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

Peer Review
(40 CFR § 194.27)

United States Department of Energy
Waste Isolation Pilot Plant

Carlsbad Field Office
Carlsbad, New Mexico

Peer Review
(40 CFR § 194.27)

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Acronyms and Abbreviations

CAO	Carlsbad Area Office
CARD	Compliance Application Review Document
CBFO	Carlsbad Field Office
CCA	Compliance Certification Application
CMR	Chemistry and Metallurgical Research
CPR	cellulose, plastic, and rubber
CRA	Compliance Recertification Application
CTAC	CBFO Technical Assistance Contractor
DOE	U.S. Department of Energy
DRZ	Disturbed Rock Zone
EEG	Environmental Evaluation Group
EPA	Environmental Protection Agency
IAEA	International Atomic Energy Agency
LANL	Los Alamos National Laboratory
MP	Management Procedure
NAS	National Academy of Sciences
NEA/OECD	Nuclear Energy Agency/Organization for Economic Cooperation and Development
OSR	Off-Site Source Recovery
QA	quality assurance
QAPD	Quality Assurance Program Document
RH-TRU	remote-handled transuranic
RSI	Institute for Regulatory Science
SNL	Sandia National Laboratories
TRU	transuranic
VE	visual examination
WAC	Waste Acceptance Criteria
WIPP	Waste Isolation Pilot Plant

Elements and Chemical Compounds

Am	americium
CO_2	carbon dioxide
MgO	magnesium oxide
Pu	plutonium

27.0 Peer Review (40 CFR § 194.27)

27.1 Requirements

§ 194.27 Peer Review

(a) Any compliance application shall include documentation of peer review that has been conducted, in a manner required by this section, for:

(1) Conceptual models selected and developed by the Department;

(2) Waste characterization analyses as required in § 194.24(b); and

(3) Engineered barrier evaluation as required in § 194.44.

(b) Peer review processes required in paragraph (a) of this section, and conducted subsequent to the promulgation of this part, shall be conducted in a manner that is compatible with NUREG–1297, ''Peer Review for High-Level Nuclear Waste Repositories,'' published February 1988. (Incorporation by reference as specified in § 194.5.)

(c) Any compliance application shall:

(1) Include information that demonstrates that peer review processes required in paragraph (a) of this section, and conducted prior to the implementation of the promulgation of this part, were conducted in accordance with an alternate process substantially equivalent in effect to NUREG–1297 and approved by the Administrator or the Administrator's authorized representative; and

(2) Document any peer review processes conducted in addition to those required pursuant to paragraph (a) of this section. Such documentation shall include formal requests, from the Department to outside review groups or individuals, to review or comment on any information used to support compliance applications, and the responses from such groups or individuals.

27.2 Background

According to 40 CFR § 194.27 (U.S. Environmental Protection Agency 1996), the U.S. Department of Energy (DOE) is required to conduct peer review evaluations related to conceptual models, waste characterization analyses, and a comparative study of engineered barriers. A peer review involves an independent group of experts who perform an in-depth critique of assumptions, calculations, extrapolations, alternative interpretations, methodology and acceptance criteria employed, and conclusions drawn in the original work. Peer review confirms the adequacy of the work (U.S. Nuclear Regulatory Commission 1988). The required peer reviews must be performed in accordance with NUREG-1297, *Peer Review for High-Level Nuclear Waste Repositories* (U.S. Nuclear Regulatory Commission 1988), which establishes guidelines for the conduct of a peer review exercise. 40 CFR § 194.27(c)(2) also requires the DOE to document in the compliance application any additional peer reviews beyond those explicitly required. These additional peer reviews will be identified in this section as informal peer reviews.

For the formal peer reviews performed before submitting the Compliance Certification Application (CCA) (U.S. Department of Energy 1996a), the DOE developed Carlsbad Area Office (CAO) Team Procedure 10.5, *Peer Review* (U.S. Department of Energy 1996b) to guide all Waste Isolation Pilot Plant (WIPP) peer reviews and to show a process compatible with section 194.27 and NUREG-1297 requirements. For the Compliance Recertification Assessment (CRA) of 2004 (CRA-2004) (U.S. Department of Energy 2004a), the DOE updated this procedure to Carlsbad Field Office (CBFO) Management Procedure (MP) 10.5, *Peer Review* (U.S. Department of Energy 2002). MP 10.5 has been revised several times since 2002, and the

latest version (Rev. 7, 7/25/07) provides the criteria for selecting the peer review panel, peer review process used, review plan development requirements, peer review report preparation requirements, and many other aspects of the peer review process.

