

FAQ Number 07-0038

FAQ Revision 0

FAQ Title Lessons learned on Multiple Spurious Operations

Plant: Harris

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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 on multiple spurious operations (MSOs).

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 Appendix B.2, Transition of Nuclear Safety Performance Criteria.

A separate FAQ will be developed to address the impact on the post transition change process (Appendices I and J of NEI 04-02)

Circumstances requiring guidance interpretation or new guidance:

Lessons have been learned from pilot plant activities, NFPA 805 task force meetings, and NRC reviews and discussions on multiple spurious operations (MSOs).

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

None.

Potentially relevant existing FAQ numbers:

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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.

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

A licensee ~~may choose to submit~~ should submit a summary of its licensing basis on circuits for NRC review and approval. At a minimum, the summary ~~must~~ should contain sufficient information relevant to methods, tools, and acceptance criteria used to enable the staff to determine the acceptability of the licensee's methodology. The NRC staff may request additional information necessary to adequately assess the licensee's submittal.

~~The options to establish a licensing basis include 1) crediting a well documented design basis which meets minimum NRC expectations, or 2) using other methods accepted by the AHJ for selection of circuits and for using risk insights to evaluate the consequences.~~

~~Minimum NRC expectations include (however are not limited to) addressing single spurious and risk significant multiple spurious failures, DID and SM.~~

~~The NRC staff has reviewed Revision 1 of NEI 00-01 and concluded that Chapter 3 provides an acceptable way for analysis of post-fire safe shutdown circuits (Reference RIS 2005-30 and Regulatory Guide 1.205) to select circuits. , and Chapter 4 provides an acceptable way to determine risk significance of circuit findings.~~ In addition, an acceptable Fire PRA as defined in Regulatory Guide 1.205 Section C.4.3 includes methods for the selection of cables and detailed circuit failure modes analysis, as well as the integration of these circuit failures into the overall Fire PRA (e.g., NUREG/CR-6850 Tasks 3, 9, 10, and 14).

~~In addition, the NRC staff has reviewed the following methodology provided by Duke Energy and agrees that it provides an acceptable approach for screening out non-risk significant issues.~~

The approach outlined in Figure XX below is one acceptable method to address fire-induced multiple spurious operations. This method uses insights from a Fire PRA that meets the requirements of Regulatory Guide 1.205, Revision 0.

This process is intended to be in support of transition to a new licensing basis. Post-transition changes would use the risk-informed, performance-based change process. The post-transition change process for the assessment of a specific MSO would be a simplified version of this process, and may not need the level of detail shown in the following section (e.g., An expert panel may not be necessary to identify and assess a new potential MSO. Identification of new potential MSOs may be part of the plant change review process and/or inspection process).

