

2014 Compliance Recertification Application (CRA-2014)
Compliance Application Review Document (CARD for Section 194.32)
Scope of Performance Assessments

32.0 BACKGROUND

Performance assessment (PA) is a process that assesses the likelihood that the Waste Isolation Pilot Plant (WIPP) will meet the release limits specified by 40 CFR 191.13 for 10,000 years after disposal. The PA process must consider both natural and man-made processes and events which have an effect on this disposal system.

Section 194.32 requires that the PA include the effects of excavation mining, drilling, fluid injection and future development of leases. The PA also must include the effects of current activities such as secondary oil recovery methods (water flooding), disposal of natural brine, solution mining to extract brine, etc., in the vicinity of the repository. Section 194.32 requires identification of all processes, events, or sequences, and combinations of processes and events that may occur during the regulatory time frame that may affect the repository. The U.S. Department of Energy (DOE or Department) must document why any events or processes, or sequences are not included in the PA.

32.1 REQUIREMENTS (194.32)

(a) "Performance assessments shall consider natural processes and events, mining, deep drilling, and shallow drilling that may affect the disposal system during the regulatory time frame."

(b) "Assessments of mining effects may be limited to changes in the hydraulic conductivity of the hydrogeologic units of the disposal system from excavation mining for natural resources. Mining shall be assumed to occur with a one in 100 probability in each century of the regulatory time frame. PAs shall assume that mineral deposits of those resources, similar in quality and type to those resources currently extracted from the Delaware Basin, will be completely removed from the controlled area during the century in which such mining is randomly calculated to occur. Complete removal of such mineral resources shall be assumed to occur only once during the regulatory time frame."

(c) "Performance assessments shall include an analysis of the effects on the disposal system of any activities that occur in the vicinity of the disposal system prior to disposal and are expected to occur in the vicinity of the disposal system soon after disposal. Such activities shall include, but shall not be limited to, existing boreholes and the development of any existing leases that can be reasonably expected to be developed in the near future, including boreholes and leases that may be used for fluid injection activities."

(d) "Performance assessments need not consider processes and events that have

less than one chance in 10,000 of occurring over 10,000 years.”

(e) “Any compliance application(s) shall include information which:

(1) Identifies all potential processes, events or sequences and combinations of processes and events that may occur during the regulatory time frame and may affect the disposal system.”

(2) Identifies the processes, events or sequences and combinations of processes and events included in performance assessments.”

(3) Documents why any processes, events or sequences and combinations of processes and events identified pursuant to paragraph (e)(1) of this section were not included in performance assessment results provided in any compliance application.”

32.2 1998 CERTIFICATION DECISION

194.32(a)

The U.S. Environmental Protection Agency (EPA or Agency) expected the Compliance Certification Application (CCA) to contain a comprehensive and complete features, events and processes (FEPs) source list.

DOE presented a discussion of the screening process for FEPs in CCA Chapter 6.2. DOE identified approximately 237 FEPs, divided into three major categories: natural, waste - and repository-induced, and human-initiated. Of particular importance to the performance of the disposal system were those FEPs dealing with mining, deep drilling, and shallow drilling. The CCA and supporting documents illustrated the process used by DOE to select the features, events and processes (FEPs) and subsequent scenarios relevant to PA. DOE’s methodology for demonstrating compliance with Section 194.32(a) was based on the general requirements for FEP and scenario identification stated in the Section 194.32(e). These requirements include the following:

- 1) Identifying FEPs relevant to the WIPP.
- 2) Classifying FEPs.
- 3) Screening FEPs.
- 4) Combining FEPs to form scenarios.
- 5) Screening scenarios
- 6) Selecting scenarios for implementation in the PA.

EPA evaluated the adequacy of the natural events and processes appropriate to the disposal system, and how these were considered in the PA. EPA also evaluated DOE’s consideration of mining and drilling in the PA. EPA performed a critical review of each step of the DOE FEP selection process in the CCA, including: identification and listing of

the potentially disruptive FEPs; screening of these FEPs; combination of FEPs to form scenarios, screening of scenarios, and the final formation of scenarios formulated for use in the CCA PA.

