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The NRC staff has reviewed Revision 1 of NEI 00-01 and concluded that Chapter 3 provides an acceptable deterministic approach for analysis of post-fire safe shutdown circuits **when applied in accordance with the regulatory expectations described in RIS 2005-30 and when used in conjunction with NFPA 805 and Regulatory Guide 1.205 for a plant that has transitioned to a 10 CFR 50.48(c) licensing basis** (Reference RIS 2005-30 and Regulatory Guide 1.205). In addition, an acceptable Fire PRA, as defined in Regulatory Guide 1.205, Section C.4.3, **and satisfying at least Capability Category II in the ASME/ANS Fire PRA Standard for all applicable Supporting Requirements**, 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). [RHG]

The approach outlined in Figure XX below is one acceptable method to address fire-induced multiple spurious operations (**MSOs**). This method uses insights from a Fire PRA that meets the requirements of Regulatory Guide 1.205, Revision 0, **and satisfies at least Capability Category II in the ASME/ANS Fire PRA Standard for all applicable Supporting Requirements**. [RHG]

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Step 1 Box (also Step 1 text on Page 5): **This should include a bullet for Operating Experience to take advantage of the broad range of fire-induced items previously identified in both NRC inspections and self-identified assessments. Many of these have been reported to NRC through 50.72 notifications and 50.73 Licensee Event Reports. Many of the peer reviews included representatives from other licensees on the teams allowing significant information sharing on this issue.** [HTB]

Step 4 Diamond: Risk Acceptable (below thresholds, **per RG 1.205: 1.E-8/yr for CDF; 1E-9/yr for LERF [prior to operator response]?** **(Changed to prevent misconception that MSO thresholds are the same as those in RG 1.205 when, in fact, the MSO thresholds are an order of magnitude lower [see “Other” comments].)** [RHG]

Step 4 “No:” **The FAQ methodology utilizes  $\Delta$ CDF prior to operator response as the parameter of interest. Once a given scenario is designated as “Potentially Risk Significant,” the first action beyond “No” in Step 4 should be to assess the risk of the scenario with operator response. If the recovery actions are feasible and reliable, the risk of the scenario may be acceptable. Note that the acceptance criteria required in RG 1.205 allows recovery actions in the consideration of risk.** [HTB]

Step 5 Box: **Evaluate in Complete NSCA (Changed to prevent misconception that Step 3 is different from an NSCA when it really is at least the initial part of an NSCA. “Complete” implies that all four steps in the NSCA will be performed, as per NFPA-805, Section 2.4.2, in Step 5.)** [RHG] **Since the recovery action(s) must be**

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evaluated with regard to risk, an additional box may be needed to add the recovery action into the PRA (HRA, change in overall risk, etc.). Since the NSCA is a deterministic approach, it does not appear that this is included in the step “Evaluate in NSCA.” [HTB]

Step 6 “Yes:” If the risk is not acceptable (Step 4 “No”), but the action is deemed compliant deterministically (Step 6 “Yes”), why is there no action required other than documenting the results? [DMF]

**Step 8: Evaluate for defense-in-depth and safety margin (Both of the “Yes” pathways in Steps 4 and 6 need to pass through an evaluation for defense-in-depth (DID) and safety margin (SM), from which both “Yes” and “No” pathways need to be addressed.)** [RHG] The text and the flow chart both should be revised to require all MSO scenarios to be subjected to a DID and SM review before any decisions are made about acceptability. A low risk MSO combination may still be unacceptable if the other DID and SM features are lacking. [HTB]

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Step 4 ... This step is intended to identify MSOs that contribute to risk significant scenarios. Simplifying approaches may be used to **‘quantify’ bound** 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 the **maximum possible  $\Delta$  CDF** associated with the MSO. **(This could serve as a bounding estimate for the  $\Delta$ CDF that would be associated with these MSO in a plant change evaluation.)** The use of surrogates (e.g., CDF for all of the scenarios within a fire area) **typically** provides a **more definitive conservative** measure of risk for a fire in an area **(this would need verification)**, ~~would~~ **could** simplify long term configuration management of MSO assessment, and, **provided that the bounding estimate falls below the threshold for risk-significance discussed below**, allows resources to be focused on refining and addressing issues (including issues being associated with MSOs) that are risk significant. [RHG]

Step 4 ... 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. (Deleted to prevent misconception that risk thresholds have been used previously to approve MSOs.) [RHG]

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Step 4 ... Cables that are part of the combination in the ‘gray area’ are included **in when completing** 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. [RHG]

Table XX: MSO Risk Assessment Criteria **(During Transition)** [RHG]

Table XX, 1<sup>st</sup> Row, Action: **If defense-in-depth and safety margin provisions are met,** no further consideration required (document results) [RHG]

Figure YY: **Please explain the meaning of “Concur”** [RHG]

Figure YY, Band 1: **If defense-in-depth and safety margin provisions are met,** no further consideration [RHG]

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Table YY: MSO Risk Assessment Criteria **(Post Transition)** [RHG]

Step 4 ... **If defense-in-depth and safety margin provisions are met,** potential MSOs of concern below the screening threshold (band 1 of Figure YY) do not require further evaluation. [RHG]

Step 5 – **Evaluate in Complete** the Nuclear Safety Capability Assessment (NSCA) [RHG]

Step 6 ... MSOs that meet the separation/protection requirements of the pre-transition licensing basis should be **evaluated for satisfaction of defense-in-depth and safety margin requirements (Step 8) and, if these are met,** documented and the appropriate transition documentation updated as necessary. [RHG]

**Other [HTB]:**

**The process presented in this FAQ defines a method to “screen” multiple spurious actuation combinations by assessing their risk significance and comparing it to the thresholds in both NEI 04-02 and RG 1.205. Several questions arise regarding this screening approach:**

- a. **Once a MSO combination screens (risk is below the threshold) there should be a paper trail to document that the combination was considered, it was evaluated, and found to be acceptable. What document will include all of this information for future reference?**

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- b. How will the risk analysis be documented? Will it be an inherent part of the PRA or will it be a stand alone calculation?
- c. For MSO combinations that are close to the threshold, will there be any need to revisit the risk analysis to be sure minor changes in the PRA will not cause them to move above the screening threshold?
- d. For recovery actions put in place to address MSOs in the “gray area”, will the recovery action be integrated into the procedures as a required step or will they be optional steps? For instance, if recovery actions for a given MSO combination are very labor intensive resulting in a possible impact on the number of operators available to take more risk significant recovery actions, will the recover actions for the lower risk “gray area” MSO still be taken?

Are you planning to report the results of the MSO review in the Transition Report? If so, how will the information be presented? Do you plan on reporting those MSO combinations that are above the self approval limits requiring notification of the NRC (MSO combinations that are  $> 1E-7/\text{yr } \Delta\text{CDF}$  and  $> 1E-8/\text{yr } \Delta\text{LERF}$ , including recovery actions [an order of magnitude higher than the MSO screening thresholds without credit of recovery actions, see Step 4 Diamond comment])?

Nowhere in the methodology is the concept of time margin addressed. One of the most complex issues with regard to MSOs is their potential impact on the feasibility of recovery actions. If three different MSOs occur simultaneously and they cause the plant to degrade at a faster rate than was considered in the thermal-hydraulic calculations for feasibility under “any and all, one at a time,” how will this be addressed in the NSCA? Feasibility appears to be fairly dynamic with regard to MSOs.