



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

December 23, 2009

MEMORANDUM TO: ACRS Members

FROM: Girija Shukla */RA/*
Senior Program manager, ACRS

SUBJECT: CERTIFICATION OF THE MINUTES OF THE RELIABILITY AND
PROBABILISTIC RISK ASSESSMENT SUBCOMMITTEE
MEETING ON NOVEMBER 13, 2009

The minutes for the subject meeting were certified on December 17, 2009. Along with the transcripts and presentation materials, this is the official record of the proceedings of that meeting. A copy of the certified minutes is attached.

Attachment: As stated

cc w/o Attachment: E. Hackett
C. Santos
A. Dias
S. Duraiswamy

cc w/ Attachment: ACRS Members



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

December 23, 2009

MEMORANDUM TO: Girija Shukla, Senior Program Manager,
Reactor Safety Branch – B
Advisory Committee on Reactor Safeguards

FROM: George E. Apostolakis, Chairman
Subcommittee on Reliability and PRA

SUBJECT: CERTIFICATION OF THE MINUTES OF THE MEETING OF THE
SUBCOMMITTEE ON RELIABILITY AND PRA REGARDING
DRAFT FINAL REGULATORY GUIDE 1.205, "RISK-INFORMED
PERFORMANCE-BASED FIRE PROTECTION FOR EXISTING
LIGHT-WATER NUCLEAR POWER PLANTS," AND
ASSOCIATED DRAFT FINAL SRP SECTION 9.5.1.2, "RISK-
INFORMED, PERFORMANCE-BASED FIRE PROTECTION" ON
NOVEMBER 13, 2009, IN ROCKVILLE, MARYLAND

I hereby certify, to the best of my knowledge and belief, that the minutes of the subject meeting on November 13, 2009, are an accurate record of the proceedings for that meeting.

 /RA/ Date 12/17/2009
George E. Apostolakis, Chairman
Subcommittee on Reliability and PRA

**ADVISORY COMMITTEE ON REACTOR SAFEGUARDS
MINUTES OF THE MINUTES OF THE MEETING OF THE SUBCOMMITTEE ON
RELIABILITY AND PRA REGARDING DRAFT FINAL REGULATORY GUIDE 1.205,
"RISK-INFORMED PERFORMANCE-BASED FIRE PROTECTION FOR EXISTING
LIGHT-WATER NUCLEAR POWER PLANTS," AND ASSOCIATED DRAFT FINAL
SRP Section 9.5.1.2, "RISK-INFORMED, PERFORMANCE-BASED FIRE
PROTECTION" ON NOVEMBER 13, 2009, IN ROCKVILLE, MARYLAND**

INTRODUCTION

On November 13, 2009, the ACRS Subcommittee on Reliability and PRA held a meeting in Room T-2B3, 11545 Rockville Pike, Rockville, Maryland. The purpose of the meeting was to discuss the draft final Regulatory Guide 1.205, and Draft final Standard Review Plan (SRP) Section 9.5.1.2. In addition to the NRC staff, representatives from Progress Energy, Duke Energy, and NEI made presentations to the Subcommittee. Mr. Girija Shukla was the designated federal official for this meeting. The subcommittee received no request from the public to make oral statements. The subcommittee chairman convened the meeting at 8:30 am and adjourned at 2:30pm.

ATTENDEES

ACRS Members

George Apostolakis, Subcommittee Chairman	William Shack, Member
Dennis Bley, Member	Michael Ryan, Member
John Stetkar, Member	Harold Ray, Member
Jack Sieber, Member	

ACRS Staff

Girija Shukla, Designated Federal Official

Principal NRC Speakers

Steven Laur, NRR	Sunil Weerakkody, NRR	Harry Barrett, NRR
Donnie Harrison, NRR		

Other Industry speakers were: Jeff Ertman and Dave Miskiewicz (Progress Energy), Rich Freudenberger and David Goforth (Duke Energy), Biff Bradley (NEI)

Other NRC staff and members of the public attended this meeting. A complete list of attendees is in the ACRS office file and is available upon request. The presentation slides and handouts used during the meeting are attached to the office copy of these minutes. The presentations to the Subcommittee are summarized below.

