

DS09  
E. Connell

64FR 58461

Oct. 29, 1999

**From:** "Jutras, Tom" <THJ@epm-inc.com>  
**To:** "CAG@nrc.gov" <CAG@nrc.gov>  
**Date:** Mon, Jan 17, 2000 10:38 AM  
**Subject:** Comments on Reg. Guide DG-1094

RECEIVED

2000 JAN 18 AM 11: 50

(3)

RULES & DIR. BRANCH  
US NRC

Ms. Carol Gallagher,

We spoke on the phone last week about these comments for DG-1094. I appologize that we did not make the earlier deadline and hope that these comments can be included with others you have received. The attached file is in Microsoft Word 97 format. Please let me know if you have any trouble opening it. We are also sending a hardcopy of the comments under separate cover to Mr. David Meyers.

Thank You

Thomas Jutras - EPM, Inc.  
(508) 875-2121 x215

<<EPM comments on reg guide DG-1094.doc>>

Add: E. Connell

## GENERAL COMMENTS

Throughout these comments the term "Regulatory Guide" is used to refer to DG-1094 Regulatory Guide – Fire Protection for Operating Nuclear Power Plants".

1. The purpose of this Regulatory Guide as stated in Section A is, "to provide a comprehensive fire protection guidance document, and to identify the scope and depth of fire protection that the staff has determined to be acceptable for operating nuclear plants." Section A also states, "The positions and guidance provided are a compilation of the fire protection requirements and guidelines from the existing regulations and staff guidance. In addition, as appropriate new guidance is provided where the existing guidance is weak or non-existent. Appendices to the guide that are referenced in Section C provide additional guidance on select topics."

There is a vast amount of previous guidance and regulations related to defining the acceptable level of fire protection at nuclear power plants. However, there remains confusion in the industry regarding achieving the acceptable level of protection using this guidance. There is also difficulty in regulating the industry in a consistent fashion due to this confusion. The confusion is caused in part by the large quantity of individual documents which are not always consistent with one another. It is also caused by a lack of guidance in specific areas. The Regulatory Guide should state these facts and the purpose should be to remedy the confusion, providing a clear path to achieving the acceptable level of fire protection in accordance with the regulations. This will help both the industry and the regulators who monitor it. While the Regulatory Guide provides a road map for addressing specific fire protection issues, it does not clarify any further those issues that have often been subject to interpretation by the nuclear utilities and their consultants and, therefore, will only add to further confusion. See specific examples below.

This document can go a long way toward removing some of the confusion regarding acceptable levels of fire protection at nuclear power plants. This opportunity should not be wasted.

2. Section B4 and C and Appendix I use the term "should" vs. "shall" or "must" in nearly all cases. In many cases the transcription from other regulations is not verbatim (e.g. changing "must" or "shall" to "should"). However, footnotes do not indicate change in text. (See specific examples in comments for Section C1.4.3 and Appendix I below.) What is the rationale for these modifications? If there is an acceptable reason, it should be stated in the document to help avoid confusion. The term "should" must be added to the glossary and defined.
3. Throughout the Regulatory Guide, the term "important to safety, safety related and required for safe shutdown" has been used. The terminology used in this document must be consistent. The term "important to safety" has been used in other NRC documents, but the term has never been defined. The recommendation would be to use just one term.

Since post fire safe shutdown is the issue, then it will be appropriate to use the term "safe shutdown" throughout the document.

4. If "new text" as identified in the Reference section introduces what could be considered as new requirements, are they enforceable?
5. As stated previously, much of the confusion associated with regulatory guidance on fire protection is the large quantity of related documents. A better method of dealing with this issue would be to compile all of these documents on a CD-ROM and have hyper-text links to the various documents referenced by Regulatory Guide DG-1094.

## **SPECIFIC COMMENTS**

### **Section B.4.2 - Assumptions**

#### **Comment:**

Many utilities' Post-Fire Safe Shutdown Analyses assume that the plant is operating at 100% power at the onset of a fire. Guidance should be provided (i.e., subsection) to discuss typical analyses initial conditions and their basis to avoid confusion in the future.

**Section B4.2.2** states in part, "[fire] is not postulated to occur simultaneously with non-fire related failures in safety systems, plant accidents, or the most severe natural phenomena. However, some external or internal events (e.g. earthquakes) may initiate a fire event."

#### **Comment:**

These two sentences appear to conflict with one another. If there is a fire which was initiated by an earthquake is the assumption that the type of earthquake which would start a fire would not simultaneously cause non-fire related failures in safety systems. This is a new guideline.

**Section B4.2.2** states in part, "Fires involving facilities shared between units and fires due to man-made site-related events that have a reasonable probability of occurring and affecting more than one reactor unit (such as an aircraft crash) should be considered."

