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# DEVELOPMENTS IN SPENT FUEL STORAGE REGULATORY ACTIVITIES

John P. Roberts
U.S. Nuclear Regulatory Commission
Mail Stop SS-396
Washington, DC 20555
301-427-4205

ABSTRACT

In November of 1980 the Nuclear Regulatory Commission issued 10 CFR Part 72, a regulation specifically dealing with spent fuel storage outside of reactor basins. In May 1982 the first license (SNM-2500) granted under Part 72 was issued renewing NRC authorization for storage located at a separate site. Licensing actions in the near future under Part 72 are expected to involve dry storage cask installations located at reactor sites. A standardized dry cask design report has been submitted by Gesellshaft fuer Nuklear Service, mbH, for safety review. A second such report is expected from Ridihalgh, Eggers and Associates this fall. Should these designs be acceptable, the submitted reports or specific sections thereof may be approved for referencing in site specific license application safety analysis reports.

## I. INTRODUCTION

In November of 1980 the Nuclear Regulatory Commission issued in final form 10 CFR Part 72, "Licensing Requirements for the Storage of Spent Fuel in an Independent Spent Fuel Storage Installation,"[1] (ISFSI) a regulation specifically dealing with spent fuel storage outside of reactor basins. The need for such a regulation was supported by the "Final Generic Environmental Impact Statement on Handling and Storage of Spent Light Water Power Reactor Fuel" (GEIS).[2] The GEIS predicted a need for additional storage capacity outside reactor basins conservatively assuming that neither reprocessing or a geologic repository would be available to alleviate storage capacity shortfalls before year 2000. While the assumptions of the GEIS regarding reprocessing and a repository appear to be holding up well, the ability of the nuclear power industry to cope with its storage problems through reracking, transshipment, and recently rod consolidation (which is developing rapidly as an option for some reactor pools) has been better than was expected. Thus, it is only now that the development of new independent spent fuel storage installation designs and of applications for storage under Part 72 is being implemented to meet storage capacity needs arising in the mid-to-late 1980's.

## II. BACKGROUND

Part 72, was developed specifically for spent fuel storage outside reactor basins. It covers both wet and dry technology design ISFSI storage for an ISFSI located either at a reactor site or at a separate site. Part 72 is a materials, not a facility, license. Thus, it involves one-step licensing. It is not necessary, as in a facility licensing action, to first obtain a construction permit and then an operating license.

When Part 72 was issued, it was generally assumed that most ISFSI storage of spent fuel would be at large federal installations utilizing water pool storage and located at separated sites. Recent developments, including changes in federal policy toward a federal storage program and industry

efforts, now make it likely that most ISFSI storage applications will involve at-reactor storage by utilities. If there is any federal spent fuel storage program, it is appears likely to be of limited scope. In addition, interest in and development of dry spent fuel storage casks (assisted by the Department of Energy)[3,4] has been more rapid than envisioned when Part 72 was issued.

## III. LICENSING REVIEWS

The first license granted under 10 CFR Part 72 for spent fuel receipt and storage in an ISFSI was for a water pool type, ISFSI, the General Electric Morris Operation, (G.E. Morris), in Morris, Illinois on May 4, 1982.[5]

Although the license was contested by the Attorney General, State of Illinois, no hearing was held. On March 2, 1982 the Atomic Safety and Licensing Board responded to a motion for summary disposition filed by G.E., supported by NRC staff, "that there are no genuine issues of material facts to be heard and decided. The Applicant's motion for summary disposition is granted. The record before the Board is closed and the matter is referred to the Director, Office of Nuclear Material Safety and Safeguards, U.S. Nuclear Regulatory Commission for appropriate action."[6] There were no appeals of this decision.

The Part 72 license (SNM-2500) was actually a renewal of authorization to receive and store spent fuel, which had previously been granted under the general regulations 10 CFR 30 and 40 and in particular 10 CFR Part 70, "Domestic Licensing of Special Nuclear Material." The period of the renewal license under Part 72 is 20 years.

At present some 1212 PWR and BWR assemblies (315 tonnes uranium, TeU) are stored at G.E. Morris [7]. However, a total of 1056 BWR assemblies (211 TeU) is expected to be shipped by rail beginning about September 1982 from the Cooper Station nuclear power plant in Nebraska to G.E. Morris for receipt and storage. Under recently issued advance notification regulations[8] governors of states through which these shipments pass will be prenotified.