OPENING REMARKS BY CHAIRMAN APOSTOLAKIS

Dr. George E. Apostolakis, Chairman of the ACRS Subcommittee convened the meeting by introducing the ACRS members present. Chairman Apostolakis stated that the purpose of this meeting is to discuss the draft final Regulatory Guide 1.205, Risk-

Informed, Performance-Based Fire Protection for Existing Light- Water Nuclear Power Plants, and Draft final Standard Review Plan Section 9.5.1.2, Risk-Informed Performance-Based Fire Protection Program The Subcommittee will gather information, analyze relevant issues and fact, and formulate proposed positions and actions, as appropriate, for the deliberation by the full Committee. The rules for participation in the meeting were announced as part of the notice of the meeting previously published in the Federal Register. Chairman Apostolakis acknowledged that the Committee has received no written comments or requests for time to make oral statements from members of the public regarding today's meeting.

SUMMARY OF THE MEETING

- **Staff Presentation**

Sunil Weerakkody of NRR/DRA stated that the staff had prepared guidance documents for plants adopting a risk-informed, performance-based fire protection program. RG 1.205, Revision 1 had been improved and provided additional guidance to facilitate compliance. RG1.205, Revision 1 had been updated to provide clear and consistent regulatory positions and had been reviewed through concurrence from other offices. The final draft had been shared with public in two meetings on September 10 and October 29, 2009, respectively. He also stated that the staff would like to obtain the recommendation that the full Committee endorse the Reg. Guide 1.205, Revision 1 and SRP Section 9.5.1.2.

Steve Laur discussed the changes since the August 8, 2009 ACRS subcommittee meeting. For evaluating cumulative risk, the baseline risk is the risk of the plant at the point of full implementation of NFPA 805 (no "offset" carried forward). For Sample License Condition, the Reg. Guide allows self-approval of "no more than minimal risk increase" in the period between the new license and full implementation. For handling risk of previously-approved recovery actions, the staff incorporated the flow chart presented to ACRS into the Reg. Guide. The staff also incorporated the comments received from the ACRS subcommittee with regard to simplifying the definition for the primary control station.

The staff incorporated majority of stakeholder comments, the remaining regulatory positions are necessary to foster clarity and regulatory stability. Steve mentioned that members of industry agreed that RG 1.205, Rev. 1 should be issued ASAP to contribute to NFPA 805 regulatory stability. There are a few concerns from the industry in the guidance that the staff will continue to utilize the FAQ process to further refine implementation details.

In conclusion, Steve stated that RG 1.205, Rev. 1 and SRP Section 9.5.1.2 incorporated the significant lessons from the pilot plants; provided clear and consistent guidance to facilitate compliance with complex regulation; fully considered stakeholder comments. The staff requests the ACRS endorse issuance of these two documents.

- **Progress Energy Presentation**

Jeff Ertman discussed the integration of the classical FPP with Fire PRA at the Harris plant. The program expects to be implemented by Mid-2010 and modifications of the plant to be completed by end of 2010. The Progress Energy fleet will incorporate the

pilot plant RAI responses, RG 1.205, Rev. 1 when issued, and pilot plant SERs when issued. He presented the fire protection improvements from the result of the pilot plant exercise. The main points are that reliance on operator manual actions are significantly reduced and NFPA 805 transition and modifications result in overall plant risk reduction.

Dave Miskiewicz discussed the Fire PRA development. The fire model uses NUREG/CR-6850 as a template and made some departures early on. He then presented the Fire PRA results from the pilot study. The remaining challenges for post transition are also discussed. These include the cumulative risk tracking for plant changes, evolving PRA standard and post transition program inspection process. The impact of the RG 1.205 Rev. 1 changes is also discussed.

- **Duke Energy Presentation**

Rich Freudenberger of Duke Energy presented the refurbishment project of the Oconee station due to the implementation of NFPA 805. Oconee will implement the natural Phenomena Barrier system and Protected Service Water system.

David Goforth then described the NFPA 805 transition process for the Oconee station. He presented the results and lesson learned from the NFPA 805 transition. He stated that it is necessary to reconstitute the Safe shutdown Analysis document and address the industry issues. He discussed the details on how to implement the transition using NEI 04-02 and offers lessons learned from the pilot study.

