NEI Dry Storage Task Force Meeting with NRC

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Agenda

- DSTF composition and mission
- Path to resolution of issues
- Issues matrix and priorities
- Discussion of specific issues

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DSTF Composition

- Comprised of about 120 individuals representing:
  - Licensees with used fuel on site
  - Used fuel storage system and transportation package CoC holders
  - EPRI
  - Consultants (case-by-case)

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DSTF Mission

- Identify and facilitate the resolution of generic issues pertaining to dry used fuel storage and transportation
  - Facilitate industry interface with NRC and among members
  - Share lessons learned on generic technical and regulatory issues
  - Support other industry groups on request

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DSTF Steering Group

- Comprised of about 30 DSTF members
- Chaired by NEI
- CoC holders and users' group chairpersons are permanent members
- Directs DSTF activities and priorities
- Coordinates industry participation in DSTF

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DSTF Steering Group (cont'd)

- Meets four times per year
  - November
  - February
  - May (at Dry Storage Information Forum)
  - August
- Meets with NRC as needed

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DSTF Issue Teams

- Smaller groups with appropriate knowledge to address a specific issue
- Goal is to resolve issues on a consensus basis using existing regulatory processes
- NEI facilitates conference calls, team meetings, and NRC interface

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Issues Matrix

- Industry owns the issues
- Each issue has, or will have a team leader
- Each issue is evaluated uniquely and a path to resolution formulated
- A generic resolution is developed
- Industry would like NRC concurrence on the proposed path to resolution for each issue

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Issues Matrix Priorities

- Priority indicated by position in list; first issue = highest priority
  - CoC Improvements
  - PWR Fuel Top Nozzle Stress Corrosion Cracking
  - BWR CILC Fuel
  - 72.48 Guidance Update
  - Intact/Damaged Fuel Implementation
  - Burnup Credit
  - High Burnup Fuel

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Discussion of Specific Issues

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CoC Improvements

- No Part 72 rule governs cask CoC content
  - Conditions, TS, Approved Contents, Design Features
- §72.44(c) and (d) do not apply to CoC holders or general licensees (per §72.13)
- No specific criteria exist for defining cask CoC contents, including TS
- NUREG-1745 provides a baseline and overall goals, but not criteria
- Without defined criteria, NRC review guidance is subjective

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Draft Standard Review Plan

- Draft NUREG-1536 Revision 1 :
  - Introduction: "Any aspect of the design or procedures that the NRC determines should not be changed by either the certificate holder or general licensee, without prior NRC approval must be placed in the CoC conditions or technical specifications"
  - Section 8.4: "any technical aspect of the design which is deemed critical to nuclear safety must appear in the TS"

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Draft Standard Review Plan (cont'd)

- **Draft NUREG-1536, Revision 1, Section 13.1:**
  - ***"IF A REVIEWER DEEMS AN ITEM SO IMPORTANT THAT IT SHOULD NOT BE CHANGED WITHOUT NRC STAFF APPROVAL, THE ITEM SHOULD EITHER BE INCLUDED DIRECTLY IN THE COC TERMS, CONDITIONS, OR SPECIFICATION"***
  - ***"ONLY THE TERMS AND CONDITIONS OF THE COC, INCLUDING THE ATTACHED TECHNICAL SPECIFICATIONS AND DRAWINGS, ARE LEGALLY ENFORCEABLE"***
  - ***Emphasis (capitalization) present in draft NUREG***

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Draft Standard Review Plan (cont'd)

- **The result is inconsistencies across CoCs, customized TS, unclear NRC expectations**
- **Licensees <u>must</u> comply with the Part 72 FSAR**
- **Enforcement actions have been taken several times for inappropriate use of 72.48 for FSAR changes**

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CoC Improvement Issue

- CoC content increasing over time
- Some requirements are redundant or unnecessary, e.g.:
  - TS requiring compliance with regulations
  - TS addressing material qualification programs
  - TS causing licensees to take actions in a less industrially safe manner
- Unnecessary requirements cause NRC and industry resources to be used to process non-safety significant CoC amendments
- Unusual CoC requirements can confuse licensed operators used to Part 50 TS

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CoC Improvement Issue – Example 1

- Docket 72-1004, Amendment 11, March 2009:
  - RAI 5.7:*"Provide suggested text to revise TS 5.2.1 to clarify that any changes to the SAR, including the TS bases, shall be provided to the NRC in accordance with 10 CFR 72.48"*
    - 10 CFR 72.48 requires a biennial report to NRC describing changes and summarizing 72.48 evaluations
    - 10 CFR 72.248 requires biennial FSAR updates to NRC, including 72.48 changes
    - TS Bases are part of the FSAR
    - Regulations are clear; no TS needed.

