



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

SAFETY EVALUATION REPORT

DOCKET NO. 72-1032
HOLTEC INTERNATIONAL
HI-STORM 100 FLOOD/WIND (FW)
MULTIPURPOSE CANISTER (MPC) STORAGE SYSTEM
CERTIFICATE OF COMPLIANCE NO. 1032, REVISION NO.1

SUMMARY

By letter dated September 16, 2014, Holtec International (Holtec) submitted revision request No. 1 to the U.S. Nuclear Regulatory Commission (NRC) for the HI-STORM 100 Flood/Wind (FW) Multipurpose Canister (MPC) Storage System, Certificate of Compliance (CoC) No. 1032. The application requested that CoC No. 1032 be changed to:

1. Correct the CoC expiration date (Editorial change)
2. Clarify heat load limits for helium backfill ranges
3. Clarify wording on vent blockage Limiting Conditions of Operations (LCO)
4. Revise vacuum drying system heat loads

This revised CoC, when codified through rulemaking, will be denoted as Revision No. 1, to CoC No. 1032. As a revision, the CoC will supersede the previous version of the CoC and Technical Specifications (TS), effective June 13, 2011, in its entirety. The applicant has requested a revision in lieu of a new amendment utilizing the following justifications.

- No new canisters are being requested to be added to CoC No. 1032.
- No new systems, components or structures (SSCs) are requested to be added to CoC No. 1032.
- The requested changes are minor.
- The requested changes are applicable to CoC No. 1032, in their entirety.

This safety evaluation report (SER) documents the review and evaluation of the proposed revision. The NRC staff (staff) followed the guidance of NUREG-1536, Revision 1, "Standard Review Plan for Dry Cask Storage Systems," Interim Staff Guidance (ISG)-11 "Cladding Considerations for the Transportation and Storage of Spent Fuel," and ISG-21 "Use of Computational Modeling Software" in performing its regulatory evaluation.

The staff's assessment is based on a review of Holtec's application and whether it meets the applicable requirements of 10 CFR Part 72 for independent storage of spent fuel. The staff's assessment focused only on modifications requested in the revision as supported by the

submitted revised final safety analysis report (FSAR) and did not reassess previously approved portions of the FSAR.

1.0 GENERAL DESCRIPTION

The objective of this chapter is to review the design changes made to the HI-STORM FW MPC Storage System to ensure that Holtec has provided a description that is adequate to familiarize reviewers and other interested parties with the pertinent features of the system, including the changes. The specific changes are described and evaluated in later sections of this SER.

1.1 Findings

F1.1 The staff concludes that the information presented in the proposed FSAR pages continues to satisfy the requirements for the general description under 10 CFR Part 72. This finding is reached on the basis of a review that considered the regulation itself, Regulatory Guide 3.61, and accepted practices. The staff concludes that the applicant's information is sufficiently detailed to allow reviewers to familiarize themselves with the pertinent features of the system and the changes requested.

2.0 PRINCIPAL DESIGN CRITERIA EVALUATION

There were no requested changes requiring evaluating the principal design criteria related to the ITS SSCs to ensure compliance with the relevant general criteria established in 10 CFR Part 72.

3.0 STRUCTURAL DESIGN CRITERIA EVALUATION

There were no requested changes requiring evaluating the structural design criteria related to the ITS SSCs to ensure compliance with the relevant general criteria established in 10 CFR Part 72.

4.0 THERMAL EVALUATION

4.1 Summary

The objective of the thermal review is to evaluate the thermal impact of the proposed changes in Revision No. 1 of CoC No. 1032. The proposed changes are to clarify (1) the heat load limits for helium backfill ranges, (2) wording on vent blockage LCO, and (3) revise vacuum drying heat loads.

1. Clarify the heat load limits for helium backfill ranges

The applicant proposed to modify the TS to clarify that the narrower helium backfill range can be used for all canisters instead of only those above a certain limit. The applicant stated in Attachment 1 of the application (Summary of Proposed Changes) that the CoC already allows for a wider band of helium backfill pressures for allowable heat loads and the proposed narrower band of helium backfill limits is a subset of the wider band as can be seen in Table 3.2 of Appendix A, TS.

