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Sandia National Laboratories
Waste Isolation Pilot Plant

Reassessment of MONPAR Analysis for Use in the 2024 Compliance Recertification Application

Revision 0

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July 2023

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1. INTRODUCTION

This report documents a reassessment of the 40 CFR 194.42 (U.S. EPA 1996) compliance analysis used to determine repository performance monitoring parameters. The Compliance Certification Application (CCA) (U.S. DOE 1996) contains an analysis which was used to fulfill the regulatory requirement at 40 CFR 194.42. This analysis, which describes the Compliance Monitoring Program (CMP), was documented in CCA Appendix MON, Attachment MONPAR (termed the MONPAR analysis). Information from the MONPAR analysis was used to determine what monitoring parameters should be included in a monitoring program to address Environmental Protection Agency (EPA) requirements. The Department of Energy (DOE) is required by the Land Withdrawal Act (U.S. Congress 1996) to demonstrate continued compliance with the EPA's disposal standards. DOE is developing the fifth Compliance Recertification Application (CRA-2024) to document WIPP's continue compliance with the EPA standards. A reassessment was made of MONPAR at the time of the first CRA (Kirkes and Wagner 2003) and was performed under AP-109 (Wagner 2003). Reassessments were also made for the second, third, and fourth recertifications (Wagner 2008, Wagner 2013, and Wagner 2018) and were performed under SP 9-8 (SNL 2020, Section 2.5). Similarly, a reassessment is required for the fifth recertification application.

Reassessments of MONPAR are necessary to demonstrate continued compliance with the EPA's monitoring requirements at 40 CFR 194.42. Since the CCA, changes in activities and conditions have occurred within the WIPP project that could potentially impact the conclusions in the original MONPAR analysis. This reassessment report developed a list of potential elements that may impact the CMP and assesses them against the conclusions in the original MONPAR analysis (U.S. DOE 1996). This reassessment's objective is to determine one of three conclusions:

1. The conclusions of the MONPAR analysis remain valid and its conclusions continue to be adequate for inclusion in CRA;

2. The conclusions of the MONPAR analysis remain valid with minor modification; or

3. The conclusions of the MONPAR analysis are invalid and a new analysis is needed.

The results of the assessment outlined in this document determined that the original conclusions in MONPAR remain valid and its conclusions continue to be adequate for inclusion in the CRA-2024.

2. ASSESSMENT APPROACH

This analysis is performed under SP 9-8, *Monitoring Parameter Assessment per 40 CFR 194.42* (SNL 2020). The objective of this reassessment is to determine the adequacy of continuing to use the CCA MONPAR analysis to meet the regulatory requirements of 40 CFR 194.42. The reassessment does this by assessing the impacts of changes that have occurred since the last recertification on the original MONPAR conclusions. The regulatory requirement for a monitoring analysis and the original MONPAR were reviewed to determine if the processes and assumptions used to derive the MONPAR conclusions remain valid.

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2.1 EPA REQUIREMENT FOR A MONPAR ANALYSIS

The EPA requires the DOE to monitor repository performance as an assurance requirement. EPA's disposal standard 40 CFR 194.42 states (U.S. EPA 1996):

(a) The Department shall conduct an analysis of the effects of disposal system parameters on the containment of waste in the disposal system and shall include the results of such analysis in any compliance application. The results of the analysis shall be used in developing plans for pre-closure and post-closure monitoring required pursuant to paragraphs (c) and (d) of this section. The disposal system parameters analyzed shall include, at a minimum:

(1) Properties of backfilled material, including porosity, permeability, and degree of compaction and reconsolidation;
(2) Stresses and extent of deformation of the surrounding roof, walls, and floor of the waste disposal room;
(3) Initiation or displacement of major brittle deformation features in the roof or surrounding rock;
(4) Ground water flow and other effects of human intrusion in the vicinity of the disposal system;
(5) Brine quantity, flux, composition, and spatial distribution;
(6) Gas quantity and composition; and
(7) Temperature distribution.

