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2CAN070502

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

SUBJECT: License Amendment Request
Pre-Application Review for License Amendment Request Regarding
ANO-2 Cask Loading Pit Criticality Analysis
Arkansas Nuclear One, Unit 2
Docket No. 50-368
License No. NPF-6

REFERENCE: 1. Nuclear Regulatory Issue Summary 2005-05, *Regulatory Issues Regarding Criticality Analyses for Spent Fuel Pools and Independent Spent Fuel Storage Installations*

Dear Sir or Madam:

The Nuclear Regulatory Commission (NRC) issued Regulatory Issue Summary (RIS) 2005-05, *Regulatory Issues Regarding Criticality Analyses for Spent Fuel Pools and Independent Spent Fuel Storage Installations*, dated March 23, 2005. RIS 2005-05 highlighted differences in the NRC Part 50 criticality requirements for the spent fuel pool and Part 72 requirements for spent fuel storage casks and emphasized that licensees are expected to comply with both Part 50 and Part 72 during cask loading operations.

In light of the RIS 2005-05 and its conclusion that fuel movement into the cask loading pit is part of the spent fuel pool and should be treated under Part 50 criticality analysis, Entergy has reviewed the ANO-1 and ANO-2 licensing basis for potential impact.

ANO-1 is currently only loading spent fuel casks that are of a 24 assembly multi-purpose canister (MPC-24) design. Entergy determined that the licensing basis for MPC-24 cask loading activities is clearly bounded by the licensing basis assumptions for the ANO-1 spent fuel pool. Therefore, Entergy has concluded that no changes to the ANO-1 operating license are necessary.

ANO-2 has been loading spent fuel into 32 assembly multi-purpose canister (MPC-32) cask design. The current criticality analysis for the ANO-2 spent fuel pool credits fuel assembly burnup and cooling time for compliance with the requirements of 10CFR50.68. Limits for

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storage of new and spent fuel in the spent fuel pool racks are specified in ANO-2 Technical Specification (TS) 3.9.12. A criticality analysis was recently performed for loading MPC-32 canisters under Part 50 licensing basis requirements. This analysis was determined to be acceptable but also assumes credit for assembly burnup as well as cooling time to meet the 10CFR50.68 criticality requirements assuming the availability of boron as specified in this regulation and the ANO-2 TS. The loading of a spent fuel cask is a temporary evolution and does not represent a permanent storage condition as does the spent fuel pool racks.

Entergy has reviewed the criteria of 10CFR50.36 and 10CFR50.59 and does not believe that either regulation would require a license amendment for the inclusion of the criticality analysis for the loading of spent fuel into MPC-32 casks while adjoining the ANO-2 spent fuel pool. However, in light of RIS 2005-05, a TS change is being proposed which provides controls for loading MPC-32 casks under the Part 50 license. This TS change does provide consistency within the TS to reflect the licensing basis for the spent fuel cask loading evolution.

Entergy is preparing a license amendment pursuant to 10CFR50.90 for the proposed TS change to the ANO-2 Part 50 license. However, Entergy believes that this license amendment can be requested and approved by the NRC on a routine, but expeditious, schedule while cask loading activities proceed. The concern identified in RIS 2005-05 is that there will be times when both Part 50 and Part 72 licensing basis requirements will have to be met. Under this condition, the ANO-2 TSs can still be met using licensee adopted administrative controls as discussed in Administrative Letter 98-10. A summary discussion of these conclusions is contained in Attachment 1.

Per the guidance of Administrative Letter 98-10, Entergy plans to continue cask loading activities while the license amendment is being reviewed by the NRC. Even though ANO-2 is not currently loading MPC-32 canisters, Entergy intends to commence further loading of these casks on or about August 8, 2005.

The purpose of this submittal is to seek initial NRC review of our proposed license amendment approach under a pre-application review while the ANO-2 license amendment is being finalized. The currently planned changes to our ANO-2 TSs are contained in Attachment 2. Therefore, Entergy requests NRC staff review of our conclusions for seeking a non-exigent license amendment. If NRC Staff review of the proposed scope or approach of this pre-application submittal warrants further discussion, please contact us expeditiously.

This submittal does not include any new commitments. If you have any questions or require additional information, please contact Steve Bennett at 479-858-4626.

Sincerely,



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Attachments:

1. **Basis for Non-Exigent Review of Technical Specification Changes for MPC-32 Cask Loading Activities**
2. **Discussion of Proposed Technical Specification Change for Loading of the MPC-32 Design Dry Fuel Storage Cask**

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Attachment 1

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**Basis for Non-Exigent Review of Technical Specification Changes
for MPC-32 Cask Loading Activities**

Basis for Non-Exigent Review of Technical Specification Changes for MPC-32 Cask Loading Activities

As discussed in Attachment 2, Entergy is planning to request a license amendment to incorporate changes into the ANO-2 Technical Specifications (TSs) for loading an MPC-32 storage cask. Entergy believes that it is appropriate and acceptable to continue to perform cask loading activities while NRC review and approval of the license amendment continues as discussed below.

