

**STATE OF NEW MEXICO  
ENVIRONMENT DEPARTMENT**

**NEW MEXICO ENVIRONMENT  
DEPARTMENT,**

**Complainant,**

**v.**

**ADMINISTRATIVE ORDER  
NO. HWB 26-03**

**UNITED STATES DEPARTMENT  
OF ENERGY, NATIONAL NUCLEAR  
SECURITY ADMINISTRATION,  
TRIAD NATIONAL SECURITY LLC,  
and NEWPORT NEWS NUCLEAR  
BWXT, LLC,  
EPA ID #: NM0890010515,**

**Respondents.**

**ADMINISTRATIVE COMPLIANCE ORDER**

Pursuant to the New Mexico Hazardous Waste Act (“HWA”), New Mexico Statutes Annotated (“NMSA”) 1978, §§ 74-4-1 to -14, the Resource Protection Compliance and Enforcement Bureau (“RPCEB”) of the Compliance and Enforcement Division (“Division”) of the New Mexico Environment Department (“NMED”), issues this Administrative Compliance Order (“Order”) to the U.S. Department of Energy (“DOE”), through its Office of Environmental Management, Los Alamos Field Office (“EM-LA”), National Nuclear Security Administration (“NNSA”), through its Los Alamos Field Office, Triad National Security LLC (“Triad”), and Newport News Nuclear BWXT, LLC (“N3B”), through its Los Alamos Office (collectively “Respondents”). This Order requires that Respondents perform corrective actions to comply with the federal Resource Conservation and Recovery Act (“RCRA”), 42 U.S.C. §§ 6901 to 6992k, the Hazardous Waste Act (“HWA”), and the New Mexico Administrative Code (“NMAC”). This Order

also assesses civil penalties for violations of the HWA, as set forth below.

**A. PARTIES AND LAW**

1. Pursuant to the Department of Environment Act, NMSA 1978, §§ 9-7A-1 to -15, NMED is an agency of the executive branch within the government of the State of New Mexico.

2. NMED, through its RPCEB, is charged with administration and enforcement of the HWA and HWMR.

3. The U.S. Environmental Protection Agency (“EPA”) has granted the State of New Mexico delegated authority to implement the federal Resource Conservation and Recovery Act (“RCRA”), 42 U.S.C. §§ 6901 to 6992k, within the state. The HWMR incorporate portions of 40 Code of Federal Regulation (“CFR”) §§ 260 through 270, 40 CFR § 279 and related federal regulations by reference.

4. The State of New Mexico adopted the federal hazardous waste regulations by reference on June 14, 2000. The State of New Mexico subsequently amended the HWMR on March 1, 2009, and on December 1, 2018, to adopt updated federal hazardous waste regulations.

5. Respondent DOE EM-LA is a “person” within the meaning of NMSA 1978, Section 74-4-3(M) of the HWA.

6. Respondent DOE EM-LA is a department of the United States Government.

7. Respondent Triad is a “person” within the meaning of NMSA 1978, Section 74-4-3(M) of the HWA.

8. Respondent Triad manages and operates LANL on behalf of DOE and NNSA pursuant to Contract No. 89233218CNA000001.

9. Respondent DOE NNSA is a “person” within the meaning of NMSA 1978, Section 74-4-3(M) of the HWA.

10. Respondent DOE NNSA is a semi-autonomous agency that is responsible for enhancing national security through the military application of nuclear science.

11. Respondent N3B is a “person” within the meaning of NMSA 1978, Section 74-4-3(M) of the HWA.

12. Respondent N3B is a limited liability partnership registered in SAM.gov as a for-profit organization and a subsidiary of Huntington Ingalls Industries, Inc. This company specializes in environmental remediation, waste management, and strategic planning services for DOE EM-LA.

13. Respondents operate a facility authorized to manage, store and treat hazardous waste (“Facility”).

14. NMED issued a Compliance Order on Consent (“Consent Order”) to the Respondents pursuant to Section 47-4-10 of the HWA, Section 74-9-36(D) of New Mexico’s Solid Waste Act (“SWA”), and 20.9.9.14 NMAC, for the purpose of addressing the corrective action activities, including requirements concerning groundwater contaminants listed at 20.6.2.3103 NMAC.

15. The Consent Order fulfills the requirements for: corrective actions for releases of hazardous waste or hazardous waste constituents under Sections 3004(u) and (v) and 3008(h) of RCRA, 42 U.S.C. §§ 6924(u) and (v) and 6928(h), Sections 74-4-4(A)(5)(h) and (i), 74-4-4.2(B), and 74-4-10(E) of the HWA, and their implementing regulations at 40 C.F.R. Part 264, subpart F (incorporated by 20.4.1.500 NMAC); and corrective actions for releases of groundwater contaminants listed at 20.6.2.3103 NMAC, toxic pollutants listed at 20.6.2.7.T(2) NMAC, and Explosive Compounds as defined herein, pursuant to Section 74-9-36(D) of the SWA.

16. The Scope of the Consent Order does not apply to “new releases and newly

discovered releases of hazardous waste or hazardous constituents from hazardous waste management units at the Facility.” Modified Consent Order, Section 7.A.1.

17. Pursuant to NMSA 1978, Sections 74-4-10 and 74-4-12 of the HWA, the Respondents are liable for a civil penalty of up to \$10,000.00 per day of noncompliance for each violation of the HWA and HWMR.

18. If Respondents fail to comply in a timely manner with the Schedule of Required Corrective Actions (Section D, below), the Secretary may assess additional civil penalties of up to \$25,000 for each day of continued noncompliance pursuant to NMSA 1978, Section 74-4-10(C) of the HWA.

## **B. HWA INVESTIGATION**

19. NMED issued the 2005 Consent Order<sup>1</sup> to the DOE on March 1, 2005, to address the investigation, cleanup, including corrective action, and other requirements for the Los Alamos National Laboratory. The purposes of the 2005 Consent Order were to 1) fully determine the nature and extent of releases of contaminants at or from the Facility, 2) to identify and evaluate alternatives for corrective measures, including interim measures, to cleanup contaminates in the environment, and to prevent or mitigate the migration of contaminants at or from the Facility, and 3) to implement such corrective measures.

20. The Respondents completed installation of regional aquifer monitoring well R-28, which was constructed for the development of a facility-wide groundwater monitoring program, on January 12, 2004. Upon the collection of first samples following well completion, elevated chromium concentrations were found between 375 and 404 parts per billion (“ppb”), exceeding the regulatory standard of 50 ppb set forth in the New Mexico Administrative Code (“NMAC”) §

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<sup>1</sup> Attachment 1 – Compliance Order on Consent (March 1, 2005).

20.6.2.3103 and the water quality standards required by the Consent Order.

21. NMED sent correspondence<sup>2</sup> on December 29, 2005 in response to the elevated chromium contamination detected in the regional aquifer, in which NMED issued a determination, following the requirements in Section VII.B.1 of the 2005 Consent Order, that interim measures are necessary to reduce or prevent migration of contaminants which have or may result in unacceptable human or environmental receptor exposure while long term corrective action remedies are evaluated and implemented. NMED required the submission of an interim measures work plan to be submitted within ninety (90) days that presents work that will aggressively characterize the nature and extent of contamination and identify the source(s) of contamination. NMED also asserted that Respondents did not provide the required notification for the exceedance of regulatory standards and cited that almost two years passed between Respondents' knowledge of the contamination and the formal notification submitted to NMED, an action contrary to the requirements for the notification of newly discovered releases set forth in the 2005 Consent Order.

22. The Respondents submitted the *Interim Measures Work Plan for Chromium Contamination in Groundwater*<sup>3</sup> on March 31, 2006, to fulfill the regulatory requirement to initiate interim measures. The work plan proposed an initial phase of investigation activities to help inform future path forward discussions and the goals included determining the primary source(s) of chromium contamination and the operations associated with the releases, characterizing the present-day spatial distribution of the contamination, collect data to evaluate the geochemical and hydrologic processes that govern chromium transport, and to collect data to guide future investigations and remedy selection. To this end, Respondents proposed installing core holes and

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<sup>2</sup> Attachment 2 – Interim Measures Work Plan Requirement, Groundwater Contaminants Detected in the Aquifer at R-28 (December 29, 2005).

<sup>3</sup> Attachment 3 – Interim Measures Work Plan for Chromium Contamination in Groundwater (March 31, 2006).

alluvial wells in lower Sandia Canyon, rehabilitating regional aquifer well R-12 in lower Sandia Canyon, refining the understanding of the speciation of chromium and the background concentrations in groundwater, and collecting data and information to support conceptual model development.