FAQ Title Lessons learned on Multiple Spurious Operations

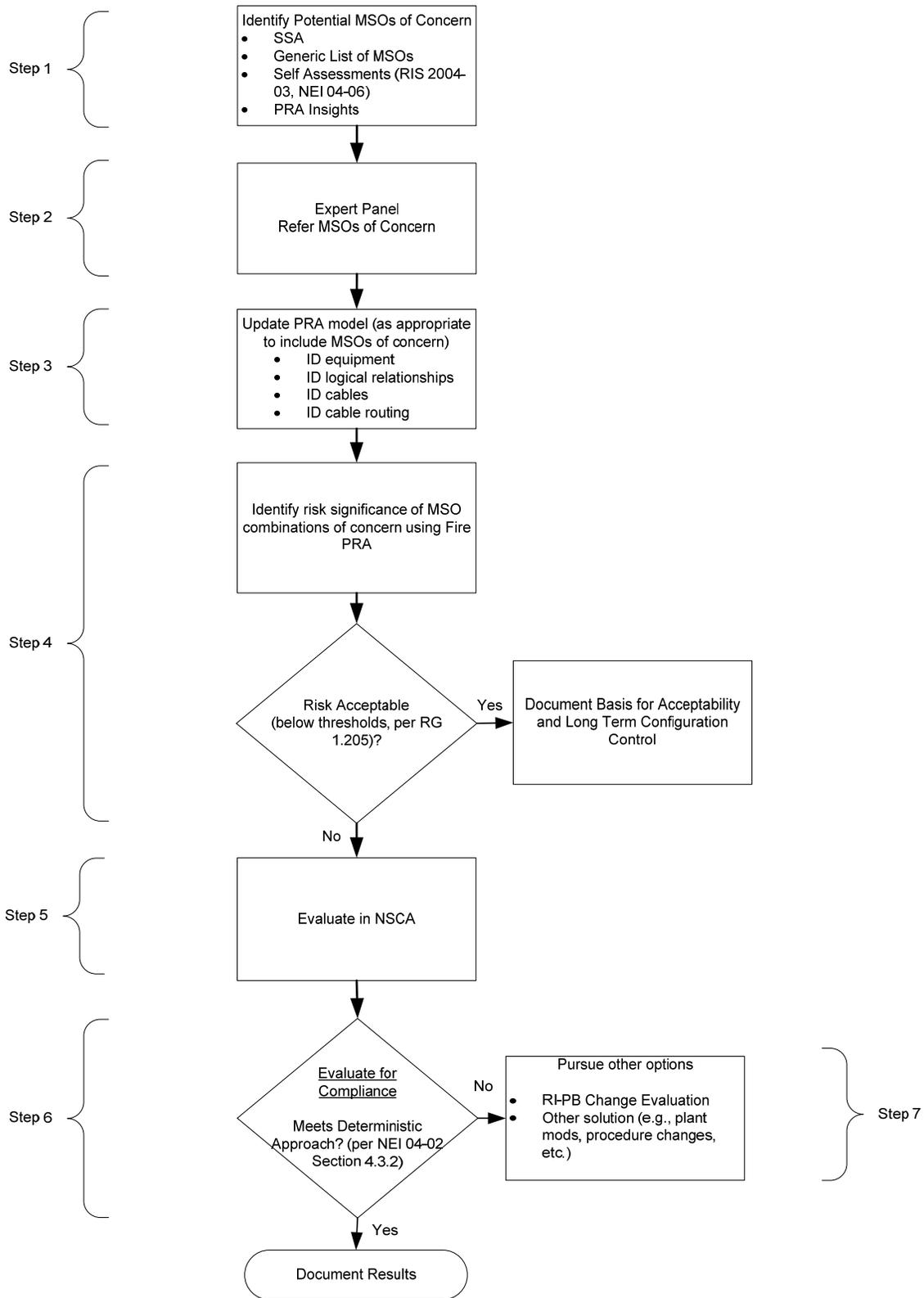


Figure XX – Multiple Spurious Operations – Transition Resolution Process

FAQ Title Lessons learned on Multiple Spurious Operations

Step 1 - Identify potential MSOs of concern. Information sources that may be used as input include:

- Post-fire safe shutdown analysis (NEI 00-01, Revision 1, Chapter 3)
- Generic lists of MSOs (e.g., from Owners Groups, if available.)
- Self assessment results (e.g., NEI 04-06 assessments performed to address RIS 2004-03)
- PRA insights (e.g., NEI 00-01 Revision 1, Appendix F)

Step 2 - Conduct an expert panel to assess plant specific vulnerabilities (e.g., per NEI 00-01, Rev. 1 Section F.4.2). The expert panel should focus on system and component interactions that could impact nuclear safety. This information will be used in later tasks to identify cables and potential locations where vulnerabilities could exist.

[Note: The physical location of the cables of concern (e.g., fire zone/area routing of the identified MSO cables), if known, may be used at this step in the process to focus the scope of the detailed review in further steps.]

Step 3 – Update the fire PRA model to include the MSOs of concern. This includes the:

- Identification of equipment (NUREG/CR-6850 Task 2)
- Identification of cables that, if damaged by fire, could result in the spurious operation (NUREG/CR-6850 Task 3, Task 9)
- Identify routing of the cables identified above.

Step 4 – Identify the risk significance of MSOs of concern.

