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

EMLA-2022-0298-04-002 Date: March 2, 2022

Mr. Chris Catechis
Acting Director
Resource Protection
New Mexico Environment Department
1190 St. Francis Drive
Santa Fe, NM 87505

Subject: Response to NMED Request for EM-LA to Delay Planned Aquifer Test at CrEX-1

Dear Mr. Catechis:

This letter is in response to the request of the New Mexico Environment Department (NMED) for the Department of Energy (DOE) Environmental Management, Los Alamos Field Office (EM-LA) to delay aquifer testing at CrEX-1.

On February 7, 2022 and February 18, 2022, Mr. Rick Shean, Bureau Chief, NMED Hazardous Waste Bureau, requested that EM-LA delay aquifer testing at CrEX-1. EM-LA had planned on commencing the aquifer testing on or about February 28, 2022. In his email of February 7, 2022, Mr. Shean stated that NMED would not be "prepared to discuss aquifer testing until mid-March." Mr. Shean also stated, "We ask that LANL hold off on aquifer testing until we have come to a mutually agreeable path forward." Subsequently, in his email of February 18, 2022, in which he reiterated his request for EM-LA to delay this testing, Mr. Shean stated, "NMED is working with experts across the country to produce a method that will address what is needed to be implemented by DOE for continued aquifer characterization," and that "this effort will take a couple of months to complete." Copies of Mr. Shean's emails are enclosed.

EM-LA notes that NMED's request for EM-LA to delay aquifer testing at CrEX-1, (1) may result in additional costs; (2) will delay acquisition of aquifer and CrEX-1 Screen 2 sample data; and (3) has a significant potential to adversely impact the timely completion of the Chromium Interim Measures and Characterization Work Plan, a fiscal year 2022 milestone with a current completion date of September 30, 2022.

While EM-LA has a bias for action and would like to proceed with the aquifer testing, EM-LA agrees to refrain from aquifer testing at this time based on NMED's delay request. However, EM-LA also recognizes—consistent with Section II of the 2016 Compliance Order on Consent—the importance of (1) cooperating and exchanging information between EM-LA and NMED; (2) minimizing the duplication of investigative and analytical work and documentation; and (3) establishing an action-oriented approach to achieve mutually-agreed upon results that makes optimum use of available resources.

To that end, and to continue the collaborative cleanup efforts between EM-LA and NMED, EM-LA respectfully requests that NMED include EM-LA in all discussions that NMED is having with experts across the country regarding practices and procedures for aquifer testing. Please provide a timeline for NMED's engagement with these experts so that our technical team can participate. In addition, please provide a timeline as to when NMED anticipates that EM-LA will be able to conduct aquifer testing at CrEX-1.

We look forward to working with NMED (and the experts with whom NMED is consulting) to reach a mutually agreeable path forward on aquifer testing that will eliminate data gaps and facilitate timely completion of the Chromium Interim Measure and Characterization Work Plan.

If you have any questions, please contact Joe Sena (505) 551-2964 (joseph.sena@em-la.doe.gov) or Cheryl Rodriguez at (505) 414-0450 (cheryl.rodriguez@em.doe.gov).

Sincerely,

M Lee Bishop Digitally signed by M Lee Bishop
Date: 2022.03.02 14:57:12
-07'00'

M Lee Bishop
Director, Office of Quality and Regulatory Compliance
Department of Energy
Environmental Management
Los Alamos Field Office

Enclosures: Two hard copies with electronic files –
1. Testing Plan, Subject: *CrEX-1 AQUIFER TESTING PLAN*, Dated: March 2022
2. Email Correspondence, Subject: *RE: [EXTERNAL] RE: CrEX-1 status*, Dated: February 7, 2021
3. Email Correspondence, Subject: *RE: [External] FW: CREX-1 Aquifer Test Plan*, Dated: February 18, 2021

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
Chris Catechis, NMED-DOE-OB/-RPD
Steve Yanicak, NMED-DOE-OB
Jennifer Payne, LANL
Troy Thomson, N3B
Joseph T. Sena, N3B
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CrEX-1 AQUIFER TESTING PLAN

1.0 INTRODUCTION

This document summarizes aquifer testing plans and requirements for well CrEX-1 at Los Alamos National Laboratory (LANL or the Laboratory). CrEX-1 is an 8-in. dual-screen vertical well located on the plateau on the south rim above Mortandad Canyon. It is an infrastructure well in the Chromium Interim Measure (IM) system that has been offline since July 2021, requiring replacement of the pump that brings water to the surface. Although the well has two screens, extraction operation of the well has been by extraction from the upper screen (screen 1) only; the lower screen (screen 2) has been packed off using a bridge plug. Aquifer tests and water sampling will be conducted on both screens before installing the permanent extraction pump back into the well and bringing CrEX-1 back online as an infrastructure well.

Specific information, including a map of the location of the test wells (CrEX-1, CrIN-1, and CrIN-2) and surrounding monitoring locations, is shown in Figure 1. This plan lays out the required equipment and time schedule for the tasks to be performed. Related and supporting information is available in the planning document “Aquifer Testing Guidance for the Los Alamos National Laboratory Site” (N3B 2021).

