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

October 20, 2009

The Honorable Gregory B. Jaczko
Chairman
U. S. Nuclear Regulatory Commission
Washington, DC 20555-0001

SUBJECT: REPORT ON THE DRAFT FINAL REVISION 2 TO REGULATORY GUIDE 1.189 (DG-1214), "FIRE PROTECTION FOR NUCLEAR POWER PLANTS"

Dear Chairman Jaczko:

During the 566th meeting of the Advisory Committee on Reactor Safeguards, October 8 – 10, 2009, we completed our review of the draft final Revision 2 to Regulatory Guide 1.189 (DG-1214), "Fire Protection for Nuclear Power Plants." Our Plant Operations and Fire Protection Subcommittee also reviewed this matter during its meeting on August 18, 2009, and the full committee conducted a preliminary review during its meeting on September 10 – 12, 2009. During these reviews, we had the benefit of discussions with representatives of the NRC staff and Nuclear Energy Institute (NEI). We also had the benefit of the documents referenced.

RECOMMENDATION

Regulatory Guide 1.189, Revision 2, (DG-1214), "Fire Protection for Nuclear Power Plants," should be issued as final.

BACKGROUND

Prior to the establishment of the NRC on January 19,1975, its predecessor regulatory agency, the Atomic Energy Commission, established rules and standards for the design and operation of nuclear power plants. These rules were mostly deterministic and primarily addressed design basis accidents. The basic tenets of nuclear safety relied heavily on design features such as redundant, independent safety trains and defense in depth to protect the public from the effects of nuclear accidents. However, fire regulations followed common industrial standards of that era.

The lessons learned from the fire at Browns Ferry Unit 1, on March 22, 1975, provided new insights and concerns regarding fire protection in nuclear power plants. At the time of the Browns Ferry fire, a number of other nuclear plants were already built and operating. Many other plants were completing their design phase and were under construction. Because of the variety of plant designs and the difficulty of changing major design features after construction had commenced, practical regulations needed to be developed which would apply the necessary protective concepts to already existing plant configurations. However major backfits, exemptions from certain regulations, and compensatory measures were still required to achieve the appropriate degree of compliance and nuclear safety.

Both industry and the staff conducted fire test programs and developed analytical methods to assist in determining how the plant would respond under design basis fire conditions, the effectiveness of fire barriers and cable insulation, modeling of the effects of fire, and other matters important to the development of effective deterministic fire protection regulations and associated standards.

In 2007, Revision 1 to Regulatory Guide 1.189 was issued. It incorporated experience gained over the preceding 30 years and information in many guidance documents issued by the NRC in the area of fire protection. Regulatory Guide 1.189 did not fully address one important issue of fire safety, the spurious actuation of electrical equipment. At Browns Ferry, fire induced cable failures caused spurious equipment actuations and equipment failures of both trains of safety-related equipment. This raised the possibility that a single fire could result in "common cause failure" of independent safety systems through spurious actuation. The industry and NRC staff research programs addressing this issue are now essentially complete. The resulting requirements and acceptable techniques and methods needed to address the issue are set forth in Regulatory Guide 1.189, Revision 2. Revision 2 also contains a number of clarifications and editorial changes.

On June 30, 1998, the Commission approved the staff's plan (SECY 98-058, "Development of a Risk-Informed, Performance-Based Regulation for Fire Protection at Nuclear Power Plants") to develop risk-informed, performance-based fire protection regulations to be based on the existing body of research and a consensus standard (NFPA 805, "National Fire Protection Association (NFPA) Standard 805, "Performance-Based Standard for Fire Protection for Light Water Reactor Electric Generating Plants, 2001 Edition") which could be used as an alternative to the deterministic regulations. While the standard is in place, the rule and associated regulatory guide are not complete. At this time, licensees of 50 nuclear units have expressed their intent to adopt the risk-informed, performance-based approach to fire protection regulations. One licensee has expressed interest but has yet to submit a letter of intent. The licensees of 53 nuclear units have not elected to pursue the risk-informed, performance-based approach. Unless they elect to use the performance-based approach, they will be required to use the current deterministic methods which are the subject of Regulatory Guide 1.189, Revision 2. These licensees will be required, within 6 months, to identify those situations where their facilities are not in compliance with the rule and the guidance set forth in Regulatory Guide 1.189, Revision 2, and to correct those noncompliances within the subsequent 30 months.

