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2CAN080502

August 26, 2005

U.S. Nuclear Regulatory Commission  
Attn: Document Control Desk  
Washington, DC 20555

**SUBJECT:** Supplement to License Amendment Request  
for Cask Loading Restrictions  
Arkansas Nuclear One, Unit 2  
Docket No. 50-368  
License No. NPF-6

- REFERENCES:**
1. Entergy letter to the NRC dated July 7, 2005, Pre-Application Review for License Amendment Request Regarding ANO-2 Cask Loading Pit Criticality Analysis (2CAN070502)
  2. Entergy letter to the NRC dated July 21, 2005, License Amendment Request To Add Cask Loading Restrictions (2CAN070503)
  3. NRC Regulatory Issue Summary 2005-05, *Regulatory Issues Regarding Criticality Analyses for Spent Fuel Pools and Independent Spent Fuel Storage Installations*
  4. Entergy letter to the NRC dated August 4, 2005, Supplement to License Amendment Request Criticality Analysis for Cask Loading Restrictions (2CAN080501)

Dear Sir or Madam:

By letter (Reference 2), Entergy Operations, Inc. (Entergy) proposed a change to the Arkansas Nuclear One, Unit 2 (ANO-2) Technical Specifications (TSs) in response to NRC Regulatory Issue Summary 2005-05 (Reference 3). The proposed change modifies TS 3.9.12, *Fuel Storage*, to define spent fuel loading restrictions for the Holtec International HI-STORM 100 Cask System for 32 assembly Multi-Purpose Canisters (MPC-32).

On August 10, 2005, Entergy received a request for additional information (RAI) from your staff that included 6 questions. On August 16, 2005 and August 24, 2005, Entergy held teleconferences with your staff to discuss the RAI and concluded that a formal response was needed.

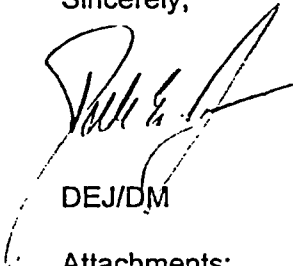
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The original no significant hazards consideration included in Reference 2 is unaffected by the information contained in this letter. There are also no new commitments contained in this letter.

If you have any questions or require additional information, please contact Dana Millar at 601-368-5445.

I declare under penalty of perjury that the foregoing is true and correct. Executed on August 26, 2005.

Sincerely,



DEJ/DJM

Attachments:

1. Response to Request for Additional Information
2. Proposed Technical Specification Changes (mark-up)

cc: Dr. Bruce S. Mallett  
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**Attachment 1**

**To**

**2CAN080502**

**Response to Request for Additional Information**

**Response to Request for Additional Information  
Related to License Amendment Request for Cask Loading Restrictions**

**Question 1:**

Upon reviewing EOI's amendment request, the staff has determined that the licensee's proposed technical specifications are not consistent with NRC's previously approved precedents. Specifically, by letter dated June 28, 2005 (ADAMS Accession No. ML051860200), the staff approved technical specification changes to permit the Joseph M. Farley Nuclear Plant (Farley) to load the same HI-STORM 100 Cask System Multi-Purpose Canister (MPC)-32 that will be used at ANO2. The staff, by its approval, found that the technical specifications proposed by Southern Nuclear Company provided reasonable assurance of the protection of the public health and safety. One example of an identified difference is EOI's reference to the MPC-32 in the technical specifications. The staff believes that this overemphasizes the specific cask design and may lead to unnecessary future amendments should EOI choose to change cask designs in the future. A possible remedy is to remove the reference to the MPC-32 in the technical specifications and instead incorporate additional design features specifications, similar to those describing the spent fuel pool, in Section 5.3, "Fuel Storage," of the technical specifications. In the interest of consistency, the staff requests that EOI review the staff's approved technical specifications for Farley to determine their acceptability at ANO2 and propose any changes deemed appropriate.

**Response 1:**

Entergy agrees that the amendment request was not consistent with Farley's submittal. However, Entergy believes that the licensing basis of the Farley Station is different than that of Arkansas Nuclear One, Unit 2 (ANO-2) and the extent of changes to the ANO-2 Technical Specifications (TSs) are not necessary. Based on changes made to the ANO-2 spent fuel pool (SFP) licensing basis in Amendment 250, Entergy changed the approach to storage of spent fuel to take credit for specific fuel storage configurations. The approach taken for the cask loading while in the cask loading pit is comparable to the licensing basis of the remainder of the SFP. The proposed TS approach provided in the request for license amendment (Reference 2) was based on the same approach provided to the NRC in the Pre-Application Review provided in Reference 1. Entergy reviewed the Farley submittal prior to issuing the ANO-2 proposed change to the NRC for review. Entergy determined the proposed content and specific location for the change to ANO-2 TS appropriately satisfied 10 CFR 50.36, "Technical specifications" and provided assurance that the requirements of 10 CFR 50.68, "Criticality accident requirements," would be met during cask loading activities in the SFP. Therefore, Entergy does not believe that the NRC approved precedence issued for Farley is appropriate for the ANO-2 licensing basis.