194.32 (b)

EPA expected the CCA to discuss how mining was incorporated into the performance assessment. This discussion included information on mining rates and probabilities, the application of institutional controls, hydraulic conductivity variations as a result of mining, and the extent of mineable reserves. DOE identified potash as the only natural resource currently being mined near the WIPP. DOE used the EPA-specified frequency of mining and probability guidance (CAG p. 43-44) in considering changes in hydraulic conductivity up to 1000 times the base hydraulic conductivity of the Culebra. In its calculation of the potash area to be mined, DOE considered minable reserves inside and outside of the controlled area.

In reviewing DOE's compliance with Section 194.32(b), EPA considered whether the CCA included a detailed, accurate, and comprehensive analysis of mined resources in the WIPP area and sufficient information to demonstrate how mining probability was determined. Specifically, EPA examined the validity of DOE's potash reserve estimates, including DOE's assumptions regarding potash reserve location, quality, and minable horizons. EPA also examined the CCA to determine how hydraulic conductivity within supra-Salado units was modified relative to changes that could be caused by mining over the 10,000-year regulatory period.

194.32(c)

EPA expected the CCA to assess whether appropriate events were identified and considered by DOE and whether the CCA presented analysis of effects on the disposal system and the effects of existing boreholes. EPA considered how these events affected the disposal system and whether DOE addressed the potential for slant drilling. EPA also examined whether DOE addressed potentially exploitable existing leases.

DOE concluded that oil and gas exploration and exploitation and water and potash exploration are the only human-initiated activities that need to be considered for the PA (CCA Chapter 6.7.5). DOE divided human-initiated activities into three categories: (1) those that are currently occurring, (2) those that might be initiated in the operational phase, and (3) those that might be initiated after disposal. Human-initiated activities included three different drilling-related intrusion scenarios used in the PA, based upon the screening analysis, designated by DOE as E1, E2 and E1E2 (CCA Chapter 6, p. 6-77). The E1 scenario assumed penetration of a panel by a borehole drilled through the repository, which then strikes a brine pocket present in the underlying Castile Formation. The E2 scenario included all future boreholes that penetrate a panel but do not strike an underlying brine pocket within the Castile Formation. The E1E2 scenario was defined as the occurrence of multiple boreholes that intersected a single waste panel, with at least

one of the events being an E1 occurrence. Refer to Section 194.33(a) in **CCA CARD 33—Consideration of Drilling Events in Performance Assessments** for additional discussion of the three different drilling-related intrusion scenarios. DOE's approach to mining is discussed in CCA CARD 32 Section 32.B.4.

DOE included an assessment of the potential effects of existing boreholes as part of its FEPs screening analysis in the CCA. DOE concluded that natural borehole fluid flow through abandoned boreholes would be of little consequence during current and operational phase activities. In addition, DOE screened out the occurrence of flow through undetected boreholes based on low probability. The CCA included CCA Appendix DEL, which described the oil and gas exploration and exploitation activities in the Delaware Basin and immediate WIPP area. This document showed the location of oil and gas wells in the Delaware Basin and WIPP area and included maps presenting the location of existing leases.

DOE provided additional information pertaining to brine extraction (solution mining) not included in the CCA. Although the brine extraction FEP was not explicitly addressed in the CCA, this additional information indicated that brine extraction (solution mining) will not have an impact on the PA, as any changes in disposal system hydraulics caused by brine extraction were already accounted for in Culebra transmissivity and hydraulic head uncertainties.

194.32(d)

EPA expected DOE to list those features, events and processes (FEPs) eliminated from the PA based on probability, and to discuss why they were not included. DOE used this requirement to screen out FEPs such as nuclear criticality, galvanic coupling, formation of new faults, glaciation, and impact of large meteorites.

194.32(e)

EPA expected the CCA to identify the processes and events or sequences and combinations of processes and events included in the performance assessment, including natural and human-initiated processes and events. Evaluations of mining, deep drilling and shallow drilling must be included. EPA expected the CCA to include linkages to PA codes and conceptual models and scenario development. Scenarios are combinations of FEPs that may be pertinent to the WIPP disposal system. They include combinations pertinent to both disturbed and undisturbed repository performance.