2.2 ORIGINAL MONPAR APPROACH

The original MONPAR analysis is documented in CCA Appendix MON, Attachment MONPAR (U.S. DOE 1996). The MONPAR analysis looked for potentially significant parameters used in performance assessment (PA) that could be used in pre-closure and post-closure monitoring programs. Significant parameters are defined in 40 CFR 194.42(c) as those that "affect the system's ability to contain waste or the ability to verify predictions about the future performance of the disposal system." The term parameter is used in 40 CFR Part 194 to describe properties and processes in the disposal system. While this use is somewhat inconsistent with the DOE's use of parameters in the mathematical modeling system, the DOE has considered PA parameters, properties, and processes in the MONPAR analysis to satisfy the criteria of 40 CFR 194.42. The original MONPAR analysis looked at PA parameters, modeling assumptions, and current monitoring programs at WIPP for possible inputs. These inputs were qualitatively assessed against EPA's definition of significance. The analysis also considered the possibility of monitoring the parameter at WIPP. The results of the analysis were used in the CCA to propose an operational CMP using 10 parameters (U.S. DOE 1996 Chapter 7, Table 7-7 and Appendix MON), termed Compliance Monitoring Parameters (COMPs). As a result of the MONPAR analysis, the following parameters have been monitored in the COMPs program and included in an annual report since 1999:

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1. Drilling Rate
2. Probability of Encountering a Brine Reservoir
3. Waste Activity
4. Subsidence
5. Changes in Groundwater Flow
6. Change in Groundwater Composition
7. Creep Closure
8. Extent of Deformation
9. Initiation of Brittle Deformation
10. Displacement of Deformation Features.

3. ASSESSMENT FOR CRA-2024

The objective of this current assessment is to determine if elements of the WIPP program that have changed since the last recertification affect the "parameters" used in the MONPAR analysis. Specifically, the PA work performed by Sandia National Laboratories (SNL) that captures the changes introduced since the CRA-2019 (U.S. DOE 2019) was reviewed to determine the impact on the original MONPAR analysis. The process first determines which changes could be considered in this reassessment, and then determines the impact of these changes on the conclusions drawn in the CCA MONPAR analysis. Changes from the following disposal system elements were evaluated for any impacts to the CCA MONPAR analysis:

1. Monitoring Results
2. Experimental and Analytical Activities
3. PA Changes - Methodology/Parameters/Implementation
4. WIPP Operational Changes
5. Proposed changes to activities and conditions approved by the EPA.

3.1 MONITORING RESULTS

There have been five annual COMPs reports since the last reassessment. These include:

- COMPs 2018 (Wagner and Hayes 2019)
- COMPs 2019 (Wagner and Hayes 2020)
- COMPs 2020 (Kicker, Bowman, and Hayes 2021)
- COMPs 2021 (Kicker, Bowman, and Jackson 2022)
- COMPs 2022 (Kicker, Jackson, and Hayes 2023).

A review of the conclusions in these annual COMPs reports show:

- Results of the COMPs assessments concluded that there were no reportable conditions or events during their reporting periods.

- The last five annual COMPs programs have not identified unexpected conditions or conditions adverse to predicted performance.

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The COMPs reports did not recommend changes to the monitoring parameters. As a result of this review, no issues were identified that effect the conclusion of the original MONPAR analysis.

3.2 EXPERIMENTAL AND ANALYTICAL ACTIVITIES

3.2.1 Sandia National Laboratories

WIPP-relevant experimental activities performed by SNL include hydrology investigations, iron (Fe) and lead (Pb) chemistry experiments, colloid formation studies, hydration experiments, room closure, and waste compaction analyses. The following sections describe these activities and their impacts on MONPAR conclusions.

3.2.1.1 Hydrology Investigations

The SNL hydrology program continues to investigate regional groundwater conditions to support flow and transport modeling in CRA PAs. These activities are described in the following Analysis Plans:

- AP-070 – Analysis Plan for Hydraulic-Test Interpretations (Bowman 2020)
- AP-150 – Analysis Plan for the Analysis of Observed Water Level Fluctuations (Bowman 2021)
- AP-160 – Analysis Plan for Hydrologic Data Report Development (Bowman and Johnson 2012)
- AP-195 – Analysis Plan for Applying Machine Learning Techniques to Hydrologic Groundwater Trends (Jackson 2022)
- AP-203 – Analysis Plan for Evaluation and Recalibration of Culebra Transmissivity Fields (Bowman 2022a).

These investigations are ongoing. The current COMPs include assessment of groundwater flow and composition. Data from groundwater well monitoring is used in these assessments and in the ongoing hydrology investigations. Because the original COMPs assessments identified issues that initiated the current hydrology investigations, the original conclusion to monitor groundwater flow and composition have been validated. The hydrology studies have resulted in changes to the groundwater flow and transport models used in the CRA-2014 PA. Changes were made to the derivation and trigger value for the Change in Culebra Groundwater Flow COMP (Wagner and Thomas 2016). These changes refined the COMP but did not change the monitoring parameter.

