



February 9, 2011  
E-29954

U. S. Nuclear Regulatory Commission  
Attn: Document Control Desk  
One White Flint North  
11555 Rockville Pike  
Rockville, MD 20852

Subject: Application for Amendment 13 to Standardized NUHOMS® Certificate of Compliance No. 1004 for Spent Fuel Storage Casks, Revision 0

In accordance with 10 CFR 72.244, Transnuclear, Inc. (TN) herewith submits its application to amend Certificate of Compliance (CoC) 1004 for the Standardized NUHOMS® System.

On April 10, 2007 TN applied for CoC 1004 **Amendment 11**. NRC review of **Amendment 11** is ongoing. On September 11, 2009 TN applied for CoC 1004 **Amendment 12**, associated with the United States Department of Energy TAD (Transportation Aging and Disposal) project. An NRC TAC number was assigned, but on December 8, 2009 NRC returned the application for **Amendment 12** based on no FY2010 funds available for TAD reviews. Therefore the application herein is for CoC 1004 **Amendment 13**.

The scope of Amendment 13 includes the following items, summarized here and more fully described in Enclosure 2:

1. Adds a 69BTH DSC (dry shielded canister).
2. Adds a 37PTH DSC.
3. Evaluates the 24PHB DSC to accommodate control components other than BPRAs, allow for storage of damaged fuel assemblies and other minor enhancements.
4. Evaluates the 32PT DSC for incorporation of high burn-up fuel assemblies with and without control components (CCs) and other minor enhancements.
5. Evaluates the 61BTH and 24PTH DSCs for storage of failed fuel.
6. Additional Changes, as follows:
  - a. Evaluates the high-seismic HSM (horizontal storage module) Model HSM-HS for storage of the following DSCs: 61BT, 32PT, 24PTH, 61BTH, 69BTH, and 37PTH.
  - b. Extends the use of metal matrix composites (MMC) as a neutron absorber material in the 61BTH Type 1 and Type 2 DSCs for higher heat loads.
  - c. Evaluates DSCs for the addition of BLEU and MOX fuel assemblies as authorized contents.

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- d. Evaluates HSM-H/HSM-HS inlet vent shielding design modifications to achieve dose reductions.
- e. Evaluates the OS200 TC (transfer cask) to allow transfer of the 61BT, 32PT, 24PTH, and 61BTH DSCs.
- f. Adds language in the updated final safety analysis report (UFSAR) to allow the use of Type III cement as an alternate equivalent to the Type II cement use in HSM construction.
- g. Changes Technical Specifications (TS) neutron absorber testing and acceptance requirements in order to remain consistent with similar requirements in other ongoing licensing actions, plus certain new changes in this area.
- h. Makes certain additional changes for consistency within the TS and the UFSAR.

Enclosure 2 of this application provides a description, justification, and evaluation of the amendment changes. Enclosure 3 provides a list of TS changes and justifications. Enclosure 4 provides a list of all CoC, TS, and UFSAR pages involved with Amendment 13. Enclosure 5 provides a mark-up of CoC 1004 showing currently proposed Amendment 11 changes and new changes for Amendment 13.

Enclosure 6 provides the entire proposed Amendment 11 TS, with all proposed Amendment 11 changes incorporated, and proposed Amendment 13 changes added, tracked by italicized text and revision bars.

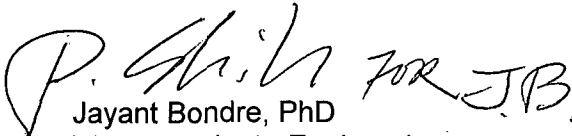
Enclosure 7 provides proposed Amendment 13 changed pages and drawings for the Standardized NUHOMS® System UFSAR. While these changes are made to the most current UFSAR revision (Revision 11), these UFSAR pages and drawings also reflect current proposed UFSAR changes for CoC 1004 Amendment 11 where the same pages or drawings are affected by both amendments. Amendment 13 proposed UFSAR changes are tracked by italicized text and revision bars, with Amendment 11 proposed changes also tracked by italicized text and revision bars, but shaded gray to distinguish between the two amendments. UFSAR Appendices Y and Z, for the 69BTH and 37PTH DSCs, respectively, are entirely new and therefore do not contain change-tracking indicators for this Revision 0 submittal. The footers of the Amendment 13 UFSAR pages are annotated as 72-1004 Amendment No. 13, January 2011, Revision 0.

Certain portions of this submittal include proprietary information which may not be used for any purpose other than to support the NRC staff's review of the application. In accordance with 10 CFR 2.390, I am providing an affidavit (Enclosure 1) specifically requesting that you withhold this proprietary information from public disclosure. The submittal also includes security-related information. With the following exception, public versions of parts containing proprietary and/or security-related information are provided in Enclosure 8. Since Enclosure 10 is a portable computer hard drive containing entirely proprietary information, no public version is provided.

TN requests that a review schedule be planned in order for the amendment to become effective within 12 months of the date of this submittal. This is needed to support a client loading campaign which involves the 24PHB DSC changes to authorized contents.

Transnuclear looks forward to working with the NRC staff on this amendment application. TN is prepared to meet with the staff to resolve any questions you might have. Should the NRC staff require additional information to support review of this application, please do not hesitate to contact Mr. Don Shaw at 410-910-6878 or me at 410-910-6881.

