40 CFR Part 191
Subparts B and C
Compliance Recertification Application 2026
for the
Waste Isolation Pilot Plant
Application of Release Limits
(40 CFR 194.31)

United States Department of Energy
Waste Isolation Pilot Plant

Carlsbad Field Office
Carlsbad, New Mexico

Compliance Recertification Application 2026
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ACRONYMS AND ABBREVIATIONS

CARD	Compliance Application Review Document
CCA	Compliance Certification Application
CH-TRU	contact-handled transuranic
CRA	Compliance Recertification Application
DOE	U.S. Department of Energy
DPA	Deferred Performance Assessment
EPA	U.S. Environmental Protection Agency
MCi	million-curie
PA	performance assessment
RH-TRU	remote-handled transuranic
TRU	transuranic
WIPP	Waste Isolation Pilot Plant
WUF	waste unit factor

31.0 APPLICATION OF RELEASE LIMITS (40 CFR 194.31)

31.1 Requirements

§ 194.31 Application of Release Limits

The release limits shall be calculated according to part 191, appendix A of this chapter, using the total activity, in curies, that will exist in the disposal system at the time of disposal.

31.2 Background

The radioactive waste disposal regulations at 40 CFR Part 191 (U.S. EPA 1993) include requirements for the containment of radionuclides. The containment requirements specify that releases from a disposal system to the accessible environment must not exceed the release limits set forth in Part 191, Appendix A, Table 1. To determine the applicable release limits for the Waste Isolation Pilot Plant (WIPP), information on the expected total curie content in the repository is needed. Since inventory estimates are updated during recertification and the curie content changes over time due to natural decay and radionuclide in-growth, the U.S. Department of Energy (DOE) must establish an inventory for performance assessment (PA) and select a reference date for decay calculations. 40 CFR 194.31 (U.S. EPA 1996) specifies that release limits must be based on the curie content at the time of disposal (meaning after the operational period, when the repository shafts have been backfilled and sealed).

According to Part 191, Appendix A, Table 1 (Note 1e), release limits for the radionuclides specified in the rule are based on "an amount of transuranic (TRU) waste containing one million curies of alpha-emitting TRU radionuclides with half-lives greater than 20 years." To obtain release limits for use in the PA, the release limits per million curies (MCi) specified in 40 CFR Part 191, Appendix A, Table 1, must be multiplied by a factor that defines the number of MCi of TRU radionuclides in the inventory. For PA purposes, this factor, defined as the waste unit factor (WUF), is expressed as:

$$f_w = \frac{\sum W_f}{10^6 Ci}$$

where f_w is the WUF and W_f is the WIPP-scale inventory in curies of each alpha-emitting TRU radionuclide with a half-life of 20 years or more. The methodology for calculating the WUF and release limits has remained unchanged since the Compliance Certification Application (CCA).

Previous compliance applications have summarized total contact-handled transuranic (CH-TRU) and remote-handled transuranic (RH-TRU) radioactivities, including tabulation of those radionuclides with the highest activity, for each new inventory used in PA calculations. Values for the WUF have also been reported for each inventory. The DOE assumed a closure date of 2033 in all previous PA compliance calculations.

The U.S. Environmental Protection Agency (EPA) has consistently confirmed that the DOE meets the criteria of 40 CFR 194.31, as documented in their decisions on the CCA (U.S. DOE 1996) and all subsequent Compliance Recertification Applications (CRAs).

31.3 Changes or New Information for the CRA-2019 DPA

A closure date of 2033 was assumed for the CRA-2019 Deferred Performance Assessment (DPA) (U.S. DOE 2019). During the CRA-2019 review, the EPA examined the verification and documentation for the ORIGEN-S and EPAUNI codes and confirmed that they adequately performed decay calculations (U.S. EPA 2022). The EPA also reviewed the waste inventory information provided by the DOE and verified calculations used in the CRA-2019 DPA. The EPA verified calculations on the inventory data used by DOE in the CRA-2019 DPA. Based on a review and evaluation of the CRA-2019 and supplemental information provided by the DOE, the EPA determined that the DOE continues to comply with the requirements for Section 194.31.

31.4 Changes or New Information Since the CRA-2019 DPA

Since the CRA-2019 DPA, two new panels have been approved for excavation and waste disposal. However, even with these additions, the total volume of waste permitted by the Land Withdrawal Act cannot be accommodated in the currently approved repository. The CRA-2026 is based on the approved interim state, which includes 12 waste panels and a capacity of 157,831.92 m^3 of waste. The Annual Transuranic Waste Inventory Report-2024 (ATWIR-2024) (U.S. DOE 2024) provides an inventory of defense-related TRU waste collected through December 31, 2023. The Interim State Performance Assessment Inventory Report – 2024 (IS_PAIR-2024) (Van Soest 2025) has been developed based on the annual inventory from TRU waste sites documented in the ATWIR-2024, scaled to fit the reduced volume appropriate for the approved repository. The closure date used to decay the CRA-2026 inventory is set for 2083, consistent with the assumed period of WIPP operations for CRA-2026. The resulting inventory represents the activity at the assumed time of disposal and is used to calculate the release limits in accordance with 40 CFR 194.31. The procedure for calculating the WUF and release limits in the CRA-2026 Performance Assessments remains unchanged from that used in the CRA-2019 DPA, as documented in Kicker (2025). The value of the WUF used in the CRA-2026 Interim State PA is 7.37.

The five radionuclides with the highest activity for the CH-TRU and RH-TRU waste in the IS_PAIR-2024, decayed through the year 2083, are shown in Table 31-1 and Table 31-2. Activities shown in these tables are derived from Table 5-3 and Table 5-4 of the IS_PAIR-2024. Five radionuclides – ^{239}Pu, ^{241}Am, ^{238}Pu, ^{240}Pu, and ^{241}Pu – contribute 98.8% of the total CH-TRU waste activity. The radionuclides ^{137}Cs, ^{137m}Ba, ^{90}Y, ^{90}Sr, and ^{238}Pu contribute 89.9% of the total RH-TRU waste activity in the CRA-2026 Interim State PA.

Table 31-1. Radionuclides with Highest Activity in the CRA-2026 Interim State CH-TRU Waste Inventory.

Radionuclide	Radioactivity (Ci)	Fraction of Total Activity (Total Activity 7.93×10^6 Ci)
^{239}Pu	3.51E+06	44.2%
^{241}Am	1.55E+06	19.5%
^{238}Pu	1.37E+06	17.3%
^{240}Pu	9.28E+05	11.7%
^{241}Pu	4.87E+05	6.1%

Table 31-2. Radionuclides with Highest Activity in the CRA-2026 Interim State RH-TRU Waste Inventory.

Radionuclide	Radioactivity (Ci)	Fraction of Total Activity (Total Activity 1.17×10^5 Ci)
^{137}Cs	3.17E+04	27.1%
^{137m}Ba	2.99E+04	25.6%
^{90}Y	1.93E+04	16.5%
^{90}Sr	1.93E+04	16.5%
^{238}Pu	4.96E+03	4.2%

The DOE's approach to demonstrating compliance with the application of release limits in the CRA-2026 PA has not changed from that used in the CRA-2019. This established methodology affirms the continued compliance with section 194.31.

31.5 References

(*Indicates a reference that has not been previously submitted.)

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