RAI Th-1:

Provide a revised completion time (based on a blocked vent condition), in addition to the short-term actions that must be completed to return the system to normal operation. (See ADAMS Accession No. ML19084A083)

The following items apply to the technical specification (TS) 3.1.4 proposed in Amendment 16:

1. Action D is initiated if

    a. A.2 (air vents blocked) cannot be completed within 16 hours ***OR***

        If item A.2 is tripped, by default, the air vents are blocked this assumption is no longer valid. This makes the 30-day completion time unacceptable UNLESS is the applicant demonstrates that the steady state temperatures of the fuel cladding and the concrete remain below limits.

    b. C.2 (unexplained temperature excursion, return to normal operation) cannot be completed within 16 hours.

        If item C.2 is tripped, then Action D must provide a remedy which immediately (or within a credible timeframe) restores the system to normal operation. The 30-day time limit has not been shown to be the limiting time frame for this restoration.

2. The basis for the time limit of 30 days for completing Action D is based on the air vents being unblocked.

In the former TS 3.1.4 (Amendment 15), the 30-day time limit was the time allowed for a calculation to be performed, not for returning the system to normal conditions. The short-term action for returning the system to normal conditions was either unloading into a Transfer Cask or returning the DSC to the fuel building.

RESPONSE TO RAI Th-1:

The ACTION COMPLETION TIME requested by this RAI was not included in the former Technical Specifications (TS) Section 5 Administrative Control item. TN understands that the purpose of the Graded Approach pilot scope is only to recommend movement of TS requirements, and it is not to introduce any technical changes. To calculate a proper ACTION COMPLETION TIME where none existed would constitute a technical change. In retrospect, TN was remiss in proposing that this Administrative Control TS become a Limiting Condition for Operation (LCO) TS. TN believes that the proper course of action is to restore this TS to the Administrative Controls TS, which are now in TS Section 4. Future amendments may consider this a strong candidate for an LCO.

As a result:

- TS 3.1.4 has been deleted.
- TS 4.3.6 is now the “HSM or HSM-H Thermal Monitoring Program.”

- A small portion of this TS will still be moved to the updated final safety analysis (UFSAR) TS Bases section.
- UFSAR citations of TS 3.1.4 have been changed to TS 4.3.6.
- Form 68 of the Evaluation Forms for CoC 1004 TS Section 5 Items has been revised, accordingly.
- The Amendment 16 High-Level Evaluation Results Summary Table has been revised, accordingly.

Application Impact:

TS Sections 3.1.4 and TS 4.3.6 have been revised as described in the response.

UFSAR citations in Chapters 4, 5, 7, 8, 10, and Sections K.8, L.4, M.8, P.8, T.8, U.8, W.8, Y.8, and Z.8 have been revised as described in the response.

Form 68 has been revised as described in the response.

The high-level evaluation results table has been revised as described in the response.

RAI Sh-1:

Provide the following information:

a. the bounding burn up, enrichment, and cooling time (BECT) combination(s), which represents the design basis source term (e.g., strengths and spectra of the neutron and gamma emitted from the spent fuel) to be defined in the TS in place of the content definition currently provided by the fuel qualification tables (FQTs), and

b. the revised technical specifications of the Model No. NUHOMS® with the information requested in this question.

In the proposed amendment 16 to Certificate of Compliance (CoC) No. 1004 for the Model No. NUHOMS® storage system, the applicant proposed to relocate the fuel qualifications tables (FQTs) from the technical specifications to the final safety analysis report. Nevertheless, the applicant did not provide the fuel parameters that would define the allowable spent fuel contents with respect to the design basis source terms to be included in the technical specifications for this storage system instead of the fuel qualification tables.

In terms of the shielding design, 10 CFR 72.234(a) requires that the cask design meets the requirements of 10 CFR 72.236. Specifically, 10 CFR 72.236(d) requires that cask design meet the dose limits of 10 CFR 72.104 and 72.106. In accordance with the regulatory requirement of 10 CFR 72.236(a), specifications must be provided for the spent fuel to be stored in the storage cask.

Based on the study published in NUREG/CR-6716, “Recommendations on Fuel Parameters for Standard Technical Specifications for Spent Fuel Storage Casks,” and NUREG/CR-6802, “A Quantitative Impact Assessment of Hypothetical Spent Fuel Reconfiguration in Spent Fuel Storage Casks and Transportation Packages,” the source terms, among other irradiation parameters, are dependent primarily on the BECT. Because a wide variety of different combinations of BECT may produce the same source terms, it is necessary to accurately define the allowable BECTs for the staff to reach a reasonable assurance finding that the source terms from the allowable fuel assemblies are within the bound of the design basis source terms.

NUREG/CR-6716 includes a study on the sensitivities of the neutron and gamma source terms of the spent fuel against all major parameters that impact the source terms. The study found that the fuel parameters with most significant impact on dose rate are fuel burnup, enrichment, and cooling time. This study recommends including these parameters in standard TSs.

