UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

MAY 03 1985

MEMORANDUM FOR: Harold R. Denton, Director
Division of Nuclear Reactor Regulation

FROM: Richard H. Vollmer, Chairman
Fire Prorection Policy Steering Committee

SUBJECT: UPDATED RECOMMENDATIONS ON FIRE PROTECTION POLICY AND PROGRAM ACTIONS

Background: In a memorandum to Mr. Dircks dated October 26, 1984, the Fire Protection Policy Steering Committee (SC) provided recommendations designed to resolve a number of issues associated with fire protection policy and implementation of fire protection features for nuclear power plants. In response to the Committee's recommendations, Mr. Dircks directed certain actions by memorandum to you and Messrs. Stello and DeYoung dated December 10, 1984, including release of the SC's work for public comment. The purpose of this memorandum is to provide you the SC's recommendations and guidance documents for your action in completing items one and four of the memorandum of December 10. The SC's recommendations and guidance documents on fire protection have, to some extent, been altered by the actions directed and the current status of the issues involved.

Discussion:

1. The report of the SC was released to the public, and as of April 15, 1985, 13 letters of public comment had been submitted. The individual public comments, except for four that were received very late, and their resolution have been reviewed by the Steering Committee and are included in Enclosure 1. As a result of these comments, those received from NRC Offices and Regions, and in consideration of the current status of some of the issues, a number of changes to individual SC recommendations have been made.

   The SC has carefully evaluated its previous recommendation regarding an expedited inspection program for reviewing fire protection compliance. Although we still believe that an expedited fire protection inspection would be beneficial, because of resource constraints the SC has modified its recommendation to place more emphasis on the priority selection of plants to be visited within current resources allocated for fire protection. The SC recommends that, while continuing the present program of inspection of plants completing their Appendix R modifications and those plants close to receiving an operating license, the regions be given flexibility to inspect plants where implementation problems are believed to exist. In addition, the staff should support a licensee's request for an inspection which may avoid costly design and implementation decisions with which the staff may disagree. This is particularly important since the Interpretations of Appendix R gives the licensee more implementation flexibility without prior staff review.

2. The proposed Generic Letter on Fire Protection to be issued as a generic letter to all licensees and operating license applicants has been revised in several areas:

   (a) The inspection program discussion reflects the recommendations indicated above.

   (b) Documentation necessary to show compliance with fire protection requirements has been clarified.

   (c) The application of quality assurance to fire protection has been clarified. Although the SC believes that the QA requirements of GDC-1 are applicable to fire protection features, the QA provisions in most fire protection programs, in addition to the recent proposed rulemaking on important to safety, provide sufficient near and long term assurance in this area.

   (d) Section F has been added to provide rationale for a standard license condition and to request licensees to submit this standard fire protection condition as a license amendment.

   The revised Generic Letter is included as Enclosure 2.

3. Very minor changes have been made to the Interpretations of Appendix R and the Guidance for Enforcement Action concerning fire protection requirements. These revised documents are included as Enclosures 3 and 4.

4. A number of changes to the question and answer package have been made as a result of public comments and comments from other NRC offices. The revised guidance document is included as Enclosure 5.

5. The SC has reviewed and approved a proposed standard license condition and several proposed technical specification changes based on fire protection requirements. These changes were developed in order to promote consistency of fire protection requirements at all operating reactors whether they are covered under Appendix R or not. These documents are included as Enclosures 6 and 7.

Recommendations:

a. Promptly issue the enclosed Generic Letter (Enclosure 2) with the Interpretations of Appendix R, Responses to Industry's Questions, and the Fire Protection License Condition as enclosures. Note that the Commission wishes to review this guidance before it is issued to industry.

b. Conduct fire protection inspections in accordance with currently allocated fire protection resources. Regional workshops should be conducted in order to provide latest information to inspection teams. A referee team should be established to promptly settle disagreements between the licensee and inspection teams.

c. Endorse a standard fire protection license condition in accordance with Enclosure 5 to all future operating licenses and encourage licensees to review their licenses to conform.

d. Utilize the proposed technical specifications where appropriate in future operating licenses and as guidance to the NRR tech spec Improvement Project for inclusion in their current effort.

e. Adopt the guidance in Enclosure 4 as the agency criteria for enforcement of fire protection requirements. Following adoption of this guidance, pending fire protection enforcement cases should promptly be processed by IE.

To keep you informed of status on approved recommendations and other fire protection matters, the Steering Committee will make periodic reports to you on this matter.

For the Fire Protection Policy
Steering Committee:
Original Signed By:
Richard H. Vollmer

Richard H. Vollmer, Chairman

Enclosures:
1. Resolution of Comments on Recommendations of the Fire Protection Steering Committee
2. Revised Generic Letter 84-01
3. Revised Interpretations of Appendix R
4. Revised Enforcement Guidance on Fire Protection Requirements
5. Proposed Standard License Condition Regarding Fire Protection Requirements
6. Proposed Revised Technical Specifications Regarding Fire Protection
7. Revised Questions and Answers Regarding Fire Protection

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ENCLOSURE 1

RESOLUTION OF COMMENTS ON THE RECOMMENDATIONS OF THE FIRE PROTECTION POLICY STEERING COMMITTEE (50FR2056 JAN. 15, 1985; G.L. 85-01)

1.0 PUBLIC COMMENTS:

1.1 Nuclear Utility Fire Protection Group: Letter from J. M. McGarry to H. R. Denton dated February 14, 1985.

1.1.1 Comment (A.1): Schedular Relief

> "The discussion at pages 1-2 of the draft Generic Letter indicates that schedular relief under 10 C.F.R. § 50.48 can no longer be obtained. The Group is concerned that this discussion could be read as precluding the filing of schedular exemption requests under 10 C.F.R. § 50.12. It is the Group's understanding from discussions with the Staff that schedular exemptions under 10 C.F.R. § 50.12 continue to be available despite the expiration of the Section 50.48 deadlines. To avoid any misunderstanding, the Group would recommend that the Staff's Generic Letter state explicitly that the filing of a schedular exemption request under Section 50.12 is not precluded by the expiration of the Section 50.48 deadlines."

Resolution:

The NUFPG comment indicates a misunderstanding of the Steering Committee recommendation on schedular exemptions, which have always been issued under 10 CFR 50.12. The Steering Committee recommended that no further schedular exemptions be granted, and that schedules (for licensees whose 50.48 deadlines have passed) will be set in the enforcement context. Therefore, their understanding that schedule exemptions would still be available if this recommendation is adopted is not correct. However, this does not preclude the filing of a schedular exemption request under 10 CFR 50.12 based on a justified "living schedule" which has been approved by the NRC. The proposed Generic Letter has been revised (footnote, Pg. 2) to clarify this point.

1.1.2 Comment (A.2): Inspection Process

a) This comment addresses the Steering Committee recommendation for an accelerated fire protection inspection program and presents reasons why such inspections should be postponed until the new guidance package has been reviewed and approved by the Commission. The conclusion of this comment states:

> "For these reasons, we believe that the most efficient use of Staff and licensee resources would result from postponing the inspections (absent a safety concern or an indication of readiness on the part of the licensee) until the new interpretations and guidance have been reviewed and approved by the Commission. 2/"

b) The above cited footnote states:

"2/ In connection with the discussion of the inspection process, the Group strongly supports the Steering Committee's recommendation regarding the establishment of a referee team, headed by senior NRR management, to resolve significant differences between inspection personnel and the licensee. The Group understands that the resolution of such differences will be accomplished expeditiously by the referee team, with a decision issued generally within one week, but in any event before the inspection report would be released."

Resolution:

a) The inspection program will be conducted as expeditiously as present resources allow with priority given to utilities not yet inspected and those requesting early inspections.

b) The understanding of the NUFPG regarding the composition and expected performance of the "referee" team is correct. If the recommendation for formation of a referee team is approved by the Commission, the substance of this comment will be included in its Charter.

1.1.3 Comment (A.3): Documentation Required to Demonstrate Compliance

"---The proposed Generic Letter states (at page 3): Failure to have such an evaluation available for an area where compliance with Appendix R is not readily demonstrated will be taken as prima facie evidence that the area does not comply with NRC requirements, and may result in enforcement action. 3/ (Emphasis added.)

It is the Group's understanding from our discussions with the staff that the term "readily demonstrated" is intended to include situations where compliance is apparent by observation. Thus, if compliance with Appendix R is apparent by observation of the features in question, failure to have an evaluation available will not be considered evidence of noncompliance. With this understanding expressly incorporated into the Generic Letter, the Group has no objection to this part of the proposed Generic Letter."

Resolution:

The understanding is correct. The proposed Generic Letter and the Guidance for Enforcement Actions have been revised to incorporate the NUFPG understanding.

1.1.4 Comment (A.4): Quality Assurance Requirements

This comment takes exception to the introductory sentence to section D of the proposed Generic Letter which states: "Fire protection systems must meet the requirements of General Design Criterion 1 of Appendix A to 10 CFR Part 50." Specifically, the objection is to the citation to GDC 1 because this impacts the current rulemaking regarding the safety classification issue, i.e., the important-to-safety vs. safety-related controversy. It further states that the QA guidance provided in BTP CMEB 9.5-1 (also cited in the proposed Generic letter) is adequate for this purpose and has generally been followed in the industry. Therefore, it recommends deletion of the citation to GDC-1.

Resolution:

This comment is considered valid. The references to GDC-1 can be deleted without loss of the point being made regarding adequate QA for fire protection equipment. The rulemaking now in progress on the safety classification issue will clarify that licemsees are expected to carry out QA commitments already present im the FSAR and other licensing documents. The proposed Generic Letter has been revised to delete reference to GDC 1 and to more completely describe the appropriate QA guidance.

1.1.5 Comment (B.1): Size of the Fire

This comment recommends that the Interpretations of Appendix R be revised to include guidance concerning the size of an assumed initiating fire. Specifically, it is recommended that the following footnote be added to Section 3, Fire Damage:

> "For purposes of the fire protection program, Staff practice has been to assume a relatively small amount of combustible material as the initiation source, i.e., absent special considerations indicating high or low potential combustible initiators, typically in the range of 5 gallons of flammable liquid."

Resolution:

We do not concur in this recommendation. Guidance concerning the size of an assumed initiating fire could be helpful in evaluating the fire severity within a fire area in a mechanistic way. However, the proposed guidance is not representative of expected transient combustibles in most plant areas, does not specify the configuration of the transient fuel and incorrectly states the staff practice.

The expected transient combustibles vary throughout the plant. For example, in some areas, the expected transient combustible may be oil; however, the amount and configuration of the oil would be dependent on the reason for it to be there. In the control room, paper (drawings and computer runs) and plastic scrap is the expected transient. In cable spreading rooms, cables and cable drums have been the most prevalent transient combustibles identified. On the refueling deck, wood and polyethylene sheets would be expected. In other areas, drums of plastic (protective clothing) are present. Each configuration of these transient combustibles poses a different threat because of the differing characteristics of fire growth, fire duration and heat release rate.

The present guidelines recommend that the appropriate transient combustible for the particular area be considered. The Fire Hazard Analyses are based on this assumption. Therefore, the proposed addition was not incorporated.

1.1.6 Comment (B.2): Fire Area Boundaries

This comment questioned whether each individual unsealed opening in a fire barrier must be evaluated, and stated that it was their understanding ".... that the staff would permit an evaluation of openings by groups, e.g., according to size of the openings and distance from combustible material."

Resolution:

The stated understanding is not correct. Unsealed openings should be grouped by the fire barrier which they penetrate. The evaluation of the overall effectiveness of the barrier should then consider the size and distribution of these openings, the combustible loading, and the proximity of such loading on both sides of the barrier. A clarifying revision to the Interpretations has been made.

1.1.7 Comment (C.1): General Guidance

The comment stated the understanding that Section 1B of the Guidance for Enforcement Actions Concerning Fire Protection Requirements does not require a separate list of safe shutdown equipment; that "the necessary equipment need only be identifiable from the fire hazards analysis and SERs."

Resolution:

This understanding is correct. No revision is considered necessary.

1.1.8 Comment (C.2): Severity Categories

The comment stated the understanding that the word "dedicated" used in Sections 2.A, 2.B and 2.C of the Guidance for Enforcement Actions Concerning Fire Protection Requirements "is meant to refer to the equipment identified in the fire hazards analysis for safe hot or cold shutdown."

Resolution:

This understanding is correct. A clarifying revision to that effect has been made.

1.1.9 Comment (D.1): Current Requirements

The comment states that the proposed license condition is unnecessary for plants licensed prior to January 1, 1979 because license conditions were issued upon completion of the staff's review of conformance to the positions in Appendix A to BTP APCSB 9.5-1; that for plants licensed after January 1, 1979, a license condition has been imposed; that all modifications must be reviewed and reported pursuant to 10 CFR 50.59; and that 10 CFR 50.72 and 50.73 provide relevant reporting requirements. Therefore, adequate enforceability is already present without additional actions.

The comment also recommended that the response to Question 8.3 (which inquired whether an exemption is required from Appendix R sections other than III.G, III.J and III.O for future modifications that do not comply with such sections) be changed from "yes" to "no." This was based on the interpretation of Appendix R as not requiring exemptions for modifications that were made to features which were approved by the staff under Appendix A of BTP APCSB 9.5-1. The Statement of Considerations to Appendix R (46FR76602, Nov. 19, 1980) was cited to support this.

Resolution:

A standard license condition is considered necessary for the following reasons. The license conditions which were imposed on plants licensed prior to January 1, 1979 only addressed the modifications that were required. Those parts of a plant's fire protection program including the fire hazards analysis, found acceptable by the staff in the Fire Protection Safety Evaluation Report with no modifications necessary were not addressed by the license condition.

The NRC has found during inspections that some licensees do not consider the Appendix A to BTP APCSB 9.5-1 items of their fire protection programs as binding and have either changed them or ignored them. For plants licensed after January 1, 1979, while all such plants have a license condition regarding fire protection, the scope of what is covered by the condition and the wording of the condition varies widely. This results in varying degrees of compliance and uneven enforcement. Therefore, we believe that a "standard license condition" is necessary for consistent and fair regulation. However, the license condition has been revised to include specific identification of the documents providing the basis for the license condition.

Regarding the applicability of 10 CFR 50.59, in many cases, including all plants licensed prior to January 1, 1979, the fire protection program and the fire hazards analysis are not described in the FSAR. Therefore, the provisions of 10 CFR 50.59 are not directly applicable. Accordingly, the license condition has been revised to specify the applicability of 10 CFR 50.59 for the evaluation process and 10 CFR 50.71(e)(2) for the reporting process. Additional revisions are described in comment resolutions 1.1.10 and 1.1.11.

Regarding the comment on Question 8.3, this comment is not considered valid. The cited Statement of Considerations does not address the applicability of Appendix R in regard to modifications made to features previously approved by the staff. The staff position in this regard is clearly supported by 10 CFR 50.48(b). A revision to the response to Question 8.3 has been made to clarify this point.

1.1.10 Comment (D.2): Hearing Requirements

Under the proposed license condition, any change to the program must be analyzed for its effect on overall fire protection safety. Even minor modifications such as adding one cable to a room or a change in the location of a fire extinguisher would have to be analyzed, and, if found to lower the level of fire protection, no matter how minor, would require a license amendment with full notice and hearing rights, an expensive and time-consuming process without a commensurate benefit to safety. Therefore, the proposed license condition should not be adopted.

Resolution:

The proposed license condition has been revised to make it clear that only those changes to the fire protection program that "significantly" decrease the level of fire protection would require prior Commission approval and a license amendment; changes which do not "significantly" decrease the level of fire protection may be

made in accordance with 10 CFR 50.59 and reported annually with FSAR revisions as required by 10 CFR 50.71(e).

1.1.11 Comment (D.3): Section 50.59

In regard to paragraph 3 of the proposed license condition the comment states:

a) "---that the requirement to submit the supporting analyses would impose an undue paperwork burden on both the licensees and the Staff. Significantly, Section 50.59 does not require actual submittal of the analyses performed in accordance with that section. Instead, licensees report to the NRC annually pursuant to 10 C.F.R. § 50.71(e) (2) on what Section 50.59 changes have been made. We would recommend that a similar procedure be used for fire protection changes, and therefore would recommend not imposing a requirement for actual submittal of the analyses."

b) "---there is no safety reason to require that "All changes to the approved program" be reported to the NRC annually. For example, changing the location of a fire extinguisher or adding one cable to a room may have no practical bearing on safety. Yet, pursuant to the license condition as postured, it may need to be reported. We maintain that such a requirement is unjustified and unwarranted."

Resolution:

a) The proposed license condition has been revised to remove the requirement for submittal of the analyses and to specify the applicability of 10 CFR 50.59 and 10 CFR 50.71(e).

b) It is not intended that changes that "---have no practical bearing on safety" be reported; it is expected that licensees would exercise reasonable judgment in this regard. A revision was made to indicate this intent.

1.1.12 Comment (E): Standard Technical Specifications

The comment supports the Steering Committee effort to revise the fire protection Technical Specifications to the extent that it is directed toward simplifying and generalizing them to be more workable. It recommends that any proposed TS changes be reviewed as part of the overall staff consideration of Technical Specifications in general, and requests an opportunity to comment on proposed changes.

Resolution:

The course of action to be followed should be defined by the Steering Committee. The options available are:

(1) Include the revised fire protection Technical Specifications in the package being submitted for CRGR review and subsequently for Commission approval.

This option would provide a complete package for "resolution" of the fire protection issue; the "Commission approved" fire protection TS could then be incorporated in the STS without delay, and implementation in OLs and ORs could proceed immediately.

(2) Handle the fire protection Technical Specifications separately (from the CRGR/Commission package), i.e., submit the proposed revision to the Technical Specification Review Group (TSRG) (E. Butcher) for eventual inclusion in the STS.

It is our understanding that the TSRG is presently revising the STS to include all clarifying changes which reflect present practice and which will not require CRGR review. The TSRG intends to make substantive type changes, which will then be submitted to the CRGR on a single issue basis, at a later date. The proposed fire protection TS changes are in this second category. Therefore, CRGR approval and subsequent implementation of the TS on OLs and ORs would be delayed significantly. Also, the direct Commission approval afforded by option (1) would not be available to support backfitting the revised TS on ORs.

(3) Defer action on fire protection TS until some action is taken by NRR on the recommendations of the Technical Specification Improvement Project (TSIP) (S. Bryan [formerly under D. Beckham]) which are scheduled for September 1985.

This option has the same detrimental aspects in regard to implementation of the TS as option (2) except that the delay involved would probably be greater.

It is recommended that option (1) be selected. It is also recommended that the TS not be issued for public comment, unless so directed by the Commission. Substantive changes to Technical Specifications normally only require CRGR review.

1.1.13 Comment (F.1): Question 3.2.3 (Fire Door Modifications)

The comment notes that according to UL and FM any modification of a fire door will invalidate its label. Therefore, the following portion of the response to Q3.2.3, "An exemption is required if fire doors installed in a fire barrier used to satisfy Section III.G.2 are modified such that the labeled rating no longer applies," could be interpreted to require an exemption for modifications to incorporate security hardware or flooding protection. It is recommended that the response be revised to state that an exemption is required only after a boundary analysis which considers the fire loading on both sides of the boundary shows that adequate margin no longer exists.

Resolution:

The comment is valid. To be consistent with Section #4 of the "Interpretations," the response to Q3.2.3 has been revised to indicate that evaluation of fire door alterations is part of a fire boundary analysis not requiring an exemption.

1.1.14 Comment (F.2): Question 3.6.2 (Intervening Combustibles)

The comment notes that the response to Q3.6.2 classifies cables in covered cable trays as "intervening combustibles" while the response to Q3.6.3 states that cables in conduit are not considered intervening combustibles. It is recommended that the response to Q3.6.2 be revised to state that "--cable in fully enclosed cable trays does not constitute an intervening combustible for Appendix R purposes."

Resolution:

The response to Q3.6.2 has been revised to state that cables in cable trays which do not have solid sheet metal bottom sides and top are considered intervening combustibles. The response to Q3.6.3 has been revised to state that cables in metal conduits or in cable trays or raceways which have solid sheet metal bottom, sides and top are not considered intervening combustibles.

1.1.15 Comment (F.3): Question 3.6.3 (Unexposed Combustibles)

> "The response to this question states that oil in closed containers that conform to NFPA Standard 30 is not considered an intervening combustible, while oil in sumps is so considered. The Group believes that oil in closed sumps should be treated as equivalent to oil in NFPA Standard 30 containers, and therefore should not be classified as an intervening combustible. The Group does not object, however, to classifying oil in open sumps as an intervening combustible."

Resolution:

The comment is valid. The requested revision has been made.

1.1.16 Comment (F.4): Question 5.3.8 (High Impedance Faults)

The comment questioned the need for including multiple high impedance faults in associated circuits subject to fire damage in short circuit coordination studies; Section III.G.2 of Appendix R was cited as expressly "not" requiring consideration of multiple high impedance faults.

Resolution:

The comment is not valid. Section III.G.2 does require consideration of "hot shorts" and "shorts to ground," and these terms encompass high impedance faults. Given a major cable fire, multiple high impedance faults will probably occur. However, the response to Q5.3.8 was revised to clarify staff practice in regard to when short circuit coordination studies need or need not be performed. The revision also corrected the typographical error identified in the comment.

1.1.17 Comment (F.5): Question 8.11 (Plants Licensed After January 1, 1979)

> "The response to Question 8.11 states that plants licensed after January 1, 1979 are subject to, inter alia, BTP CMEB 9.5-1. Some plants in this category, however, were licensed to the APCSB version of BTP 9.5-1 rather than the CMEB version. There are some material differences between the two versions, and if a plant that was licensed to the APCSB version were required to follow the CMEB version, exemption requests and modifications could be necessary. We expect the response was merely an oversight on the Staff's part. We would recommend modifying the response to Question 8.11 to read: 'BTP CMEB 9.5-1 or BTP APCSB 9.5-1, if so provided as part of a license condition or licensing commitment, which includes....'"

Resolution:

The comment is valid. A revision has been made to clarify this point.

1.1.18 Comment (F.6): Question 8.19(a) (Exemption Requests)

> "There appears to be an oversight in the response to Question 8.19(a). That response contains a cross-reference to the responses to Question 8.21.1 through 8.21.6, but the responses referred to do not appear in the document. We understand that the Staff will add the promised responses. The Group reserves the right to comment when these responses are provided."

Resolution:

The cited cross-reference has been corrected to read "--response to Questions 8.19.1 through 8.19.4."

1.2 Duke Power Company: Letter from H. B. Tucker to the Secretary of the Commission dated February 14, 1985. (Endorses the NUFPG comments and provides the following specific comments)

1.2.1 Comment (1): Quality Assurance Requirements

The comment states that reference to GDC 1 of Appendix A to 10 CFR 50 in Section D of the proposed Generic Letter is clearly inappropriate, and that "The QA program for fire protection should be reviewed to requirements of the GDC 3, BTP or SRP as applicable."

Resolution:

This is included in the resolution of comment 1.1.4 above.

1.2.2 Comment (2): Question 3.2.1 (Fire Barrier Qualification - Acceptance Criteria

"Staff Position is that maximum heat transfer (sic) across a penetration seal, subjected to ASTM-E119 Fire Endurance test, is 325°F.

Comment - 1) ASTM-#119 criteria is 250°F above ambient which frequently is greater than 75°F. 2) Appendix R, Section III.M. states acceptance criteria for temperature as '...sufficiently below the cable insulation ignition temperature...'. This interpretation (the staff's position [added]) is clearly contrary to the intent and verbage of Appendix R."

Resolution:

1) The response to Q3.2.1 clearly states that 75°F is generally recognized as an acceptable norm. No revision is warranted.

2) Question 3.2.1 addresses criteria for qualification of cable tray fire wrap material while Section III.M.2 of Appendix R addresses criteria for qualification of cable penetration seals. While Section III.M.2 is not explicitly applicable to cable wrap material, applicability is implied. Therefore, we have revised the response to Q3.2.1 to clarify that a qualification criterion less than 325°F may be justified by an analysis demonstrating that the maximum recorded temperature is sufficiently below the cable insulation ignition temperature. Also see resolution 1.3.1.

1.2.3 Comment (3): Question 3.3.4 (Cable Tray Support Protection)

"Staff Position is that '...cable tray supports should be protected regardless (emphasis added) of whether there is a sprinkler system...'.

There is no technical basis for this arbitrary position. If a sprinkler system is provided and functions (as it is apparently given credit in reducing fire barrier rating from 3 hours to 1 hour), the environment will be cooled below the temperature at which cable tray supports will be affected by heat fatigue. In addition, each area should be reviewed individually to assess combustible loadings and other factors to determine if a potential fire could generate sufficient heat to affect cable tray supports."

Resolution:

The comment is not entirely justified in that the quoted portion of the staff position is preceded by "In general," and is followed by two conditions (one based on qualification tests performed and the other on structural analysis performed) under which cable tray supports need not be protected. However, the staff agrees that a clarification regarding the analysis to be performed is desirable. The response to Q3.3.4 has been revised accordingly.

1.2.4 Comment (4): Question 3.8.4 (Control Room Fire Considerations)

The staff position in the response to Q3.8.4 does not reflect staff practice during Appendix R inspections.

"The Staff Position is '...that the only manual action usually credited in the control room by this analysis is the reactor trip. Any additional control room actions deemed necessary would have to be justified under the exemption process.'

Comment - During a recent Appendix R inspection we demonstrated the control room abandonment portion of our Hot Standby Operations procedure to Region II, ONRR and BNL representatives. We demonstrated reactor trip, turbine trip and main feedwater manual trips (in case automatic signals did not function properly). This is reasonable since the control room does not instantly become uninhabitable. There was no question during the inspection about the capability to trip all of the subject systems therefore the new interpretation should be changed to agree with actions which have been reviewed and accepted."

Resolution:

The comment is valid. The response to Q3.8.4 has been revised accordingly including removal of "Any additional control room actions deemed necessary would have to be justified under the exemption process."

1.2.5 Comment (5): Question 5.1.3 (III.L Backfit)

"The question is Why do Staff Interpretation memoranda (emphasis added) regarding the criteria for satisfaction of Section III.L. form the auditable basis for determining compliance to Appendix R...?

Comment - The response fails to address the rationale for considering Staff interpretative memoranda as part of the Rule. If necessary, the Rule should be so amended."

Resolution:

The response does provide the basis for the applicability of Section III.L of Appendix R. Because the bases cited in the response are deemed sufficient, there is no need for a rule change. Additionally, it should be noted that the explicit portions of "interpretive memoranda" describe methods acceptable to the staff for demonstrating conformance to Appendix R. This does not preclude licensees from proposing and justifying other methods, e.g., see Section 1, Process Monitoring Instrumentation, of the Interpretations of Appendix R.

1.2.6 Comment (6): Question 5.2.4 (Post Fire Procedures Guidance Documents)

"The question pertains to Staff guidance documents of post fire operating procedures. The response is that there is no guidance other than criteria of Section III.L.

Comment - Licensees need to know the criteria used for evaluating post fire shutdown procedures. In addition, without criteria how do various inspection teams plan to conduct consistent reviews?"

Resolution:

It is our judgement that the responses to Questions 5.2.1, 5.2.2, and 5.2.3 are appropriate and that the criteria for operating procedures in III.L are sufficient. As indicated in the aforementioned responses the methods for meeting these criteria are the option of each licensee. The inspection process will be flexible in this regard as long as the licensee can show compliance with the criteria of Section III.L. The preceeding sentence has been added to the response to Q5.2.4.

1.2.7 Comment (7): Question 9.3 (NTOL Inspections)

"Response states that NTOL's will be subject to Appendix R inspections.

