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NEI Position Regarding the Stack-up Configuration for Dry Storage Casks

NRC's Previously Established Regulatory Approach

Promulgation of the amendment of 10 CFR Part 72 in the Federal Register Volume 55 No. 138 starting on page 29181, August 17, 1990 clearly articulates the intent of the applicability of 10 CFR Part 72 and 10 CFR Part 50 as it relates to the loading, unloading and handling of NRC-certified casks used under the Part 72 general license as follows (page 29183):

" If spent fuel is stored in an ISFSI on a reactor site, this storage will be licensed under the regulations in 10 CFR Part 72. ... A power reactor FSAR will contain a description of cask loading and unloading, because reactor fuel (both fresh and spent) must be handled for operation of the reactor. If no amendment of the operating license is necessary (e.g. there is no problem in fuel handling concerning heavy loads and there is no unreviewed safety question), then spent fuel may be stored under the general license." (emphasis added)

" In order to utilize an NRC certified cask under a general license, power reactor licensees must (1) perform written evaluations showing that there is no unreviewed safety question or change in reactor technical specifications related to the spent fuel storage, and that spent fuel will be stored in compliance with the cask's Certificate of Compliance;..."

This supplementary information to the rulemaking clearly delineates that the loading, unloading and handling is performed under the licensee's 10 CFR Part 50 facility license. Therefore, demonstration by the licensee that there is no unreviewed safety question (USQ), as it relates to loading, unloading and handling of the cask, was intended to be performed under the 10 CFR Part 50 facility license. The term "USQ" pre-dates the 2001 revisions to the §50.59 and §72.48 rules, but the meaning remains the same; an activity requiring a change to the Technical Specifications associated with the plant license or cask CoC, or for which any of the questions in §50.59(c) or §72.48(c) are answered "yes" must receive NRC review and approval before implementation.

Promulgation of the amendment of 10 CFR Part 72 in the Federal Register Volume 55 No. 138 also clearly articulates the establishment of the licensing basis for casks under the general license provision of 10 CFR Part 72 Subpart K as follows (page 29182):

" Under this rule [10 CFR Part 72], casks will be approved by rulemaking and any safety issues that are connected with the casks are properly addressed in that rulemaking rather than in a hearing procedure." (emphasis added)

" There is a possibility that the use of a certified cask at a particular site may entail the need for site-specific licensing action. For example, an evaluation under 10 CFR0.59 for a new cask loading procedure could require a part 50 license amendment in a particular case. ... However, generic cask approval (issuance of a certificate of compliance) would, in accordance with section 133 of the Nuclear Waste Policy Act of 1982 (NWPAA), eliminate the need for site-specific approvals to the maximum extent practicable." (emphasis added)

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Clearly, the intent is to eliminate, or minimize to the extent practicable, the need for site-specific approvals, as well as to include in the cask's certificate of compliance any safety issues associated with the casks. Therefore, safety significant aspects of the casks, except for those intended to be addressed as part of the general licensee's 10 CFR Part 50 facility license (as evidenced above), are included in the cask's certificate of compliance. Additional licensing actions specific to the casks were not intended to be necessary nor were they intended to be performed by the licensee. The intention was that all known safety issues related to the cask would be adequately addressed prior to issuing a final rulemaking for the cask certificate of compliance. If an issue is identified for the cask loading, unloading or handling operations (such as the stack-up configuration), and the licensee's approach complies with the cask's certificate of compliance, then the licensee only needs to perform a review of the safety issue under their 10 CFR Part 50 facility license. However, for these operations, if the approach taken by the licensee does not comply with the cask's certificate of compliance, then the licensee (or CoC holder on behalf of the licensee) would be required to pursue site-specific approval under 10 CFR Part 72.

