

A History of Fire Protection Enforcement

The purpose of this document is to briefly summarize the history of fire protection enforcement and serve as a knowledge management tool. Fire protection enforcement involves discretion focused on fire-induced circuit failure, operator manual actions, and discretion for plants adopting 10 CFR 50.48(c), National Fire Protection Association Standard 805 (NFPA 805). This document can be used as a reference guide to identify documents which were issued and policy changes from the mid 1990's until present day to address fire protection circuit issues. The purpose of this document is to focus on enforcement discretion, therefore it may not encompass all of the related fire protection technical issues.

1990's

During NRC inspections in the early 90's, inspectors discovered conditions, fire scenarios which could cause hot shorts, at several reactors that could result in the loss of capability to maintain the reactor in a safe shutdown condition in the unlikely event that a control room fire forced reactor operators to evacuate the control room. These circuit failures could prevent operation or cause maloperation of equipment needed to achieve and maintain post fire safe shutdown. On February 28, 1992, the staff documented this issue in Information Notice 92-18, "Potential Loss of Remote Shutdown Capability During a Control Room Fire," (Agencywide Documents Access and Management System (ADAMS) accession number ML031200481). Information Notice 92-18 alerted licensees that the circuit logic associated with certain motor operated valves, when subjected to a single fire-induced hot short, could result in a spurious permissive signal. This fire-induced damage could impair the capability to shut down the plant and maintain it in a safe shutdown condition.

In 1997, a series of licensee event reports had identified plant-specific problems related to these fire-induced electrical circuit failures. The noncompliant issues appeared to stem from both misunderstanding and confusion of the regulatory and design requirements. The design requirements included protection from fire-induced circuit failures (e.g., hot shorts, open circuits and shorts to ground) which would not preclude the ability to achieve and maintain a safe shutdown condition.

Due to the number of different stakeholder interpretations of 10 CFR 50 Appendix R, "Fire Protection Program for Nuclear Power Facilities Operating Prior to January 1, 1979," Section III.G, "Fire protection of safe shutdown capability," the NRC issued Enforcement Guidance Memorandum (EGM) 98-002, Disposition of Violations of Appendix R, Sections III.G and III.L Regarding Circuit Failures," in March 2, 1998 (ADAMS Legacy Library Accession Number 9803240068, Microfiche A2707:113-A2707:114). Enforcement guidance memoranda (EGM) are used to provide the NRC staff with temporary enforcement guidance, including, in some instances, enforcement discretion, when the criteria specified in the EGM are met. EGM normally describe the situation that has occurred that requires the use of such guidance, as well as the length of time the EGM will be in effect.

The EGM included guidance for 3 different cases with a corresponding disposition. The extent of enforcement action depended on licensee identification of the condition and the corrective action taken. In general, case 1, where the licensee has identified and acknowledged the noncompliance and is taking appropriate compensatory and corrective actions, the NRC would refrain from issuing a NOV and civil penalty. For case 2, where the licensee has not identified and acknowledged the noncompliance but does not dispute the finding of noncompliance and is

taking appropriate compensatory and corrective actions the NRC would issue a violation but discretion would be used not to issue a civil penalty. For case 3, where the licensee has not identified and acknowledged the noncompliance and is not taking appropriate compensatory and corrective actions the NRC would follow standard enforcement procedures.

After the staff issued the EGM, the Nuclear Energy Institute (NEI), an industry advocacy organization, asserted that the staff's interpretation of 10 CFR 50 Appendix R Section III.G was, at a minimum, inconsistent with many licensees understanding and different from past staff interpretations. The staff and industry began working to resolve questions raised by the industry about the consistency of the existing staff guidance for 10 CFR 50 Appendix R Section III.G concerning fire-induced electrical circuit failures.

On June 19, 1997, the staff submitted Commission Paper SECY-97-127, which described the actions it would pursue to develop rulemaking for transitioning to a more risk-informed, performance-based structure for fire protection regulation of nuclear power plants. Benefits for this approach included the evaluation of the safety-impact of proposed plant changes in an integrated manner to reduce regulatory burden, and to identify areas where requirements should be increased. SECY-97-127 also stated that a research plan would be developed to coordinate additional research to advance the state of the art in fire modeling and fire risk assessment methods. In the associated Staff Requirements Memorandum (SRM), dated September 11, 1997, the Commission directed the staff to complete the current research and study by the end of calendar year 1997 and to expedite the resolution of issues necessary to formulate a rule that would eliminate the need for most exemptions granted under Appendix R to 10 CFR Part 50.

