

**Steps Required by NRC for the Licensing and Certification of
Transportation, Aging and Disposal (TAD) Canisters**

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Steps Required by NRC for Licensing and Certification of Transportation, Aging and Disposal (TAD) Canisters

Overview

With the recent release of the Final Supplemental Environmental Impact Statement for a Geologic Repository for the Disposal of Spent Nuclear Fuel and High-Level Radioactive Waste at Yucca Mountain, Nye County, Nevada, June 2008 (Yucca Mountain FSEIS), the U.S Department of Energy (DOE) has formally committed itself to a program for a canister suitable for storage, shipping, aging, and disposal of commercial spent nuclear fuel (TAD). In June 2007, DOE released the final performance requirements for the TAD canister. The TAD-based approach, originally announced in October 2005, eliminates the need for the construction of several multi-million square feet, multi-billion dollar facilities for handling spent fuel at the Yucca Mountain repository. To further cement this decision, In May 2008, DOE awarded Areva Federal Services and NAC International contracts for the design, licensing, and demonstration of the TAD canister system.

According to the Nuclear Regulatory Commission (NRC), it is the responsibility of each of the above contractors to apply for licensing and certification of the process which is required before the TAD canisters can be manufactured and implemented.

As indicated in the Yucca Mountain FSEIS, in 2006 DOE proposed a modified approach to repository design, development, and operation. Central to this proposed approach is the use of a canister concept for commercial spent nuclear fuel that minimizes handling of individual spent fuel assemblies; limits the need for complex surface facilities; and simplifies repository design, licensing, construction, and operation. DOE would use a TAD canister to transport, age, and dispose of commercial spent nuclear fuel without ever reopening the canister, thereby simplifying and reducing the number of handling operations involved in the packaging of spent nuclear fuel for disposal. In addition, the canistered approach offers the advantage of the use of practices that are familiar to the nuclear industry and the NRC, which would make the repository easier to design, license, construct, and operate. Although DOE has a small amount of spent nuclear fuel of commercial origin that it could ship to the repository uncanistered in a *cask*, consistent with the analysis in the Yucca Mountain FEIS, this Repository SEIS assumes that it would transport and receive all *DOE spent nuclear fuel* and high-level radioactive waste in *disposable canisters*. On October 13, 2006, in the Notice of Intent to prepare "Supplement to the Final Environmental Impact Statement for a Geologic Repository for the Disposal of Spent Nuclear Fuel and High-Level Radioactive Waste at Yucca Mountain, Nye County, NV" (71 FR 60490), DOE announced that it would prepare a supplement to the Yucca Mountain FEIS to evaluate potential environmental impacts of the modified repository design and operational plans. In its Notice of Intent, DOE described the primarily canistered approach whereby most commercial sites would package their spent nuclear fuel in TAD canisters, and all DOE materials would be packaged in disposable canisters at DOE sites. (FSEIS Vol. I, Part 1, p.1-5)

This paper will follow the process of licensing and certifying the proposed TAD canisters through the NRC requirements and include the public participation procedures that are available for interested parties who wish to participate.

NRC Licensing Process

As indicated in the FSEIS, the TAD canister is a component of systems that the NRC
 (1) would certify for the transportation of spent nuclear fuel under 10 CFR Part 71 and would license for surface storage at the respective commercial sites under 10 CFR Part 72; and
 (2) would license for repository site transfer, aging, and geologic disposal under 10 CFR Part 63.

Under this approach, the use of TAD canisters would minimize the handling of spent nuclear fuel assemblies because operators would seal commercial spent nuclear fuel in TAD canisters at generator sites (FSEIS Vol. I, Part 1, p.2-9)

Since the interests of the County are primarily concerned with the transportation of High Level Waste and Spent Nuclear Fuel (HLW/SNF) to the proposed Yucca Mountain Nuclear Waste Repository, this paper will focus on the licensing and certification process detailed in 10 CFR Part 71. Under 10 CFR Part 71.4, SNF is defined as fuel that has been withdrawn from a nuclear reactor following irradiation, has undergone at least 1 year's decay since being used as a source of energy in a power reactor, and has not been chemically separated into its constituent elements by reprocessing. Spent fuel includes the special nuclear material, byproduct material, source material, and other radioactive materials associated with fuel assemblies.