23. NMED issued an approval with modifications<sup>4</sup> on May 5, 2006, which stated that the primary goal of the first phase of work is to assess historical hydraulic, geochemical and contaminant data to delineate the chromium plume and its potential sources.

24. The Respondents submitted an updated fate and transport report<sup>5</sup> to NMED on July 31, 2008. Respondents stated that the goal of fate and transport modeling is to provide probabilistic depictions of the current and future chromium mass distribution in the subsurface to help inform decisions regarding potential site characterization activities, corrective measures, and groundwater monitoring. To this end, Respondents conducted hydrologic data analyses, geochemical data analyses, and model analyses that develop a three-dimensional model based on the updated geologic model for the area around Sandia Canyon to estimate the potential breakthrough locations for chromium entering the regional aquifer. Respondents cited that further revisions will be submitted to NMED by December 15, 2008.

25. On August 31, 2009, NMED issued correspondence<sup>6</sup> that stated the review of monitoring data indicated a need for an additional monitoring well to further define the southern extent of chromium contamination near the Pueblo de San Ildefonso boundary, south-southwest of the existing R-28.

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<sup>4</sup> Attachment 4 – Approval with Modifications for the “Interim Measures Work Plan for Chromium Contamination in Groundwater” (May 5, 2006).

<sup>5</sup> Attachment 5 - Fate and Transport Investigations Update for Chromium Contamination in Sandia Canyon (July 31, 2008).

<sup>6</sup> Attachment 6 – Modification of Approval of Drilling Work Plan for Los Alamos and Pueblo Canyons Groundwater Monitoring Well Installation, Direction to Install Chromium Investigation Well R-50 (August 31, 2009).

26. The Respondents submitted the required *Sandia Canyon Investigation Report*<sup>7</sup> on October 15, 2009. The investigation report presented the material required by NMED and asserted that the nature and extent of chromium contamination in intermediate and regional groundwater have been determined. Respondents discussed how the results of the groundwater modeling indicated uncertainty in the extent of chromium contamination to the south of R-28, which will be addressed by the installation of a new monitoring well R-50 planned for fall 2009.

27. NMED issued an approval with modifications<sup>8</sup> on February 9, 2010 that determined that the nature and extent of contamination within the groundwater was not defined in either the lateral or vertical direction. NMED required the submission of a phase II investigation work plan to propose, in detail, investigation actions specific to the installation of additional monitoring wells. NMED also noted that one data point within the intermediate perched zone does not indicate that the extent of contamination of the perched intermediate water is completed and required the submission of a work plan to propose installation of two intermediate aquifer wells. NMED again asserted that the contamination at R-28 is at depths of 40 to 80 feet below the water table, which suggests that the vertical component of the plume may be significant. To this end, NMED again required that two additional monitoring wells be installed near R-28, screened at approximately 150 feet and 300 feet below the water table, to inform the vertical extent of contamination in the centroid.

28. The Respondents submitted the *Phase II Investigation Work Plan for Sandia Canyon*<sup>9</sup> on July 30, 2010. The scope of work included installing three perched-intermediate wells and two regional aquifer monitoring wells, performed a geophysical survey, performed cross-hole

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<sup>7</sup> Attachment 7– Investigation Report for Sandia Canyon (October 15, 2009).

<sup>8</sup> Attachment 8 – Approval with Modification, Investigation Report for Sandia Canyon (February 9, 2010).

<sup>9</sup> Attachment 9 – Phase II Investigation Work Plan for Sandia Canyon (July 30, 2010).

pumping tests at well R-28, and developed analytical models and a numerical model of the groundwater flow and transport in the regional aquifer. This document also discussed the elevated contamination detected in the recently installed monitoring well R-50 and proposed the installation of monitoring well R-61 to reduce uncertainty about the nature and extent of contamination in the area south of R-42 and R-28 near the Pueblo de San Ildefonso border.

29. Based on the increased in chromium concentrations detected at monitoring wells R-43 and R-50, along with new data collected at recently completed monitoring wells R-61 and R-62, the Respondents proposed<sup>10</sup> to conduct an evaluation of the potential alternatives that may be implemented to control the plume and an interim measure pursuant to Section VII.B of the 2005 Consent Order that will be submitted to NMED by December 15, 2012. Respondents also noted that the submittal of the Phase II Investigation Report for Sandia Canyon, which includes the NMED direction to install two additional monitoring wells, will be submitted by September 30, 2012.

30. Respondents submitted the *Phase II Investigation Report for Sandia Canyon*<sup>11</sup> on September 30, 2012, to satisfy NMED's approval with direction. Respondents stated that the historically released effluent from the former outfall for the TA-03 power plant cooling towers in upper Sandia Canyon and effluent from the TA-50 Radioactive Liquide Waste Treatment Facility into the Mortandad Canyon watershed as the key sources of groundwater contamination. Respondents concluded that a migration pathway dominated by infiltration into the vadose zone over a short segment in the middle portion of Sandia Canyon, but the spatial distribution is significantly affected by complex vadose-zone stratigraphy, porous-media hydrologic properties,

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<sup>10</sup> Attachment 10 – Proposal to Perform Interim Measure Alternatives Analysis for Chromium in Sandia and Mortandad Canyon (June 18, 2012).

<sup>11</sup> Attachment 11 – Phase II Investigation Report for Sandia Canyon (September 30, 2012).

and perched-intermediate and regional groundwater flow directions. Respondents stated that the installation of monitoring wells R-50, R-61 and R-62 have refined the information on the extent of contamination of the chromium plume along the southern and western boundaries. Respondents stated that the nature and extent of contamination were sufficient to proceed to a corrective measures evaluation phase to evaluate and recommend a final remedy for groundwater contamination.

31. The proposal to submit interim measures work plan<sup>12</sup> for chromium contamination in groundwater was submitted by Respondents on December 21, 2012. Respondents discussed that the interim measure will include (1) hydraulic testing of regional aquifer and perched-intermediate zone wells to refine a capture zone analysis and to provide information on secondary chromium sources; (2) removing some of the chromium mass from the perched intermediate zone beneath Sandia Canyon; and (3) conducting a suite of bench-scale and field-scale geochemical studies to further refine key aspects of porosity and natural attenuation attributes in the regional aquifer. Respondents proposed submitting a corrective measures evaluation report documenting the results of this interim measures work plan in 2014.

32. NMED issued a response with direction<sup>13</sup> on January 25, 2013, that discussed how the proposed scope of work includes tasks that are not interim measures and are more appropriately described as site investigation, therefore, NMED required that the work plan address the removal of contaminated groundwater from the aquifer and/or the containment of the plume. NMED specified that this include a proposal to initiate the removal, treatment, and disposal of contaminated groundwater from existing wells R-28 and R-42, which have the highest

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<sup>12</sup> Attachment 12 - Proposal to Submit Interim Measures Work Plan for Chromium Contamination in Groundwater (December 21, 2012).

<sup>13</sup> Attachment 13 – Response, Proposal to Submit Interim Measures Work Plan for Chromium Contamination in Groundwater (January 25, 2013).

concentrations, as soon as possible, and that the work plan must include a proposal to assess the potential for increased, long-term removal of chromium by installing pilot extraction test well in the vicinity of R-28, including a high-capacity pump and a treatment system. NMED specified that the test well be capable of pumping at a sufficient rate to refine the capture zone near R-28 and to assess the chromium plume response to the pumping. To avoid undue delay, NMED required that the Respondents submit a notice of intent to discharge, or any other appropriate request, to NMED Ground Water Quality Bureau (GWQB) and apply for any required permits no later than March 1, 2013. NMED required the submission of the interim measures work plan no later than May 1, 2013.

33. On April 30, 2013, the Respondents submitted the *Interim Measures Work Plan for the Evaluation of Chromium Mass Removal*<sup>14</sup>. This described work that was proposed to be conducted to determine whether a pilot extraction well can achieve active long-term chromium removal from the aquifer and describes work to support the overall approach to remediation of the plume. Respondents proposed hydraulic and tracer field tests to inform plume behavior under extended pumping periods to provide information necessary to optimize the location and design of a pilot pumping well in the next phase of assessment anticipated in a supplemental interim measures work plan. Respondents proposed to evaluate the geochemical characterization of treated water to evaluate the interactions between reinjected treated water and aquifer materials to determine the viability and operational requirements for injection.

