

## 9.5.1b RISK-INFORMED, PERFORMANCE-BASED FIRE PROTECTION

### REVIEW RESPONSIBILITES

Primary – Organization responsible for the review of fire protection.

Secondary – Organization responsible for the review of risk-informed licensing actions

#### I. AREAS OF REVIEW

##### Introduction

Title 10, Section 50.48, “Fire protection,” of the *Code of Federal Regulations* (10 CFR 50.48) provides the U.S. Nuclear Regulatory Commission (NRC) requirements for fire protection for nuclear power plants. Under 10 CFR 50.48(c), a licensee may choose to adopt a risk-informed, performance-based (RI/PB) fire protection program (FPP) that meets the requirements of National Fire Protection Association (NFPA) Standard 805, “Performance Based Standard for Fire Protection for Light Water Reactor Electric Generating Plants,” 2001 edition, as endorsed therein, as an alternative to meeting the requirements of 10 CFR 50.48(b) for plants licensed to operate before January 1, 1979, or the approved FPP for plants licensed to operate after January 1, 1979.

Licensees who wish to adopt an RI/PB FPP that complies with NFPA 805 must submit a license amendment request (LAR) in accordance with 10 CFR 50.48(c)(3)(i). Licensees who wish to adopt 10 CFR 50.48(c) but who wish to use performance-based 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). In addition to the LARs required by the rule, licensees may submit additional elements of their program for which they wish to receive specific NRC review and approval as set forth in Regulatory Guide (RG) 1.205, “Risk-Informed, Performance-Based Fire Protection for Existing Light-Water Nuclear Power Plants,” Regulatory Position 2.2.

This chapter of the Standard Review Plan (SRP) provides guidance for NRC staff members who review RI/PB FPP LARs submitted pursuant to 10 CFR 50.48(c) and the guidance in RG 1.205. This SRP section covers the review of LARs for transition to an RI/PB FPP based on NFPA 805. However, the applicable portions of the guidance contained in this Chapter may be used by NRC staff in reviewing RI/PB FPP from licensees that have implemented NFPA 805 as their licensing bases. Note that review of non-RI/PB FPP LARs (e.g., exemptions from Appendix R to 10 CFR Part 50 requirements) is not covered in this SRP section.

In developing this SRP section, the staff considered requirements of 10 CFR 50.48(c) and NFPA 805 and the guidance provided by (1) RG 1.205 and (2) 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 endorsed in RG 1.205. In addition, the staff incorporated additional staff positions developed using experience from NFPA 805 implementation. The staff has documented these additional staff positions via the NFPA 805 Frequently Asked Questions (FAQ) Process. [RIS 2007-19]

## Review Areas

An RI/PB FPP for a nuclear power plant licensed to operate generally consists of the following elements:

- comprehensive identification and analysis of fire hazard
- organization and staff positions responsible for management and implementation of the FPP
- fire prevention program consisting of administrative policy, procedures, and practices for training of general plant personnel; control of fire hazards; inspection, testing and maintenance of fire protection systems and features; control of plant design and modification; control of fire system outages and impairments; and FPP quality assurance
- automatic fire detection, alarm, and suppression systems, including fire water supply and distribution systems
- manual suppression capability including: standpipe design, hydrants, hose stations, fire department connections, fire brigade organization, training, qualification, equipment, and drills, emergency plans and procedures, and if applicable, offsite mutual aid capabilities
- building design for fire protection including layout of fire areas, fire barrier design and qualification testing, interior finish, electrical system design, ventilation system design, drainage systems, and other systems and features for minimizing the threat of fire
- safe shutdown analysis and procedures that demonstrate the plant can achieve and maintain safe shutdown in the event of a fire
- fire PRA that quantifies the risk of fire events in terms of core damage frequency (CDF) and large early release frequency (LERF). The PRA evaluation shall address the risk contribution associated with all potentially risk-significant fire scenarios. [NFPA 805 §2.4.3],

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 Checklist attached to this SRP section. Specifically, the staff reviews the following:

1. Proposed RI/PB FPP license condition including plant modifications that the licensee has identified as necessary to implement the RI/PB FPP, schedule for implementation of the modifications, and process for self-approving RI/PB FPP changes post-transition.
2. Revised technical specifications, including Administrative Controls and Limiting Conditions for Operation and their bases.
3. Orders and license conditions that the licensee has identified as needing to be revised or superseded. Proposed FSAR changes related to the FPP if provided.
4. Statements on no significant hazards consideration and environmental considerations.
5. Schedule for implementing transition from the existing FPP to an RI/PB FPP and the justification for the schedule.

6. Licensee's request per 10 CFR 50.48(c)(2)(vii) to use performance-based methods to establish compliance with the fundamental FPP and design elements of Chapter 3 of NFPA 805.
7. Licensee's request per 10 CFR 50.48(c)(4) to use risk-informed or performance-based alternatives to compliance with NFPA 805.
8. Licensee's description of operational guidance provided to plant personnel detailing the success path(s) for each fire area and the performance of recovery actions (RAs).
9. References to FAQs to ensure that FAQs that have not been closed by the NRC are described in detail.
10. Plant structures that comprise the power block.
11. Post-fire safe shutdown analysis, including the list of systems and components needed to provide post-fire safe shutdown capability, the arrangement of the systems and components within the plant fire areas, the separation between redundant safe shutdown systems and components, the fire protection for safe shutdown systems and components, and potential interactions between non-safety systems, fire protection systems, and systems important to safety for potential adverse effects on the safe shutdown capability.
12. Use of feed-and-bleed as a safe shutdown path to ensure that it is not the only path relied on in pressurized water reactors for safe shutdown.
13. Pre- and post-transition regulatory basis for each fire area, including methods used to accomplish NFPA 805 performance criteria, deviations/exemptions, existing engineering equivalency evaluations (EEEES), and risk assessment results.
14. Treatment of fires during non-power operational modes to ensure that nuclear safety performance criteria are met.
15. Radioactive release information to ensure that the radioactive release goals have been met.
16. Basis for the technical adequacy of the fire PRA model being used to perform change evaluations and the process for assuring the PRA model is maintained and updated to reflect the as-built, as-operated and maintained plant, and operating experience of the plant.
17. Each change to the previously approved FPP, each RA, and each fire risk evaluation and changes made to the fire PRA model to assess the risk significance, the resultant risk increase/decrease, and how defense-in-depth and safety margins are maintained for each change, RA, and fire risk evaluation.
18. Monitoring program, including bases for failure probability assumptions used in the PRA, methods used to monitor availability, reliability, and performance of FPP systems, and processes for identifying and implementing corrective actions.
19. FPP documentation, including the FPP design basis document and supporting documents. The Licensee's configuration control process for the FPP.

