



UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
ADVISORY COMMITTEE ON REACTOR SAFEGUARDS  
WASHINGTON, D.C. 20555-0001

December 10, 2001

MEMORANDUM TO: ACRS Members  
*Noel Dudley*

FROM: Noel Dudley, Senior Staff Engineer  
ACRS\ACNW

SUBJECT: CERTIFICATION OF THE MINUTES OF THE ACRS  
SUBCOMMITTEE MEETING ON MATERIALS AND METALLURGY  
CONCERNING NEI 97-06 AND THE PROPOSED GENERIC  
LICENSE CHANGE PACKAGE NOVEMBER 29, 2001 –  
ROCKVILLE, MARYLAND

The minutes of the subject meeting, issued on December 3, 2001, have been certified as the official record of the proceedings of that meeting. A copy of the certified minutes is attached.

Attachment: As stated

cc: Technical Support Branch  
Operations Support Branch (3 copies)

cc via e-mail:  
J. Larkins  
S. Bahadur  
ACRS Fellows and Technical Staff  
E. Barnard



UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
ADVISORY COMMITTEE ON REACTOR SAFEGUARDS  
WASHINGTON, D.C. 20555-0001

MEMORANDUM TO: Noel Dudley, Senior Staff Engineer  
ACRS/ACNW

FROM: Dr. F. Peter Ford, Chairman  
Materials and Metallurgy Subcommittee

SUBJECT: CERTIFICATION OF THE MINUTES OF THE ACRS MATERIALS AND  
METALLURGY SUBCOMMITTEE MEETING CONCERNING NEI 97-06  
AND THE PROPOSED GENERIC LICENSE CHANGE PACKAGE  
NOVEMBER 29, 2001 - ROCKVILLE, MARYLAND

I hereby certify that, to the best of my knowledge and belief, the minutes of the subject meeting issued on December 3, 2001, are an accurate record of the proceedings for the meeting.

Dr. F. Peter Ford, Chairman  
Materials and Metallurgy Subcommittee

December 4<sup>th</sup>, 2001  
Date



UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
ADVISORY COMMITTEE ON NUCLEAR WASTE  
WASHINGTON, D.C. 20555-0001

December 3, 2001

MEMORANDUM TO: Dr. F. Peter Ford, Chairman  
Materials and Metallurgy Subcommittee

FROM: *Noel Dudley*  
Noel Dudley, Senior Staff Engineer  
ACRS/ACNW

SUBJECT: WORKING COPY OF THE MINUTES OF THE ACRS MATERIALS AND  
METALLURGY SUBCOMMITTEE MEETING CONCERNING NEI 97-06  
AND THE PROPOSED GENERIC LICENSE CHANGE PACKAGE  
NOVEMBER 29, 2001 - ROCKVILLE, MARYLAND

A working copy of the minutes for the subject meeting is attached for your review. I would appreciate your review and comment as soon as possible. Copies are being sent to the Materials and Metallurgy Subcommittee members for information and/or review.

Attachment: As stated

cc: W. Shack  
M. Bonaca  
T. Kress

cc via E-Mail:  
J. Larkins  
S. Bahadur

# CERTIFIED

Issued: 12/3/01  
Certified: 12/4/01

ADVISORY COMMITTEE ON REACTOR SAFEGUARDS  
MINUTES OF SUBCOMMITTEE MEETING ON  
MATERIALS AND METALLURGY  
NEI 97-06 AND THE PROPOSED GENERIC LICENSE CHANGE PACKAGE  
NOVEMBER 29, 2001  
ROCKVILLE, MARYLAND

The ACRS Subcommittee on Materials and Metallurgy met on November 29, 2001, to hold discussions with representatives of the NRC staff and the Nuclear Energy Institute (NEI) concerning NEI 97-06, "Steam Generator Program Guidelines," and the associated generic license change package. The entire meeting was open to public attendance. Mr. Noel Dudley was the cognizant ACRS staff engineer for this meeting. The meeting was convened at 8:30 a.m. and adjourned at 11:50 a.m.

## ATTENDEES

### ACRS

P. Ford, Chairman	T. Kress, Member
W. Shack, Vice Chairman	N. Dudley, ACRS Staff
M. Bonaca, Member	

### NRC REPRESENTATIVES

L. Lund, NRR	K. Karwoski, RES
E. Sullivan, NRR	M. Banerjee, NRR
E. Murphy, NRR	

### NEI REPRESENTATIVES

J. Riley, NEI	G. Henry, EPRI
M. Behravesh, EPRI	

There were no written comments or requests for time to make oral statements received from members of the public. Approximately 12 members of the public attended the meeting. A list of meeting attendees is available in the ACRS office files.

## INTRODUCTION

Dr. F. Peter Ford, Chairman of the Materials and Metallurgy Subcommittee, stated that the purpose of the meeting was to gather information regarding the status of NEI 97-06 and the associated generic license change package. Dr. Ford noted that the staff and industry have been working to develop the generic license change package for several years and are in general agreement. He called on Mr. Edmund Sullivan, NRR, to begin the presentation.

## **STATUS OF NEI 97-06 AND THE GENERIC LICENSE CHANGE PACKAGE**

Mr. Edmund Sullivan, NRR, introduced the staff's presentation. He presented background concerning the regulatory requirements for steam generator inspections and the staff's initiative to revise the regulatory framework. He provided the history of the industry's proposed generic change package and noted the difference of opinion between the staff and NEI concerning the inspection interval criteria.

Dr. Ford noted that the staff has been involved in revising the steam generator integrity requirements for over 10 years and asked when the staff expected to finalize the revision. Mr. Sullivan outlined the approval process and stated that he expected the generic license change package would be approved by December 2002.

The Subcommittee members and the staff discussed how the results of research projects concerning severe accidents would affect the development and approval of alternate repair criteria.

## **NEI PRESENTATION**

Mr. James Riley, NEI, presented an overview of the Industry Steam Generator Management Organization, which coordinates the work of NEI, the Electric Power Research Institute (EPRI), and the Institute of Nuclear Power Operations (INPO). He noted that the Organization addresses issues promptly, uses broad based utility participation, and maintains research and improvement efforts. Mr. Riley provided background on the regulatory approach and an overview of the NEI 97-06 revision<sup>1</sup>, "Steam Generator Inspection Guidelines," and the associated generic license change package. He identified several open issues raised by the staff and tracked in the staff's Steam Generator Action Plan. A partial listing of these open issues is provided as attachment 1. Mr. Riley emphasized that the licensees had formally committed to NEI to follow the guidance in NEI 97-06. He concluded that the industry is committed to safe operations through a long-term program, extensive communications, and continued interaction with the NRC staff.

Dr. Ford asked if NEI and the staff had reached agreement on the regulatory aspects of the proposed generic license change package. Mr. Riley explained that there was agreement on adding a new administrative technical specification concerning steam generator tube integrity and on having the steam generator integrity program located outside of the technical specifications. He noted, however, that the inspection intervals in the proposed revision to EPRI's Pressurized Water Reactor (PWR) Steam Generator Examination Guidelines were still under discussion.

The Subcommittee members and NEI discussed the following issues related to the performance-based program requirements in the proposed revision to the PWR Steam Generator Examination Guidelines.

- type of peer review used in developing EPRI implementing documents,
- the condition monitoring selection criteria,

- requirements for staff approval of changes to the assumed probability of detection,
- incorporating the results from ongoing research projects, and
- technical data for justifying the performance-based criteria.

### **STAFF PRESENTATION**

Mr. Emmett Murphy, NRR, provided background and the purpose of NEI's proposed generic license change package and presented the current regulatory requirements for steam generator tube inspections. He noted that, from operating experience, steam generator tubes operate within acceptable safety margins and that studies indicate the risk from steam generator related causes is within acceptable levels.

The Subcommittee and the staff discussed the basis for the inspection interval of 24 months for Alloy 600 (MA) tubes, proposed increased inspection intervals for Alloy 600 (TT) and Alloy 690 (TT) tubes, proposed changes to the sample size, and the change in crack growth rates over time. They also discussed what metrics are used to determine acceptable safety margins and whether risk is within acceptable levels.

Mr. Murphy presented the industry's proposed administrative technical specification requirement [see attachment 2] and the tube integrity performance criteria [see attachment 3]. He explained that the details of the steam generator program would be located outside the technical specifications and that licensees will commit to the NRC to follow NEI 97-06 guidelines. Mr. Murphy summarized the proposed requirements in the EPRI Steam Generator Examination Guidelines, Tube Integrity Assessment Guidelines, and Tube In-Situ Pressure Test Guidelines. He identified several issues related to the guidelines. The Subcommittee Members and the staff discussed the following:

- the technical basis for the performance criteria,
- possibility of tube burst at 1.4 times postulated accident conditions,
- basis for the factor of 1.4,
- use of data from tube burst tests,
- staff's review of the EPRI implementing documents,
- staff's inspection of the steam generator programs,
- justification for performance criteria,
- how compliance with performance criteria will be measured, and
- comparing the results of condition monitoring and performance assessment.

Mr. Riley, NEI, explained that the proposed EPRI guidelines allow conformance with either prescriptive or performance criteria for determining inspection intervals. He stated that the generic license change package only incorporated the prescriptive requirement, which the staff has identified as an open issue.

Mr. Murphy presented the staff's proposed path for resolving issues associated with the Industry Steam Generator Program Generic License Change Package. The path includes determining prescriptive limits on inspection intervals, which would be subject to regulatory

controls. He concluded that the staff and NEI should continue to work together to identify needed improvements to the guidelines.

### **EPRI PWR STEAM GENERATOR EXAMINATION GUIDELINES**

Dr. Mohamad Behraves, EPRI, presented a chronology of the revisions made to the PWR Steam Generator Examination Guidelines. He explained that the present regulatory requirements include inspecting a sample of 3 percent of the tubes at least every 24 months. He noted that the industry has committed to follow the requirement of NEI 97-06 revision 1 that at least 20 percent of steam generator tubes be inspected during each inspection. Dr. Behraves presented the proposed prescriptive inspection intervals, which take into account the type of steam generator tube material [see attachment 4]. He presented the basis for the inspection intervals and the current status of the latest revision to the Examination Guidelines.

Dr. Ford asked what the technical basis was for selecting the proposed inspection intervals. Mr. Gary Henry, EPRI, explained that the inspection intervals were based on national and international industry experience, pulled tube data, and in-situ tests. Mr. Riley stated that NEI was developing a white paper, which would be submitted to the staff, concerning this issue.

