



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

May 14, 2019

Ms. Kimberly Manzione  
Licensing Manager  
Holtec International  
Holtec Technology Campus  
One Holtec Boulevard  
Camden, NJ 08104

SUBJECT: REQUEST FOR SUPPLEMENTAL INFORMATION FOR ACCEPTANCE REVIEW OF THE APPLICATION FOR RENEWAL OF THE CERTIFICATE OF COMPLIANCE NO. 1008 FOR THE HI-STAR 100 STORAGE CASK SYSTEM (CAC/EPID NOS. 001028/L-2018-RNW-0030)

Dear Ms. Manzione:

By letter dated December 7, 2018, Holtec International (Holtec) submitted to the U.S. Nuclear Regulatory Commission (NRC) an application for renewal of the Certificate of Compliance (CoC) No. 1008 for the HI-STAR 100 Storage Cask System (Agencywide Documents Access and Management System (ADAMS) Accession No. ML18345A178). The submittal of the CoC renewal application was timely per the requirements of Title 10 of the *Code of Federal Regulations* (10 CFR) 72.240(b). In an email dated, March 26, 2019, I informed you of the start of the NRC staff's acceptance review of the application (ADAMS Accession No. ML19086A135).

The purpose of this letter is to provide the results of the NRC staff's acceptance review. The NRC staff has reviewed the application and concluded that it did not provide technical information in sufficient detail to enable the NRC staff to begin a detailed technical review. The NRC staff has determined that we need the information identified in the enclosed request for supplemental information (RSI). The enclosure also includes observations. Observations are questions identified by the NRC staff during the acceptance review, which do not rise to the level of an RSI that needs to be resolved before the renewal application could be accepted for review, but may require the NRC staff to issue a request for additional information (RAI) during the detailed technical review. Holtec may respond to the observations in its response to the RSIs to avoid the need for a RAI during the NRC staff's detailed technical review.

In order to schedule our technical review, responses to the enclosed RSIs should be provided by June 28, 2019. Inform us at your earliest convenience, but no later than June 14, 2019, if you are not able to provide the information by that date. To assist us in rescheduling your review, you should include a new proposed submittal date and the reasons for the delay.

In addition, the NRC staff wishes to complete its proprietary review, per 10 CFR 2.390, of the information in the application that was requested by Holtec to be withheld from public disclosure as proprietary information. Per our previous discussion, you noted that Holtec may wish to provide additional information or clarification on the basis for Holtec's request for withholding (ADAMS Accession No. ML19094A740). Please let me know if there is any additional

information you would like the NRC staff to consider in its review; otherwise, we will proceed with our proprietary review and determination.

Please reference Docket No. 72-1008 and CAC/EPID Nos. 001028/L-2018-RNW-0030 in future correspondence related to this request. If you have any questions regarding this matter, please contact me at (301) 415-7116 or [Kristina.Banovac@nrc.gov](mailto:Kristina.Banovac@nrc.gov).

Sincerely,

***/RA/***

Kristina L. Banovac, Project Manager  
Renewals and Materials Branch  
Division of Spent Fuel Management  
Office of Nuclear Material Safety  
and Safeguards

Docket No.: 72-1008  
CAC/EPID Nos.: 001028/L-2018-RNW-0030

Enclosure:  
RSI and Observations

SUBJECT: REQUEST FOR SUPPLEMENTAL INFORMATION FOR ACCEPTANCE  
 REVIEW OF THE APPLICATION FOR RENEWAL OF THE CERTIFICATE OF  
 COMPLIANCE NO. 1008 FOR THE HI-STAR 100 STORAGE CASK SYSTEM  
 (CAC/EPID NOS. 001028/L-2018-RNW-0030), DOCUMENT  
 DATE: May 14, 2019

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<b>DATE</b>	5/ 7 /19	5/ 14 /19		

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Request for Supplemental Information and Observations  
Holtec International  
Docket No. 72-1008  
Certificate of Compliance Renewal