DOE concluded in the CCA that 16 of the 70 natural FEPs should be retained for the PA, including stratigraphy, shallow dissolution, saturated groundwater, infiltration, precipitation, and climate change. Of the 108 waste and repository induced FEPs, DOE concluded that 50 of these should be retained for the PA, including disposal geometry, waste inventory, salt creep, backfill chemical composition, actinide solubility, spallings, and cavings. DOE concluded that 15 of the 57 human-initiated EPs should be retained

for the PA, including oil and gas exploration.

DOE assessed scenarios ranging from the effects of deep and shallow drilling and mining to undisturbed disposal system performance. DOE retained the scenarios describing both undisturbed and disturbed system performance. Disturbed performance includes both mining and deep drilling (E1, E2, and E1E2 scenarios). In CCA Chapter 6, Table 6-6, DOE identified the specific locations in the CCA that related to modeling of the individual FEPs. These discussions focus on conceptual model development, but often link these conceptualizations with associated computational (computer) models.

EPA reviewed the CCA to determine whether FEPs and subsequent scenarios were appropriately screened, adequately justified, and completely supported. In addition, EPA examined combinations of FEPs and scenarios included in the PA. EPA determined that DOE complied with the 40 CFR 194.32 requirements.

A complete description of EPA's 1998 Certification Decision for Section 194.32 can be obtained from EPA Air Docket, A-93-02, Items V-A-1 and V-B-2.

2.3 CHANGES IN THE 2004 COMPLIANCE RECERTIFICATION APPLICATION (2004 CRA)

For the 2004 Compliance Recertification Application (2004 CRA) and the new Performance Assessment Baseline Calculations (2004 PABC), DOE reevaluated all FEPs related to WIPP to determine if any had changed or new FEPs needed to be added. DOE's reevaluation resulted in only a few changes to the FEPs analysis. Some FEPs have had more information added, a few FEPs were deleted and merged with other FEPs and a few new FEPs have been added (See Table 32.5 below).

Tables 32-1 to 32-4 list FEPs to which DOE applied the 40 CFR 194.32 (a) to (d) screening arguments (See 2004 CRA Appendix PA, Attachment SCR). DOE methods, screening arguments, and conclusions were essentially the same as the CCA review results for the applied screening arguments for 40 CFR 193.32(a) through (d). See CCA CARD 32 and 2004 CRA Chapter 6, 2004 CRA Appendix PA and 2004 CRA Attachment SCR for details of the methods used to do this evaluation.

Table 32-1 2004 CRA FEPs 40 CFR 194.32(a) Applied

| FEP ID | FEP Name | Screening Decision | Regulatory Citation | Attachment SCR Reference |
|--------|--|--------------------|---------------------|--------------------------|
| H17 | Archeological Excavations | SO-R(Future) | 40 CFR 194.32(a) | 5.1.2.4.3 |
| H20 | Underground Nuclear Device Testing | SO-R(Future) | 40 CFR 194.32(a) | 5.1.3.2.3.2 |
| H39 | Changes in Groundwater Flow due to Explosions | SO-R(Future) | 40 CFR 194.32(a) | 5.2.3.1.3.2 |
| H42 | Damming of Streams and Rivers | SO-R(Future) | 40 CFR 194.32(a) | 5.4.1.1.5 |
| H43 | Reservoirs | SO-R(Future) | 40 CFR 194.32(a) | 5.4.1.1.5 |
| H44 | Irrigation | SO-R(Future) | 40 CFR 194.32(a) | 5.4.1.1.5 |
| H45 | Lake Usage | SO-R(Future) | 40 CFR 194.32(a) | 5.4.1.2.5 |
| H46 | Altered Soil or Surface Water Chemistry by Human Actions | SO-R(Future) | 40 CFR 194.32(a) | 5.4.1.3.5 |
| H50 | Coastal Water Use | SO-R(Future) | 40 CFR 194.32(a) | 5.6.1.1.5 |
| H51 | Seawater Use | SO-R(Future) | 40 CFR 194.32(a) | 5.6.1.1.5 |
| H52 | Estuarine Water | SO-R(Future) | 40 CFR 194.32(a) | 5.6.1.1.5 |
| H53 | Arable Farming | SO-R(Future) | 40 CFR 194.32(a) | 5.7.1.1.5 |
| H54 | Ranching | SO-R(Future) | 40 CFR 194.32(a) | 5.7.1.1.5 |
| H55 | Fish Farming | SO-R(Future) | 40 CFR 194.32(a) | 5.7.1.1.5 |

