# NEI Steam Generator Task Force

# NRC/Industry Update

## August 4, 2011

NUCLEAR ENERGY INSTITUTE

# Agenda

8:30 am Introductions - NRC

Opening Remarks - NRC and Industry

NEI Steam Generator Task Force Update - Industry

1. TSTF-510 Update
2. Pre-Service Inspection Code Change Update
3. Divider Plate/Cladding Project Status
4. On-Set of Fatigue Cracking in Through Wall Flaws
5. Eddy Current Auto-Analysis Update
6. Domestic Plant Alloy 600 Welded Plug Status
7. U-Bend Support Position Verification Survey
8. Primary to Secondary Leak Guideline Revision Update
9. In Situ Pressure Test Guideline Revision Overview

# Agenda (Continued)

**11:00 am** Address Public Questions/Comments

**11:30 am** Lunch

**1:00 pm** NEI Steam Generator Task Force Update (continued) – Industry

10. Status of Industry Documents
11. Steam Generator Operating Experience
12. **Follow-up on Previous SGTF/Executive Meetings**
13. **Future Topics**

**3:30 pm** NRC feedback on various issues - NRC and Industry

**3:45 pm** Address Public Questions/Comments - NRC and Industry

**4:00 pm** Adjourn

# TSTF-510 Update

Jay Smith, Exelon

# TSTF-510 Update

- Major Milestones Completed
  - Rev. 0 of the Traveler & Fee Waiver Request transmitted to NRC on 3/26/09
  - Fee Waiver Request Approved on 7/20/09 (ML092010534)
  - 8 RAIs received via email M. Honcharik (NRC) to B. Mann (TSTF), "TSTF-510 RAIs," February 4, 2010.
    - RAI Response and Rev. 1 submittal to NRC June 2010
  - 3 comments received at SGTF Mtg August 12, 2010
    - Response and Rev. 2 submittal to NRC October 11, 2010
  - Notice of Comment Issued on June 20, 2011
  - Industry Comments submitted on July 19, 2011
    - 3 industry comments submitted
    - Apparent inconsistencies with TSTF-510 R2 and within NRC document itself.

# TSTF-510 Comments

- **Comment 1:**

  The model Safety Evaluation, Section 3.9, Page 11, the section titled, "Proposed Change," contains an inconsistency with TSTF-510, Revision 2. The first sentence in the model Safety Evaluation for Alloy 690TT tubing states:

  "After the first refueling outage following SG installation, inspect each SG at least every 72 effective full power months or at least every other refueling outage (whichever results in more frequent inspections)."

- TSTF-510, Revision 2,states:

  "After the first refueling outage following SG installation, inspect each SG at least every 72 effective full power months or at least every third refueling outage (whichever results in more frequent inspections)."

- Note that the model Safety Evaluation for Alloy 690 TT tubing correctly reflects the TSTF-510, Revision 2, requirements in the "Assessment" section (Page 12, second paragraph).

# TSTF-510 Comments

- Comment 2:

  The model Safety Evaluation, Section 3.9, Page 11, the section titled, "Proposed Change," contains an inconsistency with TSTF-510, Revision 2. The second sentence in the model Safety Evaluation states:

  "In addition, the minimum number of tubes inspected at each scheduled inspection shall be the number of tubes in all SGs divided by the number of SG inspection outages scheduled in each inspection period as defined in a, b, and c below."

- TSTF-510, Revision 2,states:

  "In addition, the minimum number of tubes inspected at each scheduled inspection shall be the number of tubes in all SGs divided by the number of SG inspection outages scheduled in each inspection period as defined in a, b, c and d below."

# TSTF-510 Comments

- **Comment 3:**

  **The model Safety Evaluation, Section 3.11, "Specification 5.6.7, 'Steam Generator Inspection Report'," Page 14, discusses the elimination of the word "Active" from Item b but does not discuss the elimination of the word "active“ in Item e, as show in TSTF-510, Revision 2. The justification for the elimination of the word "active" is the same for both Item b and Item e.**

- **The model Safety Evaluation should be revised to discuss the elimination of the word "active" from Specification 5.6.7, Item e.**