The recommendation is based on a balanced consideration of the parameters that are important to safety and appropriate flexibility for the applicant to make changes to the allowed contents. Specifically, NUREG/CR-6716 states the following:

> “[T] the objective is to replace the current detailed TS with more general Standard Technical Specifications (STS) that concentrate control on those fuel parameters that are most important to maintaining safety. The remaining fuel parameters are of lesser importance and would be handled under the Section 72.48 process, which allows the licensees to change those parameters by performing additional safety analyses to update the FSAR.”

This information is needed to determine compliance with the regulatory requirements 10 CFR 72.234(a) and (d), 72.104, and 72.106.

RESPONSE TO RAI Sh-1:

In CoC 1004, FQTs are provided for every DSC type and every heat load used. The FQTs provide minimum cooling times as a function of burnup and enrichment for each heat load. The shielding analysis provided in the UFSAR is based on the FQT burnup, enrichment, and cooling time combinations that maximize the dose rates. Therefore, the FQTs and the design basis sources provided in the UFSAR are directly linked.

An FQT methodology has been proposed for the EOS system (CoC 1042 Amendment 1, currently under NRC review), and the FQT methodology has been tentatively accepted. The FQT methodology employed for the EOS system is also being applied to CoC 1004 Amendment 16. The general methodology is to include FQTs in the Technical Specifications (TS) only for the following conditions:

- Condition 1: An FQT that corresponds to the maximum fuel assembly heat used in the DSC is included in the TS. The maximum heat load results in the bounding fuel assembly source. This FQT is applicable to all fuel to be loaded in the DSC.
- Condition 2: Since the peripheral region dominates the dose rate, an FQT that corresponds to the dominant fuel in the peripheral region of the bounding HLZC is included in the TS .

There is only one FQT in the TS per DSC if the bounding fuel assembly occurs on the periphery (i.e., Condition 1 and Condition 2 are the same FQT). If the bounding fuel assembly occurs in an interior location, there will be two FQTs in the TS per DSC (i.e., Condition 1 and Condition 2 are different FQTs). The remaining FQTs will be relocated to the UFSAR. No changes will be made to the FQTs other than editorial changes as a result of restructuring the documents.

The treatment of low-enriched outlier fuel (LEOF) will be unchanged from the approved CoC 1004 Amendment 15. Because CoC 1004 has been developed for many independent amendments, the treatment of LEOF is DSC-specific. For instance, for the 61BT DSC, LEOF is not allowed, as indicated in the 61BT FQTs. However, for the 37PTH DSC, extrapolation into the LEOF region is allowed, as described in the notes associated with the 37PTH FQTs.

The methodology to determine whether an FQT is located in the UFSAR or TS has been added to Chapter 10 of the UFSAR. A reference for the Amendment 16 TS has been added to Chapter 1 of the UFSAR. Because the maximum fuel loading is included in the TS FQTs, the maximum fuel loading is added to the TS fuel specification tables for all DSCs (the fuel loadings were moved to the UFSAR during Amendment 16 Rev. 4).

The following table outlines FQT-related changes made to the UFSAR. Note that the 24PTH, 32PT, 32PTH1, and 37PTH DSCs share a common set of FQTs.

Table RAI Sh-1-1
Changes Made to the UFSAR

DSC	UFSAR Change
24P	Table 3.1-1 modified to update FQT cross-references
52B	Table 3.1-2 modified to update FQT cross-references
61BT	Tables K.2-1 and K.2-2 deleted with reference to TS
24PTH, 32PT, 32PTH1, 37PTH	A complete set of FQTs moved to Appendix M.2
24PTH	Appendix P.2 modified to update FQT cross-references FQT discussion added to Section P.5.4.11 Table P.2-1 deleted with reference to TS Table P.2-2 modified to add TS reference
32PT	Appendix M.2 modified to update FQT cross-references Table M.2-2a modified to add TS reference FQT discussion added to Section M.5.4.16
32PTH1	Appendix U.2 modified to update FQT cross-references Table U.2-2 modified to add TS reference FQT discussion added to Section U.5.4.12
37PTH	Appendix Z.2 modified to update FQT cross-references Table Z.2-1 deleted with reference to TS Table Z.2-2 modified to add TS reference FQT discussion added to Section Z.5.4.11
24PHB	Table N.2-1 modified to reference TS for additional items Table N.2-2a modified to add TS reference FQT discussion added to Section N.5
61BTH	A complete set of FQTs moved to Appendix T.2 FQT discussion added to Section T.5
69BTH	A complete set of FQTs moved to Appendix Y.2 FQT discussion added to Section Y.5.1