This step is intended to identify MSOs that contribute to risk significant scenarios. Simplifying approaches may be used to ‘quantify’ the risk of the MSO. For example, the estimate of fire risk (CDF) may be assumed to be all associated with the MSO, and therefore serve as a surrogate measure for Δ CDF associated with the MSO. The use of surrogates (e.g., CDF for all of the scenarios within a fire area) provides a more definitive measure of risk for a fire in an area, would simplify long term configuration management of MSO assessment, and allows resources to be focused on refining and addressing issues (including issues being associated with MSOs) that are risk significant.

Determine if the risk significance of the MSO warrants additional review / action. The following table and figure provide a summary of risk thresholds that have been reviewed and found acceptable by the NRC for addressing MSOs. If surrogate approaches are used to focus on higher risk scenarios, a CDF value of 1E-08/yr prior to operator response to address the fire-induced spurious operation (LERF value of 1E-09/yr) should be used as a threshold value for the scenarios, consistent with the values for MSOs previously found to be acceptable. Refer to Table XX and Figure YY.

FAQ Title Lessons learned on Multiple Spurious Operations

Cables that are part of the combination in the ‘gray area’ are included in the NSCA for disposition using the same tools as other cables in the NSCA per a later step in the process. Cables may be conservatively included based on surrogate risk indicators such as significance of a single cable at a time or all ‘spurious’ cables (cables that can cause a spurious operation due to a hot short) included in a fire scenario/initiator are included in the NSCA.

Table XX – MSO Risk Assessment Criteria

<u>Ref.</u>	<u>ΔCDF</u>	<u>ΔLERF</u>	<u>Characterization</u>	<u>Action</u>
NEI 04-02 (B.2.1) & RG 1.205 (C.3.3)	< 1E-08/yr (prior to operator response*)	< 1E-09/yr (prior to operator response*)	Not potentially risk significant Band 1 on Figure YY.	No further consideration required (document results)
NEI 04-02 (B.2.1) & RG 1.205 (C.3.3)	<1E-06/yr (prior to operator response*) but ≥1E-08/yr	<1E-07/yr (prior to operator response*) but ≥1E-09/yr	“Gray Area” Band 2 on Figure YY	Evaluate and include as part of NSCA (“design change or procedure change put in place, if possible, Procedure actions still meet feasibility criteria but are not considered ‘required’.”)
NEI 04-02 (B.2.1)	>1E-06/yr (prior to operator response*)	>1E-07/yr (prior to operator response*)	Potentially risk significant Band 3 on Figure YY	Evaluate and include as part of NSCA

* “Operator response” refers to operator manual action in response to the fire-induced spurious operation(s).