Sincerely,

  
Jayant Bondre, PhD  
Vice President - Engineering

cc: Jennifer Davis (NRC SFST), as follows:

- Four paper copies of this cover letter and Enclosures 1, 2, 3, 4, 5, 6, 7, and 9
- Eleven computer disks containing this cover letter and Enclosures 1, 2, 3, 4, 5, 6, 7, and 9
- One copy of the Enclosure 10 portable hard drive

Enclosures:

1. Affidavit Pursuant to 10 CFR 2.390
2. Description, Justification, and Evaluation of Amendment 13 Changes
3. List of CoC 1004 Amendment 13 Technical Specifications Changes and Justifications
4. List of Certificate of Compliance, Technical Specifications, and Updated Final Safety Analysis Report Pages Involved in CoC 1004 Amendment 13
5. CoC 1004 Marked up for Proposed Amendment 11 and Amendment 13 Changes
6. CoC 1004 Proposed Amendment 11 Technical Specifications with Proposed Amendment 13 Changes
7. Proposed Amendment 13 Changes to the Standardized NUHOMS® UFSAR (Proprietary and Security-Related)
8. Public Versions of Proprietary and Security-Related Portions of Proposed Amendment 13 Changes to the Standardized NUHOMS® UFSAR
9. Listing of Computer Files Contained in Enclosure 10
10. Certain Computer Files Associated with CoC 1004 Amendment 13 (Proprietary)

**AFFIDAVIT PURSUANT**  
**TO 10 CFR 2.390**

Transnuclear, Inc.                     )  
State of Maryland                 ) SS.  
County of Howard                 )

I, Jayant Bondre, depose and say that I am a Vice President of Transnuclear, Inc., duly authorized to execute this affidavit, and have reviewed or caused to have reviewed the information which is identified as proprietary and referenced in the paragraph immediately below. I am submitting this affidavit in conformance with the provisions of 10 CFR 2.390 of the Commission's regulations for withholding this information.

The information for which proprietary treatment is sought is contained in Enclosures 7 and 10 as listed below:

Enclosure 7:

- Portions of CoC 1004 UFSAR Appendix K.5
- Portions of CoC 1004 UFSAR Appendix M.5
- Portions of CoC 1004 UFSAR Appendix N.5
- Portions of CoC 1004 UFSAR Appendices P.1, P.4, and P.5
- Portions of CoC 1004 UFSAR Appendices T.3, T.5 and T.6
- Portions of CoC 1004 UFSAR Appendices U.1 and U.5
- Portions of CoC 1004 UFSAR Appendix Y Table of Contents, and Appendices Y.3, Y.5 and Y.6
- Portions of CoC 1004 UFSAR Appendix Z Table of Contents, and Appendices Z.3 and Z.5

**Enclosure 10:**

- **Certain Computer Files Associated with CoC 1004 Amendment 13**

These documents have been appropriately designated as proprietary.

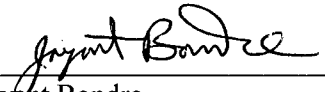
I have personal knowledge of the criteria and procedures utilized by Transnuclear, Inc. in designating information as a trade secret, privileged or as confidential commercial or financial information.

Pursuant to the provisions of paragraph (b) (4) of Section 2.390 of the Commission's regulations, the following is furnished for consideration by the Commission in determining whether the information sought to be withheld from public disclosure, included in the above referenced document, should be withheld.


- 1) The information sought to be withheld from public disclosure involves portions of a safety analysis report and computer input/output files associated with certain of those safety analysis report portions, all related to the design and analysis of dry spent fuel storage systems, which are owned and have been held in confidence by Transnuclear, Inc.
- 2) The information is of a type customarily held in confidence by Transnuclear, Inc. and not customarily disclosed to the public. Transnuclear, Inc. has a rational basis for determining the types of information customarily held in confidence by it.

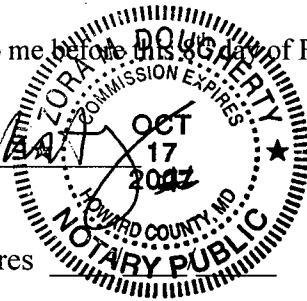
- 3) Public disclosure of the information is likely to cause substantial harm to the competitive position of Transnuclear, Inc. because the information consists of descriptions of the design and analysis of dry spent fuel storage systems, the application of which provide a competitive economic advantage. The availability of such information to competitors would enable them to modify their product to better compete with Transnuclear, Inc., take marketing or other actions to improve their product's position or impair the position of Transnuclear, Inc.'s product, and avoid developing similar data and analyses in support of their processes, methods or apparatus.

Further the deponent sayeth not.

  
Jayant Bondre  
Vice President, Transnuclear, Inc.

Subscribed and sworn to me before this 4th day of February, 2011.

  
Notary Public  
My Commission Expires



## DESCRIPTION, JUSTIFICATION AND EVALUATION OF AMENDMENT 13 CHANGES

### 1.0 INTRODUCTION

The scope of Amendment 13 to CoC 1004 includes the changes described below.

#### Change No. 1:

Addition of a 69BTH DSC to the Standardized NUHOMS® System. This DSC has been evaluated for 10 CFR Part 71 requirements and is currently under NRC review in the CoC 9302 Revision 3 application. The design requirements for the 69BTH DSC are described in new UFSAR Appendix Y.2.

#### Change No. 2:

Addition of a 37PTH DSC to the Standardized NUHOMS® System. This DSC has been evaluated for 10 CFR Part 71 requirements and is currently under NRC review in the CoC 9302 Revision 3 application. The design requirements for the 37PTH DSC are described in new UFSAR Appendix Z.2.

#### Change No. 3:

Evaluation of the 24PHB DSC to accommodate control components other than BPRAs; allow for damaged fuel assemblies with up to four missing fuel rods, and allow non-zircaloy cladding/guide tubes (B&W Mark B11 has M5 cladding; Mark B11A has M5 cladding and guide tubes). The applicable sections in UFSAR Appendix N are revised accordingly.

#### Change No. 4:

Evaluation of the 32PT DSC for incorporation of high burn-up fuel assemblies with and without control components (CCs) and to include two additional basket types based on the 24-poison plate, 0 PRA design.

#### Change No. 5:

Evaluation of the 61BTH and 24PTH DSCs for storage of failed fuel.

#### Change No. 6 (additional changes, as follows):

- 6.a Evaluation of the high-seismic HSM (Model HSM-HS) for storage of the following DSCs: 61BT, 32PT, 24PTH, 61BTH, 69BTH, and 37PTH. Currently, the HSM-HS is approved for storage of the 32PTH1 DSC (with heat load of up to 40.8 kW), as described in UFSAR Appendix U.
- 6.b Extension of the application of metal matrix composite (MMC) as a neutron absorber material in the 61BTH Type 1 and Type 2 DSCs for higher heat loads.
- 6.c Evaluation of DSCs for addition of BLEU and MOX fuel assemblies.
- 6.d Shielding evaluation of the dose reduction hardware for the HSM-H/HSM-HS to achieve enhanced shielding performance.
- 6.e Evaluation of the OS200 Transfer Cask (TC) to allow transfer of the 61BT, 32PT, 24PTH, and 61BTH. The OS200 is to be fitted with an inner sleeve to accommodate these smaller diameter DSCs. The OS200 TC is also evaluated for transfer of the 69BTH and 37PTH DSCs. The OS200 is currently approved for on-site transfer operations of the 32PTH1 DSC as documented in UFSAR Appendix U. A modified

OS200 TC (OS200FC) is used to allow air circulation through the TC/DSC annulus, if required.