The staff reviewed the application and the FSAR and finds that the proposed change will not impact the MPC internal pressures or the fuel cladding and cask component temperatures

because the proposed narrower band of helium backfill limits is a subset of the wider band already found to be acceptable. The proposed change matches the analyses already presented in the FSAR. Therefore, the staff concludes that the clarification of heat load limits for helium backfill ranges is acceptable because there is no negative impact to the safe storage of the spent fuel.

2. Clarify wording on vent blockage LCO

The applicant proposed to change the note on LCO 3.1.2 to clarify that each of the inlet and outlet vents should be 50% unblocked and not just the inlets.

The staff reviewed the application and finds that the proposed change will not impact the MPC internal pressure or the fuel cladding and cask component temperatures because the change is just a clarification for the cask user of the requirements for the allowable blockage of vents in the HI-STORM FW overpack and does not affect any thermal analyses. The staff concludes that the clarification of wording on the vent blockage LCO is acceptable because there is no negative impact to the safe storage of the spent fuel.

3. Revision to Vacuum Drying System (VDS) heat loads

The applicant proposed to reduce the limit for vacuum drying use with high burn up fuel to a lower heat load in Appendix A, Table 3-1 and Appendix B, Table 2.3-3 and 2.3-4. The applicant stated in Attachment 1 of the application (Summary of Proposed Changes) that the proposed change will not affect any thermal analyses since the proposed limit is below what has been calculated to be acceptable.

The applicant also states that the revised limit corresponds to the allowable limit in the HI-STORM 100 Cask system. In HI-STORM 100 Amendment No. 9, the VDS limit is 29 kW for high burnup fuel. In the proposed HI-STORM FW revision, the VDS heat load limits for high burnup fuel are 29.6 and 30.0 kW for the two applicable MPCs. The staff finds that these allowable VDS heat loads are similar enough to substantiate the statement that the revised limits of the HI-STORM FW correspond to the HI-STORM 100 Cask system.

The staff reviewed the application and finds that the proposed change will not impact the MPC internal pressure or the fuel cladding and cask component temperatures. Since the proposed limit is below what has been calculated to be acceptable in the FSAR, the staff assures that the internal pressures and the fuel cladding and cask components temperatures will remain below their corresponding limits. Therefore, the staff concludes that the proposed change is acceptable because there is no impact to the safe storage of the spent fuel.

4.2 Evaluation Findings

The staff reviewed the application and concludes that the proposed changes to clarify the heat load limits for helium backfill ranges, wording on vent blockage LCO and reduce the limits for vacuum drying heat loads are in compliance with 10 CFR Part 72. The evaluation of the proposed changes provides reasonable assurance that these changes will not negatively impact the safe storage of spent fuel for a licensed life. This finding is reached on the basis of a review that considered the regulation itself, appropriate regulatory guides, applicable codes and standards, and accepted engineering practices.

- F4.1 The HI-STORM FW continues to be designed with a heat-removal capability having verifiability and reliability consistent with its importance to safety. The cask is designed to provide adequate heat removal capacity without active cooling systems.
- F4.2 The spent fuel cladding continues to be protected against degradation leading to gross ruptures under long-term storage by maintaining cladding temperatures below 752°F (400°C). Protection of the cladding against degradation is expected to allow ready retrieval of spent fuel for further processing or disposal.
- F4.3 The spent fuel cladding continues to be protected against degradation leading to gross ruptures under off-normal and accident conditions by maintaining cladding temperatures below 1058°F (570°C). Protection of the cladding against degradation is expected to allow ready retrieval of spent fuel for further processing or disposal.
- F4.4 The staff finds that the thermal design of the HI-STORM FW remains in compliance with 10 CFR Part 72 and that the applicable design and acceptance criteria have been satisfied. The evaluation of the thermal design provides reasonable assurance that the HI-STORM FW will continue to provide safe storage of spent nuclear fuel. This finding is reached on the basis of a review that considered the regulation itself, appropriate regulatory guides, applicable codes and standards, and accepted engineering practices.

5.0 CONFINEMENT EVALUATION

There were no requested changes requiring evaluating the confinement criteria related to the ITS SSCs to ensure compliance with the relevant general criteria established in 10 CFR Part 72.