Table 32-2 2004 CRA FEPs 40 CFR 194.32(b) Applied

| FEP ID | FEP Name | Screening Decision | Regulatory Citation | Attachment SCR Reference |
|--------|---|-----------------------------|---------------------|--------------------------|
| H37 | Changes in Groundwater Flow due to Mining | DP(Future) | 40 CFR 194.32(b) | 5.2.2.1.4 |
| H38 | Changes in Geochemistry Due to Mining | SO-R(Future) | 40 CFR 194.32(b) | 5.2.2.2.3.3 |
| H13 | Conventional Underground Potash Mining | UP(HCN) DP (Future) | 40 CFR 194.32(b) | 5.1.2.1.1 |
| H58 | Solution Mining For Potash | SO-R (HCN) SO-R (Future) | 40 CFR 194.32(b) | 5.2.2.3.3 |

Table 32-3 2004 CRA FEPs 40 CFR 194.32(c) Applied

| FEP ID | FEP Name | Screening Decision | Regulatory Citation | Attachment SCR Reference |
|--------|---------------------|--------------------|---------------------|--------------------------|
| H40 | Land Use Changes | SO-R(Future) | 40 CFR 194.32(c) | 5.3.1.1.4 |
| H41 | Surface Disruptions | SO-R(Future) | 40 CFR 194.32(c) | 5.3.1.2.4 |
| H45 | Lake Usage | SO-R(HCN) | 40 CFR 194.32(c) | 5.4.1.2.4 |
| H50 | Coastal Water Use | SO-R(HCN) | 40 CFR 194.32(c) | 5.6.1.1.4 |
| H51 | Seawater Use | SO-R(HCN) | 40 CFR 194.32(c) | 5.6.1.1.4 |
| H52 | Estuarine Water | SO-R(HCN) | 40 CFR 194.32(c) | 5.6.1.1.4 |
| H55 | Fish Farming | SO-R(HCN) | 40 CFR 194.32(c) | 5.7.1.1.4 |

Table 32-4 2004 CRA FEPs 40 CFR 194.32(d) Applied

| FEP ID | FEP Name | Screening Decision | Regulatory Citation | Attachment SCR Reference |
|--------|--|--------------------|---------------------|--------------------------|
| N6 | Salt Deformation | SO-P | 40 CFR 194.32(d) | 4.1.3.1.1.1 |
| N7 | Diapirism | SO-P | 40 CFR 194.32(d) | 4.1.3.1.1.1 |
| N8 | Formation of Fractures | SO-P | 40 CFR 194.32(d) | 4.1.3.2.1.1 |
| N10 | Formation of New Faults | SO-P | 40 CFR 194.32(d) | 4.1.3.2.3.1 |
| N11 | Fault Movement | SO-P | 40 CFR 194.32(d) | 4.1.3.2.3.1 |
| N13 | Volcanic Activity | SO-P | 40 CFR 194.32(d) | 4.1.4.1.1 |
| N15 | Metamorphic Activity | SO-P | 40 CFR 194.32(d) | 4.1.4.2.4.1 |
| N18 | Deep Dissolution | SO-P | 40 CFR 194.32(d) | 4.1.5.3.1 |
| N20 | Breccia Pipes | SO-P | 40 CFR 194.32(d) | 4.1.5.3.1 |
| N21 | Collapse Breccias | SO-P | 40 CFR 194.32(d) | 4.1.5.3.1 |
| N29 | Saline Intrusion | SO-P | 40 CFR 194.32(d) | 4.2.2.2.1 |
| N30 | Fresh Water Intrusion | SO-P | 40 CFR 194.32(d) | 4.2.2.3.1 |
| N32 | Natural Gas Intrusion | SO-P | 40 CFR 194.32(d) | 4.2.2.5.1 |
| N40 | Impact of Large Meteorite | SO-P | 40 CFR 194.32(d) | 4.4.1.2.1 |
| N62 | Glaciation | SO-P | 40 CFR 194.32(d) | 4.6.1.3.1 |
| N63 | Permafrost | SO-P | 40 CFR 194.32(d) | 4.6.1.3.1 |
| W14 | Nuclear Criticality: Heat | SO-P | 40 CFR 194.32(d) | 6.2.1.3.1 |
| W24 | Large Scale Rock Fracturing | SO-P | 40 CFR 194.32(d) | 6.3.1.3.1 |
| W28 | Nuclear Explosions | SO-P | 40 CFR 194.32(d) | 6.3.3.2.1 |
| W65 | Reduction-Oxidation Fronts | SO-P | 40 CFR 194.32(d) | 6.5.5.2.1 |
| W95 | Galvanic Coupling (outside the repository) | SO-P | 40 CFR 194.32(d) | 6.7.4.2.1 |
| W115 | Chemical Degradation of Panel Closures | SO-P | 40 CFR 194.32(d) | 6.5.7.1.1 |

