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July 29, 2022

Arturo Duran
Designated Agency Manager
Department of Energy-EM
1200 Trinity Drive, Suite 400
Los Alamos, New Mexico 87544

Re: Approval with Modifications
Drilling Work Plan for Chromium Groundwater Project Regional Aquifer Monitoring Well R-77, Rev. 1
Los Alamos National Laboratory
EPA ID#NM0890010515
HWB-LANL-22-017

Dear Arturo Duran,

The New Mexico Environment Department (NMED) has received the United States Department of Energy (DOE) *Drilling Work Plan for Chromium Groundwater Project Regional Aquifer Monitoring Well R-77, Revision 1* (Revision 1) dated and received on June 10, 2022 and referenced as EM2022-0341. DOE submitted Revision 1 in response to the informal technical comments issued by NMED in April 2022 (Comments). The Comments were issued by NMED to DOE following NMED's review of DOE's *Drilling Work Plan for Chromium Groundwater Project Regional Aquifer Monitoring Well R-77* (Work Plan) and were issued in general accordance with the process outlined in Section XXXIII of the 2016 Order on Consent (CO). The Work Plan was submitted to NMED by DOE on March 17, 2022, and Revision 1 was submitted June 10, 2022, in fulfilment of Fiscal Year 2022 Milestone No. 9.

NMED has reviewed Revision 1 approves this revision with modifications. The required modifications that DOE must implement for the approval of FY 2022 Milestone No. 9 to be valid are provided tin the following narrative.

1. **Primary Objectives and Purpose, Page 1.**

   **DOE Statement:** "*R-77 will complement a series of wells, including R-78 (the R-28 replacement well) and R-73, which will characterize the Tcar from west to east along the groundwater flow path.*"

   **NMED Modification:** NMED noted that correct nomenclature should have been R-76, instead of "*R-78*" for the R-28 replacement well.

2. **Drilling Approach, Page 1.**

   **DOE Statement:** "*Because the deeper portion of the borehole is expected to encounter potentially unstable Tcar sediments, the drilling subcontractor may use various techniques to maintain borehole stability and eventual placement of a well screen. Specific techniques that may be used to manage conditions in the Tcar are not provided in this work plan. DOE and the selected drilling subcontractor will have the*

*responsibility to use drilling and well-completion methods that are best suited for the conditions encountered."*

**NMED Modification:** As instructed in the Comments, DOE should have provided a narrative that described the appropriate technique(s) to maintain borehole stability and screen placement, specifically how DOE plans to address the potential for encountering flowing sands in the Chamita Formation. All drilling operations must conform to Appendix F of the CO regardless of DOE's position that "*DOE and the selected drilling subcontractor will have the responsibility to use drilling and well completion methods that are best suited for the conditions encountered*". If NMED finds drilling methods and well completion methods violate the CO, NMED may require DOE to redrill the well.

3. **Geophysical Testing, Page 2.**

**DOE Statement:** *"The geophysical data will be used in conjunction with drill cuttings and driller's observations to identify intervals within the aquifer that are suitable for screen placement."*

**NMED Modification:** NMED provides a clarification that the screening groundwater-quality sample results will also be used to identify intervals within the aquifer that are suitable for screen placement (See NMED Comment No. 5).

4. **Step-Drawdown Testing, Page 3.**

**DOE Statement:** *"Step-drawdown testing will be performed to investigate and record each well screen interval's performance under controlled discharge conditions. Initial specific capacity will be determined for each screen interval, and the data will be used to help select a suitable permanent pump for the dedicated sampling system. Specific pumping rates for each step test will be determined in the field."*

**NMED Modification:** As instructed in the Comments, reference to all hydraulic testing must be removed from this and all other drilling workplans. Such activities require a separate, detailed work plan and/or Standard Operating Procedures.

5. **Water Quality Sampling, Page 3.**

**DOE Statement:** *"Water-quality samples will be collected at 20-ft intervals during advancement through the regional aquifer. Borehole water will be air lifted to the surface while each new section of 20-ft drill casing section is welded at the surface. Each sample will be collected from the air-lifted water just before continuing advancement of the casing string. These screening-level samples will be analyzed with fast turnaround at Los Alamos National Laboratory's Geochemistry and Geomaterials Research Laboratory (GGRL) for anions and metals. This practice may not be conducted within the Tcar if circulation borehole water during the welding phase causes borehole instability."*

*"After achieving total depth at approximately 170 ft into the regional aquifer, a series of "temporary wells" will be constructed in the 10-in. borehole. A well string with a 5-ft stainless steel screened interval will be lowered into the drill casing to total depth, and the annular space around the well screen will be filled with 10/20 filter-grade silica sand (adjacent to screen slots) extending 1 ft to 2 ft above and below the screened interval and with 20/40 transition sand emplaced 5 ft above and below the primary filter pack interval. The 10-in. drill casing will then be retracted to expose the screen interval to the native formation."*

**NMED Modification:** As instructed in the Comments, Revision 1 should have included a sentence that

states that split samples of the groundwater-quality samples collected at 20-ft intervals during advancement through the regional aquifer will be provided to NMED under NMED chain of custody protocol or that DOE will make the drill site safe and accessible for two NMED personnel at a time to collect their own screening-level groundwater samples during active drilling operations. Revision 1 does not include this very important work activity. NMED provides the clarification that screening groundwater samples must be collected at each run during drilling, including the Chamita Formation, and that either NMED will collect their own samples, or DOE will collect them for NMED under NMED chain-of-custody protocol.

The second groundwater quality sampling technique is unnecessary and appears to be a cost and time issue.

6. **Sampling System Installation, Page 4.**

   **DOE statement:** *"A two-screen Baski sampling system will be installed in the well. The system will use a typical 3- or 4-in. pump and motor to maintain sampling purge rates at or near 5 gal. per minute."*

   **NMED Modification:** DOE must consider an alternative sampling system if supply chain issues, such as at R-71 and R-72, prevent R-77 from being incorporated into the Interim Facility-wide Groundwater Monitoring Plan for Monitoring Year 2023. The alternative sampling system must be approved by NMED prior to use.

7. **Figure 1, *Proposed location for R-77*, Page 5.**

   The contour map intervals do not agree with the legend. The Legend shows Index contours at 40-ft intervals and Terrain contours at 10-foot intervals, but the map shows Index contours at 20-ft intervals and Terrain contours at 2-ft intervals.

   **NMED Modification:** Correct the figure so that the map and the legend show the same contour intervals and provide NMED with a replacement figure.

If you have any questions regarding this letter, please contact Michael Petersen (505) 610-5107.

Sincerely,

Rick Shean Digitally signed by Rick Shean Date: 2022.07.29 11:34:16 -06'00'

Rick Shean
Chief,
Hazardous Waste Bureau

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File: 2022 LANL, Drilling Work Plan for Chromium Groundwater Project Regional Aquifer Monitoring Well R-77, Revision 1
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