



**UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
WASHINGTON, D.C. 20555-0001**

February 13, 2019

Ms. Joyce Tomlinson  
Adjunct Licensing Manager  
Holtec International  
Holtec Technology Campus  
1 Holtec Blvd.  
Camden, NJ 08104

**SUBJECT: ACCEPTANCE REVIEW OF REQUEST FOR AMENDMENT NO. 5 TO  
CERTIFICATE OF COMPLIANCE NO. 1032 FOR THE HI-STORM  
FLOOD/WIND CASK SYSTEM (DOCKET NO. 72-1032, CAC NO. 001028,  
EPID: L-2018-LLA-0031) – REQUEST FOR SUPPLEMENTAL INFORMATION**

Dear Ms. Tomlinson:

By letter dated June 15, 2018, Holtec International (Holtec) resubmitted to the U.S. Nuclear Regulatory Commission an application for Certificate of Compliance No. 1032, Amendment No. 5, for the HI-STORM Flood/Wind Multipurpose Canister Storage System, and modified on September 20, 2018. This resubmittal completely supersedes any previous Amendment No. 5 submittals.

The staff has performed an acceptance review of your application to determine if the application contains sufficient technical information to begin a detailed technical review. The staff has determined that the application does not provide sufficient technical information to begin a detailed review and that supplemental information is needed. The information needed to continue our review is described in the enclosed request for supplemental information (RSI).

In order to schedule our technical review, responses to the enclosed RSI should be provided within 30 days from the date of this letter. If Holtec is unable to meet this response date, please notify us, at least one week prior to the due date, of your new submittal date and the reasons for the delay. If Holtec is not able to respond within this timeframe or the RSI responses do not provide sufficient information, the application may not be accepted for review.

Your September 20, 2018, letter, removed the change identified as the proposed change #9 in the June 15, 2018, application. The changed pages associated with the removal of the proposed change #9 should be included with your response to the RSI.

Please reference Docket No. 72-1032, CAC No. 001208, and EPID: L-2018-LLA-0031 in future correspondence related to this licensing action. If you have any questions, please contact me at (301) 415-1018.

Sincerely,

**/RA/**

Yen-Ju Chen, Sr. Project Manager  
Spent Fuel Licensing Branch  
Division of Spent Fuel Management  
Office of Nuclear Material Safety  
and Safeguards

DOCKET No.: 72-1032  
CAC No.: 001208  
EPID: L-2017-LLA-0031

Enclosure: RSI

SUBJECT: ACCEPTANCE REVIEW OF REQUEST FOR AMENDMENT NO. 5 TO  
CERTIFICATE OF COMPLIANCE NO. 1032 FOR THE HI-STORM FLOOD/WIND CASK  
SYSTEM (DOCKET NO. 72-1032, CAC NO. 001028, EPID: L-2018-LLA-0031) – REQUEST  
FOR SUPPLEMENTAL INFORMATION, DATE: February 13, 2019

**ADAMS No.: ML19046A064**

\*concur via email

<b>OFC:</b>	DSFM	DSFM	DSFM	DSFM	DSFM
<b>NAME:</b>	YChen	WWheatley*	JSolis*	VWilson*	DDunn*
<b>DATE:</b>	9/26/2018	9/26/2018	10/15/2018	9/28/2018	9/28/2018
<b>OFC:</b>	DSFM	DSFM	DSFM	DSFM	
<b>NAME:</b>	YDiaz-Sanabria*	MRahimi*	TTate*	JMcKirgan	
<b>DATE:</b>	10/16/2018	10/24/2018	2/13/2019	2/13/2019	

**OFFICIAL RECORD COPY**

## **Request for Supplemental Information**

### **Docket No. 72-1032 Certificate of Compliance No. 1032 Amendment No. 5 to the HI-STORM Flood/Wind Multipurpose Canister Storage System**

By letter dated June 15, 2018, Holtec International (Holtec) resubmitted to the U.S. Nuclear Regulatory Commission (NRC) an application for Certificate of Compliance (CoC) No. 1032, Amendment No. 5, for the HI-STORM Flood/Wind (FW) Multipurpose Canister Storage System. Holtec modified the application on September 20, 2018. This resubmittal completely supersedes any previous Amendment No. 5 submittals.

The staff has performed an acceptance review of the application and determined that the application does not provide sufficient technical information to begin a detailed review. The information needed to continue staff's review is provided in the request for supplemental information (RSI) below.

#### **Thermal RSI**

- 4-1** Provide all supporting thermal analysis for any new or revised thermal evaluation provided in the amendment request.

