

Plant: D. C. Cook FAQ # 06-0011 – III.G.3 Transition – Rev. 2
Submittal Date: 10/26/04
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☒ 805 TF ☐ FPWG ☐ RATF ☐ RIRWG ☐ BWROG ☐ PWROG

Subject: Definition of a Fire Protection Program (FPP) Change

Is this interpretation of current 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):

NEI 04-02, Appendix B, Section B.2.2., (Page B-7, last paragraph)

Circumstances requiring guidance interpretation or new guidance:

The subject of transitioning Appendix R III.G.3/III.L areas is discussed in Section B.2.2 of NEI 04-02. However, the wording is not entirely clear. Confusion exists with regard to transitioning the areas as deterministic or performance-based. Clarification is requested regarding the transition of areas that currently comply with Section III.G.3 of Appendix R (with or without associated engineering evaluations and exemptions) to NFPA 805 as well as the need for a change evaluation.

Detail contentious points if licensee and NRC have not reached agreement:

N/A

Potentially relevant existing FAQ numbers:

FAQ 06-0012 addresses recovery actions which require change evaluations.
Future FAQ 07-xxxx addresses evaluation of risk impact of recovery actions

Background

10 CFR 50 Appendix R, Section III.G.3 (and the corresponding section of NUREG 0800) was created to provide an acceptable means of demonstrating the ability to achieve and maintain safe shutdown in fire areas where the separation requirements of III.G.1/III.G.2 could not be met. Compliance for these areas involves the use of operator manual actions outside the Main Control Room, resulting in the need to utilize “recovery actions” as defined by NFPA 805, for these areas post-transition.

NFPA 805, Section 4.2.3.1 states, “Use of recovery actions to demonstrate the availability of a success path for the nuclear safety performance criteria automatically shall imply use of the performance-based approach as outlined in 4.2.4.”

NFPA 805, Section 4.2.2 states, “The performance-based approach shall be permitted to utilize deterministic methods for simplifying assumptions within the fire area.”

NFPA 805, Section 4.2.4 states, “When the use of recovery actions has resulted in the use of this approach, the additional risk presented by their use shall be evaluated.”¹

Response Section

Proposed Resolution of FAQ and the basis for the proposal:

Revise NEI 04-02, Section B.2.2 to address the transition of III.G.3 areas using the performance-based approach. The performance-based approach must include sufficient analyses (Thermal-Hydraulic, Fire Risk Evaluation [which may involve Fire Modeling], etc.) to demonstrate that the available safe shutdown equipment and systems can meet the nuclear safety goals, nuclear safety objectives and the nuclear safety performance criteria in Chapter 1 of NFPA 805. The results of these analyses form the foundation for the available time frames for recovery actions. The performance-based analysis should include a comparison of the time available before failure of the nuclear safety performance criteria to the timeline of required operator actions needed to achieve the nuclear safety performance criteria. The reliability of the recovery actions should be addressed in the Fire PRA developed to support the transition.² The risk associated with the implementation of recovery actions for these areas should be determined and provided in the transition report (see NEI 04-02, Section B.2.2.4).

¹ Note that the term “recovery” in NFPA 805 differs from that typically applied in PRAs. NFPA 805 “recovery” actions are essentially the same as “post-initiator” human actions in PRAs. PRA “recoveries” address actions taken to restore failed equipment or recover functional capabilities, such as offsite power. While these typically involve human actions, there may be other measures credited as well.

² Reliability may also be addressed in a deterministic way by considering the “time margin” between the demonstrated time to complete the recovery action and the time limitations imposed by the plant’s thermal-hydraulic conditions, considering uncertainties (see NUREG-1852).

