



**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 AUGUST 18, 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 REGULATORY GUIDE 1.205, "RISK-INFORMED
PERFORMANCE-BASED FIRE PROTECTION FOR EXISTING
LIGHT-WATER NUCLEAR POWER PLANTS," AND PROPOSED
SRP 9.5.1.2, "RISK-INFORMED, PERFORMANCE-BASED FIRE
PROTECTION" ON AUGUST 18, 2009, IN ROCKVILLE,
MARYLAND

I hereby certify, to the best of my knowledge and belief, that the minutes of the subject meeting on August 18, 2009, are an accurate record of the proceedings for that meeting.

/RA/ Date 12/17/09
George E. Apostolakis, Chairman
Subcommittee on Reliability and PRA

**ADVISORY COMMITTEE ON REACTOR SAFEGUARDS
MINUTES OF THE MEETING OF THE SUBCOMMITTEE
ON RELIABILITY AND PRA ON DRAFT REGULATORY GUIDE 1.205, "RISK-
INFORMED PERFORMANCE-BASED FIRE PROTECTION FOR EXISTING LIGHT-
WATER NUCLEAR POWER PLANTS," AND PROPOSED SRP 9.5.1.2, "RISK-
INFORMED, PERFORMANCE-BASED FIRE PROTECTION"
ON AUGUST 18, 2009, IN ROCKVILLE, MARYLAND**

INTRODUCTION

On August 18, 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 Regulatory Guide 1.205, and Standard Review Plan (SRP) Section 9.5.1.2. In addition to the NRC staff, representatives from NEI, EPRI, and other industry members 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 1:00pm and adjourned at 6:00 p.m.

ATTENDEES

ACRS Members

George Apostolakis, Subcommittee Chairman	William Shack, Member
Said Abdel-Khalik, Member	Dennis Bley, 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	Donnie Harrison, NRR
Harry Barrett, NRR	Stephen Dinsmore, NRR	

Other Industry speakers were: John Butler (NEI), Biff Bradley (NEI), Ken Canavan (EPRI)

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 Regulatory Guide 1.205, Risk-Informed,

Performance-Based Fire Protection for Existing Light- Water Nuclear Power Plants, and 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

Steve Laur of NRR/DRA stated that the staff had prepared guidance documents for plants adopting a risk-informed, performance-based fire protection program using NFPA 805 including RG 1.205, Rev. 1 and SRP (new 9.5.1.2 section) and would also discuss the public comments on this subject in this meeting. He also stated that the staff would like to obtain the recommendation that the full Committee endorse the Reg. Guide 1.205, Revision 1.

For the public comments, Steve stated that there were three topics: first, the fire PRA methods and comments on models and risk evaluations; second, the licensee actions, and third, the recovery actions.

On the Fire PRA Methods, Steve stated that public requested the staff provide clarification on how to meet the NFPA 805 requirement that the methods be acceptable to the "Authority Having Jurisdiction (AHJ)", and to limit the discussion of fire PRA methods to the cause and effect relationship, and not to limit methods to those in topical reports.

Steve stated that basically if the methods are based on Regulatory Guide 1.200, with NRC endorsed with exceptions and clarifications to the ASME PRA standard, is what is acceptable. As far as the cause/effect relationship, the three methods listed on the slides are acceptable: (1) That have been used in the peer-reviewed baseline PRA, (2) That have been endorsed by NRC through a license amendment or NRC approval of generic methods specifically for use in NFPA 805 risk assessment, or (3) That have been demonstrated to bound the risk impact.

On providing the guidance on fire PRA model updates and upgrades after transition, Steve stated that the guidance will be provided in the updated RG 1.205, Section 4.3 referencing RG 1.200.

Steve stated that RG 1.205 was changed to discuss both plant change evaluations and fire risk evaluations explicitly to address when plant change evaluations are required.

In providing the response to comments of evaluating total change in risk associated with implementation of NFPA 805 using RG 1.174, Steve stated that the guidance for clarification was provided in RG 1.205, Rev. 1 and RG 1.174 still provides acceptance guidelines. The cumulative risk still needs to be considered in NFPA 805. On addressing the comments of sample license conditions, the public stated that the

transition license conditions would preclude self-approval of changes before full implementation. The staff responded that RG will be changed to allow changes that clearly do not increase risk and changes using non-risk, performance-based methods allowed in the license condition.

On responding to the public comments of recovery actions, the staff stated that the RG clarified recovery actions need to be included in plant change evaluations and scope is limited per NFPA 805 section 4.2.3.1. The staff addressed the comments on the definition of the primary control station and provided the improved definition on the slide.

