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

ACRSR-2187

April 20, 2006

Mr. Luis A. Reyes
Executive Director for Operations
U. S. Nuclear Regulatory Commission
Washington, DC 20555-0001

SUBJECT: DRAFT FINAL REGULATORY GUIDE 1.205, "RISK-INFORMED, PERFORMANCE-BASED FIRE PROTECTION FOR EXISTING LIGHT-WATER NUCLEAR POWER PLANTS"

Dear Mr. Reyes:

During the 531st meeting of the Advisory Committee on Reactor Safeguards, April 5 - 7, 2006, we reviewed draft final Regulatory Guide (RG) 1.205, "Risk-Informed, Performance-Based Fire Protection for Existing Light-Water Nuclear Power Plants." We issued a letter on a previous version of this Regulatory Guide on June 14, 2005, and discussed the staff's proposed response to this letter during the 526th meeting on October 6-8, 2005. During our review, we had the benefit of discussions with representatives of the NRC staff and the Nuclear Energy Institute (NEI). We also had the benefit of the documents referenced.

CONCLUSIONS AND RECOMMENDATIONS

1. RG 1.205 should be issued after the peer-review guidance is clarified.

2. RG 1.205 should be revised to make clear that in cases where licensees elect to rely on information contained in an internal-event Probabilistic Safety Assessment (PSA)[1] or other analyses such as Individual Plant Examinations of External Events (IPEEE) to quantify risk associated with fires, these analyses should be peer reviewed.

3. The staff should develop models for human performance that focus on the probability distribution of the time to complete a recovery action under specified conditions.

BACKGROUND AND DISCUSSION

The National Fire Protection Association (NFPA) issued a performance-based standard for fire protection for light-water reactors in 2001 (NFPA 805). 10 CFR 50.48 (c) allows licensees to voluntarily adopt and maintain a fire protection program that meets the requirements of NFPA 805 as an alternative to meeting the requirements of 10 CFR 50.48 (b). NEI has worked with representatives of the industry and the NRC staff to develop implementing guidance for the specific provisions of NFPA 805 and 10 CFR 50.48 (c). In April 2005, NEI published this guidance as NEI 04-02, Revision 0. By memorandum dated May 3, 2005, the staff sent to us the draft final Regulatory Guide for our review.

In our June 14, 2005 letter, we recommended that the draft final Regulatory Guide not be issued. The main reason for this recommendation was that the proposed methods in NEI 04-02, Revision 0 for risk-informed decisionmaking were not based on a fire PSA. In a letter dated August 2, 2005, the staff agreed with the principal argument of our letter and stated that it would work with NEI to ensure that the parts of NEI 04-02, Revision 0 that the staff endorses use correct methodology and language.

[1]The terms "Probabilistic Safety Assessment" and "Probabilistic Risk Assessment" (PRA) are treated as synonymous in the regulatory guide.

NEI issued Revision 1 to NEI 04-02, in September 2005. The March 2006 version of the draft final RG 1.205 endorses the revised NEI report with the exception of Section 6. These documents have satisfactorily addressed the principal concerns that we expressed in our June 14, 2005 letter.

Plant-specific fire PSAs have shown that fires can be among the major contributors to risk. We believe that any changes to the fire protection program that claim to be risk informed should be based on a rigorous peer-reviewed, plant-specific fire PSA.

In the Background Section of RG 1.205, the staff states that it anticipates that licensees will develop a fire PSA and that, without it, licensees "will not realize the full safety and cost benefits of transitioning to NFPA." In Section 3.2.3, the staff states that, "for PSA-based methodologies," license amendment requests should include an explanation of why the fire PSA is considered technically adequate, as well as a description of the associated peer review. However, 10 CFR 50.48 (c) permits license amendment requests that are not based on a fire PSA. Such requests will have to be based on information in an internal-event PSA or an IPEEE to quantify risk associated with fires. RG 1.205 now appears to indicate that the staff would accept such alternative analyses without a peer review. The staff has agreed to clarify the RG to make clear that a peer review should be conducted for these alternative analyses. After clarifying the guidance for peer review, RG 1.205 should be issued.

RG 1.205 also addresses operator manual actions. If such actions are credited in lieu of Appendix R requirements and have not been approved by the NRC, then they must be treated as plant changes. Section B.2.2.4 of NEI 04-02, Revision 1 states: "The reliability of the recovery action should be commensurate with its risk-significance." The NEI document specifies that, in evaluating this reliability, "the amount of time available to the licensee to complete the recovery action versus the time to actually complete the action should be considered and evaluated." The evaluation should also consider the uncertainties associated with "(i) human performance, (ii) the difference between field verification conditions and actual environmental and fire conditions, and (iii) design basis (e.g., thermal hydraulic analysis) versus actual time constraints."

We agree with these statements. However, we note that their implementation would be facilitated by human reliability models that focus on the probability distribution of the time required to complete a certain action under specified conditions. Neither of the NRC models for human performance (ATHEANA and SPAR-H) focuses on this distribution. They instead treat the available time as just one of many performance shaping factors. The staff should work with the human reliability analysis experts in the Office of Nuclear Regulatory Research to develop appropriate models for evaluating the reliability of operator recovery actions.