- 6.f Add wording in the UFSAR to allow the use of Type III cement as an alternate equivalent to the Type II cement used in HSM (all models) construction.
- 6.g UFSAR Appendices K.9, M.9, P.9, T.9, and U.9 are updated in the requirements for neutron absorber material testing and acceptance, based on the most current expectations from NRC as reflected in the most current version of CoC 1030 Amendment 1 documentation. UFSAR Appendices Y.9 and Z.9 are newly created, for the 69BTH and 37PTH DSCs, respectively, and also reflect these most current expectations. Much of this information is incorporated by reference into the technical specifications.

Additionally, TN proposes changes to these seven UFSAR appendices to enhance neutron absorber material testing and acceptance. A description of these changes, and rationale, are provided below. The changes are shown by bold and underlined text here, for identification, but not in the UFSAR. UFSAR section references are provided here for Appendix K, but apply equally to Appendices M, P, T, U, Y, and Z.

**1. Reference Text – Section K.9.1.7.2**

...The material is a composite of fine boron carbide particles in an aluminum or aluminum alloy matrix. The material shall be produced by either direct chill casting, permanent mold casting, powder metallurgy, **molten metal infiltration**, or thermal spray techniques. The boron carbide content shall not exceed 40% by volume. The boron carbide content for MMCs with an integral aluminum cladding or produced by **molten metal infiltration** shall not exceed 50% by volume...

**Rationale for addition**

The text “molten metal infiltration” is added to allow the implementation of a new MMC manufacturing process which produces MMC with approximately 50% B<sub>4</sub>C.

**2. Reference Text – Section K.9.1.7.2**

... At **least 50% by weight of the B<sub>4</sub>C particles in boron carbide shall be smaller than** 40 microns. No more than 10% of the particles shall be over 60 microns...

**Rationale for addition**

The text is added to be consistent with the particle size definition of Boral, Section 9.1.7.3 and is considered by TN a better definition for particle size.

**3. Reference Text – Section K.9.1.7.6**

**...Acceptance testing shall conform to ASTM E12251, ASTM E14612, or equivalent method, performed at room temperature on coupons taken from the rolled or extruded production material. Initial sampling shall be one test per lot, and may be reduced if the first five tests meet the specified minimum thermal conductivity. For cast products, the lot shall be defined by the heat or ingot. For other products, the lot shall be defined as material produced in a single production campaign using the same heat or lots of aluminum and boron carbide feed materials...**

**Rationale for addition**

The wording in this section is updated to be consistent with the CoC 1030 Amendment 1 license.

**4. Reference Text – Section K.9.1.7.8.4.(c)**

**Clad MMCs shall be subjected to thermal damage testing following water immersion to ensure that delamination does not occur under normal conditions of storage. An example of such a test would be: (1) immerse a specimen at least 6 x 6 inches in water under pressure  $\geq 30$  psig for at least 24 hours, (2) place the specimen in a vacuum furnace preheated to at least 300°F and evacuate the furnace. Acceptance criterion: no blistering or delamination of the cladding.**

**Rationale for addition**

The wording in this section is updated to be consistent with the CoC 9302. This communicates the latest addition of wording for delamination requirements for clad MMC from the NRC.

**5. Reference Text – Section K.9.1.7.8.4 – The following text is found in the 1004 license but has not been incorporated**

**For MMCs with an integral aluminum cladding, thermal durability testing demonstrating that after a minimum 24 hour soak in either pure or borated water, then insertion into a preheated oven at approximately 825°F for a minimum of 24 hours, the specimens are free of blisters and delamination and pass the mechanical testing requirements described in test 'a' of this section.**

**Rationale for removal**

This text is replaced with text found in UFSAR Section K.9.1.7.8.4.(c).

**6.h Certain changes are made to achieve clarity and consistency within the TS and UFSAR, as follows:**

- Changes to TS and UFSAR ASME Code Alternatives tables to correct editorial items.
- Addition of the following sentence to TS 4.2.2: "ASME code requirements for basket assemblies apply only to important to safety category A components."
- TS Table 1-1bb rows for 32PTH1-S and 32PTH1-M are corrected to show the values from the CoC 1004 Amendment 10 TS. This table is not proposed for change under Amendment 11 and was not proposed for change under the Amendment 12 application.
- TS Tables 1-6a through 1-6d, and their explanatory notes, are rearranged to be consistent with other TS tables and notes.
- TS Figure 1-27 had the associated table duplicated; the duplicate is removed.
- UFSAR Pages 3.2-7 and 8.1-1 statements regarding DSCs transferred in the OS197L TC are modified to only include the 61BT and 32PT DSCs, with heat load limited to 13 kW, based on current Amendment 11 provisions.



## 2.0 DESCRIPTION OF THE CHANGES

### 2.1 Changes to the NUHOMS® CoC 1004 and Technical Specifications

Enclosure 3 provides a listing of each changed TS area, with a justification for the changes. Enclosure 6 provides CoC 1004 proposed Amendment 11 TS with proposed Amendment 13 changes tracked with revision bars and italicized text.

### 2.2 Changes to the Standardized NUHOMS® System UFSAR

Enclosure 7 provides proposed Amendment 13 changed pages and drawings for the Standardized NUHOMS® System UFSAR. While these changes are made to the most current UFSAR revision (Revision 11), these UFSAR pages and drawings also reflect current proposed UFSAR changes for CoC 1004 Amendment 11 where the same pages or drawings are affected by both amendments. Amendment 13 proposed UFSAR changes are tracked by italicized text and revision bars, with Amendment 11 proposed changes also tracked by italicized text and revision bars, but shaded gray to distinguish between the two amendments. UFSAR Appendices Y and Z, for the 69BTH and 37PTH DSCs, respectively, are entirely new and therefore do not contain change-tracking indicators for this Revision 0 submittal.

