Update on PWR Fuel Top Nozzle Stress Corrosion Cracking Implications for 10 CFR 72 and 71

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For

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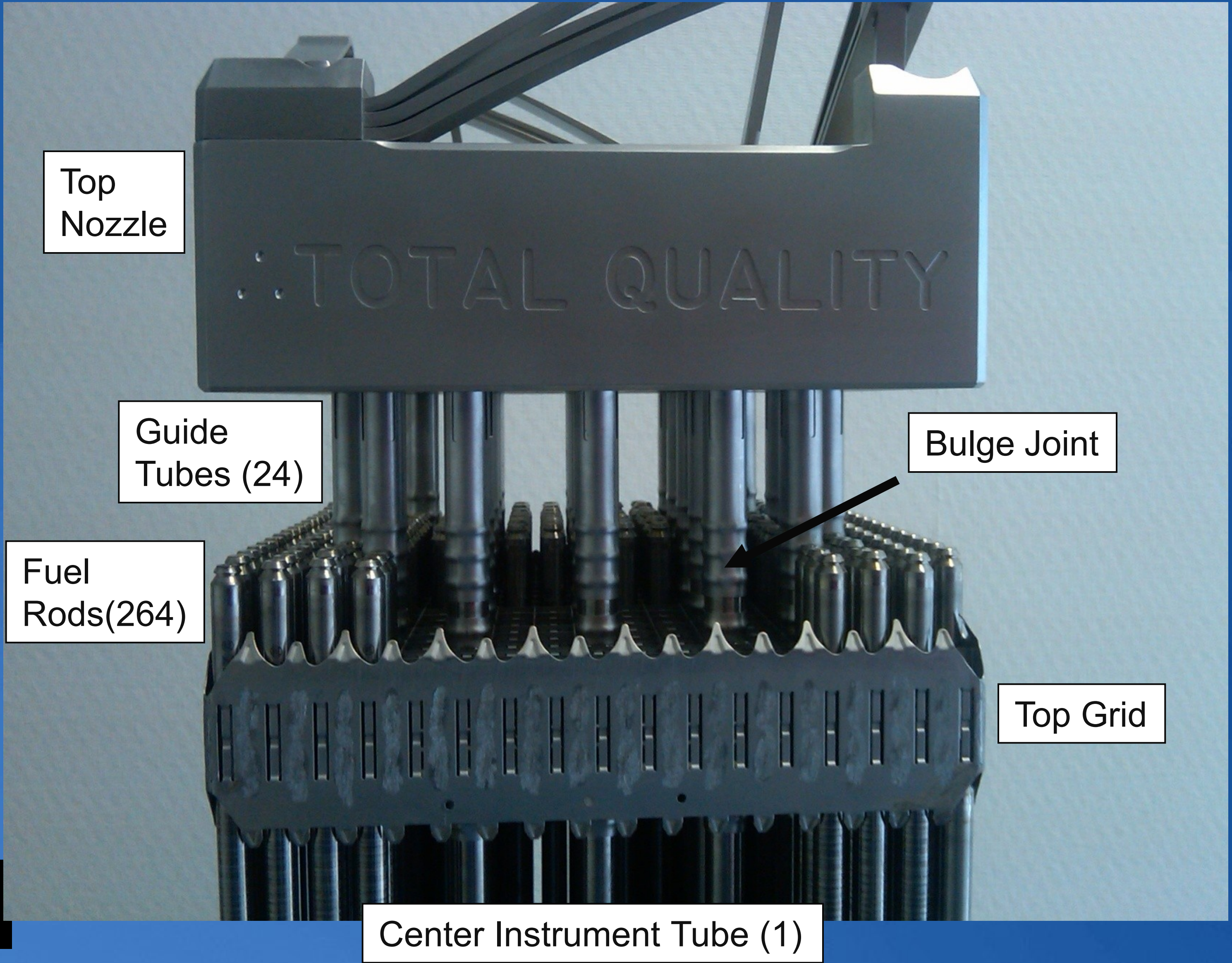
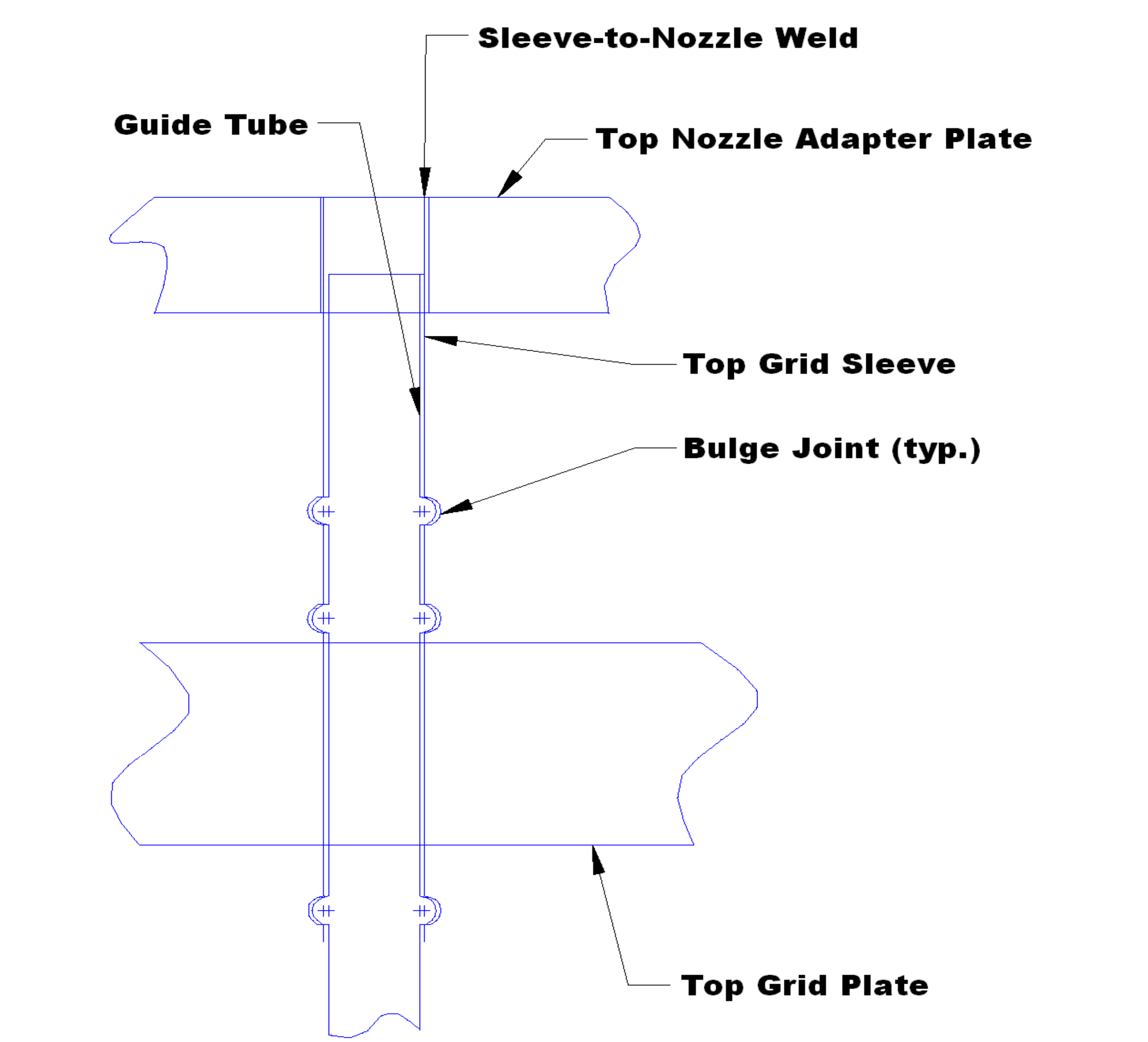
Introduction

