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ONS-2016-052

July 20, 2016 10 CFR 50.90

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Duke Energy Carolinas, LLC (Duke Energy)
Oconee Nuclear Station, Units 1, 2, and 3
Renewed Facility Operating License Numbers DPR-38, 47, and 55
Docket Nos. 50-269, 50-270, and 50-287

Subject: License Amendment Request to Revise Technical Specifications Associated with Dry Spent Fuel Storage Cask Loading and Unloading Requirements; License Amendment Request No. 2016-04

In accordance with the provisions of Section 50.90 of Title 10 of the Code of Federal Regulations, Duke Energy is submitting a request for an amendment to the Technical Specifications (TSs) for Oconee Nuclear Station (ONS) Units 1, 2, and 3. The proposed License Amendment Request (LAR) would revise the ONS TS requirements associated with Dry Spent Fuel Storage Cask loading and unloading. These TS requirements no longer pertain to the ONS Independent Spent Fuel Storage Facility (ISFSI) general license since the Nuclear Regulatory Commission (NRC) revised regulation 10 CFR 50.68 to exempt such requirements from 10 CFR Part 50 TSs. Instead, the requirements from 10 CFR Part 72 and from the ISFSI general license Certificate of Compliance (CoC) for the ONS spent fuel storage casks pertain to ONS. The exemption contained in 10 CFR 50.68 does not apply to the ISFSI site-specific license and as such, the TSs will continue to apply to spent fuel storage casks loaded under that license.

The enclosure to this letter provides an evaluation of the proposed TS changes. The Regulatory Evaluation (including the significant hazards consideration) and Environmental Considerations are provided in Sections 5 and 6 of the enclosure, respectively. Attachments 1 and 2 provide marked-up TS and TS Bases pages, respectively. Attachment 3 provides the revised (clean) TS pages.

In accordance with Duke Energy administrative procedures that implement the Quality Assurance Program Topical Report, these proposed changes have been reviewed and approved by the Plant Operations Review Committee. A copy of this LAR is being sent to the State of South Carolina in accordance with 10 CFR 50.91 requirements.

Duke Energy requests approval of the amendment by July 20, 2017, with a 60-day implementation period. There are no new regulatory commitments being made as a result of the proposed change.

A001
NRR

If there are any questions regarding the content of this document or if additional information is needed, please contact Stephen C. Newman, Lead Nuclear Engineer, ONS Regulatory Affairs, at (864) 873-4388.

I declare under penalty of perjury that the foregoing is correct and true. Executed on July 20, 2016.

Sincerely,

Scott L. Batson
Site Vice President
Oconee Nuclear Station

Enclosure: Evaluation of the Proposed Changes

Attachments:
1. Attachment 1 – Marked-Up Technical Specification Pages
2. Attachment 2 – Marked-Up Technical Specification Bases Pages
3. Attachment 3 – Revised (Clean) Technical Specification Pages

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ENCLOSURE
EVALUATION OF THE PROPOSED CHANGES

Subject: License Amendment Request to Revise the Technical Specifications Pertaining to Dry Spent Fuel Storage Cask Loading and Unloading Requirements

1 SUMMARY DESCRIPTION

The proposed amendment would revise the Oconee Nuclear Station (ONS) Units 1, 2, and 3 Technical Specifications (TSs) by revising requirements associated with Dry Spent Fuel Storage Cask Loading and Unloading. The TSs requirements no longer pertain to the ONS Independent Spent Fuel Storage Installation (ISFSI) general license since the Nuclear Regulatory Commission (NRC) revised regulation 10 CFR 50.68, via new paragraph (c) (in *Federal Register* Notices 71 FR 66648 (Ref. 1) and 72 FR 3705 (Ref. 2)), to exempt such requirements from 10 CFR Part 50 TS. Instead, the requirements from 10 CFR Part 72, and from the general license Certificate of Compliance (CoC) for the ONS Dry Storage Canisters (DSCs) (Transnuclear NUHOMS®-24P and NUHOMS®-24PHB), pertain to the ONS ISFSI general license; however, because the aforementioned exemption did not apply to ISFSI site-specific licenses, the TSs will remain in-effect for the ONS ISFSI site-specific licensed DSCs only. The specific TSs affected by this proposed amendment are:

- TS 3.7.12, "Spent Fuel Pool Boron Concentration,"
- TS 3.7.18, "Dry Spent Fuel Storage Cask Loading and Unloading," and
- TS 4.4, "Dry Spent Fuel Storage Cask Loading and Unloading."

2 BACKGROUND

Beginning in 1990, the ONS ISFSI site-specific license (No. SNM-2503) utilized a site-specific version of the NUHOMS®-24P dry spent fuel storage system. The ONS ISFSI was originally constructed with sufficient size to accommodate a maximum of 88 horizontal storage modules (HSMs). However, only the first 40 HSMs (HSM Nos. 1 through 40) were constructed and loaded with DSCs under the ISFSI site-specific license. In 2009, this 20-year site-specific license was renewed for an additional 40-year period (Ref. 9).

In the mid-1990s, Duke Energy elected to suspend further construction of the site-specific HSMs in favor of the Standardized NUHOMS®-24P system (referred to as the general license system) due to its modular design and improved thermal capacity. The NRC approved the use of the standardized NUHOMS DSC design on January 23, 1995, under 10 CFR Part 72 (NRC Docket No. 72-1004) (Ref. 3). The new system utilized the same DSC, transfer equipment, and ancillary equipment as the site-specific version. The modular general license HSMs are fabricated offsite and installed on new concrete storage pads constructed within the confines of the existing ISFSI. At ONS, Duke Energy utilizes AREVA Transnuclear, Inc. (Transnuclear) NUHOMS®-24P and NUHOMS®-24PHB DSCs.

