



**UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
ADVISORY COMMITTEE ON REACTOR SAFEGUARDS  
WASHINGTON, DC 20555 - 0001**

May 28, 2009

MEMORANDUM TO: ACRS MEMBERS

FROM: Harold Vandermolen, Senior Staff Engineer  
Advisory Committee on Reactor Safeguards

SUBJECT: CERTIFICATION OF THE MINUTES OF THE SUBCOMMITTEE ON  
RELIABILITY AND RISK ASSESSMENT MARCH 27, 2009, IN  
ROCKVILLE, MARYLAND

The minutes of the subject meeting have been certified as the official record of the proceedings for that meeting. A copy of the certified minutes is attached.

Attachment: Certification of Letter  
Minutes

cc w Attachments:ACRS Members

cc w/o Attachments: E. Hackett  
C. Santos  
S. Duraiswami  
A. Dias  
N. Mitchell-Funderburk



ADVISORY COMMITTEE ON REACTOR SAFEGUARDS  
MEETING OF THE SUBCOMMITTEE ON RELIABILITY AND RISK ASSESSMENT  
MEETING MINUTES - MARCH 27, 2009  
ROCKVILLE, MARYLAND

**INTRODUCTION**

The ACRS Subcommittee on Reliability and Risk Assessment held a meeting on March 27, 2009, in Room T2B3, 11515 Rockville Pike, Rockville, MD. The purpose of the meeting was to discuss the appendix to draft NUREG-1855, "Guidance on the Treatment of Uncertainties Associated with PRAs in Risk-Informed Decisionmaking." Dr. Harold VanderMolen was the Designated Federal Official for this meeting. The meeting was convened by the Subcommittee Chairman at 1:00 p.m. and adjourned at 3:45 p.m.

**ATTENDEES**

ACRS Members

G. Apostolakis, Chair  
D. Bley  
S. Abdel-Khalik  
W. Shack

ACRS Staff

H. VanderMolen, Designated Federal  
Official

Principal Speakers

M. Drouin, RES  
G. Parry, NRR  
K. Canavan, EPRI  
D. Vanover, ERIN  
D. True, ERIN

NRC Staff

G. DeMoss, RES  
C. Lui, RES  
Y. Orechwa, NRR  
T. Hwang, NRR  
F. Ferrante, NRR

Public/Other

D. Langewisch, MIT

A complete list of attendees is in the ACRS Office file and will be made available upon request. The presentation slides and handouts used during the meeting are attached to the office copy of these minutes.

**OPENING REMARKS BY CHAIRMAN APOSTOLAKIS**

Dr. George Apostolakis, Chairman of the ACRS Subcommittee on Reliability and Risk Assessment, convened the meeting at 1:00 p.m. The purpose of this meeting was to discuss example uses of the guidance on performance of sensitivity and uncertainty analyses as described in draft NUREG-1855, "Guidance on the Treatment of Uncertainties Associated with PRAs in Risk-Informed Decisionmaking," and the latest version of the companion EPRI report "Treatment of Parameter and Model Uncertainty for Probabilistic Risk Assessments," dated April 2008. The particular focus for this Subcommittee meeting was Appendix A of NUREG-1855, which presents an example use of the guidance provided in the two companion documents. The

Subcommittee heard presentations from the NRC's Office of Nuclear Regulatory Research (RES), the Electric Power Research Institute (EPRI), ERIN Engineering, and Sandia National Laboratories (SNL). The Subcommittee gathered information, analyzed relevant issues and facts, and formulated proposed positions and actions, as appropriate. The rules for participation in the meeting were announced as part of the notice of the meeting previously published in the *Federal Register*. The Committee had received no written statements or requests for time to make oral statements from members of the public.

## **DISCUSSION OF AGENDA ITEMS**

### **Combined Staff/EPRI Presentation on NUREG-1855 Appendix A**

Ms. Drouin reviewed the previous meetings with the Subcommittee. She then gave an overview of the major comments.

#### ACRS comment:

Results are presented in ways that might be misinterpreted as general conclusions

Important seismic dependencies are not described in ways that make it clear that the user will need to identify and model them properly.

There is a concern with an apparent use of arbitrary sensitivity analyses to evaluate model uncertainties

#### Staff resolution:

Numerous footnotes have been added which state that the conclusions are not generic but must be derived for each application independently

The discussion of the seismic analysis has been expanded to address the dependencies between seismically induced failures

Enhanced discussion has been provided to highlight the adequacy of the sensitivity analyses to identify the key sources of model uncertainty and to identify appropriate compensatory measures

In addition, several changes were made to the report to clarify the definition of the application, the screening of the low power/shutdown contribution, and that the basis for concluding that the fire analysis is conservative. The revised document also now states that an evaluation of the fire-induced LERF is needed.

Ms. Drouin and Mr. Parry then presented a walk-through of the revised document, showing the document on the screen and discussing each revision. The example calculation presented in this appendix is based upon a request to extend the allowed outage time for a BWR residual heat removal/suppression pool cooling (RHR/SPC) system from 3 to 7 days.

- Most of the various additions and clarifications were intended to make sure that future readers of the document will not make inappropriate generalizations based on approaches that are only valid for this example.
- Increasing the RHR allowed outage time, and thereby permitting more maintenance and repair while the unit is in power operation, implies that this maintenance and repair will not occur during periods of unit shutdown, which will improve the availability of the RHR

system during shutdown (when it runs almost continuously). The example does not take credit for this offsetting improvement in safety, but the reason is not because of any requirement for conservatism but instead is because, for this specific example, there was no low power/shutdown PRA available.

- Similarly, a bounding seismic assessment was done because the unit did not have a seismic PRA.

Ms. Drouin concluded by describing the staff's plans. Appendix A will be made publicly available in early April, and a workshop will be held on May 5 and 6. Based on the workshop, any additional needed changes will be made and Appendix A will be published as Volume 2 to NUREG-1855.

### **SUBCOMMITTEE DECISIONS AND ACTIONS**

After some discussion, the members invited the staff and EPRI to brief the Full Committee, preferably during the July meeting, and report on the outcome of the user workshop and public comments.

### **BACKGROUND MATERIALS PROVIDED TO THE SUBCOMMITTEE PRIOR TO THIS MEETING**

1. Subcommittee status report, including agenda
2. Draft NUREG-1855, "Guidance on the Treatment of Uncertainties Associated with PRAs in Risk-Informed Decisionmaking," and draft Appendix A, "Example Implementation of the Process for the Treatment of PRA Uncertainty in a Risk-Informed Regulatory Application," 02/02/2009

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Note: Additional details of this meeting can be obtained from a transcript of this meeting available for downloading or viewing on the Internet at <http://www.nrc.gov/ACRSACNW> or can be purchased from Neal R. Gross and Co., Inc., (Court Reporters and Transcribers) 1323 Rhode Island Avenue, NW., Washington, DC 20555 (202)234-4433