Comment - This is inappropriate for stations reviewed to technical requirements of Standard Review Plan 9.5.1 which differ significantly from requirements of Appendix R, Sections III.G and III.L."

Resolution:

The staff is aware of only one significant difference between Sections III.G and III.L of Appendix R and the corresponding positions in BTP CMEB 9.5-1 which is part of Standard Review Plan 9.5.1. See response to Question 8.11 in "Appendix R Questions and Answers."

1.2.8 Comment (8): General Question

"For stations previously inspected, will inspection results be modified to meet these new interpretations (i.e., will additional findings evolve based on new published interpretations)?"

Resolution:

For plants previously inspected and which have no remaining open fire protection items in an Inspection Report already issued, the answer is no. For previously inspected plants where open items remain in an issued Inspection Report, the new interpretations will be used in subsequent inspections performed to close out the open items. In plants where an inspection has been made but the Inspection Report has not yet been issued, the new interpretations will be used as a basis for any findings. It is recommended that the Steering Committee include the preceeding resolution in its report.

1.3 Toledo Edison Company: Letter (#1127) from R. P. Crouse to H. R. Denton dated February 14, 1985. (Endorses the NUFPG comments and provides the following specific comments)

1.3.1 Comment (1): Question 3.2.1 (Acceptance Criteria)

"The discussion in response to Question 3.2.1 of the draft Generic Letter 85-01 states as follows (page 14):

'Conduit and cable tray enclosure materials accepted by the NRC as 1 hour barrier prior to Appendix R (e.g., some Kaowool and 3M materials) and already installed by the licensee need not be replaced even though they may not have met the 325°F criteria. However, new material should meet the 325°F criterion. Justification of temperatures which exceed 325°F is required.'

It is Toledo Edison's determination that the final quoted sentences should be modified to read, 'However, newly identified conduit and cable trays requiring such wrapping should use new material which meets the 325°F criterion or justification should be provided of temperatures exceeding the 325°F criterion.'

Utilizing the different wording would prevent situations occurring, such as one conduit undergoing repair being partially wrapped by two differing materials."

Resolution:

The comment is valid. The proposed revision, with an editorial change, has been made. Also see resolution 1.2.2.

1.3.2 Comment (2): Question 5.3.8 (Short Circuit Coordination Studies)

"The response to Question 5.3.8, concerning Short Circuit Coordination Studies, states:

'Clearing such faults on non-essential circuits may be accomplished by manual breaker trips governed by written procedures.'

The word non-essential may allow misinterpretation with regard to essential vs non-essential circuits, Class 1E vs. Non-Class 1E circuits, etc. It is Toledo Edison's understanding that all loads not required to achieve and maintain safe shutdown, which may fault and cause high impedance ground fault tripping of the supply breaker may be opened allowing reenergizing of the bus supply power. Toledo Edison, therefore, recommends that the words 'non-essential circuits' be removed and replaced by 'associated circuits which may effect safe shutdown'."

Resolution:

The recommended revision has been made. Also see resolution 1.1.16.

1.4 Boston Edison Company: Letter (BECo 85-037) from W. D. Harrington to H. L. Thompson, Jr. dated February 22, 1985. (Requests a 30-day extension of the comment period and provides the following specific comments)

1.4.1 Comment (1): Schedular Relief

The comment points out that a "living schedule" including fire protection modifications beyond the 10 CFR 50.48 deadlines has been approved by the NRC. And that, therefore,

"The Steering Committee recommendation to follow the schedule dictated by 10 CFR 50.48 without granting the extensions already filed with the NRC will make the fire protection modifications the highest priority. This will preclude the evaluation of other safety issues which could be equal or higher in safety priority than fire protection."

Resolution:

The comment is valid. Section A of the proposed Generic Letter has been revised to clarify that schedular exemptions based on NRC approved "living schedules" are available and would be issued under 10 CFR 50.12. Also see resolution 1.1.1.

1.4.2 Comment (2): Question 3.6.2 (Intervening Combustibles)

Same as comment 1.1.14.

Resolution:

Same as resolution 1.1.14.

1.4.3 Comment (3): Question 4.1 (Illumination Levels)

"Section 4.1, "Illumination Levels", the clarification states 'where a licensee has provided emergency lighting per Section III.J of Appendix R, we would expect that the licensee verify by field testing that this lighting is adequate to perform the intended tasks'. The term 'adequate lighting' could be interpreted differently by the licensee and the NRC inspection staff."

Resolution:

It is expected that the licensee and NRC inspection staff would use reasonable engineering judgement to arrive at a mutually acceptable assessment of "adequate lighting." No revision to the Q4.1 response was deemed necessary.

1.4.4 Comment (4): Question 7.1 (Fire Protection and Seismic Events)

"Item 7.1 of Enclosure 5 clarifies the guidelines for the seismic design of fire protection systems in relation to the reactor coolant pump lube oil system, and those situations where seismic events are assumed to be initiators of a fire. The NRC response does not address the intent of the question but establishes guidelines for the seismic design of fire protection systems. Boston Edison takes exception to this clarification and states that a seismic event is not considered concurrent with a fire and the fire protection systems are not seismically designed."

Resolution:

It is agreed that all or parts of fire suppression systems are not seismically designed. The BTP positions cited indicate what considerations should be given to seismic design of these systems (Also, see response to Q7.2). Certain items, such as the RCP lube oil system and the hydrogen lines, were addressed specifically with regard to seismically induced fire. In both these cases, the fire protection measures specified do not involve a fire suppression system. The BTP CMEB 9.5-1 cited in the response does not apply to plants reviewed and approved prior to the issuance of that BTP. The responses to Q7.1 and 7.2 have been revised to make this clear.

1.5 Northeast Utilities: Letter (A04606) from W. G. Counsil to H. R. Denton dated March 1, 1985. (Endorses the NUFPG comments and provides the following specific comments)

1.5.1 Comment (1): Proposed License Condition

a) This comment quotes the following excerpt from Section II. Regulatory Philosophy of NUREG-0885 Issue 4, U. S. Nuclear Regulatory Commission Policy and Planning Guidance 1985:

> "The Commission intends to shift its regulatory emphasis away from detailed, prescriptive requirements toward general design and performance criteria."

and states that "While much of the fire protection policy steering committee report runs contrary to the above quoted Commission policy, the proposed license condition is the most significant one."

b) Section 2 of the proposed license condition would require a license amendment for minor changes to the fire protection program having no safety significance (Essentially the same as comment 1.1.10).

c) Section 3 of the proposed license condition would impose reporting and review requirements for fire protection greater than those associated with other elements of operating a nuclear facility (Essentially the same as comment 1.1.11).

Resolution:

a) The staff acknowledges the merit of the cited Commission policy guidance in general. However, it should be recognized that in the case of fire protection GDC-3 has provided "general design and performance criteria", and that the regulation of fire protection requirements solely on that basis has proven ineffective.

As a result, the Commission determined, after analyzing the results of the Browns Ferry fire, that the more prescriptive requirements embodied in the BTP and subsequently in Appendix R to 10 CFR 50 were necessary, and established the present regulatory requirements. The proposed license condition adds no new requirements. It only identifies in the license the fire protection program committed to by the licensee and accepted by the staff in previous reviews. It also includes an allowance for changes to be made to that program by the licensee

without Commission approval, and a method for keeping record of such changes.

b) See resolution 1.1.10.

c) See resolution 1.1.11.

1.5.2 Comment (2)/Resolution: Schedular Relief

Same as comment 1.1.1, and same resolution.

1.5.3 Comment (3)/Resolution: Quality Assurance Requirements

Same as comment 1.1.4, and same resolution.

1.5.4 Comment (4)/Resolution: Documentation Required to Demonstrate Compliance

Same as comment 1.1.3, and same resolution.

1.5.5 Comment (5a)/Resolution: Question 3.2.3 (Fire Door Modifications)

Same as comment 1.1.13, and same resolution.

1.5.6 Comment (5b): Question 3.1.1 (Fire Area Definition)

"The response to this question, referring to 10CFR50 Appendix R Section III.G.3.b, indicates that, for safety-related equipment and associated cabling the licensee must '(p)rovide the design criteria for protection of such equipment against inadvertent operation, careless operation or rupture of extinguishing systems.' In contrast the regulation itself addresses 'rupture or inadvertent operation of fire suppression systems.'

Reference (3) quoting 10CFR50 Appendix A General Design Criterion 3 (GDC) states '(f)ire fighting systems shall be designed to ensure that their rupture or inadvertent operation does not significantly impair the safety capability' of safety-related equipment. We believe that the inclusion of the additional criterion of 'careless operation,' is inappropriate. It is not clear what additional concern the NRC intends for licensees to address by inclusion of this term."

Resolution:

The comment is valid. The words "careless operation" have been deleted.

1.6 KMC, Inc.: Letter from P. F. Riehm to H. R. Denton dated February 14, 1985.

Comment/Resolution:

Same as comment 1.1.4, and same resolution.

1.7 Virginia Power: Letter (85-112) from W. L. Stewart to H. R. Denton dated February 14, 1985.

Comment:

The comment focused on the approach the Commission should take in achieving its fire protection goals rather than on specific mechanisms for doing so. It states, based on experience, that fire protection "---is a living evolving issue that does not lend itself to definitive guidance nor swift compliance."

Favorable views on the Steering Committee recommendations are expressed as follows:

"We are encouraged by such recommendations as: establishing referees to resolve significant differences that arise during inspections, inspection team workshops, expediting inspections to obtain a clearer understanding of the status of industry in achieving compliance, and designating a central point of contact within NRC to resolve internal conflict. We believe that recommendations such as these reflect not only our experience with fire protection, but indicate that NRC also recognizes that guidance must continue to evolve, that interpretations will change, and that exceptions to the regulations will arise and need to be addressed."

However, the following reservations in regard to the recommendations are cited:

> "On the other hand, we are concerned by such recommendations as: elimination of schedular exemptions, more aggressive and expedited enforcement actions, and more regulation (i.e. standard license conditions) and apparent new requirements (e.g. meeting GDC-1). We believe that recommendations such as these fail to recognize the nature of the fire protection issue. It is not reasonable to expect that fire protection issues will be resolved and compliance will be achieved solely through mandate. The history of fire protection in the nuclear industry provides ample evidence to support this. Rather, they will be resolved and achieved through better understanding and continued active communication between NRC and industry. The issuance of the Steering Committee's policy recommendations for comment is a positive step in that direction and we encourage the NRC to continue in this manner."

In summary, the comment states:

> "---and we encourage the NRC to adopt the Steering Committee's policy recommendations that support resolution of fire protection issues through understanding and communications."

Resolution:

The comment is acknowledged. The approach being taken by the Steering Committee is, we believe, in accord with the thrust of this comment and is consistent with the overall fire protection objectives of the Commission.

1.8 New York Power Authority: Letter (IPN-85-08, JPN-85-15) from C. A. NcNeill to H. R. Denton dated February 23, 1985. (Endorses the NUFPG comments and provides the following specific comments).

Comment/Resolution:

The comments are essentially the same as comments 1.1.1 and 1.1.2 (and 1.2.8), and 1.1.3, and the same resolution.

1.9 Georgia Power Company: Letter (NED-85-088) from L. T. Gucwa to H. R. Denton dated February 14, 1984. (Endorses the NUFPG comments and provides the following specific comment).

Comment/Resolution:

Same as comment 1.1.2, and the same resolution.

ENCLOSURE 2

GENERIC LETTER ON FIRE PROTECTION

TO ALL LICENSEES AND APPLICANTS FOR OPERATING LICENSES

Gentlemen:

SUBJECT: IMPLEMENTATION OF FIRE PROTECTION REQUIREMENTS

In the Spring of 1984, the Commission held a series of Regional Workshops on the implementation of NRC fire protection requirements at nuclear power plants. At those workshops, a package of recently-developed NRC guidance was distributed to each attendee which included NRC staff responses to industry questions and a document titled "Interpretations of Appendix R." The cover memo for the package explained that it was a draft package which would be issued in final form via Generic Letter following the workshops.

The guidance approved by the Commission is appended to this letter, and is in the same format as the draft package, i.e., "Interpretations of Appendix R" and responses have been modified from the draft package, and a number of industry questions raised at or subsequent to the workshops have been added and answered. This package represents the official agency position on all issues covered, and where this guidance differs from previously issued guidance (including Generic Letter 83-33) on this subject, this guidance takes precedence.

In the lettered sections below, some additional topics are covered which also bear on the interpretation and implementation of NRC fire protection requirements. The topics are: (A) schedular exemptions, (B) revised inspection program, (C) documentation required to demonstrate compliance, (D) quality assurance requirements applicable to fire protection systems, and (E) notification of the NRC when deficiencies are discovered.

A. Schedular Exemptions

The Appendix R implementation schedule was established by the Commission in 10 CFR 50.48(c), promulgated together with Appendix R in November of 1980. Allowing time to evaluate the need for alternative or dedicated shutdown systems, which require prior NRC approval before installation, and time for design of and NRC review of such systems, the Commission envisioned that implementation of Appendix R would be complete in four to five years, or approximately by the end of 1985. Many schedule extensions were granted by the staff under the "tolling provision," 50.48(c)(6), and under 10 CFR 50.12, the longest of which now extends into 1987. Some licensees have proceeded expeditiously to implement Appendix R and are now finished or nearly finished with that effort. Others have engaged in lengthy negotiations with the staff while continuing to file requests for schedule extensions, and thereby have barely begun Appendix R modifications needed to comply with Sections III.G

and III.L. Schedule extension requests have been received seeking implementation dates of 1990 or beyond.

As the 50.48(c) schedule was intended to be a one-time schedule commencing in the 1980-1982 time frame and ending in the 1985 time frame, extensions well beyond this schedule (particularly where major modifications remain to be completed) undermine the purpose of the schedule, which was to achieve expeditious compliance with NRC fire protection requirements. The NRC will therefore grant no further extensions to the 50.48(c) schedules. When a licensee's schedule expires, compliance is expected and appropriate enforcement action will be taken. If compliance cannot be achieved by that date, the licensee will be required to submit and justify a minimum schedule for completion of fire protection modifications, and to supply interim measures to compensate for the lack of compliance. In submitting a schedule which goes beyond the current 50.48 deadline the licensee will be required to demonstrate that it has endeavored in good faith to complete modifications on schedule. A showing of good faith attempt to complete implementation on schedule may mitigate enforcement action for noncompliance with NRC requirements. Licensees submitting "living schedules" for NRC approval should be aware that existing 50.48 schedules continue to apply. Licensees intending to include fire protection modifications within a "living schedule" are expected to assign within such schedules the relative safety priorities of remaining fire protection modifications. If the NRC accepts a delayed implementation date in the context of a living schedule, this would provide the basis for a schedular exemption which would then be issued under 10 CFR 50.12.

The NRC is currently reviewing all dockets of plants covered by the 50.48 schedule to determine schedule deadlines. When this review is completed, each licensee will be informed of the deadlines.

B. Revised Inspection Program (To be revised by I&E)

In 1982, the NRC developed an inspection program to verify compliance with the requirements of 10 CFR 50, Appendix R. This program was primarily oriented towards reviewing safe shutdown features of those pre-1979 licensees that had completed Appendix R modifications and selected NTOL plants. From 1982 to the present, approximately seven Appendix R compliance inspections have been performed. In a number of cases, these inspections have discovered that licensees had made significant errors in implementing a number of Appendix R requirements.

In order to expedite compliance verification and to provide the NRC staff with earlier indication of problems associated with implementation of fire protection features, the NRC will conduct fire protection inspections of operating plants and plants currently undergoing operating license review during

2. Severity Categories

A. Severity I. Violations of fire protection requirements established to protect or enable operation of safe hot shutdown equipment concurrent with an actual fire which damages that equipment such that safe hot shutdown could not be achieved or maintained using the equipment identified in the fire hazards analyses for this purpose.

B. Severity II. Violations of fire protection requirements established to protect or enable operation of safe cold shutdown equipment concurrent with an actual fire which damages that equipment such that safe cold shutdown could not have been achieved and maintained using the equipment identified in the fire hazards analyses for this purpose in accordance with the applicable requirements.

C. Severity III. Violations of fire protection requirements established to protect or enable operation of safe shutdown equipment such that a fire in the area could damage that equipment to the extent that safe hot or cold shutdown could not have been achieved and maintained using the equipment identified in the fire hazards analyses for this purpose in accordance with applicable requirements. The NRC intends to initiate enforcement action where, for a given area, compliance with Appendix R is not readily demonstrable and the licensee does not have available a written evaluation for the area. The term "readily demonstrable" includes situations where compliance is apparent by observation of the potential fire hazard and existing protective features.

D. Severity IV. Violations of one or more fire protection requirements that do not result in a Severity Level I, II or III violation and which have more than minor safety or environmental significance.

E. Severity V. Violations of one or more fire protection requirements that have minor safety or environmental significance.

ENCLOSURE 3

INTERPRETATIONS OF APPENDIX R

1. Process Monitoring Instrumentation

Section III.L.2.d of Appendix R to 10 CFR Part 50 states that "the process monitoring function shall be capable of providing direct readings of the process variables necessary to perform and control" the reactivity control function. In I&E Information Notice 84-09, the staff provides a listing of instrumentation acceptable to and preferred by the staff to demonstrate compliance with this provision. While this guidance provides an acceptable method for compliance with the regulation, it does not exclude other alternative methods of compliance. Accordingly, a licensee may propose to the staff alternative instrumentation to comply with the regulation. While such a submittal is not an exemption request, it must be justified based on a technical evaluation. The licensee may also propose alternatives to actual compliance with the regulation (e.g., instrumentation which does not provide a direct reading of the process variable) by filing an exemption request with adequate justification.

2. Repair of Cold Shutdown Equipment

Section III.L.5 of Appendix R states that when in the alternative or dedicated shutdown mode, "equipment and systems comprising the means to achieve and maintain cold shutdown conditions shall not be damaged by fire; or the fire damage to such equipment and systems shall be limited so that the systems can be made operable and cold shutdown can be achieved within 72 hours." This is not to be confused with the requirements in Section III.G.1.b of Appendix R.

Section III.G.1.b contains the requirements for normal shutdown modes utilizing the control room or emergency control station(s) capabilities. The fire areas falling under the requirements of III.G.1.b are those for which an alternative or dedicated shutdown capability is not being provided. For these fire areas, Section III.G.1.b requires only the capability to repair the systems necessary to achieve and maintain cold shutdown from either the control room or emergency control station(s) within 72 hours, not the capability to repair and achieve cold shutdown within 72 hours as required for the alternative or dedicated shutdown modes by Section III.L (noted above).

With regard to areas involving normal shutdown, however, Section I of Appendix R states that repairs must be made using only onsite capabilities. After repairs are made, cold shutdown can be achieved on a reasonable schedule using any available power source.

3. Fire Damage

Appendix R to 10 CFR Part 50 utilizes the term "free of fire damage." In promulgating Appendix R, the Commission has provided methods acceptable for assuring that necessary structures, systems and components are free of fire damage (see Section III.G.2a, b and c), that is, the structure, system or component under consideration is capable of performing its intended function during and after the postulated fire, as needed. Licensees seeking exemptions from Section III.G.2 must show that the alternative proposed provides reasonable assurance that this criterion is met. (Note also that Section III.G.2 applies only to equipment needed for hot shutdown. Therefore, an exemption from III.G.2 for cold shutdown equipment is not needed.)

4. Fire Area Boundaries

The term "fire area" as used in Appendix R means an area sufficiently bounded to withstand the hazards associated with the area and, as necessary, to protect important equipment within the area from a fire outside the area. In order to meet the regulation, fire area boundaries need not be completely sealed floor-to-ceiling, wall-to-wall boundaries. However, all unsealed openings should be identified and considered in evaluating the effectiveness of the overall barrier. Where fire area boundaries were not approved under the BTP process, or where such boundaries are not wall-to-wall, floor-to-ceiling boundaries with all penetrations sealed to the fire rating required of the boundaries, licensees must 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 and protect important equipment within the area from a fire outside the area. This analysis must be performed by at least a fire protection engineer and, if required, a systems engineer. Although not required, licensees may submit their evaluations for staff review and concurrence. In any event, these analyses must be retained by the licensees for subsequent NRC audits.

5. Automatic Detection and Suppression

Sections III.G.2.b and III.G.2.c of Appendix R state that "In addition, fire detectors and an automatic fire suppression system shall be installed in the fire area..." Other provisions of Appendix R also use the phrase "fire detectors and an automatic fire suppression system in the fire area..." (see e.g., Section III.G.2.e).

In order to comply with these provisions, suppression and detection sufficient to protect against the hazards of the area must be installed. In this regard, detection and suppression providing less than full area coverage may be adequate to comply with the regulation. Where full area suppression and detection is not installed, licensees must perform an evaluation to assess the adequacy of partial suppression and detection to protect against the hazards in the area. The evaluation must be performed by a fire protection engineer and, if required, a systems engineer. Although not required,

licensees may submit their evaluations to the staff for review and concurrence. In any event, the evaluations must be retained for subsequent NRC audits. Where a licensee is providing no suppression or detection, an exemption must be requested.

6. Alternative or Dedicated Shutdown

Section III.G.3 of Appendix R provides for "alternative or dedicated shutdown capability and its associated circuits, independent of cables, systems or components in the area, room, or zone under consideration." While "independence" is clearly achieved where alternative shutdown equipment is outside the fire area under consideration, this is not intended to imply that alternative shutdown equipment in the same fire area but independent of the room or the zone cannot result in compliance with the regulation. The "room" concept must be justified by submission of a detailed fire hazards analysis that demonstrates a single fire will not disable both normal shutdown equipment and the alternative shutdown capability.

1985 to include at least one site from each licensee who has not been subject to a previous NRC fire protection inspection. This inspection will review completed modifications and, in the case of incomplete modifications, review licensee plans and schedules for completing such modifications.

C. Documentation Required to Demonstrate Compliance

The "Interpretations" document attached to this letter states that, where the licenee chooses not to seek prior NRC review and approval of, for example, a fire area boundary, an evaluation must be performed by a fire protection engineer (assisted by others as needed) and retained for future NRC audit. Evaluations of this type must be written and organized to facilitate review by a person not involved in the evaluation. Guidelines for what such an evaluation should contain may be found in: (1) Section B of Appendix R and (2) Section C.1.b of Branch Technical Position (BTP) CMEB 9.5-1 Rev. 2 dated July 1981. All calculations supporting the evaluation should be available and all assumptions clearly stated at the outset. The NRC intends to initiate enforcement action where, for a given fire area, compliance with Appendix R is not readily demonstrable and the licensee does not have available a written fire hazard analysis for the area. The term "readily demonstrable" includes situations where compliance is apparent by observation of the potential fire hazard and the existing protective features.

D. Quality Assurance Requirements Applicable

For fire protection systems the licensee should have and maintain a quality assurance program that provides assurance that the fire protection systems will be designed, fabricated, erected, tested, maintained and operated so that they will function as intended. Fire protection systems are not "safety-related" and are therefore not within the scope of Appendix B to 10 CFR Part 50, unless the licensee has committed to include these systems under the Appendix B program for the plant. NRC guidance for an acceptable quality assurance program for fire protection systems, given in Section C.4 of Branch Technical Position CMEB 9.5-1 Rev. 2 dated July 1981, has generally been used in the review and acceptance of approved fire protection programs for plants licensed after January 1, 1979. For plants licensed prior to January 1, 1979, similar guidance was referenced in footnotes 3 and 4 to 10 CFR 50.48. They are contained in BTP APCSB 9.5-1 and Appendix A thereto and in "Nuclear Plant Fire Protection Functional Responsibilities, Administrative Control and Quality Assurance" dated June 14, 1977.

E. Notification of the NRC When Deficiencies are Discovered

Licensees are reminded of their obligation to notify the NRC of fire protection deficiencies which meet the criteria of 10 CFR 50.72 or 10 CFR 50.73 as applicable.

ENCLOSURE 4

GUIDANCE FOR ENFORCEMENT ACTIONS CONCERNING FIRE PROTECTION REQUIREMENTS

1. General Guidance

A. Fire protection requirements are delineated by 10 CFR 50 Appendix A General Design Criterion 3, 10 CFR 50.48, 10 CFR 50 Appendix R, Facility License Conditions, facility technical specifications and other legally binding requirements, as applicable. A Notice of Violation will be issued for violation of requirements. However, failure to meet fire protection commitments other than requirements will be designated as deviations.

B. Failures to meet regulatory requirements for protecting trains of equipment required for achieving and maintaining safe hot or cold shutdown are serious violations. The specific violations should be reviewed individually and as a group to determine their root cause(s). This guidance gives examples of violations at various severity levels and should be used to determine the appropriate enforcement action. For purposes of this guidance, required structures, systems, and components are those which are necessary to achieve and maintain hot and/or cold shutdown and which require the application of fire protection features as described in the licensee's fire hazards analysis report and NRC's safety evaluation report.

C. Fire protection violations may involve inoperable or inadequate: fire barriers, separation, suppression or detection systems, repair parts, procedures or other conditions or items required to prevent fires, protect safe shutdown equipment from fire and/or permit the operation of safe shutdown equipment during a fire or to restore safe shutdown equipment to service following an actual fire.

D. Numerous violations of fire protection requirements which individually may be classified at lower severity levels may cumulatively be classified at a higher severity level due to inadequate implementation of the fire protection program.

F. Standard License Condition

All licenses contain a section on fire protection. License conditions for plants licensed prior to January 1, 1979, contain a condition requiring implementation of modifications committed to by the licensee as a result of the BTP review. These license conditions were added by amendments issued between 1977 and February 17, 1981, the effective date of 10 CFR 50.48 and Appendix R. Two points should be noted in regard to these conditions: (1) they did not explicitly cover required fire protection features where modifications to the existing plant configuration or procedures were not required, and (2) some of the provisions in these conditions could have been superseded by Sections III.G., J, O, and L of Appendix R.

License conditions for plants licensed after January 1, 1979, vary widely in scope and content. Some only list open items that must be resolved by a specified date or event, such as exceeding five per cent power or the first refueling outage. Some reference a commitment to meet Appendix R; some reference the FSAR and/or the NRC staff's SER. These variations have created problems for licensees and for NRC inspectors in identifying the operative and enforceable fire protection requirements at each facility.

These license conditions also create difficulties because they do not specify when a licensee may make changes to the approved program without requesting a license amendment. If the fire protection program committed to by the licensee is required by a specific license condition or is not part of the FSAR for the facility, the provisions of 10 CFR 50.59 may not be applied to make changes without prior NRC approval. Thus licensees may be required to submit amendment requests even for relatively minor changes to the fire protection program.

A standard fire protection license condition is enclosed for your consideration. Its purpose is twofold: (1) to identify clearly the approved fire protection program for the facility, against which compliance with be measured, and (2) to specify when prior NRC approval is or is not required when changes to the approved program are contemplated. The condition also contains record retention and reporting requirements paralleling those of 10 CFR 50.71 for changes to the FSAR. Note that this standard condition does not impose any new substantive requirements, but only documents existing licensee commitments approved by the NRC.

[Optional paragraph:

We request that each licensee submit, within 120 days of the date of this letter, a license amendment request proposing a license condition for its facility using the enclosed standard condition as guidance.]

ENCLOSURE 5

FIRE PROTECTION LICENSE CONDITION

1. The licensee shall implement and maintain in effect all provisions of the approved fire protection program as described in the Final Safety Analysis Report for the facility (or as described in submittals dated--------) and as approved in the SER dated--------(and Supplements dated--------) subject to provisions 2 and 3 below.

2. The licensee may make no change to the approved fire protection program which would significantly decrease the level of fire protection in the plant without prior approval of the Commission. To make such a change the licensee must submit an application for license amendment pursuant to 10 CFR 50.90.

