



NUCLEAR ENERGY INSTITUTE

Alexander Marlon  
DIRECTOR, ENGINEERING  
NUCLEAR GENERATION DIVISION

8/18/03

68 FR 49529

(2)

Chief and Directives  
11/15/03  
SEP 22 PM 1:06

RECEIVED

September 23, 2003

Chief, Rules and Directives Branch  
Division of Administrative Services  
Office of Administration, Mail Stop T-6 D59  
U. S. Nuclear Regulatory Commission  
Washington, DC 20555-0001

**SUBJECT:** Comments on 68 FR 49529, "Proposed Generic Communication; Risk-Informed Inspection Guidance for Post-Fire Safe Shutdown Inspections," August 18, 2003

Dear Sir:

We appreciate the opportunity to provide the enclosed comments on the draft fire protection Regulatory Information Summary noticed in 68 FR 49529. These comments reflect views from a number of industry stakeholders in this issue.

Generally speaking, a risk-informed approach for conducting the inspections of associated circuits is appropriate. However, it must be clearly understood that inspecting plant safe shutdown and circuit analyses with the assumption of more than one simultaneous spurious actuation is beyond the current licensing basis of most plants. In these cases, findings based on this assumption and determined to be risk significant must be clearly separated from compliance issues. The determination of any non-compliance must be made solely with respect to the plant licensing basis, since licensee post-fire safe shutdown programs have been previously reviewed and approved.

The need for completing the fire protection Significance Determination Process (SDP) revisions currently in progress is not addressed in the proposed RIS. It is not sufficient to use risk insights only to select the circuits to be inspected. A robust risk significance evaluation method (using a completed SDP revision or NEI 00-01 techniques) is also needed. In order to maintain the distinction between licensing basis and safety issues it is imperative that NRC expend resources on resuming inspections in this area only when such methods are in place.

Template = ADM-013

E-RIDS = ADM-03  
Add - C. Petrone (CJP)  
M.H. Salley (MX53)

Chief, Rules and Directives Branch  
September 23, 2003  
Page 2

If you require further information please contact me (202-739-8080 or [am@nei.org](mailto:am@nei.org))  
or Fred Emerson (202-739-8086 or [fae@nei.org](mailto:fae@nei.org)).

Sincerely,

A handwritten signature in cursive script that reads "Alex Marion".

Alexander Marion

Enclosure

**Comments on Associated Circuit Inspection Regulatory Information  
Summary**

1. **General:** Generally speaking, a risk-informed direction for resuming the inspections of associated circuits is appropriate. However, it must be clearly understood that inspecting plant safe shutdown and circuit analyses with the assumption of more than one simultaneous spurious actuation is beyond the licensing basis of most plants. It is appropriate to inspect plant programs using this assumption only when any findings based on it are clearly delineated as issues of potential risk significance and not compliance issues. The determination of any non-compliance must be made solely with respect to the plant licensing basis, since these programs have been previously reviewed and approved.
2. **General:** The need for completion of the fire protection Significance Determination Process (SDP) revisions currently in progress is not addressed in the proposed RIS. It is not sufficient to use risk insights only to select the circuits to be inspected. A robust risk significance evaluation method (using a completed SDP revision or NEI 00-01 techniques) is also needed. It makes little sense for NRC to expend resources on resumed inspections in this area without such methods in place.
3. **General:** The inspection procedure should state clearly the treatment of Unresolved Issues (URIs), including the issues related to multiple spurious actuations and Information Notice 92-18, identified prior to the moratorium on inspections of associated circuits. Since these issues were left for resolution when a method of assessing their risk significance became available, the NEI 00-01 methods could now be used for resolving such URIs and for newly identified issues.
4. **General:** The staff should clarify references to thermoset and thermoplastic throughout the document as being applicable to the insulation material of the cables rather than the cable jacket material. The document should clarify that the critical characteristic is the cable insulation.
5. **“Summary of the Issue” Section:** This section states that the latest revision of NEI 00-01 is Revision D. In fact, it is Revision 0, issued in May 2003. The role of this document should be stated clearly in the RIS as an acceptable means of resolving circuit failure issues for plants using either a risk-informed or a deterministic licensing basis. We will address this point further in separate correspondence.
6. On page 49530 last paragraph and on page 49532 Section 3, the document suggests that inspectors should focus on associated circuits having a "significant impact" on the ability to achieve and maintain safe shutdown.

