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May 20, 2022
E-60447

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

Subject: Application for Amendment 18 to Standardized NUHOMS® Certificate of Compliance No. 1004 for Spent Fuel Storage Casks, Revision 0 (Docket No. 72-1004)

In accordance with 10 CFR 72.244, TN Americas LLC herewith submits its application to amend Certificate of Compliance (CoC) No. 1004 for the Standardized NUHOMS® System. The scope of Amendment 18 is described in Enclosure 2. Enclosure 3 includes a mark-up of proposed changes to the CoC document. Enclosure 4 provides a complete revision to the CoC Appendix A Inspections, Tests and Evaluations (ITE) with proposed changes tracked. Enclosure 5 provides a complete revision to the CoC Appendix B Technical Specifications (TS) with proposed changes tracked. Enclosure 6 provides a complete revision to the CoC Appendix C ASME Code Alternatives with proposed changes tracked. The proprietary version of the Updated Final Safety Analysis Report (UFSAR) changed pages and drawings associated with Amendment 18 are included as Enclosure 7 with a footer on each changed page annotated as "72-1004 Amendment 18, Revision 0, May 2022." New drawings are indicated as Revision 0A, and revised drawings show alpha-numeric revision numbers and clouds surrounding the changed drawing information. The public version of these UFSAR changed pages and drawings is provided as Enclosure 8.

In order to document the evaluation of Amendment 18 structures, systems, and components (SSCs) for extended operation, Enclosure 9 provides the impact of these SSCs on CoC 1004 renewal. Enclosure 10 provides a listing of computer files contained on the Enclosure 11 hard drive being submitted in support of this amendment. Enclosure 11 contains file formats and sizes not allowed by the NRC EIE application process, so they are provided separately on one computer drive.

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, TN Americas LLC is providing an affidavit (Enclosure 1), specifically requesting that this proprietary information be withheld from public disclosure.

TN Americas LLC looks forward to working with the NRC staff on this amendment application and requests that the staff assign appropriate priority for review of this application in order for Amendment 18 to become effective by November 2023.

Should you have any questions regarding this submittal, please do not hesitate to contact Mr. Douglas Yates at 434-832-3101, or me at 410-910-6859.



Prakash Narayanan
Chief Technical Officer

cc: Chris Allen (NRC DFM)

Enclosures:

1. Affidavit Pursuant to 10 CFR 2.390
2. Description, Justification, and Evaluation of Amendment 18 Changes
3. Proposed Certificate of Compliance No. 1004 Amendment 18, Revision 0 Markup
4. Proposed CoC Appendix A Inspections, Tests, and Evaluations, CoC 1004 Amendment 18, Revision 0
5. Proposed CoC Appendix B Technical Specifications, CoC 1004 Amendment 18, Revision 0
6. Proposed CoC Appendix C ASME Code Alternatives, CoC 1004 Amendment 18, Revision 0
7. Proposed Amendment 18, Revision 0 Changes to the Standardized NUHOMS® System Updated Final Safety Analysis Report (Proprietary Version)
8. Proposed Amendment 18, Revision 0 Changes to the Standardized NUHOMS® System Updated Final Safety Analysis Report (Public Version)
9. Amendment 18 Impacts on CoC 1004 Renewal
10. Listing of Computer Files Contained in Enclosure 11
11. Certain Computer Files Associated with Certificate of Compliance 1004 Amendment 18 (Proprietary) (contained on one hard drive)

AFFIDAVIT PURSUANT
TO 10 CFR 2.390

TN Americas LLC)
State of North Carolina SS.
County of Guilford)

I, Prakash Narayanan, depose and say that I am the Chief Technical Officer of TN Americas LLC, duly authorized to execute this affidavit, and have reviewed or caused to have reviewed the information that 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 meets the provisions of paragraph (a) (4) of Section 2.390 of the Commission's regulations. The information is contained in Enclosures 7 and 11, as listed below:

- Enclosure 7 - Portions of Proposed Amendment 18, Revision 0 Changes to the Standardized NUHOMS® System Updated Final Safety Analysis Report
- Enclosure 11 - Certain computer files associated with Proposed CoC 1004 Amendment 18

This document has been appropriately designated as proprietary.