#### **Comment:**

Please define (or preferably quantify) "reasonable probability". It is assumed that an aircraft crash at a multiple unit site is reasonably probable due to its being identified. Has any attempt been made to quantify the likelihood of such an event? If so, please include this information as further guidance.

**Section B.4.2.3 Loss of Offsite Power/Station Blackout (SBO)** states in part, "The relative risk of self-imposed SBO may greatly exceed the actual risk posed by the fire and should be

given appropriate consideration when evaluating the plant safe shutdown design and procedures."

**Comment:**

In the past, several licensees have been questioned with respect to self induced station blackout as a strategy to address spurious operations. Is this section now allowing licensee to pursue this option as an acceptable method/compliance strategy against spurious operations?

**Section B4.3.1** states in part "redundant safety-related systems used to mitigate the consequence of design basis accidents, but not necessary for safe shutdown following a fire may be lost to a single exposure fire. However, protection should be provided so that ....."

**Comment:** It is not clear as to why such protection is required. In addition, such protection is not typically provided in the current plant design. For example, in PWR plants the SI system is typically not relied on for safe shutdown during a postulated fire, nor is it provided with fire protection (i.e., fire suppression) system.

**Section B4.3.3** states in part "...the plant will maintain the ability to minimize the potential for radioactive release to the environment in the event of a fire"

**Comment:** Section 4.4.1 defines the performance goals for safe shutdown to be within those predicted for a loss-of-offsite power. If this is the requirement, and since it is not assumed that fire will cause a Loss of Coolant Accident (LOCA), then why is there a concern with radioactive release? And if there is a concern with regard to any release, then the limits on such releases must be defined. Is this 10CFR part 100, or part 20, or? Limit?

**Section B4.4.1** states in part "Post-fire reactor safety and performance goals for alternate/dedicated shutdown include the protection of fission product boundary integrity (fuel cladding, reactor coolant system boundary, and containment boundary) and maintaining reactor system process variables within those predicted for a loss-of-offsite power...."

**Comment:** Establishing and/or maintaining the containment boundary is not a requirement as part of the existing regulation (or requirements). As stated above, the reactor system process variables are required to be maintained within those predicted for a loss-of-offsite power. This means that a LOCA or fuel failure is not postulated. As such there is no need to establish containment boundary.

**Section C1.1.3** states in part "The analysis should identify the safe shutdown components and associated circuits for each fire area and demonstrate that the guidelines of Regulatory Position C.5.5 are met or that alternative or dedicated shutdown is provided in accordance with Regulatory Position C.5.6 of this guide."

**Comment:**

Another term should be selected in place of "associated circuit" which has a specific meaning in Appendix R space.

**Section C1.4.3** states in part, "NRC interpretations of certain Appendix R requirements allow a licensee to choose not to seek prior NRC review and approval of, for example, a fire area boundary, in which case an evaluation should be performed by a fire protection engineer..."

**Comment:**

This is not the best example as there are no Appendix R requirements for an acceptable fire area boundary identified within Appendix R (GL 86-10 provides guidance).

**Section C1.4.3** states in part "...in which case an evaluation should be performed by a fire protection engineer..."

**Comment**

"Must" has been changed to "Should" with regard to the need to prepare engineering evaluations. However, Generic Letter 86-10, Paragraph C is referenced (Reference 63) without identifying the change in the text. This is not a word-for-word copy of the text of the referenced document.

**Section C1.4.3** states in part "... specific interpretations to which this guidance applies are provided in Appendix I."

**Comment**

Appendix I is basically (in part) Enclosure 1 to GL 86-10. Additional examples should be provided based on experience gained since the original issue of GL 86-10.

**Section C1.4.7** states in part, "...the [NFPA] code edition in force at the time of the design and installation is the code-of-record to which the design is evaluated."

**Comment:**

This has been a point of question for several utilities performing code conformance reviews several years after installation of systems. It is possible that more than one edition of an NFPA code is applicable to the period "time of design and installation". Please provide more detailed guidance which will allow the code of record to be determined based on a specific date. This will allow the industry to be consistent on this issue and make enforcement more uniform.

## **Section C2.4 "Fire Protection System Maintenance and Impairments"**

### **Comment:**

Please clarify the role "if any" that NFPA standards have in the development of maintenance and testing of the fire protection systems. Are the plants required to perform all tests at the required frequencies defined in these standards. Are the most current standards always enforced or can a "code of record" philosophy be used.

**Section C3.3.2** states in part, "Adequacy of the gas suppression systems can be tested by performing an alternative test that incorporating methodology from the enclosure integrity procedure in Appendix B to NFPA 12A."

