Holtec Response to Request for Additional Information (Part 1)

Docket No. 72-1032
Holtec International
HI-STORM FW
Multipurpose Canister Storage System
Certificate of Compliance No. 1032
Amendment No. 7

RAI 4-1

Clarify the following in the final safety analysis report (FSAR), technical specifications (TS), and license drawings:

(A) Clarify whether the multi-purpose canister (MPC)-37P and MPC-44 only have the continuous basket shim (CBS) version. Although the proprietary Drawings Nos. 12283 and 12288 show MPC-37P and MPC-44, respectively, in CBS version, it is not clear in the FSAR text. Provide clarification whether MPC-37P and MPC-44 are with or without CBS.

(B) Clarify whether the unventilated high density (UVH) overpack needs to be added to FSAR table 1.0.1, HI-STORM FW System Components.

The staff needs this information to determine compliance with 10 CFR 72.236(f).

Holtec RAI Response:

(A) Drawings Nos. 12283 and 12288 only show CBS version baskets for MPC-37P and MPC-44 respectively. There are no standard version baskets for MPC-37P or MPC-44. FSAR Table 1.0.1 has been updated to clarify this point.

(B) All UVH overpack information is contained in Supplement I to the FSAR. A note has been added to FSAR Table 1.0.1 directing the reader to Supplement I for information on the UVH overpack.

RAI 4-2

Clarify the applicability of the MPC types included in HI-STORM FW Amendment No. 7 and ensure consistency on description of these MPC types in FSAR, CoC, and TS Appendices A and B.

The applicant needs to clarify the MPC types that are included in the application of the HI-STORM FW Amendment No. 7 and ensure that the thermal evaluations described in the FSAR and calculation packages are applicable to these MPC types:

(A) Is MPC-37P-CBS used in HI-STORM FW UVH overpack?
(B) Is MPC-37P-CBS used in HI-STORM FW ventilated system?
(C) Is MPC-44-CBS used in HI-STORM FW UVH overpack?
(D) Is MPC-44-CBS used in HI-STORM FW ventilated system?
(E) Is MPC-89 or MPC-89-CBS or both used in HI-STORM FW UVH overpack?
(F) Is MPC-89-CBS used in HI-STORM FW ventilated system?

The applicant needs to update the application (FSAR, CoC, and TS appendices A and B), as appropriate, to clarify the applicability of the MPC types in the Amendment No. 7 application and ensure consistency in the description of these MPC types.

The staff needs this information to determine compliance with 10 CFR 72.236(f).

Holtec RAI Response:

FSAR Table 1.0.1 lists which MPCs are used in the HI-STORM FW ventilated system and Table 1.I.1.2 lists which MPCs can be used in the HI-STORM FW UVH overpack.

To the specific questions identified above:

(A) No. FSAR Table 1.I.1.2 lists the MPCs allowed for storage in the HI-STORM FW UVH overpack Since MPC-37P is not listed in Table 1.I.1.2, it is not allowable for storage. Similarly, Appendix B of the CoC includes the allowable content heat loads for MPC-37, MPC-89, and MPC-44 only.

(B) Yes. MPC-37P is listed in Table 1.0.1 which specifies that the MPC-37P is qualified for storage in the HI-STORM FW Version E. As clarified above in the RAI 4-1 response, only CBS baskets are used in MPC-37P.

(C) Yes. MPC-44 is listed in Table 1.I.1.2, which gives the applicable components for the HI-STORM FW UVH. As clarified above in the RAI 4-1 response, only CBS baskets are used in MPC-44.

(D) Yes. MPC-44 is listed in Table 1.0.1, which gives the applicable components for the HI-STORM FW. As clarified above in the RAI 4-1 response, only CBS baskets are used in MPC-44.

(E) Yes. MPC-89 is listed in Table 1.I.1.2. This listing does not specify whether the MPC-89 will contain a standard or a CBS version basket. As both basket types can be used with the MPC-89 design and FSAR Table 1.I.1.2 does not specify a basket version it can be inferred that either basket version may be used. However, FSAR Table 1.I.1.2 has been updated to reference FSAR Table 1.0.1 for which basket versions are applicable to each MPC listed.

(F) Yes. Table 1.0.1 specifically states that MPC-89 can contain either a standard or CBS basket.

In licensing documentation (FSAR, CoC, etc.) the MPC is identified by the maximum number of fuel assemblies it can contain in the fuel basket (MPC-37, MPC-89, etc.). This identification does not specify what basket version is used in the MPC. Therefore, unless the basket version is specifically called out in a particular statement or discussion of an MPC, it should be assumed that the statement or discussion applies to any basket version designed for use with the identified MPC number. For instance, if a statement refers to MPC-89, that statement may apply to MPC-89 with standard basket or MPC-89CBS (MPC-89 with CBS basket). However, if MPC-89CBS or MPC-89 with CBS basket is called out specifically in a statement, that statement only applies to an MPC-89 with CBS basket. A statement has been added to FSAR Section 1.1 clarifying this point.

Furthermore, CBS baskets were introduced into the FSAR via 72.48 evaluations, and the conclusion in those evaluations was that the basket version could be added to the FSAR without NRC review and approval. Therefore, CBS is not and does not need to be mentioned/discussed in the CoC or its Appendices.

RAI 4-3

Clarify questions (A) and (B) below for the proposed changes in HI-STORM FW Amendment No. 7 application.

The staff reviewed TS appendix A, table 3-1 and appendix B tables/figures and summarized overpack types, MPC types, fuel types, loading patterns, and heat load limits, proposed in this amendment application, in the table below.

Item	Overpack Type	MPC Type	Fuel Type	Loading Pattern	Heat Load Limit (kW)	TS - B Table	TS - B Figure
1	Ventilated	MPC-37P-CBS	HBF LBF	Regionalized Pattern A	44.09	2.3-1A	2.1-1
2	Ventilated	MPC-37P-CBS	HBF	Regionalized Pattern A	39.68	2.3-1B	2.1-1
3	Ventilated	MPC-37P-CBS	HBF	Regionalized Pattern A	35.27	2.3-1C	2.1-1
4	Ventilated	MPC-37P-CBS	HBF LBF	Regionalized Pattern B	45.0	2.3-1A	2.1-1
5	Ventilated	MPC-37P-CBS	HBF LBF	Regionalized with DFC/DFI	45.0	2.3-7A	2.1-4 2.3-14 2.3-15
6	Ventilated	MPC-37P-CBS	HBF	**Uniform**	33 (threshold)	2.3-7B	2.1-4
7	Ventilated	MPC-44CBS	HBF LBF	**Uniform**	44	2.3-8A	2.1-5
8	Ventilated	MPC-44CBS	HBF	**Uniform**	30	2.3-8B	2.1-5
9	UVH	MPC-44CBS	HBF LBF	**Uniform**	**28** (wo. DFC) **27.6** (w. DFC)	2.3-13	2.1-5
10	UVH	**MPC-37** (not MPC-37P)	HBF LBF	**Uniform**	29	2.3-9A 2.3-9B	2.1-1
11	UVH	MPC-89	HBF LBF	**Uniform**	29	2.3-10A 2.3-10B	2.1-2

(A) Clarify whether the information in the above table is consistent with the proposed changes in the amendment application. If not, provide revisions to the table.