Most pumping tests conducted at LANL are performed on wells that were not strictly designed for aquifer testing. Most were designed and installed to capture subsurface geologic information and monitor groundwater quality in discrete zones. Others, such as CrEX-1, have been installed to capture contaminated groundwater for treatment and reinjection. Because of the great well depths at LANL, it has been impractical to install a battery of wells (pumping well and several observation wells) to provide an ideal pumping test at every location where hydraulic information is sought. As a result, hydraulic testing has been limited to the available wells that were installed for other purposes.

Infrastructure well CrEX-1 provides a great opportunity to obtain valuable hydraulic information via aquifer testing due to the need to replace the pump and the relatively high capacity of the well, which will enable drawdown responses to be measured at nearby wells. This plan proposes to test each screen zone using accepted, industry-standard methods and procedures in order to derive that greatest benefit possible from each testing opportunity.

The New Mexico Environment Department (NMED) has expressed the view that the test pumping done at LANL does not conform to industry standards. DOE/Newport News Nuclear BWXT-LLC, Los Alamos (N3B) does not agree with NMED’s perspective. The entire pumping test approach is based on, and follows, industry standards as described below.

Our standard pumping test approach, which will be followed for these tests, includes:

1. measuring background water level trends prior to and throughout testing,
2. obtaining barometric pressure data to use for applying correction factors to water level data if applicable and necessary,
3. pumping at a constant rate,
4. recording recovery data following shutdown, and
5. analyzing the resulting data using applicable analytical methods.

The following references summarize much of the guidance applicable to testing and analysis: Driscoll (1986); Kruseman and De Ridder (1990); Osborne (1993); US Department of the Interior (1995); Lohman (1972); Ferris et al. (1962); ASTM D4043; ASTM D6034. Our test pumping procedures are consistent with these protocols, and in some respects, go above and beyond the testing and analysis requirements. Examples which represent site-specific elements applied to the standard testing approach include:

1. Use of inflatable packers to minimize casing storage effects. Failing to use packers results in obliteration of the early data from pumping tests, with "early" meaning the first several minutes to tens of minutes of pumping and recovery. Our confidence in using the early time data stems largely from this improvement.

2. High-frequency collection of early pumping and recovery data to obtain reliable estimates of near-well aquifer characteristics (within one or two hundred feet, typically).

3. Use of check valves to avoid the drop pipe emptying into the well after pump shutoff, which can corrupt the recovery data.

4. Advanced understanding how to apply analytical techniques and avoiding the common industry practice of misapplying certain methods and misinterpreting data. The LANL pumping test specialist can testify to this, having reviewed hundreds of pumping test reports over the years in a litigation support role.

There are occasional circumstances that arise where optimum procedures dictate bypassing some of the "conventional" guidance. A good, clear example of this concerns maintaining a constant discharge rate during the test. NMED has insisted that backpressure must be maintained via a partially closed valve during every test to provide the latitude of opening the valve, if needed, to keep the discharge rate from declining. That may be sound advice in environments with shallow water levels. At LANL, however, this approach does more harm than good. Continual adjustment of the valve will often result in chaotic flow rate fluctuations, worsening the data set rather than enhancing it.

The original pumping test at CrEX-1 conducted in 2014 (LANL, 2015) can be used to illustrate this point. Because the tested well screen straddles the water table, inevitable casing and filter pack storage effects rendered the data from the first 5 to 10 minutes of the test unanalyzable. After that time, the drawdown over the next 24 hours increased by about 1.5 feet. In a very shallow well, drawdown of this magnitude would have a significant impact on the pressure the pump works against to pump water to the surface. In contrast, in a ~1000 ft well, 1.5 ft is an inconsequential deviation in the head that the pump must work against. Consulting the pump performance curve for the pump used in testing showed that the 1.5 ft drawdown resulted in a flow rate reduction of 0.12 gpm over the 24-hour period. That corresponded to 0.125% of the 96-gpm discharge rate for the test (i.e., an effective discharge rate of 96 plus or minus 0.06%). This negligible flow rate variation made it mandatory to avoid attempting to adjust the valve during the test. In an attempt to adjust for an inconsequential decline in flow rate, much larger changes in flow rate would be imparted through imprecise valve adjustments at the discharge point. Instead, pumping with the valve wide open offers the advantage of maximizing the discharge rate for the test.

It is anticipated that employing this approach will lead to high-quality data in these new CrEX-1 tests. Specifically, the desired goal of constant flow rate will be achieved to well within the tolerance normally expected in field tests such as these, and well within the ±5% of the target pumping test rate that must be maintained throughout the test, per guidance provided in U.S. Department of the Interior (1995).

2.0 GENERAL APPROACH

Separate constant-rate tests will be conducted in each of the two screens in CrEX-1. Screen 1 is 50 ft in length and screen 2 is 20 ft in length. It is expected that the pumping rate in screen 1 may be possible at approximately 70 and 80 gpm. The rate that pumping can be sustained in screen 2 is unknown but will be determined as part of the testing. The test duration for each screen will be 7 days long to try to capture the hydraulic response that occurs after delayed yield effects dissipate and to enhance the response in the observation (monitoring) wells. The recovery period will be 2 days to provide some post-delayed-yield data as well as provide an extra day of downtime between the two 1-week tests.