Recently, questions have arisen from regional inspectors regarding the prior review and approval under 10 CFR Part 72 of analyses related to conditions arising during cask loading operations (such as the stack-up configuration) inside of buildings governed by 10 CFR Part 50. Naturally, following the intent of the 10 CFR Part 72 rule for general license casks, the approval under 10 CFR Part 72 would not be expected to exist. Analyses for these conditions, under the intent of the promulgation of 10 CFR Part 72 described above, would be expected to be performed by licensees under their 10 CFR Part 50 facility license. This confusion could be alleviated by a clear instruction explaining the applicability of 10 CFR Part 50 and 10 CFR Part 72 for loading, unloading and handling operations, as it was intended by the promulgation of the 10 CFR Part 72 rulemaking in Federal Register Volume 55 No. 29181, August 17, 1990.

Inconsistency between the Position in Memorandum dated February 25, 2011 and NRC's Previously Established Regulatory Approach

Certain NRC-certified cask systems used under the Part 72 general license require a stack-up configuration – transfer cask atop a storage cask – during their loading operations. The 10 CFR Part 72 CoCs and FSARs supporting these cask designs do not contain design or analysis requirements for this configuration if it is performed inside of a building governed by 10 CFR Part 50 (e.g. fuel building). The NRC did not require a dynamic analysis or a non-mechanistic tip-over accident analysis of this configuration when they approved these casks. The SERs for these casks are silent on the matter. For these situations, the analysis of the tip over for a stack-up configuration is most appropriately addressed under the licensee's 10 CFR Part 50 facility license. This is consistent with the applicability of regulations discussed above.

In adherence to the regulatory approach for NRC-certified casks used under the Part 72 general license, the appropriate process for addressing the stack-up configuration (inside buildings governed by 10 CFR Part 50) is for the licensee to perform an analysis using a methodology approved under their 10 CFR Part 50 license, and perform a 10 CFR 50.59 review to determine whether prior NRC review and approval is required under their 10 CFR Part 50 plant license. This analysis would

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consider whether a tip over is a credible event. The analysis performed by the licensee under the 10 CFR Part 50 would be used in the evaluation under 10 CFR 72.212 to determine whether the cask's CoC will be met. If the licensee's approach to performing loading, unloading or handling operations, including the results of the analysis performed under 10 CFR Part 50 by the licensee, deviates from the cask's FSAR, then the licensee would be required to evaluate the change under 10 CFR 72.48 to determine whether prior review and approval is required by the NRC under 10 CFR Part 72. Consistent with the previously established NRC position, the licensee's analysis is not required to have prior NRC review and approval under 10 CFR Part 72.

NRC's specific response, and general implication, in the response to the TAR (Reference 1) is inconsistent with the process dictated by the regulations of 10 CFR Part 50 and 10 CFR Part 72, and summarized above. Specifically, the NRC is inconsistent with the previously established regulatory applicability of 10 CFR Part 50 and 10 CFR Part 72 in the following instances:

Reference 1, Page 4, "The licensee's 10 CFR 50.59 evaluation of the stack-up configuration does not address the design basis for the safety analysis of the stack—up configuration found in Subsection 2.3.3.1 of the Holtec FSAR, which 10 CFR 72.212 requires the licensee to review."

This statement is inconsistent with 10 CFR 72.212. 10 CFR 72.212(b)(4) states that 10 CFR 50.59 applies to the determination of whether activities involve a change to the facility Technical Specifications or require a license amendment for the facility. 10 CFR 72.212(b)(3) requires a review of the cask SAR to determine whether or not the reactor site parameters are enveloped by the design bases of the cask, such as earthquake intensity and tornado missiles. 10 CFR 72.212(b)(2)(ii) states that the licensee shall use 10 CFR 72.48 to evaluate changes to the cask FSAR. If an analysis demonstrates that a tip-over for the free standing stack-up configuration is not credible, then would not be part of the cask's design basis. If restraints were part of the cask's design basis for the stack-up configuration, then the licensee would determine through 10 CFR 72.48 whether such change would need prior NRC review and approval. It should be noted that the section of the Holtec FSAR referenced in the NRC's statement does not apply to buildings governed by 10 CFR Part 50.

