FAQ Number	**09-0057**	**FAQ Revision**	**1**
FAQ Title	**New Shutdown Strategy**		

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☒ 805 TF ☒ FPWG ☐ RATF ☐ RIRWG ☐ BWROG ☐ PWROG

Purpose of FAQ:

The purpose of this FAQ is to provide an alternative transition evaluation for plants that use the Self-Induced Station Blackout (SISBO) strategy in their existing Fire Protection (FP) program and have committed to:

- make a change to their current FP program by using an Alternate Shutdown Strategy (e.g. eliminate SISBO),
- incorporate the new strategy in the post-transition FPP, effectively eliminating SISBO post-transition, and
- model the Alternate Shutdown Strategy in the FPRA as the baseline for the transition process.

In addition, since NEI 04-02 addresses transitioning the CLB as the only means of satisfying the NFPA 805 goals as codified in 10 CFR 50.48(c), this FAQ proposes updates to specifically allow this alternative transition approach.

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):

Section 2.3.1
Section 4.1.1
Section 4.3.1
Section 4.3.2
Section 5.3.1
Appendix J, Section J.5

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Circumstances requiring guidance interpretation or new guidance:

The above sections from NEI 04-02 establish some important concepts:

- When transitioning to NFPA 805, the existing Appendix R program serves as the baseline for all evaluations, with certain permitted exceptions. Specifically, Section 4.1.1 states:

  "The extent to which the pre-transitional fire protection licensing basis can be incorporated into the new NFPA 805 licensing basis is determined by the extent to which the fire protection CLB can be shown to comply with the requirements in NFPA 805. However, exceptions are permitted for the following licensee specific deviations from NFPA 805 requirements:

  - "Alternatives from the fundamental fire protection program attributes of NFPA 805 Chapter 3 [NFPA 805 Chapter 3 Section 3.1] previously reviewed and approved by the NRC.

  - "Exemptions/deviations from 10 CFR 50 Appendix R / NUREG 0800 [NFPA 805 Figure 2.2] previously reviewed and approved by the NRC. Note the licensee will review these exemptions/deviations during the transition process to ensure the basis for acceptability is still valid.
  - "Existing Engineering Equivalency Evaluations [NFPA 805 Figure 2.2]. Note the licensee will review these equivalency evaluations during the transition process to ensure the quality level and the basis for acceptability is still valid."

Note that for each Chapter 3 element, the licensee must: demonstrate compliance (for example, via previous NRC approval, Engineering Equivalency Evaluations, or minor clarifications), make a change to achieve compliance, or request NRC approval (for example, via "10 CFR 50.48(c)(4)" or 10 CFR 50.48(c)(2)(vii)").

Figure 4-2 in section 4.3.1 shows that the existing fundamental fire protection program and design elements is evaluated against the NFPA 805 Chapter 3 requirements. If an element fails to meet those requirements and is not a previously approved alternative, then it must be brought into compliance through a design or operational change or a license amendment request.

Figure 4-3 in section 4.3.2 shows that the "existing" fire area compliance strategy is subjected to the area-by-area transition process and that if it does not meet the deterministic requirements then it would be treated through a performance-based

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approach per Section 4.2.4 of NFPA805 (either via the use of fire modeling or the use of a fire risk evaluation).

Section 5.3.1 discusses the application of fire risk evaluations, and quotes from NFPA 805 as follows:

> "In the event of a change to a previously approved fire protection program element, a risk-informed plant fire risk[1] evaluation shall be performed and the results used as described in 2.4.4 to ensure that the public risk associated with fire-induced nuclear fuel damage accidents is low and the adequate defense-in-depth and safety margins are maintained. [NFPA 805, Section 2.2.9]"

Section 5.3.1 and Appendix J, Section J5, indicate that such fire risk evaluations, and other fire risk evaluations, would use a FPRA representing the "existing" program as the baseline for comparison and for demonstrating that a change was risk neutral or risk reducing.