Legend:

- HCN historic, current, and near future human activities
- SO-C screened-out low consequence
- SO-P screened-out low probability
- SO-R screened-out using regulatory requirements
- DP disturbed performance scenario

DOE's reevaluation of FEPs did not change the CCA conceptual models or scenarios developed for the performance assessment in any way.

32.3.1 EVALUATION OF COMPLIANCE FOR 2004 RECERTIFICATION

For the 2004 CRA, DOE applied the same approach to developing and screening the list of FEPs that may have an effect on the disposal system as was used for the CCA. Since EPA previously evaluated and approved this process, EPA focused its 2004 recertification review on the FEPs that have changed since the 1998 Certification Decision (See Table 32.5 for a list of changes). EPA examined 2004 CRA, Chapter 6 Section 6.2, 2004 CRA Appendix PA, and 2004 CRA Appendix PA Attachment SCR to verify DOE's continued compliance with 40 CFR 193.32. See Docket Numbers A-98-49 Items II-BI-11 FEPs review and II-B1-10 Human Intrusion FEPs review for our review of DOE's reevaluation of 2004 CRA FEPs.

EPA verified that DOE's FEP development and review process was fundamentally the same as the CCA process and verified that DOE's reevaluation properly considered things that have changed since the original certification decision in 1998. EPA verified that any changes (See Table 32-5 below) to FEP screening arguments or FEPs related discussions were reasonable, appropriate and complete.

EPA received one public comment related to the Scope of the Performance Assessment. Some stakeholders proposed that karst (FEP N20) needs to be included in the performance assessment conceptual model development. EPA reviewed the karst issues in the original CCA and concluded as follows:

“Karst features, such as Nash Draw, have formed via shallow (surface down) dissolution in the WIPP area. The DOE has indicated that the development of karst features near and above the WIPP has been the subject of considerable study, and concluded that development of karst does not pose a threat to the containment capabilities of the disposal system. Examination of information presented within the CCA, as well as other information, indicates that karst features are present in the WIPP area (particularly Nash Draw). Although evidence of karst development at WIPP-33 is discussed only briefly in the CCA, as are opinions by others regarding the development of karst features, the EPA has reviewed all available data and concurs that the lack of pervasive WIPP-site karst, dry climate (including future precipitation projections), and pervasive Mescalero

Caliche supports the DOE's conclusion with regard to karst.” (Docket No: A-93-02 Item V-B-21)

For the 2004 CRA EPA reevaluated our CCA review related to karst and any new information made available since our original certification decision. Our review is discussed in 2004 CRA Technical Support Document for Section 194.14: Evaluation of Karst at the WIPP Site, Docket A-98-49 Item II-B-1-15. After a thorough review the Agency determined that karst should not be screened into the performance assessment process because, even though karst may be present in Nash Draw karst are not prevalent near the WIPP site.

