



# U.S. NUCLEAR REGULATORY COMMISSION STANDARD REVIEW PLAN

## 9.5.1.2 RISK-INFORMED, PERFORMANCE-BASED FIRE PROTECTION PROGRAM

### REVIEW RESPONSIBILITIES

**Primary** – Organization responsible for the review of fire protection program (FPP).

**Secondary** – Organization responsible for the review of risk-informed (RI) licensing actions.

### I. AREAS OF REVIEW

This section of the Standard Review Plan (SRP) provides guidance for the U.S. Nuclear Regulatory Commission (NRC) staff who reviews RI, Performance-Based (PB) FPP licensing actions submitted pursuant to Title 10 of the *Code of Federal Regulations*, Section 50.48(c), “Energy,” (10 CFR 50.48(c)), and the guidance in Regulatory Guide (RG) 1.205, “Risk-Informed, Performance-Based Fire Protection for Existing Light-Water Nuclear Power Plants.” This guidance is applicable to operating reactor licensees under 10 CFR Part 50, “Domestic Licensing of Production and Utilization Facilities,” and covers the review of license amendment requests (LARs) for transition and post-transition to a RI/PB FPP based on the 2001 Edition of the National Fire Protection Association (NFPA) Standard 805 (NFPA 805) for compliance with

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## USNRC STANDARD REVIEW PLAN

This SRP, NUREG-0800, has been prepared to establish criteria that the NRC staff responsible for the review of applications to construct and operate nuclear power plants intends to use in evaluating whether an applicant/licensee meets the NRC’s regulations. The SRP is not a substitute for the NRC’s regulations, and compliance with it is not required. However, an applicant is required to identify differences between the design features, analytical techniques, and procedural measures proposed for its facility and the SRP acceptance criteria and evaluate how the proposed alternatives to the SRP acceptance criteria provide an acceptable method of complying with the NRC regulations.

The SRP sections are numbered in accordance with corresponding sections in RG 1.70, “Standard Format and Content of Safety Analysis Reports for Nuclear Power Plants (LWR Edition).” Not all sections of RG 1.70 have a corresponding review plan section. The SRP sections applicable to a COL application for a new light-water reactor (LWR) are based on RG 1.206, “Combined License Applications for Nuclear Power Plants (LWR Edition).”

These documents are made available to the public as part of the NRC’s policy to inform the nuclear industry and the general public of regulatory procedures and policies. Individual sections of NUREG-0800 will be revised periodically, as appropriate, to accommodate comments and to reflect new information and experience. Comments may be submitted electronically by email to [NRR\\_SRP@nrc.gov](mailto:NRR_SRP@nrc.gov).

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10 CFR 50.48(c).<sup>1</sup> Also, the NRC staff previously issued an update to SRP Section 9.5.1 in March 2007; for the benefit of combined license (COL) applicants under 10 CFR Part 52, "Licenses, Certifications, and Approvals for Nuclear Power Plants." SRP Section 9.5.1 focused on deterministic FPPs and advised that the primary review guidance document for NFPA 805 plants would be developed in the future. SRP Section 9.5.1.2 provides this guidance. Note that only the review of RI/PB FPP LARs is covered by this SRP Section. For example, exemptions from Appendix R, "Fire Protection Program for Nuclear Power Facilities Operating Prior to January 1, 1979," to 10 CFR Part 50 requirements or deviations from NUREG-0800 Section 9.5.1 license commitments are not covered in this SRP Section.

In developing this SRP Section, the staff considered requirements of 10 CFR 50.48(c) and NFPA 805, 2001 Edition, to the extent it is incorporated into 10 CFR 50.48(c). The staff also considered the guidance provided by RG 1.205 which endorses with exceptions Nuclear Energy Institute (NEI) NEI 04-02, "Guidance for Implementing a Risk-Informed Performance-Based Fire Protection Program under 10 CFR 50.48(c)," Revision 2. At the time of drafting this SRP Section, some of the documents referenced herein are subject to revision, like RG 1.205 and NEI 04-02. For example, the referenced documents may be reorganized, which would affect the specific section references in this SRP. The staff should use the most current revision of RG 1.205 for accurate references. In addition, the staff incorporated interim guidance which was developed using experience from NFPA 805 pilot plant implementation. The staff has documented this interim staff guidance (ISG) via the NFPA 805 Frequently Asked Questions (FAQ) Process. [Regulatory Issue Summary (RIS) 2007-19, "Process for Communicating Clarifications of Staff Positions provided in RG 1.205 Concerning Issues Identified during the Pilot Application of National Fire Protection Association Standard 805"]

### Review Areas

A FPP for a nuclear power plant (NPP) licensed to operate generally consists of the following elements (Ref. 35):

- Delineation of organization, staffing, and responsibilities
- Performance of a fire hazards analysis sufficient to ensure safe shutdown capability and minimize radioactive material releases in the event of a fire
- Limitation of damage to structures, systems and components (SSCs) important to safety so that the capability to safely shut down the reactor is ensured
- Evaluation of fire test reports and fire data to ensure they are appropriate and adequate for ensuring compliance with NRC regulatory requirements
- Evaluation of compensatory measures for interim use for adequacy and appropriate length of use

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<sup>1</sup> 10 CFR 50.48(c), adopted by the NRC in 2004 (69 *Federal Register* (FR) 33536; June 16, 2004) (Ref. 6), incorporates NFPA 805 by reference, with certain exceptions, and allows licensees to voluntarily adopt and maintain an FPP that meets the requirements of NFPA 805 as an alternative to 10 CFR 50.48(b) or the plant-specific fire protection license conditions.

- Training and qualification of fire protection personnel appropriate for their level of responsibility
- Evaluation of quality assurance program
- Control of FPP changes

The staff reviews the overall RI/PB FPP described in the LAR with respect to the acceptance criteria in this SRP and the Acceptance Review Matrix attached to this SRP Section (Attachment 1). Specifically, the staff reviews the areas set forth in Section III, "Review Procedure," of this SRP, as applicable:

### Review Interfaces

Other SRP sections interface with this Section as follows:

SRP Section 19.1, "Determining the Technical Adequacy of Probabilistic Risk Assessment Results for Risk-Informed Activities."

SRP Section 19.2, "Review of Risk Information Used to Support Permanent Plant-Specific Changes to the Licensing Basis: General Guidance."

SRP Section 9.5.1, "Fire Protection Program."

## II. ACCEPTANCE CRITERIA

Section II lists the governing regulations applicable to the areas of review in this SRP Section and the primary guidance documents that provide acceptable methods for meeting the regulatory requirements.

### Requirements

The licensee's FPP will generally be considered acceptable if it meets the applicable criteria established in the following:

1. General Design Criterion (GDC) 3, "Fire protection," in Appendix A, "General Design Criteria for Nuclear Power Plants," to 10 CFR Part 50, which establishes the general criteria for fire and explosion protection of SSCs important to safety<sup>2</sup>
2. 10 CFR 50.48(a), which requires that each operating NPP have a fire protection plan that meets the requirements of GDC 3

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<sup>2</sup> GL 84-01 (Ref. 17) discusses the difference between "important to safety" and "safety related." Important to safety includes all equipment in the GDCs. However, safety related is a subset of important to safety but only includes equipment that meets the definition. For example, offsite power sources are usually "important to safety" but not necessarily safety related.

3. 10 CFR 50.48(c), which incorporates NFPA 805 (2001 Edition) by reference, with certain exceptions. This regulation establishes the requirements for using NFPA 805 as an alternative to the requirements associated with 10 CFR 50.48(b) and Appendix R to 10 CFR Part 50 or the specific plant license condition
4. NFPA 805 (2001 Edition), which documents the consensus standard for RI/PB fire protection of existing NPPs, to the extent incorporated by reference by 10 CFR 50.48(c)
5. 10 CFR Part 20, "Standards for Protection Against Radiation," which establishes the radiation protection limits used as NFPA 805 performance criteria, as specified in Section 1.5.2 of NFPA 805
6. 10 CFR 50.109, "Backfitting," which requires a systematic and documented analysis of cost-beneficial backfits that the Commission seeks to impose

#### SRP Acceptance Criteria

Specific SRP criteria acceptable to meet the relevant requirements of the NRC's regulations identified above are as follows for the review described in this SRP Section. The SRP is not a substitute for the NRC's regulations, and compliance with it is not required. However, an applicant is required to identify differences between the design features, analytical techniques, and procedural measures proposed for its facility and the SRP acceptance criteria and evaluate how the proposed alternatives to the SRP acceptance criteria provide acceptable methods of compliance with the NRC regulations.