On March 23, 2005, the NRC issued Regulatory Issue Summary (RIS) 2005-05 (Ref. 4) to advise addressees regarding potential inconsistencies between the regulatory bases of their spent fuel pools (SFPs) and ISFSIs. The regulatory basis for many licensees' spent fuel pools is regulation 10 CFR 50.68, "Criticality accident requirements." The regulatory basis for ISFSI licensees is 10 CFR Part 72, "Licensing Requirements for the Independent Storage of Spent Nuclear Fuel, High-Level Radioactive Waste, and Reactor-Related Greater than Class C Waste." The RIS also notified licensees of the NRC's determination that 10 CFR 50.68(b)(1) applies to the loading of dry spent fuel storage casks in the spent fuel pool.

Regulation 10 CFR 50.68(b)(1) states:

> *"Plant procedures shall prohibit the handling and storage at any one time of more assemblies than have been determined to be safely subcritical under the most adverse moderation conditions feasible by unborated water."*

The Transnuclear NUHOMS®-24P and NUHOMS®-24PHB dry spent fuel storage casks used at ONS require soluble boron during loading in the spent fuel pool. Thus, they cannot meet the requirement for subcriticality in unborated water. RIS 2005-05 described a "resolution strategy" that involved performing a criticality analysis for the spent fuel assemblies in the dry storage cask, assuming unborated water and taking credit for burnup of the spent fuel assemblies, and then submitting the analysis to the NRC "as part of a license amendment request to add a TS to the site's 10 CFR Part 50 license restricting the minimum burnup of fuel assemblies loaded in a particular cask design."

In response to RIS 2005-05, Duke Energy submitted License Amendment Request No. 2005-09 (Ref. 5) which requested approval of new TS 3.7.18; new TS Bases B 3.7.18; new Design Features Section 4.4 (Dry Spent Fuel Storage Cask Loading and Unloading); revised TS 3.7.12 (Spent Fuel Pool Boron Concentration); and revised TS Bases B 3.7.12. The license amendment request was approved by the NRC on June 15, 2006 (Ref. 6) under Amendments Nos. 351, 353, and 352 the for ONS Units 1, 2, and 3, Operating Licenses, respectively.

Subsequently, the NRC revised 10 CFR 50.68 by rulemaking (Refs. 1 and 2) effective January 30, 2007. The revision to 10 CFR 50.68 adds a new paragraph (c) which reads as follows:

> *"While a spent fuel transportation package approved under Part 71 of this chapter or spent fuel storage cask approved under Part 72 of this chapter is in the spent fuel pool:*
>
> *1) The requirements in §50.68(b) do not apply to the fuel located with that package or cask; and*
> *2) The requirements in Part 71 or 72 of this chapter, as applicable, and the requirements of the Certificate of Compliance for that package or cask, apply to the fuel within that package or cask."*

Based on new paragraph (c) to 10 CFR 50.68, the requirements of 10 CFR 50.68(b) no longer apply to general licensed DSCs when the cask is in the spent fuel pool. Since the ruling does not similarly apply to DSCs loaded under a station's site-specific license, the TSs requirements from ONS Amendments Nos. 351, 353, and 352 will continue to apply to those DSCs.

3 DETAILED DESCRIPTION OF PROPOSED CHANGES

Duke Energy proposes to modify the ONS TSs by revising information and requirements pertaining to Dry Spent Fuel Storage Cask Loading and Unloading. The TSs with proposed changes were previously identified in Section 1.

The proposed changes to the TSs associated with this license amendment request are as follows (added text is underlined/deleted text struck through):

I. For TS 3.7.12, Spent Fuel Pool Boron Concentration:

- In APPLICABILITY, revise the text, "When fuel assemblies are stored in the spent fuel pool and when fuel assemblies are in a dry spent fuel storage cask located in the spent fuel pool," to read:

  " When fuel assemblies are stored in the spent fuel pool or~~and~~ when fuel assemblies are in a site-specific licensed dry spent fuel storage cask located in the spent fuel pool."

  [Note: "and" was changed to "or" to clarify that either of the conditions would need to be in-effect rather than both.]

II. For TS 3.7.18, Dry Spent Fuel Storage Cask Loading and Unloading:

- In APPLICABILITY, revise the text, " Whenever any fuel assembly is in a dry spent fuel storage cask located in the spent fuel pool," to read:

  "Whenever any fuel assembly is in a site-specific licensed dry spent fuel storage cask located in the spent fuel pool."

- In Surveillance Requirement (SR) 3.7.18.1 - Change "Figure" to "Table" (typographical error).

III. For TS Design Feature 4.4, Dry Spent Fuel Storage Cask Loading and Unloading:

- Add the following text to the TS 4.4 Title: "4.4 Dry Spent Fuel Storage Cask Loading and Unloading for ISFSI site-specific licensed storage casks (site-specific licensed storage casks are contained in horizontal storage modules 1 through 40)."

The proposed changes to the TS Bases are as follows:

I. For TS Bases B 3.7.12, Spent Fuel Pool Boron Concentration:

- In the Applicability Section – Add the following: "This LCO applies only to spent fuel storage casks loaded under the ISFSI site-specific license. Site-specific storage casks are contained in Horizontal Storage Modules (HSMs) Nos. 1 through 40."

