Attachment 2 to Holtec Letter 5018096

Amendment Request 1032-7

CONTINUED SUMMARY OF PROPOSED CHANGES

This is an update from Attachment 3 to Holtec Letter 5018091. All changes to the CoC and FSAR are marked in the subsequent attachments. Changes that have occurred as part of prior applications are not marked as changes.

Proposed Change #1

Addition of a new variant of the HI-STORM FW Overpack, called HI-STORM FW UVH, where the UVH stands for "unventilated" with "high density" concrete for shielding. The overpack is a simplified version of the HI-STORM FW System wherein the overpack's inlet and outlet air passages have been removed, 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. 11897 Rev. 1) and FSAR. Related to this change is the increased temperature limits for the MPC baseplate and the Overpack Inner Shell. The MPC baseplate temperature is increased from 400°F to 440°F, while the Overpack Inner Shell temperature limits are added to Table 2.2.3 for normal conditions, short-term events, and off-normal/accident conditions.

Reason for Proposed Change #1

The HI-STORM FW UVH is needed to serve as a low-dose MPC storage system wherein the external environment around the canister is sought to be controlled, such as to protect from stress corrosion cracking.

Justification for Proposed Change #1

The new overpack has been evaluated for MPC-37, MPC-89, and new MPC-44 (Proposed Change #7), and is fully described in the provided Supplement I to the FSAR. This supplement provides the necessary information and analyses to support the HI-STORM FW Version UVH. The supplement identifies the areas which are impacted by the new overpack design, and each chapter also lists the sections that are unaffected by the new design. The new overpack is structurally, thermally, and shielding qualified to meet all the requirements of 10CFR72. There is no change to the criticality or confinement evaluation, since the MPCs are unchanged from previous HI-STORM FW amendments. Additionally, the temperature increases for the MPC baseplate and Overpack Inner Shell have been analyzed for all conditions in Chapter 3 of the FSAR.

Proposed Change #2

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

Reason for Proposed Change #2

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

CONTINUED SUMMARY OF PROPOSED CHANGES

Justification for Proposed Change #2

See attached Licensing Memorandum: 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 FW CoC, MPC drawings, and FSAR Chapter 9 and 10 have been updated to include this change.

Proposed Change #3

Allow automated equipment to perform leak test of the MPC materials and welds in the fabrication shop.

Justification for Proposed Change #3

The acceptance criteria for the leakage test will remains unchanged when implementing the automated process. By automating the leakage testing process, there will be more reliable and repeatable testing and eliminate possibility for human error. The current testing relies on Level III qualifications, which requires a large amount of training, of which not many personnel are qualified. The HI-STORM FW FSAR Chapter 8 and 10 have been updated to include this change.

Proposed Change #4

Change the hydrostatic pressure test of the MPC acceptance criteria to be examination for leakage only. Remove post hydrostatic test Liquid Penetrant (PT) examination.

Reason for Proposed Change #4

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

Justification for Proposed Change #4

The HI-STORM FW CoC, and FSAR Chapter 9 and 10 have been updated to include this change.

Proposed Change #5

Inclusion of the ability to run a CFD analysis to evaluate site-specific fire scenarios.

Reason for Proposed Change #5

The CFD analysis allows for an alternate and accurate modeling of site-specific fire, using the models that are already approved for normal conditions. Additionally, this change also allows for more robust evaluations of site-specific fires that could be larger than that evaluated in the FSAR.

CONTINUED SUMMARY OF PROPOSED CHANGES

Justification for Proposed Change #5

FSAR Section 4.6 has been updated to include this change. The acceptance criteria and the thermal model adopted for analysis remain unchanged when implementing the CFD method.

Proposed Change #6

Use updated methodology for tornado missile stability calculations for freestanding HI-STORMs and HI- TRACs. Clarify the weights to be used for varying heights of HI-TRACs.

Reason for Proposed Change #6

The change updates the methodology for tornado missile stability analysis to consider changing restoring arm as a cask lifts up and rotates. Also, to provide weight information for HI-TRACs that may be loaded with less than the maximum fuel assemblies.

Justification for Proposed Change #6

Structural analysis, as outlined in the updated Chapter 3, shows that all safety factors remain acceptable with the new analysis method and provides additional information on HI-TRAC loaded weights for clarity.

Proposed Change #7

Addition of a new MPC, called MPC-44. This MPC holds 44 PWR fuel assemblies of certain 14x14 fuel class. Burnup credit calculations are not included for loading considerations of this new MPC.

Reason for Proposed Change #7

This change allows for a higher capacity canister for PWR fuel assemblies that are of a certain size. For sites that utilize these fuel classes the higher capacity canister allows for fewer loadings.

Justification for Proposed Change #7

The MPC-44 is fully analyzed by all disciplines for both the Version E overpack (ventilated) and unventilated overpacks by structural, thermal, shielding, and criticality. The enclosure vessel is unchanged, and all analyses demonstrate that the canister meets the same acceptance criteria as the existing canisters.