20. Process for assuring quality for each FPP analysis, calculation, and evaluation.
21. Fire-induced multiple spurious operations (MSOs), including the process used to identify and screen MSOs and how each is evaluated in the Fire PRA.
22. Operator manual actions (OMAs) transitioning to RAs, including documentation that each has been previously approved by the NRC and that those RAs that are credited with achieving the nuclear safety performance criteria are feasible and reliable.
23. Process for resolving issues with Hemyc and MT electrical raceway fire barrier systems.

#### 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 structures, systems, and components important to safety.
2. 10 CFR 50.48(a), which requires that each operating nuclear power plant have a fire protection plan that meets the requirements of GDC 3.
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 nuclear power plants, 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.

#### SRP Acceptance Criteria

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 an RI/PB FPP in accordance with 10 CFR 50.48(c). (See also Volume 69 of the *Federal Register*, page 33684, and RG 1.205.)
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, Revision 1, and portions of NEI 00-01, Revision 1, "Guidance for Post-Fire Safe Shutdown Circuit Analysis".
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," issued November 2002, which provides NRC guidance on an acceptable method to assess the nature and impact on licensing basis changes using risk information within the context of applicability under 10 CFR 50.48(c) and RG 1.205.
4. 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 PRA models for risk-informed initiatives.
5. 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.
6. RG 1.200, Revision 1, "An Approach for Determining the Technical Adequacy of Probabilistic Risk Assessment Results for Risk Informed Activities," issued January 2007, which provides guidance with respect to acceptable methods and PRA quality. RG 1.200 has endorsed American Nuclear Society (ANS) and American Society of Mechanical Engineers (ASME) standards pertaining to internal event PRAs. NRC plans to endorse the ANS fire PRA standard, with exceptions as necessary, in the next revision to RG 1.200.
7. NUREG/CR-6850, "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 an RI/PB FPP, within the context of the additional clarification provided by the staff via the NFPA 805 FAQ process.

8. NUREG-1852, "Demonstrating the Feasibility and Reliability of Operator Manual Actions in Response to Fire," which provides non-human reliability analysis (HRA) methods to demonstrate that OMAs are feasible and reliable.
9. NUREG-1824, "Verification and Validation of Selected Fire Models for Nuclear Power Plant Applications," Volumes 1–7, issued May 2007, which provides guidance on V&V of fire models.

### III. REVIEW PROCEDURE

The review of an LAR starts with an acceptance review by the NRC staff in accordance with NRR Office Instruction LIC-109, "Acceptance Review Procedures." Once an LAR is accepted as sufficient for the staff to begin its review, the staff review proceeds in accordance with LIC-101, "License Amendments." If deemed appropriate for a given review, an audit of the licensee may be conducted in accordance with the outline in Attachment 2 of this SRP.

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

The required content of an LAR for transition to an RI/PB FPP is defined in 10 CFR 50.48(c)(3)(i) and 10 CFR 50.90 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, by reference, Section 4.6.1 of NEI 04-02, provide additional guidance on the content of the LAR.

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

The NRC staff will confirm that the licensee has identified any orders and license conditions that must be revised or superseded, and provided any necessary revisions to the plant's technical specifications and the bases thereof to implement a FPP that complies with NFPA 805. The reviewer 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]

##### III.1.1 License Condition Changes

Per 10 CFR 50.48(c)(3)(i), the LAR must identify any license conditions to be revised or superseded. The NRC staff will verify that the LAR includes a discussion of the existing approved FPP so it can be superseded by the new license condition.

###### III.1.1.1 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 the modification, a schedule for implementation of the modification, and justification, including compensatory measures until the modification is completed. Regulatory Issue Summary (RIS) 2005-07, "Compensatory Measures to Satisfy the Fire Protection Program Requirements," provides guidance on compensatory measures acceptable to the NRC.

### III.1.1.2 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 NRC staff. A plant change evaluation as described in paragraph III.5 of this SRP is required for any change to the approved FPP. The plant change evaluation assesses the impact of the change on risk, defense-in-depth, and safety margins in order to assess the acceptability of the change. The NRC staff will review the licensee's process for self-approving changes post-transition and determine whether the licensee has adequate processes in place to ensure that acceptable PRA quality is maintained and that defense-in-depth and safety margins are appropriately addressed after transition. The staff will ensure that self-approval is limited to methods that NRC has approved via plant-specific license amendment.

Note: Licensees may reference methods in NRC approved topical reports (TR). This option affords efficiencies both for licensees and in terms of NRC staff review effort. A licensee must still request approval to adopt the alternative approved in the topical report 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]

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 risk acceptance criteria and any restrictions in terms of the types of changes that may be so implemented. Note that Section 3.2.4 of RG 1.205 lists FPP changes that require prior NRC approval.

### III.1.2 Technical Specifications

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

- all Administrative Controls needing to be revoked
- Limiting Conditions for Operation to be revised, ensuring that they are consistent with 10 CFR 50.48(c)
- revised associated bases

The reviewer 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 10CFR 50, Appendix A, "Control Room." The reviewer will confirm that the licensee does not inadvertently delete the technical specifications associated with remote shutdown requirements required by other regulations related to the ability to safely shutdown from outside the control room.

