2-1 Clarify if the effective thermal properties used in the thermal evaluation bound all fuel types, as described in the Final Safety Analysis Report (FSAR).

Page 2-32 of the FSAR states that some assemblies have up to 8 fuel rods removed or replaced by guide tubes. Removal of fuel rods may result in effective thermal properties that may not be bounded by previous calculated effective values.

This information is needed to assure compliance with 10 CFR 72.236(f).

Holtec Response:

The effective thermal properties of the fuel region within the basket storage cell adopted in the thermal calculations reasonably bound all the fuel types listed in the FSAR for the reasons outlined below.

The effective fuel thermal conductivity of various fuel assembly types permissible in HI-STORM UMAX System are incorporated by reference from Table 4.1.1 of the HI-STORM FW FSAR. The thermal evaluations of these effective properties are documented in Holtec proprietary report HI-2094356 (reference 4.1.10 in the HI-STORM FW FSAR). This report clarifies that the effective planar thermal conductivity assumes that all possible locations in the fuel assembly are occupied by fuel rods, neglecting the presence of guide tubes and instrument tubes. This modeling simplification has been shown to conservatively minimize the resulting planar thermal conductivities as demonstrated in a separate Holtec proprietary report HI-971789 (previously submitted to the staff as an attachment to Holtec Letter No. 5021005, ADAMS Number ML12348A483). Based on the previous calculations, it can therefore be concluded that replacing some of the fuel rods by guide tubes results higher effective planar thermal conductivity than that used in the licensing basis thermal evaluations.

In a scenario when some fuel rods are removed but not replaced with guide tubes, the effective thermal properties of fuel region within the basket region are adversely impacted, although the effect is considerably small. For example, the axial thermal conductivity of the fuel region decreases by approximately 3% when 8 fuel rods are removed from fuel assembly type 15x15I listed in Table 2.1.2 of the FSAR. To ensure the impacts of such scenarios are bounded by the thermal evaluations presented in the FSAR, it must be noted that a penalty of 10% is already included in the effective thermal conductivities of the fuel region in all directions as described in Sub-section 4.4.1 of the HI-STORM UMAX FSAR that ensure conservative calculations. This additional 10% penalty bounds any impact of removed fuel rods not replaced with guide tubes.

Therefore based on the above information, the effective thermal properties of the fuel region used in the thermal evaluations presented in the HI-STORM UMAX FSAR are reasonably bounding of the additional fuel types.

2-2 Clarify what the permissible design temperature limits are for the damaged fuel containers.

FSAR Table 2.3.7 states that either 752°F or 1058°F is the normal and mechanical accident condition design temperature limits. The information provided in this table appears to be confusing. The application should clearly state the limits that are applicable for different conditions.

This information is needed to assure compliance with 10 CFR 72.236(f).

Holtec Response:

We regret the confusion caused by the multiple design temperature limits presented in Table 2.3.7 of the HI-STORM UMAX FSAR. The design temperature limit of the damaged fuel containers is 752^{o}F under normal conditions while it is 1058^{o}F under short-term, off-normal and accident conditions. Table 2.3.7 of the FSAR has been modified to reflect the same and is included as Attachment 2 to this letter. The changes made to the table based on this RAI response are highlighted in yellow.