

CERTIFIED

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CERTIFIED: Dr. Robert Seale February 4, 1997
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ADVISORY COMMITTEE ON REACTOR SAFEGUARDS
JOINT SUBCOMMITTEE MEETING MINUTES:
MATERIALS & METALLURGY AND SEVERE ACCIDENTS
JANUARY 9, 1997
ROCKVILLE, MARYLAND

The ACRS Subcommittees on Materials & Metallurgy and on Severe Accidents held a joint meeting on January 9, 1997, at 11545 Rockville Pike, Rockville, Maryland, in Room T-2 B3. The purpose of the meeting was to discuss with the NRC staff the use of probabilistic risk assessments (PRAs) in the regulatory process and the steam generator integrity rule and regulatory guide. 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 12:30 p.m. and adjourned at 3:50 p.m. on January 9, 1997.

ATTENDEES

ACRS

R. Seale, Chairman
M. Fontana, Chairman
G. Apostolakis, Member
I. Catton, Member

T. Kress, Member
D. Powers, Member
W. Shack, Member
N. Dudley, ACRS Staff

NRC STAFF

A. Thandani, NRR
R. Jones, NRR
G. Holahan, NRR

J. Strosnider, NRR
J. Murphy, RES
T. King, RES

There were no written comments or requests for time to make oral statements received from members of the public. An attendance list of members of the NRC staff and public is available in the ACRS office files. Dr. Shack had a conflict of interest regarding the proposed steam generator rule and did not participate in the Committee deliberations.

INTRODUCTION

Dr. Robert Seale, Acting Chairman of the Joint Subcommittees on Materials & Metallurgy and on Severe Accidents, convened the meeting at 12:30 p.m. He stated that the purpose of the meeting was to gather information concerning the technical approach used in developing the proposed risk-informed, performance-based steam generator integrity rule and regulatory guide.

Dr. Seale explained that the ACRS had sent a letter to the Executive Director for Operations (EDO) on November 20, 1996, commenting on the proposed steam generator integrity rule and regulatory guide. The EDO responded to the ACRS comments in a letter dated January 2, 1997, stating that additional meetings with the ACRS were appropriate in order to further discuss the specifics of the proposed rule.

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USE OF PROBABILISTIC RISK ASSESSMENTS IN THE REGULATORY PROCESS - Mr. Ashok Thadani, NRR

Mr. Thadani explained that the steam generator integrity rulemaking effort was one of many activities related to the use of PRAs in the regulatory process. He stated that the ACRS reports issued on August 15 and November 18, 1996, concerning risk-informed, performance-based regulation and plant-specific applications of safety goals, respectively, were helpful to the staff. Mr. Thadani noted that the ACRS and the staff were moving together in those areas.

Mr. Thadani explained the tentative schedule for future ACRS reviews of the regulatory guides and standard review plan (SRP) sections related to the use of PRAs in the regulatory process and of the technical bases for the steam generator rule. He indicated that an ACRS report, issued in March 1997, regarding the proposed SRP sections and regulatory guides associated with risk-informed, performance-based regulation would support the staff schedule for issuing the documents for public comment. Likewise, an ACRS report, issued in April 1997, regarding the proposed steam generator integrity rule would support the staff schedule.

Mr. Thadani outlined the evolution of the Commission's policy on the use of PRAs in the regulatory process. He explained the backfit process and the types of regulatory analyses required to support backfit decisions. He also explained the use of risk analysis results in the development the steam generator rule, the different types of tube degradation mechanisms, and the recently identified concern as to whether the steam generator tubes would fail under severe accident conditions.

The Subcommittee members and the staff discussed issues associated with the acceptability of license amendments that increased plant risk, including the following items:

- use of generic backfits and plant specific exemptions,
- bounding versus best-estimate analyses and criteria,
- quantification of uncertainties, and
- the need to clearly document bases for decisions.

They also discussed the relationship between risk-informed, performance-based criteria, defense-in-depth requirements, and the uncertainties associated with PRA results.

DISCUSSION OF THE STEAM GENERATOR RULEMAKING EFFORT - Mr. Jack Strosnider, NRR

Mr. Strosnider stated that the staff was in the process of preparing a NUREG and regulatory analysis, which would provide the technical basis for the steam generator integrity rule. He expected the documents to be available for ACRS

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review by mid-February 1997. In addition, Mr. Strosnider noted that the statements of consideration for the rule would bridge the gap between the risk assessments and the rule.