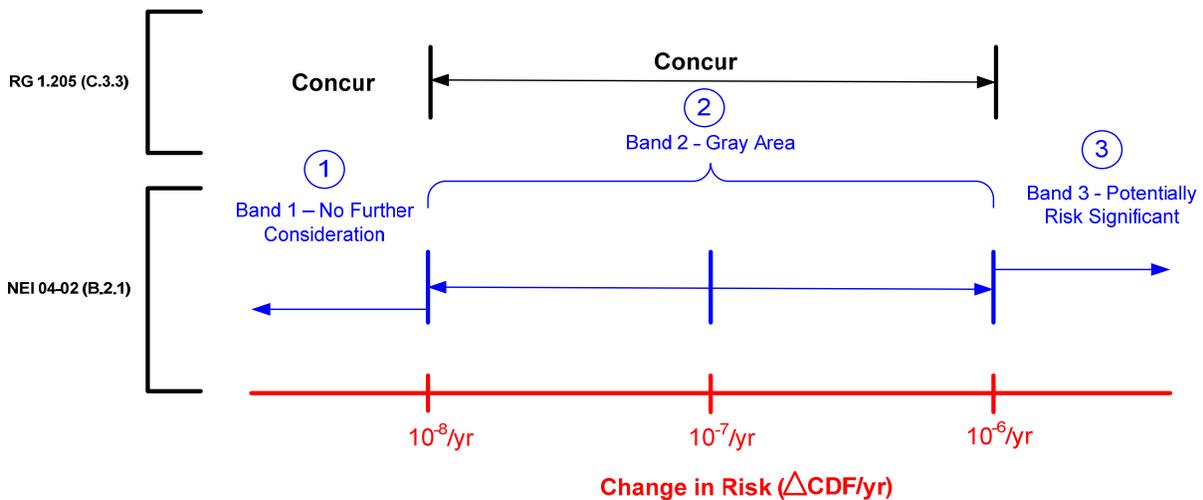


Figure YY – NEI 04-02 Section B.2.1 Change in Risk Criteria due to MSOs (Change in CDF Only Shown)

Table YY – MSO Risk Assessment Criteria

<u>Ref.</u>	<u>ΔCDF</u>	<u>ΔLERF</u>	<u>Characterization</u>	<u>Action</u>
<u>RG 1.205 (C.3.3 and C.3.1)</u>	<u><1E-06/yr but ≥1E-07/yr</u>	<u><1E-07/yr but ≥1E-08/yr</u>	<u>Post transition</u> <u>See Figure ZZ</u>	<u>Post-transition – Process in accordance with FP license condition (RG 1.205 – C.3.1)</u> <u>Allows risk increase to consider credit for feasible & reliable recovery actions.</u>

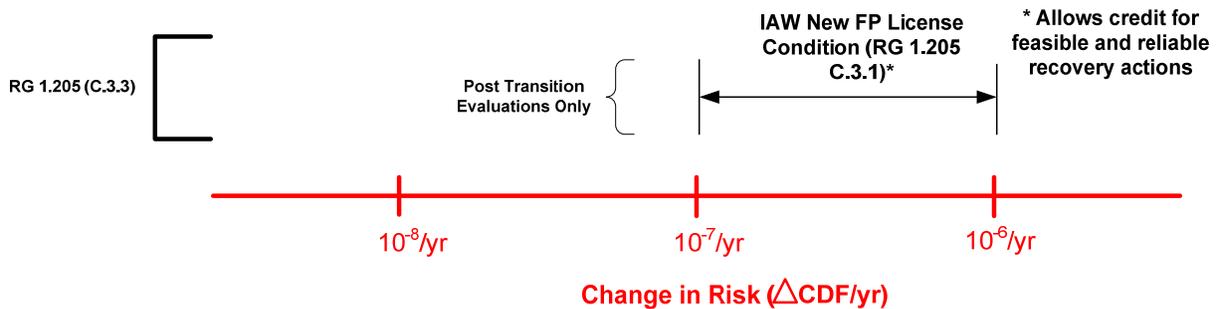


Figure ZZ – RG 1.205 Change in Risk Criteria due to MSOs (Change in CDF Only Shown)

Potential MSOs of concern below the screening threshold (band 1 of Figure YY) do not require further evaluation. The review that was performed should be documented for configuration control. This documentation should include a disposition of items recommended by the expert panel for additional review.

Step 5 – Evaluate in the Nuclear Safety Capability Assessment (NSCA)

Include the equipment/cables of concern in the Nuclear Safety Capability Assessment (NSCA) for additional assessment on a fire area-by-fire area basis.

Step 6 – Evaluate for Compliance

For MSOs of concern that have been included in the NSCA for additional assessment, determine if the concern can be addressed by meeting the pre-transition licensing basis (e.g., deterministic separation/protection per 10 CFR 50, Appendix R / NUREG-0800 with consideration of approved exemptions, etc.).

MSOs that meet the separation/protection requirements of the pre-transition licensing basis should be documented and the appropriate transition documentation updated as necessary.

Step 7 – Resolution Options

Risk significant MSOs that do not meet the separation/protection requirements of the pre-transition licensing basis will be reviewed for other resolution options, such as:

- Process as a risk-informed, performance-based change evaluation.
- Perform plant modifications to meet deterministic or risk-informed, performance-based acceptance criteria.
- Perform procedure changes