Amendment 11 to CoC 1004 RAI # 2

TN-NRC Meeting

April 16, 2009

TRANSNUCLEAR

Meeting Agenda

- Introduction
- Amendment 11 History
- Current Need for Amendment 11
- Proposed Path Forward
- Evaluation/Discussion of RAI #2
- Questions

Amendment 11 to CoC 1004 History

- ***Discussion about Amendment 11 to CoC 1004 started with NRC in late 2006***
- ***TN submitted Amendment 11 to NRC on 4-10-2007***
- ***TN anticipated continuous parallel review of both Amendment 10 and Amendment 11 which did occur through RAI #1 which TN received on 10-22-2007***
- ***TN submitted responses to RAI #1 on 12-21-2007***
- ***TN received RAI # 2 on 3-27-2009 (almost 15 months after responses to RAI #1 submitted)***

Amendment 11 to CoC 1004 History

- **Amendment 11 Included three major items:**
  - ***Convert CoC 1004 and its associated Technical Specifications to the "Improved Technical Specification" format consistent with NUREG 1745***
  - ***Submit changed UFSAR pages for the FLUENT code based thermal analysis of a loaded OS197L TC inside a supplemental trailer shield***
  - **Revise Tech Spec related to transfer cask dose rates and require use of helium for blow down to address ISG 22 concerns**

Amendment 11 Review Process has been Long

- **Standardized Technical Specifications are essential**
- ***Customer needs have changed in the mean time***
  - **Customer has agreed to upgrade the crane**
  - **Decision to upgrade crane is not reversible at this time**
- ***Review and approval of Amendment 11 is getting delayed***
  - **Crane upgrade decreased perceived review priority**
  - **NRC resources needed to support high priority work**
  - **Amendment 10 review was also affected by NRC resources**

Need for OS197L Cask has Changed

- **Conversion to Standardized Technical Specifications is still very important**
- ***Already built OS197L Cask could be used for customers with 100 ton crane capacity***
- ***Already built OS197L Cask could be used at decommissioned sites***
- ***The decay heat requirements currently are different than the original use***
- ***TN had initially planned to convert the OS197L75 cask to OS197-M using 72.48 process by removing the existing neutron shield shell and replacing with added steel and neutron shield shell for plants with 100 ton crane. TN wants to keep this option open for future needs. TN will first discuss this approach with NRC before proceeding.***

Proposed Options for Amendment 11 Based on Current Need for OS197L Cask

1. ***Respond and complete process as is:***
   - **Imposes unnecessary restrictive requirements in CoC and technical specifications**
2. ***Respond and complete process for a de-rated OS197L cask for use with 100 ton or greater crane:***
   - **Dose rates are significantly lower and comparable to other approved transfer cask designs**
   - **Review process is expected to be greatly simplified**
3. ***Respond and complete process for a de-rated OS197L cask for decommissioned plant irrespective of crane capacity:***
   - **Same considerations as option 2 above**

Discussion on Dose Rates at Lower Heat Loads for OS197L TC

- The OS197L calculations are currently performed for a heat load of 24 kW/DSC for the bounding DSC (32PT). The dose rates are shown in Appendix W, Chapter W.5 of the UFSAR.
- Shielding calculations have also been performed at a lower decay heat values in support of the OPPD exemption request and are documented in Calculation 1121-0505
- A dose rate summary is shown below:

Decay Heat – Peripheral FA	Decay Heat per DSC	Dose Rate (Maximum)	Dose Rate (Average)
1200 watts	24 kW	53 R/hour	31 R/hour
850 watts	18 kW	31 R/hour	18 R/hour
500 watts	12.4 kW	13 R/hour	9 R/hour
400 watts	13 kW	10 R/hour (estimated)	7 R/hour (estimated)

Discussion on Dose Rates at Lower Heat Loads for OS197L TC

- **The dose rate summary indicates that:**
  - **Lower dose rates can be achieved when decay heat loading of the DSC is controlled**
  - **The fuel assemblies loaded in the peripheral locations of the DSC contribute significantly to the surface dose rates**
  - **By restricting the decay heat of the peripheral fuel assemblies to approximately 400 watts per fuel assembly – it is possible to obtain maximum dose rates on the order of 10 R/hour at the surface of the OS197L TC**
  - **The maximum total decay heat of the DSC may be restricted to be approximately 13 kW/DSC**