Water produced from CrEX-1 during the two tests will be treated to remove hexavalent chromium and injected into injection wells. CrIN-1 will be used to disposition treated water pumped during the testing in CrEX-1 screen 1, whereas CrIN-2 will be used to disposition treated water pumped during the testing in CrEX-1 screen 2. The use of two separate injection locations far from CrEX-1 will provide an opportunity to evaluate pressure responses in nearby monitoring wells to each of the two discrete injection events.

IM extraction and injection will be shut down for 2 weeks prior to testing to allow aquifer water levels to recover and stabilize, thereby reducing the impact of IM operations on water levels. Note that here may still be water-level rebound in the extraction well area and water level declines in the injection area, the proposed 2-week downtime should help minimize the amount of any residual water-level recoveries. All regional aquifer monitoring wells/screens, extraction wells, and injection wells in the Cr plume area will be set to 1-minute transducer recording frequency several days prior to deployment of the packer system (see below).

To gain access to CrEX-1 screen 2, the bridge plug isolating screen 2 from screen 1 will be removed, and screen 2 will be redeveloped by swabbing and bailing prior to testing. A dual packer system will be used and be able to actuate one packer at a time, or both simultaneously. This will obviate the need to reconfigure the pump, shroud and packer assembly when switching from testing one screen to the other. Following deployment of the packer system, an additional 2 days of high-frequency groundwater monitoring will be conducted prior to the beginning of the test.

To as great an extent as possible, injection of pumped volume at each CrIN well will begin when test pumping begins, and at the same flow rate. Water level monitoring at surrounding wells will enable observation of system responses to both the pumping and the injection events.

Samples will be collected during each aquifer test and analyzed per the sampling and analysis plan provided in Table 1.

It is important to remove the effects of barometric pressure changes on the water levels measured at the site. Therefore, in addition to pressure transducers installed to monitor pressures in the two screens in the pumped well, barometric pressure will be monitored throughout the testing process.

The following is a list of observation well candidates for monitoring that cover both the pumping at CrEX-1 and injection at CrIN-1 or CrIN-2: R-50 screens 1 and 2, R-61 screens 1 and 2, R-44 screens 1 and 2, R-45 screens 1 and 2, R-70 screens 1 and 2, R-28, R-42, R-11, R-62, R-43 screens 1 and 2, R-15, R-36, piezometers CrPZ-1, CrPZ-2a, CrPZ-2b, CrPZ-3, CrPZ-4, CrPZ-5, CrEX-2, CrEX-3, CrEX-4, CrEX-5, CrIN-1 (for the portion in which CrIN-2 is used for injection), CrIN-2 (for the portion in which CrIN-1 is used for injection), CrIN-3, CrIN-4, and CrIn-5. Water levels in the observation wells should be collected at 1-minute intervals. It is expected that monitoring will continue for a few days after the final pumping test. This same measurement frequency will be used for recording barometric pressure.

3.0 SPECIAL CONSIDERATIONS

Due to the unique hydrogeologic setting at the Laboratory, there are a number of stringent requirements that must be met in order to achieve the highest quality data set possible. Following is a discussion of these specific considerations.

3.1 Water-Level Stabilization

Because the drawdowns in local observation wells are expected to be small, it will be important to stabilize background water levels and minimize fluctuations to the extent practicable so that induced drawdowns, in the observation wells attributable to the pumping test, do not get lost in the background noise.

Active pumping and injection occur continuously in the regional aquifer beneath Mortandad Canyon, potentially affecting pumping tests in that area. Any variability in system operation can affect observed levels in the observation wells. Therefore, the IM system will be turned off approximately 2 weeks leading up to the tests as well as during the testing procedures.

A minimum of 6 days will be provided between the conclusion of pumping the first screen and starting the 1-week test on the second screen. This will be about the time required for recovery from the first test, which includes pulling the pump, downloading and reprogramming the transducers, reinstalling the pump, and collecting background data for the next test.

3.2 Casing Storage

Casing and filter pack storage effects are unavoidable for screen 1 because the screen straddles the water table. For screen 2, an upper packer will both separate it from screen 1 and eliminate storage effects for screen 1 pumping and recovery.

3.3 Pumping Rate Selection and Initial Start-Up

Screen 1 will be pumped at the maximum rate of the pump, likely between 70 and 80 gpm. Based on knowledge gained from operation of the IM, the zone can easily produce at this rate.

The discharge rate for screen 2 will be determined from the data acquired during the screen 1 test. When the pump is installed for the screen 2 test, the well will be pumped initially with both screens open so that drawdown will be restricted. The discharge valve will be set to achieve the desired pumping rate. Following shutdown and equilibration, the packer used to separate screens 1 and 2 will be inflated and background water level recording will begin for the screen 2 test.

3.4 Pump Shroud

The pump will be installed inside a shroud for the test procedures. The shroud will serve several purposes. Among them, it will allow locating the pressure transducer for the pumped zone beneath the pump thereby minimizing electrical interference from the pump cable and, possibly, lessening the mechanical vibration associated with pump operation. It is essential for suspending the lower inflatable packer and lower transducer for the screen 1 test.