On March 26, 1998, the staff submitted Commission Paper SECY-98-058, which proposed that the staff defer the fire protection rulemaking and instead work with the National Fire Protection Association (NFPA) and the industry to develop a performance-based, risk-informed consensus standard for fire protection for nuclear power plants. This standard, if successfully developed, could be endorsed by the staff in a future rulemaking as an alternative method of meeting NRC fire protection requirements.

On June 3, 1999, the staff documented these fire-induced circuit problems in Information Notice 99-17, "Problems Associated with Post-Fire Safe-Shutdown Circuit Analysis," (ML023510114). Soon after the staff issued Information Notice 99-17, the staff and stakeholders began interacting to resolve these circuit issues.

On July 21, 1999, the NRC staff revised EGM 98-002 (Legacy Library Accession Number 9907270125, Microfiche A8708:024-A8708:036). The NRC temporarily deferred formal enforcement actions for those licensees that disputed whether identified issues actually constituted violations of regulatory requirements, provided that reasonable compensatory actions were implemented for the identified vulnerabilities. Additionally, the EGM provided guidance for licensee's that did not dispute that identified vulnerabilities constituted violations, enforcement discretion would be exercised not to cite the violations provided appropriate compensatory actions were implemented and corrective actions were initiated. This would allow the industry time to develop positions that could be NRC endorsed. The staff expected to reach agreement with the industry on an acceptable approach for resolving this issue within 180 days of the date of this EGM (January 18, 2000). Enforcement deferral and discretion would continue until the staff provided proper generic notification to the industry and licensees had time to respond.

On November 15, 1999, the Boiling Water Reactor Owner's Group (BWROG) submitted a deterministic methodology for post-fire safe shutdown circuit analysis. Also, the NRC staff held a public meeting on December 20, 1999 with the Nuclear Energy Institute (NEI) to discuss the status of the industry effort. At the end of the meeting, the staff stated that the NEI outline of its risk-based post-fire safe shutdown circuit analysis methodology appeared to constitute an acceptable conceptual approach to the issue. NEI agreed to submit a revised methodology outline by January 17, 2000 and a complete draft of the methodology by March 2000.

2000-2002

In Commission Paper SECY-00-0009, dated January 13, 2000, titled "Rulemaking Plan, Reactor Fire Protection Risk-Informed, Performance-Based Rulemaking," the staff requested Commission approval to proceed with rulemaking to permit reactor licensees to adopt NFPA 805 as a voluntary alternative to existing fire protection requirements. In SRM-SECY-00-0009 dated February 24, 2000, the Commission directed the staff to proceed with this rulemaking.

On February 2, 2000, the staff issued EGM 98-002 Revision 2 (ML003710123). This revision stated that the deferral and discretion provisions of the EGM would be extended until a decision on the acceptability of the NEI and BWROG methodologies was reached. In the event that the proposed methodology is unacceptable, the guidance would be withdrawn or amended, or both, as necessary.

In 2001 the Electric Power Research Institute (EPRI) and NEI performed a series of cable functionality fire tests to advance the nuclear industry's knowledge of circuit failure mechanisms. This series of tests significantly increased the knowledge available to the industry and NRC with respect to fire-induced circuit failures. NEI considered the results of the testing and prepared an industry guidance document for circuit analysis, NEI 00-01, "Guidance for Post-Fire Safe-Shutdown Circuit Analysis."

The National Fire Protection Association (NFPA) Standards Council issued NFPA Standard 805, "Performance-Based Standard for Fire Protection for Light Water Reactor Electric Generating Plants," on January 13, 2001.

While licensees addressed circuit issues, systematic inspections of licensees' safe-shutdown capability were being performed as part of the Fire Protection Baseline Inspections of the Reactor Oversight Program. During these inspections, inspectors noted that many licensees had not upgraded or replaced Thermo-Lag fire barrier material or had not provided the separation distance between redundant safe-shutdown success paths necessary to satisfy the requirements in 10 CFR 50 Appendix R Section III.G.2. Section III.G.2 requires, in part, for redundant trains of systems necessary to achieve hot shutdown that are located in the same fire area: one of the following means of ensuring that one of the redundant trains is free of fire shall be provided, separation of cables and equipment of redundant trains by a fire barrier having a 3-hour rating; or separation of cables and equipment of redundant trains by a horizontal distance of more than 20 feet, in addition to fire detectors and an automatic fire suppression system installed in the fire area; or enclosure of cables and equipment of one redundant train in a fire barrier having a 1-hour rating, in addition to fire detectors and an automatic fire suppression system installed in the fire area.