NRC Licensing Requirements – 10 CFR Part 71.3

The basic requirements to apply for a license are contained in the above mentioned CFR. For a complete text of the regulation, please see Nuclear Waste Transp\TAD Licensing\10 CFR Part 71--Packaging and Transportation of Radioactive Material.mht. The contractors chosen to develop the TAD containers, Areva Federal Services and NAC International are currently licensed by the NRC. The NRC licenses the following activities:

- construction, operation, and decommissioning of commercial reactors and fuel cycle facilities
- possession, use, processing, exporting, importing, and certain aspects of transporting nuclear materials and waste
- siting, design, construction, operations, and closure of waste disposal sites

The licensing process includes approving the initial license, subsequent license modifications, and license renewals.

To be licensed to use nuclear materials or operate a facility that uses nuclear materials, an entity or individual submits an application to the NRC. The staff reviews this information, using standard review plans, to ensure that the applicant's assumptions are

technically correct and that the environment will not be adversely affected by a nuclear operation or facility. (10 CFR Part 71.3)

Transportation of Spent Nuclear Fuel

The NRC regulates spent fuel transportation through a combination of safety and security requirements, certification of transportation casks, inspections, and a system of monitoring to ensure that requirements are being met. Spent nuclear fuel refers to uranium-bearing fuel elements that have been used at commercial nuclear reactors and that are no longer producing enough energy to sustain a nuclear reaction. Once the spent fuel is removed from the reactor the fission process has stopped, but the spent fuel assemblies still generate significant amounts of radiation and heat. Because of the residual hazard, spent fuel must be shipped in containers or casks that shield and contain the radioactivity and dissipate the heat.

Nuclear Materials Transportation Package Certification

Even though Areva and NAC are licensed, NRC will require additional cask certification through the process for the new design and construction of the TAD canisters. This process is described by NRC at <http://www.nrc.gov/waste/spent-fuel-transp.html>. The various steps include:

1. Obtaining a Radioactive Material Package Certificate of Compliance (CoC)

The NRC must approve any package used for shipping nuclear material before shipment. If the package meets NRC requirements, the NRC issues a Radioactive Material Package Certificate of Compliance (CoC) to the organization requesting approval of a package. Organizations are authorized to ship radioactive material in a package approved for use under the general licensing provisions of 10 CFR Part 71.

NRC also provides The Standard Review Plan (SRP) for Transportation Packages for Spent Nuclear Fuel (NUREG-1617) provides guidance for the review and approval of applications for packages used to transport spent nuclear fuel under 10 CFR Part 71. This document is intended for use by the U.S. Nuclear Regulatory Commission (NRC) staff. Its objectives are to

- (1) summarize 10 CFR Part 71 requirements for spent fuel transport package approval,
- (2) describe the procedures by which NRC staff determines that these requirements have been satisfied, and
- (3) document the practices used by the staff in reviews of package applications.

(The entire Review plan can be found at: <http://www.nrc.gov/reading-rm/doc-collections/nuregs/staff/sr1617/1617/sr1617.pdf>)

Nuclear materials packages must abide by the following requirements:

Shipping Requirements

Materials Packages

Before any shipment can occur, the shipper is required to review the package certificate of compliance (CoC) to determine if any testing or maintenance is

required. The shipper may be required to check or change package seals and other components or perform leak testing. In addition, the shipper must take radiation measurements at specific locations on and around the package to make sure that the levels are below the required limits.

The shipper must also meet the Department of Transportation's requirements for shipment of the nuclear material including route selection, vehicle condition and placarding, driver training, package marking, labeling, and other shipping documentation.

Spent Nuclear Fuel

Certain specific requirements apply to shippers of spent nuclear fuel.

A shipper must use NRC-approved highway routes for transport of spent nuclear fuel.

The shipper must make sure that spent fuel is protected against radiological sabotage. Shippers who transport or deliver spent fuel to a carrier for transport are required to meet specific requirements that include--

- notifying NRC of the shipment,
- having procedures for addressing emergencies,
- having a communications center, having a written log of shipment events,
- making arrangements with local law enforcement agencies for shipments while en route, and
- using armed escorts in heavily populated areas.

