ENCLOSURE 4

HI-STORM 100U

PROPOSED RESOLUTION OF RAI#1 ISSUES, LAR 1014-6

3/27/2008

RAI G-1

- *Revise CoC, TS and FSAR*
- The FSAR, CoC and TS that will be submitted with the RAI responses will include all items requested to be include in the LAR.

RAI 1-1

- *Address Additional Material in Lid*
- Drawings and Figures will be updated for consistency. Any additional material will be appropriately addressed in the evaluations

General comment on Shielding RAIs

- RAI History
- Purpose of Chapter 5
- RAI wording

General comment on Shielding RAIs (Continued)

- RAIs by Section
  - 5.I: 4 RAIs
  - 9.I: 1 RAI
  - 10.I: 4 RAIs
  - 12.I: 7 RAIs
- What *Safety Significant* Issues had not been addressed previously?

General comment on Shielding RAIs (Continued)

- 1014-3, 2nd Round of RAIs (July 2006)
  - 5.I: None
  - 9.I: None
  - 10.I: None
  - 12.I: None

General comment on Shielding RAIs (Continued)

- The FSAR does NOT demonstrate regulatory compliance in the shielding area
- 10 CFR 72 sets site boundary dose limits for the entire ISFSI, but no local dose rates for individual casks
- Regulatory Compliance is demonstrated in the site specific analyses under 72.212

General comment on Shielding RAIs (Continued)

- Purpose of the FSAR review is "to ensure that the proposed shielding features provide adequate protection against direct radiation from the cask content" (NUREG-1536)
- The level of detail in the FSAR and the level of review should focus on safety significant issues, and should be consistent with the purpose stated above. This is specifically important in the context of schedules and resources

General comment on Shielding RAIs (Continued)

- "A sample input file should also be provided that demonstrates that this minimum dimension is used in the shielding calculations" (5-1)
  - Is there any concern regarding the accuracy of the shielding models? Typically, that would be covered by the review under our QA program, not by the NRC review.

General comment on Shielding RAIs (Continued)

- "Any equipment or engineered features or assumed parameter limits relied upon in the evaluations may need to be included in the conditions of the certificate or the technical specifications" (11-1)
  - We might as well include the entire FSAR in the CoC

General comment on Shielding RAIs (Continued)

- "... cask locations where shielding deficiencies may noticeably affect doses at the controlled area boundary ..." (12-5)
  - Deficiencies ?

RAI 5-1

- ***Minimum Distance MPC-Inlet***
- **The minimum distance is the addition of the values of B (12”) and D (18.5”) on sheet 3 of Drawing 4501.**
- **A sample shielding input file will be provided as attachment to the RAI Response.**

RAI 5-2

- *Bounding Source Term and Configuration*
- Previous RAIs and the Draft SER recognized the use of the MPC-32 and did not raise any concerns
- Why does the shielding analysis in the FSAR need to be based on a bounding source term? Compliance with the regulatory requirements is not demonstrated in the FSAR, but in the site specific analyses that support the 72.212 evaluation. The purpose of the FSAR is to show that the system is capable to meet the regulatory requirements.
- What is the regulatory basis for the request "Provide an analysis that results in the maximum dose rates"

RAI 5-3

- *Lid Buttress Rods*
- It is inherently obvious that due to its length and small diameter, the vertical lid buttress rods will not have a significant effect on dose rates above the lid (or at the site boundary). Nevertheless, the RAI requests a "quantitative" evaluation, i.e. re-analysis. In the context of a SAFETY evaluation this would be an excessive waste of resources.

RAI 5-4

- *Provide Various Dimensions*
- The requested information will be included in the FSAR/Drawing.
- A sample shielding input file will be provided (see RAI 5-1).

RAI 6-1

- *Criticality Analyses for basket deformations*
- The structural analyses demonstrate that there is no deformation of the basket under accident conditions (A discussion will be added to the structural chapter to discuss this). Therefore, the current statements in Chapter 6 are correct and applicable to the HI-STORM 100U

RAI 8-1

- *Empty 100U Configuration*
- Holtec agrees that the text, as written, might be unclear. We will therefore rewrite the steps to clarify that the closure lid and outlet vent cover may or may not be in place on an empty overpack.
- The empty HI-STORM 100U is typically configured with the closure lid and outlet vent cover in place. The key requirement for the HI-STORM 100U is that the overpack be covered to minimize the potential for water and foreign materials to accumulate in the overpack cavity prior to loading with fuel and to minimize any potential radiation dose from adjacent loaded overpacks that are loaded with fuel. This may be accomplished using the closure lid and outlet vent cover or any other mechanism that prevents materials and personnel from getting into the cavity.