The following paragraphs discuss the changed UFSAR areas proposed for change, based on the 13 changes described above.

In support of Change 1, UFSAR Appendix Y has been created to provide the safety analysis results for the newly added 69BTH DSC. Certain chapters (Chapters 1, 2, etc.) are also changed, to account for this new DSC.

In support of Change 2, UFSAR Appendix Z has been created to provide the safety analysis results for the newly added 37PTH DSC. Certain chapters (Chapters 1, 2, etc.) are also changed, to account for this new DSC.

In support of Change 3, changes are made to UFSAR Appendix N.

In support of Change 4, changes are made to UFSAR Appendix M.

In support of Change 5, changes are made to UFSAR Appendices P and T.

In support of Change 6.a, changes are made to UFSAR Appendices K, M, P, T, and U, plus new Appendices Y and Z are affected as well.

In support of Change 6.b, changes are made to UFSAR Appendix T.

In support of Change 6.c, changes are made to UFSAR Appendices K, M, P, T, and U, plus new Appendices Y and Z are affected as well.

In support of Change 6.d, changes are made to UFSAR Appendices P and U.

In support of Change 6.e, changes are made to UFSAR Appendices K, M, P, T, and U, plus new Appendices Y and Z are affected as well.

In support of Change 6.f, changes are made to UFSAR Appendices P and U.

In support of Change 6.g, changes are made to UFSAR Appendices K.9, M.9, P.9, T.9, and U.9, plus new Appendices Y.9 and Z.9 are affected as well.

The areas affected by the Change 6.h items are detailed in their descriptions.

### 3.0 JUSTIFICATION OF CHANGES

TN has a contract with one of our customers for the use of 24PHB DSC and the additional authorized contents requested in this amendment. TN requests that the staff assign appropriate priority for review of this application, consistent with the issuance of an RAI, if needed, by July 2011 and final certification by February 2012. Other of our existing customers also need this amendment for the use of 32PT DSC with higher burnup fuel, and for the provisions of the additional requested changes.

### 4.0 EVALUATION OF CHANGES

TN has evaluated the changes described above for structural, thermal, shielding, confinement and criticality adequacy, as applicable, and has concluded that these changes to the Standardized NUHOMS<sup>®</sup> System have no significant effect on safety.

The evaluations for the changes to the 61BT, 32PT, 24PHB, 24PTH, 61BTH and 32PTH1 DSCs, for the addition of the 69BTH and 37PTH DSCs, the changes to the OS200 TC, and the changes to the Standardized HSM, the HSM-H, and the HSM-HS are included in Enclosure 7.

## List of CoC 1004 Amendment 13 Technical Specifications Changes and Justifications

Changed Technical Specification Area	Justification
Cover page	Amendment level changed to 13.
Table of Contents	Updated
TS 1.1	Definition of HORIZONTAL STORAGE MODULE (HSM) updated to account for the high seismic HSM-HS option.
TS 1.1	Definition of DRY SHIELDED CANISTER (DSC) updated to include the newly added 69BTH and 37PTH DSCs.
TS 1.1	Definition of INTACT FUEL ASSEMBLY modified to account for damaged and failed fuel assemblies.
TS 1.1	Definition added for BLEU FUEL MATERIAL as this is being proposed as authorized contents.
TS 2.1	69BTH and 37PTH DSCs added to list of DSCs.  (Reference UFSAR Appendices Y and Z)
Limiting Condition for Operation (LCO) 3.1.2	69BTH and 37PTH DSCs added to LCO for DSC Helium Backfill Pressure.  (Reference UFSAR Appendices Y and Z)
Surveillance Requirement (SR) 3.1.2	69BTH and 37PTH DSCs added to SR for DSC Helium Backfill Pressure.  (Reference UFSAR Appendices Y and Z)
LCO 3.1.3	69BTH and 37PTH DSCs added to this LCO for the time Limit for completion of DSC transfer.  (Reference UFSAR Appendices Y and Z)
LCO 3.1.4	69BTH and 37PTH DSCs added to this LCO for HSM Maximum Air Exit Temperature with a Loaded DSC.  (Reference UFSAR Appendices Y and Z)
LCO 3.2.1	In this cask criticality control LCO, <ul style="list-style-type: none"> <li>Figure 1-10a is added to the 24PHB row of the table for minimum boron concentration (Reference UFSAR Appendix N)</li> <li>the 37PTH DSC is added to table for minimum boron concentration (Reference UFSAR Appendix Z)</li> </ul>

## List of CoC 1004 Amendment 13 Technical Specifications Changes and Justifications

Changed Technical Specification Area	Justification
TS 4.1	<ul style="list-style-type: none"> <li>• 32PT DSC Basket Types A1 and A2 added to table referencing tables of DSC Minimum B10 Areal Density for Poison Plates.</li> <li>• In 61BTH DSC row, “and” has been changed to “or” for clarity.</li> <li>• 69BTH and 37PTH DSCs added to table referencing tables of DSC Minimum B10 Areal Density for Poison Plates.</li> <li>• The table notes are changed to reflect changes in UFSAR Appendices K.9, M.9, P.9, T.9, U.9, and notes are added to indicate which portions of new UFSAR Appendices Y.9 and Z.9 are incorporated into TS by reference.</li> </ul>
TS 4.2.2	<ul style="list-style-type: none"> <li>• Clarification is added that ASME code requirements for basket assemblies apply only to important to safety category A components. Consistent with Appendix A of Regulatory Guide 7.10, the most rigorous industrial materials standards, fabrication controls, and inspection practices, that is, ASME Code Section III jurisdiction, would be applied to level A components, while B components could use ASTM materials, and Level C and NITS materials could be provided by commercial suppliers.</li> </ul> <p>(Reference Regulatory Guide 7.10, Rev 2, Establishing Quality Assurance Programs for Packaging Used in Transport of Radioactive Material, USNRC 2005)</p> <ul style="list-style-type: none"> <li>• 69BTH and 37PTH DSCs are added to the table indicating the Code edition and year</li> </ul> <p>(Reference UFSAR Appendices Y and Z)</p>
TS 4.2.4	<ul style="list-style-type: none"> <li>• NG/NF-2130, NG/NF-4121, and NG/NF-8000 rows added to 61BT DSC Basket table for consistency with the UFSAR.</li> <li>• NG-2130 and NG/NF-2130 rows in several tables are changed for consistency.</li> <li>• ASME Code Alternatives tables are added for the 69BTH and 37PTH DSCs confinement boundaries and baskets.</li> </ul> <p>(Reference UFSAR Appendices Y and Z)</p>
TS 4.3.3.3	<p>69BTH and 37PTH DSCs added to the average daily ambient temperature requirements for certain DSCs.</p> <p>(Reference UFSAR Appendices Y and Z)</p>
TS 4.3.3.4	<p>69BTH and 37PTH DSCs added to the limitations for temperature extremes for certain DSCs.</p> <p>(Reference UFSAR Appendices Y and Z)</p>

