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**Title 40 CFR Part 191  
Subparts B and C  
Compliance Recertification  
Application  
for the  
Waste Isolation Pilot Plant  
Executive Summary**



**United States Department of Energy  
Waste Isolation Pilot Plant**

**Carlsbad Field Office  
Carlsbad, New Mexico**

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# **Executive Summary**

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## **Acronyms and Abbreviations**

CCA	Compliance Certification Application
CCDF	complementary cumulative distribution functions
CFR	Code of Federal Regulations
CRA	Compliance Recertification Application
DOE	U.S. Department of Energy
EPA	U.S. Environmental Protection Agency
FEPs	features, events, and processes
LANL	Los Alamos National Laboratory
LWA	Land Withdrawal Act
MgO	magnesium oxide
PA	performance assessment
PABC	Performance Assessment Baseline Calculation
T fields	transmissivity fields
TRU	transuranic
RH	Remote-Handled
WIPP	Waste Isolation Pilot Plant

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# EXECUTIVE SUMMARY

## EXECSUM-1.0 Overview

The Waste Isolation Pilot Plant (WIPP), located near Carlsbad, New Mexico, is a deep geologic repository for the disposal of transuranic (TRU) wastes generated by U.S. defense activities. The WIPP Land Withdrawal Act (LWA) (Pub. L. 102-579, 106 stat. 4777, as amended by Pub. L. 104-201, 110 stat. 2422) requires the U.S. Environmental Protection Agency (EPA) to certify the WIPP's compliance with the long-term disposal regulations of 40 CFR Part 191 Subparts B and C prior to the commencement of disposal operations. To comply with this requirement, the U.S. Department of Energy (DOE) submitted the Compliance Certification Application (CCA) in October 1996 demonstrating compliance with the disposal standards and the criteria for compliance established at 40 CFR Part 194. The CCA demonstrated how the geological, hydrological, physical, chemical, and environmental characteristics of the site, along with engineered features of the facility, would safely contain radioactive waste for the 10,000-year regulatory time period. After a thorough review of the CCA, the EPA certified WIPP's compliance with these regulations in May 1998, paving the way for waste disposal operations which began on March 26, 1999.

The WIPP LWA also requires the DOE to submit documentation of WIPP's continued compliance with the disposal regulations to the EPA not later than five years after initial receipt of TRU waste for disposal at the repository, and every five years thereafter until the decommissioning of the facility is completed. This periodic documentation of continued compliance is referred to as "recertification." The DOE has completed one recertification cycle. The first Compliance Recertification Application (CRA-2004) was submitted to the EPA on March 26, 2004. After a thorough review of the CRA-2004, the EPA recertified the WIPP's compliance on March 29, 2006. The second five-year recertification cycle ends on March 26, 2009. As with the CRA-2004, the CRA-2009 is being submitted to the EPA in accordance with the provisions of the LWA and demonstrates that the WIPP continues to be in compliance with the applicable radioactive waste disposal standards.

According to the WIPP Certification Criteria at 40 CFR § 194.15, recertification applications must include any information that is new or different from information contained in the most recent compliance application. Therefore, the DOE must review any new information that relates to the WIPP's certification basis and include the new information in each CRA. The central message of this CRA-2009 is that no significant changes have taken place since the CRA-2004 was submitted in March 2004. While there are minor changes documented and analyzed in the following recertification application, none compromise compliance with the radioactive waste disposal standards. The second five-year recertification cycle ends on March 26, 2009. As with the CRA-2004, the CRA-2009 is being submitted to the EPA in accordance with the provisions of the LWA and demonstrates that the WIPP continues to be in compliance with the applicable radioactive waste disposal standards. Continuing scientific studies and analyses have led to the conclusion that the WIPP repository is operating and performing as expected. This conclusion is underpinned by the fact that the results and analyses based on well-established probabilistic modeling tools show that the repository will not adversely impact public health and the environment during the required regulatory period.

