

October 3, 2005

Mr. Steven P. Kraft, Director
Waste Management
Nuclear Energy Institute
1776 I Street, NW
Suite 400
Washington, D.C. 20006-3708

Dear Mr. Kraft:

On July 25, 2005, the Nuclear Energy Institute (NEI) submitted a letter to the U.S. Nuclear Regulatory Commission (NRC) discussing concerns raised by certain licensees about the implementation of Regulatory Issue Summary (RIS) 2005-05, "Regulatory Issues Regarding Criticality Analyses for Spent Fuel Pools and Independent Spent Fuel Storage Installations" (ADAMS Accession No. ML043500532). Specifically, NEI's concerns focused on the need for the NRC to develop a single acceptable set of inputs and assumptions for spent fuel storage criticality analyses. RIS 2005-05 provides the regulatory and technical history of this issue.

Due to the differences in the licensing bases and the physical environments for spent fuel pools (SFPs) and storage or transportation casks, the Offices of Nuclear Reactor Regulation (NRR) and Nuclear Material Safety and Safeguards (NMSS) developed distinct criticality analysis methodologies for licensing high density fuel storage in SFPs and large capacity dry cask storage designs, respectively. NRR's criticality analysis methodologies rely on a plant-specific, full-burnup credit but do not allow a soluble boron credit; NMSS's methodologies permit a general, partial-burnup credit as well as a soluble boron credit. The methodology differences result in the need for separate criticality analyses to satisfy NRC regulations. NRR and NMSS are working together to address NEI's concerns and to ensure the safe storage of irradiated fuel in SFPs and independent spent fuel storage installations (ISFSIs).

In its letter, NEI raised concerns that the criticality analysis issue identified in RIS 2005-05 could adversely impact planned cask-loading campaigns at nuclear plants. The NRC is working diligently to ensure that this issue does not adversely affect planned cask-loading campaigns. The NRC has contacted licensees identified as potentially affected by the criticality issue to ensure that they do not violate the regulations and that the issue is resolved in a timely manner. The NRC has completed all of the requested licensing actions and, to its knowledge, has not delayed or impeded any cask-loading activities. The NRC strongly encourages any licensee affected by this issue to inform the NRC early so that the staff can assure cask loading campaigns are conducted in a safe manner, consistent with NRC regulations and that schedules are not adversely affected.

NEI proposed both near- and long-term resolutions for this issue. The attachment to this letter responds to each of the NEI suggestions and discusses NRC actions focused on near-term resolutions to ensure regulatory compliance and long-term resolutions to minimize the need to perform separate criticality analyses to satisfy 10 CFR 50.68 and 10 CFR 72.124.

Mr. S. P. Kraft

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The NRC agrees that the NRC, licensees, NEI, and interested stakeholders should meet to discuss SFP and ISFSI criticality analysis concerns. NRC staff from NRR and NMSS will support any scheduled meetings. NRR has the lead for this issue and will contact your staff to schedule a meeting in the near term to discuss NRC and industry actions to resolve this issue.

If you have any questions, please feel free to contact either Mr. Robert Taylor (NRR) at 301-415-1437 or Mr. Meraj Rahimi (NMSS) at 301-415-2947.

Sincerely,

/RA/

J. E. Dyer, Director
Office of Nuclear Reactor Regulation

/RA/

Jack R. Strosnider, Jr., Director
Office of Nuclear Material Safety
and Safeguards

Attachment: As stated

Mr. S. P. Kraft

-3-

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Attachment: As stated

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Response to Nuclear Energy Institute (NEI) Letter

On July 25, 2005, NEI submitted a letter to the U.S. Nuclear Regulatory Commission (NRC) discussing concerns raised by certain licensees about the implementation of Regulatory Issue Summary (RIS) 2005-05, "Regulatory Issues Regarding Criticality Analyses for Spent Fuel Pools and Independent Spent Fuel Storage Installations." Specifically, NEI's concerns focused on the need for the NRC to develop a single acceptable set of inputs and assumptions for criticality analyses.

Near-term Resolution

In its letter NEI proposed two near-term NRC actions to allow cask loadings to proceed while the issues raised in RIS 2005-05 are resolved. NEI suggested that either the NRC should issue a general exemption to the requirements of 10 CFR 50.68 for cask loading operations or implement a discretionary enforcement policy similar to the policy used when the 10 CFR 70.24 criticality monitoring issue was first identified.