The proposed change for ANO-2 specifically includes reference to MPC-32 in TS because, as was included in Section 3.0, Background, of the amendment request, three dry cask storage designs are used at ANO-2; the Pacific Sierra Nuclear Associates' Ventilated Storage Cask (VSC-24), the Holtec International HI-STORM 100 Cask System for 24 assembly Multi-Purpose Canisters (MPC-24) and the HI-STORM MPC-32. Currently, the HI-STORM MPC-32 is the primary cask that will be used to store ANO-2 fuel assemblies. Several VSC-24 and HI-STORM MPC-24 have been loaded, sealed and placed on the cask storage pad.

As was specified in Regulatory Information Summary (RIS) 2005-05, *Regulatory Issues Regarding Criticality Analyses for Spent Fuel Pools and Independent Spent Fuel Storage Installations*, the requirements of 10 CFR 50.68 and 10 CFR 72.124, "Criteria for nuclear criticality safety" have to be met when cask loading / unloading is in progress. In order to support the unanticipated need to unload a VSC-24 or MPC-24 storage cask in the SFP, criticality analyses have to be performed in accordance with 10 CFR 50.68. Entergy anticipates the possibility of future TS changes after the 10 CFR 50.68 criticality analyses for the VSC-24 and MPC-24 have been completed. The reference to MPC-32 was included in the ANO-2 TS to ensure the TS user understands that the loading restriction applies specifically to the MPC-32.

The NRC approved amendment for Farley included a TS for the Cask Storage Area Boron Concentration – Cask Loading Operations. As was demonstrated in the ANO-2 submittal, the current SFP boron concentration is bounding for the MPC-32 cask loading activities. Therefore, the addition of a separate TS for boron concentration for cask loading activities was not deemed necessary or appropriate.

The NRC approved amendment for Farley included a TS that imposed loading restrictions whenever any fuel assembly is stored in the cask storage area without specific reference to a cask type. The ANO-2 proposed change includes loading restrictions for the MPC-32. As discussed above, Entergy specifically addressed the MPC-32 in the TS and recognizes the potential of additional TS loading restrictions associated with the VSC-24 and MPC-24 storage casks.

The NRC approved amendment for Farley included a description of the spent fuel casks in the Design Features section of the Part 50 TSs. In accordance with 10 CFR 50.36, "Technical specifications," the TSs should include a category entitled "Design Features." This category is described as follows in 10 CFR 50.36:

"Design features to be include are those features of the facility such as materials of construction and geometric arrangements, which, if altered or modified, would have a significant effect on safety and are not covered in categories described in paragraphs (c)(1), (2) and (3) of this section."

The categories described in paragraphs (c)(1), (2) and (3) are Safety Limits, Limiting Safety System Settings, and Limiting Control Settings; Limiting Conditions for Operation; and Surveillance Requirements, respectively. The proposed change incorporates loading restrictions for the MPC-32 in the Limiting Conditions for Operation section of the Part 50 TSs. The construction and geometric arrangement of the storage cask is not governed by the Part 50 TSs and therefore, should not be included in the Design Features of the Part 50 TSs. The construction and geometric arrangement of the storage cask is included in the Certificate of Compliance (CoC) Technical Specification (10 CFR 72) Design Features section (see Section 3.2.5, page 3-1 of CoC TS). The storage cask is temporarily placed in the SFP during cask loading activities and is not considered a design feature of the Part 50 plant.

In conclusion, Entergy does not believe the Farley TSs are directly applicable to ANO-2. Therefore, no changes, in this regard, are proposed to the original submittal.

**Question 2:**

In its proposed revision to LCO 3.9.12, "Fuel Storage," EOI has incorporated the following note: "APPLICABILITY: During storage of the fuel in the spent fuel pool (Note: The tilt pit and cask loading pit are considered part of the spent fuel pool when their respective gates are open." In its amendment request, the licensee states that the basis for this note is the NRC staff's approval of Amendments 220 and 248 to Facility Operating License Nos. DPR-51 and NPF-6, respectively. In that amendment the staff approved use of the spent fuel crane to lift heavy loads in excess of 100 tons. In its safety evaluation, the staff stated that "Additional administrative controls require that gates between the spent fuel pool and associated cask pit be in place prior to suspending a heavy load over the cask pit, which prevents a cask drop within the cask pit from adversely affecting the spent fuel pool." However, the staff has been unable to identify where in the safety evaluation the staff concluded that when the gate is closed between the spent fuel shipping cask and the SFP, the shipping cask pool is no longer considered part of the SFP. The staff believes that the proposed note may be misinterpreted as permitting the licensee to disregard technical specification controls contained in the LCO whenever the gates are closed. Therefore, the staff requests that EOI clarify the purpose of including the proposed note in the technical specifications.

