



DEPARTMENT OF ENERGY
Environmental Management Los Alamos Field Office (EM-LA)
Los Alamos, New Mexico 87544

EMLA-2020-1437-02-001

April 29, 2020

Mr. Kevin Pierard
Bureau Chief
Hazardous Waste Bureau
New Mexico Environment Department
2905 Rodeo Park Drive East, Building 1
Santa Fe, NM 87505-6313

Subject: Response to April 16, 2020, New Mexico Environment Department Email, Impacts from Cr IM Shutdown

References: 1. NMED email to C. Rodriguez, EM-LA, from N. Dhawan, NMED-HWB,
Subject: Impacts from Cr IM shutdown, dated April 16, 2020

Dear Mr. Pierard:

On March 31, 2020, the U.S. Department of Energy (DOE) Environmental Management Los Alamos Field Office (EM-LA) notified the New Mexico Environment Department (NMED) that as a prudent measure in response to the situation involving COVID-19 in New Mexico, EM-LA and the Los Alamos Legacy Cleanup Contract (LLCC) contractor Newport News Nuclear BXWT-Los Alamos, LLC (N3B) had transitioned to Essential Mission Critical Activities (EMCA) status on March 24, 2020. Activities that support the LLCC cleanup mission have been limited to those necessary to ensure the safety of the public, our workers, and the environment. EMCA status is expected to remain in place until no longer needed to support COVID-19 protection measures.

Under the EMCA status, the only 2016 Compliance Order on Consent activity that remains operational is the ongoing maintenance of groundwater monitoring well packer systems. The chromium plume control interim measure (IM) was shut down March 25, 2020. On April 16, 2020, NMED sent a request for a formal response addressing concerns regarding impacts of shutdown of the chromium IM on migration of the chromium plume, given the proximity of the plume to Los Alamos County water-supply well PM-3. EM-LA and N3B have performed the enclosed analysis of chromium plume response to previous IM shutdowns and chromium plume monitoring-well R-70 responses to operation of PM-3.

EM-LA and N3B look forward to a return to full implementation of the cleanup mission at Los Alamos National Laboratory and the restart of the chromium plume control IM. In the meantime, we are confident that significant rebound is unlikely along the southern edge of the plume and that Los Alamos County water-supply well PM-3 is not threatened by chromium plume advance toward the well during the current shutdown.

If you have any questions, please contact Emily Day at (505) 695-4243 (emily.day@em-la.doe.gov) or Cheryl Rodriguez at (505) 414-0450 (cheryl.rodriguez@em.doe.gov).

Sincerely,

Arturo Duran

Digitally signed by Arturo
Duran
Date: 2020.04.29
14:00:58 -06'00'

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

Enclosures:

1. Analysis of Impact of Chromium Plume Control Interim Measure System Interruption on Plume Evolution (EM2020-0217)

CC (letter and enclosure[s] emailed):

Laurie King, EPA Region 6, Dallas, TX
Raymond Martinez, San Ildefonso Pueblo, NM
Dino Chavarria, Santa Clara Pueblo, NM
Michelle Hunter, NMED-GWQB
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Public Reading Room (EPRR)
PRS Website

Pamela T. Maestas

From: Pierard, Kevin, NMENV <Kevin.Pierard@state.nm.us>
Sent: Wednesday, April 29, 2020 3:56 PM
To: Pamela T. Maestas
Cc: Dhawan, Neelam, NMENV; Emily M. Day; Regulatory Documentation; Martinez, Cynthia, NMENV; Danny Katzman; cheryl.rodriquez@em.doe.gov
Subject: RE: Submittal to NMED on 4/29/2020 of Resp to 4/16 email, Cr Shutdown Impact