27.3 1998 Certification Decision

For the CCA, the DOE completed the required peer reviews and documented them in the CCA, Chapter 9.0 and Appendix PEER. The CCA, Chapter 9.0 and Appendix PEER, also contains documentation demonstrating that the DOE's procedures and plans for the required peer reviews are compatible with NUREG-1297. Peer reviews conducted after promulgation of 40 CFR Part 194 and intended to demonstrate compliance with section 194.27 were subject to the requirements of the pertinent procedures and plans. To assess the peer review process during the CCA, the EPA conducted an audit of the DOE's quality assurance (QA) records for peer review (U.S. Environmental Protection Agency 1997). The audit consisted of an extensive review of the DOE's records and interviews of DOE staff and contractors responsible for managing the required peer reviews.

The U.S. Environmental Protection Agency's (EPA's) certification decision was published in U.S. Environmental Protection Agency (1998a). The EPA found the DOE in compliance with the requirements of section 194.27. The EPA's independent audit established that the DOE had conducted and documented the required peer reviews in a manner compatible with NUREG-1297. The EPA also determined that the DOE adequately documented additional peer reviews in the CCA (see Compliance Application Review Document [CARD] 27, U.S. Environmental Protection Agency 1998b).

27.4 Changes in the CRA-2004

The DOE performed two conceptual model peer reviews between the CCA and the CRA-2004. These include the Salado Flow Conceptual Model Peer Review in March 2003 (see CRA-2004, Chapter 9.0, Section 9.3.1.3.4) and the Spallings Model Peer Review in September 2003 (see CRA-2004, Chapter 9.0, Section 9.3.1.3.5).

External informal peer reviews that fall under section 194.27(c)(2) requirements were also performed during this period. Reviews conducted by the National Academy of Sciences (NAS), the International Atomic Energy Agency (IAEA), Nuclear Energy Agency of the Organization for Economic Cooperation and Development (NEA/OECD), Institute for Regulatory Science (RSI), and the Environmental Evaluation Group (EEG) are described in the CRA-2004, Chapter 9.0, and the reports are included in the CRA-2004, Appendix PEER-2004.

27.5 EPA's Evaluation of Compliance for the 2004 Recertification

The following is the EPA's evaluation of the DOE's compliance with Section 194.27 (the CRA-2004, Chapter 9.0 and Appendix PEER-2004) as contained in the EPA's Recertification Decision (U.S. Environmental Protection Agency, 2006a) and the accompanying CARD 27 (U.S. Environmental Protection Agency, 2006b).

The EPA reviewed the new DOE MP 10.5, Rev. 5 (U.S. Department of Energy 2003a) and determined that it was adequately comparable with section 194.27 requirements and NUREG-1297 guidance. The DOE followed the MP 10.5, Rev. 5, for the Salado Flow Conceptual Model Peer Review (U.S. Department of Energy 2003b) and the Spallings Model Peer Review (U.S. Department of Energy 2003c). The EPA attended and reviewed each of the conceptual model peer reviews as they were performed and reviewed all documents related to each peer review. The EPA's review verified that the process used by the DOE to perform these peer reviews was compatible with NUREG-1297 requirements. The EPA completed its Salado Flow Conceptual Model Peer Review Report in June 2003 (U.S. Environmental Protection Agency 2003a), and the Spallings Model Peer Review in December 2003 (U.S. Environmental Protection Agency 2003b).

