



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

May 24, 2016

Ms. Kimberly Manzione
Licensing Manager
Holtec International
Holtec Center
One Holtec Drive
Marlton, NJ 08053

**SUBJECT: AMENDMENT NO. 3 TO CERTIFICATE OF COMPLIANCE NO. 1032 FOR THE
HI-STORM FLOOD/WIND MULTIPURPOSE CANISTER STORAGE SYSTEM –
REQUEST FOR ADDITIONAL INFORMATION**

Dear Ms. Manzione:

By letter dated December 18, 2015 (Agencywide Document Access and Management System (ADAMS) Accession No. ML15364A561), as modified on April 22, 2016 (ADAMS Accession No. ML16113A398), Holtec International (Holtec) submitted an amendment request to the U.S. Nuclear Regulatory Commission for the HI-STORM Flood/Wind Multipurpose Canister (MPC) Storage System Certificate of Compliance (CoC) No. 1032.

The NRC staff has reviewed your application and determined the need for the request for additional information (RAI) as provided in the enclosure to this letter. We request that you provide the information by June 22, 2016. Please inform us in writing at your earliest convenience, but no later than June 15, 2016, if you are not able to provide the information by the requested date. You should also include a new proposed submittal date and the reasons for the delay to assist us in rescheduling your review.

Please reference Docket No. 72-1032 and CAC No. L25076 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.: L25076

Enclosure:
HI-STORM 100 FW Amendment 3 RAI

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Enclosure:
HI-STORM 100 FW Amendment 3 RAI

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Request for Additional Information
Docket No. 72-1032
Holtec International
HI-STORM 100 Flood/Wind
Multipurpose Canister Storage System
Certificate of Compliance No. 1032
Amendment No. 3

By letter dated December 18, 2015 (Agencywide Document Access and Management System (ADAMS) Accession No. ML15364A561), as modified on April 22, 2016 (ADAMS Accession No. ML16113A398), Holtec International (Holtec) submitted an amendment request to the U.S. Nuclear Regulatory Commission for the HI-STORM Flood/Wind Multipurpose Canister (MPC) Storage System Certificate of Compliance (CoC) No. 1032. The proposed changes include the inclusion of burnup credit for the MPC-37 and revision of Condition 8. This request for additional information (RAI) identifies information needed by the U.S. Nuclear Regulatory Commission staff (the staff) in connection with its review of the application. The requested information is listed by chapter number and title in the applicant's safety analysis report (SAR). NUREG-1536, "Standard Review Plan for Spent Fuel Dry Storage Systems at a General License Facility — Final Report," was used by the staff in its review of the application.

Each question describes information needed by the staff to complete its review of the application and to determine whether the applicant has demonstrated compliance with regulatory requirements.

Chapter 6

- 6-1 Update the SAR with descriptions, reasons and the associated criticality analysis for the Technical Specification, and FSAR changed pages, for the change from 1500 to 1600 ppm boron concentration for undamaged 14x14 and 16x16 assemblies with maximum initial enrichment of 5.0% U-235.

In a prior amendment, a description and analysis for increasing boron concentration for only intact 16x16A assemblies within DFCs with maximum initial enrichment of 5.0% U-235 was provided. Descriptions and reasons for increases to the minimum boron concentration for all 16x16 and 14x14 assemblies need to be provided in this amendment in addition to the analysis for 14x14 and 16x16B and 16x16C assemblies.

The staff needs this information to determine that the applicant has met the criticality safety regulations in 10 CFR 72.236(c).

- 6-2 Justify the use of the 15x15H, 15x15B, 16x16A as representative assemblies for the burnup credit analyses.

In Section 6.I.B.1.1 of the SAR, the applicant states that they use the 15x15H fresh fuel assembly and 15x15B spent fuel assembly to represent all 15x15 and 17x17 fuel assembly classes, and the 16x16A fresh and spent fuel assemblies to represent all 16x16 fuel assembly classes when performing burnup credit evaluations. The staff did not find a justification for using these assemblies as representative. The applicant needs to revise the SAR to include this justification.

- a) Section 6.I.B.4.1 of the SAR states the bounding axial profiles were determined for four sets of assemblies. The applicant needs to revise this section of the SAR to clarify how it uses these groupings to determine that the axial profile for the representative assembly is bounding for all assemblies it is representing.
- b) Similar to part a) of this RAI, the staff does not understand how the applicant uses the assembly groupings in Table 6.I.B.2 to determine the depletion parameters for the limiting assemblies are bounding for all assemblies it is representing. The staff requests that the applicant discuss how this was done.

