

NEI 00-01 [Revision 3]

GUIDANCE FOR POST FIRE SAFE SHUTDOWN CIRCUIT ANALYSIS

October 2011

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Nuclear Energy Institute

Guidance for Post-
Fire Safe Shutdown
Circuit Analysis

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1 INTRODUCTION

For some time there has been a need for a comprehensive industry guidance document for the performance of post-fire safe shutdown analysis to implement existing fire protection regulations. Such a document is needed to consistently apply the regulatory requirements for post-fire safe shutdown analysis contained in 10 CFR 50.48 (Reference 7.4.1) and 10 CFR 50 Appendix R (Reference 7.4.3).

From the standpoint of deterministic safe shutdown analysis, Generic Letter 86-10 (Reference 7.1.10) provided standardized answers to certain questions related to specific issues related to this topic. The answers provided, however, did not comprehensively address the entire subject matter. The lack of comprehensive guidance for post-fire safe shutdown analysis, in combination with the numerous variations in the approach used by the architect engineers responsible for each plant design, have resulted in wide variation in plant specific approaches to deterministic post-fire safe shutdown analysis.

Some of these approaches are based on long-held industry interpretations of the NRC regulations and guidance. In many cases, these interpretations were not documented in a manner that indicated a clear NRC acceptance of the position. In an NRC letter to NEI in early March 1997 (Reference 7.4.30) NRC stated that the regulatory requirements and staff positions are well documented, and that regulatory requirements recognize that fires can induce multiple hot shorts. The industry responded (Reference 7.4.31) that industry and NRC staff interpretations of existing regulations and regulatory guidance differ significantly on, at least, some aspects of the post-fire safe shutdown analysis requirements and provided reasons for these differing interpretations. The Boiling Water Reactor Owners Group (BWROG) developed a comprehensive document for BWRs to compile deterministic safe shutdown analysis practices based on existing regulatory requirements and guidance. That document was adopted into NEI 00-01 with minor changes to address PWR-specific safe shutdown analysis considerations.

Changes were made in Revision 2 to provide an approach for addressing fire-induced multiple spurious operations (MSOs).

Changes made in Revision 3 reflect an approach consistent with that endorsed by the NRC in Regulatory Guide 1.189 Revision 2 and provide clarifications to licensee in-process questions while resolving the Multiple Spurious Operation (MSO) issue. Revision 3 also provides an update to the Generic MSO Lists in Appendix G. The list changes are as a result of the initial assessment of Appendix G by the Expert Panels at individual plants. The changes to the generic lists should be treated similar to other operating experience (OE) issues following the same process as the initial list.

The NRC Staff position relative to the post-fire safe shutdown circuit guidance contained in NEI 00-01 Revision 2 is stated in Regulatory Guide 1.189 Revision 2. The NRC Staff stated in an

October 27, 2010 meeting on NEI 00-01 Revision 3 that the regulatory guide gives current Staff guidance as one acceptable way to meet the regulations. (Reference ML103280072) Deviations from the guidance in Regulatory Guide 1.189 Revision 2 should be appropriately evaluated and consistent with a plants current licensing basis.

1.1 PURPOSE

The purpose of this document is to provide a consistent process for performing a post-fire safe shutdown circuit analysis. While it describes differences between NRC and industry licensing positions, NEI 00-01 does not define what any plant's licensing basis is or should be. Plant licensing bases have been developed over many years of licensee interactions with NRC staff, and the interpretation of these licensing bases is a matter between each licensee and NRC staff. The guidance provided in this document accounts for differences and uncertainties in licensing basis assumptions about circuit failures. It also provides, **when used in conjunction with the pertinent sections of NRC Regulatory Guide 1.189 Revision 2**, a method for the resolution of the differences between the NRC and the industry related to fire-induced circuit failures resulting in MSOs.

In general, the Industry has concluded that the treatment of MSO as outlined in this document is a new approach not previously used within the industry. It is aimed at providing a path to closure for the differences of opinion between the NRC and the Industry relative to the treatment of fire-induced circuit failures and fire-induced spurious operation of plant equipment. As such, in aggregate, this specific resolution methodology is not part of any plant's current licensing basis. As a whole, the resolution methodology for addressing MSO and the revised circuit failure criteria outlined in this document are considered to be beyond the current licensing basis (CLB) of operating plants. This conclusion is evidenced, in part, by the fact that NRC Regulations on Fire Protection required one train to be free of fire damage and many of the MSO Scenarios involve damage to the non-credited train. Historically, in both the licensing and inspection arenas, there is reasonable precedent for the single spurious criteria previously used within the Industry. Having said this, however, it is clear from the numerous meeting between the NRC and the Industry that the NRC Position is that MSOs should have always been considered in a Licensee's Post-Fire Safe Shutdown Analysis. As a result, it is incumbent on each Licensee to understand their current licensing bases as it relates to this document, including the MSO resolution process. This document is a compilation of industry best practices that in some cases go beyond the guidance issued by the NRC related to post-fire safe shutdown.