Typically, a change being sought under 10CFR50.90 is not to be implemented until the NRC has approved a "proposed change". However, in this specific application, the ongoing ANO-2 cask loading activities is more appropriately characterized as a degraded or non-conforming change under the Part 50 license since it has already received NRC Staff review and approval under Part 72. Entergy's conclusions are based on the following considerations:

1. The current condition identified in RIS 2005-05 relates to a non-conforming condition which is subject to GL 91-18 guidance,
2. The non-conforming condition represents a non-conservative change to the ANO-2 TSs per Admin Letter 98-10, and
3. The NRC has already approved the acceptability of cask handling activities under Part 72.

Regulatory Information Summary 2005-05

RIS 2005-05, *Regulatory Issues Regarding Criticality Analyses for Spent Fuel Pools and Independent Spent Fuel Storage Installations*, dated March 23, 2005 was issued to alert licensees that 10CFR Parts 50 and 72 impose different criticality requirements applicable to spent fuel pools and independent spent fuel storage installations (ISFSIs) and to encourage licensees to review their spent fuel pool and ISFSI licensing and design bases to ensure compliance with both requirements during dry cask loading, unloading and handling operations.

Non-Conforming Condition under Generic Letter 91-18, Revision 1

NRC guidance regarding non-conforming conditions is contained in NRC Generic Letter 91-18, Revision 1, *Information to Licensees Regarding NRC Inspection Manual Section on Resolution of Degraded and Nonconforming Conditions*, dated October 8, 1997 (GL 91-18). This revision to GL 91-18 was issued to address the interaction between NRC operability guidance and the change control process set forth in 10 CFR 50.59.

In the event that a licensee's reanalysis of its criticality determinations indicates that the current licensing basis is insufficient to assure safe plant operation, GL 91-18 provides that such a degraded or nonconforming condition (or previously unanalyzed condition) should promptly be addressed through the licensee's corrective action program and that the licensee establish an acceptable basis to continue to operate the plant (see GL 91-18 Sections 4.3-4.4). Of direct application here, GL 91-18 establishes the underlying principle that:

... if the TS are satisfied, and required equipment is operable, and the licensee is correcting the degraded or nonconforming condition in a timely manner, continued plant operation does not pose an undue risk to public health and safety. [GL 91-18, R1, Section 4.5.1.]

Further application of this general NRC position is set forth in Section 4.8 - Final Resolution, of GL 91-18 which states:

The proposed final resolution can be under staff review and not affect the continued operation of the plant, because interim operation is being governed by the processes of the operability determination and corrective action of Appendix B.

Similarly, this approach is consistent when a change involves a change to the current licensing basis. A review under 10CFR50.59 is triggered which in turn results in a conclusion that the change requires NRC review and approval. GL 91-18 provides that:

In both these situations, the need to obtain NRC approval for a change (e.g., because it involves a USQ [unreviewed safety question] does not affect the licensee's authority to operate the plant. The licensee may make mode changes, restart from outages, etc., provided that necessary equipment is operable and the degraded condition is not in conflict with the TS or the license.

Accordingly, it seems clear that subject to the operability and corrective action expectations noted above, the NRC's pending consideration of changes to the plant or procedures required as a result of an USQ determination does not affect continued plant operation so long as the facility remains in compliance with the TS and the license. The changes identified in Attachment 2, provide comparable restrictions to the spent fuel pool, but the loading of MPC-32 casks are not in violation of the ANO-2 Technical Specifications.

Note: The NRC's pending Inspection Manual, Part 9900: Technical Guidance, *Operability Determinations & Functionality Assessments for Resolution of Degraded and Nonconforming Conditions Adverse to Quality or Safety*, has no material changes to the relevant guidance in GL 91-18, discussed above.

Non-Conservative TS changes under Administrative Letter 98-10

NRC Administrative Letter (AL) 98-10: *Dispositioning of Technical Specifications that Are Insufficient to Assure Plant Safety*, provides NRC guidance on when degraded or non-conforming conditions arise where a TS is found to be non-conservative but the TSs are not violated, administrative controls can be established and a license amendment sought separately. AL 98-10 states:

... the discovery of an improper or inadequate TS value or required action is considered a degraded or nonconforming condition as defined in GL 91-18. Imposing administrative controls in response to an improper or inadequate TS is considered an acceptable short-term corrective action. The staff expects that, following the imposition of administrative controls, an amendment to the TS, with appropriate justification and schedule, will be submitted in a timely fashion. Once any amendment correcting the TS is approved, the licensee must update the final safety analysis report, as necessary, to comply with 10 CFR 50.71(e).

