UNITED STATES
NUCLEAR REGULATORY COMMISSION
OFFICE OF NUCLEAR MATERIAL SAFETY AND SAFEGUARDS
WASHINGTON, D.C. 20555-0001

June 5, 1995

NRC INFORMATION NOTICE 95-28: EMPLACEMENT OF SUPPORT PADS FOR SPENT FUEL DRY STORAGE INSTALLATIONS AT REACTOR SITES

Addressees

All holders of operating licenses or construction permits for nuclear power reactors.

Independent spent fuel storage installation designers and fabricators.

Purpose

The U.S. Nuclear Regulatory Commission (NRC) is issuing this information notice to alert addressees to the importance of complying with all conditions and requirements specified in Section 72.212(b) of Title 10 of the *Code of Federal Regulations* (10 CFR 72.212(b)) and other applicable NRC regulations before using certified casks under the provisions of the general license under 10 CFR Part 72 for the dry storage of spent fuel. It is expected that the recipients will review this information notice for applicability to their facilities and consider actions, as appropriate. However, suggestions contained in this information notice are not NRC requirements; therefore, no specific action or written response is required.

Background

The NRC reviews and approves cask designs for use in storing spent fuel under a general license as stated in Subpart L of 10 CFR Part 72. Approved cask designs are listed in Subpart K of 10 CFR Part 72, (10 CFR 72.214), and a certificate of compliance is issued to the cask designer after the rulemaking approving the cask design is completed. Once a cask design has been certified and casks fabricated, casks may be used to store spent fuel at nuclear power reactor sites in accordance with Subpart K of 10 CFR Part 72. Such a license is only available to utilities that hold a license to possess or operate a power reactor under 10 CFR Part 50.

Before storing spent fuel under the general license, reactor facility licensees must meet the requirements stated in 10 CFR 72.212(b). Notably, they must--

- Determine and document that storage activities are in accordance with the provisions and conditions of the certificate of compliance for the cask.

- Ensure that reactor site parameters, including any external hazards, are enveloped by the design-basis values established in the cask

design safety analysis report referenced in the certificate of compliance and the related NRC safety evaluation report.

- Determine whether cask use will involve a reactor facility unreviewed safety question or a change to the facility technical specifications (10 CFR 50.59).

- Review and modify the reactor facility quality assurance program, security program, emergency plan, training program, and radiation control program to include spent fuel storage activities as appropriate.

- Develop reactor facility written operating procedures for cask handling and storage operations.

This information notice discusses circumstances regarding the emplacement of spent fuel dry storage cask pads.

Spent fuel storage cask designs are analyzed for normal, off-normal, and accident conditions, including tip-over and cask drop accidents. In instances where the pad supporting the casks, including the foundation beneath the pad, is not relied upon to perform a safety function, it is not treated as safety related or as important to safety. The cask design safety analysis report does not analyze for the effects of earthquakes, soil stability, or erosion on the cask pad and foundation.

However, 10 CFR 72.212(b)(2) requires that the general licensee ensure that, "cask storage pads and areas have been designed to adequately support the stati[c] load of the stored casks." Section 72.212(b)(3) states that the licensee shall, "determine whether or not the reactor site parameters, including analyses of earthquake intensity and tornado missiles, are enveloped by the cask design bases." The holder of a general license performs these evaluations to ensure that the design and construction of the cask storage pad is adequate to support the static load of the fully loaded storage casks. In addition, if potential conditions exist at the reactor site that could unacceptably diminish cask safety by any credible means, then the licensee must evaluate the potential conditions to verify that impairment of cask safety is highly unlikely. These evaluations are reviewed during NRC inspections and audits of licensee operations.

Description of Circumstances

During its initial siting analysis for dry spent fuel storage at the Palisades facility, Consumers Power Company (the licensee) noted that the peak ground acceleration used in the initial analysis for siting the power plant was 0.2g. The design-basis ground motion for the spent fuel dry storage casks is a peak ground acceleration of 0.25g. Therefore, the licensee determined that the safe shutdown ground acceleration of the site was enveloped by the design basis for the cask. No additional analyses were performed for the siting analysis at that time.

Since the Palisades plant is in close proximity to Lake Michigan, questions were raised by the NRC staff and interested members of the public regarding the possible effects of earthquakes on soil liquefaction, wind and wave effects on ground erosion, and the effects of these phenomena on the cask support pad and the spent fuel storage casks.

As a result of these questions, the licensee performed a detailed analysis of the effects of soil erosion, including the effects of high lake waves, wind, and rain on the cask support pad. In addition, the licensee analyzed the effect of a safe shutdown earthquake (SSE) on soil and foundation stability, based on both existing soil data and new data acquired from additional soil borings taken in response to the questions regarding the stability of the pad site.

Other questions addressed by the review included the following:

- Whether there had been any changes in the general site conditions since the submittal of the environmental impact statement for licensing of the facility (e.g., stability of site topography and wind erosion concerns).
- Whether there was sufficient vertical and horizontal separation between Lake Michigan and the pad location to provide a conservative margin against wave-driven erosion.
- Whether the cask support pad had been analyzed for the SSE peak ground acceleration defined for the Palisades site.
- Whether the geologic and seismological analyses had been properly performed.

The results of the licensee analysis showed that the pad could support the casks safely. These results are documented in a letter to the NRC dated July 27, 1994.