34. Respondents submitted the *Interim Measures Work Plan for Chromium Plume Control*<sup>15</sup> on May 26, 2015, in response to the requirements of NMED's January 25, 2013, correspondence, which directed that the work plan assess the potential for long-term removal of

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<sup>14</sup> Attachment 14 - Interim Measures Work Plan for the Evaluation of Chromium Mass Removal (April 30, 2013).

<sup>15</sup> Attachment 15 - Interim Measures Work Plan for Chromium Plume Control (May 26, 2015).

chromium from the regional aquifer by pumping a pilot extraction test well. Respondents stated that the principal objective of the interim measures presented in the work plan is to achieve the 50-ppb downgradient plume edge within the LANL boundary, and the proposed actions are to expedite control of plume migration. The secondary objective was to hydraulically control the plume migration in the eastern downgradient plume edge near R-45, which is expected to be achieved through injection in two wells located near R-45.

35. Concurrently with the proposal for an interim measure treatment system, Respondents also submitted the *Work Plan for Chromium Plume Center Characterization*<sup>16</sup> to NMED on July 28, 2015. The proposal in this document incorporated NMED's requirement by proposing an investigation of the potential for active long-term removal of chromium from the aquifer. The objectives of the work plan included: 1) investigate the feasibility of chromium source removal from the center of the plume by evaluating the potential to optimize mass removal, determining geochemical transients during pumping and recovery, investigating potential decline in concentrations during pumping and during rebound, and to assess the optimal well configuration, well design and operational mode for mass removal; and 2) further characterize aquifer heterogeneity for the purpose of evaluating potential in situ remedial strategies by conducting dilution-tracer tests, field-scale cross-hole tracer tests, and a field scale deployment of a pilot test to evaluate potential in situ remediation approaches.

36. NMED issued an approval with modifications<sup>17</sup> for the plume control work plan on October 15, 2015. NMED noted that the primary objective is to rapidly reduce off-site migration of chromium by achieving hydraulic control of the leading edge of the plume along the southern

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<sup>16</sup> Attachment 16 - Work Plan for Chromium Plume Center Characterization (July 28, 2015).

<sup>17</sup> Attachment 17 – Approval with Modifications, Interim Measures Work Plan for Chromium Plume Control (October 15, 2015).

facility boundary with the Pueblo de San Ildefonso. NMED specified that the proposal from Respondents was to commence construction of up to six injection wells, starting with two injection wells southeast and southwest of R-50, CrIN-4 and CrIN-5, with the intent of producing a west to east hydraulic barrier or mound along the boundary with the Pueblo de San Ildefonso. Based on the modeling results presented, Respondents expected to achieve hydraulic control of the plume by the second year of full operation of CrEX-1 with reinjection to CrIN-4 and CrIN-5. Further, NMED specified that the interim measures actions are significantly dependent on the numerical modeling results provided in Appendix A of the submission, and that many uncertainties exist concerning the modeling results and associated interim measures action, including the selection of the locations for injection wells and the performance monitoring criteria. NMED stated concern that the action proposed may not be sufficient to meet the primary objective to rapidly reduce off-site chromium transport by noting that the detections in aquifer piezometer CrPZ-1 suggest that the overall flux of chromium migrating offsite could be more extensive than previously thought, stated concern for the increasing levels of chromium in boundary well R-50, and stated concern for the proximity to Los Alamos County production wells. NMED stated that the lack of sufficient spatial characterization of contamination is a concern for the ability to achieve the primary objectives as proposed.

37. NMED issued an approval with modifications<sup>18</sup> for the Work Plan for Chromium Plume Center Characterization on October 15, 2015. NMED concurred with the proposal to install extraction well CrEX-3 and conduct pumping tests to evaluate capture zones, hydraulic responses, and aquifer properties to delineate changes in chromium under transient conditions. NMED also required a modification to conduct infiltration investigation up to 1,000 feet downstream along a

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<sup>18</sup> Attachment 18 – Approval with Modifications, Work Plan for Chromium Plume Center Characterization (October 15, 2015).

reach extending from SCS-2.

38. The Respondents submitted the *Drilling Work Plan for Chromium Plume Control Interim Measure and Plume-Center Characterization Injection Wells CrIN-1 through CrIN-6*<sup>19</sup>, Respondents specified that two injection wells situated along the boundary west and east of R-50, CrIN-4 and CrIN-5, had the specific role in helping to control chromium plume migration to the south by establishing a hydraulic barrier. Two injection wells at the plume edge west of R-45, CrIN-1 and CrIN-2, were intended to address the potential advancement of the plume in the east. One injection well situated at the plume edge west of R-44, CrIN-3, was intended to help ensure the plume does not advance to the southeast. And the final proposed injection location was in the plume centroid near R-42 to provide additional disposition and to test how the injection of treated water may enhance diffusive processes of chromium in the aquifer.

39. As part of the approval with modifications<sup>20</sup> issued on January 22, 2016, NMED required the proposed injection well CrIN-6 be relocated to a more technically appropriate location, such as up-canyon near regional monitoring well R-33 or east of well R-45. NMED cited that injection of treated water within the vicinity of the plume center will likely induce downward and lateral spreading of high concentrations of hexavalent chromium.

40. On June 24, 2016, NMED issued the 2016 Compliance Order on Consent (“Consent Order”) to the Respondents, which fulfills the requirements for: (1) corrective actions for releases of hazardous waste or hazardous waste constituents; (2) corrective actions for releases of groundwater contaminants listed at NMAC § 20.6.2.3103, toxic pollutants listed at NMAC § 20.6.2.7.T.(2), and explosive compounds pursuant to Section 74-9-36(D) of the Solid Waste Act;

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<sup>19</sup> Attachment 19 – Drilling Work Plan for Chromium Plume Control Interim Measure and Plume-Center Characterization Injection Wells CrIN-1 through CrIN-6 (December 15, 2015).

<sup>20</sup> Attachment 20 - Approval with Modifications, Drilling Work Plan for Chromium Plume Control Interim Measure and Plume-Center Characterization Injection Wells CrIN-1 through CrIN-6 (January 22, 2016).

(3) groundwater monitoring, groundwater characterization and groundwater corrective action activities, including regulated units under Subpart F and miscellaneous units under Subpart X of NMAC § 20.4.1.500; and (4) additional groundwater information required in Part B permit applications under NMAC § 20.4.1.900. The Consent Order sets forth a regulatory procedure for the prioritization and execution of corrective action for legacy waste contamination from Los Alamos National Laboratory (“LANL”), but does not purport to address newly discovered releases of legacy hazardous waste.

41. The Respondents submitted the revised *Drilling Work Plan for Groundwater Injection Well CrIN-6*<sup>21</sup> on December 13, 2016, to fulfill the approval with modification requirements. The Respondents proposed installing CrIN-6 northwest of R-45 and cited that additional plume control may be gained by having an injection well downgradient of the preferential migration pathway the modeling results indicate may be located north of CrEX-1 and south of R-11. NMED Hazardous Waste Bureau (HWB) issued an approval<sup>22</sup> of this revised location on January 4, 2017.

42. Respondents submitted the Chromium Extraction Well Evaluation Report and Recommendation<sup>23</sup> on April 25, 2017, which was conducted by using the water-level responses at monitoring wells within the chromium plume from pumping at CrEX-1 and CrEX-3 to evaluate how CrEX-2 would support the interim measures objectives. Respondents stated that modeling indicates that injection of treated water plays a major role in controlling the downgradient edge of the plume and stated the additional volume provided by CrEX-2 will help achieve the primary

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<sup>21</sup> Attachment 21 - Drilling Work Plan for Groundwater Injection Well CrIN-6 (December 13, 2016).

<sup>22</sup> Attachment 22 - Approval, Drilling Work Plan for Groundwater Injection Well CrIN-6 (January 4, 2017).

<sup>23</sup> Attachment 23 – Chromium Extraction Well Evaluation Report and Recommendation for CrEX-2 (April 25, 2017).

objective to gain hydraulic control of plume migrations. The modeling results provided indicated that pumping at CrEX-2 would result in decreased concentrations along the plume edge, in both the eastern and southern boundaries, and would reduce concentrations at R-61 to below regulatory standards after three years of pumping.

43. NMED issued an approval<sup>24</sup> on the chromium extraction well evaluation report. NMED noted that the technical content of the document was addressed following a pre-submission meeting, including the requirement to provide plume responses to pumping at extraction wells CrEX-1 and CrEX-3.