Under an AL 98-10 condition, the licensee uses administrative controls to ensure plant safety pending NRC approval of the associated license amendment. These administrative controls represent the basis for continued operation until NRC approval is obtained for a technical specification. Therefore, this NRC guidance is applicable to ANO-2 which would allow Entergy to continue cask loading activities while the license amendment is being reviewed by the NRC.

NRC Approval of ANO Licensing Basis under Part 72 including Loading Restrictions

When seeking a license amendment under 10CFR50.90, they are to be sought by requesting Commission approval under 10CFR50.4. In this case, Commission approval of the cask loading operations has already been granted under Part 72. The MPC-32 cask loading and associated criticality analysis was approved by the NRC prior to loading any casks under the Part 72 license. Based on the NRC acceptance of the Part 72 license, including loading restrictions, a safety decision has already been established by the Commission for the ANO spent fuel pools and cask loading pits. Therefore, Entergy believes that cask loading activities, previously approved under Part 72, provides adequate controls and additional basis to proceed with cask loading activities without interruption, while the NRC approves inclusion of licensing basis changes into the Part 50 license.

Corrective Action

The condition described in RIS-2005-05 has been entered into the ANO 10CFR50 Appendix B corrective action program. Appropriate actions to ensure the safe loading of the MPC-32 cask are being addressed in our corrective action program.

Conclusion

Entergy concludes that since ANO has established appropriate corrective actions, continued safe plant operation is assured (i.e., operability determination), that the limits contained in the TS are not violated, and that Part 72 safety has been concluded by the NRC staff, cask loading activities can continue during the pending NRC review of proposed changes to the operating license.

Attachment 2

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**Discussion of Proposed Technical Specification Change for Loading
of the MPC-32 Design Dry Fuel Storage Cask**

**Discussion of Proposed Technical Specification Change for Loading
 of the MPC-32 Design Dry Fuel Storage Cask**

A criticality analysis was performed to ensure that k_{eff} is less than or equal to 0.95 with an MPC-32 cask fully loaded with fuel of the highest permissible reactivity. For normal conditions, the MPC-32 was analyzed with no credit for boron, and for accident conditions, credit for soluble boron was permitted. It was conservatively assumed that the initial U-235 fuel enrichment was 4.95 wt% with a tolerance of 0.05 wt%. The use of this enrichment and tolerance in the analyses of the normal storage and accident cases bounds the current allowable fuel enrichment for fuel assemblies stored in the SFP of 4.55 ± 0.5 wt% (TS 3.9.12.a and 5.3.2.a). The maximum calculated reactivity values included a margin for uncertainty in reactivity calculations, manufacturing tolerances, and temperature effects, and were calculated with a 95% probability at a 95% confidence level.

However, in order to assure k_{eff} does not exceed the 10CFR50.68 limit of 0.95 with no credit for soluble boron, fuel assembly burnup and cooling time decay were credited. The calculations were performed with credit for 3 years of decay in the changes in fission product concentrations. Calculations for various U-235 fuel enrichments were performed to determine acceptable minimum burnups up to a bounding value of 4.95 wt%. The enrichments were varied from 2.5 wt% to 4.95 wt%. The burnup requirements for normal storage conditions are shown in Figure 1.

The effects of postulated abnormal/accident scenarios were also evaluated, where the most limiting case of all poison plates being replaced with water yielded a required a soluble boron concentration of 950 ppm. This is acceptable since it is well below the normal Part 50 operating SFP boron concentration and the normal Part 72 boron concentration required during fuel loading activates. Results for this accident case and less limiting cases are summarized in Table 1 below.

Table 1: MPC-32 Part 50 and Part 72 Boron Requirements.

Criticality Analysis	TS Boron Concentration (ppm)	Criticality Assumptions Boron Concentration (ppm) $k_{eff} \leq 0.95$	Misloading Abnormal Location Analysis Boron Concentration (ppm) $k_{eff} \leq 0.95$	Dropped Fuel Assembly Boron Concentration (ppm) $k_{eff} \leq 0.95$	Misalignment of Active Fuel Region Boron Concentration (ppm) $k_{eff} \leq 0.95$
SFP Part 50	>2000	240	825	825	2000
MPC-32 Part 50	>2000	0	400	0	950
MPC-32 Part 72	≥ 2500	2500	Not analyzed	Not analyzed	Not analyzed

The Part 50 analysis concluded that k_{eff} would remain below 0.95 when fuel is loaded/unloaded in the MPC-32 and when a combination of cooling time, burnup and initial enrichment is credited prior to inserting the assembly in the MPC-32 basket. Therefore, associated loading restrictions for an MPC-32 are being included in the ANO-2 TS. A new limiting condition for operation will be added to TS 3.9.12 to assure that the limits of the new loading restriction curve (Figure 3.9-1) for an MPC-32 will be met. A new surveillance requirement will also be provided which verifies that the fuel assemblies to be placed in a storage cask are within the limits of Figure 3.9.1

Figure 3.9-1
Loading Restrictions for MPC-32
(Fuel Cooling Time > 3 years)