Thank you, I acknowledge receipt

From: Pamela T. Maestas <pamela.maestas@em-la.doe.gov>
Sent: Wednesday, April 29, 2020 3:11 PM
To: Pierard, Kevin, NMENV <Kevin.Pierard@state.nm.us>
Cc: Dhawan, Neelam, NMENV <neelam.dhawan@state.nm.us>; Emily M. Day <Emily.Day@em-la.doe.gov>; Regulatory Documentation <RegDocs@EM-LA.DOE.GOV>; Martinez, Cynthia, NMENV <cynthia.martinez1@state.nm.us>; Danny Katzman <danny.katzman@em-la.doe.gov>; cheryl.rodriquez@em.doe.gov
Subject: [EXT] Submittal to NMED on 4/29/2020 of Resp to 4/16 email, Cr Shutdown Impact

Mr. Pierard,

Attached for submittal is a pdf of the following:

- Response to April 16, 2020, New Mexico Environment Department Email, Impacts from Cr IM Shutdown (letter and enclosure)

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

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ANALYSIS OF IMPACT OF CHROMIUM PLUME CONTROL INTERIM MEASURE SYSTEM INTERRUPTION ON PLUME EVOLUTION

The following analysis was performed to address questions or concerns regarding the impact of the COVID-19–related shutdown of the chromium plume control interim measure (IM) at Los Alamos National Laboratory (the Laboratory). The analysis focuses on plume evolution and considers whether the interruption will result in plume rebound along the southern portion of the plume or migration toward Los Alamos County water-supply well PM-3 along the northeastern portion of plume.

The IM uses a system of extraction, treatment, and injection to hydraulically control the downgradient portion of the plume. A portion of the IM along the Laboratory’s boundary with Pueblo de San Ildefonso has been operational since 2017, and a more recent completion of the system has enabled pumping, treatment, and injection along the eastern edge of the plume beginning in November 2019. During the operational period, shutdowns of the IM system have occurred for periodic maintenance and also to allow for construction and integration of additional infrastructure.

Maintenance shutdowns generally last for only a few days up to a couple of weeks, whereas construction-related shutdowns have lasted for up to several months. The information presented below indicates that neither of these types of shutdowns has resulted in significant setbacks to progress towards the overall objective of the IM to control chromium plume migration.

Figure 1 shows a current representation of the chromium plume in the regional aquifer as defined by the 50 parts per billion (ppb) New Mexico groundwater standard and the group of wells that makes up the monitoring and IM infrastructure network at the Chromium project site. Figure 2 shows the chromium concentration time series for groundwater from screen 1 in well R-50 near the Pueblo de San Ildefonso boundary. As Figure 2 shows, IM operations along the southern portion of the plume have resulted in significant decreases in chromium concentrations at performance monitoring well R-50. A 7-week construction-related pause of IM operations in the summer of 2019 resulted in a rebound in chromium concentrations from approximately 40 ppb to approximately 50 ppb at R-50. (Note that R-50 has two screens and groundwater from screen 2, the deeper screen, has historically shown background concentrations for chromium.) After the system was turned back on, chromium concentrations rapidly began to decline again in response to the IM. Additionally, samples collected from injection wells CrIN-4 and CrIN-5 following months with no injection into those wells showed no rebound from the nondetected chromium concentrations representative of the injection water quality. For context, the initial concentration of chromium upon completion of these two injection wells was approximately 100 ppb and 95 ppb, respectively.

Based on this information on plume response to past system interruptions, the most recent chromium concentration of approximately 26 ppb at R-50 would likely provide a several-month period of potential rebound before concentrations approached the 50-ppb New Mexico groundwater standard for chromium at R-50, and rebound to pre-IM concentrations of approximately 140 ppb would take much longer.

With respect to Los Alamos County’s water-supply well PM-3, which is northeast of the eastern edge of the 50-ppb plume boundary (Figure 1), there is no basis for concern that the current shutdown of that part of the IM creates a unique situation for migration of chromium into the well. Interim measure operations in that part of the plume began in November 2019 and ran until shutdown during the week of March 23. A 13-year period of monitoring data from two sentinel wells, R-35a and R-35b, upgradient of PM-3, shows a record of chromium concentrations consistent with background (Figure 3). The deeper of the two monitoring wells (R-35a), is screened at the same elevation as upper louvered portion of the water-supply well. As such, it is ideally positioned to monitor potential arrival of chromium at PM-3. Samples are also

collected for chromium analysis on a quarterly basis directly from PM-3 and those data have shown no indication of chromium contamination in the water-supply well (Figure 3).

