

POLICY ISSUE  
(Notation Vote)

September 11, 2006

SECY-06-0196

FOR: The Commissioners

FROM: Luis A. Reyes  
Executive Director for Operations /RA/

SUBJECT: ISSUANCE OF GENERIC LETTER 2006-XX, "POST-FIRE  
SAFE-SHUTDOWN CIRCUITS ANALYSIS SPURIOUS ACTUATIONS"

PURPOSE:

To inform the Commission that the U.S. Nuclear Regulatory Commission (NRC) staff intends to issue the subject generic letter (GL). This paper does not address any new commitments or resource implications.

BACKGROUND:

The regulatory requirements for post-fire safe shutdown are given in Title 10 of the *Code of Federal Regulations* (10 CFR) Part 50.48 and General Design Criterion 3, "Fire Protection," in Appendix A, "General Design Criteria for Nuclear Power Plants," to 10 CFR Part 50, "Domestic Licensing of Production and Utilization Facilities." Additionally, all nuclear power plants (NPPs) licensed to operate before January 1, 1979, are required to comply with Section III.G, "Fire Protection of Safe Shutdown Capability," of Appendix R, "Fire Protection Program for Nuclear Power Facilities Operating Prior to January 1, 1979," to 10 CFR Part 50. All NPPs licensed to operate after January 1, 1979, were evaluated against

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Section 9.5.1 of NUREG-0800, "Standard Review Plan for the Review of Safety Analysis Reports for Nuclear Power Plants." The fire protection program (FPP) and the associated safety evaluation report are specifically incorporated into those plants' licensing bases. All NPP licensees are responsible for meeting the fire protection requirements.

The objective of the fire protection requirements and guidance is to ensure that one train of systems necessary to achieve and maintain safe shutdown remains free of fire damage. To do so, licensees must protect circuits whose fire-induced failure could prevent the operation, or cause maloperation, of equipment necessary to achieve and maintain post-fire safe-shutdown. As part of its FPP, each licensee performs a circuit analysis to identify these circuits and to provide adequate protection against fire-induced failures.

Beginning in 1997, the staff noticed that a series of licensee event reports (LERs) identified plant-specific problems related to potential fire-induced electrical circuit failures that could prevent operation, or cause maloperation, of equipment necessary to achieve and maintain safe shutdown. Based on the number of similar LERs, the NRC treated the issue generically. In 1998, the staff started to interact with interested stakeholders in an attempt to understand the problem and develop an effective risk-informed solution to the circuit analysis issue. NRC also issued Enforcement Guidance Memorandum 98-002, Revision 2, to provide a process for treating inspection findings while the issues were being clarified. The staff documented these problems in Information Notice 99-17, "Problems Associated With Post-Fire Safe-Shutdown Circuit Analyses." Because different stakeholders interpreted the regulations differently, the NRC decided to temporarily suspend the associated circuit part of fire protection inspections. This decision is documented in an NRC memorandum from John Hannon (Chief, Plant Systems Branch, Office of Nuclear Reactor Regulation (NRR)) to Gary Holahan (Director, Division of Systems, Safety and Analysis, NRR) dated November 29, 2000 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML003773142).

In 2001, the Electric Power Research Institute (EPRI) and the Nuclear Energy Institute (NEI) performed a series of cable functionality fire tests to further the nuclear industry's understanding of fire-induced circuit failures, particularly spurious equipment actuations initiated by circuit failures (hot shorts, open circuits, and shorts to ground). EPRI coordinated this effort and issued the final report (EPRI Report No. 1006961). Additional analysis of the EPRI/NEI test results can be found in NUREG/CR-6776, "Cable Insulation Resistance Measurements Made During Cable Fire Tests", (ADAMS Accession Nos. ML022600200 and ML022600307). Based on the test results, the staff and NEI concluded that the probability of fire-induced circuit failures can be relatively high and that there can be a relatively high probability of multiple spurious actuations occurring simultaneously or in rapid succession.

#### DISCUSSION:

In the GL, the staff requests licensees of light-water nuclear power reactors to review their FPPs to confirm compliance with applicable regulatory requirements in light of the relatively high probability of fire-induced circuit failures. The staff requests licensees to submit a description of their licensing basis regarding multiple spurious post-fire safe-shutdown circuit analyses and their conclusion regarding compliance with the regulatory requirements described in the GL. For those licensees who conclude that they are not in compliance with regulatory requirements, the staff requests their plan to establish compliance with regulatory requirements for the affected structures, systems, and components. A copy of the proposed GL is provided

as Enclosure 1.

