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

ACRSR-2132

June 14, 2005

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

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

Dear Mr. Reyes:

During the 523rd meeting of the Advisory Committee on Reactor Safeguards, June 1-3, 2005, we met with representatives of the NRC staff to review the draft final Regulatory Guide, "Risk-Informed, Performance-Based Fire Protection for Existing Light-Water Nuclear Power Plants," which endorses, with certain exceptions, the Nuclear Energy Institute (NEI) document NEI 04-02, "Guidance for Implementing a Risk-Informed, Performance-Based Fire Protection Program Under 10 CFR 50.48 (c)." Our Subcommittee on Fire Protection met with representatives of the NRC staff and NEI on May 17, 2005 to review this matter. During these reviews, we had the benefit of the documents referenced.

CONCLUSIONS AND RECOMMENDATIONS

1. The Regulatory Guide should not be issued in its present form.

2. The acceptability of changes in a fire protection program that is based on the National Fire Protection Association (NFPA) Standard 805 should be determined using methods consistent with Regulatory Guide 1.174. In particular:

   - The "initial fire modeling" approach should not be used as an alternative to estimates of changes in core damage frequency (ΔCDF) and large early release frequency (ΔLERF). Identification of a success path does not necessarily assure that ΔCDF and ΔLERF are negligible (Section 5.3.4.1 of NEI 04-02).

   - The staff should not endorse methods for evaluating ΔCDF and ΔLERF (Section 5.3.5.1 of NEI 04-02) that are not based on a fire probabilistic risk assessment (PRA).

3. NEI 04-02 contains many statements that are inconsistent with the Commission's policy of promoting the use of PRA methods. In the Regulatory Guide, the staff should make it clear that it does not endorse such statements.

4. The staff should ensure that the parts of NEI 04-02 that it endorses use correct methodology and language.

BACKGROUND

NFPA issued a performance-based standard for fire protection for light-water reactors (LWRs) in 2001 (NFPA 805). This standard specifies the minimum fire protection requirements for existing LWRs and offers the choice of a “deterministic” and a “performance-based” methodology for determining fire protection features and demonstrating that nuclear safety performance criteria are met.

Effective July 16, 2004, the Commission amended its fire protection requirements in 10 CFR 50.48 to add 10 CFR 50.48(c), which incorporates the 2001 edition of NFPA 805 by reference, with certain exceptions. Section 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). Adopting NFPA 805 requires the submission of a license amendment request to the NRC.

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. The Regulatory Guide endorses NEI 04-02, with certain exceptions, and offers guidance to licensees in meeting the Commission’s requirements.

DISCUSSION

The Regulatory Guide endorses the guidance provided in NEI 04-02 regarding the transition to an NFPA 805-based fire protection program. This transition process is essentially deterministic. It “brings forward” a significant portion of the existing licensing basis to the new NFPA 805-based licensing basis and adds some new requirements, such as one for investigating fires occurring during non-power operational modes.

After this transition phase, NFPA 805 requires that any request for changes to the approved fire protection program be risk-informed. Paragraph 2.4.4 of NFPA 805 states: “The evaluation process shall consist of an integrated assessment of the acceptability of risk, defense-in-depth, and safety margins.” Paragraph 2.4.3.1 states further that: “The PSA [probabilistic safety assessment] evaluation shall use core damage frequency (CDF) and large early release frequency (LERF) as measures for risk.” Regulatory Guide 1.174 provides guidance and acceptability criteria for implementing a risk-informed approach to changes in the licensing basis, including changes in the fire protection program. This is acknowledged in Section 5.3.5 of NEI 04-02. However, NEI 04-02 deviates from Regulatory Guide 1.174 by appearing to allow:

- Demonstration of the existence of a success path as an alternative to an assessment of the change in risk (Section 5.3.4.1)

- Risk-informed judgments to be made about the acceptability of changes without a defensible assessment of the CDF and LERF of the plant (Section 5.3.5.1).