Table RAI-Sh-1-2
Changes Made to the TS

DSC	TS Change
24P	Table 1-1a modified to add reference to FQTs Table 1-1c modified to add reference to FQTs
52B	Table 1-1b modified to add reference to FQTs
61BT	Table 1-1c modified to return maximum fuel loading limit and add reference to FQTs Table 1-1j modified to return maximum fuel loading limit and add reference to FQTs
24PTH, 32PT, 32PTH1, 37PTH	FQT Table 1-3p added, which includes the low-enrichment, low-burnup results for the indicated DSCs. Mark FQT Tables 1-3a, 1-3b, 1-3c, 1-3d, 1-3e, 1-3f, 1-3g, 1-3h, 1-3j, and 1-3l as deleted Revise common notes as needed
24PTH	Table 1-1l modified to return maximum fuel loading limit and add reference to FQTs New Figure 1-16a to illustrate peripheral locations Add FQT Table 1-3k (24PTH-S-LC) Add FQT Table 1-3m and 1-3o (24PTH-S/L)
32PT	Table 1-1e modified to return maximum fuel loading limit and add reference to FQTs Add FQT Table 1-3n
32PTH1	Table 1-1aa modified to return maximum fuel loading limit and add reference to FQTs Add FQT Table 1-3k
37PTH	Table 1-1ll modified to return maximum fuel loading limit and add reference to FQTs Add FQT Table 1-3i
24PHB	Table 1-1i modified to return maximum fuel loading limit and add reference to FQTs Mark FQT Tables 1-2n and 1-2o as deleted Add FQT Table 1-2p
61BTH	Table 1-1t modified to return maximum fuel loading limit and add reference to FQTs New Figure 1-25c to illustrate peripheral locations Mark FQT Table 1-4a, 1-4b, 1-4c, 1-4d, 1-4f, 1-4g, 1-4h as deleted Add FQT Table 1-4e and 1-4i Revise notes as needed.
69BTH	Table 1-1gg modified to return maximum fuel loading limit and add reference to FQTs Mark FQT Table 1-7a, 1-7a1, 1-7b, 1-7c, 1-7d, 1-7e, 1-7f, 1-7g, 1-7h, 1-7i, 1-7j, 1-7l as deleted Add FQT Table 1-7k and 1-7m Revise notes as needed.

Application Impact:

The UFSAR and TS have been revised as described in the response.

RAI Op-1:

Clarify the following:

a. if the time limits identified in LCO 3.1.3 incorporate or cover the use of the OS197FC (OS197L), and

b. if OS197FC and OS197L are the same.

The staff added Condition No. 5 to the CoC No. 1004 in Amendment 11. In its application for amendment 16 of CoC No. 1004, the applicant proposed to eliminate this condition from the CoC because the applicant considered this condition strictly a notification requirement and covered by LCO 3.1.3. The staff reviewed LCO 3.1.3 and could not determine if the applicant considered the use of the OS197FC transfer cask as part of the actions to initiate active cooling within a specified time limit. Condition No. 5 includes a 30-day period, which the staff has accepted in various applications to address recovery from off-normal and accident conditions.

This information is needed to determine if it meets the evaluation criteria to be maintained in the TS/CoC or move to the Final Safety Analysis Report (FSAR).

RESPONSE TO RAI Op-1:

Item a:

The time limits identified in LCO 3.1.3 do incorporate and cover the use of the OS197FC. The time limits identified in LCO 3.1.3 do not incorporate or cover the use of the OS197L, as explained below.

- Proposed CoC Amendment 16 Condition II.3.b (based on Amendment 15 TS 4.4) states that:

  "The OS197L TC shall only be used with DSC models 61BT and 32PT."

- The title of LCO 3.1.3 is as follows, and does not include the 61BT or 32PT DSCs:

  "Time Limit for Completion of DSC Transfer (24PTH, 61BTH Type 2, 32PTH1, 69BTH, or 37PTH DSC Only)."

- The table shown in LCO 3.1.3 only provides time limits for the DSC models spelled out in the LCO title.
- Again, those LCO 3.1.3 DSC models do not include the 61BT or the 32PT.
- Therefore, LCO 3.1.3 is not applicable to the OS197L.

Item b:

The OS197FC and the OS197L are not the same. This is supported by the following bullets.

- The sixth paragraph of proposed CoC Amendment 16 Condition I states that:

> "The following TC models are authorized for use in the Standardized NUHOMS® System: Standardized TC, OS197, OS197H, OS197L, OS200. Additional TCs include the OS197FC and the OS197FC-B variants of the OS197, the OS197HFC and the OS197HFC-B variants of the OS197H, and the OS200FC variant of the OS200, as described in the TS."

The first sentence of the condition quoted above lists the TC models, including the OS197L. The second sentence accounts for the various forced cooling (FC) variants of the OS197, the OS197H, and the OS200. No FC variants for the OS197L are listed.

- Additionally, the OS197L is fully described in UFSAR Appendix W. None of the drawings in Appendix W show forced cooling provisions, nor is forced cooling discussed anywhere in Appendix W.
- Also, as described in the response to Item a. above, the OS197L can only be used with the 61BT and 32PT DSC models, and LCO 3.1.3, which accounts for the forced cooling time requirements for the Standardized NUHOMS® System, does not include the 61BT or 32PT DSCs. This further demonstrates that the OS197L and the OS197FC are not the same.

Application Impact:

No changes as a result of this RAI.