### **SUBCOMMITTEE COMMENTS, CONCERNS, AND RECOMMENDATIONS**

Dr. Mario Bonaca, ACRS, stated that the EPRI proposed revision to the Steam Generator Examination Guidelines was a responsible approach for addressing the inspection interval issue. He noted that the NEI presentation concerned the prescriptive criteria, while the staff presentation identified issues concerning a performance-based criteria.

Dr. William Shack, ACRS, noted that the presentations identified a short term success path for implementing the prescriptive criteria for inspection intervals and numerous performance-based criteria issues, which would be resolved in the future.

### **STAFF AND INDUSTRY COMMITMENTS**

None.

### **SUBCOMMITTEE DECISIONS**

The Subcommittee requested that the staff present the following information at the December 7, 2001 ACRS meeting.

- summary of staff activities since the last Committee review of NEI 97-06 in April 1999,
- short term plans for review and approval of NEI 97-07 and the generic license change package,
- technical issues associated with the inspection intervals and the tube burst limit of 1.4 times postulated accident conditions,

- issues concerning the EPRI Steam Generator Integrity Assessment Guidelines definitions of “specific criteria for structural limits” and “probability of burst,” and
- effect of the proposed inspection intervals on risk.

The Subcommittee requested that NEI present the technical justification for the prescriptive inspection intervals the December 7, 2001 ACRS meeting.

### **FOLLOW-UP ACTIONS**

None

### **PRESENTATION SLIDES AND HANDOUTS PROVIDED DURING THE MEETING**

The presentation slides and handouts used during the meeting are available in the ACRS office files or as attachments to the transcript.

### **BACKGROUND MATERIAL PROVIDED TO THE SUBCOMMITTEE:**

1. Letter dated November 15, 1991, from David Ward, Chairman, ACRS, to Ivan Selin, Chairman, NRC, Subject: Steam Generator Tube Repair Limits.
2. Letter dated September 12, 1994, from T. S. Kress, Chairman, ACRS, to Ivan Selin, Chairman, NRC, Subject: Proposed Generic Letter 94-XX, “Voltage-Based Repair Criteria for Westinghouse Steam Generator Tubes.”
3. Letter dated May 15, 1995, from T. S. Kress, Chairman, ACRS, to James Taylor, Executive Director for Operations, Subject: Proposed Final Generic Letter 95-XX, “Voltage-Based Repair Criteria for Westinghouse Steam Generator Tubes.”
4. Letter dated November 20, 1996, from T. S. Kress, Chairman, ACRS, to James Taylor, Executive Director for Operations, Subject: Proposed Rule on Steam Generator Integrity.
5. Letter dated June 20, 1997, from R. L. Seale, Chairman, ACRS, to Shirley Ann Jackson, Chairman, NRC, Subject: Proposed Regulatory Approach Associated With Steam Generator Integrity.
6. Letter dated September 15, 1997, from R. L. Seale, Chairman, ACRS, to Shirley Ann Jackson, Chairman, NRC, Subject: Proposed Generic Letter and Draft Regulatory Guide DG-1074 Concerning Steam Generator Tube Integrity.
7. Memorandum dated October 15, 1997, from John Larkins, Executive Director, ACRS, to L. Joseph Callan, Executive Director for Operations, Subject: Proposes Final Generic Letter, “Steam Generator Tube Inspection Techniques.”
8. Letter dated April 22, 1999, from Dana Powers, Chairman, ACRS, to William Travers, Executive Director for Operations, Subject: Status of Resolution of Steam Generator Tube Integrity Issues.
9. Letter dated February 7, 2001, from David Modeen, NEI, to Samuel Collins, Director, Office of Nuclear Reactor Regulation, Subject: NEI 97-06, “Steam Generator Program Guidelines,” Revision 1.

10. Letter dated December 11, 2000, from David Modeen, NEI, to Samuel Collins, Director, Office of Nuclear Reactor Regulation, Subject: Revised Industry Steam Generator Program Generic License Change Package.
11. Memorandum dated September 18, 2001, from Edmund Sullivan, NRR, to William Bateman, NRR, Subject: NRC Staff Comments on Steam Generator Inspection Intervals.
12. Memorandum dated September 21, 2001, from Maitri Banerjee, NRR, to Edmund Sullivan, NRR, Subject: Summary of August 29, 2001, Public Meeting With the Nuclear Energy Institute Regarding NEI 97-06.

.....

NOTE: Additional details of this meeting can be obtained from a transcript of this meeting available in the NRC Public Document Room, One White Flint North, 11555 Rockville Pike, Rockville, MD, (301) 415-7000, downloading or viewing on the Internet at "<http://www.nrc.gov/ACRSACNW>," or can be purchased from Neal R. Gross and Co., 1323 Rhode Island Avenue, NW, Washington, D.C. 20005, (202) 234-4433 (Voice), 387-7330 (Fax), e-mail: [nrgross@nealgross.com](mailto:nrgross@nealgross.com).

.....

ADVISORY COMMITTEE ON REACTOR SAFEGUARDS  
 MEETING OF THE MATERIALS AND METALLURGY SUBCOMMITTEE  
 NEI 97-06 AND PROPOSED CHANGE PACKAGE  
 NOVEMBER 29, 2001  
 ROCKVILLE, MARYLAND

- AGENDA -

<u>TOPIC</u>	<u>PRESENTER</u>	<u>TIME</u>
I. Opening Remarks	P. Ford, ACRS	5 min. 8:30-8:35 a.m.
II. Introductory Remarks History of staff reviews	E. Sullivan, NRR	10 min. 8:35-8:45 a.m.
III. NEI Presentation	J. Riley, NEI	40 min. 8:45- <del>9:25</del> <sup>9:30</sup> a.m.
A. NEI 97-06		
B. NEI Generic Change Package (GCP)		
C. Present Issues		
IV. Concerns With GCP and NEI 97-06	E. Murphy, NRR	35 min. <del>9:25-10:00</del> <sup>9:40-11:00</sup> a.m.
<b>BREAK</b>		15 min. <del>10:00-10:15</del> <sup>9:30-9:40</sup> a.m.
V. Staff Presentation (Cont.)	E. Murphy, NRR	55 min. <del>10:15-11:20</del> a.m.
A. Proposed resolutions		
1. Inspection intervals		
2. Regulatory Controls		
B. Status and Plans		
VI. NEI Status	<del>J. Riley, NEI</del> <i>M. Behravesh, EPRI</i>	10 min. <del>11:20-11:30</del> <sup>11:00-11:30</sup> a.m.
VII. Discussion	P. Ford, ACRS	30 min. <del>11:30-12:00</del> <sup>11:50</sup> noon
VIII. Adjournment	P. Ford, ACRS	<del>12:00</del> <sup>11:50</sup> noon

NOTE:

Presentation time should not exceed 50 percent of the total time allotted for specific item. The remaining 50 percent of the time is reserved for discussion.

Number of copies of the presentation materials to be provided to the ACRS - 25

NFD

will receive an information briefing on the NRC staff's performance confirmation plans for Yucca Mountain, NV.

F. 5:30-6:00 P.M.: Discussion of Proposed ACNW Reports (Open)—The Committee will discuss proposed ACNW reports on Yucca Mountain Performance Confirmation, ACRS/ACNW November 14, 2001 Joint Subcommittee Meeting on Risk-Informed Regulation in NMSS, GTCC Waste and Sealed Source Issue and Conservatism.

Wednesday, November 28, 2001

G. 8:30-8:35 A.M.: Opening Remarks by the ACNW Chairman (Open)—The ACNW Chairman will make opening remarks regarding the conduct of the meeting.

H. 8:35-9:00 A.M.: Summary of Discussion from the First Day (Open)—Members, with input from workshop participants, will summarize key observations from first day presentations/ discussions.

I. 9:00-12:15 P.M.: Knowledge and Technical Tools Needed for Future Regulatory Decisions-What Research is Needed (Open)—Presentations will be provided by experts in selected areas as to how research can be used to develop the needed knowledge and technical tools.

J. 1:15-4:30 P.M.: Prioritization of NRC-Sponsored Research—How Should It Be Done (Open)—Panelists will present their perspectives as to how to address what research projects are necessary and will add the most value to the relevant regulatory decisions.

K. 4:30-5:30 P.M.: Workshop Summary and General Discussion (Open)—Discussion among Members and meeting participants as to workshop findings and a summarization of key observations resulting from this two day workshop.

L. 5:45-6:00 P.M.: Preparation for Meeting with the NRC Commissioners (Open)—The next meeting with the Commissioners is scheduled to be held in the Commission Conference Room at 9:30 a.m. in One White Flint North on January 9, 2002. The Committee will review its proposed presentations. The following items will be discussed:

- Sufficiency Review
- TSPA-SR
- Research Program in Radioactive Waste

- Chemistry Issues
- Risk-Informed Performance-Based Regulation of Waste

Thursday, November 29, 2001

M. 8:30-8:35 A.M.: Opening Remarks by the ACNW Chairman (Open)—The

ACNW Chairman will make opening remarks regarding the conduct of the meeting.

N. 8:35-11:45 A.M.: Supplemental Science and Performance Analysis (SSPA) (Open)—The Committee will receive input on the SSPA from representatives from the following: NRC, Clark County, NV, and DOE.

O. 12:45-3:30 P.M.: Preparation of ACNW Reports (Open)—The Committee will continue its discussion of proposed ACNW reports.

P. 3:30-4:00 P.M.: Miscellaneous (Open)—The Committee will discuss matters related to the conduct of Committee activities and matters and specific issues that were not completed during previous meetings, as time and availability of information permit.

Procedures for the conduct of and participation in ACNW meetings were published in the **Federal Register** on October 3, 2001 (66 FR 50461). In accordance with these procedures, oral or written statements may be presented by members of the public, electronic recordings will be permitted only during those portions of the meeting that are open to the public, and questions may be asked only by members of the Committee, its consultants, and staff. Persons desiring to make oral statements should notify Howard J. Larson, ACNW, as far in advance as practicable so that appropriate arrangements can be made to schedule the necessary time during the meeting for such statements. Use of still, motion picture, and television cameras during this meeting will be limited to selected portions of the meeting as determined by the ACNW Chairman. Information regarding the time to be set aside for taking pictures may be obtained by contacting the ACNW office, prior to the meeting. In view of the possibility that the schedule for ACNW meetings may be adjusted by the Chairman as necessary to facilitate the conduct of the meeting, persons planning to attend should notify Mr. Larson as to their particular needs. Further information regarding topics to be discussed, whether the meeting has been canceled or rescheduled, the Chairman's ruling on requests for the opportunity to present oral statements and the time allotted therefore can be obtained by contacting Mr. Howard J. Larson, ACNW (Telephone 301/415-6805), between 8:00 A.M. and 4:00 P.M. EST.