3. The licensee may make changes to features of the approved fire protection program which do not significantly decrease the level of fire protection without prior Commission approval provided (a) such changes do not otherwise involve a change in a license condition or technical specification or result in an unreviewed safety question (see 10 CFR 50.59), and (b) such changes do not result in failure to complete the fire protection program approved by the Commission prior to license issuance. The licensee shall maintain, in an auditable form, a current record of all such changes, including an analysis of the effects of the change on the fire protection program, and shall make such records available to NRC inspectors upon request. All changes to the approved program shall be reported annually to the Director of the Office of Nuclear Reactor Regulation, along with the FSAR revisions required by 10 CFR 50.71(e).

ENCLOSURE 6

APPENDIX R QUESTIONS AND ANSWERS

APPENDIX R

QUESTIONS AND ANSWERS

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7.1 Fire Protection and Seismic Events
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1. INTRODUCTION

A major fire damaging safe shutdown equipment occurred at the Browns Ferry Nuclear Station in March 1975. The fire damaged over 1600 electrical cables and caused the temporary unavailability of some core cooling systems. Because this fire did substantial damage, the NRC established a Special Review Group which initiated an evaluation of the need for improving the fire protection programs at all nuclear power plants. The group found serious design inadequacies regarding fire protection at Browns Ferry, and its report, "Recommendations Related to Browns Ferry Fire" (NUREG-0050, February 1976), contained over fifty recommendations regarding improvements in fire prevention and control in existing facilities. The report also called for the development of specific guidance for implementing fire protection regulations, and for a comparison of that guidance with the fire protection program at each operating plant.

NRC developed technical guidance from the technical recommendations in the Special Group's report, and issued those guidelines as Branch Technical Position Auxiliary Power Conversion Systems Branch 9.5-1 (BTP APCSB 9.5-1),[1] "Guidelines for Fire Protection for Nuclear Power Plants." This guidance did not apply to plants operating at that time. Guidance to operating plants was provided later in Appendix A [2] to BTP APCSB 9.5-1 which, to the extent practicable, relies on BTP APCSB 9.5-1. The guidance in these documents was also published for public comment as Regulatory Guide 1.120, "Fire Protection for Nuclear Power Plants" (June 1976). In response to public comment, the NRC issued an extensively revised version of Regulatory Guide 1.120 for further public comment.

In May 1976, the NRC asked licensees to compare operating reactors with BTP APCSB 9.5-1, and in September 1976, those licensees were informed that the guidelines in Appendix A would be used to analyze the consequences of a fire in each plant area. In September 1976 the licensees, were also requested to provide a fire hazards analysis that divided the plant into distinct fire areas and show that redundant systems required to achieve and maintain cold shutdown are adequately protected against damage by a fire. Early in 1977 each licensee responded with a Fire Protection Program Evaluation which included a Fire Hazard Analysis. These evaluations and analyses identified aspects of licensees' fire protection programs that did not conform to the NRC guidelines.

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[1]/Rather than serving as inflexible, legal requirements that must be followed by licensees, issuances such as regulatory guides and branch technical positions are meant to give guidance to licensees concerning those methods the staff finds acceptable for implementing the general criteria embodied in the NRC's rules. See, e.g., Petition for Emergency & Remedial Action, CLI-78-6, 7 NRC 400, 406 (1978); Gulf States Utilities Company (River Bend Station, Units 1 and 2) ALAB-444, 6 NRC 760, 772 (1977).

[2]/Guidelines for Fire Protection for Nuclear Power Plants Docketed Prior to July 1, 1976.

Thereafter, the staff initiated discussions with all licensees aimed at achieving implementation of fire protection guidelines by October 1980. The staff held many meetings with licensees, conducted extensive correspondence with them, and visited every operating reactor. As a result, many fire protection items were resolved, and agreements were included in Fire Protection Safety Evaluation Reports issued by the NRC. Several fire protection issues remained unresolved with a number of licensees.

By early 1980, most operating plants had implemented most of the guidelines in Appendix A. However, as the Commission noted in its Order of May 23, 1980, the fire protection program has had some significant problems with implementation. Despite the staff's efforts, several licensees had expressed continuing disagreement with, and refused to adopt recommendations relating to several generic issues, including the requirements for fire brigade size and training, water supplies for fire suppression systems, alternate and dedicated shutdown capability, emergency lighting, qualifications of seals used to enclose places where cables penetrated fire barriers, and the prevention of reactor coolant pump lubrication system fires. To establish a definitive resolution of these contested subjects in a manner consistent with the general guidelines in Appendix A to the BTP and to assure timely compliance by licensees, the Commission issued a proposed fire protection rule and its Appendix R, which was described as setting out minimum fire protection requirements for the unresolved issues (45 Fed. Reg. 36082 May 29, 1980).[3]/ The fire protection features addressed included protection of safe shutdown capability, emergency lighting, fire barriers, associated circuits, reactor coolant pump lubrication system, and alternate shutdown systems. The Commission stated that it expected all modifications (except for alternate and dedicated shutdown capability) to be implemented by November 1, 1980.[4]/

As originally proposed (Federal Register Vol. 45 No. 1&5, May 22, 1980), Appendix R would have applied to all plants including those for which the staff had previously accepted other fire protection modifications. After analyzing comments on the rule, the Commission determined that only three of the fifteen items in Appendix R were of such safety significance that they should apply to all plants, including those for which alternative fire protection actions had been approved previously by the staff. These items are protection of safe shutdown capability (including alternate shutdown systems), emergency lighting, and the reactor coolant pump lubrication system. Accordingly, the final rule required all reactors licensed to operate before January 1, 1979, to comply with these three items even if the NRC had previously approved alternative fire protection features in these areas (45 Fed. Reg. 76602 Nov. 19, 1980). However, the final rule is more flexible than the proposed rule because Item III.G now provides three alternative fire protection features which do not require analysis to demonstrate the protection of redundant safe shutdown equipment, and reduces the acceptable distance in the physical separation alternative from fifty feet to twenty feet. In addition, the rule now also provides an exemption procedure which can be initiated by a licensee's assertion that any required fire protection feature will not enhance fire protection safety in the facility or that such modifications may be detrimental to overall safety (10 CFR 50.48(c)(6)). If the Director, Nuclear Reactor Regulation determines

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[3]/11 NRC 707, 718 (1980)

[4]/Id. at 719

that a licensee has made a prima facie showing of a sound technical basis for such an assertion, then the implementation dates of the rule are tolled until final Commission action on the exemption request.

Most licensees requested and were granted additional time to perform their reanalysis, propose modifications to improve post fire shutdown capability and to identify exemptions for certain fire protection configurations. In reviewing some exemption requests, the staff noted that some licensees had made significantly different interpretations of certain requirements. These differences were identified in the staff's draft SER's. These differences were also discussed on several occasions with the cognizant licensee as well as the Nuclear Utility Fire Protection Group. These discussions culminated in the issuance of generic letter 83-33.

2. OVERVIEW

Section 50.48 Fire Protection of 10 CFR Part 50 requires that each operating nuclear power plant have a fire protection plan that satisfies General Design Criterion 3 of Appendix A to 10 CFR 50. It specifies what should be contained in such a plan and lists the basic fire protection guidelines for this plan. It requires that the Fire Protection Safety Evaluation Report which has been issued for each operating plant state how these guidelines were applied to each facility.

Section 50.48 also requires that all plants with operating licenses prior to January 1, 1979 satisfy the requirements of Section III.G, III.J and III.O, and other Sections of Appendix R where approval of similar features had not been obtained prior to the effective date of Appendix R. By a separate action, the Commission approved the staff's requirement that all plants to receive their operating license after January 1, 1979 also satisfy the requirements of Sections III.G, III.J and III.O and that a fire protection license condition be established. Deviations from Appendix R requirements for pre-1979 plants are processed under the exemption process. Deviation from other guidelines are identified and evaluated in the Safety Evaluation Report.

A standard fire protection license condition has been developed and will be included in each new operating license. Present operating licenses will be amended to include the standard license condition.

The Regions initiated inspections of operating plants and identified several significant items of non-compliance. The Nuclear Utility Fire Protection Group requested interpretations of certain Appendix R requirements and provided a list of questions that they thought should be discussed with the industry. The NRC held workshops in each Region to assist the industry in understanding the NRC's requirements and to improve the Staff's understanding of the industry's concerns.

This document presents the NRC's response to the questions posed by the industry and supplemented with additional questions identified at the workshops as being of interest to the industry or the staff. These responses may be used as guidance for design, review and inspection activities. The questions have been reformatted according to their applicability to Sections of Appendix R, BTP CMEB 9.5-1, licensing policy or inspection policy.

3. SECTION III.G, FIRE PROTECTION OF SAFE SHUTDOWN CAPABILITY

3.1 Fire Area Boundaries

3.1.1 Fire Area Definition

QUESTION

Section III.G states the fire protection features required for cables and equipment or redundant trains of systems required to achieve and maintain hot shutdown that are located within the same fire area. Is the fire area of Section III.G, the same fire area referred to in BTP APCSB 9.5-1, Appendix A; and the supplementary guidance of September 1976?

RESPONSE

The definition of a fire area given in the BTP is somewhat more restrictive than that given in Section #4 of the "Interpretations of Appendix R." Clearly, where a licensee has reviewed its facility using the BTP criteria, this would meet Appendix R requirements. The BTP criteria may continue to be used as guidance, but the minimum requirements for fire area boundaries are set out in Section #4 of the "Interpretations."

3.1.2 Previously Accepted Fire Area Boundaries

QUESTION

If a fire area boundary was described as a rated barrier in the 1977 fire hazards analysis, no open items existed in this area in the Appendix A SER, and the barriers have not been altered, then need those barriers be reviewed by licensees or the Staff under Appendix R?

RESPONSE

If a fire area boundary was described as a rated barrier in the 1977 fire hazards analysis, and was evaluated and accepted in a published SER, the fire area boundary need not be reviewed as part of the re-analysis for compliance with Section III.G of Appendix R. Openings in the fire barriers, if any, should have been specifically identified and justified in the fire hazards analysis performed in the Appendix A process. If openings in the fire area boundaries were not previously evaluated, such an evaluation should be performed as a basis for assessing compliance with Appendix R. See Items #4 and #6 of the "Interpretations of Appendix R," and the response to question 3.1.1.

In BTP APCSB 9.5-1, Fire Barrier is defined as:

"Fire Barrier - those components of construction (walls, floors, and roofs) that are rated by approving laboratories in hours for resistance to fire to prevent the spread of fire.

The term "fire area" as used in Appendix R means an area sufficiently bounded to withstand the hazards associated with the fire area and, as necessary, to protect important equipment within the fire area from a fire outside the area. In order to meet the regulation, fire area boundaries need not be completely

sealed with floor to ceiling and/or wall-to-wall boundaries. Where fire area boundaries were not approved under the Appendix A process, or where such boundaries are not wall-to-wall or floor-to-ceiling boundaries with all penetrations sealed to the fire rating required of the boundaries, licensees must perform an evaluation to assess the adequacy of fire area boundaries in their plants to determine if the boundaries will withstand the hazards associated with the area and protect important equipment within the area from a fire outside the area. This analysis must be performed by at least a fire protection engineer and, if required, a systems engineer. Although not required, licensees may submit their evaluations for Staff review and concurrence. In any event, these analyses must be retained by the licensees for subsequent NRC audits.

3.1.3 Exterior Walls

QUESTION

Must exterior walls to buildings and their penetrations be qualified as rated barriers?

RESPONSE

Exterior walls and their penetrations should be qualified as rated barriers when (1) they are required to separate a shutdown-related division(s) inside the plant from its redundant (alternate) counterpart outside the plant in the immediate vicinity of the exterior wall, (2) they separate safety related areas from non-safety related areas that present a significant fire threat to the safety related areas, or (3) they are designated as a fire barrier in the FSAR or FHA.

Usually exterior walls are designated as a fire area boundary; therefore, they are evaluated by the guidelines of Appendix A. A FHA should be performed to determine the rating of exterior walls, if required by the above criteria.

3.1.4 Exterior Yards

QUESTION

How should a utility define the boundaries of fire areas comprising exterior yards?

RESPONSE

An exterior yard area without fire barriers should be considered as one fire area. The area may consist of several fire zones. The boundaries of the fire zones should be determined by a FHA.

The protection for redundant/alternate shutdown systems within a yard area would be determined on the bases of the largest "design basis fire" (see response to question 3.8.2) that is likely to occur and the resulting damage. The boundaries of such damage would have to be justified with a fire hazards analysis. The analysis should consider the degree of spatial separation between divisions; the presence of in-situ and transient combustibles, including vehicular traffic; grading; available fire protection; sources of ignition; and the vulnerability and criticality of the shutdown related systems. See Sections #3, #4 and #6 of the "Interpretations of Appendix R."

3.1.5 Fire Zones

QUESTION

Appendix R, Section III.G.3 states "alternative or dedicated shutdown capability and its associated circuits, independent of cables, systems or components in the area room or zone under consideration...." What is the implied utilization of a room or zone concept under Section III.G of Appendix R? The use of the phraseology "area, room or zone under consideration" is used again at the end of the Section III.G.3. Does the requirement for detection and fixed suppression indicate that the requirement can be limited to a fire zone rather than throughout a fire area? Under what conditions and with what caveats can the fire zone concept be utilized in demonstrating conformance to Appendix R?

RESPONSE

Section III.G was written after NRC's multi-discipline review teams had visited all operating power plants. From these audits, the NRC recognized that it is not practical and may be impossible to subdivide some portions of an operating plant into fire areas. In addition, the NRC recognized that in some cases where fire areas are designated, it may not be possible to provide alternate shutdown capability independent of the fire area and, therefore, would have to be evaluated on the basis of fire zones within the fire area. The NRC also recognized that because some licensees had not yet performed a safe shutdown analysis, these analyses may identify new unique configurations.

To cover the large variation of possible configurations, the requirements of Section III.G were presented in three parts:

- Section III.G.1 requires one train of hot shutdown systems be free of fire damage and damage to cold shutdown systems be limited.

- Section III.G.2 provides certain separation, suppression and detection requirements within fire areas; where such requirements are met, analysis is not necessary.

- Section III.G.3 requires alternative dedicated shutdown capability for configurations that do not satisfy the requirements of III.G.2 or where fire suppressants released as a result of fire fighting, rupture of the system or inadvertent operation of the system may damage redundant equipment. If alternate shutdown is provided on the basis of rooms or zones, the provision of fire detection and fixed suppression is only required in the room or zone under consideration.

Section III.G recognizes that the need for alternate or dedicated shutdown capability may have to be considered on the basis of a fire area, a room or a fire zone. The alternative or dedicated capability should be independent of the fire area where it is possible to do so (See Supplementary Information for the final rule Section III.G). When fire areas are not designated or where it is not possible to have the alternative or dedicated capability independent of the fire area, careful consideration must be given to the selection and location of the alternative or dedicated shutdown capability to assure that the performance requirement set forth in Section III.G.1 is met. Where alternate or dedicated shutdown is provided for a room or zone, the capability must be physically and

electrically independent of that room or zone. The vulnerability of the equipment and personnel required at the location of the alternative or dedicated shutdown capability to the environments produced at that location as a result of the fire or fire suppressant's must be evaluated. These environments may be due to the hot layer, smoke, drifting suppressants, common ventilation systems, common drain systems or flooding. In addition, other interactions between the locations may be possible in unique configurations.

If alternate shutdown is provided on the basis of rooms or zones, the provision of fire detection and fixed suppression is only required in the room or zone under consideration. Compliance with Section III.G.2 cannot be based on rooms or zones.

See also Sections #5 and #6 of the "Interpretations of Appendix R."

3.1.6 Documentation

QUESTION

In Generic Letter 83-33 at pg. 2, the NRC Staff referred to the guidance in Appendix A to BTP 9.5-1 to establish the rating of the barrier. What level of documentation must be provided to verify that the fire area meets the requirements of Appendix R?

RESPONSE

The documentation required to verify the rating of a fire barrier should include the design description of the barrier and the test reports that verify its fire rating. Reference can be made to UL listed designs.

3.2 Fire Barrier Qualification

3.2.1 Acceptance Criteria

QUESTION

Recently the Staff has applied a 325°F cold side temperature criterion to its evaluation of the acceptability of one-hour and three-hour fire barrier cable tray wraps. This criterion is not in Branch Technical Position (BTP) APCSB 9.5-1, Appendix A as an acceptance criterion for fire barrier cable tray wraps and is not contained in Appendix R. It appears to represent post-Appendix R guidance. What is the origin of this criterion and why is it applicable to electrical cables where insulation degradation does not begin until jacket temperatures reach 450°F to 650°F?

RESPONSE

Fire barriers relied upon to protect shutdown related systems to meet the requirements of III.G.2 need to have a fire rating of either one or three hours. § 50.48 references BTP APCSB 9.5-1, where the fire protection definitions are found. Fire rating is defined:

"Fire Rating - the endurance period of a fire barrier or structure; it defines the period of resistance to a standard fire exposure before the first critical point in behavior is observed (see NFPA 251)."

The acceptance criteria contained in Chapter 7 of NFPA 251, "Standard Methods of Fire Tests of Building Construction and Materials," pertains to non-bearing fire barriers. These criteria stipulate that transmission of heat through the barrier "shall not have been such as to raise the temperature on its unexposed surface more than 250°F above its initial temperature." The ambient air temperature at the beginning of a fire test usually is between 50°F and 90°F. It is generally recognized that 75°F represents an acceptable norm. The resulting 325°F cold side temperature criterion is used for cable tray wraps because they perform the fire barrier function to preserve the cables free of fire damage. It is clear that cable that begins to degrade at 450°F is free of fire damage at 325°F.

During the Appendix A review, licensees began to propose fire barriers to enclose cable trays, conduit, fuel lines, coolant lines, etc. Industry did not have standard rating tests for such components or for electrical, piping or bus duct penetrations. The NRC issued a staff position giving acceptance criteria for electrical penetration tests. These criteria require an analysis of any temperature on the unexposed side of the barrier in excess of 325°F. In the past, manufacturers designed their own qualification tests. Nuclear Insurers, and the Institute of Electrical and Electronic Engineers have issued tests for some of these components. These tests usually exposed the component to the ASTM E-119 time temperature curve, but all had different acceptance criteria. Conduit and cable tray enclosure materials accepted by the NRC as 1 hour barrier prior to Appendix R (e.g. some Kaowool and 3M materials) and already installed by the licensee need not be replaced even though they may not have met the 325°F criteria. However, for newly identified conduit and cable trays requiring such wrapping new material which meets the 325°F criterion should be used, or justification should be provided for use of material which does not meet the 325°F criterion. This may be based on an analysis demonstrating that the maximum recorded temperature is sufficiently below the cable insulation ignition temperature.

3.2.2 Deviations from Tested Configurations

QUESTION

Due to obstructions and supports, it is often impossible to achieve exact duplication of the specific tested configuration of the one-hour fire barriers which are to be placed around either conduits or cable trays. For each specific instance where exact replication of a previously tested configuration is not and cannot be achieved, is an exemption necessary in order to avoid a citation for a violation?

RESPONSE

No. Where exact replication of a tested configuration cannot be achieved, the field installation should meet all of the following criteria:

1. The continuity of the fire barrier material is maintained.

2. The thickness of the barrier is maintained.

3. The nature of the support assembly is unchanged from the tested configuration.

4. The application or "end use" of the fire barrier is unchanged from the tested configuration. For example, the use of a cable tray barrier to protect a cable tray which differs in configuration from those that were tested would be acceptable. However, the use of structural steel fire proofing to protect a cable tray assembly may not be acceptable.

5. The configuration has been reviewed by a qualified fire protection engineer and found to provide an equivalent level of protection.

3.2.3 Fire Door Modifications

QUESTION

Where labeled and rated fire doors have been modified to incorporate security hardware or for flooding protection, is an exemption from Appendix R required?

RESPONSE

Where a door is part of a fire area boundary, and the modification does not effect the fire rating (for example, installation of security "contacts"), no further analysis need be performed. If the modifications could reduce the fire rating (for example, installation a vision panel), the fire rating of the door should be reassessed to ensure that it continues to provide adequate margin considering the fire loading on both sides. Since this reassessment pertains to the establishment of a valid fire area boundary, an exemption is not required. See Section #4 of the "Interpretations of Appendix R."

3.3 Structural Steel

3.3.1 NFPA Approaches

QUESTION

Does the NRC's definition of structural steel supporting fire barriers completely accommodate approaches described in NFPA guidance documents and standards?

RESPONSE

The NRC does not define the structural steel supporting fire barriers. This steel is identified by the licensee. Our position regarding the need to protect the structural steel, which forms a part of or supports fire barriers, is consistent with sound fire protection engineering principles as delineated in both NFPA codes and standards, and The Fire Protection Handbook.

3.3.2 Previously Accepted Structural Steel

QUESTION

Is it necessary to protect structural steel in exisitng fire barriers where those barriers were approved in an Appendix A SER?

RESPONSE

No.

3.3.3 Seismic Supports

QUESTION

Does structural steel whose sole purpose is to carry dynamic loads from a seismic event require protection in accordance with Section III.G.2a of Appendix R?

RESPONSE

No, unless the failure of any structural steel member due to a fire could result in significant degradation of the fire barrier. Then it must be protected.

3.3.4 Cable Tray Support Protection

QUESTION

Should cable tray supports be protected if there is a sprinkler system in the fire area? Under what conditions may cable tray supports be unprotected? Do unprotected supports require an exemption?

RESPONSE

In general, cable tray supports should be protected, regardless of whether there is a sprinkler system. However, they need not be protected if (1) the qualification tests were performed on wrapped cable trays with unprotected supports, and the supports are shown to be adequate, or (2) an analysis is performed, which takes into account the fire loading and automatic suppression available in the area, and which demon-strates that the unprotected support(s) will not fail and cause a loss of the cable tray fire barrier required for the postulated fire.

An exemption is not required; however, the qualification tests and applicability or the structural evaluation should be documented and available for audit.

3.4 Automatic Suppression System

3.4.1 Water Density

QUESTION

Staff guidance provided in Generic Letter 83-33 concerning automatic suppression coverage of fire areas interprets the phrase "in the fire area" in Section III.G as meaning "throughout the fire area." What delivered water density or occupancy standard as specified in NFPA-STD-13 must be achieved to meet this guidance?

RESPONSE

Individual plant areas are diverse in nature. The designer should determine the particular water density or occupancy classification. Those areas which contain a limited quantity of in-situ and anticipated transient combustibles and which feature contents such as tanks and piping, may be considered as "Ordinary Hazard (Group 1)," as defined by NFPA Standard No. 13. For those areas containing large amounts of cables or flammable liquids, an occupancy classification of "Extra Hazard" may be warranted. The decision as to which

classification should be applied should be made by a qualified fire protection engineer.

Once the occupancy classification is determined, the minimum water density should be based on the Density Curves in table 2.2.1(B) of NFPA 13. Any density equal to or in excess of the curves would be in conformance with our guidelines as delineated in Section C.6.c of BTP CMEB 9.5-1.

3.4.2 NRC Consultation

QUESTION

Section 4.1.2 of NFPA-STD-13 allows for "partial installations" or partial coverage. The standard states that "the authority having jurisdiction shall be consulted in each case." With the NRC as authority in this instance, must consultation occur only through the exemption process?

RESPONSE

No. The staff is always available to consult with utility representatives and provide guidance as to the acceptability of a particular fire protection configuration in individual plant areas. See also Section #5 of the "Interpretations of Appendix R."

3.4.3 Sprinkler Location

QUESTION

How does a suppression system designer know whether the term "throughout the area" means that sprinkler heads must be above or below cable trays when, in his judgment, the hazard of concern is a floor based fire?

RESPONSE

Section C.6.c(3) of BTP CMEB 9.5-1 states:

"(3) Fixed water extinguishing systems should conform to requirements of appropriate standards such as NFPA-13, "Standard for the Installation of Sprinkler Systems," and NFPA-15, "Standard for Water Spray Fixed Systems"."

This question pertains to those sprinkler systems covered by NFPA-13. Chapter 4 of NFPA-13 provides guidance as to the location of sprinkler heads in relation to common obstructions. In general, to achieve complete area-wide coverage, sprinklers should be located at the ceiling, with additional sprinklers provided below significant obstructions such as wide HVAC ducts and "shielded" or solid bottom stacked cable trays. To the extent that an existing or proposed sprinkler system design deviates from this concept, the design would have to be justified by a fire hazards analysis. See also Section #5 of the "Interpretations of Appendix R."

3.4.4 Fixed Suppression System In Fire Area

QUESTION

Are fixed suppression systems required by Section III G.3 to be throughout the fire area, room or zone under consideration?

RESPONSE

No, but partial coverage must be properly justified and documented.

See Item #5 of the "Interpretations of Appendix R."

"...suppression less than full area coverage may be adequate to comply with the regulation. Where full area suppression and detection is not installed, licensees must perform an evaluation to assess the adequacy and necessity of partial suppression and detection in an area. The evaluation must be performed by a fire protection engineer and, if required, a systems engineer. Although not required, licensees may submit their evaluations to the staff for review and concurrence. In any event, the evaluations must be retained for subsequent NRC audits..."

3.4.5 Sprinkler Head Location

QUESTION

If stacks of horizontal or vertical cable trays extend from ceiling to floor, are sprinkler heads required (1) under the lowest horizontal trays, near the floor for vertical trays; (2) at some intermediate level between the floor and ceiling, and (3) at the ceiling?

RESPONSE

Sprinkler heads should be located at the ceiling. Sprinkler heads at other locations may be necessary depending upon the hazard and the cumulative effect of the obstructions to the discharge of water from the sprinkler head. The sprinkler system design should meet NFPA 13.

3.4.6 Previously Approved Suppression Systems

QUESTION

Must suppression systems approved and installed under BTP APCSB 9.5-1, Appendix A be extended or altered to meet the total area requirements of Section III.G (as interpreted by the Staff) or does this "requirement" only apply to new installations?

RESPONSE

Suppression systems installed in connection with Appendix A may or may not have to be extended as a result of III.G. The licensee must analyze each area where suppression is required by III.G, and where only partial suppression has been provided, determine if the coverage is adequate for the fire hazard in the area. The licensee may consult with the staff during this review. In any event, the

Appendix R analysis showing that the suppression provided is adequate must be retained and available for NRC audit. See also Section #5 of the "Interpretations of Appendix R."

3.5 Separation of Redundant Circuits

3.5.1 Twenty-Foot Separation Criteria

QUESTION

Assuming that a licensee is utilizing the 20-foot separation for circuit protection, could an exemption request be granted for a portion of the circuit that did not maintain the 20-foot minimum separation if that portion was protected by one-hour barrier until 20-foot was achieved? This barrier would not be firewall-to-firewall, and the circuit protection would not be claimed under the one-hour barrier rule.

RESPONSE

With the erection of a partial qualified one-hour rated barrier for portions of the circuits with less than 20 ft. separation, if 20 feet of horizontal separation existed between the redundant unprotected portions of the circuits without intervening combustibles or fire hazards, and if the fire area was protected by automatic fire detection and suppression, compliance with Section III.G.2.b would be achieved.

These types of configuration have to be evaluated on a case-by-case basis by the NRC.

3.5.2 Floor-to-Floor Separation

QUESTION

Where redundant circuits are separated by floor elevation but are within the same fire area due to open hatchways, stairs, etc., what is the NRC's position with regard to separation criteria? If train A is located twenty feet from an open hatchway on the lower elevation and train B is located ten feet from the same opening on the next elevation, would this be considered adequate separation?

RESPONSE

If a wall or floor/ceiling assembly contains major unprotected openings such as hatchways and stairways, then plant locations on either side of such a barrier must be considered as part of a single fire area. Refer to Section #4 of the "Interpretations of Appendix R."