Another line of evidence on the potential for plume migration to PM-3 is the recent analysis of hydraulic pressure responses in R-70 from pumping at PM-3. R-70 is the closest IM performance monitoring well to PM-3. During November 2019, water was pumped from PM-3 at variable rates up to approximately 700 gallons per minute. No discernable pressure response was observed in either screen 1 or screen 2 of R-70 (Figure 4). The lack of any discernable pressure response to the PM-3 pumping cycles indicates little if any hydraulic connection between PM-3 and R-70, suggesting negligible influence of pumping at PM-3 on plume migration.

In summary, plume responses to past IM shutdowns or to water-supply well pumping, as evidenced by data from performance monitoring wells R-50 and R-70, provide confidence that significant rebound in chromium concentration is unlikely along the southern edge of the plume along the boundary with the Pueblo de San Ildefonso and that Los Alamos County water-supply well PM-3 is not threatened by chromium plume advance toward the well under the current shutdown.

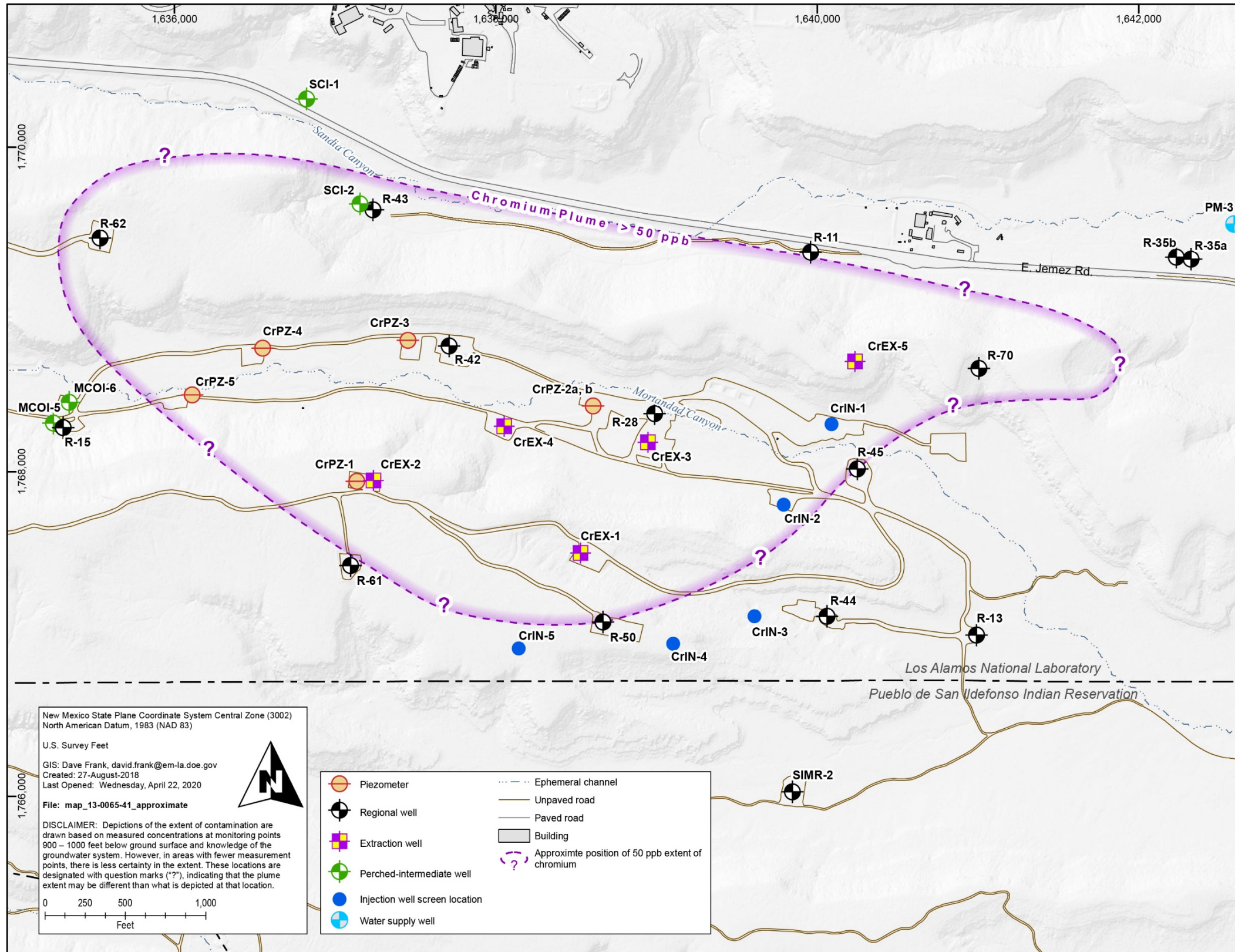
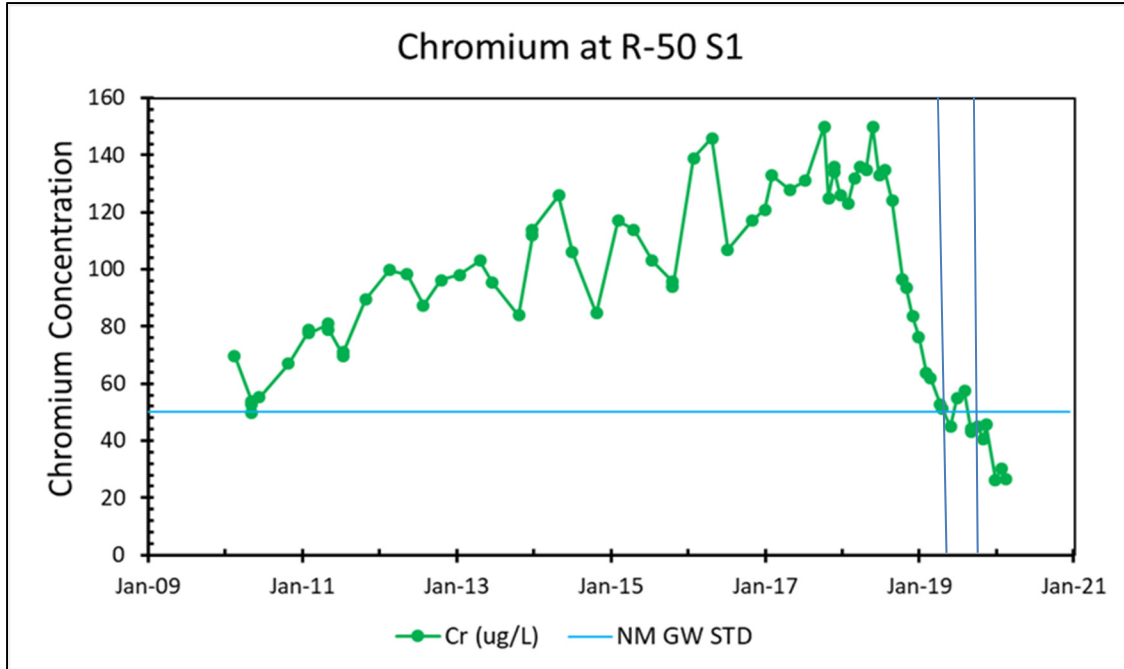
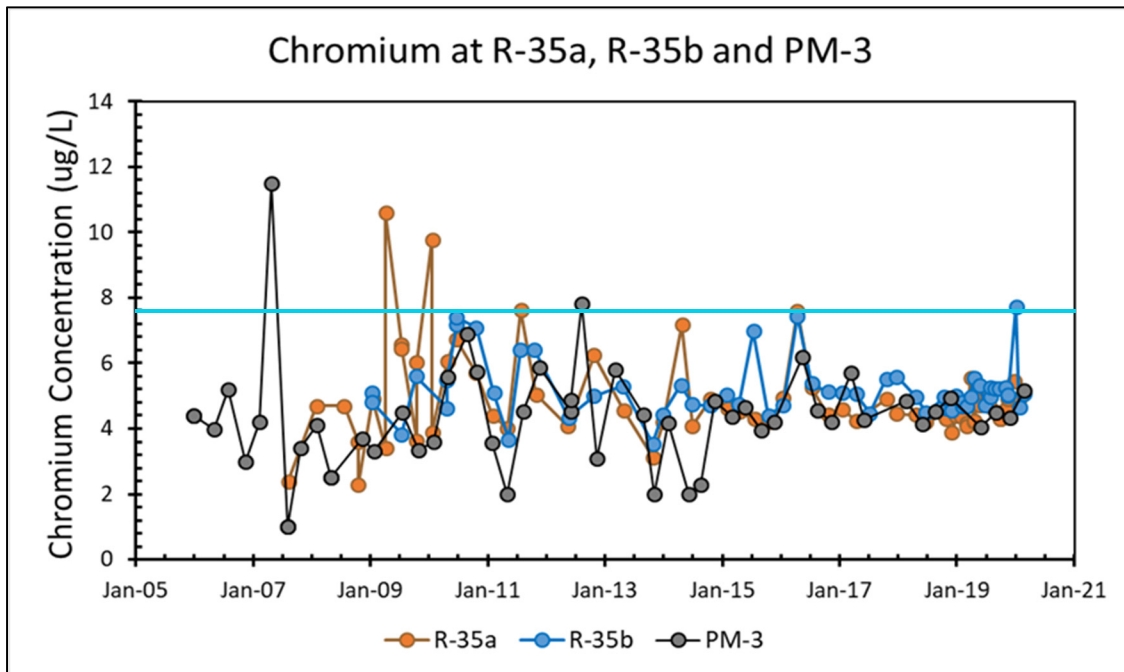


