

March 10, 2015

MEMORANDUM TO: AFPB Files

FROM: Alexander R. Klein, Branch Chief */RA/*
Fire Protection Branch
Division of Risk Assessment
Office of Nuclear Reactor Regulation

SUBJECT: CLOSE-OUT OF NATIONAL FIRE PROTECTION ASSOCIATION
FREQUENTLY ASKED QUESTION 08-0054 ON
DEMONSTRATING COMPLIANCE WITH CHAPTER 4 OF
NATIONAL FIRE PROTECTION ASSOCIATION 805,
REVISION 1

Frequently Asked Question (FAQ) 08-0054 was proposed by National Fire Protection Association (NFPA) 805 transition team at the Oconee nuclear plant through the Nuclear Energy Institute (NEI) NFPA 805 Task Force, to clarify the guidance for demonstrating compliance with Chapter 4 of NFPA 805 in NEI 04-02, "Guidance for Implementing a Risk-Informed, Performance-Based Fire Protection Program under Title 10 of the *Code of Federal Regulations* (10 CFR) 50.48(c)," Revision 2 (NEI 04-02).

This letter, "Close-Out of National Fire Protection Association Frequently Asked Question 08-0054 on Demonstrating Compliance with Chapter 4 of National Fire Protection Association 805, Revision 1," supersedes the original close-out letter, "Close-Out of National Fire Protection Association Frequently Asked 07-0054 on Demonstrating Compliance with Chapter 4 of National Fire Protection Association 805," dated February 17, 2011 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML110140183), which included a typographical error that stated the FAQ number as 07-0054, rather than 08-0054.

Background

NEI 04-02 currently addresses compliance with NFPA 805 Chapter 4 in the following sections:

- 4.3.2 Nuclear Safety Performance Criteria Transition Review
- B.2.2. Fire Area-by-Fire Area Transition

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Based on lessons learned in the NFPA 805 pilot program, additional guidance was required to provide the appropriate level of detail in performing the analyses required by NFPA 805 Chapter 4 as well as address issues previously resolved in other FAQs (FAQ 06-0008 and FAQ 07-0030) and changes made to NRC guidance (Regulatory Guide 1.205 Revision 1(Regulatory Guide 1.205)).

Industry Proposal

FAQ 08-0054, Revision 1 proposes revising section 4.3.2 of NEI 04-02 to address previously performed fire protection program changes as well as the ability to perform fire protection engineering evaluations in the future as reflected in the sample license condition in Revision 1 to Regulatory Guide 1.205.

FAQ 08-0054, Revision 1 also proposes a complete revision of section B.2.2 of NEI 04-02, adding a six (6) step process to demonstrate compliance with NFPA 805 Chapter 4:

- Step 1 – Assemble documentation
- Step 2 – Document Fulfillment of Nuclear Safety Performance Criteria
- Step 3 – Variance From Deterministic Requirements (VFDR) Identification, Characterization, and Resolution Considerations
- Step 4 – Performance-Based Evaluations
 - Fire Modeling Evaluations
 - Fire Risk Evaluations
- Step 5 – Final VFDR Evaluation
- Step 6 – Document Required Fire Protection Systems and Features

Step 1 gathers the documentation to be used in performing the analysis to demonstrate compliance with NFPA 805 Chapter 4. This should include fire area analyses that document the systems and components that are free of fire damage for each fire area (including those components added to address Multiple Spurious Operations (MSOs)), feasibility assessments for any operator manual actions required to demonstrate the availability of a success path to meeting the nuclear safety performance criteria, results of validity/quality reviews of existing engineering equivalency evaluations and previously approved licensing actions, and any corrective action documents that identify compliance issues against the existing fire protection licensing basis.

Step 2 determines how the nuclear safety performance criteria are met for each fire area. For each fire area, the method of accomplishment for each nuclear safety performance criteria is documented. The method of accomplishment should include a high level summary of required strategies that provide reasonable assurance that, in the event of a fire, the plant is not placed in an unrecoverable condition. This step also assesses the continued need for, validity of, and required quality of existing engineering equivalency evaluations and licensing actions (exemptions and/or deviations).

Also included in this step also is the evaluation of the effects of fire suppression activities. NFPA 805 requires that licensees evaluate the effects of fire suppression activities on the ability to meet the nuclear safety performance criteria.

Step 3 identifies and characterizes variances from the deterministic requirements (VFDRs) of NFPA 805. These VFDRs are the issues to be evaluated using a performance-based approach.

Step 4 provides guidance on using a performance-based approach to evaluate each VFDR to demonstrate that the risk is acceptable to the U. S. Nuclear Regulatory Commission (NRC). The proposal provides guidance on using either a Fire Modeling approach or use of a Fire Risk Evaluation approach.

The proposal directs licensees using a Fire Modeling approach to use the six step process in NFPA 805 Section 4.2.4.1 to demonstrate that the circuits and components required to achieve the nuclear safety performance criteria are maintained free of fire damage, and there is sufficient margin between the maximum expected fire scenarios and the limiting fire scenarios.