The Salado Flow Conceptual Model Peer Review was performed from April 2002 to March 2003. The final report was published in March 2003 (U.S. Department of Energy 2003d). This peer review evaluated changes to 3 of 24 conceptual models: Disposal System Geometry, Repository Fluid Flow, and Disturbed Rock Zone (DRZ). The three conceptual models were changed because of new information gained after the original certification or changes to conceptual model assumptions mandated by the EPA in the final CCA decision, such as the Option D panel closure condition. Changes included modification of the computational grid to accommodate the new panel closure requirement, shaft simplification, changes in fluid flow paths, and changing from a constant DRZ porosity to a range of values for the halite and anhydrite layers (U.S. Department of Energy 2003d). The peer review panel accepted the proposed changes. The EPA reviewed the peer review plan (U.S. Department of Energy 2003b) and the final peer review report (U.S. Department of Energy 2003d) for the Salado Flow Conceptual Model Peer Review. The EPA also observed the actual performance of the peer review, evaluated the process for the selection of the review panel, observed the interaction of the review panel with the DOE and Sandia National Laboratories (SNL), and reviewed the documents produced during and as a result of the peer review. The EPA determined that the peer review process and the implementation of MP 10.5 met the requirements of section 194.27 and the guidance in NUREG-1297 (U.S. Environmental Protection Agency 2003a).

The Spallings Model Peer Review was performed from July 2003 to October 2003. The final report was published in October 2003 (U.S. Department of Energy 2003e). This model was changed because the original conceptual peer review found the CCA's spallings model to be inadequate (although the spallings volumes used in the CCA were found to be reasonable) and the EPA expected the DOE to develop a new spallings model before the first recertification in 2004. The new spallings model includes three major elements: consideration of multiphase flow processes in the intrusion borehole, consideration of fluidization and transport of waste particulates from the intact waste mass to the borehole, and a numerical solution for the coupled mechanical and hydrological response of the waste as a porous medium (U.S. Department of Energy 2003e and 2004b). The DOE developed a new numerical code to implement the new spallings conceptual model, which was written to calculate the volume of WIPP solid waste that may undergo material failure and be transported to the surface as a result of a drilling intrusion. The peer review panel accepted the proposed changes. The EPA reviewed the peer review plan (U.S. Department of Energy 2003c) and the final peer review report (U.S. Department of Energy 2003e) and found them to adequately fulfill the requirements of section 194.27 and NUREG-1297. The EPA observed the actual performance of the peer review, evaluated the process for

the selection of the panel, observed the interaction of the panel with the DOE and SNL, and reviewed the documents produced during and as a result of the peer review. The EPA determined the peer review process and the implementation of MP 10.5 met the requirements of section 194.27 and the guidance in NUREG-1297 (U.S. Environmental Protection Agency 2003b).

The EPA conducted desktop evaluations of other reviews done since the CCA for compliance with section 194.27(c)(2). These include those done by the NAS, IAEA, NEA/OECD, RSI, and EEG from October 1996 to September 2003. The EPA found these reviews to be useful, reasonable, and helpful to the WIPP project, and determined that they reasonably fulfilled the requirements of section 194.27(c)(2).

The EPA did not receive any public comments on the DOE's continued compliance with the peer review requirements of section 194.27. Based on a review and evaluation of the CRA-2004 and supplemental information provided by the DOE (U.S. Department of Energy 2004a, Chapter 9.0 and Appendix PEER-2004), the EPA (2006a and 2006b) determined that the DOE continued to comply with the requirements for section 194.27.

27.6 Changes or New Information since the 2004 Recertification

27.6.1 LANL Sealed Sources Peer Review

A peer review on "sealed sources" was conducted for the Off-Site Source Recovery (OSR) Project at Los Alamos National Laboratory (LANL) in December 2003 (Los Alamos National Laboratory 2003).

Actinide-containing sealed sources (those containing plutonium-238 [^{238}Pu], plutonium-239 [^{239}Pu], and americium-241 [^{241}Am]) were generated over the past 60 years. Due to radiological risks posed by these materials, the OSR Project at LANL was responsible for gathering these sources for proper control and disposal. To support disposal of these sources at the WIPP, the OSR proposed using existing data from original production, transportation, or source control documents as the basis for determining radiological information required by the EPA.

This peer review panel was convened to review the adequacy of the available data to reasonably determine the radionuclide content for compliance with the WIPP Contact-Handled Transuranic (TRU) Waste Acceptance Criteria (WAC). These records include original manufacturing records; shipping data sheets; source control information, such as the Nuclear Materials Management and Safeguards System; and other corroborating sources of information, such as sealed source engraved markings. Nuclear Regulatory Commission/Agreement State regulatory approval data and U.S. Department of Transportation records were collected to support the assignment of radiological properties.