RAI 9-1

- *Shielding Effectiveness Test*
- Shielding Effectiveness is verified by
  - Using standard proven materials
  - Weight of the lid
  - Dose rate measurements of loaded casks
- A discussion will be added to 9.I
- This is considered sufficient to ensure that the 10CFR dose limits are met. No further tests are therefore proposed.

RAI 10-1

- *Rad Protection for Excavation*
- Section 10.I will be modified to include the requested information.

RAI 10-2

- *Occupational Dose from Aboveground System*
- This issue was already closed in 1014-3
  - RAI 1, 10-1
  - RAI 2, no further questions
  - Draft SER, F10.6, "The FSAR sufficiently describes ..."
- Note that actual occupational dose during loading vary widely depending on site specific conditions. The effect of the additional bolts would be small in comparison.

RAI 10-3

- *Streaming through empty cavity*
- An evaluation of streaming through an empty cavity next to a loaded cavity will be added to Chapter 5. No significant effect is expected.

RAI 10-4

- *Streaming through ICCPS test station*
- An evaluation of streaming through the ICCPS will be added to Chapter 5. No significant effect is expected.

RAI 11-1

- *Accidents during construction*
- Accidents during construction are inherently a site specific issue. Therefore, the 72.212 evaluations are the appropriate place to address such accidents. This is consistent with other accidents not explicitly addressed in the FSAR. Some examples are
  - Large explosions
  - Collapse of Transmission Towers

RAI 12-1

- *TS Dose Rate Limit*
- The Dose rate limit in the TS will be re-evaluated. This may be affected by the answer to other RAIs. In general, the Dose Rates are set at the next multiple of 10 mrem/h.

RAI 12-2

- *Changes to TS 5.7.6.b and 5.7.7*
- Changes will be generally made as requested
- Propose to split 5.7.7 into a) for aboveground and b) for underground

RAI 12-3

- *Changes to TS definitions for consistency*
- Changes will be made as requested

RAI 12-4 & 12-5

- *Additional Dose Rate Limits in TS*
- The primary method to show compliance with the site boundary dose are the (site specific) calculations
- The purpose of the Rad Protection program in the TS is to provide a "sanity check" on the calculated doses. A single dose rate measurement should be sufficient to satisfy this purpose.
- The RAIs appear to extend the Rad Protection program beyond this purpose (Example: shielding deficiencies). The relevance of such an extension is unclear.
- The requested actions are a substantial amount of work.
- If such an extension is desired, than this should have been requested years ago in the early stages of this licensing action.

RAI 12-6

- *Technical Basis for RPS size*
- Basis is a low dose rate

RAI 12-7

- *Clarification on RPS*
- The TS will be clarified

RAI C-1, C-3, C-4

- *Re-Write CoC Section 3.5 on the CFT; Provide certain clarifications and justifications*
- Section will be re-written and clarifications/justifications will be provided

RAI C-2

- *CoC Section 1.b*
- We agree with the proposed change, except that we recommend to change "a drywell or caisson" to "an air-cooled vault or caisson".

RAI C-5

- *Concrete Encasement Properties*
- Properties of the encasement concrete are not specified since *critical characteristics* are not applicable to the function of this concrete. The concrete encasement thickness is specified as 5 inches minimum (FSAR Subsection 3.I.4.1.ii "Concrete Encasement"), and purposely over-specified at least 5 fold (with respect to 20 licensing basis life) and by all practical matters over-specified by over 10 fold.

RAI C-5 (Continued)

- For clarification purposes the statement in 3.I.4.1.ii will be revised as follows:
  - "The concrete encasement shall be installed in accordance with Holtec approved procedures following applicable guidance from the ACI Code (e.g. ACI 318 [3.3.2]), as appropriate, for commercial concrete. Installation procedures shall address, mix designs (incorporating Portland cement), testing, mixing, placement and reinforcement with the aim to enhance concrete durability and minimize voids and micro-cracks."

RAI C-6

- Structural – Discussed in separated meeting

RAI C-7

- *Test for first system*
- Condition will be modified as requested

RAI C-8

- *Consistency with previous amendments*
- SAR and proposed CoC will be revised as requested