



Michelle Lujan Grisham
Governor

Howie C. Morales
Lt. Governor

**NEW MEXICO
ENVIRONMENT DEPARTMENT**

Hazardous Waste Bureau

2905 Rodeo Park Drive East, Building 1
Santa Fe, New Mexico 87505-6313
Phone (505) 476-6000 Fax (505) 476-6030

www.env.nm.gov



James C. Kenney
Cabinet Secretary

Jennifer J. Pruett
Deputy Secretary

CERTIFIED MAIL – RETURN RECEIPT REQUESTED

April 28, 2021

Arturo Q. Duran
Designated Agency Manager
Environmental Management
U.S. Department of Energy
Los Alamos Field Office
P.O. Box 1663 MS M984
Los Alamos, NM 87544

**RE: WELL REHABILITATION WORK PLAN REQUIREMENT
REGIONAL AQUIFER WELLS R-28, R-42, AND CREX-3
LOS ALAMOS NATIONAL LABORATORY
EPA ID #NM0890010515
HWB-LANL-19-055**

Dear Mr. Duran:

The New Mexico Environment Department (NMED) is concerned that the impacts from the chemical amendment injection pilot study conducted by the United States Department of Energy (DOE) in 2017 at two former monitoring wells, R-28, and R-42, have had an adverse impact on groundwater quality around these wells and may have permanently affected the integrity of the wells and their usefulness for monitoring purposes. Our core concern is that these two wells have monitored the highest concentrations of hexavalent chromium in the regional aquifer but have not been part of the Interim Facility-wide Groundwater Monitoring Plan (IFGMP) since the pilot study began.

As a consequence, NMED is directing DOE to submit a work plan for our review and approval of DOE's ongoing efforts to rehabilitate former monitoring wells R-28 and R-42 following the August and September 2017 chemical amendment injections.

It is apparent that DOE's attempts to rehabilitate these wells under the work scope provided in the *Supplemental Work Plan for Pilot-Scale Amendments Testing for Chromium in Groundwater beneath Mortandad Canyon, Revision 1 (SWP)* have not been successful. The SWP, submitted by DOE in December 2019 and approved with modifications by NMED in January 2020, required DOE to rehabilitate the well screens using physical and mechanical means including:

- Video-logging pre redevelopment conditions.

- Brushing each screen interval with a stiff-bristled water-well brush.
- Surging with a tight-fitting surge block.
- Bailing until water clarity improves.
- Pumping the entire screen length until parameters stabilize and turbidity is below 5 NTU.
- Video-logging post redevelopment conditions.
- Assessing flow velocity changes via dilution tracer tests.

The SWP also required DOE to collaborate with NMED through technical team meetings and to document the completed work in a final report that was to be submitted in June 2020, neither of which were carried out by DOE.

On February 19, 2021, NMED sent an email to DOE regarding the status of the well rehabilitation based on its review of the January 2021 Monthly NMED Update provided by DOE. This update had indicated that well redevelopment was completed sometime in December 2020 and that biweekly extended purges and sampling had since been undertaken. DOE subsequently acknowledged in a March 4, 2021 email that redevelopment at R-42 and R-28 had taken place and involved surging, bailing, and use of the Hydropuls tool followed by extended pumping and sampling.

However, at the last technical team meeting concerning these wells, which took place on April 21, 2020, DOE did not inform NMED that adjustments to the work plan and report schedule were anticipated. In addition, since that meeting, DOE has not kept NMED apprised of the work related to well rehabilitation, as required by the SWP, and has not asked for an extension for its submission of the necessary report. In effect, DOE has been ignoring the agreed upon SWP and acting unilaterally.

During our April 15, 2021 joint meeting to discuss notice of intent to discharge, DOE stated that additional extended pumping and sampling of these wells are necessary to complete rehabilitation. We pointed out that these additional tasks are not part of the approved SWP, and if DOE wanted to pursue additional well rehabilitation efforts, a new work plan must be submitted and approved by NMED before any additional activities not included in the current approved SWP are conducted.

In order to be effective, the new work plan must include criteria that will establish successful well rehabilitation. The Attachment to this letter includes geochemical criteria that must be achieved for each well before rehabilitation can be considered successful and before these wells can be reintegrated into the IFGMP. NMED's Groundwater Quality Bureau (GWQB) developed these criteria based on pre-chemical amendment injection water quality data. Using these criteria, by the end of well rehabilitation efforts, groundwater pumped from R-28 and R-42 must be clear and odorless and not be impacted by biogeochemical reactions and processes that occurred after the 2017 addition of amendments.

In a March 22, 2021 email to NMED, DOE requested, without providing a justification, that the post-redevelopment dilution tracer test requirement specified in the SWP for R-28 and R-42 no longer be considered necessary, and that instead, the parties should rely on specific capacity data. We cannot approve of this because the collected data upon which the pre-amendment injection specific capacity for R-28 and R-42 are based were improperly collected. As a result, specific capacity measurements would not be a valid measure of well rehabilitation success. The dilution tracer test provides the most reliable means to evaluate pre- and post-amendment injection flow conditions at these wells.