I have personal knowledge of the criteria and procedures utilized by TN Americas LLC 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 the UFSAR, and analysis computer files, all related to the design of the Standardized NUHOMS® dry spent fuel storage system, which are owned and have been held in confidence by TN Americas LLC.
- 2) The information is of a type customarily held in confidence by TN Americas LLC, and not customarily disclosed to the public. TN Americas LLC 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 TN Americas LLC, because the information consists of descriptions of the design 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 TN Americas LLC, take marketing or other actions to improve their product's position or impair the position of TN Americas LLC's product, and avoid developing similar data and analyses in support of their processes, methods or apparatus.

Further the deponent sayeth not.

A. Prakash

Prakash Narayanan
Chief Technical Officer, TN Americas LLC

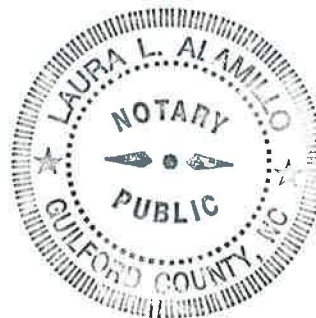
North Carolina
Guilford County

Subscribed and sworn before me this 10th day of May, 2022.

Laura L. Alamillo

Notary Public

My Commission Expires 10/05/2024



DESCRIPTION, JUSTIFICATION, AND EVALUATION OF AMENDMENT 18 CHANGES

1.0 INTRODUCTION

The scope of Amendment 18 to the Standardized NUHOMS® Certificate of Compliance (CoC) No. 1004 includes the changes described below.

Change No. 1:

Provide for a 24PTH improved basket design using staggered plates similar to EOS-37PTH to simplify construction, reduce weight and improve fabricability. In CoC Appendix B Technical Specifications (TS), Table 1-1l, *PWR Fuel Specification for the Fuel to be Stored in the NUHOMS – 24PTH DSC* weight limit was increased from 1682 lbs to 1715 lbs for fuel assembly plus CC based on the lighter Type 3 basket. In addition, the total weight of the FFC and all its contents is deleted. For consistency with the two other DSCs that contain a similar total weight of the FFC plus all its contents statement, this statement is also deleted from Table 1-1e for the 32PT DSC and from Table 1-1t for the 61BTH DSC. CoC Appendix A, Inspections, Tests and Evaluations (ITE), has a new section added to address the high strength low alloy steel used in the new Type 3 basket design for the 24PTH DSC. In addition, transfer cask dose rate values were updated and simplified for the 24PTH DSC.

The CoC Appendix A (ITE), Appendix B TS, Appendix C ASME Code Alternatives and Updated Final Safety Analysis (UFSAR) have been revised accordingly, as described further in this enclosure. The CoC, appendices and UFSAR were revised to differentiate 24PTH Type 3 basket requirements from the existing 24PTH Type 1 and Type 2 basket requirements as necessary.

Lastly, the CoC 1004 renewal impact evaluation in Enclosure 9, with the main focus on the new Type 3 basket SSC changes, uses the latest Interim Staff Guidance on fuel retrievability as documented in ISG-2 Revision 2. As a result, Chapters 12 and P.1 have been updated to reflect ISG-2 Revision 2.

Change No. 2:

Deletion of Appendix A ITE requirement for initial HSM delta T measurement with a loaded DSC.

Change No. 3:

Clarifies Appendix B TS Section 4.3.2 language related to transfer casks with liquid neutron shields regarding the OS197L TC, which is significantly different than other TC models.

Change No. 4:

Updated Appendix C ASME Code Alternatives Table C-12 to add code alternative NG-4231.1 as approved on February 3, 2022, ML22025A169

Change No. 5:

Change Appendix B TS Section 4.3.2, first paragraph, by removing a reference to 10 CFR Part 20 to clarify language indicating that the site specific evaluation in accordance with 10 CFR 72.212 is to demonstrate compliance with 10 CFR 72.104.

Change No. 6:

Clarify TC/DSC annulus draining language in Appendix B TS Section 4.3.2 within the last paragraph.

Change No. 7:

Clarify in Appendix B TS LCO 3.1.3 that there is no transfer time limit associated with the 24PTH-S-LC DSC, consistent with existing UFSAR analysis.

Change No. 8:

Editorially correct CoC name/address information by adding missing space between 7160 and Riverwood Drive.