He then described the Oconee fire PRA and the impact of RG 1.205 Rev. 1 on the Fire PRA modification. In summary, the transition process is a very complicated process requiring significant change management including training of station personnel. Duke Energy supports the approval of draft RG 1.205 Rev. 1. He stated that having stable guidance for NFPA 805 transition is important for effective project management.

- **NEI Presentation**

Mr. Biff Bradley presented the perspective view of Fire PRA from NEI. For the Fire PRA methods, Biff stated that using immature and conservative methods could lead to incorrect decision to NFPA 805 and other PRA applications. One of the examples was the incorrect depiction of total plant risk through simple summing of risk metrics. Biff stated that NFPA 805 process needs to recognize these issues and allow for adjustments as models are refined.

BACKGROUND

- **Regulatory Guide 1.205, "Risk-Informed Performance-Based Fire Protection for Existing Light-Water Nuclear Power Plants." and proposed SRP Section 9.5.1.2, "Risk-Informed, Performance-Based Fire Protection."**

Originally, fire protection at nuclear power plants was governed by the same fire protection codes as any major industrial organization. However, the situation changed after a fire occurred in the Browns Ferry plant in the mid-1970s. In that incident, a fire in the cable spreading room under the main control room disabled most of the safety systems in the plant, and, had the control rod drive pumps not been available, the plant might well have had a serious accident.

The NRC later developed detailed requirements for fire protection and prevention, which were issued as regulations - 10 CFR 50.48, "Fire Protection," and 10 CFR 50, Appendix R, "Fire Protection Program for Nuclear Power Facilities Operating Prior to January 1, 1979."

The original requirements were completely prescriptive – they applied to all areas of the plant equally, regardless of the safety significance of the equipment located within any fire zone. Starting in the mid-1990s, efforts were begun to develop a more risk-informed, performance-based approach to fire protection requirements. The intent is to assess fire risk and safety significance for each plant area, and to implement fire protection commensurate with this assessment. The governing regulation, 10 CFR 50.48(c), was issued in 2004. Regulatory Guide 1.205, "Risk-Informed, Performance-Based Fire Protection for Existing Light-Water Nuclear Power Plants," was issued in draft in 2004 and in final in 2006 to provide guidance for complying with 10 CFR 50.48(c). RG 1.205 is currently being revised.

The overall fire protection program integrates plant design and fire protection equipment with administrative controls, employee training, and fire watches to provide a defense in depth. There are following four regulatory documents upon which a risk-informed performance-based fire protection is based: 10 CFR 50.48(c), NFPA 805, NEI 04-02, and Regulatory Guide 1.205.

- The governing regulation is 10 CFR 50.48(c), "National Fire Protection Association Standard NFPA 805," which endorses NFPA 805 with some exceptions and modifications (e.g., credit for the use of feed-and-bleed cooling is not permitted).
- NFPA 805, "Performance-Based Standard for Fire Protection for Light Water Reactor Electric Generating Plants," is a fairly extensive document. It covers the entire fire protection program in detail for all phases of plant operation, including not only normal operation but also shutdown, degraded conditions, and decommissioning. Thus, NFPA 805 establishes a comprehensive set of requirements for fire protection programs. Its primary focus is on technical issues.
- Both 10 CFR 50.48(c) and NFPA 805 are considered to be "requirements." In contrast, NEI 04-02, "Guidance for Implementing a Risk-Informed, Performance-Based Fire Protection Program under 10 CFR 50.48(c)," as its title states, is intended to provide a framework for the regulatory processes for adopting NFPA as a new licensing basis, i.e., transitioning to a risk-informed, performance-based program. In addition, NEI 04-02 provides guidance on the use of analytical tools, etc.
- Finally, Regulatory Guide 1.205 endorses NEI 04-02, again with some exceptions and modifications. Thus, the majority of the detailed technical material is in the NFPA and NEI documents; the NRC- issued regulation and regulatory guide are primarily endorsements

Regulatory Guide 1.205 was issued in April of 2006, and thus has been in use for several years. The purpose of this meeting is not to review the regulatory guide or the overall fire protection program, but instead to review the proposed changes to the regulatory guide.

DISCUSSION OF AGENDA ITEMS

During the Subcommittee meeting, the staff discussed changes to RG 1.205 Rev.1 after the August 18, 2009 subcommittee meeting.

