



# NRR FIRE PROTECTION IMPROVEMENT PLAN

## Background

The Nuclear Regulatory Commission (NRC) has been applying its four outcome goals to the management of its fire protection program: Maintain safety, reduce unnecessary regulatory burden, increase public confidence, and improve efficiency and effectiveness, and has been making significant progress. Despite challenges, the fire protection program continues to improve. These challenges stem from (1) the fact that we have prescriptive regulations that are subject to different interpretations and are not always able to be enforced in a clear and consistent way, and (2) the fact that licensees have varying degrees of specificity in their licensing basis and in some cases are substantially different, which can also lead to different interpretations of regulatory intent. The activities described below address these challenges with the objective of achieving the outcome goals.

Much progress has been made in a number of fire protection areas, including the issuance of Regulatory Guide (RG) 1.189, "Fire Protection for Operating Nuclear Power Plants", issuance of draft NUREG-1805 (for comment), "Fire Dynamics Tools Quantitative Fire Hazard Analysis Methods for the U.S. Nuclear Regulatory Commission Fire Protection Program" (Volumes 1 and 2) including an accompanying CD-ROM with fire modeling spreadsheets (Attachment 2, item 6), issuance of draft Regulatory Issue Summary (RIS), "Risk-Informed Inspection Guidance for Post-Fire Safe-Shutdown Inspections" on risk-informed associated circuit analysis (Attachment 1), a proposed risk-informed, performance-based fire protection rule (Attachment 2, item 10), and substantial improvements in inspector training. Emerging challenges facing the fire protection program (FPP) reinforce the need for a clear and comprehensive Fire Protection Improvement Plan (FPIP). This NRR FPIP started in October 2002.

The Office of Nuclear Reactor Regulation Fire Protection Improvement Program (NRR FPIP) continues to receive considerable feedback from a number of stakeholders. These include concerns with:

- The progress in resolving circuit analysis issues (Attachment 1)
- Circuit analysis inspection activity (Attachment 1)
- The uniformity in our approach when manual actions are employed to meet 10 CFR Part 50, Appendix R III.G.2 (Attachment 2, Item 1)
- Inspections taking into account the Current Licensing Basis (CLB) at the facility being inspected or give credit for self assessments (Attachment 2, Item 2)
- The treatment of old design issues in the fire protection area and issue management in general (Attachment 2, Item 3)
- The application of Significance Determination Process (SDP) in the fire protection area (Attachment 2, Item 4)
- Relying on fire watches as compensatory measures (Attachment 2, Item 5)
- The application of "Quantitative Fire Hazard Analysis Methods" in the inspection program (Attachment 2, Item 6)

- The NRC position on fire protection equipment included in the scope of License Renewal Application (LRA) reviews (Attachment 2, Item 7)
- A need for adequate guidance for advanced reactors in the fire protection area (Attachment 2, Item 8)
- Risk-informed, performance based rulemaking (NFPA 805) (Attachment 2, Item 10)
- Fire protection program pilot for combined operating license (Attachment 2, Item 11)
- Testing of selected fire barrier materials (Attachment 2, Item 12)

All of these concerns pointed to the need for a comprehensive FPIP to manage staff efforts to improve the fire protection regulatory environment (Attachment 2, Item 9). The FPIP is managed by the NRR's Division of Systems Safety and Analysis (DSSA).

### **Improvement Plan Objectives**

The FPIP was developed to consider and take appropriate actions in response to concerns and feedback from stakeholders regarding implementation of the FPP. The FPIP is formulated as a separate document comprising a list of fire protection improvement activities with milestones and schedules identified.

The FPIP includes fire protection activities such as Circuit Analysis Resolution Plan (CARP); proposed manual actions rulemaking plans; incentives; old design issues; SDP Improvement Program; compensatory measures; fire hazards analysis tools; license renewal fire protection scoping; fire protection guidance for advanced reactors; FPIP development; risk-informed, performance-based NFPA 805 rulemaking; fire protection program pilot for combined operating license; and fire barrier testing.

