72-1004

TRANSNUCLEAR WEST

June 8, 2001
NUH03-01-1706

Mr. Timothy Kobetz
Spent Fuel Project Office, NMSS
U. S. Nuclear Regulatory Commission
11555 Rockville Pike M/S 0-6-F-18
Rockville, MD 20852

Subject: Revision 1 of Application for Amendment No. 4 of NUHOMS® Certificate of Compliance (CoC) No. 1004.

References:
1. Robert M. Grenier Letter to Timothy Kobetz, "Administrative Error in NUHOMS® CoC 72-1004, Amendment No. 2", May 25, 2001.

2. W. R. Mcollum Jr. Letter to William Brach, "Request for Exemption to Permit Storage of Fuel Assemblies in Standardized NUHOMS® –24P Canisters Licensed Under Amendment 2 of the Certificate Of Compliance (72-1004), June 8, 2001.

Dear Mr. Kobetz:

Transnuclear West Inc. herewith submits Revision 1 of its Application for Amendment No. 4 of NUHOMS® CoC No. 1004. This revision requests approval to correct an administrative error in the Fuel Specification Tables 1-1a and 1-1b as described in Reference 1.

While Duke Energy Corporation (Duke) has an immediate need for the change proposed herein for its Oconee Nuclear Station as discussed in Reference 2, the proposed changes are applicable to any general licensee.

TN West has assessed the proposed change and determined that there is no safety significance as discussed in Attachment A of this submittal.

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on 06/19/01

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Should you or your staff require additional information to support review of this application, please do not hesitate to contact me at 510-744-6053.

Sincerely,

U. B. Chopra
Licensing Manager

Docket 72-1004

Enclosures:
1. Instructions for Updating Application for Amendment No. 4 to CoC 1004
2. Ten (10) copies of Revision 1 of Application for Amendment No. 4 to COC 1004 (Replacement pages only)

Instructions for Updating Application for Amendment No. 4 to COC 72-1004

SUBJECT MATERIAL	REMOVE AND DESTROY MATERIAL	INSERT MATERIAL
Attachment A	All Pages, Revision 0	All Pages, Revision 1
Attachment B	Pages B.1, B4 and B5, Revision 0	Pages B.1, B4 and B.5, Revision 1
Attachment C	Pages C1, C2 and C3, Revision 0	Pages C1, C2, C3 and C3a, Revision 1

ATTACHMENT A

Description, Justification and Evaluation of Amendment Changes

ATTACHMENT A

DESCRIPTION, JUSTIFICATION AND EVALUATION OF AMENDMENT CHANGES

1. INTRODUCTION

The purpose of this amendment application is to amend CoC 72-1004 Technical Specifications 1.2.1 and 1.2.15 to allow storage of PWR fuel assemblies (with or without BPRAs) which have an equivalent unirradiated enrichment of greater than 1.45 wt. % U-235 in NUHOMS®-24P DSC. In addition, Table 1-1a of Specification 1.2.1 is revised to specify a new unirradiated Maximum Assembly + BPRA Length of 171.93 inches for fuel with burnup ≤ 32,000 MWd/MTU.

This section of the application provides (1) a brief description of the change (2) justification for the change (3) and a safety evaluation for this change.

Revision 1 of this application reflects the changes to correct an administrative error in Tables 1-1a and 1-1b of Fuel Specification 1.2.1 of CoC 72-1004, Amendment No. 2.