44. Respondents submitted the compendium of technical reports<sup>25</sup> document on March 28, 2018, to summarize the studies conducted over the last several years. The technical reports included: results of field tracer testing and long-term pumping tests from 2013 to 2017, isotopic signatures of hexavalent chromium for evaluation of natural attenuation, hydrogeological features from stratigraphic and sedimentological studies, geochemical fingerprints for identification of source areas, potential source areas using machine learning data analyses of geochemical data, bioremediation bench-scale studies, chemical remediation bench-scale studies, and a groundwater modeling status report.

45. Respondents submitted the *Chromium Plume Control Interim Measure Performance Monitoring Work Plan*<sup>26</sup> on April 24, 2018. This work plan was submitted to establish the monitoring and reporting to evaluate performance of the interim measures conducted under the *Interim Measures Work Plan for Chromium Plume Control*. The objective of the

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<sup>24</sup> Attachment 24 – Approval, Chromium Extraction Well Evaluation Report and Recommendation for CrEX-2 (July 17, 2017).

<sup>25</sup> Attachment 25 – Compendium of Technical Reports Conducted Under the Work Plan for Chromium Plume Center Characterization (March 28, 2018).

<sup>26</sup> Attachment 26 - Chromium Plume Control Interim Measure Performance Monitoring Work Plan (April 24, 2018).

performance monitoring and reporting is to collect, evaluate, and report on the performance of the interim measures, including regular evaluation of contaminant concentrations, tracer transients and water level data.

46. The Respondents submitted the *Evaluation of Chromium Plume Control Interim Measure Operational Alternatives for Injection Well CrIN-6*<sup>27</sup> on April 26, 2018. Respondents conducted groundwater modeling of alternative operational configurations for CrIN-6 towards maintaining the hydraulic control approach underway in the southern edge of the chromium plume. The operational configurations included using CrIN-6 as a monitoring location, as an injection well, or as an extraction well. The modeling analysis provided for the utilization of CrIN-6 as an injection well predicted that injection pushes chromium contamination to the north, effectively expanding the lateral footprint of the plume, and pushes contamination towards Los Alamos County production well (PM-3) with increases in sentinel well R-35b. The analysis for extraction occurring at CrIN-6 discussed that extraction does not push the plume footprint to the north and doesn't drive increases in chromium concentration at R-35b, but stated that extraction diminishes hydraulic control due to water recirculation between injection in CrIN-1 and extraction from CrIN-6 and that extraction is not as effective as injection at reducing the plume footprint to achieve a smaller final remediation target because extraction keeps higher concentrations near CrIN-6. Respondents recommended that extraction at CrIN-6, rather than injection, provides the highest probability that the IM objectives for the eastern portion of the plume will be met. Respondents also recommended that a monitoring well be installed downgradient of CrIN-6 to verify the interim measures actions were successful at meeting the objectives of hydraulic control.

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<sup>27</sup> Attachment 27 – Evaluation of Chromium Plume Control Interim Measure Operational Alternatives for Injection Well CrIN-6 (April 26, 2018).

47. NMED responded<sup>28</sup> on June 6, 2018, by stating that the Respondents requested an expedited response from NMED to proceed with preparing the administrative and infrastructure changes necessary to convert CrIN-6 from an injection well into an extraction well. NMED approved the conversion of CrIN-6 to an extraction well based on the IM objective of controlling plume migration and reducing the potential to increase chromium mass migration towards PM-3. However, NMED noted that a comprehensive review of the voluminous document, including the modeling information provided, would be completed at a later date.

48. NMED and Respondents participated in a series of draft comment responses to the interim measures performance monitoring work plan between December 2018 and the final comment resolution<sup>29</sup> submitted on January 3, 2019. NMED commented on the location of R-50 by identifying that the location is upgradient of injection wells and is not ideal for monitoring interim measures performance, specifying that Respondents should describe what responses are indicative of interim measures performance or the lack thereof.

49. On April 1, 2019, NMED issued a second response<sup>30</sup> to the evaluation of alternatives for CrIN-6 submission. NMED noted that the location for CrIN-6 was intended to be approximately 300 feet downgradient of the depicted plume boundary of contamination, as depicted in the drilling work plan. The correspondence stated that, regardless of the multiple reiterations that were made by both GWQB and HWB on the importance of providing the information requested in NMED's November 21, 2017, letter, Respondents was deficient in their submittal. NMED asserted that Respondents failed to provide the modeling information requested

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<sup>28</sup> Attachment 28 – NMED Response, Evaluation of Chromium Plume Control Interim Measure Operational Alternatives for Injection Well CrIN-6 (June 6, 2018).

<sup>29</sup> Attachment 29 – Draft Comment Resolution, Chromium Plume Control Interim Measure Performance Monitoring Work Plan (January 3, 2019).

<sup>30</sup> Attachment 30 – Evaluation of Chromium Plume Control Interim Measure Operational Alternatives for Injection Well CrIN-6 (April 1, 2019).

and that NMED has not conducted a comprehensive review, nor will NMED conduct a review of reports that include recommendations based on modeling results that do not provide supporting documentation of input parameters.

50. Construction on regional aquifer monitoring well R-70<sup>31</sup>, which was proposed to satisfy the monitoring well recommendation set forth in the CrIN-6 evaluation document, was completed on May 17, 2019. The objectives for R-70 were to monitor plume response to extraction occurring at the former CrIN-6, now renamed CrEX-5, in a timely manner to guide adaptive management of the interim measures operational approach in that area and to further characterize the lateral and vertical extent of chromium contamination in the northeastern portion of the plume. The location was selected based on modeling results and was the closest location to the modeling run location P-2 described in the CrIN-6 evaluation report, which was a location predicted by the model to have chromium concentrations drop to below regulatory standards over different time periods depending on the operational scenario and, thus, can be used to monitor the actual plume responses. The analytical results from the screened intervals in R-70 indicated that contamination exceeding regulatory standards resided deeper in the regional aquifer in that area than anticipated and changed the perception of the conceptual site model used to design the interim measures pump-and-treat system.

51. On December 16, 2019, the Respondents submitted the *Assessment Work Plan for the Evaluation of Conditions in the Regional Aquifer Around R-70*<sup>32</sup>, in which Respondents proposed activities associated with evaluating existing and newly acquired information on the

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<sup>31</sup> Attachment 31 – Drilling Work Plan for Chromium Groundwater Project Regional Aquifer Monitoring Well R-70 (October 30, 2018).

<sup>32</sup> Attachment 32 – Assessment Work Plan for the Evaluation of Conditions in the Regional Aquifer Around Well R-70 (December 16, 2019).

condition of the regional groundwater and the need to install two additional groundwater monitoring wells, R-35c and R-73, in the eastern region of the plume to ensure the protection of PM-3. Respondents noted that the assessment will provide an opportunity to consider how the interim measures operations, specifically extraction at CrEX-5 and injection into CrIN-1 and CrIN-2, impact the need for additional wells.

52. Respondents submitted the *Assessment Report for the Evaluation of Conditions in the Regional Aquifer Around Well R-70*<sup>33</sup> document on June 30, 2021. Respondents evaluated the data in the R-70 area and recommended that a new well, R-73, be installed with the objective of characterizing the vertical extent of contamination. Respondents also provided justification for the recommendation to not install the required R-35c, which was required by NMED to evaluate the deeper contamination and the concern for a preferential pathway leading towards PM-3 that is affected by the presence of the Puye pumiceous unit and by water-supply pumping occurring at PM-3. Respondents stated that there is no evidence of significant hydraulic influences that would impact chromium migration at depths between the two screened intervals of R-35a and R-35b. Respondents also did not conduct the required modeling, as described in the approved work plan, and cited that the variability in chromium concentrations from samples collected between August 2020 and March 2021 prevented Respondents' ability to produce model predictions that incorporate the data from R-70.

53. NMED responded to the submission<sup>34</sup> on December 20, 2021, and except for agreement with the recommendation to install R-73, NMED did not concur with the submission

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<sup>33</sup> Attachment 33 - Assessment Report for the Evaluation of Conditions in the Regional Aquifer Around Well R-70 (June 30, 2021).

<sup>34</sup> Attachment 34 – Review, Assessment Report for the Evaluation of Conditions in the Regional Aquifer Around Well R-70 (December 20, 2021).

and noted many instances where the document lacked viable scientific data and information to support the recommendations provided. NMED noted that the calibration of the groundwater model, as described in the work plan, was a critical component to the data gap analysis to properly evaluate the need for R-35c. To this end, NMED provided a series of comments on the deficiency of the report and also provided comments from an independent third-party review of the document that was solicited to satisfy technical disagreements between the parties on the analysis provided for the R-70 region.