The following documents provide acceptable methods, guidance, and other criteria applicable to meeting the Commission's FPP requirements:

1. NUREG-1600, "General Statement of Policy and Procedure for NRC Enforcement Actions, Interim Enforcement Policy," May 1, 2000, which provides the Commission's policy on enforcement discretion for non-compliant conditions, either existing or identified during transition to a RI/PB FPP in accordance with 10 CFR 50.48(c).
2. RG 1.205, "Risk-Informed, Performance-Based Fire Protection for Existing Light-Water Nuclear Power Plants," which provides NRC guidance on an acceptable approach to meeting 10 CFR 50.48(c), including endorsement (with exceptions) of NEI 04-02, "Guidance for Implementing a Risk-Informed Performance-Based Fire Protection Program Under 10 CFR 50.48(c)," and portions of NEI 00-01, "Guidance for Post-Fire Safe Shutdown Circuit Analysis." ISG that will be considered in future revisions of RG 1.205 is documented in approved NFPA 805 FAQs.
3. RG 1.174, Revision 1, "An Approach for Using Probabilistic Risk Assessment in Risk-Informed Decisions on Plant-Specific Changes to the Licensing Basis," which provides NRC guidance on an acceptable method to assess the nature and impact of licensing basis changes using risk information within the context of applicability under 10 CFR 50.48(c) and RG 1.205.

4. RG 1.189, Revision 1, "Fire Protection for Nuclear Power Plants," which provides general guidance on acceptable FPPs.
5. Section 19.1 of the SRP, "Determining the Technical Adequacy of Probabilistic Risk Assessment Results for Risk-Informed Activities," which provides review guidance on determining the technical adequacy of probabilistic risk assessment (PRA) models for RI initiatives.
6. Section 19.2 of the SRP, "Review of Risk Information Used to Support Permanent Plant-Specific Changes to the Licensing Basis: General Guidance," which provides guidance on reviewing risk information used to support plant-specific changes to the licensing basis.
7. RG 1.200, Revision 2, "An Approach for Determining the Technical Adequacy of Probabilistic Risk Assessment Results for Risk Informed Activities," March 2009, which provides guidance with respect to acceptable methods and PRA quality.
8. NUREG/CR-6850, EPRI 1011989, "EPRI/NRC-RES Fire PRA Methodology for Nuclear Power Facilities," Volumes 1 and 2, issued September 2005, which provides a method for developing a fire PRA in support of adopting a RI/PB FPP, within the context of the additional clarifications provided by the staff via the NFPA 805 FAQ process.
9. NUREG-1852, "Demonstrating the Feasibility and Reliability of Operator Manual Actions in Response to Fire," issued October 2007, which provides qualitative methods to demonstrate that Operator Manual Actions (OMAs) are feasible and reliable.
10. NUREG-1824, EPRI 1011999, "Verification and Validation of Selected Fire Models for Nuclear Power Plant Applications," Volumes 1–7, issued May 2007, which provides guidance on verification and validation (V&V) of fire models.
11. NRC Management Directive 8.4, "Management of Facility-Specific Backfitting and Information Collection", issued October 28, 2004, which reflects NRC's organizational responsibilities and authorities with respect to the management of facility-specific backfits.

### III. REVIEW PROCEDURE

Licensees of existing plants that wish to adopt a RI/PB FPP that complies with NFPA 805 must submit an LAR in accordance with 10 CFR 50.48(c)(3)(i). Licensees that wish to adopt 10 CFR 50.48(c) but wish to use PB methods permitted elsewhere in NFPA 805 for the Chapter 3, "Fundamental Fire Protection Program and Design Elements," of NFPA 805 may do so by submitting an LAR in accordance with 10 CFR 50.48(c)(2)(vii). Licensees that wish to use RI/PB alternatives to compliance with NFPA 805 must submit an LAR in accordance with 10 CFR 50.48(c)(4). Licensees may submit specific elements of their program for which they need to receive explicit NRC review and approval to ensure clarity of the fire protection licensing basis, as set forth in RG 1.205, "Risk-Informed, Performance-Based Fire Protection for Existing Light-Water Nuclear Power Plants," Regulatory Position 2.2.1.

The review of an LAR starts with an acceptance review by the staff in accordance with the Office of Nuclear Reactor Regulation (NRR) Office Instruction (OI) No. LIC-109, "Acceptance Review Procedures." Attachment 1 of this SRP includes an acceptance review matrix as an aid in performing the acceptance review of the LAR. Once an LAR is accepted as sufficient for the staff to begin its detailed review, the staff review proceeds in accordance with NRR OI No. LIC-101, "License Amendments Review Procedures." If deemed appropriate for a given review, a regulatory audit of the licensee may be conducted in accordance with NRR OI No. LIC-111, "Regulatory Audits," for the staff to gain a better understanding of the licensee's FPP analyses, calculations, evaluations, proposed plant modifications, and other aspects of the LAR.

The staff reviewing LARs to implement a RI/PB FPP should be aware of the NFPA 805 FAQ process. The NRC established the FAQ process as described in RIS 2007-19, to clarify issues encountered during the transition of two pilot plants to the new fire protection licensing basis. The FAQ process provides a means for the staff to establish and communicate interim positions on technical and regulatory issues that emerge as experience is gained in the review of the two pilot plant's LARs. Approved interim positions documented through the FAQ process should be used where applicable in reviewing those portions of an LAR to which they apply. These positions will be addressed in future revisions of RG 1.205 and reflected in this SRP.

### III.1 PROGRAMMATIC REVIEW OF LICENSE AMENDMENT REQUEST

The required content of an LAR for transition to a RI/PB FPP is defined in 10 CFR 50.48(c)(3)(i), 10 CFR 50.90, "Application for Amendment of License, Construction Permit, or Early Site Permit," and, as applicable, 10 CFR 50.48(c)(2)(vii) and 10 CFR 50.48(c)(4). Regulatory Position 2.2 of RG 1.205 and Section 4.6.1 of NEI 04-02, provide additional guidance on the content of the LAR. 10 CFR 50.48(c)(3)(ii) requires the licensee to perform the required analyses and revise the fire protection plan prior to changing either the plant or the FPP.

Section 2.2 of NFPA 805 provides the general approach for establishing the fire protection requirements for a NPP. Section 3.3 of NEI 04-02 provides additional detail on implementing this approach. The staff will review the LAR to verify that each step in the process has been satisfactorily completed.

#### III.1.1 Orders, License Condition, and Technical Specifications (TSs)

The staff will confirm that the licensee has identified any orders and license conditions that must be revised or superseded, and that the licensee has provided any necessary revisions to the plant's TSs and the bases thereof to implement a FPP that complies with 10 CFR 50.48(c). The staff should ensure that the LAR includes a discussion of the changes to the Updated Final Safety Analysis Report (UFSAR) necessitated by the license amendment. [NEI 04-02, Paragraph 4.6.1]

The staff will verify that the LAR provides updated TSs. The staff will verify that the LAR includes the following (as identified by the licensee):

- Changed, added or revoked Administrative Controls

- Revised or superseded Limiting Conditions for Operation, ensuring that they are consistent with 10 CFR 50.48(c) and 10 CFR 50.36
- Revised associated Bases as required by 10 CFR 50.48(c)(3)(i)

The staff must keep in mind that there will likely be other requirements that must be met with regard to remote shutdown capability to meet GDC 19 of 10 CFR Part 50, Appendix A, "Control Room." The staff will confirm that the licensee does not inadvertently delete the TSs associated with remote shutdown requirements required by other regulations related to the ability to safely shut down from outside the control room.

### III.1.2 Modifications

The staff will ensure that the license condition lists any plant modifications that the licensee has identified as necessary to implement the RI/PB FPP and includes a description of each modification, a schedule for implementation of each modification, and a commitment to maintain in effect compensatory measures until the modifications are completed.

### III.1.3 Self-Approval of Certain FPP Changes

After a licensee implements NFPA 805, it may implement changes to its FPP in accordance with the license condition approved by the staff. A plant change evaluation as described in Paragraph III.5.3 of this SRP is required for any change to a previously approved FPP element.