# TSTF-510 Update
# Remaining Milestones

| TSTF-510 Revision to Steam Generator Program Inspection Frequencies and Tube Sample Selection | | | | |
|---|---|---|---|---|
| **Milestone Action** | **Original Target Date** | **Current Target Date** | **Responsible Group** | **Comments/Status** |
| Submit Rev. 0 TSTF Traveler to NRC | 1/1/2009 | 3/26/2009 | TSTF/NEI SGTF | Complete |
| Receive NRC Acceptance & Schedule Letter | 3/1/2009 | 12/31/2009 | TSTF /NEI SGTF | Not Sent |
| Receive Rev. 0 RAI's (email used) | 6/1/2009 | 2/4/2010 | TSTF /NEI SGTF | Complete |
| Respond to Rev. 0 RAI's | 9/1/2009 | 6/15/2010 | TSTF /NEI SGTF | Complete |
| Submit Rev. 1 TSTF Traveler to NRC | 1/1/2010 | 6/17/2010 | TSTF /NEI SGTF | Complete |
| Receive Rev. 1 RAI's (SGTF Mtg) | N/A | 8/12/2010 | TSTF /NEI SGTF | Complete |
| Respond to Rev. 1 RAI's | N/A | 9/15/2010 | TSTF /NEI SGTF | Complete |
| Submit Rev. 2 TSTF Traveler to NRC | N/A | 9/22/2010 | TSTF /NEI SGTF | Complete |
| **Receive Notice for Comment** | **12/1/2009** | **6/20/2011*** | **TSTF /NEI SGTF** | **Complete*** |
| **Respond to Notice for Comment** | **1/1/2010** | **7/19/2011*** | **TSTF /NEI SGTF** | **Complete*** |
| **NRC Publish Notice of Availability** | **4/1/2010** | **10/20/2011*** | **NRC** | **Current Estimate*** |
| * Change since previous SGTF meeting | | | | |

# TSTF-510 Update
# Survey Results

- It was requested by the Staff to provide an estimate of the Utility schedule for submitting the TSTF-510 License Amendment Requests.
- An Industry survey was conducted to obtain this information.
- 61 of 69 Plants responded to the survey.

# TSTF-510 Update Survey Results

| | Plan to Submit ASAP | Plan to Submit Within 3 Months of NOV | Plan to Submit Within 6 Months of NOV | Plan to Submit Within 1 year of NOV | Plan to Submit More than 1 year of NOV | No Plan to Submit |
|---|---|---|---|---|---|---|
| Number of Plants | 1** | 6 | 3 | 33 | 18 | 1 |
| Number of LAR's* | 1** | 2 | 2 | 16 | 11 | 1 |

*Assumes dual unit and sister plants have common Tech Specs

** Plant submitted TSTF-510 LAR on July 20, 2011.

NOV – Notice of Availability

# Pre-Service Inspection Code Guidance

Viki Armentrout, Dominion

# Pre-Service Inspection Code Guidance

- **NRC Comment regarding Pre-service Examination of SG tubing:**
  - **IWB-2200(c) of Section XI of the ASME Code indicates that steam generator tube examination shall be governed by the plant Technical Specification. The technical specifications do not address pre-service inspections. Discuss with the industry a path forward to address this issue (e.g., incorporating pre-service inspections into TSTF-510, modifying the ASME Code).**

# Pre-Service Inspection Code Guidance

- **ASME item BC 10-129 already in place to modify the steam generator inspection requirements.**
- **Action opened by Subgroup on Industry Experience for New Plants (BPV III & BPV XI).**
- **ASME Code meeting scheduled for August 8, 2011. Steam Generator Inspection requirements will be discussed at that time.**
- **NRC contact information requested to discuss and resolve comments.**
- **SGTF Recommendation to close action to ASME tracking item BC 10-129. No further SGTF actions required.**

# Divider Plate/Cladding Cracking Project Status

Helen Cothron, EPRI

# Divider Plate/Cladding Cracking Project Status

- **Two issues – tube to tubesheet weld and channel head integrity**
  - **If PWSCC initiates in Alloy 600 materials in the SG divider plate or tubesheet cladding it has been postulated by the NRC that it may propagate over time to pressure boundaries such as the tube-to-tubesheet weld or the channel head.**
- **Stresses in the area of concern have not been modeled.**
- **No qualified techniques in the US.**
- **Inspections inside the SG bowl result in high dose to workers**

