FAQ Number 07-0039 **FAQ Revision** 2

FAQ Title Lessons Learned – NEI 04-02 B-2 Table

Plant: Harris Date: September 9, 2008

Contact: Andy Ratchford Phone: 925-377-0482

Email: Andy_ratchford@msn.com

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Purpose of FAQ:

The purpose of this FAQ is to provide updates to NEI 04-02 to reflect lessons learned from pilot plant activities, NFPA 805 task force meetings, and NRC reviews and discussions.

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):

NEI 04-02 Section 4.3.2, Nuclear Safety Performance Criteria Transition Review and Appendix B.2, Transition of Nuclear Safety Performance Criteria.

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Circumstances requiring guidance interpretation or new guidance:

NEI 04-02 guidance was written with templates on Table B-2.. Lessons learned during actual development of the table warrant additional clarification.

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

None.

Potentially relevant existing FAQ numbers:

Response Section:

Proposed resolution of FAQ and the basis for the proposal:

See the proposed attached proposed NEI 04-02 markups.

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

See the proposed attached proposed NEI 04-02 markups.

Note: At the request of the NRC at the August 21, 2008 FAQ meeting, FAQ 07-0039 was revised as part of Revision 2 to only address the NEI 04-02 Table B-2. NEI 04-02 Table B-3 will be addressed by FAQ 08-0055.

Proposed Markup to NEI 04-02 Section 4.3.2:

4.3.2 Nuclear Safety Performance Criteria Transition Review

The nuclear safety performance goals, objectives, and criteria are very similar to the requirements contained in Sections III.G and III.L of 10 CFR 50, Appendix R or applicable sections of NUREG-0800. Each nuclear plant has an approved fire protection program that must demonstrate compliance with the safe shutdown requirements in Sections III.G and III.L of 10 CFR 50, Appendix R (or applicable sections of NUREG-0800), or has documented exemptions/deviations from these requirements. For these reasons, a substantial part of an existing fire protection program can be transitioned to a new NFPA 805 licensing basis by performing a transition review and by addressing NFPA 805 topics not typically addressed in a previously approved fire protection program (i.e., fires originating in non-power operational modes and fires resulting in radioactive release). It is important to note one substantial difference between the requirements of 10 CFR 50, Appendix R and NFPA 805. Unlike 10 CFR 50, Appendix R which includes requirements to achieve cold shutdown, the nuclear safety goal of NFPA 805 requires "… reasonable assurance that a fire during any operational mode and plant configuration will not prevent the plant from achieving and maintaining the fuel in a safe and stable condition."

The deterministic branch of Figure 2.2 of NFPA 805 recognizes the new fire protection licensing basis may include components of the existing plant Fire Protection Program (including approved exemptions / deviations, and correctly implemented 10 CFR 50.59 and Fire Protection Regulatory reviews) that can be shown to comply with Chapters 1, 2 and 4. This would be considered compliance with deterministic compliance in NFPA 805 Chapter 4. Otherwise, additional Fire Protection Regulatory reviews may be used to demonstrate equivalence.

Just as in the Fundamental Fire Protection Program and Design Elements review discussed in Section 4.3.1, Fire protection program features and systems, associated with a pre-transitional licensing basis, although previously reviewed and approved by the NRC, may have been changed since initial NRC approval. Such changes are part of the Licensee's approved Fire Protection Program if they have been made in accordance with the correct 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). 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 and as such should be submitted to the NRC for approval as a license amendment request.

A systematic approach should be taken when assessing the transitioning plant fire protection program against the nuclear safety requirements of Chapters 1, 2 and 4 of NFPA 805. This is necessary to provide clear documentation of acceptance prior to moving forward with a new licensing basis. Specific acceptance of a plant configuration, as well as changes since original acceptance, should be documented. The review should consist of two fundamental items:

1. Review of the safe shutdown methodology for basic attributes (Chapters 1 and 2 of NFPA 805)

2. Fire area by fire area review (Chapter 4 of NFPA 805)

The safe shutdown methodology review evaluates the existing post-fire safe shutdown analyses against the guidance provided in Section 2.4.2 of NFPA 805 for the Nuclear Safety Capability Assessment. This methodology review is implemented by a review of NEI 00-01 Chapter 3, "Deterministic Methodology", as discussed in Appendix B-2 of this guidance. This review ensures that the basic elements (systems and equipment selection, circuit selection, equipment and cable location, and fire area assessment) are adequate to support transition to a new licensing basis for fires originating at power operations. Differences identified during the transition review must be reconciled prior to transition to a new risk-informed, performance-based licensing basis. Where the licensing basis is unclear or silent on methodologies, care should be taken to establish a licensing basis going forward. Guidance on performing and documenting the NFPA 805 Chapter 2 methodology reviews is provided in the tables in Appendix B-2 of this guidance.

