

FAQ Number 07-0033

FAQ Revision 1c

FAQ Title Transition of Existing Engineering Equivalency Evaluations

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Purpose of FAQ:

Provide guidance on the transition of existing engineering equivalency evaluations and to assist in determining which evaluations require submittal as part of the NFPA 805 transition.

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 4.3.1, 4.3.2, Appendix B

Circumstances requiring guidance interpretation or new guidance:

NEI 04-02 (Reference 2.4) Section 4.1.1 states in part:

“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.”*

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NEI 04-02 (Reference 2.4) Section 4.3.1 states:

“It is important that the “previously approved alternatives” be clearly determined in order to understand the level of review and potential upgrades necessary to meet the requirements in Chapter 3 of NFPA 805. Fire protection program features and systems, although previously reviewed and approved by the NRC, may have been changed since initial NRC approval. Such changes are part of the Current Licensing Basis (CLB) if they have been made in accordance with the correct application of the guidelines of Generic Letter 86-10, an evaluation of plant changes under the requirements of 10 CFR 50.59, or the fire protection standard license condition (NEI 02-03). The fire protection standard license condition allows changes to the “approved fire protection program without prior approval of the Commission if those changes would not adversely affect the ability to achieve and maintain safe shutdown in the event of a fire.” Where the changes from the original NRC review and approval have been made appropriately using an approved change process, the changes are considered an acceptable part of the CLB. Licensees may rely on these changes to claim compliance but the NRC may inspect those changes and conclude that they do not comply with NFPA 805. However, they are not considered previously approved by the NRC for the purposes of superseding requirements in Chapter 3.”

Regulatory Guide 1.205 Section 2.3 states in part:

“Section 2.2.7 of NFPA 805 describes the application of existing engineering equivalency evaluations (EEEEs) when using a deterministic approach during the transition to an NFPA 805 FPP. One type of EEEE, commonly referred to as a “Generic Letter 86-10 (GL 86-10) evaluation,” allows licensees who have adopted the standard fire protection license condition (under their current FPP and in accordance with GL 86-10) to make changes to the approved FPP without prior NRC approval if those changes would not adversely affect the ability to achieve and maintain safe shutdown in the event of a fire. With the exception of evaluations of certain recovery actions and any deviations from NFPA 805 requirements, a GL 86-10 evaluation showing no adverse effect on safe shutdown and permitted under the licensee’s current licensing basis is one acceptable means of meeting the NFPA 805 EEEE acceptance criterion of “an equivalent level of fire protection compared to the deterministic requirements.” However, EEEEs performed prior to transitioning to a performance-based FPP must be based on deterministic methods. If based on a risk calculation, the EEEE will have to be evaluated using the licensee’s approved NFPA 805 change evaluation process.

EEEEs that support deviations from the requirements and methods of NFPA 805 must be submitted for NRC approval in accordance with 10 CFR 50.48(c) and NFPA 805. Regulatory Position 3.2.4 also provides specific guidance regarding submittal requirements. Of the EEEEs that must be approved by the NRC, those that are preexisting and those performed during the transition to an NFPA 805 licensing basis should be submitted with the fire protection license amendment request.”

The term Engineering Equivalency Evaluation has been used in many contexts as pointed out in Regulatory Guide 1.205. Types of Engineering Equivalency Evaluations that are recognized in Generic Letter 86-10 include:

- Fire Area Boundaries
 - Enclosure 1, Item 4 Barriers have to be adequate for the hazard

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- [Enclosure 2, Question 3.1.1](#)
- [Enclosure 2, Question 3.1.2](#)
- [Structural Fire Barriers Enclosure 2, Question 3.2.2 implies ERFBS](#)
- [Fire Doors Enclosure 2, Question 3.2.3 - Modifications to doors can be evaluated to show they are rated or they can be evaluated as adequate for the hazard Encl 1, Item 4](#)
- [ERFBS](#)
 - [Enclosure 2, Question 3.2.2 - Considerations for comparing as-built to tested configurations to qualify electrical raceway fire barrier systems.](#)
 - [Enclosure 2, Question 3.3.4 – Cable tray support protection](#)
- [ASD Fire Area, Room, Zone](#)
 - [Encl 1, Item 6 – Alternative or Dedicated Shutdown](#)
 - [Encl 2, Question 3.1.5 – Fire zones](#)
- [Coverage of Detection and Suppression Systems](#)
 - [Enclosure 1, Item 5 - Suppression and detection has to be adequate for the hazard.](#)
 - [Enclosure 2, Question 3.4.3 – Sprinkler location](#)
 - [Enclosure 2, Question 3.4.4 - Suppression and detection has to be adequate for the hazard.](#)
- [Intervening Combustibles between Redundant Trains](#)
 - [Enclosure 2, Question 3.6.1 - Negligible quantities of combustibles.](#)
 - [Enclosure 2, Question 3.6.2 - Discussion of non-combustible materials](#)
- [NFPA Code Deviations](#)
 - [Enclosure 2, Question 3.8.1 - Fire Protection Features NFPA Conformance](#)
 - [Enclosure 2, Question 8.9 – NFPA Code Deviations](#)

Guidance needs to be provided to document [which Engineering Equivalency Evaluations will be documented in the licensee transition documentation \(e.g., LAR, transition report\)](#) and the criteria against which the Existing Engineering Equivalency Evaluations will be reviewed.