# Divider Plate/Cladding Cracking Project Status Project Scope

- **Developing a database of 82/182 material properties and Alloy 690TT tubing material properties**
  - **Establish the likely range of chromium content in the tubesheet cladding and in the 690 tubing in the field**
- **Reviewing work done in other issue programs to determine the acceptable level of chromium to resist PWSCC initiation.**
  - **Current 24% threshold to be reviewed based on recent test data.**

# Divider Plate/Cladding Cracking Project Status Project Scope

- **Reviewing work done in other Issue Programs to determine what happens to PWSCC when it comes into contact with materials resistant to PWSCC.**

# Divider Plate/Cladding Cracking Project Status Modeling

- **Finite element modeling will be used to determine the stresses in the channel head and in the tubesheet regions**
  - **Determine if the stresses are enough to drive a fatigue crack from the PWSCC in the divider plate triple point through the channel head**
  - **Calculate a growth rate for fatigue cracking into the channel head material**
    - **Growth rate data will be used along with the results of the stress analysis to determine the acceptable flaw size in terms of structural and leakage integrity of the channel head.**

# Divider Plate/Cladding Cracking Project Status Modeling

- **Determine if the estimated stresses are enough to propagate PWSCC from the SG tubesheet cladding to the tube-to-tubesheet weld**
- **Estimate the chromium content in the autogenous tube to tubesheet weld between 82/182 material and Alloy 690TT material.**

# Divider Plate/Cladding Cracking Project Status
# Tube To Tubesheet Weld Mockup

- **Identify mockups that are available from manufacturing vendors**
- **Develop mockups using representative materials and autogenous welding techniques.**
- **Mockup tube to tubesheet cladding welds will be analyzed for chromium content and compared to the model results.**

# Divider Plate/Cladding Cracking Project Status

- **Kick off meeting among the following participants was held June 2**
  - **Structural Integrity Associates**
  - **Westinghouse**
  - **EPRI WRTC**
  - **SGMP**
- **Database development and review of fabrication shop practices have begun.**

# Onset of Fatigue Cracking in Through Wall SG Flaws

**Jim Begley – TCA Solutions**

# Eddy Current Auto-Analysis Update

Steve Swilley, EPRI

# Auto-Analysis Workshop Summary

- **Conducted in Charlotte, NC, February 9th and 10th, 2011**
  - The NRC provided feedback on the EPRI Auto Analysis workshop during the February 2011 SGTF meeting in Washington DC
  - The industry is evaluating the NRC feedback through the EPRI PWR Steam Generator Examination Guidelines, Revision 8 process
    - The Auto Analysis subcommittee is tasked with addressing the feedback and recommending resolution and/or actions
    - Their evaluation should be completed by December 2011

# Spring 2011 Automated Analysis Experience

- First implementation of fully automated analysis process
  - Implemented through documented Guideline deviation
  - Replaced primary, secondary and resolution process
    - Used CDS to bridge new technology
    - Fully automated analysis process results consistent with CDS results
  - Successful implementation
  - No changes to base configuration required

# Spring 2011 Automated Analysis Experience

- Used fully automated analysis product as a secondary analysis tool.
  - Implemented within existing Guideline requirements
  - Used as the secondary analysis process
  - Included bobbin, MRPC, and X-Probe
  - No field changes made to the base configuration

# Domestic Plant Alloy 600 Welded Plug Survey Status

**Jay Smith - Exelon**

# Domestic Plant Alloy 600 Welded Plug Survey Status

- During the February, 2011 SGTF Meeting, the Staff inquired as to the number of Alloy 600 welded plugs that are in-service in U.S. plants. The inquiry also requested how the plugs are monitored.
- The SGTF conducted an industry survey through the EPRI SGMP to obtain the requested information.
- 53 of 69 U.S. plants responded to the survey

# Domestic Plant Alloy 600 Welded Plug Survey Status

- 14 plants have Alloy 600 plugs
  - 169 total A600 welded plugs
  - 18 A600 mechanical plugs
    - 1 plant has 18 PIPs (plug-in-plug)
      - The PIPs are visually inspected to ensure no cracking in the tack weld
      - This plant has plans to replace SGs
- All plants perform visual inspection as part of the primary side steam generator scope during each steam generator inspection outage.