Monitoring Culebra groundwater levels continues. Data since 2008 show stable to declining water levels as an end to the long-term rises observed in most wells. The latest assessment of Culebra water level changes and the impacts of groundwater pumping and precipitation are found in Bowman (2022b). Updated transmissivity estimates derived from pumping tests and recalculated heads were used as optimization targets for recalculated T-fields in CRA-2024. The same base

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T-fields from the CRA-2009 Performance Assessment Baseline Calculation (PABC) (Clayton et al. 2010) were used in the recalculation. Recent groundwater investigations have not greatly impacted the groundwater COMPs and no recommendations have been made to change the CMP.

3.2.1.2 Chemical Conditions Experiments

The SNL WIPP Geochemistry experimental programs continue to investigate the long-term chemical conditions expected after repository closure. These activities related to the recent updates in the thermodynamic database are described in the following analysis plan:

- AP-190 – Analysis Plan for Analysis Reports documenting Solubility and Complexation of Iron, Lead, Magnesium, Neodymium, and Boron in WIPP-Relevant Brines under Test Plans 00-07, 06-03, 08-02, 10-01, 12-02, 14-03, 16-02, 19-01, and 20-01 (Jang et al. 2021).

The impacts of Fe, Colloids and Mineral Fragments in PA are addressed through chemical condition assumptions and specific parameters. With respect to chemical conditions in the repository, the original MONPAR states,

> *The closed repository will not achieve the long-term chemical conditions (brine composition, dissolved actinide concentrations, or colloidal actinide concentrations) used in performance assessment during the operational or active control periods. Therefore, monitoring the [repository] chemical conditions will not provide relevant information or verify assumptions used in performance assessment. [The long-term] Chemical conditions in the repository cannot be monitored after decommissioning without jeopardizing repository integrity. Thus these parameters will not be monitored during the operational period nor during the post-closure periods.* (U.S. DOE 1996, Appendix MON, MONPAR.3.7)

Colloid parameters were updated in the CRA-2014 PA to incorporate data given in Reed et al. (2013). Actinide colloid enhancement parameters were re-assessed and updated, as appropriate, to reflect recent literature and more extensive WIPP-specific data. The CRA-2019 PA contains no changes to the WIPP colloid model developed for the CCA.

No changes to colloidal parameters are being introduced for CRA-2024. In 2022 a new Test Plan, TP 22-02 "Investigation of the Stability of Mineral Fragment Colloids Forming from Magnesium Oxide" (Foli, Jang, and Arnold 2022) was approved for colloidal investigations.

3.2.1.3 Room Closure and Geomechanical Studies

SNL continues to investigate the impact of salt creep and room closure at WIPP. These activities are described in the following test and analysis plans:

- TP 17-03 – Experimental Investigation of WIPP Salt Samples and Clay Seams (Sobolik 2019)

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- AP-178 – Reconsideration of the WIPP Geomechanical Model for Room Closure (Kicker, Reedlunn, and Herrick 2017)
- AP-179 – Analysis Plan for Modifications to the Munson-Dawson Model (Reedlunn 2017)
- AP-197 – Analysis Plan for Improvements to the Disposal Room Porosity Model (Reedlunn 2022).

Since CRA-2019, these test and analysis plans have led to the following new publications:

- Enhancements to the Munson-Dawson Model for Rock Salt (Reedlunn 2018)
- Initial Simulations of Empty Room Collapse and Reconsolidation at the Waste Isolation Pilot Plant (Reedlunn et al. 2019)
- Reconstruction of the Room D, B, G, and Q Closure Histories at the Waste Isolation Pilot Plant (Reedlunn and Williams 2021)
- Gas Generation Function for Calculating Waste Creep Closure (King 2021)
- A Reinvestigation into Munson's Model for Room Closure in Bedded Rock Salt (Reedlunn, Argüello, and Hansen 2022)
- WEIMOS: Shear Behaviors of Bedded Salt Clay Seams and Their Impact on Disposal Room Porosity (Sobolik et al. 2022)
- A New Rock Salt Constitutive Model with Back Stress and Drag Stress Hardening (Reedlunn 2022a)
- A New Constitutive Model for Rock Salt Viscoplasticity: Formulation, Implementation, and Demonstrations (Reedlunn 2022b)
- Improved Modeling of Waste Isolation Pilot Plant Disposal Room Porosity (Vignes, Bean, and Reedlunn 2023).

