



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

October 29, 2019

Mr. Luis Hinojosa
Holtec International
1 Holtec Blvd.
Camden, NJ 08104

SUBJECT: REQUEST FOR ADDITIONAL INFORMATION FOR THE REVIEW OF THE
MODEL NUMBER HI-STAR 180 PACKAGE

Dear Mr. Hinojosa:

By letter dated June 21, 2019, Holtec International submitted an application for Certificate of Compliance No. 9325, Revision No. 3, for the Model No. HI-STAR 180 package. The U.S. Nuclear Regulatory Commission staff (the staff) performed an acceptance review of your application and accepted your application for a detailed technical review upon receiving your response (Agencywide Documents Access and Management Accession No. ML19261A163), on September 5, 2019, to our request for supplemental information dated August 7, 2019.

In connection with our technical review, we need the information identified in the enclosure to this letter. We request that you provide this information by January 6, 2020. If you are unable to meet this deadline, you must notify us in writing no later than December 15, 2019, of your new submittal date and the reasons for the delay. The staff will then assess the impact of the new submittal date and notify you of a revised schedule.

Please reference Docket No. 71-9325 and EPID L-2019-LLA-0122 in future correspondence related to this request. If you have any questions regarding this matter, I may be contacted at (301) 415-7505.

Sincerely,

/RA/

Pierre Saverot, Project Manager
Storage and Transportation Licensing Branch
Division of Fuel Management
Office of Nuclear Material Safety
and Safeguards

Docket No. 71-9325
EPID L-2019-LLA-0122

Enclosure: Request for Additional Information

SUBJECT: REQUEST FOR ADDITIONAL INFORMATION FOR THE REVIEW OF THE
MODEL NUMBER HI-STAR 180 PACKAGE

DOCUMENT DATED: October 29, 2019

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Request for Additional Information
Holtec International
Docket No. 71-9325
Model No. HI-STAR 180 Package

By letter dated June 21, 2019, Holtec International submitted an application for Certificate of Compliance No. 9325, Revision No. 3, for the Model No. HI-STAR 180 package.

This request for additional information identifies information needed by the U.S. Nuclear Regulatory Commission staff (the staff) in connection with its review of the Model No. HI-STAR 180 package application to confirm whether the applicant has demonstrated compliance with regulatory requirements.

The requested information is listed by chapter number and title in the package application. NUREG-1617, "Standard Review Plan for Transportation Packages for Spent Nuclear Fuel," was used for this review.

1- GENERAL INFORMATION

- 1-1 Provide the American National Standard Institute (ANSI) N14.5-2014 definition of leaktight on Page G-4 of the application.

On Page G-4 of G-9 of the application, the definition of leaktight does not match the definition of leaktight in ANSI N14.5-2014.

This information is needed to determine compliance with Title 10 of the *Code of Federal Regulations* (10 CFR) 71.51(a)(1) and (2).

2- STRUCTURAL AND MATERIALS EVALUATION

- 2-1 Explain and justify (i) the technical basis for taking an exception to ASME Code Section II for an option not to meet the required Charpy absorbed energy for the dose blocker steels in Table 2.1.10A of the application, (ii) the use of a full-penetration quality factor for the partial-penetration fuel basket friction stir welds and why these welds were reclassified from non-important to safety (NITS) to important to safety (ITS).

The applicant made changes regarding the Fracture Toughness Test Criteria (Dose Blocker Steel Parts, Table 2.1.10A) and removed the requirement for the measurement of the Charpy absorbed energy. Such changes are not consistent with the requirements of ASME B&PV Code Section II. Furthermore, the applicant did not provide any justification for such a change to allow for an option to measure the Charpy lateral expansion in Table 2.1.14, "ASME Code Requirements and Alternatives for the HI-STAR 180 Package."

In addition, while the staff has approved full penetration for Friction Stir Welds (FSW), the applicant is now using welds that provide less than a full penetration. The reasons for the change from full-penetration to partial penetration, as well as the possible identification of functions to cause the safety designation to change from NITS to ITS, are unclear for the staff.