With regard to NEI's request for a general exemption, the NRC considered the technical and regulatory feasibility of adopting this approach. As NEI is aware, the NRC has issued five exemptions to 10 CFR 50.68 to permit dry cask loading, unloading, and handling operations in the SFP. The NRC reviewed and approved the exemptions based on the licensee's ability to satisfy plant-specific design and operating criteria for criticality analyses and boron dilution events. The NRC does not have a regulatory mechanism for granting a general exemption. Under 10 CFR 50.12, "Specific Exemptions", the NRC can grant specific exemptions to licensees based on special circumstances. No provision in 10 CFR Part 50 permits the NRC to grant a general exemption. The NRC expects that the objective of the proposed general exemption could be better accomplished through rulemaking. As will be discussed later, NRR will evaluate a revision to 10 CFR 50.68 to address the issues in RIS 2005-05 consistent with its priority as determined in the Fiscal Year 2006 Rulemaking Plan.

Secondly, NEI proposed that the NRC grant enforcement discretion similar to the discretion used when the 10 CFR 70.24 criticality-monitoring issue was first addressed. The NRC has determined that there are substantial differences between the current criticality issue and the 10 CFR 70.24 criticality monitoring issue. The 10 CFR 70.24 criticality-monitoring issue was an oversight by both the NRC and nuclear industry during the issuance of the 10 CFR Part 50 operating licenses for many plants. This resulted in an immediate 10 CFR 70.24 noncompliance for many reactors. The NRC recognized that this perpetual noncompliance resulted through no intentional act by licensees and that enforcement discretion was appropriate until licensees could take action to either comply with the regulation or perform the appropriate analyses to demonstrate that an inadvertent criticality event was precluded without credit for soluble boron. Unlike the 10 CFR 70.24 criticality-monitoring issue, the current criticality issue does not result in an unintentional noncompliance for any licensees. A violation only occurs if a licensee intentionally loads, unloads, or handles certain cask systems in the spent fuel pool without performing the proper analyses to demonstrate subcriticality. The NRC cannot grant enforcement discretion permitting licensees to willfully violate NRC regulations.

ATTACHMENT

Although the NRC appreciates NEI's suggestions for the near-term resolution of this issue, the NRC cannot endorse either proposed approach as an acceptable resolution. In lieu of implementing NEI's suggestions, the NRC intends to continue pursuing the two available regulatory approaches, exemptions and amendments, to ensure regulatory compliance. The NRC has issued five exemptions to 10 CFR 50.68(b)(1) to permit licensees to conduct cask loading, unloading, and handling operations in the spent fuel pools. There are significant disadvantages to reviewing and issuing exemptions. First, the NRC discourages the practice of regulation by exemption. Second, the NRC has determined that some licensees may not be able to provide the necessary technical or regulatory justification to support the issuance of an exemption. Finally, since a licensee may not apply the 10 CFR 50.59 process to evaluate changes to a specific exemption, it is highly likely that licensees will need a new 10 CFR 50.68 exemption if any subsequent changes are made to the design, license, or operation of the (1) spent fuel pool; (2) dry cask storage system; (3) fuel assemblies to be stored; (4) boron dilution analyses; or (5) supporting procedures and controls. Each of these disadvantages results in significant burden for both licensees and the NRC. Therefore, the exemption process is not the NRC staff-preferred approach.

Prior to the March 23, 2005, issuance of RIS 2005-05, the NRC accepted exemptions based on the 10 CFR 50.12(a)(ii) special circumstance that "Application of the regulation in the particular circumstances would not serve the underlying purpose of the rule or is not necessary to achieve the underlying purpose of the rule." In RIS 2005-05, the NRC provided an acceptable methodology for demonstrating compliance with 10 CFR 50.68. The NRC has determined that since compliance with the regulation can be demonstrated, it is no longer appropriate to issue exemptions based on this special circumstance. However, the NRC will review an exemption if a licensee can demonstrate that a significant hardship exists or other special circumstances are present. The NRC will review each exemption on a case-by-case basis.