In order to effectively manage the FPP consistent with other agency programs, it will also be necessary get old design issues into a satisfactory resolution process. Experience has shown that the Technical Interface Agreement (TIA) process has not served us well when evaluating performance issues where the licensing basis was not clear, or when evaluating old design issues. The TIA process has been augmented with a decision logic that would enable more efficient application of limited resources for emerging fire protection issues that are identified in the Reactor Oversight Process (ROP) to determine if they represent actual performance deficiencies, preferably before they have triggered an inspection finding and a formal risk significance determination (Attachment 2, Item 3).

A pilot effort to resolve potential generic issues associated with gaseous suppression systems identified in the ROP has been completed. The pilot effort employed augmented decision logic to require a prompt decision on the applicability of the CLB, then move those issues which are not subject to enforcement into a backfit process, rulemaking process, or generic issue process, taking risk implications into consideration. The decision logic prioritized the issues to allow determination of resources. In December 2002, the Plant Systems Branch (SPLB) staff provided training to the Division of Licensing and Project Management (DLPM) on using the augmented decision logic.

Other issues such as certain circuit analysis risk configurations have been transferred to the NRC Office of Nuclear Regulatory Research (RES) for consideration in the Fire Risk Research Plan: Fiscal Years 2003–2006.

The FPIP has four attachments. The first attachment covers the proposed circuit analysis inspection and resolution plans. The second attachment includes other fire protection topics

that have been identified by stake holders. The third attachment lists public meeting that have been held to resolve major fire protection issues. The fourth attachment identifies fire protection emerging issues. These attachments will be revised as necessary to update progress and identify new issues.

**Fire Protection Improvement Plan  
Proposed Circuit Analysis and Resolution Plan (CARP)  
Attachment 1**

**Part 1 - Circuit Analysis Inspection Plan**

Below items support the withdrawal of the associated circuit analysis moratorium memorandum

<b>Activity</b>	<b>Schedule/Status</b>
Obtain stakeholder perspectives from the Facilitated Workshop.	February 2003 (Complete)
Meet with NEI on the draft inspection plan	March 2003 (Complete)
Draft Regulatory Issue Summary (RIS) on associated circuits and transmit to Reactor Improvements Branch (RORP)	May 2003 (Complete)
Issue the RIS and input to inspection guidance for public comment	August 2003 (Complete)ML032030584
Receive IIPB and OE agreement on enforcement policy on old open items and on new findings	August 2003 (Complete)
Publish draft NUREG-1778 on Knowledge Base for Post-Fire Safe Shutdown Analysis for public comment	December 2003
Issue the final RIS on associated circuits	December 2003
Conduct public workshop on new risk-informed associated circuit inspection	1 <sup>st</sup> Quarter 2004
Issue final NUREG-1778	May 2004
Withdraw associated circuit analysis inspection moratorium	June 2004

**Part 2 - Circuit Analysis Resolution Plan (CARP)**

Below items support the resolution of the CARP and new risk-informed RG

<b>Activity</b>	<b>Schedule/Status</b>
Develop and Obtain Management Approval of CARP	September - October 2002 (Complete)
Prepare tool to risk-inform circuit findings using NEI 00-01 and fire protection SDP	January 2004
Complete SECY on "fixes" to circuit issues via manual actions	February 2004
Complete SECY on enforcement policy on old open items and on new findings	February 2004
Endorse the final industry guidance, as appropriate, in a new risk-informed RG on NFPA 805	November 2004