54. The annual progress reports submitted on Chromium Plume Control Interim Measure Performance provided concentrations plots for monitoring wells in the region to evaluate interim measure efficacy. On the June 30, 2022, submission,<sup>35</sup> “the provided data indicated that chromium concentrations have significantly increased in a monitoring well downgradient of injection operations, R-45 screen 2, following the start of injection occurring in the eastern area of the plume.” The progress report indicated that although slightly increasing concentration trends were occurring in the lower screened interval prior to the interim measures, the onset of injection operations resulted in a drastically increasing trend and resulted in the detection of contamination in excess of the regulatory standards for groundwater. NMED Ground Water Quality Bureau (GWQB), which regulates compliance with the operation of the underground injection control wells used for the interim measures, issued a violation to Respondents for the newly identified exceedance in the lower screen of R-45, a downgradient monitoring well on the Discharge Permit 1835 (DP-1835), and required a corrective action plan to respond to the exceedance.

55. On September 29, 2022, the Respondents submitted the *Chromium Interim*

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<sup>35</sup> Attachment 35 – Annual Progress Report on Chromium Plume Control Interim Measure Performance, July 2021 through March 2022 (June 30, 2022).

*Measure and Characterization Work Plan* (“Interim Measures Work Plan”).<sup>36</sup> This work plan was intended to supersede the Interim Measures Work Plan for Chromium Plume Control for the continued operations of the chromium interim measures and proposed characterization activities necessary to close data gaps in support of a corrective measures evaluation of remedial alternatives. This Interim Measures Work Plan included three primary objectives: 1) provide interim measures to prevent migration of the plume beyond the laboratory boundary, 2) perform scientific studies and aquifer testing to obtain the necessary data to conduct a corrective measures evaluation, including filling data gap investigation activities, and 3) to develop a strategy to conduct a corrective measures evaluation. Respondents proposed continuing conducting the interim measures as the system was designed and has operated since 2018, including a description of the conceptual site model and updates that have occurred with new information to support the continued operations. Respondents proposed investigation activities that include hydraulic analysis, capture zone analysis, mass removal assessment, install monitoring wells to determine the plume horizontal and vertical extent, aquifer testing, mass flux evaluation, tracer testing, and incorporation of an adaptive site management plan to identify interim objectives.

56. On February 28, 2023, Respondents submitted the *Initial Five-Year Evaluation of the Interim Measures for Chromium Plume Control with an Assessment of Potential Modifications to Operations* (“Five-Year Evaluation”)<sup>37</sup> to NMED GWQB. Respondents stated that reaching compliance with NMED’s regulatory direction to complete the proposed actions in the R-45 Action Plan or cease injections authorized under DP-1835 by April 1, 2023, cannot be reasonably completed. However, Respondents provided an initial assessment of the interim measures

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<sup>36</sup> Attachment 36– Chromium Interim Measures and Characterization Work Plan (September 29, 2022).

<sup>37</sup> Attachment 37– Submittal of Initial Five-Year Evaluation of the Interim Measures for Chromium Plume Control with an Assessment of Potential Modifications to Operations (February 28, 2023).

treatment system using a predictive assessment of the potential impacts of injection under a series of four operational configurations. Respondents asserted that the results of this analysis were used to indicate that the groundwater at R-45 is captured by the extraction wells in the vicinity, and thus, adequately addressed NMED directives to control the cause of the contamination migration and prevent further migration of the plume. Respondents concluded by recommending that the injection system be operated at full capacity, the installation of the monitoring wells required by the R-45 Action Plan should be prioritized, and that the highest priority extraction should occur at extraction well CrEX-5. Furthermore, Respondents specified that alternative disposition of the treated water is not feasible given the constraints in the land application Discharge Permit 1793 and that deep extraction to address the deeper contamination observed at R-45 is not necessary at this time.

57. On March 30, 2023, Respondents requested a 45-day extension<sup>38</sup> to continue injections past the April 1, 2023, deadline for the cessation of injection authorized under DP-1835. In this request, Respondents cited decreasing concentration trends noted at R-45 since the reduced operational scenario that had been necessitated by maintenance issues beginning in November 2022. Respondents noted that extraction wells CrEX-1, CrEX-2 and CrEX-3 were turned off awaiting maintenance activities which resulted in the concomitant shutdown of injection wells CrIN-1, CrIN-2 and CrIN-3 in the eastern region of the plume near R-45. The lack of injections occurring in the eastern portion of the plume and the extraction occurring in the eastern-most extraction well are cited as resulting in compliance with the regulatory requirement to control the source of contaminant migration occurring in the downgradient monitoring well, and thus, provides adequate evidentiary support to allow continued operations. Respondents stated the

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<sup>38</sup> Attachment 38 - Request for 45-Day Extension Regarding Notification of Cessation of Injection Activities, Los Alamos National Laboratory Underground Injection Control Wells, Discharge Permit 1835 (March 30, 2023).

extension would enable the additional collection and interpretation of the data to drive decision making and would allow time for NMED and the Pueblo de San Ildefonso to conduct a meeting scheduled for April 11, 2023.

58. NMED did not approve of the extension request and on April 3, 2023, Respondents submitted a notification<sup>39</sup> of cessation of injection activities. This notification specified that the injections authorized under DP-1835 ceased on March 31, 2023, and noted that Respondents reserves the right to challenge this direction from NMED.

59. NMED issued a Notice of Disapproval<sup>40</sup> (“NOD”) in accordance with the Consent Order requirements on May 31, 2023. In the NOD, NMED required that the revised document propose the construction of a new injection location outside the plume boundary to address the need for injection operations and without contradicting the GWQB directive to cease all injection operations associated with DP-1835. NMED also required the estimated implementation schedules for all investigation activities proposed in the Interim Measures Work Plan and provided specific comments on the contents of the document.

60. Respondents responded to the NOD<sup>41</sup> on July 31, 2023, stating that subsequent meetings would be necessary to discuss the detailed response and would ultimately lead to a revised Interim Measures Work Plan.

61. Respondents and NMED presented at the Radioactive and Hazardous Materials Interim Committee legislative meeting held on August 21, 2023, to discuss the trends identified in the periphery of the contamination plume since the cessation of injection occurred in March 2023.

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<sup>39</sup> Attachment 39 – Notification of Cessation of Injection Activities as Required per the Corrective Action Plan Response and Further Action Required, Los Alamos National Laboratory Underground Injection Control Wells, DP-1835 (April 3, 2023).

<sup>40</sup> Attachment 40 – Notice of Disapproval, Chromium Interim Measures and Characterization Work Plan (May 31, 2023).

<sup>41</sup> Attachment 41 – EM-LA Response to Notice of Disapproval, Chromium Interim Measures and Characterization Work Plan (July 31, 2023).

Recommendations from the legislative members encouraged seeking resolution of the differences in technical position between Respondents and NMED through a collaborative approach towards finding a path forward and by jointly seeking an independent expert review to provide recommendations on the points of contention. To this end, NMED issued a letter<sup>42</sup> on September 7, 2023, that included a proposal to allow for partial operation of the injection wells associated with DP-1835 following the submission of a revised Corrective Action Plan that includes implementation of actions proposed in an appendix to this letter. NMED proposed a 12 month temporary injection authorization following submission of a Corrective Action Plan that includes: (1) the installation of an alternative high-capacity disposal location for injection of treated water, (2) temporary injection authorized in CrIN-3 and CrIN-4 contingent on the installation and sampling of a regional aquifer monitoring well south of the injection wells and located on Pueblo de San Ildefonso lands, stating that cessation would be required if detections in SIMR-3 indicate evidence of contamination exceeding background values, and (3) install R-80 to information contaminant migration east of R-45 prior to reconsideration for authorization of injection into CrIN-1 and CrIN-2.

62. NMED and Respondents participated in technical meetings on July 24, 2023, and October 26, 2023, regarding the Notice of Disapproval comments provided on the Chromium Interim Measures and Characterization Work Plan. Following that meeting, NMED required that Respondents propose a timeline for the generation of a revised work plan, including redline changes. On November 3, 2023, Respondents sent an email<sup>43</sup> to NMED stating that the revision of the will be completed no later than 26 weeks after written feedback from NMED on

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<sup>42</sup> Attachment 42 – Corrective action under DP-1835 associated with the chromium plume (September 7, 2023).