**“Significant impact” should be defined in terms of a delta CDF if possible. This would allow licensees to establish a process to focus possible corrective actions at the appropriate risk level if issues are determined to be risk-significant.**

- 7. Background Information Section: NRC should also list as a reference EPRI Report 1003326, “Characterization of Fire-Induced Circuit Faults: Results of Cable Fire Testing,” as this document provides the most complete discussion of the EPRI/NEI testing forming the basis of this RIS.**
- 8. Background Information Section: The NRC should provide the basis for moving thermoplastic inter cable faults into Bin 1, since this is inconsistent with the results of the February 19 workshop. It seems overly conservative to treat inter-cable thermoplastic cable failure the same as intra-cable failures for all cables.**
- 9. Basic Risk Equation Section: Care should be taken to assure that the “Basic Risk Equation” is consistent with NEI 00-01 and with the SDP revision currently in progress.**
- 10. Paragraph 2: Armored cable should be expressly addressed along with thermoset and thermoplastic cable.**
- 11. Paragraphs 2A and 2B: The EPRI and Sandia testing reported a “maximum cable temperature” and compared this to the time to damage. The actual hot gas layer was measured and not reported, but was 100 F higher or more than the maximum cable temperature. The RIS should be revised to include this additional temperature increase prior to failure.**
- 12. Paragraphs 2A and 2B: The criteria that thermoset cables will fail within 10 minutes of exposure to 700 degree F temperatures, and thermoplastic cables within five minutes of exposure to 425 degree temperatures are not useful. First, it is difficult to determine with precision when specific cables are exposed to specific temperatures. Second, it does not reflect the total time taken to reach the projected failure point. It would be far more appropriate to use a criterion such as “cables will fail within X minutes of initiation of a fire that reaches 700 degrees.” This allows the inspector to more easily determine if the licensee can take action to control the fire or mitigate the consequences within the total time available. The fire test data are sufficient to support the development of such criteria.**
- 13. Paragraph 2B: The definition of thermoset cable as “typically IEEE 383 qualified” should be changed to “IEEE 383 qualified or evaluated as equivalent” to clarify this requirement. The cable terms used in the document are not typical of those used in cable specifications and as such may create unnecessary confusion for inspectors and licensees in the proper**

classification of the installed cable.

14. Paragraph 2C, first bullet, states that “inspectors should consider only a few (three or four) of the most critical postulated combinations” for intra-cable shorting. Consistent with the prior discussion in this paragraph 2C bullet, it should be made clear that these are combinations of two failures, and that the combinations of two failures must result in unacceptable consequences in order to qualify for review.
15. Paragraph 2C, 4th Bullet: It doesn't appear to be appropriate to lump DC failures of the same polarity into the same bin as intra-cable shorts. The probability of a spurious operation of this type is much lower than a simple intra-cable short.

If both positive and negative conductors are present, the combination of these conductors may open the circuit protection device (e.g. blow associated fuse). For example, assume four conductors are present; 2 target and 2 source conductors. To initiate a spurious operation, the positive "source" conductor must contact the positive "target" conductor. In addition, the source conductor must be from the same DC source or the negative conductors must also make contact. The following discussion addresses the latter case (i.e., the “source” is not from the same DC source, thus requiring the negative conductor to also make contact).

These are the possible 2 conductor combinations (“S” refers to the source, or powered conductor; “T” to the target or unpowered conductor):

Combination 1: (+)S to (+)T & (-)S to (-)T

Combination 2: (+)S to (-)S & (+)T to (-)T

Combination 3: (+)S to (-)T & (+)T to (-)S

Combination # 1 results in a spurious operation. Combination # 2 results in protective devices operating and deenergizing the circuit. Combination # 3 will cause current to flow in the reverse direction. Dependent on the target device, this may or may not cause a spurious operation. If any three conductors combine prior to the occurrence of Combination # 1, the protective device will operate.

For these reasons, the probability of spurious actuation from this type of interaction is lower than for a simple intra-cable hot short. It would be more appropriate to defer this pending additional research.

16. Paragraph 3: The consequences of potential circuit failures are an important parameter to focus inspections. Risk also needs to be considered. There are many possible high-consequence circuit failure scenarios the inspector could review, so it is important to focus on those high-consequence scenarios that are also risk significant. The inspection procedure input considers risk by

stating that "Failures that impede hot shutdown in the first hour of the fire tend to be the most risk significant in a first-order evaluation." The licensee should be permitted to demonstrate that other factors, such as plant-specific cable or fire barrier configurations, could make specific "high consequence" fire-induced failures an acceptable risk even if there is a potential for impeding safe shutdown in the first hour.

17. "Items to be Deferred at This Time Pending Additional Research" Section: The NRC summary of the workshop on February 19 indicated that "the group agreed that, in general, armored cable with fuses was not a likely source for maloperation." The workshop participants agreed that multiple shorts involving armored cable should be considered a "Bin 2" issue and thus not subject to inspection when the circuit analysis inspections resume. This should be included in this section, as inter-cable shorts in armored cable are discussed under "Items Not to be Considered at This Time."