### **Comment:**

There is some uncertainty as to whether the enclosure integrity test procedure identified in Appendix B to NFPA 12A (which applies to Halon) can be applied to other gaseous fire extinguishing agents. The physical properties of the different agents varies widely and can most accurately be evaluated by actual discharge into the protected space. Is the intent of this section to allow the alternate test procedure designed for Halon to be used for any gaseous suppression system agent?

**Section C4.1.2.1** states in part, "Fire Barriers that define the boundaries of a fire area should have a minimum fire resistance rating of 3 hours..."

### **Comment:**

Fire area boundaries are not required to be 3 hour rated for approximately half of the operating plants in the country. Appendix R to 10CFR50 does not define fire area boundary requirements. Generic letter 86-10 provides the definition for an Appendix R fire area boundary in Enclosure 1, item 4. This document calls for fire area boundaries to be "adequate to withstand the hazards associated with the areas." Fire area boundary requirements are also delineated in Appendix A to BTP APCSB 9.5-1. This document calls for fire area boundaries to be "evaluated to determine barrier requirements" for plants operating and under construction prior to July 1, 1976. Therefore, the section as written would be very misleading to users and enforcers and should be updated accordingly.

**Section C4.1.3.4** states in part "Redundant systems used to mitigate the consequences of ....." It follows to state "...protection should be provided so that a fire within only one such system will not damage the redundant system.

**Comment:** It appears that this section is proposing to protect systems that are not required for safe shutdown during a fire, but required for safe shutdown to mitigate the consequences of DBAs. Why is it necessary to provide such protection?

**Section C4.1.3.6** states in part "high voltage electrical cabinets should be provided with adequate special separation or substantial physical barriers to...."

**Comment:** Please define High Voltage. Also please provide clarification with regard to cables or cabinets important to safety. Is the concern about the safety-related equipment, or the equipment required to safely shut down the plant during a postulated fire?

**Section C4.1.3.6** states in part "rooms containing electrical cabinets important to safety should be provided with area wide detection, suppression and manual fire suppression capability."

**Comment:** While providing area wide detection is a good idea for rooms containing electrical cabinets, it is not always good practice to provide area wide suppression for such rooms. A recommendation would be to change this guidance to state in part "Rooms containing safety-related (Note: NOT important to safety) electrical cabinets should be evaluated to determine the protection needed to minimize the consequences of a fire".

**Section C4.1.4.2** states in part, "Smoke and corrosive gases should generally be discharged directly outside to an area that will not affect plant areas important to safety."

**Comments:**

Are there any requirements regarding exhausting potentially contaminated smoke to the atmosphere or does the fire condition override this concern. Portable smoke venting strategies would be impacted by this determination. Please provide further guidance.

**Section C4.1.4.3** states in part "For control room evacuation, egress passageways and remote control stations should also be habitable."

**Comment:**

This statement appears to be defining new requirements, and the enforcement of this paragraph could translate into providing ventilation, etc. (i.e., more than just lights) for egress passageways to the remote station.

**Section C4.1.4.3** states in part "Consideration should be given to protection of safe shutdown areas from infiltration of gaseous suppression agents".

**Comment:**

This statement could be interpreted as a backfit regulation.

**Section C4.2.3.2** states in part "Licensees should request an exemption or deviation as appropriate, when relying on fire rated cables to meet NRC requirements....".

**Comment:** If such cables have been tested by an approved laboratory, then why should it be required to request an exemption for using such cables?

### **Section C.5 – Safe Shutdown Capability**

**Comment:**

Although alternative methods of process monitoring are acceptable per C.5.2, Section C.5.3.1.5 should discuss typical alternatives that have been credited such as Steam Generator Narrow Range Level and Auxiliary Feed Water Flow as an acceptable alternative to Steam Generator Wide Range Level. It would also be beneficial to discuss the ability to credit local indication if time allows in lieu of Central Control Room indication.

**Section C.5.3 – Hot Standby (PWR) Hot Shutdown (BWR) Systems and Instrumentation** states in part, "Manual Operation of valves, switches and circuit breakers is allowed... and is not considered a repair."

**Comment:**

1. Why not discuss the issue of pulling/replacing fuses and/or the use of tools to disconnect instrument air tubing to fail AOV's to their desired position since these options have been used by a number of utilities to address hot shutdown spurious operation concerns.
2. Also, what is meant by the paragraph "Modifications, e.g., wiring changes, are allowed.... whose fire induced maloperation may indirectly affect hot shutdown." This appears to allow repairs for hot shutdown-related equipment. In what way is this different from a piece of equipment that is directly associated with hot standby/shutdown? Please provide a typical example if practical.
3. Section C.5.3, in contrast to Section 5.4 appears to prohibit fuse removal as a valid hot shutdown action. EPM's experience is that fuse removal (although not reinstallation) is permitted for HSD, provided that fuse pullers are maintained (restrained) in the immediate vicinity.