1 **EXECSUM-1.1 Contents of the CRA-2009**

2 The CRA-2009 has been developed in accordance with the EPA’s Certification Criteria found at  
3 Part 194. The Criteria allow unchanged information contained in previous applications to be  
4 referenced, rather than repeated in recertification applications. Topics addressed in the  
5 CRA-2009 include, but are not limited to, the following:

- 6 • Natural and engineered features of the disposal system, including geology, geophysics,  
7 and hydrogeology of the repository and its environs, as well as the geochemistry of  
8 interactions between the disposal system and the wastes placed in it
- 9 • Information concerning the inventory of TRU waste emplaced in the repository, stored at  
10 DOE sites, and the waste expected to be generated at those sites and shipped to the WIPP  
11 in the future
- 12 • Updated WIPP-relevant features, events, and processes (FEPs) based on data and  
13 information acquired since the most recent CRA. FEPs are screened using specific  
14 criteria to determine what phenomena and components of the disposal system can and  
15 should be dealt with in PA calculations.
- 16 • Assessments of the disposal system’s long-term performance, including the input  
17 parameters and models used in those assessments
- 18 • Individual and groundwater protection standards and the DOE’s analyses demonstrating  
19 that the WIPP meets or exceeds those standards and will continue to do so
- 20 • Assurance requirements, including active and passive institutional controls, monitoring,  
21 and the effects of natural resource extraction.

22 **EXECSUM-1.2 Changes Since the CRA-2004**

23 This application incorporates information about, and assessments of, changes proposed by the  
24 DOE and approved by the EPA or requested by the EPA since the CRA-2004. In addition, some  
25 changes were driven by the availability of new data. These changes may involve different  
26 aspects of the physical repository and its components, as well as changes to the predictive tools  
27 used to demonstrate compliance. These changes include

- 28 • Inventory: The inventory included in the CRA-2004 was updated during the CRA-2004  
29 Performance Assessment Baseline Calculation (PABC) in response to comments from the  
30 EPA. The inventory used in the CRA-2009 PA is the same as the PABC inventory,  
31 which is slightly different from that used in the CRA-2004. Section 24 of this application  
32 contains details on the inventory.
- 33 • Remote-Handled (RH) TRU Waste: WIPP began accepting RH-TRU waste in January  
34 2007. The impact to the performance of the repository for this waste is assessed in the  
35 current performance assessment (PA) as was done in all previous PAs. Information  
36 related to the RH-TRU certification process is found in Sections 8 and 21.

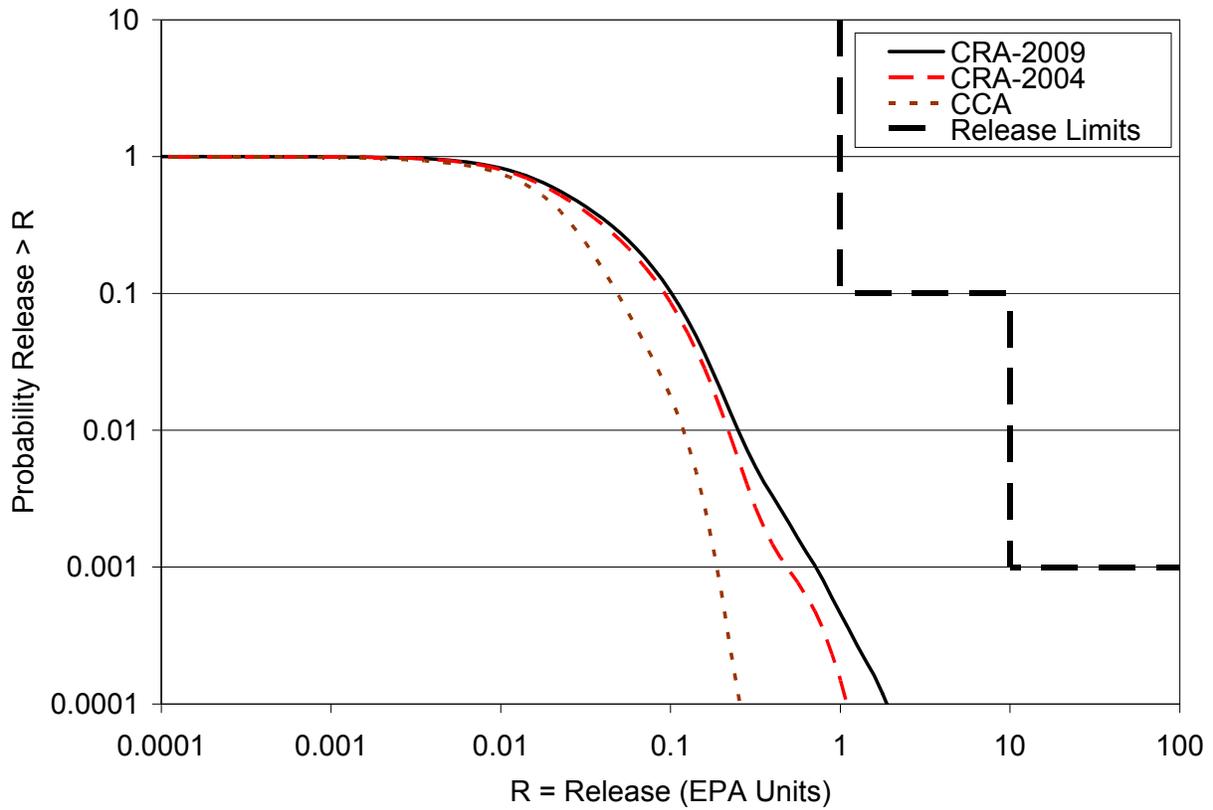
- 1 • CRA-2004 PABC Parameters: Changes to the CRA-2004 PA were made during the  
2 recertification process as part of the CRA-2004 PABC. The CRA-2004 PABC included  
3 changes in gas generation modeling, PA parameter changes, new Culebra transmissivity  
4 fields (T fields), and revisions to the calculations of spillings releases during drilling.
  