Change No. 9:

Incorporate administrative controls during short duration independent spent fuel storage installation (ISFSI) handling operations that are unanalyzed for tornado hazards in accordance with the guidance contained in NRC EGM 22-001, "Enforcement Discretion for Noncompliance of Tornado Hazards Protection Requirements at Independent Spent Fuel Storage Installations". These changes are in UFSAR Chapter 3, the operational portions of Chapters 5, K.8, M.8, P.8, T.8, U.8, Y.8, and Z.8 and in Chapter 12.

2.0 DESCRIPTION OF THE CHANGES

2.1 Changes to the Standardized NUHOMS® CoC

The table below provides proposed changes to the CoC pages, a brief description of the subject and/or change, and a reference to the scope item from Section 1.0 that relates to the change or changes.

CoC page	CoC Number	Description	Scope Item
1	N/A	Amendment number changed to 18 and Amendment effective Date changed to "TBD".	none
1	N/A	Added space between "7160" and "Riverwood" in address.	8
3	N/A	Update ASME Code Requirements for 24PTH DSC for Type 3 Basket	1

CoC page	CoC Number	Description	Scope Item
2 through 5	header	Amendment number changed to 18	none

2.2 Changes to the Standardized NUHOMS® CoC 1004 Appendix A Inspections, Tests, and Evaluations

The table below provides proposed changes to the ITE pages, a brief description of the subject and/or change, and a reference to the scope item from Section 1.0 that relates to the change or changes.

ITE page	ITE Number	Description	Scope Item
Cover Page	N/A	Amendment number changed to 18.	none
TOC/LOT/LOF	N/A	Table of Contents, etc. automated updates.	none
2	2.0	Adds new basket type to table	1
3	New 2.4	HSLA Steel for Basket Structure	1
6	3.1.8	Clarifies requirements for 24PTH Type 1 and 2 baskets. The High Seismic option is not applicable to 24PTH DSC with Type 3 basket.	1
6	3.2 Table	Update and simplify dose rates for 24PTH	1
8	3.3.2 Table	Update 24PTH-S-LC dose rates	1
10	4.4	HSM Maximum Air Exit Temperature with a Loaded DSC is deleted.	2

2.3 Changes to the Standardized NUHOMS® CoC 1004 Appendix B Technical Specifications

The table below provides proposed changes to the TS pages, a brief description of the subject and/or change, and a reference to the scope item from Section 1.0 that relates to the change or changes.

TS page	TS Number	Description	Scope Item
Cover Page	N/A	Amendment number changed to 18.	none
TOC/LOT/LOF	N/A	Table of Contents, etc. automated updates.	none
2-1	2.1.1	Deleted pointer to ITE Section 4.4 which is being deleted.	2

TS page	TS Number	Description	Scope Item
3-7	3.1.3	Clarification to Time Limit for Completion of DSC Transfer for 24PTH-S-LC for existing basket Type 2. Add time limit for completion of transfer for 24PTH-S, 24PTH-L and 24PH-S-LC DSCs with new Type 3 basket. Removed "DSC" from each row, as this is redundant to the column heading.	1, 7
4-3	4.3.2, 1 st paragraph	By removing mention of 10 CFR Part 20, this clarifies the language to indicate that the evaluation pursuant to 72.212 is to confirm limits of 72.104 are satisfied for the site.	5
4-3, 4-4	4.3.2	Clarify and split out the requirements that apply to the OS197L TC, versus other TCs with liquid neutron shields.	3
4-3, 4-4	4.3.2, Last paragraph	Clarify language to indicate that the neutron shield level should be monitored when draining the TC/DSC annulus as those drain locations are close to each other, but removed the language regarding draining the DSC cavity.	6
T-5	Table 1-1e	Delete total weight of FFC plus contents sentence for failed fuel (32PT).	1
T-19	Table 1-1l	Delete total weight of FFC plus contents sentence for failed fuel (24PTH).	1
T-20	Table 1-1l	Increase the weight limit from 1682 lbs to 1715 lbs for Maximum Assembly plus CC Weight for Type 3 basket.	1
T-21	Table 1-1l	Update decay heat for Type 3 basket.	1
T-25, T-26	Table 1-1p	Update 24PTH Intact Fuel Table to reflect new basket type.	1
T-27	Table 1-1q	Update 24PTH Damaged Fuel Table to reflect new basket type.	1
T-28, T-29	Table 1-1q1	Update 24PTH Damaged/Failed Fuel Table to reflect new basket type.	1
T-30	Table 1-1r	Update 24PTH Poison Plate Table	1
T-32	Table 1-1t	Delete total weight of FFC plus contents sentence for failed fuel (61BTH).	1
F-18	Figure 1-15	Update notes to reflect Type 3 basket.	1