**Section C.5.7 – Post-Fire Safe Shutdown Procedures** indicates that the procedure for safe shutdown "should reflect result and conclusions of the SSD Analysis and any time critical operations incorporated into post fire procedures should be validated".

**Comment:** Section C.5.7.1 indicates that you only need post-fire safe shutdown procedures for alternative shutdown areas. Safe shutdown areas (III.G.2 Areas) should be covered by operator training and plant Abnormal Operating Procedures/Emergency Operating Procedures. This seems to imply that safe shutdown analysis results and time critical

operations only occur in alternative shutdown areas. Isn't it also pertinent to reflect analysis results and time critical actions resulting from fire induced spurious operation in post-fire procedures (AOPs/EOPs) for applicable III.G.2 Areas?

**Section D – Implementation** states in part that " This guide has been developed from a compilation of fire protection regulations..." and follows to state "The specific NRC fire protection requirements applicable to any given operating reactor are a function of licensing dates, specific license conditions, rule applicability statements, approved exemptions/deviations, and individual plant Safety Evaluation Reports.

**Comment:**

1. The fact that many parts of this guide are not applicable to many plants is of critical importance for the users and enforcers of this document. This information should be one of the first things presented in the guide. A suggestion is to move the Section D information to the front or provide a summary in the front (Preferably Section A) and refer readers to Section D for details.
2. It appears that in many cases the "compilation of regulations" tends to identify the most restrictive requirements regarding a particular issue and does not mention the less restrictive regulations which may apply to many of the operating plants. (see comment on Section C4.1.2.1 above for one example of this)

**APPENDIX B: Associated Circuits of Concern**

**Comment:**

The purpose of this appendix is to provide the guidelines for evaluating the circuits required for safe shutdown during a postulated fire scenario. This subject is the most complex and highly controversial issue in the industry. The appendix as presented, does not provide any clarification on the subject issue. In fact, the way it is presented is not complete, and it introduces additional confusion. For example, in section B-1.2 second paragraph, it states in part "High impedance faults should be considered for all associated circuits located in the fire area of concern". What is the intent of this statement? If the intent of the statement is to address the Multiple High Impedance Faults issue, then the way it is stated and the paragraph that the statement is stated in does not provide a clear guideline for this issue. In addition, although this issue was introduced in previous guidance documents (i.e., GL 86-10) it is felt that this is not a real issue, and as such, the recommendation is to remove this requirement from this guidance document.

If the intent of this Regulatory Guide is to provide guidance in the subject matter (i.e., identification and evaluation of circuits required for safe shutdown during a fire) then clear and detailed guidance will be required in order for the industry to perform a consistent safe shutdown analysis. For example the Regulatory Guide discusses the Hot Shorts issue. What does hot short mean? Is this an internal conductor to conductor short? Or is it an external cable to cable short? Or is it both? And if so, how many of such shorts need be considered

for each fire area. Absent of such detailed guidance, the industry will not be able to satisfy the intended requirements of the guidance document. The current efforts in the industry have provided detailed guidance on the subject issue. For example, appendix B of Draft NFPA 805 provides detailed guidance on the subject issue. This appendix should be rewritten similar to the Appendix B of the draft NFPA 805.

### **Section B-1.3 Hi/Low Pressure Interface**

**Comment:**

With respect to the evaluation of Hi/Low pressure interfaces, it would be beneficial to provide a list of typical Hi/Low Interfaces for PWRs and BWRs as this has been subject to interpretation throughout the nuclear industry.

## **APPENDIX I**

**Section I-1.2** states in part "Where fire area boundaries are not wall-to-wall, floor-to-ceiling boundaries with all penetrations sealed to the fire rating required of the boundaries, licensees should perform an evaluation to assess the adequacy of fire boundaries in their plants to determine if the boundaries will withstand the hazards associated with the area."

### **Comment**

The word "Must" has been replaced with "Should". This creates a gray area as to how to demonstrate compliance (i.e. Are evaluations required?).

**Section I-1.3** states in part "In order to comply with these provisions, suppression and detection sufficient to protect against the hazards of the area should be installed."

### **Comment**

The word "Must" has been replaced with "Should" with regards to the need to provide suppression and detection in III.G.2.b and III.G.2.c areas. However, III.G.2.b and c specifically state "...detection and suppression shall be installed...".

**Section I-1.3** states in part "Where full area suppression and detection is not installed, licensees should perform an evaluation to assess the adequacy of partial suppression and detection to protect against the hazards in the area".

### **Comment**

The word "Must" has been replaced with "Should" with regards to the need to perform an evaluation when no suppression or detection is provided. This creates a gray area as to how to demonstrate compliance (i.e. Are evaluations required?).