A change may be any of the following: [RG 1.205, Regulatory Position 3.2.1]

- (a) A physical plant modification that affects the FPP;
- (b) A programmatic change (e.g., change to a procedure, assumption or analysis) that affects the FPP; or,
- (c) An in-situ condition (physical or programmatic) that is an FPP regulatory non-compliance or a fire protection licensing-basis non-compliance, which the licensee does not intend to correct via a plant or programmatic modification.

RG 1.205, Regulatory Position 3.1 contains a sample license condition that allows for self-approval of FPP changes under certain conditions. The staff will verify that the license condition contains sufficient detail to ensure self-approval meets these regulatory positions.

The staff will ensure that the license condition identifies whether the licensee is permitted to make certain changes to the FPP without prior NRC review and approval, and, if so, the acceptance criteria and any restrictions in terms of the types of changes that may be so implemented. Note that Section 3.2.3 of RG 1.205 provides examples of changes that must be submitted for NRC review and approval through an LAR before implementation.

The staff will review the licensee's process for self-approving changes and determine whether the licensee has adequate processes in place to ensure that defense-in-depth (DID) and safety margins are appropriately addressed after transition.

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#### III.1.4 Significant Hazards Consideration

The staff will verify that the LAR includes a statement concerning the “no significant hazards consideration,” in accordance with 10 CFR 50.91, “Notice for Public Comment; State Consultation,” and 10 CFR 50.92, “Issuance of Amendment.” Appendix H to NEI 04-02 provides one example of an acceptable statement.

#### III.1.5 Environmental Consideration (Categorical Exclusion Finding)

The staff will verify that the LAR includes a statement on environmental considerations in accordance with 10 CFR 51.22(b) and (c). Appendix H to NEI 04-02 provides one example of an acceptable statement.

#### III.1.6 Transition Implementation Schedule

The staff will verify that the LAR includes an “updated transition schedule” per Section 4.6.1 of NEI 04-02. The submittal will provide a transition schedule, justification for the schedule, and a list of modifications with a commitment to maintain in effect associated compensatory measures. The staff will ensure that the proposed schedule is reasonable.

#### III.1.7 Performance-Based Methods for NFPA 805 Chapter 3 Elements

Notwithstanding the prohibition in Section 3.1 of NFPA 805, a licensee can request NRC approval under 10 CFR 50.48(c)(2)(vii), via a license amendment, to apply PB methods permitted elsewhere in the standard (i.e. NFPA 805, Section 4.2.4) to the fundamental FPP and design elements of Chapter 3 of NFPA 805. Where a licensee proposes to use PB methods to demonstrate compliance with the fundamental FPP and design elements in Chapter 3 of NFPA 805, the staff will review the LAR in accordance with 10 CFR 50.48(c)(2)(vii) and RG 1.205, Regulatory Position 2.2.2, to verify the adequacy of the methods and the licensee’s evaluation and conclusions.

#### III.1.8 Risk-Informed, Performance-Based Alternatives to Compliance with NFPA 805

NFPA 805 provides one framework describing how RI/PB methods may be used to self-approve plant changes that affect the FPP. Other frameworks may be acceptable. Under 10 CFR 50.48(c)(4), a licensee may request NRC approval to use RI or PB alternatives (i.e., different from those prescribed by NFPA 805) to demonstrate compliance with 10 CFR 50.48(c) using the LAR process. In those instances, the staff will review the LAR in accordance with 10 CFR 50.48(c)(4) to verify that all of the following are true for the proposed alternative and its application:

- (a) It satisfies the performance goals, objectives, and criteria specified in NFPA 805 related to nuclear safety and radiological release;
- (b) It maintains safety margins; and,
- (c) It maintains fire protection DID (fire prevention, fire detection, fire suppression, mitigation, and post-fire safe-shutdown capability).

Regulatory Position 2.2.3 of RG 1.205 provides additional guidance to licensees requesting staff approval for alternative RI/PB methods. Consistent with NEI 04-02, Revision 2, Section 2.4.1, the licensee should provide:

- (a) A detailed description of the alternative RI/PB method
- (b) A description of how the method will be applied, the aspects of the FPP to which it will be applied, and the circumstances under which it will be applied
- (c) The acceptance criteria, including risk increase acceptance criteria, that the licensee will apply when determining whether the results of an evaluation that uses this methodology meet the required NFPA 805 performance goals, performance objectives, and performance criteria
- (d) For risk assessments using PRA methods, a justification of the technical adequacy of the PRA model per RG 1.200 for evaluation of the changes to which it will be applied
- (e) For risk assessments using PRA methods, a description of the peer review and how the review findings have been addressed.

The staff's review of LARs submitted in accordance with 10 CFR 50.48(c)(4) will focus on the technical aspects of the approach or method proposed as an alternative to compliance with NFPA 805. The approach or method shall meet an equivalent level of protection to that established by NFPA 805. The staff will review a sample of the calculations to verify that the licensee's evaluation and conclusions with regard to meeting the safety margin and DID criteria are acceptable. Proposed alternatives are subjected to the same evaluation criteria (e.g., V&V) as the endorsed methods. The staff will also evaluate the LAR to verify that the licensee adequately performed and documented these evaluations.

Note: Licensees may reference methods in NRC approved topical reports (TR). This option affords efficiencies both for licensees and NRC. A licensee must still request approval to adopt the alternative approved in the TR by applying for a license amendment which demonstrates the licensee has met the criteria in the TR for such adoption. [NEI 04-02, Paragraph 2.4.2]

### III.2 FUNDAMENTAL FIRE PROTECTION PROGRAM ELEMENTS AND MINIMUM DESIGN REQUIREMENTS

Chapter 3 of NFPA 805 establishes the fundamental FPP and design elements. The staff will review the LAR to verify that the licensee complies with the fundamental FPP and design elements required by Chapter 3 of NFPA 805.

The staff will review the LAR to evaluate the applicant's overall approach to determining how its FPP complies with NFPA 805, Chapter 3 requirements. The approach in NEI 04-02, as endorsed in RG 1.205, is one approach acceptable to the NRC.

Chapter 3 of NFPA 805 notes that alternatives to the fundamental FPP attributes of Chapter 3, which were previously approved by the NRC, take precedence over the requirements in Chapter

3. If the licensee references previous NRC approvals, including approved exemptions or deviations, the staff will ensure the licensee adequately demonstrated prior NRC approval. The documentation should contain justification of the prior approval and that any exemptions or deviations are still valid. [RG 1.205, Regulatory Position 2.3.1]

### III.2.1 Water Supply and Distribution

10 CFR 50.48(c)(2)(vi) modifies NFPA 805, Paragraph 3.6.4 by not endorsing the italicized exception; i.e., a “provisional” manual fire fighting standpipe/hose station system may not be used in place of seismically qualified standpipes and hose stations unless previously approved in the licensing basis. Licensees who wish to use the italicized exception in Section 3.6.4 of NFPA 805 must submit a request for a license amendment in accordance with 10 CFR 50.48(c)(2)(vii). However, because the NRC considers seismically qualified standpipes and hose stations to be of such importance, the staff must ensure that the three criteria in 10 CFR 50.48(c)(2)(vii) are satisfied.

Note that Appendix A to Branch Technical Position (BTP) Auxiliary and Power Conversion Systems Branch (APCSB) 9.5-1, “Guidelines for Fire Protection for Nuclear Power Plants,” dated February 24, 1977, makes separate provisions for operating plants and plants with construction permits issued before July 1, 1976, and does not require seismically qualified standpipes and hose stations for those plants. Therefore, the requirement in Section 3.6.4 of NFPA 805 is not applicable to licensees with non-seismic standpipes and hose stations previously approved in accordance with Appendix A to BTP APCS 9.5-1.

Field C

### III.2.2 Definition of Power Block

The staff will review the LAR to determine which plant structures are identified as comprising the “power block.” The staff should verify that the licensee’s list of power block structures conforms to the definition of “power block” in the glossary of NFPA 805 and the guidance in RG 1.205.

