



Interim Storage of Used or Spent Nuclear Fuel

Background Information

February 2008

BACKGROUND INFORMATION

Definitions

Consolidated storage—Proposed independent spent fuel storage installation (ISFSI) for a defined period based upon the facility license, placement into operation, and determination of further disposition of any used nuclear fuel placed in such storage.

Disposition—Any (or a combination) of the proposed options or methods determined and made operational to resolve the interim storage issue of used nuclear fuel.

PART OF NRC WASTE CONFIDENCE DECISION¹

The following is reprinted from “Temporary Storage of Spent Fuel After Cessation of Reactor Operation—Generic Determination of No Significant Environmental Impact,” Title 10, Part 51.23(a), *Code of Federal Regulations*.

§ 51.23 Temporary storage of spent fuel after cessation of reactor operation--generic determination of no significant environmental impact.

(a) The Commission has made a generic determination that, if necessary, spent fuel generated in any reactor can be stored safely and without significant environmental impacts for at least 30 years beyond the licensed life for operation (which may include the term of a revised or renewed license) of that reactor at its spent fuel storage basin or at either onsite or offsite independent spent fuel storage installations. Further, the Commission believes there is reasonable assurance that at least one mined geologic repository will be available within the first quarter of the twenty-first century, and sufficient repository capacity will be available within 30 years beyond the licensed life for operation of any reactor to dispose of the commercial high-level waste and spent fuel originating in such reactor and generated up to that time.

(b) Accordingly, as provided in §§ 51.30(b), 51.53, 51.61, 51.80(b), 51.95, and 51.97(a), and within the scope of the generic determination in paragraph (a) of this section, no discussion of any environmental impact of spent fuel storage in reactor facility storage pools or independent spent fuel storage installations (ISFSI) for the period following the term of the reactor operating license or amendment, reactor combined license or amendment, or initial ISFSI license or amendment for which application is made, is required in any environmental report, environmental impact statement, environmental assessment, or other analysis prepared in connection with the issuance or amendment of an operating license for a nuclear power reactor under parts 50 and 54 of this chapter, or issuance or amendment of a combined license for a nuclear power reactor under parts 52 and 54 of this chapter, or the issuance of an initial license for storage of spent fuel at an ISFSI, or any amendment thereto.



(c) This section does not alter any requirements to consider the environmental impacts of spent fuel storage during the term of a reactor operating license or combined license, or a license for an ISFSI in a licensing proceeding.

[49 FR 34694, Aug. 31, 1984, as amended at 55 FR 38474, Sept. 18, 1990; 72 FR 49509, Aug. 28, 2007]

The U.S. Nuclear Regulatory Commission (NRC) continues to view dry casks as an interim or temporary storage method for spent nuclear fuel until a permanent repository for high-level nuclear waste is available. NRC found in 1990 as part of its revised *Waste Confidence Decision*¹ that spent fuel could be safely stored in spent fuel pools or dry casks without significant environmental impact for at least 100 years. NRC reaffirmed its finding in 1999.

DISCUSSION

The following is reprinted from Mark Holt, Environment and Natural Resources Policy Division, "Civilian Nuclear Spent Fuel Temporary Storage Options," Report of Congressional Research Service, Library of Congress, updated March 27, 1998.

Reactor Storage Versus Central Storage

According to the Nuclear Regulatory Commission (NRC), providing adequate spent fuel storage capacity at nuclear power plants is not a very difficult engineering problem. Nevertheless, nuclear utilities and their supporters cite several reasons for minimizing storage at reactor sites through federal central storage, such as reduced costs, increased safety, and the fulfillment of DOE's statutory obligations. Utility opponents counter that the risk of transporting spent fuel to a central storage facility would outweigh any problems created by leaving the material at reactor sites. There is also concern that development of a federal central storage site could preempt the completion of a permanent underground nuclear waste repository.

When spent nuclear fuel is first removed from a reactor, after it can no longer efficiently sustain a nuclear chain reaction, it is intensely radioactive and thermally hot. Until its radioactivity has sufficiently subsided, spent fuel must be cooled in pools of water that are adjacent to each commercial reactor. After several years, spent fuel can safely be removed from the storage pools and transferred to dry storage facilities outside the reactor building.

In dry storage systems, sufficiently cooled spent fuel is transferred from underwater storage in the pools to thick metal casks or thinner canisters, which are then drained, filled with inert gas, and sealed. The thick casks can be placed directly on a concrete pad, while the thinner canisters are placed in concrete casks or bunkers to provide radiation shielding. Such dry storage facilities have been constructed on small parcels of land at several nuclear power plants that have run out of space in their spent fuel pools. NRC has determined that dry storage of spent fuel at reactor sites is safe for at least 100 years, and generally considers dry storage safer than pool storage.



According to DOE, about 1,000 metric tons of spent fuel is currently in dry storage at reactor sites. That number is projected to grow to above 2,000 metric tons by the turn of the century and exceed 10,000 metric tons by 2010. (The tonnage refers to the weight of the original nuclear fuel, excluding metal cladding and assembly hardware.)

Although dry storage of spent nuclear fuel at reactor sites is a proven technology, nuclear utilities would prefer to move their spent fuel as soon as possible to a federal interim storage facility. Utilities are particularly concerned about incurring indefinite responsibility for maintaining on-site storage facilities a concern that has grown with each delay in DOE's schedule for opening a permanent underground waste repository.

Supporters of federal storage contend that a centralized interim storage facility would be safer and less expensive in the long run than storage at each reactor site, and it would allow DOE to meet its obligation to nuclear power users, who have been assessed billions of dollars of fees to pay for waste disposal. Utilities and state utility regulators sued DOE for determining that it could disregard the 1998 disposal deadline if storage and disposal facilities were unavailable; a federal circuit court panel agreed with the utilities that the deadline was legally binding and vacated DOE's determination July 23, 1996. In a subsequent decision, issued November 14, 1997, the court ordered DOE to develop an acceptable remedy for its failure to begin taking waste from plant sites as required.

Some utilities may want to avoid building their own dry storage facilities because of the possibility of public controversy. Several proposals for dry storage at reactor sites have drawn strong state and local opposition; tight storage capacity limits were imposed at one nuclear plant, but no dry storage facility has yet been blocked altogether. The nuclear industry also is concerned that indefinite storage at reactor sites could pose a major obstacle to future nuclear power growth.

Opponents of federal interim storage contend that those problems do not justify moving spent fuel from nuclear power plants and incurring transportation risks before a permanent disposal site is ready. Strong state and local opposition has blocked previous proposals for centralized nuclear waste storage, particularly because of concern that such storage would become permanent.

The Nuclear Waste Technical Review Board, a scientific advisory body established by NWPAs, warned that immediate development of a DOE central storage facility could jeopardize the effort to develop a permanent underground repository. In a March 1996 report, the Board argued that a storage facility could divert scarce funding from the planned repository and could erode political support for the repository program. The Board was also concerned that locating the storage facility at the proposed repository site would make it appear that the results of future scientific studies of the site's suitability for permanent disposal had been predetermined.

Reference

1. *Waste Confidence Decision*, 49 FR 34694, August 31, 1984, as amended at 55 FR 38474, September 18, 1990; 72 FR 49509, August 28, 2007, *Federal Register*.