Reference 1, Page 5, "For the inspection of a freestanding (unrestrained) stack-up configuration, the inspectors shall request the general licensee to provide the documentation approving the unrestrained stack-up configuration used to perform vertical transfer operations and the associated NRC staff SER. In the absence of such documentation vertical transfer operations shall be postponed until either documentation approving such operations can be provided or a system of lateral restraints has been installed. When a lateral restraint system has been provided, the inspectors should review the seismic analysis calculations to ensure the structural adequacy of the lateral restraint design"

Reference 1, Page 9, "When lateral restraint is not provided to the HI-TRAC cask when it is not held by the lifting device in a stack-up configuration, an analysis acceptable to the staff shall be

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provided demonstrating that the stack-up configuration is dynamically stable during a seismic event."

While it is not explicitly stated whether the NRC believes that the prior review and approval is required under 10 CFR Part 50 or 10 CFR Part 72, it is implied, based upon being written by NRC/NMSS/SFST, that the NRC believes prior review and approval must be obtained under the 10 CFR Part 72 general license or the CoC for the cask. This is inconsistent with the previously established position regarding the applicability of regulations for loading, unloading and handling in buildings governed by 10 CFR Part 50, and with the certificate of compliance of the casks. If prior review and approval of the analysis were required, it would be required under the 10 CFR Part 50 facility license. The only cases in which prior review and approval under the 10 CFR Part 72 license of the cask would be required, are if restraints were required by the CoC (which they are not), or if an evaluation under 10 CFR 72.48 determined that a change to the FSAR required prior review and approval (which would be on a licensee by licensee basis and the NRC statement would not be accurate on a generic basis).

Reference 1, Page 3, "The "stack-up" of a HI-TRAC transfer cask on top of a HI-STORM storage cask was an unknown load handling procedure when NUREG-0612 was issued in July 1980. Never-the-less, NUREG-0612 indicates that it reflects "an overall philosophy that provides a defense-in-depth approach for controlling the handling of heavy loads."

This statement implies that the NRC believes that NUREG-0612 applies to the stack-up configuration even when it is not a load on the lifting device. This is inconsistent with NUREG-0612. When the stack-up configuration is supported from underneath, and is not a load for the lifting device, it is not required to meet the guidance of NUREG-0612.

Reference 1, Page 9, "In addition, the licensee must provide for defense-in-depth consistent with the requirements for the control of heavy loads. Defense-in-depth shall be demonstrated by performing an accident analysis of the consequences of a stack-up tip-over to show that the evaluation criteria of Section 5.1, Recommended Guidelines, of NUREG-0612 are satisfied."

Again, it is implied based upon the authorship of Reference 1 that these are requirements being mandated by NRC/NMSS/SFST under 10 CFR Part 72. This is inconsistent with the applicability of regulations for loading, unloading and handling in buildings governed by 10 CFR Part 50, and with the certificate of compliance for the casks. Handling of the heavy loads inside of buildings governed by 10 CFR Part 50 is regulated under 10 CFR Part 50. Licensees have made commitments to meet NUREG-0612 under their 10 CFR Part 50 facility license, and the above requirement is not consistent with the current licensing basis for casks under 10 CFR Part 72. The certificates of compliance for casks approved under 10 CFR Part 72 have been approved to expressly acknowledge that the heavy loads of casks be addressed by the licensee with their 10 CFR Part 50 facility heavy load handling requirements. It is neither advisable nor practical for heavy load requirements inside buildings governed by 10 CFR Part 50 to be stipulated in the cask's 10 CFR Part 72 CoC or FSAR. Doing so

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creates significant additional regulatory burden with no commensurate gain in safety because compliance with the commitments by the licensing for the 10 CFR Part 50 facility license appropriately addresses the safety of this configuration.