### III.2.3 Electrical Raceway Fire Barrier Systems (e.g. Hemyc and MT)

On April 10, 2006, the NRC issued GL 2006-03, “Potentially Non-Conforming Hemyc and MT Fire Barrier Configurations,” requiring licensees to provide information regarding the use of electrical raceway fire barriers, particularly Hemyc and MT, at their plants. If the licensee has not resolved the electrical raceway fire barrier issue prior to submittal of their RI/PB FPP LAR, the licensee must address the issue in the LAR. The staff will verify that the licensee has adequately addressed this issue, including having provided a justification for the use of any compensatory measures and proposed plant modifications.

### III.2.4 Existing Cables

NFPA 805, Paragraph 3.3.5.3 states that electrical cables shall meet a flame propagation test that is acceptable to the authority having jurisdiction. 10 CFR 50.48(c)(2)(v), which does not endorse the italicized exception in NFPA 805, Paragraph 3.3.5.3, allows a flame retardant coating on the cables or an automatic fixed suppression system to provide an equivalent level of protection.

The staff will review the LAR to verify that the requirements for existing cables are met. If the staff approves use of these alternatives, this approval should be explicitly documented in the staff's safety evaluation report (SER).

Note that the flame spread testing requirements in Institute of Electrical and Electronic Engineers (IEEE) 383, "IEEE Standard for Type Test of Class 1E Electric Cables, Field Splices, and Connections for Nuclear Power Generating Stations," are now provided in IEEE 1202, "IEEE Standard for Flame-Propagation Testing of Wire and Cable," and have been removed from the current version of IEEE 383. Most existing plants reference earlier versions of IEEE 383 and have approved FPPs based on this standard. Plants that reference IEEE 383 are not required to meet IEEE 1202 when transitioning to a RI/PB FPP.

Plants that have a licensing basis that does not reference IEEE 383 should demonstrate that the installed cables meet cable fire spread acceptance criteria at least as stringent as those in IEEE 383-1974. This equivalency should be documented in the SER.

### III.3 NUCLEAR SAFETY PERFORMANCE CRITERIA

Chapter 2 of NFPA 805 provides the methodology to be used in implementing a PB FPP. Chapter 4 of NFPA 805 establishes the methodology to determine the fire protection systems and features required to achieve the performance criteria outlined in NFPA 805, Section 1.5. NEI 04-02, Section 4.3.2 sets out a systematic process for evaluating the existing post-fire safe shutdown analysis against the methodology requirements provided in Chapter 2 of NFPA 805 and the methods for achieving the nuclear safety performance criteria in Chapter 4 of NFPA 805.

#### III.3.1 Nuclear Safety Compliance Assessment Methodology Transition

10 CFR 50.48(c)(3)(ii) states that Chapter 2 analyses shall be completed and the fire protection plan modified before changing the FPP and the plant as permitted by NFPA 805.

The staff will ensure that the licensee has adequately performed applicable engineering analyses in NFPA 805, Section 2.4, including fire modeling, nuclear safety capability assessment, and fire risk evaluations.

The staff will ensure that the licensee completed a systematic approach to transition the FPP to the new requirements in NFPA 805. To the extent endorsed in RG 1.205, Section 4.3.2 and Section B.2 of Appendix B to NEI 04-02 describe one acceptable approach to documenting the comparison of an existing FPP with the requirements of NFPA 805 and industry guidance document NEI 00-01. RG 1.205 endorses the deterministic post-fire safe shutdown analysis methodology provided in Chapter 3 of NEI 00-01.

The staff will review the LAR to determine whether the nuclear safety performance criteria have been met consistent with the requirements in NFPA 805. One acceptable means of demonstrating compliance is the guidance in NEI 04-02, to the extent endorsed by RG 1.205. The staff will ensure licensee compliance with the following requirements:

### III.3.1.1 Feed-and-Bleed

10 CFR 50.48(c)(2)(iii) specifically notes that use of feed-and-bleed as the sole fire-protected safe-shutdown path for maintaining reactor coolant inventory, pressure control, and decay heat removal capability is not permitted for pressurized-water reactors (PWRs). The staff will determine if the LAR includes a statement to this effect as well as a description of any dependence on feed-and-bleed in the FPP.

### III.3.1.2 Fire-Induced Multiple Spurious Operations (MSOs)

Section 2.4.2.2 of NFPA 805 requires the applicant to evaluate fire-induced failure modes resulting from spurious operations and signals, as a part of its safe shutdown circuit analysis. NEI 00-01, Revision 1, "Guidance for Post-Fire Safe Shutdown Circuit Analysis," and RG 1.205, Regulatory Position 3.3 provide one acceptable approach to circuit analysis for a plant implementing an FPP under 10 CFR 50.48(c). NEI 04-02, Section B.2.1, provides one acceptable approach for identifying MSOs when analyzing the post-fire safe-shutdown circuits. The description of the MSO analysis should contain sufficient information concerning methods, tools, and acceptance criteria used to enable the staff to determine the acceptability of the licensee's methodology. The analysis should generally be performed and arranged by fire area, although in some cases an alternative spatial approach may prove to be more practical. If an expert panel process is used, it should be documented with results clearly presented. The staff will verify that the applicant has evaluated MSOs in conformance with Regulatory Position 3.3 of RG 1.205 and the referenced NEI 00-01 and NEI 04-02 sections.

### III.3.1.3 Transition of Operator Manual Actions to Recovery Actions (RAs)

Use of RAs, as defined in NFPA 805, Section 1.6.52, to demonstrate the availability of a success path for the nuclear safety performance criteria, does not meet the deterministic requirements in Section 4.2.3 of NFPA 805. The staff has provided a definition of "primary control station" in Regulatory Position 2.4 of RG 1.205, which will result in some OMAs being classified as RAs and other OMAs not being so classified. OMAs that transition to RAs that are used to demonstrate the availability of a success path for the nuclear safety performance criteria, whether or not currently allowed or previously approved in the plant's existing licensing basis, automatically shall imply use of the PB approach as outlined in NFPA 805, Paragraph 4.2.4. The staff will verify that these OMAs have been evaluated using PB methods. Assessing the risk of these RAs is discussed in SRP Section III.5.4, "Risk of Crediting Recovery Actions."

### III.3.2 Specific Compliance with NFPA 805 by Fire Area

In evaluating nuclear safety performance criteria transition, staff will reference Section 1.5 of NFPA 805, which establishes the nuclear safety performance criteria, and Chapter 4 of NFPA 805, which provides the methodology to determine the fire protection systems and features required to achieve the performance criteria outlined in Section 1.5.

The staff will review the LAR to ensure that each fire area has been evaluated and determined to comply with the requirements of NFPA 805. The staff will verify that each fire area either meets NFPA 805, Paragraph 4.2.3 deterministic requirements; meets the NFPA 805, Paragraph 1.5 performance criteria as demonstrated by using PB methods as allowed under NFPA 805,

Paragraph 4.2.4; or meets the NFPA 805, Paragraph 1.5 performance criteria as demonstrated using RI or PB alternatives to compliance with NFPA 805 pursuant to 10 CFR 50.48(c)(4). When using the PB approach of NFPA 805, Paragraph 4.2.4, the user shall be permitted to utilize deterministic methods for simplifying assumptions within the fire area as allowed by Paragraph 4.2.2. Refer to Paragraph III.1.8 of this SRP Section for further information on alternatives.

#### III.3.2.1 Deterministic Compliance with NFPA 805, Section 4.2.3

For each fire area where the licensee has selected the deterministic approach to demonstrate compliance, the staff will verify that the LAR commitments meet the deterministic requirements of NFPA 805, Paragraph 4.2.3. Note that certain RAs do not constitute deterministic compliance and require use of a PB approach, whether or not part of a plant's existing licensing basis, as discussed in Section III.1.3. Licensees may demonstrate compliance through:

- (a) Compliance with the deterministic requirements of NFPA 805 through the use of previously approved exemptions/deviations from their current licensing basis; or,
- (b) The use of an engineering equivalency evaluation of an existing configuration to demonstrate an equivalent level of fire protection compared to the deterministic requirements. [NFPA 805, Paragraph 2.2.7]

Previously approved exemptions/deviations (normally from Appendix R requirements) describe plant configurations that the staff has determined to be acceptable, notwithstanding that Appendix R or NFPA 805 may require some other configuration. Such plant configurations may be deemed to satisfy the deterministic requirements of NFPA 805 provided the basis for acceptability of these previously approved exemption/deviations continues to be valid. Guidance for acceptable existing engineering equivalency evaluations (EEEEEs) is provided in RG 1.205, Regulatory Position 2.3.2 and NEI 04-02, Appendix B.3. Submittal of EEEEEs for NRC review and approval should be as discussed in the RG 1.205, Regulatory Position.

