



EMLA-24-079-4-1

Date: December 19, 2023

Dr. Inés Triay
Interim Dean
College of Engineering & Computing
Florida International University
10555 West Flagler Street
Engineering Center Suite 2100
Miami Florida 33174

Subject: Independent Technical Review of Los Alamos National Laboratory Chromium Interim Measures and Plume Characterization

Dear Dr. Triay:

We request you organize and conduct an independent technical review of actions taken by the Department of Energy Office of Environmental Management Los Alamos Field Office (EM-LA) to characterize and model the hexavalent chromium plume at the Los Alamos National Laboratory (LANL) and the efficacy of Chromium Plume Control Interim Measures (IM) taken to prevent plume migration offsite. The purpose of this review is to assess IM control of the plume, plume modeling, additional proposed corrective actions cited in the New Mexico Environment Department (NMED) letter of September 6, 2023, project readiness to propose a remedy and monitoring well design within the chromium plume.

This independent technical review should respond to the following questions:

1. Chromium Plume Control Interim Measure Hydraulic Control: Do groundwater data and modeling results demonstrate that operation of the IM, as originally approved and in full operation, hydraulically control the plume. Is there assurance that existing injection locations are outside the current 50 micrograms-per-liter or parts-per-billion plume boundary? To what extent are the increasing chromium concentration trends in R-45 S2 and R-61 the result of an adverse impact of current injection locations? Will the current IM be protective of the environment until a remedial alternative is selected and implemented? If not, what are the recommendations for maintaining hydraulic control?
2. Chromium Plume modeling: Is the software currently used to model the chromium plume [Finite Element Heat and Mass (FEHM)] at LANL appropriate? Are modeling assumptions, inputs, and results reasonable and defensible? Are there technical issues or data gaps that significantly impair the project's or the regulator's ability to use the model results when making operational or regulatory decisions? To what extent can the modeling be relied upon (e.g., predictions) without the data gaps being fully closed? What limitations should be considered when using the model before the known data gaps are filled? What aspects of the existing model are sufficiently mature to predict future

plume behavior, and what recommendation(s) does the team have to improve the model's ability to predict future plume behavior (e.g., aquifer test versus slug test)?

3. NMED Groundwater Quality Bureau Acceptable Corrective Actions and Conditions in September 6, 2023, letter (Enclosure) Appendix A Proposal: Are the proposed Appendix A conditions appropriate as part of the IM or more suited for remedy selection? Has a technical basis been established that demonstrates the existing extraction wells alone would control plume migration if the IM were modified for use of an alternative injection location that did not provide hydraulic control? What are the team's recommendations for considering alternative injection locations?
4. Regulatory: Is the current chromium plume characterization consistent with industry practices and EPA guidance for the maturity and understanding necessary to propose and begin evaluating potential remedial alternatives (i.e., conducting a corrective measures evaluation and Corrective Measures Evaluation Report)? Has the project defined the needed data and uncertainties for designing a remedy (e.g., Corrective Measures Implementation Plan [CMIP])? Which data gaps need to be closed, if any, before completing the comparison of the potential remedial alternatives? Is use of an adaptive management strategy as a component of a final remedy appropriate? If so, how is regulatory oversight preserved during the CMIP phase as design evolves due to emerging information? Under what circumstances is it more favorable to apply an adaptive management strategy to interim measures vice the remedy itself?
5. Well Design: Do the monitoring wells constructed with bentonite in the chromium plume region demonstrate a seal between the screened intervals in the dual-screened monitoring wells that is adequate to ensure the prevention of commingling or inter-aquifer exchanges between the separate hydrogeologic units in the plume area? Are there alternatives to bentonite that can be used to seal chromium monitoring wells at LANL that will not negatively impact or alter groundwater chemistry (e.g., cement in lieu of bentonite)?