Table 32.5 2004 CRA FEPs - Changed Since the CCA

| FEP I.D. | FEP Name | Summary of Change |
|-----------------|--|---|
| | | <u>FEPs Combined with other FEPs</u> |
| N17 | Lateral Dissolution | Combined with N16, Shallow Dissolution . N17 removed from baseline. |
| N19 | Solution Chimneys | Combined with N20, Breccia Pipes , N19 removed from baseline. |
| H33 | Flow Through Undetected Boreholes | Combined with H31, Natural Borehole Fluid Flow . H33 removed from baseline. |
| W38 | Investigation Boreholes | Addressed in H31, Natural Borehole Fluid Flow , and H33, Flow Through Undetected Boreholes . W38 removed from baseline. |
| | | <u>FEPs With changed Screening Decisions</u> |
| W50 | Galvanic Coupling | SO-P to SO-C |
| W68 | Organic Complexation | SO-C to UP |
| W69 | Organic Ligands | SO-C to UP |
| H27 | Liquid Waste Disposal | SO-R to SO-C |
| H28 | Enhanced Oil and Gas Production | SO-R to SO-C |
| H29 | Hydrocarbon Storage | SO-R to SO-C |
| H41 | Surface Disruptions | SO-C to UP (HCN) |
| | | <u>New FEPs for CRA</u> |
| H58 | Solution Mining for Potash | Separated from H13, Potash Mining |
| H59 | Solution Mining for Other Resources | Separated from H13, Potash Mining |

From 2004 CRA Appendix PA, Attachment SCR, Table SCR-1

32.3.2 2004 RECERTIFICATION DECISION

Based on a review and evaluation of the 2004 CRA and supplemental information provided by DOE (FDMS Docket ID No. EPA-HQ-OAR-2004-0025, Air Docket A-98-49), EPA determines that DOE continues to comply with the requirements for Section 194.32 for 2004 CRA.

32.4 CHANGES IN THE 2009 COMPLIANCE RECERTIFICATION APPLICATION (2009 CRA)

For the 2009 Compliance Recertification Application (2009 CRA) DOE reevaluated all FEPs related to WIPP to determine if any had changed or new FEPs needed to be added. DOE's reevaluation resulted in only a few changes to the FEPs analysis. Some FEPs have had more information added, one FEP had its screening decision changed and ten FEPs were split into twenty FEPs to make them more specific for panel closures and to apply specifically within the WIPP boundary (See Table 32.6 below).

Tables 32-1 to 32-5 list FEPs to which DOE applied the 40 CFR 194.32 (a) to (e) screening arguments, none of these arguments have changed for 2009 CRA (See 2009 CRA Section 32, 2009 CRA Appendix PA-2009, 2009 CRA Appendix SCR-2009). DOE's methods, screening arguments, and conclusions are essentially the same as the CCA and the 2004 CRA results for the applied screening arguments for 40 CFR 193.32(a) through (e). See CCA CARD 32 and 2004 CRA Chapter 6, 2004 CRA Appendix PA and 2004 CRA Attachment SCR, 2009 CRA Section 32, 2009 CRA Appendix PA-2009 and 2009 CRA Appendix SCR-2009 for details of the methods used to do this evaluation.

DOE's reevaluation of FEPs did not change the CCA or the 2004 CRA conceptual models or scenarios developed for the performance assessment in any way.

32.4.1 EVALUATION OF COMPLIANCE FOR 2009 RECERTIFICATION

For the 2009 CRA, DOE applied the same approach to developing and screening the list of 245 FEPs that may have an effect on the disposal system as was used for the CCA and the 2004 CRA. Since EPA previously evaluated and approved this process, EPA focused its 2009 recertification review on the FEPs that have changed since the 2004 Recertification Decision (See Table 32.6 for a list of changes). EPA examined 2009 CRA Section 32, 2009 CRA Appendix PA-2009, and 2009 CRA Appendix SCR-2009 to verify DOE's continued compliance with 40 CFR 193.32. See EPA's Technical Support Document For Section 194.25, 194.32 and 194.33: Review of Changes to the WIPP Performance Assessment Features, Events, and Processes Since 2004 Recertification (EPA 2010c) and Technical Support Document For Section 194.23 and 194.33: 2009 Compliance Recertification Application Re-evaluation of Selected Human Intrusion Activities (EPA 2010d) for our review of DOE's reevaluation of 2009 CRA FEPs. DOE updated 35 FEPs with new or revised information and the screening decision for H41-Surface Disruptions changed from SO-R to SO-C to make it consistent with rationale. In addition DOE split 10 FEPs into twenty FEPs to make them more specific. See Table 32-6 below for a list of these changes and also see 2009 CRA Section 32 for DOE's complete list of FEPs and their changes.

EPA verified that DOE's FEP development and review process was fundamentally the same as the CCA and the 2004 CRA processes and verified that DOE's reevaluation properly considered things that have changed since the original certification decision in 1998 and the 2004 recertification. EPA verified that any changes (See Table 32-6 below) to FEP screening arguments or FEPs related discussions were reasonable, appropriate and complete.