The implication or assumptions resulting from the above text from NEI 04-02 for a plant that uses a SISBO strategy is as follows:

- the existing program to be used for the compliance assessment would be the SISBO program;
- the elimination of the SISBO strategy would be a change, and hence be subject to a fire risk evaluation;
- the baseline for this fire risk evaluation would have to be a FPRA representing the SISBO strategy; and
- all other fire risk evaluations would also use the SISBO FPRA as a baseline for fire risk evaluation.

Discussion

A major benefit to the nuclear industry of the risk informed regulation in NFPA 805 is that it provides a driving force for utilities to abandon strategies that, although they comply with Appendix R requirements, take actions that inherently increase plant risk. The Self Induced Station Blackout (SISBO) approach is an example of such a strategy that, in order to meet deterministic requirements, purposefully removes offsite power and a train of Engineered Safety Feature equipment to reduce the likelihood of spurious operation.

[1] Note that this passage currently reads "change evaluation." This FAQ has updated terminology to conform with the latest draft of R.G. 1.205.

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Using NFPA 805 as the driver, plants that eliminate the SISBO strategy in favor of an approach that optimizes available equipment are inherently reducing the plant risk due to fire. However, because NFPA 805 is the driver for performing a new Fire PRA that complies with RG1.200, many plants only have old IPEEE Fire PRAs (which do not comply with RG 1.200) that show the fire risk associated with their Appendix R fire protection strategy. As a result, plants that are revising their overall Safe Shutdown Strategy will be developing a new Fire PRA to reflect the revised overall strategy and will not have a comparable assessment of the fire risk under their Appendix R Program (CLB). It is not cost-effective to develop two fire PRAs just to make the comparison, especially when the existing, deterministic (CLB) compliance strategy is to be abandoned.

A plant may make the decision that it will eliminate SISBO and many associated operator actions as part of the transition process to NFPA 805. As a result, the FPRA being developed to support the NFPA 805 transition fire risk evaluations and post transition change evaluations would logically reflect the plant operations after these changes have been made. Hence, the FPRA will not be reflective of the current Appendix R program, but of a revised shutdown strategy. As a result there will be no baseline FPRA that meets the requirements of the soon-to-be-issued RG 1.200 addendum for FPRA capability per ASME/ANS-RA-2009, and thus no basis for the transition/fire risk evaluation showing that elimination of SISBO and associated operator actions is “risk neutral or risk reducing”. Further, other fire risk evaluations resulting from the transition process will not have a baseline FPRA for the current Appendix R program against which to compare the impact of the change.

It is believed that transitioning to NFPA805 will provide long term benefit to the Fire Protection Program, and a plant would approach this project as an opportunity to improve risk in this area. In addition, there would be little value in developing a full Fire PRA for a strategy the station intends to abandon. While it is understandably desirable to quantitatively define risk improvements, the additional expense to re baseline the existing Appendix R strategy is not cost beneficial.

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

Project goals were established to improve the Fire Protection Program by revising the Appendix R shutdown approach. While the new approach may be beneficial from a regulatory standpoint, the specific directions found in NEI 04-02 may be challenged from a “comparable” risk standpoint. NRC may not accept the elimination of SISBO as representing an “allowable” deviation from Appendix R for the purpose of establishing the baseline for the pre-transition program. This could also lead to NRC not accepting change analyses unless “comparable” risk insights are made available in the LAR. This includes assuming that the starting point for the

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NFPA805 fire risk evaluations (after elimination of SISBO and associated manual operator actions to the extent practical) is risk neutral or risk reducing versus Appendix R program.

Potentially relevant existing FAQ numbers:

06-0012
08-0054
08-0055

Response Section:

Proposed resolution of FAQ and the basis for the proposal:

Proposed Alternative: The replacement of SISBO with a symptom-based fire protection strategy will be accepted as risk reducing or risk neutral without a requirement to quantify the exact reduction in fire risk. The FPRA performed for the non-SISBO case would constitute the baseline PRA for all fire risk evaluations performed to support the NFPA 805 transition.