The Peer Review Panel concluded the following (Los Alamos National Laboratory 2003):

> The historical documents gathered by the OSR Project were originally prepared in a controlled manner. Strict adherence to procedures under the oversight of quality assurance programs assured that these sources and their associated production documents were prepared with a high degree of care and certainty. The nature of the source production work itself and the historically successful

performance of these sources for their intended purposes support this observation. In addition, the feed material batches to produce these sources were generated with close tolerances. These narrow tolerances were necessary to satisfy Material Type (MT) requirements in the production of defense materials, as well as the manufacture of sources to defined specifications.

The Peer Review Panel concluded that the various data records collected provide either uniquely, or as the sum of several individual records, adequate documentation for determining the radionuclide type, radionuclide content/activity, and either the date of manufacture or some other more conservative date for the purpose of decay correction. The Peer Review Panel concluded that these data were adequate for assigning, with a high degree of certainty, the radiological information required for the disposal of this material at the WIPP.

The EPA did not observe or audit this peer review.

27.6.2 LANL Remote-Handled TRU Waste Visual Examination Data Verification Peer Review

A peer review on *Los Alamos National Laboratory Remote-Handled Waste Visual Examination Data Verification* was performed in April 2007. Details of this peer review are contained in Time Solutions Corporation (2007a).

This peer review was an in-depth analysis and evaluation of visual examination (VE) data that were originally created by technicians at LANL for remote-handled- (RH-) transuranic (TRU) (RH-TRU) waste. The RH-TRU waste was derived from cleanup and decommissioning of hot cells located in Wing 9 of the Chemistry and Metallurgical Research (CMR) building at LANL during 1986-1992. During the cleanup process, LANL technicians recorded in CMR Laboratory Notebook #23744 descriptions of activities conducted and waste materials packaged. Data contained in that notebook were later used to assist in documenting the containerized waste so that it could be transported and stored at an on-site facility. The RH-TRU waste generated at Wing 9 of the CMR is intended for disposal at the WIPP. The data used by LANL for onsite transportation and storage were not created under the requirements of the current WIPP Quality Assurance Program Document (QAPD). Peer reviews are specifically recognized as a means for qualifying data not generated under a WIPP-approved QA program. The purpose of this peer review was to arrive at an expert opinion on whether the data are technically sufficient to determine if current data quality objectives and quality assurance objectives can be met.

For this peer review, a Peer Review Plan was developed that met the requirements of DOE MP 10.5, Rev. 6 (U.S. Department of Energy 2005). A three-member Peer Review Panel of independent, technically qualified experts was assembled to determine whether or not the VE data were technically robust enough for decisions concerning the residual liquid content and physical form of the waste. It was the unanimous opinion of the panel that the VE data may be used for those purposes.

While a number of criteria must be met to assure waste acceptance at the WIPP, this peer review was concerned with only two: (1) the volume of residual liquid content and (2) classifying the physical form of the waste. The scope of the peer review was to evaluate whether the technical information contained in the original data records prepared by LANL technicians is adequate for evaluating the residual liquid content in the waste and for classifying the waste as either (1)

homogeneous solids, (2) soils/gravel, or (3) debris. The scope did not include determining the residual liquid content of the waste or placing the waste into the correct physical form category, nor did it include determining if other (or all) WAC have been met.

The peer review was held in Albuquerque, NM, April 9–12, 2007. Organizations represented at the meeting included the DOE-CBFO, the EPA, Washington TRU Solutions, and the CBFO Technical Assistance Contractor (CTAC). The peer review process and documents created during the peer review are subject to all of the protocols described in the QAPD and MP 10.5. The DOE-CBFO Office of Quality Assurance, with support from CTAC, conducted the audit of the peer review process and found that it was satisfactorily performed and documented (see Appendix AUD-2009, Table AUD-3, Audit # A-07-23).

As a result of a peer review conducted according to the procedures contained in MP 10.5 and subject to the assumptions and limitations contained in Sections 6.1 and 6.2 of the peer review report, the Peer Review Panel concluded without dissent that with respect to the LANL RH-TRU Waste VE data:

- The data are sufficient for decision-making with respect to the volume of residual liquid contained in the RH-TRU waste.
- The data are sufficient for decision-making with respect to classifying the physical form of the RH-TRU waste.
- The data are complete with respect to the RH-TRU waste generated during hot cell cleaning and decommissioning at Wing 9 of the CMR at LANL.