The application includes addition of new heat load patterns for MPC-37 and MPC-89. However, the applicant did not provide the supporting thermal analysis input and output files for the new or revised thermal evaluations during storage and transient operations. Section 4.5.4.1 of NUREG-1536 states that any model used in the thermal evaluation should be clearly described. Section 4.5.4.7 of NUREG 1536 states that the application should be reviewed to ensure that the applicant made the correct assumptions and provided the correct input, and that the output is consistent with established physical (thermal) behavior. The staff needs the information to determine the adequacy of the thermal analysis and to determine applicable thermal limits are not exceeded.

The staff needs this information to verify the requirements of 10 CFR 72.236(g), (l), and (m).

#### **Shielding RSI**

- 6-1** Verify whether the combinations of burnup, initial enrichment, and cooling time (BECT) used to determine source terms for the new decay heat patterns represent bounding source terms. Otherwise, provide a list of BECTs to ensure that the source terms from these new contents are within the design limits.

The application did not include proposed updates to BECT within the TS and the staff cannot determine the BECT of the intended contents. In addition, the staff cannot determine BECT used by the applicant to develop radiological source terms. Page 5-7

Enclosure

of the Safety Analysis Report (SAR) states: "The range of burnups and cooling times conservatively exceeds that permitted for the fuel being loaded." However, the proceeding information does not state exactly which specific BECT combinations were used in developing radiological source terms. The SAR further includes some source term information in Tables 5.2.2 through 5.2.5, 5.2.7 through 5.2.14, 5.2.17 and 5.2.18. However, many of these tables are listed as "selected" and it is not clear whether these source terms are bounding. Table 5.2.18 has BECT for patterns 89B1 and 89B2; however, this information is not reflected in the proposed TS as allowable contents and this BECT information is missing for the other proposed loading patterns: 37C1, 37C2, 37C3, 37D1, 37D2, 37D3, 37E1, 37E2, 37E3, 89A1, and 89A2.

It is important to note that the recommendations published in NUREG/CR-6716 are based on a balanced evaluation of parameters important to safety while alleviating limitations in the TS to provide the CoC holders flexibility to make design changes under the provisions in 10 CFR 72.48.

The staff needs this information to determine if the requested new contents meets the regulatory requirements of 10 CFR 72.236(d).

- 6-2** Provide specifications for the damaged fuel and fuel debris to include the quantity limit, the geometric form, and how the fuel is confined and discuss how it is modeled within the shielding evaluation and justify that it is bounded.

The proposed HI-STORM FW amendment contains new loading patterns that include damaged fuel and fuel debris. The staff needs this information to evaluate the adequacy of the shielding analyses for casks with these loading patterns because damaged fuel and fuel debris may reconfigure under normal, off-normal, and accident conditions

Section 6.5.3.1 of NUREG-1536 states: *"If the applicant has requested storage of damaged fuel assemblies, ensure that the applicant has adequately described the proposed damage assemblies. If the fuel assemblies are damaged to the extent that reconfiguration of the fuel into a geometry different from intact fuel assemblies can occur, ensure that the applicant provides appropriate [d]ose assessments for normal, off-normal and accident conditions."*

The staff needs this information to evaluate the capability of the cask system to meet dose limits in 10 CFR 72.104 and 106 as required by 10 CFR 72.236(d).

## **Materials RSI**

- 8-1** Provide the following information for the damaged fuel isolators (DFI) described in SAR Section 1.2.3 and shown in Figure 1.2.9:

1. Provide engineering drawings that include tolerances, materials of construction, and the safety category for this component. Include information to describe how the DFI allow water to drain from the basket cells which are equipped with DFI. The description of the DFI provided in SAR Section 2.1.3, Damaged SNF and Fuel Debris

Specifications, states, “[t]he DFI is made of corrosion resistant alloy steel and includes mesh screens or perforated plates at the top and bottom.” The statement is insufficient to conduct a safety review and make a finding.

