Request for Supplemental Information (non-proprietary)

By letter dated March 31, 2021, TN Americas LLC submitted to the U.S. Nuclear Regulatory Commission (NRC) an application for Certificate of Compliance (CoC) No. 1042, Amendment No. 3 to the NUHOMS® EOS System, pursuant to the requirements of Part 72 of Title 10 of the *Code of Federal Regulations* (10 CFR 72).

This request for supplemental information (RSI) identifies additional information needed by the NRC staff in connection with its review of this amendment application. Each RSI below describes information needed by the staff to complete its acceptance review determination of the subject application. In addition, the staff has noted several observations, which may result in a request for additional information should the application be accepted for docketing.

Thermal RSI and Observations:

RSI 4-1: Provide the following thermal analysis files listed in Enclosure 7 of the application:

a. Section 4.9.8.2 (load case (LC) 3 in Table 4.9.8-1) Folder: \Thermal\EOS-89BTH-EOS-HSM\LC3 Input and output files for the bounding accident storage condition of the EOS-89BTH DSC in the EOS-HSM with heat load zone configuration (HLZC) 4.
b. Section A.4.5.6 (LC 2c in Table A.4-43) Folder: \Thermal\EOS-89BTH-HSM-MX\LC2c Input and output files for the bounding accident storage evaluation of the EOS-89BTH DSC in the EOS-HSM-MX with HLZC 4.

The input and output thermal analysis files in a., listed above, cannot be opened, it should be confirmed that the files are usable, and then provided again. The thermal analysis files in b., listed above, do not correspond to LC 2c; the files appear to correspond to LC 2b in Table A.4-43 of the UFSAR. The thermal analysis files that correspond to the accident conditions in LC 2c should be provided again.

This information is needed to determine compliance with 10 CFR 72.236(f).

Observation 4-1: Describe how the lead gamma shielding thickness value of the EOS-TC125 transfer cask was chosen and used in the thermal analysis to provide a maximum peak cladding temperature (PCT) and maximum component temperature results.

The proposed change in the lead gamma shielding thickness of the EOS-TC125 transfer cask includes a variable thickness (i.e. from x inches to y inches). Based on this proposed variation, it is not clear how a bounding value (i.e. x or y) was chosen to provide a maximum PCT and maximum component temperatures in the thermal analysis. Note that the lead gamma shielding temperature should be below the lead melting point during normal, off-normal, and accident conditions based on the reduced lead thickness.

This information is needed to determine compliance with 10 CFR 72.236(f).

Observation 4-2: Clarify in Figure 11 of the NUHOMS® EOS System Technical Specifications (TS) whether the payload will be adjusted to maintain the total canister heat load within the specified limits in notes 1 and 2.

The NUHOMS® EOS System TS Figure 11 Note 1 describes that the maximum heat load for the EOS-89BTH DSC during storage is 48.2 kW in the EOS-HSM. The NUHOMS® EOS System TS Figure 11 Note 2 describes that the maximum heat load for the EOS-89BTH DSC during storage is 48.2 kW in the lower compartment of the HSM-MX and 41.8 kW in the upper compartment of the HSM-MX. However, utilizing the maximum per assembly decay heat and maximum number of fuel assemblies in each of the six zones as described in TS Figure 11 will result in the maximum decay heat per DSC (described in notes 1 and 2) being exceeded.

This information is needed to determine compliance with 10 CFR 72.236(f).

Observation 4-3: Clarify the NUHOMS® EOS System TS Figure 4F.

The NUHOMS® EOS System TS Figure 4F note 1 states, “Adjust the payload to maintain total DSC heat load within the specified limit,” which is 31.2 kW and found in the table that is located below Figure 4F. However, when adding the maximum decay heat per zone for each of the six zones, the total is 31.18 kW, which is already less than 31.2 kW specified in the table. Therefore, for the NUHOMS® EOS System TS Figure 4F, if the per assembly decay heat values are correct, the payload to maintain the total DSC heat load does not need to be adjusted, and then note 1 does not appear to be necessary. In this case, the payload should not be adjusted to exceed 31.18 kW while also remaining below 31.2 kW.

This information is needed to determine compliance with 10 CFR 72.236(a).

Observation 4-4 (Proprietary): See Enclosure 2.

Observation 4-5 (Proprietary): See Enclosure 2.

Observation 4-6 (Proprietary): See Enclosure 2.

Observation 4-7 (Proprietary): See Enclosure 2.

Observation 4-8: Provide clarification for a statement in Section 4.9.1.2 of the UFSAR based on the proposed changes to the amendment.

It is not clear in the application what proposed change in the amendment the following statement from the UFSAR is connected to, “The bounding effective specific heat based on GE1/2/3 FA and bounding effective density based on Switzerland- KKL BWR 10/15 FA are listed in Table 4.9.1-7 and also summarized in Section 4.2.1.”

This information is needed to determine compliance with 10 CFR 72.236(f).