Discussion of RAIs with Potential for Industry Wide Implication-RAI 2-1

- **RAI 2-1: Considering Transfer Cask as a part of "SPENT FUEL STORAGE CASKS" which has been considered as OVERPACK and its integral canister per NUREG-1745**
  - **Not consistent with current industry practice**

RAIs with Potential for Industry Wide Implication-RAI 5-1: Include Transfer Cask Details in CoC

- **RAI 5-1: Include in CoC nominal weight, minimum thicknesses of steel shell, two piece neutron shield, and thickness of water inside the neutron shield**
  - **Driven by high dose rate from the bare cask**
- ***RAI 5-1: Include description of temporary shielding used with transfer cask***
  - **Driven by high dose rate from the bare cask**
- ***RAI 5-1: Include materials of construction and the basic structure of Transfer Cask***
  - **Information is requested to satisfy the requirements of 10CFR72.236(d)**

RAIs with Potential for Industry Wide Implication-RAI 5-5: Include Operational Steps in Tech Specs

- **RAI 5-5: Add description of temporary shielding in Tech Specs**
- ***RAI 5-5: Include operational steps for placements of temporary shielding and any required actions in tech spec TS5.5 "Transfer Cask Design Features"***
  - **Information is requested to satisfy the requirements of 10CFR72.236**

RAIs with Potential for Industry Wide Implication-RAI 5-8: Include ALARA Details, Procedural Details, Follow Regulations in Tech Specs

- **RAI 5-8: Prescribing what shall be included in ALARA assessment by General Licensee**
- **RAI 5-8: Prescribing what shall be addressed by General Licensee in procedures and also what operator actions may be required by operators per 10CFR50 Tech Specs**
- **RAI 5-8: Adding a requirement that General Licensee verify compliance with the dose limits in 10CFR72.104 and 10CFR20**
  - **Information is requested to satisfy the requirements of 10CFR72.236**

RAIs with Potential for Industry Wide Implication-RAI 5-8: Include Transfer Cask Dose Rates in Tech Specs

- **RAI 5-8: Include axial surface dose rates for detecting fuel mis-loading**
  - **Currently Tech Spec already has transfer cask radial dose rate limits**
  - **Any fuel not meeting any one of tech spec requirements is mis-loaded fuel. Measuring axial surface dose rate will not detect majority of fuel mis-load**
  - **Will not be permitted to add more shielding to reduce dose rates on the top portion of basket/DSC for ALARA or to accept non-conformances during fabrication (e.g., shield plugs, basket plates etc.)**
  - **All dose rates are already in SAR which General Licensee uses for ALARA planning purpose**

RAIs with Potential for Industry Wide Implication-RAI 5-8: Include Requirement for General Licensee to Establish Site-Specific Dose Rate Limit in Tech Specs

- **RAI 5-8: Include additional requirement for General Licensee to establish a set of transfer cask dose rate limits**
  - **This is requested to be added in addition to all the other requirements discussed previously**

TRANSNUCLEAR

RAIs with Potential for Industry Wide Implication-RAI 5-13: Include a Caution in Tech Spec

- **RAI 5-13: Include a caution that, depending on the layout of the licensee's site, it may be necessary to limit the number of HSMs loaded in a year or take other actions to limit potential doses due to the requirements of 10 CFR 72.104(a) and 10CFR20.1301**

Discussion on Methodology for Accident Dose Rates- RAI 5-27

- **RAI 5-27: Justify the Ratio Method employed to determine the accident dose rates with 24PHB DSC and OS197L TC**
  - **All normal condition shielding calculations performed with the 32PT DSC/OS197L TC are bounding since dose rates are dominated by gamma source terms**
  - **For accident calculations documented in Appendix W, Section W.11.1.4, a ratio method is employed to conservatively scale the 32PT dose rates to obtain dose rates with the 24PHB DSC**
  - **Scaling methods have been employed in 61BT (Appendix K, Section K.11.2.5.3), 32PT (Appendix M, Section M.11.2.5.3) and 24PHB (Appendix N, Section N.11.2.5.3) to scale the accident dose rates calculated for the 24P DSC (Section 8.2.5.3.2)**