4.0 EQUIPMENT REQUIREMENTS

The drilling contractor will provide specialty equipment to execute the pumping test plan. Some of the specialty equipment is listed below.

Submersible Pump

A 6-in., 40 horsepower submersible pump, with the capacity to produce approximately 70 to 80 gallons per minute (gpm) at the prevailing head conditions, will be adequate and appropriate based on the known well capacity. The expected head will be the hydraulic lift plus friction loss in the drop pipe and any other infrastructure piping losses. Assuming a 2-in. drop pipe and a discharge rate of 70 to 80 gpm, the friction loss component could range from approximately 100 to 120 ft for Schedule 40 pipe. The anticipated vertical lift from the pumping water level to ground surface is expected to be less than 1000 ft to 1100 ft. Thus, the total discharge head could range from approximately 1100 ft to 1200 ft.

Electric Generator

The submersible pump will be powered by grid power from the existing panel rack at the wellhead. Alternatively, an electric generator with the voltage and amperage capacity to power the selected pump may be used instead.

Drop Pipe

The drop pipe used in the testing will be 2-in. stainless-steel JSL pipe. This material uses a slip-in, O-ring-fitted, spline-lock design and is less susceptible to leaks than typical threaded drop pipe.

Pressure Gauge

A pressure gauge will be provided at the discharge manifold to measure the backpressure on the pump during operation. The range of the gauge must be sufficient to handle the shut-in pressure that will be achieved by the pump. The pressure gauge is located first in line in the discharge assembly, i.e., ahead of all other components.

Flow-Control Valve

A stainless-steel ball valve will be installed immediately downstream from the pressure gauge to control the discharge rate as needed.

Flow Meter

A volume-totalizing flow meter is installed in the discharge line immediately downstream from the flow control valve to track production volume and provide the data needed to document discharge rates.

Inflatable Packer(s) and Appurtenances

Nitrogen-actuated inflatable packers will be provided that meet the anticipated pressure requirements for the well and test. Suitable nylon tubing, associated connecting fittings, and nitrogen tanks for inflating the packers will be provided.

Pump Shroud

A suitable pump shroud for housing the submersible pump and suspending additional piping beneath it will be provided along with a pass-through nitrogen line for the two-packer installations.

Check Valve

The pumping string will be equipped with a check valve, which has a pressure rating well in excess of the anticipated static head in the drop pipe above the check. This will prevent water from the drop pipe draining back into the well following pump shutoff. Without a check valve, the high flux of drop-pipe water surging into the packed-off screen would corrupt the recovery data. In general, the check valve should be placed close to the pump and shroud assembly, usually within several feet, as directed by the Subject Matter Expert (SME) during pumping-string assembly.

Transducers

Three Level TROLL 700 non-vented pressure transducers will be provided for testing. The one used to monitor barometric pressure must be a 30-psi unit. The pressure range of the two downhole units will be determined based on the static water level and anticipated installation depths of the pumping-string components.

Transducer Cages

The transducers will be placed in perforated metal sleeves fabricated from 1-in. pipe and strapped securely to the drop-pipe assembly.

5.0 ANTICIPATED SCHEDULE

To provide adequate recovery time from development pumping and the initial constant-rate pumping test, the sequence of tasks and anticipated timing are listed here. The schedule is arrayed to ensure approximately (1) 6 days between the 7-day tests, and (2) more than 2 days of background readings for each test. It is assumed that packer removal and development of screen 2 by swabbing and bailing, concludes on Day Zero, and that counting the days on the schedule goes from there.

Days 1, 2, and 3: Array and assemble components for the pumping string and discharge piping system, pressure test packers, install pump, bring water to the surface and set flow control valve, position pump for the first test, and begin recording background water levels. (Note: if these tasks can be done more quickly, it will provide an opportunity to increase the background monitoring period accordingly.)

Day 4: Continue background monitoring, interrupted briefly by trial testing or step drawdown testing, as directed by the SME.

Day 5: Continue background monitoring.

Day 6: Pump on to begin constant-rate 7-day test.

Days 7-12: Continue 7-day test.

Day 13: Pump off to terminate 7-day test.

Days 14 and 15: Measure recovery for 48 hours, pull pump, download and reprogram pressure transducers, reinstall pump, bring water to the surface and set flow control valve, position pump for the second test, and begin recording background water levels.

Day 16: Continue background monitoring, interrupted briefly by trial testing or step drawdown testing as directed by the SME.

Day 17: Continue background monitoring.

Day 18: Pump on to begin constant rate 7-day test.

Days 19-24: Continue 7-day test.

Day 25: Pump off to terminate 7-day test.

Day 26: Pull test pump.

Days 27-plus: Continue 15-min monitoring of observation wells and barometric pressure for several days.

6.0 REFERENCES

ASTM D4043 Standard Guide for Aquifer Test Methods in Determining Hydraulic Properties by Well Methods.

ASTM D6034 Standard Practice (Analytical Procedure) for Determining the Efficiency of a Production Well in a Confined Aquifer from a Constant Rate Pumping Test.