As to the example provided, if train A was separated by a cumulative horizontal distance of 20 feet from train B, with no intervening combustible materials or fire hazards, and both elevations were provided with fire detection and suppression, the area would be in compliance with Section III.G.2.b.

3.6 Intervening Combustibles

3.6.1 Negligible Quantities of Intervening Combustibles

QUESTION

Twenty feet of separation with absolutely no intervening combustibles is a rare case in most nuclear plants. What is the most acceptable method of addressing intervening combustibles? How are various utilities addressing this subject, and what would be sufficient justification to support an exemption request?

RESPONSE

If more than negligible quantities of combustible materials (such as isolated cable runs) exist between redundant shutdown divisions, an exemption request should be filed. [Negligible quantity" is an admittedly judgmental criterion, and this judgment should be made by a qualified fire protection engineer and documented for later NRC audit.] Justifications for such exemptions have been based on the following factors:

1. A relatively large horizontal spatial separation between redundant divisions; all cables qualified to IEEE-383.

2. The presence of an automatic fire suppression system over the intervening combustible (such as a cable tray fire suppression system);

3. The presence of fire stops to inhibit fire propagation in intervening cable trays;

4. The likely fire propagation direction of burning intervening combustibles in relation to the location of the vulnerable shutdown division;

5. The availability of compensating active and passive fire protection.

Any future changes in the cable configuration due to modifications could be handled under 50.59. See the provisions of the license condition in the response to question 8.2.

3.6.2 In-Situ Exposed Combustibles

QUESTIONS

Within Appendix R, Section III.G.2.b, the phrase "twenty feet with no intervening combustible or fire hazards" is utilized. What is the definition of "no intervening combustible?" Is the regulation focused predominantly on the absence of fixed combustibles?

RESPONSE

There is no specific definition of "no intervening combustible." The regulation is focused on the absence of in-situ exposed combustibles. Non combustible materials would not be considered as intervening combustibles.

In BTP CMEB 9.5-1, noncombustible material is defined as:

"Noncombustible Material

a. A material which in the form in which it is used and under the conditions anticipated, will not ignite, burn, support combustion, or release flammable vapors when subjected to fire or heat.

b. Material having a structural base of noncombustible material, as defined in a., above, with a surfacing not over 1/8-inch thick that has a flame spread rating not higher than 50 when measured using ASTM E-84 Test "Surface Burning Characteristics of Building Materials."

In Generic Letter 83-33, we state:

"Staff Position: Section III.G.2.b requires the "separation ...with no intervening combustibles ..." To meet this requirement, plastic jackets and insulation of grouped electrical cables, including those which are coated, should be considered as intervening combustibles."

For fire protection, "no intervening combustibles" means that there is no significant quantities of in-situ materials which will ignite and burn located between redundant shutdown systems. The amount of such combustibles that has significance is a judgmental decision. As with other issues, if the licensees fire protection engineer is concerned that the quantity of combustibles between shutdown divisions may not be considered insignificant by an independent reviewer, an exemption could be requested, or the staff consulted.

Transient materials are not considered as an intervening combustible; however, they must be considered as part of the overall fire hazard within an area.

Cables that are in cable trays which do not have solid sheet metal bottom, sides and top should also be considered as intervening combustibles.

Coated cables with a fire retardant material are also considered as intervening combustibles.

3.6.3 Unexposed Combustibles

QUESTION

Are unexposed combustibles, such as oil in sumps, closed cans, or sealed drums, or electrical cable in conduits, considered as "intervening combustibles?"

RESPONSE

Only oil in closed containers which are in accordance with NFPA 30 or electrical cables in metal conduits (or in cable trays or raceways having solid sheet metal bottom, sides and top) are not considered as intervening combustibles. In situ oil in open sumps is considered to be an intervening combustible; in-situ oil in closed sumps equivalent to NFPA Standard-30 containers is not considered to be an intervening combustible.

3.7 Radiant Energy Shield

3.7.1 Fire Rating

QUESTION

Recently, the NRC Staff indicated that non-combustible radiant energy shields should be tested against ASTM-TD-E-119 based, apparently, on the requirements of BTP CMEB 9.5-1, Rev. 3, a document issued after Appendix R was promulgated. This new requirement would not appear to be required by Appendix R or BTP APCSB 9.5-1 Appendix A. Could the Staff clarify the requirements in this area?

RESPONSE

During the Appendix A reviews, we observed that inside some containments, there were large concentrations of cables converging at electrical penetration areas. In some cases, where the penetrations were grouped by division, shields were placed between the divisions so that radiant energy from a fire involving the cables of one division would not degrade or ignite cables of the other divisions. These shields also directed the convective energy from the fire away from the surviving division. These shields were usually constructed of 1/2-inch marinite board in a metal frame. Appendix R, Section III.G.f refers to these shields as "a noncombustible radiant energy shield." The guidelines in BTP CMEB 9.5-1, Section C.7.a(1)b. indicate that these shields should have a fire rating of 1/2 hour. In our opinion any material with a 1/2 hour fire rating should be capable of performing the required function.

The guidelines of BTP CMEB 9.5-1 relating to a firerated radiant energy shield are being considered in our current reviews of NTOL plants. However, to the extent that an applicant can justify that a proposed radiant energy shield can achieve an equivalent level of safety, we have been accepting shields that have not been tested against the acceptance criteria of ASTM E-119.

In our Appendix R reviews, we have accepted non-fire-rated radiant energy shields that have been demonstrated by fire hazards analysis to provide an acceptable level of protection against the anticipated hazard of a localized fire within the containment. We have also accepted fire-rated metal-sheathed mineral insulated cables, as a radiant energy shield in specific configurations.

3.8 Design Bases

3.8.1 Fire Protection Features NFPA Conformance

QUESTION

Should the fire protection features required by Section III.G conform to the NFPA Codes?

RESPONSE

Yes. For example, Section III G.2 requires an automatic suppression system. Our guidelines would recommend that the system be in accordance with an NFPA Code. If deviations are made from the Code, they should be identified in the FSAR or FHA.

3.8.2 Design Basis Fire

QUESTION

Why isn't the industry allowed to design to protect against a design basis fire?

RESPONSE

Neither the industry nor the Staff has been able to develop criteria for establishing design basis fire conditions for a single "design basis fire" because the in-situ and potential transient combustibles vary widely in different areas of the plant. However, the establishment of a "design basis fire" for specific fire areas or zones is a prerequisite to performance of a valid fire hazards analysis (See Appendix R Section II.B(1) and BTP CMEB 9.5-1 Sections C.b(1) and (2)).

3.8.3 Redundant Trains/Alternate Shutdown

QUESTION

Confusion exists as to what will be classified as an alternate shutdown system and thus what systems might be required to be protected by suppression and detection under Section III.G.3.b. For example, while we are relying upon the turbine-building condensate system for a reactor building fire and the RHR system for a turbine building fire, would one system be considered the alternative to the other. If so, would suppression and detection be required for either or both systems under III.G.3.b? An explanation of alternative shutdown needs to be advanced for all licensees.

RESPONSE

If the system is being used to provide its design function, it generally is considered redundant. If the system is being used in lieu of the preferred system because the redundant components of the preferred system does not meet the separation criteria of Section III.G.2, the system is considered an alternative shutdown capability. Thus, for the example above, it appears that the condensate system is providing alternative shutdown capability in lieu of separating redundant components of the RHR System. Fire detection and a fixed fire suppression system would be required in the area where separation of redundant components of the RHR system is not provided. However, in the event of a turbine building fire, the RHR system would be used for safe shutdown and is not considered an alternative capability. However, one train of the RHR system must be separated from the turbine building.

3.8.4 Control Room Fire Considerations

QUESTION

What considerations should be taken into account in a control room fire? What is the damage that is considered? What actions can the operators take before evacuating the CR? When can the control room be considered safe after a fire for the operator to return?

RESPONSE

The control room fire area contains the controls and instrumental redundant shutdown systems in close proximity (i.e. usually separation is a few inches). Because it is possible to provide shutdown capability that is physically and electrically independent of the fire area, it is our opinion that alternative or dedicated shutdown capability and its associated circuits for the control room be independent of the cables system and components in the control room fire area.

The damage to the system in the control room for a fire that causes evacuation of the control room cannot be predicted. A bounding analysis should be made to assure that safe conditions can be maintained from outside the control room. This analysis is dependent to the specific design. The usual assumptions are:

1. The reactor is tripped in the control room.

2. Offsite power is lost as well as automatic starting of the onsite a.c. generators and the automatic function of valves and pumps whose control circuits could be affected by a control room fire.

The analysis should demonstrate that capability exists to manually achieve safe shutdown conditions from outside the control room by restoring a.c. power to designated pumps, assuring that valve lineups are correct, and assuming that any malfunctions of valves that permit the loss of reactor coolant can be corrected before unrestorable conditions occur.

Note that the only manual action in the control room prior to evacuation usually given credit for is the reactor trip. For any additional control room actions deemed necessary prior to evacuation, a demonstration of the capability of performing such actions would have to be provided. Additionally, assurance would have to be provided that such actions could not be negated by subsequent spurious actuation signals resulting from the postulated fire.

After the fire, the operators could return to the control room when the following conditions have been met:

1. The fire has been extinguished and so verified by appropriate fire protection personnel.

2. The control room has been deemed habitable by appropriate fire protection personnel and the shift supervisor.

3. Damage has been assessed and, if necessary, corrective action has been taken to assure necessary safety, control and information systems are functional (some operators may assist with these tasks) and the shift supervisor has authorized return of plant control to the control room.

4. Turnover procedures which assure an orderly transfer of control from the alternate shutdown panel to the control room has been completed.

After returning to the control room, the operators can take any actions compatible with the condition of the control room. Controls in any area (cabinet) where the fire occurred would not be available. Smoke and fire suppressant

damage in other areas (cabinets) must also be assessed and corrective action taken before controls in such cabinets are deemed functional. Controls in undamaged area (cabinets) could be operated as required. Minor modifications inside the control room may be performed to reach cold shutdown.

4. EMERGENCY LIGHTING

4.1 Illumination Levels

QUESTION

What is the requisite intensity level for emergency lighting for egress routes and areas where shutdown functions must be performed? What are the bases for determining these levels of lighting?

RESPONSE

The level of illumination provided by emergency lighting in access routes to and in areas where shutdown functions must be performed is a level that is sufficient to enable an operator to reach that area and perform the shutdown functions. At the remote shutdown panels the illumination levels should be sufficient for control panel operators.

The bases for estimating these levels of lighting are the guidelines contained in Section 9.5.3 of the Standard Review Plan, which are based on industry standards (i.e., Illuminating Engineering Society Handbook).

Where a licensee has provided emergency lighting per Section III.J Appendix R, we would expect that the licensee verify by field testing that this lighting is adequate to perform the intended tasks.

5. ALTERNATIVE AND DEDICATED SHUTDOWN CAPABILITY

5.1 Safe and Alternative Shutdown

5.1.1 Previously Accepted Alternative Shutdown Capability

QUESTION

As part of the Appendix A review process, some plants had committed to an alternative shutdown system in the form of a remote shutdown panel or remote shutdown system. Footnote 2 to Appendix R describes alternative shutdown capability as being associated with "Rerouting, relocating, or modifying of existing systems." To the extent that an existing remote shutdown system previously reviewed and approved under Appendix A to BTP 9.5-1 does not require modifications, rerouting, or relocating of existing systems, are the requirements of Section III.L of Appendix R backfit?

RESPONSE

Yes. Existing remote shutdown capabilities previously reviewed and approved under Appendix A to BTP APCSB 9.5-1 do not categorically comply with Section III.G.3 of Appendix R. Licensees were requested to re-analyze their plants to determine compliance with Section III.G. If the licensee chooses to use the

option of III.G.3 for provision of safe shutdown capability for certain areas, the criteria of Section III.L are applicable to that capability for that area. See also the response to 5.1.3.

5.1.2 Pre-Existing Alternative Shutdown Capability

QUESTIONS

Some licensees defined safe shutdown capability for purposes of analysis to Section III.G criteria as being composed of both the normal safe shutdown capability and the pre-existing redundant or remote safe shutdown capability which was previously installed as part of the Appendix A process. This definition often took the form of two "safe shutdown trains" comprising (1) one of the two normal safe shutdown trains, and (2) a second safe shutdown train capability which was being provided by the pre-existing remote shutdown capability. This definitional process, which was undertaken by a number of licensees, makes a significant difference in the implementation of Appendix R. Under such a definition, does Section III.L criteria apply when the Commission did not call out Section III.L as a backfit?

RESPONSE

The definitional process mentioned considers an alternative shutdown capability provided under the Appendix A review as a redundant shutdown capability under the Appendix R review. This definitional process is incorrect. For the purpose of analysis to Section III.G.2 criteria, the safe shutdown capability is defined as one of the two normal safe shutdown trains. If the criteria of Section III.G.2 are not met, an alternative shutdown capability is required. The alternative shutdown capability may utilize existing remote shutdown capabilities and must meet the criteria of Sections III.G.3 and III.L of Appendix R. See also the response to 5.1.3.

5.1.3 III.L Backfit

QUESTION

Why do the Staff interpretive memoranda regarding the criteria for satisfaction of Section III.L form the auditable basis for determining compliance to Appendix R when the Commission failed to backfit this section to all plants?

RESPONSE

Although 10 CFR 50.48(b) does not specifically include Section III.L with Sections III.G, J, and O of Appendix R as a requirement applicable to all power reactors licensed prior to January 1, 1979, the Appendix, read as a whole, and the Court of Appeals decision on the Appendix, Connecticut Light and Power, et al. v. NRC, 673 F2d. 525 (D.C. Cir., 1982), demonstrate that Section III.L applies to the alternative safe shutdown option under Section III.G if and where that option is chosen by the licensee. This does not preclude licensees from proposing and justifying other methods, e.g., see Section #1, Process Monitoring Instrumentation, of the "Interpretations of Appendix R."

5.2 Procedures

5.2.1 Shutdown and Repair Basis

QUESTION

With regard to the term "post-fire procedures" the Commission states that it is impossible to predict the course and extent of a fire. Given this, how does one write post-fire shutdown and repair procedures that are both symptomatic and usable to an operator?

RESPONSE

Safe shutdown capabilities including alternative shutdown capabilities are all designed for some maximum level of fire-damage (system unavailabilities, spurious actuations). Since the extent of the fire cannot be predicted, it seems prudent to have the post-fire shutdown procedures guide the operator from full system availability to the minimum shutdown capability. As for repair procedure, similar conditions exist. A repair procedure can be written based on the maximum level of damage that is expected. This procedure would then provide shutdown capability without accurately predicting likely fire damage.

5.2.2 Post Fire Operating Procedures

QUESTION

Does the NRC have any requirements regarding whether post-fire operating procedures should be based upon fire areas, systems, or be symptom-based?

RESPONSE

The NRC does not have requirements, nor do we propose any requirements regarding whether post-fire operating procedures should be based upon fire areas, systems or be symptom-based. We suggest that the post-fire shutdown capabilities designs be reviewed with the plant operation staff and procedures written with their input. See also responses to 5.2.1 and 5.2.3.

5.2.3 Alternative Shutdown Capability

QUESTION

Is it acceptable to develop post-fire operating procedures only for those areas where alternative shutdown is required? (For other areas standard, emergency operating procedures would be utilized in the presence of potential fire damage to a single train.)

RESPONSE

Yes. The only requirement for post-fire operating procedures is for those areas where alternative shutdown is required. For other areas of the plant, shutdown would be achieved utilizing one of the two normal trains of shutdown system. Shutdown in degraded modes (one train unavailable) should be covered by present operator training and abnormal and emergency operating procedures. If the degraded modes of operation are not presently covered, we would suggest

that the operation staff of the plant determine whether additional training or procedures are needed.

5.2.4 Post Fire Procedures Guidance Documents

QUESTION

Do any NRC Staff guidance documents exist relative to the extent, form, nature, etc. of Appendix R post-fire operating procedures?

RESPONSE

No. Other than the criteria of Section III.L, no specific post-fire shutdown procedure guidance has been developed. See also responses to 5.2.1, 5.2.2 and 5.2.3. The inspection process will be flexible in this regard as long as the licensee can show compliance with the criteria of Section III.L.

5.3 Safe Shutdown and Fire Damage

5.3.1 Circuit Failure Modes

QUESTION

What circuit failure modes must be considered in identifying circuits associated by spurious actuation?

RESPONSE

Sections III.G.2 and III.L.7 of Appendix R define the circuit failure modes as hot shorts, open circuits, and shorts to ground. For consideration of spurious actuations, all possible functional failure states must be evaluated, that is, the component could be energized or de-energized by one or more of the above failure modes. Therefore, valves could fail open or closed; pumps could fail running or not running; electrical distribution breakers could fail open or closed. For three-phase AC circuits, the probability of getting a hot short on all three phases in the proper sequence to cause spurious operation of a motor is considered sufficiently low as to not require evaluation except for any cases involving Hi/Lo pressure interfaces. For ungrounded DC circuits, if it can be shown that only two hot shorts of the proper polarity without grounding could cause spurious operation, no further evaluation is necessary except for any cases involving Hi/Lo pressure interfaces.

5.3.2 "Hot Short" Duration

QUESTION

If one mode of fire damage involves a "hot short" how long does that condition exist as a result of fire damage prior to terminating in a ground or open circuit and stopping the spurious actuation?

RESPONSE

We would postulate that a "hot short" condition exists until action has been taken to isolate the given circuit from the fire area, or other actions as

appropriate have been taken to negate the effects of the spurious actuation. We do not postulate that the fire would eventually clear the "hot short."

5.3.3 Hot Shutdown Duration

QUESTION

Since hot shutdown cannot be maintained indefinitely, hot shutdown equipment needs to be protected for only a limited period of time. How long must a plant remain in that condition in order to meet the requirement for achieving hot shutdown with a single train of equipment?

RESPONSE

Section III.G.1 requires that the one train of systems needed to achieve and maintain hot shutdown be free of fire damage. Thus, the systems needed are to be completely protected from the fire regardless of time. If the intent of the question concerns how long these systems must operate, these systems must be capable of operating until the systems needed to achieve and maintain cold shutdown are available.

5.3.4 Cooldown Equipment

QUESTION

Certain equipment is necessary only in the cooldown phase when the plant is neither in hot nor cold shutdown condition as defined by technical specifications. Is this equipment considered hot or cold shutdown in nature?

RESPONSE

As stated in Section III.G.1, one train of systems needed to achieve and maintain hot shutdown conditions must be free of fire damage. Systems necessary to achieve and maintain cold shutdown can be repaired within 72 hours. Thus, if this certain equipment necessary only in the cooldown phase, is used to achieve cold shutdown, it can be repaired within 72 hours. If the certain equipment is maintaining hot shutdown while repairs are being made, one train must be free of fire damage. See also Section #2 of the "Interpretations of Appendix R."

5.3.5 Pressurizer Heaters

QUESTION

Most PWRs do not require pressurizer heaters to maintain stable conditions. In fact, the Commission does not consider heaters to be important to safety and they are not required to meet Class IE requirements. Are they required for hot shutdown under Appendix R? If yes, then how does a plant meet the separation requirements of Section III.G.2.d,e. or f without major structural alterations to the pressurizer?

RESPONSE

One train of systems necessary to achieve and maintain hot shutdown conditions must be free of fire damage. PWR licensees have demonstrated the capability to achieve and maintain stable hot shutdown conditions without the use of pressurizer heaters by utilizing the charging pump and a water solid pressurizer for reactor coolant pressure control.

5.3.6 On-Site Power

QUESTION

Appendix R, Section III.L.4 states in part, "If such equipment and systems will not be capable of being powered by both on-site and off-site electrical power systems because of fire damage, an independent on-site power system shall be provided." Again, in Appendix R, Section III.L.5, the statement is made "If such equipment and systems used prior to 72 hours after the fire will not be capable of being powered by both onsite and offsite electrical power systems because of fire damage, an independent onsite power system shall be provided." An interpretation is needed of the meaning and the applicability of these two quotes relative to alternative shutdown capabilities.

RESPONSE

These statements are meant to indicate that the alternative shutdown capability should be powered from an onsite power system independent (both electrically and physically) from the area under consideration. Further, if the normal emergency onsite power supplies (diesel generators) are not available because of fire damage, then a separate and independent onsite power system shall be provided. As an example, some plants are utilizing a dedicated onsite diesel generator or gas turbine to power instrumentation and control panels which are a part of the alternative shutdown capability.

5.3.7 Torus Level Indication

QUESTION

For BWRs, I&E Information Notice 84-09 suggests that licensees need to have torus level indication post-fire. If an analysis shows that a level does not change significantly during any operational modes or worse case conditions, is level indication still required? Is an analysis in file adequate or is an exemption request required?

RESPONSE

It continues to be our position that torus (suppression pool) level indication is the preferred post-fire monitoring instrumentation in order to confirm the availability of the torus (suppression pool) as a heat sink. We recognize that existing analyses indicate that suppression pool level is not significantly changed during emergency shutdown conditions. However, we believe the operator should be able to confirm that spurious operations or other unanticipated occurrences have not affected the torus function. An analysis of torus level change by itself is not considered an acceptable basis.

5.3.8 Short Circuit Coordination Studies

QUESTION

Should circuit coordination studies consider high impedance faults?

RESPONSE

Yes, in those coordination studies performed to assess the vulnerability of safe shutdown capability due to fires involving associated circuits. To meet the separation criteria of Section III.G.2 and III.G.3 of Appendix R, high impedance faults should be considered for all associated circuits located in the fire area of concern. Thus, simultaneous high impedance faults (below the trip point for the breaker on each individual circuit) for all associated circuits located in the fire area should be considered in the evaluation of the safe shutdown capability. Clearing such faults on associated circuits which may effect safe shutdown may be accomplished by manual breaker trips governed by written procedures. Circuit coordination studies need not be performed if it is assumed that shutdown capability will be disabled by such high impedance faults and appropriate written procedures for clearing them are provided.

5.3.9 Diagnostic Instrumentation

QUESTION

What is diagnostic instrumentation?

RESPONSE

Diagnostic instrumentation is instrumentation, beyond that previously identified in Attachment 1 to I&E Information Notice 84-09, needed to assure proper actuation and functioning of safe shutdown equipment and support equipment (e.g., flow rate, pump discharge pressure). The diagnostic instrumentation needed depends on the design of the alternative shutdown capability. Diagnostic instrumentation, if needed, will be evaluated during the staff's review of the licensee's proposal for the alternative shutdown capability.

5.3.10 Design Basis Plant Transients

QUESTION

What plant transients should be considered in the design of the alternative or dedicated shutdown systems?

RESPONSE

Per the criteria of Section III.L of Appendix R a loss of offsite power shall be assumed for a fire in any fire area concurrent with the following assumptions:

a. The safe shutdown capability should not be adversely affected by any one spurious actuation or signal resulting from a fire in any plant area; and

b. The safe shutdown capability should not be adversely affected by a fire in any plant area which results in the loss of all automatic function (signals, logic) from the circuits located in the area in conjunction with one worst case spurious actuation or signal resulting from the fire; and

c. The safe shutdown capability should not be adversely affected by a fire in any plant area which results in simultaneous spurious actuation of all valves in high-low pressure interface lines.

5.3.11 Alternative/Dedicated Shutdown v. Remote Shutdown Systems

QUESTION

What is the difference between the alternate/dedicated shutdown systems required for fire protection and the remote shutdown systems recommended under Chapter 7 of the SRP?

RESPONSE

The remote shutdown systems recommended under Chapter 7 of the SRP are needed to meet GDC 19. These remote shutdown systems need to be redundant and physically independent of the control room in order to meet GDC 19. For GDC 19, damage to the control room is not considered. Alternate shutdown systems for Appendix R need not be redundant but must be both physically and electrically independent of the control room.

6. OIL COLLECTION SYSTEMS FOR REACTOR COOLANT PUMP

6.1 Lube Oil System Seismic Design

QUESTION

If the reactor coolant pump lube oil system and associated appurtenances are seismically designed, does the lube oil collection system also require seismic design? Is an exemption required?

RESPONSE

Where the RCP lube oil system is capable of withstanding the safe shutdown earthquake (SSE), the analysis should assume that only random oil leaks from the joints could occur during the lifetime of the plant. The oil collection system, therefore, should be designed to safely channel the quantity of oil from one pump to a vented closed container. Under this set of circumstances, the oil collection system would not have to be seismically designed.

An exemption is required for a non-seismically designed oil collection system. The basis for this exemption would be that random leaks are not assumed to occur simultaneously with the seismic event, since the lube oil system is designed to withstand the seismic event. However, the Rule, as written, does not make this allowance.

6.2 Container

QUESTION

It would appear that a literal reading of Section III.O regarding the oil collection system for the reactor coolant pump could be met by a combination of seismically designed splash shields and a sump with sufficient capacity to contain the entire lube oil system inventory. If the reactor coolant pump is seismically designed and the nearby piping hot surfaces are protected by seismically designed splash shields such that any spilled lube oil would contact only cold surfaces, does this design concept conform to the requirements of the rule?

RESPONSE

If the reactor coolant pump, including the oil system, is seismically designed and the nearby hot surfaces of piping are protected by seismically designed splash shields such that any spilled lube oil would contact only cold surfaces, and it could be demonstrated by engineering analysis that sump and splash shields would be capable of preventing a fire during normal and design basis accident conditions, the safety objective of Section III.O would be achieved. Such a design concept would have to be evaluated under the exemption process. The justification for the exemption should provide reasonable assurance that oil from all potential pressurized and unpressurized leakage points would be safely collected and drained to the sump. The sump should be shown capable of safely containing all of the anticipated oil leakage. The analysis should verify that there are no electric sources of ignition.

7 BRANCH TECHNICAL POSITION CMEB 9.5-1

7.1 Fire Protection and Seismic Events

QUESTION

For which situations other than the reactor coolant pump lube oil system are seismic events assumed to be initiators of a fire?

RESPONSE

The guidelines for the seismic design of fire protection systems which cover other general situations is delineated in BTP CMEB 9.5-1 C.1.C(3) and (4):

"(3) As a minimum, the fire suppression system should be capable of delivering water to manual hose stations located within hose reach of areas containing equipment required for safe plant shutdown following the safe shutdown earthquake (SSE). In areas of high seismic activity, the staff will consider on a case-by-case basis the need to design the fire detection and suppression systems to be functional following the SSE.

(4) The fire protection systems should retain their original design capability for (a) natural phenomena of less severity and greater frequency than the most severe natural phenomena (approximately once in 10 years) such as tornadoes, hurricanes, floods, ice storms, or small-intensity earthquakes

that are characteristic of the geographic region, and (b) potential man-made site-related events such as oil barge collisions or aircraft crashes that have a reasonable probability of occurring at a specific plant site. The effects of lightning strikes should be included in the overall plant fire protection program."

We have considered California as being a high seismic activity area.

For those plants reviewed under Appendix A, our position is (A.4):

"Postulated fires or fire protection system failures need not be considered concurrent with other plant accidents or the most severe natural phenomena."

Our guidelines on the seismic design of fire protection systems installed in safety related areas are delineated in Regulatory Guide 1.29 "Seismic Design Classification," paragraph C.2. The failure of any system should not affect a system from performing its safety function.

Our guidelines on the seismic design of hydrogen lines is delineated in BTP CMEB 9.5-1 Section C.5.d(5):

(5) Hydrogen lines in safety-related areas should be either designed to seismic Class I requirements, or seleved such that the outer pipe is directly vented to the outside, or should be equipped with excess flow valves so that in case of a line break, the hydrogen concentration in the affected areas will not exceed 2%.

All PWR's have a hydrogen line going to the Volume Control Tank (Make-up Tank) that needs to be protected.

