
**Title 40 CFR Part 191
Subparts B and C
Compliance Recertification Application 2019
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 2019
Application of Release Limits
(40 CFR 194.31)

Table of Contents

31.0 Application of Release Limits (40 CFR 194.31) 31-1
 31.1 Requirements 31-1
 31.2 Background..... 31-1
 31.3 Changes or New Information Since the CRA-2014 31-2
 31.4 References..... 31-2

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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
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

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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 calculate the applicable release limits for the Waste Isolation Pilot Plant (WIPP), information is needed on the expected total curie content in the repository. However, because the inventory estimates are updated as part of the recertification effort, and because the curie content of the waste inventory in the repository will change over time as a result of natural decay and in-growth of radionuclides, the U.S. Department of Energy (DOE) must establish an inventory for use in performance assessment (PA) and must determine a date for decay purposes to be used as a reference point for calculating the curie content of waste. 40 CFR 194.31 ([U.S. EPA 1996](#)) specifies that release limits should be calculated based on the curie content at the time of disposal (that is, after the end of the operational period, when the shafts of the repository 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 TRU [transuranic] 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 methodologies for calculating the WUF and release limits have remained unchanged for all compliance applications.

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 noted for each inventory. A closure date of 2033 has been assumed for all PA calculations.

For the Compliance Certification Application (CCA) ([U.S. DOE 1996](#)) and each subsequent CRA (Compliance Recertification Application), the U.S. Environmental Protection Agency (EPA) has reviewed the information provided and has determined that the DOE continues to comply with the criteria of 40 CFR 194.31.

During the CRA-2014 review, the EPA reviewed the verification of and documentation for the ORIGEN-S and EPAUNI codes and ensured that they adequately performed decay calculations (Compliance Application Review Document [CARD] 31) ([U.S. EPA 2017](#)). The EPA reviewed the information collected by the DOE related to the waste inventory for the CRA-2014 PA. The EPA verified calculations on the inventory data used by DOE in the CRA-2014 PA. Based on a review and evaluation of the CRA-2014 and supplemental information provided by the DOE, the EPA determined that the DOE continues to comply with the requirements for Section 194.31.

Information and data from previous compliance certification and recertification applications that form the basis of past DOE compliance positions and past EPA decision documents are found in the CRA-2014 ([U.S. DOE 2014](#)).

31.3 Changes or New Information Since the CRA-2014

The DOE has deferred submittal of the CRA-2019 PA until after submission of the CRA-2019 (see Executive Summary 2019, Section 1.3). As such, the CRA-2014 PA continues to be the baseline calculation for the CRA-2019. As directed in 40 CFR 194.15(b), where information remains valid and has been submitted in previous recertification applications, such information may be summarized and referenced. The results of the deferred PA will be described in a second submission that will also include revisions, when appropriate, to the information submitted in March, 2019.

31.4 References

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

U.S. Department of Energy (DOE). 1996. Title 40 CFR Part 191 Compliance Certification Application for the Waste Isolation Pilot Plant (October). 21 vols. Carlsbad, NM: Carlsbad Area Office. DOE/CAO 1996-2184.

U.S. Department of Energy (DOE). 2014. Title 40 CFR Part 191 Subparts B and C. Compliance Recertification Application for the Waste Isolation Pilot Plant (March). Carlsbad Field Office, Carlsbad, NM. DOE/WIPP 2014-3503.*

U.S. Environmental Protection Agency (EPA). 1993. 40 CFR Part 191: Environmental Radiation Protection Standards for the Management and Disposal of Spent Nuclear Fuel, High-Level and Transuranic Radioactive Wastes: Final Rule. *Federal Register*, vol. 58 (December 20, 1993): 66398–416.

U.S. Environmental Protection Agency (EPA). 1996. 40 CFR Part 194: Criteria for the Certification and Recertification of the Waste Isolation Pilot Plant's Compliance with the 40

CFR Part 191 Disposal Regulations: Final Rule. *Federal Register*, vol. 61 (February 9, 1996): 5223–5245.

U.S. Environmental Protection Agency (EPA). 2017. 2014 Compliance Recertification Application (CRA-2014) Compliance Application Review Document (CARD for Section 194.31): Application of Release Limits. Washington, DC: Office of Radiation and Indoor Air.*

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