### III.1.3 Orders and Exemptions

The staff will verify that the LAR identifies orders and exemptions/deviations related to the FPP that need to be revised or suspended, describes the necessary revisions to these orders and exemptions/deviations, and explain why these revisions are necessary to accomplish the licensee's adoption of NFPA 805, in accordance with 10 CFR 50.48(c)(3)(i).

### 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 and 10 CFR 50.92. 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

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 and justification for the schedule.

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

Under 10 CFR 50.48(c)(2)(vii), a licensee can request NRC approval, via a license amendment, to use performance-based methods to establish compliance with the prescriptive fundamental FPP and design elements of Chapter 3 of NFPA 805.

Where a licensee proposes to use performance-based methods to demonstrate compliance with the fundamental FPP and design elements in Chapter 3 of NFPA 805, the NRC staff will review the LAR in accordance with 10 CFR 50.48(c)(2)(vii) and RG 1.205, Regulatory Position 3.2.3, to verify all of the following are true for the proposed method 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.
- (c) It maintains fire protection defense-in-depth (fire prevention, fire detection, fire suppression, mitigation, and post-fire safe shutdown capability).

The staff will verify the adequacy of the methods and the licensee’s evaluation and conclusions with regard to meeting the safety margin and defense-in-depth criteria of NFPA 805.

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

Under 10 CFR 50.48(c)(4), a licensee may request NRC approval to use risk-informed or performance-based 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 NRC 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.

- (c) It maintains fire protection defense-in-depth (fire prevention, fire detection, fire suppression, mitigation, and post-fire safe shutdown capability).

Regulatory Position 3.2.3 of RG 1.205 provides additional guidance regarding the information to be supplied by the licensee when requesting NRC staff approval for alternative risk-informed, performance-based methods; the licensee should provide:

- (a) a detailed description of the alternative risk-informed, performance-based 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 PRA-based methodologies, 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

The NRC 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. This 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 defense-in-depth criteria are acceptable. Proposed alternatives are subjected to the same evaluation criteria (e.g., V&V) as the endorsed methods. The reviewer will also evaluate the LAR to verify that the licensee adequately performed and documented these evaluations.

### III.1.9 Operational Guidance

Section 4.2.4.1.6 of NFPA 805 requires the licensee to provide guidance to plant personnel that details the credited success path(s) for each fire area, including the performance of RAs and repairs.

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, and that all RAs are feasible and reliable. NUREG-1852 is one acceptable performance-based approach that can be used in judging the feasibility and reliability of RAs. A risk-informed approach to assess RA reliability is through the performance of an HRA as part of the fire PRA.

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

Chapter 3 of NFPA 805 establishes the fundamental FPP and design elements. The NRC 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 the requirements of NFPA 805 Chapter 3 requirements. The approach in NEI 04-02 as endorsed in RG 1.205 is one approach acceptable to the NRC.

### 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 (Statement of Considerations for 10 CFR 50.48(c), 69 FR 33550). 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 NRC reviewer 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.

### III.2.2 Definition of Power Block

The staff will review the LAR to determine how the licensee classifies various plant structures that comprise the "power block." The reviewer should verify that the licensee's classification conforms to the definition of "power block" in the glossary of NFPA 805, which defines power block as "structures that have equipment required for nuclear plant operations."

## III.3 NUCLEAR SAFETY PERFORMANCE CRITERIA

Chapter 2 of NFPA 805 provides the methodology to be used in implementing a performance-based FPP. 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. RG 1.205 endorses the deterministic post-fire safe shutdown analysis methodology provided in Chapter 3 of NEI 00-01, Revision 1.

### III.3.1 Transition and Implementation

The staff will ensure that the licensee used a systematic approach to transitioning the post-fire safe-shutdown analysis to the new requirements in Chapter 2 of NFPA 805. As endorsed in RG 1.205, Section B-2 of Appendix B to NEI 04-02 describes one acceptable approach to documenting the comparison of an existing post-fire safe-shutdown analysis methodology with the requirements of Chapter 2 of NFPA 805 and industry guidance document NEI 00-01.

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 determine whether the nuclear safety performance criteria have been met consistent with the requirements in NFPA 805. 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. 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 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. {May be modified once FAQ 06-0022 has been resolved}

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. If the NRC staff approves use of these alternatives, this approval should be explicitly documented in the staff's safety evaluation report.

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

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, employs performance-based methods as allowed under NFPA 805 paragraph 4.2.4, or employs risk-informed or performance-based alternatives to compliance with NFPA 805 pursuant to 10 CFR 50.48(c)(4); refer to paragraph III.1.8 of this SRP Section for further information on alternatives. The staff will ensure that the appropriate risk assessments and plant change evaluations (section III.5 of this SRP) have been performed for each fire area and that the results meet the acceptance guidance of RG 1.174.

The staff will verify that the applicant has provided a risk summary for each fire area, including identifying fire hazards, reporting CDF and LERF values, identifying the significant core damage sequences and initiating events, and providing other information in accordance with RG 1.174.

The staff will review the following information for each fire area:

- Regulatory Basis – The description of both pre and post-transition regulatory bases.
- Performance Goal Summary – The method of accomplishment of each of the performance criteria in NFPA 805 Section 1.5.
- Reference Documents – Specific references to operating procedures and the nuclear safety capability assessment.