NEI 04-02 includes an approach based on the concepts of a Maximum Expected Fire Scenario and Limiting Fire Scenario (Figure 5-1 and Section 5.3.4.1). Figure 5-1 suggests that this approach is intended to simplify the calculation of ΔCDF and ΔLERF in some cases. The statement in Section 5.3.4.1 that "This approach eliminates the need for additional risk assessment because it effectively demonstrates that target damage does not occur and that a success path remains free of fire damage"[1] suggests that NEI 04-02 is confusing the identification of a success path with an estimate that ΔCDF and ΔLERF are small. Even when it can be demonstrated that a success path free of fire damage exists, a proposed change may result in ΔCDF and ΔLERF that exceed the guidelines in Regulatory Guide 1.174. The staff should state in the Regulatory Guide that it is unacceptable to interpret Section 5.3.4.1 of NEI 04-02 in a way that confuses the identification of a success path free of fire damage with a demonstration that ΔCDF and ΔLERF are small.

While the use of simplified calculations can be acceptable, the definitions of the Maximum Expected Fire Scenario and Limiting Fire Scenario in NFPA 805 and NEI 04-02 are sometimes contradictory and confusing. The Regulatory Guide should be revised to provide definitions of the Maximum Expected Fire Scenario and Limiting Fire Scenario that are acceptable.

Comparison of the Maximum Expected Fire Scenario and Limiting Fire Scenario is supposed to determine whether sufficient margin exists to assume that fire damage is negligible and therefore the change is acceptable. The Regulatory Guide should note that the definition of sufficient margin should include the uncertainties in the fire model being used in the analysis.

The staff should ensure that the parts of NEI 04-02 that it endorses use correct methodology and language. For example, Section 5.3.5.1 states: "If the ΔCDF satisfies the ΔLERF acceptance criteria, a specific assessment for ΔLERF is not required." This statement erroneously assumes that the relationship between ΔCDF and ΔLERF is the same as that between CDF and LERF. Another example of confused logic is the following: "If the fire-induced consequences do not disable the containment isolation function, then the ΔLERF criterion can be considered satisfied" (NEI 04-02, Section 5.3.5.1).

We look forward to reviewing the revised Regulatory Guide.

Sincerely,

/***RA***/

Graham B. Wallis
Chairman

---

[1] Statements such as this one are also inconsistent with the stated policy of the Commission that "the use of PRA technology in NRC regulatory activities should be increased to the extent supported by the state-of-the-art in PRA methods and data..."

REFERENCES

1. Regulatory Guide X.XXX, “Risk-informed, Performance-Based Fire Protection for Existing Light-Water Nuclear Power Plants,” July 2005.

2. Nuclear Energy Institute (NEI), “Guidance for Implementing a Risk-Informed, Performance-Based Fire Protection Program Under 10 CFR 50.48(c),” NEI 04-02, Revision 0, April 2005.

3. NFPA 805,”Performance-Based Standard for Fire Protection for Light-Water Reactor Electric Generating Stations,” 2001 Edition, National Fire Protection Association, Quincy, MA.

4. Regulatory Guide 1.174, “An Approach for Using Probabilistic Risk Assessment in Risk Informed Decision on Plant-Specific Changes to the Licensing Basis,” Revision 1, November 2002.

5. U.S. Nuclear Regulatory Commission, Final Policy Statement on Use of Probabilistic Risk Assessment Methods in Nuclear Regulatory Activities, Dated August 16, 1995.

REFERENCES

1. Regulatory Guide X.XXX, “Risk-informed, Performance-Based Fire Protection for Existing Light-Water Nuclear Power Plants,” July 2005.

2. Nuclear Energy Institute (NEI), “Guidance for Implementing a Risk-Informed, Performance-Based Fire Protection Program Under 10 CFR 50.48 (c),” NEI 04-02, Revision 0, April 2005.

3. NFPA 805,”Performance-Based Standard for Fire Protection for Light-Water Reactor Electric Generating Stations,” 2001 Edition, National Fire Protection Association, Quincy, MA.

4. Regulatory Guide 1.174, “An Approach for Using Probabilistic Risk Assessment in Risk Informed Decision on Plant-Specific Changes to the Licensing Basis,” Revision 1, November 2002.

5. U.S. Nuclear Regulatory Commission, Final Policy Statement on Use of Probabilistic Risk Assessment Methods in Nuclear Regulatory Activities, Dated August 16, 1995.

DOCUMENT NAME: E:\Filenet\ML051650432.wpd

OFFICE	ACRS	ACRS	ACRS	ACRS	ACRS
NAME	HNourbakhsh	MSnodderly	MScott	AThadani	JTL for GBW
DATE	6/14/05	6/14/05	6/14/05	6/14/05	6/14/05

OFFICIAL RECORD COPY