B.2 Transition of Nuclear Safety Performance Criteria

B.2.1 Methodology Review

B.2.1.1 Background

Nuclear Safety Performance Criteria (NSPC) are established in Section 1.5.1 of NFPA 805. There are four substantial differences between these NSPC and traditional fire protection requirements from 10 CFR 50, Appendix R/NUREG-0800. These differences arise from the statements of the criteria, the scope of their applicability, and the nuclear safety goal they support. These differences are described below and guidance is provided on how to apply these differences in an evaluation of the extent to which the fire protection programs meet NFPA 805.

- The NSPC established in Section 1.5.1 of NFPA 805 require that "Fire protection features shall be capable of providing reasonable assurance that, in the event of a fire, the plant is not placed in an unrecoverable condition."

  This requirement on fire protection features introduces a change from the traditional requirements, which focus on achieving and maintaining safe shutdown in the event of a fire. By shifting the focus from safe shutdown to avoiding an unrecoverable condition, NFPA 805 introduces flexibility in the analysis necessary to show that the NSPC have been met. In particular, in many cases it will be sufficient to show that a plant can achieve and maintain hot shutdown (standby) in the event of a fire.

- A second substantial difference between the NSPC and existing requirements arises from the scope of applicability of the NSPC. NFPA 805 specifies the minimum fire protection requirements for existing light water nuclear power plants during all phases of plant operation, including degraded conditions, shutdown and decommissioning.

  By including all phases of plant operation, including shutdown, degraded conditions, and decommissioning, NFPA 805 requires additional analyses of fire protection features that have not generally been conducted by power plant licensees. Strategies for addressing this broadened scope of analysis of fire protection features for all plant conditions are discussed in the guidance in Appendix F of this document.

- A third substantial difference between the NSPC and existing requirements arises from the Nuclear Safety Goal ("NSG") in Section 1.3.1 of NFPA 805. It states "The nuclear safety goal is to provide reasonable assurance that a fire during any operational mode and plant configuration will not prevent the plant from achieving and maintaining the fuel in a safe and stable condition."

  By including any plant configuration, the NSG may require additional analyses of fire protection features. Because analyses of all configurations cannot be performed, bounding configurations must be identified and analyzed. An evaluation may show that existing fire protection analyses have included the bounding configurations for operation.

- The fourth substantial difference arises from the focus on maintaining the fuel in a safe and stable condition. Safe and Stable Conditions are defined in Section 1.6.56 of NFPA 805 as "For fuel in the reactor vessel, head on and tensioned, safe and stable conditions are defined as the ability to maintain K(eff) < 0.99, with a reactor coolant temperature at or below the requirements for hot shutdown for a boiling water reactor and hot standby for a pressurized water reactor. For all other configurations, safe and stable conditions are defined as maintaining K(eff) < 0.99 and fuel coolant temperature below boiling." Therefore, to be in a safe and stable condition, it may not be necessary to perform a transition to cold shutdown as currently required under 10 CFR 50, Appendix R/NUREG-0800.

  Thus, the definition of safe and stable conditions provides more flexibility in showing that the NSPC have been met than for non-power modes of operation.

B.2.1.2 Methodology Review Process

Summary

The suggested methodology for transition of the Nuclear Safety Performance Criteria is as follows:

Section 2.4.2 of NFPA 805 establishes the methodology for conducting a safety capability assessment for determining achievement of the nuclear safety criteria in NFPA 805 Chapter 1. To a large extent, the activities to be undertaken to implement this methodology have already been completed for the purposes of determining compliance with the existing requirements.

Tables B-2 and B-3 of this Appendix outline a recommended method to review the acceptability of a program for transition by examining the basic components of a nuclear safety capability assessment. These worksheets organize the transition of the 'pre-transitional safe shutdown analysis' to the 'nuclear safety analysis' as follows:

1. Nuclear Safety Capability System and Equipment Selection
2. Nuclear Safety Capability Circuit Analysis
3. Nuclear Safety Equipment and Cable Location
4. Fire Area Assessment

The review should be conducted against the methodology provided in NEI 00-01 Chapter 3, "Deterministic Methodology". This review is intended to ensure that the transitioning nuclear safety analysis meets basic established criteria for identification and analysis of equipment and cables. Exceptions and clarifications identified during the transition review should be documented in order to provide a well-established baseline for future changes.

Note: NEI 00-01 Chapter 3 contains methodology and "acceptable methods", but does not contain regulatory requirements. NEI 00-01 Chapter 3 has methods that "can" and "may" be

used to perform an analysis in an acceptable and/or efficient manner. Judgment will be necessary to determine the impact of a lack of alignment with NEI 00-01 guidance on the acceptability of the methodology transition.