2. BRIEF DESCRIPTION OF THE CHANGE

2.1 Suggested Changes to NUHOMS COC 72-1004, *Amendment No.* 2

- Revise the "Bases" section of Specification 1.2.1, "Fuel Specification", to delete the requirement that the authorized fuel assemblies for storage in NUHOMS® 24P DSC must have an equivalent unirradiated enrichment of less than or equal to 1.45 wt. % U-235.
- *Revise the current description of the Physical Parameters (with and without BPRAs) as listed in Tables 1-1a of Specification 1.2.1 from "Maximum Assembly Width (unirradiated)" to "Nominal Cross-Sectional Envelope".*
- *Revise the current description of the Physical Parameters as listed in Tables 1-1b of Specification 1.2.1 from "Maximum Assembly Width (unirradiated)" to "Nominal Cross-Sectional Envelope". Also, provide a clarification note for the cross-sectional envelope of the BWR fuel.*
- Revise "Physical Parameters (with BPRAs)" listed in Table 1-1a of Specification 1.2.1, to add a new Unirradiated Maximum Assembly + BPRA Length of 171.93 inches for fuel with burnup ≤ 32,000 MWd/MTU. Also, the current maximum Assembly + BPRA Length of 171.71 inches is limited to fuel with burnup in the range of > 32,000 MWd/MTU and ≤ 45,000 MWd/MTU.
- Revise Table 1-2a of Specification 1.2.1 to replace the existing note "Not acceptable per Figure 1.1" shown in the top shaded area of this table with a new note which

states that "Minimum cooling time 5 years, and minimum 2350 ppm soluble boron required in the DSC cavity during loading or unloading". Modify Table 1-2a note associated with the fourth bullet as marked.

- Revise Table 1-2c of Specification 1.2.1 to replace the existing note "Not acceptable per Figure 1.1" shown in the top shaded area of this table with a new note which states that "Minimum cooling time 5 years, and minimum 2350 ppm soluble boron required in the DSC cavity during loading or unloading". Modify Table 1-2c note associated with the sixth bullet as marked.
- Revise Figure 1.1 to show that the fuel assemblies which exceed the equivalent enrichment parameter of 1.45 wt. % and were previously identified as "Not Qualified" are now "Qualified with 2350 ppm minimum soluble boron" in the DSC cavity during loading or unloading. Also revise the existing note on this Figure for previously "Qualified" fuel assemblies to say "Qualified with 2000 ppm minimum boron".
- Revise Technical Specification 1.2.15 to specify separate limits of 2000 ppm and 2350 ppm soluble boron concentration as marked.
- Revise the Objective and Bases of Technical Specification 1.2.15 to make it consistent with the proposed change.

2.2 Changes to NUHOMS® FSAR, Revision 5

The following changes to NUHOMS® FSAR Revision 5 are being implemented:

- *Revise FSAR Table 3.1-2 to add a clarification note for the cross-sectional envelope of the BWR fuel.*
- Revise FSAR Tables 3.1-1 and 3.1-1a to specify a new unirradiated Maximum Assembly + BPRA Length of 171.93 inches for fuel with burnup $\leq$ 32,000 MWd/MTU. Also, the current maximum Assembly + BPRA Length of 171.71 inches is limited to fuel with burnup in the range of $>$ 32,000 MWd/MTU and $\leq$ 45,000 MWd/MTU.
- Revise FSAR section 3.3.4.1 to provide cross reference to a new FSAR section 3.6 as discussed in the next paragraph. In addition, this section is revised to clarify that the current licensing basis of 2000 ppm soluble boron is applicable to fuel assemblies with equivalent unirradiated enrichment of less than or equal to 1.45 wt. % U-235.
- Add a new FSAR section 3.6 which addresses the safety analysis of storage of PWR fuel assemblies which exceed the existing equivalent unirradiated enrichment of 1.45 wt. % U-235. A description of the model and methodology used is provided. The results of criticality analysis show that a minimum boron concentration of 2350 ppm maintains the system reactivity below 0.95.
- Renumber existing FSAR Section 3.6 entitled "References" to section 3.7. Revise section 3.7 to reflect the new references which are discussed in the revised FSAR pages.