## List of CoC 1004 Amendment 13 Technical Specifications Changes and Justifications

Changed Technical Specification Area	Justification
TS 4.3.3.8	69BTH and 37PTH DSCs added to the seismic limitations for certain DSCs.  (Reference UFSAR Appendices Y and Z)
TS 5.1	37PTH DSC added to DSCs which contain borated water.  (Reference UFSAR Appendix Z)
TS 5.2.2	69BTH and 37PTH DSCs added to UFSAR references for operations procedures.  (Reference UFSAR Appendices Y and Z)
TS 5.2.4 c)	69BTH and 37PTH DSCs added to table of DSC leak test criteria.  (Reference UFSAR Appendices Y and Z)
TS 5.2.4 e)	69BTH and 37PTH DSCs added to table of Dose Rate Limits with TC (except OS197L TC) and to TC dose rate limits.  (Reference UFSAR Appendices Y and Z)
TS 5.2.6	69BTH and 37PTH DSCs added to Hydrogen Gas Monitoring.  (Reference UFSAR Appendices Y and Z)
TS 5.3.1.B	69BTH and 37PTH DSCs added to TC/DSC TRANSFER OPERATIONS at High Ambient Temperatures.  (Reference UFSAR Appendices Y and Z)
TS 5.4.2	69BTH and 37PTH DSCs added to table of Dose Rate Limits for the Standardized HSM and HSM-H.  (Reference UFSAR Appendices Y and Z)
Table 1-1c	Changes made to allow BLEU fuel in the 61BT DSC.  Note 3 is added for additional requirements if the OS197L transfer cask is employed.  (Reference UFSAR Tables K.2-1 and W.2-2)
Table 1-1e	Changes made to reflect changes to clarify control components definition and to account for new 32PT DSC Basket Types A1 and A2.  (Reference UFSAR Table M.2-1)
Table 1-1f	Clarified which types of CC are not allowed for storage with CE 15 x15 class assemblies in the 32PT DSC.  (Reference UFSAR Table M.2-2)
Table 1-1g1	New table added to provide initial enrichment and minimum soluble boron loading for the new Type A1 and A2 32PT DSC baskets.  (Reference UFSAR Table M.2-3a)

## List of CoC 1004 Amendment 13 Technical Specifications Changes and Justifications

Changed Technical Specification Area	Justification
Table 1-1h	<p>The new Type A1 and A2 32PT DSC baskets are added to the table for B10 Specification for the NUHOMS®-32PT Poison Plates, and a column is added for the allowed number of PRAs.</p> <p>(Reference UFSAR Table M.2-4a)</p>
Table 1-1i	<p>The PWR Fuel Specifications for Fuel to be Stored in the Standardized NUHOMS®-24PHB DSC is revised to reflect the change proposed changes in authorized contents.</p> <p>(Reference UFSAR Table N.2-1)</p>
Table 1-1j	<p>Note 1 is added to require 3.0 additional years of cooling if a fuel assembly contains BLEU fuel pellets.</p> <p>Note 2 is added for additional requirements if the OS197L transfer cask is employed.</p> <p>(Reference UFSAR Tables K.2-2 and W.2-3)</p>
Table 1-1l	<p>The fuel damage specification is clarified regarding handling by normal means.</p> <p>Details are added regarding failed fuel storage.</p> <p>The control component definition is clarified.</p> <p>For specificity, the Nominal Assembly Width line specifies "for Intact and Damaged Fuel Only."</p> <p>The Thermal/Radiological Parameters section is revised to reference certain tables for intact or damaged fuel, and others for failed fuel.</p> <p>Note 1 is added, requiring that one year of cooling time be added for fuel assemblies with control components.</p> <p>Note 2 is added to clarify that referenced tables directly applicable to the 32PTH1 DSC are also applicable to the 24PTH DSC.</p> <p>(Reference UFSAR Table P.2-1)</p>
Table 1-1n	<p>The 24PHB DSC is added to this table, as the results are applicable to both the 24PTH and the 24PHB.</p> <p>(Reference UFSAR Table N.2-2a and Table P.2-3)</p>
Table 1-1q	<p>The table is clarified regarding the allowance for damaged fuel, with a note added regarding enrichment limits when more than 8 damaged fuel assemblies are loaded.</p> <p>(Reference UFSAR Table P.2-5)</p>