Driscoll, Fletcher G., 1986, *Groundwater and Wells*, Second Edition. Johnson Filtration Systems, Inc., St. Paul, MN 55112, 1089 pages.

Ferris, J. G., D. B. Knowles, R. H. Brown and R. W. Stallman, 1962, *Theory of Aquifer Tests*. U.S. Geological Survey Water Supply Paper 1536-E, pp 69-174.

Kruseman, G. P. and N. A. de Ridder, 1990, *Analysis and Evaluation of Pumping Test Data*, Second Edition (Completely Revised). Publication 47, International Institute for Land Reclamation and Improvement, P.O. Box 45, 6700 AA Wageningen, The Netherlands, 1994, 377 pages.

LANL (Los Alamos National Laboratory), January 2015. Completion Report for Groundwater Extraction Well CrEX-1. Document EP2015-0005. Los Alamos, New Mexico (LANL, 2015)

Lohman, S. W., 1972, *Ground-Water Hydraulics*, Professional Paper 708. U.S. Geological Survey. United States Government Printing Office, Washington D.C.

Osborne, Paul S., 1993, *Suggested Operating Procedures for Aquifer Pumping Tests*. U.S. EPA Ground Water Issue, Office of Research and Development, Office of Solid Waste and Emergency Response; EPA/540/S-93/503.

N3B (Newport News Nuclear BWXT-Los Alamos, LLC), August 2021. “Aquifer Testing Guidance for the Los Alamos National Laboratory Site,” Newport News Nuclear BWXT-Los Alamos, LLC, document EM2021-0481, Los Alamos, New Mexico. (N3B 2021, xxxxxx)

U.S. Department of the Interior, Bureau of Reclamation, 1995, Ground Water Manual, A Water Resources Technical Publication, Second Edition. U.S. Government Printing Office, Washington, DC 20402, 661 pages. (US Department of the Interior, 1995).

Table 1. Sampling and Analysis Plan for the CrEX-1 Aquifer Tests

Location	Metals (filtered) - GGRL	Anions (EXCLUDING CLO4) – GGRL	TAL Metals (filtered) - Offsite	General Inorganics (INCLUDING Br, Cl, F, SO4, ClO4, NO3/NO2, alkalinity, pH) – Offsite	TOC - GGRL	Naphthalene Sulfonates - GGRL	Sodium Perrhenate Tracer - GGRL	Field Parameters pH, temp, DO, ORP, SpCond, and Turb
CrEX-1 Aquifer Test – Screen 1	At 30-minute after start of test and 1 daily including day 7	At 30-minute after start of test and 1 daily including day 7	At 4-hr after start of test, and on day 7	At 4-hr after start of test, and on day 7	All Samples	All Samples	All Samples	All Samples
CrEX-1 Aquifer Test – Screen 2	At 30-minute after start of test and 1 daily including day 7	At 30-minute after start of test and 1 daily including day 7	At 4-hr after start of test, and on day 7	At 4-hr after start of test, and on day 7	All Samples	All Samples	All Samples	All Samples