# Domestic Plant Alloy 600 Welded Plug Survey Status

- Two plants had detected degradation in A600 welded plugs during routine visual plug monitoring:
  - A plant found one shop welded bar stock plug with axial indications in 1994. All bar stock A600 welded plugs were replaced with A690 welded plugs at this plant.
  - A plant found 3 pre-service installed A600 welded plugs with fabrication related defects. Two were found in 2002 and one found in 2010. The 3 plugs were replaced with A690 plugs. Plant is scheduled for SG replacement.

# U-Bend Support Position Verification Survey Results

**Jay Smith - Exelon**

# U-Bend Support Position Verification Survey Results

- **During the February SGTF meeting, the Staff raised a potential concern that plants are have not verified the position of U-Bend support verification in light of foreign plant experience and industry & NRC generic correspondence.**
- **As a result of this discussion, the SGTF conducted an Industry survey to determine how many plants have addressed or are planning to address this concern and how many plants have not addressed this concern.**

# U-Bend Support Position Verification Survey Results

- 53 of 63 US plants with recirculating steam generators responded.
  - Different methods used to verify position
  - Some SG designs inherently support all tube rows
  - SGMP needs to further evaluate results
- Preliminary survey results
  - 21 plants have verified the position of their U-Bend supports
  - 9 plants have plans to verify in the future
  - 23 plants have not verified the position of their U-bend supports.
    - 20 of these plants are replacement SGs.
- EPRI letter SGMP-10-01 issued to re-emphasize the importance of comparing as-found condition of the SG support locations to the SG design.
- SGMP E&R TAC is evaluating the survey results to determine what future actions are warranted.
  - This will be discussed during the August 9, E&R TAC conference call.

# Primary to Secondary Leak Guideline Revision Update

Jim Benson – EPRI

# Guideline Revision – Primary-to-Secondary Leak Guidelines, Rev 4 Status

- This guideline is used by chemistry and operations departments in developing operational responses to primary-to-secondary leakage, selecting leakage monitoring methods and equipment, performing leak rate calculations, and evaluating data.
- This document provides the requirements and suggested procedures for responding to primary-to-secondary leakage to reduce the probability of a tube rupture.

# Guideline Revision – Primary-to-Secondary Leak Guidelines, Rev 4 Status

**Overview of Revision 4 Changes**

- Technical basis chapter re-organized
- Guidance chapter re-organized
- Two methodologies clearly delineated
  - Rate of Change
  - Constant Leakage
- Some requirements re-worded for clarity so that intent better understood
- All requirements (mandatory, shall, and recommendations) clearly defined and summarized in a Chapter
- Chapters and appendices added or revised to update industry experience or provide additional information

# Guideline Revision – Primary-to-Secondary Leak Guidelines, Rev 4 Status

**Broad-Based Review**

- Guideline Committee Recommendation to Distribute Draft for Broad-Based Review
  - completed on 10/20/10
- TS TAC Recommendation to Distribute Draft for Broad-Based Review
  - completed on 11/08/10
- Broad-based Review
  - completed on 1/17/11
- Committee to resolve comments from the broad-based review and revise document
  - completed on 3/1/11

# Guideline Revision – Primary-to-Secondary Leak Guidelines, Rev 4 Status

**Endorsement Status**

- Guideline Committee Endorsement for Adoption of the Guideline
  - completed on 4/6/11
- TS TAC Endorsement for Adoption of the Guideline
  - completed on 5/2/11
- SGMP IC Endorsement for Adoption of the Guideline
  - completed on 5/25/11
- EC Endorsement for Adoption of the Guideline
  - completed on 8/1/11

# Guideline Revision – Primary-to-Secondary Leak Guidelines, Rev 4 Status

## Forward Plan

- Publication expected in Fall 2011
- Implementation
  - 6 months from date of implementation letter
    - If refueling outage within six months, then 9 months from the date of letter.
- Webcasts

# In Situ Pressure Test Guideline Revision Overview

Helen Cothron - EPRI

# In Situ Pressure Test Guideline Revision

- The EPRI Steam Generator In Situ Pressure Test Guidelines, Revision 3 was issued in August 2007 (1014983)
- An industry guideline revision committee was formed in early 2010 to update the guidelines to Revision 4.
  - The committee consisted of EPRI, Utility, and Vendor personnel

# In Situ Pressure Test Guideline Revision

- Major Changes & Scope of Work
  - In Situ field test results have been downloaded from the SGDD and validated by utility owners
    - No threshold values were changed
  - Section on screening volumetric indications was rewritten
  - Added voltage screens for foreign object wear
  - Addressed bending loads for circumferential indications
  - Independent review of equations and examples