Steve discussed the latest RG 1.205, Rev.1 positions to include that additional risk (Δ CDF; Δ LERF) of recovery actions (RA) must be evaluated and for the previously approved ones, the risk has to be acceptable to the AHJ unless it trips the backfit adequate protection or cost-beneficial backfit.

Steve discussed using RG 1.174 to evaluate the additional risk from a previously-approved RA and engaged discussion with the subcommittee members.

Steve concluded that final SRP and RG will be ready by December, 2009.

NEI PRESENTATION

Mr. John Butler of NEI stated that there were some reinterpretations of the regulations from the staff presentation and that is causing a lot of difficulty in implementing 805. Mr. Biff Bradley stated that there were significant changes in implementation guidelines such as evaluation of changes against "ideal plant" versus current approved plant. 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. Biff stated that advanced detection systems are one practical solution for the conservative assumptions of fire growth and heat release rates in fire PRA. For fire PRA methods, Biff stated that NUREG 1855 and EPRI 1010068 provided information regarding aggregation of models with different biases. Simple summing of risk results was not appropriate in this case. Biff 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.

EPRI PRESENTATION

Ken Canavan of EPRI stated that EPRI is committed to risk-informed, performance based approach to the fire protection program. EPRI has collaborated with NRC RES to develop the fire PRA methodology. The fire PRA pilots showed that the initial results were conservative and not unexpected. Ken stated that there were several issues under the FAQ program for the fire PRA. These included the fire ignition frequencies, credit for incipient detection, treatment of large oil fires, credit for fire suppression, hot short susceptibility, probability and duration, and high energy arcing faults. Ken then described a "relay" fire damage sequence through a timeline ranging from the adverse condition to the fully-developed fire. From this example, Ken made the point that individual conservatism can be significant and combined effects can be extreme to the

fire PRA results. In conclusion, Ken stated that realistic Fire PRA methods are required; EPRI and industry have accelerated efforts to improve fire PRA methods.

STAFF PRESENTATION – DIFFERING PROFESSIONAL OPINION (DPO)

Steve Laur of NRR stated that “mixing and matching “individual requirements between two alternative rules may not always provide adequate protection. Steve stated that a hybrid approach could hit all the necessary elements in one case and other necessary elements in another but they may not, by picking and choosing, still cover all the bases.

Steve Laur stated “safe today, safe tomorrow” should be utilized carefully and it should not become an NRC position. Steve also stated that NRC staff should be careful not to set a precedent of “carry over” of part of an existing licensing basis in lieu of meeting the requirements of an alternative rule.

Stephen Dinsmore of NRR stated that the draft RG 1.205 issued thirty-so days ago did not provide acceptance guidelines on the risk calculation. With the presentation presented today earlier, however, Stephen stated that this issue went away.

BACKGROUND

- **Regulatory Guide 1.205, "Risk-Informed Performance-Based Fire Protection for Existing Light-Water Nuclear Power Plants." and proposed SRP 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 proposed changes to RG 1.205 (DG-1218). The guidance in the proposed new SRP Section 9.5.1.2 is consistent with the proposed changes to RG 1.205.

The staff also presented public feedback and comments on RG 1.205 and SRP 9.5.1.2, and staff’s resolutions of public comments. The staff discussed the latest RG 1.205, Rev.1 positions to include that additional risk (Δ CDF; Δ LERF) of recovery actions (RA) must be evaluated and for the previously approved ones, the risk has to be acceptable to the AHJ unless it trips the backfit adequate protection or cost-beneficial backfit. The staff discussed using RG 1.174 to evaluate the additional risk from a previously-approved RA.

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.

The EPRI representative discussed the results of fire PRA from pilots and it showed that the initial results were conservative and not unexpected. EPRI representative stated that there were several issues under the FAQ program for the fire PRA.

Two members of the staff presented their DPOs, these were the comments raised before today's presentation. The members agreed with today's staff presentation.

COMMENTS AND OBSERVATIONS FROM THE SUBCOMMITTEE MEMBERS

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

- Further discussions on slides 11, 12 and 13 of the staff's presentation and include them in the Reg. Guide 1.205
- Definition of Primary Control Station
- Risk acceptance criteria of RG 1.174 related to what an interpretation of the rule
- Previously approved human actions versus recovery actions
- Fire ignition frequency evaluation and uncertainty
- Enforcement discretion – for existing plant that was approved under deterministic situations and how to evaluate the current risk
- Rule or the standard okay?

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 made several comments and suggestions which had been raised during the meeting. The Subcommittee decided to further discuss these matters in its future meetings.

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

BACKGROUND MATERIALS PROVIDED TO THE SUBCOMMITTEE

1. Draft 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," 2006
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).