The members and staff discussed the cumulative risk including the delta-CDF/delta LEF and total CDF/total LERF for fire areas under evaluations. The staff agreed to add some clarifications on the requirements of total CDF/total LERF to evaluate changes where risk impact exceeds specific guidelines. The members also asked how the fire transition was being treated in the shutdown mode. The staff responded that the evaluation was treated qualitatively following the guidelines in NEI 04-02. The staff also discussed the recovery actions which the additional risk must be evaluated. This recovery actions involves "success path" which if not successful would lead to the fire induced failures. Other operator actions which do not involve success path may be credited in the evaluation. The staff will clarify this on the Reg. Guide. The member also raised a question on the reference of the circuit analysis. In Section 3.3, Circuit Analysis, it is suggested to specify the specific chapter referenced in NEI 00-01, Rev. 1 for circuit failure analysis.

Progress Energy discussed the fire protection improvements with the Committee and gave the rationale leading to the fire wrap barriers upgrade and incipient detection. For previously-approved recovery actions, Progress Energy only had one which is the "operator leaving control room". To reduce the reliance on the operator actions, Progress Energy take the credit of the modification such as the alternate seal injections. Progress Energy discussed the Fire PRA development which followed the guidelines in NUREG/CR-6850, it turned out that the analysis of scoping, screening and compartments stated in the NUREG was not very useful for the fire PRA development. Progress Energy also discussed that the number of cables modeled in the fire PRA is necessary.

Duke Energy discussed lessons learned from the pilot project using the Draft RG 1.205, revision 1. There are no additional recovery actions used in the fire PRA other than the existing ones in the plant PRA model.

The NEI representative stated that there were some reinterpretations of the regulations from the staff presentation and that is causing a lot of difficulty in implementing 805. The NEI representative stated that using immature and conservative methods could lead to incorrect decision to NFPA 805 and other PRA applications. The NEI representative suggested that transition to NFPA 805 should be allowed to slow down due to difficult technical issues and the industry needs to do it right.

COMMENTS AND OBSERVATIONS FROM THE SUBCOMMITTEE MEMBERS

The following main comments were made by the members on RG 1.205 and today's meeting:

- Rev. 1, as it stands now, has clarified a lot of the issues that the committee had from the previous revision.
- Clarify why the performance-based approaches are adequate for fire areas previously evaluated using deterministic approaches.

- Discuss Δ Risk (e.g., Δ CDF and Δ LERF) and total risk (e.g., CDF and LERF) in Section 2.2.4.1, Figure 1.
- Clarify what other operator actions that may be credited in plant procedures In Section 2.4, Recovery Actions.
- In Section 3.3, Circuit Analysis, it is suggested to specify the specific chapter referenced in NEI 00-01, Rev. 1 for circuit failure analysis.

SUBCOMMITTEE DECISIONS AND ACTIONS

Following the staff and applicant presentations and discussions, Chairman Apostolakis asked members if they had additional issues and concerns that needed to be discussed. Members were asked for their overall observations from the presentations.

The members recommended issuing RG 1.205, Revision 1 with the incorporation of the comments made in the meeting.

He then adjourned the meeting by thanking everyone for attending the meeting.

BACKGROUND MATERIALS PROVIDED TO THE SUBCOMMITTEE

1. Draft final Regulatory Guide DG-1218, "Risk-Informed, Performance-Based Fire Protection for Existing Light-Water Nuclear Power Plants," March 2009 (proposed Revision 1 of Regulatory Guide 1.205, dated April 2006)
2. Regulatory Guide 1.205, "Risk-Informed, Performance-Based Fire Protection for Existing Light-Water Nuclear Power Plants," May 2006
3. NFPA 805, "Performance-Based Standard for Fire Protection for Light Water Reactor Electric Generating Plants," 2001
4. NEI 04-02, "Guidance for Implementing a Risk-Informed, Performance-Based Fire Protection Program under 10 CFR 50.48(c)," April 2008

 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 view on the Internet at <http://www.nrc.gov/reading-rm/doc-collections/acrs/> or it can be purchased from Neal R. Gross and Co., 1323 Rhode Island Avenue, NW, Washington, D.C. 20005, (202) 234-4433 (voice), (202) 387-7330 (fax), nrgross@nealgross.com (e-mail).