Thank you for agreeing to serve as the lead for this independent technical review. Ms. Cheryl Rodriguez will serve as the EM-LA point of contact and Messrs. John Rhoderick and Rick Shean will serve as the NMED point of contact for this review. When the independent team of experts has finished its independent review, please engage with EM-LA and NMED to lead technical discussions of the team's independent findings/conclusions to help us resolve our differing professional opinions. We would appreciate receiving the independent team's report within 60 days of the conclusion of those discussions.

If you have any questions, please contact Cheryl Rodriguez, Director, Office of Cleanup Execution, EM-LA at (505) 414-0450 (cheryl.rodriguez@em.doe.gov) or Rick Shean, Director, Resource Protection Division, NMED at (505) 629-6494 (rick.shean@env.nm.gov).

Sincerely,

Michael A. Mikolanis
 Michael A. Mikolanis
 Manager
 Department of Energy
 Environmental Management
 Los Alamos Field Office

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Rick Shean
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Enclosure:

1. New Mexico Environment Department Letter, Subject: *Corrective action under DP-1835 associated with the chromium plume*, dated: September 6, 2023

cc:

R. Martinez, San Ildefonso Pueblo, NM
 J. Ball, NMED-GWQB
 J. Herman, NMED-GWQB
 M. Sandoval, NMED-GWQB
 A. Romero, NMED-GWQB
 N. Dhawan, NMED-HWB
 S. Yanicak, NMED-OB
 Chandler, Sarah, DOE EM-LA
 Evans, John, DOE EM-LA
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 McCrory, Thomas, DOE EM-LA
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 J. Payne, LANL
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September 6, 2023

VIA EMAIL

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RE: Corrective action under DP-1835 associated with the chromium plume

Dear Messrs. Mikolanis and Duran:

The New Mexico Environment Department (NMED), including both the Groundwater Quality Bureau (GWQB) and Hazardous Waste Bureau (HWB), has no more pressing mission than to protect the health of all New Mexicans. The gravity of our responsibility is clearly illustrated by our ongoing efforts to protect the drinking water of those surrounding the Los Alamos National Laboratory (LANL). As an agency driven and directed by science, we seek the greatest possible clarity in understanding how our actions and those of regulated entities will impact the people and environment of our State. To that end, we seek a path forward with you that will further our shared goal of protecting public health through collaborative decision-making while maintaining our clear roles as permittee and regulator, respectively.

Since December of 2022, LANL and NMED have discussed the impacts of injection on downgradient wells, ceasing injection at the location and spreading of the chromium plume. Throughout the corrective action process, LANL has expressed that treated ground water can only be disposed of by injecting into existing injection wells, a position with which NMED disagrees.

Recognizing the gravity of the situation, the risks to groundwater safety, and the urgent need to take immediate action, the GWQB is taking the extraordinary step, one that GWQB rarely takes, of identifying an acceptable corrective action path forward (see Appendix A). NMED, including GWQB and HWB, feel this path is supported by the best available science and will allow us to take the action necessary to protect the regional aquifer. We hope LANL will take this opportunity to submit a revised Corrective Action Plan (CAP) to NMED including the actions identified in Appendix A (20.6.2.3107 (A)(10) NMAC). This matter is of utmost urgency and your immediate response will reflect your understanding of the importance of submitting and

Michael Mikolanis, DP-1835

September 6, 2023

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implementing a revised CAP as soon as possible.

The Hazardous Waste Bureau (HWB) fully supports the corrective action path provided in this letter and Appendix A.

To continue to expedite corrective action, NMED would like LANL to identify and retain an independent mediator to facilitate such technical discussions as soon as possible. The use of an independent mediator was recently recommended by the Government Accountability Office and endorsed by the New Mexico legislators at the August 21, 2023, Radioactive and Hazardous Waste Interim Legislative Committee (RHW) meeting. We believe working together in conjunction with a third-party mediator will clarify the technical discussions and open both parties to new ideas to protect the environment and public health of this historic community, a goal we both share. We look forward to meeting within the next several weeks to collaboratively discuss the path forward for corrective action alternatives. Please contract with a third-party mediator and provide a copy of the contract prior to our meeting.