- Revise Figure 3.3-3 to show that the fuel assemblies which exceed the equivalent enrichment parameter of 1.45 wt. % and were previously identified as "Not Qualified" are now "Qualified with 2350 ppm minimum soluble boron" in the DSC cavity during loading or unloading. Also revise the existing note on this Figure for previously "Qualified" fuel assemblies to say "Qualified with 2000 ppm minimum boron".
- Revise FSAR section J.4.4 (FSAR Appendix J) to provide an analysis of the allowable irradiation growth for a B&W 15x15 fuel assembly (with BPRAs) which is 0.25 inch longer than the existing limiting length of 171.71 inch and the corresponding maximum burnup value which can be qualified for storage in a 24P long cavity DSC.

3. JUSTIFICATION OF CHANGE

Duke Energy Corporation (Duke) uses the NUHOMS® -24P system at the Oconee Nuclear Station. Inventories in both of the Oconee spent fuel pools currently exceed the level Duke considers prudent for refueling activities. Duke has planned dry storage loading campaigns to reduce these excessive inventories.

Currently, Duke's most urgent need is to load 144 fuel assemblies located in the Oconee Unit 3 spent fuel pool into 6 DSCs for dry storage during summer 2001. Fuel assemblies in one of these DSCs will exceed the equivalent unirradiated enrichment parameter of 1.45 wt. % U-235 and thus do not currently qualify for storage into NUHOMS® -24P DSC.

Finally, some of these fuel assemblies with BPRAs to be stored in 24P long cavity DSC have an unirradiated length that is 0.25 inch longer than the value currently specified in Fuel Specification Table 1-1a and thus do not qualify for storage into NUHOMS® -24P DSC.

The changes requested herein would allow Duke to remove a total of 131 such fuel assemblies which do not currently qualify for dry storage from its Oconee Unit 3 spent fuel pool, such that prudent inventories can be re-established.

While Duke has the current need for the amendment proposed herein, the proposed changes are applicable to any general licensee.

4. EVALUATION OF CHANGE

TN West has evaluated the proposed change and has concluded that it has no significant effect on safety.

- Revised SAR pages (included with Attachment C of this submittal) provide a complete evaluation of the proposed change.
- *Revision 1 of this application reflects the changes to correct an administrative error in Tables 1-1a and 1-1b of Fuel Specification 1.2.1 of CoC 72-1004, Amendment No. 2. This change revises the description of the fuel assembly width parameter in the aforementioned tables as described in paragraph 2.1 and serves to restore the fuel*

assembly width description back to what was previously approved in CoC Amendment 1. This is necessary because the description as stated in CoC Amendment 2 is inconsistent with the fuel assemblies approved for storage under Amendment 2. Thus this change ensures that all PWR and BWR fuel assemblies approved for storage can be loaded into the Standardized NUHOMS DSCs. This change has no impact on safety. It is important only to ensure that the authorized fuel assembly fits within the DSC guide sleeve (for PWR application) or spacer disc opening (for BWR application). The change in description of this width parameter does not change the design of the approved fuel assemblies nor are any changes being made to the DSC guide sleeves or spacer disc openings which accommodate the fuel assemblies. The assembly width dimension is not an input to the criticality evaluation. There is no impact on the thermal, shielding or structural analyses presented in the FSAR since no change is being implemented to any of the related fuel assembly or DSC design parameters.

ATTACHMENT B

Certificate of Compliance Suggested Changed Pages
(Revisions indicated relative to NUHOMS CoC 1004, *Amendment No.* 2)

- Section 1.2.1 (Entire Section)
- Section 1.2.15 (Entire Section)

Table 1-1a
PWR Fuel Specifications for Fuel to be Stored in the Standardized NUHOMS®-24P DSC