**Fire Protection Improvement Plan  
Other Topics  
Attachment 2**

**Item 1 - Manual Actions**

<b>Activity</b>	<b>Schedule/Status</b>
Draft Regulatory Issue Summary (RIS) and forward it to RORP	February 2003 (Complete)
Document the appropriateness of symptom-based fire protection procedures	March 2003 (Complete)
Prepare a proposed Rulemaking Plan	March 2003 (Complete)
Release draft <u>interim</u> criteria to public	October 2003 (Complete)(68 FR 66501)
Public meeting to discuss draft <u>interim</u> criteria and solicit comments	November 2003 (Complete)
Final <u>interim</u> criteria	March 2004
Prepare an Interim Enforcement Policy Statement to support rulemaking on manual actions	June 2004
Issue proposed rule for public comment	Nov/Dec 2004
Final Manual Actions Rule published in Federal Register	September 2005
Revise RG 1.189 to include manual actions criteria	TBD

**Item 2 - Licensing Basis**

<b>Activity</b>	<b>Schedule/Status</b>
Consider a risk-informed approach to establish licensing basis issue priorities	April 2003 (Complete)
Engage NEI on potential incentives to promote adoption of NFPA 805 (e.g., credit for self-assessments)	August 2003 (Complete)
Response to NEI on potential incentives to promote adoption of NFPA 805	August 2003 (Complete)
Response to NEI on additional potential incentive to promote adoption of NFPA 805	December 2003
SECY to receive Commission approval for some incentives to licensees (e.g., enforcement discretion)	February 2004

### Item 3 - Old Design Issues

Activity	Schedule/Status
Collect emerging issues being developed in ROP	Continuous (See Attachment 4)
Enhance management controls on the inspector and technical staff interface	November 2002 (Complete)
Train DLPM on the pilot TIA process with NRC stakeholders	December 2002 (Complete)
Establish periodic meeting schedule with NEI to discuss and prioritize emerging issues	January 2003 (Complete)
Consider a risk-informed approach as a threshold to identify emerging issues	February 2003 (Complete- Issues prioritized in Protocol)
Train regions on the pilot TIA process	April 2004

### Item 4 - Application of SDP

Activity	Schedule/Status
Support SDP improvement program	As needed
Update fire frequency data base	October 2002 (Complete)
Obtain PRA training for selected fire protection engineers	April 2003 (Complete)
Public meeting to discuss fire protection SDP	October 2003 (Complete)
Conduct table top exercises on draft fire protection SDP	November-December 2003
Issue revised fire protection SDP guidance	January 2004
Conduct training on revised fire protection SDP	February-April 2004
Implement Revised fire protection SDP	May 2004
Develop fire brigade SDP for ROP use	May 2004

### Item 5 - Use of Compensatory Measures (Predecisional)

Activity	Schedule/Status
Determine the appropriateness of fire watches being used for non-safety compliance issues and prepare white paper	August 2003 (Complete)
Prepare an appropriate regulatory tool	February 2004

**Item 6 - Quantitative Fire Hazards Evaluation**

<b>Activity</b>	<b>Schedule/Status</b>
Develop quantitative fire hazards analysis tools	(Complete)
Issue Draft NUREG-1805 and spreadsheets for public comments	June 2003 (Complete)
Issue Final NUREG-1805	January 2004

**Item 7 - LRA Scoping Fire Protection Equipment**

<b>Activity</b>	<b>Schedule/Status</b>
Publish License Renewal Application (LRA) review criteria for scoping fire protection as an ISG	November 2002 (Complete)
Refer transferred ISG license renewal issues to RLEP	January 2003 (Complete)
Public meeting to discuss NRC proposed ISG and NEI comments (ISG on-hold; see ML0328011510)	September 2003 (Complete)

**Item 8 - Advanced Reactors**

<b>Activity</b>	<b>Schedule/Status</b>
Revise Standard Review Plan (SRP) Section 9.5.1 Concurrence cycle	July 2003 (Complete)
Revise Standard Review Plan (SRP) Section 9.5.1 Final issuance	November 2003 (Complete)

**Item 9 - FPIP Development**

<b>Activity</b>	<b>Schedule/Status</b>
Complete the FPIP and obtain management concurrence	November 2002 (Complete)
Meet with stakeholders to discuss FPIP in workshop	November 2002 (Complete)