- Licensing Actions – Specific references to deviation requests for post-1979 plants and exemptions for pre-1979 plants that will remain part of the post-transition licensing basis and the basis for acceptability of that licensing action. For each licensing action transitioned, the staff will consider the following:
  - the original basis of acceptability
  - the validity of the basis of acceptability after transition, considering both the case immediately after transition with some plant changes written into the license condition, and the case where the plant changes committed to as part of transition have been completed
- EEEEs – Specific references to each EEEE that relies on determinations of “adequate for the hazard” that will remain part of the post-transition licensing basis and the basis for acceptability of that EEEE. The staff will verify that an EEEE meets the following attributes to be considered acceptable:
  - is not based solely on quantitative risk evaluations
  - is an appropriate use of an engineering equivalency evaluation process
  - is of appropriate quality
  - Meets the standard license condition. (See I.1.2, above)
  - The evaluation reflects the as-built and as-operated and maintained plant
  - is technically adequate

### III.3.3 Non-Power Operational Modes

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

RG 1.205 endorses the approach documented in NEI 04-02. Section 4.3.3 of NEI 04-02 states: “The nuclear safety goal of NFPA 805 requires evaluation of the effects of a fire during any operational modes and plant configurations.” Section 4.3.3 of NEI 04-02 goes on to provide a strategy that “...demonstrate[s] that the nuclear safety performance criteria are met for High(er) Risk Evolutions (HREs) (HREs as defined by Nuclear Management and Resources Council (NUMARC) 91-06) during non-power operational modes, ...”

The staff will review the LAR to verify that the licensee has demonstrated that the nuclear safety performance criteria are met during HREs. To accomplish this objective, the staff will verify that the licensee has adequately documented the following tasks using Table F-1 of Appendix F to NEI 04-02.

- review of existing plant outage processes (outage management and outage risk assessments) to determine equipment relied upon to provide key safety functions (KSFs), including support functions during the required plant operating states

- comparison of the equipment credited for achieving these KSFs against the equipment credited for nuclear safety
- for those components not already credited (or credited in a different way, such as on versus off, open versus closed, etc.), analysis of the circuits in accordance with the nuclear safety methodology
- identification of locations where: (1) fires may cause damage to the equipment (and cabling) credited above or (2) RAs credited for the KSFs are performed
- identification of fire areas where a single fire may damage all the credited paths for a KSF

NUMARC 91-06 discusses the development of outage plans and schedules. A key element of that process is to ensure that the KSFs perform as needed during the various outage evolutions. The results of the fire area analysis of those components relied upon to maintain defense-in-depth should be factored into the plant's existing outage planning process.

For the areas mentioned above, the licensee may consider combinations of the following options to reduce fire risk, depending upon the significance of the potential damage:

- prohibition or limitation of hot work in fire areas during periods of increased vulnerability
- verification of operable detection and/or suppression in the vulnerable areas
- prohibition or limitation of combustible materials in fire areas during periods of increased vulnerability
- plant configuration changes (e.g. removing power from equipment once it is placed in its desired position).
- provision of additional fire patrols at periodic intervals or other appropriate compensatory measures (such as surveillance cameras) during periods of increased vulnerability
- use of RAs to mitigate potential losses of KSFs
- identification and monitoring of in-situ ignition sources for fire precursors (e.g., equipment temperatures)
- reschedule the work to a period with lower risk or higher DID

In addition, for KSF equipment removed from service during the HREs the impact should be evaluated based on KSF equipment status and the NPO fire area assessment to develop needed contingency plans/actions.

### III.4 RADIOACTIVE RELEASE PERFORMANCE CRITERIA

NFPA 805 includes radioactive release goals, performance objectives, and performance criteria as follows:

§1.3.2 states: “The radioactive release goal is to provide reasonable assurance that a fire will not result in a radiological release that adversely affects the public, plant personnel, or the environment.”

§1.4.2 states: “Either of the following objectives shall be met during all operational modes and plant configurations. (1) Containment integrity is capable of being maintained. (2) The source term is capable of being limited.”

§1.5.2 states: “Radiation release to any unrestricted area due to the direct effects of fire suppression activities (but not involving fuel damage) shall be as low as reasonably achievable and shall not exceed applicable 10 CFR, Part 20, Limits.”

The staff will verify that the LAR documents that radiation release to any unrestricted area due to the direct effects of fire protection activities (but not involving fuel damage) remains as low as reasonable achievable, not to exceed the limits in 10 CFR Part 20. Section 4.3 of Appendix H to NEI 04-02 provides one acceptable approach to documenting information that the LAR must include for staff evaluation. Appendix G to NEI 04-02 provides items for the reviewer 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:

- Plant Change Evaluations [NFPA 805 Section 2.4.4]
- Additional risk associated with RAs [NFPA 805 Section 4.2.4]
- Fire Risk Evaluations [NFPA 805 Section 4.2.4.2]

The NRC staff will review the risk assessments and plant change evaluations associated with the licensee's planned transition to a RI/PB FPP. The staff will also review the licensee's risk assessment and plant change evaluation process to be used after implementation of the approved RI/PB FPP. This post-implementation risk assessment and plant change evaluation process may apply both to changes that may be made by the licensee without prior NRC approval, as well as changes that require prior NRC approval. All plant change evaluations must consider the change in risk and any impact on defense-in-depth and safety margins. [NFPA 805 Section 2.4.4; RG 1.174; RG 1.200; RG 1.205 Section 2.2; SRP Section 19.1; SRP Section 19.2]

#### III.5.1 Fire 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, supplemented by an assessment against the fire PRA requirements of the American Society of Mechanical Engineers/American Nuclear Society

"Standard for Probabilistic Risk Assessment for Nuclear Power Plant Applications," ASME/ANS RA-S-2007, September 1, 2007 (draft, for review). The staff will confirm 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.

The staff will review the licensee's assessment of the technical adequacy of the PRA model used for plant change evaluations required to transition to a RI/PB FPP and for any types of changes the licensee will be allowed to self-approve after implementation of the approved RI/PB FPP. The staff will review the maintenance and update process for the PRA model using SRP Section 19.1.

