

October 20, 2000

Mr. Brian Gutherman
Licensing Manager
Holtec International
555 Lincoln Drive West
Marlton, NJ 08053

SUBJECT: PRELIMINARY SAFETY EVALUATION REPORT AND CERTIFICATE
OF COMPLIANCE FOR THE HI-STAR 100 CASK SYSTEM
AMENDMENT 2 (TAC NO. L23150)

Dear Mr. Gutherman:

By application dated August 4, 2000, Holtec International, (Holtec) requested approval of an amendment, under the provisions of 10 CFR Part 72, Subpart K, to the proposed Amendment 1 to the Certificate of Compliance (CoC) for the HI-STAR 100 Cask System.

The Nuclear Regulatory Commission has completed the preliminary review of your application and the staff has prepared a preliminary CoC and Safety Evaluation Report (SER) pursuant to the requirements of 10 CFR Part 72. Enclosed is a preliminary copy of the SER and the affected page of the CoC (Appendix B, page 4) for Holtec's review and identification of inaccuracies and omissions. Holtec is requested to respond with any comments by close of business on November 10, 2000. Please reference Docket No. 72-1008 and TAC No. L23150 in future correspondence related to this request.

The review identified two items that have been discussed with you and corrected in the preliminary CoC and SER. The first item relates to the proposed CoC reference to the Topical Safety Analysis Report (TSAR). To be consistent with a number of 10 CFR Part 72 regulations, including 10 CFR 72.48 and 72.248, Amendment 1 to the HI-STAR CoC, which is currently in the rulemaking process, establishes a Final Safety Analysis Report (FSAR) rather than a TSAR. As a result, in the changes to the CoC we have replaced the requested reference to the TSAR with a reference to the FSAR. Additionally, in the SER we have referred to the proposed TSAR changes as proposed Safety Analysis Report changes. The second item identified relates to the proposed change to CoC, Appendix B, Section 1.4.6. The requested change, as written, could be interpreted to only require an impact analysis for either the design basis drop or the tipover event. Based on the remainder of the amendment request and subsequent conversations, this was not Holtec's intent. We have modified the verbiage in the CoC to clearly state that the impact analysis shall be performed on both the design basis cask drop and tipover event.

Mr. Gutherman

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October 20, 2000

If you have any comment or question concerning this request, please contact me at 301-415-2947.

Sincerely,
/S/ /RA/
Christopher Jackson, Project Manager
Licensing Section
Spent Fuel Project Office
Office of Nuclear Material Safety
and Safeguards

Docket No.: 72-1008

Enclosures: 1. Preliminary SER
2. Preliminary CoC Appendix B page 4

If you have any comment or question concerning this request, please contact me at 301-415-2947.

Sincerely,
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Christopher Jackson, Project Manager
Licensing Section
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Docket No.: 72-1008

- Enclosures: 1. Preliminary SER
- 2. Preliminary CoC Appendix B page 4

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PRELIMINARY SAFETY EVALUATION REPORT

Docket No. 72-1008
HI-STAR 100 CASK SYSTEM
Certificate of Compliance No. 1008
Amendment No. 2

SUMMARY

By application dated August 4, 2000, Holtec International, (Holtec) requested approval of an amendment, under the provisions of 10 CFR Part 72, Subpart K, to the Certificate of Compliance (CoC) for the HI-STAR 100 Cask System. For this amendment, Holtec requested changes to Appendix B of the CoC. Appendix B of the CoC specifies the approved contents and design features for the HI-STAR 100 Cask System. The changes to CoC Appendix B modify the specifications for the cask pad and foundation. The principal design criteria and the allowable cask contents are not being altered with this amendment. All other aspects of the cask design and operation, including the thermal, shielding, criticality, confinement, operating procedures, acceptance tests and maintenance, radiation protection, accident analysis, quality assurance and decommissioning are also unaffected. As a result, this Safety Evaluation Report (SER) only addresses the structural aspects of the cask design and operation.

The HI-STAR 100 Cask System was evaluated against the regulatory standards in 10 CFR Part 72. NRC staff reviewed the application using the guidance in NUREG-1536, "Standard Review Plan for Dry Cask Storage Systems." Based on the statements and representations in the application and the conditions discussed in this SER, the staff concluded that the HI-STAR 100 Cask System meets the requirements of 10 CFR Part 72. The changes to the CoC are indicated by change bars in the margin.

REFERENCES

Holtec International application dated August 4, 2000.

STRUCTURAL

The current CoC requires that all independent spent fuel storage installation (ISFSI) pads be designed to meet a specific set of detailed parameters, including pad thickness, concrete compressive strength, reinforcing bar yield strength, and subgrade modulus of elasticity. Holtec requested that these parameters, which are specified in Section 1.4.6 of Appendix B in the CoC, be removed from the CoC and be replaced by a single requirement. The single requirement is that all ISFSI pads be designed such that all design basis postulated accident cask drop and non-mechanistic tipover events on the pad result in a HI-STAR 100 cask deceleration of less than or equal to 60-g at the top of the fuel basket.