Some licensees compensated for the lack of or degraded fire barriers by relying on operator manual actions that are not an option included in the rule and had not been reviewed and approved by the NRC. Others misinterpreted Section III.G.1 to allow the use of operator

manual actions in lieu of the means specified in Section III.G.2, although redundant safe-shutdown success paths were in the same fire area. Section III.G.1 requires, in part, one train of systems necessary to achieve and maintain hot shutdown is free of fire damage.

2003-2004

In Commission Paper SECY-03-0100, dated March 7, 2005, "Rulemaking Plan on Post-Fire Operator Manual Actions," the NRC staff recommended a revision to the reactor fire protection regulation contained in Appendix R to 10 CFR part 50 and associated guidance to resolve a regulatory compliance issue. The Commission approved of the staff's proposal to develop rulemaking to allow the use of post fire operator manual actions coincident with fire detectors and an installed automatic fire suppression system in the fire area as an alternative method to achieve hot shutdown conditions in the event of fires in certain plant areas. The anticipated outcome of this proposed rule was to reduce unnecessary regulatory burden and maintain NRC effectiveness and efficiency by reducing the need for licensees to prepare exemption requests, and for NRC review and approval of these requests.

On May 11, 2004, the Commission issued SRM-SECY-04-0050, "Revision of 10 CFR 50.48 to Allow Performance-Based Approaches Using National Fire Protection Association (NFPA) Standard 805 (NFPA 805) Performance-Based Standard for Fire Protection for Light Water Reactor Electric Generating Plants." This SRM approved adding a new paragraph (c) to the Fire Protection Rule in Title 10, Section 50.48, of the *Code of Federal Regulations* (10 CFR 50.48). This new paragraph allowed reactor licensees to comply with the risk-informed, performance-based fire protection requirements in NFPA 805 instead of the requirements elsewhere in 10 CFR 50.48, with certain exceptions stated in the rule language.

In June 2004, the NRC revised its Enforcement Policy (69 FR 33684) to include an interim enforcement policy regarding enforcement discretion for certain issues involving fire protection programs at operating nuclear power plants. The NRC Enforcement Policy sets forth the general principles governing the NRC's enforcement program and the Commission's expectations regarding the process to be used by the NRC to assess and disposition violations of NRC requirements. This revision to the Policy explains enforcement guidance for licensees who opt to transition to National Fire Protection Association (NFPA) Standard 805 in accordance with 10 CFR 50.48(c). 10 CFR 50.48(c) allows reactor licensees to voluntarily comply with the risk-informed, performance based fire protection approaches in NFPA 805. Since inception, this interim policy has been amended 3 times. On January 14, 2005, the first amendment (70 FR 2662) changed the date in which the licensee must submit a letter of intent to receive enforcement discretion for existing identified noncompliances from January 16, 2005 to December 31, 2005. On April 18, 2006, the second amendment (71 FR 19905) extended the enforcement discretion period from 2 to 3 years. On September 10, 2008, the third amendment (73 FR 52705) allows a licensee, on a case-by-case basis, additional enforcement discretion if a licensee has made substantial progress in its transition process.

2005-2006

In 2005, after reviewing public comments on the proposed rule regarding the use of operator manual actions (SECY-03-0100), the staff recommended withdrawal of the rulemaking. Industry stakeholders and NEI commented that the proposed rule requirement for an automatic fire suppression system is not necessary and installation of such systems would be costly without a clear safety enhancement. Industry stakeholders and NEI stated that this requirement would

likely not reduce or eliminate the number of exemption requests, and thus, would not meet one of the primary purposes of the rulemaking.