II. For TS Bases B 3.7.18, Dry Spent Fuel Storage Cask Loading and Unloading:

- In the Applicability Section – Add the following: "This LCO applies only to spent fuel storage casks loaded under the ISFSI site-specific license. Site-specific storage casks are contained in Horizontal Storage Modules (HSMs) Nos. 1 through 40."

4 TECHNICAL ANALYSIS

The spent fuel storage casks utilized at ONS are Transnuclear NUHOMS®-24P and NUHOMS®-24PHB type dry shielded canisters (DSCs). Fuel loading and unloading operations for the NUHOMS®-24P and NUHOMS®-24PHB DSCs take place in the cask pit area of the spent fuel pool. The cask pit is adjacent to the spent fuel storage racks in each of the ONS spent fuel pools, and is open to the rest of the spent fuel pool at all times. The NUHOMS®-24P and NUHOMS®-24PHB DSCs contain storage cells for 24 fuel assemblies. Eligible Babcock & Wilcox (B&W) 15x15 fuel assemblies (MkB2-B8, MkB9, and MkB10) with initial enrichments ≤ 5.0 weight percent (weight %) U-235 may be stored in either the NUHOMS®-24P or NUHOMS®-24PHB DSC, as long as the fuel assemblies meet the minimum burnup and cooling time requirements specified in the Certificate of Compliance (CoC) for the standardized NUHOMS DSC design.

Currently, TSs 3.7.12, 3.7.18 and 4.4 contain criticality requirements pertaining to fuel loaded in the ONS spent fuel storage casks when the spent fuel storage cask is in the spent fuel pool. However, such requirements are no longer required to be in 10 CFR Part 50 TS for certified general license holders. As specified in Section 2 of this enclosure, NRC regulation 10 CFR 50.68(c) states if a spent fuel storage cask is approved under 10 CFR Part 72 regulations, then 10 CFR 50.68(b) requirements are not applicable to the spent fuel located in the storage cask. Instead, the requirements of 10 CFR Part 72, and the requirements of the CoC for the cask, i.e., general license holders, apply to the fuel within the cask. Since the NUHOMS®-24P and NUHOMS®-24PHB DSCs used at ONS are Part 72-approved (NRC Docket No. 72-1004), criticality requirements on the spent fuel in the ONS spent fuel storage casks when in the spent fuel pool are no longer specified in 10 CFR 50.68(b) but rather derived from the 10 CFR Part 72 and the CoC for the standardized NUHOMS DSC. Therefore upon issuance of this amendment request, TS 3.7.12, 3.7.18 and 4.4 requirements, issued under Amendments Nos. 351, 353, and 352 for ONS Units 1, 2, and 3, Operating Licenses, respectively, will only apply to the ONS ISFSI site-specific licensed DSCs.

5 REGULATORY SAFETY ANALYSIS

5.1 APPLICABLE REGULATORY REQUIREMENTS/CRITERIA

The regulatory requirements that apply to this license amendment request, and how ONS satisfies the requirements, are provided as follows:

10 CFR 50.36 – "Technical Specifications"

The limiting conditions for operation and surveillance requirements that apply to dry spent fuel storage cask loading and unloading are no longer required to be in 10 CFR Part 50 TS if the dry spent fuel storage cask is NRC-approved in accordance with 10 CFR Part 72. Instead, the requirements of 10 CFR Part 72, as applicable, and the requirements of the Certificate of Compliance for the dry spent fuel storage cask, apply to the fuel within that cask during loading and unloading.

The limiting conditions for operation and surveillance requirements that apply to spent fuel pool boron concentration are still provided in revised TS 3.7.12, as set forth in this license amendment request.

10 CFR 50.68 – "Criticality accident requirements"

Paragraph (b) of 10 CFR 50.68 requires licensees to adhere to specified maximum k_{eff} values when handling and storing fuel, in lieu of maintaining a monitoring system capable of detecting a criticality as described in 10 CFR 70.24. However, when an NRC-approved spent fuel storage cask is in the spent fuel pool, paragraph (c) of 10 CFR 50.68 allows the requirements of 10 CFR Part 72, as applicable, and the requirements specified in the Certificate of Compliance for the spent fuel storage cask, to apply to the fuel in the spent fuel storage cask, instead of requirements specified in 10 CFR 50.68(b). However, the regulation remains in effect for ISFSI site-specific licensed DSCs.

10 CFR Part 72 – "Licensing Requirements for the Independent Storage of Nuclear Spent Fuel, High-Level Radioactive Waste, and Reactor-Related Greater than Class C Waste"

Regulation 10 CFR Part 72 requires licenses to adhere to requirements, procedures, and criteria to transfer and possess power reactor spent fuel and other radioactive materials associated with spent fuel storage in an Independent Spent Fuel Storage Installation (ISFSI). This part also establishes requirements, procedures, and criteria for Certificates of Compliance approving spent fuel storage cask designs. Duke Energy obtained approval for, and maintains, an ISFSI at ONS. Thus, the requirements of this regulation apply to ONS.

5.2 PRECEDENT

A review of the NRC's Agencywide Documents Access and Management System (ADAMS), since January 1, 2005, for NRC approval of prior license amendment requests which removed TS involving spent fuel cask criticality requirements during loading and unloading fuel in the spent fuel pool, resulted in no documents of precedence. However, two (2) letters were identified which withdrew submitted LARs associated with spent fuel cask criticality TS changes (after 10 CFR 50.68 was revised):

- Dominion Surry Units 1 and 2 Withdrawal Of Proposed TS Change Request Concerning Spent Fuel Cask Loading Requirements, dated March 12, 2007 (Ref. 7),
- Entergy Withdrawal of LAR for Indian Point Unit 2 to Add Spent Fuel Cask Loading Requirements to the TS dated April 11, 2007 (Ref. 8).