#### III.3.2.2 Performance-Based Compliance with NFPA 805, Section 4.2.4

For each fire area where the licensee has selected the PB approach, the staff will verify that the LAR commitments meet the requirements of NFPA 805, Paragraph 4.2.4. A PB approach is necessary if the deterministic requirements of NFPA 805, Section 4.2.3, (as discussed in Section III.3.2.1) are not satisfied. As discussed in Section 4.2.2 of NFPA 805, the PB approach shall be permitted to utilize deterministic methods for simplifying assumptions within the fire area.

If the fire modeling PB approach is employed, the staff will verify that the LAR commitments meet the requirements of NFPA 805, Paragraph 4.2.4.1. The staff will verify that the licensee has made a statement in the LAR confirming that it has provided the operational guidance required by NFPA 805, Paragraph 4.2.4.1.6, and that all RAs are feasible. NUREG-1852 is one acceptable PB approach that can be used in judging the feasibility of RAs. Another acceptable set of criteria that a licensee may use to evaluate the feasibility of RAs is outlined in NFPA 805, Appendix B.5.2(e).

If the fire risk evaluation PB approach is employed, the staff will review the integrated assessment of the acceptability of risk, DID, and safety margins per Section III.5.5 of this SRP. The staff will review OMAs that the licensee desires to transition to RAs. If the licensee has chosen to use the PB approach because the licensee credits RAs to demonstrate the availability of a success path for the nuclear safety performance criteria, the staff will review the licensee's evaluation of the additional risk per Section III.5.4 of this SRP.

### III.3.2.3 Risk-Informed or Performance-Based Alternatives to Compliance with NFPA 805

For each fire area where the licensee has selected RI or PB alternatives to compliance with NFPA 805, the staff will verify that the LAR commitments meet the appropriate requirements. Refer to Paragraph III.1.8 of this SRP Section for information relating to these alternatives.

### III.3.3 Non-Power Operational Modes

The staff will review the licensee's treatment of fires during non-power operations (NPOs).

As stated in RG 1.205, Regulatory Position 2.2.5, Section 4.3.3 and Appendix F to NEI 04-02 provide detailed guidance on one acceptable approach to addressing fires during non-power operational modes. Approved FAQ 07-0040, Revision 4, provides updated language to the NEI 04-02 sections.

The staff will review the LAR to verify that the licensee has demonstrated that the nuclear safety performance criteria are met during High(er) Risk Evolutions (HREs). One way to accomplish this objective is for the staff to verify that the licensee has adequately documented the completion of the tasks in Appendix F to NEI 04-02.

## III.4 RADIOACTIVE RELEASE PERFORMANCE CRITERIA

NFPA 805 includes radioactive release goals, performance objectives, and performance criteria in Paragraphs 1.3.2, 1.4.2, and 1.5.2. The staff will verify that the LAR documents that radiation release to any unrestricted area due to the direct effects of fire suppression activities (but not involving fuel damage) remains as low as reasonable achievable, not to exceed the limits in 10 CFR Part 20. Appendix G to NEI 04-02 provides items for the staff to consider as part of this review.

## III.5 RISK ASSESSMENTS AND PLANT CHANGE EVALUATIONS

NFPA 805 requires risk assessments to be performed in several instances:

1. Plant Change Evaluations [NFPA 805, Section 2.4.4]
2. Additional risk associated with RAs [NFPA 805, Section 4.2.4]
3. Fire Risk Evaluations [NFPA 805, Section 4.2.4.2]

staff review guidance for the risk assessments (1, 2, and 3 above) is provided in SRP Paragraphs III.5.3, III.5.4, and III.5.5, respectively.

### III.5.1 PRA Technical Adequacy

The staff will confirm the licensee has provided an evaluation of the technical adequacy of its PRA model consistent with RG 1.200 and SRP Section 19.1. The staff will confirm that the licensee has provided a description of its processes for assuring the PRA model is maintained and updated to reflect the as-built, as-operated and maintained plant, including operating experience of the plant, using SRP Section 19.1.

The staff will review the licensee's assessment of the technical adequacy of the PRA model used for any risk evaluations required to transition to a RI/PB FPP, including resolution of peer review findings and licensee self-assessments.

### III.5.2 DID and Safety Margins

The staff will ensure that the licensee's plant change evaluations (Section III.5.3 of this SRP) and fire risk evaluations (Section III.5.5 of this SRP) ensure that the philosophy of DID is maintained relative to fire protection and nuclear safety. [NFPA 805, Paragraph 2.4.4.2 and Paragraph 4.2.4.2]

Fire protection DID is achieved when an adequate balance of each of the following elements is provided: [NFPA 805, Paragraph 1.2]

1. Preventing fires from starting
2. Rapidly detecting fires and controlling and extinguishing promptly those fires that do occur, thereby limiting fire damage
3. Providing an adequate level of fire protection for SSCs important to safety, so that a fire that is not promptly extinguished will not prevent essential plant safety functions from being performed

SRP Section 19.2 provides guidance on nuclear safety DID.

The staff will ensure that the licensee's plant change evaluations ensure that sufficient safety margins are maintained. [NFPA 805, Paragraph 2.4.4.3] With sufficient safety margins:

- Codes and standards or their alternatives approved for use by the NRC are met; and,
- Safety analysis acceptance criteria in the licensing basis are met, or proposed revisions provide sufficient margin to account for analysis and data uncertainty.

Note that the deterministic approach in NFPA 805 for meeting the performance criteria, as described in Section III.3.2.1, shall be deemed to satisfy the DID and safety margins requirements. [NFPA 805, Paragraphs 2.4.4.2 and 2.4.4.3]

### III.5.3 Plant Change Evaluations



Changes to a previously approved FPP element shall be evaluated with a plant change evaluation. NFPA 805, Section 2.4.4 states:

“A plant change evaluation shall be performed to ensure that a change to a previously approved fire protection program element is acceptable. The evaluation process shall consist of an integrated assessment of the acceptability of risk, defense-in-depth, and safety margins. The impact of the proposed change shall be monitored.”

Guidance for performing plant changes is provided in RG 1.205, Regulatory Position 3.2, and in NEI 04-02, Section 5.3, Appendix I and Appendix J.

The staff will review the licensee’s plant change evaluations using the acceptance guidance of RG 1.174, and SRP Section 19.2. The staff should review any combined changes and cumulative risk as described in Section III.5.6 below.

If required to address the acceptance guidance of RG 1.174 and SRP Section 19.2, the staff will confirm the licensee has provided the total core damage frequency (CDF) and large early release frequency (LERF), i.e., risk contributions from internal and external events, including internal fires, to allow comparison with the acceptance guidelines of RG 1.174.

#### III.5.4 Risk of Crediting Recovery Actions

Use of RAs, as defined in NFPA 805, Section 1.6.52, to demonstrate the availability of a success path for the nuclear safety performance criteria, does not meet the deterministic requirements in Section 4.2.3 of NFPA 805. NFPA 805, Paragraph 4.2.4 requires that the additional risk presented by the use of these RAs be evaluated.” The staff will review the licensee’s evaluation of this additional risk of RAs. This risk evaluation may be qualitative per NFPA 805, Paragraph 4.2.4.1 or quantitative per Paragraph 4.2.4.2, and a bounding approach is acceptable. [RG 1.205, Regulatory Position 2.4]

#### III.5.5 Fire Risk Evaluations

NFPA 805, Paragraph 4.2.4.2 states in part: “Use of fire risk evaluation for the PB approach shall consist of an integrated assessment of the acceptability of risk, DID, and safety margins.”

The fire risk evaluation is performed on each fire area where the licensee has chosen this approach. The licensee should describe the change in risk for a given fire area in sufficient detail for the staff to be able to determine that the method is acceptable (a reference to a previously approved methodology would be sufficient if the licensee fully adopts such a methodology). The characterization of each change, or type of change, should include establishing a cause-effect relationship to identify portions of the PRA affected by the issue being evaluated. The results of the change in risk analyses should reflect this cause-effect relationship in a quantification of the impact on the PRA elements.