The time and date of the shipment must be protected as sensitive safeguards

For a transportation package to be certified by the NRC, it must be shown by actual test or computer analysis to withstand a series of accident conditions. The tests are performed in sequence to determine their cumulative effects on one cask.

2. Process for New Certificates of Compliance

To apply for a CoC to ship nuclear material, an organization would submit an application to NRC for review and approval. The application would contain information as described in "Standard Review Plan for Transportation Packages for Radioactive Material" (NUREG-1609) or the "Standard Review Plan for Transportation Packages for Spent Fuel" (NUREG-1617). The application must address the safety and operational characteristics of the package, including design analysis for structural, thermal, radiation shielding, nuclear criticality, material content confinement, and the four accident test conditions listed. In addition the application must contain operational guidance, such as any testing and maintenance requirements, operating procedures, and conditions for package use.

3. Modification Process for Certificates of Compliance

To modify a CoC, a CoC holder would submit a request to NRC with any necessary supporting technical information for NRC to review and approve, if appropriate, the amendment.

4. Renewal Process for Certificates of Compliance

To renew a CoC, a CoC holder at the end of the five-year approval period, would submit a request to NRC with any necessary supporting information describing the capability of the package design to continue to meet technical requirements. After reviewing this information, the NRC would determine whether to grant a CoC renewal.

5. Transfer and Merger Process for Certificates of Compliance

To transfer ownership of a CoC or to merge with another organization, a CoC holder would submit a request to NRC with any necessary supporting organizational information for NRC to review and approve the amendment.

Package Performance Study

The NRC is conducting a Package Performance Study to re-evaluate an original spent fuel transportation safety study sponsored by NRC in 1987 and documented in "Shipping Container Response to Severe Highway and Railway Accident Conditions" (NUREG/CR-4829).

Public Involvement

Throughout the entire licensing and certification process, the public has a right to participate in all phases as spelled out in the NRC regulations cited at <http://www.nrc.gov/about-nrc/regulatory/adjudicatory/hearing.html#who>.

Public Involvement in Licensing

Involvement in Licensing Actions

The public can become involved in the licensing of a facility and can make their views known to the Commission at various stages in the process. In the pre-licensing stage, the public is notified through the Federal Register, press releases, and local advertisements that an application has been received.

Notices regarding opportunities for hearings or public comment on all reactor licensing actions, including amendments to a facility's operating license, or license renewal proceedings are published in the Federal Register.

If local interest is strong, the NRC may hold public meetings in the vicinity of a proposed facility. Notices of meetings may be mailed to citizens' groups and civic and government leaders in the community and may be advertised in local newspapers.

For nuclear power plants, individuals who are directly affected by the proceeding may participate in a formal hearing. For materials licensees and fuel facilities, however, most hearings are informal.

The NRC conducts hearings on disputed matters involved in the licensing of nuclear reactors, nuclear materials, and nuclear materials facilities. Hearings are also available to contest civil penalties for infractions of NRC regulations or staff orders directing that

some action be taken. The NRC regulations that govern the hearing process are in Rules of Practice for Domestic Licensing Proceedings and Issuance of Orders (10 CFR Part 2).

Who Can Participate in a Hearing

Individuals or entities whose interests are affected by an NRC licensing or enforcement action may participate in hearings.

How to Learn About Opportunities for Hearings

Hearing requests and intervention petitions must be filed within 60 days of the date of the Federal Register publication of the Notice of Opportunity for Hearing.

Licensing Actions Involving Nuclear Materials or Nuclear Material Facilities

When NRC licensing actions involve nuclear materials or nuclear material facilities, frequently notices are not published in the Federal Register. However, information on opportunities for hearing for major licensing and regulatory actions involving nuclear materials or nuclear material facilities will be available at <http://www.nrc.gov/about-nrc/regulatory/adjudicatory/hearing-license-applications.html>

Deadline for Filing a Petition or Hearing Request

If a Federal Register notice of an opportunity for hearing is published, hearing requests and intervention petitions ordinarily must be filed within 60 days of the date of Federal Register publication of the "Notice of Opportunity for Hearing." If a Federal Register notice of opportunity for hearing is not published, hearing requests and intervention petitions ordinarily must be filed within 60 days of either the date that notice is provided at <http://www.nrc.gov/about-nrc/regulatory/adjudicatory/hearing-license-applications.html>, or within 60 days after the requestor receives actual notice of a pending application, but not more than 60 days after the NRC takes final action on the application.