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

N/A

Potentially relevant existing FAQ numbers:

FAQ 06-0008 provides a process for post-transition engineering analyses.

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

~~Engineering evaluations that have been made in accordance with an appropriate application of the guidelines of Generic Letter 86-10, and evaluated under the requirements of 10 CFR 50.59, or the fire protection standard license condition (Fire Protection Program Regulatory Reviews), are acceptable for transition to the new fire protection licensing basis. These engineering evaluations are not considered a “change” for the purposes of a transition change evaluation.~~

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These evaluations may be associated with fire protection systems and features addressed in NFPA 805, Chapter 3.

Provide guidance for reviewing existing Engineering Equivalency Evaluations to determine if they are of appropriate quality for transition. The guidance should include determination that the evaluation is: 1) not be based solely on quantitative risk evaluations, 2) appropriate use of an engineering equivalency evaluation, 3) appropriate quality, 4) determination that the standard license condition is met, and 5) determination that the evaluation reflects the plant as-built condition.

Provide additional guidance as to which engineering equivalency evaluations will be summarized in the licensee transition documentation (e.g., LAR, transition report).

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

Section 4.3.1 of NEI 04-02, Revision 1, last sentence (page 27). Insert underlined information.

Guidance on performing and documenting the fundamental element review is provided in Appendix B-1 of this document. A sample table showing NFPA 805 requirements, fundamental program and design elements, items for review, method of compliance, and licensing basis references are also shown in Appendix B.1 of this document. Guidance on reviewing existing engineering equivalency evaluations for transition is provided in Appendix B.3 of this document.

Section 4.3.2 of NEI 04-02, Revision 1, last sentence (page 29). Insert underlined information.

Where the licensing basis is unclear or silent on fire area compliances, care should be taken to establish a licensing basis going forward. Guidance on performing and documenting the NFPA 805 Chapter 4 reviews is provided in the tables in Appendix B.2 of this guidance. Guidance on reviewing existing engineering equivalency evaluations for transition is provided in Appendix B.3 of this document.

Insert new section B.3 to Appendix B of NEI 04-02:

B.3 Review of Existing Engineering Equivalency Evaluations—Acceptability Determination

B.3.1 Types of Engineering Equivalency Evaluations

The term Engineering Equivalency Evaluation has been used in many different contexts. Types of Engineering Equivalency Evaluations that are recognized in Generic Letter 86-10 include:

- Fire Area Boundaries
 - Enclosure 1, Item 4 Barriers have to be adequate for the hazard
 - Enclosure 2, Question 3.1.1
 - Enclosure 2, Question 3.1.2

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- [Structural Fire Barriers Enclosure 2, Question 3.2.2 implies ERFBS](#)
- [Fire Doors Enclosure 2, Question 3.2.3 - Modifications to doors can be evaluated to show they are rated or they can be evaluated as adequate for the hazard Encl 1, Item 4](#)
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 - [Enclosure 1, Item 5 - Suppression and detection has to be adequate for the hazard.](#)
 - [Enclosure 2, Question 3.4.3 – Sprinkler location](#)
 - [Enclosure 2, Question 3.4.4 - Suppression and detection has to be adequate for the hazard.](#)
- [Intervening Combustibles between Redundant Trains](#)
 - [Enclosure 2, Question 3.6.1 - Negligible quantities of combustibles.](#)
 - [Enclosure 2, Question 3.6.2 - Discussion of non-combustible materials](#)
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 - [Enclosure 2, Question 3.8.1 - Fire Protection Features NFPA Conformance](#)
 - [Enclosure 2, Question 8.9 – NFPA Code Deviations](#)

B.3.2 Submittal of Existing Engineering Equivalency Evaluations in License Amendment Request

For the purposes of ~~this~~ the transition, [Existing Engineering Equivalency Evaluations should be reviewed to validate their quality level and their appropriate use. Those evaluations that demonstrate that a fire protection system or feature is rated or compliant will not be summarized in the licensee transition documentation \(e.g., LAR, transition report\) License Amendment Request, since they can be shown to meet the NFPA 805 Chapter 3 requirement. Consideration should be given to summarizing the methodology used for ‘evaluating the rating/compliance’ of the system and feature in the appropriate section of the NFPA 805 Chapter 3 comparison.](#)

