative of specific periods of time. Figure 2.3-1 depicts the average water-level data and water table contour map for May 2020. 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 2020 Quarter 2, the well levels data set was complete and therefore imputation was not required for any well.

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. During 2019 Quarter 4, the cone of depression continued to expand, likely in response to regular pumping at CrEX-1 and CrEX-2. The largest injection rates occurred at CrIN-4 and CrIN-5, and an increase in water level at the nearest monitoring well (R-50) was observed (Figure 2.3-1). CrEX-5 (which was converted from CrIN-6), CrIN-1, and CrIN-2 began sustained pumping 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 continued at CrIN-2, CrIN-4, and Cr-5 and extraction at CrEX-1, CrEX-2, and CrEX-5 until late March 2020, when injection and extraction activities ceased because of the EMCA status. In the current 2020 Quarter 2 reporting period, changes in the water level elevations appear to be more influenced by

seasonal variations than injection/extraction, with the cone of depression shifting slightly downgradient, toward the east/south-east.

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 and contouring methods.

2.4 Any Operations/Maintenance Activities Performed (Requirement 4)

As discussed in section 1.0, extraction, treatment, and discharge into the regional aquifer did not occur during 2020 Quarter 2 because of the EMCA operational status.

Operations and maintenance activities completed during 2020 Quarter 2 are listed in Table 2.4-1 for the extraction, treatment, and injection system.

Table 2.4-1
Operations and Maintenance Activity Summary Table – 2020 Quarter 2, DP-1835

Maintenance Date	Elements Impacted	Operation/Maintenance Description
04/01/2020 through 06/30/2020	CrEX-1, CrEX-2, CrEX-5, CTUA, CTUC, CrIN-1, CrIN-2, CrIN-4, CrIN-5	System shut down on 03/25/2020 because of EMCA status.
06/30/2020	CrIN-3, CrIN-4, CrIN-5	Wellhead samples collected at injection wells (CrIN-1 and CrIN-2 sampled the following day, 07/01/2020).*

* Wellhead sample collection at injection wells CrIN-1 and CrIN-2 will be reported in Table 2.4-1 as an operational/maintenance activity performed during the 2020 Quarter 3 report.

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

Periodic testing of mechanical integrity was not conducted or reported to NMED during 2020 Quarter 2. 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)

As discussed in section 1.0, extraction, treatment, and discharge into the regional aquifer did not occur during 2020 Quarter 2 because of the EMCA operational status. There were no replacement of any primary or secondary IX vessels or associated treatment system infrastructure during 2020 Quarter 2.

2.7 Any Well Workovers Conducted (Requirement 7)

Well workovers did not occur during 2020 Quarter 2.

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 were not conducted because of the EMCA status.

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

As discussed in section 1.0, extraction, treatment, and discharge into the regional aquifer did not occur during 2020 Quarter 2 because of the EMCA operational status.

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

As discussed in section 1.0, extraction, treatment, and discharge into the regional aquifer did not occur during 2020 Quarter 2 because of the EMCA operational status.

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

As discussed in section 1.0, extraction, treatment, and discharge into the regional aquifer did not occur during 2020 Quarter 2 because of the EMCA operational status.

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

As discussed in section 1.0, extraction, treatment, and discharge into the regional aquifer did not occur during 2020 Quarter 2 because of the EMCA operational status.

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

As discussed in section 1.0, extraction, treatment, and discharge into the regional aquifer did not occur during 2020 Quarter 2 because of the EMCA operational status.

2.14 Facility Layout Map (Requirement 14)

Figure 2.14-1 is the facility layout map for 2020 Quarter 2, showing the location and number of each well.

2.15 Groundwater Elevation Contour Map (Requirement 15)

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

3.0 REFERENCES

DOE (U.S. Department of Energy) 2020."U.S. Department of Energy Environmental Management Los Alamos Field Office Transition to Essential Mission Critical Activities Notification," Environmental Management Los Alamos Field Office letter EMLA-2020-1393-02-001 to K. Pierard (NMED-HWB) from A. Duran (DOE EM-LA), Los Alamos, New Mexico (March 31, 2020).