<sup>43</sup> Attachment 43 - Email from Respondents to NMED, RE: October 26<sup>th</sup> LANL Chromium Groundwater Technical Meeting (November 3, 2023).

Respondents' "Response to the Notice of Disapproval, Chromium Interim Measures and Characterization Work Plan".

63. Respondents responded to NMED's path forward proposals on December 5, 2023<sup>44</sup> by stating disagreement with the conditions stated in NMED's proposal and stated the urgent need to resume operation of the interim measure based on Respondents' technical evaluation and analysis. Respondents cited that increasing chromium concentrations were being measured in the extraction wells since the cessation of injection and stated that a prolonged shutdown of the interim measures, or implementing substantive operational changes, poses potential contamination risks to the regional aquifer under the Pueblo de San Ildefonso. However, the Respondents agreed to initiate an independent review of the differing technical positions and proposed to task the review team with evaluating the technical basis for NMED's proposed corrective actions and to evaluate if sufficient data is available to conduct a final remedy evaluation for the plume. Respondents acknowledged the gravity and environmental impacts of a prolonged system shutdown and requested approval to resume partial operation of the interim measures, including the use of injection wells CrIN-2, CrIN-3, CrIN-4 and CrIN-5, during the independent review.

64. NMED provided written feedback on the response matrix to the NOD<sup>45</sup> on January 3, 2024, and required the submission of the revised Interim Measures Work Plan to occur no later than July 3, 2024. This deadline was consistent with the timeline proposed by Respondents to submit the revised document no later than twenty-six (26) weeks after receipt of written feedback from NMED.

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<sup>44</sup> Attachment 44 – Response to New Mexico Environment Department September 6, 2023, Letter, "Corrective action under DP-1835 associated with the chromium plume" (December 5, 2023).

<sup>45</sup> Attachment 45 – NMED Response, EM-LA Response to Notice of Disapproval, Chromium Interim Measures and Characterization Work Plan (January 3, 2024).

65. On February 6, 2024<sup>46</sup>, NMED did not approve of the request to resume partial operation of the interim measures system. NMED noted that action towards resumption could have been approved, following Respondents agreement to implement the necessary protective measures proposed by NMED, and that no proposals to satisfy the regulatory requirements set forth have been made by Respondents to move towards a resumption of the injection authorization. NMED offered another proposal for corrective actions that would address regulatory concerns regarding the efficacy of the treatment system, while allowing for partial operation during the approval and implementation process. NMED agreed to participate in the independent technical review, using the mechanism proposed by Respondents, but noted that Respondents' immediate action is critical to protect the groundwater and prevent potential contamination risks.

66. Respondents again refuted the need to implement the corrective actions proposed by Respondents in the correspondence<sup>47</sup> dated April 10, 2024. Respondents asserted the importance of resuming the interim measures to address increasing concentration in some wells around the plume. Again, Respondents discussed that the interim measures was designed to provide hydraulic control of the plume by operating injection wells along the downgradient edge and extraction wells within the plume. The Respondents stated commitment to incorporating the results of the independent technical review, including conditions from NMED which the expert review determines are appropriate. However, Respondents again stated disagreement with the revised conditions proposed by NMED in the February 6, 2024, correspondence. This time Respondents stated that NMED's proposal was (1) not protective of the regional aquifer; (2) do

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<sup>46</sup> Attachment 46 – Response to Respondents December 5, 2023, Letter, Response to New Mexico Environment Department September 6, 2023, Letter, “Corrective action under DP-1835 associated with the chromium plume” (February 6, 2024).

<sup>47</sup> Attachment 47 – Response to New Mexico Environment Letter of February 6, 2024, Regarding Resumption of Interim Measures Associated with the Chromium Plume (April 10, 2024).

not consider the purpose and design of the interim measures; and (3) are not consistent with the purpose of an interim measure under the 2016 Compliance Order on Consent, the regulatory document guiding the remediation. Furthermore, Respondents stated that NMED's decision to have the resumption of the injection operations be contingent on agreement towards the protective measures set forth in the conditions was premature. Respondents specified disagreement with the requirement to propose an alternative injection location for the disposition of treated water, which NMED HWB has required since 2022 as an adaptive management approach to alleviate NMED concerns for injection occurring upgradient of contamination exceeding regulatory standards, by stating that the conditions proposed are arbitrary conditions without scientific basis. Respondents, again, did not propose any concessions towards reaching a path forward to achieve the regulatory directives and again requested NMED approval to resume partial operations of the interim measures during the expert technical review by allowing injection to occur in CrIN-2, CrIN-3, CrIN-4 and CrIN-5, prioritizing the southern boundary injection wells near R-50 to prevent migration of the plume onto Pueblo de San Ildefonso lands.

67. On May 29, 2024, NMED authorized<sup>48</sup> partial operation of injection wells under DP-1835. NMED cited the need to pursue Respondents compliance with the regulatory requirements but concluded that the potential risks to groundwater safety of the sole source aquifer and the contamination risk to the Pueblo de San Ildefonso resulting from a lack of action outweighed the deadlock reached. Therefore, NMED authorized operation of injection wells CrIN-3, CrIN-4, and CrIN-5 in order facilitate the restart of extraction and treatment of contaminated groundwater. NMED stated that if chromium concentration data in monitoring wells along the

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<sup>48</sup> Attachment 48 – Response to Respondents April 10, 2024, Letter Response to New Mexico Environment Letter of February 6, 2024, Regarding Resumption of Interim Measures Associated with the Chromium Plume (May 29, 2024).

periphery of the current known plume extent, both upgradient and downgradient of injection operations, indicate concerning trends, NMED will reevaluate this authorization. Furthermore, operation of the injection wells causing any violation of the conditions in DP-1835 may be subject to civil penalties pursuant to New Mexico Water Quality Act 74-6-10(C) and 74-6-10.1.

68. On June 17, 2024, Respondents submitted a letter<sup>49</sup> informing NMED of the intent to postpone revision of the Interim Measure and Characterization Work Plan until the independent technical review is completed.

69. NMED and Respondents received a draft of the Independent Review of the Chromium Interim Measures Remediation System in Mortandad Canyon Los Alamos, New Mexico (“IRT Report”) in September 2024 with the opportunity to comment on factual accuracy. The review team was tasked with answering a series of questions jointly posed by NMED and Respondents regarding the ability of the interim measures operating as originally approved to hydraulically control the plume, if adverse impact from injection locations caused increasing concentration trends, the state of the groundwater modeling, NMED’s proposed acceptable corrective actions in the series of correspondence, well design, and the efficacy of moving the process towards a corrective measures evaluation of the final remedy alternatives with the information currently available.

70. NMED’s regulatory requirements were supported by the recommendations provided in the draft report prepared by the independent technical review, and NMED issued a letter<sup>50</sup> on December 10, 2024, stating the requirement for Respondents to submit a revised Interim Measures Work Plan no later than February 8, 2025.

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<sup>49</sup> Attachment 49 – Response to NMED letter RE: “EM-LA Response to Notice of Disapproval Chromium Interim Measures and Characterization Work Plan, dated January 3, 2024. (June 17, 2024).

<sup>50</sup> Attachment 50 – NMED Response, Response to NMED letter RE: “EM-LA Response to Notice of Disapproval Chromium Interim Measures and Characterization Work Plan, dated January 3, 2024 (December 10, 2024).