In the case of the stack-up configuration being connected to the lifting device, the NRC correctly identifies that use of a single failure proof crane is one acceptable method to comply with NUREG-0612. It should be stressed that the guidance of NUREG-0612 must be met as part of the licensee's 10 CFR Part 50 plant licensing basis and as required by a condition in the cask CoC.

It is apparent to NEI and industry that the statements made by the NRC in Reference 1 represent a change in NRC position regarding the applicability of 10 CFR Part 50 and 10 CFR Part 72 to loading, unloading and handling of casks performed inside buildings governed by 10 CFR Part 50. It is our interpretation that the NRC now believes that cask loading, unloading and handling inside buildings governed by 10 CFR Part 50 must now be performed under 10 CFR Part 72. This would be a duplication of regulations, since licensees already must perform these operations under 10 CFR Part 50. This change in position is of serious concern, not only because it has occurred through inspection guidance and not through a more appropriate regulatory process, but also because it is inconsistent with the intent of 10 CFR Part 72 as promulgated in 1990.

Inconsistency of NRC's Position with 10 CFR 50.59 and 10 CFR 72.48 Guidance

NRC's specific statements, and general implication, in the response to the TAR (Reference 1) are inconsistent with the 10 CFR 50.59 and 10 CFR 72.48 regulations. Both 10 CFR 50.59 and 10 CFR 72.48 permit licensees to make changes to the facility and cask design bases described in the FSARs without prior NRC approval, under certain conditions. NEI has developed guidance in NEI 96-07 (Reference 2) on implementing the 10 CFR 50.59 and 10 CFR 72.48 regulations, and this guidance has been endorsed by the NRC in Regulatory Guides 1.187 and 3.72. Specifically, the NRC is inconsistent with the regulations and guidance for 10 CFR 50.59 and 10 CFR 72.48 with respect to the extent with which changes may be made without prior NRC review and approval in the following instances:

Reference 1, Page 5, "For the inspection of a freestanding (unrestrained) stack-up configuration, the inspectors shall request the general licensee to provide the documentation approving the unrestrained stack-up configuration used to perform vertical transfer operations and the associated NRC staff SER. In the absence of such documentation vertical transfer operations shall be postponed until either documentation approving such operations can be provided or a system of lateral restraints has been installed. When a lateral restraint system has been provided, the inspectors should review the seismic analysis calculations to ensure the structural adequacy of the lateral restraint design"

The presumption that prior NRC review and approval in the form of an NRC staff SER is required solely because it is an analysis-based justification for a free standing stack-up configuration is inconsistent with the intent of the 10 CFR 50.59 and 10 CFR 72.48 regulations. Both 10 CFR 50.59 and 10 CFR 72.48 permit licensees to make changes to the facility and cask design without prior

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NRC approval provided there is no change to the facility or cask technical specifications and criteria in subsection "c" are met. The NRC statement that the general licensee must provide documentation of prior NRC approval, including an SER, is not consistent with the authority granted to licensees to make changes to the facility and cask design described in the FSAR without prior NRC review and approval pursuant to 10 CFR 50.59 and 10 CFR 72.48. The NRC statement implies that an analysis that incorporates the use of lateral restraints does not need prior NRC review and approval, whereas, an analysis which could use the same methodology, without consideration of restraints, would require prior review and approval by the NRC. Again, the 10 CFR 50.59 and 10 CFR 72.48 processes are the correct methods for the licensee to determine if prior review and approval by the NRC is required.

