



State of New Mexico
ENVIRONMENT DEPARTMENT



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CERTIFIED MAIL – RETURN RECEIPT REQUESTED

November 20, 2018

Doug Hintze, Manager
Environmental Management
Los Alamos Field Office
P.O. Box 1663 MS-M984
Los Alamos, NM 87545

**RE: THIRD QUARTERLY REPORT ON PILOT-SCALE AMENDMENTS
TESTING FOR CHROMIUM IN GROUNDWATER
BENEATH MORTANDAD CANYON
LOS ALAMOS NATIONAL LABORATORY (LANL)
EPA ID #NM0890010515
HWB-18-041**

Dear Mr. Hintze:

The New Mexico Environment Department (NMED) has received from the United States Department of Energy (DOE) the *Third Quarterly Report On Pilot-Scale Amendments Testing for Chromium in Groundwater Beneath Mortandad Canyon* (Third Quarterly Report), dated July, 2018 and referenced by EM2018-0019. The Third Quarterly Report, received on July 31, 2018, fulfills Fiscal Year 2018 Milestone #8, Summary Report (Completion or Progress) of the Phase 1 Pilot Amendment Test Results, in Appendix B of the 2016 Compliance Order on Consent (Consent Order).

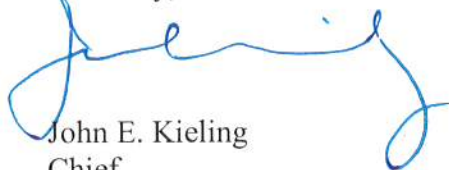
Prior to DOE's submittal of the Third Quarterly Report, NMED sent DOE draft comments (attachment 1) on the *Second Quarterly Report On Pilot-Scale Amendments Testing for Chromium in Groundwater Beneath Mortandad Canyon*. During a technical team meeting on August 23, 2018 DOE stated that NMED's comments would be addressed in the Third Quarterly Report. NMED reviewed the content of the Third

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Quarterly Report and determined that comments 2,3,and 5 were not completely addressed. The outstanding comments were discussed by NMED and DOE at a technical team meeting held on November 15, 2018 and the parties agreed that due to the ongoing nature of the amendments pilot test, NMED's comments will best be addressed through future technical team meetings.

If you have any questions or comments regarding this correspondence, please contact Robert Murphy at 505-476-6022.

Sincerely,



John E. Kieling
Chief
Hazardous Waste Bureau

Attachment

- 1) NMED Draft Comments on *Second Quarterly Report On Pilot-Scale Amendments Testing For Chromium In Groundwater Beneath Mortandad Canyon*

cc: N. Dhawan, NMED HWB
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File: Reading and LANL 2018, TA-05 Chromium plume amendments testing

Draft Comments on “**SECOND QUARTERLY REPORT ON PILOT-SCALE AMENDMENTS TESTING FOR CHROMIUM IN GROUNDWATER BENEATH MORTANDAD CANYON**” dated April, 2018 (cover letter dated April 26, 2018)

1 - The 2018 milestone deliverable number 8 of the 2016 Compliance Order on Consent (Consent Order), *Summary Report (Completion or Progress) of the Phase 1 Pilot Amendments Test Results*, is due to be submitted to NMED on July 31, 2018. NMED requests to meet with the Permittees to discuss the contents of the report prior to its preparation or pre-submittal meeting.

2 - Specifically to R-42, assessing impacts to the aquifer-hydraulic properties (e.g., permeability) after amendment deployment should be addressed. Additionally, the summary report should present results and interpretations related to the re-mobilization and stability of chromium after ambient-upgradient groundwater re-enters the monitoring area surrounding R-42. The primary questions concerning the injection of sodium-dithionite at R-42 include: 1) did the amendment reduce hexavalent chromium?; 2) what were the physical and chemical impacts to the aquifer strata after amendment deployment?; and 3) the fate of contaminants and mineral assemblages within impact zone surrounding the R-42 screened interval with reference to the re-established ambient groundwater flow at R-42? The content of the summary report Milestone should be discussed between NMED and DOE/N3B as soon as possible.

3 - The Permittees present a discussion of the borehole dilution tracer test conducted at R-42 in January 2018. The Permittees report problems with implementation of the test and state that “*the 2018 borehole dilution tracer test was not considered to have provided a valid estimate of the ambient groundwater flow velocity through the R-42 well screen after the dithionite injection.*” The Permittees discussion that follows this statement contains a number of unverifiable assumptions regarding the estimation of the number of pore volumes of aquifer water that have passed through the reaction zone created by the injection of sodium dithionite. It is not clear how some of these assumptions were arrived at. For example, the estimate on reduction in flow velocity at R-42 from 0.14 m/d (before the test) to 0.1 m/d, after the test, needs to be defined in terms of the method(s) used to make the determination as well as the associated uncertainty in the measurement. In question, what is the uncertainty in the assumed effective porosity of 0.2?

4 - The Permittees have provided geochemical data and drawdown data collected during the amendments tests for wells R-42 and R-28. NMED requests that the Permittees also provide dissolved oxygen, specific conductance, pH, turbidity, and oxidation reduction potential data collected during the tests.

5 - The Permittees have provided a discussion of the effects of the amendments deployments on aquifer permeabilities in the vicinity of R-42 and R-28. NMED recommends that the Permittees collect and analyze additional data to determine if the measured $\approx 40\%$ reduction in the ratio of discharge to drawdown (i.e., proxy for permeability) at R-42 is related to the entrapment of air in the formation and/or the buildup of solid-phase reactive compounds such as chromium hydroxide in the formation pore space. Note that tracer injections of 1,5-NDS, NA 2,6 DFBA, NaBr, treated R-42 water, and NaHCO_3 at R-42 prior to the emplacement of amendments at the well may be related to the observed decrease in permeability.

6 - The Permittees state that “*specific capacity [at R-28] was consistently about a factor of 3 less than it was before the molasses injection. This result is consistent with the lingering of molasses and other species in the vicinity of R-28 long after they would have been expected to drift away based on the results of the 2016 tracer test in R-28.*” NMED concurs with the Permittees that

there has been some reduction in the permeability in the vicinity of R-28 due to the injected molasses that there is no ability to interrogate the Cr(VI) reduction capacity in the surrounding aquifer until the molasses is gone. NMED recommends that the Permittees evaluate whether R-28 might be damaged to the point that additional testing is likely not warranted and the possibility of re-habilitating the well to return it to its former use as a monitoring well.