Sincerely,

/RA/

Graham B. Wallis
Chairman

References:

4. Regulatory Guide 1.205, "Risk-informed, Performance-Based Fire Protection for Existing Light-Water Nuclear Power Plants," March 2006 (ADAMS Accession No. ML060600183).
5. NEI 04-02, Revision 1, "Guidance for Implementing a Risk-Informed, Performance-Based Fire Protection Program Under 10 CFR 50.48 (c)," September 2005 (ADAMS Accession No. ML052590476).
6. Letter from the EDO to Dr. Wallis, dated August 2, 2005, Subject: Draft Final Regulatory Guide, "Risk-Informed, Performance-Based Fire Protection for Existing Light-Water Nuclear Power Plants" (ADAMS Accession No. ML051940255).
7. Letter from Dr. Wallis to the EDO, dated June 14, 2005, Subject: Draft Final Regulatory Guide, "Risk-Informed, Performance-Based Fire Protection for Existing Light-Water Nuclear Power Plants" (ADAMS Accession No. ML051650432).
8. Memo from M. Salley, RES, to S. Weerakkody, NRR, "Transmittal of Fire Risk Analysis Review Guidance in Support of NFPA 805 Based Changes to the Fire Protection Program" dated January 12, 2006 (ADAMS Accession No. ML060120449).

NEI issued Revision 1 to NEI 04-02, in September 2005. The March 2006 version of the draft final RG 1.205 endorses the revised NEI report with the exception of Section 6. These documents have satisfactorily addressed the principal concerns that we expressed in our June 14, 2005 letter.

Plant-specific fire PSAs have shown that fires can be among the major contributors to risk. We believe that any changes to the fire protection program that claim to be risk informed should be based on a rigorous peer-reviewed, plant-specific fire PSA.

In the Background Section of RG 1.205, the staff states that it anticipates that licensees will develop a fire PSA and that, without it, licensees "will not realize the full safety and cost benefits of transitioning to NFPA." In Section 3.2.3, the staff states that, "for PSA-based methodologies," license amendment requests should include an explanation of why the fire PSA is considered technically adequate, as well as a description of the associated peer review. However, 10 CFR 50.48 (c) permits license amendment requests that are not based on a fire PSA. Such requests will have to be based on information in an internal-event PSA or an IPEEE to quantify risk associated with fires. RG 1.205 now appears to indicate that the staff would accept such alternative analyses without a peer review. The staff has agreed to clarify the RG to make clear that a peer review should be conducted for these alternative analyses. After clarifying the guidance for peer review, RG 1.205 should be issued.

RG 1.205 also addresses operator manual actions. If such actions are credited in lieu of Appendix R requirements and have not been approved by the NRC, then they must be treated as plant changes. Section B.2.2.4 of NEI 04-02, Revision 1 states: "The reliability of the recovery action should be commensurate with its risk-significance." The NEI document specifies that, in evaluating this reliability, "the amount of time available to the licensee to complete the recovery action versus the time to actually complete the action should be considered and evaluated." The evaluation should also consider the uncertainties associated with "(i) human performance, (ii) the difference between field verification conditions and actual environmental and fire conditions, and (iii) design basis (e.g., thermal hydraulic analysis) versus actual time constraints."

We agree with these statements. However, we note that their implementation would be facilitated by human reliability models that focus on the probability distribution of the time required to complete a certain action under specified conditions. Neither of the NRC models for human performance (ATHEANA and SPAR-H) focuses on this distribution. They instead treat the available time as just one of many performance shaping factors. The staff should work with the human reliability analysis experts in the Office of Nuclear Regulatory Research to develop appropriate models for evaluating the reliability of operator recovery actions.

Sincerely,

Graham B. Wallis
Chairman

References:

9. Regulatory Guide 1.205, "Risk-informed, Performance-Based Fire Protection for Existing Light-Water Nuclear Power Plants," March 2006 (ADAMS Accession No. ML060600183).
10. NEI 04-02, Revision 1, "Guidance for Implementing a Risk-Informed, Performance-Based Fire Protection Program Under 10 CFR 50.48 (c)," September 2005 (ADAMS Accession No. ML052590476).
11. Letter from the EDO to Dr. Wallis, dated August 2, 2005, Subject: Draft Final Regulatory Guide, "Risk-Informed, Performance-Based Fire Protection for Existing Light-Water Nuclear Power Plants" (ADAMS Accession No. ML051940255).
12. Letter from Dr. Wallis to the EDO, dated June 14, 2005, Subject: Draft Final Regulatory Guide, "Risk-Informed, Performance-Based Fire Protection for Existing Light-Water Nuclear Power Plants" (ADAMS Accession No. ML051650432).
13. Memo from M. Salley, RES, to S. Weerakkody, NRR, "Transmittal of Fire Risk Analysis Review Guidance in Support of NFPA 805 Based Changes to the Fire Protection Program," dated January 12, 2006 (ADAMS Accession No. ML060120449).

DOCUMENT NAME: **E:\Filenet\ML061100238.wpd**
To receive a copy of this document, indicate in the box: "C" = Copy without attachment/enclosure **"E"** = Copy with attachment/enclosure **"N"** = No copy Accession #: ML061100238

OFFICE	ACRS/ACNW	Y	ACRS/ACNW	Y	ACRS/ACNW	Y	ACRS/ACNW	Y	ACRS/ACNW	Y	ACRS/ACNW	Y
NAME	JLamb		EThornsbury		MSnodderly		AThadani		JLarkins		JTL for GBW	
DATE	04/18/06		04/18/06		04/19/06		/ /06		04/20/06		04/20/06	

OFFICIAL RECORD COPY