

FAQ Number 06-0008

FAQ Revision 1

FAQ Title Alternative Method for Fire Protection Engineering Analyses

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Purpose of FAQ:

The purpose of FAQ 06-0008 is to provide a process for the use of fire protection engineering analyses post-transition to address NFPA 805 Chapter 3 requirements. Currently, licensees may self approve these evaluations under the existing fire protection license conditions. The process discussed in this FAQ will be submitted for approval as part of the transition license amendment request (LAR). Post-transition, licensees will use this process to self approve acceptable fire protection engineering analyses.

Is this Interpretation of guidance? ☒ Yes / No

Proposed new guidance not in NEI 04-02? ☒ Yes / No

Details:

NEI 04-02 guidance needing interpretation (include section, paragraph, and line numbers as applicable):

Sections 2.3, 2.4, 4.3.1, 4.6.1, 5.3.2, Appendix H, and Appendix I of NEI 04-02 Revision 1.

Circumstances requiring guidance interpretation or new guidance:

Risk-informed, performance-based fire protection engineering analyses are an acceptable alternative to the deterministic approaches in NFPA 805 Chapter 4. Risk-informed, performance-based fire protection engineering analyses may also be needed to document the acceptability of fire protection systems and features addressed in NFPA 805 Chapter 3. However, there are restrictions on performance-based approaches for NFPA 805 Chapter 3 systems and features (as documented in Section 3.1 of NFPA 805). Therefore, an alternative method (approach) is needed to allow risk-informed, performance-based fire protection engineering analyses to be performed post-transition for specific fire protection systems and features addressed in NFPA 805, Chapter 3.

Detail contentious points if licensee and NRC have not reached consensus on the facts and circumstances:

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10 CFR 50.48(c)(2)(vii) and 10 CFR 50.48(c)(4) provide for performance-based methods and alternatives to NFPA 805 as a means of meeting fire protection regulations, as long as the appropriate regulatory processes (i.e., a license amendment request) are utilized.

A process for a 10 CFR 50.48(c)(2)(vii)/10 CFR 50.48(c)(4) License Amendment Request has not yet been agreed upon.

Potentially relevant existing FAQ numbers:

FAQ 06-0004 includes a process for defining fire protection systems and features required to meet NFPA 805 Chapter 3 criteria.

Response Section:**Proposed resolution of FAQ and the basis for the proposal:**

See attached.

If appropriate, provide proposed rewording of guidance for inclusion in the next Revision:

[To be provided following review and discussion on the attached approach with the NRC.]

A proposed approach is to include the content of Sections 2.2 and 2.3 of the attached response in a new Appendix to NEI 04-02, along with guidance similar to NEI 02-03 Appendix A. The new Appendix to NEI 04-02 would be cross-referenced in the other sections of NEI 04-02 (i.e., 2.3, 2.4, 4.3.1, 4.6.1, Appendix H, and Appendix I).

1.0 Purpose

The purpose of FAQ 06-0008 is to provide a process for the use of fire protection engineering analyses post-transition to address NFPA 805 Chapter 3 requirements. Currently, licensees may self approve these evaluations under the existing fire protection license conditions. The process discussed in this FAQ will be submitted for approval as part of the transition license amendment request (LAR). Post-transition, licensees will use this process to self approve acceptable fire protection engineering analyses.

The use of fire protection engineering analyses is an acceptable alternative method that meets regulatory requirements of 10 CFR 50.48(c)(2)(vii) and 10 CFR 50.48(c)(4).

2.0 Post-Transition Fire Protection Engineering Analyses

2.1 Summary of Issue

Risk-informed, performance-based engineering analyses are an acceptable alternative to the deterministic approaches in NFPA 805 Chapter 4. Risk-informed, performance-based fire protection engineering analyses may also be needed to document the acceptability of fire protection systems and features addressed in NFPA 805 Chapter 3. There are restrictions on performance-based methods for NFPA 805 Chapter 3 systems and features (as documented in Section 3.1 of NFPA 805).¹

Therefore, an alternative method (approach) is needed to allow risk-informed, performance-based fire protection engineering analyses to be performed post-transition for specific fire protection systems and features addressed in NFPA 805, Chapter 3.

The use of alternative methods is discussed in 10 CFR 50.48(c)(2)(vii) and 10 CFR 50.48(c)(4) under the license amendment process as an acceptable means of meeting 10 CFR 50.48(c).

NEI 04-02 section 4.6.1 states:

“As discussed above in Section 2.4.1, a LAR is required for any licensee proposal to use alternative methods and analytical approaches to demonstrate compliance with NFPA 805(10 CFR 50.48(c)(4)). Where a licensee proposes to use an alternative method and analytical approach to support the transition to compliance with NFPA 805, that LAR may be incorporated in the LAR required under 10 CFR 50.48(c)(3)(i). Each request will need to be supported with the type of technical analysis that the station’s procedures require to be provided for any substantive LAR. In addition, to demonstrate compliance with 10 CFR 50.48(c)(3)(i), the LAR must show that the alternative method and analytical approach meets the following requirements in 10 CFR 50.48(c)(4)”

The NRC has endorsed NEI 04-02 with Regulatory Guide 1.205, Regulatory Position C.1.

¹ The promulgation of 10 CFR 50.48(c) did not endorse the prohibition on performance-based methods in meeting NFPA 805 Chapter 3 requirements. This exception was granted in order to “provide licensees greater flexibility in meeting the fire protection program elements and minimum design requirements of Chapter 3 by the use of performance-based methods (including the use of risk-informed methods) described in the NFPA 805 standard.”