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) 2020. "Quarterly Report for the Discharge of Treated Groundwater to the Regional Aquifer under Discharge Permit 1835, Calendar Year 2019 Quarter 4," Newport News Nuclear BWXT-Los Alamos, LLC, document number EM2020-0035, Los Alamos, New Mexico (February 2020)

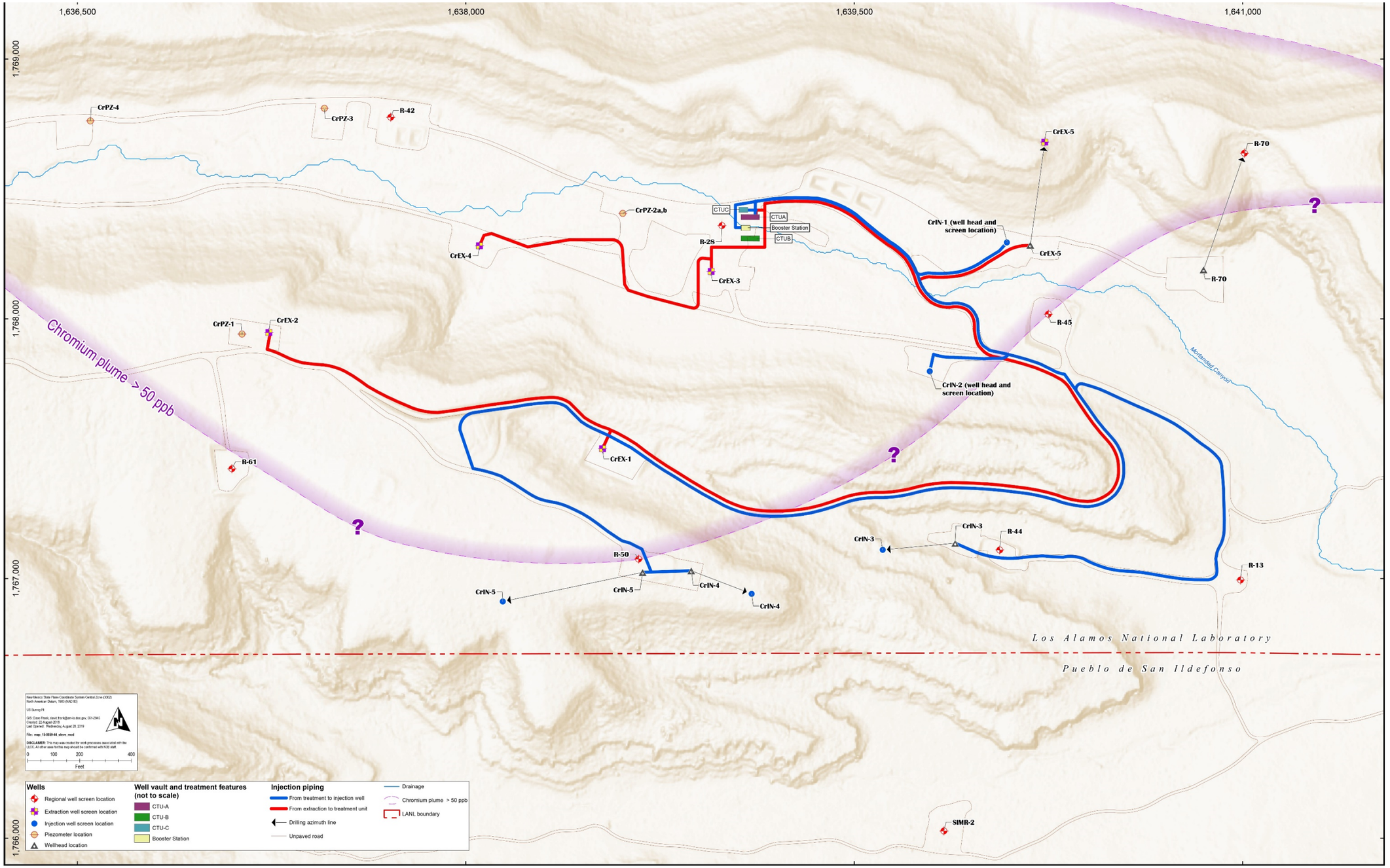

Figure 2.14-1 Facility layout map – 2020 Quarter 2, DP-1835