5.3 NO SIGNIFICANT HAZARDS CONSIDERATION DETERMINATION

Duke Energy Carolinas, LLC (Duke Energy) has evaluated the proposed change to the ONS TS using the criteria in 10 CFR 50.92 and has determined that the proposed changes do not involve a significant hazards consideration. An analysis of the issue of no significant hazards consideration is presented below:

Basis for Proposed No Significant Hazards Consideration Determination

As required by 10 CFR 50.91(a), the Duke Energy analysis of the issue of no significant hazards consideration using the standards in 10 CFR 50.92 is presented below:

1. Does the Proposed Change Involve a Significant Increase in the Probability or Consequences of an Accident Previously Evaluated?

   Response: No

   The proposed changes to Technical Specifications (TSs) 3.7.12, 3.7.18 and 4.4, do not modify the method of nuclear fuel storage or handling at Oconee Nuclear Station (ONS), or make any physical changes to the facility design, material, or construction standards. The proposed change revises the criticality requirements contained in the TSs, as allowed by 10 CFR 50.68(c), that are redundant to regulatory requirements provided in 10 CFR Part 72 and the Nuclear Regulatory Commission (NRC)-approved Certificate of Compliance (CoC) for the spent fuel dry shielded canisters utilized at ONS. The proposed change to the TS requirements neither result in operation that will increase the probability of initiating an analyzed event nor alter assumptions relative to mitigation of an accident or transient event. The change has no effect on the process variables, structures, systems, and components that must be maintained consistent with the safety analyses and licensing basis. Therefore, the proposed change does not involve a significant increase in the probability or consequences of an accident previously evaluated.

2. Does the Proposed Change Create the Possibility of a New or Different Kind of Accident from any Accident Previously Evaluated?

   Response: No

   The proposed changes to TSs 3.7.12, 3.7.18 and 4.4, do not modify the method of nuclear fuel storage or handling at ONS, nor make any physical changes to the facility design, material, or construction standards. The change does not alter the plant configuration (no new or different type of equipment will be installed) or make changes in the methods governing normal plant operation. The proposed change to the ONS TS requirements does not adversely impact the results of the ONS safety analyses and is compliant with the current licensing basis. Therefore, the proposed change does not create the possibility of a new or different kind of accident from any kind of accident previously evaluated.

3. Does the Proposed Change Involve a Significant Reduction in a Margin of Safety?

   Response: No

   The proposed changes to TS 3.7.12, 3.7.18 and 4.4, do not modify the method of nuclear fuel storage or handling at ONS, nor make any physical changes to the facility design, material, or construction standards. The proposed changes comply with NRC approved regulations and the station's Part 72 and 50 licensing basis. Therefore, the proposed TS change does not involve a significant reduction in a margin of safety.

Based upon the above analysis, Duke Energy concludes that the requested change does not involve a significant hazards consideration, as set forth in 10 CFR 50.92(c), "Issuance of Amendment."

5.4 CONCLUSION

The regulatory requirements and guidance applicable to this license amendment request are identified in Section 5.1. In Section 5.3, Duke Energy made the determination that this amendment request involves a No Significant Hazards Consideration by applying the standards established in 10 CFR 50.92.

6 ENVIRONMENTAL CONSIDERATION

Duke Energy has evaluated this license amendment request against the criteria for identification of licensing and regulatory actions requiring environmental assessment in accordance with 10 CFR 51.21. Duke Energy has determined that this license amendment request meets the criteria for a categorical exclusion as set forth in 10 CFR 51.22(c)(9). This determination is based on the fact that the amendment meets the following specific criteria:

- The amendment involves no significant hazard consideration as demonstrated in Section 5.
- There is no significant change in the types or significant increase in the amounts of any effluent that may be released offsite.
- The principal barriers to the release of radioactive materials are not modified or affected by this change and no significant increases in the amounts of any effluent that could be released offsite will occur as a result of this change.
- There is no significant increase in individual or cumulative occupational radiation exposure. Because the principal barriers to the release of radioactive materials are not modified or affected by this change, there will be no significant increase in individual or cumulative occupational radiation exposure resulting from this change.

Therefore, no environmental impact statement or environmental assessment need be prepared in connection with the proposed amendment pursuant to 10 CFR 51.22(b).