Discussion

In virtually all areas of nuclear power plant emergency response except for fire, nuclear plants follow symptom-oriented emergency procedures. This is recognized as the most appropriate manner of responding to plant accident conditions. The use of SISBO and associated operator actions is an event-oriented approach, which existed prior to the post-TMI transition to symptom-oriented in the 1980's. By its very nature, eliminating SISBO (and numerous associated operator actions) allows plants to better protect the critical safety functions in the event of a serious fire. The completion of comprehensive circuit analysis for both NSP and FPRA as part of the NFPA 805 transition process obviates the reason why SISBO was originally used at these plants. Therefore, elimination of SISBO and numerous associated operator actions should be deemed risk-neutral or risk reducing when comprehensive circuit analysis is being performed as part of NFPA 805 transition. Quantifying the exact reduction in fire risk should not be required.

Since this will be the new baseline risk for fire, and since this constitutes an improvement over the Appendix R case, the non-SISBO case should constitute the baseline PRA for all fire risk evaluations performed to support the NFPA 805 transition, including any subsequent fire risk evaluations.

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

Revise NEI 04-02 Section 4.1.1 Transition Process Overview

Modify as follows (new text in ***bold italic***).

The extent to which the pre-transitional fire protection licensing basis can be incorporated into the new NFPA 805 licensing basis is determined by the extent to which the fire protection CLB can be shown to comply with the requirements in NFPA 805. However, exceptions are permitted for the following licensee specific deviations from NFPA 805 requirements:

- Alternatives from the fundamental fire protection program attributes of NFPA 805 Chapter 3 [NFPA 805 Chapter 3 Section 3.1] previously reviewed and approved by the NRC.
- Exemptions/deviations from 10 CFR 50 Appendix R / NUREG 0800 [NFPA 805 Figure 2.2] previously reviewed and approved by the NRC. Note the licensee will review these exemptions/deviations during the transition process to ensure the basis for acceptability is still valid.
- Existing Engineering Equivalency Evaluations [NFPA 805 Figure 2.2]. Note the licensee will review these equivalency evaluations during the transition process to ensure the quality level and the basis for acceptability is still valid.

In cases where alternate shutdown strategies and equipment are selected to support evaluation of the plant against the performance criteria of NFPA805, Chapter 1, compliance with the deterministic requirements [NFPA805, section 4.2.3] or the performance based approach [NFPA805, section 4.2.4] shall be performed consistent with the requirements of the standard. For this case,

- ***An engineering evaluation shall indicate the strategy (1) satisfies the performance criteria, performance objectives, and goals for nuclear safety and radiological release; (2) maintains safety margins (3) maintains post-fire defense-in-depth (fire prevention, fire suppression, and post-fire safe shutdown capability); and (4) a ~~qualitative~~ quantitative assessment of the change in risk comparing the ~~current CLB (and shutdown strategy)~~ deterministically compliant [NFPA 805, section 4.2.3] and the new shutdown strategy shall conclude that the new strategy/***

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associated equipment ~~is risk-neutral or risk reducing.~~[2] Meets the requirements for risk, defense-in-depth and safety margins.

- ***For areas where a risk based evaluation has been performed (NFPA805, section 4.2.4.2) utilizing an alternative safe shutdown strategy, the fire PRA representing the alternative safe shutdown strategy shall be the baseline and shall be used as a basis for future fire risk evaluations [NFPA 805, section 2.4.4] to perform quantitative assessments of deviations from the deterministic requirements of Chapter 4.***

Revise NEI 04-02 Figure 4-3, "Fire Area by Fire Area Transition Process (Simplified)"

Revise Entry Box 

to 

Revise NEI 04-02, Section 4.3.2, Nuclear Safety Performance Criteria Transition Review

The fire area by fire area review determines whether the CLB is intact ***or the revised shutdown strategy is*** documented adequately to support the transition. The review is intended to identify and document how each fire area: …

[2] The purpose of item 4 is to establish that it is not necessary to perform a fire risk evaluation to demonstrate that the new shutdown strategy selected for transition is risk reducing versus the CLB. For example, if the CLB is SISBO, and the new strategy is non-SISBO, it is not necessary to perform a fire risk evaluation to show that the non SISBO strategy is risk reducing versus the SISBO strategy. This can be documented by qualitative assessment.