Suggested Process

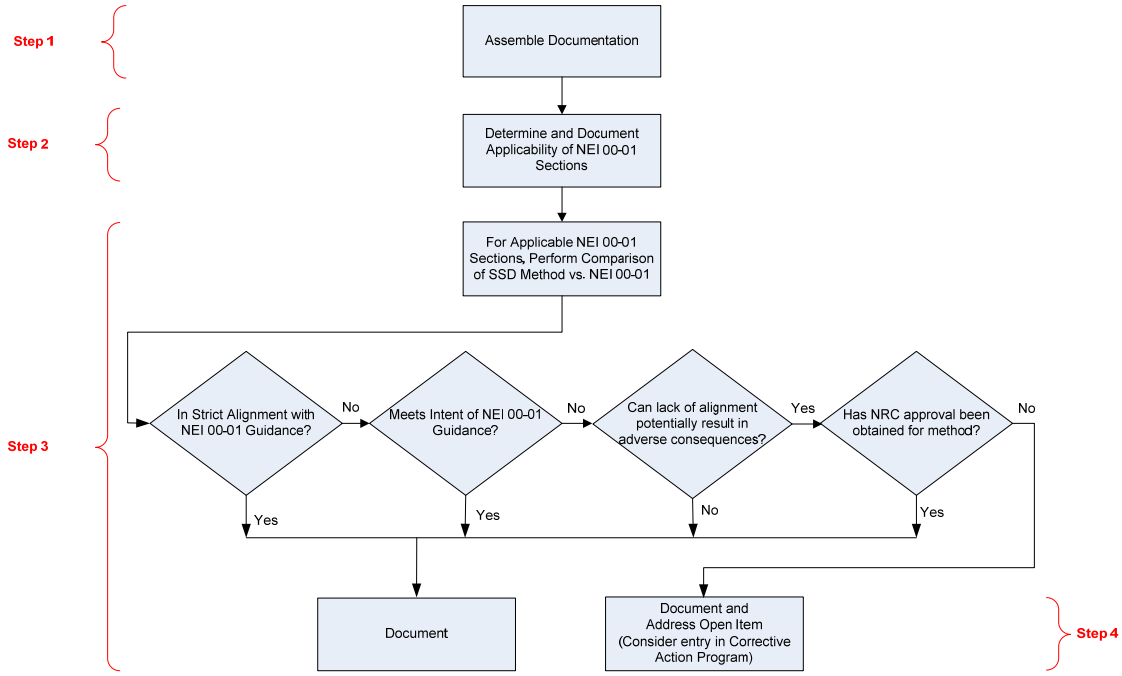

Figure XX – Summary of Nuclear Safety Methodology Review Process

Step 1 - Assemble Documentation

Gather industry and plant-specific information.

Industry Documentation

- NFPA 805, 2001 edition
- Applicable Sections of NEI 00-01, Revision 1
- Outstanding Frequently Asked Questions (FAQs) related to the Nuclear Safety Methodology Transition and status documents such as NRC comments and comment resolutions.

Plant specific calculations/analyses

Gather core methodology documents and plant specific calculations/analyses for:

- Safe shutdown system and equipment selection (NFPA 805 Section 2.4.2.1)

- Safe shutdown cable identification (NFPA 805 Section 2.4.2.2)
- Safe shutdown equipment and cable location (NFPA 805 Section 2.4.2.3)
- Fire area assessment and supporting analyses (operator manual action feasibility) (NFPA 805 Section 2.4.2.4)

Step 2 – Determine and Document NFPA 805 Applicability of NEI 00-01 Sections

Step 2.1 – Correlate the NFPA 805 Section 2.4.2 Section to the corresponding sections of NEI 00-01 Chapter 3.

Step 2.2

Based upon the content of the NEI 00-01 methodology statements, determine if the section is applicable to the plant. Examples where a section may not be applicable include:

- For a PWR, guidance provided in NEI 00-01 specifically for BWRs.
- Specific references to equipment/component types/cable types that are not used at the plant under review.

Step 3 – Perform Comparison of Plant Specific Safe Shutdown Methodology to Applicable Sections of NEI 00-01

For each applicable NEI 00-01 section that is determined in Step 2 to be applicable, a comparison should be performed of the plant safe shutdown methodology against the applicable NEI 00-01 section.