The staff concurs that the 60-g deceleration limit is an appropriate safety limit to be included in the CoC. The 60-g limit is the current HI-STAR 100 Cask System's design basis g-load. As a result, there is reasonable assurance that no structural failure of the cask system will occur after a postulated accident drop or a non-mechanistic tipover event. Removing the detailed

pad parameters from the CoC and leaving the specific ISFSI pad design parameters to the discretion of the cask users allows more flexibility for the cask users to design their ISFSI pads according to their site-specific needs and geological characteristics, while continuing to meet the design basis cask deceleration limit.

In the existing Safety Analysis Report (SAR), the HI-STAR 100 Cask System has been evaluated using the ISFSI pad design parameters presented in Table 2.2.9. With this amendment, Holtec has evaluated the HI-STAR Cask System using an additional set of ISFSI parameters. The second set of ISFSI pad design parameters is also presented in Table 2.2.9 of the proposed SAR changes in the amendment request. Finite element analyses have been performed using the second set of pad design parameters to confirm that the cask drop and tipover events will result in cask decelerations less than or equal to the design basis 60-g limit. Based on these analyses results, additional site-specific cask impact analyses are not needed when the ISFSI pads and subgrade are in compliance with either of the two sets of ISFSI design parameters provided in Table 2.2.9 of the proposed SAR. Although a site-specific impact analysis is not needed if the parameters from SAR Table 2.2.9 are chosen, 10 CFR 72.212(b)(2)(ii) continues to require a structural analysis of the ISFSI pad be performed to ensure that the ISFSI pads are adequately designed for the HI-STAR 100 Cask System and the foundations of ISFSI sites. The ISFSI pad structural analysis should be included in 10 CFR 72.212 evaluations performed by the ISFSI cask user.

In conclusion, the amendment does not change the structural design aspects of the HI-STAR 100 Cask System nor will it affect the ability of the package to meet the requirements of 10 CFR Part 72.

CONDITIONS FOR CASK USE - TECHNICAL SPECIFICATIONS

Certificate of Compliance No. 1008, Appendix B, "APPROVED CONTENTS AND DESIGN FEATURES FOR THE HI-STAR 100 CASK SYSTEM," is being modified with this amendment. Specifically, item 6 in Section 1.4, "Site Specific Parameters and Analyses," is being modified to eliminate the specific requirements associated with concrete thickness, concrete compressive strength, concrete reinforcement, and the effective modulus of elasticity for the soil. The revised CoC replaces the specific parameters with a requirement that the analyzed cask deceleration be limited to 60-g for the design basis cask drop and non-mechanistic tipover event. The revised specification requires the analysis be performed using the methodologies described in the FSAR.

CONCLUSION

The staff reviewed the amendment request and the proposed SAR changes for the HI-STAR 100 Cask System. Based on the statements in the application and representations contained in the proposed SAR changes and the conditions in the CoC, the staff concludes that the HI-STAR 100 Cask System meets the requirements of 10 CFR Part 72.

Issued with Certificate of Compliance No. 1008,
Amendment No. 2, on XXXXX, 2000.

CERTIFICATE OF COMPLIANCE NO. 1008

APPENDIX B

**APPROVED CONTENTS AND DESIGN FEATURES
FOR THE HI-STAR 100 CASK SYSTEM**

AMENDMENT 2

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Table 1-4

Design-Basis Earthquake Input on the Top Surface of an ISFSI Pad

Horizontal g-Level in Each of Two Orthogonal Directions	Horizontal g-Level Vector Sum	Corresponding Vertical g-Level (Upward)
0.222 g	0.314 g	$1.00 \times 0.222 \text{ g} = 0.222 \text{ g}$
0.235 g	0.332 g	$0.75 \times 0.235 \text{ g} = 0.176 \text{ g}$
0.24 g	0.339 g	$0.667 \times 0.24 \text{ g} = 0.160 \text{ g}$
0.25 g	0.354 g	$0.500 \times 0.25 \text{ g} = 0.125 \text{ g}$

4. The analyzed flood condition of 13 fps water velocity and a height of 656 feet of water (full submergence of the loaded cask) are not exceeded.
5. The potential for fire and explosion shall be addressed, based on site-specific considerations. This includes the condition that the on-site transporter fuel tank will contain no more than 50 gallons of combustible transporter fuel.
6. The cask storage pads shall be verified by analysis to limit cask deceleration during both the design basis drop and the non-mechanistic tipover event to $\leq 60\text{-g}$ at the top of the MPC fuel basket. Analyses shall be performed using methodologies consistent with those described in the HI-STAR 100 FSAR.
7. In cases where engineered features (i.e., berms, shield walls) are used to ensure that the requirements of 10 CFR 72.104(a) are met, such features are to be considered important to safety and must be evaluated to determine the applicable Quality Assurance Category.