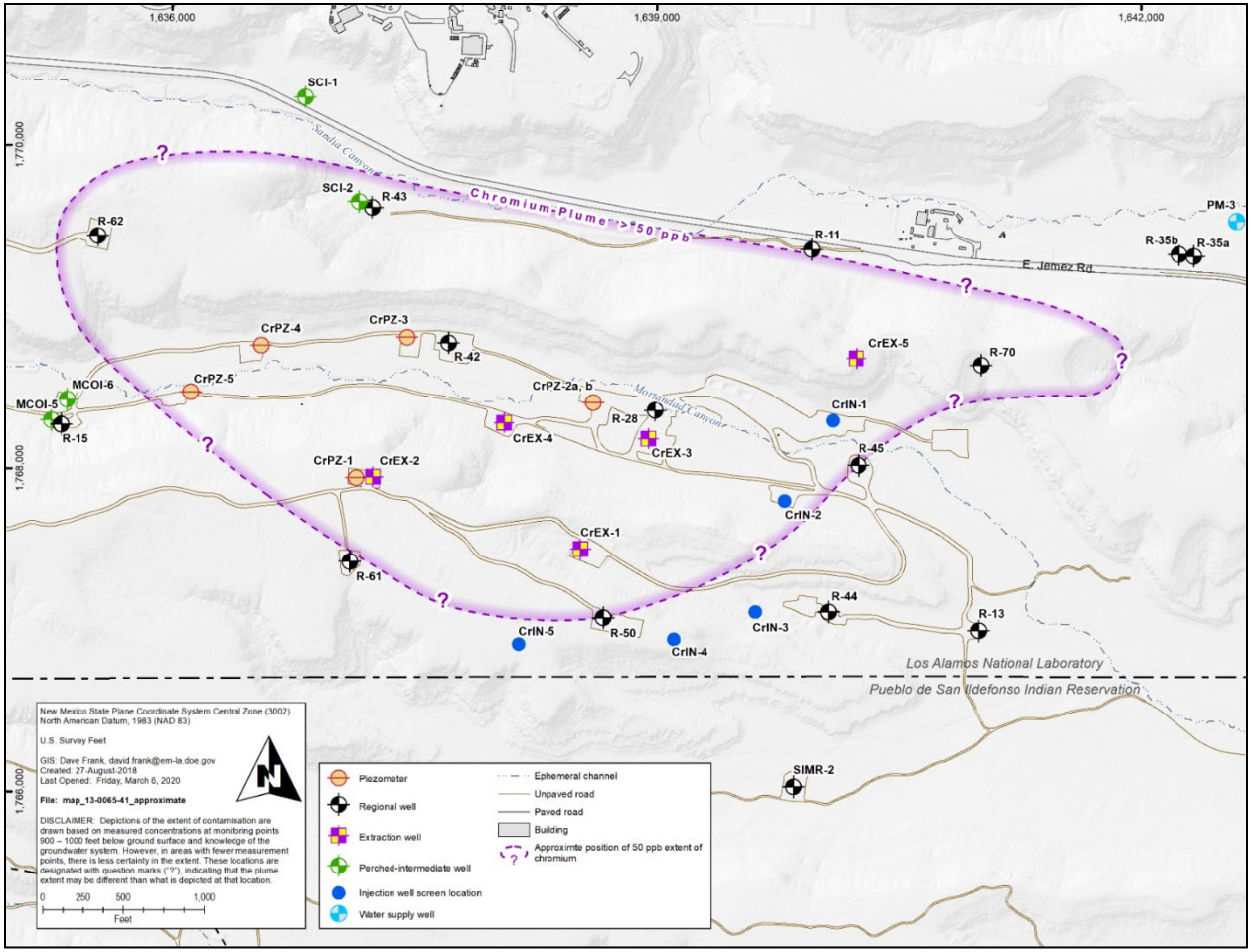

Figure 1. Map showing the locations of pumping well CrEX-1, injection wells CrIN-1 and CrIN-2, and other locations at which monitoring will take place

From:	Shean, Rick, NMENV
To:	Duran, Arturo Q.; Dhawan, Neelam, NMENV
Cc:	Longmire, Patrick, NMENV; Maupin, Christian T; Rodriguez, Cheryl; Krambis, Christopher, NMENV; Bishop, M. Lee; Catechis, Chris, NMENV
Subject:	RE: [EXTERNAL] RE: CrEX-1 status
Date:	Monday, February 7, 2022 3:14:04 PM
Attachments:	Review of LANL Aquifer Test Guidance and R-71 and R-72 Aq Testing WPs_11-1-2021.pdf

Hello, Arturo:

Thank you for your patience for our response. We have discussed the proposals below and have determined that we will not be prepared to discuss aquifer testing until Mid-March. We ask that LANL hold off on aquifer testing until we have come to a mutually agreeable path forward. In the meantime, NMED staff will be reviewing existing SOPs for aquifer tests to provide you all in March and consulting with our contractors. If LANL has its own aquifer testing SOP, we'd like to take a look at it, as well. I have attached a recent letter that HWB sent you with our input on the aquifer testing approach you have previously proposed for your convenience, which should answer questions you may have at this time.

Sincerely,

Rick

Rick Shean Bureau Chief
New Mexico Environment Department
Hazardous Waste Bureau
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From: Duran, Arturo Q. <arturo.duran@em.doe.gov>
Sent: Thursday, February 3, 2022 11:43 AM
To: Dhawan, Neelam, NMENV <neelam.dhawan@state.nm.us>; Shean, Rick, NMENV <Rick.Shean@state.nm.us>
Cc: Longmire, Patrick, NMENV <Patrick.Longmire@state.nm.us>; Maupin, Christian T <christian.maupin@em-la.doe.gov>; Rodriguez, Cheryl <cheryl.rodriguez@em.doe.gov>; Krambis, Christopher, NMENV <Christopher.Krambis@state.nm.us>; Bishop, M. Lee <lee.bishop@em.doe.gov>; Catechis, Chris, NMENV <Chris.Catechis@state.nm.us>
Subject: RE: [EXTERNAL] RE: CrEX-1 status

Good morning Rick and Neelam,

In the spirit of mutual collaboration I would like to propose the following:

- Both our technical teams exchange their proposed plan and methodology for each party's review and analysis.
- Hold technical meeting to seek realignment next week.
- DOE will not perform aquifer testing until technical alignment is achieved.
- If technical alignment is not achieved by the 17th of February, DOE will not perform the test at hand. However, alignment discussions could continue for future wells.
- Each party exchange their proposed plan based on best practices and industry standards considering Los Alamos specific conditions by COB Monday February 7th through the Designated Agency Managers (DAMs).

Please let me know if you will agree to the above. I look forward to working with you in facilitating resolution of the issues and developing an agreeable path forward.