Enclosure

The applicant needs to explain the reasons for such changes, as well as provide the proper rationales and detailed justifications of those changes.

This information is needed to determine compliance with 10 CFR 71.31(c).

- 2-2 Clarify the set pressure of the neutron shielding pressure relief devices in the licensing drawings.

Licensing Drawing 4845, "HI-STAR 180 Cask," contains a revision to Note 17 which states that (i) the maximum set pressure of the neutron shielding pressure relief devices is 35 psig, and (ii) the set pressures of the devices will be lower, if needed, to avoid overstressing neutron shielding cover plates. Note 17 provides no indication of how a lower set pressures would be determined.

Calculation 27 of Structural Calculation Package HI-2063552, Rev. 15, shows that the pressure limit for the Holtite enclosure space in the inner closure lid assembly would be overstressed if pressures were allowed to reach 35 psig. The drawing note should more specifically identify the set pressures for the neutron shielding pressure relief devices.

This information is needed to determine compliance with 10 CFR 71.51(a).

- 2-3 Provide, in Licensing Drawing 4845, the material options for the following components: Fuel Impact Attenuator, Outer Closure Lid Access Port Plug Seal, Outer Closure Lid Access Port Cover Seal, Outer Closure Lid Inter-Seal Test Port Plug Seal, Outer Closure Lid Outer Seal, Outer Closure Lid Inner Seal, Inner Closure Lid Inter-Seal Test Port Plug Seal, Inner Closure Lid Outer Seal, and Inner Closure Lid Outer Seal.

These components reference either Drawing Note 41 or Drawing Note 43 in place of listed material options. However, in the latest revision to Licensing Drawing 4845, Drawing Note 43 has been deleted. Also, Drawing Note 41 has been revised to remove the material options and refers solely to an appendix and a table in the application.

These material options need to be explicitly listed in the drawing package. The drawings tie down the design of the packaging and, as such, notes to the drawings are to be explicit and detailed in full.

This information is needed to determine compliance with 10 CFR 71.33.

- 2-4 Clarify the difference between the maximum loaded quiver weight of 375 kg, specified in Table 2.2.14 of the application, and the maximum allowable loaded quiver weight of 500 kg, specified in Table 1.2.3a of the application.

Section 2.7.1, "9-meter Free Drop," states that drop simulations are not needed for inclusion of the Quiver, because the analyzed fuel assemblies have similar weights to the loaded Quiver. It is necessary to clarify the weight of the Quiver that would experience this free drop.

This information is needed to determine compliance with 10 CFR 71.33 and 71.73.

- 2-5 Provide the structural design information for the proposed Quiver damaged fuel container.

Quivers are classified as ITS. Section 2.1.2.2, "Acceptance Criteria," of the application states that the structural design data of the Quiver is summarized in Table 2.2.14, "Structural Capacity Data on the Quiver." Section 2.1.2.2 also states that the loading limits, maximum axial deceleration, and maximum lateral deceleration sustained by the Quiver must remain below the design limits in Table 2.2.14. However, Table 2.2.14 simply lists the heights of the free drop conditions required by 10 CFR 71.71(c)(7) and 71.73(c)(1).

Details of the structural design, including the structural capacity of Quivers, are needed to ensure that the use of Quivers in the HI-STAR 180 Cask System meets the regulatory requirements.

This information is needed to determine compliance with 10 CFR 71.71 and 71.73.

- 2-6 Justify the classification of the FSW, along the length of the exterior corners of HI-STAR 180 fuel baskets, as full penetration corner welds.

Calculation 17, basket weld calculation, of Holtec Report No. HI-2063552, "Calculation Package for the HI-STAR 180 Transportation Cask System," uses a weld quality factor taken from Table NG-3352-1 of the ASME Boiler & Pressure Vessel Code, Section III, Subsection NG. As stated in the calculation, this weld quality factor is associated with Type III full penetration welded joints.

However, these FSWs are not full penetration welds. As noted by the applicant in the report, "Summary of Proposed Changes HI-STAR 180 Transport LAR 9325-3, Revision 0," and Licensing Drawings 4847 and 4848, these FSWs have a weld size less than the basket panel fitness.