To identify plant specific situations in which seismic events could initiate a fire in a specific plant area, the fire protection engineer and systems engineer performing the fire hazards analysis should be concerned with in-situ combustible materials which can be released in a manner such that they could contact in-situ ignition sources by a seismic event. An example of this would be the rupture of the RCP lube oil line directly above the hot reactor coolant piping. The fire protection engineer should also be concerned with seismic induced ignition sources, electrical or mechanical, which could contact nearby in-situ combustible materials.

It should be noted that the guidelines cited above from BTP CMEB 9.5-1 are not applicable to plants reviewed and approved under BTP APCSB 9.5-1.

7.2 Random Fire and Seismic Events

QUESTION

Is a random fire to be postulated concurrent with a seismic event?

RESPONSE

Our position, as stated in Section C.1.6 of BTP CMEB 9.5-1, is "Worst case fire need not be postulated to be simultaneous with nonfire-related failures in safety systems, plant accidents, or the most severe natural phenomena."

Where plant systems are designed to prevent the release of combustible materials caused by a seismic event, such as a dike around a fuel oil tank transformer, or seismic supports for hydrogen lines, then no fire need to be arbitrarily assumed to take place in the fire hazards analysis.

Because it is impossible to completely preclude the occurrence of a seismically induced fire, Section C.6.c(4) of CMEB 9.5-1 states:

> "Provisions should be made to supply water at least to standpipes and hose connections for manual firefighting in areas containing equipment required for safe plant shutdown in the event of a safe shutdown earthquake. The piping system serving such hose stations should be analyzed for SSE loading and should be provided with supports to ensure system pressure integrity. The piping and valves for the portion of hose standpipe system affected by this functional requirement should, as a minimum, satisfy ANSI B31.1, 'Power Piping.' The water supply for this condition may be obtained by manual operator actuation of valves in a connection to the hose standpipe header from a normal seismic Category I water system such as the essential service water system. The cross connection should be (a) capable of providing flow to at least two hose stations (approximately 75 gpm per hose station), and (b) designed to the same standards as the seismic Category I water system; it should not degrade the performance of the seismic Category I water system."

The post-seismic procedures should include a damage survey, and a determination of whether any fires were initiated as a result of the seismic event. See also the response to Question 7.1.
It should be noted that the guidelines cited above from BTP CMEB 9.5-1 are not applicable to plants reviewed and approved under BTP APCSB 9.5-1.

8. LICENSING POLICY

8.1 Fire Hazard Analysis/Fire Protection Plan Updating

QUESTION

What constitutes the fire protection plan required by 50.48(a)? Should licensees have programs to maintain the fire hazards analysis and the fire protection plan current or updated periodically? How often should the plan be updated? Must revisions be provided to the NRC?

RESPONSE

The basic elements required in the fire protection plan are described in 10 CFR 50.48(a). The fire protection program that implements that plan should include the details of the fire hazards analysis. The plan and program may be separate or combined documents and must be kept current with the fire hazards analysis updated prior to making modifications. We would expect that for most plants licensed after January 1, 1979, the fire protection plan and program would be part of the FSAR and therefore, would be updated and sumitted to the NRC in conformance with the requirements of 10 CFR 50.71(e). For plants whose fire protection plans and programs are not part of the FSAR, we would expect that they would be updated prior to making modifications and kept at the site in an auditable form for NRC inspection.

8.2 Fire Protection License Condition

QUESTION

What is the significance of the fire protection license condition?

RESPONSE

For those plants licensed prior to January 1, 1979 (Appendix R plants), the license condition is the legally enforceable requirement for the fire protection features other than those required by III.G, III.J and III.O that were accepted by the NRC staff as satisfying the provisions of Appendix A to Branch Technical Position BTP APCSB 9.5-1.

For those plants licensed after January 1, 1979, the license condition is the legally enforceable requirement for all fire protection features at the facility.

Appendix R is only enforceable on Post 1979 plants through the license condition. 10 CFR 50.48 makes Appendix R applicable only to plants licensed prior to January 1, 1979. Refer to 10 CFR 50.48(e).

The NRC has drafted new language for this license condition which delineates the circumstances under which the fire protection plan may be revised. We are now including this language in all new licenses and are considering amending present licenses. The revised language is as follows.

"9.5 Fire Protection Program (Section 9.5, SER)

a. The licensee shall implement and maintain in effect all provisions of the approved fire protection program as described in the Final Safety Analysis Report for the facility (or as described in submittals dated _____) and as approved dated _____ in the SER (and supplements dated _____) subject to provisions b & c below.

b. The licensee ma make no change to the approved fire protection program which would decrease the level of fire protection in the plant without prior approval of the Commission. To make such a change the licensee must submit an application for license amendment pursuant to 10 CFR 50.90.

c. The licensee may make changes to features of the approved fire protection program which do not significantly decrease the level of fire protection without prior Commission approval provided (a) such changes do not otherwise involve a change in a license condition or technical specification or result in an unreviewed safety question (see 10 CFR 50.59), and (b) such changes do not result in failure to complete the fire protection program approved by the Commission prior to license issuance. The licensee shall maintain, in an auditable form, a current record of all such changes including an analysis of the effects of the change on the fire protection program, and shall make such records available to NRC inspectors upon request. All changes to the approved program shall be reported annually to the Director of the Office of Nuclear Reactor Regulation, along with the FSAR revisions required by 10 CFR 50.71(e).

8.3 III G, J and O Exemptions for Future Modifications

QUESTION

Is an exemption required from Appendix R Sections other than III.G, III.J and III.O for future modifications that do not comply with such sections?

RESPONSE

Yes, for those modifications which deviate from the previously accepted fire protection configurations. The exclusion of the applicability of Sections of Appendix R other than III.G, III.J, and III.O is limited to those features "accepted by the NRC staff as satisfying the provisions of Appendix A to Branch Technical Position BTP APCSB 9.5-1 reflected in staff fire protection safety evaluation reports issued prior to the effective date of the rule." No re-analysis is required except for proposed modifications which would alter previously approved features. This position is based directly on CFR 50.48(b). Also see response to Question 8.2.

8.4 Future Changes

QUESTION

Will future changes (no matter how minor) to approved configurations be required to be reviewed by the Staff in an exemption request? At what point may the process of 10 CFR 50.59 be invoked?

RESPONSE

If a future modification involves a change to a license condition or technical specification, a license amendment request must be submitted. When a modification not involving a technical specification or license condition is planned, the evaluation made in conformance with 10 CFR 50.59 to determine whether an unreviewed safety question is involved must include an assessment of the modification's impact on the existing fire hazards analysis for the area. This part of the evaluation must be performed by the person responsible for the fire safety program for the plant. The assessment must include the effect on combustible loading and distribution and the consideration of whether circuits or components, including asociated circuits, for a train of equipment needed for safe shutdown are being affected or a new element introduced in the area. If this evaluation concludes that there is no significant impact, this conclusion and its basis must be documented as part of the 50.59 evaluation and be available for future inspection and reference. If the evaluation finds that there is an impact that could result in the area either not being in conformance with Appendix R, or some other aspect of the approved fire protection program, or being outside the basis for an exemption that was granted for the area involved, the licensee must either make modifications to achieve conformance or justify and request exemption (or, for the post 1979 plants, approval) from the NRC. See also responses to Questions 8.1 and 8.2.

8.5 Schedular and Blanket Exemptions

QUESTION

If an exemption is warranted and at the same time the provisions of the rule indicate that the appropriate schedular deadlines have passed, should a scheduler exemption be filed at the same time as the technical exemption request?

If as part of the exemption request the utility is proposing to make modifications to achieve a reasonable level of conformance with Appendix R, and if the associated "clock" has run out for that type of modification, should the technical exemption request and the description of the modification be filed with a schedular exemption?

When filing a schedular exemption under §50.12, it is not always clear from what specific paragraphs of §50.48 an exemption should be sought. Is it acceptable to request a blanket exemption from the schedular provisions of 10 CFR §50.48 without a specification by paragraph?

If an exemption request is submitted to meet newly published interpretations of Appendix R, when does the licensee need to be in compliance? Is the schedule presented in Appendix R still the guideline or must a new schedule be developed under a different criteria?

RESPONSE

We do not intend to issue any further extensions of the 50.48(c) schedules. When a licensee determines that a 50.48(c) schedule cannot be met, the appropriate NRC Region must be notified. This policy is further explained in the generic letter transmitting this package.

8.6 Trivial Deviations

QUESTION

What guidance can the NRC Staff give the industry regarding when a deviation from the literal interpretation of Appendix R is sufficiently trivial as to not require a specific exemption?

RESPONSE

The significance of a deviation must be judged as part of a fire hazards analysis. The conclusion of this analysis is always subject to review by the NRC inspector.

8.7 Revised Modifications

QUESTION

What is the process for altering configurations not yet implemented for plants with Appendix R SERs?

RESPONSE

If licensees propose changes to their NRC approved modifications, they must submit their new proposal and revised schedule for implementation for NRC approval.

This change must be justified as to (1) the reason for the change, (2) the basis for the revised schedule, and (3) the interim measures that will be provided to assure post fire shutdown capability until the final modifications are implemented. Whether or not enforcement action will be taken based upon continued noncompliance with Appendix R will be decided by the NRC Regional Administrator in consultation with NRC Headquarters.

8.8 Smallest Opening in a Fire Barrier

QUESTION

What is the smallest opening allowed in a fire area barrier for which an exemption request is not needed?

RESPONSE

Unsealed openings in the configuration for which approval was obtained by an approved laboratory or the NRC staff would be acceptable.

Our position on openings is given in Section 5.a(3) of BTP CMEB 9.5-1:

"(3) Openings through fire barriers for pipe, conduit, and cable trays which separate fire areas should be sealed or closed to provide a fire resistance rating at least equal to that required of the barrier itself. Openings inside conduit larger than 4 inches in diameter should be sealed at the fire barrier penetration. Openings inside conduit 4 inches or less in diameter should be sealed on each side of the fire barrier and sealed either at both ends or at the fire barrier with non-combustible material to prevent the passage of smoke and hot gases. Fire barrier penetrations that must maintain environmental isolation or pressure differentials should be qualified by test to maintain the barrier integrity under such conditions."

The unsealed opening(s) allowed in a fire area boundary or a barrier which separates redundant shutdown divisions should not permit flame, radiant energy, smoke and hot gases to pass through the barrier and cause damage to redundant shutdown divisions on the other side. The licensee should assess the adequacy of existing protection and should determine the minimum size based on a fire hazards analysis and conservative fire protection engineering judgment. If the significance of openings in fire barriers is marginal, a formal exemption request could be submitted or the staff consulted. The basis for the lack of significance should be available for review by NRC Inspectors.

Our acceptance of unprotected openings in fire barriers would depend upon the quantity and nature of combustible materials on either side of the barrier; the location of the opening(s) in relation to the ceiling (for openings in walls); the location, vulnerability and importance of shutdown systems on either side of the barrier; and compensating fire protection.

See also Section #4 of the "Interpretations of Appendix R."

8.9 NFPA Code Deviation

QUESTION

Is an exemption/deviation required for deviations from NFPA Codes?

RESPONSE

Deviations from the codes should be identified and justified in the FSAR or FHA.

An exemption is not required for NFPA codes. NRC guidelines reference certain NFPA codes as guidelines to the systems acceptable to the staff, and therefore such codes may be accorded the same status as Regulatory Guides.

When the applicant/licensee states that its design "meets the NFPA codes" or, "meets the Intent of the NFPA Codes" and does not identify any deviations from such codes, NRR and the Regions expect that the design conforms to the code and the design is subject to inspection against the NFPA codes.

8.10 "ASTM E-119" Design Basis

QUESTION

Is an exemption/deviation required, if components are designed to withstand an "ASTM E-119" fire?

RESPONSE

Some cables are being developed for high temperature (e.g., 1700°F) applications. An exemption would be required if such cable is used in lieu of the alternatives of III.G.2 or III.G.3 in a pre-1979 plant. A deviation from the guidelines would be required for similar applications in a post 1979 plant.

8.11 Plants Licensed After January 1, 1979

QUESTION

What fire protection guidelines and requirements apply to the plants licensed after January 1, 1979?

RESPONSE

Post-1979 plants are subject to:

- GDC 3
- 10 CFR 50.48(a) and (e)
- The guidelines identified in the footnotes to 50.48(a)
- Guidelines documents issued after January 1, 1979.

- Commitments made to meet the requirements of Appendix R; or specific sections such as III.G, III.J, III.O; or Appendix A to BTP APSCB 9.5-1; or BTP CMEB 9.5-1, which includes the requirements of Appendix R* and the previous guidance documents incorporated into the Branch Technical Position.

The license for each plant licensed after January 1, 1979 contains a license condition which identifies by reference the approved fire protection program for that plant.

*A deficiency in the BTP CMEB 9.5-1 has been noted in that a requirement in Appendix R Section III.G.3.b to provide alternative or dedicated shutdown capability in an area where both redundant safe shutdown trains could be damaged by suppression activities or inadvertent operation or rupture of fire suppression systems is not included. This requirement will be added in the next revision of the BTP.

8.12 Cold Shutdown Equipment Availability

QUESTION

A. Can a licensee achieve compliance with III.G.1(b) by demonstrating that one train of cold shutdown equipment will remain free of fire damage?

B. In demonstrating that one train of cold shutdown equipment will remain free of fire damage, is a licensee limited to the three alternatives in III.G.2?

RESPONSE

A. Yes.

B. No.

8.13 Guidance Documents

QUESTION

Please list all NRR guidance documents and position papers issued since Appendix R was promulgated.

RESPONSE

Fire Protection Guidance Issued Since January 1, 1975:

IE Information Notices

No. 83-41: Actuation of fire suppression systems causing inoperability of safety related equipment.

No. 83-69: Improperly installed fire dampers at nuclear power plants.

No. 83-83: Use of portable radio transmitters inside nuclear power plants.

*No. 84-09: Lessons Learned From NRC Inspections of Fire Protection Safe Shutdown Systems (10 CFR 50, Appendix R)

Standard Review Plan

9.5.1, Rev. 1 Fire Protection System, dated 5/1/76

9.5.1, Rev. 2 Fire Protection Program, dated 03/78

9.5.1, Rev. 3 Fire Protection Program, July 1981.

Regulations

10 CFR Part 50: Proposed fire protection program for nuclear power plants operating prior to January 1, 1979, dated May 29, 1980. Federal Register Vol. 45, No. 105, 36082.

10 CFR Part 50: Fire protection program for operating nuclear power plants, dated November 19, 1980. Federal Register Vol. 45, No. 225, 76602.

10 CFR Part 50: Fire protection rule corrections, dated September 8, 1981. Federal Register Vol. 46, No. 173, 44734.

Generic Letters

NOTE: The following documents were obtained from the Palisades file Docket No. 50-255. Similar documents should be in the file for other operating facilities. The dates may vary slightly.

1. Letter dated 9/28/76 - Enclosing App. A to BTP APCSB 9.5-1 and supplementary guidance on information needed for fire protection program evaluation.

2. Letter dated 12/1/76 - Enclosing sample Technical Specifications and an errata sheet.

3. Letter dated 8/19/77 - Enclosing "Nuclear Plant Fire Protection Functional Responsibilities, Administrative Controls and Quality Assurance."

4. Letter dated 6/8/78 - Re: Manpower requirements for operating reactors.

5. Letter dated 9/7/79 - Re: Minimum fire brigade shift size.

6. Letter dated 9/14/79 - Enclosing staff positions - safe shutdown capability.

7. Letter dated 10/31/80 - Enclosing new 10 CFR 50.48 regarding fire protection schedules for operating nuclear power plants.

8. Letter dated 11/24/80 - Enclosing a copy of revised 10 CFR 50.48 and new App. R to 10 CFR 50, and a summary of open items from the SER for the BTP APCSB 9.5-1 review.

9. Letter dated 2/20/81 - Generic Letter 81-12 identifying information needed for NRC review of modifications for alternative shutdown capability.

10. Letter dated 4/7/82 - Provided clarification to Generic Letter 81-12 and guidance on information needed for NRC review of exemption requests.

11. Letter dated 10/6/82 - Generic Letter 82-21; provided criteria for annual, biennial, and triennial audits required by Technical Specifications.

*12. Letter dated 10/19/83 - Generic Letter 83-33; NRC Positions on Certain Requirements of Appendix R to 10 CFR 50.

Staff Generic Positions

1. Letter, Denton to Bernsen, dated 4/20/82 - Control room fires.

*2. SECY 83-269, dated July 5, 1983 - Attachments B and C.

3. Memo, Eisenhut to Olshinski, dated 12/30/83 - Physical independence of electrical systems.

4. Memo, Eisenhut to Jordan, dated 10/24/83 - Bullet resistant fire doors.

*Staff positions regarding the need for certain exemptions delineated in this guidance document have been revised per the "Interpretations of Appendix R".

8.14 Deviation From Guidance Documents

QUESTION

If a utility determines that a deviation from a guidance document exists, does an exemption request need to be filed? If so, what is the legal basis for this requirement?

RESPONSE

No.

8.15 Staff Interpretation of Appendix R

QUESTION

How does the Staff initiate interpretations of Appendix R in a manner which ensures their technical adequacy and consistency with the rule's objectives (e.g., presentation to ACRS, issue for comment as in draft regulatory guides, etc.)?

RESPONSE

Staff positions are initiated when our experience shows that generic issues are identified that require clarification. These positions are reviewed for accuracy and consistency by the cognizant Division Directors. Usually, they are not issued for comment. However, Generic Letter 83-33 was commented on by the NUFPG since it was initiated, in part, at their request.

8.16 Dissemination of New Staff Positions

QUESTION

Will licensees be automatically sent a copy of new Staff position papers as they are developed?

RESPONSE

The Staff positions on generic subjects are considered for issuance in Generic Letters from ONRR and Information Notices or Bulletins from OI&E. Staff positions issued for specific questions on specific plants are not given generic promulgation because they normally involve plant specific design considerations.

8.17 Equivalent Alternatives

QUESTION

How does a licensee demonstrate that alternative measures are equivalent to the measures of Section III.G.2 in order to obtain an exemption lacking a formal definition of the term "free of fire damage"?

RESPONSE

See Item #3 of "Interpretations of Appendix R."

8.18 Coordination Study Update

QUESTION

Circuit modifications are an ongoing process. How recent must a coordination study be in order to be valid in protecting circuits associated by common power source?

RESPONSE

We would expect that as circuit modifications are made, the design package would address the electrical protection required and the effects of this protection on the coordination of the protection for the power distribution system. This type of consideration should be included in the evaluation required by 10 CFR 50.59 Changes, Tests and Experiments. The design package and modification evaluation could not be complete without consideration of the coordination study. Therefore, we would expect that the coordination studies would be current with the last circuit modification made.

8.19 Exemption Request Threshold

QUESTION

(a) What is the threshold for exemption requests? (b) Is it necessary to file a request for each and every possible deviation from Appendix R?

RESPONSE

Typical examples are discussed in the response to Questions 8.19.1 through 8.19.4.

(a) The licensee must develop its criteria for an exemption request threshold.

(b) No.

8.19.1 Penetration Designs Not Laboratory Approved

QUESTION

Where penetration designs have been reviewed and approved by NRC but have not been classified by an approval laboratory, will it be necessary to submit an exemption request?

RESPONSE

No.

8.19.2 Individual vs. Package Exemptions

QUESTION

How do we submit future modification exemption requests, etc.? Would NRC prefer them individually, or developed and submitted in packages for review and approval?

RESPONSE

Future exemptions should be submitted individually, if they are independent of each other.

8.19.3 Exemption Request Supporting Detail

QUESTION

When an exemption request is filed, what criteria are used to determine the level of detail needed to support the request?

RESPONSE

See Enclosure 2 of NRC's letter to all licensees dated April-May 1982.

8.19.4 50.12 vs. 50.48 Exemption Requests

QUESTION

With regard to exemption requests for future modifications, will they be submitted under 50.12 or 50.48?

RESPONSE

10 CFR 50.12.

8.20 Post January 1, 1979 Plants and Exemption Requests

QUESTION

Do plants licensed after January 1, 1979 which have committed to meet the requirements of Section III.G, III.J and III.O and are required to do so as a license condition, need to request exemptions for alternative configurations?

RESPONSE

No; however, deviations from the requirements of Section III.G, III.J and III.O should be identified and justified in the FSAR or FHA and the deviation would probably require a license amendment to change the license condition. See responses 8.1 and 8.2.

8.21 NRC Approval for BTP CMEB 9.5-1 Deviations

QUESTION

Do future deviations from BTP CMEB 9.5-1 guidelines require approval by the NRC? Do such deviations constitute a violation of license conditions?

RESPONSE

Compliance with guidelines in the BTP is only required to the extent that they were incorporated in the approved Fire Protection Program as identified in the license condition.

When the new license condition is in place (See Response 8.2), future deviations may be made in accordance with the procedure stated therein. With present non-uniform license conditions, such deviations may or may not require a license amendment. In the absence of a license amendment, a violation may exist.

9. INSPECTION POLICY

9.1 Safety Implications

QUESTION

Since the Commission states that fire damage cannot be defined and fire spread cannot be predicted, how does the Commission determine which Appendix R violations have "important safety implications?"

RESPONSE

III.G.2 provides alternatives to ensure that one of the redundant trains is free of fire damage. Fire spread within one area cannot be predicted, but damage is limited to one fire area.

the same fire area that are needed for safe shutdown or can adversely affect safe shutdown, and are not protected by the features of III.G.2, III.G.3 or an approved alternative.

9.2 Uniform Enforcement

QUESTION

How does the Commission ensure that violations of the rule are uniformly treated between regions?

RESPONSE

Each Region evaluates violations in accordance with the NRC Enforcement Policy, 10 CFR 2, Appendix C. The Policy provides guidance for the determination of appropriate enforcement sanctions for violations. The Office of Inspection and Enforcement provides guidance for and monitors Regional implementation of the Policy to ensure a uniform application. In addition, the policy requires that all escalated enforcement actions be approved by the Director of the Office of Inspection and Enforcement.

9.3 NTOL Inspections

QUESTION

Will NTOLs be subject to an Appendix R audit now being performed on plants licensed to operate prior to January 1, 1979? Or, will the current review and analysis being performed by the Staff be satisfactory?

RESPONSE

Yes, NTOLs will be subject to the Appendix R audit; the TI 2515/62 is being revised to reflect the appropriate requirements for NTOLs' and it is our intent to conduct such inspections prior to issuing the operating license.

10 CFR 50.48 requires each such plant to have a fire protection plan. Their operating license will contain a specific license condition to implement their approved fire protection program which must identify deviations from Appendix R. The fire protection inspections will be against the particular license conditions.

9.4 Future TI 2515/62 Revisions

QUESTION

Does the NRC plan to issue a new or revised version of Temporary Instruction 2515/62 for future Appendix R audits?

RESPONSE

Yes.

9.5 Documentation Supplied by Licensee

QUESTION

Temporary Instruction 2515/62 provided a list of documentation that the NRC needs to review as part of the audit process. In past audits, the NRC has requested additional information other than that contained on the list. Will a new list of documentation be developed?

RESPONSE

The documentation listing Provided in TI-2515/62 does not restrict the inspection team from enhancing inspection efficiency by requesting a licensee to provide additional relevant documentation. A new listing of documentation for TI-2515/62 is not being developed.

9.6 Subsequent Inspections

QUESTION

To what extent will Appendix R issues be raised at future Regional I&E Fire Protection Audits after a successful Appendix R audit? For example, if an area has already been reviewed and no noncompliance found, will it be subject to later review and reinterpretation by the Staff?

RESPONSE

The Appendix R inspections are conducted on a sample basis. These inspections do not certify that all possible items of noncompliance with Appendix R have been identified. The inspection results do provide a basis for a determination of the adequacy of a licensee's Appendix R reanalysis, modification and preparation.

When a noncompliance with Appendix R requirements is identified, a notice of violation will be issued to ensure adequate corrective action. In those cases in which the licensee believes that the staff has invoked a reinterpretation of adequacy in areas which had previously been reviewed, NRC's procedures for appeal would be applicable.

9.7 NRC List of Conforming Items

QUESTION

At the end of the audit, will the NRC provide a list of items that had been reviewed and found in conformance with Appendix R? To date, only areas of nonconformance have been specifically identified in exit interviews.

RESPONSE

Subsequent to an Appendix R inspection, the NRC will not provide a list of items reviewed and found to be in conformance with Appendix R.

We do list the areas inspected and where non-compliances were not found.

9.8 Inspection Re-review

QUESTION

Where assumptions are made and clearly stated within the analysis submitted to NRR for review, will such assumptions be subject to a second review by OI&E during the inspection process?

Where assumptions are made in conjunction with the analysis, should exemption requests be filed just to provide protection for the licensee?

If NRR accepts a licensee's selection of equipment and shutdown paths as being sufficient to meet the Appendix R shutdown criteria, will OI&E review and have the right to challenge the approved shutdown paths and approved equipment selection? Or will they only check the shutdown paths and equipment in question to see that they meet the Appendix R requirements, i.e., separation?

RESPONSE

To the extent that a licensee's submittal to NRR is comprehensive and sufficiently detailed, the basis for the OI&E Appendix R inspection will be the assumptions, shutdown paths and equipment selections approved by NRR. If the inspection results in new information that casts doubt upon the approved configuration, the Regional inspectors have the responsibility to resolve such doubts.

9.9 List of Shutdown Equipment

QUESTION

What lists of shutdown equipment will be used by the Regional inspectors, if the shutdown analysis has not been reviewed and approved by NRR?

RESPONSE

Regional Inspectors will use the lists of shutdown equipment the licensee has identified in his fire protection plan.

Generic Letter 81-12 and its clarification documents expect licensees to show how they will shutdown if a fire area is not provided with redundant train separation. Inherent within this expectation is the assumption that the licensee will identify the equipment to be used. It is because the licensees have not had fire hazard analyses at all for non-alternative shutdown fire areas that the inspectors to date have resorted to using the only lists available (the alternative shutdown equipment list used by NRR in their reviews).

It is unlikely there would not be a list of at least those systems to be used for alternate shutdown, since 10 CFR 50.48 requires NRR review and approval of the means of alternate shutdown.

ENCLOSURE 7

With Attachments 1, 2 & 3)

4/12/85

INSTRUMENTATION

FIRE DETECTION INSTRUMENTATION

LIMITING CONDITION FOR OPERATION

3.3.3.8 As a minimum, the fire detection instrumentation for each fire detection zone shown in Table 3.3-11 shall be OPERABLE.

APPLICABILITY: Whenever equipment protected by the fire detection instrument is required to be OPERABLE.

ACTION:

a. With any, but not more than one-half the total in any fire zone, Function A fire detection instruments shown in Table 3.3-11 inoperable, restore the inoperable instrument(s) to OPERABLE status within 14 days or within the next 1 hour establish a fire watch patrol to inspect the zone(s) with the inoperable instrument(s) at least once per hour, unle the instrument(s) is located inside the containment, then inspect that containment zone at least once per 8 hours (or monitor the containment air temperature at least once per hour at the locations listed in Specification 4.6.1.6).

b. With more than one-half of the Function A fire detection instruments in any fire zone shown in Table 3.3-11 inoperable, or with any Function B fire detection instruments shown in Table 3.3-11 inoperable, ~~or with any two or more adjacent fire detection instruments shown in Table 3.3-11 inoperable, within 1 hour~~

restore the inoperable instrument(s) within 24 hours so that more than one-half of the Function A and all of the Function B instruments are OPERABLE, or within the next 1 hour

establish a fire watch patrol to inspect the zone(s) with the inoperable instrument(s) at least once per hour, unless the instrument(s) is located inside the containment, then inspect that containment zone at least once per 8 hours (or monitor the containment air temperature at least once per hour at the locations listed in Specification 4.6.1.6).

c. The provisions of Specifications 3.0.3 and 3.0.4 are not applicable.