In lieu of exemptions, the NRC-preferred near-term strategy for ensuring regulatory compliance is to review and approve license amendments to address the criticality issue during cask loading. To date, the NRC has approved two license amendments to permit long-term loading, unloading, and handling of dry cask storage systems in spent fuel pools based on a plant-specific burnup credit. The NRC has determined that there are significant advantages associated with following the amendment process. First, licensees would comply with the regulations. Second, the NRC anticipates that in most cases licensees will need only a one-time license amendment to permit cask loading, unloading, and handling operations. Since the licensee will be in compliance with 10 CFR 50.68, it may evaluate changes to its 10 CFR Part 50 criticality analyses with respect to loading, unloading, or handling dry cask storage systems in the SFP via the 10 CFR 50.59 process. Additionally, many of the methodologies for performing the required analyses have been approved by the NRC. A licensee that follows its approved plant-specific criticality analysis methodology will significantly expedite the review process. Finally, the NRC has considerable experience approving these types of license amendments. This has been demonstrated by the NRC's ability to approve amendments related to this issue more quickly than exemptions. On June 28, 2005, the NRC issued a license amendment (ADAMS Accession No. ML051860200) to the Joseph M. Farley Nuclear Plant to permit dry cask loading, unloading, and handling operations in the spent fuel pool. The NRC considers this amendment an excellent precedent that other licensees can use to prepare high-quality submittals for NRC review.

Long-term Resolution

The NEI letter proposes that “for the permanent solution to the issues raised by RIS 2005-05, the NRC should adopt a single acceptable set of inputs and assumptions for burnup credit analysis across the agency.” Specifically, NEI suggested that the Office of Nuclear Materials Safety and Safeguards (NMSS) adopt the Office of Nuclear Reactor Regulation (NRR)-accepted burnup credit methodology. **The NRC recognizes that the most efficient long-term solution is a single criticality analysis methodology that can be used in both spent fuel pool storage and storage or transportation casks. However, due to differences in the physical environments** and the licensing bases (site-specific versus general) of pools and casks, it is not appropriate to apply the current methodology used by NRR to casks licensed by NMSS. The NRR methodology can address uncertainties by evaluating a restricted population of fuel assemblies discharged from a single reactor, whereas NMSS cask reviews must address a far larger population of fuel assemblies discharged from any reactor. Additionally, the spent fuel pool environment allows the use of soluble boron as a defense-in-depth measure to offset any unknown uncertainties in burnup credit. Transportation casks cannot credit soluble boron and therefore cannot compensate for uncertainties in this way.

NRC is taking steps to develop a burnup credit approach that can be applied to spent fuel pools, as well as to storage and transportation environments. The Spent Fuel Project Office (SFPO) began developing a more general burnup credit methodology by issuing Interim Staff Guidance (ISG)-8, “Burnup credit in the Criticality Safety Analysis of PWR Spent Fuel in Transportation and Storage Casks.” The most recent revision to ISG-8 was issued on September 27, 2002 (ADAMS Accession No. ML02270555). This document describes the considerations an applicant should address when using burnup credit and offers potential solutions. Although this document only addresses actinides and does not currently include burnup credit for fission products, it does not preclude their use. The NRC understands that the **industry wants to pursue burnup credit that includes fission products. The NRC is willing to evaluate any methodology offered for review.**

The primary deterrent to granting credit for actinides and fission products has been the significant uncertainties in the composition and nuclear characteristics of spent fuel. A NRC and Department of Energy study is currently underway to review recently acquired international actinide and fission product **data. The NRC believes this data will be instrumental in supporting the development of a generic burnup credit methodology. SFPO will issue future ISG-8 revisions, as appropriate, to include the new burnup credit methodologies.**

Effective communication with the industry is crucial in developing a mutually acceptable full burnup credit methodology. To that end, both NMSS and NRR will continue to participate actively in a wide range of national **standards committees, meetings, and conferences on the safe storage, transportation, and disposal of spent fuel. The NRC believes that continued communication among the NRC, licensees, NEI, and interested stakeholders will be vital in the development of a generic burnup credit methodology.**

NRR will evaluate a revision to 10 CFR 50.68 to address the issues in RIS 2005-05 consistent with its priority as determined in the Fiscal Year 2006 Rulemaking Plan. This effort will proceed

in parallel with SFPO's burnup credit efforts and will serve as an alternative long-term resolution strategy. As NEI is aware, the NRC has a number of planned and on-going high priority rulemaking activities. The NRC must utilize its rulemaking resources efficiently and effectively to accomplish these activities on the appropriate schedule. The NRC strongly encourages NEI to take an active part in the planned rulemaking on this issue.

Summary

The NRC believes that, in the near term, amendments offer the most efficient and effective path available while assuring compliance with the criticality requirements of 10 CFR 50.68 during the loading of storage casks in the spent fuel pool. If a licensee believes that an amendment would not resolve its particular situation, exemptions will be considered on a case-by-case basis. For the long-term solution, the NRC is committed to working with licensees, cask vendors, and other stakeholders to develop a new burnup credit methodology for use in storage and transportation casks that could also be used in spent fuel pools. In parallel, NRR will evaluate a 10 CFR Part 50 rulemaking consistent with its priority to resolve this issue.