### III.5.2 Defense-in-Depth 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 defense-in-depth is maintained relative to fire protection and nuclear safety. [NFPA 805 paragraph 2.4.4.2 and paragraph 4.2.4.2]

Defense-in-depth shall be 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, hereby limiting fire damage
- (3) Providing an adequate level of fire protection for structures, systems, and components important to safety, so that a fire that is not promptly extinguished will not prevent essential plant safety functions from being performed

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]

Note that the deterministic approach in NFPA 805 for meeting the performance criteria shall be deemed to meet the defense-in-depth 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 shall be evaluated with a plant change evaluation. [NFPA 805 section 2.4.4]. The staff will identify in the LAR all FPP non-compliances (based on current deterministic requirements) that the licensee does not intend to bring into what would constitute deterministic compliance under NFPA 805. For each individual noncompliant item, the staff will confirm the licensee has provided a plant change evaluation which includes the following:

- Change in CDF and LERF comparing the non-compliant configuration to what would constitute a fully compliant deterministic configuration
- Defense-in-depth evaluation

- Safety margin evaluation

In addition, the staff will confirm the licensee has provided the cumulative change in CDF and LERF due to all non-compliances, including plant changes planned for the transition to NFPA 805. This may also include credit for risk decreases due to retaining or making changes to fire protection features not required by NFPA 805, as permitted in RG 1.205 Section 2.2.

If required to address the acceptance guidance of RG 1.174 and SRP Section 19.2 (i.e., if any individual change or the cumulative change results in a risk increase above 1.0E-6 CDF, or 1.0E-7 LERF), the staff will confirm the licensee has provided the total CDF and LERF, i.e., risk contributions from internal and external events, including internal fires.

The staff will review the licensee's plant change evaluations, and the cumulative impact evaluation, using the acceptance guidance of RG 1.174, and SRP Section 19.2. Where risk decreases are credited, these will be evaluated as Combined Change Requests (CCRs) as described in RG 1.174 and SRP Section 19.2.

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

NFPA 805 paragraph 4.2.4 states, in part: "When the use of recovery actions has resulted in the use of this approach, the additional risk presented by their use shall be evaluated." The staff will evaluate the licensee's risk assessment of RAs when used in lieu of deterministic requirements in NFPA 4.2.3 and determine if the change in risk is acceptable based on RG 1.174 acceptance guidelines.

NFPA 805 paragraph 1.6.52 defines recovery action: "Activities to achieve the nuclear safety performance criteria that take place outside of the main control room or outside of the primary control station(s) for the equipment being operated, including the replacement or modification of components."

Note that the definition of "recovery" in NFPA 805 1.6.52 would exclude actions taken in the control room or at the "primary control station" for the equipment being operated.

#### III.5.5 Fire Risk Evaluations

NFPA 805 paragraph 4.2.4.2 states in part: "Use of fire risk evaluation for the performance-based approach shall consist of an integrated assessment of the acceptability of risk, defense-in-depth, and safety margins. The evaluation process shall compare the risk associated with implementation of the deterministic requirements with the proposed alternative. The difference in risk between the two approaches shall meet the risk acceptance criteria described in 2.4.4.1." The staff will review the licensee's evaluation for any use of the performance-based approach in NFPA 805 paragraph 4.2.4.2 to ensure that the change in risk satisfies RG 1.174 acceptance guidelines and that defense-in-depth and safety margins remain acceptable.

#### III.5.6 Cumulative Risk

NFPA 805 Section 2.4.4.1 states, in part:

When more than one change is proposed, additional requirements shall apply. If previous changes have increased risk but have met the acceptance criteria, the

cumulative effect of those changes shall be evaluated. 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.

The staff will verify that the licensee's process for conducting Plant Change Evaluations (III.5.3 above) and Fire Risk Evaluations (III.5.5 above) includes the requirement to assess cumulative risk of changes made following implementation of NFPA 805 (including completion of all modifications necessary to fully implement NFPA 805).

### III.5.7 FPP Changes without Prior NRC Approval

The staff will review the licensee's process for modifying its RI/PB FPP after implementation of NFPA 805. The staff will ensure the following aspects of the licensee's process are acceptable to permit changes to the RI/PB FPP without prior NRC approval:

- The fire PRA is technically adequate for the types of changes to be self-approved
- The licensee's PRA maintenance and update process ensures that the PRA reflects the as-built, as-operated and maintained plant
- Acceptable risk criteria are specified for changes in both CDF and LERF
- The method for ensuring adequate defense-in-depth and safety margins are maintained is acceptable

The staff will limit, in the license condition, the licensee's ability to make changes to the approved FPP to those that utilize methods reviewed and approved by the NRC.

RG 1.205 Regulatory Position 3.1 contains a sample license condition that allows for self-approval of FPP changes; Regulatory Position 3.2.5 provides information a licensee would submit to NRC periodically for self-approved changes. The staff will verify that the license condition contains sufficient detail to ensure self-approval meets the regulatory positions above; see section III.1.1.2 of this SRP.

{May be modified once FAQ 06-0008 has been resolved}

## 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 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.

The staff will review the licensee's proposed program to comply with these requirements. One approach acceptable to the staff is the licensee's 10 CFR 50.65 Maintenance Rule program applied to fire protection systems and features.

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

### **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 NRC staff will verify that the licensee has established an FPP design basis document that meets the requirement of §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 NRC 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, verification and validation, personnel qualifications, and uncertainty analyses.

The NRC staff will verify that the licensee has established an FPP quality program that meets the requirements of §2.7.3.

## **III.8 ADDITIONAL LAR INFORMATION**

### **III.8.1 Supplemental Information – Generic Issue Resolution**

The staff will review the LAR and verify that it includes an evaluation of the risk impact associated with major issues, such as OMAs that are being transitioned to RAs, circuit analysis of possible MSOs (either quantitative or qualitative), and Hemyc and MT fire barriers, as appropriate.