ACNW meeting notices, meeting transcripts, and letter reports are now available for downloading or viewing on the internet at <http://www.nrc.gov/ACRSACNW>.

Videoteleconferencing service is available for observing open sessions of ACNW meetings. Those wishing to use this service for observing ACNW meetings should contact Mr. Theron Brown, ACNW Audiovisual Technician (301/415-8066), between 7:30 a.m. and 3:45 p.m. EST at least 10 days before the meeting to ensure the availability of this service. Individuals or organizations requesting this service will be responsible for telephone line charges and for providing the equipment and facilities that they use to establish the videoteleconferencing link. The availability of videoteleconferencing services is not guaranteed.

Dated: October 5, 2001.

Andrew L. Bates,

Advisory Committee Management Officer.

[FR Doc. 01-28183 Filed 11-8-01; 8:45 am]

BILLING CODE 7590-01-P

**NUCLEAR REGULATORY COMMISSION**

**Advisory Committee on Reactor Safeguards Joint Meeting of the Subcommittees on Human Factors and Safety Research Program; Postponed**

The joint meeting of the ACRS Subcommittees on Human Factors and Safety Research Program scheduled to be held on November 15, 2001, in Room T-2B3, 11545 Rockville Pike, Rockville, Maryland has been postponed at the request of the NRC staff. Notice of this meeting was published in the **Federal Register** on Friday, November 2, 2001 (66 FR 55710). Rescheduling of this meeting will be announced in a future **Federal Register** Notice.

For further information contact: Mr. Michael T. Markley, cognizant ACRS staff engineer (telephone 301/415-6885) between 7:30 a.m. and 4:15 p.m. (EST) or by e-mail: [MTM@NRC.gov](mailto:MTM@NRC.gov).

Dated: November 5, 2001.

Sher Bahadur,

Associate Director for Technical Support, ACRS/ACNW.

[FR Doc. 01-28181 Filed 11-8-01; 8:45 am]

BILLING CODE 7590-01-P

**NUCLEAR REGULATORY COMMISSION**

**Advisory Committee on Reactor Safeguards Meeting of the ACRS Subcommittee on Materials and Metallurgy; Notice of Meeting**

The ACRS Subcommittee on Materials and Metallurgy will hold a meeting on November 29, 2001, Room T-2B3,

11545 Rockville Pike, Rockville, Maryland.

The entire meeting will be open to public attendance.

The agenda for the subject meeting shall be as follows:

*Thursday, November 29, 2001—8:30 a.m. until 12:00 Noon.*

The Subcommittee will hear presentations from representatives of the staff and the Nuclear Energy Institute (NEI) concerning the latest revision of NEI 97-06, "Steam Generator Program Guidelines," and the Generic License Change Package Issues. The purpose of this meeting is to gather information, analyze relevant issues and facts, and formulate proposed positions and actions, as appropriate, for deliberation by the full Committee.

Oral statements may be presented by members of the public with the concurrence of the Subcommittee Chairman; written statements will be accepted and made available to the Committee. Electronic recordings will be permitted only during those portions of the meeting that are open to the public, and questions may be asked only by members of the Subcommittee, its consultants, and staff. Persons desiring to make oral statements should notify the cognizant ACRS staff engineer named below five days prior to the meeting, if possible, so that appropriate arrangements can be made.

During the initial portion of the meeting, the Subcommittee, along with any of its consultants who may be present, may exchange preliminary views regarding matters to be considered during the balance of the meeting.

The Subcommittee will then hear presentations by and hold discussions with representatives of the NRC staff, NEI, and other interested persons regarding this review.

Further information regarding topics to be discussed, whether the meeting has been canceled or rescheduled, and the Chairman's ruling on requests for the opportunity to present oral statements and the time allotted therefor, can be obtained by contacting the cognizant ACRS staff engineer, Mr. Noel F. Dudley (telephone 301/415-6888) between 7:00 a.m. and 3:45 p.m. (EST). Persons planning to attend this meeting are urged to contact the above named individual one or two working days prior to the meeting to be advised of any potential changes to the agenda, etc., that may have occurred.

Dated: November 5, 2001.

**Sher Bahadur,**

*Associate Director for Technical Support, ACRS/ACNW.*

[FR Doc. 01-28182 Filed 11-8-01; 8:45 am]

BILLING CODE 7590-01-P

## **NUCLEAR REGULATORY COMMISSION**

### **Notice of Availability of the Draft Supplement to the Final Generic Environmental Impact Statement on Decommissioning of Nuclear Facilities and Notice of Public Meetings**

Notice is hereby given that the U.S. Nuclear Regulatory Commission (NRC) has published draft Supplement 1 to NUREG-0586, "Final Generic Environmental Impact Statement on Decommissioning of Nuclear Facilities [GEIS]," dealing with decommissioning of nuclear power reactors.

The draft supplement to the GEIS is available electronically through the NRC's Public Electronic Reading Room (PERR) found on the Internet at the following web address: <http://www.nrc.gov/NRC/ADAMS/index.html>. From this site, the public can gain access to the NRC's Agencywide Document Access and Management Systems (ADAMS), which provides text and image files of NRC's public documents. The draft report can also be examined, or copied for a fee, at the NRC's Public Document Room found at One White Flint North, 11555 Rockville Pike (first floor), Rockville, MD. If you do not have access to ADAMS or if there are problems in accessing the documents located in ADAMS, contact the NRC Public Document Room (PDR) Reference staff at 1-800-397-4209, or 301-415-4737, or by e-mail to [pdr@nrc.gov](mailto:pdr@nrc.gov).

Any interested party may submit comments on the draft supplement to the GEIS for consideration by the NRC staff. To be certain of consideration, comments on the draft supplement to the GEIS and the proposed action must be received by December 31, 2001. Comments received after the due date will be considered if it is practical to do so, but the NRC staff is able to assure consideration only for comments received on or before this date. Written comments on the draft supplement to the GEIS should be sent to: Chief, Rules and Directives Branch, Division of Administrative Services, Mailstop T 6 D 59, U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001.

Comments may be hand-delivered to the NRC at 11545 Rockville Pike,

Rockville, Maryland, between 7:45 a.m. and 4:15 p.m. on Federal workdays. Comments may be submitted electronically to the NRC to the e-mail address [dgeis@nrc.gov](mailto:dgeis@nrc.gov). All comments received by the NRC, including those made by Federal, State, and local agencies; Indian tribes; or other interested persons, will be accessible electronically through NRC's PERR link listed above, and can be examined, or copied for a fee, at the NRC's Public Document Room in Rockville, Maryland.

Notice is hereby given that the NRC staff will hold four public meetings to present an overview of the draft supplement to the GEIS and to accept public comments on the document. The public meetings will be held at the following locations and dates:

*December 4, 2001*

The Argent Hotel, 50 Third Street, San Francisco, CA 94103, 1-415-974-6400

*December 10, 2001*

Boston Marriott Copley Place, 110 Huntington Avenue, Boston, MA 02116, -617-236-5800

*December 6, 2001*

The Drake, 140 East Wallon Place, Chicago, IL 60611, 1-312-787-2200

*December 12, 2001*

Marriott Marquis, 265 Peachtree Center Avenue, Atlanta, GA 30303, 1-404-521-0000

The meetings will commence at 7 p.m. and will continue until 10 p.m. All meetings will be transcribed and will include (1) a presentation of the contents of the draft supplement to the GEIS, and (2) the opportunity for interested government agencies, organizations, and individuals to provide comments on the draft report. Additionally, the NRC staff will host informal discussions one hour prior to the start of each session. No comments on the draft supplement to the GEIS will be accepted during the informal discussions. To be considered, comments must be provided either at the transcribed public meetings or in writing, as discussed below. Persons may register to attend or present oral comments at a meeting by contacting Mr. Dino Scaletti by telephone at 1-800-368-5642, extension 1104, or by Internet to the NRC at [dgeis@nrc.gov](mailto:dgeis@nrc.gov) no later than November 27, 2001. Members of the public may also register to provide oral comments within 15 minutes of the start of each session. Individual oral comments may be limited by the time available, depending

ADVISORY COMMITTEE ON REACTOR SAFEGUARDS  
MATERIALS AND METALLURGY  
SUBCOMMITTEE MEETING

NOVEMBER 29, 2001

Today's Date

NRC STAFF PLEASE SIGN IN FOR ACRS MEETING

PLEASE PRINT

NAME

NRC ORGANIZATION

Edmund Sullivan

NRC/NRR /DE

Maitri Banerjee

NRC/NRR /DLPM

Ken Karwowski

NRC/NRR /DE

Louise Lund

NRC /NRR /DK

Steve Long

NRC/NRR/DSSA

FAROUK ELTAWILA

NRR /DE

ADVISORY COMMITTEE ON REACTOR SAFEGUARDS  
MATERIALS AND METALLURGY  
SUBCOMMITTEE MEETING

NOVEMBER 29, 2001

Today's Date

ATTENDEES PLEASE SIGN IN FOR ACRS MEETING

PLEASE PRINT

NAME

AFFILIATION

RICK MULLINS

SOUTHERN Co.

Jim RILEY

NEI

GARY HEWRY

EPRI

BOB EXNER

PG&E

HERM LABALLI

WESTINGHOUSE

MATI MERILO

EPRI

Lane Hay

SERCHE Bechtel

Helen COYWOOD

TVA

BOB KEATING

WESTINGHOUSE

Robert Cullen

Entergy

ROBERT K. JOHNSON

NIPER

MOHAMAD BEHRAVESTH

EPRI

## Open Issues

- SG Action Plan technical issues include:
  - Assessment of degradation mechanisms – E&R IRG
  - NDE data quality – SG Exam G/L rev 6
  - NDE qualification – SG Exam G/L rev 6
  - NDE data analysis – SG Exam G/L rev 6
  - Pressure testing – In Situ Test Ad Hoc
  - Operational assessment – IA Ad Hoc
  - Tech Specs - GLCP
  - NEI 97-06 initiative - GLCP



## Open Issues

- SG Action Plan technical issues
  - Industry responses provided to NRC last summer
  - NRC commented on most of the responses
  - Resolution dependent on Ad Hoc committee work, receiving remaining comments, and disposition of the inspection interval issue



## Industry Proposed Admin TS: "Steam Generator Program"

An **SG Program** shall be established and implemented to ensure SG tube integrity performance criteria are maintained.