(B) Provide the overpack version (standard, version XL and/or version E) used for each of the ventilated overpacks (items 1-8) proposed in this amendment application.

The staff needs this information to determine compliance with 10 CFR 72.236(f).

Holtec RAI Response:

A few revisions were made to the table provided by the reviewer. The updated table is presented below, along with the appropriate overpack versions. Certain rows (Items 2 and 3 in the table provided by the reviewer) are not applicable to MPC-37P and therefore are not in the table provided below.

Item	Overpack Type	Versions	MPC Type	Fuel Type	Loading Pattern	Heat Load Limit (kW)	TS-B Table	TS-B Figure
1	Ventilated	Version E only	MPC-37PCBS	HBF LBF	Regionalized Pattern A	44.09	2.3-1A	2.1-1
2	Ventilated	Version E only	MPC-37PCBS	HBF LBF	Regionalized Pattern B	45.0	2.3-1A	2.1-1
3	Ventilated	Version E only	MPC-37PCBS	HBF LBF	Regionalized with DFC/DFI	45.0	2.3-7A	2.1-4 2.3-14 2.3-15

4	Ventilated	Version E only	MPC-37PCBS	HBF LBF	Uniform	33.3 (Threshold)	2.3-7B	2.1-4
5	Ventilated	All variants	MPC-44CBS	HBF LBF	Uniform	44 (wo DFC/DFI) 43.4-44.0 (w. DFC/DFI)	2.3-8A	2.1-5
6	Ventilated	All variants	MPC-44CBS	HBF LBF	Uniform	30	2.3-8B	2.1-5
7	Unventilated	UVH	MPC-44CBS	HBF LBF	Uniform	28 (wo DFC/DFI) 27.6-28.0 (w. DFC/DFI)	2.3-13	2.1-5
8	Unventilated	UVH	MPC-37 Standard (Not MPC-37P)	HBF LBF	Uniform	29	2.3-9A	2.1-1
					Regionalized	29	2.3-9B	
9	Unventilated	UVH	MPC-89 (Standard and CBS)	HBF LBF	Uniform	29	2.3-10A	2.1-2
					Regionalized	29	2.3-10B	

The heat load penalty pertaining to MPC-44CBS in HI-STORM FW UVH when DFC/DFIs are loaded has been added in a note to Table 2.3-13 of Appendix B of the CoC. Supplement 4.I.4.4 has been revised to clarify that MPC-89CBS design is bounded by MPC-89 standard design when placed in HI-STORM FW UVH.

RAI 4-4

Clarify the information in Note (2) to FSAR table 1.2.3c for MPC-37P-**CBS**.

Note (2) to the FSAR table 1.2.3c, Alternative MPC-37P-**CBS** Heat Load Data, states that decay heat per cell for cells containing damaged fuel or fuel debris is equal to the decay heat limit per cell of the region where the damaged fuel or fuel debris is permitted to be stored.

(A) Does the term the damaged fuel or fuel debris underlined above need to be revised to the intact fuel for clarification that there is no decay heat penalty per cell for cells permitted to contain damaged fuel or fuel debris for MPC-37PCBS?

(B) Provide the percentage (%) in the FSAR table 1.2.3c if there is decay heat penalty per cell for cells permitted to contain damaged fuel or fuel debris for MPC-37P-**CBS**. (See FSAR table 1.2.3e for MPC-44**CBS** with a 5% decay heat penalty per cell for cells permitted to contain damaged fuel or fuel debris.)

The staff needs this information to determine compliance with 10 CFR 72.236(f).

Holtec RAI Response:

(A) The statement in Note (2) of FSAR Table 1.2.3c is not applicable to alternate heat load patterns for MPC-37P and therefore has now been deleted. Alternate heat load patterns for MPC-37P do not follow region wise heat load distribution. Instead, every storage cell has a unique decay heat value as shown in Figures 1.2.9a and 1.2.9b of the FSAR. These figures explicitly provide the allowable decay heat and locations for damaged fuel or fuel debris.

(B) There is no heat load penalty per cell for cells permitted to contain damaged fuel or fuel debris in MPC-37PCBS. The technical basis for this is provided in Section 8.4 of Holtec Report HI-2210379. Furthermore, explicit thermal evaluation of damaged fuel or fuel debris placed in a DFC in an MPC-37 basket storage cell was previously evaluated and documented in Appendix V of HI-2094400. The results of those evaluations further ascertained that the PCT, other component temperatures and MPC cavity pressure are similar to the scenario of an MPC-37 loaded with only intact fuel assemblies. The same conclusion can also be extended to MPC-37PCBS due to the similarity in MPC-37 and MPC-37PCBS designs.

RAI 4-5

[PROPRIETARY INFORMATION WITHHELD IN ACCORDANCE WITH 10CFR2.390]

Holtec RAI Response:

[PROPRIETARY INFORMATION WITHHELD IN ACCORDANCE WITH 10CFR2.390]

RAI 4-6

Provide the information in response to OBS 4-5 to TS appendix B, figures 2.3-14 (loading pattern 1) and 2.3-15 (loading pattern 2) to clarify the heat load limits for MPC-37P-CBS stored in the HI-STORM FW ventilated overpack.

In response to OBS 4-5 regarding the heat load limits presented in TS appendix B table 2.3-7A and figure 2.3-14 (loading pattern 1), and figure 2.3-15 (loading pattern 2) for the MPC-37P-CBS stored in a HI-STORM FW ventilated overpack, the applicant summarized all the requirements in notes 1 through 3 below:

1. per cell decay heat limits shall be equal to or below that specified in appendix B figures 2.3-14 and 2.3-15.

2. total MPC heat load shall not exceed 45 kW, and

3. total heat load in every quadrant defined in appendix B figure 2.1-4 shall not exceed 11.25 kW.