Note that the list above does not include "stepping-stone" publications. Stepping-stone publications are publications that have been largely superseded by the more recent publications listed above.

The assumptions, results, and conclusions in the above plans and reports generally do not lead to a reevaluation of the existing CMP. The existing program, which monitors creep, salt fractures, and observation borehole measurements in drifts and disposal rooms, is largely sufficient to validate the various geomechanical models.

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3.2.1.4 Waste Compaction Studies

SNL also investigates the expected compaction behavior of emplaced waste. These activities are described in the following test and analysis plans:

- TP 08-01 – Compaction Behavior of Emplaced Waste (Broome and Costin 2010)
- AP-180 – Analysis Plan for the Development of a Model for the Compaction Behavior of Emplaced WIPP Waste (Herrick and Jensen 2017)
- AP-197 – Analysis Plan for Improvements to the Disposal Room Porosity Model (Reedlunn 2022).

Since CRA-2019, these test and analysis plans resulted in the following new publications:

- Simulations of Pipe Overpack Container Compaction at the Waste Isolation Pilot Plant (Reedlunn and Bean 2019)
- Improved Compaction Experiments and Modeling of Waste Isolation Pilot Plant Standard, Non-degraded, Waste Containers (Jensen et al. 2023)
- Improved Modeling of Waste Isolation Pilot Plant Disposal Room Porosity (Vignes, Bean, and Reedlunn 2023).

The assumptions, results, and conclusions in the above plans and reports generally do not lead to a reevaluation of the previous MONPAR conclusion: waste compaction monitoring is not possible because gradual creep closure is not expected to compact the waste during the operational period. Gradual creep closure only begins to compact the waste after the repository is closed. Similarly, the waste's structural integrity is not expected to appreciably degrade unless it is exposed to brine well after the repository is closed.

3.2.2 Los Alamos National Laboratory

WIPP-relevant actinide/brine chemistry and microbial experiments continue to be performed by the Los Alamos Actinide Chemistry and Repository Science Program (ACRSP) team. These research programs are briefly described in the following sections along with their potential impacts on MONPAR and expected input to PA.

3.2.2.1 Actinide/Brine Chemistry Investigations

The overall goal of the actinide/brine chemistry research is to perform experiments that establish the solubility, speciation, oxidation state distribution, and colloidal contribution of actinides to the mobile actinide source term used in WIPP PA. This research has focused on actinide or analog solubility in simulated brine systems.

Additionally, the redox effects of iron on multivalent actinides as well as more fundamental studies in simplified brine systems are being conducted. These studies are designed to confirm the WIPP

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modeling approach and quantify the extent of conservatism in current predictions. The following Test Plans govern this research:

- LCO-ACP-02 – Solubility/Stability of Uranium (VI) in WIPP Brines (LANL 2003)
- LCO-ACP-03 – Solubility of Neodymium (Ill) in WIPP Brines (LANL 2004a)
- LCO-ACP-04 – Plutonium (VI) Reduction by Iron: Limited-Scope Confirmatory Study (LANL 2004b)
- LCO-ACP-05 – Plutonium Speciation and Solubility in the WIPP (LANL 2006)
- LCO-ACP-06 – Americium Solubility/Stability in WIPP Brine (LANL 2007a)
- LCO-ACP-07 – Effect of Acetate, Citrate, EDTA, Oxalate and Borate Ions on Neodymium Solubility in WIPP Brine (LANL 2007b)
- LCO-ACP-11 – WIPP Actinide-Relevant Brine Chemistry (LANL 2010a)
- LCO-ACP-22 – Actinide Sorption Under WIPP-Relevant Conditions (LANL 2017)
- LCO-ACP-25 – Effects of Radiolysis, Organic Complexation, and Redox Conditions on the Speciation and Oxidation State Distribution of Pu(III/IV) (LANL 2020)
- LCO-ACP-26 – Experimental Strategy to Challenge Actinide Solubility Predictions (LANL 2022).

The original MONPAR recognized actinide solubilities as the key contributor to the mobile actinide source term used in PA for calculating direct brine release (DBR), and past sensitivity analyses have confirmed the importance of actinide solubility uncertainties on long-term repository performance (Kirchner 2013 and Zeitler 2019b). Because the experimental program addresses the long-term conditions in the repository after closure, operational monitoring programs cannot be used to directly confirm PA solubility parameters. As stated in the original MONPAR and quoted in Section 3.2.1, the closed repository will not achieve the long-term chemical conditions modeled in PA during the monitoring time period such that these conditions cannot be monitored. Although the results from these studies are used to validate PA assumptions, they are not expected to impact the original MONPAR conclusions.

