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

Expert Judgment
(40 CFR § 194.26)**



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

**Carlsbad Field Office
Carlsbad, New Mexico**

**Expert Judgment
(40 CFR § 194.26)**

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Acronyms and Abbreviations

CARD	Compliance Application Review Document
CCA	Compliance Certification Application
CRA	Compliance Recertification Application
DOE	U.S. Department of Energy
EPA	U.S. Environmental Protection Agency
PA	performance assessment
PIC	passive institutional control
WIPP	Waste Isolation Pilot Plant

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1 **26.0 Expert Judgment (40 CFR § 194.26)**

2 **26.1 Requirements**

§ 194.26 Expert Judgment

(a) Expert judgment, by an individual expert or panel of experts, may be used to support any compliance application, provided that expert judgment does not substitute for information that could reasonably be obtained through data collection or experimentation.

(b) Any compliance application shall:

(1) Identify any expert judgments used to support the application and shall identify experts (by name and employer) involved in any expert judgment elicitation processes used to support the application.

(2) Describe the process of eliciting expert judgment, and document the results of expert judgment elicitation processes and the reasoning behind those results. Documentation of interviews used to elicit judgments from experts, the questions or issues presented for elicitation of expert judgment, background information provided to experts, and deliberations and formal interactions among experts shall be provided. The opinions of all experts involved in each elicitation process shall be provided whether the opinions are used to support compliance applications or not.

(3) Provide documentation that the following restrictions and guidelines have been applied to any selection of individuals used to elicit expert judgments:

(i) Individuals who are members of the team of investigators requesting the judgment or the team of investigators who will use the judgment were not selected; and

(ii) Individuals who maintain, at any organizational level, a supervisory role or who are supervised by those who will utilize the judgment were not selected.

(4) Provide information which demonstrates that:

(i) The expertise of any individual involved in expert judgment elicitation comports with the level of knowledge required by the questions or issues presented to that individual; and

(ii) The expertise of any expert panel, as a whole, involved in expert judgment elicitation comports with the level and variety of knowledge required by the questions or issues presented to that panel.

(5) Explain the relationship among the information and issues presented to experts prior to the elicitation process, the elicited judgment of any expert panel or individual, and the purpose for which the expert judgment is being used in compliance application(s).

(6) Provide documentation that the initial purpose for which expert judgment was intended, as presented to the expert panel, is consistent with the purpose for which this judgment was used in compliance application(s).

(7) Provide documentation that the following restrictions and guidelines have been applied in eliciting expert judgment:

(i) At least five individuals shall be used in any expert elicitation process, unless there is a lack or unavailability of experts and a documented rationale is provided that explains why fewer than five individuals were selected.

(ii) At least two-thirds of the experts involved in an elicitation shall consist of individuals who are not employed directly by the Department or by the Department's contractors, unless the Department can demonstrate and document that there is a lack or unavailability of qualified independent experts. If so demonstrated, at least one third of the experts involved in an elicitation shall consist of individuals who are not employed directly by the Department or by the Department's contractors.

(c) The public shall be afforded a reasonable opportunity to present its scientific and technical views to expert panels as input to any expert elicitation process.

3

4 **26.2 Background**

5 According to 40 CFR § 194.26 (U.S. Environmental Protection Agency 1996), the expert
6 judgment by an individual expert or panel of experts may be used to support any compliance
7 application, provided that expert judgment does not substitute for information that could
8 reasonably be obtained through data collection or experimentation.

1 The U.S. Environmental Protection Agency’s (EPA’s) Certification Decision (U.S.
2 Environmental Protection Agency 1998a) provides the following explanation of the use of the
3 expert judgment process in demonstrating compliance with 40 CFR Part 194 (1996):

4 The requirements of 40 CFR § 194.26 apply to expert judgment elicitation. Expert judgment is
5 typically used to elicit two types of information: numerical values for parameters (variables) that
6 are measurable only by experiments that cannot be conducted due to limitations of time, money,
7 and physical situation; and essentially unknowable information, such as which features should be
8 incorporated into passive institutional controls to deter human intrusion into the repository (61 FR
9 5228). Quality assurance (QA) requirements (specifically 40 CFR § 194.22(a)(2)(v)) must be
10 applied to any expert judgment to verify that the procedures for conducting and documenting the
11 expert elicitation have been followed.
12

13 The requirements of 40 CFR Part 194 prohibit expert judgment from being used in place of
14 experimental data, unless the Department of Energy (DOE) can justify that the necessary
15 experiments cannot be conducted. Expert judgment may substitute for experimental data only in
16 those instances in which limitations of time, resources, or physical setting preclude the successful
17 or timely collection of data.

