

Recertification CARD No. 43

Passive Institutional Controls

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 Waste Isolation Pilot Plant (WIPP) for many thousands of years (50 FR 38072). Section 194.43 incorporates one of the six assurance requirements in the Compliance Criteria. Passive Institutional Controls (PICs) are defined in Section 191.12 as “(1) Permanent markers placed at a disposal site, (2) public records and archives, (3) government ownership and regulations regarding land or resource use, and (4) other methods of preserving knowledge about the location design, and contents of a disposal system.” The advantage of PICs is that they require little or no human intervention to convey the message to potential intruders that they should not disturb the site (Taylor, 1993).

Because changes in language, technology, and political institutions cannot be predicted over thousands of years, PICs and their messages cannot be assumed to last in perpetuity. For this reason, neither the disposal regulations nor the compliance criteria require that PICs be shown to be effective for 10,000 years (Response to Comments Document for 40 CFR Part 194, p. 15-12). In addition, there is no guarantee that a person will obey an admonition not to disturb the site, even if he or she has read and understood it. The U.S. Environmental Protection Agency (EPA or Agency) therefore intends that PICs serve only to avert “unintentional” intrusions into the repository (e.g., resource exploration resulting from lack of knowledge of the presence of radioactive waste). The Agency also intends that PICs be designed to survive as long as possible using available technology and materials.

REQUIREMENTS

(a) “Any compliance application shall include detailed descriptions of the measures that will be employed to preserve knowledge about the location, design, and contents of the disposal system. Such measures shall include:

- (1) Identification of the controlled area by markers that have been designed and will be fabricated and emplaced to be as permanent as practicable.
- (2) Placement of records in the archives and land record systems of local, State, and Federal governments, and international archives, that would likely be consulted by individuals in search of unexploited resources. Such records shall identify:
 - (i) The location of the controlled area and the disposal system.
 - (ii) The design of the disposal system.

(iii) The nature and hazard of the waste.

(iv) Geologic, geochemical, hydrologic, and other site data pertinent to the containment of waste in the disposal system, or the location of such information, and

(v) The results of tests, experiments, and other analyses relating to backfill of excavated areas, shaft sealing, waste interaction with the disposal system, and other tests, experiments, or analyses pertinent to the containment of waste in the disposal system, or the location of such information.

(3) Other passive institutional controls practicable to indicate the dangers of the waste and its location.”

(b) “Any compliance application shall include the period of time passive institutional controls are expected to endure and be understood.”

(c) “The Administrator may allow the Department to assume passive institutional control credit, in the form of reduced likelihood of human intrusion, if the Department demonstrates in the compliance application that such credit is justified because the passive institutional controls are expected to endure and be understood by potential intruders for the time period approved by the Administrator. Such credit, or a smaller credit as determined by the Administrator, cannot be used for more than several hundred years and may decrease over time. In no case, however, shall passive institutional controls be assumed to eliminate the likelihood of human intrusion entirely.”

1998 CERTIFICATION DECISION

To meet the requirements for Section 194.43, EPA expected the U.S. Department of Energy (DOE) to describe the markers that would be placed at the WIPP site to warn future generations about the disposal system’s design and contents, which included the presence and hazards of radioactive waste. The markers were to be as permanent as is practicable using current technology. They also needed to describe individual markers in detail and be supported by information demonstrating that the markers were as permanent as practicable. Permanence refers to the markers’ ability to withstand both natural and human-initiated forces that could reasonably be expected to occur at the site. Markers did not need to be designed to withstand catastrophic, low-probability events, such as nuclear war or a comet strike, since any attempt to do so would undoubtedly strain the practicability of the design. Practicability refers to DOE’s ability to emplace markers using currently available resources and technology.

In addition to describing markers that would be fabricated and emplaced, DOE was also expected to provide a time line for implementing the markers. Finally, DOE was permitted to

propose a credit for PICs in the performance assessment. A credit must be based on the proposed effectiveness of PICs over time, and would take the form of reduced likelihood in the performance assessment of human intrusion over several hundred years.

Compliance Certification Application (CCA) Chapters 7.3.3.1.1 and 7.3.3.3, Appendices PIC and EPIC, and supplemental information requested by EPA contain the information supporting DOE's compliance with this requirement.