**Item 10 - Risk Informed Rule (NFPA 805)**

<b>Activity</b>	<b>Schedule/Status</b>
Issue proposed rule for public comment	November 2002 (Complete)
75 day comment period on proposed NFPA 805 rule ends	January 2003 (Complete)
NEI Implementation Guidance pilot table top exercise at Farley (change control process)	April 2003 (Complete)

<b>Activity</b>	<b>Schedule/Status</b>
Receive revision D of NEI Implementation Guidance document for NFPA 805	May 2003 (Complete)
NEI Implementation Guidance table top exercise at McGuire on transition to NFPA 805	August 2003 (Complete)
All comments on proposed rule resolved with OGC assistance	November 2003 (Complete)
ACRS full committee briefing	December 2003 (Complete)
DRIP issues draft final rule package for internal NRR review and ADM review	December 2003
DRIP issues final rule package for inter-office concurrence	January 2004
Establish enforcement policy during transition period	February 2004
CRGR briefing (if necessary)	February 2004
Comment on Revision E of NEI implementation guidance document on Rulemaking	March 2004
NRR Office Director concurrence obtained for NFPA 805 Rulemaking. Final Rulemaking package to EDO.	March 2004
Prepare draft RG for public comment to support the rule	June 2004
SRM issued after Commission vote	TBD
Final NFPA 805 Rule published in Federal Register	TBD
Draft SRP: staff audit guidance	July 2004
Final SRP: staff audit guidance	TBD
Endorse the final industry guidance, as appropriate, in a new risk-informed RG on NFPA 805	November 2004
Draft inspection guidance	TBD
Final inspection guidance	TBD

**Item 11 - Fire Protection as a Pilot for Programmatic Inspection, Tests, Analyses, and Acceptance Criteria (ITAAC)**

<b>Activity</b>	<b>Schedule/Status</b>
Workshop to discuss with interested stakeholders ITAAC for operational programs	August 2003 (Complete)



**Item 12 - RES Fire Barrier Testing**

<b>Activity</b>	<b>Schedule/Status</b>
Complete fire barrier test plan (Hemyc and MT) and transfer to RES	January 2003 (Complete)

**Fire Protection Improvement Plan  
Public Meetings in Fire Protection Major Program Areas 1998-Present  
Attachment 3**

<b>Subject Area</b>	<b>Date</b>	<b>Purpose/Comments</b>
<b>Circuit Analysis</b>	July 1, 1998	Presentation to ACRS on post-fire safe shutdown circuit analysis
	July 23, 1998	NRC workshop for Public and Industry on post-fire safe shutdown circuit analysis (National attendance by public and industry)
	December 14, 1998	Meeting with NEI in fire-induced circuit failure assumptions for various cable configurations
	March 25, 1999	NRC staff/NEI meeting to discuss fire-induced circuit failures
	May 3-5, 1999	NEI Fire Protection Forum, Public Meeting. NRC discusses issue resolution and status. NEI discusses industry activity. RES presents their research on issue. Cleveland, Ohio
	August 18-19, 1999	Meeting with Boiling Water Reactor Owners Group (BWROG) to discuss circuit analysis issues
	October 18-20, 1999	NEI Fire Protection Forum, Public Meeting. NRC discusses Resolution status. NEI presented Assessment Methodology, St. Petersburg, Florida
	December 20, 1999	Meeting to discuss status of the NEI post-fire safe shutdown circuit analysis methodology development efforts (NEI 00-01)
	April 13, 2000	NRC staff/NEI meeting to discuss NEI 00-01, Rev. A
	May 25, 2000	Tele-conference with NEI to discuss preliminary staff comment on NEI 00-0, Rev. A
	July 21, 2000	Meeting with NEI to discuss Sandia Report "Circuit Analysis, Failure Modes and Likelihood Analysis," and related circuit analysis technical issues
	July 26, 2000	NRC staff/BWROG/NEI on post-fire safe shutdown circuit analysis

