

## REQUESTS FOR SUPPLEMENTAL INFORMATION (RSI)

### HOLTEC HI-STORM UMAX – AMENDMENT NO. 3

Docket No. 72-1040

#### ADMINISTRATIVE

- RSI-1. Provide clarification on how incorporation of only the publicly available portions of the safety analysis report (SAR) for the 24PT1-DSC constitutes a complete and adequate licensing basis for the UMAX system.

The application incorporates by reference only the publicly available portions of the SAR for the 24PT1-DSC. Staff seeks to understand how the incorporation of only this partial information constitutes a complete application and how Holtec International (Holtec) will be able to demonstrate it can meet all the relevant regulatory requirements under Part 72. For example, 10 CFR 72.234 requires, in part, “The certificate holder and applicant for a CoC shall ensure that the design, fabrication, testing, and maintenance of a spent fuel storage cask comply with the requirements in §72.236.” The application states: “Since the 24PT1-DSC canister has already been approved by the NRC for storage under Part 72, (and is presently in active use) under Docket No. 72-1029, much of the safety analysis information is incorporated herein by reference to the NUHOMS FSAR [I.1.2.1].” It is not clear how the applicant is able to ensure compliance with 10 CFR 72.236 based upon only the publicly available portions of the 24PT1-DSC. If the applicant is relying upon the NRC’s findings in Docket No. 72-1029 to ensure compliance with 10 CFR 72.236, please explain how those findings address variations in the licensing bases between the 24PT1-DSC and the UMAX system.

This information is needed ensure the application complies with 10 CFR 72.230.

#### MATERIALS

- RSI-2. Provide licensing drawings and/or drawing details that, at a minimum, clearly identify materials joined, joining processes, and the level of NDE, symbols and dimensions.

Welding/fabrication/design details on the licensing drawings provided make the following statements, “Design of rail and supports is to be determined. Final design will be shown on fabrication drawing.” Staff require final design details to determine materials joined, joining processes, level of NDE, symbols, dimensions, etc. in order to evaluate safety.

This information is needed to evaluate compliance with 10 CFR 72.158.

- RSI-3. Provide a definition/identification of critical characteristics and an explanation of how critical characteristics are determined.

Text on the cask handling apparatus (CHA) licensing drawing 10488, CHA-90

ASSEMBLY, states the following: Equivalent materials that meet the required critical characteristics may be used in lieu of the named material. Critical characteristics may be crosscutting depending on the staff's review discipline.

This information is needed to evaluate compliance with 10 CFR 72.156.

### **CRITICALITY**

- RSI-4. Please provide a criticality safety analysis that demonstrates the safety of a 24PT1-DSC canister loaded into the UMAX system during storage and transfer.

Supplement I.6 does not have any evaluation associated with the use of the UMAX system to store a 24PT1-DSC. The evaluation states that the results would be "practically identical" to the results in Chapter 6 of the Standardized Advanced NUHOMS FSAR ([I.1.2.1]), Tables 6.4-1 through 6.4-3, however no supporting information was provided in supplement I.6 to support this contention. In addition, the contention that the HI-TRAC is "similar" to the NUHOMS-MP187 transfer canister and is bounded by the calculations for the NUHOMS system is not justified by the information provided.

This information is required under 10 CFR 72.124 and 10 CFR 72.236.

### **SHIELDING**

- RSI-5. Justify the use of the Holtec MPC-32 source term calculation to simulate the shielding evaluation for the 24PT1-DSC.

In SUPPLEMENT I.1: GENERAL DESCRIPTION OF 24PT1-DSC CANISTER, the applicant states: "

- The 24PT1-DSC has a smaller diameter than the MPC-37, resulting in a larger gap between the canister enclosure shell and CEC. However, the diameter of the 24PT1-DSC is similar to that of MPC-32 analyzed in the main section of this chapter.
- The 24PT1-DSC is shorter than the MPC-32 and the MPC-37."

The 24PT1-DSC has an outside diameter of 67.2 inches and height of 186.5 inches. The MPC-32 has an outside diameter of 75.5 inches and height of 213 inches according to USNRC Docket #72-1040 Holtec Project 5021 Holtec Report #HI-2115090 (ML14202A031). Considering 24 fuel assemblies for source term calculation and assuming smearing all fuel assemblies in the source term calculation, the dose rate on the surface of 24PT1-DSC basket should be higher than for the MPC-32 due to smaller diameter and shorter length of 24PT1-DSC. The applicant needs to justify the source term used in their evaluation.

This information is needed by the staff to determine compliance with 10 CFR 72.236(d) and 10 CFR 72.104(a) and 106(b).