The issuance of Regulatory Guide 1.189, Revision 2, will bring closure to the deterministic process and will provide guidance for a path forward to allow all affected facilities to come into full compliance with the regulations.

DISCUSSION

In accordance with Commission direction in the December 15, 2006, Staff Requirements Memorandum related to SECY 06-0196, "Issuance of Generic Letter 2006-XX, "Post-Fire Safe-Shutdown Circuits Analysis Spurious Actuations," the staff developed Regulatory Guide 1.189, Revision 2 with stakeholder engagement, to update and resolve outstanding issues remaining in the previous issue of Regulatory Guide 1.189, Revision 1. In addition to the guidance on the

assessment of the potential for spurious actuations, important changes in the current draft guide are clarifications on the identification of the safe shutdown success path components, identification of components important to safety, use of operator manual actions, and fire modeling for assessing components and associated circuits important to safety. The revised guide also includes examples of components in the "safe shutdown success path" and components "important to safe shutdown." It includes references to the industry guidance document NEI-00-01, Revision 2 as an example of an acceptable methodology for the identification of multiple spurious actuations that may affect safe shutdown success path structures, systems, and components, when applied in conjunction with the regulatory guide.

Industry stakeholders provided significant comments. Specific issues where the staff and industry have reached agreement are:

- The time line from the start of a fire until the beginning of the allowed 1-hour period for operator action.
- The definition of components which are designated as "safe shutdown success path" components versus components which are "important to safe shutdown."
- An approach for analysis of circuit configurations and failure modes.

For equipment important to safe shutdown, non-latching and non-locking circuits, the staff has revised the guide to state:

- Licensees should consider multiple fire-induced circuit failures in two separate cables, where defense-in-depth features are present.
- For high/low pressure interfaces, licensees should consider circuit failures in three cables, where defense-in-depth features are present.
- For multi-conductor cables, all circuit faults that could occur within the cable should be assumed to occur.
- For deviations from this approach, such as where defense-in-depth features are not present, a risk-informed license amendment may be submitted.

Regulatory Guide 1.189, Revision 2 resolves longstanding issues and provides clear guidance for compliance with the regulations. It should be issued as final.

Sincerely,

/RA/

Mario V. Bonaca
Chairman

REFERENCES

1. Draft Regulatory Guide DG-1214, “Fire Protection for Nuclear Power Plants,” 04/2009 (ML090070453)

2. Letter from A. Marion, NEI to J. Grobe, US NRC, transmitting NEI 00-01, Revision 2, “Guidance for Post Fire Safe Shutdown Circuit Analysis,” 06/05/2009 (ML091770265)

3. Memorandum from R. W. Borchardt, EDO to The Commissioners, “Resolution of Issues Related to Fire-Induced Circuit Failures,” 06/30/2008 (ML081370346)

4. Staff Requirements Memorandum – SECY-08-0093 – Resolution of Issues Related to Fire-Induced Circuit Failures, 09/03/2008 (ML0824705710)

5. Staff Requirements Memorandum -– SECY 98-058, Development of a Risk-Informed, Performance-Based Regulation for Fire Protection at Nuclear Power Plants, 06/30/2008 (ML003753120)

6. Staff Requirements Memorandum – SECY-06-0196 - Issuance of Generic Letter 2006-XX, “Post-Fire Safe-Shutdown Circuits Analysis Spurious Actuations,” 12/15/2006 (ML063490140)

7. National Fire Protection Association (NFPA) Standard 805, “Performance-Based Standard for Fire Protection for Light Water Reactor Electric Generating Plants, 2001 Edition”

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Letter to the Honorable Gregory B Jaczko, Chairman, NRC, from Mario V. Bonaca, Chairman, ACRS, dated October 20, 2009

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