18 **26.3 1998 Certification Decision**

19 **26.3.1 Expert Judgment for PA Parameters**

20 The Compliance Certification Application (CCA) (U.S. Department of Energy 1996) does not
21 identify any formal expert judgment activities related to the performance assessment (PA)
22 parameters. During the EPA’s review of the PA parameters, the EPA found inadequate
23 explanation and information for 149 parameters that the U.S. Department of Energy (DOE)
24 claimed had been derived using professional judgment. The compliance criteria do not provide
25 for utilization of “professional judgment.” Input parameters are to be derived from data
26 collection, experimentation, or expert elicitation. The EPA requested that the DOE provide
27 additional information on the derivation of the 149 parameters (Trovato 1997a, 1997b, and
28 1997c).

29 The DOE responded to the EPA’s requests by adding information to and improving the quality
30 of the records to enhance the traceability of parameter values. The EPA deemed the
31 documentation provided by the DOE adequate to demonstrate proper derivation of all but one of
32 the professional judgment parameters—the waste particle size distribution parameter. The EPA
33 required the DOE to use the process of expert elicitation to develop the value for the waste
34 particle size distribution parameter (Trovato 1997c).

35 The DOE conducted the expert judgment elicitation on May 5-9, 1997. The results of the expert
36 elicitation consisted of a model for predicting waste particle size distribution as a function of the
37 processes occurring within the repository, as predicted by the PA. The DOE completed a final
38 report entitled, *Expert Elicitation on WIPP Waste Particle Size Distributions(s) During the*
39 *10,000-Year Regulatory Post-Closure Period* (Carlsbad Area Office Technical Assistance
40 Contractor [CTAC] 1997). The particle size distribution derived from the expert elicitation was
41 considered in the PA verification test parameterization.

42 The EPA’s review of the DOE’s compliance with the requirements of section 194.26 principally
43 focused on the conduct of the elicitation process, since section 194.26 sets specific criteria for

1 the performance of an expert judgment elicitation. The EPA observed the DOE's elicitation
2 process and conducted an audit of the documentation prepared in support of the DOE's
3 compliance with section 194.26. The scope of the audit covered all aspects of the expert
4 judgment elicitation process, including panel meetings, management and team procedures,
5 curricula vitae of panel members, background documents, and presentation materials. The EPA
6 also assessed compliance with the quality assurance requirements of 40 CFR § 194.22(a)(2)(v)
7 (U.S. Environmental Protection Agency 1996). The EPA found that the documentation was
8 appropriate, that the panel members were appropriately qualified, and that the results of the
9 elicitation were used consistently with the stated purpose; the EPA, therefore, found the DOE in
10 compliance with section 194.26 (U.S. Environmental Protection Agency 1998a).

11 Comments on the EPA's proposed decision for section 194.26 related to two main issues: (1)
12 commenters questioned DOE's statement that it did not conduct any expert judgment activities in
13 developing the CCA, and (2) commenters questioned the use or role of professional judgment in
14 the development of input parameters used in the CCA. In response, the EPA stated that the
15 DOE's understanding of expert judgment was consistent with the EPA's use of the term "expert
16 judgment" in the compliance criteria, namely a formal, highly structured elicitation of expert
17 opinion. The EPA further stated that while the CCA initially did not contain adequate
18 information to ascertain whether a large number of the input parameters had been properly
19 derived, the DOE subsequently provided additional information that enabled the EPA to confirm
20 that all but one of the parameters (i.e., particle size) was adequately supported (Response to
21 Comments for 40 CFR Part 194, U.S. Environmental Protection Agency 1998b).

22 Based on its review of documentation developed by the DOE and its contractors, the results of
23 the EPA's audit, and consideration of public comments, the EPA concluded that the DOE
24 complied with the requirements of section 194.26 in conducting the required expert elicitation.
25 For further information on the EPA's evaluation of compliance with section 194.26 in the CCA,
26 see Compliance Application Review Document (CARD) 26 (U.S. Environmental Protection
27 Agency 1998c).

