



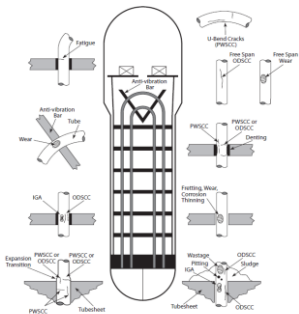
Industry Programs to Manage Steam Generator Tube Degradation

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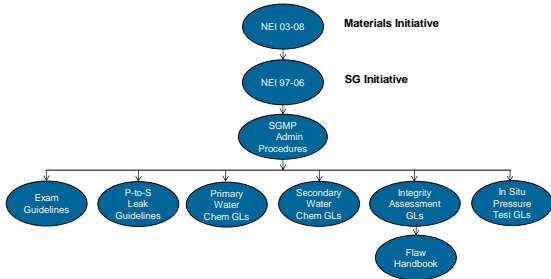
Contents

- US Nuclear Industry Materials Initiative – NEI 03-08
- Steam Generator Initiative – NEI 97-06
- Steam Generator Management Program

Steam Generator Tube Degradation



Hierarchy of Documents



US Nuclear Industry Materials Initiative - NEI 03-08

- To establish and maintain regulatory credibility on materials issues, the NSIAC unanimously approved the materials initiative May 2003

"Each licensee will endorse, support and meet the intent of NEI 03-08, Industry Guideline for the Management of Materials Issues. This initiative is effective January 2, 2004."

Utility Commitments Required by Materials Initiative - NEI 03-08

- Commitment of executive leadership and technical personnel
- Commitment of funds for materials issues within the scope of this Initiative
- Commitment to implement applicable guidance documents

Issue Programs in the Initiative - NEI 03-08

- EPRI
 - Steam Generator Management Program
 - BWRVIP
 - Materials Reliability Program
 - Primary System Corrosion Research
 - Water Chemistry Control
 - NDE
- PWR Owners Group Materials Sub-committee

Initiative Accomplishments - NEI 03-08

- Achieved a high level of industry integration, coordination, alignment, and communication on material issues
- Established a common process for prioritizing projects, budgets, and planning
- Defined expectations for industry actions and interface with NRC upon discovery of an emergent issue
- Defined a consistent process for guideline deviations and communication with NRC
- Provided for executive level interactions between industry and senior NRC management
- Consistent set of metrics that monitor funding and performance by IPs and utilities
- Self assessments by IPs every 3 years

Utility Responsibilities - NEI 03-08

- Communicate the importance of the Materials Initiative to utility personnel
- Support industry Issue Programs
 - Funding support
 - Staff support – technical and executive levels
 - OE sharing
- Establish proactive materials management program and its implementing documents

Issue Program Responsibilities - NEI 03-08

- Identifying, prioritizing, and resolving issues
- Communicating
- Managing regulatory interface
- Developing guidance
- Reviewing deviations
- Self assessments and performance metrics
- Process for addressing emergent materials issues

Steam Generator Initiative - NEI 97-06

- Recognizing the importance of steam generators on safe plant operations, the NEI Nuclear Strategic Issues Advisory Committee (NSIAC) unanimously approved the Steam Generator Initiative on December 16, 1997

“Each licensee will evaluate its existing Steam Generator Program and, where necessary, revise and strengthen program attributes to meet the intent of the guidance provided in NEI 97-06, Steam Generator Program Guidelines, no later than the first refueling outage starting after January 1, 1999.”