The EPA examined the Panel's report in the context of its technical scope and results to understand the process followed and its relevance to the EPA's baseline inspection of the RH-TRU waste characterization program conducted at LANL on May 8 – 10, 2007. The EPA concluded that the results of the peer review were reasonable (U.S. Environmental Protection Agency 2008, p. 44).

27.6.3 WIPP Revised DRZ and Cuttings and Cavings Submodels Peer Review

In 2007, the DOE proposed modifications that would affect 2 of the 24 conceptual models in the Performance Assessment Baseline Calculation, the EPA's current performance assessment baseline from the CRA-2004. It was determined that since these proposed modifications would impact the conceptual models, an independent technical peer review on the adequacy of the proposed changes to the approved conceptual models should be performed in accordance with the requirements of section 194.27. Before the peer review was completed, the DOE decided in October 2007 to postpone considering the proposed modifications. The peer review panel prepared a report (Time Solutions Corporation 2007b) to document their interim findings.

27.6.4 The RSI Expert Review of the DOE's Use of MgO

In 2005 and 2006, the RSI of Alexandria, VA, reviewed the DOE's use of magnesium oxide (MgO) in the WIPP disposal rooms, paying particular attention to the need to emplace additional

MgO in rooms with super-compacted waste. This review was conducted at the request of the DOE and the results were submitted to the EPA in 2006 in support of the DOE's Planned Change Request for reducing the MgO excess factor from 1.67 to 1.2. The RSI expert panel met for two days in July 2005 in Carlsbad, NM, where the DOE scientists presented the technical justification for reducing the MgO excess factor. The RSI expert panel met again for two days in September 2005 in Albuquerque, NM, where the DOE scientists responded to several issues raised by the panel. The panel's findings were published in Institute for Regulatory Science (2006).

In its deliberations, the panel assessed the biodegradation potential of the WIPP waste, particularly the cellulosics, plastics, and rubbers (CPRs) in the waste under the projected physical and chemical conditions of the WIPP repository for the 10,000-year regulatory period. It also examined the role of MgO in consuming the carbon dioxide (CO_2) expected to be produced as a result of biodegradation. The panel concluded that most of the MgO will be available for chemical reaction; only a small fraction of the CPR material is likely to be biodegraded to produce CO_2, and it is therefore likely that the EPA release standards would be met even if there is less MgO than the quantity required to consume all the CO_2 produced. Therefore, the panel concluded that the 67% MgO excess factor is not necessary.

The EPA considered this review when evaluating the DOE request to reduce the quantity of MgO required to be emplaced in the WIPP repository. More details on this expert review can be found in Appendix MgO-2009 (Section MgO-6.2.4.1) (Reyes 2008).

The WIPP remains in compliance with the requirements of section 194.27.

27.7 References

Institute for Regulatory Science (RSI). 2006. *Application of Magnesium Oxide as an Engineered Barrier at [the] Waste Isolation Pilot Plant: Report of the Expert Panel* (February 21). RSI-06-01. Alexandria, VA: Institute for Regulatory Science.

Los Alamos National Laboratory (LANL). 2003. *Sealed Sources Peer Review Report* (December 5). WSMS-LOS-03-0065. Los Alamos: LANL Off-Site Source Recovery (OSR) Project.

Reyes, J. 2008. Letter to D.C. Moody (5 Enclosures). 11 February 2008. U.S. Environmental Protection Agency, Office of Air and Radiation, Washington, DC.

Time Solutions Corporation. 2007a. *Los Alamos National Laboratory Remote Handled Waste Visual Examination Data Verification Peer Review Report* (April). Albuquerque.

Time Solutions Corporation. 2007b. *Waste Isolation Pilot Plant Interim Report for the Revised DRZ and Cuttings & Cavings Sub-Models Peer Review* (December). Albuquerque.

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

U.S. Department of Energy (DOE). 1996b. *CAO Team Procedure: Peer Review* (Revision 0). TP No. 10.5. Carlsbad, NM: Carlsbad Area Office.

U.S. Department of Energy (DOE). 2002. *CBFO Management Procedure: Peer Review* (Revision 4). MP No. 10.5. Carlsbad, NM: Carlsbad Field Office.

U.S. Department of Energy (DOE). 2003a. *CBFO Management Procedure: Peer Review* (Revision 5). MP No. 10.5. Carlsbad, NM: Carlsbad Field Office.