NOTE: Changes made by the Working Group are designated by a double bar in the right margin.

SURVEILLANCE REQUIREMENTS

4.3.3.8.1 Each of the above required fire detection instruments which are accessible during plant operation shall be demonstrated OPERABLE at least once per 6 months by performance of a TRIP ACTUATING DEVICE OPERATIONAL TEST. Fire detectors which are not accessible during plant operation shall be demonstrated OPERABLE by the performance of a TRIP ACTUATING DEVICE OPERATIONAL TEST during each COLD SHUTDOWN exceeding ~~24 hours~~ 72 hours unless performed in the previous 6 months.

The supervisory system for the NFPA Standard 72D

4.3.3.8.2 ~~The NFPA Standard 72D~~ supervised circuits ~~supervision~~ associated with the detector alarms of each of the above required fire detection instruments shall be demonstrated OPERABLE at least once per 6 months.

4.3.3.8.3 The nonsupervised circuits, associated with detector alarms, between the instrument and the control room shall be demonstrated OPERABLE at least once per 31 days.

TABLE 3.3-11
FIRE DECTECTION INSTRUMENTATION

INSTRUMENT LOCATION (Illustrative)	TOTAL NUMBER OF INSTRUMENTS* HEAT (x/y)	FLAME (x/y)	SMOKE (x/y)
1. Containment #			
a. Zone 1 Elevation ____			
b. Zone 2 Elevation ____			
2. Control Room			
3. Cable Spreading			
a. Zone 1 Elevation ____			
b. Zone 2 Elevation ____			
4. Computer Room			
5. Switchgear Room			
6. Remote Shutdown Panels			
7. Station Battery Rooms			
8. Turbine			
a. Zone 1 Elevation ____			
b. Zone 2 Elevation ____			
9. Diesel Generator			
a. Zone 1 Elevation ____			
b. Zone 2 Elevation ____			
10. Safety Related Pumps			
a. Zone 1 Elevation ____			
b. Zone 2 Elevation ____			
11. Fuel Storage			
a. Zone 1 Elevation ____			
b. Zone 2 Elevation ____			

(List all detectors in areas required to ensure the OPERABILITY of safety-related equipment).

*(x/y): x is number of Function A (early warning fire detection and notification only) instruments.
y is number of Function B (actuation of Fire Suppression Systems and early warning and notification) instruments.

#The fire detection instruments located within the containment are not required to be OPERABLE during the performance of Type A containment leakage rate tests.

3/4.7.11 FIRE SUPPRESSION SYSTEMS

FIRE SUPPRESSION WATER SYSTEM

LIMITING CONDITION FOR OPERATION

3.7.11.1 The Fire Suppression Water System shall be OPERABLE with:

a. At least (two) fire suppression pumps, each with a capacity of (2500) gpm,

at (125)psig and (rated)rpm for diesel-driven pumps

with their discharge aligned to the fire suppression header,

b. Separate water supplies, each with a minimum contained volume of _____ gallons, and

c. An OPERABLE flow path capable of taking suction from the _____ tank and the _____ tank and transferring the water through distribution piping with OPERABLE sectionalizing control or isolation valves to the yard hydrant curb valves, the last valve ahead of the water flow alarm device on each sprinkler or hose standpipe, and the last valve ahead of the deluge valve on each Deluge or Spray System required to be OPERABLE per Specifications 3.7.11.2, 3.7.11.5, and 3.7.11.6.

APPLICABILITY: At all times.

ACTION:

a. With one pump and/or one water supply inoperable, restore the inoperable equipment to OPERABLE status within 7 days or provide an alternate backup pump or supply. The provisions of Specifications 3.0.3 and 3.0.4 are not applicable.

b. With the Fire Suppression Water System otherwise inoperable establish a backup Fire Suppression Water System within 24 hours.

4.7.11.1.1 The Fire Suppression Water System shall be demonstrated OPERABLE:

a. At least once per 7 days by verifying the contained water supply volume,

b. At least once per 31 days on a STAGGERED TEST BASIS by starting each electric motor-driven pump and operating it for at least 15 minutes on recirculation flow,

c. At least once per 31 days by verifying that each valve (manual, power operated, or automatic) in the flow path is in its correct position,

~~d. (At least once per 6 months by performance of a system flush,)~~

~~e.~~ At least once per 12 months by cycling each testable valve in the flow path through at least one complete cycle of full travel,

~~f.~~ At least once per 18 months by performing a system functional test which includes simulated automatic actuation of the system throughout its operating sequence, and:

1) Verifying that each automatic valve in the flow path actuates to its correct position,

2) ~~Verifying that each pump develops at least (2500) gpm at a system head of (250) feet~~,

Verifying that each fire pump starts (sequentially) through automatic operation and delivers 150 percent of rated capacity at not less than 65 percent of the total rated head and that the shutoff head does not exceed 120 percent of rated head for the split-case pumps or 140 percent for end-section pumps at rated speed (rpm).

3) Cycling each valve in the flow path that is not testable during plant operation through at least one complete cycle of full travel ~~and~~

~~4) Verifying that each fire suppression pump starts (sequentially) to maintain the Fire Suppression Water System pressure greater than or equal to ___ psig.~~

g. At least once per 3 years by performing a flow test of the system in accordance with Chapter 5, Section 11 of the Fire Protection Handbook, 15th ~~14th~~ Edition, published by the National Fire Protection Association.

and at least once per (6 months - 3 years) by performing a system flush.

The interval for the system flush should be selected on a plant-specific basis, based on the quality of the water source (e.g., tank, pond, river, etc.).

SURVEILLANCE REQUIREMENTS (Continued)

4.7.11.1.2 The fire pump diesel engine shall be demonstrated OPERABLE:

a. At least once per 31 days by verifying:

1) The fuel storage tank contains at least ___ gallons of fuel, and

2) The diesel starts from ambient conditions and operates continuously for at least 30 minutes on recirculation flow.

b. At least once per 92 days by verifying that a sample of diesel fuel from the fuel storage tank, obtained in accordance with ASTM-D270-1975 is within the acceptable limits specified in Table 1 of ASTM D975-1977 when checked for viscosity, water, and sediment; and

c. At least once per 18 months, during shutdown, by subjecting the diesel to an inspection in accordance with procedures prepared in conjunction with its manufacturer's recommendations for the class of service.

4.7.11.1.3 The fire pump diesel starting 24-volt battery bank and charger shall be demonstrated OPERABLE:

a. At least once per 7 days by verifying that:

1) The electrolyte level of each battery is above the plates, and

2) The overall battery voltage is greater than or equal to 24 volts.

b. At least once per 92 days by verifying that the specific gravity is appropriate for continued service of the battery and

c. At least once per 18 months by verifying that:

1) The batteries, cell plates, and battery racks show no visual indication of physical damage or abnormal deterioration, and

2) The battery-to-battery and terminal connections are clean, tight, free of corrosion, and coated with anti-corrosion material.

SPRAY AND/OR SPRINKLER SYSTEMS

LIMITING CONDITION FOR OPERATION

3.7.11.2 The following Spray and/or Sprinkler Systems shall be OPERABLE:

a. (Plant dependent - to be listed by name and location.)

b.

c.

APPLICABILITY: Whenever equipment protected by the Spray/Sprinkler System is required to be OPERABLE.

ACTION:

a. With one or more of the above required Spray and/or Sprinkler Systems inoperable, within 1 hour establish a continuous fire watch with ~~backup~~ equivalent manual fire suppression equipment for those areas in which redundant systems or components could be damaged; for other areas, establish a hourly fire watch patrol.

b. The provisions of Specifications 3.0.3 and 3.0.4 are not applicable.

SURVEILLANCE REQUIREMENTS

4.7.11.2 Each of the above required Spray and/or Sprinkler Systems shall be demonstrated OPERABLE:

a. At least once per 31 days by verifying that each valve (~~manual~~, power operated, or automatic) in the flow path is in its correct position,

b. At least once per 12 months by cycling each testable valve in the flow path through at least one complete cycle of full travel,

c. At least once per 18 months:

1) By performing a system functional test which includes simulated automatic actuation of the system, and:

a) Verifying that the automatic valves in the flow path actuate to their correct positions on a _____ test signal, and

b) Cycling each valve in the flow path that is not testable during plant operation through at least one complete cycle of full travel.

SURVEILLANCE REQUIREMENTS (Continued)

c) Opening a drain valve sufficient to verify that water is available to the system.

2) By a visual inspection of the ~~dry pipe spray and sprinkler headers~~ system piping, hangers and appurtenances to verify their integrity; and

3) By a visual inspection of each nozzle's spray area to verify the spray pattern is not obstructed.

d. At least once per 3 years by performing an air flow test through each open head spray/sprinkler header and verifying each open head spray/sprinkler nozzle is unobstructed.

CO_2 SYSTEMS

LIMITING CONDITION FOR OPERATION

3.7.11.3 The following High Pressure and Low Pressure CO_2 Systems shall be OPERABLE:

a. (Plant dependent - to be listed by name and location.)

b.

c.

APPLICABILITY: Whenever equipment protected by the CO_2 Systems is required to be OPERABLE.

ACTION:

a. With one or more of the above required CO_2 Systems inoperable, within 1 hour establish a continuous fire watch with backup fire suppression equipment for those areas in which redundant systems or components could be damaged; for other areas, establish an hourly fire watch patrol.

b. The provisions of Specifications 3.0.3 and 3.0.4 are not applicable.

SURVEILLANCE REQUIREMENTS

4.7.11.3.1 Each of the above required CO_2 Systems shall be demonstrated OPERABLE at least once per 31 days by verifying that each valve (manual, power operated, or automatic) in the flow path is in its correct position.

4.7.11.3.2 Each of the above required ~~Low Pressure~~ CO_2 Systems shall be demonstrated OPERABLE:

For low-pressure systems,

a. At least once per 7 days by verifying the CO_2 storage tank level to be greater than ____ and pressure to be greater than ____ psig, and

for high-pressure systems, at least once per 6 months by verifying that the CO_2 storage tank weight is at least 90% of full-charge weight, and

SURVEILLANCE REQUIREMENTS (Continued)

b. At least once per 18 months by verifying:

1) The system including valves, associated Ventilation System time delays and alarm interlocks fire dampers, and fire door release mechanisms, actuate manually and automatically, upon receipt of a simulated actuation signal, and

2) Flow from each nozzle during a "Puff Test."

3) The integrity of the system piping, hangers and appurtenances by visual inspection.

~~4.7.11.3.3 Each of the above required High Pressure CO_2 Systems shall be demonstrated OPERABLE:~~

~~a. At least once per 6 months by verifying the CO_2 storage tank weight to be at least 90% of full charge weight, and~~

~~b. At least once per 18 months by:~~

~~1) Verifying the system, including associated Ventilation System fire dampers and fire door release mechanisms, actuates manually and automatically, upon receipt of a simulated actuation signal, and~~

~~2) Performance of a flow test through headers and nozzles to assure no blockage.~~

PLANT SYSTEMS

HALON SYSTEMS

LIMITING CONDITION FOR OPERATION

3.7.11.4 The following Halon Systems shall be OPERABLE:

a. (Plant dependent - to be listed by name and location.)

b.

c.

APPLICABILITY: Whenever equipment protected by the Halon System is required to be OPERABLE.

ACTION:

a. With one or more of the above required Halon Systems inoperable, within 1 hour establish a continuous fire watch with backup fire suppression equipment for those areas in which redundant systems or components could be damaged; for other areas, establish an hourly fire watch patrol.

b. The provisions of Specifications 3.0.3 and 3.0.4 are not applicable.

SURVEILLANCE REQUIREMENTS

4.7.11.4 Each of the above required Halon Systems shall be demonstrated OPERABLE:

a. At least once per 31 days by verifying that each valve (manual, power operated, or automatic) in the flow path is in its correct position,

b. At least once per 6 months by verifying Halon storage tank weight (or level) to be at least 95% of full charge weight (or level) and pressure to be at least 90% of full charge pressure, and

c. At least once per 18 months by verifying:

1) ~~Verifying~~ The system, including associated Ventilation System fire dampers and fire door release mechanisms, actuates manually and automatically, upon receipt of a simulated actuation signal, and

2) ~~Performance of a~~ Flow ~~test~~ through headers and nozzles during a test to assure no blockage.

3) The integrity of the system piping, hangers and appurtenances by visual inspection

FIRE HOSE STATIONS

LIMITING CONDITION FOR OPERATION

3.7.11.5 The fire hose stations shown in Table 3.7-5 shall be OPERABLE.

APPLICABILITY: Whenever equipment in the areas protected by the fire hose stations is required to be OPERABLE.

ACTION:

a. With one or more of the fire hose stations shown in Table 3.7-5 inoperable, ~~provide gated wye(s) on the nearest OPERABLE hose station(s). One outlet of the wye shall be connected to the standard length of hose provided for the hose station. The second outlet of the wye shall be connected to a length of hose sufficient to provide coverage for the area left unprotected by the inoperable hose station. Where it can be demonstrated that the physical routing of the fire hose would result in a recognizable hazard to operating technicians, plant equipment, or the hose itself, the fire hose shall be stored in a roll at the outlet of the OPERABLE hose station. Signs shall be mounted above the gated wye(s) to identify the proper hose to use. The above ACTION requirement shall be accomplished within 1 hour if the inoperable fire hose is the primary means of fire suppression; otherwise route the additional hose within 24 hours~~.
restore the inoperable station(s) to an OPERABLE status within 24 hours, or within the next 1 hour provide equivalent suppression capability in the affected area(s); after 7 days, establish a continuous fire watch in the affected area(s).

b. The provisions of Specifications 3.0.3 and 3.0.4 are not applicable.

SURVEILLANCE REQUIREMENTS

4.7.11.5 Each of the fire hose stations shown in Table 3.7-5 shall be demonstrated OPERABLE:

a. At least once per 31 days, by a visual inspection of the fire hose stations accessible during plant operations to assure all required equipment is at the station.

b. At least once per 18 months, by:

1) Visual inspection of the stations not accessible during plant operations to assure all required equipment is at the station,

2) Removing the hose for inspection and re-racking, and

3) Inspecting all gaskets and replacing any degraded gaskets in the couplings.

c. At least once per 3 years, by:

1) Partially opening each hose station valve to verify valve OPERABILITY and no flow blockage, and

2) Conducting a hose hydrostatic test at a pressure of 150 psig or at least 50 psig above maximum fire main operating pressure, whichever is greater.

TABLE 3.7-5

FIRE HOSE STATIONS

LOCATION*	ELEVATION	HOSE RACK #

*List all Fire Hose Stations required to ensure the OPERABILITY of safety-related equipment.

YARD FIRE HYDRANTS AND HYDRANT HOSE HOUSES

LIMITING CONDITION FOR OPERATION

3.7.11.6 The yard fire hydrants and associated hydrant hose houses shown in Table 3.7-6 shall be OPERABLE.

APPLICABILITY: Whenever equipment in the areas protected by the yard fire hydrants is required to be OPERABLE.

ACTION:

a. With one or more of the yard fire hydrants or associated hydrant hose houses shown in Table 3.7-6 inoperable, ~~within 1 hour have sufficient additional lengths of 2 1/2 inch diameter hose located in an adjacent OPERABLE hydrant hose house to provide service to the unprotected area(s) if the inoperable fire hydrant or associated hydrant hose house is the primary means of fire suppression; otherwise, provide the additional hose within 24 hours.~~

restore the inoperable hydrant(s) and/or hose house(s) to an OPERABLE status within 24 hours, or within the next 1 hour provide equivalent suppression capability in the affected area(s); after 7 days, establish a continuous fire watch in the affected area(s).

b. The provisions of Specifications 3.0.3 and 3.0.4 are not applicable.

SURVEILLANCE REQUIREMENTS

4.7.11.6 Each of the yard fire hydrants and associated hydrant hose houses shown in Table 3.7-6 shall be demonstrated OPERABLE:

a. At least once per 31 days, by visual inspection of the hydrant hose house to assure all required equipment is at the hose house,

b. At least once per 6 months (once during March, April, or May and once during September, October, or November), by visually inspecting each yard fire hydrant and verifying that the hydrant barrel is dry and that the hydrant is not damaged, and

c. At least once per 12 months by:

1) Conducting a hose hydrostatic test at a pressure of 150 psig or at least 50 psig above maximum fire main operating pressure, whichever is greater,

2) Inspecting all the gaskets and replacing any degraded gaskets in the couplings, and

3) Performing a flow check of each hydrant to verify its OPERABILITY.

TABLE 3.7-6

YARD FIRE HYDRANTS AND ASSOCIATED HYDRANT HOSE HOUSES

LOCATION*	HYDRANT NUMBER

*List all Yard Fire Hydrants and Hydrant Hose Houses required to ensure the OPERABILITY of safety-related equipment or facilities housing safety-related equipment.

3/4.7.12 FIRE RATED ASSEMBLIES

LIMITING CONDITION FOR OPERATION

3.7.12 All fire rated assemblies (walls, floor/ceilings, cable tray enclosures and other fire barriers) separating safety-related fire areas or separating portions of redundant systems important to safe shutdown within a fire area and all sealing devices in fire rated assembly penetrations (fire doors; fire windows; fire dampers; cable, piping, and ventilation duct penetration seals) shall be OPERABLE. and

APPLICABILITY: ~~At all times.~~ Whenever the equipment protected by the fire-rated assembly(ies) must be OPERABLE.

ACTION:

a. With one or more of the above required fire rated assemblies and/or sealing devices inoperable, within one hour either establish a continuous fire watch on at least one side of the affected assembly, or verify the OPERABILITY of fire detectors on at least one side of the inoperable assembly and establish an hourly fire watch patrol.

b. The provisions of Specifications 3.0.3 and 3.0.4 are not applicable.

SURVEILLANCE REQUIREMENTS

4.7.12.1 ~~At least once per 18 months~~ the above required fire rated assemblies and penetration sealing devices shall be verified OPERABLE~~: by performing a visual inspection of:~~

a. At least once per 18 months by performing visual inspections of:

1. ~~a.~~ The exposed surfaces of each fire rated assembly,

2. ~~b.~~ Each fire window/fire damper and associated hardware, and

3. ~~c.~~ At least 10% percent of each type of sealed penetration. If apparent changes in appearance or abnormal degradations are found, a visual inspection of an additional 10% of each type of sealed penetration shall be made. This inspection process shall continue until a 10% sample with no apparent changes in appearance or abnormal degradation is found. Samples shall be selected such that each penetration will be inspected every 15 years.

b. At least once per 18 months by performing a functional test of at least 10% of the accessible fire dampers. If any non-conforming dampers are found, an additional 10% will be functionally tested. This process will continue until an acceptable sample is found. Samples shall be selected such that all accessible dampers are tested every 15 years.

SURVEILLANCE REQUIREMENTS (Continued)

4.7.12.2 Each of the above required fire doors shall be verified OPERABLE by: ~~inspecting the automatic hold-open, release and closing mechanism and latches at least once per 6 months, and by verifying:~~

~~a. The OPERABILITY of the fire door supervision system for each electrically supervised fire door by performing a TRIP ACTUATING DEVICE OPERATIONAL TEST at least once per 31 days,~~

~~b. That each locked closed fire door is closed at least once per 7 days,~~

~~c. That doors with automatic hold-open and release mechanisms are free of obstructions at least once per 24 hours, and a functional test is performed at least once per 18 months, and~~

~~d. That each unlocked fire door without electrical supervision is closed at least once per 24 hours.~~

a. At least once per 24 hours, by verifying that doors with automatic hold-open and release mechanisms are free of obstructions and that unlocked fire doors without electrical supervision are closed;

b. At least once per 7 days, by verifying that each locked-closed fire door is locked and closed;

c. At least once per 31 days, by performing a TRIP ACTUATING DEVICE OPERATIONAL TEST for each electrically-supervised fire door;

d. At least once per 6 months, by visually inspecting the automatic hold-open, release and closing mechanisms and latches; and

e. At least once per 18 months, by performing a functional test of all hold-open and release mechanisms.

PLANT SYSTEMS

3/4.7.13 ALTERNATIVE/DEDICATED SHUTDOWN SYSTEM

LIMITING CONDITION FOR OPERATION

3.7.13 The Alternative/Dedicated Shutdown System (ASS/DSS) equipment, shown on Table 3.3-X, shall be OPERABLE.

APPLICABILITY: MODES 1, 2, and 3.

ACTION:

a. With less than the minimum ASS/DSS equipment in Table 3.3-X OPERABLE, restore the inoperable equipment to OPERABLE within 7 days, or provide equivalent shutdown capability and restore the inoperable equipment to OPERABLE within 60 days, or be in HOT STANDBY within the next 12 hours and HOT SHUTDOWN within the following 24 hours.

b. The provisions of Specifications 3.0.3 and 3.0.4 are not applicable.

SURVEILLANCE REQUIREMENTS

4.7.13.1 Each monitoring instrumentation channel shall be demonstrated OPERABLE by performing the CHANNEL CHECK and CHANNEL CALIBRATION operations at the frequencies shown on Table 4.3-X.

4.7.13.2 Each transfer switch, power supply and control circuit shall be demonstrated OPERABLE at least once per 18 months by operating each actuated component from the ASS/DSS stations.

4.7.13.3 The ASS/DSS diesel generator shall be demonstrated OPERABLE:

a. At least once per 31 days by verifying:

1) The fuel level in the fuel storage tank is greater than or equal to ( ) inches, and

2) The diesel starts from ambient conditions and operates for at least 30 minutes at greater than or equal to ( ) kW.

b. At least once per 92 days, by verifying that a sample of diesel fuel from the fuel storage tank, obtained in accordance with ASTM-D270-1975, is within the acceptance limits specified in Table 1 of ASTM-D975-1977 when checked for viscosity, water and sediment; and

c. At least once per 18 months, during shutdown, by subjecting the diesel to an inspection in accordance with procedures prepared in conjunction with the manufacturer's recommendations for the applicable class of service.

SURVEILLANCE REQUIREMENTS (continued)

4.7.13.4 The ASS/DSS battery bank and charger shall be demonstrated OPERABLE:

a. At least once per 7 days by verifying that:

1) The electrolyte level of each battery is above the plates, and

2) The overall battery voltage is greater than or equal to ( ) volts.

b. At least once per 92 days by verifying that the specific gravity is appropriate for continued service of the battery; and

c. At least once per 18 months by verifying that:

1) The batteries, cell plates, and battery racks show no visual indication of physical damage or abnormal deterioration, and

2) The battery-to-battery and terminal connections are clean, tight, and free of corrosion.

NOTE: ADD OPERABILITY, ACTION REQUIREMENTS AND SURVEILLANCE REQUIREMENTS FOR ANY OTHER ASS/DSS PLANT-SPECIFIC EQUIPMENT, AS APPROPRIATE

(ILLUSTRATIONAL ONLY)

TABLE 3.3-X

ASS/DSS MINIMUM EQUIPMENT

INSTRUMENT	READOUT LOCATION	MINIMUM CHANNELS
TRANSFER SWITCHES	SWITCH LOCATION	
CONTROL CIRCUITS	SWITCH LOCATION	

NOTE: IDENTIFY OTHER MINIMUM EQUIPMENT REQUIRED TO OPERATE ASS/DSS, AS APPROPRIATE

PLANT SYSTEMS

3/4.7.14 PORTABLE FIRE EXTINGUISHERS

LIMITING CONDITION FOR OPERATION

3.7.14 All portable fire extinguishers protecting areas containing safety-related equipment, as described in the Fire Hazards Analysis, shall be OPERABLE.

APPLICABILITY: At all times.

ACTION:

a. With one or more of the required portable fire extinguishers inoperable, within 8 hours replace the inoperable extinguisher with an OPERABLE extinguisher having the same classification and at least equal rating.

b. The provisions of Specifications 3.0.3 and 3.0.4 are not applicable.

SURVEILLANCE REQUIREMENTS

4.7.14 Each required portable fire extinguisher shall be verified to be OPERABLE by performing surveillance and maintence in accordance with procedures prepared in conjunction with the manufacturer's recommendations and verifying that each extinguisher is located as designated in the Fire Hazards Analysis.

(ILLUSTRATIONAL ONLY)

TABLE 4.3-X

ASS/DSS INSTRUMENTATION SURVEILLANCE REQUIREMENTS

INSTRUMENT	CHANNEL CHECK	CHANNEL CALIBRATION

PLANT SYSTEMS

3/4.7.15 EMERGENCY LIGHTING UNITS

LIMITING CONDITION FOR OPERATION

3.7.15 All required self-contained, battery-powered emergency lighting units, as described in the Fire Hazards Analysis, shall be OPERABLE.

APPLICABILITY: At all times.

ACTION:

a. With one or more of the required emergency lighting units inoperable, within 8 hours replace the inoperable lighting unit with an OPERABLE lighting unit.

b. The provisions of Specifications 3.0.3 and 3.0.4 are not applicable.

SURVEILLANCE REQUIREMENTS

4.7.15 Each of the required emergency lighting units shall be verified to be OPERABLE by performing surveillance and maintence in accordance with procedures prepared in conjunction with the manufacturer's recommendations.

3/4.3.3.2 MOVABLE INCORE DETECTORS

The OPERABILITY of the movable incore detectors with the specified minimum complement of equipment ensures that the measurements obtained from use of this system accurately represent the spatial neutron flux distribution of the core. The OPERABILITY of this system is demonstrated by irradiating each detector used and determining the acceptability of its voltage curve.

For the purpose of measuring $F_Q(Z)$ or $F^N_{\Delta H}$ a full incore flux map is used. Quarter-core flux maps, as defined in WCAP-8648, June 1976, may be used in recalibration of the Excore Neutron Flux Detection System, and full incore flux maps or symmetric incore thimbles may be used for monitoring the QUADRANT POWER TILT RATIO when one Power Range channel is inoperable.

3/4.3.3.3 SEISMIC INSTRUMENTATION

The OPERABILITY of the seismic instrumentation ensures that sufficient capability is available to promptly determine the magnitude of a seismic event and evaluate the response of those features important to safety. This capability is required to permit comparison of the measured response to that used in the design basis for the facility to determine if plant shutdown is required pursuant to Appendix A of 10 CFR Part 100. The instrumentation is consistent with the recommendations of Regulatory Guide 1.12, "Instrumentation for Earthquakes," April 1974.

3/4.3.3.4 METEOROLOGICAL INSTRUMENTATION

The OPERABILITY of the meteorological instrumentation ensures that sufficient meteorological data are available for estimating potential radiation doses to the public as a result of routine or accidental release of radioactive materials to the atmosphere. This capability is required to evaluate the need for initiating protective measures to protect the health and safety of the public and is consistent with the recommendations of Regulatory Guide 1.23, "Onsite Meteorological Programs," February 1972.

3/4.3.3.5 REMOTE SHUTDOWN SYSTEM

The OPERABILITY of the Remote Shutdown System ensures that sufficient capability is available to permit safe shutdown of the facility from locations outside of the control room. This capability is required in the event control room habitability is lost and is consistent with General Design Criterion 19 of 10 CFR Part 50.

The OPERABILITY of the Remote Shutdown System ensures that a fire will not preclude achieving safe shutdown. The Remote Shutdown System instrumentation,

SECTION NOT APPLICABLE

REMOTE SHUTDOWN SYSTEM (Continued)

control and power circuits and transfer switches necessary to eliminate effects of the fire and allow operation of instrumentation, control and power circuits required to achieve and maintain a safe shutdown condition are independent of areas where a fire could damage systems normally used to shutdown the reactor. This capability is consistent with General Design Criterion 3 and Appendix R to 10 CFR 50.