If the impacts of a change to the plant cannot be associated with elements of the PRA, the PRA should be modified accordingly or the impact of the change should be evaluated qualitatively as part of the integrated decision-making process. In any case, the effects of the changes on the

reliability and unavailability of SSCs or on operator actions should be appropriately accounted for in the risk assessment.

For each fire area where the fire risk evaluation has been used to demonstrate compliance with NFPA 805, any increase in risk should be acceptable as described in Regulatory Position 2.2.4.1 of RG 1.205, and the total increase in risk from these fire areas should also be acceptable as described in Regulatory Position 2.2.4.2 of RG 1.205. When a licensee transitions to NFPA 805, the NRC reviewer should ensure that the licensee has identified any RAs that have been previously approved by the NRC and provided sufficient basis for that approval. The additional risk of previously-approved RAs is deemed to be acceptable by virtue of the previous NRC approval,<sup>3</sup> but that risk is included in the determination of the acceptability of non-previously-approved variances from the NFPA 805, Section 4.2.3, deterministic criteria during transition to a RI/PB FPP licensing basis. Regulatory Position 2.2.4 of RG 1.205 provides guidance that the reviewer should use to determine whether the fire-area and total plant change in risk is acceptable. The staff should review any combined changes and cumulative risk as described in Section III.5.6 below.

### III.5.6 Cumulative Risk and Combined Changes

Section 2.4.4.1 of NFPA 805 requires licensees to evaluate the cumulative effect of plant changes (including all previous changes that have increased risk) on overall risk. The staff will review the licensee's evaluation of cumulative risk in accordance with the guidance in Section 3.3.2 of RG 1.174. For a transition LAR, cumulative risk is the total risk of transition. After transition to NFPA 805, the cumulative risk of further plant changes will be the change in risk between any future RI/PB changes and the fire CDF and LERF associated with the plant immediately after transition to NFPA 805. If the licensee includes a license condition permitting self approval of future changes to the FPP, the staff will verify that the proposed license condition limits the risk increase from any individual change such that there is reasonable assurance that the effect of self-approved changes on cumulative risk will be acceptable. [RG 1.205, Regulatory Position 3.2.5]

Section 2.4.4.1 further states that if more than one plant change is combined into a group for the purposes of evaluating acceptable risk, the evaluation of each individual change shall be performed along with the evaluation of combined changes. Any risk increases may be combined with risk decreases when estimating the total risk change. The staff will evaluate the licensee's combined changes as combined change requests as described in RG 1.174 and SRP Section 19.2. RG 1.205, Regulatory Position 3.2.5 provides guidance for combining changes.

### III.6 MONITORING PROGRAM

Section 2.6 of NFPA 805 requires licensees to establish and monitor acceptable levels of availability, reliability, and performance of fire protection systems and features. Monitoring

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<sup>3</sup> Unless circumstances indicate that a backfit under 10 CFR 50.109 is warranted on an adequate protection or cost-beneficial safety improvement basis. Any actions to impose a backfit would take place independent of the licensing action under consideration, per 10 CFR 50.109(d), which states: "No licensing action will be withheld during the pendency of backfit analyses required by the Commission's rules."

methods are required to consider plant and industry operating experience. If the established levels of availability, reliability, or performance are not met, appropriate corrective actions to return to the established levels shall be implemented.

NEI 04-02, Section 4.5.3 and Appendix E, provide guidance to licensees, acceptable to the staff, for implementing the required monitoring program. The staff will review the licensee's proposed program to ensure the program adequately addresses the endorsed guidance.

### III.7 PROGRAM DOCUMENTATION, CONFIGURATION CONTROL, AND QUALITY ASSURANCE

Section 5 of NEI 04-02 provides guidance to licensees regarding program documentation, configuration control, and quality assurance. This guidance is endorsed in RG 1.205.

#### III.7.1 Program Documentation

Section 2.7.1 of NFPA 805 requires the licensee to adequately document compliance with the requirements in the standard, including establishment of an FPP design basis document. The staff will verify that the licensee has established an FPP design basis document that meets the requirement of NFPA 805, Section 2.7.1.2.

#### III.7.2 Configuration Control

Section 2.7.2 of NFPA 805 requires the licensee to maintain configuration control of the design basis and supporting documents. The design basis document shall be kept up-to-date and maintained as a controlled document. Changes affecting the design, operation, or maintenance of the plant shall be reviewed by the licensee to determine if these changes impact the FPP documentation.

The staff will review the licensee's process for maintaining configuration control of the FPP design basis document.

The acceptability of licensee's process for maintaining configuration control of the fire PRA methods and model is determined per Section III.5.1 of this SRP.

#### III.7.3 Quality

Section 2.7.3 of NFPA 805 establishes the quality requirements for each analysis, calculation, or evaluation performed in support of the LAR. These quality requirements are in the areas of independent review, V&V, personnel qualifications, and uncertainty analyses.

The staff will verify that the licensee has established an FPP quality program that meets the requirements of NFPA, Section 2.7.3. The staff will verify that the licensee has justified that fire models used are acceptable to the NRC. Note that the uncertainty analysis required by NFPA 805, Section 2.7.3.5 is not required to support deterministic approach calculations per 10 CFR 50.48(c)(2)(iv).

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#### IV. EVALUATION FINDINGS

The staff verifies that the applicant has provided sufficient information and that the review and calculations (if applicable) support conclusions similar to the following to be included in the staff's SER:

The staff concludes that the proposed LAR to implement a RI/PB FPP is acceptable and that the licensee has demonstrated that the resulting FPP will meet the requirements of GDC 3, 10 CFR 50.48(a) and 10 CFR 50.48(c). The staff has reviewed the licensee's analysis and justifications for the change and concludes that there is reasonable assurance that a fire in any plant area during any operational mode and plant configuration will not prevent the plant from achieving and maintaining the fuel in a safe and stable condition.

The staff also states the bases for those conclusions.

#### V. IMPLEMENTATION

The following is intended to provide guidance to applicants and licensees regarding the staff's plans for using this SRP Section.

The staff will use this SRP Section in performing safety evaluations of licensee requests to:

- Establish and maintain a FPP that complies with NFPA 805, as allowed by 10 CFR 50.48(c)(3)(i);
- Use PB methods permitted in NFPA 805 for the FPP elements and minimum design requirements of NFPA Chapter 3, as allowed by 10 CFR 50.48(c)(2)(vii);
- Use RI or PB alternatives to compliance with NFPA 805, as allowed by 10 CFR 50.48(c)(4).

The staff will also use applicable portions of this SRP Section in performing safety evaluations of licensee requests for any changes to its NFPA 805 FPP that must be submitted for prior approval.

The provisions of this SRP Section apply to reviews of applications submitted 6 months or more after the date of issuance of this SRP Section, unless superseded by a later revision.

#### VI. REFERENCES

1. 10 CFR Part 50, "Domestic Licensing of Production and Utilization Facilities," NRC, Washington, DC.
2. 10 CFR Part 50, §50.12, "Specific exemptions," NRC, U.S. Government Printing Office (GPO), Washington, DC.

3. 10 CFR Part 50, §50.22, "Class 103 licensees' for commercial and industrial facilities," NRC, GPO, Washington, DC.
4. 10 CFR Part 50, §50.34, "Contents of applications; technical information," NRC, GPO, Washington, DC.
5. 10 CFR Part 50, §50.36, "Technical Specifications," NRC, GPO, Washington, DC.
6. 10 CFR Part 50, §50.48, "Fire protection," NRC, GPO, Washington, DC.
7. 10 CFR Part 50, §50.90, "Application for amendment of license or construction permit," NRC, GPO, Washington, DC.
8. 10 CFR Part 50, §50.91, "Notice for public comment; State consultation," NRC, GPO, Washington, DC.
9. 10 CFR Part 50, §50.92, "Issuance of amendment," NRC, GPO, Washington, DC.
10. 10 CFR Part 50, §50.109, "Backfitting," NRC, GPO, Washington, DC.
11. 10 CFR Part 50, Appendix A, GDC 3, "Fire Protection," NRC, GPO, Washington, DC.
12. 10 CFR Part 50, Appendix A, GDC 5, "Sharing of Structures, Systems, and Components," NRC, GPO, Washington, DC.
13. 10 CFR Part 50, Appendix A, GDC19, "Control Room," NRC, GPO, Washington, DC.
14. 10 CFR Part 50, Appendix R, "Fire Protection Program for Nuclear Power Facilities Operating Prior to January 1, 1979," NRC, GPO, Washington, DC.
15. BTP Chemical Engineering Branch (CMEB) 9.5-1, "Fire Protection Program." (ADAMS Accession No. ML070660454)
16. BTP APCS 9.5-1, "Guidelines for Fire Protection for Nuclear Power Plants," May 1, 1976. (ADAMS Accession No. ML070660461)
17. BTP APCS 9.5-1, Appendix A, "Guidelines for Fire Protection for Nuclear Power Plants Docketed Prior to July 1, 1976." (ADAMS Accession No. ML070660458)
18. GL 84-01, NRC Use of the Terms, "Important to Safety" and "Safety Related" January 5, 1984. (ADAMS Accession No. ML031150515)
19. GL 86-10, "Implementation of Fire Protection Requirements," April 24, 1986. (ADAMS Accession No. ML031150322)
20. GL 86-10, Supplement 1, "Fire Endurance Test Acceptance Criteria for Fire Barrier Systems used to Separate Redundant Safe-Shutdown Trains within the Same Fire Area," NRC, March 25, 1994. (ADAMS Accession No. ML031130661)