Mr. Thadani stated that the staff did not intend on analyzing the health effects associated with steam generator tube ruptures. The staff planned instead to calculate off-site releases for cost-benefit purposes. Dr. Apostolakis stated that during the Subcommittee meeting on November 4-5, 1996, the industry presented a framework for calculating off-site dose that began with accident sequences. He noted that the industry framework placed the off-site dose issue in the broader context of risk. The discussion between the Subcommittee members and the staff concerning off-site dose considerations included the following items:

- the use of bounding criteria versus the use of site-specific criteria,
- the decoupling of siting criteria and plant design criteria,
- the consideration given to plant location in regulatory decisions, and
- the effectiveness of the steam generator internal components in attenuating radioactive nuclide releases.

The discussion between the Subcommittee members and the staff concerning the use of a large early release frequency criterion included the following items:

- establishing a representative parameter for large early release frequency,
- use of quantitative health objectives to calculate performance criteria,
- reduction of uncertainties associated with the calculations, and
- a definition for large early release that would encompass all sites.

Mr. Gary Holahan, NRR, explained that the staff has identified six different approaches for maintaining adequate defense-in-depth in the regulatory process. He noted that the six approaches used different gradations of integrating both a traditional engineering analysis approach, which relies on a traditional defense-in-depth philosophy, and a solely risk-based analysis approach. The gradation of integration depended on the amount of performance data available. Mr. Strosnider explained that in developing the proposed steam generator rule, the staff attempted to use a well-balanced approach that used risk-informed, performance-based criteria and defense-in-depth program requirements, which provided the licensees flexibility.

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The discussion between the Subcommittee members and the staff concerning the defense-in-depth aspects of the proposed rule and regulatory guide included the following items:

- the need to clearly document the application of defense-in-depth requirements,
- why defense-in-depth programs are not adequate in and of themselves, and
- the coherence between the current version of the regulatory guide for using risk in the regulatory process and the proposed steam generator rule.

SUBCOMMITTEE COMMENTS

Dr. Seale indicated that the discussions with the staff did not completely resolve the comments and recommendations in the November 20, 1996 ACRS letter to the EDO. He urged the Subcommittee members to read the letter, dated January 8, 1997, from the Nuclear Energy Institute to the ACRS concerning the steam generator rule.

Dr. Apostolakis stated that the requirement to perform probabilistic risk assessments described in the proposed regulatory guide appears to create new requirements. The regulatory guide does not clearly identify the role of risk assessment in the development of performance criteria and program requirements.

Dr. Catton stated that the regulatory guide does not clearly state the objectives, functional requirements, performance requirements, verifications, acceptable solutions, and alternative solutions associated with the performance criteria.

Dr. Powers stated that the regulatory guide does not describe, in all cases, a standard for complying with the performance criteria or program requirements. Nor does the regulatory guide define reasonable assurance.

Dr. Kress stated that the staff should explain the basis for the 0.05 tube failure per year criteria -- in particular, how the value for steam generator tube ruptures is an appropriate allocation of the total conditional containment failure probability; how the criteria for tube plugging are derived from inspection findings, leak rates, or voltage criteria; and how plugging criteria are derived from a probability of tube failure.

Dr. Shack stated that the regulatory guide does not explain how licensees should demonstrate that the frequency of spontaneous steam generator tube failures will be below the assumed failure criteria. Also, the regulatory guide does not explain the basis for the allocation of 20 percent of the tube failure probability criteria to each degradation mechanism.

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FOLLOWUP ACTIONS

The Subcommittee members requested that the staff be prepared to discuss, during the next Subcommittee meeting, the comments and recommendations in the November 20, 1996 ACRS letter to the EDO and the comments documented in the "Subcommittee Comments" section of these minutes. [note: member comments were included in a memorandum from Dr. John Larkins, Executive Director, ACRS, to Mr. Ashok C. Thadani, NRR, dated January 31, 1997]

SUBCOMMITTEE RECOMMENDATIONS

The Subcommittee planned to meet with the staff and industry when the NUREG, regulatory analysis, and statements of considerations associated with the steam generator integrity rulemaking are available.

BACKGROUND MATERIAL PROVIDED TO THE SUBCOMMITTEE:

1. Memorandum dated October 25, 1996, from Brian Sheron, NRR, to John Larkins, ACRS Executive Director, Subject: ACRS Review of the Proposed Steam Generator Rule [forwarded latest drafts of the proposed rule and regulatory guide]
2. Letter dated January 2, 1997, from James M. Taylor, Executive Director for Operations, to T.S. Kress, ACRS Chairman, Subject: Staff Response to ACRS Comments on Proposed Steam Generator Rule

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NOTE: Additional details of this meeting can be obtained from a transcript of this meeting available in the NRC Public Document Room, 2120 L Street, N.W., Washington, D.C. 20006, (202) 634-3274, or can be purchased from Neal R. Gross and Company Incorporated, Court Reporters and Transcribers, 1323 Rhode Island Avenue, N.W., Washington, D.C. 20005, (202) 234-4433.

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