71. The final IRT Report<sup>51</sup> was provided to the Parties on December 30, 2024. The IRT report determined that the current interim measures, even at full operations, will not contain all chromium migration and stated that the existing interim measures system will need to be modified, reconfigured, and possibly expanded with at least one additional extraction well in the vicinity of R-70. The IRT Report stated that the data is not sufficient to conclude if the interim measure operation has hydraulically controlled the plume, but that predictive modeling conducted using the Finite Element Heat and Mass (“FEHM”) transport groundwater model shows that the plume was not hydraulically controlled and that the vertical containment by the interim measure requires further evaluation. The IRT Report specified that it is more likely than not that the injection occurring into CrIN-1 and CrIN-2 adversely impacted R-45 screen 2 and could have caused enhanced downward migration of the chromium contamination. To maintain hydraulic control, the IRT Report recommended accelerating in-depth modeling, restarting limited interim measures operations by using CrEX-4, CrEX-5, CrIN-4 and CrIN-5, converting CrIN-1 into an extraction well to enhance capture at the leading edge, and potentially adding an additional extraction well further east based on the data collected from data gap wells R-73 redrill and R-79 upon installation. The evaluation of the groundwater modeling indicated that the current parameterization does not adequately reflect site data and discussed that technical concerns warranting model improvement include the representation of aquifer parameters, responses to supply well pumping, and data gaps regarding the lateral and vertical extents of contamination. The IRT Report recommended mitigating the concerns for the uncertainty in predictive modeling conducted by Respondents by converting the current FEHM groundwater model to the MODFLOW family of codes and to

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<sup>51</sup> Attachment 51 – Independent Technical Review Chromium Interim Measures Remediation System in Mortandad Canyon Los Alamos, New Mexico (December 30, 2024).

reevaluate the representation of key parameters, as presented throughout the document. The IRT Report evaluated the multiple lists of acceptable corrective actions proposed in the correspondences aimed at authorizing partial injection operations to resolve the dispute. The review team concurred that the conditions proposed by NMED should be implemented and the increased injection capacity would greatly simplify hydraulic control of the plume and recommended a partial restart of the interim measures while Respondents locates, designs and constructs this new alternative cleaned water return system at the earliest practical date. The IRT Report discussed that the chromium concentration data collected at SIMR-3, a regional aquifer monitoring well south of injection locations and on Pueblo de San Ildefonso lands, can guide the future decisions regarding continued operations at CrIN-5. Further, the IRT Report stated that containment of the chromium plume is not contingent on injection wells providing hydraulic control and that containment of the region east of CrEX-5 and R-70 might be achieved with extraction wells only and a high volume alternative cleaned water return system with a capacity of 300+ gallons per minute to increase extraction flow rates in existing wells and/or converting some of the injection wells to extraction wells. For implementation of an alternative cleaned water return system, the IRT Report recommended repurposing water supply well PM-3 into an injection well or constructing a deep injection well located 1000 to 2000 feet below ground surface. Finally, the IRT Report determined that the site investigations have not provided sufficient information to propose and evaluate remedial alternatives, stated that data gaps uncertainties have not been resolved enough to design a final remedy system, and concluded that the investigation and remediation should continue as an interim measure using an adaptive management approach to fill the data gaps quickly and effectively.

72. On February 7, 2025, Respondents submitted a letter<sup>52</sup> stating that submission of the revised Interim Measures Work Plan is not occurring by the required deadline and requested a meeting with NMED by March 7, 2025, to discuss the path forward to finalization of the revised Interim Measures Work Plan.

73. NMED has continued to participate in multiple meetings to communicate the requirements for the revised Interim Measures Work Plan between March 2025 and present.

74. Respondents began construction on a regional aquifer monitoring well located on Pueblo de San Ildefonso tribal lands in June 2025 aimed to define the nature and extent of contamination of hexavalent chromium.

75. Screening level sampling of the regional aquifer occurred throughout October 2025 to inform the presence of contamination extending beyond the Facility property. Analytical results indicate that contamination within the regional aquifer has migrated beyond the Facility and that the contamination is present on Pueblo de San Ildefonso lands at levels up to 70 ppb, which exceed the regulatory standards.

76. In response to this newly identified exceedance of groundwater quality standards, both offsite downgradient of injection operations, NMED GWQB withdrew the temporary authorization<sup>53</sup> for partial operation of DP-1835 on November 18, 2025. NMED discussed that the Respondents has not complied with the regulatory directives and has not taken appropriate steps to ensure that contamination does not migrate further in the regional aquifer or offsite, as evidenced by the exceedance above regulatory standards on the Pueblo de San Ildefonso lands. NMED noted

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<sup>52</sup> Attachment 52 – Response to the New Mexico Department Environment Department Notice of Disapproval Received on December 10, 2024, and Proposed Approach to Incorporating Independent Technical Review Team Report Recommendations into the Chromium Campaign (February 7, 2025).

<sup>53</sup> Attachment 53 - Withdrawal of the Temporary Authorization for Partial Operation of Discharge Permit 1835 (DP-1835) (November 18, 2025).

that this newly identified contamination is contrary to the assertions made by Respondents throughout the operation of the interim measures, in which Respondents continuously asserted that the interim measures are successfully achieving the principal objective to achieve and maintain downgradient plume edge within the LANL boundary. Furthermore, the exceedance on Pueblo de San Ildefonso lands indicates that the migration of contamination to the regional aquifer may be resulting from inadequately characterized sources from corrective action units upgradient in Mortandad Canyon.

77. On November 18, 2025, NMED received an email<sup>54</sup> confirming receipt of the directive and stated that the operation of the extraction, treatment, and injection operations associated with the hexavalent chromium interim measures have been ceased.

78. Respondents formally responded<sup>55</sup> to GWQB's directive to cease injection on November 21, 2025. Respondents asserted that operations of the entire interim measures are contingent on the injection authorization, including the extraction and treatment, based on the design of the interim measures and the limitation of alternative water discharge options, and therefore, the cessation of injection drives the cessation of interim measures remediation. Respondents mentioned the need to complete the installation of SIMR-3 and stated that the screening results were surprising. Again, Respondents requested authorization to resume injection operations, stating that restating the interim measures will avoid increasing chromium concentrations at performance monitoring locations near the Pueblo de San Ildefonso boundary.

### **C. VIOLATIONS AND PENALTIES**

79. **Violation 1.** Failure to submit an adequately revised Interim Measures Work Plan.

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<sup>54</sup> Attachment 54 – Respondents Response, Withdrawal of the Temporary Authorization for Partial Operation of Discharge Permit 1835 (DP-1835) (November 18, 2025).

<sup>55</sup> Attachment 55 – Respondents Response, Notification of Withdrawal of the Temporary Authorization for Partial Operation of Discharge Permit 1835 (November 21, 2025).

The Consent Order provides a regulatory procedure for the prioritization and execution of cleanup work, which includes a process for NMED approval or disapproval of corrective action documents submitted by Respondents. Following NMED disapproval of a document, Section 23.H.3 provides for the submission of a revised document that includes a final written response to each of NMED's disapproval comments. NMED has asserted that compliance with the requirement to submit a revised document is critical to maintaining the efficacy of the interim measures system and to progress the corrective action remediation.

- a. Respondents' failure to comply with the deadlines set forth by NMED for the submission of the revised document consistent with Consent Order Section 23.H constitutes a violation of that section.
- b. The civil penalty for Violation 1 is \$3,005,750.

80. **Violation 2.** Failure to implement corrective measures beyond the facility property boundary where necessary to protect human health and the environment for releases of groundwater contaminants.

Interim measures may be used to reduce or prevent migration of site-related contaminants which have or may result in an unacceptable human or environmental receptor risk while long-term corrective action remedies are evaluated and implemented. Respondents failed to prepare and submit an adequately revised Interim Measures Work Plan, which includes estimated implementation schedules for completion of the interim measures, to NMED for review and approval. NMED identified the need for expanded interim measures to prevent migration of site-related contaminants and required the preparation of a revised Interim Measures Work Plan to incorporate the need for additional action. NMED's regulatory directives, supported by the recommendations from the independent technical review, are necessary to achieve the interim

measure goal to prevent migration of site-related contamination. Without the expansion of the Interim Measures Work Plan as requested by NMED and suggested by the ITR to both accelerate characterization activities and conduct effective remediation, the chromium release has migrated beyond the facility property boundary. Respondents is thereby not in compliance with 40 CFR Part 264 Subpart F, requiring a corrective action program to ensure protection of groundwater below regulatory limits.

- a. Respondents' failure to comply with the regulatory requirement to expand the interim measures treatment system to successfully achieve the standards set forth by 40 CFR Part 264 Subpart F and constitutes a violation of 40 CFR § 264.101.
- b. The civil penalty for Violation 2 is \$3,005,750.

**D. PAYMENT OF PENALTIES AND COSTS**

81. \$6,011,500.00 is the total amount of civil penalties that Respondent owes for Violations 1 through 2, as described in Section C, above.

82. Additionally, NMED assesses administrative compliance costs in the amount of \$14,624.16, calculated to cover HWB personnel costs associated with inspecting the facility, performing compliance actions, and ensuring return to compliance.

83. No later than 30 days after this Order becomes final, Payment shall be made to the "New Mexico Environment Department" via ACH or EFT deposit using this account and deposit information:

Wells Fargo Bank, N.A.  
100 W Washington Street, Floor 20  
Phoenix, AZ 85003

Routing Transit Number: 121000248  
Deposit Account Number: 4123107799  
Descriptor: HWB 26-03

84. On the date(s) that the deposits of funds are initiated, Respondent shall email Hazardous Waste Bureau Financial Manager Jessi Sanchez at Jessi.sanchez3@env.nm.gov, listing the date and dollar amount of deposit.