3.2.2.2 Microbial Investigations

Microorganisms can have an impact on repository performance and the mobile actinide source term by generating gas from the degradation of organic waste components and by forming biocolloids. Research to characterize the microbial ecology of WIPP and the potential impacts of microbial processes on gas generation under repository-relevant conditions, oxidation-state

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distribution, and bioassociation of actinides is ongoing. These are described in the following Test Plan:

- LCO-ACP-12 - Microbial Interactions in the Waste Isolation Pilot Plant (WIPP) (LANL 2010b).

Microbial degradation of cellulose, plastics and rubber waste materials is an important element in PA and impacts gas generation in both the unsaturated and post-saturation phase of the WIPP. Microbial impacts on the mobile actinide source term only affect the longer-term post-saturation PA release calculations in DBR scenarios.

There are no significant changes to the original MONPAR conclusions from these studies.

3.3 PERFORMANCE ASSESSMENT CHANGES

The CRA-2019 is the current compliance PA baseline. However, because the CRA-2019 PA was delayed until after the CRA-2019 submittal, the last MONPAR reassessment was made against the CRA-2014 PA. The changes from the CRA-2014 PA to the CRA-2019 PA are found in the Analysis Plan AP-181 (Zeitler 2019a). Changes from the CRA-2019 PA to the CRA-2024 PA are documented in the *Analysis Plan for the 2024 WIPP Compliance Recertification Application Performance Assessment*, AP-205 (Brunell 2023) and outlined in AP-204 (Hansen et al. 2023).

3.3.1 CRA-2014 PA to CRA-2019 PA Changes

Several changes were incorporated in the CRA-2019 PA relative to the CRA-2014 PA that potentially impact parameter sensitivity analysis results. The analysis plan for the CRA-2019 PA calculations (AP-181) outlines the 16 categories of changes since the CRA-2014 PA that were incorporated into the CRA-2019 PA calculations. The changes are:

1. Inclusion of an approach to accommodate the operational decisions to not emplace panel closures in Panels 3, 4, 5, and 6 and to not emplace waste in Panel 9.

2. Inclusion of an approach to accommodate an additional shaft connecting the repository to the surface, as well as an additional mined region in the repository north end to accommodate drifts that lead to the new shaft.

3. Refinement of the gas generation process model to include brine radiolysis.

4. An update to the probability that a drilling intrusion into a repository excavated region will intersect the Castile brine reservoir modeled in BRAGFLO.

5. Refinement to the corrosion rates of steel under humid and inundated conditions.

6. Refinement to the effective shear strength of WIPP waste.

7. Refinement to colloid enhancement parameters associated with actinide mobilization.

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8. Refinement to the hydromagnesite to magnesite conversion rate.
9. Removal of two chemical reactions associated with iron sulfidation.
10. Correction to the length of the northernmost panel closure representation in the BRAGFLO grid.
11. Updates to drilling rate and plugging pattern parameters.
12. Updates to WIPP waste inventory parameters.
13. Updates to radionuclide solubilities and their associated uncertainty.
14. An update to the BH_OPEN:RELP_MOD parameter.
15. Introduction of new materials to define properties in some disturbed rock zone areas.
16. Hardware and computational code updates.

Changes listed above are discussed in more detail by Zeitler (2019a) and include repository planned changes, parameter updates, and refinements to PA implementation.

The repository planned changes implemented in PA, including a new shaft and drifts, are similar to the existing mine workings. The implementation of these repository changes in PA do not impact the CMP or to the basis of the original MONPAR analysis.

Inventory information, specifically actinide activity, was identified as important in the MONPAR analysis and was identified as a COMP. The inventory information has been accounted for in the CRA-2019 PA through the waste unit factor, actinide activities, and waste material parameters. Since waste activity is currently a COMP, inventory parameter changes do not impact the original MONPAR conclusions. Actinide solubility values, and their uncertainty ranges are directly related to the inventory information. Although actinide solubility related parameters were determined to be significant to PA results in the MONPAR analysis, they could not be directly monitored during operations and the post-closure period and were not identified as potential COMPs.

