

# Fire Protection Closure Plan

**Project**      **10 CFR 50.48(c) NFPA 805**

**Background**    The National Fire Protection Association (NFPA) Standards Council approved NFPA Standard 805, "Performance-Based Standard for Fire Protection for Light-Water Reactor Electric Generating Plants, 2001 Edition" (NFPA 805) on January 13, 2001, as a performance-based standard for light-water nuclear power plants. The NRC staff cooperatively participated in the development of NFPA 805. Published in February 2001, NFPA 805 describes a methodology for existing light-water nuclear power plants to apply performance-based requirements and fundamental fire protection design elements to establish fire protection systems and features for all modes of operation, as well as a methodology for establishing fire protection procedures, systems, and features for decommissioning and permanently shut down nuclear power plants.

The Commission approved the final rule incorporating NFPA 805 into 10CFR50 by reference via a Staff Requirements Memorandum (SRM) of May 11, 2004. The rule was published on June 16, 2004, and became effective July 16, 2004. The Commission provided certain enforcement discretion as an incentive for licensees to adopt NFPA 805.

Two licensees, Progress Energy and Duke Energy, volunteered Shearon Harris and Oconee respectively to become pilot plants for the transition to NFPA 805. Consequently, the staff kicked off the pilot implementation in August 2005. The staff supported the transition effort with observation visits. These observation visits document pilot plant implementation through publicly available trip reports.

In June 2006, the staff issued Regulatory Guide 1.205, "Risk-Informed, Performance-Based Fire Protection for Existing Light-Water Nuclear Power Plants." In July 2006, the staff endorsed the industry proposal to establish a Frequently Asked Questions (FAQs) program to provide timely clarification of issues emerging at plants transitioning to NFPA 805. The staff is holding monthly public meetings with the industry to discuss emerging issues.

By June 2008, operators of 47 reactor units had sent letters of intent indicating their commitment to adopt NFPA 805.

**Objective**      To develop and implement regulatory processes that facilitate predictable, efficient, and effective transition of operating nuclear power plants to NRC's risk-informed and performance-based fire protection requirements.

Organization	Activity	Due Date	Current Status
NFPA	National Fire Protection Association issues NFPA 805.	2001 - 2/9	Completed
NRC	NRC promulgates 10 CFR 50.48 (c) endorsing NFPA 805	2004 - 6/16	Completed
NRC	NRC issues new 10 CFR 50.48 Enforcement Policy for NFPA 805	2004 - 6/16	Completed
NRC	NRC revises NFPA 805 Enforcement Policy to address licensee budgetary cycles to end of 2005 for existing non-compliances	2005 - 1/14	Completed
Pilot plants	NRC receives first letter of intent to transition (pilot plant milestones shaded yellow)	2005 - 2/28	Completed
Pilot plants	NRC receives second letter of intent to transition	2005 - 6/10	Completed
Industry and NRC	Industry and NRC issue NUREG/CR-6850 on fire PRA methods	2005 - 9/1	Completed
Industry	Industry issues implementation guidance NEI 04-02, Revision 1	2005 - 9/1	Completed
NRC	NRC revises NFPA 805 enforcement policy	2006 - 3/1	Completed

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NRC	NRC issues Regulatory Guide 1.205, endorsing NEI 04-02, Revision 1	2006 - 4/18	Completed
Pilot plants	NRC receives Harris pilot submittal	2008 - 05/29	Completed
Pilot plants	NRC receives Oconee pilot submittal	2008 - 05/30	Completed
Industry	Industry proposes additional areas for clarification in NUREG/CR-6850	2008 - 10/1	
NRC	NRC staff transmits proposed enforcement policy update to Commission	2008 - 10/1	
NRC	NRC completes and documents technical review (via FAQ process) of industry-proposed clarifications to NUREG/CR-6850	2009 - 1Q FY	
NRC	NRC issues revised Regulatory Guide 1.205 and Standard Review Plan for NFPA 805	2009 - 2Q FY	
Industry and NRC	Industry and NRC issue clarification of NUREG/CR-6850 (possible supplement)	2009 - 2Q FY	
Pilot plants	NRC issues pilot plant SERs	2009 - 2Q FY	
Industry	Industry submits revision of NEI 04-02	2009 - 2Q FY	
First non-pilot plant	Licensee submits first non-pilot plant license amendment	2009 - 3Q FY	
First non-pilot plant	NRC issues first non-pilot plant submittal SER	2010 - 3Q FY	
Pilot plants	Pilot plants complete facility modifications	2010 - 3Q FY	
Last non-pilot plant	Licensee submits last (currently identified) non-pilot plant license amendment	2011 - 2Q FY	
Pilot plants	NRC completes pilot plant review actions/inspections	2011 - 2Q FY	
First non-pilot plant	First non-pilot plant completes modifications	2011 - 3Q FY	
First non-pilot plant	NRC completes review actions/inspections on first non-pilot plant	2012 - 3Q FY	
Last non-pilot plant	Last (currently identified) non-pilot plant completes modifications	2013 - 4Q FY	
Last non-pilot plant	NRC issues SER for last (currently identified) non-pilot plant	2013 - 4Q FY	
Last non-pilot plant	NRC completes review actions/inspections on last (currently identified) non-pilot plant	2014 - 4Q FY	

