



# Proposed Evaluation of ITTR using 10 CFR 72.48 Process for the NUHOMS<sup>®</sup> HD System



# Agenda



- ▶ **Discuss proposed approach for a 10 CFR 72.48 evaluation for allowing the loading and storage of “modified” fuel assemblies – Fuel assemblies that have been fitted with Instrument Tube Tie Rods (ITTRs)**
- ▶ **Obtain NRC Feedback**

# Scope and Introduction



- ▶ **Fuel Assemblies with ITTRs are evaluated for storage in the NUHOMS® HD System under 10 CFR 72.48**
- ▶ **NRC Letter dated 9/22/2011 provides clarification of the requirements for evaluation of ITTRs as applicable to loading / storage under a 10 CFR Part 72 CoC**
  - ▶ **ITTRs are considered as sub-components of the “modified” fuel assemblies and are evaluated for their effect on the design functions**
  - ▶ **“Modified” Fuel assemblies shall be bounded by the CoC Parameters**
  - ▶ **Changes to the UFSAR are evaluated by the 10 CFR 72.48 process**

# Scope and Introduction



- ▶ **“Modified” Fuel Assembly for this evaluation:**
  - ▶ **Modified means of attaching the top nozzle to the rest of the fuel assembly using ITTRs**
  - ▶ **Modification reviewed under the 10 CFR 50.59 process**

# CoC and Technical Specifications



- ▶ **Condition 6 of the CoC 1030 for the NUHOMS® HD System**
  - ▶ **“Contents of the NUHOMS® HD System must meet the fuel specifications in Appendix A (Technical Specifications)”**
- ▶ **Technical Specification 2.1: Fuel to be Stored in the 32PTH DSC**
  - ▶ **Fuel Assembly design characteristics per Table 2**
  - ▶ **Fuel Assemblies with and without CCs**
  - ▶ **Maximum Assembly plus CC Weight of 1585 lbs**

# CoC and Technical Specifications



- ▶ **Technical Specification Table 2: *Fuel Assembly Design Characteristics for the NUHOMS® 32PTH DSC***
  - ▶ **Maximum Unirradiated Length**
  - ▶ **Maximum MTU/Assembly**
  - ▶ **Maximum Number of Fuel Rods, Guide and Instrument Tubes**
  
- ▶ **Technical Specification Table 7: *Maximum Assembly Average Initial Enrichment for Intact and Damaged Fuel Loading***
  - ▶ **Maximum Enrichment as a function of Basket Type and Boron Loading**
  - ▶ **Intact / Damaged Fuel with and without CCs**

# Proposed Approach



- ▶ **“Modified” Fuel Assemblies meet all the requirements of CoC 1030 and the associated Technical Specifications discussed above**
- ▶ **ITTRs are non-separable constituents of the “modified” fuel assembly**
- ▶ **Therefore, no changes are required to the CoC or Technical Specifications for qualification of “modified” fuel assemblies**



# Design Functions & Safety Evaluations



- ▶ **ITTR affects the following design functions**
  - ▶ **Structural – Mass of the fuel assembly**
  - ▶ **Criticality – Displace borated water**
  - ▶ **Shielding / Thermal / Confinement design functions and retrievability are unaffected**
- ▶ **Safety Evaluations for ITTR**
  - ▶ **Structural evaluations are performed to qualify fuel assembly with ITTR from a handling standpoint**

# Design Functions & Safety Evaluations



- ▶ **Safety Evaluations for ITTR**
  - ▶ **10 CFR 50.59 evaluation for “modified” fuel assemblies ensure that**
    - ▶ **Top Nozzle is secured to fuel assembly**
    - ▶ **Fuel assemblies are handled by normal means**
  - ▶ **No cladding damage due to stress corrosion cracking**
  - ▶ **Additional Structural analysis not required if the maximum weight is less than or equal to 1585 lbs**
  - ▶ **Criticality evaluation for fuel assembly with ITTR is bounded by that for CCs**

# Proposed UFSAR Changes



- ▶ **Proposed Changes to the HD System UFSAR**
  - ▶ **Add to DSC contents in Section 1.2.3: “Fuel assemblies modified using nonfuel hardware that are positioned within the fuel assembly after discharge from the core, such as Guide Tube or Instrument Tube Tie Rods or Anchors, Guide Tube Inserts are also acceptable for storage in 32PTH DSC as intact ... ”**
  - ▶ **Add description and outline safety evaluation in Section 2.1.1**
  - ▶ **Include Criticality Evaluation in Chapter 6**



**Questions?**