#### **III.8.1.1 Fire-Induced Multiple Spurious Operations**

Section 2.4.2.2 of NFPA 805 requires the applicant to evaluate fire-induced failure modes resulting from spurious operations and signals, including multiples, as a part of their safe shutdown circuit analysis. 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 Areas, although in some cases an alternative spatial approach may prove to be more practical. If an expert panel process was used, it should be documented with results clearly presented. The NRC staff will verify that the applicant has evaluated MSOs in conformance with Regulatory Position 3.3 of RG 1.205 and Section B.2.1 of NEI 04-02. {May be modified once FAQ 07-0038 has been resolved}

### III.8.1.2 Operator Manual Actions Transitioning to Recovery Actions

Section 4.2.4 of NFPA 805 requires the applicant to evaluate the additional risk resulting from the use of RAs. Regulatory Position 2.2 of RG 1.205 provides one acceptable method for calculating the additional risk. The description of the transition of OMAs to RAs should include: (1) whether the OMAs are currently allowed or were previously reviewed and approved by the NRC's Office of Nuclear Reactor Regulation (NRR), and (2) reference to documentation that demonstrates prior review and approval by the NRC. The NRC staff will verify that the applicant has evaluated OMAs being transitioned to RAs in conformance with Regulatory Position 2.4 of RG 1.205 and Appendix B-2 of NEI 04-02. Per Section 4.2.4.1.6 of NFPA 805, the NRC staff will also confirm that RAs credited to achieve the nuclear safety performance criteria are feasible and reliable. The NRC staff will determine that the additional risk due to the RAs is in conformance with the criteria in RG 1.174.

### III.8.1.3 Hemyc and MT Electrical Raceway Fire Barrier Systems

On April 10, 2006, the NRC issued Generic Letter 2006-03, "Potentially Non-Conforming Hemyc and MT Fire Barrier Configurations," requiring licensees to provide information regarding the use of Hemyc and MT fire barriers at their plants. If the applicant has not resolved the Hemyc and MT fire barrier issue prior to their RI/PB FPP LAR, the applicant must address use of these materials at their plant in the LAR. The staff will verify that the applicant has adequately addressed this issue, including having provided a risk evaluation of the use of any compensatory measures and proposed plant modifications.

## III.8.2 Requests for NRC Staff Review of Elements of Uncertain Status of Licensee's FPP to Obtain Approval for These Elements Under 50.48(c) (RG 1.205 Position 2.2)

Licensees may include in their LAR specific topics for which staff review and approval is requested or required in conjunction with the transition to NFPA 805. The NRC staff will review the technical merit of these submittals applying the appropriate acceptance criteria for the topic being reviewed. These submittals may be included in the LAR to adopt NFPA 805 under 10 CFR 50.48(c) or as separate requests. Examples of these reviews include the following:

- (a) circuit analysis methods used for evaluating the consequences of fire on safety-related and, potentially, non-safety risk-significant circuits, including licensee methods for evaluating the impact of MSOs on meeting the nuclear safety performance criteria [NEI 04-02, Section 4.6, and Appendix B, Section B.2]
- (b) evaluations of licensee transition of OMAs under the previous FPP to RAs as defined by NFPA 805, including the licensee's plant transient analysis and operator action timelines that support the acceptability of the actions in meeting the performance criteria [NEI 04-02, Sections 4.3.2 and 4.6 and Appendix B, Section B.2; RG 1.205, Regulatory Positions 2.2 and 2.3; and NUREG-1852]

- (c) alternatives to the fundamental FPP or design elements of NFPA 805 that the licensee has determined to be previously approved by the staff and, therefore, take precedence over the Chapter 3 requirements [NFPA 805, Chapter 3, Section 3.1; NEI 04-02, Sections 4.3.1 and 4.6]
- (d) EEEEs, which the licensee will carry forward as part of the transition to an RI/PB FPP. Although not required to submit these evaluations, the licensee may choose to request NRC review and approval regarding the acceptability of specific evaluations [RG 1.205, Regulatory Position 2.3; NFPA 805, Section 2.2.7]

#### IV. EVALUATION FINDINGS

The reviewer verifies that the applicant has provided sufficient information and that the review and calculations (if applicable) support conclusions of the following type to be included in the staff's safety evaluation report. The reviewer also states the bases for those conclusions.

The staff concludes that the proposed LAR to implement an RI/PB FPP is acceptable and that the FPP meets the requirements of 10 CFR Parts 50.48(a) and 50.48(c). The staff has reviewed the licensee's analysis and justifications for the change and concludes that the plant is still able to achieve and maintain safe-shutdown conditions and to mitigate a radiological release following a fire.

#### V. IMPLEMENTATION

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

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

- Maintain a FPP that complies with NFPA 805, as allowed by 10 CFR 50.48(c)(3)(i);
- Use performance-based 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 risk-informed or performance-based 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 changes to a RI/PB FPP that must be submitted for prior NRC approval.

The provisions of this SRP section apply to reviews of applications submitted six 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, §50.12, "Specific exemptions."
2. 10 CFR Part 50, §50.34, "Contents of applications; technical information."
3. 10 CFR Part 50, §50.48, "Fire protection."