The drilling rate parameter was recognized in the MONPAR analysis as a significant parameter and is a current COMP. This rate is also a requirement under 40 CFR 194.33 such that it must be included as a monitored parameter. The current well plugging pattern is represented in PA and is monitored outside of the COMPs program. The MONPAR analysis did recognize this parameter as a potential COMP however it was not directly identified within the program. As it is an updated parameter in each recertification PA, no changes are necessary to the CMP.

Changes to PA implementation have not impacted MONPAR conclusions because they do not affect COMPs directly.

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3.3.2 CRA-2019 PA to CRA-2024 PA Changes

The CRA-2024 PA differs from the CRA-2019 as follows:

Changes related to inventory:

1. Waste inventory parameters will be based on the 2022 Performance Assessment Inventory Report (PAIR) (Van Soest 2022).
2. Actinide base solubilities will be updated in conjunction with the updated inventory parameters and thermodynamic database changes.
3. Uncertainty distributions for each actinide's solubility will be updated in conjunction with the updated inventory.
4. Parameters related to microbial and intrinsic colloids are expected to be updated.

Changes related to the replacement and additional panels:

5. The grid for the Salado flow model is modified to accommodate new panels.
6. The grid for computing DBRs is modified to account for the new panels.
7. Logic for assigning panel neighbors is extended to account for the new panels.
8. Repository area and volume parameters are updated to account for the new panels.
9. The procedure for calculating releases due to transport through the Culebra is modified to account for the extended footprint of the repository due to the new panels.

Changes related to new information and/or model revisions since the CRA-2019:

10. An update to the iron surface area used for gas generation from iron corrosion in the Salado Flow model.
11. An update to the calculation of waste area pressures at the time of closure.
12. The porosity surface used to represent creep closure of excavations in the Salado is updated to reflect changes in the modeling process and in material models.
13. Parameters describing the Castile brine reservoir may be updated to account for a recent re-analysis of Castile reservoir data.
14. Permeability of a borehole after plug failure and degradation of borehole materials may be updated to account for a re-analysis of wellbore materials.
15. The model for the oxidation states of actinides is revised.

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16. Drilling rates and borehole plugging pattern probabilities are updated to account for new data.

17. Transmissivity fields in the Culebra are updated to account for new data from wells (Bowman 2022a). The new transmissivity fields are computed with different codes (MODFLOW6 and PEST++) than the codes used to compute the transmissivity fields used in the CRA-2019 (MODFLOW2000 and PEST).

Changes related to codes and computing platform:

18. The PRECCDFGF and CCDFGF codes are modified to accommodate new panels and the modified procedure for calculating Culebra releases.

19. The PRELHS code is revised to correct an error (SNL 2022).

20. The PBRINE parameter distribution is adjusted due to the correction of the error found in the PRELHS code.

21. MODFLOW6 will be used in place of MODFLOW2000 to calculate flow fields in the Culebra.

22. The PRESECOTP2D code is modified to work with MODFLOW6.

23. The PANEL code is changed to implement the revised model for actinide oxidation states.

24. Hardware and software are updated to migrate the PA calculation to a new computational platform (Long 2020).

Changes listed above are discussed in more detail by Hansen et al (2023).

As discussed in Section 3.3.1, waste activity is currently a COMP, and inventory parameter changes do not impact the original MONPAR conclusions. The changes to the CRA-2024 PA include several PA implementation changes that have not impacted MONPAR conclusions because they do not affect COMPs directly.

The Culebra transmissivity field change relates to the process that PA uses to determine fluid flow and contaminant transport to the accessible boundary. The changes were made to account for new well data. These changes enhance the CMP and do not impact the original conclusion in the MONPAR analysis.

3.4 OPERATIONAL CHANGES TO ACTIVITIES AND CONDITIONS APPROVED BY THE EPA

For the period between the CRA-2019 and the CRA-2024, the most significant operational changes at WIPP include ongoing construction of a new ventilation shaft and ongoing excavation of associated drifts. The new excavation activity will include two waste emplacement panels. The design of the shaft and drifts are similar to the existing mine workings and are not expected to be

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significantly different than the existing mine workings. The current geotechnical monitoring program will be applied to any new mine workings. Therefore, no impact is expected to the CMP or to the basis of the original MONPAR analysis.

4. CONCLUSION

A review of the original MONPAR results was made using SP 9-8. Based on the review of activities, conditions and experimental programs that occurred since the CRA-2019, this reassessment concludes that the conclusions of the MONPAR analysis remain valid and its conclusions continue to be adequate for inclusion in the CRA-2024.

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