3/4.3.3.6 ACCIDENT MONITORING INSTRUMENTATION

The OPERABILITY of the accident monitoring instrumentation ensures that sufficient information is available on selected plant parameters to monitor and assess these variables following an accident. This capability is consistent with the recommendations of Regulatory Guide 1.97, "Instrumentation for Light-Water-Cooled Nuclear Power Plants to Assess Plant Conditions During and Following an Accident," December 1975 and NUREG 0737, "Clarification of TMI Action Plan Requirements," November 1980.

3/4.3.3.7 CHLORINE DETECTION SYSTEMS

The OPERABILITY of the Chlorine Detection System ensures that sufficient capability is available to promptly detect and initiate protective action in the event of an accidental chlorine release. This capability is required to protect control room personnel and is consistent with the recommendations of Regulatory Guide 1.95, "Protection of Nuclear Power Plant Control Room Operators Against an Accidental Chlorine Release," February 1975.

3/4.3.3.7 FIRE DETECTION INSTRUMENTATION

OPERABILITY of the detection instrumentation ensures that both adequate warning capability is available for prompt detection of fires and that Fire Suppression Systems, that are actuated by fire detectors, will discharge extinguishing agent in a timely manner. Prompt detection and suppression of fires will reduce the potential for damage to safety-related equipment and is an integral element in the overall facility Fire Protection Program. When instrumentation is inoperable, frequent fire patrols are required in the affected area until OPERABILITY can be restored.

Fire detectors that are used to actuate Fire Suppression Systems represent a more critical~~ly important~~ component of a plant's Fire Protection Program than detectors that are installed solely for early fire warning and notification. Consequently, ~~the minimum number of OPERABLE fire detectors must be greater~~.

~~The loss of detection capability for Fire Suppression Systems, actuated by fire detectors, represents a significant degradation of fire protection for~~

SECTION NOT APPLICABLE

FIRE DETECTION INSTRUMENTATION (Continued)

~~any area. As a result, the establishment of~~ a fire watch patrol must be initiated at an earlier stage than would be warranted for the loss of detectors that provide only early fire warning. ~~The establishment of frequent fire patrols in the affected areas is required to provide detection capability until the inoperable instrumentation is restored to OPERABILITY~~.

3/4.3.3.9 LOOSE-PART DETECTION INSTRUMENTATION

The OPERABAILITY of the loose-part detection instrumentation ensures that sufficient capability is available to detect loose metallic parts in the Reactor System and avoid or mitigate damage to Reactor System components. The allowable out-of-service times and surveillance requirements are consistent with the recommendations of Regulatory Guide 1.133, "Loose-Part Detection Program for the Primary System of Light-Water-Cooled Reactors," May 1981.

3/4.3.3.10 RADIOACTIVE LIQUID EFFLUENT MONITORING INSTRUMENTATION

The radioactive liquid effluent instrumentation is provided to monitor and control, as applicable, the releases of radioactive materials in liquid effluents during actual or potential releases of liquid effluents. The Alarm/Trip Setpoints for these instruments shall be calculated and adjusted in accordance with the methodology and parameters in the ODCM to ensure that the alarm/trip will occur prior to exceeding the limits of 10 CFR Part 20. The OPERABILITY and use of this instrumentation is consistent with the requirements of General Design Criteria 60, 63 and 64 of Appendix A to 10 CFR Part 50. The purpose of tank level indicating devices is to assure the detection and control of leaks that if not controlled could potentially result in the transport of radioactive materials to UNRESTRICTED AREAS.

3/4.3.3.11 RADIOACTIVE GASEOUS EFFLUENT MONITORING INSTRUMENTATION

The radioactive gaseous effluent instrumentation is provided to monitor and control, as applicable, the releases of radioactive materials in gaseous effluents during actual or potential releases of gaseous effluents. The Alarm/Trip Setpoints for these instruments shall be calculated and adjusted in accordance with the methodology and parameters in the ODCM to ensure that the alarm/trip will occur prior to exceeding the limits of 10 CFR Part 20. This instrumentation also includes provisions for monitoring (and controlling) the concentrations of potentially explosive gas mixtures in the WASTE GAS HOLDUP SYSTEM. The OPERABILITY and use of this instrumentation is consistent with the requirements of General Design Criteria 60, 63 and 64 of Appendix A to 10 CFR Part 50.

SECTION NOT APPLICABLE

SNUBBERS (Continued)

The service life of a snubber is established via manufacturer input and information through consideration of the snubber service conditions and associated installation and maintenance records (newly installed snubber, seal replaced, spring replaced, in high radiation area, in high temperature area, etc. . .). The requirement to monitor the snubber service life is included to ensure that the snubbers periodically undergo a performance evaluation in view of their age and operating conditions. These records will provide statistical bases for future consideration of snubber service life. The requirements for the maintenance of records and the snubber service life review are not intended to affect plant operation.

3/4.7.10 SEALED SOURCE CONTAMINATION

The limitations on removable contamination for sources requiring leak testing, including alpha emitters, is based on 10 CFR 70.39(c) limits for plutonium. This limitation will ensure that leakage from Byproduct, Source, and Special Nuclear Material sources will not exceed allowable intake values.

Sealed sources are classified into three groups according to their use, with Surveillance Requirements commensurate with the probability of damage to a source in that group. Those sources which are frequently handled are required to be tested more often than those which are not. Sealed sources which are continuously enclosed within a shielded mechanism (i.e., sealed sources within radiation monitoring or boron measuring devices) are considered to be stored and need not be tested unless they are removed from the shielded mechanism.

3/4.7.11 FIRE SUPPRESSION SYSTEMS

The OPERABILITY of the Fire Suppression Systems ensures that adequate fire suppression capability is available to confine and extinguish fires occurring in any portion of the facility where safety-related equipment is located. The Fire Suppression System consists of the water system, spray, and/or sprinklers, CO_2, Halon, fire hose stations, and yard fire hydrants. The collective capability of the Fire Suppression Systems is acequate to minimize potential damage to safety-related equipment and is a major element in the facility Fire Protection Program.

In the event that portions of the Fire Suppression Systems are inoperable, capability ~~alternate~~ backup fire-fighting ~~equipment~~ is required ~~to be made available~~ in the affected areas until the inoperable equipment is restored to service. ~~When the inoperable fire-fighting equipment is intended for use as a backup means of fire suppression, a longer period of time is allowed to provide an alternate means of fire fighting than if the inoperable equipment is the primary means of fire suppression.~~

SECTION NOT APPLICABLE

FIRE SUPPRESSION SYSTEMS (Continued)

Backup fire fighting equipment, provided when the primary suppression systems are inoperable, must be able to provide an equivalent capability; in this context, equivalent capability means a reasonably similar fire suppression function, consistent with the primary system's design objective in the Fire Hazards Analysis. Backup equipment should not compromise plant safety when used.

~~The Surveillance Requirements provide assurance that the minimum OPERABILITY requirements of the Fire Suppression Systems are met. An allowence is made for ensuring a sufficient volume of Halon in the Halon storage tanks by verifying either the weight or the level of the tanks. Level measurements are made by either a U.L. or F.M. approved method.~~

In the event the Fire Suppression Water System becomes inoperable, prompt ~~immediate~~ corrective measures must be taken since this system provides the major fire suppression capability of the plant.

3/4.7.12 ~~FIRE RATED~~ FIRE RATED ASSEMBLIES

The functional integrity of the fire rated assemblies and barrier penetrations ensures that fires will be confined or adequately retarded from spreading to adjacent portions of the facility. These design features minimize the possibility of a single fire rapidly involving several areas of the facility prior to detection and extinguishing of the fire. The fire barrier penetrations are a passive element in the facility fire protection program and are subject to periodic inspections.

Fire barrier penetrations, including cable penetration barriers, fire doors and dampers are considered functional when the visually observed condition is the same as the as-designed condition. ~~for those fire barrier penetrations that are not in the as-designed condition, an evaluation shall be performed to show that the modification has not degraded the fire rating of the fire barrier penetration.~~

The active assemblies (e.g., doors and dampers) are periodically tested to demonstrate their operability.

During periods of time when a barrier is not functional, either: (1) a continuous fire watch is required to be maintained in the vicinity of the affected barrier, or (2) the fire detectors on at least one side of the affected barrier must be verified OPERABLE and an hourly fire watch patrol established, until the barrier is restored to functional status.

3/4.7.13 AREA TEMPERATURE MONITORING

The area temperature limitations ensure that safety-related equipment will not be subjected to temperatures in excess of their environmental qualification temperatures. Exposure to excessive temperatures may degrade equipment and can cause a loss of its OPERABILITY. The temperature limits include an allowance for instrument error of ± ( )°F.

SECTION NOT APPLICABLE

3/4.7.13 ALTERNATIVE/DEDICATED SHUTDOWN SYSTEM

The OPERABILITY of the ASS/DSS ensures that a fire will not preclude achieving safe shutdown. The ASS/DSS equipment are independent of areas where a fire could damage systems normally used to shutdown the reactor. This capability is consistent with GDC 3 and 10CFR50, Appendix R.

The equivalent shutdown capability provided when the ASS/DSS is inoperable depends on the specific equipment involved and, therefore, should be sufficient to assure that the intended shutdown actions can be accomplished, or that fires can be reasonably precluded during that time for which ASS/DSS equipment would otherwise be required, consistent with the ASS/DSS design basis. Any temporary procedures or special fire watch patrols established to provide this equivalent capability should be reviewed by the (PORC) and approved by the (station superintendent) prior to implementation.

3/4.7.14 PORTABLE FIRE EXTINGUISHERS

The portable fire extinguishers are the first line of fire defense and are most effective when fires are in their early stages of development. Portable extinguishers provide the capability to protect safety-related equipment from fires in their incipient stages, but must be properly distributed throughout the plant and maintained in good operating condition to be effective. When an extinguisher is inoperable, it should be promptly repaired or replaced.

3/4.7.15 EMERGENCY LIGHTING UNITS

The 8-hour emergency lighting units are provided in areas needed for operation of safe shutdown equipment and in access and egress routes thereto. This equipment provides illumination for operators to manipulate required equipment concurrent during plant emergency shutdown operations with the lost of the normal illumination within the area. This equipment should be properly maintained and if inoperative should be promptly repaired or replaced consistent with the defense-in-depth philosophy.

d. The performance of activities required by the Operational Quality Assurance Program to meet the criteria of Appendix "B", 10 CFR 50, at least once per 24 months.

e. The Emergency Plan and implementing procedures at least once per 12 months.

f. The Security Plan and implementing procedures at least once per 12 months.

g. Any other area of unit operation considered appropriate by the (CNRAG) or the (Vice President Operations).

h. The Fire Protection programmatic controls including the implementing procedures at least once per 24 months by qualified licensee QA personnel;

i. The fire protection equipment and program implementation at least once per 12 months utilizing either qualified offsite licensee fire protection engineer or an outside independent fire protection consultant. An outside independent fire protection consultant shall be used at least every third year;

AUTHORITY

6.5.2.9 The (CNRAG) shall report to and advise the (Vice President Operations) on those areas of responsibility specified in Sections 6.5.2.7 and 6.5.2.8.

RECORDS

6.5.2.10 Records of (CNRAG) activities shall be prepared, approved and distributed as indicated below:

a. Minutes of each (CNRAG) meeting shall be prepared, approved and forwarded to the (Vice President-Operations) within 14 days following each meeting.

b. Reports of reviews encompassed by Section 6.5.2.7 above, shall be prepared, approved and forwarded to the (Vice President-Operations) within 14 days following completion of the review.

c. Audit reports encompassed by Section 6.5.2.8 above, shall be forwarded to the (Vice President-Operations) and to the management positions responsible for the areas audited within 30 days after completion of the audit by the auditing organization.

PROPOSED ACTION STATEMENTS FOR SECTIONS 3.7.11.2-4
AUTOMATIC FIRE SUPPRESSION SYSTEMS

a. With the [system] inoperable such that one train of a safety system is not protected by automatic fire suppression, verify the functional capability of the redundant safety system train(s) which would accomplish the intended function and its associated fire suppression system, and restore the [system] to OPERABLE within 7 days or establish hourly fire watch patrols in the affected area(s).

b. With the [system] inoperable such that a safety function (i.e., both or all trains of the safety system) is not protected by automatic fire suppression or a fire area is not protected such that a fire could not be contained within the fire barriers which establish the area, within one hour establish a continuous fire watch with equivalent manual fire suppression equipment in the affected area(s).

c. The provisions of Specifications 3.0.3 and 3.0.4 are not applicable.

BASES

The OPERABILITY of the fire suppression systems does not include the actuating instrumentation (detectors) because they are covered under 3/4.3.3.8. When a fire suppression system is found to be inoperable, the action statement recognizes the importance of the safety functions being protected, consistent with the design approach for fire damage limits. When one train of a safety system becomes vulnerable to fires, the functional capability of the redundant train must be verified. This requirement is intended to provide assurance that a fire in the affected area will not result in a complete loss of the

safety function of the systems involved. The term verify the functional capability, as used in this context, means to administratively check by examining logs or other information to determine if necessary components are out-of-service for maintenance or other reasons; it does not mean to perform the surveillance required to demonstrate OPERABILITY of the system because such testing could reduce the system's reliability.

When an entire safety function (both or all trains) becomes vulnerable to fires, prompt action must be taken to ensure adequate manual fire-fighting capability, until the automatic fire suppression systems are restored. Similarly, when a fire area is unprotected such that a fire in that area would not be automatically contained and, therefore, could spread beyond its boundaries, prompt action must be taken to monitor the area with preparations for any manual fire fighting necessary to ensure such fires will be contained.

Attachment 2

SIGNIFICANT FIRE PROTECTION TECHNICAL SPECIFICATION ISSUES

1. Detection Instrumentation

The Working Group (WG) initially tried to remove the Function B (actuation) instrumentation from Technical Specification (TS) 3.3.3.8. Our objective was to simplify the complex action statement associated with Function A, Function B and detectors inside containment.

However, in doing so, the resulting action statement associated with the suppression system, as it would apply to the Function B detectors, would be overly restrictive. Moreover, there is an STS objective to keep such instrumentation separate and a precedent in the Reactor Protection System for distinguishing the LCO for actuating instrumentation (sensors) from the actuated system LCO.

Ideally, there should be a actior matrix which is a function of the number of inoperable detectors in any zone and the number of unprotected fire areas served by those detectors. However, such a requirement would be overly complex and confusing. Conversely, we believe that action within one hour whenever <u>any</u> detector is inoperable is wholly unwarranted. Therefore, we have left the original construction of the action statement and modified the restoration periods to be appropriately comparable with those which would be required with one or both trains of a safety system inoperable. In our judgment these changes are still conservative.

2. Definition of Terms

There were several comments that relate to the definition or explanation of terms; e.g., fire watch patrol, backup equipment, TRIP ACTUATING DEVICE OPERATIONAL TEST, and puff test. Terms which are used consistently throughout the STS and have a precise meaning are defined in the introduction and are capitalized in the text (e.g., OPERABLE).

In some cases, there seems to be a wide range of views regarding terms commonly understood by fire protection engineers. Many of the clarifications proposed are so detailed that they more appropriately belong in the plant's procedures implementing the technical specifications. In such cases, the inspector must be able to judge whether the procedures achieve the objective of the TS and, if they do not, then we would expect that the licensee has a broader problem which requires appropriate enforcement action.

Where reasonably simple and constructive clarifications can be made, we have augmented the associated "bases" section in accordance with STS practice.

3. Reporting Requirements

There were existing and recommended reporting requirements in action statements which would otherwise allow an indeterminant period of equivalent manual fire detection (fire watch patrol) or suppression.

These reporting requirements appear to principally serve as a punitive measure to prevent licensees from operating under such conditions for extended periods of time.

We believe that such reporting requirements are unnecessary and only serve to shift the responsibility for action from the licensee to the NRC. The personnel time (i.e., fire watch patrols) required to provide the equivalent protection should be sufficient incentive for the licensee to repair inoperable equipment.

The Regions may not completely agree with this judgment.

4. Surveillance Requirements

In several cases, recommended changes to the surveillance requirements were so detailed that they constituted implementing procedures or they appeared to verify design capability. We believe such changes go beyond the objective of surveillance requirements, which is to simply describe the inspections and tests necessary to assure that the LCO is satisfied.

In those cases where specific procedures or testing requirements are necessary to accomplish the surveillance, then specific references should be cited; e.g., ASTM-D975-1977 for diesel fuel chemistry. Otherwise, procedures for conducting surveillance should be prepared in accordance with TS 6.8.1 and, where appropriate, reference is made to procedures "prepared in conjunction with manufacturer's recommendations."

5. Fire Suppression Systems - Action Requirement

Based on comments received, the WG attempted to prepare a new set of action statements which would be applied consistently to all fire suppression systems. These action statements would recognize that the fire suppression systems serve to protect safety systems and, therefore, if a redundant safety system train is still protected, a longer restoration time could be allowed than if an entire safety function is unprotected. Even then, manual fire suppression could serve for some reasonable time until the fire suppression system is again operable. These action statements would also recognize that fire suppression systems prevent fires from spreading from one fire area to another or from growing to an unmanagable size.

A draft of these action statements is presented in ~~Enclosure~~ 3. While we believe that the approach is correct, we have not had time to assure that the proposed actions are appropriate for all possible system failures. We suggest that the Steering Committee consider this approach and, if agreeable, we will continue to refine this proposal.

6. Alternate/Dedicated Shutdown Systems

Based on a variety of existing and recommended LCOs and surveillance requirements for Alternate and Dedicated Shutdown Systems (ASS/DSS), the WG has endeavored to construct a composite STS. We received comments regarding ASS/DSS inoperability for 60 days and the completeness of the TS.

The WG selected a 60-day restoration period because (1) we included a provision for "equivalent shutdown capability" in the event for inoperable equipment cannot be restored in 7 days, and (2) we considered the time that would be required to evaluate and process a TS change, should a situation arise requiring a temporary modification to the ASS/DSS. We believe that, in most cases, any necessary repairs could be made in 60 days and the system inoperability could be reasonably compensated during that time.

With regard to completeness, we attempted to identify LCOs and surveillance requirements for all of the major system components. A clarifying note is included which explains that additional (plant-specific) components should be similarly added.

7. Equivalent Capability

There are several actions which require the licensee to establish "equivalent" fire protection capability when a system is inoperable. We used the term "equivalent" to be consistent with its use throughout the STS. However, we believe this term will be misconstrued in many cases; it does not mean identical, it is intended to be more like "comparable." In order to ensure this understanding, we have added clarifications to the appropriate bases sections.

As a generic matter, we recommend that the Technical Specification Review Group (TSRG) consider an alternate term for use throughout the STS which will not be construed to mean "identical" where it is not so intended; e.g., comparable, compensatory, or appropriate.

8. Refueling Outage Surveillance

The STS specify "at least once per 18 months" for surveillance that are intended during refueling outages. The WG noted that such a period can create schedular problems for plants with long power runs and, therefore, recommended changes to "at each refueling outage."

This is a policy issue beyond fire protection. The STS practice is to specify time periods. In either case, there are potential problems (e.g., replacing one fuel element is a refueling outage). Therefore, we have withdrawn our recommendation in favor of consistency. However, as a generic matter, we suggest the TSRG consider extending the 18-month period or specify "at least at each scheduled refueling outage but not less often than once each 24 months."

9. Emergency/Security Plans

A question was raised regarding a change in the schedules from 24 months to 12 months for Emergency and Security Plans (6.5.2.8). These changes were made by the TSRG, not the WG, to make these schedules consistent with the requirement for annual updates required in the regulations.

Attachment 3

WORKING GROUP COMMENTS ON PROPOSED FIRE PROTECTION TECHNICAL SPECIFICATIONS

The Working Group reviewed the Standard Technical Specifications (STS) taking into account comments from Regions I, II and III. The CRGR package version of the Westinghouse STS was used as the basis document. The Working Group attempted to simplify and clarify the STS and added specifications for alternative and dedicated shutdown systems, portable fire extinguishers and emergency lighting. The rationale for these additions is that these features are explicitly included in Appendix R.

Obviously, the Working Group has had to exercise a collective judgment to develop these recommended changes to the technical specifications. We did not always include recommended changes to the technical specifications; because of the wide range of opinions, we perceive that there may never be universal agreement on the details of these requirements. Nevertheless, there were comments which raised issues broader than fire protection or involved conflicting objectives; e.g., simplicity of action statements, definition of terms, reporting requirements, procedural details, action objectives and

consistency, use of "equivalent" capabilities, and surveillance during refueling outages. To ensure that the bases for our recommended changes are clearly understood, we have responded to the more significant comments and explained some of our judgments in Attachment 2. We have also recommended generic improvements to the STS which should be considered when a final action is taken to upgrade the fire protection technical specifications.

The Working Group is not entirely satisfied with its revisions to the STS. Although we believe the surveillance and LCOs concerning fire protection enhance safety, we are concerned that the way they are presented elevates fire protection almost to the stature of ECCS. However, given the safety significance of fire protection and the present format of the STS, the Working Group could not come up with an acceptable alternative.

We believe that the technical specification format included in the proposed rulemaking offers a more appropriate way of regulating fire protection surveillance and compensatory measures for inoperative equipment. The rulemaking (47FR13369, 3/30/82) calls for only the most important features to be included in the body of the technical specifications. The LCOs, compensatory measures, surveillance requirements, and administrative requirements of lesser importance but still important to safety removed from the technical specifications are to be placed in a companion document (supplemental specifications). The supplemental specification may be revised by the licensee upon approval

of its safety committee. The supplemental specifications and the documentation of surveillance and tests conducted in accordance with the supplemental specifications are subject to NRC inspection.

We recommend that the "new" Technical Specifications include an administrative requirement for the licensee to maintain a procedure for surveillance and compensatory measures for inoperative equipment. This procedure would not be a part of the Technical Specifications but would be included in and therefore could be revised by the licensee on approval of the licensee's safety committee without NRC approval. However, the procedure and the records of surveillances and compensatory measures could be inspected by the region.

ENCLOSURE 6

OTD 5/3/85
UPDATED RECOMMENDATIONS
ON FIRE PROTECTION POLICY
AND PROGRAM
ACTIONS

Revised

~~APP R~~
~~STEERING~~
COMMITTEE
RECOMMENDATIONS

APPENDIX R QUESTIONS AND ANSWERS

APPENDIX R

QUESTIONS AND ANSWERS

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1. INTRODUCTION

A major fire damaging safe shutdown equipment occurred at the Browns Ferry Nuclear Station in March 1975. The fire damaged over 1600 electrical cables and caused the temporary unavailability of some core cooling systems. Because this fire did substantial damage, the NRC established a Special Review Group which initiated an evaluation of the need for improving the fire protection programs at all nuclear power plants. The group found serious design inadequacies regarding fire protection at Browns Ferry, and its report, "Recommendations Related to Browns Ferry Fire" (NUREG-0050, February 1976), contained over fifty recommendations regarding improvements in fire prevention and control in existing facilities. The report also called for the development of specific guidance for implementing fire protection regulations, and for a comparison of that guidance with the fire protection program at each operating plant.

NRC developed technical guidance from the technical recommendations in the Special Group's report, and issued those guidelines as Branch Technical Position Auxiliary Power Conversion Systems Branch 9.5-1 (BTP APCSB 9.5-1),[1/] "Guidelines for Fire Protection for Nuclear Power Plants." This guidance did not apply to plants operating at that time. Guidance to operating plants was provided later in Appendix A [2/] to BTP APCSB 9.5-1 which, to the extent practicable, relies on BTP APCSB 9.5-1. The guidance in these documents was also published for public comment as Regulatory Guide 1.120, "Fire Protection for Nuclear Power Plants" (June 1976). In response to public comment, the NRC issued an extensively revised version of Regulatory Guide 1.120 for further public comment.

In May 1976, the NRC asked licensees to compare operating reactors with BTP APCSB 9.5-1, and in September 1976, those licensees were informed that the guidelines in Appendix A would be used to analyze the consequences of a fire in each plant area. In September 1976 the licensees, were also requested to provide a fire hazards analysis that divided the plant into distinct fire areas and show that redundant systems required to achieve and maintain cold shutdown are adequately protected against damage by a fire. Early in 1977 each licensee responded with a Fire Protection Program Evaluation which included a Fire Hazard Analysis. These evaluations and analyses identified aspects of licensees' fire protection programs that did not conform to the NRC guidelines.

[1/] Rather than serving as inflexible, legal requirements that must be followed by licensees, issuances such as regulatory guides and branch technical positions are meant to give guidance to licensees concerning those methods the staff finds acceptable for implementing the general criteria embodied in the NRC's rules. See, e.g., Petition for Emergency & Remedial Action, CLI-78-6, 7 NRC 400, 406 (1978); Gulf States Utilities Company (River Bend Station, Units 1 and 2) ALAB-444, 6 NRC 760, 772 (1977).

[2/] Guidelines for Fire Protection for Nuclear Power Plants Docketed Prior to July 1, 1976.

Thereafter, the staff initiated discussions with all licensees aimed at achieving implementation of fire protection guidelines by October 1980. The staff held many meetings with licensees, conducted extensive correspondence with them, and visited every operating reactor. As a result, many fire protection items were resolved, and agreements were included in Fire Protection Safety Evaluation Reports issued by the NRC. Several fire protection issues remained unresolved with a number of licensees.

By early 1980, most operating plants had implemented most of the guidelines in Appendix A. However, as the Commission noted in its Order of May 23, 1980, the fire protection program has had some significant problems with implementation. Despite the staff's efforts, several licensees had expressed continuing disagreement with, and refused to adopt recommendations relating to several generic issues, including the requirements for fire brigade size and training, water supplies for fire suppression systems, alternate and dedicated shutdown capability, emergency lighting, qualifications of seals used to enclose places where cables penetrated fire barriers, and the prevention of reactor coolant pump lubrication system fires. To establish a definitive resolution of these contested subjects in a manner consistent with the general guidelines in Appendix A to the BTP and to assure timely compliance by licensees, the Commission issued a proposed fire protection rule and its Appendix R, which was described as setting out minimum fire protection requirements for the unresolved issues (45 Fed. Reg. 36082 May 29, 1980).[3]/ The fire protection features addressed included protection of safe shutdown capability, emergency lighting, fire barriers, associated circuits, reactor coolant pump lubrication system, and alternate shutdown systems. The Commission stated that it expected all modifications (except for alternate and dedicated shutdown capability) to be implemented by November 1, 1980.[4]/

As originally proposed (Federal Register Vol. 45 No. 1&5, May 22, 1980), Appendix R would have applied to all plants including those for which the staff had previously accepted other fire protection modifications. After analyzing comments on the rule, the Commission determined that only three of the fifteen items in Appendix R were of such safety significance that they should apply to all plants, including those for which alternative fire protection actions had been approved previously by the staff. These items are protection of safe shutdown capability (including alternate shutdown systems), emergency lighting, and the reactor coolant pump lubrication system. Accordingly, the final rule required all reactors licensed to operate before January 1, 1979, to comply with these three items even if the NRC had previously approved alternative fire protection features in these areas (45 Fed. Reg. 76602 Nov. 19, 1980). However, the final rule is more flexible than the proposed rule because Item III.G now provides three alternative fire protection features which do not require analysis to demonstrate the protection of redundant safe shutdown equipment, and reduces the acceptable distance in the physical separation alternative from fifty feet to twenty feet. In addition, the rule now also provides an exemption procedure which can be initiated by a licensee's assertion that any required fire protection feature will not enhance fire protection safety in the facility or that such modifications may be detrimental to overall safety (10 CFR 50.48(c)(6)). If the Director, Nuclear Reactor Regulation determines

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[3]/11 NRC 707, 718 (1980)

[4]/Id. at 719

that a licensee has made a prima facie showing of a sound technical basis for such an assertion, then the implementation dates of the rule are tolled until final Commission action on the exemption request.