TS page	TS Number	Description	Scope Item
F-19	Figure 1-15a	Update figure title to include Type 3 basket.	1

2.4 Changes to the Standardized NUHOMS® CoC 1004 Appendix C ASME Code Alternatives

The table below provides proposed changes to the TS pages, a brief description of the subject and/or change, and a reference to the scope item from Section 1.0 that relates to the change or changes.

ASME Code Alt page	ASME Code Alt Number	Description	Scope Item
Cover Page	N/A	Amendment number changed to 18.	none
LOT/Tables	N/A	Amendment number changed to 18.	none
C-1	List of Tables	Updated to differentiate 24PTH Type 1 and 2 baskets from Type 3	1
C-14, C-15	Table C-8	Updated to indicate items are for 24PTH Type 1 and 2 baskets	1
C-23	NG-4231.1	Addition of Approved Code Alternative	4

2.5 Changes to the Standardized NUHOMS® CoC 1004 UFSAR

Enclosure 7 (Proprietary version) and Enclosure 8 (Public version) provide proposed Amendment 18 changed pages for the Standardized NUHOMS® UFSAR. Amendment 18 proposed UFSAR changes are tracked by italicized text and revision bars.

The following paragraphs discuss the UFSAR areas proposed for change, based on the changes described above. Editorial changes to correct spelling, grammar, etc. are also made to the changed UFSAR pages where appropriate.

In support of Change 1, changes are made to UFSAR Chapters 1, References; 12, Aging Management; Appendix P.1, General Discussion; P.2, Principal Design Criteria; P.3, Structural Evaluation; P.4, Thermal Evaluation; P.5, Shielding Evaluation; P.6, Criticality Evaluation; P.8, Operating Systems; P.9, Acceptance Tests and Maintenance Program; P.10, Radiation Protection and P.11, Accident Analyses.

In support of Change 2, a change was made to UFSAR Chapter 10, Operating Controls and Limits, to delete the ITE Bases section for ITE 4.4.

Changes 3 through 8 do not require UFSAR changes.

In support of Change 9, changes are made to UFSAR Section 3.2.1, Tornado Wind Loadings; operating procedures associated with DSC insertion or retrieval at the ISFSI in Chapters 5; Appendices K.8, M.8, P.8, T.8, U.8, Y.8, Z.8, and UFSAR Section 12.3.

3.0 JUSTIFICATION OF THE NEED FOR THESE CHANGES

Change 1 provides for a 24PTH improved basket design using staggered plates similar to EOS-37PTH to simplify construction, reduce weight and improve fabricability. In conjunction with the improved basket design, the weight limit was increased from 1682 lbs to 1715 lbs for Maximum Assembly plus CC Weight as a result of the weight reduction associated with the new EOS based staggered plate Type 3 basket design. In order to provide a consistent and appropriate level of detail related to fuel weights, the total weight of FFC plus all its contents requirement is deleted from Table 1-1l. For completeness, total weight requirement is also deleted from Tables 1-1e and 1-1t as well. The resulting level of detail is consistent with maximum assembly weight requirements contained in other CoC TS such as CoC 1029 and CoC 1042. Lastly, new Section 2.4 was added to Appendix A ITE to provide a discussion on the high strength low alloy steel that will be used in the new basket design. In addition, transfer cask dose rate values were updated and simplified for the 24PTH DSC. The CoC, Appendix A (ITE), Appendix B Technical Specifications (TS), Appendix C ASME Code Alternatives and Updated Final Safety Analysis (UFSAR) have been revised accordingly, as well, to differentiate 24PTH Type 3 basket requirements from the existing 24PTH basket requirements as necessary.