- Certain older Westinghouse fuel assemblies are susceptible to stress corrosion cracking (SCC) at the bulge joints near the top nozzle
- An event at North Anna in 2001 confirmed that, if severe enough, the SCC could result in the top nozzle separating from the assembly when lifted
  - NRC Information Notice 2002-09
  - SCC does not affect fuel cladding

PWR Fuel Assembly Top Region



Fuel Assembly Bulge Joint Detail



Background

- Fuel assemblies susceptible to top nozzle SCC were loaded into storage casks at McGuire (and elsewhere) over the years
- NRC letter to Duke Energy, August 2008:
  - Systems containing modified, SSC susceptible fuel assemblies loaded for storage are not transportable until an analysis demonstrating the assemblies meet Part 71 requirements is reviewed and approved by the NRC.

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RIRP Issue I-10-01

- The Duke letter created confusion in the industry among licensees and CoC holders as what it meant for others regarding this fuel
  - Industry seeks clarification on whether NRC approval is required under Parts 72 and 71 to store and transport the affected fuel, for:
    - Modified fuel assemblies
    - Unmodified fuel assemblies
- What regulations and regulatory process(es) apply to making this determination?

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Initial Industry Proposal

- Position paper submitted to NRC 8/27/10
- Four “variants” of susceptible fuel assemblies
- Total of eight “variants” across 72/71
- Proposes position and a basis for if amendments are required in Part 72/71 to store and transport the fuel

Variants

1. Unmodified fuel assemblies moved with a standard tool

2. Unmodified fuel assemblies moved with a thimble grip tool

3. Modified assemblies with guide tube anchors (GTAs) or similar device

4. Modified assemblies with instrument tube tie rods (ITTRs) or similar device

RIRP Issue Plan

- Schedule
  - 8/27/10 (A) – Industry position letter to NRC (unmodified and modified assemblies)
  - 9/16/10 (A) – Public meeting, NRC requests Industry address “Contents” issue (modified assemblies)
  - 11/9/10 (A) – Industry’s “Contents” white Paper sent to NRC
  - 9/22/11 (A) – NRC response to “Contents” white Paper
  - 11/11 (T) – Discuss Industry proposal for unmodified assemblies
  - 12/11 (T) – Public meeting to discuss industry proposal for unmodified assemblies and reach consensus on issue closure
- Success Criteria
  - Decide if storage and/or transport amendments are required for unmodified assemblies (last four variants)
  - Agree on technical aspects to address in supporting analyses
  - Agree on “durable record” of issue resolution

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Resolution of "Contents" Issue

- Part 71 and 72
  - ITTRs, guide tube anchors, and other similar hardware are contents of a storage cask or transport package
  - Cask contents are licensed by the NRC for both Part 72 and 71
- Part 72
  - Fuel assemblies contain many sub-components not explicitly specified in the CoC or license
  - Some <u>are</u> specifically defined and limited as allowable contents because they may significantly influence or change the safety analysis
  - Contents that are non-separable constituents of a fuel assembly may not need to be identified in the CoC or license
  - Cask or ISFSI FSARs may be able to be amended under 72.48 to list ITTRs, guide tube anchors and similar hardware as non-separable constituents of already approved contents

Resolution of "Contents" Issue (cont'd)

- Part 71
  - No 72.48-like change process in Part 71
  - Part 71 SAR has a different standing than a Part 72 SAR
  - Part 71 CoCs refer to a specific revision of the supporting SAR
  - Approved contents, including ITTRs and GTAs need to be specified in the CoC
  - CoC holders may want to consider proposing a CoC condition that approves criteria for non-fuel contents that have little or no impact on safety, e.g., foreign material
- Industry believes issue is resolved for modified assemblies (4 of the 8 variants)

Proposed Resolution for Unmodified Assemblies

- Need to reach agreement on whether prior NRC review and approval is required for storage and transport of <u>unmodified</u>, SCC-susceptible fuel assemblies
- Industry communicated its position in the 8/27/10 letter, and no new information received to alter the position:
  - Fuel classification issue to be implemented by Industry, inspected by NRC
  - Use criteria in NUREG-1536, Rev. 1 for storage and ISG-1, Rev. 2 for transportation to classify fuel assembly as damaged or undamaged
  - Supporting analyses/evaluations (A/E) required

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Proposed Path Forward

- Dec. 2011 Public Meeting to discuss
  - Unmodified assemblies and the proposed approach in 8/27/10 letter
  - Identify actions need to reach resolution, and update resolution plan
- Desired final outcome and closure of the RIRP issue
  - Durable record to memorialize agreed-upon resolution
    - NEI report with NRC endorsement or Regulatory Guide
  - Document lessons learned for pilot issue and revise NEI RIRP program document, as appropriate

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