

## **SUMMARY OF PROPOSED CHANGES**

### **Proposed Change No. 1**

Instrument tube tie rods (ITTRs) are added to the approved contents as non-fuel hardware. All modifications are a result of this proposed change. Editorial and minor text changes are made to the HI-STORM 100 Cask System Certificate of Compliance (CoC) wording as follows:

- Change Amendment Number, Effective Date and Licensing Chief to “TBD”.
- Appendix B, Section 1.0; added the words “instrument tube tie rods (ITTRs),” to the definition of NON-FUEL HARDWARE.
- Appendix B, Table 2.1-1, Section I, Note 1; added the words “with or without ITTRs,” to the note. This change is also made to Note 1 of Section IV and V of Table 2.1-1.
- Appendix B, Table 2.1-1; Page numbers were modified as necessary.
- Appendix B, Table 2.1-8
  - Note 8 was added to the table stating “Non-fuel hardware burnup and cooling times are not applicable to ITTRs since they are installed post-irradiation.”
  - Reference to Note 8 was added in the title of the table.

Additionally, the following changes are made to the HI-STORM FSAR:

- FSAR Section 1.0; added the words “instrument tube tie rods (ITTRs),” to the definition of Non-fuel hardware.
- FSAR Section 2.1, Table 2.1.17, Table 2.1.20 and Table 2.1.24; In the column labeled “Value” in the row labeled “Other Limitations” the text “with or without ITTRs,” is added to the bullet beginning “BPRAs...”
- FSAR Section 2.1, Table 2.1.25
  - Note 8 was added to the table stating “Non-fuel hardware burnup and cooling times are not applicable to ITTRs since they are installed post-irradiation.”
  - Reference to Note 8 was added in the title of the table.
- FSAR Section 5.0, page 5.0-2
  - Deletion of the text “yet removable”
  - Addition of the text “, with the exception of instrument tube tie rods (ITTRs), which may be stored in the assembly along with other types of non-fuel hardware”
- FSAR Section 5.0; add “n” to “patters” to create the correct word “patterns”
- FSAR Section 5.4, page 5.4-11; change the 2<sup>nd</sup>, 3<sup>rd</sup>, and 4<sup>th</sup> sentences of 1<sup>st</sup> paragraph of subsection 5.4.6 to read:

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“Since each of these devices occupy the same location within an assembly (i.e., the guide tubes), only one of these devices will be present in a given assembly. ITTRs, which are installed after core discharge and do not contain radioactive material, may also be stored in the assembly. BPRAs, TPDs and ITTRs are authorized for unrestricted storage in an MPC.”

- FSAR Section 6.4, page 6.4-16; add:

“An Instrument Tube Tie Rod (ITTR) is inserted into the instrument tube and is permitted for storage with all PWR assemblies. Studies for representative PWR assemblies, including the assembly with the lowest margin (15x15F in the MPC-32), with voided instrument tubes confirm that this condition is equivalent to or bounded by the condition with flooded instrument tubes. An ITTR in the assembly instrument tube is therefore acceptable in all PWR assembly types, and all results and conclusions for PWR fuel assemblies without an ITTR are directly applicable to PWR assemblies with an ITTR.”

### **Reason for Change**

The changes detailed are necessary to provide adequate description and justification that the addition of ITTRs to the approved contents of the HI-STORM CoC are within the bounds of the safety analysis presented in the HI-STORM FSAR.

### **Justification for Change**

#### **Structural**

The maximum weight requirement for PWR fuel assemblies, which includes the weight of any non-fuel hardware or damaged fuel container, remains unchanged. All structural calculations are performed with the maximum weight; therefore no further structural calculations are necessary.

#### **Thermal**

An ITTR is a long stainless steel rod inserted in the PWR instrument tube located in or near the center of the fuel assembly. The principal effect of the ITTR on the thermal design of the HI-STORM cask is the blockage of the instrument tube flow area for thermosiphon cooling and reduction in the free volume of the MPCs.

The flow blockage is bounded by the HI-STORM thermal analysis because solid (i.e. blocked) guide tubes and instrument tubes are assumed in the flow resistance calculations. The ITTRs under a bounding fuel loading scenario (MPC-32 canister and ITTRs inserted in all storage locations) displace a miniscule volume ( $0.4 \text{ ft}^3$ ) relative to the free volume of the MPC-32 ( $226.5 \text{ ft}^3$ ).

#### **Shielding**

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ITTRs are installed into spent fuel assemblies post-irradiation. Since these devices do not add to the source term, it is conservative to neglect the steel associated with the ITTR for the shielding analysis

### **Criticality**

The current criticality analysis assumes that the instrument tube of the PWR assembly remains flooded with spent fuel pool water. This water includes credit for soluble boron as necessary for demonstration that the appropriate regulatory requirements for reactivity are met. Studies for representative assemblies with voided instrument tubes confirm that this condition is equivalent to or bounded by the condition with flooded instrument tubes.

### **Confinement**

The MPC meets the appropriate guidance defined in ISG-18 and therefore there is no radioactive leakage from the MPC. The presence of an ITTR in the instrument tubes does not change the justification that there is no credible leakage from the MPC.

### **Operations**

The ITTRs do not change the operation or loading of the MPC.