- Condition monitoring assessments of as-found tube condition vs the performance criteria shall be performed at each SG inspection outage. Requirements for condition monitoring are defined in the **SG Program**.
- Changes to performance criteria are subject to NRC review and approval.
- Changes to tube repair criteria and repair methods are subject to NRC review and approval.

## Tube Integrity Performance Criteria

### Structural Criteria:

- Maintain factor of three against burst under normal full power operating conditions.
- Maintain factor of 1.4 against burst for postulated accident conditions.

### Accident-Induced Leakage Criteria:

- Accident leakage shall not exceed that assumed in licensing basis accident analysis.
- Accident leakage shall not exceed [1 gpm, except as approved by NRC].

## Sampling Requirements for Prescriptive Based Examinations

Separate sampling requirements for inspection of 600 MA, 600TT (and 800TT), and 690TT materials

- 600MA every outage
- 600TT every other outage
- 690TT every third outage

ACRS Nov. 29, 2001 5

EPRI

## Sampling Requirements for Prescriptive Based Examinations

### 600 MA:

- Inspect 100% of tubes in each SG every 60 EFPM
- SG's shall be inspected each refueling outage
  - Minimum 20% random sample at each inspection
- This requirement is essentially the same as it is in the current Rev. 5 of the Guidelines

ACRS Nov. 29, 2001 6

EPRI

## Sampling Requirements for Prescriptive Based Examinations

### 600 TT:

- Given SGs are free from cracking,
  - Inspect 100% of tubes in each SG in 120, 90, 60, 60,..., EFPMs and with the following conditions:
    - Minimum 20% random sample at each inspection
    - Extended inspection periods require supporting DA and OA
    - Secondary side program requirements are met
    - Examine at least 50% of tubes in each SG by the refueling outage nearest the mid-point of the period and the remaining 50% by the refueling outage nearest the end of the period.
    - No SG can operate for more than two refueling cycles without being inspected.
- If cracking is discovered, the tubing shall be subject to the same rules as for Alloy 600 MA tubing.

EPRI

ACRS Nov. 29, 2001 7

## Sampling Requirements for Prescriptive Based Examinations

### 690 Alloy:

- Given SG are free from active cracking degradation,
  - Inspect 100% of tubes in each SG in 144, 108, 72, 60, 60, 60,... EFPMs with the following conditions:
    - Minimum 20% random sample at each inspection
    - Extended inspection periods require supporting DA and OA
    - Secondary side program requirements are met
    - Examine at least 50% of tubes in each SG by the refueling outage nearest the mid-point of the period and the remaining 50% by the refueling outage nearest the end of the period.
    - No SG can operate for more than three refueling cycles without being inspected.
- If cracking is discovered, the tubing shall be subject to the same rules as for Alloy 600 MA tubing.

EPRI

ACRS Nov. 29, 2001 8



UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
ADVISORY COMMITTEE ON REACTOR SAFEGUARDS  
WASHINGTON, D.C. 20555-0001

December 10, 2001

MEMORANDUM TO: ACRS Members  
*Noel Dudley*

FROM: Noel Dudley, Senior Staff Engineer  
ACRS\ACNW

SUBJECT: CERTIFICATION OF THE MINUTES OF THE ACRS  
SUBCOMMITTEE MEETING ON MATERIALS AND METALLURGY  
CONCERNING NEI 97-06 AND THE PROPOSED GENERIC  
LICENSE CHANGE PACKAGE NOVEMBER 29, 2001 –  
ROCKVILLE, MARYLAND

The minutes of the subject meeting, issued on December 3, 2001, have been certified as the official record of the proceedings of that meeting. A copy of the certified minutes is attached.

Attachment: As stated

cc: Technical Support Branch  
Operations Support Branch (3 copies)

cc via e-mail:  
J. Larkins  
S. Bahadur  
ACRS Fellows and Technical Staff  
E. Barnard

Issued: 12/3/01  
Certified: 12/4/01

**CERTIFIED**

ADVISORY COMMITTEE ON REACTOR SAFEGUARDS  
MINUTES OF SUBCOMMITTEE MEETING ON  
MATERIALS AND METALLURGY  
NEI 97-06 AND THE PROPOSED GENERIC LICENSE CHANGE PACKAGE  
NOVEMBER 29, 2001  
ROCKVILLE, MARYLAND

The ACRS Subcommittee on Materials and Metallurgy met on November 29, 2001, to hold discussions with representatives of the NRC staff and the Nuclear Energy Institute (NEI) concerning NEI 97-06, "Steam Generator Program Guidelines," and the associated generic license change package. The entire meeting was open to public attendance. Mr. Noel Dudley was the cognizant ACRS staff engineer for this meeting. The meeting was convened at 8:30 a.m. and adjourned at 11:50 a.m.

**ATTENDEES**

**ACRS**

P. Ford, Chairman  
W. Shack, Vice Chairman  
M. Bonaca, Member

T. Kress, Member  
N. Dudley, ACRS Staff

**NRC REPRESENTATIVES**

L. Lund, NRR  
E. Sullivan, NRR  
E. Murphy, NRR

K. Karwoski, RES  
M. Banerjee, NRR

**NEI REPRESENTATIVES**

J. Riley, NEI  
M. Behravesh, EPRI

G. Henry, EPRI

There were no written comments or requests for time to make oral statements received from members of the public. Approximately 12 members of the public attended the meeting. A list of meeting attendees is available in the ACRS office files.

**INTRODUCTION**

Dr. F. Peter Ford, Chairman of the Materials and Metallurgy Subcommittee, stated that the purpose of the meeting was to gather information regarding the status of NEI 97-06 and the associated generic license change package. Dr. Ford noted that the staff and industry have been working to develop the generic license change package for several years and are in general agreement. He called on Mr. Edmund Sullivan, NRR, to begin the presentation.

## **STATUS OF NEI 97-06 AND THE GENERIC LICENSE CHANGE PACKAGE**

Mr. Edmund Sullivan, NRR, introduced the staff's presentation. He presented background concerning the regulatory requirements for steam generator inspections and the staff's initiative to revise the regulatory framework. He provided the history of the industry's proposed generic change package and noted the difference of opinion between the staff and NEI concerning the inspection interval criteria.

Dr. Ford noted that the staff has been involved in revising the steam generator integrity requirements for over 10 years and asked when the staff expected to finalize the revision. Mr. Sullivan outlined the approval process and stated that he expected the generic license change package would be approved by December 2002.

The Subcommittee members and the staff discussed how the results of research projects concerning severe accidents would affect the development and approval of alternate repair criteria.

## **NEI PRESENTATION**

Mr. James Riley, NEI, presented an overview of the Industry Steam Generator Management Organization, which coordinates the work of NEI, the Electric Power Research Institute (EPRI), and the Institute of Nuclear Power Operations (INPO). He noted that the Organization addresses issues promptly, uses broad based utility participation, and maintains research and improvement efforts. Mr. Riley provided background on the regulatory approach and an overview of the NEI 97-06 revision<sup>1</sup>, "Steam Generator Inspection Guidelines," and the associated generic license change package. He identified several open issues raised by the staff and tracked in the staff's Steam Generator Action Plan. A partial listing of these open issues is provided as attachment 1. Mr. Riley emphasized that the licensees had formally committed to NEI to follow the guidance in NEI 97-06. He concluded that the industry is committed to safe operations through a long-term program, extensive communications, and continued interaction with the NRC staff.

Dr. Ford asked if NEI and the staff had reached agreement on the regulatory aspects of the proposed generic license change package. Mr. Riley explained that there was agreement on adding a new administrative technical specification concerning steam generator tube integrity and on having the steam generator integrity program located outside of the technical specifications. He noted, however, that the inspection intervals in the proposed revision to EPRI's Pressurized Water Reactor (PWR) Steam Generator Examination Guidelines were still under discussion.

The Subcommittee members and NEI discussed the following issues related to the performance-based program requirements in the proposed revision to the PWR Steam Generator Examination Guidelines.

- type of peer review used in developing EPRI implementing documents,
- the condition monitoring selection criteria,

- requirements for staff approval of changes to the assumed probability of detection,
- incorporating the results from ongoing research projects, and
- technical data for justifying the performance-based criteria.

### **STAFF PRESENTATION**

Mr. Emmett Murphy, NRR, provided background and the purpose of NEI's proposed generic license change package and presented the current regulatory requirements for steam generator tube inspections. He noted that, from operating experience, steam generator tubes operate within acceptable safety margins and that studies indicate the risk from steam generator related causes is within acceptable levels.

The Subcommittee and the staff discussed the basis for the inspection interval of 24 months for Alloy 600 (MA) tubes, proposed increased inspection intervals for Alloy 600 (TT) and Alloy 690 (TT) tubes, proposed changes to the sample size, and the change in crack growth rates over time. They also discussed what metrics are used to determine acceptable safety margins and whether risk is within acceptable levels.

Mr. Murphy presented the industry's proposed administrative technical specification requirement [see attachment 2] and the tube integrity performance criteria [see attachment 3]. He explained that the details of the steam generator program would be located outside the technical specifications and that licensees will commit to the NRC to follow NEI 97-06 guidelines. Mr. Murphy summarized the proposed requirements in the EPRI Steam Generator Examination Guidelines, Tube Integrity Assessment Guidelines, and Tube In-Situ Pressure Test Guidelines. He identified several issues related to the guidelines. The Subcommittee Members and the staff discussed the following:

- the technical basis for the performance criteria,
- possibility of tube burst at 1.4 times postulated accident conditions,
- basis for the factor of 1.4,
- use of data from tube burst tests,
- staff's review of the EPRI implementing documents,
- staff's inspection of the steam generator programs,
- justification for performance criteria,
- how compliance with performance criteria will be measured, and
- comparing the results of condition monitoring and performance assessment.

Mr. Riley, NEI, explained that the proposed EPRI guidelines allow conformance with either prescriptive or performance criteria for determining inspection intervals. He stated that the generic license change package only incorporated the prescriptive requirement, which the staff has identified as an open issue.

Mr. Murphy presented the staff's proposed path for resolving issues associated with the Industry Steam Generator Program Generic License Change Package. The path includes determining prescriptive limits on inspection intervals, which would be subject to regulatory

controls. He concluded that the staff and NEI should continue to work together to identify needed improvements to the guidelines.