2. Clarify what type of damaged fuel assemblies may be stored in the MPC basket using DFI. SAR Section 2.1.3, Damaged SNF and Fuel Debris Specifications, states, “[f]or damaged fuel assemblies that can be handled by normal means, the use of a Damaged Fuel Isolator (DFI) (Figure 2.1.7) can be substituted for the use of the DFC.” However SAR Section 9.2.2, Preparation of HI-TRAC VW and MPC, Step 15 states, “[i]f used, the DFC or DFI can be installed in those cells where damaged fuel or fuel debris will be positioned.” The description in SAR Section 9.2.2 implies that the DFI may be used to store fuel debris that cannot be handled by normal means.
3. Explain how the DFI used for the storage of damaged fuel that undergoes geometric rearrangement will not lead to operational safety issues during loading or unloading operations. In the amendment TS, a damaged fuel assembly is defined as an assembly “whose structural integrity has been impaired such that geometric rearrangement of fuel or gross failure of the cladding is expected based on engineering evaluations.” It appears that a damaged fuel assembly may produce fuel debris during normal and off-normal conditions of storage. The TS indicate that fuel debris cannot be handled by normal means.
4. Provide the procedures that describe the loading and unloading steps for the damaged fuel assemblies using DFI. Based on a review of CoCs with similar components, the procedures for removing damaged or fuel debris require additional steps that are not included in HI-STORM FW SAR, Revision 6E, Section 9.4.4, MPC Unloading, which refers to “applicable site procedures.” Address, as necessary, the testing of fission gases, radiation dose rates and ALARA practices, removal of top and bottom end caps, and the recovery of damaged fuel which may produce fuel debris that cannot be handled by normal means.

The staff needs this information to assure compliance with 10 CFR 72.236(a), (b), (c), (d), (f), (g), (h), and (m).

- 8-2** Provide TS and Bases for the vent monitoring of the HI-TRAC VW Version V and V2. HI-STORM FW SAR, Revision 6E, Section 9.2.4, MPC Closure, includes a warning which states, “A HI-TRAC VW Version V or V2 containing an MPC loaded with spent fuel assemblies shall NOT be left unattended to insure that blockage of the air flow paths does not occur.” Likewise, SAR Revision 6E, Section 9.4.2, HI-STORM FW Recovery from Storage, includes a warning which states, “A HI-TRAC VW Version V or V2 containing an MPC loaded with spent fuel assemblies shall NOT be left unattended when the MPC does not contain water.” These warnings do not specify the frequency of vent inspections and imply that the vents must be continuously monitored. In addition, such surveillance requirement, including required actions, should be included in TS.

The staff needs this information to assure compliance with 10 CFR 72.236(a), (b), and (f).

### **Radiation Protection RSI**

- 11-1** Provide revised estimated doses to workers and the public from the HI-TRAC VW version V2.

The procedures for loading the HI-TRAC VW version V2 are significantly different from the HI-TRAC VW, and the estimated dose rates for the dry MPC with neutron shield cylinder part of the process in Table 5.1.10 of the SAR are significantly higher than that of the HI-TRAC VW. The estimates to the doses received to personnel for loading, surveillance, and maintenance in Chapter 11, "Radiation Protection" need to be updated to reflect the HI-TRAC VW version V2 loading procedures and estimated doses to workers as well as that to individuals at or beyond the controlled area.

Section 11.5.2, "Occupational Exposures," of NUREG-1536 states: *"The reviewer should verify that the applicant presents the rationale used to justify the bases for various exposure times, personnel locations relative to the casks (including hot spots), number of personnel required, and appropriate gamma and neutron dose rates. In addition, the reviewer should verify that the calculated doses are consistent with these estimates."* Section 11.5.3, "Exposures at or Beyond the Controlled Area Boundary" states: *"As required by 10 CFR 72.236(d), the application must demonstrate that the shielding and confinement features of the cask are sufficient to meet the requirements for real individuals in 10 CFR 72.104, and for DBA conditions in 10 CFR 72.106."*

The staff needs the information to (1) evaluate the capability of the cask system to control and limit occupational exposures within the limits in 10 CFR Part 20 and to meet the objective of maintaining exposures ALARA, (2) evaluate the capability of the cask system to meet dose limits in 10 CFR 71.104 and 106, and (3) evaluate compliance with 10 CFR 72.236(d).

### **OBSERVATIONS**

**OBS 8-1** Table 1.2.5. Typo on specific gravity and density units. Closed parentheses are superscripted.

**OBS 8-2.** Table 1.2.10. Long fuel dimensions has no upper limit. There is a maximum limit based on the overall dimensions of the MPC. Provide the upper limit for the long fuel

**OBS 8-3** SAR Section 1.A.2. Typo on the first line in this section.

**OBS 8-4** SAR Section 10.1.3. Typo in 3<sup>rd</sup> paragraph, 5<sup>th</sup> sentence starting with *"The procedures shall ensure..."* The term "mix rations" should be "mix ratios."

**OBS 8-5** SAR Section 10.1.6 Shielding Integrity - Holtite: The last sentence states: “*Also, see Subsection 10.1.3 for concrete material testing requirements.*” It is unclear why this sentence is needed in the description for Holtite which immediately follows the description for Concrete.