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21. GL 2006-03, "Potentially Non-Conforming Hemyc and MT Fire Barrier Configurations," NRC, April 10, 2006. (ADAMS Accession No. ML053620142)
22. 69 FR 33536, "Voluntary Fire Protection Requirements for Light Water Reactors; Adoption of NFPA 805 as a Risk-Informed, Performance-Based Alternative," *Federal Register*, Volume 69, Number 115, pp. 33536–33550, Washington, DC, June 16, 2004.
23. IEEE 383, "Qualifying Class 1E Electric Cables and Field Splices for Nuclear Power Generating Stations," IEEE, Inc.
24. IEEE 1202, "Flame Testing of Cables for Use in Cable Tray," IEEE, Inc.
25. NEI 00-01, "Guidance for Post-Fire Safe Shutdown Circuit Analysis," Revision 1, NEI, January 2005. (ADAMS Accession No. ML050310295)
26. NEI 04-02, "Guidance for Implementing a Risk-Informed, Performance-Based Fire Protection Program Under 10 CFR 50.48(c)," Revision 2, NEI, September 2005. (ADAMS Accession No. ML081130188)
27. NEI 07-12, "Fire Probabilistic Risk Assessment (FPRA) Peer Review Guidelines," Draft Version F, Revision 0, NEI, December 2007. (ADAMS Accession No. ML073551159)
28. NFPA 805, "Performance-Based Standard for Fire Protection for Light-Water Reactor Electric Generating Plants," 2001 Edition, National Fire Protection Association, Quincy, MA. Copies may be purchased from the NFPA, 1 Batterymarch Park, Quincy, MA, phone: (800) 344-3555; fax: (800) 593-NFPA (6372). Purchase information is available through the NFPA's Web-based store at <http://www.nfpa.org/Catalog>.
29. NUREG-0800, "Standard Review Plan for the Review of Safety Analysis Reports for Nuclear Power Plants (LWR Edition)," Section 9.5.1, "Fire Protection System," NRC, Washington, DC, various dates and revisions. (Available at <http://www.nrc.gov/reading-rm/doc-collections/nuregs/staff/sr0800>.)
30. NUREG-1600, "General Statement of Policy and Procedure for NRC Enforcement Actions, Interim Enforcement Policy May 1, 2000," NRC, Washington, DC. (ADAMS Accession No. ML003715971)
31. NUREG-1805, "Fire Dynamics Tools (FDTs) Quantitative Fire Hazard Analysis Methods for the NRC Fire Protection Inspection Program," December 2004, NRC, Washington, DC. (ADAMS Accession No. ML043290075)
32. NUREG-1824, "Verification and Validation of Selected Fire Models for Nuclear Power Plant Applications," Volumes 1–7, May 2007, NRC, Washington, DC. (ADAMS Accession Nos. ML071650546, ML071730305, ML071730493, ML071730499, ML071730527, ML071730504, and ML071730543)

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33. NUREG-1852, "Demonstrating the Feasibility and Reliability of Operator Manual Actions in Response to Fire," October 2007, NRC, Washington, DC. (ADAMS Accession No. ML073020676)
34. NUREG/CR-6850, "EPRI/NRC-RES, Fire PRA Methodology for Nuclear Power Facilities," Volumes 1 and 2, September 2005, NRC, Washington, DC. (ADAMS Accession Nos. ML052580075 and ML052580118)
35. RG<sup>1</sup> 1.174, Revision 1, "An Approach for Using Probabilistic Risk Assessment in Risk-Informed Decisions on Plant-Specific Changes to the Licensing Basis," November 2002, NRC, Washington, DC. (ADAMS Accession No. ML023240437)
36. RG1.189, Revision 1, "Fire Protection for Nuclear Power Plants," March 2007, NRC, Washington, DC. (ADAMS Accession No. ML070370183)
37. RG1.200, Revision 2, "An Approach For Determining The Technical Adequacy Of Probabilistic Risk Assessment Results For Risk-Informed Activities," March 2009, NRC, Washington, DC. (ADAMS Accession No. ML090410014)
38. RG1.205, "Risk-Informed, Performance-Based Fire Protection for Existing Light Water Nuclear Power Plants," May 2006. (ADAMS Accession No. ML061100174)
39. RIS 2004-03, Revision 1, "Risk-Informed Approach for Post-Fire Safe-Shutdown Associated Circuit Inspections," December 29, 2004, NRC, Washington, DC. (ADAMS Accession No. ML042440791)
40. RIS 2005-07, "Compensatory Measures to Satisfy the Fire Protection Program Requirements," April 19, 2005, NRC, Washington, DC. (ADAMS Accession No. ML042360547)
41. RIS 2005-30, "Clarification of Post-Fire Safe-Shutdown Circuit Regulatory Requirements," December 20, 2005, NRC, Washington, DC. (ADAMS Accession No. ML053360069)
42. RIS 2006-10, "Regulatory Expectations with Appendix R Paragraph III.G.2 Operator Manual Actions," June 30, 2006, NRC, Washington, DC. (ADAMS Accession No. ML061650389)

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<sup>1</sup>All RGs listed herein were published by the NRC. Most are available electronically through the Public Electronic Reading Room on the NRC's public Web site, at <http://www.nrc.gov/reading-rm/doc-collections/reg-guides/>. Single copies of RGs may also be obtained free of charge by writing the Reproduction and Distribution Services Section, ADM, USNRC, Washington, DC 20555-0001, or by fax to (301) 415-2289, or by email to [DISTRIBUTION@nrc.gov](mailto:DISTRIBUTION@nrc.gov). Active guides may also be purchased from the National Technical Information Service (NTIS) on a standing order basis. Details on this service may be obtained by contacting NTIS at 5285 Port Royal Road, Springfield, Virginia 22161, online at <http://www.ntis.gov>, by telephone at (800) 553-NTIS (6847) or (703)605-6000, or by fax to (703) 605-6900. Copies are also available for inspection or copying for a fee from the NRC's Public Document Room (PDR), which is located at 11555 Rockville Pike, Rockville, Maryland; the PDR's mailing address is USNRC PDR, Washington, DC 20555-0001. The PDR can also be reached by telephone at (301) 415-4737 or (800) 397-4209, by fax at (301) 415-3548, and by email to [PDR@nrc.gov](mailto:PDR@nrc.gov).



43. RIS 2007-19, "Process for Communicating Clarifications of Staff Positions Provided in RG1.205 Concerning Issues Identified during the Pilot Application of National Fire Protection Association Standard 805," August 20, 2007, NRC, Washington, DC. (ADAMS Accession No. ML071590227)
44. NRC OI No. LIC-101, "License Amendments Review Procedures," February 9, 2004, NRC, Washington, DC. (ADAMS Accession No. ML040060258)
45. NRC NRR OI No. LIC-109, "Acceptance Review Procedures," May 2, 2008, NRC, Washington, DC. (ADAMS Accession No. ML081200811)
46. NRC NRR OI No. LIC-111, "Regulatory Audits," USNRC, December 29, 2008. (ADAMS Accession No. ML082900195)
47. NRC NRR OI No. LIC-500, "Processing Requests for Reviews of Topical Reports," June 24, 2005, NRC, Washington, DC. (ADAMS Accession No. ML051800651)
48. NRC Management Directive 8.4, "Management of Facility-specific Backfitting and Information Collection," October 28, 2004. (ADAMS Accession No. ML050110156)

VII. ATTACHMENTS

RI/PB FPP LAR Technical Acceptance Review Checklist for use with NRR OI No. LIC-109, "Acceptance Review Procedures."