- Determine if failure to maintain strict alignment with the guidance in NEI 00-01 could have adverse consequences. Since NEI 00-01 is a guidance document, portions of its text could be interpreted as 'good practice' or intended as an example of an efficient means of performing the analyses. In some instances the commentary presents analytical preferences which can be performed in a number of different ways without impacting the validity of the results. These sections of NEI 00-01 can be dispositioned without further review. The basis for this determination should be documented.
- Document the following information for applicable NEI 00-01 Chapter 3 Sections:

  Alignment Statement

  - Aligns
  - Aligns with intent
  - Not in Alignment
  - Not in Alignment, but Prior NRC Approval

- Not in alignment, but no adverse consequences

Alignment Basis – A description supporting the Alignment Statement. This basis may also include a discussion of the relevance of the step to transition (for NEI 00-01 sections that are not considered to be necessary for successful performance of a safe shutdown analysis).
Reference Document – Reference documents supporting the alignment statement and basis.
Comments and Other Details – Any clarification information to support the other statements.
Unit Applicability - If particular review attribute is only applicable to a single unit, designate the applicability of the single unit.

Step 4 - Document Open Items associated with the review of the NEI 00-01 guidance.
Document open items applicable to the methodology review.

Non-conformances associated with the existing safe shutdown methodology that are considered non-compliances with 10 CFR 50, Appendix R or the approved fire protection licensing basis must be entered into the corrective action program and dispositioned appropriately to ensure enforcement discretion.

Note: If the existing licensing basis is vague or silent on the methodologies identified, then a licensing basis should be clearly defined during the transition period. For example, if the existing licensing basis is vague or silent on the methodology for circuit analysis (selection and/or protection of circuits) or evaluation of the failures of circuits within a fire area (single failure, any and all, one-at-a-time, sequential/concurrent, cumulative effects) a licensing basis should be established against which changes can be assessed post transition.

B.2.1.3 Fire-Induced Circuit Failures (Multiple Spurious Actuations)

[Refer to FAQ 07-0038]

Table B-2 Nuclear Safety Capability Assessment

Methodology Review

NFPA 805 Section: 2.4.2.1 Nuclear Safety Capability System and Equipment Selection

Aligns	The same systems used for post reactor trip inventory control will also be used for inventory control. Specifically, the CVCS system using the boric acid tank(s) and the RWST as sources of makeup water are used to maintain pressurizer level.	TP-E/ELEC-0001, Safe Shutdown in Case of Fire and Fire Hazards Analysis, Rev. 0, 6/2/2006	Sections B.2.2, B.4

NEI 00-01 Ref	NEI 00-01 Guidance
3.1.2.4 Decay Heat Removal	[BWR] Systems selected for the decay heat removal function(s) should be capable of: - Removing sufficient decay heat from primary containment, to prevent containment over-pressurization and failure. - Satisfying the net positive suction head requirements of any safe shutdown systems taking suction from the containment (suppression pool). - Removing sufficient decay heat from the reactor to achieve cold shutdown. [PWR] Systems selected for the decay heat removal function(s) should be capable of: - Removing sufficient decay heat from the reactor to reach hot shutdown conditions. Typically, this entails utilizing natural circulation in lieu of forced circulation via the reactor coolant pumps and controlling steam release via the Atmospheric Dump valves. - Removing sufficient decay heat from the reactor to reach cold shutdown conditions. This does not restrict the use of other systems.

Applicability	Comments
Applicable	

Alignment Statement	Alignment Basis	Comments	Unit	Reference Document	Doc. Details
Aligns	Test Plant uses the Auxiliary Feedwater System and Steam Generator PORVs to remove decay heat while in hot standby. Once temperature is reduced to about 350F, the RHR system is placed in service to complete the cooldown ot cold shutdown conditions.			TP-E/ELEC-0001, Safe Shutdown in Case of Fire and Fire Hazards Analysis, Rev. 0, 6/2/2006	Sections B.2.4, B.4

NEI 00-01 Ref	NEI 00-01 Guidance
3.1.2.5 Process Monitoring	The process monitoring function is provided for all safe shutdown paths. IN 84-09, Attachment 1, Section IX "Lessons Learned from NRC Inspections of Fire Protection Safe Shutdown Systems (10CFR50 Appendix R)" provides guidance on the instrumentation acceptable to and preferred by the NRC for meeting the process monitoring function. This instrumentation is that which monitors the process variables necessary to perform and control the functions specified in Appendix R Section III.L.1. Such instrumentation must be demonstrated to remain unaffected by the fire. The IN 84-09 list of process monitoring is applied to alternative shutdown (III.G.3). IN 84-09 did not identify specific instruments for process monitoring to be applied to redundant shutdown (III.G.1 and III.G.2). In general, process monitoring instruments similar to those listed below are needed to successfully use existing operating procedures (including Abnormal Operating Procedures). BWR - Reactor coolant level and pressure - Suppression pool level and temperature - Emergency or isolation condenser level - Diagnostic instrumentation for safe shutdown systems