7 REFERENCES

1. *Federal Register* Notice 71 FR 66648, dated November 16, 2006, "Criticality Control of Fuel Within Dry Storage Casks or Transportation Packages in a Spent Fuel Pool."
2. *Federal Register* Notice 72 FR 3705, dated January 26, 2007, "Criticality Control of Fuel Within Dry Storage Casks or Transportation Packages in a Spent Fuel Pool; Confirmation of Effective Date."
3. NRC Certificate of Compliance (No. 1004) For Dry Spent Fuel Storage Casks to Vectra Technologies, Inc. for Standardized NUMOS Horizontal Modular Storage System for Irradiated Nuclear Fuel, dated January 23, 1995 [ADAMS ACCESSION No. ML073470459].
4. NRC RIS 2005-05, "Regulatory Issues Regarding Criticality Analyses For Spent Fuel Pools And Independent Spent Fuel Storage Installations," dated March 23, 2005.
5. Duke Power Letter to the NRC Document Control Desk, dated March 1, 2006, "License Amendment Request to Reconcile 10 CFR 50 and 10 CFR 72 Criticality Requirements for Loading and Unloading Dry Spent Fuel Storage Canisters in the Spent Fuel Pool" [ADAMS ACCESSION No. ML060720030].
6. NRC Letter to Mr. Bruce H. Hamilton, Vice President, Oconee Site, dated June 15, 2006, "Oconee Nuclear Station, Units 1, 2, and 3, Issuance Of Amendments Regarding Criticality Requirements For Loading and Unloading Dry Spent Fuel Storage Canisters in the Spent Fuel Pool (TAC Nos. MC0238, MD0239, and MD0240)" [ADAMS ACCESSION No. ML061380571].
7. Virginia Electric and Power Company (Dominion) Letter to the NRC Document Control Desk, dated March 12, 2007, "Surry Power Station Units 1 and 2 Withdrawal Of Proposed Technical Specifications Change Request Concerning Spent Fuel Cask Loading Requirements" [ADAMS ACCESSION No. ML070710245].
8. Energy Letter to the NRC Document Control Desk, date April 11, 2007, "Indian Point Unit 2 Withdrawal of License Amendment Request (LAR) for Indian Point Unit 2 to Add Spent Fuel Cask Loading Requirements to the Technical Specifications" [ADAMS ACCESSION No. ML071130011].
9. Issuance of Renewed Materials License No. SNM-2503, Oconee Independent Spent Fuel Storage Installation (ISFSI) (TAC Nos. L24184 and L24206), dated May 29, 2009.

ATTACHMENT 1

Marked-Up Technical Specification Pages

NOTE: This attachment contains markups of existing TS pages (identified below) which incorporate the changes described in the Letter Enclosure. Added text is underlined and deletions shown by ~~strikethrough~~.

3.7.12-1
3.7.18-1
4.0-3

3.7 PLANT SYSTEMS

3.7.12 Spent Fuel Pool Boron Concentration

LCO 3.7.12 The spent fuel pool boron concentration limit shall be within limits.

APPLICABILITY: When fuel assemblies are stored in the spent fuel pool or~~and~~ when fuel assemblies are in a site-specific licensed dry spent fuel storage cask located in the spent fuel pool.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. Spent fuel pool boron concentration not within limit.	----------NOTE---------- LCO 3.0.3 is not applicable. ----------	
	A.1 Suspend movement of fuel assemblies in the spent fuel pool.	Immediately
	AND	
	A.2 Initiate action to restore spent fuel pool boron concentration to within limit.	Immediately

3.7 PLANT SYSTEMS

3.7.18 Dry Spent Fuel Storage Cask Loading and Unloading

LCO 3.7.18 The combination of initial enrichment, burnup and post-irradiation cooling time of each fuel assembly in a dry spent fuel storage cask shall meet the criteria of Table 3.7.18-1.

APPLICABILITY: Whenever any fuel assembly is in a site-specific licensed dry spent fuel storage cask located in the spent fuel pool.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. Requirements of the LCO not met.	A.1 ----------NOTE---------- LCO 3.0.3 is not applicable. ---------- Initiate action to move the noncomplying fuel assembly to an acceptable storage location.	Immediately

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.7.18.1	Verify by administrative means the initial enrichment, burnup, and post-irradiation cooling time of the fuel assembly is in accordance with Table~~Figure~~ 3.7.18-1.	Prior to placing the fuel assembly into a dry spent fuel storage cask for loading AND Prior to placing a dry spent fuel storage cask into the spent fuel pool for unloading.

4.0 DESIGN FEATURES

4.4 Dry Spent Fuel Storage Cask Loading and Unloading for ISFSI site-specific licensed storage casks (site-specific licensed storage casks are contained in horizontal storage modules 1 through 40).

4.4.1 Criticality

Dry spent fuel storage cask loading or unloading in the spent fuel pool shall be maintained with:

a. Fuel assemblies having a maximum nominal U-235 enrichment of 5.0 weight percent;

b. $k_{eff} < 1.0$ if fully flooded with unborated water, which includes an allowance for uncertainties as described in Section 9.1 of the UFSAR;

c. $k_{eff} \leq 0.95$ if fully flooded with water borated to 430 ppm, which includes an allowance for uncertainties as described in Section 9.1 of the UFSAR. Maintaining the normal spent fuel pool boron concentration within the TS limits assures $k_{eff} \leq 0.95$ for any accident condition.

d. Dry spent fuel storage cask designs limited to NUHOMS®-24P or NUHOMS®-24PHB.

ATTACHMENT 2

Marked-Up Technical Specification Bases Pages

(for information only)

NOTE: This attachment contains markups of existing TS Bases pages (identified below) which incorporate the changes described in the Letter Enclosure. Added text is underlined and deletions shown by ~~strikethrough~~.

B 3.7.12-1 through 3
B 3.7.18-1 through 4

B 3.7 PLANT SYSTEMS

B 3.7.12 Spent Fuel Pool Boron Concentration

BASES

BACKGROUND

Each Oconee spent fuel pool (SFP) contains racks for fuel assembly storage and a cask pit area for loading assemblies into a NUHOMS® -24P/24PHB dry storage canister (DSC). Criticality analyses have been performed for the both SFP rack storage and DSC loading/unloading operations, in accordance with the regulation (Ref. 1) and the guidance in References 2 and 3. The SFP and DSC criticality analyses each take credit for 430 ppm soluble boron during normal conditions, in order to achieve system $k_{eff} \leq 0.95$. This partial soluble boron credit is included in TS 4.3.1 c. (SFP storage racks) and 4.4.1 c. (DSC).