Further, it is in the best interest of the U.S. Department of Energy (DOE) to renegotiate a functional and effective consent order governing the clean-up of LANL, including the chromium plume. As Mr. Mikolanis stated in his response to Representative Christine Chandler's line of questioning related to available funding and changes to the interim measure addressing the chromium plume at the August 21, 2023 Radioactive and Hazardous Waste Interim Legislative Committee meeting, "...we have the money to operate the system and we have the money to move into a remedy...that consent order does not envision an 'amping up' of the chromium interim measure to something different. That would be a change to the consent order and that is not within my authority..." The fact that LANL has stated the 2016 consent order is an impediment to more aggressive clean-up is precisely why the U.S. DOE Environmental Management leadership in Washington, DC must renegotiate a new consent order.

Please note that nothing in this letter or Appendix A shall be construed as relieving the Permittees of the obligation to comply with all requirements of DP-1835 and all other applicable state and federal laws, regulations, permits, and orders.

If you have any questions, please contact Justin Ball, GWQB Chief, at (505) 231-3773 or Ricardo Maestas, HWB Chief, at 505-690-6148.

Sincerely,

John Rhoderick

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John Rhoderick, Director
Water Protection Division
New Mexico Environment Department

Rick Shean

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Rick Shean, Director
Resource Protection Division
New Mexico Environment Department

Michael Mikolanis, DP-1835

September 6, 2023

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JB: JH

Enc: GWQB Acceptable Corrective Actions

cc: Rep. Joanne J. Ferrary
Sen. Jeff Steinborn
Rep. Eliseo Lee Alcon
Rep. Cathrynn N. Brown
Rep. Christine Chandler
Sen. David M. Gallegos
Rep. Stefani Lord
Sen. Brenda G. McKenna
Sen. Shannon D. Pinto
Sen. Nancy Rodriguez
Sen. Joshua A. Sanchez
Rep. Debra M. Sarinana
Rep. John Block
Sen. Ron Griggs
Rep. D. Wonda Johnson
Sen. Harold Pope
R. Macfarlane, N3B-Los Alamos
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N. Dhawan, NMED-HWB
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L. King, US EPA R6
J. Payne, LANL
S. Hoffman, NA-LA
C. Rodriguez, EM-LA
C. Maupin, N3B

GWQB Acceptable Corrective Actions

DP-1835

NMED would accept restart of injection for a period of 12 months based on implementation of the following actions by LANL in a revised CAP (20.6.2.3107 (A)(10) NMAC):

1. During a one-year temporary recommencement of injections, LANL will develop, install, and operate an alternative disposal location for injection of treated water.
 - a. The alternative disposal location must be designed to be able to dispose of the full amount of water intended to be extracted.
 - b. The alternative disposal location must be outside of the plume and not hydrologically affect the plume. Outside of the plume will be defined as 1200 feet from the outer boundary of an area where the plume is well-defined as indicated by data.
 - c. The alternative disposal location can be used on an ongoing basis to inject treated water as an alternative to injecting into CRINs 1-5.

2. LANL/DOE recommences injection into CRINs 3 and 4 for a maximum of one-year.
 - a. During the one-year temporary recommencement of injection, with the approval and oversight of the Pueblo of San Ildefonso, LANL will install and sample SIMR 3 on San Ildefonso land.
 - i. If SIMR 3 sampling shows any evidence of levels of Chromium above background, LANL will cease injections immediately.
 - ii. If SIMR 3 sampling does not show any evidence of Chromium contamination, LANL may continue injection into CRINs 3 and 4 and may commence injection into CRIN-5.
 - b. No injections may recommence into CRINs 1 and 2 until R-80 is installed, sampled, and evaluated. Additional wells or analysis may be required to make any determination on the effects of CRINs 1 and 2 on nearby wells.
 - i. If data shows that R-45 Screen 2 will continue to be impacted by injections into CRINs 1 and 2, those injections will remain paused.
 - ii. If hard data shows that R-45 Screen 2 will not be impacted further by injections into CRIN-1 or CRIN-2, LANL may commence injection into one, the other, or both