Subject Area	Date	Purpose/Comments
	October 3, 2000	NRC staff/NEI meeting on (circuit analysis) fire test protocols
	February 4-7, 2001	NRC staff presentation on fire-induced circuit failure analysis, NEI Fire Protection Information Forum (General Industry in attendance). Also, NEI status presentation on NEI 00-01
	August 8, 2001	NRC staff/NEI meeting to discuss industry progress on circuit analysis resolution activities
	October 22-25, 2001	NEI Fire Protection, Information Forum, NRC presents status of fire protection issues. Public Meeting Clearwater, Florida
	June 4, 2002	NEI and NRR staff present their view of draft NEI 00-01. Rev C. to ACRS Fire Protection Sub- Committee (Public Meeting at HQ)
	August 29-30, 2002	NEI Fire Protection Information Forum. NEI presents the results of pilot use of NEI 00-01. NRC staff present comments on the NEI 00-01 and NRC resolution plan
	October 22, 2002	NEI explained the NEI 00-01, Rev. D to the staff (Public Meeting at HQ)
	February 19, 2003	The NRC hosted an all-day Facilitated Workshop to discuss risk-informing the associated circuit inspection portion of the fire protection triennial inspections. The meeting was facilitated by an OGC representative. The Workshop was attended by representatives from licensees, industry groups (NEI, EPRI), consulting firms, national laboratories (SNL, BNL), RES, Region I and NRR
	March 20, 2003	Presentation of the "Proposed Risk Informed Inspection Guidance for Post-fire Safe-Shutdown Associated Circuit Inspection," at regularly scheduled IIPB/NEI meeting
	September 9, 2003	Presentation to ACRS fire protection subcommittee

Subject Area	Date	Purpose/Comments
	September 15-17, 2003	NEI Fire Protection Information Forum, public meeting. NRC discussed status of circuit analysis resolution and inspections. Baltimore, MD.
	October 17, 2003	Risk-informed associated circuits inspection public workshop
<b>NFPA 805 Rulemaking</b>	January 16, 2002	Continue discussion of the NEI outline of implementing guidance for NFPA 805
	February 12, 2002	Continue discussion of the NEI outline of implementing guidance for NFPA 805
	February 26, 2002	Continue discussion of NEI implementing guidance for NFPA 805
	April 23, 2002	Continue discussions of issues raised in the NEI letter of April 9, 2002 concerning fire protection rulemaking language to adopt NFPA 805
	August 1, 2002	Continue the discussion of NEI outlines of implementing guidance for NFPA 805
	September 9, 2003	Presentation to ACRS fire protection subcommittee
	September 15-17, 2003	NEI Fire Protection Information Forum, public meeting. NRC discussed status of NFPA 805 rulemaking. Baltimore, MD.
	October 15, 2003	Public meeting to discuss NRC comments for NEI 04-01 implementation guide
<b>Manual Action</b>	June 20, 2002	Follow-up discussion of May 16, 2002-letter on the use of manual actions to achieve a safe shutdown, to satisfy the requirement of Section III.G.2 of Appendix R to 10 CFR Part 50
	August 21, 2002	SPLB met with Executive Team, and received direction to proceed with rulemaking
	November 6, 2002	SPLB presented description of "feasible manual actions," to public at Licensing Workshop at Washington Terrace Hotel, DC