Title or Parameter	Specifications
Fuel	Only intact, unconsolidated PWR fuel assemblies (with or without BPRAs) with the following requirements
Physical Parameters (without BPRAs)	
Maximum Assembly Length (unirradiated)	165.75 in (standard cavity) 171.71 in (long cavity)
Nominal Cross-Sectional Envelope	8.536 in
Maximum Assembly Weight	1682 lbs
No. of Assemblies per DSC	≤ 24 intact assemblies
Fuel Cladding	Zircalloy-clad fuel with no known or suspected gross cladding breaches
Physical Parameters (with BPRAs)	
Maximum Assembly + BPRA Length (unirradiated)	
With Burnup > 32,000 and ≤ 45,000 MWd/MTU	171.71 in (long cavity)
With Burnup ≤ 32,000 MWd/MTU	*171.96 in (long cavity)*
Nominal Cross-Sectional Envelope	8.536 in
Maximum Assembly + BPRA Weight	1682 lbs
No. of Assemblies per DSC	≤ 24 intact assemblies
No. of BPRAs per DSC	≤ 24 BPRAs
Fuel Cladding	Zircalloy-clad fuel with no known or suspected gross cladding breaches
Nuclear Parameters	
Fuel Initial Enrichment	≤ 4.0 wt. % U-235
Fuel Burnup and Cooling Time	Per Table 1-2a (without BPRAs) or Per Table 1-2c (with BPRAs)
BPRA Cooling Time (Minimum)	5 years for B&W Designs 10 years for Westinghouse Designs
Alternate Nuclear Parameters	
Initial Enrichment	≤ 4.0 wt. % U-235
Burnup	≤ 40,000 MWd/MTU and Per Figure 1.1
Decay Heat (Fuel + BPRA)	≤ 1.0 kW per assembly
Neutron Fuel Source	≤ 2.23×10^{8} n/sec per assy with spectrum bounded by that in Chapter 7 of SAR
Gamma (Fuel +BPRA) Source	≤ 7.45×10^{15} g/sec per assy with spectrum bounded by that in Chapter 7 of SAR

Table 1-1b
BWR Fuel Specifications of Fuel to be Stored in the Standardized NUHOMS®-52B DSC

Title or Parameter	Specifications
Fuel	Only intact, unconsolidated BWR fuel assemblies with the following requirements
Physical Parameters Maximum Assembly Length (unirradiated) *Nominal Cross-Sectional Envelope* * Maximum Assembly Weight No. of Assemblies per DSC Fuel Cladding	 176.16 in 5.454 in 725 lbs ≤ 52 intact channeled assemblies Zircaloy-clad fuel with no known or suspected gross cladding breaches
Nuclear Parameters Fuel Initial Lattice Enrichment Fuel Burnup and Cooling Time	 ≤ 4.0 wt. % U-235 Per Table 1-2b
Alternate Nuclear Parameters Initial Enrichment Burnup Decay Heat Neutron Source Gamma Source	 ≤ 4.0 wt. % U-235 ≤ 35,000 MWd/MTU ≤ 0.37 kW per assembly ≤ 1.01×10^8 n/sec per assy with spectrum bounded by that in Chapter 7 of SAR ≤ 2.63×10^{15} g/sec per assy with spectrum bounded by that in Chapter 7 of SAR

**Cross Sectional-Envelope is the outside dimension of the fuel channel.*

ATTACHMENT C

FSAR Changed Pages

(Revisions indicated relative to NUHOMS FSAR, Revision 5.)

- Table 3.1-1
- Table 3.1-1a
- *Table 3.1-2*
- Section 3.3.4.1 (Only Revised Pages are Included)
- Section 3.3.4.1.1 (Only Revised Pages are Included)
- Section 3.3.4.1.4 (Only Revised Pages are Included)
- Figure 3.3-3
- Section 3.6 (New Section)
- Section 3.7 (Only Revised Pages are Included)
- Section J.4.4 (Only Revised Pages are Included)

Table 3.1-1
Principal Acceptance Parameters for PWR Fuel to be Stored in NUHOMS® -24P DSC