4. 10 CFR Part 50, §50.90, "Application for amendment of license or construction permit."
5. 10 CFR Part 50, §50.91, "Notice for public comment; State consultation."
6. 10 CFR Part 50, §50.92, "Issuance of amendment."
7. 10 CFR Part 50, Appendix A, General Design Criterion 3, "Fire Protection."
8. 10 CFR Part 50, Appendix A, General Design Criterion 5, "Sharing of Structures, Systems, and Components."
9. 10 CFR Part 50, Appendix A, General Design Criterion 19, "Control Room."
10. 10 CFR Part 50, Appendix R, "Fire Protection Program for Nuclear Power Facilities Operating Prior to January 1, 1979."
11. Branch Technical Position (BTP) SPLB 9.5-1, "Guidelines for Fire Protection for Nuclear Power Plants," USNRC (Formerly BTP CMEB 9.5-1). (ADAMS Accession No. ML070660454)
12. BTP APCSB 9.5-1, "Guidelines for Fire Protection for Nuclear Power Plants," USNRC, May 1, 1976. (ADAMS Accession No. ML070660461)
13. BTP APCSB 9.5-1, Appendix A, "Guidelines for Fire Protection for Nuclear Power Plants Docketed Prior to July 1, 1976," USNRC. (ADAMS Accession No. ML070660458)
14. Generic Letter 1986-10, "Implementation of Fire Protection Requirements," USNRC, April 24, 1986.
15. Generic Letter 1986-10, Supplement 1, "Fire Endurance Test Acceptance Criteria for Fire Barrier Systems Used To Separate Redundant Safe-Shutdown Trains Within the Same Fire Area," USNRC, March 25, 1994.
16. Generic Letter 2006-03, "Potentially Non-Conforming Hemyc and MT Fire Barrier Configurations," USNRC, April 10, 2006
17. NEI 00-01, "Guidance for Post-Fire Safe Shutdown Circuit Analysis," Revision 1, Nuclear Energy Institute, January 2005. (ADAMS Accession No. ML050310295)
18. NEI 04-02, "Guidance for Implementing a Risk-Informed, Performance-Based Fire Protection Program Under 10 CFR 50.48(c)," Revision 1, Nuclear Energy Institute, September 2005. (ADAMS Accession No. ML052590476)
19. NEI 07-12, "Fire Probabilistic Risk Assessment (FPRA) Peer Review Guidelines," Draft Version F, Revision 0, Nuclear Energy Institute, December 2007. (ADAMS Accession No. ML073551159)
20. NFPA 805, "Performance-Based Standard for Fire Protection for Light-Water Reactor Electric Generating Plants," National Fire Protection Association.

21. NUREG-1600, "General Statement of Policy and Procedure for NRC Enforcement Actions, Interim Enforcement Policy May 1, 2000," USNRC.
22. NUREG-1805, "Fire Dynamics Tools (FDTs) Quantitative Fire Hazard Analysis Methods for the U.S. Nuclear Regulatory Commission Fire Protection Inspection Program," USNRC, Washington, DC, December 2004.
23. NUREG-1824, "Verification and Validation of Selected Fire Models for Nuclear Power Plant Applications," Volumes 1–7, USNRC, May 2007.
24. NUREG-1852, "Demonstrating the Feasibility and Reliability of Operator Manual Actions in Response to Fire," USNRC, October 2007.
25. NUREG/CR-6850, "EPRI/NRC-RES, Fire PRA Methodology for Nuclear Power Facilities," Volumes 1 and 2, USNRC, September 2005.
26. Regulatory Guide 1.174, Revision 1, "An Approach for Using Probabilistic Risk Assessment in Risk-Informed Decisions on Plant-Specific Changes to the Licensing Basis," USNRC, November 2002.<sup>1</sup>
27. Regulatory Guide 1.200, Revision 1, "An Approach For Determining The Technical Adequacy Of Probabilistic Risk Assessment Results For Risk-Informed Activities," USNRC, January 2007.
28. Regulatory Guide 1.205, "Risk-Informed, Performance-Based Fire Protection for Existing Light Water Nuclear Power Plants," USNRC, May 2006. (ADAMS Accession No. ML061100174)
29. Regulatory Issue Summary 2004-03, Revision 1, "Risk-Informed Approach for Post-Fire Safe-Shutdown Associated Circuit Inspections," USNRC, December 29, 2004.
30. Regulatory Issue Summary 2005-07, "Compensatory Measures to Satisfy the Fire Protection Program Requirements," USNRC, April 19, 2005.
31. Regulatory Issue Summary 2005-30, "Clarification of Post-Fire Safe-Shutdown Circuit Regulatory Requirements," USNRC, December 20, 2005.
32. Regulatory Issue Summary 2006-10, "Regulatory Expectations with Appendix R Paragraph III.G.2 Operator Manual Actions," USNRC, June 30, 2006.

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<sup>1</sup> All regulatory guides listed herein were published by the U.S. Nuclear Regulatory Commission. 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/req-guides/>. Single copies of regulatory guides 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).

VII. ATTACHMENTS

1. RI/PB FPP LAR Technical Acceptance Review Checklist for use with NRR Office Instruction LIC-109, "Acceptance Review Procedures"

**PAPERWORK REDUCTION ACT STATEMENT**

The information collections contained in the Standard Review Plan 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 (OMB), approval numbers 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.



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

<b>Acceptance Criteria</b>	<b>Sufficient for Review?</b>	<b>Comments</b>
1. The staff of the Division of Risk Assessment (DRA) will review the License Amendment Requests (LARs) to ensure that the LARs:		
1.1 Describe the amendment (the template in Appendix H.2 of NEI-04-02 provides one acceptable example).		
1.2 Meet all appropriate regulatory and administrative criteria, such as those listed in Section 2.2 of LIC-101.		
1.3 Cite approved guidance documents, or, if they cite any unapproved guidance, which may be used as the basis for a proposed change, provided, the licensee supplies all information necessary to support the change. Simply citing unapproved guidance is not acceptable.	X	
1.4 Is complete in scope and provides sufficient information to support the review:		
1.4.1 Identify all license conditions that must be revised.		
1.4.2 Identify all orders that must be revised.		
1.4.3 Identify all technical specifications that must be revised.		
1.4.4 Identify all technical specifications that must be revised. If applicable, identify exemptions and previous license amendments, approved by the staff, which will be superseded when transitioning to NFPA 805.		
1.5 Cites only justified precedents, if precedents are cited. Determine whether any deviations from the precedent appear to be justified.		
1.6. Provide a brief description of the process used to identify all orders, license conditions, exemptions, license amendments and technical specifications that must be revised to implement NFPA 805.		
1.7. Provide proposed changes to license conditions.		