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CoC Improvement Issue – Example 2

- **Docket 72-1004, Amendment 11, March 2009:**
  - **RAI 5.8-9:*"Provide suggested text to revise the last paragraph in TS 5.4.2e to add text requiring the user to verify compliance with the dose limits of 10 CFR 72.104 and 10 CFR 20"***
    - **TS not needed to require a licensee to comply with the regulations**

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CoC Improvement Issue – Example 3

- **Docket 72-1031, July 2009:**
  - **RAI 1: "*The credit taken for the efficacy of Boral neutron absorbers (75%) should be explicitly stated in the TS.*"**
  - **RAI 2: *"Provide proposed language for the TS to specify the grade of boron carbide powder…used in the neutron absorbing materials."***
- **Docket 72-1025 June 2009:**
  - **STC canister also uses Boral neutron absorber**
  - **No similar requests for TS made during a concurrent review.**
- **Lack of criteria yields inconsistent standards among NRC reviewers**

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CoC Improvement Issue – Example 4

- Original CoC and all amendments are approved for use
- General licensee does not have to use latest amendment
- Additions to a CoC via amendment do not apply to previous amendments or original CoC
- If additions are safety-significant, should they apply to original CoC and all amendments?

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CoC Content

- Industry recognizes certain, criteria based, items do belong in the CoC
- What criteria govern the following?:
  - Fuel parameters
  - Fuel cavity atmosphere (drying, inerting)
  - Confinement boundary positive closure
  - Ambient temperature
- Focus should be on items under control of the user in the field

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CoC Content (cont'd)

- Allow the regulations to speak for themselves
- Clear parallel exists with impetus for Part 50 TS improvement from early 1980's
  - Custom TS
  - Dilution of safety focus
- Focus of CoC contents should be on immediate threat to public health and safety similar to reactors

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Part 50 TS Commission Policy Statement:

- *"The purpose of Technical Specifications is to impose those conditions or limitations on reactor operation necessary to obviate the possibility of an abnormal situation or event giving rise to an immediate threat to the public health and safety by identifying those features that are of controlling importance to safety and establishing on them certain conditions of operation which cannot be changed without prior Commission approval."*

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CoC Improvement Resolution Path

- Would resolution of this issue benefit from a Commission policy statement?
- Is rulemaking appropriate?
- Part 50 TS policy statement and §50.36 are good examples
- 72.48 guidance update and training will help
- Next action?

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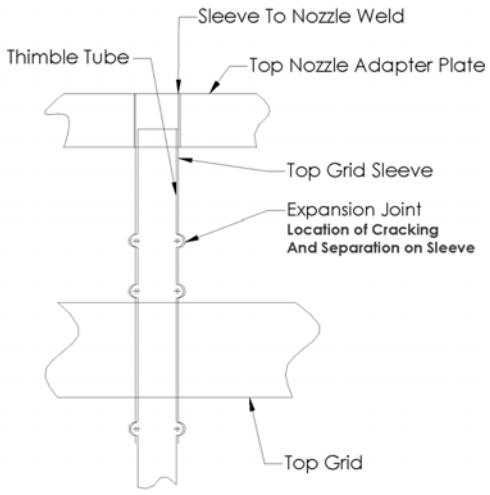
PWR Fuel Top Nozzle SCC Issue

- Zircaloy guide tube resides inside 304 SS top grid sleeve between top nozzle and top grid
- "Bulge joints" allow for grid/sleeve thermal expansion
- Materials and service conditions resulted in potential for stress corrosion cracking at bulge joints
- Corrosion at bulge joints can lead to separation of top nozzle from fuel assembly when lifted



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PWR Fuel Top Nozzle SCC Issue

- All Westinghouse fuel fabricated before 1985 susceptible
- >10,000 assemblies
- Westinghouse provided licensees with criteria to distinguish "susceptible" fuel vs. "affected" fuel
- Handling "affected" fuel assemblies by:
  - Thimble grip handling tool
  - Guide tube anchors
  - Instrument Tube Tie-Rods
- Other future options may become available

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PWR Top Nozzle SCC Issue

- Numerous plants affected; one is permanently shut down and must place this fuel into dry storage and make transport-ready in the very near future
- Many plants have delayed dealing with susceptible fuel
- Running out of other fuel to load for storage
- Susceptible fuel often older and could be used in zoned/regionalized cask loading
- Losing ALARA benefit of loading older fuel assemblies into casks; cask loading dose higher than it could be