EPA received one comment related to 40 CFR 194.32. Once again, karst was recommended to be included in the FEPs for the WIPP performance assessment. Therefore, EPA directed DOE in its second completeness letter, dated June 16, 2009 (EPA 2009b), to thoroughly review the comment received on karst. EPA and DOE re-examined this comment and did not change our conclusions developed during the 2004 CRA review. Karst features are in fact present in Nash Draw but are neither present nor active within the vicinity of the WIPP site. Evidence presented by the commenter was difficult to analyze and did not completely support the commenters arguments (see Chaturvedi 2009). The commenter appeared to ignore work done by DOE within the past ten years, particularly new monitoring wells drilled at WIPP and pump tests performed at some of the wells. The pump test results do not exhibit any clear evidence of karst activity. Once again, EPA believes that karst features or processes do not need to be included in the WIPP performance assessment calculations and that the issues related to karst are closed unless truly new evidence is presented.

Table 32.6 2009 CRA - FEPs Changed Since 2004 CRA

| FEP I.D. | FEP Name | Summary of Change |
|-----------------|--|--|
| | | <u>FEPs With changed Screening Decisions</u> |
| H41 | Surface Disruptions | SO-R to SO-C (Future) |
| | | <u>New FEPs for 2009 CRA-Split From Others</u> |
| H60 | Liquid Waste Disposal- Inside WIPP-IB | Separated from H27, Similar to H27 but applies inside WIPP boundary. |
| H61 | Enhanced Oil and Gas Production-IB | Separated from H28, Similar to H28 but applies inside WIPP boundary |
| H62 | Hydrocarbon Storage-IB | Separated from H29, Similar to H29 but applies inside WIPP boundary |
| W109 | Panel Closure Geometry | Split for W6 to be specific to panel closure |
| W110 | Panel Closure Physical Properties | Split for W7 to be specific to panel closure |
| W111 | Panel Closure Chemical Composition | Split for W8 to be specific to panel closure |
| W112 | Radionuclides Effects on Panel Closure | Split for W17 to be specific to panel closure |
| W113 | Consolidation of Panel Closures | Split for W36 to be specific to panel closure |
| W114 | Mechanical Degradation of Panel Closures | Split for W37 to be specific to panel closure |
| W115 | Chemical Degradation of Panel Closures | Split for W74 to be specific to panel closure |
| | | <u>FEPs Clarified to be Less Generic</u> |
| H27 | Liquid Waste Disposal - Outside Boundary (OB) | Changed to specify outside of site boundary |
| H28 | Enhanced Oil and Gas Production - OB | Changed to specify outside of site boundary |
| H29 | Hydrocarbon Storage – OB | Changed to specify outside of site boundary |
| W6 | Shaft Seal Geometry | Changed to specify shaft seals rather than generic seals. |
| W7 | Shaft Seal Physical Properties | Changed to specify shaft seals rather than generic seals. |

| | | |
|-----|--|---|
| W8 | Shaft Seal Chemical Composition | Changed to specify shaft seals rather than generic seals. |
| W17 | Radiological Effects on Shaft Seals | Changed to specify shaft seals rather than generic seals. |
| W36 | Consolidation of Shaft Seals | Changed to specify shaft seals rather than generic seals. |
| W37 | Mechanical Degradation of Shaft Seals | Changed to specify shaft seals rather than generic seals. |
| W74 | Chemical Degradation of Shaft Seals | Changed to specify shaft seals rather than generic seals. |

From 2009 CRA, Section 32, 2009 CRA Appendix PA-2009, 2009 CRA Appendix SCR-2009

32.4.2 2009 RECERTIFICATION DECISION

Based on a review and evaluation of the 2009 CRA and supplemental information provided by DOE (FDMS Docket ID No. EPA-HQ-OAR-2009-0330, Air Docket A-98-49), EPA determines that DOE continues to comply with the requirements for Section 194.32 for 2009 CRA.