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In accordance with 10 CFR 50.48(c)(vii) and 10 CFR 50.48(c)(4), this alternative method (approach) is required to:

- (i) Satisfy the performance goals, performance objectives, and performance criteria specified in NFPA 805 related to nuclear safety and radiological release;
- (ii) Maintain safety margins; and
- (iii) Maintain fire protection defense-in-depth (fire prevention, fire detection, fire suppression, mitigation, and post-fire safe shutdown capability).

The transition LAR will discuss how the use of fire protection engineering analyses will meet those criteria.

Post-transition fire protection engineering analyses to address cases where the specific requirements of NFPA 805, Chapter 3 are not met shall be evaluated using the risk-informed, performance-based change process in NEI 04-02 Chapter 5 and Appendices I and J (and supplemented by RG 1.205 Section 3.2).

2.2 Basis for Post-Transition Fire Protection Engineering Analyses

The LAR required by 10 CFR 50.48(c)(2)(vii)/10 CFR 50.48(c)(4) will provide an alternative method to perform risk-informed, performance-based fire protection engineering analyses on ‘changes’ to the post-transition NFPA 805 Chapter 3 fire protection systems and features. The method will ensure that the following requirements are met:

10 CFR 50.48(c) Requirement	Method of Accomplishment
(a) The required NFPA 805 performance goals, performance objectives, and performance criteria are satisfied.	The fire protection engineering analysis process includes the assessment of impact on NFPA 805 performance goals, performance objectives, and performance criteria are satisfied. Impact will be assessed per risk-informed, performance-based change process in NEI 04-02 Chapter 5 and Appendices I and J and supplemented by RG 1.205 Section 3.2.
(b) Safety margins are maintained.	Maintaining safety margins will be ensured using the risk-informed, performance-based change process in NEI 04-02 Chapter 5 and Appendices I and J and supplemented by RG 1.205 Section 3.2.
(c) Fire protection defense-in-depth is maintained.	Maintaining fire protection defense-in-depth will be ensured using the risk-informed, performance-based change process in NEI 04-02 Chapter 5 and Appendices I and J and supplemented by RG 1.205 Section 3.2.

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The LAR will contain the following information per Regulatory Guide 1.205 Section C.3.2.3:

RG 1.205 Guidance	Method of Accomplishment
(a) detailed description of the alternative risk-informed, performance-based method	<p>The alternative method will be described in the LAR in detail, or a reference to NEI 04-02 will be provided.</p> <p>The steps of the alternative method are as follows:</p> <ol style="list-style-type: none"> 1. Technical evaluations that address the function and performance-based acceptance criteria. The performance-based acceptance criteria for each applicable NFPA 805 Chapter 3 section will be provided for approval in the Transition LAR. 2. Change evaluation process used to assess impact on NFPA 805 performance criteria, plant risk, defense-in-depth, and Safety Margins.
(b) description of how the method will be applied, the aspects of the FPP to which it will applied, and the circumstances under which it will be applied	<p>Risk-informed, performance based fire protection engineering analyses will be allowed to be applied to all fire protection systems and features previously allowed by Generic Letter 86-10.</p> <p>In addition, risk-informed, performance-based fire protection engineering analyses will be allowed to address NFPA 805 Chapter 3 fire protection systems and features and NFPA code compliance deviations related to fire protection systems and features.</p> <p>Risk-informed, performance-based fire protection engineering analyses for programmatic fire protection program elements will not be allowed under the alternative method.</p>
(c) 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	<p>Acceptance criteria for changes will use the risk-informed, performance-based change process in NEI 04-02 Chapter 5 and Appendices I and J (and supplemented by RG 1.205 Section 3.2).</p>
(d) for PSA-based methodologies, an explanation of how the PSA is of sufficient technical adequacy for evaluation of the changes to which it will be applied	<p>Technical adequacy of the PSA used in the risk-informed, performance-based approach will be in accordance with RG 1.205.</p>
(e) for PSA-based methodologies, a description of the peer review and how the review findings have been addressed	<p>Peer review of the PSA used in the risk-informed, performance-based approach will be in accordance with RG 1.205.</p>

2.3 Guidance for Performing Post-Transition Fire Protection Engineering Analyses

Post-transition fire protection engineering analyses should be performed in accordance with the guidance in Appendix A to NEI 02-03, *Guidance for Performing a Regulatory Review of Proposed Changes to the Approved Fire Protection Program* (June 2003). Although NEI 02-03 was developed for use under a pre-NFPA 805 fire protection licensing basis, most of the guidance for performing engineering evaluations is directly applicable to a licensee that has transitioned to a new NFPA 805 licensing basis.

The guidance in Appendix A to NEI 02-03 should be modified/supplemented as follows:

- Each evaluation should provide a clear statement regarding the applicability of the process as it relates to the approved license amendment under 10 CFR 50.48(c)(2)(vii)/ 10 CFR 50.48(c)(4).
- Acceptance criteria and processes should be derived from NFPA 805 and Regulatory Guide 1.205
- A review against performance-based acceptance criteria for the applicable NFPA 805 Chapter 3 section that was provided for approval in the Transition LAR.
- Each evaluation should clearly document that:
 - (a) The required NFPA 805 performance goals, performance objectives, and performance criteria are satisfied.
 - (b) Safety margins are maintained.
 - (c) Fire protection defense-in-depth is maintained.
- Interface with the risk-informed, performance-based change evaluation process should be included.

It is proposed that guidance similar to NEI 02-03 Appendix A be included as a new Appendix to NEI 04-02.