

CARD No. 46

Removal of Waste

46.A.1 BACKGROUND

Assurance requirements were included in the disposal regulations to compensate in a qualitative manner for the inherent uncertainties in projecting the behavior of natural and engineered components of the repository for many thousands of years (50 FR 38072). Section 194.46 is one of the assurance requirements in the Compliance Criteria.

46.A.2 REQUIREMENT

“Any compliance application shall include documentation which demonstrates that removal of waste from the disposal system is feasible for a reasonable period of time after disposal. Such documentation shall include an analysis of the technological feasibility of mining the sealed disposal system, given technology levels at the time a compliance application is prepared.”

46.A.3 ABSTRACT

In reviewing information applicable to Section 194.46, EPA sought a description of DOE’s strategy for removing the waste from the repository after disposal is complete. DOE presented a five-phase approach to accomplish the removal of waste. This approach is supported by a discussion of techniques that could be used to remove the waste, given repository conditions at the time of removal. EPA reviewed the material to assess the completeness of the strategy and the justification of the proposed technology for removing the waste.

46.A.4 COMPLIANCE REVIEW CRITERIA

EPA’s Compliance Application Guidance (CAG) states that compliance with the Section 194.46 criteria is demonstrated by an analysis that includes: (1) procedures necessary for removal of waste after disposal is complete; (2) descriptions of current technology that could be used in implementing these procedures; and (3) an estimate of how long it will be technologically feasible to remove the waste.

46.A.5 DOE METHODOLOGY AND CONCLUSIONS

Information related to DOE’s demonstration of compliance with Section 194.46 is located in Chapter 7 of the CCA and Appendix WRAC. DOE makes several assumptions in developing its waste removal strategy:

- ◆ The reason for removing the waste is the result of some future insight or discovery into the storage of waste, not a cataclysmic event.

- ◆□ There are no cost or time limits on the process to remove waste.
- ◆□ The eventual disposition of the waste upon removal is not important.
- ◆□ The length of time the repository has ceased receiving waste at the time of waste removal is known.
- ◆□ The contact-handled transuranic waste containers have been breached by the time of waste removal.
- ◆□ Contamination that may have migrated beyond the disposal region will not be removed.

DOE proposed a five-phase approach for removing waste from the repository that is projected to be feasible during the entire regulatory time frame (Appendix WRAC.5, p.WRAC-21).

Phase One: Planning and Permitting. DOE will research site conditions at the time that waste removal is found to be necessary and will determine which of the available technologies are most appropriate to complete the removal. Planning activities include determining how much time has passed since the repository ceased operations, which will enable DOE to anticipate the condition of the repository and waste. DOE will also identify the permitting requirements applicable at the time of removal.

Phase Two: Initial Above Ground Setup and Shaft Sinking. During this phase, DOE establishes the necessary above ground support and radiation control facilities. In addition, DOE will estimate the necessary amount of mining and sink the initial access shafts.

Phase Three: Underground Excavation and Facility Set-up. Once the shafts are completed, DOE will establish the underground support and service areas. This excavation will provide for mine support rooms, haulage drifts, ventilation, and access to the waste.

Phase Four: Waste Location and Removal Operations. DOE will mine the waste from the emplaced areas and transport it to the packaging areas.

Phase Five: Decontamination and Decommissioning of the Facility. Once the waste has been removed from the repository, the facility will be decommissioned according to regulations that are applicable at the time of removal.

The CCA cites the preamble to 40 CFR Part 191 (50 FR 38082), which states that “any current concept for a mined geologic repository” must meet the removal of waste requirement “without any additional procedures or design features” (p. WRAC-2). The CCA discusses several existing mining techniques that could be used to remove waste from the WIPP: continuous mining, drill and blast, solution mining, small-scale mechanical excavation techniques, and remote mining. DOE determined that although all the proposed mining techniques are viable, small-scale remote continuous mining and small-scale mechanical excavation are likely to be the most

appropriate for the WIPP (p. WRAC-40 to 41). The CCA also states that if the situation or level of contamination requires it, currently available remote controlled technology could be used to remove waste from the repository (p. WRAC-23). The CCA states that it is technically feasible to remove waste at any time during the regulatory time frame (p. WRAC-1).

DOE concluded that the strategy presented in the CCA demonstrates compliance with Section 194.46 and is feasible over the 10,000-year regulatory time frame.

46.A.6 EPA COMPLIANCE REVIEW

EPA reviewed Chapter 7 of the CCA and Appendix WRAC for compliance with Section 194.46. EPA reviewed the six assumptions that DOE made in developing the removal of waste strategy. EPA found these assumptions to be reasonable because the information to satisfy most of these assumptions should be readily available at the time of removal. Although the eventual disposition of the waste is an important environmental concern, 40 CFR Part 194 does not require DOE to speculate on the possible location or hazards of the waste once it is removed from the repository.

The CCA provided sufficient detail to enable EPA to establish that the five phases involved in waste removal could be implemented. DOE presented an orderly sequence of procedures for planning and implementation of the removal of waste from the repository after disposal. The proposed activities, techniques, and equipment that would be necessary to remove the waste all are presently feasible. These procedures are discussed at length in WRAC.6.

Phase One involves obtaining records, locating the site, determining baseline environmental conditions, determining the time since disposal, reviewing facility design, obtaining permits, and establishing radiological controls.

Phase Two addresses the types and potential locations of surface facilities and the construction of the shafts. This section of the CCA also discusses the basic ventilation system components that would be required.

Phase Three implementation involves excavation to establish support and access areas without contact with the waste. Once the support, ventilation, and access excavations are complete, Phase Four would begin. The position of the waste and the location of the panel closures will be located, after which additional evaluations of the conditions within the panel(s) will be conducted. Based on this information, DOE will determine the appropriate procedures and techniques to remove the waste.

Finally, during Phase Five, decontamination and decommissioning of the facility will be undertaken according to the regulatory requirements at that time.

EPA reviewed the CCA for an estimate of how long after disposal it would remain technologically feasible to remove waste. DOE stated that, using the system and equipment proposed in the CCA, it would be feasible to remove waste any time after emplacement (Chapter 7.6 and WRAC.8). Thus DOE concluded that no features of the disposal system (such as salt

creep) will prevent the removal of waste from the repository as long as the technology described in the CCA remains available. DOE did not address how long the technology might remain available.

Because DOE's assessment of how long waste removal might be feasible depended heavily on the assumption that present technology would not be lost, EPA considered how long the technology described in the CCA might remain available. The Agency concluded that, as long as our present society remains stable, it is reasonable to conclude that there will likely be a continuity or advancement of technology that would facilitate waste removal. Maintenance of active institutional controls (AICs) at the site in accordance with 40 CFR 194.41 would indicate a stable society. DOE committed to maintain AICs for 100 years after the end of the operational period (see **CARD 41—Active Institutional Controls**). EPA therefore finds it reasonable to assume that the technology for removal of waste will remain available during the 100-year period when AICs are in effect, and that this constitutes a reasonable period of time after disposal.

46.B REFERENCES

None.