

## Clarification Request for Additional Information

### Docket No. 72-1040 Certificate of Compliance No. 1040 Amendment No. 4 to the HI-STORM UMAX Canister Storage System

#### Chapter 6 – Shielding Evaluation

6-1

##### NRC Clarification:

Holtec provided a supplemental response to RAI 6-1 on 12/20/2019 (ML20002A425) stating that it modified the dose rate in Section 5.3.4 of the CoC to be approximately 1.5 times the dose rate reported in the FSAR for both the standard and Version B lids. The staff summarized discussion from the previous clarification call held on 12/6/2019 (ML19345E201) and re-emphasized that a basis/justification for the Technical Specifications (TS) dose rate limits should be provided in the FSAR analysis for UMAX Amendment 4. Staff understands the justification and calculated dose rates in the FSAR (i.e., 66 mrem/hr for the standard lid and 22 mrem/hr for the Version B lid), but was not understanding the connection to the higher dose rate limits (i.e., 90 mrem/hr for the standard lid and 30 mrem/hr for the Version B lid) that Holtec had proposed for the TS. Holtec is planning to provide an additional supplemental response to RAI 6-1 to revise the proposed TS dose rate limits to match the dose rates calculated in the FSAR.

##### Holtec Response:

The dose limits in 5.3.4.a of the CoC Appendix A are revised to be 66 mrem/hr for the standard lid and 22 mrem/hr for the Version B lid for casks loaded subsequent to issuance of amendment 4. These are the same calculated dose rate values reported in the SAR Table 5.4.7 and supporting calculation packages.

The dose limits in 5.3.4.a of the CoC Appendix A are revised to 1 mrem/hr for casks loaded prior to issuance of amendment 4. This is the same calculated dose value reported in the calculation package for location #1.

The methodology for determining the dose rate limits for casks loaded prior and subsequent to amendment 4 is the same. The difference in dose rates results from the difference in dose measurement locations. The revised measurement location for casks loaded subsequent to amendment 4 ensures that the appropriate location of dose rate is measured. However, it is important to note that as long as the locations for measured and site specific calculated values are the same, a successful comparison provides reasonable assurance that 10CFR72.104 is met.

6-3 NRC Clarification:

In the previous clarification call on 12/6/2019, staff had requested the minimum concrete density and tolerances for the Version B lid. Holtec provided the tolerances in their supplemental response on 12/20/2019, but had not provided the minimum concrete density. Holtec

acknowledged not providing this information (it was just an oversight on their part) and intends to provide the minimum concrete density for the Version B lid. This information will be included with the additional supplemental response that Holtec intends to provide.

The staff reviewed the modeling of the Version B lid within Appendix I of HI-2125194. Section I-5 states: "The UMAX Version B material densities and compositions are the same as those in the UMAX FSAR." Table 5.3.2 of the HI-STORM UMAX SAR states that the concrete density used within the shielding model is 2.4 g/cm<sup>3</sup> (150 lb/ft<sup>3</sup>). Note 1 to this table states that the concrete density may be less than this value.

The staff reviewed the drawings and bill of materials of the Version B lid as part of this amendment. In the bill of materials for the closure lid, drawing 10017 Rev. 5 from the HI-STORM UMAX FSAR Revision 5, June 27, 2018, the "Closure lid outer shield," and "closure lid inner shield" materials are specified by Notes 9 and 10. Note 10 states that the minimum nominal concrete is specified in Table 2.3.2 of the SAR which states that the nominal dry density is 150 lb/ft<sup>3</sup>. Note 9 says material requirements are defined in Section 8.2 of the SAR. Section 8.2.2.i of the SAR discusses concrete used for shielding. This section says that "the shielding performance of the plain concrete is maintained by ensuring that the minimum concrete density is met during construction." The staff requests that the applicant provide additional information on what the value of the "minimum density" is in the context of the Chapter 8 materials section.

This information is needed in accordance with 10 CFR 72.236(d) which requires that the storage system's shielding design is capable of meeting the annual dose limits in 72.104 and 72.106.

Holtec Response:

The minimum nominal density for the HI-STORM UMAX closure lid concrete is 150 lb/ft<sup>3</sup> and is provided in Table 2.3.2 of the SAR. Table 2.3.2 was revised to clarify that this is a minimum nominal value. In addition, Note 1 was removed from Table 5.3.2 to eliminate confusion with the value provided in Table 2.3.2. As stated in Drawing 10017 Rev. 5 Note 9, material requirements are defined in Section 8.2 of the SAR. Section 8.2.2.i references Table 2.3.2 for the minimum nominal density value and refers to the manufacturing process to ensure this value is met. During the manufacturing process, the ready mix concrete requirements for HI-STORM UMAX are controlled by Holtec Standard Procedure (HSP-1109). This procedure states that the dry unit weight (density) of the concrete mix shall be 150 lb/ft<sup>3</sup> or greater. In conclusion, the minimum installed dry density of concrete in HI-STORM UMAX lid is 150 lb/ft<sup>3</sup>.