EPA determined that DOE complied with the requirements of Section 194.43 because the measures proposed in the CCA are comprehensive, practicable, and likely to endure and be understood for long periods of time. EPA denied DOE's request for credit for a 99 percent reduction in the likelihood of human intrusion into WIPP during the first 700 years after closure. EPA denied the credit because DOE did not use an expert judgment elicitation to derive the credit. EPA also established a condition of the 1998 Certification Decision that DOE submit additional information concerning the schedule for completing PICs, fabrication of granite markers, and commitments by various recipients to accept WIPP records no later than the final recertification application.

A complete description of EPA's 1998 Certification Decision for Section 194.43 can be obtained from Docket A-93-02, Items V-A-1 and V-B-2.

CHANGES IN THE CRA

In Chapter 7.3.1 (Requirements for PICs) of the 2004 Compliance Recertification Application (2004 CRA), DOE added language discussing Condition 4 of EPA's 1998 Certification Decision. This condition requires that DOE must submit the following prior to the final recertification application submitted before closure of the disposal system:

- A schedule for implementing PICs, which also describes the testing of all aspects of the conceptual design;
- Documentation regarding the granite pieces for the proposed monuments;
- Documentation regarding the archives and record centers maintaining the WIPP docket documents; and
- Documentation regarding plan to ensure the recipients of WIPP information continue to have access to docket documents and supplementary information.

New information pertaining to the permanent markers portion of the PICs program and additional amendments to the planning process was also included in Chapter 7.3.3 (Implementation of the PICs program) of the 2004 CRA, which is documented in the following reports:

- Permanent Markers Testing Program Plan;
- Program Overview;
- Testing Rationale;

- Tests Specification;
- Detailed Test Plans;
- Evaluation of Results;
- Program Organization;
- Quality Assurance;
- Contractor Reports;
- Rock Types;
- Form of Inscriptions; and
- Additional Studies.

Language discussing the design specifications for the markers was added in 2004 CRA, Chapter 7.3.3.1.1 (Markers). DOE noted that the final specifications will be provided to EPA for approval prior to construction.

Examples of the types of files to be archived were added in 2004 CRA, Chapter 7.3.3.1.2 (Records).

In 2004 CRA, Chapter 7.3.3.3 (PICs Timelines) discusses a new and revised schedule under which DOE will implement its PICs program. DOE references a letter sent to EPA (dated May 16, 2002; Docket A-98-49, II-B3-41) and EPA's subsequent approval (dated November 7, 2002; Docket A-98-49, Item II-B3-41) of this revised timeline.

DOE claimed no credit for the effectiveness of PICs for the 2004 CRA, Chapter 7.3.4.2 and was not changed for the PABC (Docket A-98-49, Item II-B1-16). As indicated previously by EPA, DOE has the right to claim such credit in future recertification applications.

EVALUATION OF COMPLIANCE FOR RECERTIFICATION

Based on EPA's review of the activities and conditions in and around the WIPP site, EPA did not identify any significant changes in the planning and execution of the DOE's PICs plan since the 1998 Certification Decision.

The 2004 CRA adequately describes, in detail, the proposed PICs and their location and function, and identified the basis for their assumed effectiveness. In addition, DOE has shown that they understand their obligations as required under Condition 4 of EPA's initial certification decision. EPA also finds that DOE justifies the changes in the 2004 CRA regarding the design specifications and timeline – the latter of which was already reviewed and approved by the Agency. EPA continues to find DOE's assertion that the PICs program at WIPP can be considered as permanent as practicable.

Public comments expressed concern that DOE has not provided adequate information on their proposed PIC plan, nor for the basis for delays. Additionally, a comment contends the 2004 CRA is incomplete because it lacks a discussion of the accelerated cleanup program and its

possible impacts on WIPP and closure activities, including the PIC system.

DOE submitted a proposal in May 2002 (Docket A-98-49, II-B3-41) to change the schedule for implementation of the PICs program, and EPA responded with a November 2002 memorandum (Docket A-98-49, II-B3-41) accepting the revised schedule which still requires DOE to provide data in advance of the decommissioning of the WIPP facility. EPA believes DOE has provided sufficient information based on our review of the 2004 CRA.

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 194.43.