~~However, Engineering Equivalency Evaluations are those evaluations that demonstrate a fire protection system or feature is adequate for the hazard~~ [should be summarized in the licensee transition documentation \(e.g., LAR, transition report\) License Amendment Request. \(Note, since these evaluations are allowed under the current licensing basis, they do not require change evaluations\) In other words, the feature /system cannot be evaluated as ‘rated’ or ‘compliant’.](#) For example a penetration seal engineering equivalency evaluation that determines the seal is ‘rated’ ~~would not be included in the EEEE review of this procedure. However~~ [For example](#), if the evaluation takes into consideration combustible loading, other suppression/detection features, location of safe shutdown equipment, etc., and makes a claim that the seal [feature](#) is ‘adequate for the hazard’ then this evaluation ~~would~~ [should](#) ~~be considered in the scope of this instruction~~ [summarized as part of the transition process. in the transition.](#)

B.3.3 Guidance for Reviewing Existing Engineering Equivalency Evaluations

NEI 02-03 (~~Revision 0, ML031780500~~)(Revision 0, ML031780500), Appendix A, provides guidance for the preparation and development of engineering evaluations ~~to determine if changes result in a deviations from applicable regulatory requirements, guidance documents, or the fire protection licensing basis are appropriate.~~ The guidance may also be utilized to evaluate deviations from applicable NFPA codes. The guidance in NEI 02-03 is consistent with the information contained in Generic Letter 86-10. The evaluation criteria and **technical** considerations in Appendix A to NEI 02-03 should be utilized in the decision-making process regarding the adequacy of engineering evaluations for transition (**Refer to Section B.3.4**). These criteria and considerations should also be utilized in upgrading engineering evaluations or performing additional engineering evaluations prior to transition.

The following process should be used to determine if an existing engineering equivalency is adequate to transition:

- **The engineering evaluation has been evaluated against the criteria in the pre-transition standard fire protection license condition, 10 CFR 50.59, or plant specific process used to determine the impact of the change/condition on the ability to achieve and maintain post-fire safe shutdown.**
- The engineering evaluation should not be based solely on quantitative risk evaluations.
- ~~The engineering evaluation should be qualitative, and avoid performance based justifications.~~
- The engineering evaluation should be an appropriate use of the engineering evaluation process (e.g., for a pre-1979 plant, judging that 15 feet of separation between redundant trains with suppression and detection meets 10 CFR 50, Appendix R, Section III.G.2.b is not appropriate, since an exemption would be required.)
- ~~The engineering evaluation has been evaluated against the criteria in the pre transition standard fire protection license condition, 10 CFR 50.59, or plant specific process used to determine the impact of the change/condition on the ability to achieve and maintain post fire safe shutdown.~~
- The engineering evaluations should be judged to be of acceptable quality. A recommended quality standard for engineering evaluations is based upon ASME NQA-1. ASME NQA-1 requires that design analyses meet minimum requirements. Design analyses shall be:
 - Legible and in a form suitable for reproduction, filing, and retrieving.
 - Provide analysis sufficiently detailed as to purpose, method, assumptions, design input, references and units, such that a person technically qualified in the subject can review and understand the analysis and verify the adequacy of the results without recourse to the originator.
 - ASME NQA-1 applies these requirements to safety-related and augmented quality design analyses. Fire Protection is typically "augmented quality", so engineering evaluations would be subject to these requirements.
- The engineering evaluation should reflect the current plant configuration or clearly bound changing plant conditions (**e.g., evaluation assumed maximum/bounding combustible loading values in order to bound the plant configuration**).

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The engineering evaluation results will require judgment. The results of the transition evaluation should be formally documented as part of the transition ~~submittals report~~. This documentation should consist of a listing of each evaluation (document reference, revision no., related fire areas, etc.) and the results of the adequacy review. Existing engineering evaluations that will be transitioned to the new licensing basis and are determined to be inadequate can be resolved in the following manner:

- The condition requiring an engineering evaluation can be brought into literal compliance with the current fire protection licensing basis, thus eliminating the need for an evaluation.
- Updated to an acceptable level before transition and transitioned over to the new licensing basis.
- Evaluated during the transition process as part of the change evaluation process. (Note: Depending upon the significance of the adequacy determination, the item under consideration may need to be addressed via the corrective action process and/or may require compensatory measures.)

Note: Fire protection systems and features, as well as administrative controls, may be relied upon in the determination of acceptability for the engineering evaluations. These credited systems, features, and control should be included, as appropriate, into the plant configuration control processes (and potentially monitoring programs).