28 **26.3.2 Expert Judgment for Passive Institutional Control Credit**

29 In the CCA, Appendix EPIC, the DOE proposed a 700-year credit for the passive institutional
30 controls (PICs) to prevent human intrusion at Waste Isolation Pilot Plant (WIPP) and argued that
31 the PA for WIPP need not consider human intrusion for the first 700 years due to the postulated
32 effective active and PICs. Such credit is allowed by 40 CFR § 194.43(c) (U.S. Environmental
33 Protection Agency 1996).

34 In its 1998 decision on the CCA (CARD 43, U.S. Environmental Protection Agency 1998d), the
35 EPA did not allow the requested credit, based in part on the argument that the DOE did not
36 conduct an expert judgment process in the manner prescribed by section 194.26 (Expert
37 Judgment) to derive the PICs credit. EPA stated that instead of a formal expert judgment, the
38 DOE prepared a credit proposal and submitted it to a peer review panel.

39 The EPA did not consider the peer review to be equivalent to an expert judgment elicitation, as
40 prescribed in section 194.26. For instance, the EPA stated, the PIC peer review panel was

1 composed of three members, whereas EPA's expert judgment requirements call for at least five
2 members on a panel (40 CFR § 194.26(b)(7)(i)).

3 The EPA provided the following detailed discussion in CARD 43 for its decision:

4 DOE undertook two expert judgment exercises related to PICs prior to the promulgation of the
5 final compliance criteria. In one exercise, DOE asked groups of experts to predict the likelihood
6 of various intrusion scenarios in the future. In another, DOE asked an expert panel to identify the
7 elements of a marker system and to estimate the probability that such system would deter
8 inadvertent intrusion. In neither case did DOE present the panel with the conceptual design for
9 PICs that is in the CCA and ask the panel to derive a credit proposal based on that design. EPA
10 therefore noted that the results of either exercise may not be viewed as directly relevant to DOE's
11 credit proposal, and DOE has not requested that EPA consider them in this way.

12 **26.4 Changes in the CRA-2004**

13 No formal expert judgment elicitation were performed between the original certification
14 decision (U.S. Environmental Protection Agency 1998a) and the 2004 Compliance
15 Recertification Application (CRA-2004).

16 **26.5 EPA's Evaluation of Compliance for the 2004 Recertification**

17 Because no activity relating to formal expert judgment had taken place after the original
18 certification decision (U.S. Environmental Protection Agency 1998a) and before submission of
19 the CRA-2004, the EPA did not identify any issues relating to section 194.26 in the evaluation of
20 compliance for the 2004 recertification. During its review of the CRA-2004, the EPA received
21 no public comments on the DOE's continued compliance with the expert judgment requirements
22 of section 194.26.

23 Based on its review of the material pertaining to the CRA-2004, the EPA concluded that the
24 DOE demonstrated continued compliance with the requirements of section 194.26.

25 **26.6 Changes or New Information Since the 2004 Recertification**

26 No formal expert judgment elicitation have been performed for the WIPP project since the
27 submission of the CCA. Information pertaining to expert judgment as provided for the CCA and
28 the CRA-2004 remains unchanged. The DOE believes it has demonstrated continued
29 compliance with the provisions of section 194.26.

30 **26.7 References**

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- 23 U.S. Environmental Protection Agency (EPA). 1998c. “CARD No. 26: Expert Judgment.”
24 *Compliance Application Review Documents for the Criteria for the Certification and*
25 *Recertification of the Waste Isolation Pilot Plant’s Compliance with the 40 CFR Part 191*
26 *Disposal Regulations: Final Certification Decision* (May) (pp. 26-1 through 26-9).
27 Washington, DC: Office of Radiation and Indoor Air.
- 28 U.S. Environmental Protection Agency (EPA). 1998d. “CARD No. 43: Passive Institutional
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30 *Recertification of the Waste Isolation Pilot Plant’s Compliance with the 40 CFR Part 191*
31 *Disposal Regulations: Final Certification Decision* (May) (pp. 43-1 through 43-47).
32 Washington, DC: Office of Radiation and Indoor Air.