The applicant should add notes 2 and 3 to TS appendix B figures 2.3-14 and 2.3-15 to clearly describe that all limits shown in notes 1 through 3 are required for the loading patterns shown in figures 2.3-14 and 2.3-15.

The staff needs this information to determine compliance with 10 CFR 72.236(f).

Holtec RAI Response:

The following statement has been added to the notes below TS Appendix B Figures 2.3-14 and 2.3-15: "Total MPC heat load shall not exceed 45 kW. Total heat load in every quadrant defined in appendix B figure 2.1-4 shall not exceed 11.25 kW."

RAI 4-7

(A) Clarify the titles of appendix B, tables 2.3-1B and 2.3-1C or justify appendix A, table 3-1 for consistency, and

(B) Clarify whether MPC-37P and MPC-44, shown in appendix A, table 3-1, represent MPC-37P-CBS and MPC-44CBS.

In response to OBS 4-6, the applicant stated that the description of MPC-37P in appendix A, table 3-1 does not reference appendix B, tables 2.3-1B and 2.3-1C and no change is required to the titles of appendix B, tables 2.3-1B and 2.3-1C. However, the description of MPC-37 in appendix A, table 3-1 does refer to appendix B, tables 2.3-1B and 2.3-1C. On page 3.4-2 of appendix A, the description for MPC-37P with one or more assemblies > 45,000 MDW/MTU and ≤ 44.09 kW, it states "Pattern A in tables 2.3-1A, **B, C** of Appendix B." The applicant needs to either change the titles of appendix B, tables 2.3-1B and 2.3-1C or revise appendix A, table 3-1 for consistency.

Clarify whether MPC-37P and MPC-44 represent MPC-37P-CBS and MPC-44CBS or both (with CBS and without CBS) in appendix A, table 3-1, and the entire amendment application.

The staff needs this information to determine compliance with 10 CFR 72.236(f).

Holtec RAI Response:

(A) Holtec regrets the confusion caused by the contents of Appendix A, Table 3-1. Reference to Appendix B, Tables 2.3-1B and 2.3-1C on Page 3.4-2 of Appendix A have been deleted from Appendix A, Table 3-1. This is now consistent with the response provided to OBS 4-6 which is that Tables 2.3-1B and 2.3-1C are not applicable to MPC-37P.

(B) Yes, an MPC in the licensing document (FSAR, CoC, etc.) represents all its versions unless a particular version is called out in a particular statement. For instance, if a statement refers to MPC-89, that statement applies to MPC-89 with standard basket or MPC-89CBS (MPC-89 with CBS basket). At this time, only the CBS versions of the MPC-37P and MPC-44 baskets exist. Also see response to RAI 4-2.

RAI 4-8

(A) Explain why the temperature limits of the overpack steel inner shell, as shown in FSAR table 2.2.3, are different from the temperature limits of the remainder of the overpack steel structure under normal condition, short-term event, and off-normal/accident conditions, and

(B) provide rationales or sources (e.g., material books) for defining these temperature limits.

FSAR table 2.2.3 shows that the temperature limits of the overpack inner shell (steel) are 475°F, 700°F, and 800°F, respectively, under normal condition, short-term event, and off-normal/accident conditions, while the temperature limits of the remainder of the overpack steel structure are 350°F, 350°F, and 700°F, respectively, under normal condition, short-term event, and off-normal/accident conditions,

The applicant needs to A) explain why the temperature limits of the overpack steel inner shell are different from the temperature limits of the remainder of the overpack steel structure under normal condition, short-term event, and off-normal/accident conditions while they all are made of the same type of material, and B) provide rationales or sources (e.g., material books) for defining these temperature limits.

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

Holtec RAI Response:

(A) The reviewer's observation is right that the temperature limits of overpack inner shell under various conditions of storage are different from rest of the overpack steel structure although they are made of the same material. The material temperature limits in the FSAR are conservatively set at or below the ASME Section II and III temperature limits. The temperature limits of the HI-STORM FW overpack inner shell are set higher than the remainder of the overpack since the FSAR design basis thermal evaluations indicate greater maximum temperatures for inner shell compared to other overpack components under normal and short-term conditions.

(B) The FSAR temperature limits for the overpack steel components are set at or below the ASME Section II and III limits for the applicable material. The off-normal/accident temperature limits for the overpack inner shell are revised to 700°F in Table 2.2.3 of the FSAR consistent with the ASME Section II Part D. As explained in footnotes of Table 2.2.3, the structural evaluations supporting FSAR Chapter 3 are performed using conservatively bounding temperatures.

RAI 4-9

Provide clarification to items (A) and (B) below, in the amendment application.

FSAR table 4.5.32 shows peak cladding temperatures (PCTs) of 444°C (831°F) for high burnup fuel (HBF) at a threshold heat load of 30.0 kW and 368°C (694°F) for moderate burnup fuel (MBF) at a design heat load of 44.0 kW for drying operation of MPC-44 (or MPC-44-CBS). These PCTs are not consistent with the PCTs shown in Holtec report HI-2094400. Appendix Z of Holtec report HI-2094400 shows PCTs of 368°C for HBF at a threshold heat load of 30.0 kW (table Z.5.9) and 444°C for MBF at a design heat load of 44.0 kW (table Z.5.8).

(A) Revise fuel and component temperatures in FSAR table 4.5.32.to be consistent with tables Z.5.8 and Z.5.9 in appendix Z of Holtec report HI-2094400. Otherwise, explain why the PCT (444°C) for high burnup fuel at a threshold heat load of 30.0 kW exceed the 400°C limit as defined in ISG-11 Revision 3.

(B) Clarify whether MPC-44 represent MPC-44-CBS or both (with and without CBS) in FSAR table 4.5.19 and 4.5.32, Holtec report HI-2094400 tables Z.5.8 and Z.5.9, and in this amendment application.

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

Holtec RAI Response:

(A) As observed by the reviewer, there had been a transpositional error in the FSAR. The fuel and component temperatures in FSAR Table 4.5.32 are now corrected to be consistent with the values presented in Tables Z.5.8 and Z.5.9 in Appendix Z of HI-2094400.

(B) As discussed in the response to RAI 4-1 above, there is no non-CBS version of MPC-44 at this time.

RAI 4-10

(A) Provide information (e.g., calculations) to demonstrate how the MPC helium backfill pressure limit and the annulus air design pressure are determined/derived for MPC-44-CBS when stored in HI-STORM FW UVH.