**E. SCHEDULE OF REQUIRED CORRECTIVE ACTIONS**

85. Based upon the foregoing findings and conclusions, Respondents are hereby ordered to take the following corrective actions, according to the following schedule, to achieve compliance with the HWA and the HWMR.

86. No later than 60 calendar days from the date this Order is signed by NMED, Respondents shall submit to NMED the following:

- a. An initial plan to further characterize and remediate the contamination that has migrated beyond the Facility boundary onto Pueblo de San Ildefonso land, including an implementation schedule that provides completion dates for each of the proposed corrective action activities. This plan must address how Respondents will collaboratively coordinate with, and gain approval from, NMED and the Pueblo de San Ildefonso to evaluate the southern plume boundary data gaps, including data gaps located offsite, and the methods proposed to satisfy the extent of contamination requirements while providing minimal impact to the sovereign lands. Specifically, the plan must identify the actions required to determine the extent of contamination present within the regional aquifer beneath Pueblo de San Ildefonso lands and must identify actions that would address the future need to modify the interim measures system to treat the contaminated groundwater that has migrated beyond the LANL boundary. The conceptual design for SIMR-3 has the primary purpose to act as a monitoring well, but NMED notes that the final well construction approved by the Pueblo de San Ildefonso

includes the additional potential for SIMR-3 to be utilized as an extraction well if necessitated in the future. Therefore, NMED requires that the plan include a detailed discussion of the data and threshold points that will be used to inform the need to begin remediation on Pueblo de San Ildefonso lands to alleviate the impacts of the offsite migration.

- b. Respondents must minimize the migration of contamination during the implementation of the corrective actions by accelerating the process required to begin extracting contaminated groundwater. To achieve this requirement, the Respondents must submit the permits and regulatory submittals required by the New Mexico Office of the State Engineer (NMOSE) and the NMED GWQB to allow for the authorization of extraction activities to proceed, including all supplementary information required to issue a regulatory decision on the request, within 60-days from the date of this Order. Furthermore, Respondents must begin extracting a minimum of 170,000 gallons per day of contaminated groundwater from at least two extraction wells beginning May 10, 2026. All regulatorily allowable alternative methods for the disposition of treated water are encouraged to be utilized to ensure consistent compliance with this requirement. The Respondents are required to continue remediation of contaminated groundwater at this volume until at least October 31, 2026. In consideration for the current limitations with the permitted land application for the disposition of treated water, NMED will not maintain the volume extraction requirement during the winter months. However, during the duration of time needed for the multiple regulatory procedures required to authorize injection to occur and until the installation of the alternative injection location(s) are completed, the Respondents are required to

continue extracting a minimum of 170,000 gallons per day of contaminated groundwater between the months of April and October. Once the alternative injection location is installed and ready for operation, the volume of contaminated groundwater extracted and treated must be increased to exceed a minimum of 430,000 gallons per day year-round, which is equivalent to volume of five extraction wells operating at 60 gallons per minute.

87. No later than 270 calendar days from the date of this Order (by November 6, 2026),

Respondents shall submit to NMED the following:

- a. The revised Interim Measures and Characterization Work Plan, including the required response to NMED's NOD and the amalgamation of the critical modifications to the interim measures set forth therein. This revised Interim Measures and Characterization Work Plan must integrate all recommendations from the IRT Report, including actions to address deficiencies in the conceptual site model of the plume, collaborative redevelopment of the groundwater model that addresses the concerns raised by NMED and the IRT Report, and the investigation activities required to evaluate remedial alternatives. The revised Interim Measures and Characterization Work Plan must include a proposal for a high-capacity alternative location(s) for the disposition of treated water, which at a minimum must be capable of disposing the volume of treated water from all five current extraction wells as an alternative to injecting into the existing injection well network, and must be located outside of the plume extent both laterally and vertically. The proposal must include the technical justification for the proposed location(s), any modeling predictions used to provide assurance that the location(s) will be outside the vertical

and lateral extent of contamination, and timelines for the delivery of all associated documents required to be submitted for regulatory approval for implementation of the alternative injection location(s). Further, the revised Interim Measures and Characterization Work Plan must include an implementation schedule with completion dates for all proposed corrective action activities occurring in the next three fiscal years and must include prioritization of the remaining longer-term activities. The revised submittal must discuss how the results of any completed investigation activities will use the adaptive management strategy to inform future actions, including specification to when decision-making based on the information received from investigation activities or interim measures activities will be required to inform the path forward, and what affiliated parties must be included in those decisions.

- b. Quarterly status updates on Respondents' implementation of the recommendations provided by the independent technical review, including estimated completion timelines. This shall include status updates on the re-evaluation of the conceptual site model using existing and newly discovered data, on the re-development of the groundwater model, and status updates on the investigation activities conducted under the Hexavalent Chromium Campaign.

#### **F. RIGHT TO ANSWER AND REQUEST A HEARING**

88. Pursuant to NMSA 1978, Section 74-4-10(H) of the HWA, and NMED's Adjudicatory Procedures, 20.1.5.200 NMAC, Respondent may file a written request for a public hearing with the Hearing Clerk no later than 30 days from the receipt of this Order. An Answer must be filed with the Request for Hearing. The Answer shall:

a. Clearly and directly admit, deny, or explain each of the factual allegations contained in this Order with regard to which Respondent has any knowledge. Where Respondent has no knowledge of a particular factual allegation, Respondent shall so state, and Respondent may deny the allegation on that basis. Any allegation of the Order not specifically denied shall be deemed admitted. 20.1.5.200.A(2)(a) NMAC.

b. Assert any affirmative defenses upon which Respondent intends to rely.

Any affirmative defense not asserted in the Answer, except a defense asserting lack of subject matter jurisdiction, shall be deemed waived. 20.1.5.200.A(2)(b) NMAC.

c. Be signed under oath or affirmation that the information contained therein is, to the best of the signer's knowledge, believed to be true and correct. 20.1.5.200.A(2)(c) NMAC.

d. Include a copy of this Order attached. 20.1.5.200.A(2)(d) NMAC.

89. The Answer and Request for Hearing shall be filed with the Hearing Clerks at the following email addresses:

Hearing Clerks  
New Mexico Environment Department  
luis.lopez@env.nm.gov  
pamela.jones@env.nm.gov

90. Respondent also must serve a copy of the Request for Hearing on Raymond Romero, Office Manager and Senior Paralegal, Office of General Counsel, New Mexico Environment Department, ray.romero@env.nm.gov.

#### **G. FINALITY OF ORDER**

This Order shall become final unless Respondent files a Request for Hearing and Answer with the Hearing Clerk within 30 days after the date of receipt of this Order pursuant to NMSA 1978, § 74- 4-10(H).

**H. TERMINATION**

This Order shall terminate when Respondent certifies that all requirements of this Order have been met and the Department has approved such certification, or when the Secretary of the Environment approves a settlement agreement and signs a stipulated final order.

**I. COMPLIANCE WITH OTHER LAWS**

Compliance with the requirements of this Order does not remove the obligation to comply with all other applicable laws and regulations.

DocuSigned by:  
  
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\_\_\_\_\_  
**Bruce Baizel, Director**  
**New Mexico Environment Department**  
**Compliance and Enforcement Division**

**DATE:** 2/11/2026

**CERTIFICATE OF SERVICE**

I hereby certify that on 2/11/2026, the foregoing Administrative Compliance Order was emailed and mailed, postage prepaid, via Certified Mail, Return Receipt Requested, to the following:

Theodore Wyka  
Field Office Manager  
NNSA  
3747 W. Jemez Road, MS A316  
Los Alamos, NM 87544  
theodore.wyka@nnsa.doe.gov

Jessica Kunkle  
Field Office Manager  
DOE EM-LA  
P.O. Box 1663, MS M969  
Los Alamos, NM 87545  
jessica.kunkle@em.doe.gov

Bradley Smith  
President  
Newport News Nuclear BWXT-Los Alamos  
1200 Trinity Drive, Suite 150  
Los Alamos, NM 87544  
bradley.smith@em-la.doe.gov

Thomas Mason  
Laboratory Director  
Triad National Security, LLC  
P.O. Box 1663, MS M969  
Los Alamos, NM 87545  
masont@lanl.gov

DocuSigned by:  
  
6E4A14E63E364B3...  
Raymond R. Romero, Senior Paralegal  
New Mexico Environment Department