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**PAPERWORK REDUCTION ACT STATEMENT**

The information collections contained in the SRP are covered by the requirements of 10 CFR Part 50 and 10 CFR Part 52, and were approved by the Office of Management and Budget, approval number 3150-0011 and 3150-0151.

**PUBLIC PROTECTION NOTIFICATION**

The NRC may not conduct or sponsor, and a person is not required to respond to, a request for information or an information collection requirement unless the requesting document displays a currently valid OMB control number.

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## **SRP Section 9.5.1.2 Description of Changes**

This SRP Section affirms the technical accuracy and adequacy of the guidance previously provided in (Draft) Revision 0, dated January 1, 2009 of this SRP. See ADAMS Accession No. ML090050052.

In addition this SRP Section was administratively updated in accordance with NRR OI LIC-200, Revision 1, "Standard Review Plan Process." The revision also adds standard paragraphs to extend application of the updated SRP section to prospective submittals by applicants pursuant to 10 CFR Part 52.

This SRP Section was issued initially as Revision 0 and as a new guidance in January 2009 and was offered to stakeholders for comments under the agency's *Federal Register* notice published on February 5, 2009 (74 FR 6181). The staff captured the changes that were received in response to that notification, dispositioned the comments and in incorporating those are issuing this as Revision 1 and as a final guidance. The public comment disposition is shown in some greater detail in separate documents (see ADAMS Accession Nos.: ML091100448, ML091480255, and ML091480256.)

The individual changes in specific areas of this SRP Section are shown below. There were a few generic comments and among the generic comment the one important comment that staff dispositioned was each section of the SRP should show appropriate cross references to NEI 04-02. staff dispositioned that the SRP provides a general reference to RG 1.205 and NEI 04-02, and specific references where it was judged important to call attention to specific parts of these documents.

- I. Areas of Review - See ADAMS Accession Nos. ML091100448, ML091480255, and ML091480256.
- II. Acceptance Criteria - See ADAMS Accession Nos. ML091100448, ML091480255, and ML091480256.
- III. Review Procedures - See ADAMS Accession Nos. ML091100448, ML091480255, and ML091480256.
- IV. Evaluation Findings - See ADAMS Accession Nos. ML091100448, ML091480255, and ML091480256.
- V. Implementation - See ADAMS Accession Nos. ML091100448, ML091480255, and ML091480256.
- VI. References - See ADAMS Accession Nos. ML091100448, ML091480255, and ML091480256.
- VII. Attachments - Added a new header entitled "License Amendment Request Review Matrix." See ADAMS Accession Nos. ML091100448, ML091480255, and ML091480256.

**Attachment 1 – RI/PB FPP LAR Acceptance Review Matrix**

<b>RI/PB FPP License Amendment Request Acceptance Review Matrix</b>			
<b>SRP III.</b>	<b>Required Information</b>	<b>Sufficient for Review?</b>	<b>Comments</b>
1.1	The LAR identifies any orders and license conditions that must be revised or superseded.		
	The LAR provides any necessary revisions to the plant's TSS and the bases thereof to implement a FPP that complies with NFPA 805.		
	The LAR includes a discussion of the changes to the UFSAR necessitated by the license amendment.		
1.2	The LAR lists any plant modifications necessary to implement the RI/PB FPP; it includes description, a schedule, and justification, including compensatory measures until the modification is completed.		
1.3	Self approval: Ensure the following are included in the LAR:		
	Licensee's process for self-approving changes post-transition.		
	The risk acceptance criteria and any restrictions in terms of the types of changes that may be so implemented.		
	The process for ensuring DID and safety margins are appropriately addressed.		
	Revised license condition, including self-approval if sought.		
1.4	The LAR includes "no significant hazards consideration" statement.		
1.5	The LAR includes a statement on environmental considerations.		
1.6	The LAR includes a transition schedule, justification for the schedule, and a list of modifications with a commitment to maintain in effect associated compensatory measures		
1.7	(optional) The LAR includes a request to use PB methods to establish compliance with the prescriptive fundamental FPP and design elements of Chapter 3 of NFPA 805 (10 CFR 50.48(c)(2)(vii)).		

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1.8	(optional) The LAR includes a request to use RI or PB alternatives to demonstrate compliance with 10 CFR 50.48(c) (10 CFR 50.48(c)(4)).		
2	The LAR describes how the licensee complies with the fundamental FPP and design elements in Chapter 3 of NFPA 805; the LAR describes the licensee's approach.		
2.1	The LAR justifies use of the italicized exception in Section 3.6.4 of NFPA 805 per 10 CFR 50.48(c)(2)(vii) for water supply and distribution (if applicable).		
2.2	The LAR identifies structures that comprise the "power block."		
2.3	The LAR addresses potential issues with electrical raceway fire barrier system issues (e.g., Hemyc and MT) (if applicable).		
2.4	The LAR discusses flame propagation ratings of existing cables and the basis for the ratings and provides flame propagation ratings for new or replacement cables.		
3.1	The LAR includes a description of how the licensee performed applicable engineering analyses in NFPA 805, Section 2.4.		
	The LAR describes the systematic approach used to transition the FPP to the new requirements in NFPA 805.		
3.1.1	The LAR discusses use of feed-and-bleed for post fire.		
3.1.2	The LAR discusses fire-induced failure modes resulting from spurious operations and signals.		
3.1.3	The LAR identifies RAs used to demonstrate the availability of a success path for the nuclear safety performance criteria and evaluates those using PB methods.		

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3.2	The LAR describes the licensee's approach to establishing nuclear safety performance criteria and the results of implementing the approach.		
	The LAR evaluates each fire area/zone for compliance to NFPA 805 requirements:		
3.2.1	Description of use of the deterministic approach of NFPA 805, Paragraph 4.2.3 are met, as applicable.		
	Documentation of previous NRC approval claimed to meet NFPA 805, Paragraph 2.2.7 for meeting the deterministic requirements (Paragraph 4.2.3).		
3.2.2	Description of use of the fire modeling approach of NFPA 805, Paragraph 4.2.4.1 (if applicable)		
	Statement that licensee has provided operational guidance required by NFPA 805, Paragraph 4.2.4.1.6 (if applicable).		
	Description of use of the fire risk approach of NFPA 805, Paragraph 4.2.4.2 (if applicable).		
3.2.3	Description of use of RI/PB alternatives to NFPA 805 if approved (or approval requested) per 50.48(c)(4) – relates to SRP Section III.1.8 (if applicable).		
3.3	The LAR describes fire protection during NPOs and demonstrates that the nuclear safety performance criteria will be met during HREs.		
4	The LAR describes how the radioactive release performance criteria are met.		
5.1	The LAR describes the fire PRA technical adequacy, including: -evaluation against appropriate standards -process for PRA model maintenance/update -technical adequacy for any NFPA 805 required risk assessments		
5.2	The LAR describes how DID and safety margins are maintained.		

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5.3	The LAR includes plant change evaluations for any changes to a previously approved FPP that require prior NRC review and approval.		
	The LAR provides the total CDF and LERF, i.e., risk contributions from internal and external events, including internal fires if required to address the acceptance guidance of RG 1.174 and SRP Section 19.2.		
5.4	The LAR provides the additional risk of crediting RAs in lieu of meeting the deterministic requirements of NFPA 805, Section 4.2.3, whether or not previously approved by NRC (as applicable).		
5.5	The LAR includes fire risk evaluations per NFPA 805, Section 4.2.4.2 including an integrated assessment of the acceptability of risk, DID, and safety margins (as applicable).		
5.6	The LAR provides the cumulative risk if applicable.		
5.6	The LAR provides the individual risk of changes when changes are combined into a group for the purposes of evaluating risk.		
6	The LAR describes the proposed monitoring program to monitor acceptable levels of availability, reliability, and performance of fire protection systems and features.		
7.1	The LAR describes of the FPP design basis document.		
7.2	The LAR describes the configuration control process for the FPP design basis document.		
7.3	The LAR describes the program to ensure quality requirements are met.		