(B) Clarify whether the MPC-44, shown in FSAR table 4.I.1.3, represents MPC-44, MPC-44-CBS, or both, as well as clarify representation of MPC-44 types (MPC44, MPC-44-CBS, or both) in this amendment application.

The applicant provided initial backfill pressure limits for MPC helium and annulus air, in the FSAR table 4.I.1.3, for MPC-44-CBS stored in HI-STORM FW UVH. Given that the UVH is not identical to the ventilated overpack in heat removal mechanism, the applicant needs to provide information (e.g., calculations) on how the MPC helium backfill pressure limit (41.0 - 44.0 psig at 70°F) and the annulus air design pressure (10 psig) are determined and derived.

Clarify whether the MPC-44, shown in FSAR table 4.I.1.3, represents MPC-44, MPC-44-CBS, or both. The applicant needs to clarify representation of MPC-44 types (MPC-44, MPC-44-CBS, or both) in this amendment application.

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

Holtec RAI Response:

The following responses are applicable to all MPCs, including MPC-44, loaded into HI-STORM FW UVH system. Detailed calculations specific to MPC-44 are presented in Appendix C of HI-2200191.

(A)

i. MPC Backfill Pressure Limits: While the UVH system differs from the ventilated systems in the heat removal mechanism *outside the MPC*, the thermal and flow mechanisms inside the MPC remain essentially the same as those in the ventilated systems. Therefore, the MPC-44 helium backfill pressure limits are derived using the previously accepted methodology in the HI-STORM FW FSAR for ventilated systems presented in Section B.5.3 of the supporting thermal calculation package, HI-2094400. In summary, the initial helium backfill pressure limits are established to ensure the operating pressure remains below design pressure limits under all conditions of storage. A range is provided for operational purposes.

ii. Annulus Pressure:

a. Backfill Pressure Limits: As presented in Section 4.I.1.4 of the FSAR, the maximum annulus fill pressure is computed on a site-specific basis such that the design basis maximum internal pressure provided in Table 2.I.2.3 is satisfied. The methodology to compute the site-specific initial fill pressure has been added to Section 4.I.1.4 of the FSAR. Additionally, the site-specific annulus fill requirements are also identified in the operational procedures in Supplement 9.I.

b. Maximum Operating Pressure: The maximum annulus operating pressure for HI-STORM FW UVH loaded with any of the permitted MPCs is computed using ideal gas law and the maximum initial annulus fill pressure. This has been added to Section 4.I.4.1 of the FSAR and detailed in Section A.6.3 of the supporting thermal calculation package (HI-2200191). In addition to this, the maximum annulus operating pressure is limited by the pressure venting mechanism described in Section 1.I.2. This “lid lift-off pressure” specification has been added to Table 2.I.2.3.

c. Design Pressure: The annulus design pressures are derived from structural analyses documented in the structural calculation package (HI-2094418 Supplement 43) and presented in Table 2.I.2.3 of the FSAR.

(B) As discussed in prior responses, there is only CBS version of MPC-44 at this time.

<u>RAI 4-11</u>

Provide worksheets of “HI-DRIP-sizing-requirements.xlsx” and “HI-DRIPsizing.xmcd” for staff’s further review of the sizing methodology and the correlation of the design parameters for HI-TRAC VW transfer cask used in HI-STORM FW system.

The applicant described A) estimation of the heat rejection rate from the HI-TRAC, using the heat transfer coefficient and the temperature difference between HI-TRAC cask surface and ambient temperature in appendix N.5.21 of Holtec report HI2094400, *Thermal Evaluation of HI-STORM FW*; B) sizing methodology of HI-DRIP auxiliary cooling system in appendix N.5.22 of Holtec report HI-2094400; and C) design parameters of the HI-DRIP auxiliary cooling system design in table N.21 of Holtec report HI-2094400.

The applicant needs to provide worksheets of “HI-DRIP-sizing-requirements.xlsx” and “HI-DRIP-sizing.xmcd” for staff’s review on sizing methodology and correlation of the design parameters.

This information is needed to determine compliance with 10 CFR 72.236(b) and (f).

<u>Holtec RAI Response:</u>

The supporting worksheets are shared with the NRC Staff as part of this response. It is also noted that the spreadsheet “HI-DRIP-sizing requirements.xlsx” is obsolete and not used in the HI-DRIP calculations. All the necessary calculations are contained within the worksheet “HI-DRIP-sizing.xmcd”. This editorial oversight in Section N.5.22 if HI-2094400 has been corrected and the description in this appendix has been revised.

It is also noted that the calculations performed and documented in this Mathcad sheet follow the same methodology as that was reviewed and accepted by the USNRC in HI-STORM 100 LAR 1014-15 (ML19277G818).

RAI 4-12

Provide a general description/instruction in FSAR chapter 9, “Operating Procedures,” for performing the HI-DRIP cooling system operations at the independent spent fuel storage installation (ISFSI) sites.

In response to OBS 4-3, the applicant described detailed methodology for sizing and determining the specifications of the HI-DRIP cooling system for HI-TRAC transfer cask and documented the methodology and calculations in appendix N of the Calculation Package HI-2094400, *Thermal Evaluation of HI-STORM FW*.

To ensure effective operations of the HI-DRIP cooling system, the applicant needs to include a general description in FSAR chapter 9, “Operating Procedures,” for performing the HI-DRIP cooling system operations at the ISFSI sites. The description/instruction could include, but are not limited to, transfer cask decontamination, sizing of the HI-DRIP components, determination of operating parameters (e.g., minimum cooling water flow rate), and time-to-boil (TTB) clock (caution: no later than 50% of the allowable TTB duration).

This information is needed to determine compliance with 10 CFR 72.236(b) and (f).

Holtec RAI Response:

In accordance with the NRC Staff’s request, Chapter 9 of the HI-STORM FW FSAR is revised to outline the necessary steps to operate the HI-DRIP cooling system. Specifically, the steps for initiation and termination of the HI-DRIP system are identified. Cautionary note is added to ensure initiation of the system within 50% of the time-to-boil duration. As noted in Section 4.5.7 of the FSAR, the HI-DRIP system sizing and flow rate calculations shall be performed on a site-specific basis. This is also identified within the relevant operational steps in Chapter 9.

RAI 4-13

Provide clarifications on questions A), B), and C) below.