## List of CoC 1004 Amendment 13 Technical Specifications Changes and Justifications

Changed Technical Specification Area	Justification
Table 1-1q1	<p>This new table is added, providing maximum assembly average initial enrichment versus neutron poison requirements for the 24PTH DSC with up to 8 damaged and/or failed fuel assemblies.</p> <p>(Reference UFSAR Table P.2-5a)</p>
Table 1-1t	<p>Allowance for failed fuel is added to this fuel specification.</p> <p>The fuel damage specification is clarified regarding cladding damage to be consistent with other DSCs.</p> <p>(Reference UFSAR Table T.2-1)</p>
Table 1-1w1	<p>This new table is added, providing BWR fuel assembly initial lattice average enrichment versus minimum B10 requirements for the 61BTH DSC poison plates with failed and/or damaged fuel.</p> <p>(Reference UFSAR Table T.2.4a)</p>
Table 1-1aa	<p>The specification for fuel damage is revised to allow missing fuel rods and to require top and bottom end fittings or nozzles or tie plates consistent with our CoC 9302 MP197HB Part 71 application.</p> <p>The control components definition is clarified.</p> <p>(Reference UFSAR Table U.2-1)</p>
Table 1-1bb	<p>The current Amendment 11 TS inadvertently shows outdated values in this table for the rows for 32PTH1-S and 32PTH1-M.</p> <p>This table is not proposed for technical change under Amendment 11, under (discontinued) Amendment 12, nor under Amendment 13.</p> <p>Therefore, the values are changed to be consistent with the rows for 32PTH1-S and 32PTH1-M from the CoC 1004 Amendment 10 TS.</p>
Table 1-1ee	<p>The table is revised to be consistent with the UFSAR analysis.</p> <p>(Reference UFSAR Tables M.2-2a and U.2-2)</p>
Table 1-1gg	<p>This new table is added, providing a BWR fuel specification for <math>\text{UO}_2</math> fuel to be stored in the 69BTH DSC.</p> <p>(Reference UFSAR Table Y.2-1)</p>
Table 1-1hh	<p>This new table is added, providing a BWR fuel specification for MOX fuel to be stored in the 69BTH DSC.</p> <p>(Reference UFSAR Table Y.2-1a)</p>

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Changed Technical Specification Area	Justification
Table 1-1ii	This new table is added, providing BWR fuel assembly design characteristics for the 69BTH DSC.  (Reference UFSAR Table Y.2-2)
Table 1-1jj	This new table is added, providing BWR fuel assembly initial lattice average enrichment versus minimum B10 requirements for the 69BTH DSC poison plates for intact $\text{UO}_2$ or MOX fuel.  (Reference UFSAR Table Y.2-3)
Table 1-1kk	This new table is added, providing BWR fuel assembly initial lattice average enrichment versus minimum B10 requirements for the 69BTH DSC poison plates for damaged $\text{UO}_2$ fuel only.  (Reference UFSAR Table Y.2-4)
Table 1-1ll	This new table is added, providing a PWR fuel specification for fuel to be stored in the 37PTH DSC.  (Reference UFSAR Table Z.2-1)
Table 1-1mm	This new table is added, providing a PWR fuel specification for MOX fuel to be stored in the 37PTH DSC.  (Reference UFSAR Table Z.2-1a)
Table 1-1nn	This new table is added, providing PWR fuel assembly design characteristics for fuel to be stored in the 37PTH DSC.  (Reference UFSAR Table Z.2-3)
Table 1-1oo	This new table is added, providing maximum assembly average initial enrichment versus minimum soluble boron concentration for the 37PTH DSC with intact and damaged $\text{UO}_2$ fuel only.  (Reference UFSAR Table Z.2-4)
Table 1-1pp	This new table is added, providing maximum assembly average initial enrichment versus minimum soluble boron concentration for the 37PTH DSC with intact MOX and $\text{UO}_2$ fuel.  (Reference UFSAR Table Z.2-5)
Table 1-1qq	This new table is added, providing thermal and radiological characteristics for control components to be stored in the 37PTH DSC.  (Reference UFSAR Table Z.2-2)
Table 1-1rr	This new table is added, providing the B10 specification for 37PTH DSC basket poison plates.  (Reference UFSAR Table Z.2-16)



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Changed Technical Specification Area	Justification
Table 1-2d Table 1-2e Table 1-2f Table 1-2g Table 1-2h	<p>The results in these tables now represent fuel with or without control components; therefore "(Fuel with or without CCs)" is added to their titles.</p> <p>Results for 46 to 55 GWd/MTU are added to these tables.</p> <p>The explanatory notes which were previously provided on each individual table are moved to after Table 1-2h.</p> <p>(Reference UFSAR Tables M.2-5, -6, -7, -8, and -9, respectively)</p>
Notes for Tables 1-2d through 1-2h	<p>The notes for Tables 1-2d through 1-2h were previously shown on each of these tables. Because they were entirely redundant, they are now shown on this single page, with the following changes:</p> <p>The bullet which previous prohibited storage of fule with a burnup greater than 45 GWd/MTU is raised to 55 GWd/MTU, per the changed results on Tables 1-2d through 1-2h.</p> <p>A bullet is added to the notes to require 3.0 additional years of cooling if a fuel assembly contains BLEU fuel pellets.</p> <p>The example provided is revised, for improved clarity.</p> <p>(Reference UFSAR Notes for Table M.2-5 through M.2-9)</p>
Table 1-2i Table 1-2j Table 1-2k Table 1-2l Table 1-2m	<p>These tables are deleted. Previously they provided fuel qualification tables for fuel assemblies with BPRAs stored in the 32PT DSC. Tables 1-2d through h are revised and now account for fuel assemblies with or without control components (including BPRAs) and therefore these tables are no longer necessary.</p> <p>(Reference UFSAR Tables M.2-10, -11, -12, -13, and -14, respectively)</p>
Table 1-2n Table 1-2o Table 1-2p	<p>"BPRAs" are changed to "Control Components" in the table title as the proposed changes include allowing control components other than just BPRAs.</p> <p>"Zircaloy" is changed to "Zirconium-alloy" for these 24PHB DSC fuel qualification tables as the proposed changes to authorized content include non-zircaloy cladding/guide tubes.</p> <p>A bullet is added which clarifies that cooling times for damaged and intact assemblies are identical.</p> <p>A bullet is added to the notes to require 3.0 additional years of cooling if a fuel assembly contains BLEU fuel pellets.</p> <p>(Reference UFSAR Tables N.2-3 to N.2-5)</p>