The SFP storage rack criticality analysis yields fuel assembly storage configuration requirements and associated minimum burnup values (as a function of initial U-235 enrichment), which are specified in LCO 3.7.13. The DSC criticality evaluation establishes minimum burnup requirements for the loading of fuel assemblies into a NUHOMS® -24P/24PHB DSC without location restrictions. The DSC burnup requirements are provided in LCO 3.7.18.

The minimum SFP boron concentration of 2220 ppm (per SR 3.7.12.1) allows sufficient time to detect and mitigate all credible boron dilution scenarios, well before the SFP boron concentration drops to 430 ppm. The minimum 2220 ppm boron is available for all accident conditions evaluated in the SFP rack and DSC criticality analyses, per the double contingency principle (Ref. 4).

APPLICABLE SAFETY ANALYSES

Reference 3 discusses several criticality accident conditions that should be considered in SFP storage rack criticality analysis. Applicable accidents for the Oconee SFP storage racks include: 1) drop of a fuel assembly on top of the SFP storage rack; 2) drop of a fuel assembly outside of the storage rack modules; 3) abnormal SFP water temperatures outside the normal temperature range; 4) the misloading of a fuel assembly in a storage cell for which restrictions on location, enrichment, burnup, or post-irradiation cooling time are not satisfied; and 5) the drop of a heavy load (transfer cask) onto the SFP storage racks (NUREG-0612). Of these SFP storage rack accidents, the heavy load drop event requires the largest amount of soluble boron (almost 2200 ppm) to maintain SFP $k_{eff} \leq 0.95$.

BASES

APPLICABLE SAFETY ANALYSES (continued)

The accident scenarios (Ref. 3) that are valid for the loading/unloading of a NUHOMS® -24P/24PHB DSC include: 1) drop of a fuel assembly on top of the DSC storage cells; 2) drop of a fuel assembly immediately outside of the transfer cask containing the DSC; 3) abnormal SFP water temperatures beyond the normal temperature range; and 4) the misloading of a fresh 5.0 wt % U-235 fuel assembly in one of the DSC storage cells. Of these DSC accidents, the misload event requires the largest amount of soluble boron (630 ppm) to achieve a system $k_{eff} \leq$ 0.95.

Note that it is plausible to consider a loss of normal SFP cooling accident occurring in conjunction with a boron dilution event in the Oconee SFPs. In this unlikely scenario, with SFP water temperatures up to 212°F, the largest concentration of soluble boron required to maintain system keff ≤ 0.95 is 500 ppm (for the SFP storage racks). This amount of soluble boron is still much less than that remaining after the worst-case credible dilution event (825 ppm).

Therefore, maintaining the SFP boron concentration ≥ 2220 ppm per SR 3.7.12.1 ensures that $k_{eff} \leq$ 0.95 for any accident conditions in the SFP storage rack or NUHOMS® -24P/24PHB DSC. This minimum boron concentration limit includes allowance for analytical, mechanical, and instrument measurement uncertainties.

The concentration of dissolved boron in the SFP satisfies Criterion 2 of 10 CFR 50.36 (Ref. 5).

LCO

The minimum concentration of dissolved boron in the SFP (2220 ppm) preserves the assumptions used in the analysis of the potential accident scenarios described above. The minimum boron concentration ensures that the system k_{eff} for the SFP storage rack or the NUHOMS® -24P/24PHB DSC will remain below 0.95 for all credible criticality accident scenarios and boron dilution events.

APPLICABILITY

This LCO applies whenever fuel assemblies are stored in the SFP storage racks, or whenever fuel assemblies are being loaded into a NUHOMS® -24P/24PHB DSC in the SFP. <u>This LCO applies only to spent fuel storage casks loaded under the ISFSI site-specific license. Site-specific storage casks are contained in Horizontal Storage Modules (HSMs) Nos. 1 through 40.</u>

ACTIONS

<u>A.1 and A.2</u>

The Required Actions are modified by a Note indicating that LCO 3.0.3 does not apply.

BASES

ACTIONS

A.1 and A.2 (continued)

If moving irradiated fuel assemblies while in MODE 5 or 6, LCO 3.0.3 would not specify any action. If moving irradiated fuel assemblies while in MODE 1, 2, 3, or 4, the fuel movement is independent of reactor operation. Therefore, inability to suspend movement of fuel assemblies is not a sufficient reason to require a reactor shutdown.

When the concentration of boron in the SFP is less than required, immediate action must be taken to preclude the occurrence of an accident or to mitigate the consequences of an accident in progress. This is achieved by immediately suspending the movement of the fuel assemblies. This does not preclude movement of a fuel assembly to a safe position. Immediate action is also required to initiate action to restore the SFP boron concentration to within limits.

SURVEILLANCE REQUIREMENTS

SR 3.7.12.1

This SR verifies that the concentration of boron in the SFP is within the required limit. As long as this SR is met, the analyzed incidents are fully addressed. The Surveillance Frequency is based on operating experience, equipment reliability, and plant risk and is controlled under the Surveillance Frequency Control Program. The COLR revision process assures that the minimum boron concentration specified in the COLR bounds the limit specified by this SR.

REFERENCES

1. 10 CFR 50.68(b).

2. American Nuclear Society, "American National Standard Design Requirements for Light Water Reactor Fuel Storage Facilities at Nuclear Power Plants," ANSI/ANS-57.2-1983, October 7, 1983.

