

Attachment 1 to Holtec Letter 50140917
Amendment Request 1014-16
SUMMARY OF PROPOSED CHANGES

Proposed Change #1

A new variant of the HI-STORM 100 Overpack, called HI-STORM 100 UVH, where the “UVH” stands for “unventilated” with “high density” concrete for shielding is added to the HI-STORM 100 docket (CoC and FSAR). The overpack is a simplified version of the HI-STORM 100 System without inlet and outlet air passages, resulting in a complete cessation of ventilation in the space between the cask cavity and the stored multi-purpose canister (MPC) during the system’s operation. To compensate for the removal of the inlet and outlet vents, the total allowable heat load of an MPC is reduced, and higher thermal conductivity concrete is employed to increase system heat transfer capabilities. Other features include full depth rib plates between the overpacks inner and outer shells that enhance the overpacks thermal performance, the use of higher density concrete that enhance the overpacks shielding performance, and a drain assembly to assist in short term operations such as evacuating the overpack’s annulus cavity air. These features are denoted in the licensing drawing (No. 12233 Rev. 0) and FSAR.

Reason for Proposed Change #1

The HI-STORM 100 UVH is needed to serve an enclosed MPC storage system that protects against environmental conditions that could cause stress corrosion cracking while maintaining ALARA principles.

Justification for Proposed Change #1

The HI-STORM 100 Version UVH System (for the MPC-32M and MPC-68M) has been evaluated and is fully described in the provided Supplement IV of the HI-STORM 100 FSAR. This supplement provides the necessary information and analyses to support the HI-STORM 100 Version UVH. The supplement is provided only for chapters that are impacted by the new overpack design and identifies the areas which are impacted by the new overpack design and areas which are unaffected by the new design. The HI-STORM 100 Version UVH is designed for MPC-32M and MPC-68M, which may be used with any HI-STORM 100 system transfer cask. The new overpack is qualified to meet the structural, thermal, and shielding requirements of 10CFR72. There is no change to the criticality or confinement evaluation, since the MPCs are unchanged from the MPCs previously approved by NRC in Supplement III (MPC-68M) and the MPC-32M under rulemaking in Supplement II (MPC-32M, License Amendment Request (LAR) 1014-15) of the HI-STORM 100 FSAR, and no new or changed fuel is introduced.

The aging management considerations from the license renewal application for the HI-STORM 100 System under review by USNRC (Docket 72-1014, Holtec Letter 5014890 dated January 31, 2020) are applied to the HI-STORM 100 UVH System added to the HI-STORM 100 System docket via this amendment. The MPCs evaluated for the HI-STORM 100 UVH (MPC-32M and MPC-68M) are evaluated in the license renewal application, and therefore do not require further evaluation in this amendment. The HI-STORM 100 UVH Overpack added via this amendment was not previously evaluated, and as such, requires aging management evaluation for this amendment. However, it should be noted that due to similarities between the HI-STORM 100 UVH Overpack and the HI-STORM 100 Overpack, some components of the HI-STORM 100 UVH Systems have already been evaluated in the license renewal application. Therefore, aging management evaluation for this amendment only adds the HI-STORM 100 UVH components not previously evaluated in the license renewal application. Aging management changes to the HI-STORM 100 FSAR and requirements in the proposed CoC are submitted herewith. Aging management evaluation specific to the HI-STORM 100 UVH System is documented in Attachment 20 to the Holtec Letter No. 50140917 for submittal of this amendment.

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Proposed Change #2

Inclusion of the ability to use CFD analysis to evaluate site-specific fire accident scenario.

Reason for Proposed Change #2

The CFD analysis allows for an alternate and more accurate modeling of site-specific fire accident scenario, using the models that are already approved for normal conditions. This approach has been previously approved for MPCs with stainless steel baskets in FSAR Section 4.6. This change is an extension to all MPC and overpack designs for fire accident condition. Additionally, this change also allows for more robust evaluations of site-specific fires that could be larger than that evaluated in the FSAR.

Justification for Proposed Change #2

FSAR Section 4.6 and Supplement Section 4.II.6 have been updated to include this change. The acceptance criteria adopted for analysis remains unchanged when implementing the CFD method.

Proposed Change #3

Modify vent and drain penetrations to include the option of second port cover plate.

Reason for Proposed Change #3

The addition of a second cover plate for these penetrations removes the need to do field helium leak testing of these cover plates.

Justification for Proposed Change #3

See Licensing Memorandum in Attachment 12 to Holtec Letter No. 50140917: Proposed design change for MPC Lid Port Covers to improve ALARA and ruggedness of the MPC for increased reliability of confinement integrity.

