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Environmental Management Los Alamos Field Office 1200 Trinity Drive, Suite 400 Los Alamos, New Mexico 87544 (240) 562-1122

Date: November 27, 2023 *Refer To*: N3B-2023-0441

Ricardo Maestas, Acting Bureau Chief Hazardous Waste Bureau New Mexico Environment Department 2905 Rodeo Park Drive East, Building 1 Santa Fe, NM 87505-6313

Subject: Notification to the New Mexico Environment Department Hazardous Waste Bureau of Anomalous Data Collected at Groundwater Regional Aquifer Monitoring Well R-70 Screen 1 and Screen 2

Dear Mr. Maestas:

This letter is to inform you that recent anomalous chromium concentrations were measured in groundwater regional aquifer monitoring well R-70 in the lower screen (screen 2) during the August sampling event and in the upper screen (screen 1) during the September sampling event. The concentration of 74 μ g/L in the sample collected from R-70 screen 2 on August 3, 2023, is approximately one-third of previously recorded measurements. The concentration of 137 μ g/L in the sample collected from R-70 screen 1 on September 21, 2023, is several times the highest concentration previously recorded. Both of these results are identified as anomalous outliers in the enclosed time series plot. The root cause is still under investigation; however, sampling system malfunction resulting in an ineffective actuation of the access port valves (APVs) is the most likely cause of these anomalous chromium concentrations. An evaluation of the water-level data and packer pressures indicates the packer is functioning properly and there is no passive cross-flow between screened intervals. Newport News Nuclear BWXT-Los Alamos, LLC (N3B) will be pulling the sampling system at R-70 to address these issues and pending further evaluation will prioritize any ensuing maintenance and repairs.

Chromium concentrations in groundwater samples from R-70 screen 1 have consistently been in the range of 10–20 μ g/L, which is below the New Mexico Water Quality Standard of 50 μ g/L. At R-70 screen 2, chromium concentrations have exceeded the hexavalent chromium standard since it was installed in 2019. The concentrations in screen 2 were steadily decreasing from 270 μ g/L to 140 μ g/L during the 3-year period when the interim measure (IM) system was in operation. However, since the IM system was turned off at New Mexico Environment Department Groundwater Quality Bureau direction on March 31, 2023, the concentrations have rebounded closer to their initial values.

During the August sampling event, the chromium concentration at R-70 screen 2 was anomalously low at 74 μ g/L, approximately one-third of previous measurements at this location. Based on this result, N3B reviewed water-level data for potential cross-flow, completed a Level 4 validation of the analytical data, conducted a geochemical analysis of potential mixing between screen 1 and screen 2, reviewed the sampling notes and procedures, evaluated the sampling system condition, and accelerated laboratory analysis for the September R-70 samples. The inflatable packer between the screens is holding pressure and does not appear to be allowing passive cross-flow between screens. Sampling personnel did not observe any abnormal events during sampling, and recorded packer pressures indicated that the packer and APVs were functioning normally. However, geochemical calculations do support the mixing of the water between the two screens, suggesting that the mixing may be occurring within the sampling system rather than within the well. These calculations also support the absence of laboratory error, which has also been confirmed by a focused validation of the fixed laboratory analytical results.

Several attempted sampling events in September indicated that the sampling system might be inconsistently malfunctioning. The Baski dual-valve pumping system installed at R-70 relies on two APVs to sample two screened intervals in a well using a single pump. The APVs are pneumatic valves that are opened and closed using nitrogen gas and serve as the mechanism to select which screened interval will be sampled. When either APV is opened, hydrostatic pressure causes a shroud to fill through the drop pipe, allowing sample collection from only the selected screened interval. Abnormal venting during the operation of the Baski dual-valve pumping system was observed during the September sampling events, suggesting that the system's APVs may be malfunctioning.

Before receipt of these data, R-70 was scheduled to be sampled on September 11, 2023. Unexpected venting from the APVs was documented by sampling personnel, so sampling was halted. R-70 screen 1 was sampled on September 21, 2023; venting was not observed and APV pressures appeared normal. However, venting was again observed during preparation to sample R-70 screen 2, and sampling was paused pending further evaluation. Field personnel and subject matter experts visited R-70 to troubleshoot and test the functionality of the APV system. R-70 screen 1 and screen 2 APVs were successfully actuated and depressurized. R-70 screen 2 was sampled on September 27, 2023; venting was not observed and APV pressures appeared normal.

During the September sampling event, the chromium concentration at R-70 screen 2 was measured at 233 μ g/L, which is consistent with recent concentration trends. However, the chromium concentration at R-70 screen 1 was unusually elevated at 137 μ g/L, nearly 10 times greater than historical concentrations. This result became publicly available in the Intellus NM database on November 8, 2023, with appropriate data qualifiers resulting from the focused validation of fixed laboratory analysis.

N3B is still investigating the root cause of the anomalous measurements but since October is using Hach test kits, which provide real-time screening-level concentrations, before sampling to determine if concentrations at both screens are representative. For example, October Hach test kit results indicated representative chromium concentrations for both screens, with concentration estimates (adjusted to account for the reagent blank) of 30 μ g/L and 250 μ g/L for screen 1 and screen 2, respectively. October fixed laboratory analyses of chromium concentrations were 30.7 μ g/L and 252 μ g/L for screen 1 and screen 2, respectively. The screen 1 value is lower than the anomalously high value of 137 μ g/L but is somewhat higher than historical measurements

 $(10-20 \ \mu g/L)$, whereas the screen 2 value is consistent with the recent trend in chromium concentrations. No anomalous APV venting was observed during the October sampling event.

The use of Hach test kits will continue at R-70 until the cause has been identified and resolved. The demonstration of potential sample mixing and inconsistent APV operation may be resulting in simultaneous pumping from both screened intervals and mixing within the sampling system. To remedy, N3B is prioritizing R-70 for well maintenance as soon as possible, which is tentatively scheduled to begin winter 2023.

If you have any questions, please contact Tanner Bonham at (505) 412-8968 (tanner.bonham@emla.doe.gov) or Susan Wacaster at (505) 709-8704 (susan.wacaster@em.doe.gov).

Sincerely,

noy thomas

Troy Thomson Program Manager Environmental Remediation N3B-Los Alamos

Sincerely,

Digitally signed by BRIAN HARCEK Date: 2023.11.22 12:28:02 -07'00'

Brian Harcek, Acting Co-Director Office of Quality and Regulatory Compliance U.S. Department of Energy Environmental Management Los Alamos Field Office

Enclosure(s): One hard copy with electronic file:

1. Time-Series Plot of Chromium Concentrations at Regional Well R-70 (EM2023-0814)

cc (letter and enclosure[s] emailed): Laurie King, EPA Region 6, Dallas, TX Steve Yanicak, NMED-DOE-OB Neelam Dhawan, NMED-HWB Kylian Robinson, NMED-HWB Rick Shean, NMED-RPD Arturo Duran, EM-LA Sarah Eli Gilbertson, EM-LA Thomas McCrory, EM-LA Kent Rich, EM-LA Joseph Richie, EM-LA Cheryl Rodriguez, EM-LA Susan Wacaster, EM-LA William Alexander, N3B Tanner Bonham, N3B Cami Charonko, N3B Mei Ding, N3B Vicky Freedman, N3B

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Enclosure 1

Time-Series Plot of Chromium Concentrations at Regional Well R-70