B.3.4 Evaluation Criteria and Technical Considerations from NEI 02-03, Appendix A, Guidance for Performing GL 86-10 Evaluations

The following excerpts are from NEI 02-03 Revision 0 Guidance for Performing a Regulatory Review of Proposed Changes to the Approved Fire Protection Program, June 2003 (ML031780500), Appendix A “Guidance for Performing GL 86-10 Evaluations”. This guidance provides the minimum evaluation criteria and technical considerations that should be included in existing engineering equivalency evaluations.

“When fire protection features are evaluated, the postulated fire in the Fire Hazard Analysis for the area, zone, or room affected by the change should be considered, and the overall protection scheme should be kept in perspective. The defense-in-depth principles of the fire protection program provide an adequate balance between the different features. Strengthening any one can compensate for weaknesses in others.

- Adequacy of Separation of Redundant Systems/Components Required for Post Fire Safe Shutdown

When evaluating the adequacy of a fire barrier, the fire areas, zones, or rooms on each side of the barrier are to be individually analyzed for the impact of a fire on either side of the barrier on the redundant safe shutdown capability, including the likely spread of fire. The effectiveness of the barrier should be evaluated to demonstrate the adequacy of a barrier commensurate with the fire hazards in the area. A specific description of the fire protection features in the areas, zones, or rooms being analyzed is required to justify the change. Low fire loading alone is not a sufficient basis for the evaluation. If it is determined that each fire barrier of concern is capable of protecting the safe shutdown equipment/cables protected by

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the barrier (i.e., within and/or adjacent to the opposite side of the barrier), the analysis and justification for the acceptability of the fire barrier shall be documented.

- If evaluating passive fire-rated components, the evaluation should determine, as a minimum, that:
 - The temperature on the unexposed side of the barrier is sufficiently below the ignition temperature of the penetrating items.
 - The continuity and thickness of the fire barrier material is maintained.
 - The nature of the support assembly is equivalent to the tested configuration.
 - The application or "end use" of the fire barrier is unchanged from the tested configuration. For example, the use of structural steel fire proofing to protect a cable tray assembly may not be acceptable.
- If evaluating active fire rated components, then the evaluation should determine if the component provides an adequate level of separation considering the fire loading on both sides.
- If evaluating the significance of combustible materials (e.g., type, quantity, distribution, etc.) located between redundant shutdown divisions that are not separated by rated fire barriers (i.e., intervening combustibles), then the evaluation should consider the following factors to determine whether circuits or components, including associated circuits required for safe shutdown, could be adversely affected or whether a new hazard / element is being introduced:
 - The horizontal spatial separation between redundant divisions.
 - Cable qualification (IEEE-383).
 - The presence of an automatic fire suppression system over the intervening combustible.
 - The likely fire propagation direction of burning intervening combustibles in relation to the location of the vulnerable shutdown division.
 - The availability of other active and passive compensating fire protection features provided.

Note: For fire protection, "no intervening combustibles" means that there are not significant quantities of in-situ materials that will ignite and burn located between redundant shutdown systems. "Significant quantity" is a judgmental criterion, and the judgment of whether or not intervening combustibles are significant should be made by a fire protection engineer and documented (for later NRC audit).

▪ Suppression and Detection System Coverage

When evaluating the adequacy of partial suppression and/or detection coverage, the hazards in the fire areas, zones, or rooms of concern should be considered. The effectiveness of the system should be judged based on the location of the system components (i.e., detector, sprinklers, etc.) relative to the hazards, including the likely spread of fire, and should determine whether or not the system is commensurate with the fire hazards in the area. A specific description of the fire protection features in the areas, zones, or rooms being

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analyzed is required to justify the change. Low fire loading alone is not a sufficient basis for the evaluation.

- Manual Action Feasibility Evaluation Methodology
Refer to NEI 04-02 Section B.2.2.4 Recover Actions
- NFPA Code Deviations
As a minimum, applicable NFPA code deviations should be evaluated and justified by a qualified fire protection engineer based on engineering judgment. Guidance, considerations, and criteria provided throughout this document may be utilized when determined to be applicable by the evaluating engineer.
- Administrative Controls
 - If changing a preventive maintenance or surveillance procedure method and/or frequency, the evaluation should ensure the change provides reasonable assurance that the associated system, feature, or component is maintained in full operating condition (and to indicate probable continuance of that condition until the next performance of that procedure). Vendor guidance, NFPA guidance, fire protection engineering judgment, and/or actual performance should be considered.
 - If changing a specified compensatory measure, then the evaluation should ensure the proposed compensatory measure provides reasonable assurance that post-fire safe shutdown capability is preserved when the compensatory measure is established.”