### **CONTAINMENT**

- RSI-6. Provide Chapter 7 (Confinement) change pages from Revisions 2 and 5 of the Standardized Advanced NUHOMS FSAR.

The confinement evaluation for the NUHOMS 24PT1-DSC is incorporated by reference into the HI-STORM UMAX application in reference I.1.2.1. Reference I.1.2.1 is identified as the Standardized Advanced NUHOMS FSAR, Revision 6. In a letter containing reference supplemental information dated November 4, 2016, the applicant states, "The "Final Safety Analysis Report for the Standardized Advanced NUHOMS Horizontal Modular Storage System for Irradiated Nuclear Fuel," Revision 6 was compiled from public documents available in ADAMS. Rev 0 of the FSAR is available in three pieces, with ADAMS accession numbers ML050410252, ML031040379, and ML031040312. This initial revision was then updated based on the publically available changed pages in ADAMS accession numbers ML040910311, ML082341022, ML102290084, ML12229A121, and ML14226A790, up to Revision 6."

The Revision 6 FSAR should incorporate all changes made in the previous revisions. Since the Revision 6 change pages do not specify changes to the confinement chapter, it is assumed the confinement chapter is made up of Revision 0, Revision 2 and Revision 5 information per LOEP-5 in the Revision 5 change pages. Change pages for Revision 2 were not included in the reference supplemental information letter and although Revision 5 change pages were included in the reference supplemental information letter, specific Chapter 7 changes are not included or identified in those change pages.

Chapter 7 changes from Revision 2 and Revision 5 should be provided so the staff has Revision 6 of the NUHOMS FSAR.

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

## **STRUCTURAL**

- RSI-7. Please provide calculations and drawing details supporting the design of the sliding rail used in the cask handling apparatus, CHA-90 assembly.

Bill of materials item 1 (sliding rail) described in licensing drawing 10488 sheet 1 and 2 states that the design of the sliding rail and its supports are to "be determined" at a later time according to flag note 1. This important to safety item appears to affect lifting operations and could affect retrievability. A safety finding cannot be made without drawing details and supporting calculations of this item.

This information is needed to determine compliance with 10 CFR 72.124(a) and 10 CFR 72.236(m).

- RSI-8. Please provide calculations and/or description for lifting lugs depicted on sheet 1 of drawing 10576.

Flag note 1 on sheet 1 of drawing 10576 indicates that "lugs may vary in location size and quantity". It is unclear if these ITS lugs are used to support and/or lift the 24PT1 DSC in any fashion by way of the seismic restrain assembly. If so, provide calculations backing their design as a safety finding cannot be made for these

important to safety items without knowing their size and location.

This information is needed to determine compliance with 10 CFR 72.124(a).

- RSI-9. Please provide structural calculations for the pedestal shown on sheet 1 of drawing 10576.

Flag note 7 on Sheet 1 of drawing 10576 indicates that pedestal joints are to be determined at the fabrication level. A finding for this important to safety item used for structural support, lifting operations, seismic analysis, and retrievability cannot be made without structural calculations, nor can it be fabricated as depicted without pertinent weld information such as size, filler material, weld process etc. Provide calculations in the SAR and place weld size, filler material, and process on the licensing drawings.

This information is needed to determine compliance with 10 CFR 72.124(a) and 10 CFR 72.236(m).

- RSI-10. Please provide LS-DYNA input and output files used to characterize the seismic response of the 24PT1-DSC within the UMAX VVM.

Section I.3.1.3 describes the stress analysis and computer codes used to determine the seismic response of the 24PT1-DSC canister within the UMAX VVM. However, the input/output files have not been provided.

This information is needed to determine compliance with 10 CFR 72.24(d)(2).

- RSI-11. Please provide the following references:

- a) Reference [I.1.2.3] HI-STORM FW FSAR, HI-2114830, latest revision along and licensing drawings
- b) Reference 3.1.3 as cited in Table I.3.1.1 of the FSAR as part of the acceptance criteria for the 24PT1-DSC.
- c) Structural Calculation Package For the HI-STORM UMAX System, HI-2125228, Revision 5
- d) HI-STORM UMAX FSAR, HI-2115090, Proposed Rev. 3D (LAR 1040-3)

This information is needed to determine compliance with 10 CFR 72.230(a).

- RSI-12. Please describe the condition of the fuel within the 24PT1 DSC canister when subjected to seismic loading.