Proposed Change #8

Addition of a new MPC, called MPC-37P. This MPC holds 37 PWR fuel assemblies of certain 15x15 fuel class. Burnup credit calculations are added to the criticality chapter for loading considerations of this new MPC.

CONTINUED SUMMARY OF PROPOSED CHANGES

Reason for Proposed Change #8

This change allows for the same capacity canister for PWR fuel as currently qualified, but with assemblies that are of a certain size and heat loads, required for certain sites.

Justification for Proposed Change #8

The MPC-37P design is shown to be comparative to the MPC-37 for structural and criticality analyses for the Version E (ventilated) overpack and is fully analyzed for the Version E overpack by thermal and shielding. The enclosure vessel is unchanged, and all analyses demonstrate that the canister meets the same acceptance criteria as the existing canisters.

Proposed Change #9

Add HI-DRIP ancillary system. HI-DRIP is an optional ancillary system designed to prevent water within the MPC from boiling during loading/unloading operations while the loaded MPC is in the HI-TRAC transfer cask. FSAR Section 1.2.1.7 describes the HI-DRIP system.

Reason for Proposed Change #9

The HI-DRIP system has potential use during the period when the loaded MPC is full of water and is out of the pool. The HI-DRIP is used to provide additional cooling for the MPC in the HI-TRAC during the interval after it has been lifted out of the fuel pool and is subject to surface decontamination, lid welding and related operations which precede the evacuation of water from the MPC followed by activation of the Forced Gas Dehydrator (FGD). This time period is termed “fuel packaging”. As such, HI-DRIP is essentially a device to provide additional cooling of the MPC’s water during the period it is full of water and out of the pool.

Justification for Proposed Change #9

The area of safety that requires consideration, for the HI-DRIP system is thermal.

Thermal analysis of the use of the HI-DRIP system is summarized in Section 1.2. The optional use of the HI-DRIP system is shown to be acceptable.

Proposed Change #10

Inclusion of the ability to run approved CFD analysis to evaluate site-specific calculations for the burial under debris accident scenario.

Reason for Proposed Change #10

The CFD analysis allows for an alternate and accurate modeling of a burial under debris accident using the models that are already approved for normal conditions, and the appropriate thermal properties of site specific possible debris.

Justification for Proposed Change #10

FSAR Section 4.6 has been updated to include this change. The thermal accident acceptance criteria and the thermal model adopted for analysis remain unchanged when implementing the CFD method.

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CONTINUED SUMMARY OF PROPOSED CHANGES

Proposed Change #11

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. This is provided as an optional method rather than the use of glycol.

Reason for Proposed Change #11

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 #11

FSAR Section 1.2, 2.0, 3.4, 5.3, 8.8, 9.2, 9.4, and 12.1 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 #12

Add new 10x10 fuel type to approved contents, named 10x10J. This change is shown in the marked changes in the CoC.

Reason for Proposed Change #12

This proposed change allows storage of additional fuel types in the HI-STORM FW System.

Justification for Proposed Change #12

Criticality analyses of the new fuel was performed, and the results of these analyses have been added to Chapter 6. The new fuel type was determined to be bounded by the design basis fuel already analyzed in the FSAR for thermal, structural, and shielding; therefore, no additional analyses were required for the HI-STORM FW System. A marked copy of FSAR Chapters 2 and 6 are provided to show the changes.

Proposed Change #13

Update bounding fuel variables for 8x8F and 11x11A BWR fuel types in CoC Appendix B.

Reason for Proposed Change #13

This proposed change allows storage of additional fuel in the HI-STORM FW System.

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Justification for Proposed Change #13

Criticality analyses of the updated fuel was performed, and the results of these analyses have been added to Chapter 6. The changes to the CoC Appendix B table also include a new note to clarify an existing dimension listed for the 11x11A fuel. The updated fuel types were determined to remain bounded by the design basis fuel already analyzed in the FSAR for thermal, structural, and shielding; therefore, no additional analyses were required for the HI-STORM FW System. Marked pages of FSAR Chapters 2 and 6 are provided to show the changes.

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Editorial Changes

- Deleted
- Update the statements in FSAR Section 3.2 related to CG eccentricities in the evaluation of lifting devices. The previous FSAR commitment does not stem from any requirement in NUREG-0612 or ANSI N14.6. This FSAR requirement is unnecessary since ANSI N14.6 mandates increased design factors of 6 and 10 with respect to material yield and ultimate strength, which adequately compensates for small CG variations.
- Deleted Appendices 3.A to 3.C and added references to calculation packages [3.4.13] and [3.4.15] where applicable.
- Update CoC Appendix B Section 2.5 to clarify the equation burn up and cooling time qualification requirements (with applicable Table 2.5-2), only apply to the alternative loading patterns shown in Figures 2.3-1 through 2.3-13, and do not apply to the original loading patterns of Table 2.1-1.