### **EPRI PWR STEAM GENERATOR EXAMINATION GUIDELINES**

Dr. Mohamad Behravesh, EPRI, presented a chronology of the revisions made to the PWR Steam Generator Examination Guidelines. He explained that the present regulatory requirements include inspecting a sample of 3 percent of the tubes at least every 24 months. He noted that the industry has committed to follow the requirement of NEI 97-06 revision 1 that at least 20 percent of steam generator tubes be inspected during each inspection. Dr. Behravesh presented the proposed prescriptive inspection intervals, which take into account the type of steam generator tube material [see attachment 4]. He presented the basis for the inspection intervals and the current status of the latest revision to the Examination Guidelines.

Dr. Ford asked what the technical basis was for selecting the proposed inspection intervals. Mr. Gary Henry, EPRI, explained that the inspection intervals were based on national and international industry experience, pulled tube data, and in-situ tests. Mr. Riley stated that NEI was developing a white paper, which would be submitted to the staff, concerning this issue.

### **SUBCOMMITTEE COMMENTS, CONCERNS, AND RECOMMENDATIONS**

Dr. Mario Bonaca, ACRS, stated that the EPRI proposed revision to the Steam Generator Examination Guidelines was a responsible approach for addressing the inspection interval issue. He noted that the NEI presentation concerned the prescriptive criteria, while the staff presentation identified issues concerning a performance-based criteria.

Dr. William Shack, ACRS, noted that the presentations identified a short term success path for implementing the prescriptive criteria for inspection intervals and numerous performance-based criteria issues, which would be resolved in the future.

### **STAFF AND INDUSTRY COMMITMENTS**

None.

### **SUBCOMMITTEE DECISIONS**

The Subcommittee requested that the staff present the following information at the December 7, 2001 ACRS meeting.

- summary of staff activities since the last Committee review of NEI 97-06 in April 1999,
- short term plans for review and approval of NEI 97-07 and the generic license change package,
- technical issues associated with the inspection intervals and the tube burst limit of 1.4 times postulated accident conditions,

- issues concerning the EPRI Steam Generator Integrity Assessment Guidelines definitions of “specific criteria for structural limits” and “probability of burst,” and
- effect of the proposed inspection intervals on risk.

The Subcommittee requested that NEI present the technical justification for the prescriptive inspection intervals the December 7, 2001 ACRS meeting.

### **FOLLOW-UP ACTIONS**

None

### **PRESENTATION SLIDES AND HANDOUTS PROVIDED DURING THE MEETING**

The presentation slides and handouts used during the meeting are available in the ACRS office files or as attachments to the transcript.

### **BACKGROUND MATERIAL PROVIDED TO THE SUBCOMMITTEE:**

1. Letter dated November 15, 1991, from David Ward, Chairman, ACRS, to Ivan Selin, Chairman, NRC, Subject: Steam Generator Tube Repair Limits.
2. Letter dated September 12, 1994, from T. S. Kress, Chairman, ACRS, to Ivan Selin, Chairman, NRC, Subject: Proposed Generic Letter 94-XX, “Voltage-Based Repair Criteria for Westinghouse Steam Generator Tubes.”
3. Letter dated May 15, 1995, from T. S. Kress, Chairman, ACRS, to James Taylor, Executive Director for Operations, Subject: Proposed Final Generic Letter 95-XX, “Voltage-Based Repair Criteria for Westinghouse Steam Generator Tubes.”
4. Letter dated November 20, 1996, from T. S. Kress, Chairman, ACRS, to James Taylor, Executive Director for Operations, Subject: Proposed Rule on Steam Generator Integrity.
5. Letter dated June 20, 1997, from R. L. Seale, Chairman, ACRS, to Shirley Ann Jackson, Chairman, NRC, Subject: Proposed Regulatory Approach Associated With Steam Generator Integrity.
6. Letter dated September 15, 1997, from R. L. Seale, Chairman, ACRS, to Shirley Ann Jackson, Chairman, NRC, Subject: Proposed Generic Letter and Draft Regulatory Guide DG-1074 Concerning Steam Generator Tube Integrity.
7. Memorandum dated October 15, 1997, from John Larkins, Executive Director, ACRS, to L. Joseph Callan, Executive Director for Operations, Subject: Proposes Final Generic Letter, “Steam Generator Tube Inspection Techniques.”
8. Letter dated April 22, 1999, from Dana Powers, Chairman, ACRS, to William Travers, Executive Director for Operations, Subject: Status of Resolution of Steam Generator Tube Integrity Issues.
9. Letter dated February 7, 2001, from David Modeen, NEI, to Samuel Collins, Director, Office of Nuclear Reactor Regulation, Subject: NEI 97-06, “Steam Generator Program Guidelines,” Revision 1.

10. Letter dated December 11, 2000, from David Modeen, NEI, to Samuel Collins, Director, Office of Nuclear Reactor Regulation, Subject: Revised Industry Steam Generator Program Generic License Change Package.
11. Memorandum dated September 18, 2001, from Edmund Sullivan, NRR, to William Bateman, NRR, Subject: NRC Staff Comments on Steam Generator Inspection Intervals.
12. Memorandum dated September 21, 2001, from Maitri Banerjee, NRR, to Edmund Sullivan, NRR, Subject: Summary of August 29, 2001, Public Meeting With the Nuclear Energy Institute Regarding NEI 97-06.

.....

NOTE: Additional details of this meeting can be obtained from a transcript of this meeting available in the NRC Public Document Room, One White Flint North, 11555 Rockville Pike, Rockville, MD, (301) 415-7000, downloading or viewing on the Internet at "http://www.nrc.gov/ACRSACNW," or can be purchased from Neal R. Gross and Co., 1323 Rhode Island Avenue, NW, Washington, D.C. 20005, (202) 234-4433 (Voice), 387-7330 (Fax), e-mail: [nrgross@nealgross.com](mailto:nrgross@nealgross.com).

.....

## Open Issues

- **SG Action Plan technical issues include:**
  - Assessment of degradation mechanisms – E&R IRG
  - NDE data quality – SG Exam G/L rev 6
  - NDE qualification – SG Exam G/L rev 6
  - NDE data analysis – SG Exam G/L rev 6
  - Pressure testing – In Situ Test Ad Hoc
  - Operational assessment – LA Ad Hoc
  - Tech Specs - GLCP
  - NEI 97-06 initiative - GLCP

The logo for Nuclear Energy Institute (NEI), consisting of the letters "NEI" in a bold, sans-serif font with a stylized arrow pointing downwards and to the left.

## Open Issues

- **SG Action Plan technical issues**
  - Industry responses provided to NRC last summer
  - NRC commented on most of the responses
  - Resolution dependent on Ad Hoc committee work, receiving remaining comments, and disposition of the inspection interval issue

The logo for Nuclear Energy Institute (NEI), consisting of the letters "NEI" in a bold, sans-serif font with a stylized arrow pointing downwards and to the left.

## Industry Proposed Admin TS: "Steam Generator Program"

An **SG Program** shall be established and implemented to ensure SG tube integrity performance criteria are maintained.

- Condition monitoring assessments of as-found tube condition vs the performance criteria shall be performed at each SG inspection outage. Requirements for condition monitoring are defined in the **SG Program**.
- Changes to performance criteria are subject to NRC review and approval.
- Changes to tube repair criteria and repair methods are subject to NRC review and approval.

## Tube Integrity Performance Criteria

### Structural Criteria:

- Maintain factor of three against burst under normal full power operating conditions.
- Maintain factor of 1.4 against burst for postulated accident conditions.

### Accident-Induced Leakage Criteria:

- Accident leakage shall not exceed that assumed in licensing basis accident analysis.
- Accident leakage shall not exceed [1 gpm, except as approved by NRC].

## Sampling Requirements for Prescriptive Based Examinations

Separate sampling requirements for inspection of 600 MA, 600TT (and 800TT), and 690TT materials

- 600MA every outage
- 600TT every other outage
- 690TT every third outage

ACRS Nov. 29, 2001 5

EPRI

## Sampling Requirements for Prescriptive Based Examinations

### 600 MA:

- Inspect 100% of tubes in each SG every 60 EFPM
- SG's shall be inspected each refueling outage
  - Minimum 20% random sample at each inspection
- This requirement is essentially the same as it is in the current Rev. 5 of the Guidelines

ACRS Nov. 29, 2001 6

EPRI

## Sampling Requirements for Prescriptive Based Examinations

### 600 TT:

- Given SGs are free from cracking,
  - Inspect 100% of tubes in each SG in 120, 90, 60, 60,...., EFPMs and with the following conditions:
    - Minimum 20% random sample at each inspection
    - Extended inspection periods require supporting DA and OA
    - Secondary side program requirements are met
    - Examine at least 50% of tubes in each SG by the refueling outage nearest the mid-point of the period and the remaining 50% by the refueling outage nearest the end of the period.
    - No SG can operate for more than two refueling cycles without being inspected.
- If cracking is discovered, the tubing shall be subject to the same rules as for Alloy 600 MA tubing.

EPRI

ACRS Nov. 29, 2001 7

## Sampling Requirements for Prescriptive Based Examinations

### 690 Alloy:

- Given SG are free from active cracking degradation,
  - Inspect 100% of tubes in each SG in 144, 108, 72, 60, 60, 60,... EFPMs with the following conditions:
    - Minimum 20% random sample at each inspection
    - Extended inspection periods require supporting DA and OA
    - Secondary side program requirements are met
    - Examine at least 50% of tubes in each SG by the refueling outage nearest the mid-point of the period and the remaining 50% by the refueling outage nearest the end of the period.
    - No SG can operate for more than three refueling cycles without being inspected.
- If cracking is discovered, the tubing shall be subject to the same rules as for Alloy 600 MA tubing.