By letter dated December 7, 2018, Holtec International (Holtec) submitted to the U.S. Nuclear Regulatory Commission (NRC) an application for renewal of the Certificate of Compliance No. 1008 for the HI-STAR 100 Storage Cask System (Agencywide Documents Access and Management System (ADAMS) Accession No. ML18345A178). This request for supplemental information (RSI) identifies information needed by the NRC staff to complete its acceptance review of the renewal application. NUREG-1927, Revision 1, "Standard Review Plan for Renewal of Specific Licenses and Certificates of Compliance for Dry Storage of Spent Nuclear Fuel" (ADAMS Accession No. ML16179A148) and Spent Fuel Storage and Transportation Office Instruction – 14 (SFST – 14), "Acceptance Review Process" (ADAMS Accession No. ML101130519) were used by the staff in its review of the application.

Each individual RSI describes information needed by the NRC staff to begin a detailed review of the application and to determine whether the applicant has demonstrated compliance with the regulatory requirements. Observations are also provided. The observations are questions identified by the NRC staff during the acceptance review, which do not rise to the level of an RSI that needs to be resolved before the renewal application could be accepted for review, but may require the NRC staff to issue a request for additional information (RAI) during the detailed technical review. Holtec may respond to the observations in its response to the RSIs to avoid the need for a RAI during the NRC staff's detailed technical review.

**RSI-1.** Update all time-dependent aging analyses in the HI-STAR 100 Cask System Final Safety Analysis Report (FSAR) to demonstrate that intended functions will be maintained during the proposed 20- to 60-year period of extended operation.

The following analyses in the FSAR address time-dependent aging effects:

- FSAR Section 3.1.2.4 concludes that fatigue failure is not a concern for the HI-STAR 100 System.
- FSAR Section 3.4.11 states that the MPC is not subject to fatigue with respect to a 40-year service life and that the integrity of the spent fuel cladding is assured throughout a 40-year service life by maintaining an inert helium environment in accordance with the leak tightness requirements of the Technical Specifications.
- FSAR Section 4.3 analyzes fuel cladding integrity over a 40-year dry storage period, considering the effects of creep and diffusion-controlled cavity growth.
- FSAR Section 6.3.2 evaluates neutron absorber boron depletion and its effect on criticality control over 50 years.

The staff notes that the analyses above would typically be considered time-limited aging analysis (TLAAs) in accordance with 10 CFR 72.3 and 72.240(c)(2). However, only boron depletion was addressed in the application as a TLAA (although FSAR Section 6.3.2 was not updated to reflect that TLAA).

Enclosure

It is unclear to the staff why the remaining analysis were not addressed as TLAAs in the application. Regarding fatigue, the staff notes that American Society of Mechanical Engineers Boiler and Pressure Vessel Code (ASME BPVC) criteria for the design of the multi-purpose canister (MPC) confinement boundary, fuel basket, and overpack helium retention boundary included an evaluation of fatigue per ASME BPVC Section III, NB and NG-3222.4.

This information is required to demonstrate compliance with 10 CFR 72.240(c)(2).

**RSI-2.** Demonstrate that hardening of the concrete pad will not cause cask decelerations in a tip-over event that exceed the 60 g limit defined in FSAR Section 2.2.3.2.

FSAR Section 2.2.3.2 provides an analysis of the postulated cask tip-over event. The analysis uses values of concrete compressive strength at 28-days after placement.

Concrete testing data shows that the compressive strength of concrete increases significantly over time (Refs. 1 and 2). It is unclear to the staff whether the 60 g deceleration limit in the FSAR will be exceeded due to concrete hardening over the renewed storage period. The staff notes that the issue of concrete hardening and its effect on tip-over decelerations was previously addressed for the HI-STORM 100 storage system at a general licensee's facility (Ref. 3).

This information is required to demonstrate compliance with 10 CFR 72.236(b),(c),(d), and (l); 10 CFR 72.240(c).