The staff issued the draft GL in the *Federal Register* on October 19, 2005, and provided a 60-day comment period. At the request of industry, the staff reopened the comment period in the *Federal Register* on December 22, 2005. Subsequently, the staff held a public meeting to inform the industry and other stakeholders about the disposition of comments and to provide an opportunity for additional clarifications. Enclosure 2 provides a summary of the comments and the staff's responses. In addition, the staff revised the GL in response to the comments in the Advisory Committee for Reactor Safeguards (ACRS) letter dated June 16, 2006 (ADAMS Accession No. ML061670327).

If a licensee concludes that it is no longer in compliance with the fire protection regulations, there are several acceptable methods to reestablish full regulatory compliance. One way is to reperform the post-fire safe-shutdown circuit analysis based on guidance provided in the GL and make the necessary modifications. Another way to address the issue is to perform either a risk-informed evaluation that considers defense-in-depth and safety margins or a deterministic evaluation.

The licensees who committed to adopt 10 CFR 50.48(c), the National Fire Protection Association (NFPA) 805 standard, can address the noncompliances during their transition to NFPA 805.

The staff has assessed whether immediate regulatory action is necessary while licensees respond to the subject GL, and has determined that continued operation is justified because there are several levels of defense-in-depth (DID) in place for fire protection in addition to the protection of cables from fire damage by separation. The other levels of DID (fire detection, fire suppression, fire barriers, administrative controls) are not affected by multiple spurious actuations.

The staff recognized the potential for significant burdens that could be imposed on the licensees due to this GL. Therefore, the staff has been communicating to licensees the results of the EPRI/NEI cable fire tests, and the staff's expectations, through a series of public meetings since 2003. In addition, the staff performed a regulatory analysis (ADAMS Accession No. ML061950043) and evaluated options available for licensees to reestablish compliance with the regulations. The staff concluded that the GL provides the preferred approach to identify and resolve potential risk-significant situations associated with the credible multiple-spurious actuations caused by fires.

By letter dated August 25, 2006, NEI notified the staff of their plans to submit comments on this regulatory analysis. The staff will consider any new comments and revise the regulatory analysis or take other action, as appropriate. Due to the importance of bringing these fire protection issues to resolution and the recognition that the draft GL was published for an extended public comment period and each of the comments was addressed, the staff has decided to move forward with the proposed GL.

The staff recognizes that licensees who do not comply with the fire protection regulations need time to re-analyze some of their circuits in light of the information provided in this GL. The staff plans to revise its enforcement guidance to provide continued enforcement discretion on circuits issues related to multiple spurious actuations findings in light of the information provided in the GL as described below.

Enforcement discretion will be exercised for noncompliances attributed to circuit issues related to multiple spurious actuations provided that, within the initial 90-day period referenced in the subject GL, licensees: (1) notify the NRC that they may not be in compliance; (2) implement compensatory measures; (3) enter the noncompliances into their corrective action program; and (4) within 6 months of the date of the GL, submit to the NRC their plan and schedule to establish compliance with regulatory requirements. The NRC expects timely completion of the corrective actions consistent with Regulatory Issue Summary 2005-20, "Revision to Guidance Formerly Contained in NRC Generic Letter 91-18." This enforcement discretion will continue provided that appropriate compensatory measures are maintained and the planned corrective actions are completed by March 6, 2009.

COORDINATION:

The Committee To Review Generic Requirements (CRGR) reviewed the GL on April 25, 2006, and endorsed it after the staff incorporated CRGR comments. The ACRS reviewed the GL on May 31, 2006, and recommended that it be issued after the staff incorporated ACRS comments. The Office of the General Counsel reviewed the GL and had no legal objection to its content. The Office of the Chief Financial Officer reviewed the GL and had no objections based on budget or financial management concerns or potential resource impacts.

The subject GL is not a major "rule" under the Small Business Regulatory Enforcement Fairness Act of 1996, and the Office of Management and Budget has confirmed this determination.

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Enclosures:

1. Generic Letter 2006-XX
2. Resolution of Public Comments

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