Justification for Removal of the Weight of the Failed Fuel Can (FFC) Plus All Its Contents

The weight of the FFC plus all its contents requirement is removed from the TS, but is retained without any changes within the UFSAR. Eliminating the weight of the FFC plus its contents does not modify the system behavior beyond the allowable bounds since:

1. The total weight of the FFC is mostly driven by the fuel assembly weight, which is already specified within the Technical Specifications.
2. The weight limit of the fuel assembly also includes the weight of the non-fuel assembly hardware. It is extremely unlikely that all of the fuel assemblies within a DSC are loaded to the maximum limit, which provides additional margin to the total weight limit.
3. The total weight requirement remains within the UFSAR to convey the design requirements and to ensure that any modifications to the FFC remain within the applicable bounds of the UFSAR evaluation.
4. There are only a few locations within each DSC wherein failed fuel assemblies are stored. If the weight of the FFC exceeds the maximum specified within the UFSAR, it is evaluated using the design change and 10 CFR 72.48 process. This will ensure that all design criteria including stress allowable limits and 10CFR 72.48 requirements are satisfied.

It should also be noted that removing the FFC weight limitation from the Technical Specification is consistent with more recent approvals such as the 32PTH1 DSC in the same CoC, 32PTH2 in Amendment 3 to CoC 1029 and EOS-37PTH in Amendment 1 to CoC 1042.

Change 2 removes CoC 1004 Appendix A ITE Section 4.4, *HSM Maximum Air Temperature with a Loaded DSC*. The purpose of this measurement was to ensure that the system is performing as designed by comparing the measured thermal performance of the cask against that predicted by the UFSAR thermal analysis for the same heat load. Operating experience from loading over 800 DSCs over more than two decades has resulted in no known delta T temperature issues and demonstrates that this requirement realistically no longer appears to be necessary and newer systems such as the CoC 1042 TS do not require this one time measurement after initial DSC loading.

Change 3 clarifies Appendix B TS Section 4.3.2 language related to transfer cask liquid neutron shields through formatting to more clearly indicate what applies to the OS197L TC.

Change 4 updates the Appendix C ASME Code Alternatives Table C-12 to add recently approved code alternative NG-4231.1. NRC approved this code alternative on February 3, 2022. ML22025A169

Change 5 improves the clarity of the Radiation Protection Program discussion by revising text in first paragraph to reflect that the evaluation pursuant to 72.212 is to confirm the limits of 72.104 for the actual site conditions.

Change 6 clarifies draining requirements language in the TS to indicate that the neutron shield level should be monitored when draining the TC/DSC annulus as those two drain locations are close to each other, but the NS level does not need to be monitored when draining the DSC cavity since the DSC cavity drain is on the opposite end of the DSC from the annulus and neutron shield drains.

Change 7 improves the clarity of the CoC 1004 Appendix B TS and is based on the existing thermal performance of the 24PTH-S-LC DSC during transfer operations in the Standardized TC. As noted in UFSAR Section P.4.6.5.2, the thermal evaluation of 24PTH-S-LC DSC with a heat load of 24 kW within the Standardized TC is performed for the following ambient conditions:

- Maximum normal ambient temperature of 100 °F with insolation, and
- Minimum normal ambient temperature of 0 °F without insolation

The results of these analyses are reported in UFSAR Table P.4-14 as results for HLZC 5 and in UFSAR Table P.4-17. As shown in the UFSAR Table P.4-14, there are no time limits specified for HLZC 5 unlike the columns for HLZC 1 and 4 which demonstrates that there are no time limits required.

Change 8 corrects a formatting issue with the CoC address information.

Change 9 incorporates administrative controls during short duration ISFSI handling operations that are unanalyzed for tornado hazards in accordance with the guidance contained in EGM 22-001. These changes are in UFSAR Chapter 3, the operational portions of Chapters 5, K.8, M.8, P.8, T.8, U.8, Y.8, Z.8, and Chapter 12 and provide a defense-in-depth approach that precludes ISFSI handling operations during periods of adverse weather involving tornado hazards, or when adverse weather involving tornado hazards is predicted, and contains compensatory measures to place important to safety SSCs in an analyzed condition, as necessary.

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® System have no significant effect on safety.

The evaluations for the changes are included in Enclosure 7 (Proprietary version) and Enclosure 8 (Public version) of this submittal.