Materials RSI

RSI-1:

Provide supplemental information on the HSM-MX Transfer Cask Adapter described in Updated Final Safety Analysis Report (UFSAR) section B.1.2.2 including: (1) drawing of the components with dimensions and tolerances, (2) a parts list with material specifications and quality category information, and (3) material and design limits information relevant to UFSAR Section B.4.2.

The staff needs this information to proceed with its review to determine if the amendment application meets the regulatory requirements of 10 CFR 72.236(b).

RESPONSE TO RSI-1:

The Matrix Horizontal Storage Module (HSM-MX) Transfer Cask (TC) Adapter (adapter) is part of the transfer equipment. It is a not-important-to-safety (NITS) component used only during transfer operations. The adapter aids in alignment similar to other transfer equipment, such as the skid and skid positioning system, and provides additional shielding for As Low As Reasonably Achievable (ALARA) purposes. The adapter is constructed of coated ASTM A36. It is mounted to the HSM-MX door to engage with the top flange of the OS197 TC during the dry shielded canister (DSC) insertion, and removed after insertion, prior to installing the HSM-MX door. The adapter is not credited for its shielding properties, and radiation exposure dose rates as reported in UFSAR Chapter B.11 do not account for the adapter being in place. Regardless, if an adapter is to be used, the design of the adapter provides supplemental shielding for ALARA purposes. Clarification of the adapter functionality is provided in Section B.1.2.2, and Figure B.1-1 is added to provide a conceptual sketch of the adapter.

UFSAR Section B.4.2 discusses the thermal material and design limits of the NUHOMS® MATRIX-61BTH System. The adapter is mounted to the HSM-MX door recess only during transfer operations, and engages with the OS197 TC/61BTH Type 2 DSC only during DSC insertion, which is not a case required to be evaluated in the thermal analysis due to the short-term nature of the activity.

Application Impact:

UFSAR Section B.1.2.2 has been revised as described in the response.

UFSAR Figure B.1-1 has been added as described in the response.

Proprietary Information on This Page
Withheld Pursuant to 10 CFR 2.390.

Materials Observation

OBS-M1:

The definition of damaged fuel in EOS Amendment 2 UFSAR Technical Specifications Section 1.1 is not equivalent to the definition in 72-1004 Amendment 15 Technical Specifications Table 1-1 t for the 618TH (ML 183478336). The definition in 72-1004 Amendment 15 Technical Specifications Table 1-1t includes the additional characteristic as follows:

> *The extent of damage in the fuel rods is to be limited such that a fuel pellet is not able to pass through the damaged cladding during handling and retrievability is ensured following normal and off-normal conditions.*

The staff note that the change in the definition of damaged fuel from that provided in the approved 72-1004 Amendment 15 Technical Specifications Table 1-1t will need additional analyses to show the revised contents can be safely loaded, stored and unloaded (if necessary) without the use of a failed fuel can.

The staff needs this information to proceed with its review to determine if the amendment application meets the regulatory requirements of 10 CFR 72.236(a), (g), and (h).

RESPONSE TO OBS-M1:

The DAMAGED FUEL definition has been revised to provide further clarification. This definition has been revised in Section 1.1 of the proposed Technical Specifications (TS) and in UFSAR Chapter B.2.

General licensees use site-specific procedures to classify their fuel assemblies and prepare loading plans for their dry storage loading campaigns. The sites use a combination of historical records, records from sipping campaigns, and fuel inspections as inputs to their classification program. The procedures include license compliance evaluations against both the reactor 10 CFR Part 50 license and the applicable 10 CFR Part 72 storage CoC, TS, and UFSAR requirements. Because the extent of cladding damage on fuel rods is not easy to visualize, especially for fuel rods located inside the fuel rod array, the size and shape of cladding damage are not appropriate criteria for damaged fuel classification. A handling requirement is used instead.

The integrity of the fuel rods preventing pellet material passing through the cladding is to be maintained during inspection and handling operations in the pool prior to loading operations. The swelling of a fuel pellet due to fission gas formation during irradiation causes pellet-cladding interfacial friction and mechanical stress that tend to maintain the fuel pellet inside the cladding. There are no normal or off-normal storage conditions more severe than the inspection or handling conditions in the pool for the fuel cladding mechanical function. Structural analyses in UFSAR Section 3.9.6.7 of CoC 1042 for the 37PTH DSC and Section T.3.5 of UFSAR Revision 18 of CoC 1004 for the 61BTH DSC, referred in UFSAR Section B.3.9.6 of CoC 1042, demonstrate that damaged fuel will retain their integrity when subjected to normal and off-normal conditions of storage and onsite transfer loads. As a result, it is a reasonable assumption that if pellet material is not released from the fuel rod during inspection and handling operations in the pool prior to loading, pellet material will not be released either during loading operations or during normal and off-normal conditions of transfer and storage.