Figure 1 Map of chromium plume area and various monitoring and infrastructure wells



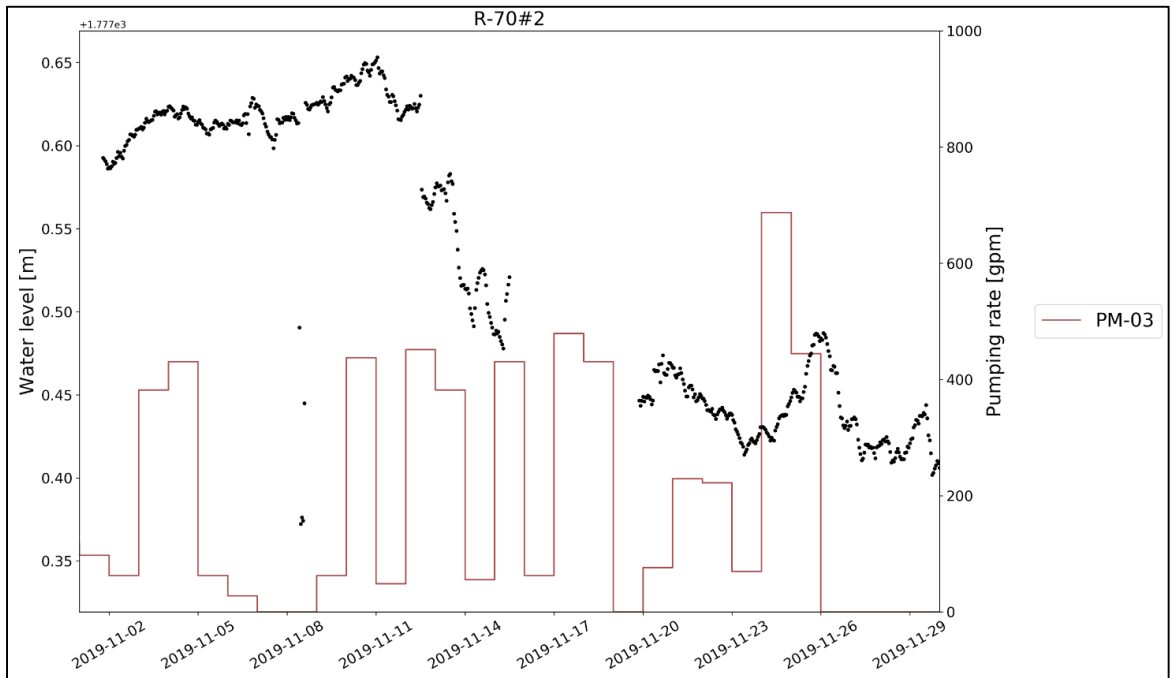
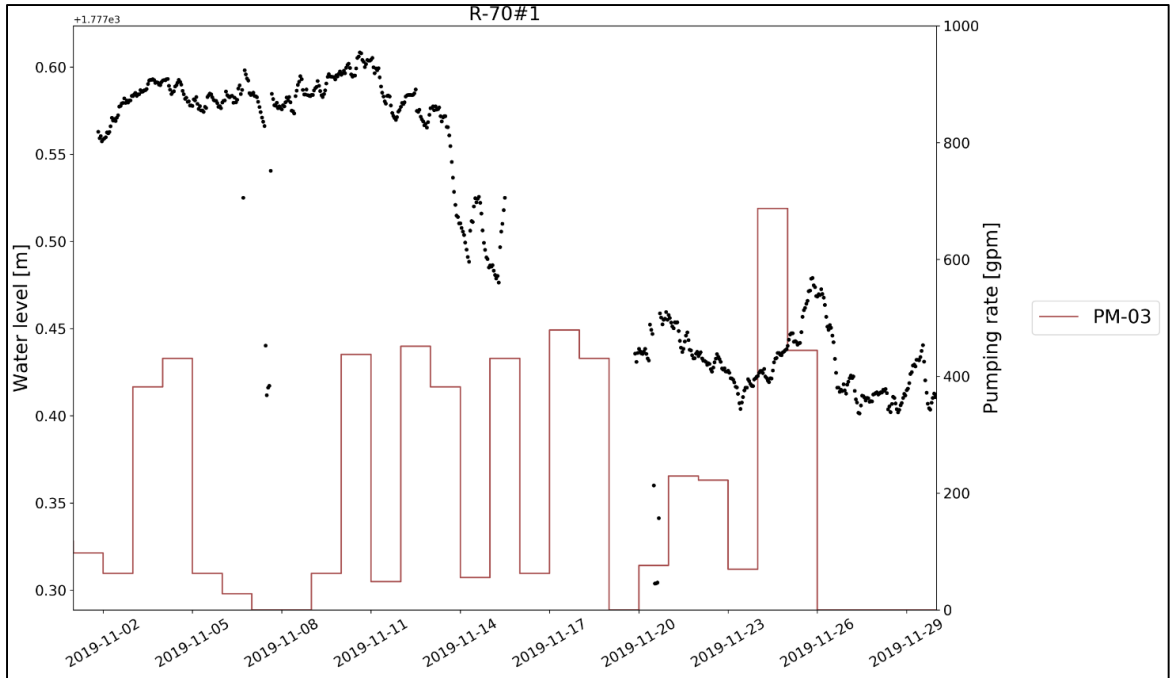
Notes: The short period of rebound followed by continued decline is associated with the 7-week shutdown from May 9 to July 1 (approximated with the two vertical lines) in the summer of 2019. The New Mexico groundwater standard is shown with the horizontal line at 50 ppb.

Figure 2 Chromium concentration trend at R-50 screen 1



Notes: R-35b is screened just below the water table, and R-35a is screened deeper in the aquifer at the top of the louvered section of PM-3. Chromium background in groundwater is shown with the horizontal line at 7.48 $\mu\text{g/L}$.

Figure 3 Chromium concentration trend at sentinel wells R-35a and R-35b and water-supply well PM-3



Note: Plots show no apparent pressure responses to pumping at PM-3, suggesting negligible hydraulic connection between the wells.

Figure 4 Changes in transducer pressure at R-70 screens 1 and 2 compared with pumping record for PM-3