3. Nuclear Regulatory Commission, Memorandum to Timothy Collins from Laurence Kopp, "Guidance on the Regulatory Requirements for Criticality Analysis of Fuel Storage at Light Water Reactor Power Plants," August 19, 1998.

4. Double contingency principle of ANSI N16.1-1975, as specified in the April 14, 1978 NRC letter (Section 1.2) and implied in the proposed revision to Regulatory Guide 1.13 (Section 1.4, Appendix A).

5. 10 CFR 50.36.

B 3.7 PLANT SYSTEMS

B 3.7.18 Dry Spent Fuel Storage Cask Loading and Unloading

BASES

BACKGROUND

Fuel loading and unloading operations for the NUHOMS®-24P and NUHOMS®-24PHB dry storage canisters (DSCs) take place in the cask pit area of the spent fuel pool. The cask pit is adjacent to the spent fuel storage racks in each of the Oconee spent fuel pools, and is open to the rest of the spent fuel pool at all times. The NUHOMS®-24P and NUHOMS®-24PHB DSCs contain storage cells for 24 fuel assemblies. Eligible B&W 15x15 fuel assemblies (MkB2-B8, MkB9, and MkB10) with initial enrichments ≤ 5.0 wt % U-235 may be stored in the NUHOMS®-24P or NUHOMS®-24PHB DSC, as long as the fuel assemblies meet the minimum burnup and cooling time requirements specified in Table 3.7.18-1.

For normal conditions in the spent fuel pool, the NUHOMS®-24P and NUHOMS®-24PHB DSCs have been analyzed using credit for soluble boron as allowed in Reference 1. This ensures that the system multiplication factor, k_{eff}, is $\leq$ 0.95 as recommended in ANSI/ANS-57.2-1983 (Ref. 2) and NRC guidance (Ref. 3). The DSC is analyzed to allow loading/unloading of eligible fuel assemblies while maintaining $k_{eff} \leq 0.95$, including uncertainties, tolerances, biases, and credit for 430 ppm soluble boron. Note that the criticality analysis accounts for a maximum as-built enrichment tolerance of 0.05 wt % U-235. For example, for a specified maximum design enrichment of 5.00 wt % U-235, an as-built enrichment up to 5.05 weight percent is acceptable. The 430 ppm soluble boron credit must provide sufficient subcritical margin to maintain the DSC $k_{eff} \leq$ 0.95. In addition, sub-criticality of the DSC ($k_{eff} < 1.0$) must be assured on a 95/95 basis, without the presence of any soluble boron in the spent fuel pool.

The dual k_{eff} criteria identified in the above paragraph are satisfied for fuel assemblies meeting the minimum burnup and post-irradiation cooling time requirements specified in Table 3.7.18-1. Reactivity reduction with cooling time is primarily attributable to Pu-241 decay and Gd-155 buildup (via Eu-155 decay).

Specification 4.4.1 c. requires that the DSC k_{eff} be $\leq$ 0.95 when flooded with water borated to 430 ppm. A spent fuel pool boron dilution analysis has been performed that confirms that sufficient time is available to detect and mitigate a dilution of the spent fuel pool before the 0.95 k_{eff}

BASES

BACKGROUND (continued)

design basis is exceeded. The spent fuel pool boron dilution analysis concluded that an unplanned or inadvertent event which could result in the dilution of the spent fuel pool boron concentration to 430 ppm is not a credible event.

APPLICABLE SAFETY ANALYSES

Several accident conditions (Ref. 3) are considered that could result in an increase in system k_{eff} for a DSC being loaded or unloaded in the spent fuel pool. These accident conditions include the drop of a fuel assembly on top of the DSC storage cells, the drop of a fuel assembly just outside the transfer cask containing the DSC, a higher than normal spent fuel pool water temperature, and the misloading of a fresh 5.0 wt % U-235 assembly in one of the DSC storage cells.

For an occurrence of these postulated accidents, the double contingency principle discussed in ANSI N-16.1-1975 and the April 1978 NRC letter (Ref. 4) can be applied. This double contingency principle does not require assuming two unlikely, independent, concurrent events to ensure protection against a criticality accident. Thus, for these postulated accident conditions, the presence of additional soluble boron in the spent fuel pool water (above the 430 ppm required to maintain $k_{eff} \leq 0.95$ under normal DSC loading/unloading conditions) can be assumed as a realistic initial condition since not assuming its presence would be a second unlikely event.

Calculations were performed to determine the amount of soluble boron required to offset the highest reactivity increase associated with these postulated accidents, in order to maintain $k_{eff} \leq 0.95$. It was found that a spent fuel pool boron concentration of 630 ppm was sufficient to maintain $k_{eff} \leq 0.95$ for the worst-case postulated criticality-related accident (the fresh fuel assembly misloaded in a DSC storage cell). Specification 3.7.12 ensures the spent fuel pool contains adequate dissolved boron to compensate for the increased reactivity caused by these postulated accidents.

For normal storage conditions, Specification 4.3.1 c. requires that the spent fuel rack k_{eff} be ≤ 0.95 when flooded with water borated to 430 ppm. A spent fuel pool boron dilution analysis was performed which confirmed that sufficient time is available to detect and mitigate a dilution of the spent fuel pool before the 0.95 k_{eff} design basis is exceeded. The spent fuel pool boron dilution analysis concluded that an unplanned or inadvertent event which could result in the dilution of the spent fuel pool boron concentration to 430 ppm is not a credible event.