No license for these shipments is required under NRC regulations since receipt and storage of spent fuel is already licensed at G.E. Morris. However, NRC regulations concerning shipment require the spent fuel shipped to be in Type B shipping casks certificated under 10 CFR Part 71 and that route approval under 10 CFR Part 73 be obtained from NRC's Division of Safeguards before shipment can begin. Approved routes are published in updated reports by the Division of Safeguards.[9]

License applications for spent fuel storage in at-reactor site ISFSI are expected from Virginia Electric and Power Company (VEPCO) this fall and from the Tennessee Valley Authority (TVA) in early 1983. The VEPCO application will be to meet storage needs at its Surry 1 and 2 plants. A dry cask ISFSI design is expected to be submitted. The TVA application is expected to be for a demonstration of dry cask storage at its Browns Ferry site and will probably involve only two casks.

At this time it seems likely that most future applications for ISFSI spent fuel storage will involve at-reactor site ISFSI. Separate site ISFSI are unlikely unless Congress authorizes a federal storage program in nuclear waste management legislation, such as the "National Nuclear Waste Policy Act of 1982," S.1662, passed by the Senate this year.[10]

Such legislation, even if passed by both houses of Congress and signed by the President this year, will not lead to geologic repository before the late 1990's at the earliest. Therefore it is possible that some spent fuel from reactors having expired operating licenses (unless these licenses are renewed) will have to be stored. Such storage can be accommodated under existing 10 CFR Part 72.

## IV. TOPICAL REPORTS

A Topical Report from Gesellschaft fuer Nuklear Service, mbH, (GNS) was received by the Office of Nuclear Material Safety and Safeguards (NMSS)

on June 23, 1982 and docketed under Project No. M-34.[11] The Topical Report, submitted by GNS covers a standardized nodular cast iron dry spent fuel storage cask ISFSI design and is entitled, "Topical Safety Analysis Report for a Castor Cask Type Independent Spent Fuel Storage Installation (Dry Storage)."

A Topical Report (TR) received by NMSS is first evaluated for completeness and technical adequacy. A TR is expected to be in the format of a Safety Analysis Report (SAR). While a TR is non-site specific, any design submitted should address a range of site parameters in developing the design such that the TR, or sections thereof, after receiving a safety review by NMSS staff, may be referenceable for the standardized design in future site specific license application SARs. After being evaluated, the TR, supplemented and/or revised as needed, may be accepted for safety review. This review is at the same level as the review of an SAR and a staff Safety Evaluation Report (SER) is issued. Also, assuming acceptability, a letter will be issued permitting the TR, or sections thereof, to be referenced in site specific license application SARs for the standardized design.

The submitted GNS TR has received an initial evaluation, and the NMSS staff have made specific recommendations to GNS concerning its report. However, since GNS has requested that all appendices be withheld from public disclosure, NMSS recommendations are not publically available. However, NMSS has sent a letter to GNS requesting that it "address with specificity" considerations listed in 10 CFR Part 2, Section 2.790(b)(4) concerning its request that all Appendices of the TR except Appendices 2, 4 and 5 be withheld from public disclosure.[13]

A second Topical Report for a stainless steel and lead dry spent fuel storage cask ISFSI design is expected to be submitted in October 1983 by Ridihalgh, Eggers and Associates (REA). The cask to be considered is the REA 2023 which is designed to store 52 unconsolidated BWR spent fuel assemblies (10 TeU). REA submitted its Quality Assurance Plan for review, which was received and docketed on May 25, 1982 under Project No. M-33.[12] The QAP is Chapter 11 of the Topical Report to be submitted. The QAP was reviewed and accepted as submitted.[15]

## V. CONCLUSIONS

In its most recent report on spent fuel storage requirements the Department of Energy indicates that additional storage capacity will be needed for between 8 and 23 nuclear power plants through 1990.[16] These estimates assume maximum reracking and, in the former case, full intrautility transshipment. Rod consolidation is not assumed in either case. A recent NRC report also examines[17] spent fuel storage needs and utility plans to meet those needs. It is in general agreement with the DOE assessment of storage capacity needs. DOE also shows additional storage capacity needs rising in year 2000 to between 11,320 metric tons uranium (MTU) of spent fuel with intrautility transshipment to 14,490 MTU without it for maximum reracking. This compares with only 400 MTU of spent fuel with transshipment and 1,420 MTU without it in 1990.[18] Even if one assumed successful use of rod consolidation in most reactors, it seems likely that some ISFSI storage capacity will be needed in the 1980s and that this need will increase rapidly in the 1990s.

In 1974 the Atomic Energy Commission issued a regulatory guide on storage of spent fuel in ISFSI,[19] which then supported 10 CFR Part 70. This guide and Part 70 were superseded with respect to the regulation of spent fuel storage in ISFSI in 1980 by a rule specifically addressing such storage, 10 CFR Part 72, and new regulatory guides supporting it. While ISFSI storage developments have been much slower than originally expected by some, it now appears that in the decade of the 1980's the ISFSI will finally emerge as a fully developed option by those utilities needing interim spent fuel storage capacity outside their reactor basins.