The applicant stated in FSAR section 9.I.2.6 that “if the site is using non-oxidizing gas in place of air in the annulus, evacuate air in the MPC/HI-STORM FW UVH annulus and replace with dry nitrogen (or another non-oxidizing gas) using couplings provided in the small penetrations in the cask body. The target fill pressure of the nonoxidizing fill gas shall be determined on a site-specific basis to meet the design pressure indicated in FSAR table 4.I.1.3.” Licensing drawing 11897 (sheet 1 of 2) also notes that the pressure in the annulus shall be evacuated to the pressure value stated in the FSAR and air may be replaced with non-oxidizing gas such as nitrogen.

(A) The applicant should provide criteria/conditions, in FSAR chapter 9, for the use of non-oxidizing gas at sites, procedure on full evacuation of air and replacement with non-oxidizing gas, and derivation of required pressure of nonoxidizing gas in annulus to ensure no compromise on heat removal capacity from the cask.

(B) Provide the criteria pressure value of the annulus air that needs to be evacuated before filling the non-oxidizing gas.

(C) Clarify MPC-44, listed in FSAR table 4.I.1.3, refer to MPC-44, MPC-44CBS, or both.

This information is needed to determine compliance with 10 CFR 72.236(b) and (f).

Holtec RAI Response:

(A) The option of using a non-oxidizing gas in the HI-STORM FW UVH annulus has been removed. Thus, the queries pertaining to criteria and calculations of evacuation/backfill pressure for non-oxidizing gases therefore do not apply at this time. The methodology to compute the initial annulus air fill pressure and the annulus operating pressure have been added to Section 4.I.1.4 of the FSAR. A brief description is also provided in the response to RAI 4-10. Table 9.I.2.1 related to evacuation and backfill equipment has been removed from the chapter.

(B) The option of using a non-oxidizing gas in the HI-STORM FW UVH annulus has been removed. Thus, the queries pertaining to evacuation pressure criteria do not apply at this time. Additionally, note 5 has been removed from Drawing 11897.

(C) As discussed in the response to RAI 4-1 above, there is no non-CBS version of MPC-44 at this time.

RAI 5-1

Provide the design parameters for the new BWR 10x10J fuel assembly used in the source terms and shielding calculations.

The applicant requests to add BWR 10x10J fuel assembly as approved content; however, the applicant did not provide any design parameters information in the FSAR shielding chapter.

This information is needed for the staff to confirm compliance with 10 CFR 72.236(b) and 10 CFR 72.236(d) for sufficient radiation shielding to meet 10 CFR 72.104 and 10 CFR 72.106.

Holtec RAI Response:

Table 2.1.3 of the FSAR provides critical characteristics of the new BWR 10x10J fuel assembly.

The typo in the fuel pellet diameter in Table 2.1.3 of Chapter 2 has been fixed. The typo in the fuel pellet diameter in Table 2.1-3 of CoC Appendix B has been fixed.

The additional design parameters for the new BWR 10x10J fuel assembly used in the source terms and shielding calculations have been added in Appendix Y of HI-STORM FW and HI-TRAC VW Shielding Analysis, HI-2094431, Revision 30.

RAI 5-2

Demonstrate by calculations that the BWR 10x10J fuel assembly is bound by the design basis BWR GE 10x10.

The applicant requests to add BWR 10x10J fuel assembly as approved content; however, the applicant did not provide any information to demonstrate how this fuel assembly is bounded by the design basis fuel assembly in the source terms analysis.

This information is needed for the staff to confirm compliance with 10 CFR 72.236(b) and 10 CFR 72.236(d) for sufficient radiation shielding to meet 10 CFR 72.104 and 10 CFR 72.106.

Holtec RAI Response:

Consideration of the higher fuel weight of the assembly class 10x10J for shielding calculations

The newly introduced assembly class 10x10J has a slightly higher uranium weight than the design basis assembly class (10x10A). The following write-up discusses the impact on dose rates around the cask, the possible ways to address this in the context of the licensing of the fuel, and the considerations that lead to the proposed approach.

Dose effect

Based on the assumption that all rods are full length for both classes, the weight difference is about 10%. The increased fuel weight results in accordingly increased nuclear source terms, which would tend to increase dose rates, but also in increased self-shielding of the fuel in the radiation transport analyses which would tend to reduce dose rates. The net effect is therefore not immediately clear, hence initial dose calculations were performed to evaluate the effect. They showed that this increase in weight would in fact result in a small increase in dose rates around the cask, on average about 5%.

Principal Solutions

There are two principal options to address this situation

- Option 1: Use 10x10J as the new design basis fuel in the FSAR. This way, no further justification would be needed.
- Option 2: Introduce some adjustment in the loading requirements for the 10x10J, so that after this adjustment is applied, the dose rates around a cask loaded with 10x10J fuel assemblies would be essentially the same as that for a cask loaded with the design basis fuel assembly, without such adjustments, specifically for locations with higher dose rates. This way, the design basis assembly would remain unchanged.

From a licensing perspective, the Option 1 would be the easier approach. However, from a practical and implementation perspective, it would result in a significant amount of work, since the design basis assembly is used for many calculations, and those would need to be adjusted. Also, this would create additional conservatisms for all other fuel assembly types, in a situation where calculated dose rates are already being found to be generally more conservative compared to measured values. Option 2, while not as logical from a licensing perspective than Option 1, requires significantly less work, and avoids the additional conservatism.

Option 2 was chosen to address the weight issue for the 10x10J for the HI-STORM FW.

Selected Approach

Content defined by a loading curve, i.e. for the patterns in Figures 1.2.6 and 1.2.7 of the FSAR
When staying with design basis fuel and design basis source terms, there are only 2 parameters that can be adjusted to affect dose rates, namely burnup and cooling time (note that enrichment is already assumed to be a conservatively low value, so that parameter is not available as a mean of an adjustment).

Cooling time is a parameter with a highly non-linear effect on dose rates, i.e. the same change in dose rate that only a small change in cooling time generates at a very short cooling time would require a much larger cooling time change at longer cooling times. Direct adjustments in cooling time (i.e. a fixed increase) are therefore not an appropriate way to adjust dose rates.