- 5 • CRA-2009 PA Updates: Changes to PA since the CRA-2004 PABC include parameter  
6 updates, code improvements, and corrections. Upgrades were also made to the  
7 computational platform used to execute the CRA-2009 PA. These changes are described  
8 in detail in Appendix PA-2009, Section PA-2.1.1.
  
- 9 • Engineered Barrier: The DOE obtained approval from the EPA to reduce the excess  
10 factor for the WIPP's engineered barrier (magnesium oxide – MgO chemical buffer) from  
11 1.67 to 1.2. Additionally, the supplier for the engineered barrier has changed from that  
12 used during the CRA-2004. See Section 44 of this application for additional information.  
13 These changes are detailed in Appendix MgO-2009.
  
- 14 • Peer Review: Documentation of WIPP peer reviews pertaining to RH-TRU waste visual  
15 examination data verification and sealed sources at Los Alamos National Laboratory  
16 (LANL) are presented in the CRA-2009. These peer reviews are detailed in Section 27.

### 17 **EXECSUM-1.3 Results**

18 Past PA results included in the previous certification applications (and two previous EPA-  
19 requested PAs) have all demonstrated compliance with the release limits of 40 CFR Part 191.  
20 Based on these PA results and other information contained in the compliance applications, the  
21 EPA has continued to certify the WIPP's compliance with the long-term disposal regulations.  
22 Similar to the CRA-2004, the CRA-2009 assesses the combined effect of any new changes on  
23 the performance of the disposal system. As with the results of past PAs, the combined effects of  
24 changes analyzed in this CRA do not adversely impact performance or compliance; the predicted  
25 releases from the repository remain well below the limits specified in Part 191 Subpart B.  
26 Continued compliance with the assurance requirements of the standards and the criteria is also  
27 demonstrated by CRA-2009.

28 The results of the CRA-2009 PA demonstrate that the repository continues to comply with the  
29 disposal standards. The results demonstrate a greater-than-95% level of statistical confidence  
30 that the overall mean of the population of complementary cumulative distribution functions  
31 (CCDFs) is in compliance with the containment requirements of 40 CFR § 191.13. The overall  
32 mean CCDFs of the CCA, CRA-2004, and CRA-2009 are shown in Figure EXECSUM-1 and  
33 illustrate the wide margin of compliance of the predicted releases with respect to the release  
34 limits.

35 Similarly, compliance analyses performed on the undisturbed repository result in a single  
36 postulated release whose value is significantly smaller than even the very small release estimated  
37 by the same analyses in the CCA. Taken together, the CCA, the CRA-2004, and the CRA-2009  
38 compliance analyses demonstrate that the WIPP continues to comply with the individual and  
39 groundwater protection standards in Part 191 Subparts B and C.



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2 **Figure EXECSUM-1. Overall Mean Total Releases for the CCA, CRA-2004, and**  
3 **CRA-2009**