**Response 2:**

The licensing basis for ANO-2 credits the separation of the cask loading pit and the spent fuel pool by closure of the cask loading pit gate for heavy loads movements of the cask. However, the inclusion of the Note in the proposed TSs is not required to implement the TS associated with this license amendment. Entergy intends to clarify the TS Bases under the ANO-2 Bases Control Program to clarify when the cask loading pit isolation is appropriate. Therefore, the Note associated with the TS Applicability will be deleted. A revised markup of the affected TS page is included in Attachment 2.

**Question 3:**

In Section 4.0 of the LAR, under "MPC-32 Design," the licensee provides a list of key parameters used in developing the MPC-32 model used in the criticality analyses. In items 2 and 3 of that list, the licensee provides a description of the modeling of the axial water regions above and below the active fuel. In those descriptions the licensee states that following a small region of water, a larger steel region is modeled. In typical criticality analyses, the axial region above and below the active fuel is usually modeled as one to two feet of water for conservatism. Since it appears that the licensee is employing a more realistic model approach, the staff requests that the licensee describe how the model employed reflects the most limiting fuel assembly storage conditions. For example, the 15.5 inches of steel modeled above the active fuel region may not represent the most limiting condition since a period of time exists during cask handling operations where the lid has not yet been installed on a fully loaded cask.

**Response 3:**

See response to question 4.

**Question 4:**

Additionally, in Section 4.0 of the LAR, under "MPC-32 Design," the licensee states that the MPC-32 was assumed to be located in the HI-STAR overpack which bounds the HI-TRAC. However, no basis is provided for why the HI-STAR system bounds that of the HI-TRAC. The staff requests that the licensee provide a brief technical basis for why this assumption in the criticality analysis is conservative.

**Response 4:**

The modeling approach is consistent with the dry storage analysis, which was approved by the NRC as the licensing basis for the Holtec HI-STORM 100 cask system in Revision 2 of the Final Safety Analysis Report (FSAR) for the HI-STORM 100 Cask System (Docket No. 72-1014).

**Question 5:**

A major component of the EOI criticality analyses was 3 years of cooling time credit. However, no description of the methodology employed for calculating the cooling time credit was provided. Therefore, the staff requests that the licensee provide a description of the methodology employed and isotopes considered in calculating the cooling time credit.

**Response 5:**

The methodology used for cooling time is identical to that used in the ANO-2 SFP criticality analysis (ANO-2 TS Amendment 250).

**Question 6:**

In Section 4.0 of the LAR, the licensee states that "A slightly larger than nominal pellet diameter was modeled in the criticality analyses to account for any pellet uncertainties." Although the staff agrees that an increase in pellet diameter in the model is conservative, the licensee has not provided sufficient information to justify that this conservatism is sufficient "to account for any pellet uncertainties." Therefore, the staff requests that the licensee provide a technical basis for its conclusion that the slightly larger pellet diameter offsets other uncertainties in the pellet.

**Response 6:**

The wording should be clarified to state:

*A larger than nominal pellet diameter was conservatively modeled consistent with the SFP criticality analysis performed to support the approval of ANO-2 TS Amendment 250. Fuel uncertainties with respect to density and enrichment were addressed separately.*

**Attachment 2**

**2CAN080502**

**Proposed Technical Specification Changes (mark-up)**



## REFUELING OPERATIONS

### FUEL STORAGE

#### LIMITING CONDITION FOR OPERATION

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- 3.9.12.a Storage in the spent fuel pool shall be restricted to fuel assemblies having initial enrichment less than or equal to  $4.55 \pm 0.05$  w/o U-235. The provisions of Specification 3.0.3 are not applicable.
- 3.9.12.b Storage in the spent fuel pool shall be further restricted by the limits specified in Figure 3.9.2. The provisions of Specification 3.0.3 are not applicable.
- 3.9.12.c The boron concentration in the spent fuel pool shall be maintained (at all times) to be greater than 2000 parts per million.
- 3.9.12.d Storage in the MPC-32 shall be further restricted by the limits specified in Figure 3.9-1. The provisions of Specification 3.0.3 are not applicable.

APPLICABILITY: During storage of fuel in the spent fuel pool

#### ACTION:

Suspend all actions involving the movement of fuel in the spent fuel pool if it is determined a fuel assembly has been placed in an incorrect location until such time as the correct storage location is determined. Move the assembly to its correct location before resumption of any other fuel movement.

Suspend all actions involving the movement of fuel in the spent fuel pool if it is determined the pool boron concentration is less than 2001 ppm, until such time as the boron concentration is increased to 2001 ppm or greater.

#### SURVEILLANCE REQUIREMENTS

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- 4.9.12.a Verify all fuel assemblies to be placed in the spent fuel pool have an initial enrichment of less than or equal to  $4.55 \pm 0.05$  w/o U-235 by checking the assemblies' design documentation.
- 4.9.12.b Verify all fuel assemblies to be placed in the spent fuel pool are within the limits of Figure 3.9.2 by checking the assemblies' design and burnup documentation.
- 4.9.12.c Verify at least once per 31 days the spent fuel pool boron concentration is greater than 2000 ppm.
- 4.9.12.d Verify all fuel assemblies to be placed in a storage cask are within the limits of Figure 3.9-1 by checking the assemblies' design and burnup documentation.