Reference 1, Page 4, *"Because the HI-TRAC is required by the FSAR to be laterally restrained when not held by the lifting device, no accident analysis for the tip-over of the stack-up configuration was performed in the Holtec FSAR. Therefore, not providing lateral restraints is not only a departure from the method of evaluation described in the Holtec FSAR, it also creates a possibility for an accident not previously evaluated in the FSAR. A 10 CFR 72.48 evaluation, had it been performed, would require the general licensee to request the CoC holder to obtain a CoC amendment (i.e., LAR) or would require the general licensee to request an exemption."*

The NRC's premise that lateral restraints are required by the FSAR for a stack-up configuration inside a building governed by 10 CFR Part 50 is inconsistent with the HI-STORM CoC and FSAR. The cask CoC and FSAR explicitly state that restraints are not required inside structures governed by 10 CFR Part 50. The FSAR sections cited by the NRC exclusively govern Cask Transfer Facilities (CTFs). A CTF is not used inside buildings governed by 10 CFR Part 50. This is supported by FSAR Section 2.3.3.1, which states (as also quoted in Reference 1): *"For those users choosing to perform the MPC inter-cask transfer using devices not integral to structures governed by the regulations of 10 CFR Part 50 (e.g., fuel handling or reactor building), a Cask Transfer Facility (CTF) is required."* (emphasis added) Reactor Buildings, Fuel Handling Buildings and associated cranes are clearly "structures governed by the regulations of 10 CFR Part 50". This is further supported by the NRC's statement in the SER *"Section 2.3.3 of the SAR provides detailed design criteria for the auxiliary equipment and structures that would be used to perform an MPC transfer outside of a 10 CFR Part 50 controlled structure."* If a cask transfer facility is not required for operations inside buildings governed by 10 CFR Part 50, then requirements exclusive to a cask transfer facility (such as restraints) would not be relevant for operations inside buildings governed by 10 CFR Part 50.

The NRC position in Reference 1 that not providing restraints would be a departure from the method of evaluation is inconsistent with NEI-96-07, including Appendix B. Lateral restraints are a physical design feature, not a method of evaluation. Reference 2 clearly defines what is considered a change in the method of evaluation in Section B3.4, B3.10 and B4.3.8. Section B3.10 defines a method of evaluation as *"the calculational framework"*, and gives examples such as physical constants, limitations of a computer program, statistical treatment, etc. Restraints clearly do not meet the definition of a method of evaluation.

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The NRC position in Reference 1 that not providing restraints would create the possibility for an accident not previously evaluated in the FSAR is also inconsistent with NEI 96-07, including Appendix B. If the analysis demonstrates that the cask will not tip over, then a tip over cannot be postulated as a credible accident. NEI does not understand how the NRC can reach the conclusion that an accident exists, if an analysis clearly demonstrates that it cannot occur. If an accident is clearly demonstrated not to exist, then it is not possible that the possibility for a new accident has been created.

It is apparent to NEI and the industry that the statements made by the NRC in Reference 1 represent a change in NRC position regarding the authority granted by 10 CFR 50.59 and 10 CFR 72.48 to licensees to determine whether prior NRC review and approval is required for changes in the facility or cask design as described in the FSAR. It is our interpretation that the NRC now believes that prior NRC review and approval is necessary if licensees use analytical approaches to justify changes that are allowed to be made pursuant to 10 CFR 50.59 and/or 10 CFR 72.48. NEI also believes that the position expressed in Reference 1 demonstrates that the NRC did not adhere to the guidance in NEI 96-07 including Appendix B, which it previously endorsed. This change in position is of serious concern, not only because it has occurred through inspection guidance and not through a more appropriate regulatory process, but also because it is inconsistent with the NRC regulations embodied in 10 CFR 50.59 and 10 CFR 72.48 and the guidance in NEI 96-07 as endorsed by NRC Regulatory Guides 1.187 and 3.72.

References

1. "Response to Region III Technical Assistance Request for First Energy Operating Company Perry Nuclear Power Plant, Unit 1, Evaluation of Freestanding Stack-up Configuration (ML103010389), Dated 10-29-2010" NRC Memorandum from Vonna Ordaz to Anne Boland, DSST Ticket No. 201100002, ML110200478, February 25, 2011.
2. "Guidelines for 10 CFR 50.59 Implementation" and Appendix B "Guidelines for 10 CFR 72.48 Implementation" NEI 96-07 Rev. 1, November 2001.