Hence the adjustment is applied to the burnup. Initially, given the fact that the fuel weight is 10% higher, one may consider increasing the burnup by the same percentage. However, an increase in burnup by a certain percentage will not necessarily result by an increase in dose rate by the same amount. There are various reasons for that. One is the self-shielding of the fuel, which would result a reduced effect on dose rate. One other is the non-linearity of the neutron source as a function of burnup, which increases by the burnup to about the power of 4, so neutron dose rates may increase far more than proportional to a percentage. On other noticeable finding from the initial dose rate calculations is that the impact can be very different at different locations around the cask. Given that the impact is not initially clear, several different burnup adjustments were tested, including an increase by 10%, and increases by various fixed amounts, between 1,000 MWd/mtU and 10,000 MWd/mtU. The results showed that an increase of 10% did not result in dose rates that are consistently below those of the design basis calculations without the adjustment. In some cases, some of the higher dose rates around the cask were higher by up to 25%. This therefore did not achieve the goal of having comparable dose rates from the cask with 10x10J assemblies and the burnup adjustment for locations with higher dose rates. The calculations with fixed burnup increases were reviewed, and the increase was selected that achieved the stated goal. Through this, for the patterns in Figures 1.2.6 and 1.2.7 of the FSAR, an increase of 5,000 MWd/mtU was identified, and for the pattern in Table 1.2.4a of the FSAR, an increase of 10,000 MWd/mtU was identified to achieve the goal.

Applying the adjustment is simple, due to the way burnup and cooling time limits are defined for the 10x10J, and does not require any additional source term calculations. For this assembly, the approach in Section 2.5.1 of the CoC (Paragraph 2.1.6.1 of the FSAR), together with the coefficients in Table 2.5-2 (Table 2.1.10 of the FSAR) are applicable. This approach results in the calculation of a minimum cooling time as a function of burnup. Note that the decay heat limit is only used as a convenient reference to the different cell locations in the basket, and do not imply that meeting a burnup and cooling time limit will ensure that the decay heat limit is met, and vice versa. The adjustment is then applied to the burnup that is used to determine the cooling time. For example, for an assembly with a burnup of 45,000 MWd/mtU, and an adjustment of 5,000 MWd/mtU, the cooling time is calculated using a burnup of 50,000 MWd/mtU instead of the 45,000 MWd/mtU. , and that higher cooling time limit is then used for fuel with a burnup of 45,000 MWd/mtU. Hence, in a sense, the adjustment is made to the cooling time, but indirectly through the burnup that is used with the polynomial, since a direct adjustment of the cooling time would not be feasible due to the highly nonlinear effect of the cooling time on the dose rates.

Adjustment to content for earlier 3-region loading patterns (Table 1.2.4a of the FSAR)

For the patterns defined in Table 1.2.4a of the FSAR, no loading curves are defined hence that are no curves were an adjustment can be applied to. Therefore, for these loading patterns, a set of acceptable burnup and cooling time combinations is directly defined that satisfies the requirements that dose rates are about the same as for the design basis conditions.

Summary

In summary, the 10x10J assembly type is being qualified for loading into the MPC-89, by applying an adjustment of the burnup and cooling time requirement for this fuel, or by specifying discrete cooling time limits as a function of burnup, which ensures that the dose rates from a cask loaded with this fuel shows about the same dose rates as a cask loaded with design basis fuel and analyzed without such adjustment.

Other considerations

All fuel depletion calculations for Holtec's Dry Storage systems, including the HI-STORM FW and the earlier developed and licensed HI-STORM 100 have been performed with a standard set of parameters, including axial burnup profiles, void percentage (for BWR), fuel and water temperatures, and power densities. Also, for BWR fuel, the existence of shorter (part length) rods has been ignored, i.e. all fuel rods are consider to be at full length which increases the uranium weight in the model. These parameters had been established as reasonable for the purpose of calculating dose rates under storage conditions early on, and have been applied to all assemblies, including assemblies added since the initial submittal and approval. The same parameters have been used when adding the 10x10J assembly class.
~~Additional source terms and MCNP calculations have been performed and documented in Appendix Y of HI-STORM FW and HI-TRAC VW Shielding Analysis, HI-2094431, Revision 30. This appendix discusses dose rates comparison between HI-STORM FW / HI-TRAC VW loaded with BWR 10x10J fuel and HI-STORM FW / HI-TRAC VW loaded with BWR GE10x10 design basis fuel.~~

~~A higher fuel weight of 10x10J results in larger neutron and gamma source terms for a given burnup, enrichment, and cooling time combination. In order to maintain dose rates for cask loaded with BWR 10x10J fuel type below or similar to the dose rates for cask loaded with BWR 10x10 design basis fuel additional penalties are introduced in Table 2.1.10 of Chapter 2 and in Table 2.5-2 of CoC Appendix B for BWR 10x10J fuel type.~~

~~A sentence is added in paragraph 2.1.6.1 of Chapter 2 to indicate that burnup and cooling time combinations in Table 2.1.10 also apply for 10x10J fuel loaded according to heat load regions shown in Table 1.2.4a.~~

~~A sentence is added in paragraph 2.5.1 of CoC Appendix B to indicate that burnup and cooling time combinations in Table 2.5-2 also apply for 10x10J fuel loaded according to heat load regions shown in Tables 2.3-2A, 2.3-2B and 2.3-4.~~

~~The dose rate calculations in Appendix Y of HI-STORM FW and HI-TRAC VW Shielding Analysis, HI-2094431, Revision 30 demonstrate that dose rates for casks loaded with BWR 10x10J fuel with a penalty are lower or similar to the dose rates for casks loaded with BWR GE10x10 design basis fuel, hence the update of the design basis results in Section 5.1 of the FSAR is not necessary.~~

RAI 8-1

Clarify if the strength of the bolting that attaches the continuous basket shims to the fuel basket (i.e., for the new MPC-44-CBS and MPC-37P-CBS) is relied on in any mechanical loading scenarios and, if so, justify the absence of a materials standard in FSAR table 3.3.4 "Bolting Material Properties" to provide minimum mechanical property requirements.

FSAR section 3.1.1 states that the shims experience significant loadings in the nonmechanistic tipover events from cantilever loads. It is unclear if the attachment bolts have a role in these loading cases. If so, define the material procurement controls (e.g., material standard) that ensure that the bolts are capable of performing their structural function.

The staff notes that the general class of material for the bolts is included in the property tables in FSAR chapter 3; however, those properties are stated to be applicable to the forging and plate product forms.

This information is needed to demonstrate compliance with 10 CFR 72.236(b) and (c).

Holtec RAI Response:

The function of the attachment bolts connecting the continuous basket shims (CBS) to the extended panels of the fuel baskets is to maintain the axial connectivity of the basket panels during normal operations. The bolts do not experience any significant loads during the applicable mechanical loading scenarios under all conditions.

