

1 **EXECUTIVE SUMMARY**

2 *The Waste Isolation Pilot Plant (WIPP), located near Carlsbad, New Mexico, is a deep*
3 *geologic repository for the disposal of transuranic (TRU) wastes generated by atomic energy*
4 *defense activities. The WIPP Land Withdrawal Act (LWA) requires the Department of Energy*
5 *(DOE) to submit to EPA documentation of WIPP's continuing compliance with the Agency's*
6 *disposal regulations, 40 CFR Part 191, Subparts B and C, not later than five years after initial*
7 *receipt of 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 m³ 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*
27 *changes occurred. It also presents new data and associated analyses. In addition, it responds*
28 *to specific requests from EPA for new or expanded information or analyses. Topics addressed*
29 *in this CRA 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*
38 *at DOE sites, and the waste DOE expects to generate at those sites in the future;*

- 1 • *Re-assessments 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*
3 *original certification;*
- 4 • *Individual and groundwater protection standards and DOE's analyses demonstrating*
5 *that WIPP will meet or exceed those standards; and*
- 6 • *Assurance requirements, including active and passive institutional controls,*
7 *monitoring 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*
12 *WIPP, 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*
15 *proposed by DOE and approved by EPA (or requested by EPA itself) since the original*
16 *certification. These changes involve many aspects of the repository and the systems and*
17 *processes associated 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*
20 *the waste already emplaced at WIPP. The updated waste information is incorporated*
21 *into performance assessments (PAs) conducted for and described in this CRA.*
- 22 • *Repository Configuration:* *DOE requested approval from EPA for a small change in*
23 *the horizon at which the repository is mined to facilitate ground control and provide*
24 *greater protection to workers underground.*
- 25 • *Panel Closure:* *In its original certification, EPA stipulated that panel closures should*
26 *be constructed using a specific design (known as "Option D"). The performance of*
27 *this design is modeled in the 2004 PA, rather than the generic panel closure design*
28 *modeled in the 1996 PA.*
- 29 • *Disposal Operations:* *Considering the extensive creep closure of excavations in Panel*
30 *1, 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*
33 *in the repository, while retaining the bulk of the MgO in "super-sacks" placed on top*
34 *of 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***
7 ***rock zone. A peer review panel extensively examined these changes and found***
8 ***them to be reasonable and appropriate.***
 - 9 – ***Responding to EPA’s guidance that another conceptual model needed***
10 ***modification, DOE developed a new model to predict possible spall releases and***
11 ***submitted it to a peer review. That review judged the new model to be reasonable***
12 ***and appropriate.***
 - 13 – ***DOE implemented a single PA parameter set for this CRA, rather than maintaining***
14 ***two – one used in the creation of the CCA and the other resulting from PA***
15 ***verification tests mandated by EPA as part of its evaluation of the CCA.***
 - 16 – ***DOE updated PA computing hardware and key software components of the PA***
17 ***system, including operating systems and database software, to improve***
18 ***computational performance. These upgrades also prolong the capabilities of the***
19 ***PA computing environment.***

20 ***Results***

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

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

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