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PWR Top Nozzle SCC Issue

- All options are safe, but not the same
  - 1) Declare all susceptible fuel damaged and can
    - Damaged fuel cans expensive
    - Limited number of canister slots for damaged fuel
    - Increases personnel dose
  - 2) Modify with anchors, ITTRs, or other mod
    - Material plus installation expensive
    - Increases personnel dose
  - 3) Use handling tool
    - Leaves fuel as-is; considered as "handling by normal means"

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PWR Top Nozzle SCC Case Study

- Prairie Island loaded affected fuel for storage
  - Most have guide tube anchors installed
  - No need to request NRC approval of anchors as contents via Part 72 specific license amendment
    - Fuel assemblies were modified to include anchors under 50.59
    - Anchors are not used during reactor operation – no activation or source term
    - No impact on criticality results or TS boron requirements
  - Performed functional evaluations of guide tube anchors for storage and transport
    - Reviewed and authorized under 72.48 for storage
    - Explicit NRC approval for transport not requested

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PWR Top Nozzle SCC Issue Resolution Path

- Licensee should decide which approach is best
  - Anchors, ITTRs, handling tool, future options?
- Licensees can determine cost of options but need clarification on regulatory side, re:
  - 9/11/07 Catawba inspection report
  - 8/13/09 McGuire letter
  - Prairie Island experience

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PWR Top Nozzle SCC Issue Resolution Path

- For unmodified fuel (no anchors, ITTRs, other):
  - Classify as damaged or undamaged based on functional evaluations; ANSI N14.33 and ISG-1, Rev 2
  - Damaged fuel will be canned
- For structurally enhanced (modified) fuel:
  - Anchors, ITTRs, or similar unirradiated hardware do not require NRC approval as cask contents
  - Perform functional evaluations to confirm undamaged
  - Review under 72.48
- NRC verifies user implementation by inspection

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PWR Top Nozzle Issue Resolution Path

- Next Action
  - Industry issues generic action plan
  - Users develop plant-specific implementation process based on their storage system CoC requirements
  - NRC verifies compliance with process by inspection of users

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BWR CILC Fuel Issue

- CILC – Crud-Induced Localized Corrosion
- Affects BWR fuel; primarily due to copper condenser tubes
- At least seven plants affected
- Some CILC fuel has been evaluated and loaded into storage casks as intact
- Fundamentally, a damaged fuel classification issue

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BWR CILC Fuel Issue Resolution Path

- Use ANSI N14.33, informed by ISG-1, Rev. 2 to develop user classification protocol
  - It's either damaged or undamaged
- Fuel manufacturer and CoC holder assist with fuel-specific and system-specific functional criteria and evaluations
- Damaged fuel will be canned
- NRC verifies user implementation by inspection

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BWR CILC Fuel Issue Resolution Path

- Next Action
  - Industry issues generic action plan
  - Users develop plant-specific implementation process based on their storage system CoC requirements
  - NRC verifies compliance with process by inspection of users

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72.48 Guidance Update

- New NEI document to replace NEI 96-07, Appendix B
- Will request NRC endorsement of changes via revision to RG 3.72
- First draft out for industry review
- Keeping NEI LATF and USA/STARS 50.59 Project informed
- Resolve industry comments 1Q 2010 and provide to NRC for comment

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72.48 Guidance Update

- Improve guidance on process issues unique to Part 72, e.g.:
  - 212 Report, no Maint. Rule exemption
- Improve Applicability Determination guidance
- Use enforcement experience to clarify guidance where needed
- Address issues where industry and NRC appear to have differing opinions

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Intact/Damaged Fuel Implementation

- Damaged fuel first generically licensed for storage and transport in 2000
  - CoCs include definitions of intact fuel, damaged or failed fuel, and/or fuel debris
- ISG-1 evolution trailed CoC licensing case work
- Different 71 and 72 CoCs have different and changing definitions
- Fuel loaded in dual-purpose systems was classified per Part 71/72 CoC definitions at the time of loading for storage
- Transport is per Part 71 CoC revision in effect at that time

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Intact/Damaged Fuel Implementation

- ISG-1, Rev. 2 offers good flexibility for licensees and aligns well with ANSI N14.33
  - Allows CoCs to simply require damaged fuel to be canned
  - Classification protocol can be controlled in (F)SARs and change as guidance evolves
- Need to ensure intact fuel previously loaded remains transportable

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Burnup Credit and High Burnup Fuel

- **Burnup Credit**
  - **Tracking broader efforts in this area (Part 50 and others)**
  - **EPRI work**
- **High Burnup Fuel**
  - **EPRI work**
  - **Handle detailed resolution via individual CoC case work**

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Conclusions

- **Action items?**
- **Next meeting?**

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