Acceptance Criteria	Sufficient for Review?	Comments
1.8. Provide proposed changes to technical specifications.		
1.9. Provide an Environmental Assessment, or categorical exclusion, pursuant to 10 CFR 51.22(c).		
1.10. Specify the requested review schedule and/or implementation period.		
1.11. Discuss the changes to the Updated Final Safety Analysis Report (UFSAR) necessitated by the license amendment with a statement that the changes will be made in accordance with 10 CFR 50.71(e).		
1.12. Provide a safety analysis that supports the requested change.		
1.13. Provide a Transition Implementation Schedule per section 4.6.1 of NEI-04-02.		
2. The minimum scope of the safety analysis for transitioning to NFPA 805 should:		
2.1. Provide a summary of the current licensing basis including the applicable regulatory requirements (e.g., Appendix R, BTP 9.5.1).		
2.2. Provide a list of non-compliances that will be under enforcement discretion until the transition to NFPA 805 is complete.		
2.3. Provide documentation summarizing the transition of Fundamental Fire Protection Program and Design Elements to demonstrate compliance with NFPA 805 (see Table B-1 of NEI 04-02 for one acceptable approach).		
2.4. Provide a summary of the method used to develop the safe shutdown equipment list and the method used to transition the nuclear safety criteria (see Table B-2 of NEI-04-02 for one acceptable approach).		

Acceptance Criteria	Sufficient for Review?	Comments
2.5 Provide a summary of the fire area-by-area assessment to demonstrate compliance with NFPA 805 code (see Table B-3 of NEI 04-02 for one acceptable approach).		
2.6 Provide a brief description of the method used to address any major fire protection issues (e.g., circuits, operator manual actions, and Hemyc/MT).		
2.7 Provide a brief description of fire models used and their acceptability to the NRC in accordance with requirements of Sections 2.4.1.2.1 and 2.7.3.2 of the NFPA 805 standard (Section 4.2 of Regulatory Guide 1.205 provides one acceptable approach).		
2.8 Provide indication of whether or not the licensee developed and used new methods to resolve major issues (e.g., circuits), with sufficient detail on those methods to enable staff review and if appropriate approval.		
2.9 Provide indication of whether or not modifications are/were necessary to support the new licensing basis and, if so, a brief description of the modifications and the proposed schedule for completion with a justification for the proposed schedule.		
2.10 Provide analysis for non-power operational modes.		
2.11 Verify that the radioactive release performance criteria are satisfied.		
2.12 Provide a summary of the monitoring program.		
2.13 Provide program documentation, including documentation in support of quality assurance.		
2.14 Provide the method for administrative implementation.		
2.15 Provide the list of personnel qualifications.		

Acceptance Criteria	Sufficient for Review?	Comments
2.16 Provide analysis for Multiple Spurious Operations, including documentation of any expert panel processes used.		
2.17 Provide documentation of Verification and Validation of any calculational fire models used.		
3. If the licensee used a fire PRA to address non-compliances during the transition to NFPA 805, provide the following information:		
3.1 Identify the draft or final standards as well as draft or final regulatory guides (or similar regulatory guidance) that served as a basis for addressing non-compliances through fire PRA.		
3.2 Identify the draft or final PRA standards used to determine that the fire PRA is of sufficient technical quality to support addressing non-compliances during transition to NFPA 805.		
3.3 Provide a statement confirming that the licensee followed guidance provided in Section 4.3 of Regulatory Guide 1.205 with respect to the fire PRA application. If the licensee deviated from the guidance provided in Section 4.3 of Regulatory Guide 1.205, provide justification for those deviations.		
3.4 Provide a statement confirming that the licensee is in possession of archival documentation in accordance with guidance outlined in Section 4.1 of Regulatory Guide 1.200, for NRC audit. Along those lines, provide a paragraph explaining the steps implemented (e.g., peer reviews) to ensure that requirements of Section 2.4.3 of NFPA 805 on PSA approach, methods, and data were met.		
3.5 If the licensee's archival documentation deviates from the guidance provided in Section 4.1 of Regulatory Guide 1.200, provide a justification for such deviations.		
3.6 Provide information about the processes that the licensee has		

Acceptance Criteria	Sufficient for Review?	Comments
established, or plans to establish, in order to ensure that PRA and fire modeling calculations in support of post-transition changes have sufficient quality.		
3.7 Provide information confirming that the licensee has submitted documentation in accordance with the guidance outlined in Section 4.2 of Regulatory Guide 1.200, for NRC review as they apply to NFPA 805 LARs. For example, the non-pilot plants must provide all significant facts & observations (F&O) from the peer review(s) conducted for the fire PRA, their resolution (or plan for resolution, with schedule and commitments) and a list of all significant facts and observations "from the internal events PRA peer reviews, (including supplemental or "focused-scope" reviews) that have the potential to impact the fire PRA, and their resolutions. Provide significant findings from assessments against the endorsed PRA quality standards and their resolutions, if the peer reviews were not conducted in conformance with the endorsed standards and RG 1.200.		
3.8 For each item of non-compliance that is carried forward to NFPA 805 licensing basis as a risk-informed, performance-based change, provide the difference in CDF and LERF for the plant, with and without the item being in compliance.		
3.9 For each item of non-compliance that is carried forward to NFPA 805 licensing basis as a risk-informed, performance-based change, address defense-in-depth and safety margins as required by Sections 4.2.4.2 of NFPA 805.		
3.10 Specify the cumulative difference in CDF and LERF associated with all non-compliances (credit for non-fire-related decreases in CDF and LERF may be taken as per Regulatory Guide 1.205, but only during the transition), from that of the CDF and LERF for the fully compliant plant.		
3.11 As necessary, provide the total CDF and LERF (internal events and external events) of the plant as it will be configured upon completion of the transition, including all modifications to which the licensee commits in the LAR (licensee may use guidance provided in RG. 1.174 to use qualitative and quantitative information), to enable NRC staff to make		

Acceptance Criteria	Sufficient for Review?	Comments
decisions with respect to acceptability of plant changes using criteria provided in RG 1.174.		
3.12 Provide additional information required by 10 CFR 50.48(c)(4), if the licensee plans to rely on alternatives to compliance with NFPA 805 (see Section 4.6.1 of NEI 04-02 for additional guidance).		