EPRI

ACRS Nov. 29, 2001 8

# NEI 97-06 Proposed Steam Generator Generic License Change Package

## Introductory Remarks

ACRS Materials and Metallurgy Subcommittee

November 29, 2001

Ted Sullivan  
Division of Engineering  
Office of Nuclear Reactor Regulation  
(301) 415-2796

## Background

- Regulatory requirements for SG inspection/repair are prescriptive and out of date
  - Requirements not focused on key objective of ensuring tube integrity for entire period between inservice inspections
  - Meeting these requirements does not, in and of itself, ensure tube integrity is being maintained
- Staff initiative for a revised regulatory framework has evolved over time; staff has previously met with ACRS SC to discuss initiative
  - Rulemaking - 1996 and 1997
  - Generic Letter and Regulatory Guide - 1997
  - Consideration of industry's NEI 97-06 initiative - 1999
  - Review of NEI SG Generic Change Package (GCP) - 2001

## NEI SG Generic Change Package (GCP)

- Initially submitted February 4, 2000
  - Revised submittal dated December 11, 2000
- Staff did not initiate review until January 2001
  - due to followup activities relating to IP-2 SG tube failure on February 15, 2000
- Staff initiative to revise regulatory framework through review of NEI 97-06 GCP is part of the NRC Steam Generator Action Plan

## Inspection Interval Issue

- At the NRC SG Workshop in February 2001, industry representatives discussed draft revisions to the EPRI SG examination guidelines to permit inspection intervals for SGs with Alloy 600 TT or Alloy 690 TT tubing well beyond current EPRI guidelines and regulatory requirements:
- Staff is concerned that certain EPRI guidelines are not sufficiently well developed to ensure that extended inspection intervals will be implemented so as to ensure that:
  - tube integrity performance criteria will continue to be met
  - tubing conditions not meeting the performance criteria will be promptly detected

## Presentations to Follow

- Jim Riley from NEI will summarize industry steam generator program, NEI 97-06, upon which NRC revised SG regulatory framework is based
- Emmett Murphy will then discuss in some detail staff's concerns with GCP that are related to inspection intervals and resolution path staff is pursuing

# Steam Generator Program

ACRS Materials and Metallurgy Briefing

November 29, 2001

*Jim Riley, NEI*



November 29, 2001

1

## Presentation Outline

- Organizational Background
- Industry SG Management Organization
- Regulatory Approach Background
- NEI 97-06 Overview
- Industry SG Program Initiative
- Continuing Evolution
- Industry Communication
- SG Program Generic License Change Package
- Industry / NRC interface

■ Summary

November 29, 2001



2

## **Organizational Background**

- EPRI SGMP organized in 1976 to address SG corrosion concerns
- NUMARC and SGMP worked with the NRC since 1993 to establish a framework for SGDSM and ARCs
- NEI SGIWG and SGTF chartered in 1995 to meet with the NRC on the SG rulemaking

November 29, 2001

3



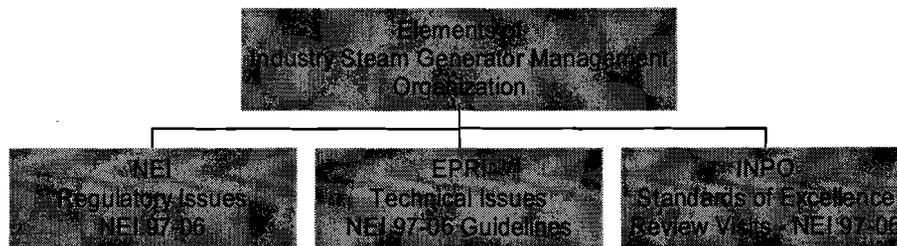
## **Overview of Industry Steam Generator Management Organization**

November 29, 2001

4



# Industry Organization

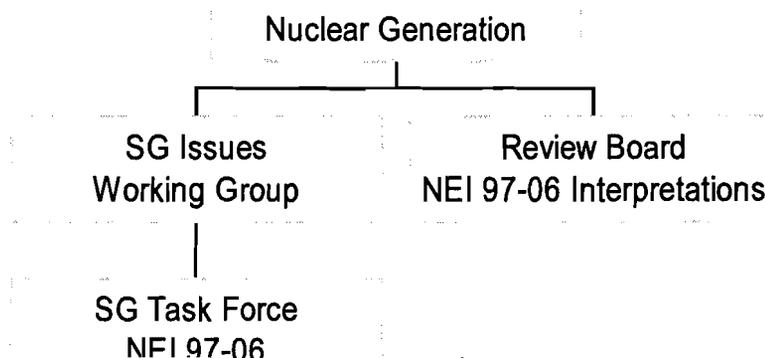


November 29, 2001

5



# NEI Organization



## NEI Organization

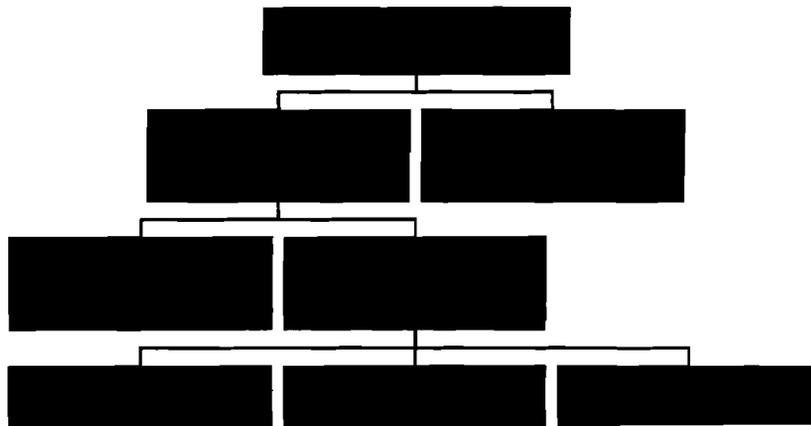
- **NEI SG Issues Working Group/Task Force**
  - ◆ **Developed NEI 97-06**
  - ◆ **Generic License Change Package**
  - ◆ **SG Action Plan**
- **NEI 97-06 Review Board Process**
  - ◆ **Resolve generic questions about NEI 97-06 and EPRI guidelines**
  - ◆ **Advisory Panels – Members From SGMP**
  - ◆ **Review Board – Members From IIG**
  - ◆ **Interpretations – Posted on Web**
  - ◆ **SGMP Administrative Procedure**

November 29, 2001

7



## Industry/EPRI Organization



## Industry/EPRI Organization

- PMMP
  - ◆ Executive Group
  - ◆ Overall Policy/Budget Approval
  - ◆ Approves EPRI Guidelines
- SGMP
  - ◆ General Organization
    - US and Foreign Utilities - Manage SG issues and technology development
  - ◆ SGMP Administrative Procedures
  - ◆ EPRI Guidelines
    - Revision process through Ad Hoc committees – include vendors and consultants
    - Guidelines assigned to specific subcommittees
  - ◆ SG Degradation Database - Website

November 29, 2001

9



## Industry/EPRI Organization

- Technical Advisory Group (TAG)
  - ◆ Information Sharing/Working Groups/Policy Review and Approval
  - ◆ Reviews EPRI Guidelines
  - ◆ 3 Meetings/Year – 1 with Senior Reps
  - ◆ Chemists/Engineers/NDE Specialists
    - People Responsible for SG Programs
  - ◆ Information Forum – NRC Presentations are Invited

November 29, 2001

10



## Industry/EPRI Organization

- **Issues Integration Group (IIG)**
  - ◆ Interface **between** TAG and Executive Group
  - ◆ Issue **Prioritization** – Resource Allocation
  - ◆ **Members represent** all three NSSS and SG designs
- **Engineering and Regulatory Issue Resolution Group (E & R IRG)**
  - ◆ Respond to Engineering/Regulatory Issues
  - ◆ SG In Situ Pressure Test Guidelines
  - ◆ SG Integrity Assessment Guidelines
- **In-service Inspection / Non-Destructive Examination (ISI/NDE IRG)**
  - ◆ Respond to NDE Issues

November 29, 2001 PWR SG Examination Guidelines



11

## Industry/EPRI Organization

- **Technical Support Subcommittee (TSS)**
  - ◆ Long term R&D
  - ◆ PWR Secondary Chemistry Guidelines
  - ◆ PWR Primary Chemistry Guidelines
  - ◆ PWR Primary-to-Secondary Leak Guidelines

November 29, 2001



12

## INPO Organization

- Industry's Assessment Organization
- SG Review Visit Program
  - ◆ Peer Participation – Information Sharing
  - ◆ SG Program Recommendations and Strengths
  - ◆ Year end Summary Provided to Industry
  - ◆ Some Follow-up Items
- Operating Experience Programs
  - ◆ Notification of events
  - ◆ Information Sharing
  - ◆ Website

November 29, 2001

13



## Summary

- Industry has a SG Management Program in place that:
  - ◆ Addresses issues promptly
  - ◆ Uses broad based utility participation
  - ◆ Encompasses all SG types/vintages
  - ◆ Issues guidelines and policy
  - ◆ Self monitors through peer reviews
  - ◆ Interfaces with NRC through NEI
  - ◆ Maintains research/improvement efforts

November 29, 2001

14



## Regulatory Approach Background

- In mid 90's regulatory approach shifted from rule to Generic Letter and Draft Guide (DG 1074)
- During the same time frame the industry SGDSM framework developed into NEI 97-06, *Steam Generator Program Guidelines*
- In 1999 the NRC and industry focused on endorsing the SG Program requirements in NEI 97-06

November 29, 2001

15



## NEI 97-06 Overview

- Framework incorporates a balance of prevention, inspection, evaluation, repair, maintenance, and leakage monitoring
- Establishes performance criteria that define the basis for SG operability
- Defines the essential elements of a steam generator program:

Degradation assessment  
Integrity assessment  
Leakage monitoring  
Foreign material exclusion  
Self assessment

Inspection  
Maintenance and repair  
Water chemistry  
Secondary side integrity  
NRC reporting

16



## NEI 97-06 Overview

- NEI 97-06 written as upper level guidance for SG Program requirements
  - Detailed requirements are contained within EPRI SG Guidelines:
    - ◆ SG Examination G/L
    - ◆ Integrity Assessment G/L
    - ◆ In Situ Pressure Test G/L
    - ◆ Primary-to-Secondary Leak G/L
    - ◆ Primary Chemistry G/L
    - ◆ Secondary Chemistry G/L

November 29, 2001

17



## Industry SG Program Initiative

- Revision 0 of NEI 97-06 issued in December 1997
- In December 1997 the NEI NSIAC voted to adopt a formal industry Initiative on SG Program requirements:

*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.*

- Initiative commits all PWRs to the specified actions

November 29, 2001

18



## Continuing Evolution

- NEI 97-06 and EPRI SG Guidelines are living documents - they are changed in response to new technologies and experience
  - NEI 97-06 revised as necessary (revision 1 issued in January 2001)
  - EPRI SG Guidelines are evaluated for revision biannually
    - ◆ Interim guidance issued as necessary

November 29, 2001

19



## Industry Communication

- SG Program requirements include numerous means of communicating SG experience to PWR plants
  - NEI SG Review Board interpretations (as requested)
  - Interim guidance (as needed)
  - NEI APC Letters
  - SGMP TAG (3 times a year)
  - SGMP Workshops (annually)
  - EPRI SG Guideline revision (biannually)