6.0 SHIELDING EVALUATION

There were no requested changes requiring shielding evaluation related to the ITS SSCs to ensure compliance with the relevant general criteria established in 10 CFR Part 72.

7.0 CRITICALITY EVALUATION

There were no requested changes requiring evaluating the criticality criteria related to the ITS SSCs to ensure compliance with the relevant general criteria established in 10 CFR Part 72.

8.0 MATERIALS EVALUATION

There were no requested changes requiring evaluating the materials criteria related to the ITS SSCs to ensure compliance with the relevant general criteria established in 10 CFR Part 72.

9.0 OPERATING PROCEDURES EVALUATION

There were no requested changes requiring evaluating the operating procedures criteria related to the ITS SSCs to ensure compliance with the relevant general criteria established in 10 CFR Part 72.

10.0 ACCEPTANCE TESTS EVALUATION

There were no requested changes requiring evaluating the acceptance tests criteria related to the ITS SSCs to ensure compliance with the relevant general criteria established in 10 CFR Part 72.

11.0 RADIATION PROTECTION EVALUATION

There were no requested changes requiring evaluating the radiation protection criteria related to the ITS SSCs to ensure compliance with the relevant general criteria established in 10 CFR Part 72.

12.0 ACCIDENT ANALYSIS EVALUATION

The applicant submitted a revised structural analysis to meet seismic accident conditions required by general licensees in areas with higher seismic demands than those previously analyzed. This was evaluated in Chapter 3 of this SER.

13.0 TECHNICAL SPECIFICATIONS

13.1 Review Objective

The objectives of this review were to ensure that the changes to the operating controls and limits or the TS in CoC No. 1032, Revision No. 1, continue to meet the requirements of 10 CFR Part 72. The evaluation is based on information provided by the applicant in this revision request, a review of the FSAR, as well as consideration of accepted practices. Specifically, the proposed changes were reviewed to ensure that they acceptably supported the equipment changes requested by the applicant. The technical and safety aspects of these changes were evaluated by the staff in previous sections of this SER and were found to be acceptable. The applicant proposed technical and editorial TS changes. Changes and additions that required TS change evaluations were as follows:

1. Correct the CoC expiration date (Editorial change)
2. Clarify heat load limits for helium backfill ranges
3. Clarify wording on vent blockage Limiting LCO
4. Revise vacuum drying system heat loads

The corresponding TS changes are

- (1) CoC – Correct the expiration date to June 12, 2031.
- (2) Appendix A, Table 3-2 is modified to show that the narrower helium backfill range can be used for all canisters instead of only those above a certain limit. Additionally, the footnotes on this table are revised.
- (3) Appendix A, LCO 3.1.2 – Revised the note to clarify that each of the inlet and outlet vents should be 50% unblocked.
- (4) Appendix A, Table 3-1 and Appendix B, Tables 2.3-3 and 2.3-4. –

Appendix A, Table 3-1 is revised to limit the MPC heat load limit for using VDS to a lower value, and the table notes are revised accordingly.

Appendix B, Tables 2.3-3 and 2.3-4 are revised for the per cell heat load limits to correspond to the lower MPC heat load limit.

13.2 Findings

F13.1 The staff finds that correcting the CoC expiration date to reflect a 20 year versus a 40 year certification is an editorial change. This based on the original HI-STORM FW MPC Storage System application and SER. The expiration date error was created by a staff misunderstanding in final CoC processing.

F13.2 The staff finds that CoC No. 1032 continues to identify necessary TS to satisfy 10 CFR Part 72 and that the applicable criteria of 10 CFR 72.236 have been satisfied. The proposed TS changes provide assurance that the HI-STORM FW MPC Storage System will continue to allow safe storage of spent nuclear fuel.

14.0 CONCLUSIONS

Based on its review of the revision request to CoC No. 1032, Revision No. 1, the staff has determined that there is reasonable assurance that: (i) the activities authorized by the amended certificate can be conducted without endangering the health and safety of the public and (ii) these activities will be conducted in compliance with the applicable regulations of 10 CFR Part 72. The staff has further determined that the issuance of the amendment will not be inimical to the common defense and security. Therefore, the revision should be approved.

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February XX, 2015