# Fire Protection Closure Plan

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**Project**      **Electrical Raceway Fire Barrier Closure**

**Background**    In response to the Browns Ferry fire, the NRC created fire protection regulations and guidelines to ensure that nuclear power plants (NPPs) can be safely shut down in the event of a fire. An important new requirement of these rules was to require the protection of redundant pathways of equipment and cables required to place the plant in a safely shutdown state. When these redundant pathways of cables and equipment were in the same room or fire area, licensees often installed Electrical Raceway Fire Barrier Systems (ERFBS) to achieve the required separation.

Through the 1990's and 2000's, various questions were raised about different designs and manufacturers of ERFBS. The NRC staff responded to these questions by taking a variety of actions. One barrier material (Hemyc) raised more complex concerns. As a result, the NRC initiated full scale fire tests in 2001 on Hemyc. The test results indicated that Hemyc did not perform consistent with its rating for the configurations tested. The NRC issued Generic Letter 2006-03, "Potentially Nonconforming Hemyc and MT Fire Barrier Configurations," to aid in achieving final resolution of Hemyc issues.

The Generic Letter required licensees to: address the Hemyc issue and describe how other fire barrier materials are capable of providing the appropriate fire resistance rating. By the end of calendar year 2007, all responses to the Generic Letter had been accepted by the NRC, and all of the licensing actions approved. All commitments made in the Generic Letter responses and approved licensing actions have entered the normal inspection process. To date, certain compensatory measures and corrective actions have been inspected at a number of units through the routine fire protection inspection program.

**Objective**      To evaluate and document the actions taken to address ERFBS questions, including the specific actions taken to address issues related to Hemyc.

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Organization	Activity	Due Date	Current Status
NRC	NRC issues Information Notice 2005-07 "Results of HEMYC Electrical Raceway Fire Barrier System Full Scale Fire Testing"	2005 - 4/1	Completed
NRC	NRC issues Generic Letter 2006-03, "Potentially Nonconforming Hemyc and MT Fire Barrier Configurations"	2006 - 4/10	Completed
NRC	NRC responds to all Generic Letter 2006-03 information requests	2007 - 12/17	Completed
NRC	NRC finalizes approach to document actions on all ERFBS issues	2008 - 10/1	
NRC	NRC inspects licensee Hemyc actions related to Generic Letter 2006-03 for plants not transitioning to NFPA 805, completing the final ERFBS actions.	2009 - 1Q FY	
NRC	NRC completes documentation of all ERFBS actions	2010 - 1Q FY	

# Fire Protection Closure Plan

**Project**      **Fire Induced Circuit Failure Closure**

**Background**    In response to the Browns Ferry fire, the NRC created fire protection regulations and guidelines to ensure that nuclear power plants (NPPs) can be safely shut down in the event of a fire. An important requirement of these rules was to require the protection of redundant equipment and cables required to place the plant in a state of safe shutdown. This included a requirement to protect circuits from failure or maloperation.

Beginning in 1997, a series of licensee event reports (LERs) identified plant-specific problems related to potential fire-induced electrical circuit failures that could affect equipment necessary to achieve and maintain safe shutdown. The NRC staff issued Information Notice (IN) 99-17, "Problems Associated with Post-Fire Safe-Shutdown Circuit Analyses," on June 3, 1999, to document additional problems.

In 2001, the Electric Power Research Institute (EPRI) and 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. Based on the test results and continued interactions with industry, the NRC staff concluded that clarification of regulatory expectations was needed to assure safety and provide clear regulatory expectations in the area of fire-induced circuit faults, and, where appropriate, to make plant changes to mitigate such faults.

**Objective**      To implement a predictable, efficient, and effective process to ensure that licensees complete specific actions related to possible fire-induced circuit failures.