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Changed Technical Specification Area	Justification
Table 1-2q	<p>A bullet is added to the notes to require 3.0 additional years of cooling if a fuel assembly contains BLEU fuel pellets.</p> <p>(Reference UFSAR Table K.2-11)</p>
Notes for Tables 1-3a to 1-3h	<p>Failed fuel storage is allowed and is added to the bullet which states that cooling times for damaged and intact assemblies are identical.</p> <p>A bullet is added to the notes to require 3.0 additional years of cooling if a fuel assembly contains BLEU fuel pellets.</p> <p>(Reference UFSAR Notes for Tables P.2-6 through P.2-13)</p>
Table 1-4f	<p>The previous 0.55 kW fuel qualification table was conservatively used for the 0.7 kW/FA FQT in previous amendment. That 0.55 kW table is replaced with the 0.7 kW table.</p> <p>(Reference UFSAR Table T.2-10)</p>
Notes for Tables 1-4a to 1-4f	<p>Failed fuel storage is allowed and is added to the bullet which states that cooling times for damaged and intact assemblies are identical.</p> <p>Clarification on enrichment is added to the note regarding reconstituted fuel assemblies.</p> <p>A bullet is added to the notes to require 3.0 additional years of cooling if a fuel assembly contains BLEU fuel pellets.</p> <p>(Reference UFSAR Notes for Tables T.2-5 through T.2-10)</p>
Table 1-5a Table 1-5b Table 1-5c Table 1-5d Table 1-5e Table 1-5f	<p>The table titles are clarified by deleting "(Fuel without CCs)". These fuel qualification tables, added by CoC 1004 Amendment 10, apply to fuel with or without CCs, as indicated in the fourth bullet of the notes for Tables 1-5a through 1-5f.</p> <p>(Reference UFSAR Tables U.2-6, 7, 8, 9, 11, and 10, respectively)</p>
Notes for Tables 1-5a to 1-5f	<p>A bullet is added to the notes to require 3.0 additional years of cooling if a fuel assembly contains BLEU fuel pellets.</p> <p>(Reference UFSAR Table U.2-12, Notes for Tables U.2-6 through U.2-11)</p>

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Changed Technical Specification Area	Justification
Table 1-6a	<p>A statement referring to UFSAR Appendix W tables is not needed and is removed.</p> <p>The bulleted notes apply to Tables 1-6a and 1-6b. A statement to this effect is added.</p> <p>A bullet is added to the notes to require 3.0 additional years of cooling if a fuel assembly contains BLEU fuel pellets.</p> <p>The example is revised to improve clarity.</p> <p>(Reference UFSAR Table W.2-4)</p>
Table 1-6b	<p>The title is revised to specify that this table applies to "0.17 kW" assemblies.</p> <p>A statement referring to a UFSAR Appendix W table is not needed and is removed.</p> <p>The bulleted notes on Table 1-6a apply to Tables 1-6a and 1-6b. A statement to this effect is added.</p> <p>(Reference UFSAR Table W.2-5)</p>
Table 1-6c	<p>The notes which previously followed this table apply to Tables 1-6c and 1-6d. Consistent with the approach throughout these TS, those notes are relocated to after Table 1-6d. The statement regarding the notes is revised to this effect.</p> <p>(Reference UFSAR Table W.2-7)</p>
Table 1-6d	<p>The title is revised to specify that this table applies to "0.4 kW" assemblies.</p> <p>The notes which previously preceded this table apply to Tables 1-6c and 1-6d. Consistent with the approach throughout these TS, those notes are relocated to after this table. The statement regarding the notes is revised to this effect.</p> <p>(Reference UFSAR Table W.2-8)</p>
Notes for Table 1-6c and 1-6d	<p>The notes which previously followed Table 1-6c apply to Tables 1-6c and 1-6d. Consistent with the approach throughout these TS, those notes are relocated to after Table 1-6d.</p> <p>A bullet is added to the notes to require 3.0 additional years of cooling if a fuel assembly contains BLEU fuel pellets.</p> <p>The example is revised to improve clarity.</p> <p>(Reference Table W.2-7)</p>

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Changed Technical Specification Area	Justification
Table 1-7a Table 1-7b Table 1-7c Table 1-7d Table 1-7e Table 1-7f Table 1-7g Table 1-7h Table 1-7i Table 1-7j Table 1-7k Table 1-7l	New BWR fuel qualification tables for fuel with 0.10, 0.22, 0.25, 0.30, 0.35, 0.393, 0.40, 0.45, 0.488, 0.55, 0.60, and 0.70 KW per assembly, respectively, stored in the new 69BTH DSC.  (Reference UFSAR Table Y.2-5, -6, -7, -8, -9, -10, -11, -12, -13, -14, -15, and -16, respectively)
Notes for Tables 1-7a to 1-7l	Explanatory notes for new Tables 1-7a to 1-7l, providing limitations and examples.  (Reference UFSAR Notes for Tables Y.2-5 through Y.2-16)
Table 1-7m	New table which provides requirements for MOX composition for BWR fuel qualification, defining Composition 1 and Composition 2.  (Reference UFSAR Table Y.2-17)
Table 1-7n Table 1-7o	New BWR fuel qualification tables for MOX (Compositions 1 and 2, respectively) fuel stored in the new 69BTH DSC.  (Reference UFSAR Tables Y.2-17a and b, respectively)
Notes for Tables 1-7n and 1-7o	Explanatory notes for new Tables 1-7n and 1-7o, providing limitations and examples.  (Reference UFSAR Tables Y.2-17a and Table Y.2-17b)
Table 1-8a Table 1-8b Table 1-8c Table 1-8d Table 1-8e	New PWR fuel qualification tables for fuel with 0.4, 0.5, 0.6, 0.7, and 1.2 kW per assembly, respectively, stored in the new 37PTH DSC.  (Reference UFSAR Tables Z.2-6, -7, -8, -9, and -10, respectively)
Notes for Tables 1-8a to 1-8e	Explanatory notes for new Tables 1-8a to 1-8e, providing limitations and examples.  (Reference UFSAR Tables Z.2-6 through Z.2-10)
Table 1-8f	New table which provides requirements for MOX composition for PWR fuel qualification, defining Composition 1 and Composition 2.  (Reference UFSAR Table Z.2-11)
Table 1-8g Table 1-8h	New table to provide minimum required cooling times for MOX (Compositions 1 and 2, respectively) PWR fuel assemblies.  (Reference UFSAR Tables Z.2-11a and b, respectively)