FSAR Subsection 3.1.1 states that the basket panel extensions, and not the shims, may be subject to cantilever loads during the nonmechanistic tipover event in the CBS basket designs. However, the attachment bolts do not experience any loading from to the cantilever action of the panel extensions as they are aligned perpendicular to the panel's face.

For completeness, a new paragraph 3.3.2d is added in FSAR to discuss "CBS Bolts and Nuts" and a reference to FSAR Table 3.3.1 is provided.

RAI 8-2

Clarify the drawing references to the requirements of the concrete used in the UVH overpack.

The HI-STORM FW FSAR proposed Drawing 11897 for UVH contains unclear references regarding the requirements and density of the concrete used in the overpack body and lid. FSAR Drawing 11897, Flag Note 1, states that the plain concrete in the UVH overpack body and lid shall comply with FSAR section 3.2, "Weights and Centers of Gravity", which does not contain necessary requirements for fabrication requirements and material properties of the plain concrete.

However, FSAR Drawings 6494, 6508, and 9964 state that concrete used in the existing HI-STORM FW ventilated overpacks shall meet the requirements of FSAR table 1.2.5 and the requirements of HI-STORM 100 FSAR Appendix 1.D.

SAR section 5.I.3 states that a minimum of 200 pcf density concrete is required for enhanced thermal conductivity as specified in table 1.D.1 of HI-STORM 100 FSAR Appendix 1.D, but neither section 5.I.3 nor the HI-STORM 100 FSAR are referenced in Drawing 11897.

This information is required to demonstrate compliance with 10 CFR 236(b).

Holtec RAI Response:

The FSAR Drawing 11897, Flag Note 1, has been updated to clarify that "CONCRETE USED IN THE HI-STORM FW VERSION UVH OVERPACK BODY AND LID SHALL MEET THE REQUIREMENTS DEFINED IN FSAR TABLE 1.I.2.1 AND THE REQUIREMENTS IN THE HI-STORM 100 FSAR APPENDIX 1.D., LATEST REVISION."

Concrete properties mentioned in FSAR Supplement Sections 1.I.2 and 5.I.3 for the HI-STORM FW Version UVH Overpack body have been moved to a new Table 1.I.2.1.

RAI 8-3

Clarify the referenced emissivity values for the MPC-44 fuel basket.

The proposed FSAR Drawing 12288, Flag Note 1, states that the basket panels and shims are coated to achieved emissivity values in accordance with the HI-STORM FSAR table 1.2.8B; however, it does not identify which specific HI-STORM system (i.e., FW, 100, UMAX) this FSAR is referring to.

This information is required to demonstrate compliance with 10 CFR 72.236(b).

Holtec RAI Response:

The FSAR Drawing 12288, Flag Note 1, first bullet, has been updated to clarify "HI-STORM FW FSAR TABLE 1.2.8B (STORAGE)."

RAI 9-1

Revise the proposed FSAR section 9.I.2.6 to provide clear step-by-step instructions on the installation of lid studs, washers, and hex nuts after the lid is placed on top of the gasket.

In Amendment No. 7, HI-STORM FW proposed FSAR section 9.I.0, "Introduction," states: "The operations associated with the use of the HI-STORM FW UVH system, described in Supplement 9.I, are like the operations for the standard HI-STORM FW system. The following sections describe those operations that are, in any respect, unique to the HI-STORM FW UVH system and thus supplement the information presented in Chapter 9. Where practical, the section numbers used below directly references the corresponding section in Chapter 9. For example, Section 9.I.2.6 supplements the operations described in Section 9.2.6. The guidance provided in this supplement shall be used along with the operations procedures provided in chapter 9 to develop the site-specific operating procedures for the HI-STORM FW UVH." The proposed FSAR section 9.I.2.6, "Placement of HI-STORM FW UVH into Storage," states to incorporate the following instructions into the existing instructions in the official FSAR revision 9 (ML21169A040) section 9.2.6.

- The proposed FSAR section 9.I.2.6 step 1 states, "Before installing the Closure Lid on the cask body, the lid gasket is placed on the top of the cask's top ring."
- The proposed FSAR section 9.I.2.6 step 3 states, "Place cask lid on top of the gasket."
- The proposed FSAR section 9.I.2.6 step 5 states, "After the cask is placed in its storage location on the ISFSI pad install lid studs, washers, and hex nuts onto the cask."
- The proposed FSAR section 9.I.2.6 step 6 states, "Tighten lid hex nuts to the point of contact with the washer. Then loosen nut to provide a nominal axial gap of 0.5 inches."

In the official HI-STORM FW FSAR revision 9, the existing section 9.2.6, "Placement of HI-STORM FW into Storage," step 14.a states: "Remove the mating device." In step 14.c it states: "Install the HI-STORM FW lid and the lid studs and nuts or lid closure bolts." Step 14.f states: "Secure HI-STORM FW to the transporter device as necessary." Step 14.h states: "Transfer the HI-STORM FW to its designated storage location at the appropriate pitch."

It is clear from the existing instruction in section 9.2.6, steps 14.a, 14.c, 14.f and 14.h, that a ventilated overpack lid must be mechanically fastened down (attached) to the overpack body prior to transferring the HI-STORM FW to its storage location at an ISFSI. However, it is not clear whether the cask lid for the UVH is to be mechanically fastened down (attached) to the overpack body after placing the lid on top of the gasket prior to transferring the MPC loaded HI-STORM FW UVH to its storage location at an ISFSI. The proposed FSAR section 9.I.2.6 step 5 only states that after the UVH cask is in its storage location on the ISFSI pad to install the lid studs, washers, and hex nuts onto the cask.

The UVH cask cannot be transported to its final location on a ISFSI pad after the stack up operation and having its lid placed on the top of the gasket without the lid being mechanically fastened (attached) to the UVH cask. With the lid resting on the UVH cask without fastening it to the cask during cask transport, the accident analyses will be invalidated. If a transport trailer is used to transport a MPC loaded UVH cask, the cask lid must first be mechanically attached to the UVH cask. Provide clear new step-by-step instructions in FSAR section 9.I.2.6 that after the lid is placed on the top of the gasket, how will the lid studs, washers, and hex nuts be installed and the lid hex nuts hand tightened to contact the washers. Only after the UVH cask is at its final ISFSI location shall the nuts be loosened to provide a 0.5-inch axial gap.

If a Vertical Cask Transporter (VCT) is used to transport a MPC loaded UVH cask, revise the proposed FSAR section 9.I.2.6 to provide procedural steps on how to attach the VCT special lifting devices so that the mechanical connection does not crush the gasket under the lid. If a VCT is used for transport, only after the UVH cask is at its final location on the ISFSI pad and the VCT special lifting devices removed, invoke new section 9.I.2.6 steps 5 and 6.