Deterministic methods may be used to simplify the analysis by verifying that the compliance strategy for the area meets the existing licensing basis, including approved exemptions and properly implemented Fire Protection Program (FPP) changes made under the Standard Fire Protection License Condition. Note that exemptions and properly implemented FPP changes must be reviewed to verify that the quality level and the basis for acceptability are still valid (see NEI 04-02 Sections 2.3.1 and 4.1.1). Also note that previous analysis has demonstrated the ability to achieve the safe shutdown goals required by 10 CFR 50 Appendix R, Section III.L. These same analyses should be capable of demonstrating the ability to achieve the NFPA 805 nuclear safety performance criteria for these areas.

For a III.G.3 fire area that fully meets the current licensing basis, “Defense-in-Depth” and “Safety Margin” requirements of Sections 2.4.4.2 and 2.4.4.3 of NFPA 805 are “deemed to satisfy”. Also, if no changes were made, an uncertainty analysis is also not required per 10 CFR 50.48(c)(2)(iv).

It should be noted that it is expected that licensees transitioning to an NFPA 805-based Fire Protection Program will be developing a plant specific fire PRA (ref. RG 1.205) and the risk presented by the use of recovery actions in these areas will be determined as part of this effort (see NEI 04-02, Section B.2.2.4)

If appropriate, provide proposed rewording of guidance for inclusion in next revision.

Revise NEI 04-02, Section B.2.2 (second paragraph) to state the following:

Transition of a fire area that is governed by Sections III.G.3/III.L of 10 CFR 50 Appendix R (or applicable sections of NUREG-0800) will be performed using the performance-based approach. The performance-based approach must include sufficient analyses (Thermal-Hydraulic, Fire Risk Evaluation [which may include Fire Modeling], etc.) to demonstrate that the available safe shutdown equipment and systems can meet the nuclear safety goals, nuclear safety objectives and the nuclear safety performance criteria in Chapter 1 of NFPA 805. The results of these analyses form the foundation for the available time frames for recovery actions. The performance-based analyses should include a comparison of the time available before failure of the nuclear safety performance criteria to the timeline of required operator actions needed to achieve the nuclear safety performance criteria. The reliability of the recovery actions should be addressed in the Fire PRA developed to support the transition³. The risk associated with the implementation of recovery actions for these areas should be determined and provided in the transition report. (See NEI 04-02, Section B.2.2.4)

³ Reliability may also be addressed in a deterministic way by considering the “time margin” between the demonstrated time to complete the recovery action and the time limitations imposed by the plant’s thermal-hydraulic conditions, considering uncertainties (see NUREG-1852).

Deterministic methods may be used to simplify the analysis by verifying that the compliance strategy for the area meets the existing licensing basis, including approved exemptions and properly implemented Fire Protection Program (FPP) changes made under the Standard Fire Protection License Condition. Note that exemptions and properly implemented FPP changes must be reviewed to verify that the quality level and the basis for acceptability are still valid (see NEI 04-02 Sections 2.3.1 and 4.1.1). Also note that previous analyses have demonstrated the ability to achieve the safe shutdown goals required by 10 CFR 50 Appendix R, Section III.L. These same analyses may be capable of demonstrating the ability to achieve the nuclear safety performance criteria for these areas.

For III.G.3 fire areas that fully meet the current licensing basis, “Defense-in-Depth” and “Safety Margin” requirements of Sections 2.4.4.2 and 2.4.4.3 of NFPA 805 are “deemed to satisfy” so no additional Defense-in-Depth or Safety Margin analyses are necessary. Also, if no changes were required to meet the nuclear safety performance criteria, an uncertainty analysis is also not required per 10 CFR 50.48(c)(2)(iv).

The current licensing basis for an alternative/dedicated shutdown fire area may be more explicit than other fire areas, since many licensees have detailed alternative/dedicated shutdown Safety Evaluation Reports. It may require more detailed documentation to ensure future change evaluations accurately capture the baseline configuration. For example, a dedicated shutdown methodology may credit a unique power source or pump that is not part of the plant’s safety systems or post-fire safe shutdown program. Post-transition changes to this equipment or methodology would need to be accurately captured for assessment of risk impact and therefore, the alternate/dedicated shutdown strategy must be adequately modeled in the fire PRA.