Subject Area	Date	Purpose/Comments
	September 9, 2003	Presentation to ACRS fire protection subcommittee
	September 15-17, 2003	NEI Fire Protection Information Forum, public meeting. NRC discussed status of manual actions rulemaking. Baltimore, MD.
	October 17, 2003	Public meeting releasing draft interim feasible criteria for manual actions
	November 12, 2003	Public meeting to discuss interim feasible criteria for manual actions
<b>Fire Protection SDP</b>	May 23, 2002	Public meeting to discuss fire protection SDP revision
	July 9, 2002	Public meeting to discuss fire protection SDP revision
	August 14, 2002	Working Group meeting to discuss Phase 2 fire protection SDP methodology
	September 4, 2002	The NRC and NEI discussed separate Phase 1 screening alternatives. Eleven issues for improving Phase 2 were discussed and task leaders were assigned action plans for short and long term fixes to be presented at a workshop in November 2002
	September 14, 2002	An update of the SDP revision effort was presented at the FP Inspector Workshop in Region III. Three issues (i.e., fire scenario development, and fire barriers) were discussed with inspectors to mine resolution alternatives
	November 2002	A public workshop to discuss new fire protection SDP methodology
	April 14, 2003	A public workshop to discuss new fire protection SDP methodology
	September 15-17, 2003	NEI Fire Protection Information Forum, public meeting. NRC discussed status of revised fire protection SDP. Baltimore, MD.
	October 30, 2003	A public workshop to discuss new fire protection SDP methodology

Subject Area	Date	Purpose/Comments
<b>Fire Protection Improvement Plan (FPIP)</b>	November 5, 2002	SPLB Branch Chief briefs NRR Associate Director on FPIP
	November 6, 2002	FPIP presented at a NEI licensing forum at the Washington Terrace
	November 20, 2002	The NRR Office Director is briefed on the FPIP by the SPLB Branch Chief
	January 15, 2003	NRC staff and NEI representatives held a public meeting to discuss FPIP updates and the management of fire protection emerging issues
	March 18, 2003	NRC staff and NEI representatives held a public meeting to continue the discussion on fire protection emerging issues
	April 18, 2003	NRC staff and NEI representatives held a public meeting to continue the discussion on fire protection issue management
	August 21, 2003	NRC staff and NEI representatives held a public meeting to continue the discussion on fire protection issue management

**Fire Protection Improvement Plan  
Fire Protection Emerging Issues  
Attachment 4**

<b>Emerging Issue</b>	<b>Status</b>
Incentives for adopting NFPA 805 (ADAMS ML030370027)	Staff responded by letter to NEI dated August 28, 2003 (ML032450186)
Interim inspection guidance for manual actions (ADAMS ML030370027)	Staff developing interim guidance (see Attachment 2, Item 1)
Scoping for license renewal is a CLB issue under Part 50. Reference item 7, Attachment 2 (ADAMS ML030370027)	Staff proposed ISG on hold; refer to meeting minutes ML032801151
Seek Region feedback on NEI concerns with inspectors in the areas of safe-shutdowns and the regulatory process (ADAMS ML030370027)	Region representative attends NRC/NEI fire protection issues management meeting
Clarify the process and documentation necessary to provide fire protection issue closure (ADAMS ML030370027)	Protocol established for emerging fire protection issues. See ML031210232 for protocol and ML032760609 for adoption
Heat collector sprinkler heads (ADAMS ML023030065)	SPLB representatives attended a public meeting at the Brunswick Steam Electric Plant site in February 2003
Evaluate results of first round of triennial inspections (ADAMS ML030370027)	Staff/NEI April 2003 agenda item
Epoxy floor coating flame spread	Staff/NEI August 2003 agenda item. NEI action item.
Alternate shutdown timing issues	Staff/NEI August 2003 agenda item
Fire protection safety evaluations in CLB	Action item identified at National Regional Utility Group (RUG) meeting 2003. Staff/NEI August 2003 meeting agenda item.
NRC fire protection regional public workshops	Action item identified at National Regional Utility Group (RUG) meeting 2003. Staff/NEI August 2003 meeting agenda item. NEI action item.
INPO fire protection assessment guidance development	Action item identified during Staff/NEI August 21, 2003 public meeting. NEI action item.
Gaseous fire suppression system lockouts	Staff/NEI August 2003 agenda item. NEI action item.