# In Situ Pressure Test Guideline Revision

- All technical work is completed
- Committee is reviewing the final draft
- Broad based review planned for later this year
- Publication is planned for 2012

# Status of Industry Documents

Jim Benson, EPRI

# SGMP Guidelines Status

| Guideline Title | Current Rev # | Report # | Last Pub Date | Imple-mentation Date(s) | Interim Guidance | Review Date | Comments |
|---|---|---|---|---|---|---|---|
| Steam Generator Integrity Assessment Guidelines | 3 | 1019038 | Nov 2009 | 9/1/10 | SGMP-IG-10-01 | 2012 | |
| EPRI Steam Generator In Situ Pressure Test Guidelines | 3 | 1014983 | Aug 2007 | ~~3/14/08~~ 6/14/08 | none | | ~~Rev 4 in progress.~~ |
| PWR Steam Generator Examination Guidelines | 7 | 1013706 | Oct 2007 | 9/1/08 | SGMP-IG-08-04 | | Rev 8 in progress. |
| PWR Steam Generator Primary-to-Secondary Leakage Guidelines | 3 | 1008219 | Dec 2004 | 7/17/06 10/17/06 | none | | Rev 4 in progress. Expected to be issued by Dec 2011. |

# SGMP Guidelines Status

| Guideline Title | Current Rev # | Report # | Last Pub Date | Imple-mentation Date(s) | Interim Guidance | Review Date | Comments |
|---|---|---|---|---|---|---|---|
| PWR Primary Water Chemistry Guidelines | 6 | 1014986 | Dec 2007 | 6/17/08<br>9/17/08 | SGMP-IG-09-01<br>SGMP-IG-11-02 | 2011 | Review Board interpretation CHEM 16 issued. |
| PWR Secondary Water Chemistry Guidelines | 7 | 1016555 | Feb 2009 | 8/20/09<br>11/20/09 | none | 2011 | Review Board interpretation CHEM 17 issued. |
| Steam Generator Management Program Administrative Procedures | 3 | 1022343 | Dec 2010 | 9/1/11<br>12/31/11 | none | n/a | |
| Steam Generator Degradation Specific Flaw Handbook | 1 | 1019037 | Dec 2009 | n/a | none | n/a | |

# Interim Guidance – PWR Primary Water Chemistry Guidelines, Rev 6

- Implementation letter (SGMP-IG-11-02) issued May 9, 2011
- Interim Guidance modifies an existing "shall" requirement that could allow stations an option to increase the maximum reactor coolant system dissolved hydrogen concentration Action Level 1 value from 50 up to 60 cc(STP)/kg H20.
- Licensees shall incorporate the interim guidance into their steam generator programs by Nov 9, 2011 (or Feb 9, 2012 if a plant's refueling outage is within six months from date of letter)

# Protocol for NRC to Review EPRI Technical Reports

- At the Feb 2011 SGTF meeting, the NRC indicated that they sometimes have a desire to obtain EPRI SGMP Technical Reports
- It was acknowledged that the process for EPRI to develop a non-proprietary version of EPRI Technical Reports, along with an affidavit is burdensome to EPRI staff and can take a significant amount of time
- At the June 2011 IC meeting, it was suggested that EPRI could make requested EPRI Technical Reports available for NRC review either at the EPRI or NEI offices

# SG Operating Experience

Anthony Martin, Southern Nuclear

# SG Operating Experience

- From the previous SGTF Meeting held with the Staff in February 2011, the SGTF took an action to develop an appropriate process to discuss operating experience in public meetings.

- The EPRI SGMP Integration Committee determined that the intent of the OE discussions is to identify industry significant issues and the impact to industry guidance, if any.
  - The Utility and Plant identification is not pertinent to these discussions.
  - Therefore, the Utility/Plant name will not be used.
  - Additionally, sensitive Utility/Plant information will not be discussed until the appropriate time (e.g., in-progress root cause analyses that involve potential litigation or emerging issues that are not releasable by the Utility)

# OE for US Plants with Alloy 600TT Tubing

- Plants are still using alternate repair criteria to limit inspections in the tubesheet
- Cracking continues to be identified in Alloy 600TT tubing

| Location | ODSCC | | PWSCC | |
|---|---|---|---|---|
| | Axial | Circ | Axial | Circ |
| U-Bend | | | X | |
| TSP | X | | | |
| TTS/Exp Trans | X | X | X | X |
| Tubesheet | X | | | X |
| Tube End | | | X | X |