Even if a small quantity of pellet material is released during transfer or storage, the top and bottom end caps will provide confinement for the debris, and the amount of debris will be negligible and bounded by the damaged fuel configurations presented in the UFSAR. Regarding criticality, the most limiting credible geometry under normal and off-normal configurations, and most limiting credible material reconfiguration under accident conditions for damaged fuel are evaluated in Section T.6.4.2.C of UFSAR Revision 18 of CoC 1004 for the 61BTH DSC, including pitch variation, single-ended breaks for the effect of radial movement of fuel rod pieces, and double-ended breaks for the effect of axial movement of fuel rod pieces up to 12.5 inches above the poison part of the basket.

If the extent of damage is such that the DAMAGED FUEL requirements are not met, the fuel assembly is classified as FAILED FUEL and stored in a failed fuel can (FFC). The maximum enrichment values for DAMAGED and FAILED FUEL are reduced to account for reconfiguration as presented in the proposed TS Table 9, Table 10, Table 11 or Table 12 for the 61BTH DSC, and Table 4 for the 37PTH DSC.

Chapter B.2 was revised to add details about the DAMAGED and FAILED FUEL considerations for the 61BTH DSC.

Application Impact:

TS Section 1.1 has been revised as described in the response.

UFSAR Section B.2.2 has been revised as described in the response.

Proprietary Information on This Page
Withheld Pursuant to 10 CFR 2.390.

Confinement Observations

OBS-C1:

Ensure that the description of the siphon/vent port block welds for the EOS-37PTH/89BTH DSCs and the 618TH Type 2 DSC (Enclosure 4 to E-53778: Proposed Technical Specifications, CoC 1042 Amendment 2, Rev. 0) is appropriate.

In Enclosure 4 to E-53778, the description of the welds (first paragraph for NB-4243 and NB-5230, page 4-6) for the EOS-37PTH and the EOS-89BTH DSCs should be identical to the description for the 61 BTH Type 2 DSC (page 4-8); however, it's noted that the description for the 618TH Type 2 DSC also describes the siphon and the vent port block welds, whereas the description for the EOS-37PTH and the EOS-89BTH DSCs does not. The applicant should review the design drawings and ensure that the description of the siphon/vent port block welds is appropriate for both the EOS-37PTH/89-BTH DSCs and the 618TH Type 2 DSC.

This information is needed to determine compliance with 72.236 (j) and (l).

RESPONSE TO OBS-C1:

The vent and siphon block exists as a component only in the 61BTH Type 2 DSC. In the 61BTH Type 2 DSC, the vent and siphon block is a trapezoidal steel block welded to the inside of the DSC shell, into which are drilled the siphon and vent ports, as shown in Figure OBS–C1-1. The vent and siphon block welds connect the block to the DSC shell and are partial penetration welds subject to the same examination requirements as the other discussed welds. Editorial corrections were made for clarity in Technical Specifications (TS) Section 4.0, Table “61BTH Type 2 DSC ASME Code Alternatives for the Confinement Boundary,” ASME Code Section NB-4243 and NB-5230 (page 4-8).

In the EOS-37PTH and the EOS-89BTH DSCs, the drain and vent ports are drilled directly into the top shield plug and inner top cover plate rather than a separate drain and vent block component, as shown in Figure OBS-C1-2. Therefore, there are no block welds to be discussed for the EOS-DSCs. Only the drain port cover and vent port plug welds are discussed.