BASES

APPLICABLE SAFETY ANALYSIS (continued)

The configuration of fuel assemblies in the DSC and the concentration of dissolved boron in the spent fuel pool satisfy Criterion 2 of 10 CFR 50.36 (Ref. 5)

LCO

The k_{eff} of the dry spent fuel storage cask (NUHOMS®-24P or NUHOMS®-24PHB DSC), during loading and unloading operations in the spent fuel pool, will always remain ≤ 0.95, assuming the spent fuel pool is flooded with water borated to at least 430 ppm, and that each loaded fuel assembly meets the initial enrichment, burnup, and post-irradiation cooling time of Table 3.7.18-1.

APPLICABILITY

This LCO applies whenever any fuel assembly is in a dry spent fuel storage cask located in the spent fuel pool. This LCO applies only to spent fuel storage casks loaded under the ISFSI site-specific license. Site-specific storage casks are contained in Horizontal Storage Modules (HSMs) Nos. 1 through 40.

ACTIONS

A.1

Required Action A.1 is modified by a Note indicating that LCO 3.0.3 does not apply.

If moving fuel assemblies while in MODE 5 or 6, LCO 3.0.3 would not specify any action. If moving fuel assemblies while in MODE 1, 2, 3, or 4, the fuel movement is independent of reactor operation. Therefore, in either case, inability to move fuel assemblies is not sufficient reason to require a reactor shutdown.

When the configuration of fuel assemblies loaded in the NUHOMS®-24P or NUHOMS®-24PHB DSC is not in accordance with the LCO, immediate action must be taken to make the necessary fuel assembly movement(s) to bring the configuration into compliance with the LCO.

SURVEILLANCE REQUIREMENTS

SR 3.7.18.1

This SR verifies by administrative means that the initial enrichment, burnup, and post-irradiation cooling time of the fuel assembly to be loaded into or removed from the NUHOMS®-24P or NUHOMS®-24PHB DSC is in accordance with Table 3.7.18-1.

BASES

REFERENCES

1. 10 CFR 50.68(b)(4)

2. American Nuclear Society, "American National Standard Design Requirements for Light Water Reactor Fuel Storage Facilities at Nuclear Power Plants," ANSI/ANS-57.2-1983, October 7, 1983.

3. Nuclear Regulatory Commission, Memorandum to Timothy Collins from Laurence Kopp, "Guidance on the Regulatory Requirements for Criticality Analysis of Fuel Storage at Light Water Reactor Power Plants," August 19, 1998.

4. Double contingency principle of ANSI N16.1-1975, as specified in the April 14, 1978 NRC letter (Section 1.2) and implied in the proposed revision to Regulatory Guide 1.13 (Section 1.4, Appendix A).

5. 10 CFR 50.36

ATTACHMENT 3

Revised (Clean) Technical Specification Pages

NOTE: This attachment contains the clean, revised TS pages identified below.

3.7.12-1
3.7.18-1
4.0-3

3.7 PLANT SYSTEMS

3.7.12 Spent Fuel Pool Boron Concentration

LCO 3.7.12 The spent fuel pool boron concentration limit shall be within limits.

APPLICABILITY: When fuel assemblies are stored in the spent fuel pool or when fuel assemblies are in a site-specific licensed dry spent fuel storage cask located in the spent fuel pool.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. Spent fuel pool boron concentration not within limit.	----------NOTE---------- LCO 3.0.3 is not applicable. ----------	
	A.1 Suspend movement of fuel assemblies in the spent fuel pool.	Immediately
	AND	
	A.2 Initiate action to restore spent fuel pool boron concentration to within limit.	Immediately

3.7 PLANT SYSTEMS

3.7.18 Dry Spent Fuel Storage Cask Loading and Unloading

LCO 3.7.18 The combination of initial enrichment, burnup and post-irradiation cooling time of each fuel assembly in a dry spent fuel storage cask shall meet the criteria of Table 3.7.18-1.

APPLICABILITY: Whenever any fuel assembly is in a site-specific licensed dry spent fuel storage cask located in the spent fuel pool.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. Requirements of the LCO not met.	A.1 ----------NOTE---------- LCO 3.0.3 is not applicable. ---------- Initiate action to move the noncomplying fuel assembly to an acceptable storage location.	Immediately

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.7.18.1	Verify by administrative means the initial enrichment, burnup, and post-irradiation cooling time of the fuel assembly is in accordance with Table 3.7.18-1.	Prior to placing the fuel assembly into a dry spent fuel storage cask for loading AND Prior to placing a dry spent fuel storage cask into the spent fuel pool for unloading.

4.0 DESIGN FEATURES

4.4 Dry Spent Fuel Storage Cask Loading and Unloading for ISFSI site-specific licensed storage casks (site-specific licensed storage casks are contained in horizontal storage modules 1 through 40).

4.4.1 Criticality

Dry spent fuel storage cask loading or unloading in the spent fuel pool shall be maintained with:

a. Fuel assemblies having a maximum nominal U-235 enrichment of 5.0 weight percent;

b. $k_{eff} < 1.0$ if fully flooded with unborated water, which includes an allowance for uncertainties as described in Section 9.1 of the UFSAR;

c. $k_{eff} \leq 0.95$ if fully flooded with water borated to 430 ppm, which includes an allowance for uncertainties as described in Section 9.1 of the UFSAR. Maintaining the normal spent fuel pool boron concentration within the TS limits assures $k_{eff} \leq 0.95$ for any accident condition.

d. Dry spent fuel storage cask designs limited to NUHOMS®-24P or NUHOMS®-24PHB.