## References


1. U.S. Nuclear Regulatory Commission, "Licensing Requirements for the Storage of Spent Fuel in an Independent Spent Fuel Storage Installation," Federal Register, Vol. 45, No. 220, November 12, 1980, 74693-74712.

2. U.S. Nuclear Regulatory Commission, "Final Generic Environmental Impact Statement on Handling and Storage of Spent Light Water Power Reactor Fuel," USNRC Report NUREG-0575, docketed under Project No. M-4, August 1979. Available from National Technical Information Service, Springfield, VA 22161.

3. Department of Energy Request for Proposals No. DE-AC09-81SR10965, August 17, 1981.

4. Commerce Business Daily, Issue No. PSA-8103, p. 1-2, June 14, 1982.

5. Letter from Leland C. Rouse, Chief, Advanced Fuel and Spent Fuel Licensing Branch to the General Electric Company dated May 4, 1982 with enclosed License No. SNM-2500. Available from the NRC Public Document Room, 1717 H. Street, NW, Washington, DC 20555, under Docket No. 72-1.

6. In the Matter of General Electric Company (General Electric Morris Operation Spent Fuel Storage Facility, Decision and Order (Granting Motion for Summary Disposition), March 2, 1982, (LBP-82-14). Available from NRC Public Document Room, 1717 H. Street, NW, Washington, DC 20555, under Docket No. 72-1.

7. Letter from D. M. Dawson, Manager, Licensing Transportation and Quality Assurance, General Electric Uranium Management Corporation to Office of Nuclear Material Safety and Safeguards dated July 8, 1982. Available from the NRC Public Document Room, 1717 H. Street, NW, Washington, DC 20555, under Docket No. 72-1.

8. U.S. Nuclear Regulatory Commission, "Advance Notification to States of Transportation of Certain Types of Nuclear Waste," Federal Register, Vol. 47, No. 3, January 6, 1982, 600-604.

9. U.S. Nuclear Regulatory Commission, "Public Information Circular for Shipments of Irradiated Reactor Fuel," USNRC Report NUREG-0725, Rev. 2, June 1982.

10. Congressional Record - Senate, "National Nuclear Waste Policy Act of 1982," April 29, 1982, S4325-S4335.

11. Letter from Jack D. Rollins, U.S. Representative, GNS, to Director, Division of Fuel Cycle and Material Safety, Office of Nuclear Material Safety and Safeguards dated April 30, 1982 with 2 enclosed copies of the topical report. Available from NRC Public Document Room, 1717 H. Street, NW, Washington, DC 20555, docketed under Project No. M-34.

12. Affidavit signed by Jack D. Rollins and notarized April 30, 1982. Available from NRC Public Document Room, 1717 H. Street, NW, Washington, DC 20555, docketed under Project No. M-34.

13. Letter from Leland C. Rouse, Chief, Advanced Fuel and Spent Fuel Licensing Branch to Jack D. Rollins, Gesellschaft fuer Nuklear Services, mbH, dated August 13, 1982. Available from NRC Public Document Room, 1717 H. Street, NW, Washington, DC 20555, docketed under Project M-34.

14. Letter from Patricia E. Parker to Leland C.Rouse, Chief, Advanced Fuel and Spent Fuel Licensing Branch, dated May 6, 1982 with 25 enclosed copies of Quality Assurance Plan. Available from NRC Public Document Room, 1717 H. Street, NW, Washington, DC 20555, docketed under Project No. M-33.

15. Letter from Leland C. Rouse, Chief, Advanced Fuel and Spent Fuel Licensing Branch, to Ridihalgh, Eggers and Associates dated August , 1982. Available from NRC Public Document Room, 1717 H. Street, NW, Washington, DC 20555, docketed under Project No. M-33.

16. U.S. Department of Energy, "Spent Fuel Storage Requirements," U.S. DOE Report DOE/RL-82-1, June 1982, p. 15. Available from National Technical Information Service, Springfield, VA 22161.

17. U.S. Nuclear Regulatory Commission, "U.S. Reactor Spent-Fuel Storage Capabilities," U.S. NRC Report NUREG/CR-2704, June 1982. Available from National Technical Information Service, Springfield, VA 22161.

18. Op. cit., U.S. Department of Energy (Ref. 16), p. 14.

19. U.S. Nuclear Regulatory Commission. Regulatory Guide 3.24, "Guidance on the License Application, Siting, Design, and Plant Protection for an Independent Spent Fuel Storage Installation," U.S. Atomic Energy Commission, December 1974.