Organization	Activity	Due Date	Current Status
NRC	NRC issues letter to Industry regarding spurious actuations	1997 - 3/11	Completed
NRC	NRC issues Enforcement Guidance Memorandum 98-002-Disposition of Violations of Appendix R, Sections III.G and III.L Regarding Circuit Failures	1998 - 3/2	Completed
Industry	Industry performs circuit failure testing at Omega Point Laboratories, Elmendorf, Texas	2001 - 6/1	Completed
Industry and NRC	NRC and industry publish "Spurious Actuation of Electrical Circuits Due to Cable Fires: Results of an Expert Elicitation"	2002 - 5/1	Completed
NRC	NRC issues RIS 2004-03, Revision 1, "Risk-Informed Approach for Post-Fire Safe-Shutdown Associated Circuit Inspections."	2004 - 12/30	Completed
NRC	NRC issues "Clarification of Post-Fire Safe-Shutdown Circuit Regulatory Requirements"	2005 - 12/20	Completed
NRC	Commission issues SRM-SECY-2006-0196 - Issuance of Generic Letter 2006-xx, "Post-Fire Safe-Shutdown Circuits Analysis Spurious Actuations"	2006 - 12/15	Completed
NRC	NRC transmits SECY 2008-0093, "Resolution of Issues Related to Fire-Induced Circuit Failures" to Commission for action	2008 - 06/30	Completed
NRC	NRC informs industry of clarification in SECY 2008-0093.	2008 - 11/1	
NRC	NRC holds public meeting to discuss DC circuit testing and smoke effects on electrical circuits	2008 - 11/1	
Industry	Industry revises NEI 00-01	2009 - 1Q FY	
NRC	NRC issues regulatory issue summary endorsing NEI 001-01 with appropriate conditions	2009 - 2Q FY	

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NRD	NRC determines need for followup research on smoke issues	2010 - 1Q FY
NRC	NRC issues regulatory guide on fire induced circuit failures	2010 - 1Q FY
NRC	NRC completes DC Circuit Testing	2010 - 3Q FY
NRC	NRC determines additional actions, if any, for spurious actuations involving DC circuits	2010 - 4Q FY
Industry	Industry resolves fire-induced circuit failure issues	2012 - 1Q FY
NRC	NRC completes circuit failure actions/inspections and documents results	2013 - 3Q FY

# Fire Protection Closure Plan

**Project**      **Operator Manual Actions**

**Background**    In response to the Browns Ferry fire, the NRC created fire protection regulations and guidelines to ensure that nuclear power plants (NPPs) can be safely shut down in the event of a fire. An important requirement of these rules was to require the protection of redundant equipment and cables required to place the plant in a state of safe shutdown. Where separation of redundant equipment could not occur, licensees were permitted, under certain conditions, to use post-fire operator manual actions (OMAs) to counteract the effects of the fire.

In 2000, NRC inspections identified that some licensees compensated for the lack of approved separation by relying on operator manual actions under conditions not permitted by NRC. NRC issued Regulatory Issue Summary 2006-10 to clarify expectations.

With the intention of providing licensees an opportunity to find and fix unapproved post-fire OMAs, the NRC issued enforcement discretion for licensee-identified unapproved post-fire OMAs. This discretion provided a period of time for licensees to self-identify unapproved post-fire OMAs and also provided time for the licensees to bring those unapproved post-fire OMAs into compliance without NRC taking enforcement action. The NRC expects the unapproved post-fire OMAs to be resolved through reanalysis, procedure changes, modifications, or by requesting approval from the NRC. Facilities transitioning to NFPA 805 will address OMAs as part of the transition.

The NRC also issued NUREG-1852, "Demonstrating the Feasibility and Reliability of Operator Manual Actions in Response to Fire," to assist NRC staff in reviewing post-fire OMA applications under conditions permitted by the NRC. NUREG-1852 is publicly available so that licensees are able to examine the factors that the NRC staff will review.

Licensees are expected to complete their modifications or submit information for NRC acceptance by March 6, 2009, the date that the enforcement discretion expires.

**Objective**      To ensure that licensees complete appropriate actions related to the inappropriate crediting of operator manual actions.

Organization	Activity	Due Date	Current Status
NRC	Commission issues SRM-SECY-04-0233 - Proposed Rulemaking - Post-Fire Operator Manual Actions	2005 - 1/18	Completed
NRC	NRC issues Fire Protection Program- Post-Fire Operator Manual Actions Federal Register Notice 71 FR 11169, March 1, 2005. Withdrawal of the proposed rule	2006 - 3/6	Completed
NRC	NRC publishes NRC Regulatory Issue Summary 2006-10 - Regulatory Expectations with Appendix R Paragraph III.G.2 Operator Manual Actions	2006 - 6/30	Completed
NRC	NRC publishes NUREG-1852, "Demonstrating the Feasibility and Reliability of Operator Manual Actions in Response to Fire"	2007 - 10/1	Completed
Industry	Licensees complete corrective actions or requests amendment/exemption	2009 - 2Q FY	
NRC	Enforcement discretion related to Enforcement Guidance Memorandum 07-004 ends	2009 - 2Q FY	
NRC	NRC finalizes NRC closure plan for operator manual actions	2010 - 1Q FY	
NRC	NRC completes actions/inspections related to operator manual actions and documents results	2010 - 2Q FY	