32.5 CHANGES IN THE 2014 COMPLIANCE RECERTIFICATION APPLICATION (2014 CRA)

For the 2014 Compliance Recertification Application (2014 CRA) DOE reevaluated all FEPs related to WIPP to determine if any had changed or new FEPs needed to be added. DOE's reevaluation resulted in changes in some of the FEPs analysis. For the 2014 CRA, DOE's reassessment of FEPs led to the conclusion that out of 245 FEPs, the same as in the 2009 CRA, 184 were unchanged, 61 have been updated with new information, and 1 of which (W115) had its screening decision changed.

Tables 32-1 to 32-4 (above) list FEPs to which DOE applied the 40 CFR 194.32 (a) to (e) screening arguments, three have been add since the CCA (H13, H58, and W115) (See 2014 CRA DOE Section 32, 2014 CRA Appendix PA-2014, 2014 CRA Appendix SCR-2014). DOE's methods, screening arguments, and conclusions are essentially the same as the CCA, the 2004 CRA, and the 2009 CRA. The results for the applied screening arguments for 40 CFR 193.32(a) through (e) had minor additions. See CCA CARD 32, 2014 CRA DOE Section 32, 2014 CRA Appendix PA-2014 and 2014 CRA Appendix SCR-2014 for details of the methods used to do this evaluation.

DOE's reevaluation of FEPs did not change the CCA, the 2004 CRA, or the 2009 CRA conceptual models or scenarios developed for the performance assessment in any way.

32.5.1 EVALUATION OF COMPLIANCE FOR 2014 RECERTIFICATION

For the 2014 CRA, DOE applied the same approach to developing and screening the list of 245 FEPs that may have an effect on the disposal system as was used for the CCA, the 2004 CRA and the 2009 CRA. Since EPA previously evaluated and approved this process, EPA focused its 2014 recertification review on the FEPs that have changed since the 2009 Recertification Decision. EPA examined 2014 CRA DOE Section 32, 2014 CRA Appendix PA-2014, and 2014 CRA Appendix SCR-2014 to verify DOE's continued compliance with 40 CFR 193.32. See EPA's Technical Support Document For Section 194.25, 194.32 and 194.33: *Review of Changes to the WIPP Performance Assessment Features, Events, and Processes Since 2009 Recertification* (EPA 2017a)¹ for our review of DOE's reevaluation of 2014 CRA FEPs. DOE updated 61 FEPs with new or revised information, such as new monitoring and inventory information (see Kirkes 2013b, Table 4, ERMS 560488)², and the screening decision for W115 Chemical Degradation of Panel Closures was changed from UP to SO-P because of the change in panel closure design to run of mine salt.

EPA verified that DOE's FEP development and review process was fundamentally the same as the CCA and previous CRAs processes and verified that DOE's reevaluation properly considered things that have changed since the original certification decision in 1998 and the 2004 and 2009 recertifications. EPA verified that any changes to FEP screening arguments or FEPs related discussions were reasonable, appropriate and complete.

EPA had a number of comments on FEPs in EPA's second comment letter¹, general comment 2-32-G1 and specific comments 2-32-S1 through 2-32-S26. First, EPA believed that screening arguments did not reflect changes that have occurred in past years. EPA also believed that screening arguments need to provide a more complete discussion of the FEP and how it is determined to be screened-in or screened-out. EPA also did not agree with some FEPs reported as "no change". DOE responded in Response Letters Four and Five by updating some FEP arguments and providing additional information from recent studies. DOE reevaluation based on EPA comments did not change any 2014 CRA FEP decisions. EPA found DOE's changes to FEPs to be adequate.

32.5.2 2014 RECERTIFICATION DECISION

¹ EPA 2017 a Technical Support Document For Section 194.25, 194.32 and 194.33: *Review of Changes to the WIPP Performance Assessment Features, Events, and Processes Since 2009 Recertification*. Docket No. EPA-HQ-OAR-2014-0609. U.S. Environmental Protection Agency. Washington, DC.

² Kirkes, G.R. 2013b. *Features, Events and Processes Assessment for the Compliance Recertification Application—2014* (Revision 0). ERMS 560488. Carlsbad, NM: Sandia National Laboratories.

Based on a review and evaluation of the 2014 CRA and supplemental information provided by DOE (Docket ID No. EPA-HQ-OAR-2014-0609), EPA determines that DOE continues to comply with the requirements for Section 194.32 for 2014 CRA.