### References

1. G. Washa, J. Saemann, and S. Cramer, "Fifty-Year Properties of Concrete Made in 1937," ACI Materials Journal, Technical Paper, Title no. 86-M31. July-August 1989, pp. 367-371.
2. NUREG/CR-6424; ORNL/TM-13148, "Report on Aging of Nuclear Power Plant Reinforced Concrete Structures," Prepared for the U.S. Nuclear Regulatory Commission by D. Naus and C. Oland (Oak Ridge National Laboratory) and B. Ellingwood (Johns Hopkins University), March 1996. [page 80]
3. NRC Inspection Report 05000397/2012008 and 07200035/2012001 for the Columbia Generating Station. ADAMS Accession No. ML12236A395. August 24, 2012.

### Observations

**Observation 1.** Update the time-dependent nuclide quantity and helium loss analyses in the FSAR, as necessary, to demonstrate compliance with 10 CFR Part 72 requirements for the proposed 20- to 60-year period of extended operation.

The FSAR contains the following time-dependent analyses that do not address the proposed 60-year storage term:

- FSAR Section 2.4 provides the quantities of major nuclides in an evaluation of decommissioning considerations. Those quantities are based on irradiation over a 40-year storage period.

- FSAR Appendix 12B, “Comment Resolution Letters for the Review of the HI-STAR 100 Spent Fuel Storage Cask System,” letter dated August 12, 1998, contains an evaluation of helium loss from the MPC cavity and its effect on heat transfer over a 20-year time frame.

The staff notes that updates of these analyses may be needed to demonstrate continuation of the approved design bases through the proposed period of extended operation.

This information is required to demonstrate compliance with 10 CFR 72.236(a),(f),(i), and (m).

**Observation 2.** In the aging management review (AMR), clarify the bases for apparent discrepancies between the identified aging effects/mechanisms and the technical basis document that was stated to be used for conducting the AMR.

Section 3.3.4.4 of the application states that the potential aging effects/mechanisms that were considered for the ISFSI pad were based on Draft NUREG-2214, “Managing Aging Processes in Storage (MAPS) Report.” However, the application does not mention several credible aging effect/mechanism combinations identified in NUREG-2214 Table 4-24, “Concrete Pad.” Examples include, but are not necessarily limited to:

- Cracking due to differential settlement
- Cracking, loss of strength, loss of material, and reduction in concrete pH due to aggressive chemical attack
- Loss of material due to salt scaling
- Loss of strength, loss of material, increase in porosity and permeability, and reduction in concrete pH due to microbiologically influenced corrosion
- Loss of concrete/steel bond, loss of material, cracking, and loss of strength due to corrosion of the reinforcing steel.

The application does not discuss the discrepancies with the cited technical basis document, and the basis for the omission of these aging effects/mechanisms is unclear.

NUREG-1927 Section 3.4.1.2 recommends that renewal applications provide the analyses used for identifying aging mechanisms and effects. The staff notes that such analyses provide clarity on the technical bases for the AMR conclusions, resulting in a more efficient application review.

This information is required to demonstrate compliance with 10 CFR 72.240.

**Observation 3.** Clarify whether the subcomponents with a safety class of “NITS” (not important to safety), listed in Tables 2.1-2, 2.1-3, and 2.1-4 of the application, are considered within the scope of renewal.

Tables 2.1-2, 2.1-3, and 2.1-4 provide a list of subcomponents for the MPC enclosure vessel, MPC basket, and HI-STAR 100 overpack, respectively. Some subcomponents are listed with a “NITS” safety class in the tables. However, it appears that some of these NITS subcomponents

are included in the AMR. It is unclear whether the listed NITS subcomponents are considered to be within the scope of the renewal.

This information is required to demonstrate compliance with 10 CFR 72.240.

**Observation 4.** Clarify which components were excluded from the AMR because their condition is already monitored, and justify that the monitoring activities are sufficient to address all potential aging effects for those components.

Section 3.2.1 states that components that already have their condition monitored were excluded from further reevaluation in the AMR. The staff notes that the existence of ongoing monitoring or inspection activities is typically not considered a basis for excluding a component from the AMR, per the recommendations of NUREG-1927. The staff also notes that ongoing activities may be credited in aging management programs, but those activities should be demonstrated to adequately manage all potential aging effects for the covered components (e.g., via the AMR).

This information is required to demonstrate compliance with 10 CFR 72.240.