The Commission approved the staff's recommendation (SECY-06-0010) and the staff withdrew the rulemaking on March 6, 2006. "Fire Protection Program—Post-Fire Operator Manual Actions," (71 FR 11169), states, in summary, that the NRC will terminate enforcement discretion (EGM 98-002) 6 months after the publication date of this *Federal Register* notice. During this 6 month period, guidance in both EGM 98-002 and Inspection Procedure IP 71111.05T, "Fire Protection (Triennial)" will ensure the adequacy and appropriateness of compensatory measures in the form of operator manual actions implemented in accordance with the licensee's fire protection program. The continuation of enforcement discretion guidance for 6 months was intended to provide a reasonable amount of time for licensees that had implemented feasible and reliable operator manual actions as compensatory measures to initiate corrective actions. The NRC expected the licensee to complete the corrective actions in a timely manner, i.e., not to exceed 3 years from the date of this *Federal Register* notice, or consistent with the licensee's NFPA 805 transition schedule. See Regulatory Issues Summary (RIS) 2005-20, "Revision to Guidance Formerly Contained in NRC Generic Letter 91-18," dated September 26, 2005 (ML052020424), for information on timely corrective actions.

The *Federal Register* Notice also mentions EGM 98-002 and how it discusses fire-induced circuit failure requirements and encompasses the vast majority of manual actions since manual actions are used as compensatory measures to satisfy the regulatory requirements related to fire-induced circuit failures.

However, the NRC recognized that some licensees may have been relying on operator manual actions as a mitigating strategy for multiple spurious actuations and the staff was nearing the issuance of a generic letter on the issue of multiple spurious actuations. The staff proposed a generic letter in Commission paper SECY-06-0196, but due to Commission deliberations over the generic letter, the generic letter would not be issued by September 6, 2006. Therefore, on September 6, 2006, the staff issued EGM 98-002 Rev 2 Supplement 1 (ML062480380), which extended the EGM until both a generic letter and another EGM was developed and issued.

The Commission, in SRM SECY-06-0196 (ML063490140), dated December 1, 2006, disapproved the issuance of the Generic Letter. The NRC staff began developing a closure plan to address post-fire safe shutdown circuit spurious actuations and the Commission direction set forth in SRM-SECY-06-0196. On February 16, 2007, the staff issued EGM 98-002 Revision 2, Supplement 2, which further extended the enforcement discretion period until the Commission approved a new enforcement discretion policy for circuit failure issues.

2007-Present

On June 30, 2007, the staff issued EGM 07-004 (ML071830345). EGM 07-004 established an end date for the 6-month time period that does not rely on the issuance of the generic letter and thus closed the open-ended date (EGM 98-002 Rev 2 Supplement 2) for licensees to initiate corrective actions and implement compensatory measures for noncompliant operator manual actions. However, noncompliant issues involving operator manual actions that are relied upon as the mitigating mechanism for fire-induced multiple-spurious actuations are not addressed by EGM 07-004 and will be addressed by separate enforcement discretion guidance.

EGM 07-004 established September 6, 2007, as the date by which licensees were required to initiate corrective actions and implement compensatory measures in order to receive

enforcement discretion for all noncompliances involving operator manual actions associated with single fire-induced circuit failures. March 6, 2009, or the end date consistent with the licensee's NFPA-805 transition schedule, was the date by which the licensee must complete their corrective actions.

EGM 07-004 superseded Supplements 1 and 2 of EGM 98-002, Revision 2. Enforcement discretion related to other circuit failure issues, specifically, multiple spurious actuations, continued to be addressed under EGM 98-002, Revision 2.

On May 14, 2009, the staff issued EGM-09-002 "Enforcement Discretion For Fire-Induced Circuit Faults" (ML090300446). This EGM is applicable to licensees who are not transitioning to NFPA 805. If the licensee meets the criteria as stated in the EGM, the licensee may receive enforcement discretion for noncompliant multiple fire-induced circuit faults for three years from the date of issuance of Regulatory Guide (RG) 1.189 Revision 2. EGM 09-002 supersedes EGM 98-002 Revision 2.

On November 2, 2009, the Federal Register (74 FR 56672) announced the issuance of RG 1.189 Revision 2. The revised RG includes a method of compliance for licensees to resolve multiple fire-induced circuit faults. It provides the necessary definition for licensees to understand the regulatory requirements and implement these requirements at their stations. Based on this issuance date of RG 1.189, Revision 2, licensees have until May 2, 2010, to enter noncompliances into their corrective actions program and establish compensatory measures to qualify for enforcement discretion. The corrective actions for those noncompliances need to be completed by November 2, 2012 to receive enforcement discretion.