# OE for Plants with Alloy 600TT Tubing

- During the Spring 2011 full length bobbin coil inspection, a distorted support plate indication (DSI) was detected in one Row 2 tube at the 9th TSP
- Unusual to initially find axial indications higher up in tube bundle.
- Plus-point was performed at each hot leg TSP location in the affected tube.
- Identified two additional smaller single axial indications at TSP 03H and TSP 07H.
- Each TSP was also inspected with the Ghent Probe
  - Signals confirmed with similar results

# OE for Plants with Alloy 600TT Tubing

- Affected tube was not originally identified as having higher residual stress from the 2003 screening.
  - Affected tube and all in service tubes were inspected with bobbin coil each refuel outage since 2003 and no other indications were found until the 2011 inspection.
  - In 2003, three high row -2 sigma tubes were found with cracking at TSP locations. Affected tubes were plugged. No other indications were found in -2 sigma tubes during each subsequent outage inspection.
- A re-screen of the affected tube for higher residual stress signal was performed.
  - Affected tube did contain higher residual stress signal (U-bend offset)
  - Missed during original screening in 2003
  - Extent of condition screening of all low row tubes in all SG's performed and no additional tubes found with signature signal.

# OE for 600MA Tubing

- Three domestic plants with Alloy 600MA tubing performed in situ pressure testing to demonstrate tube integrity
- All in situ pressure tests passed structural and leakage performance criteria. No leakage identified.

# OE for 600MA Tubing

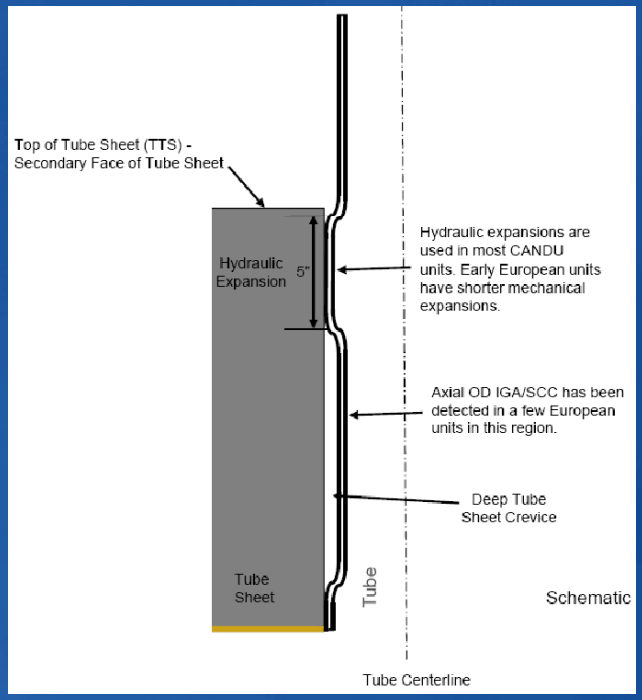
- **In Situ Pressure Test Details**

| | Degradation Mechanism | Plus-Point Volts | Depth | Length | Maximum Test Pressure | Leakage |
|---|---|---|---|---|---|---|
| Plant 1 | TSP Axial ODSCC | 0.54 | 64% | 1.98” | 5700 | 0 |
| | TSP Axial ODSCC | 0.44 | 59% | 2.0” | 5900 | 0 |
| | Sludge Pile Axial ODSCC | 0.63 | 67% | 0.70” | 4600 | 0 |
| Plant 2 | Freespan Axial ODSCC | 0.55 | 67% | 1.47” | 4900 | 0 |
| | Ding Axial ODSCC | 0.88 | 76% | 0.68” | 4900 | 0 |
| | Freespan Axial ODSCC | 0.84 | 75% | 7.18” | 4900 | 0 |
| Plant 3 | Permeability Variations | n/a | n/a | n/a | 4900 | 0 |