This information is needed to determine compliance with 10 CFR 72.234(f).

<u>Holtec RAI Response:</u>

FSAR Section 9.I.2.6 has been reformatted and additional details added to more clearly indicate the additional steps needed for the HI-STORM FW Version UVH.

Furthermore, additional information regarding lid hardware steps applicable to both Ventilated and UVH HI-STORMs has been added to Section 9.2.6 in the FSAR.

<u>RAI 9-2</u>

Revise the FSAR chapter 9 to include appropriate steps/instructions/table line items to address the addition of the HI-DRIP system in the HI-STORM FW system. These steps/instructions should be the same or similar to the ones addressing the HI-DRIP system in HI-STORM 100 FSAR revision 22 (ML21221A329) chapter 8.

The proposed FSAR section 4.5.7, “HI-DRIP,” states that the HI-DRIP system has been approved for use with HI-STORM 100 system. In HI-STORM 100 FSAR revision 22, chapter 8: “Operating Procedures,” the following steps and table addition have been added to the operating procedures to address the HI-DRIP system.

- On page 8-20, step u: If used, the HI-DRIP Cooling System may be installed and initiated.
- On page 8-26, step b: Stop HI-DRIP Cooling System, if used.
- On page 8-28, step 7b: Stop HI-DRIP Cooling System, if used.
- On page 8-48, in table 8.1.6, “HI-STORM 100 SYSTEM ANCILLARY EQUIPMENT OPERATIONAL DESCRIPTION,” the following line has been added:

HI-DRIP Cooling System	Not Important To Safety	1.2.1.9	Optional Ancillary used for prevention of loaded MPC from boiling during interval between when the HI-TRAC has been removed from the Spent Fuel Pool and prior to MPC Drying and Backfill.

In the HI-STORM FW proposed FSAR for Amendment No. 7, there is no step/instruction/table line item in chapter 9, "Operating Procedures," that addresses the HI-DRIP Cooling System like those shown above in chapter 8 of the HI-STORM 100 FSAR revision 22. Add the same or similar steps/instructions/table line item as shown above for the HI-DRIP at the appropriate locations in the HI-STORM FW FSAR in chapter 9, "Operating Procedures."

This information is needed to determine compliance with 10 CFR 72.234(f).

Holtec RAI Response:

The requested information has been added to Chapter 9, Operating Procedures.

RAI 9-3

Revise paragraph 1.b.ii of the FSAR to provide guidance for calculating the cooling time limit for MPC-37P and MPC-44 assemblies.

In the HI-STORM FW official FSAR revision 9, section 9.2.3, "MPC Fuel Loading," paragraph 1.b.ii provides guidance for calculating the cooling time limit for MPC-37, MPC-89, and MPC-32ML assemblies. MPC-37P-CBS and MPC-44-CBS have been added in Amendment No. 7; however, no new guidance is added to paragraph 1.b.ii in the proposed FSAR for MPC-37P and MPC-44.

Revise paragraph 1.b.ii of FSAR to provide guidance for calculating the cooling time limit for MPC-37P and MPC-44 assemblies.

This information is needed to determine compliance with 10 CFR 72.234(f).

Holtec RAI Response:

The information regarding MPC-37P and MPC-44 cooling time calculations has been added to Section 9.2.3, paragraph 1.b.ii.

RAI 10-1

Revise HI-STORM FW FSAR chapter 10, "Acceptance Criteria and Maintenance Program," to include the acceptance testing and testing process for the HI-DRIP system in section 10.1.7 for the HI-STORM FW system.

The proposed HI-STORM FW FSAR section 4.5.7, "HI-DRIP," states that the HIDRIP system has been approved for use with HI-STORM 100 system.

HI-STORM 100 FSAR revision 22, section 9.1.6.1, "Supplemental Cooling System Thermal Acceptance Testing," provides acceptance testing for the HI-DRIP system when used with the HI-STORM 100 system. In section, 9.1.6.1.1, "HI-DRIP Supplemental Cooling Thermal Acceptance Testing," the process for testing the HIDRIP System is provided.

Revise HI-STORM FW FSAR chapter 10, "Acceptance Criteria and Maintenance Program," to include similar information on the HI-DRIP system in section 10.1.7 for the HI-STORM FW system as was done for the HI-STORM 100 system. Explain if the HI-DRIP system testing described in the HI-STORM 100 FSAR revision 22 is applicable to the HI-STORM FW system or describe HI-DRIP system testing required when the HI-DRIP system is used with the HI-STORM FW system.

This information is needed to determine compliance with 10 CFR 72.234(f).

Holtec RAI Response:

Added Section 10.1.7.1 to address Supplemental Cooling System Thermal Acceptance Testing.

RAI 12-1

Provide information in HI-STORM FW FSAR chapter 12, “Accident Analysis,” to address the situation of using the HI-DRIP system when a power failure occurs. This information should be similar to that provided in HI-STORM 100 FSAR Section 11.II.1.7.

The proposed HI-STORM FW FSAR section 4.5.7, “HI-DRIP,” states that the HI-DRIP system has been approved for use with HI-STORM 100 system. In HI-STORM 100 FSAR revision 22, Supplement chapter 11.II, “Safety Evaluation of Accident Conditions,” section 11.II.1.7, “Power Failure in an Active Cooling System” discusses the HI-DRIP system operation should a power failure occur.

Provide similar information in HI-STORM FW FSAR chapter 12, “Accident Analysis,” as was done for the HI-STORM 100 system should a power failure occur when using the HI-DRIP system for the HI-STORM FW system.

This information is needed to determine compliance with 10 CFR 72.236(f) and (l).

Holtec RAI Response:

Unlike the HI-STORM 100 System, the HI-STORM FW System does not use any active cooling systems. The HI-DRIP used in both the HI-STORM 100 and FW Systems is a passive system. New Section 12.1.6 has been added to the HI-STORM FW FSAR to clarify this point.

Editorial Changes

Consider the following editorial changes to the HI-STORM FW FSAR:

(A) Table 9.I.2.3, change UV to UVH in the title.
(B) Section 12.I.0, “Introduction,” change UV to UVH at two locations in the paragraph.
(C) Table 12.I.1 for the Burial-under-debris event, change UV to UVH at four locations in the comment block.

Holtec RAI Response:

(A) Title corrected
(B) Text corrected
(C) Comment block corrected