Parameter	Value
Physical Parameters	
Assembly Length (Unirradiated)	
*With Burnup ≤ 45,000 MWd/MTU (*Standard Cavity *DSC)*	≤ 4.210 m (165.75 in.)
*With Burnup > 32,000 and ≤ 45,000 MWd/MTU (*Long Cavity *DSC)*	≤ 4.361 m (171.71 in.)
With Burnup ≤ 32,000 MWd/MTU (Long Cavity DSC)	*≤ 4.368 m (171.96 in.)*
Nominal Cross-Sectional Envelope	0.2168 m (8.536 in.)
Maximum Assembly Weight	≤ 764 Kg (1,682 lb.)
No. of Assemblies per DSC	≤ 24 intact assemblies
Thermal Characteristics	
Decay Heat Power per Assembly	≤1.0 kW
Radiological Characteristics	
Maximum Initial Enrichment	≤ 4.0 wt. % U-235
Burnup	≤ 40,000 MWd/MTU *and per Figure 3.3-3*
Post-Irradiation Cooling Time	≥ 5 years

Table 3.1-1a
PWR Fuel Assembly Designs Suitable for Storage

Type[1]	Nominal Width (in)	Assembly Unirradiated Length *(w/o* BPRAs)* *(in)*	Assembly Unirradiated Length *(with BPRAs)* (in)	Assembly Weight *(w/o* BPRAs)* (lbs)	Assembly Weight *(with BPRAs)* (lbs)	Heavy Metal Weight (kg-U)	Cladding Material
B&W 15x15[8]	8.536	165.75	170.875	1550.0	1682.0	475.0	Zircaloy-4
CE 14x14 Fort Calhoun[2]	8.100	147.00	*n/a*	1220.0	*n/a*	365.6	Zircaloy-4
CE 15x15 Palisades[3]	8.250	149.00	*n/a*	1360.0	*n/a*	412.4	Zircaloy-4
CE 14x14 Standard/Generic	8.100	157.00	*n/a*	1270.0	*n/a*	382.2	Zircaloy-4
Westinghouse 14x14[5]	7.763	160.13	*n/a*	1302.0	*n/a*	405.0	Zircaloy-4
Westinghouse 15x15[6]	8.434	160.10	*n/a*	1472.0	*n/a*	460.0	Zircaloy-4
Westinghouse 17x17[7]	8.434	160.10	167.220	1482.0	1663.2	461.0	Zircaloy-4
Limit:	8.536	165.75	171.710/191.96[9]	1682.0	1682.0	475.0	

(1) Each fuel assembly must be qualified for storage per 72-1004 CoC Technical Specifications.
(2) Includes Exxon/ANF FT. CALHOUN 14 X 14 ANF
(3) Includes Exxon/ANF 15x15 CE
(4) Not used
(5) Includes Exxon/ANF 14x14 Westinghouse
(6) Includes Exxon/ANF 15x15 Westinghouse
(7) Includes Babcock and Wilcox WE 17 X 17 B&W Mark BW
(8) Excludes Westinghouse 15x15 reload fuel for B&W 15x15 reactors
(9) Maximum allowed burnup is 32,000 MWd/MTU for the 171.96 long assemblies (plus BPRAs)

* w/o means without

Table 3.1-2
Principal Acceptance Parameters for BWR Fuel to be Stored in NUHOMS® -52B DSC

Parameter	Value
Physical Parameters	
Assembly Length (Unirradiated)	≤ 4.474 m (176.16 in.)
Nominal Cross-Sectional Envelope*	0.1385 m (5.454 in.)
Maximum Assembly Weight (w/fuel channels)	≤ 329Kg (725 lb.)
No. of Assemblies per DSC	≤ 52 intact channeled assemblies
Thermal Characteristics	
Decay Heat Power per Assembly	≤ 0.37 kW
Radiological Characteristics	
Maximum Initial Lattice Enrichment	≤ 4.0 w/o U-235
Burnup	≤ 35,000 MWd/MTHM
Post-Irradiation Cooling Time	≥ 5 years

** Cross-Sectional Envelope is the outside dimension of the fuel channel.*