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Changed Technical Specification Area	Justification
Notes for Tables 1-8g and 1-8h	<p>Explanatory notes for new Tables 1-8g and 1-8h, providing limitations and examples.</p> <p>(Reference UFSAR Notes on page following UFSAR Table Z.2-11b)</p>
Figure 1-8 Figure 1-9	<p>Changes are made to denote locations where damaged fuel assemblies can be stored in the 24PHB DSC – Configuration 1 and 2, respectively.</p> <p>(Reference UFSAR Figures N.2-1 and N.2-2)</p> <p>“BPRAs” are changed to “Control Components” in the figure title as the proposed changes include allowing control components other than just BPRAs.</p>
Figure 1-10	<p>To provide clarity and consistency relative to new Figure 1-10a discussed below, the title of Figure 1-10 has “(Intact Fuel)” inserted and also “NUHOMS®”.</p> <p>(Reference UFSAR Figure N.2-3)</p>
Figure 1-10a	<p>A new figure is added to provide requirements for Soluble Boron Concentration vs. Fuel Initial U-235 Enrichment for damaged fuel in the NUHOMS®-24PHB DSC.</p> <p>(Reference UFSAR Figure N.2-4)</p>
Figure 1-11	<p>Changes made to allow failed fuel assemblies to be stored in HLZC No. 1 for the 24PTH-S and 24PTH-L and a maximum decay heat load for damaged fuel assemblies is stated.</p> <p>(Reference UFSAR Figure P.2-1)</p>
Figure 1-12	<p>Changes made to allow failed fuel assemblies to be stored in HLZC No. 2 for the 24PTH-S and 24PTH-L and a maximum decay heat load for damaged fuel assemblies is stated.</p> <p>(Reference UFSAR Figure P.2-2)</p>
Figure 1-13	<p>Changes made to allow failed fuel assemblies to be stored in HLZC No. 3 for the 24PTH-S and 24PTH-L and a maximum decay heat load for damaged fuel assemblies is stated.</p> <p>(Reference UFSAR Figure P.2-3)</p>
Figure 1-14	<p>Changes made to allow failed fuel assemblies to be stored in HLZC No. 4 for the 24PTH-S and 24PTH-L and a maximum decay heat load for damaged fuel assemblies is stated.</p> <p>(Reference UFSAR Figure P.2-4)</p>
Figure 1-15	<p>Changes made to allow failed fuel assemblies to be stored in HLZC No. 5 for the 24PTH-S-LC and a maximum decay heat load for damaged fuel assemblies is stated.</p> <p>(Reference UFSAR Figure P.2-5)</p>

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Changed Technical Specification Area	Justification
Figure 1-16	Changes made to allow storage of both damage and failed fuel in the 24PTH DSC.  (Reference UFSAR Figure P.2-6)
Figure 1-17	The note which disallowed use of 61BTH DSC HLZC No. 1 for a Type 1 61BTH DSC with MMC or Boral <sup>®</sup> poison plates has been removed; HLZC No. 1 may be used with Borated Aluminum or MMCs or Boral <sup>®</sup> .  (Reference UFSAR Figure T.2-1)
Figure 1-18	The note which disallowed use of 61BTH DSC HLZC (HLZC) No. 2 for a Type 1 61BTH DSC with MMC or Boral <sup>®</sup> poison plates has been removed; HLZC No. 2 may be used with Borated Aluminum or MMCs or Boral <sup>®</sup> .  (Reference UFSAR Figure T.2-2)
Figure 1-19	The note which stated that HLZC No. 3 has no restrictions as to the applicable basket poison plates (as opposed to HLZC No. 1 and No. 2 (previously)) is removed, as there is no longer a need to provide this distinction.  (Reference UFSAR Figure T.2-3)
Figure 1-20	The note which stated that HLZC No. 4 has no restrictions as to the applicable basket poison plates (as opposed to HLZC No. 1 and No. 2 (previously)) is removed, as there is no longer a need to provide this distinction.  (Reference UFSAR Figure T.2-4)
Figure 1-21	The note which only allowed use of 61BTH DSC HLZC No. 5 for a Type 2 61BTH DSC with Borated Aluminum poison plates has been removed; HLZC No. 5 may be used with Borated Aluminum or MMCs or Boral <sup>®</sup> .  (Reference UFSAR Figure T.2-5)
Figure 1-22	The note which only allowed use of 61BTH DSC HLZC No. 6 for a Type 2 61BTH DSC with Borated Aluminum poison plates has been removed; HLZC No. 6 may be used with Borated Aluminum or MMCs or Boral <sup>®</sup> .  (Reference UFSAR Figure T.2-6)
Figure 1-23	The note which only allowed use of 61BTH DSC HLZC No. 7 for a Type 2 61BTH DSC with Borated Aluminum poison plates has been removed; HLZC No. 7 may be used with Borated Aluminum or MMCs or Boral <sup>®</sup> .  (Reference UFSAR Figure T.2-7)

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Changed Technical Specification Area	Justification
Figure 1-24	<p>The note stipulating that HLZC No. 8 is applicable to a Type 2 61BTH DSC only with HLZC No. 7 for a Type 2 61BTH DSC with Borated Aluminum or MMCs or Boral<sup>®</sup> poison plates has been removed as there is no longer a need to provide this distinction.</p> <p>(Reference UFSAR Figure T.2-8)</p>
Figure 1-25	<p>Changes made to allow storage of both damage and failed fuel in the 61BTH DSC.</p> <p>(Reference UFSAR Figure T.2-9)</p>
Figure 1-27	<p>The table below the figure had been inadvertently duplicated in the CoC Amendment 11 application. The duplicate is removed.</p>
Figure 1-31 Figure 1-32 Figure 1-33 Figure 1-34 Figure 1-35 Figure 1-36	<p>New figures for the 69BTH DSC Heat Load Zoning Configurations No. 1, 2, 3, 4, 5, and 6, respectively.</p> <p>(Reference UFSAR Figures Y.2-1, -2, -3, -4, -5, -6, respectively)</p>
Figure 1-37	<p>New figure to show the permitted location of damaged fuel assemblies in the 69BTH DSC.</p> <p>(Reference UFSAR Figure Y.2-7)</p>
Figure 1-38 Figure 1-39 Figure 1-40	<p>New figures for the 37PTH DSC Heat Load Zoning Configurations No. 1, 2, and 3, respectively.</p> <p>(Reference UFSAR Figures Z.2-1, -2, and -3, respectively)</p>

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