The staff needs this information to determine that the applicant has met the criticality safety regulations in 10 CFR 72.236(c).

- 6-3 Discuss how assemblies that have been located under a control rod bank that was permitted to be inserted more than 8 inches from the top of the active length during full power operation are excluded from crediting burnup.

Section 6.I.B.2.2.2 of the SAR states: *“Any assemblies that have been located under a control rod bank that was permitted to be inserted more than 8 inches from the top of the active length during full power operation are permitted for storage in the Configuration 2 of MPC-37, specifically in the basket cells intended for the fresh fuel assemblies.”* The staff did not find any restrictions of this nature in the proposed language for revising Appendix B to the Certificate of Compliance. The applicant needs to discuss if this was an oversight or how this restriction is implemented. Alternatively the applicant should justify that this condition does not need to be included.

The staff needs this information to determine that the applicant has met the criticality safety regulations in 10 CFR 72.236(c).

- 6-4 Revise Appendix 6.I.B.2.2 of the SAR to demonstrate that the potential effects of integral burnable absorbers are bounded by the assumed irradiation conditions of the PWR fuel for the burnup credit analysis.

Section 6.I.B.2.2 contains a discussion of integral burnable absorbers, and summarizes NUREG/CR-6760, “Study of the Effect of Integral Burnable Absorbers for PWR Burnup Credit.” This study shows a positive effect of integral burnable absorbers that do not cover the ends of the fuel rods in a PWR fuel assembly. Section 6.I.B.2.2 of the SAR does not address integral burnable absorbers further. NUREG/CR-6760 recommends that PWR burnup credit analyses include either: 1) a small reactivity bias to bound the effect of integral burnable absorber, or 2) demonstration that the effects of integral burnable absorbers are bounded by the effects of other modeling assumptions (e.g., BPR exposure).

The staff needs this information to determine that the applicant has met the criticality safety regulations in 10 CFR 72.236(c).

- 6-5 Provide information on how burnup credit assemblies are restricted to those bounded by the operating parameters in Table 6.I.B.2 of the SAR.

Section 6.I.B.2.1 states: *“Only fuel assemblies bounded by the parameters in Table*

6.I.B.2 are allowable for loading.” The staff did not find any restrictions on core operating parameters within the draft Certificate of Compliance Appendix B. The applicant should discuss if this was an oversight or in what other way burnup credit assemblies are restricted to those bounded by these operating parameters in Table 6.I.B.2. Alternatively the applicant should discuss how the burnup credit assemblies do not need limits for these operating parameters.

The staff needs this information to determine that the applicant has met the criticality safety regulations in 10 CFR 72.236(c).

- 6-6 Revise the isotopic bias determination in Section 6.I.B.3.1.3 to correct the least squares fit and to evaluate trends in the bias as a function of burnup.

This section of the SAR states that the least squares fit of calculated versus measured reactivity differences in Figures 6.I.B.1 and 6.I.B.2 was calculated to intercept 0 delta-k at 0 burnup. This may not be appropriate, as the bias will be non-linear as it nears zero burnup (i.e., will potentially jump significantly from zero burnup to a burnup value that requires isotopic depletion calculations). Additionally, Section 6.I.B.3.1.3 states that the slope of the fit can be shown to be statistically insignificant, but no such demonstration is provided. The bias appears to vary as much as 0.01 over the burnup range from 10 to 60 GWd/MTU, which is significant from a criticality safety perspective.

The staff needs this information to determine that the applicant has met the criticality safety regulations in 10 CFR 72.236(c).

- 6-7 Revise Section 6.I.B.5.1 to justify and clarify the use of a combined loading curve for cooling times greater than 3 years to be used with 16x16 fuel assemblies in the regionalized loading configuration.

This section of the SAR states that the 3 and 7 year cooling time loading curves for 16x16A class fuel assemblies are combined into a single loading curve for a regionalized basket loading applicable for fuel cooled 3 years or more. The applicant needs to provide further details on how the 3 and 7 year cooling time curves were combined and justify that it was done in a conservative way. The applicant needs to update Table 6.I.1.1 with the results of k-eff evaluations to demonstrate that fuel loaded with this curve also meets the criticality safety requirements. The applicant needs to update Figure 6.I.B.8 to show the third loading curve.

The staff needs this information to determine that the applicant has met the criticality safety regulations in 10 CFR 72.236(c).