While an analysis has been provided for the canister under seismic conditions, it is unclear what the structural integrity of the fuel will be after being subjected to seismic loading. Note that canister rated g-loads are dependent on canister drop orientations and boundary conditions which are not shared by the seismic analysis. Note that the 24PT1 DSC canister stored in the UMAX is supported and oriented in a manner unlike its original NUHOMS configuration, and is supported in a manner that is unlike

other canisters in the UMAX. Please place the supporting analysis into the SAR.

This information is needed to determine compliance with 10 CFR 72.24(d)(2).

## **THERMAL**

RSI-13. Provide detailed drawings that support the thermal model.

Section I.4.4 of the SAR states “*24PT1-DSC storage in the UMAX VVM is evaluated using a suitably calibrated thermal model of the canister that conservatively represents the temperatures in its licensed configuration as articulated in the NUHOMS FSAR.*” However, the application did not provide detailed drawings of the module. Section 4.5.1 of NUREG-1536 states that in addition to the material compositions, the dimensions of the cask components and SNF assemblies are to be clearly indicated. All drawings, figures, and tables should be sufficiently detailed to support in-depth staff evaluation. The drawings need to provide sufficient detail to support the applicant’s statement that the thermal model is suitably calibrated, representative, and conservative. The staff needs this information to ensure its proper use in the thermal calculations and to verify that the dimensions and materials are consistent with those in the drawings of the actual cask.

This information is necessary to verify the requirements of 10 CFR 72.230(a) and 10 CFR 72.236.

RSI-14. Provide a detailed description of the NUHOMS 24PT1 DSC thermal model.

Section I.4.4 of the SAR states “*24PT1-DSC storage in the UMAX VVM is evaluated using a suitably calibrated thermal model of the canister that conservatively represents the temperatures in its licensed configuration as articulated in the NUHOMS FSAR.*” However, the application did not provide a detailed description of the model configuration. Section 4.5.4.1 of NUREG-1536 states that any model used in the thermal evaluation should be clearly described. The staff needs this information to determine the adequacy of the developed thermal models to predict applicable thermal limits.

This information is necessary to verify the requirements of 10 CFR 72.230(a) and 10 CFR 72.236.

## **OBSERVATIONS**

“Observations” include questions (identified by staff during the acceptance review), which do not rise to the level of a RSI that needs to be resolved before the requested licensing action (RLA) could be accepted for review, but may require staff to issue a request for additional information (RAI) during the detailed technical review. The observations may be provided in the RSI to the applicant, and if the applicant wishes, it may respond to the observation in its response to the RSI to avoid the need for an RAI on the question during the staff’s detailed technical review.

## **ADMINISTRATIVE**

O-1. The information contained in previous applications, statements, or reports filed with the Commission may be incorporated by reference provided that these references are

clear and specific. Provide in the appropriate sections of the SAR, a summary of all documents submitted to the Commission in other applications that are incorporated in whole or in part that support this requested licensing action (RLA).

For example, in the General Information section of "Supplement I.1: General Description of 24PT1-DSC Canister," it is stated: "Since the 24PT1-DSC canister has already been approved by the NRC for storage under Part 72, (and is presently in active use) under Docket No. 72-1029, much of the safety analysis information is incorporated herein by reference to the NUHOMS FSAR." This statement is not specific and not exactly clear.

This information is needed to evaluate compliance with 10 CFR 72.230(a).

- O-2. Format citations in the reference sections according to a style rule consistent with either "The Elements of Style" by Strunk & White, the Modern Language Association's (MLA) Style Manual and Guide to Scholarly Publishing, the publicly available, NUREG-1379, "NRC Editorial Style Guide" (ML093280744), or equivalent.

Citations directs the reader to the source the writer(s) used. So, the reference list should have reference entries that allows the reader to find the original source a writer used. No specific style rule has been adhered to throughout the entire RLA submittal. For example, in the "Reference" section of "Supplement I.1: General Description of 24PT1-DSC Canister," the following citation is both incomplete and incorrectly formatted.

"[I.1.2.3] HI-STORM FW FSAR, HI-2114830, latest revision"

This information is needed to evaluate compliance with 10 CFR 72.230(a).

- O-3. Certain or specific portions of the engineering drawings may be categorized as proprietary. However, should any drawings be relied on as the technical basis for adding the dry storage system (DSS) design to the list of approved DSSs contained in Subpart K of 10 CFR Part 72, those drawings become part of the public record. Such drawings will not be treated as proprietary and will be made available to the public.

Currently, the amendment request includes proprietary drawings and descriptions that will remain proprietary upon approval of the certificate, the sketches, drawings, and diagrams that provide the general description and operational features need not show the proprietary features. This may be achieved by depicting less detail or by illustrating generic components that fulfill the design function. However, these representations should show the operational concept and features important to safety in sufficient detail to form an acceptable basis for public review and comment.