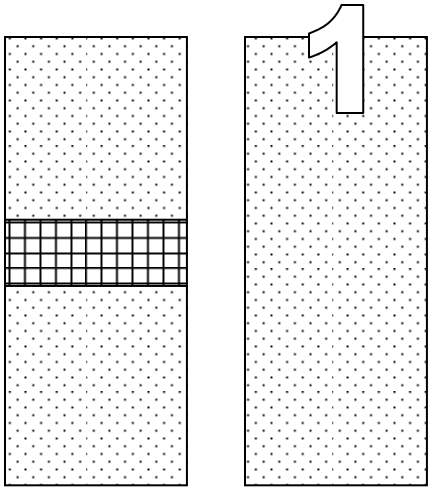
Discussion on Methodology for Accident Dose Rates- RAI 5-27

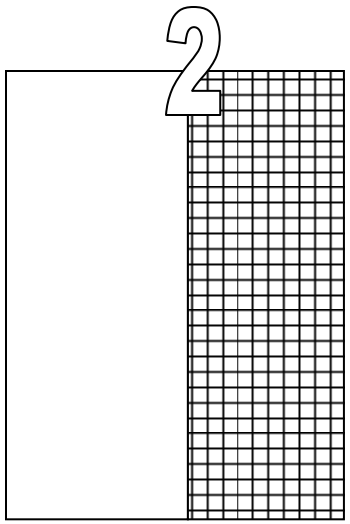
- **A ratio of the accident dose rates calculated in Appendix M, Section M.11.2.5.3 (for the 32PT DSC / OS197 TC) and those calculated in Appendix W, Section W.11.1.4 (for the 32PT DSC / OS197L TC) provides an estimate of the differences in modeling methods in addition to differences in TC design**
- **This ratio (factor) is employed to scale the 24PHB dose rates calculated in Appendix N, Section N.11.2.5.3**
- **This approach is further conservative considering the fact that neutron radiation accounts for 87% of the accident surface dose rate for 24PHB and 81% of the accident dose rate for 32PT DSC in the OS197 TC while it only accounts for 3% of the accident dose rate for 32PT DSC in the OS197L TC**
- **As shown in Table in Appendix W, Section W.11.1.4, the calculated neutron dose rates at the radial surface of the cask under accident conditions for the OS197L TC and the OS197 TC for the 32PT DSC are within 2% of each other**

Clarification for Neutron Streaming through the Weld Seams- RAI 5-34

- **RAI 5-34: Justify the discussion on neutron streaming – not clear whether the neutron streaming through the seams of the OS197L neutron shield is adequately analyzed**
  - **Appendix W, Section W.5.4.8.3 provides the discussion on the dose rate evaluation performed for the removable two piece neutron shielding**
  - **An explicit MCNP calculation was not performed to determine the effect of streaming through the weld seams because it represents a region of dose "depression" – due to the dominance of gamma dose rate over neutron dose rate**
  - **A conservative estimate of the dose rate in the immediate vicinity of the seams is obtained from the results shown in Appendix W, Table W.5-1 and Table W.5-12**
  - **This is illustrated in the discussion in the next slide**

Clarification for Neutron Streaming through the Weld Seams- RAI 5-34





<u>Design</u>

Water Neutron Shield – 3″ thick

Stainless Steel Seam – 3″ thick, 1.5″ wide

<u>Model 1 (Table W.5-1) - No Seam, Bare Cask</u>

Neutron = 250 mrem/hour

Gamma = 53,000 mrem/hour

<u>Model 2 (Table W.5-12) - No Water, 2.5″ steel</u>

Neutron = 900 mrem/hour

Gamma = 3100 mrem/hour

Clarification on ALARA Evaluation- RAI 5-49

- **RAI 5-49: Clarification on the effect of three piece design on thermal performance and explain the apparent discrepancy in the weight calculation**
  - **For the OS197L TC, the weight limit of 75 Tons is realized with 2.68 inches of steel – using a 2.00-inch requirement for structural protection, only 0.68 inches of steel is available for ALARA enhancement from Calculation NUH06L-0501**
  - **Due to differences in densities for steel and lead, only 0.45 inches of lead can be utilized in place of the 0.68 inches of steel**
  - **The shielding evaluation using 0.45 inches of lead documented in Calculation NUH06L-0501 shows that no enhancement in shielding performance will be achieved using this configuration**
  - **The 0.75-inch thick lead employed in Calculation NUH06L-0500 (configuration C) is a sensitivity evaluation (weight of approximately 80 Tons) to determine the effect of shielding materials. The difference in weight of approximately 5 tons sufficiently explains this "apparent" discrepancy**

Questions