November 29, 2001

20



## SG Generic License Change Package

- Intended to address the regulatory aspects of the implementation of NEI 97-06 and its referenced EPRI Guidelines
- Content was the subject of numerous meetings between the industry and NRC
- Submitted to the NRC on Feb 4 and revised on Dec 11, 2000
- One more revision will be required

November 29, 2001

21



## SG Generic License Change Package

- Consists of:
  - SG Tube Integrity Tech Spec and Bases
  - Operational Leakage Tech Spec and Bases
  - Administrative Tech Spec addressing:
    - ◆ Condition Monitoring
    - ◆ Change controls on performance criteria, alternate repair criteria, and repair methods
    - ◆ Reporting requirements
  - Generic Safety Analysis
  - Generic Significant Hazards Consideration
  - Amendment cover letter template

November 29, 2001

22



## Industry / NRC Interface

- Industry and NRC working on several issues related the GLCP:
  - Inspection intervals and their associated regulatory controls – key issue for approval
    - ◆ General agreement on regulatory controls
    - ◆ Presentation on technical approach
  - Various technical issues - ongoing
- NEI and SGMP will continue to work with the NRC to improve the program and to address emerging issues

November 29, 2001

23



## Summary

- The industry is committed to safe operation
  - Long term program
  - Industry commitment to requirements
  - Prepared and guided by industry experts
  - Living documents - responsive to changes in technology and experience
  - Extensive communication
  - NRC interaction

November 29, 2001

24



## Open Issues

- SG Action Plan technical issues include:
  - Assessment of degradation mechanisms – E&R IRG
  - NDE data quality – SG Exam G/L rev 6
  - NDE qualification – SG Exam G/L rev 6
  - NDE data analysis – SG Exam G/L rev 6
  - Pressure testing – In Situ Test Ad Hoc
  - Operational assessment – IA Ad Hoc
  - Tech Specs - GLCP
  - NEI 97-06 initiative - GLCP



## Open Issues

- SG Action Plan technical issues
  - Industry responses provided to NRC last summer
  - NRC commented on most of the responses
  - Resolution dependent on Ad Hoc committee work, receiving remaining comments, and disposition of the inspection interval issue





NEI Steam Generator Generic Change Package (SG GCP)  
-Outstanding Issues

ACRS Materials and Metallurgy Subcommittee

November 29, 2001

Emmett Murphy, (301) 415-2710  
Division of Engineering  
Office of Nuclear Reactor Regulation

## Background/Purpose

- September 25, 2001 Briefing of ACRS Materials and Metallurgy Subcommittee
  - Overview discussion of the NEI SG GCP, including background
  - NRC review status including outstanding issues.
- Today's briefing is intended to provide Committee members with additional details of the outstanding issues, proposed resolutions, and an update of the current status and plans.

## Current Requirements

Inspect a specified sample of SG tubes at specified intervals, and plug tubes containing indications which exceed specified limit.

- Frequency: 24 calendar months (typically one fuel cycle), or 40 calendar months if degradation activity is minimal
- Sample Size: 3 to 100%, depending on level of degradation
- Plugging Limit: 40% TW (typ)

Inspection methods are subject to ASME Code requirements. However, improved inspection performance through the years has been largely driven by technology improvements and improved industry practice in accordance with EPRI examination guidelines.

## Safety Considerations

- Available evidence from operating experience is that steam generator tubes generally operate with acceptable safety margins, consistent with the licensing basis.
  - Exceptions do occur, but appear to be relatively isolated occurrences.
  - Exceptions include, but not limited to the eight SGTR events in the US to date.
- Risk studies (e.g., NUREG-0844 and NUREG-1570) indicate that risk from SG related causes is within acceptable levels.
  - Ongoing work in this area as part of the SG Action Plan
- Room for improvement from past performance.

## Safety Considerations (Continued)

The acceptable safety record to date reflects:

- Current TS requirements; notably including the 24 month inspection interval requirement for plants with active degradation effectively limiting inspection intervals to one fuel cycle.
- Industry actions in excess of minimum regulatory requirements.

## Industry Guidelines

- EPRI Secondary Water Chemistry Guidelines
- EPRI Steam Generator Examination Guidelines
- EPRI Primary to Secondary Leakage Monitoring Guidelines
  
- EPRI Steam Generator In Situ Pressure Test Guidelines
- EPRI Steam Generator Integrity Assessment Guidelines
  
- NEI 97-06, "Steam Generator Program Guidelines"

Industry guidelines reflect consideration of:

- operating experience/industry and NRC studies/new technology
- NRC generic communications
- DG-1074

## Industry Proposed Admin TS: "Steam Generator Program"

An **SG Program** shall be established and implemented to ensure SG tube integrity performance criteria are maintained.

- Condition monitoring assessments of as-found tube condition vs the performance criteria shall be performed at each SG inspection outage. Requirements for condition monitoring are defined in the **SG Program**.
- Changes to performance criteria are subject to NRC review and approval.
- Changes to tube repair criteria and repair methods are subject to NRC review and approval.

## Tube Integrity Performance Criteria

### Structural Criteria:

- Maintain factor of three against burst under normal full power operating conditions.
- Maintain factor of 1.4 against burst for postulated accident conditions.

### Accident-Induced Leakage Criteria:

- Accident leakage shall not exceed that assumed in licensing basis accident analysis.
- Accident leakage shall not exceed [1 gpm, except as approved by NRC].

## SG Program

- Details of the SG program will be located outside of tech specs
- Licensee's will commit to developing the SG Program in accordance with NEI 97-06, which references detailed EPRI guidelines.
- NEI 97-06 provides general guidance for a performance based, programmatic strategy for ensuring SG tube integrity.

## Condition Monitoring

10 CFR 50, Appendix B, Criterion 16: Measures shall be established to assure that conditions adverse to quality are promptly detected and corrected.

Condition monitoring programs must be capable of meeting this requirement.

Failure to fully satisfy the performance criteria represents a tolerable condition, provided such condition is promptly detected and corrected.

## EPRI SG Examination Guidelines, Revision 5 (1997):

- Prescriptive criteria for inspection frequency and sampling
  - Inspection sample: 20 to 100%
  - Inspect each refueling outage (12 to 22 EFPM)
  - Inspect every second refueling, if no “active degradation”
  - Inspect 100% of active tubes by each 60 EFPM
  - Per NEI 97-06, scheduled inspection intervals must be supported by operational assessment (OA)
- Performance based criteria for inspection frequency and sampling
  - Inspection intervals and sample size shall be such as to ensure performance criteria are maintained, as supported by OA.
  - Intervals not to exceed two fuel cycles

## EPRI SG Examination Guidelines (Continued)

- NDE technique qualification
- NDE personnel qualification
- Site-specific qualification
- NDE process controls

## EPRI SG Tube Integrity Assessment Guidelines

Tube integrity assessment includes:

- Condition Monitoring
- Operational Assessment
- Degradation Assessment

Guidelines address:

- Performance standards for satisfying performance criteria
- Treatment of uncertainties
- Predictive models and methodologies for burst and accident leakage assessment

## EPRI SG Tube In-Situ Pressure Test Guidelines

Supplements tube integrity assessment guidelines for condition monitoring.

Addresses:

- Equipment
- Procedure
- Tube selection/screening criteria

## Discussion - EPRI Guideline Documents

- It had not, initially, been the staff's intent to formally review or endorse the sub-tier, detailed EPRI guideline documents.
  - staff expectation that guidelines would be sufficiently well developed to lead to improved tube integrity performance.
  - issues pertaining to the guidelines were issues that existed under the current regulatory framework and, thus, were not unique to the proposed new framework.
  - staff expectation that guidelines would continue to evolve over time in response to identified issues, technology changes, lessons learned from operating experience, and results of industry and NRC studies (e.g., NRC SG mockup and ECT round robin, SG and DPO action plan).

## Guideline Issues

- Need for consistent, acceptable performance standards for demonstrating that tube integrity performance criteria are met.
- Need for improved guidance on needed attributes of performance demonstration to quantify NDE system (technique plus personnel) flaw detection and sizing performance (uncertainties).
- Need for improved guidance on consideration of NDE flaw detection and sizing performance in condition monitoring and operational assessments.
- Need for NDE data quality (noise) criteria and improved site specific NDE performance demonstration guidelines.

## Guideline Issues - Tube Integrity Assessment (Continued)

- Need for improved guidance on SG tube in-situ pressure testing, with respect to test selection criteria, interpretation and assessment of incomplete burst test results, and the use of in-situ test results for purposes of establishing burst and leakage models.
- Need for guidance for bench marking operational assessment methodologies against actual experience.
- Topical issues; e.g., pressurization rate issue, fractional flaw methodology for inferring undetected indications based on NDE POD performance, applicable performance criteria for tubes with small volumetric flaws (e.g., 0.3-in dia).

## Performance Standard Guidelines

NEI 97-06 provides a general performance standard for the conduct of condition monitoring and operational assessment:

*These assessments shall account for all significant uncertainties so as to provide a conservative assessment relative to the performance criteria. Conservative assumptions should be employed to account for uncertainties not directly treated in the analysis.*

The EPRI SG Integrity Assessment Guidelines define specific criteria:

1. Structural limits are set such that a flaw evaluated to be at the limits satisfies the structural performance criteria with probability of 0.9 evaluated at a 50% confidence level.
2. Probability of burst of one or more tubes (for the population of degraded tubes)  $< 0.1$  at applicable performance criteria.

## Issue - Performance Standard Guidelines

- Criterion 2 is not applied consistently throughout the guidelines, nor are licensees applying this criteria in many of their tube integrity assessments.
- The staff is concerned that without implementation of criterion 2, there may be relatively low probability that all tube satisfy the performance criteria even though each tube has high probability of satisfying the performance criteria.

## Draft Revision 6 to Examination Guidelines Inspection Intervals

At the NRC SG Workshop in February 2001, industry representatives discussed draft revision 6 to the EPRI SG examination guidelines to permit inspection intervals for SGs with Alloy 600 TT or Alloy 690 TT tubing well beyond current (i.e., Rev. 5) EPRI SG examination guidelines and regulatory requirements:

- Proposed prescriptive criteria
  - For SGs with Alloy 600 TT tubing and no "active degradation," inspect 50% sample each 5-6 EFPY. (Two fuel cycle limitation has recently been added to draft.)
  - For SGs with Alloy 690 TT tubing and no "active degradation," inspect 50% sample each 6-7 EFPY. (Three fuel cycle limitation has recently been added to draft.)

