August 17, 2012

Dr. Stefan Anton
Vice-President, Engineering
Acting Licensing Manager
Holtec International
Holtec Center
555 Lincoln Drive West
Marlton, NJ 08053

SUBJECT: SECOND REQUEST FOR ADDITIONAL INFORMATION FOR AMENDMENT REQUEST NO. 1 TO THE HOLTEC INTERNATIONAL HI-STORM FLOOD/WIND MULTI-PURPOSE CANISTER STORAGE SYSTEM (TAC NO. L24584)

Dear Dr. Anton:

By letter dated October 13, 2011, Holtec International (Holtec) submitted an application to the U.S. Nuclear Regulatory Commission (NRC) to amend the HI-STORM Flood/Wind (FW) Multi-Purpose Canister (MPC) Storage System. The proposed amendment would license two new high capacity MPC models (MPC-37 and MPC-89). The NRC staff has reviewed your application and has determined that the request for additional information (RAI) identified in the enclosure to this letter is required to complete its detailed technical review.

We request that you provide the information by September 12, 2012. Please inform us in writing at your earliest convenience, but no later than August 31, 2012, if you are not able to provide the information by the requested date. You should also include a new proposed submittal date and the reasons for the delay to assist us in re-scheduling your review.

Please reference Docket No. 72-1032 and TAC No. L24584 in future correspondence related to this licensing action. If you have any questions, please contact me at (301) 492-3325.

Sincerely,

/RA/

John Goshen, P.E., Project Manager
Licensing Branch
Division of Spent Fuel Storage and Transportation
Office of Nuclear Material Safety
and Safeguards

Docket No.: 72-1032
TAC No.: L24584

Enclosure: 2nd RAI

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Docket No.: 72-1032
TAC No.: L24584

Enclosure: 2nd RAI
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HOLTEC INTERNATIONAL

DOCKET NO. 72-1032

AMENDMENT REQUEST NO. 1

TO THE HI-STORM FW MPC STORAGE SYSTEM

SECOND REQUEST FOR ADDITIONAL INFORMATION

By letter dated October 13, 2011, Holtec International (Holtec or applicant)) submitted an application to the U.S. Nuclear Regulatory Commission (NRC) to amend the HI-STORM Flood/Wind (FW) Multi-Purpose Canister (MPC) Storage System. The proposed amendment would license two new high capacity MPC models (MPC-37 and MPC-89). The NRC staff (staff) has reviewed your application and has determined that additional information is required to complete its detailed technical review.

4.0 THERMAL EVALUATION

4-1 The calculation provided in the applicant's October 13, 2011, application did not provide the correct representative grid size per American Society of Mechanical Engineers (ASME) Verification and Validation (V&V) 20-2009. Either provide justification for using an alternate grid size or provide a corrected calculation.

The correct calculation of a representative grid size, per ASMEV&V 20-2009, which states that for non-structured grids can be defined as:

$$h = [(\Sigma_{i=1}^{N} \Delta V_i)/N]^{1/3} \quad (1)$$

where N total number of cells used for the computations and ΔV_i is the volume of the i^{th} cell. However, the applicant used the following equation to calculate the representative grid size:

$$h = [(\Sigma_{i=1}^{N} \Delta V_i)/N] \quad (2)$$

Appendix H to Holtec Report HI-2094400 provides the Grid Convergence Index (GCI) calculation, following the 5-step approach described in ASME V&V 20-2009. However, the calculation of a representative grid size does not appear to be correct. Based on the corrected grid sizes (calculated using Equation 1 above), the staff calculated a maximum refinement grid factor of about 1.13. However, the staff obtained an apparent (or observed order) p of the method of about 9, for grids h_1, h_2, and h_3 (mesh 8, 7, and 6) and about 22, for grids h_2, h_3, and h_4 (mesh 7, 6, and 5). Based on the applicant's analysis results and the corrected grid sizes, as stated above, the staff also calculated an observed order p for grids h_1, h_3, and h_4 (mesh 8, 6, and 5) of about 4. As it can be seen from the obtained results, the observed p is not constant for the applicant's simulation series (i.e., the calculated apparent orders are 4, 9, and 22). Also, the applicant did not state how the apparent order compares with the theoretical one.

These results may indicate that a systematic grid refinement was probably not performed, per the ASME standard recommendation. The ASME standard recommends

that the grid refinement should be made systematically (i.e., the refinement itself should be structured even if the grid is unstructured). The ASME standard also recommends that a minimum of four grids is required to demonstrate that the observed order p is constant for a simulation series. The ASME standard also states that It should also be noted that if the observed value of p is significantly different from the expected order of the method (for example, the method might be expected to be third-order for the primary variables but it is observed to be less than 1), then one should delve into the root cause of this difference. It may suggest a possible error in the method or its implementation, or that the grid resolutions are not in the asymptotic region, or that a singularity is present. See Section 2-4 of ASME V&V 20-2009 ("Standard for Verification and Validation in Computational Fluid Dynamics and Heat Transfer") for further details.

This information is needed to determine compliance with 10 CFR 72.236.

5.0 SHIELDING EVALUATION

5-1 Provide calculations used in the shielding analysis to determine the bounding dose rates as specified in Section 5.4 of the Final Safety Analysis Report (FSAR).

Section 5.4 of the FSAR discusses the methodology used to determine the dose rates for the bounding configuration (Pattern B). As part of the methodology, the dose rate contribution per starting particle in each energy group and basket location is evaluated in MCNP™. They are then multiplied by the source strength in that energy group and a sum is determined from the resulting dose rates for all groups and basket locations using equations listed in Section 5.4. As part of the review to determine adequacy of the methodology used, the staff requests sample calculations and other supporting data (e.g., spreadsheet) used to determine the resulting dose rates corresponding to the bounding configuration.

This information is needed to determine compliance with 10 CFR 72.104 and 72.106(b).

5-2 Confirm that the revised dose rate values listed in Table 2.3.2 of the FSAR are accurate.

While reviewing dose rates listed in Table 2.3.2 of the FSAR for Design Basis Dose Rates for the HI-STORM FW Overpack Surfaces, the staff identified that dose rates corresponding to the inlet and outlet vents were equal to dose rates for other cask surfaces listed in the table. The staff also noticed that the previous version of this table yielded a difference in dose rates between the two 100 mrem/hr cases evaluated. Please examine the data and provide an explanation for the equivalent dose rate values listed in the new version of Table 2.3.2.

This information is needed to determine compliance with 10 CFR 72.104 and 72.106(b).