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## EXECUTIVE SUMMARY

2 The Waste Isolation Pilot Plant (WIPP), located near Carlsbad, New Mexico, is a deep geologic  
3 repository for the disposal of transuranic (TRU) wastes generated by atomic energy defense  
4 activities. The WIPP Land Withdrawal Act (LWA) requires the Department of Energy (DOE) to  
5 submit to EPA documentation of WIPP's continuing compliance with the Agency's disposal  
6 regulations, 40 CFR Part 191, Subparts B and C, not later than five years after initial receipt of  
7 TRU waste for disposal at the repository, and every five years thereafter until the  
8 decommissioning of the facility is completed. The first five-year period ends on March 27,  
9 2004. This Compliance Recertification Application (CRA) demonstrates WIPP's continuing  
10 compliance and requests that EPA recertify the repository.

### 11 **Background**

12 DOE estimates that approximately 115,000 m<sup>3</sup> of defense TRU wastes are stored at DOE sites  
13 across the country. Ongoing decommissioning and dismantlement work at these sites will  
14 generate more TRU wastes, as will continuing operations to maintain the nation's nuclear  
15 arsenal. Disposal of these wastes in the WIPP repository will ensure their isolation from the  
16 accessible environment for at least 10,000 years.

17 Waste disposal operations at the WIPP began on March 26, 1999, after the Environmental  
18 Protection Agency (EPA) certified WIPP's compliance with the disposal regulations. EPA's  
19 certification of WIPP in May 1998 followed submittal by DOE of the Compliance Certification  
20 Application (CCA) in October 1996. The first application demonstrated how the geological,  
21 hydrological, physical, chemical, and environmental characteristics of the site, along with  
22 engineered features of the facility, would comply with EPA's requirements for at least 10,000  
23 years.

### 24 **Content of the CRA**

25 As required by 40 CFR Parts 191 and 194, this CRA addresses a wide range of topics. It  
26 incorporates portions of the CCA and provides updates in those areas where approved changes  
27 occurred. It also presents new data and associated analyses. In addition, it responds to specific  
28 requests from EPA for new or expanded information or analyses. Topics addressed in this CRA  
29 include (but are not limited to) the following:

- 30 • Natural and engineered features of the disposal system, including geology, geophysics,  
31 and hydrogeology of the repository and its environs, as well as the geochemistry of  
32 interactions between the disposal system and the wastes placed in it;
- 33 • Assessments of the disposal system's long-term performance, including the input  
34 parameters used in those assessments;
- 35 • Criteria for accepting waste at WIPP and the programs and activities that ensure  
36 adherence to those criteria;
- 37 • Information concerning the inventory of TRU waste emplaced in the repository, stored at  
38 DOE sites, and the waste DOE expects to generate at those sites in the future;

- 1 • Reassessments of WIPP-relevant features, events, and processes (FEPs) that are  
2 important to the repository's performance, in light of data acquired since WIPP's original  
3 certification;
- 4 • Individual and groundwater protection standards and DOE's analyses demonstrating that  
5 WIPP will meet or exceed those standards; and
- 6 • Assurance requirements, including active and passive institutional controls, monitoring  
7 and impact of natural resource extraction.

8 The CRA follows the format of the CCA, but is modified to include new information and to  
9 respond to the guidance given by EPA on the content of this first CRA. As approved by EPA,  
10 portions of the original CCA were modified for this application; other portions of the CCA are  
11 incorporated by reference. Should EPA approve of DOE's request for recertification of WIPP,  
12 the CRA would establish an updated compliance baseline for the repository.

### 13 **Changes Since the CCA**

14 This application incorporates information about, and assessments of, several changes proposed  
15 by DOE and approved by EPA (or requested by EPA itself) since the original certification.  
16 These changes involve many aspects of the repository and the systems and processes associated  
17 with it. The most important of these changes include:

- 18 • **Inventory:** DOE updated estimates used in the CCA describing the TRU waste the  
19 Department may dispose of at WIPP. In addition, DOE compiled information about the  
20 waste already emplaced at WIPP. The updated waste information is incorporated into  
21 performance assessments (PAs) conducted for and described in this CRA.
- 22 • **Repository Configuration:** DOE requested approval from EPA for a small change in the  
23 horizon at which the repository is mined to facilitate ground control and provide greater  
24 protection to workers underground.
- 25 • **Panel Closure:** In its original certification, EPA stipulated that panel closures should be  
26 constructed using a specific design (known as "Option D"). The performance of this  
27 design is modeled in the 2004 PA, rather than the generic panel closure design modeled  
28 in the 1996 PA.
- 29 • **Disposal Operations:** Considering the extensive creep closure of excavations in Panel 1,  
30 DOE requested approval from EPA to not use certain rooms for waste disposal.
- 31 • **Engineered Barrier:** DOE requested approval from EPA to eliminate emplacement of  
32 so-called magnesium oxide (MgO) "mini-sacks" among the stacks of waste containers in  
33 the repository, while retaining the bulk of the MgO in "supersacks" placed on top of  
34 stacks of waste containers.
- 35 • **Waste Characterization:** DOE requested approval from EPA for updates to the WIPP  
36 Waste Acceptance Criteria (WAC). EPA approved the updates with conditions, which  
37 DOE fulfilled.

- 1 • **Performance Assessment:** DOE modified its approach to assessing the long-term  
2 performance of the repository in a number of aspects.
  - 3 – To make the representation of the shafts and of the repository geometry more  
4 appropriate for modeling the repository’s performance, and to explicitly include the  
5 Option D panel closure system, DOE modified 3 of the 24 conceptual models  
6 employed in PA: disposal system geometry, repository fluid flow, and disturbed rock  
7 zone. A peer review panel extensively examined these changes and found them to be  
8 reasonable and appropriate.
  - 9 – Responding to EPA’s guidance that another conceptual model needed modification,  
10 DOE developed a new model to predict possible spall releases and submitted it to a  
11 peer review. That review judged the new model to be reasonable and appropriate.
  - 12 – DOE implemented a single PA parameter set for this CRA, rather than maintaining  
13 two – one used in the creation of the CCA and the other resulting from PA  
14 verification tests mandated by EPA as part of its evaluation of the CCA.
  - 15 – DOE updated PA computing hardware and key software components of the PA  
16 system, including operating systems and database software, to improve computational  
17 performance. These upgrades also prolong the capabilities of the PA computing  
18 environment.

## 19 **Results**

20 DOE requested and EPA approved the changes described above at various times since EPA’s  
21 original certification of WIPP. This CRA assesses the combined effect of these changes on the  
22 compliance of the facility and demonstrates that the combined effect does not adversely impact  
23 performance or compliance.

24 The predicted releases from the repository remain well below the limits specified in 40 CFR Part  
25 191, Subpart B. Similarly, compliance analyses performed on the undisturbed repository result  
26 in a single postulated release whose value is significantly smaller than even the very small  
27 release estimated by the same analyses in the CCA. Taken together, the CCA and the CRA  
28 compliance analyses demonstrate that WIPP complies with the individual and groundwater  
29 protection standards promulgated in 40 CFR Part 191, Subpart C. When considered with  
30 information in this CRA pertaining to other aspects of TRU waste characterization and disposal,  
31 the PA and compliance analysis results amply demonstrate WIPP’s continued compliance with  
32 EPA’s requirements.

33 Therefore, WIPP continues to comply with the governing laws and regulations for the disposal of  
34 transuranic waste and the repository should be recertified by EPA.