Section 2.3.1 of the application states that these welds are "incorporated in the basket's design, included in the structural finite element evaluations, and specified as structural welds in the drawing package." Further justification is needed for classifying the welds as full penetration welds and the use of the associated weld quality factor.

This information is needed to determine compliance with 10 CFR 71.31.

- 2-7 Justify the removal of the weld between the Bottom Ring Forging and the Monolithic Shield Cylinder in Licensing Drawing 4845.

The applicant states in the report, "Summary of Proposed Changes HI-STAR 180 Transport LAR 9325-3, Revision 0," that "sufficient structural support" is provided by a separate weld between the Monolithic Shield Cylinder and the Containment Baseplate.

However, there is no further information to support this statement in any section of the application, any structural calculation report, or in the licensing drawings. Further justification is needed to remove this basket weld from licensing drawing 4845.

This information is needed to determine compliance with 10 CFR 71.31.

- 2-8 Provide the method and confirmation methodology used for sealing the Quiver.

The Quiver is a type of damaged fuel container for individual fuel rods which have been removed from their assemblies. For example, fuel debris are loaded into Quivers. The Quiver maintains its contents (fuel rods) in an inert (helium filled) environment, thus precluding the risk of in-service corrosion of its contents, according to page 1.2-20 of the application.

However, the applicant did not explain or justify how an inert environment is maintained in a Quiver in order to avoid corrosion. The staff needs to review both the methods and confirmation methodologies for sealing a Quiver.

This information is needed to determine compliance with 10 CFR 71.31(b) and 71.31(c).

8- ACCEPTANCE TESTS AND MAINTENANCE

- 8-1 Clarify Sections 8.1.4 and 8.2.2 of the application to specify an American Society for Nondestructive Testing (ASNT) nondestructive testing (NDT) Level III in leak testing.

An ASNT NDT Level III specifically in leak testing, should write and approve the detailed leakage rate testing procedures for each package. Personnel trained to ASNT NDT Level III in leak testing has gained knowledge and experience of complex issues, and can review a leak test procedure to verify the procedure adequately detects leaks to the level intended by the requirements of NRC regulations.

This information is needed to determine compliance with 10 CFR 71.51(a)(1) and (2).

- 8-2 Provide justification for, or alternatively revise the factor of 1.86 in Note 1 of Table 8.1.1 of the application.

Based on Section B.15.13, "Example 13," of ANSI N14.5-2014, for 1.0×10^{-7} ref-cm³/s, air, the equivalent helium leakage rate at the same reference conditions is 1.85×10^{-7} atm-cm³/s, helium, rather than 1.86×10^{-7} atm-cm³/s, helium.

This information is needed to determine compliance with 10 CFR 71.51(a)(1) and (2).

- 8-3 Remove the following two paragraphs from Chapters 7 and 8, respectively, of the application.

"The text matter and data presented in this chapter in bold font (or as otherwise noted) are an integral part of the Certificate of Compliance (CoC) of the package and cannot be altered without NRC's approval through a license amendment. Moreover, essential elements and criteria in Section 7.0 through Section 7.3, essential elements and criteria in Appendix 7.A and the whole of Appendix 7.D have been identified as conditions of the CoC."

"The text matter and data presented in this chapter in bold font (or as otherwise noted) are an integral part of the Certificate of Compliance (CoC) of the package and cannot be altered without NRC's approval through a license amendment. Moreover, essential elements of the acceptance tests in Section 8.1 and of the maintenance program in Section 8.2 have been identified as conditions of the CoC."

The above two paragraphs are inconsistent with Condition 6 of the CoC that states: *"In addition to the requirements of Subpart G of 10 CFR Part 71:*

- (a) The package shall be prepared for shipment and operated in accordance with Chapter 7 of the application.*
- (b) The package shall meet the acceptance tests and be maintained in accordance with Chapter 8 of the application."*

Therefore, based on Condition No. 6 of the CoC, any change to Chapters 7 or 8 of the application necessitates NRC staff's approval.

This information is needed to determine compliance with 10 CFR 71 Subpart G and Condition No. 6 of the CoC.