This information is needed to evaluate compliance with 10 CFR 72.230(a).

- O-4. Please provide the steps to unload a 24PT1-DSC that have been provided in the applicable NUHOMS FSAR rather than the HI-STORM FW FSAR.

Page 9-18 of the SAR states that "[t]he regulatory compliance justifications and conclusions described in Section 9.5 apply to this Supplement, with the following exception: The steps to unload a 24PT1-DSC have been provided in the NUHOMS

FSAR rather than the HI-STORM FW FSAR.” However, a specific NUHOMS FSAR reference was not provided so that this information is clearly incorporated by reference into the licensing basis.

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

- O-5. Please provide Section 8.2.1 of the Standardized Advanced NUHOMS FSAR which states the steps necessary to remove the DSC from the AHSM.

Page 9-6 of the SAR states in Step 5 to “[r]etrieve the 24PT1-DSC canister from the AHSM into the NUHOMS transfer cask per Section 8.2.1 of the Standardized Advanced NUHOMS FSAR.” However, a specific reference to the Standardized Advanced NUHOMS FSAR was not provided so that the staff can verify the adequacy and compatibility of the operating procedures of the two SARs being used together.

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

- O-6. Clarify (provide) the basis and evaluation as to why the requirement for and of a fuel removal procedure are not provided in the HI-STORM UMAX Technical Specifications (TS) as they are in Section 5.1 of the Standardized Advanced NUHOMS Technical Specifications.

Page 5-1 of the Standardized Advanced NUHOMS TS states the requirement for a fuel removal procedure and then lists, at a minimum, what it shall include. However, the HI-STORM UMAX TS provided in this application do not contain similar requirements to ensure the same level of rigor and protection of personnel is provided in the fuel removal procedure.

This information is needed to determine compliance with 10 CFR 72.234(f).

- O-7. Clarify (provide) the basis as to why the requirement for inspection of the DSC after any transfer cask drop of 15 inches or greater is not provided in the HI-STORM UMAX TS as it is in Section 5.3.2 of the Standardized Advanced NUHOMS TS.

Pages 5-8 and 5-9 of the Standardized Advanced NUHOMS TS state the requirement for DSC inspection after a transfer cask drop of 15 inches or greater to ensure it will continue to provide confinement and the transfer cask can continue to perform its design function. However, the HI-STORM UMAX TS provided in this application does not contain a similar requirement to ensure the DSC can continue to perform its safety function in the unlikely case it is dropped during Transport Operations.

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

- O-8. Please clarify the number of hours cited in the TS for the Completion Time of LCO 3.1.1.C.2.2.

The TS LCO states 64 hours for the completion time, however, page I.13.A-15 of the SAR states, in part, for Required Action C.2.2, “[t]he Completion Time of 24 hours reflects the Completion Time from Required Action C.2.1 to ensure component temperatures remain below their short-term temperature limits for the respective decay heat loads.” Please clarify/verify this value throughout the SAR and TS.

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

### **SHIELDING**

No observations for this discipline.

### **STRUCTURAL**

- O-9. Provide a standalone licensing drawing that incorporates UMAX drawing 10017 along with the items referenced in Note 1 of Sheet 1 of drawing 10576.

Note 1 of the Additional notes section on Sheet 1 of drawing 10576 indicates that UMAX drawing 10017 should be coordinated with certain features specific to the 24PT1 DSC shown on Sheet 1 of drawing 10576. To eliminate confusion in the review by technical staff and inspectors, a separate licensing drawing or detail should be provided incorporating the two drawings rather than having to guess at what Sheet 1 of drawing 10576 should be like with a different pedestal, closure lid restrain block assembly, shield ring, upper MPC guides etc.

This information is needed to determine compliance with 10 CFR 72.146(a) and 10 CFR 72.160.

### **THERMAL**

- O-10. State the reasons why the k- $\omega$  turbulent model adequately captures the heat transfer and flow characteristics of the VVM cooling passages.

Section I.4.4.2 of the SAR states that "*the airflow through the cooling passages of the VVM is modeled as turbulent, using the k- $\omega$  model with transitional option.*" The applicant needs to clearly state the reasons why the selected turbulence model adequately capture the heat transfer and flow characteristics for such low decay heat and air flow velocities. The staff needs this information to verify heat transfer and air flow characteristics are realistic or conservative.

This information is necessary to verify the requirements of 10 CFR 72.230(a) and 10 CFR 72.236.