Draft RIS 2002-XX, SG Tube Inspection Methods Background

- Some plants experiencing active circ. cracking in tubesheet expansion region.
- At San Onofre 2 and Sequoyah 2, rotating coil inspection is performed only for upper five or seven inches of the expansion zone.
  - Licensees' analyses indicate circ cracks below the five inch zone not detrimental to tube integrity.

Draft RIS 2002-XX, SG Tube Inspection Methods

Staff Position (Draft)

- TS defines portions of tubing subject to inspection.
- TS define the acceptance criteria.
- Inspection method must provide information to determine that the acceptance criteria are met.
  - At all locations where tube inspections are req'd.
  - For all active and potential degradation mechanisms.
- Where technical justification exists to support an alternate approach, licensees may submit technical specification amendment

Issue Status

- Staff has prepared draft Regulatory Issue Summary.
  - Expect issuance in September 2002.
- At staff's request, amendment requests were submitted for Sequoyah 2/San Onofre 2; approved by NRC.

NEI SG GLCP - Key Outstanding Issues

- Maximum SG inspection interval criteria
- Clarification/revision - applicability of 1.4 criterion for burst under accident conditions to differential thermal stress
- Revisions to administrative technical specifications to include specifications for:
  - Tube integrity performance criteria
  - Maximum SG inspection intervals
  - Tube repair criteria
  - Tube repair methods

Maximum Inspection Intervals

Background

- EPRI examination and tube integrity assessment guidelines are not sufficient to support performance based inspection intervals.
  - NRC letter dated 8/2/2001; Accession No ML 012200349
- Continued need for prescriptive inspection interval criteria consistent with operating experience and improved SCC resistance of 600TT and 690TT tubing
  - NRC letter dated 11/26/2001; Accession No. ML013250537.

Maximum Inspection Intervals

Background (Continued)

- Continuing dialog between industry/NRC staff concerning prescriptive inspection interval criteria in forthcoming Rev 6 of EPRI examination guidelines.
  - NRC memo dated 9/18/2001; Accession No. ML012610664
  - NRC letter dated 9/09/2002; Accession No. ML022520413
- Timely inspections are critical to ensuring:
  - prompt detection of conditions adverse to quality (10 CFR 50, Appendix B)
  - acceptable risk
- Continued need to maintain tech spec control on maximum inspection intervals.
  - NRC letter dated 11/26/2001; Accession No. ML013250537.

Maximum Inspection Intervals

Staff Comments re. Industry Proposed Tech Spec Requirements

- Lack critical details for ensuring intervals will not be excessively long.
- Inconsistant with and less restrictive than industry guidelines.
- May be less effective in some cases for ensuring tube integrity than existing tech specs, particularly for SGs with active degradation.

Maximum Inspection Intervals

Staff Tech Spec Proposal - Alloy 600 MA Tubing

Steam generator tube inspection intervals shall be established and implemented to ensure that the steam generator tube integrity is maintained. In addition, the inspection interval for each steam generator shall not exceed one fuel cycle or 24 EFPM, whichever is less.

Maximum Inspection Intervals

Staff Tech Spec Proposal - Alloy 600 TT Tubing

- Steam generator tube inspection intervals shall be established and implemented to ensure that the steam generator tube integrity is maintained. In addition:

a. Except as provided for in b., inspect 100% of tubes at sequential intervals of 120, 90, and, thereafter, 60 EFPM. The first sequential interval shall be considered to begin at the first inservice inspection of the steam generators. In addition, inspect 50% of the tubes by the refueling outage nearest the mid point of the interval and the remaining 50% by the refueling outage near the end of the interval. No steam generator can operate for more than two fuel cycles or 48 EFPM, whichever is less, without being inspected.

b. If any steam generator contains a degradation mechanism(s) exceeding the **degradation activity threshold** during a given inspection, the next inspection interval for each SG for the subject degradation mechanism(s) shall not exceed one fuel cycle or 24 EFPM, whichever is less.

Maximum Inspection Intervals

Staff Tech Spec Proposal - Alloy 600 TT Tubing (Continued)

- **Degradation activity threshold** refers to any of the following:
  - A combination of ten or more new indications (≥ 20% of the initial tube wall thickness) of thinning, pitting, wear, impingement, or other form of volumetric indications which display an average growth rate equal to or greater than 25% of the tube repair limit in one inspection-to-inspection interval. Damage from loose parts or foreign objects may be excluded from consideration only if the causal objects are identified and removed from the steam generators.
  - One or more new or previously identified indications (≥ 20% of the initial tube wall thickness) which display a growth increment greater than or equal to the **tube repair criteria** in one inspection-to-inspection interval. Damage from loose parts or foreign objects may be excluded from consideration only if the causal objects are identified and removed from the steam generators.
  - Any crack indication (e.g., outside diameter intergranular attack/stress corrosion cracking or inside diameter stress corrosion cracking).

Maximum Inspection Intervals

Priority Guideline Issues

- Clarification of degradation assessment objectives.
- Clarification - Need for updating degradation and operational assessments based on recent experience at other similar plants.
- Clarification of guideline discussion re interpretation of definition of burst
  - I.E., clarification of gross versus local structural failure of tube wall.

1.4 Safety Factor Issue

- Industry raised the issue re. applicability of the 1.4 structural performance criterion to differential thermal loads or other sources of secondary stress at public meeting in November 2001.
  - Industry preparing white paper to justify revising or clarifying interpretation of the criterion.
  - Not yet submitted.
- Industry has proposed revising the criterion in TS to make it applicable to "design basis accidents under service level D."

1.4 Safety Factor Issue

Staff's Observations

- Industry proposal would effectively exclude application of the 1.4 criterion to differential thermal loads.
- Differential thermal loads can be significant, particularly for OTSGs.
- Industry needs to address an appropriate criterion for differential thermal loads
- Industry needs to provide appropriate justification; e.g., white paper
- Critical issue for going forward with GLCP?

Administrative Technical Specifications Re SG Program

Industry Proposal

- Incorporates unnecessary changes relative to previous versions.
- Insufficient detail re:
  - Condition monitoring
  - Performance criteria
  - Inspection intervals
  - Repair methods

Conclusion

- Staff's continued support of GLCP as best option is contingent on quickly resolving outstanding issues.