Deadline for Filing a Petition or Hearing Request

There are three ways to participate in the NRC hearing process. An eligible individual or entity can participate by

- requesting intervention and a hearing
- requesting an opportunity to make an oral limited appearance
- submitting a written limited appearance statement

How to Participate

To be granted a hearing on a concern regarding a domestic licensing or enforcement action, you must demonstrate that you will be affected by the action and request a hearing as required by 10 CFR Part 2. To comply with this regulation, you file a petition to intervene in the hearing within the period specified in NRC's notice in the *Federal Register* of the licensing or enforcement action. See the following sections to learn more about participating in a hearing:

- 10 CFR 2.309 - Hearing requests, petitions to intervene, requirements for standing, and contentions
- 10 CFR 2.303 - Docket

- 10 CFR Part 2 - Rules of Practice for Domestic Licensing Proceedings and Issuance of Orders

Involvement in Environmental Impact Review

NRC considers impacts on the environment while reviewing any proposals for new major facilities or other major actions. An Environmental Assessment is usually prepared, which describes the need for a proposed action and a list of the agencies and experts consulted. If the assessment indicates the proposed facility or action will have a significant effect on the environment, an Environmental Impact Statement (EIS) is also developed by the NRC staff. Both documents are published in the *Federal Register*. The EIS includes information on the physical characteristics of the area -- geology, water, and air -- the ability of the transportation systems to support the facility, and local population data.

Scoping meetings are held in the vicinity of the affected community to provide a forum for members of the public to express their opinion and provide information for the environmental review. These meetings are often held to help NRC identify issues to be addressed in an Environmental Impact Statement and typically involve state and local agencies, Indian Tribes, or other interested people who request participation.

References

Nuclear Regulatory Commission, 10 CFR Part 63,
<file:///H:/Nuclear%20Waste%20Transp/TAD%20Licensing/10CFRPart63-fulltext.htm>

Nuclear Regulatory Commission, 10 CFR Part 71, file:///H:\Nuclear Waste Transp\TAD Licensing\10 CFR Part 71--Packaging and Transportation of Radioactive Material.mht

Nuclear Regulatory Commission, 10 CFR Part 72,
<file:///H:/Nuclear%20Waste%20Transp/TAD%20Licensing/10%20CFR%20Part%2072%20E2%80%94Licensing%20Requirements%20for%20the%20Independent%20Storage%20of%20Spent%20Nuclear%20Fuel%20and%20High-Level%20Radioactive%20Waste,%20and%20Reactor%20Related%20Greater%20than%20Class%20C%20Waste.htm>

Nuclear Regulatory Commission, *How to Learn About Opportunities for Hearings*,
<http://www.nrc.gov/about-nrc/regulatory/adjudicatory/hearing-license-applications.html>

Nuclear Regulatory Commission, *Nuclear Materials Transportation Package Certification*, <http://www.nrc.gov/waste/spent-fuel-transp.html>.

Nuclear Regulatory Commission, *Public Involvement*, <http://www.nrc.gov/about-nrc/regulatory/adjudicatory/hearing.html#who>

Nuclear Regulatory Commission, *The Standard Review Plan (SRP) for Transportation Packages for Spent Nuclear Fuel (NUREG-1617)*, <http://www.nrc.gov/reading-rm/doc-collections/nuregs/staff/sr1617/1617/sr1617.pdf>

US Department of Energy, *Final Supplemental Environmental Impact Statement for a Geologic Repository for the Disposal of Spent Nuclear Fuel and High-Level Radioactive Waste at Yucca Mountain, Nye County, Nevada, June 2008 (Yucca Mountain FSEIS)*

US Department of Energy, *Notice of Intent to prepare "Supplement to the Final Environmental Impact Statement for a Geologic Repository for the Disposal of Spent Nuclear Fuel and High-Level Radioactive Waste at Yucca Mountain, Nye County, NV" (71 FR 60490)*