The HI-STORM 100 CoC, MPC drawings, and FSAR Chapter 8 and 9 have been updated to include this change.

Proposed Change #4

Inclusion of the ability to use CFD analysis to evaluate site-specific burial under debris accident scenario.

Reason for Proposed Change #4

The CFD analysis allows for an alternate and more accurate modeling of a burial under debris accident using the models that are already approved for normal conditions. This approach has been previously approved for MPCs with stainless steel baskets in FSAR Section 4.6. This change is an extension to all MPC and overpack designs for burial accident scenario and allows for more robust evaluations of site-specific burial scenarios.

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Justification for Proposed Change #4

FSAR Section 4.6, Supplements 4.II.6 and 4.III.6 have been updated to include this change. The acceptance criteria adopted for analysis remains unchanged when implementing the CFD method.

Proposed Change #5

Inclusion of the ability to use water without glycol in the HI-TRAC water jacket during transfer operations below 32°F based on the site specific MPC total heat loads.

Reason for Proposed Change #5

To provide an alternate means to prevent freezing of the water in the HI-TRAC water jacket at temperatures below 32°F. Additionally, removal of glycol use within the HI-TRAC water jacket removes any concerns of glycol leaking into the spent fuel pool during loading operations.

Justification for Proposed Change #5

FSAR Section 1.2, 2.0, 2.1, 3.4, 4.5, 4.II.5, 4.III.5, 5.3, 8.1, and 8.3 have been updated to include this change. Thermal analyses have been added to Chapter 4 to provide the methodology for site-specific calculations to determine the MPC's minimum acceptable heat load. The example calculation also demonstrates that an MPC with a specified minimum heat load ensure that the neutron shielding material in the HI-TRAC water jacket stays above its freezing point under low environmental temperatures.

Proposed Change #6

Change the hydrostatic pressure test of the MPC acceptance criteria to be examination for leakage only. Remove post hydrostatic test Liquid penetrant (PT) and magnetic particle (MT) examination.

Reason for Proposed Change #6

The post hydrostatic pressure test PT or MT examination is not an ASME Code requirement and causes incurred dose without corresponding safety benefit.

Justification for Proposed Change #6

The HI-STORM 100 CoC, and FSAR Chapter 9 have been updated to include this change.

Proposed Change #7

Replace the fuel qualification tables presented in Chapter 2 and the CoC, including the equation for calculation of the maximum allowable burnup as a function of the cooling time and cooling time-dependent coefficients, with simpler sets of burnup and cooling time limits. Additionally, the minimum cooling time for PWR fuel is reduced from 2 years to 1 year.

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Reason for Proposed Change #7

Due to its complicated form, the current approach has resulted in rejecting assemblies as content that were below the applicable heat load limit of a cell, and that had burnup, enrichment and cooling times that would have not resulted in dose rates above those reported in the FSAR, i.e. in rejecting them without any safety reason. The revised approach resolves this issue, and also significantly simplifies the fuel qualification process. The revised approach is then extended to a minimum cooling time of 1 year for PWR fuel (for BWR fuel the minimum cooling time was already at 1 year). To assure that the overall dose performance of the cask remains unchanged, i.e. that previously reported dose rates are not exceeded, appropriate dose rate limits are proposed to be included.

Justification for Proposed Change #7

The HI-STORM 100 CoC and FSAR Chapters 2, 5, and 12 are updated accordingly for this change.

Miscellaneous Changes

Overpack Concrete

Revised Appendix 1.D (Specification for Plain Concrete in the HI-STORM Family of Overpacks) is revised for clarification, to enhance certain requirements, to add certain revised shielding assumptions following a significant thermal event and to add critical characteristics for concrete employed in the HI-STORM 100 UVH System.

RIRP-I-16-01 CoC Reorganization

In 2017, NEI proposed an outline for improving the storage CoC format and contents on behalf of the industry via Regulatory Issue Resolution Protocol Screening Form and Resolution Plan for Improving the Part 72 Regulatory Framework (RIRP-I-16-01 transmitted 5/12/2017). This outline was based on the format, content, and selection criteria proposed in Industry Petition for Rulemaking (PRM) 72-7. Following the RIRP-I-16-01, the CoC has been reorganized accordingly via the provided matrix within RIRP-I-16-01. To ensure clarity of the proposed changes above as part of this Amendment Request 1014-16, the CoC format and contents are provided following Holtec's current approved CoC and are also provided following the reorganization per RIRP-I-16-01. Both CoC formats (including the reorganization matrices) are included as attachments to Holtec Letter 5014917.