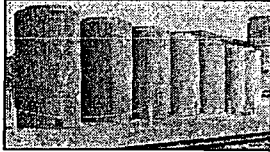




### LAR to Add Instrument Tube Tie Rods to the HI-STORM CoC



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NRC – Rockville, MD  
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### Agenda

- Top Nozzle Stress Corrosion Cracking
- Instrument Tube Tie Rod (ITTR)
- Technical Justification
- Changes to the CoC
- Schedule

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### Stress Corrosion Cracking

- In 2001, a top nozzle separated from a Westinghouse 17x17 fuel assembly during handling.
- The failure mechanism was Intergranular Stress Corrosion Cracking at the bulge joint between the top nozzle and thimble tubes.
- These assemblies must be handled with a "nozzleless handling tool" or reinforcement of the top nozzle must be made (anchors or tie rods).

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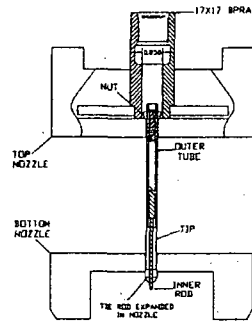
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## Instrument Tube Tie Rod

- Tie rod is a stainless steel tube that extends from the top nozzle adapter plate through the instrument tube to the bottom nozzle.
- Weight: ~ 7 lbs
- Reinforces connection between top nozzle and rest of fuel assembly
- Designed to carry the weight of the assembly during lifting/handling
- Fuel assembly can now be handled with standard handling tool



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## Instrument Tube Tie Rod

- Implemented under 50.59 in the spent fuel pool
- Installed to allow movement of these fuel assemblies in the spent fuel pool without use of the nozzleless handling tool
- Allows BPRAs, APSRs, WABAs, RCCAs, etc to be placed back into the assembly after installation of the ITTR
- Allows assemblies to be classified as intact fuel and not be placed in damaged fuel containers

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## Technical Justification

- Structural – fuel assembly with ITTR and other non-fuel hardware (i.e., B-PRA) must still meet CoC fuel weight limit of 1680 lbs
- Thermal – Current methodology assumes blocked instrument tube; no effect
- Shielding – ITTRs are not radioactive material, these fuel assemblies are not returned to the core for additional irradiation
- Criticality – ITTRs displace a small amount of water in the instrument tube; this has a negligible effect on reactivity

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## CoC Changes

- Modify definition of "NON-FUEL HARDWARE" in Section 1.0 of Appendix B to add ITTRs
- Modify Table 2.1-1 of Appendix B to add ITTRs to acceptable contents and state that assemblies with ITTRs may be placed in all storage locations
- Limited to 15x15 and 17x17 fuel assembly types
- FSAR changes will be consistent with CoC changes – some additional justification may be added to the FSAR as appropriate

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## Schedule

- Approximately 100 ITTRs were installed in January 2008
- Another 100-200 ITTRs will be installed in January 2009
- Assemblies with ITTRs are planned to be loaded into HISTORM in Spring 2009
- Other utilities may use ITTRs as a solution to address top nozzle stress corrosion cracking
- Submittal of LAR to NRC by mid-April
- NRC SER and approval of Amendment requested by January 2009 to allow for implementation of new CoC for loading campaign

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Questions?

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