NRC independently reviewed the licensee analyses of the soil liquefaction effects on pad integrity, the pad design and construction, and the stability of slopes surrounding the pad to determine both the long-term effects of erosion under normal conditions and the effects of a postulated earthquake. This independent analysis also concluded that the cask pad would adequately support the cask as required by 10 CFR 72.212. The NRC independent assessment of the licensee analysis is documented in the "Independent NRC Staff Final Safety Assessment of the Dry Spent Fuel Cask Storage Facility at Palisades Nuclear Power Plant Site," dated September 20, 1994.

Discussion

Potential dry cask storage users are required by 10 CFR 72.212 to perform written evaluations, before use, that establish that the conditions for using NRC-approved spent fuel storage casks set forth in the certificate of compliance have been met. These evaluations include review of the cask design

safety analysis report and the related NRC safety evaluation report to ensure that the reactor site parameters are enveloped by the cask design bases. The licensee is also required to perform a written evaluation that ensures that the cask storage pad and areas are designed to support the static load of the stored cask. The effects of a postulated earthquake based on the earthquake ground motion used for the plant design-basis SSE is valid for the storage casks without further analysis only if the foundation geology for the cask pad is the same as that for the plant. A different soil amplification resulting from SSE ground motion at the pad site could result in exceeding the cask design basis.

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Brian K. Grimes, Director
Division of Project Support
Office of Nuclear Reactor
Regulation

William D. Travers, Director
Spent Fuel Program Office
Office of Nuclear Material
Safety and Safeguards

Technical contacts: F. Sturz, NMSS
(301) 415-7278

M. Gamberoni, NRR
(301) 415-3024

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2. List of Recently Issued NRR Information Notices

LIST OF RECENTLY ISSUED NMSS INFORMATION NOTICES

Information Notice No.	Subject	Date of Issuance	Issued to
95-25	Valve Failure during Patient Treatment with Gamma Stereotactic Radiosurgery Unit	05/11/95	All U.S. Nuclear Regulatory Commission Medical Licensees.
94-64, Supp. 1	Reactivity Insertion Transient and Accident Limits for High Burnup Fuel	04/06/95	All holders of OLs or CPs for Nuclear Power Reactors and all fuel fabrication licensees.
95-07	Radiopharmaceutical Vial Breakage during Preparation	01/27/95	All U.S. Nuclear Regulatory Commission medical licensees authorized to use byproduct material for diagnostic procedures.
95-01	DOT Safety Advisory: High Pressure Aluminum Seamless and Aluminum Composite Hoop-Wrapped Cylinders	01/04/95	All U.S. Nuclear Regulatory Commission licensees.
94-89	Equipment Failures at Irradiator Facilities	12/28/94	All U.S. Nuclear Regulatory Commission irradiator licensees.
89-25, Rev. 1	Unauthorized Transfer of Ownership or Control of Licensed Activities	12/07/94	All fuel cycle and material licensees.
94-81	Accuracy of Bioassay and Environmental Sampling Results	11/25/94	All U.S. Nuclear Regulatory Commission licensees.
93-60, Supp. 1	Reporting Fuel Cycle and Materials Events to the NRC Operations Center	10/20/94	All 10 CFR Part 70 fuel cycle licensees.

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Information Notice No.	Subject	Date of Issuance	Issued to
95-27	NRC Review of Nuclear Energy Institute, "Thermo-Lag 330-1 Combustibility Evaluation Methodology Plant Screening Guide"	05/31/95	All holders of OLs or CPs for nuclear power plants.
95-26	Defect in Safety-Related Pump Parts due to Inadequate Heat Treatment	05/31/95	All holders of OLs or CPs for nuclear power reactors.
94-61, Supp. 1	Corrosion of William Power Gate Valve Disc Holders	05/25/95	All holders of OLs or CPs for nuclear power reactors.
95-25	Valve Failure during Patient Treatment with Gamma Stereotactic Radiosurgery Unit	05/11/95	All U.S. Nuclear Regulatory Commission Medical Licensees.
95-24	Summary of Licensed Operator Requalification Inspection Program Findings	04/25/95	All holders of OLs or CPs for nuclear power reactors.
95-23	Control Room Staffing Below Minimum Regulatory Requirements	04/24/95	All holders of OLs or CPs for nuclear power reactors and all licensed operators and senior operators at those reactors.
95-22	Hardened or Contaminated Lubricants Cause Metal Clad Circuit Breaker Failures	04/21/95	All holders of OLs or CPs for nuclear power reactors.
95-21	Unexpected Degradation of Lead Storage Batteries	04/20/95	All holders of OLs or CPs for nuclear power reactors.

OL = Operating License
CP = Construction Permit

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orig /s/'d by BKGrimes

Brian K. Grimes, Director
Division of Project Support
Office of Nuclear Reactor
Regulation

orig /s/'d by WDTravers

William D. Travers, Director
Spent Fuel Program Office
Office of Nuclear Material
Safety and Safeguards

Technical contacts: F. Sturz, NMSS
(301) 415-7278

M. Gamberoni, NRR
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DATE	05/22/95		05/26/95		05/24/95		05/25/95	

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Office of Nuclear Material
Safety and Safeguards

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Office of Nuclear Reactor Regulation

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This seems to be an appropriate subject for addl administrative letter.

John Hannon for

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