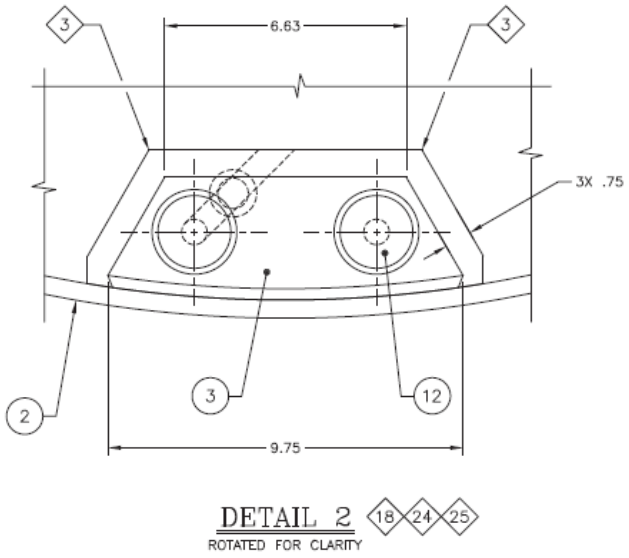

Figure OBS-C1-1: 61BTH Type 2 DSC Vent and Siphon Block

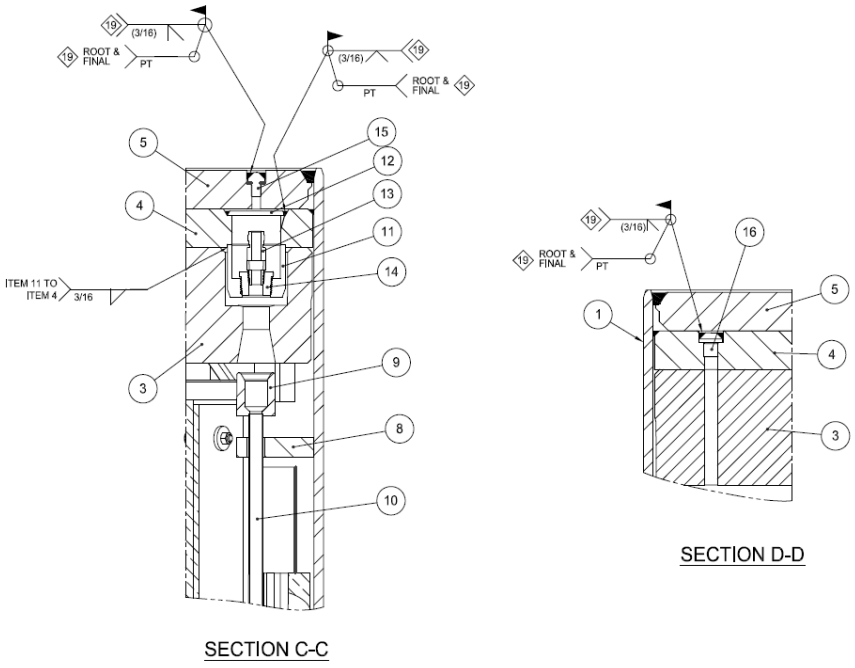

Figure OBS-C1-2: EOS-DSC Vent and Drain Ports

Application Impact:

TS Section 4.0 has been revised as described in the response.

OBS-C2:

All references to ISG-15 should be revised to refer .to NUREG-1536 Revision 1 in NUHOMS EOS Amendment 2, since ISG-15 was incorporated into NUREG-1536 Revision 1.

In Enclosure 4 to E-53778, the description of the cover to shell welds (second paragraph for NB-4243 and NB-5230 for the EOS-37PTH and EOS-89BTH DSCs (page 4-6) and second paragraph for 618TH Type 2 DSC (page 4-8)), refer to NUREG-1536 Revision 1, instead of ISG-15, as guidance for welds (see revisions below):

The cover to shell welds are designed to meet guidance provided in NUREG-1536 Revision 1 ~~ISG-15~~ for stress reduction factor (page 4-6).

The shell to the outer top cover weld will be a multi-level weld and receive multi-level PT examination in accordance with the guidance provided in NUREG-1536 Revision 1 ~~ISG-15~~ for NDE (page 4-8).

This is because ISG-15 was incorporated into NUREG-1536 Revision 1.

This information is needed to determine compliance with 72.236(j) and (l).

RESPONSE TO OBS-C2:

The description of NB-4243 and NB-5230 for the EOS-37PTH and EOS-89BTH DSCs found in Technical Specifications (TS) Section 4.0, Table, “61BTH Type 2 DSC ASME Code Alternatives, Subsection NB,” ASME Code Section NB-4243 and NB-5230 (page 4-6), has been revised to say that the cover to shell welds are designed to meet the guidance provided in NUREG-1536 Revision 1 for stress reduction factor.

The description of NB-4243 and NB-5230 for the 61BTH Type 2 DSC, found in Technical Specifications (TS) Section 4.0, Table “61BTH Type 2 DSC ASME Code Alternatives for the Confinement Boundary,” ASME Code Section NB-4243 and NB-5230 (page 4-8), has been revised to say that the shell to the outer top cover weld will be a multi-level weld and receive multi-level PT examination in accordance with the guidance provided in NUREG-1536 Revision 1 for NDE. It has also been revised to say that all of these welds will be designed to meet the guidance provided in NUREG-1536 Revision 1 for stress reduction factor.

Application Impact:

TS Section 4.0 has been revised as described in the response.

Proprietary Information on This Page
Withheld Pursuant to 10 CFR 2.390.