Thanks

Arturo
575 373-5966

From: Dhawan, Neelam, NMENV <neelam.dhawan@state.nm.us>
Sent: Thursday, February 3, 2022 9:14 AM
To: Duran, Arturo Q. <arturo.duran@em.doe.gov>; Krambis, Christopher, NMENV <Christopher.Krambis@state.nm.us>
Cc: Longmire, Patrick, NMENV <Patrick.Longmire@state.nm.us>; Shean, Rick, NMENV <Rick.Shean@state.nm.us>; Maupin, Christian T <christian.maupin@em-la.doe.gov>; Rodriguez, Cheryl <cheryl.rodriguez@em.doe.gov>
Subject: RE: [EXTERNAL] RE: CrEX-1 status

Arturo
I appreciate your getting back with us quickly on this important issue. NMED is working on it and will provide written directions on how to conduct aquifer tests that are consistent with industrial standards and would be acceptable to NMED. Please do not run any aquifer tests until this issue is resolved. Instead of having another meeting, NMED's preference is to provide written directions since meetings have not been useful in resolving this issue. In accordance with the requirements of the Consent Order, collaboration with NMED is essential. A reminder that NMED must be consulted before any decisions are made on projects covered under the CO. NMED must be provided with regular updates on the status of these projects so timely input can be provided by NMED.

Thanks

Neelam Dhawan
LANL Group Manager
Hazardous Waste Bureau
New Mexico Environment Department
505-690-5469
(pronoun-she, her) why: https://www.mypronouns.org/what-and-why

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From: Duran, Arturo Q. <arturo.duran@em.doe.gov>
Sent: Wednesday, February 2, 2022 4:48 PM
To: Krambis, Christopher, NMENV <Christopher.Krambis@state.nm.us>
Cc: Dhawan, Neelam, NMENV <neelam.dhawan@state.nm.us>; Longmire, Patrick, NMENV <Patrick.Longmire@state.nm.us>; Shean, Rick, NMENV <Rick.Shean@state.nm.us>; Maupin, Christian T <christian.maupin@em-la.doe.gov>; Rodriguez, Cheryl <cheryl.rodriguez@em.doe.gov>
Subject: RE: [EXTERNAL] RE: CrEX-1 status

I understand Chris. I recommend that coordination and exchanges take place prior to technical meetings in order to seek alignment on topics to be discussed. A good summary of items resolved and pending items will be of good use as well. I also believe that a follow up meeting in regards to aquifer testing may be beneficial. I though the first meeting was good in highlighting the areas of conflict, but we did not arrived to a resolution stage. May be we should schedule a second meeting. Any thoughts?

From: Krambis, Christopher, NMENV <Christopher.Krambis@state.nm.us>
Sent: Wednesday, February 2, 2022 4:41 PM
To: Duran, Arturo Q. <arturo.duran@em.doe.gov>
Cc: Dhawan, Neelam, NMENV <neelam.dhawan@state.nm.us>; Longmire, Patrick, NMENV <Patrick.Longmire@state.nm.us>; Shean, Rick, NMENV <Rick.Shean@state.nm.us>; Maupin, Christian T <christian.maupin@em-la.doe.gov>
Subject: RE: [EXTERNAL] RE: CrEX-1 status

Arturo,

Why hasn't DOE discussed any of this during the monthly meetings? The complexities of what has been described in your email require a work plan. This unilateral approach by DOE is very disappointing to NMED. You should know by now that I do not concur with your aquifer testing approach and much needs to be corrected starting with an SOP followed by a work plan for my approval as stated in many formal correspondences last year. If the testing is conducted unilaterally be DOE, I am under no obligation to accept the results of the work.

Christopher Krambis, Jr., P.G.
Water Resource Professional IV
New Mexico Environment Department
Hazardous Waste Bureau - Los Alamos Field Office

1183 Diamond Drive, Suite B, Los Alamos, NM 87544
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From: Duran, Arturo Q. <arturo.duran@em.doe.gov>
Sent: Wednesday, February 2, 2022 4:29 PM
To: Krambis, Christopher, NMENV <Christopher.Krambis@state.nm.us>
Cc: Dhawan, Neelam, NMENV <neelam.dhawan@state.nm.us>; Longmire, Patrick, NMENV <Patrick.Longmire@state.nm.us>; Shean, Rick, NMENV <Rick.Shean@state.nm.us>; Maupin, Christian T <christian.maupin@em-la.doe.gov>
Subject: [EXTERNAL] RE: CrEX-1 status

Good afternoon Chris,

Please see below update I received from our technical team:

Coincidental to your email, we were getting ready to provide the following update and plan for CrEX-1 and notification of Chromium (Cr) Plume Control Interim Measure (IM) temporary system shutdown. Planned activities at CrEX-1 include pump removal and replacement, packer removal and rehabilitation, swabbing and bailing of the lower screen and sample collection during individual aquifer tests conducted in each of the two screens in CrEX-1. All this requires use of a hoist rig, so the plan is to move the hoist rig from R-71 once no longer needed there and is anticipated to occur the week of February 14, 2022. The IM shutdown is necessary to allow water levels in the aquifer to equilibrate, which will support interpretation of pressure-response data from monitoring wells. System shutdown will begin approximately 2 weeks prior to the initiation of the first aquifer test. Key predecessor activities to aquifer test initiation include removal of the pump and existing packer and swabbing and bailing of the lower screen at CrEX-1.