# OE for Non-US Plants with Alloy 800NG Tubing

- IGA/SCC in Siemens/KWU Design
  - Axial SCC in deep tubesheet crevices
  - Axial and Circ SCC at TTS and Axial SCC at TSPs
  - Circ SCC at TTS in Dents
- TTS Denting in Siemens/KWU Design

| 800NG Location | ODSCC | | PWSCC | |
|---|---|---|---|---|
| | Axial | Circ | Axial | Circ |
| U-bend | | | | |
| TSP | X | | | |
| TTS/Exp Trans | X | X | | |
| Tubesheet | X | | | |
| Tube End | | | | |



# Update on Top of Tubesheet Denting

| SG Design | Tube Material | Denting at TTS | Cracks Associated with Denting | Comments |
|---|---|---|---|---|
| BWI | 690TT | X | | Domestic Plant |
| Siemens | 690TT | | | Inspections indicate an increase in the height and distribution of hard sludge |
| Siemens | 800NG | X | X | Denting correlated with hard sludge |
| Siemens | 800NG | X | | High pressure sludge lancing used on one SG was successful in removing hard sludge |
| Siemens | 800NG | X | X | Denting is increasing in two of the three SGs and new cracking is being identified |
| Framatome | 600TT | X | X | Sludge is compact and resistant to high pressure sludge lancing |

# Foreign Object Experience

- A replacement once through steam generator identified foreign object wear
  - First time for a OTSG
    - Long term action for SGMP to include this experience in the next revision of Integrity Assessment Guidelines
  - Indications were identified by eddy current
    - Fully Automatic Analysis Analyzer detected wear
      - Manual Review detected PLP
      - FOSAR confirmed foreign object

# Foreign Object Experience

- 690TT plant performed contingency planning for use of sizing foreign object wear from the secondary side of the tubes
  - no eddy current planned
  - 2nd inspection after replacement
  - Plan to perform sludge lancing and FOSAR during outages with no primary side work
  - Minimal risk of foreign object

# Foreign Object Experience

- Contingency plan development
  - Used a tool developed by GE for wear scar sizing.
  - AREVA provided a mockup and EPRI SGMP provided wear scar standards.
  - Demonstrated the ability to size a 40% wear scar.
  - Contingency plan called for mobilizing eddy current if wear scar was sized at greater than 40%.
  - No foreign objects or wear scars were identified. Technique was not used.
  - SG Exam G/L Rev. 8 Committee is evaluating guidance for alternate NDE techniques.

# Follow-up on Previous SGTF/Executive Meetings

# Follow-up on June Executive Meeting

- The NRC staff will provide the industry executives feedback related to licensee letters that provide notification of deviations from NEI 03-08 mandatory items.
- The SGMP will provide a description of its fouling evaluation program and will provide a discussion of the ratio of SGMP effort devoted to original versus replacement steam generators.
- The SGMP will propose a schedule for interacting with the NRC staff to define performance objectives and milestones for resolution of the SGMP open issues.
- The SGMP executive and cognizant NRC manager will continue periodic (approximately monthly) teleconferences on the H* alternate repair criteria for steam generator tubes.

# Identified Open Issues from June Executive Meeting

| NRC Technical Issue | Industry Response |
|---|---|
| Need for eddy current testing technique essential variable tolerance for generically qualified techniques | SGMP project is complete and provides the methodology for evaluating site-specific system performance. This information will be included in the next revision of the Examination Guidelines |
| Divider plate cracking | SGMP project began in 2011 to investigate crack propagation during extended period of operation |
| The effect of eddy current noise on probability of detection and sizing of indications | SGMP has published protocol and procedures and software specification for noise monitoring. Vendors have been developing software for automated noise monitoring Pilot projects are being funded through SGMP to demonstrate the capabilities of the software |
| Onset of fatigue cracking in throughwall steam generator defects | SGMP project to perform tests to determine the onset of fatigue cracking. NRC/ANL/SGMP working together on this project |

# Identified Open Issues from June Executive Meeting

| NRC Technical Issue | Industry Response |
|---|---|
| Tube fouling | SGMP is funding projects to better understand how existing plant measurements can be used to evaluate the level of fouling, to develop a model to predict the level of fouling over time, and to develop a dynamic analysis tool for prediction of the level of fouling that may result in operational issues. |
| Performance standards for tube integrity assessments | SGTF presented industry position that current performance standards are adequate. Staff will review the documentation and this will be discussed at a future meeting |

# Future Topics

# NRC feedback on various issues

- Up-Coming NRC Generic Correspondence
- Other Feedback

# Address Public Questions/Comments

# Adjourn