Observation 4-9: Provide clarification in Section 4.9.8.3 of the UFSAR if the water is boiling in the annulus during transfer operations. Similarly, provide clarification in the application if the water is boiling in the annulus during vacuum drying.

It is not clear from the application if water is boiling in the annulus during transfer operations or during vacuum drying. The presence of water in the annulus provides heat transfer to maintain component temperatures below allowable limits.

This information is needed to determine compliance with 10 CFR 72.236(f).

Observation 4-10 (Proprietary): See Enclosure 2.

Observation 4-11: Consider whether all, or portions of the, "Graded approach evaluation," in Enclosure 10 could be made public.

At this time, all of Enclosure 10 that describes the, "Graded approach evaluation," that is related to proposed change # 7 is proprietary. Given that all of the information in Enclosure 10 is labeled proprietary, this might necessitate public, and non-public SERs.

This information is needed to determine compliance with 10 CFR 72.20.

Criticality RSI:

RSI 6-1: Revise the application to provide the locations of short and long partial-length rods in the ATRIUM 11 fuel assembly, and to discuss how this fuel was modeled in the criticality analysis.

The applicant requested that the ATRIUM 11 fuel assembly be added as an allowable fuel type for storage in the EOS 89BTH canister. Table 2-3 of the UFSAR provides the assembly design characteristics for the ATRIUM 11 fuel assembly design, including the numbers and lengths of the full length, short partial-length, and long partial-length rods. However, the UFSAR does not show the location of the short and long partial-length rods in the assembly lattice. The UFSAR should be revised to include this information. Additionally, the criticality chapter of the UFSAR does not describe how the ATRIUM 11 assembly was modeled. The UFSAR should be updated to describe whether the partial-length rods were modeled actual length, full length, or missing, and if the central water rod channel is modeled as designed or replaced by water, and demonstrate that the assembly configuration modeled is conservative.

This information is needed to ensure compliance with the criticality safety requirements in 10 CFR 72.124 and 72.236(c).

Procedures and Acceptance Test RSIs

RSI 9-1: Provide supplemental information to clarify the (1) sequencing of the helium leak testing of the dry shielded canister (DSC) and the nondestructive examination (NDE) of the outer top cover plate (OTCP) welds, and (2) repair of inner top cover plate (ITCP) weld if a leak is identified when the outer top cover plate (OTCP) structural weld is performed using single pass high amperage gas tungsten arc welding (HA-GTAW).

Provide a justification for conducting the helium leak test prior to performing NDE to verify the integrity of the OTCP weld. The applicant's proposed changes to the updated final safety analysis report (UFSAR) Section 9.1.4, "DSC Sealing Operations," steps 3 and 4 indicate that the helium leak test can be performed after the single pass HA-GTAW weld is completed but prior to NDE of the single pass weld (which is identified in step 6). As written, the procedures imply that the helium leak test can be conducted prior to the required NDE of the OTCP to DSC shell weld when the HA-GTAW process is used.

In addition, provide supplemental information to clarify how a general licensee or their contractors will remove the single pass HA-GTAW weld as indicated in Step 5 if the helium leak test results do not meet the requirements in Technical Specification 5.1.2.f and repair of the ITCP weld is necessary. For the multi-pass GTAW method, only the root pass of the OTCP to DSC shell weld would need to be removed to gain access to the ITCP weld to conduct a repair. It is not clear to the staff that a general licensee or their contractors would have the necessary equipment and experience to successfully remove the 0.5 inch thick OTCP weld without altering the OTCP or the DSC in such a way that could prevent the reinstallation of the OTCP. As an alternative, revise the procedures to require the helium leak test to be conducted using a test head before installing and welding the OTCP using the HA-GTAW method. The use of the test head is listed currently stated as an alternative in step 4.

This information is needed to determine compliance with the requirements of 10 CFR 72.236(j).

RSI 10-1: Provide supplemental information on the NDE of the OTCP to the DSC shell weld by ultrasonic testing (UT) to clarify the following: (1) qualification requirements of the NDE technique and procedure, and (2) justification or demonstration of the ability to detect/identify/size flaws at any location on the OTCP structural weld to ensure that the sum of depth of aligned defect subtracted from measured weld thickness will be greater than or equal to 0.30" using a weld quality factor of 1.0, as stated in UFSAR Section 10.1.3.1.

The applicant's proposed change to UFSAR Section 10.1.3.1 "DSC" does not include or reference details of the UT technique or include a demonstration that supports that the UT procedure will be sufficient for the detection of welding flaws in the OTCP to DSC shell weld using either multipass GTAW welding or the HA-GTAW welding such as ASME Section V Article 14 "Examination System Qualification" with a justification for the level of rigor. Further, the proposed changes do not address or reference NDE personnel qualification requirements to that specific technique for flaw detection/identification/sizing.

This information is needed to determine compliance with the requirements of 10 CFR 72.236(b) and (e).