The proposal provides guidance for licensees using the Fire Risk Evaluation approach on how to calculate the increase in risk of a VFDR rather than modify the plant to bring it into compliance with the deterministic requirements of NFPA 805. The guidance directs licensees to perform the delta risk assessments on a fire area basis, which is consistent with NFPA 805 and Regulatory Guide 1.205.

When using a fire risk evaluation, the proposal directs the licensee to perform a team review of each VFDR. The team composition may include the safe shutdown/nuclear safety capability assessment engineer, the fire protection engineer, and the fire PRA engineer. The purpose of the team review is to consolidate the VFDR(s) for a given fire area into manageable groups of issues that can be assessed, ensure that the VFDRs are properly modeled in the fire PRA, consider cable routing information when identifying targets sets for evaluation, and identify ignition sources for consideration.

The information from the team review is used as an input to the fire risk evaluation. The proposal discusses several approaches to performing the evaluation. The licensee can use a bounding approach, or a more detailed delta risk calculation may be performed. The proposal includes guidance consistent with that provided in FAQ 07-0030 regarding calculating a delta risk for required recovery actions. There is also a discussion regarding how to treat the fire risk evaluation of fire areas that are associated with pre-transition alternative or dedicated shutdown strategies.

Guidance is also provided related to cold shutdown considerations. For situations where the VFDR involves cables and equipment required only for cold shutdown, the proposal directs the licensee to perform a qualitative risk assessment unless the fire induced plant transient is of such a nature that in order to achieve safe and stable conditions, cold shutdown related systems and/or functions are required, or the variance affects achievement of a Key Safety Function during a non-power operation, higher-risk evolution. For the situation where cold shutdown related systems/functions are required, they should be modeled in the fire PRA and included in the delta risk evaluation. For the variance that impacts key safety functions during a higher-risk evolution during non-power operations, additional fire protection actions should be taken to lower fire risk in accordance with the non-power operations method used at the plant.

Once the delta risk has been determined, it must be compared to the acceptance criteria. The proposal provides guidance on comparison of a quantitative risk evaluation with the risk acceptance criteria provided in Regulatory Position C.2.2.4. of RG 1.205. The proposal also provides guidance on the performance of qualitative reviews of defense-in-depth and safety margins.

The proposal also discusses the use of offsetting risk reductions. The proposal points out that, post-transition, offsetting risk reductions can only be claimed to the extent that they affect fire risk. Offsetting risk reductions that impact other hazard categories may only be used if the licensee obtains prior NRC staff review and approval.

Step 5 addresses the final disposition of the VFDRs and recommends documenting the performance-based evaluation results in the B-3 table. This step includes providing a detailed summary of the compliance basis for each fire area, indicating whether the area complies using a deterministic approach or a performance-based approach.

Step 6 requires the licensee to use the results of Step 5 to determine which fire protection systems and features are required to meet the nuclear safety performance criteria. The proposal directs the licensee to perform a detailed review of the compliance basis to determine the fire detection, fire suppression and passive fire protection features that are required to meet the performance criteria. This includes a detailed review of Existing Engineering Equivalency Evaluations and previously NRC-approved exemptions/deviations to determine those fire protection systems/features required to meet deterministic requirements. The proposal directs the licensee to include a list of systems and features required to meet the criteria in the B-3 table.

The proposal includes guidance for establishing the safe and stable conditions for the plant under NFPA 805. If the safe and stable conditions for the plant include a defined time limit, the FAQ defines the information required by the staff to perform an adequate review.

NRC Staff Evaluation

The NRC staff (the staff) has evaluated the FAQ 08-0054, Revision 1 proposal with respect to regulatory compliance and technical adequacy.

The proposed additions to NEI 04-02 are consistent with the regulation and NFPA 805 as well as the guidance provided in Regulatory Guide 1.205. Therefore, the staff finds the proposed changes to NEI 04-02 to be acceptable.

The staff has reviewed the proposed changes to NEI 04-02 as presented in FAQ 08-0054, Revision 1 and finds that nothing in this FAQ would prevent continued endorsement of NEI 04-02. In accordance with RIS 2007-19, the guidance in this FAQ is acceptable for use by licensees in transition. The final endorsement of this FAQ will be addressed by the next revision to Regulatory Guide 1.205.

References:

For details regarding this FAQ, please see the following:

1. FAQ 08-0054, dated August 19, 2010, ADAMS Accession No: ML102370581
2. NRC Staff response to FAQ 08-0054, presented at the December 16, 2010 FAQ meeting, ADAMS Accession No: ML103510012
3. FAQ 08-0054, Revision 1, dated December 17, 2010, ADAMS Accession No: ML103510379
4. Close-Out of National Fire Protection Association Frequently Asked 07-0054 on Demonstrating Compliance with Chapter 4 of National Fire Protection Association 805, dated February 17, 2011, ADAMS Accession No: ML110140183

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