## Draft Revision 6 to Examination Guidelines Inspection Intervals (Continued)

- Proposed prescriptive criteria (Cont)
  - (One cycle limitation for alloy 600 MA tubing was recently added to draft.)
  - In addition, planned inspection intervals must be supported by operational assessment.
- Proposed performance based criteria
  - Applicable to SGs with Alloy 600 TT and 690 TT
  - As necessary to ensure performance criteria are maintained, as supported by degradation and operational assessment, possibly ranging to 22 EFPY.

## Staff Concerns Regarding Extended Inspection Intervals

- Appropriate inspection/condition monitoring intervals are critical to ensuring the prompt detection of conditions not meeting performance criteria.
- Certain guidelines not sufficiently well developed to support inspection intervals significantly longer than what is being implemented under current requirements or acceptable alternatives.
- Industry may revise guidelines; licensees may not follow aspects of the guidelines.
- Assurance needed that condition monitoring will be capable of fulfilling its 10 CFR 50, Appendix B obligation.

## Guideline Issues - Inspection Intervals

- Numerous issues relating to the rigor of guidelines for tube integrity assessments (condition monitoring and operational assessment); particularly the treatment of uncertainties associated with these assessments. Longer inspection intervals magnify the importance of these uncertainties relative to ensuring that the performance criteria are being maintained.
- Guidelines for operational assessment of active degradation mechanisms are not yet sufficiently developed to be used as tool for directly determining acceptable inspection interval extensions.
- Degradation assessment guideline details, and technical bases for these guidelines, have not been developed for ensuring that the initial occurrence of new degradation mechanisms will not cause performance criteria to be exceeded.
- Draft inspection interval strategies for Rev 6 of examination guidelines are still being finalized, have thus far lacked critical details, and technical justification has not been provided.

## Resolution Path Proposed by NRC Staff

- Predictive methodologies for managing known degradation mechanisms and anticipating the occurrence of new mechanisms need to be strengthened to support implementation of inspection intervals significantly exceeding current requirements or acceptable alternative.
  - The staff will continue to work with the industry in identifying the needed improvements to the guidelines.
- In meantime, inspection intervals should be subject to appropriate limitations, based on experience and consideration of the improved stress corrosion performance expected with alloy 600 TT and 690 TT tubing. Acceptable approaches include:
  - limitations similar to current specs
  - potential others; e.g., prescriptive approach being developed for Rev 6 of guidelines subject to resolution of staff comments

## Resolution Path Proposed by NRC Staff (Continued)

- In addition to the need for acceptable inspection interval criteria, the staff has concluded that there must be appropriate regulatory controls with respect to inspection intervals to ensure that the performance criteria are maintained, that conditions failing to satisfy these criteria are promptly detected and corrected, and that risk is not increased.

## Resolution Path Proposed by NRC Staff (Continued)

Industry proposed Admin TS would be revised to include the following:

*SG Inspection Interval - Inspection intervals for SG tubing shall not exceed the maximum intervals defined in the SG Program. Revisions to these maximum inspection intervals require review and approval by the NRC staff. The maximum intervals may be revised to incorporated changes approved generically by the NRC subject to the limitations set forth in the staff's approving document.*

Licensees would submit the maximum intervals which will initially be in their SG Programs when they submit their plant-specific change packages. The staff would review and approve.

## Industry Response

NEI/NRC public meeting dated November 1, 2001

- NRC comments on inspection interval issue are being addressed.
- New draft of rev 6 issued for industry comment on 10/22/01.  
Comments requested by 12/18/01.
- Following this review, revised draft to be provided to NRC.

NEI letter dated November 2, 2001

- Proposed control on inspection intervals through the licensee commitment process in lieu of admin TS control.

## NRC Status - Letter to NEI dated November 26, 2001

- Industry's November 2 proposal does not adequately address the staff's concerns.
- The staff remains committed to a revised regulatory framework which is more directly focused on ensuring tube integrity and which will result in enhanced flexibility to licensees.
- No further progress can be made until inspection interval issue is resolved.
- NEI should submit appropriate inspection interval criteria and a revised administrative technical specification proposal which ensures that these criteria will be implemented unless otherwise reviewed and approved by the NRC staff.
  - Request target date of 1/31/2002.
- Unless timely resolution can be reached, staff may consider alternative approaches to achieving revised regulatory framework.

## Industry Response - Proposed Resolution

NRC/NEI Senior Management Meeting - Nov. 28, 2001:

- Industry can accept the concept of an administrative TS similar to that proposed by NRC staff controlling changes in inspection intervals with interval lengths defined outside of TS. (Staff proposal should be revised to clarify that the generic approval process for changes to maximum inspection intervals may involve approval of methodologies for determining maximum inspection intervals.)
- But only if the technical issues surrounding extended intervals are resolved first.
  - i.e., resolution of issues pertaining to inspection interval criteria to be incorporated in Rev 6 of the SG examination guidelines

## Industry Response - Proposed Schedule

- Disposition industry and NRC comments on Rev 6 of examination guidelines - early 2002.
- Reach agreement with NRC on extended inspection intervals - mid 2002.
- Submit final GLCP reflecting inspection intervals - mid 2002.
- Issue SG Examination Guidelines, Revision 6 - mid 2002.
- NRC approval of GLCP - late 2002.
- Submittal of plant-specific license amendments - 2003.
- Implementation - 2003.

## Conclusions

- There is conceptual agreement on a resolution path for the inspection interval issue, allowing review of the GLCP to proceed.
- Staff will work with NEI to achieve best possible schedule.
- Industry needs to finalize the technical details of the Rev 6 inspection interval criteria and address staff comments thereto.
- Over the long term, the staff and industry need to work together to identify the needed changes to industry guidelines which will allow optimal flexibility to licensees in implementing their SG programs consistent with continued maintenance of SG tube integrity.

# Revision 6 PWR SG Examination Guidelines

Mohamad Behravesh

ACRS 11-29-01

EPRI

## Chronology of Guidelines Revisions

- Original Issue, 1981, NDE Center Draft Topical
- Revision 1 1984 , Formal EPRI Report
- Revision 2 1988, Added NSSS Input
- Revision 3 1992, Perf. Demo. Requirements
- Revision 4 1996, Prescriptive Sampling
- Revision 5 1997, Strong Language, "*Shalls*"

Current requirement to assess need for revision at  
least once every two years

ACRS Nov. 29, 2001 2

EPRI

## Background

- PWR SG Examination Guidelines delineates what,when, how to inspect and by whom
  - Results are used in SG assessments
- It is a utility developed document that has benefited from vendors' input and comments
- Work on Revision 6 started in March 2000 and is expected to finish by mid-2002

EPRI

ACRS Nov. 29, 2001 3

## Background

- Rev. 6 draft was completed in April 2001 and received industry review during May 1-June 25
- This presentation highlights the most significant changes to the requirements
  - Prescriptive Inspections
  - Data Quality

EPRI

ACRS Nov. 29, 2001 4

## Sampling Requirements for Prescriptive Based Examinations

Separate sampling requirements for inspection of 600 MA, 600TT (and 800TT), and 690TT materials

- 600MA every outage
- 600TT every other outage
- 690TT every third outage

EPRI

ACRS Nov. 29, 2001 5

## Sampling Requirements for Prescriptive Based Examinations

### 600 MA:

- Inspect 100% of tubes in each SG every 60 EFPM
- SG's shall be inspected each refueling outage
  - Minimum 20% random sample at each inspection
- This requirement is essentially the same as it is in the current Rev. 5 of the Guidelines

EPRI

ACRS Nov. 29, 2001 6

## Sampling Requirements for Prescriptive Based Examinations

### 600 TT:

- Given SGs are free from cracking,
  - Inspect 100% of tubes in each SG in 120, 90, 60, 60,..., EFPMs and with the following conditions:
    - Minimum 20% random sample at each inspection
    - Extended inspection periods require supporting DA and OA
    - Secondary side program requirements are met
    - Examine at least 50% of tubes in each SG by the refueling outage nearest the mid-point of the period and the remaining 50% by the refueling outage nearest the end of the period.
    - No SG can operate for more than two refueling cycles without being inspected.
- If cracking is discovered, the tubing shall be subject to the same rules as for Alloy 600 MA tubing.

EPRI

ACRS Nov. 29, 2001 7

## Sampling Requirements for Prescriptive Based Examinations

### 690 Alloy:

- Given SG are free from active cracking degradation,
  - Inspect 100% of tubes in each SG in 144, 108, 72, 60, 60, 60,... EFPMs with the following conditions:
    - Minimum 20% random sample at each inspection
    - Extended inspection periods require supporting DA and OA
    - Secondary side program requirements are met
    - Examine at least 50% of tubes in each SG by the refueling outage nearest the mid-point of the period and the remaining 50% by the refueling outage nearest the end of the period.
    - No SG can operate for more than three refueling cycles without being inspected.
- If cracking is discovered, the tubing shall be subject to the same rules as for Alloy 600 MA tubing.

EPRI

ACRS Nov. 29, 2001 8

## **600TT and 690TT Inspection Intervals**

- **Basis**

- Collective experience
  - With increasing number of new and replacement steam generators, the aggregate of the 600TT and 690TT steam generators are sampled and inspected with sufficient frequency
  - If any degradation is detected in any 600TT or 690TT steam generator, it must be considered in the degradation assessments of all other plants of the same tubing material and modify inspection plans accordingly
- Compensatory measures
  - If cracking is detected, the inspection interval reverts to 600 MA requirements
  - Secondary side requirements address foreign objects
- Program enhancement over existing regulation
  - Proposed sampling/frequency much more conservative than the current Tech Spec requirement of 3% every 40 months

**EPR21**

ACRS Nov. 29, 2001 9

## **Data Quality**

- Data quality parameters are for monitoring and answering two basic questions:
  - Is the data getting noisy to the point of affecting flaw detectability and sizing?
  - Have the bounds of the ETSS performance been exceeded such that the performance indices are degraded?
- Provides a frequency, location, acceptance criteria, and corrective action for each of the listed quality parameters.

**EPR21**

ACRS Nov. 29, 2001 10

## Current Status

- Latest draft Rev. 6 is in industry review with comments due by mid-December
- All comments will be addressed and resolved starting January 2002
- Consensus will be achieved, as for the past revisions, with the goal of an industry approved document by mid-2002

**EPR1**