Shutdown of the system is expected to start over the next several days, and the aquifer testing is expected to start approximately two weeks after shutdown. Water-quality sampling will also be conducted during the aquifer testing, and notifications will be made to NMED several days prior to each test to provide NMED an opportunity to collect samples. Replacement of the packer between the upper and lower screens and installation of the new pump will allow for continued extraction operations in the upper screen when the full IM system is turned back on. Water generated during pumping from the upper screen in CrEX-1 will be treated and dispositioned into CrIN-1. Water generated during pumping from the lower screen in CrEX-1 will be treated and dispositioned in CrIN-2. The use of 2 separate injection locations will provide an opportunity to evaluate pressure responses in the aquifer to each of the two discrete injection events. The total down time for IM operations is expected to be approximately 4-5 weeks.

Let me know if you need anything else or I can be of further assistance.

Arturo

From: Krambis, Christopher, NMENV <Christopher.Krambis@state.nm.us>
Sent: Wednesday, February 2, 2022 8:15 AM
To: Duran, Arturo Q. <arturo.duran@em.doe.gov>
Cc: Dhawan, Neelam, NMENV <neelam.dhawan@state.nm.us>; Longmire, Patrick, NMENV <Patrick.Longmire@state.nm.us>; Shean, Rick, NMENV <Rick.Shean@state.nm.us>; Maupin, Christian T <christian.maupin@em-la.doe.gov>
Subject: [EXTERNAL] CrEX-1 status

Hello Arturo;

I hope all is well with you. I would like to request from you an update on the operational status and sampling plan/schedule for CrEX-1.

As you know, CrEX-1 has been offline since July 2021, and I have not heard anything regarding this important chromium interim measures extraction well in months. The importance for this well to continuously operate cannot be underestimated as it was the first well in the interim measures system, installed in 2014, that was shown to be effective to remove chromium from the regional aquifer and to control plume migration from entering San I Pueblo land.

I'm not sure why it is taking your contractor so long to repair/replace a pump, but I suspect something else is going on. Please provide NMED with a detailed update, and considering this appears to be a long-term issue, monthly updates until CrEX-1 is returned to full extraction operation.

CrEX-1 should also be discussed during the next meeting as well as other mechanical issues with chromium infrastructure and wells.

Thank you for your attention to this matter.

Respectfully,

Christopher Krambis, Jr., P.G.
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****

From:	Shean, Rick, NMENV
To:	Duran, Arturo Q.
Cc:	Bishop, M. Lee; Catechis, Chris, NMENV; Mikolanis, Michael A; Dhawan, Neelam, NMENV; Krambis, Christopher, NMENV; Petersen, Michael, NMENV
Subject:	RE: [EXTERNAL] FW: CREX-1 Aquifer Test Plan
Date:	Friday, February 18, 2022 5:18:20 PM

Hello, Arturo:

Before the weekend I want to let you know that NMED does not think that the revised workplan adequately address our concerns regarding DOE's approach to aquifer testing. It appears to us that the workplan submitted is a reiteration of methods that we have already stated were not satisfactory. As an example, the emphasis on what DOE terms as "early time" data and analysis reflects DOE's previous position that the hydrogeologic setting at LANL is unique and that standard methods must be modified. NMED has previously rejected the referenced "Aquifer Testing Guidance for the Los Alamos National Laboratory Site" document, and the notion that limited testing is not pertinent as input to the plume scale groundwater fate & transport modeling effort. At this point I would note that DOE's proposed injection operation during the CrEX-1 is not activity that can be agreed to by NMED during the aquifer test. Our specific concern for this approach is that there is the potential for interference with the aquifer test, adding too many variables to the analysis of the data. In addition, DOE's approach to dealing with barometric pressure on test data do not appear to be in-line with standard aquifer analyses. NMED will provide an acceptable approach for DOE to follow.

To advance this campaign, NMED is working with experts across the country to produce a method that will address what is needed to be implemented by DOE for continued aquifer characterization at both plumes. This effort will take a couple of months to complete, but once finished NMED will base approvals of all aquifer tests based on our prepared method. Progress towards a mutually acceptable set of data and resulting model will be further delayed, if NMED's approach is not followed. As we stated before, we ask that DOE not perform any aquifer tests until we have provided you with an approach that we will find acceptable.

Sincerely,

Rick

Rick Shean Bureau Chief
New Mexico Environment Department
Hazardous Waste Bureau
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From: Duran, Arturo Q. <arturo.duran@em.doe.gov>
Sent: Tuesday, February 15, 2022 7:49 AM
To: Shean, Rick, NMENV <Rick.Shean@state.nm.us>; Dhawan, Neelam, NMENV <neelam.dhawan@state.nm.us>; Krambis, Christopher, NMENV <Christopher.Krambis@state.nm.us>; Petersen, Michael, NMENV <Michael.Petersen@state.nm.us>
Cc: Bishop, M. Lee <lee.bishop@em.doe.gov>
Subject: [EXTERNAL] FW: CREX-1 Aquifer Test Plan

Good morning Rick and Neelam,

Here is our revised aquifer test plan for CrEX1. Our team believes it addresses some important issues you have raised. Can your technical team review this and provide me with any feedback? Let me know if you all believe the plan adequate addresses your concerns and if not let me know how it should be modified.

Your prompt response would be greatly appreciated.

Arturo