Request for Additional Information

By letter dated September 28, 2018, Holtec International submitted an application to the U.S. Nuclear Regulatory Commission for Certificate of Compliance (CoC) No. 1040, Amendment No. 4 to the HI-STORM UMAX System, pursuant to the requirements of Part 72 of Title 10 of the *Code of Federal Regulations* (10 CFR Part 72).

This request for additional information (RAI) identifies additional information needed by the NRC staff in connection with its review of this amendment application. Each RAI describes information needed by the staff to complete its review of the application and to determine whether the applicant has demonstrated compliance with the regulatory requirements.

General Information

1-1 Provide information for the staff to review the addition of the neutron shield cylinder.

The applicant has proposed to modify Page 2 to the CoC to add a neutron shield cylinder in its discussion of the transfer cask neutron shielding. The applicant did not submit any supporting documentation for this change. The staff requests that the applicant provide a description of this component including drawings and the appropriate safety analyses justifying that the inclusion of this component meets the requirements in 10 CFR 72.236.

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

Thermal

4-1 Clarify the following regarding Required Action C.2.3 of Limiting Condition for Operation (LCO) 3.1.2.

a. Summarize the technical bases to demonstrate that a completion time of 24 hours is acceptable to perform an engineering evaluation.

b. Explain how an engineering evaluation is performed to demonstrate that component temperatures are within allowable limits.

c. Describe what type of engineering evaluation is needed to demonstrate that component temperatures are within allowable limits.

Required action C.2.3 of LCO 3.1.2 of the application states that one option to return the system to operable condition would be to perform an engineering evaluation within 24 hours. It is not clear to the staff how an engineering evaluation and what type of engineering evaluation that includes analysis and results could be realistically performed in 24 hours (especially due to the complexity of the thermal model, if it is used in the evaluation.). The application also states that a previous evaluation may be referenced but does not point to any reference or previous analysis (such as previous applicable engineering evaluations or applicable Sections in the Final Safety Analysis Report). The

staff needs to have assurance that no safety limit would be exceeded during normal, short-term, off-normal, or accident conditions.

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

Shielding

6-1 Revise the Technical Specification (TS) dose rate limit in Section 5.3.4.a of Appendix A of the CoC and the location of the measurement to ensure that measurement is taken in a manner consistent with the determination that the loaded ventilated vertical module (VVM) meets site boundary annual dose limits in 10 CFR 72.104.

Results of evaluations in Tables I-3 of HI-2125194 Rev. 10, "Shielding Analysis of the HI-STORM UMAX," (ML18285A815) and Table 5.1.3 of the Safety Analysis Report (SAR) (Revision 5, June 27, 2018) show that the standard lid gives higher site boundary dose rates than the Version B lid. This is in spite of the fact that the standard lid is overall thicker than the Version B lid and the dose rates for the Version B lid are overall higher than that of the standard lid. The only location that the dose rates are higher for the standard lid is Location 1 (per Figure 5.1.1 of the SAR) which is at the side of the lid. The site boundary annual dose is higher for the standard lid here because the Version B lid is wider and provides more shielding and it has inlet vent shielding which reduces radiation streaming. This shows that the dose rate at Location 1 is what drives the site boundary doses; therefore, measuring dose rates above the annulus is not conservative. This is also inconsistent with statements in the revised Technical Specification Bases. Proposed Section B.5.3.4 states *"These dose rate limits are set at a value above the maximum expected dose rates at the locations described in 5.3.8, from a system loaded with design basis fuel."*

Table 5.4.3 of the SAR shows for the standard lid that the calculated dose rate at the location above the annulus is less than 1 mrem/hr. Due to inaccuracies in measurements at the lower dose rates, if the dose rate above the annulus is measured to be 3 mrem/hr, it would be 3 times higher than the calculated value and it would not be known if this is due to measurement error or if the Location 1 dose rate (that drives the site boundary dose rates) is also 3 times higher.

The staff requests that the applicant modify its TS dose rate limit at the lid and the measurement location to ensure that the loaded VVM is within the site boundary annual dose limit for both the standard and Version B lids.

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 limit in 72.104.

6-2 Justify using an average TS surface dose rate measurement limit in Section 5.3.3 in Appendix A of the CoC instead of using a maximum to indicate a design or loading error.

Proposed language in the Technical Specification Bases B.5.3.4 states in part: *"If measured dose rates exceed these limits, it could be an indication of a design or loading error that may require corrective actions."* Using an average of the measurements could wash out any dose rate measurements exceeding the limits that are measured locally. Currently Section 5.3.3 from Appendix A of the CoC establishes limits for

meeting the average of the measured dose rates. The staff requests that the applicant justify averaging dose rates would be appropriate for identifying a design or loading error.

This information is needed in accordance with10 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.

6-3 Provide additional information on what the minimum concrete density is.

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^3 (150 lb/ft^3). 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^3. 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 selection.

This information is needed in accordance with10 CFR 72.236(d) which requires that the storage system's shielding design is capable of meeting the annual dose limit in 72.104 and 72.106.

6-4 Provide tolerances for the Version B lid.

Drawing 10017 Rev. 5 of the Version B lid does not include tolerances. The staff requests that the applicant provide the dimensional tolerances for the thickness of the closure lid inner and outer shield including the width. The staff is requesting this information so that it can determine that the as modeled configuration will not differ significantly from the fabricated lid.

This information is needed in accordance with10 CFR 72.236(d) which requires that the storage system's shielding design is capable of meeting the annual dose limit in 72.104 and 72.106.