Steam Generator Initiative - NEI 97-06

- NEI 97-06 was developed as a framework for a comprehensive Steam Generator Program that used the EPRI SGMP Guidelines as its technical foundation
- Performance criteria were included to ensure steam generator tube integrity would be maintained
- Important program elements are described and EPRI SGMP Guidelines are referenced

SGMP Guidelines Referenced in NEI 97-06

- The EPRI Guidelines that form the basis of steam generator program requirements are:
 - PWR Secondary Water Chemistry Guidelines
 - PWR Primary Water Chemistry Guidelines
 - PWR Steam Generator Examination Guidelines
 - PWR Primary-to-Secondary Leak Guidelines
 - Steam Generator Integrity Assessment Guidelines
 - Steam Generator In Situ Pressure Test Guidelines

Integrated Materials Issues Strategic Plan

- Provides Systematic Approach to Managing Materials Issues
 - Identify vulnerabilities
 - Assess condition (inspect & evaluate)
 - Mitigate degradation initiation and propagation mechanism
 - Repair or replace as required
- Approach Used:
 - Materials Degradation Matrix (MDM) and Issue Management Tables (IMT) developed and maintained as living documents
- MDM and IMTs are effective tools to help prioritize EPRI R&D resources, and to provide guidance for planning materials R&D

SGMP High Priority Gaps

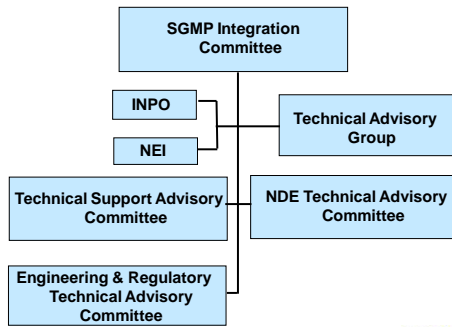
Steam Generator Tube Damage due to Loose Parts or Foreign Objects
Steam Generator Foreign Object Detection and Evaluation Improvements
ODSCC of Thermally Treated Alloy 600 Steam Generator Tubing
PWSCC Mitigation via Water Chemistry Controls
Steam Generator Tubing ODSCC Mitigation via Water Chemistry Technologies
Steam Generator Tubing Eddy Current Technology Improvements
Steam Generator Improved Tubing Leak Rate Modeling
NDE - Tools for Steam Generator Tubing Integrity Assessments
NDE Capability for Sizing Steam Generator Tubing ODSCC Indications
Steam Generator Sludge Deposits and Scale Buildup
Safety Significance of Cracks in Steam Generator Divider Plate

SGMP Objectives

The specific objectives of the EPRI SGMP include:

- Identifying, prioritizing and conducting steam generator research to address knowledge gaps as defined in the EPRI Materials Degradation Matrix Issue Management Tables
- Performing long term R&D in areas such as water chemistry, NDE, materials and thermal hydraulics that have significant impact on steam generator operational issues
- Developing necessary technology, processes, procedures, and tools to support the assessment of steam generator tube integrity

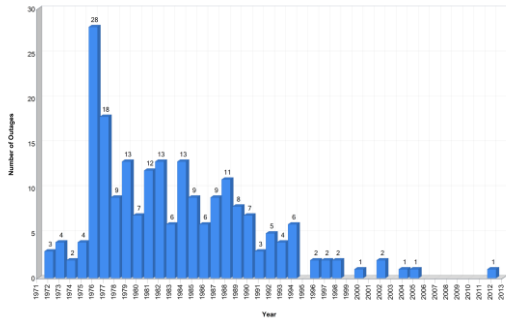
EPRI SGMP Organization



SGMP Emerging Issues

- NEI 03-08 requires each issue program to develop a protocol for rapidly identifying, assessing, and addressing emergent issues that have the potential for a major operational, regulatory or financial impact on the industry
- The SGMP Administrative Procedures include a section describing the SGMP's protocol for rapidly identifying, assessing, and addressing emergent issues
- Utilities shall communicate new materials issues with generic significance to the industry in order to allow an evaluation of the generic aspects of the information in a timely manner

SG Tube Leak Forced Outages (US)



Plot is based on data in SGDD.

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Conclusions

- SGMP provides the tools to develop technically strong steam generator programs which focus on maintaining SG tube integrity.
- The tools include results of EPR research, guidance documents and access to world-wide SG operating experience.
- SG programs are continuously updated based on new industry guidance, research results and industry operating experience.
- Industry guidance has been flexible enough to address emerging tube degradation issues ranging from SCC to foreign object wear to tube-to-tube wear.

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