U.S. Department of Energy (DOE). 2003b. *Salado Flow Peer Review Plan* (Revision 1). Carlsbad, NM: Carlsbad Field Office.

U.S. Department of Energy (DOE). 2003c. *Spallings Peer Review Plan* (June 20). Carlsbad, NM: Carlsbad Field Office.

U.S. Department of Energy (DOE). 2003d. *Salado Flow Conceptual Model Peer Final Review Report* (March). Carlsbad, NM: Carlsbad Field Office.

U.S. Department of Energy (DOE). 2003e. *Spallings Conceptual Model Peer Review Report* (October). Carlsbad, NM: Carlsbad Field Office.

U.S. Department of Energy (DOE). 2004a. *Title 40 CFR Part 191 Compliance Recertification Application for the Waste Isolation Pilot Plant* (March). 10 vols. DOE/WIPP 2004-3231. Carlsbad, NM: Carlsbad Field Office.

U.S. Department of Energy (DOE). 2004b. *Spallings Conceptual Model Peer Review Report: Errata* (February 20). Carlsbad, NM: Carlsbad Field Office.

U.S. Department of Energy (DOE). 2005. *Management Procedure: Peer Review* (Rev. 6, Effective July 25, 2005 to July 25, 2007). CBFO MP 10.5. Carlsbad, NM: Carlsbad Field Office.

U.S. Department of Energy (DOE). 2007. *Management Procedure: Peer Review* (Rev. 7, Effective July 25, 2007 to July 25, 2009). CBFO MP 10.5. Carlsbad, NM: Carlsbad Field Office.

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): 5223–45.

U.S. Environmental Protection Agency (EPA). 1997. *Audit of the Peer Review Process Conducted by the Department of Energy* (Revision 0). Carlsbad, NM: Carlsbad Area Office.

U.S. Environmental Protection Agency (EPA). 1998a. "40 CFR Part 194: Criteria for the Certification and Recertification of the Waste Isolation Pilot Plant's Compliance with the Disposal Regulations: Certification Decision; Final Rule." *Federal Register*, vol. 63 (May 18, 1998): 27353–406.

U.S. Environmental Protection Agency (EPA). 1998b. "CARD No. 27: Peer Review." *Compliance Application Review Documents for the Criteria for the Certification and Recertification of the Waste Isolation Pilot Plant's Compliance with the 40 CFR Part 191 Disposal Regulations: Final Certification Decision* (May) (pp. 27-1 through 27-11). EPA 402-R-97-013. Washington, DC: Office of Radiation and Indoor Air.

U.S. Environmental Protection Agency (EPA). 2003a. *EPA Review of the U.S. Department of Energy Salado Flow Conceptual Model Peer Review* (June). Washington, DC: Office of Radiation and Indoor Air.

U.S. Environmental Protection Agency (EPA). 2003b. *EPA Review of the U.S. Department of Energy Spallings Conceptual Model Peer Review* (December). Washington, DC: Office of Radiation and Indoor Air.

U.S. Environmental Protection Agency (EPA). 2006a. "40 CFR Part 194: Criteria for the Certification and Recertification of the Waste Isolation Pilot Plant's Compliance with the Disposal Regulations: Recertification Decision" (Final Notice). *Federal Register*, vol. 71 (April 10, 2006): 18010–021.

U.S. Environmental Protection Agency (EPA). 2006b. "Recertification CARD No. 27: Peer Review." *Criteria for the Certification and Recertification of the Waste Isolation Pilot Plant's Compliance with the 40 CFR Part 191 Disposal Regulations: Final Recertification Decision* (March) (pp. 27-1 through 27-5). Washington, DC: Office of Radiation and Indoor Air.

U.S. Environmental Protection Agency (EPA). 2008. *EPA Baseline Inspection No. EPA-LANL-CCP-RH-5.07-8 of the Central Characterization Project: Remote-Handled Transuranic Waste Characterization Program at the Los Alamos National Laboratory, May 8–10, 2007* (February). Waste Characterization Inspection Report. Washington, DC: Office of Radiation and Indoor Air.

U.S. Nuclear Regulatory Commission (NRC). 1988. *Peer Review for High-Level Nuclear Waste Repositories: Generic Technical Position.* NUREG-1297. Washington, DC.