In addition to the specific criteria set forth in the Attachment, the hydraulic criteria that establish the

success of the well rehabilitation must indicate whether pre- and post-dilution tracer test results are within a 10 percent range and must be conducted at both wells, in accordance with the criteria outlined in the SWP. Additionally, the pre- and post-well screen conditions as determined by video logs must be evaluated, and spinner logs must be conducted to verify that flow has been restored along the entire screen length for each well.

Moreover, CrEX-3, an extraction well in the vicinity of R-28, has also been impacted by the amendments pilot study and must be rehabilitated to meet the criteria listed in the Attachment and with criteria proposed in the *Seventh Report on Pilot-Scale Amendments Testing for Chromium in Groundwater Beneath Mortandad Canyon, April to September 2019*.

NMED recommends that DOE undertake a two-week period for the extended purge and sampling. Based on the 2018 dilution tracer test, NMED believes a 45-day period to conduct both dilution tracer tests, and subsequent monitoring would be sufficient to complete this work. Consistent with the approved SWP, DOE must provide NMED with a detailed schedule and real time chemical and dilution tracer test data during the entire rehabilitation event.

In summary, DOE must submit a work plan to NMED within 30 days of receipt of this letter. The work plan must provide a detailed description of DOE's plan to further the well rehabilitation of R-28, R-42, and CrEX-3. This work plan must also provide a schedule to perform the necessary extended pumping/purging and sampling, the dilution tracer tests, and comparisons of the results to the pre amendment conditions.

Please contact Christopher Krambis at (505) 231-5423 with questions regarding this correspondence.

Sincerely,

**Kevin
Pierard**

Digitally signed by
Kevin Pierard
Date: 2021.04.28
11:30:05 -06'00'

Kevin M. Pierard, Chief
Hazardous Waste Bureau

Cc:

N. Dhawan, NMED HWB
C. Krambis, NMED HWB
C. Catechis, NMED-DOE-OB
S. Yanicak, NMED-DOE-OB
M. Hunter, NMED GWQB
P. Longmire, NMED GWQB
S. Pullen, NMED GWQB
L. King, US EPA Region 6
C. Rodriguez, EM-LA
H. Shen, EM-LA
R. Martinez, San Ildefonso Pueblo, NM
D. Chavarria, Santa Clara Pueblo, NM
D. Katzman, N3B

Mr. Duran
Page 4

M. Everett, N3B
C. Maupin, N3B
P. Maestas, N3B
W. Alexander, N3B
emla.docs@em.doe.gov

File: 2021 Reading and LANL, TA-05 Work Plan Requirement for Rehabilitation of R-28, R-42, and CrEX-3

Attachment
For R-28 and R-42 Rehabilitation

Field Parameters

dissolved oxygen, >6.70 mg/L
odor, non-detect
oxidation-reduction potential (ORP), uncorrected, >+250 mV
pH >7.5 <8.0
specific conductance, <430 uS/cm
turbidity, <0.80 NTU

Solutes (GGRL, dissolved)

total carbonate alkalinity, 90 - 100 mgCaCO₃/L
aluminum, <1 ug/L, non-detect
ammonium-N, <0.01 mg/L, non-detect
antimony, <1.0 ug/L, non-detect
arsenic, <1.0 ug/L
barium, <80 ug/L
beryllium, <1.0 ug/L, non-detect
boron, <50 ug/L
bromide, <0.01 mg/L
cadmium, <0.30 ug/L, non-detect
calcium, <45 mg/L
cesium, <1ug/L, non-detect
chloride, <40 mg/L
chromium, breakthrough 380 - 530 ug/L, if reduced Cr as Cr(III), <3 ug/L
cobalt, <1 ug/L, non-detect
color, non-detect
copper, < 0.8 ug/L, non-detect
dissolved organic carbon, <1.0 mgC/L
fluoride, 0.29 - 0.40 mg/L
hardness, 125 - 170 mg/L
iron (total dissolved), <10 ug/L, non-detect
ferrous iron, <10 ug/L, non-detect
lead, <0.20 ug/L, non-detect
lithium, <40 ug/L
magnesium, <13 mg/L
manganese, <1 ug/L, non-detect
mercury, <0.05 ug/L, non-detect
molybdenum, <1 ug/L, non-detect
nickel, <25 ug/L
nitrate-N, >3.0 mg/L
nitrite-N, <0.01 mg/L, non-detect
oxalate, <0.01 mg/L, non-detect
perchlorate, >0.30 ug/L

phosphorus, orthophosphate (P), <0.01 mg/L, non-detect
potassium, <2.0 mg/L
rhenium, <0.1 ug/L, non-detect

selenium, <2.5 ug/L, non-detect
silica (SiO₂), <80 mg/L
silver, <0.30 ug/L, non-detect
sodium, <17 mg/L
strontium, <160 ug/L
sulfate, <60 mg/L
sulfide, <0.01 mg/L, non-detect
thallium, <0.60 ug/L, non-detect
tin, <1 ug/L, non-detect
titanium, <2 ug/L, non-detect
total dissolved solids, <400 mg/L
total kjeldahl nitrogen, <0.10 mg/L, non-detect (GEL, offsite laboratory)
total organic carbon, <1.0mgC/L
uranium, >1.0 ug/L
vanadium, <7 ug/L
zinc, <1 ug/L, non-detect