Most licensees requested and were granted additional time to perform their reanalysis, propose modifications to improve post fire shutdown capability and to identify exemptions for certain fire protection configurations. In reviewing some exemption requests, the staff noted that some licensees had made significantly different interpretations of certain requirements. These differences were identified in the staff's draft SER's. These differences were also discussed on several occasions with the cognizant licensee as well as the Nuclear Utility Fire Protection Group. These discussions culminated in the issuance of generic letter 83-33.

2. OVERVIEW

Section 50.48 Fire Protection of 10 CFR Part 50 requires that each operating nuclear power plant have a fire protection plan that satisfies General Design Criterion 3 of Appendix A to 10 CFR 50. It specifies what should be contained in such a plan and lists the basic fire protection guidelines for this plan. It requires that the Fire Protection Safety Evaluation Report which has been issued for each operating plant state how these guidelines were applied to each facility.

Section 50.48 also requires that all plants with operating licenses prior to January 1, 1979 satisfy the requirements of Section III.G, III.J and III.O, and other Sections of Appendix R where approval of similar features had not been obtained prior to the effective date of Appendix R. By a separate action, the Commission approved the staff's requirement that all plants to receive their operating license after January 1, 1979 also satisfy the requirements of Sections III.G, III.J and III.O and that a fire protection license condition be established. Deviations from Appendix R requirements for pre-1979 plants are processed under the exemption process. Deviation from other guidelines are identified and evaluated in the Safety Evaluation Report.

A standard fire protection license condition has been developed and will be included in each new operating license. Present operating licenses will be amended to include the standard license condition.

The Regions initiated inspections of operating plants and identified several significant items of non-compliance. The Nuclear Utility Fire Protection Group requested interpretations of certain Appendix R requirements and provided a list of questions that they thought should be discussed with the industry. The NRC held workshops in each Region to assist the industry in understanding the NRC's requirements and to improve the Staff's understanding of the industry's concerns.

This document presents the NRC's response to the questions posed by the industry and supplemented with additional questions identified at the workshops as being of interest to the industry or the staff. These responses may be used as guidance for design, review and inspection activities. The questions have been reformatted according to their applicability to Sections of Appendix R, BTP CMEB 9.5-1, licensing policy or inspection policy.

3. SECTION III.G, FIRE PROTECTION OF SAFE SHUTDOWN CAPABILITY

3.1 Fire Area Boundaries

3.1.1 Fire Area Definition

QUESTION

Section III.G states the fire protection features required for cables and equipment or redundant trains of systems required to achieve and maintain hot shutdown that are located within the same fire area. Is the fire area of Section III.G, the same fire area referred to in BTP APCSB 9.5-1, Appendix A; and the supplementary guidance of September 1976?

RESPONSE

The definition of a fire area given in the BTP is somewhat more restrictive than that given in Section #4 of the "Interpretations of Appendix R." Clearly, where a licensee has reviewed its facility using the BTP criteria, this would meet Appendix R requirements. The BTP criteria may continue to be used as guidance, but the minimum requirements for fire area boundaries are set out in Section #4 of the "Interpretations."

3.1.2 Previously Accepted Fire Area Boundaries

QUESTION

If a fire area boundary was described as a rated barrier in the 1977 fire hazards analysis, no open items existed in this area in the Appendix A SER, and the barriers have not been altered, then need those barriers be reviewed by licensees or the Staff under Appendix R?

RESPONSE

If a fire area boundary was described as a rated barrier in the 1977 fire hazards analysis, and was evaluated and accepted in a published SER, the fire area boundary need not be reviewed as part of the re-analysis for compliance with Section III.G of Appendix R. Openings in the fire barriers, if any, should have been specifically identified and justified in the fire hazards analysis performed in the Appendix A process. If openings in the fire area boundaries were not previously evaluated, such an evaluation should be performed as a basis for assessing compliance with Appendix R. See Items #4 and #6 of the "Interpretations of Appendix R," and the response to question 3.1.1.

In BTP APCSB 9.5-1, Fire Barrier is defined as:

"Fire Barrier - those components of construction (walls, floors, and roofs) that are rated by approving laboratories in hours for resistance to fire to prevent the spread of fire.

The term "fire area" as used in Appendix R means an area sufficiently bounded to withstand the hazards associated with the fire area and, as necessary, to protect important equipment within the fire area from a fire outside the area. In order to meet the regulation, fire area boundaries need not be completely

sealed with floor to ceiling and/or wall-to-wall boundaries. Where fire area boundaries were not approved under the Appendix A process, or where such boundaries are not wall-to-wall or floor-to-ceiling boundaries with all penetrations sealed to the fire rating required of the boundaries, licensees must perform an evaluation to assess the adequacy of fire area boundaries in their plants to determine if the boundaries will withstand the hazards associated with the area and protect important equipment within the area from a fire outside the area. This analysis must be performed by at least a fire protection engineer and, if required, a systems engineer. Although not required, licensees may submit their evaluations for Staff review and concurrence. In any event, these analyses must be retained by the licensees for subsequent NRC audits.

3.1.3 Exterior Walls

QUESTION

Must exterior walls to buildings and their penetrations be qualified as rated barriers?

RESPONSE

Exterior walls and their penetrations should be qualified as rated barriers when (1) they are required to separate a shutdown-related division(s) inside the plant from its redundant (alternate) counterpart outside the plant in the immediate vicinity of the exterior wall, (2) they separate safety related areas from non-safety related areas that present a significant fire threat to the safety related areas, or (3) they are designated as a fire barrier in the FSAR or FHA.

Usually exterior walls are designated as a fire area boundary; therefore, they are evaluated by the guidelines of Appendix A. A FHA should be performed to determine the rating of exterior walls, if required by the above criteria.

3.1.4 Exterior Yards

QUESTION

How should a utility define the boundaries of fire areas comprising exterior yards?

RESPONSE

An exterior yard area without fire barriers should be considered as one fire area. The area may consist of several fire zones. The boundaries of the fire zones should be determined by a FHA.

The protection for redundant/alternate shutdown systems within a yard area would be determined on the bases of the largest "design basis fire" (see response to question 3.8.2) that is likely to occur and the resulting damage. The boundaries of such damage would have to be justified with a fire hazards analysis. The analysis should consider the degree of spatial separation between divisions; the presence of in-situ and transient combustibles, including vehicular traffic; grading; available fire protection; sources of ignition; and the vulnerability and criticality of the shutdown related systems. See Sections #3, #4 and #6 of the "Interpretations of Appendix R."

3.1.5 Fire Zones

QUESTION

Appendix R, Section III.G.3 states "alternative or dedicated shutdown capability and its associated circuits, independent of cables, systems or components in the area room or zone under consideration...." What is the implied utilization of a room or zone concept under Section III.G of Appendix R? The use of the phraseology "area, room or zone under consideration" is used again at the end of the Section III.G.3. Does the requirement for detection and fixed suppression indicate that the requirement can be limited to a fire zone rather than throughout a fire area? Under what conditions and with what caveats can the fire zone concept be utilized in demonstrating conformance to Appendix R?

RESPONSE

Section III.G was written after NRC's multi-discipline review teams had visited all operating power plants. From these audits, the NRC recognized that it is not practical and may be impossible to subdivide some portions of an operating plant into fire areas. In addition, the NRC recognized that in some cases where fire areas are designated, it may not be possible to provide alternate shutdown capability independent of the fire area and, therefore, would have to be evaluated on the basis of fire zones within the fire area. The NRC also recognized that because some licensees had not yet performed a safe shutdown analysis, these analyses may identify new unique configurations.

To cover the large variation of possible configurations, the requirements of Section III.G were presented in three parts:

- Section III.G.1 requires one train of hot shutdown systems be free of fire damage and damage to cold shutdown systems be limited.

- Section III.G.2 provides certain separation, suppression and detection requirements within fire areas; where such requirements are met, analysis is not necessary.

- Section III.G.3 requires alternative dedicated shutdown capability for configurations that do not satisfy the requirements of III.G.2 or where fire suppressants released as a result of fire fighting, rupture of the system or inadvertent operation of the system may damage redundant equipment. If alternate shutdown is provided on the basis of rooms or zones, the provision of fire detection and fixed suppression is only required in the room or zone under consideration.

Section III.G recognizes that the need for alternate or dedicated shutdown capability may have to be considered on the basis of a fire area, a room or a fire zone. The alternative or dedicated capability should be independent of the fire area where it is possible to do so (See Supplementary Information for the final rule Section III.G). When fire areas are not designated or where it is not possible to have the alternative or dedicated capability independent of the fire area, careful consideration must be given to the selection and location of the alternative or dedicated shutdown capability to assure that the performance requirement set forth in Section III.G.1 is met. Where alternate or dedicated shutdown is provided for a room or zone, the capability must be physically and

electrically independent of that room or zone. The vulnerability of the equipment and personnel required at the location of the alternative or dedicated shutdown capability to the environments produced at that location as a result of the fire or fire suppressant's must be evaluated. These environments may be due to the hot layer, smoke, drifting suppressants, common ventilation systems, common drain systems or flooding. In addition, other interactions between the locations may be possible in unique configurations.

If alternate shutdown is provided on the basis of rooms or zones, the provision of fire detection and fixed suppression is only required in the room or zone under consideration. Compliance with Section III.G.2 cannot be based on rooms or zones.

See also Sections #5 and #6 of the "Interpretations of Appendix R."

3.1.6 Documentation

QUESTION

In Generic Letter 83-33 at pg. 2, the NRC Staff referred to the guidance in Appendix A to BTP 9.5-1 to establish the rating of the barrier. What level of documentation must be provided to verify that the fire area meets the requirements of Appendix R?

RESPONSE

The documentation required to verify the rating of a fire barrier should include the design description of the barrier and the test reports that verify its fire rating. Reference can be made to UL listed designs.

3.2 Fire Barrier Qualification

3.2.1 Acceptance Criteria

QUESTION

Recently the Staff has applied a 325°F cold side temperature criterion to its evaluation of the acceptability of one-hour and three-hour fire barrier cable tray wraps. This criterion is not in Branch Technical Position (BTP) APCSB 9.5-1, Appendix A as an acceptance criterion for fire barrier cable tray wraps and is not contained in Appendix R. It appears to represent post-Appendix R guidance. What is the origin of this criterion and why is it applicable to electrical cables where insulation degradation does not begin until jacket temperatures reach 450°F to 650°F?

RESPONSE

Fire barriers relied upon to protect shutdown related systems to meet the requirements of III.G.2 need to have a fire rating of either one or three hours. § 50.48 references BTP APCSB 9.5-1, where the fire protection definitions are found. Fire rating is defined:

"Fire Rating - the endurance period of a fire barrier or structure; it defines the period of resistance to a standard fire exposure before the first critical point in behavior is observed (see NFPA 251)."

The acceptance criteria contained in Chapter 7 of NFPA 251, "Standard Methods of Fire Tests of Building Construction and Materials," pertains to non-bearing fire barriers. These criteria stipulate that transmission of heat through the barrier "shall not have been such as to raise the temperature on its unexposed surface more than 250°F above its initial temperature." The ambient air temperature at the beginning of a fire test usually is between 50°F and 90°F. It is generally recognized that 75°F represents an acceptable norm. The resulting 325°F cold side temperature criterion is used for cable tray wraps because they perform the fire barrier function to preserve the cables free of fire damage. It is clear that cable that begins to degrade at 450°F is free of fire damage at 325°F.

During the Appendix A review, licensees began to propose fire barriers to enclose cable trays, conduit, fuel lines, coolant lines, etc. Industry did not have standard rating tests for such components or for electrical, piping or bus duct penetrations. The NRC issued a staff position giving acceptance criteria for electrical penetration tests. These criteria require an analysis of any temperature on the unexposed side of the barrier in excess of 325°F. In the past, manufacturers designed their own qualification tests. Nuclear Insurers, and the Institute of Electrical and Electronic Engineers have issued tests for some of these components. These tests usually exposed the component to the ASTM E-119 time temperature curve, but all had different acceptance criteria. Conduit and cable tray enclosure materials accepted by the NRC as 1 hour barrier prior to Appendix R (e.g. some Kaowool and 3M materials) and already installed by the licensee need not be replaced even though they may not have met the 325°F criteria. However, for newly identified conduit and cable trays requiring such wrapping new material which meets the 325°F criterion should be used, or justification should be provided for use of material which does not meet the 325°F criterion. This may be based on an analysis demonstrating that the maximum recorded temperature is sufficiently below the cable insulation ignition temperature.

3.2.2 Deviations from Tested Configurations

QUESTION

Due to obstructions and supports, it is often impossible to achieve exact duplication of the specific tested configuration of the one-hour fire barriers which are to be placed around either conduits or cable trays. For each specific instance where exact replication of a previously tested configuration is not and cannot be achieved, is an exemption necessary in order to avoid a citation for a violation?

RESPONSE

No. Where exact replication of a tested configuration cannot be achieved, the field installation should meet all of the following criteria:

1. The continuity of the fire barrier material is maintained.

2. The thickness of the barrier is maintained.

3. The nature of the support assembly is unchanged from the tested configuration.

4. The application or "end use" of the fire barrier is unchanged from the tested configuration. For example, the use of a cable tray barrier to protect a cable tray which differs in configuration from those that were tested would be acceptable. However, the use of structural steel fire proofing to protect a cable tray assembly may not be acceptable.

5. The configuration has been reviewed by a qualified fire protection engineer and found to provide an equivalent level of protection.

3.2.3 Fire Door Modifications

QUESTION

Where labeled and rated fire doors have been modified to incorporate security hardware or for flooding protection, is an exemption from Appendix R required?

RESPONSE

Where a door is part of a fire area boundary, and the modification does not effect the fire rating (for example, installation of security "contacts"), no further analysis need be performed. If the modifications could reduce the fire rating (for example, installation a vision panel), the fire rating of the door should be reassessed to ensure that it continues to provide adequate margin considering the fire loading on both sides. Since this reassessment pertains to the establishment of a valid fire area boundary, an exemption is not required. See Section #4 of the "Interpretations of Appendix R."

3.3 Structural Steel

3.3.1 NFPA Approaches

QUESTION

Does the NRC's definition of structural steel supporting fire barriers completely accommodate approaches described in NFPA guidance documents and standards?

RESPONSE

The NRC does not define the structural steel supporting fire barriers. This steel is identified by the licensee. Our position regarding the need to protect the structural steel, which forms a part of or supports fire barriers, is consistent with sound fire protection engineering principles as delineated in both NFPA codes and standards, and The Fire Protection Handbook.

3.3.2 Previously Accepted Structural Steel

QUESTION

Is it necessary to protect structural steel in exisitng fire barriers where those barriers were approved in an Appendix A SER?

RESPONSE

No.

3.3.3 Seismic Supports

QUESTION

Does structural steel whose sole purpose is to carry dynamic loads from a seismic event require protection in accordance with Section III.G.2a of Appendix R?

RESPONSE

No, unless the failure of any structural steel member due to a fire could result in significant degradation of the fire barrier. Then it must be protected.

3.3.4 Cable Tray Support Protection

QUESTION

Should cable tray supports be protected if there is a sprinkler system in the fire area? Under what conditions may cable tray supports be unprotected? Do unprotected supports require an exemption?

RESPONSE

In general, cable tray supports should be protected, regardless of whether there is a sprinkler system. However, they need not be protected if (1) the qualification tests were performed on wrapped cable trays with unprotected supports, and the supports are shown to be adequate, or (2) an analysis is performed, which takes into account the fire loading and automatic suppression available in the area, and which demon-strates that the unprotected support(s) will not fail and cause a loss of the cable tray fire barrier required for the postulated fire.

An exemption is not required; however, the qualification tests and applicability or the structural evaluation should be documented and available for audit.

3.4 Automatic Suppression System

3.4.1 Water Density

QUESTION

Staff guidance provided in Generic Letter 83-33 concerning automatic suppression coverage of fire areas interprets the phrase "in the fire area" in Section III.G as meaning "throughout the fire area." What delivered water density or occupancy standard as specified in NFPA-STD-13 must be achieved to meet this guidance?

RESPONSE

Individual plant areas are diverse in nature. The designer should determine the particular water density or occupancy classification. Those areas which contain a limited quantity of in-situ and anticipated transient combustibles and which feature contents such as tanks and piping, may be considered as "Ordinary Hazard (Group 1)," as defined by NFPA Standard No. 13. For those areas containing large amounts of cables or flammable liquids, an occupancy classification of "Extra Hazard" may be warranted. The decision as to which

classification should be applied should be made by a qualified fire protection engineer.

Once the occupancy classification is determined, the minimum water density should be based on the Density Curves in table 2.2.1(8) of NFPA 13. Any density equal to or in excess of the curves would be in conformance with our guidelines as delineated in Section C.6.c of BTP CMEB 9.5-1.

3.4.2 NRC Consultation

QUESTION

Section 4.1.2 of NFPA-STD-13 allows for "partial installations" or partial coverage. The standard states that "the authority having jurisdiction shall be consulted in each case." With the NRC as authority in this instance, must consultation occur only through the exemption process?

RESPONSE

No. The staff is always available to consult with utility representatives and provide guidance as to the acceptability of a particular fire protection configuration in individual plant areas. See also Section #5 of the "Interpretations of Appendix R."

3.4.3 Sprinkler Location

QUESTION

How does a suppression system designer know whether the term "throughout the area" means that sprinkler heads must be above or below cable trays when, in his judgment, the hazard of concern is a floor based fire?

RESPONSE

Section C.6.c(3) of BTP CMEB 9.5-1 states:

"(3) Fixed water extinguishing systems should conform to requirements of appropriate standards such as NFPA-13, "Standard for the Installation of Sprinkler Systems," and NFPA-15, "Standard for Water Spray Fixed Systems"."

This question pertains to those sprinkler systems covered by NFPA-13. Chapter 4 of NFPA-13 provides guidance as to the location of sprinkler heads in relation to common obstructions. In general, to achieve complete area-wide coverage, sprinklers should be located at the ceiling, with additional sprinklers provided below significant obstructions such as wide HVAC ducts and "shielded" or solid bottom stacked cable trays. To the extent that an existing or proposed sprinkler system design deviates from this concept, the design would have to be justified by a fire hazards analysis. See also Section #5 of the "Interpretations of Appendix R."

3.4.4 Fixed Suppression System In Fire Area

QUESTION

Are fixed suppression systems required by Section III G.3 to be throughout the fire area, room or zone under consideration?

RESPONSE

No, but partial coverage must be properly justified and documented.

See Item #5 of the "Interpretations of Appendix R."

"...suppression less than full area coverage may be adequate to comply with the regulation. Where full area suppression and detection is not installed, licensees must perform an evaluation to assess the adequacy and necessity of partial suppression and detection in an area. The evaluation must be performed by a fire protection engineer and, if required, a systems engineer. Although not required, licensees may submit their evaluations to the staff for review and concurrence. In any event, the evaluations must be retained for subsequent NRC audits..."

3.4.5 Sprinkler Head Location

QUESTION

If stacks of horizontal or vertical cable trays extend from ceiling to floor, are sprinkler heads required (1) under the lowest horizontal trays, near the floor for vertical trays; (2) at some intermediate level between the floor and ceiling, and (3) at the ceiling?

RESPONSE

Sprinkler heads should be located at the ceiling. Sprinkler heads at other locations may be necessary depending upon the hazard and the cumulative effect of the obstructions to the discharge of water from the sprinkler head. The sprinkler system design should meet NFPA 13.

3.4.6 Previously Approved Suppression Systems

QUESTION

Must suppression systems approved and installed under BTP APCSB 9.5-1, Appendix A be extended or altered to meet the total area requirements of Section III.G (as interpreted by the Staff) or does this "requirement" only apply to new installations?

RESPONSE

Suppression systems installed in connection with Appendix A may or may not have to be extended as a result of III.G. The licensee must analyze each area where suppression is required by III.G, and where only partial suppression has been provided, determine if the coverage is adequate for the fire hazard in the area. The licensee may consult with the staff during this review. In any event, the

Appendix R analysis showing that the suppression provided is adequate must be retained and available for NRC audit. See also Section #5 of the "Interpretations of Appendix R."

3.5 Separation of Redundant Circuits

3.5.1 Twenty-Foot Separation Criteria

QUESTION

Assuming that a licensee is utilizing the 20-foot separation for circuit protection, could an exemption request be granted for a portion of the circuit that did not maintain the 20-foot minimum separation if that portion was protected by one-hour barrier until 20-foot was achieved? This barrier would not be firewall-to-firewall, and the circuit protection would not be claimed under the one-hour barrier rule.

RESPONSE

With the erection of a partial qualified one-hour rated barrier for portions of the circuits with less than 20 ft. separation, if 20 feet of horizontal separation existed between the redundant unprotected portions of the circuits without intervening combustibles or fire hazards, and if the fire area was protected by automatic fire detection and suppression, compliance with Section III.G.2.b would be achieved.

These types of configuration have to be evaluated on a case-by-case basis by the NRC.

3.5.2 Floor-to-Floor Separation

QUESTION

Where redundant circuits are separated by floor elevation but are within the same fire area due to open hatchways, stairs, etc., what is the NRC's position with regard to separation criteria? If train A is located twenty feet from an open hatchway on the lower elevation and train B is located ten feet from the same opening on the next elevation, would this be considered adequate separation?

RESPONSE

If a wall or floor/ceiling assembly contains major unprotected openings such as hatchways and stairways, then plant locations on either side of such a barrier must be considered as part of a single fire area. Refer to Section #4 of the "Interpretations of Appendix R."

As to the example provided, if train A was separated by a cumulative horizontal distance of 20 feet from train B, with no intervening combustible materials or fire hazards, and both elevations were provided with fire detection and suppression, the area would be in compliance with Section III.G.2.b.

3.6 Intervening Combustibles

3.6.1 Negligible Quantities of Intervening Combustibles

QUESTION

Twenty feet of separation with absolutely no intervening combustibles is a rare case in most nuclear plants. What is the most acceptable method of addressing intervening combustibles? How are various utilities addressing this subject, and what would be sufficient justification to support an exemption request?

RESPONSE

If more than negligible quantities of combustible materials (such as isolated cable runs) exist between redundant shutdown divisions, an exemption request should be filed. [Negligible quantity" is an admittedly judgmental criterion, and this judgment should be made by a qualified fire protection engineer and documented for later NRC audit.] Justifications for such exemptions have been based on the following factors:

1. A relatively large horizontal spatial separation between redundant divisions; all cables qualified to IEEE-383.

2. The presence of an automatic fire suppression system over the intervening combustible (such as a cable tray fire suppression system);

3. The presence of fire stops to inhibit fire propagation in intervening cable trays;

4. The likely fire propagation direction of burning intervening combustibles in relation to the location of the vulnerable shutdown division;

5. The availability of compensating active and passive fire protection.

Any future changes in the cable configuration due to modifications could be handled under 50.59. See the provisions of the license condition in the response to question 8.2.

3.6.2 In-Situ Exposed Combustibles

QUESTIONS

Within Appendix R, Section III.G.2.b, the phrase "twenty feet with no intervening combustible or fire hazards" is utilized. What is the definition of "no intervening combustible?" Is the regulation focused predominantly on the absence of fixed combustibles?

RESPONSE

There is no specific definition of "no intervening combustible." The regulation is focused on the absence of in-situ exposed combustibles. Non combustible materials would not be considered as intervening combustibles.

In BTP CMEB 9.5-1, noncombustible material is defined as:

"Noncombustible Material

a. A material which in the form in which it is used and under the conditions anticipated, will not ignite, burn, support combustion, or release flammable vapors when subjected to fire or heat.

b. Material having a structural base of noncombustible material, as defined in a., above, with a surfacing not over 1/8-inch thick that has a flame spread rating not higher than 50 when measured using ASTM E-84 Test "Surface Burning Characteristics of Building Materials."

In Generic Letter 83-33, we state:

"Staff Position: Section III.G.2.b requires the "separation ...with no intervening combustibles ..." To meet this requirement, plastic jackets and insulation of grouped electrical cables, including those which are coated, should be considered as intervening combustibles."

For fire protection, "no intervening combustibles" means that there is no significant quantities of in-situ materials which will ignite and burn located between redundant shutdown systems. The amount of such combustibles that has significance is a judgmental decision. As with other issues, if the licensees fire protection engineer is concerned that the quantity of combustibles between shutdown divisions may not be considered insignificant by an independent reviewer, an exemption could be requested, or the staff consulted.

Transient materials are not considered as an intervening combustible; however, they must be considered as part of the overall fire hazard within an area.

Cables that are in cable trays which do not have solid sheet metal bottom, sides and top should also be considered as intervening combustibles.

Coated cables with a fire retardant material are also considered as intervening combustibles.

3.6.3 Unexposed Combustibles

QUESTION

Are unexposed combustibles, such as oil in sumps, closed cans, or sealed drums, or electrical cable in conduits, considered as "intervening combustibles?"

RESPONSE

Only oil in closed containers which are in accordance with NFPA 30 or electrical cables in metal conduits (or in cable trays or raceways having solid sheet metal bottom, sides and top) are not considered as intervening combustibles. In situ oil in open sumps is considered to be an intervening combustible; in-situ oil in closed sumps equivalent to NFPA Standard-30 containers is not considered to be an intervening combustible.

3.7 Radiant Energy Shield

3.7.1 Fire Rating

QUESTION

Recently, the NRC Staff indicated that non-combustible radiant energy shields should be tested against ASTM-TD-E-119 based, apparently, on the requirements of BTP CMEB 9.5-1, Rev. 3, a document issued after Appendix R was promulgated. This new requirement would not appear to be required by Appendix R or BTP APCSB 9.5-1 Appendix A. Could the Staff clarify the requirements in this area?

RESPONSE

During the Appendix A reviews, we observed that inside some containments, there were large concentrations of cables converging at electrical penetration areas. In some cases, where the penetrations were grouped by division, shields were placed between the divisions so that radiant energy from a fire involving the cables of one division would not degrade or ignite cables of the other divisions. These shields also directed the convective energy from the fire away from the surviving division. These shields were usually constructed of 1/2-inch marinite board in a metal frame. Appendix R, Section III.G.f refers to these shields as "a noncombustible radiant energy shield." The guidelines in BTP CMEB 9.5-1, Section C.7.a(1)b. indicate that these shields should have a fire rating of 1/2 hour. In our opinion any material with a 1/2 hour fire rating should be capable of performing the required function.

The guidelines of BTP CMEB 9.5-1 relating to a firerated radiant energy shield are being considered in our current reviews of NTOL plants. However, to the extent that an applicant can justify that a proposed radiant energy shield can achieve an equivalent level of safety, we have been accepting shields that have not been tested against the acceptance criteria of ASTM E-119.

In our Appendix R reviews, we have accepted non-fire-rated radiant energy shields that have been demonstrated by fire hazards analysis to provide an acceptable level of protection against the anticipated hazard of a localized fire within the containment. We have also accepted fire-rated metal-sheathed mineral insulated cables, as a radiant energy shield in specific configurations.

3.8 Design Bases

3.8.1 Fire Protection Features NFPA Conformance

QUESTION

Should the fire protection features required by Section III.G conform to the NFPA Codes?

RESPONSE

Yes. For example, Section III G.2 requires an automatic suppression system. Our guidelines would recommend that the system be in accordance with an NFPA Code. If deviations are made from the Code, they should be identified in the FSAR or FHA.

3.8.2 Design Basis Fire

QUESTION

Why isn't the industry allowed to design to protect against a design basis fire?

RESPONSE

Neither the industry nor the Staff has been able to develop criteria for establishing design basis fire conditions for a single "design basis fire" because the in-situ and potential transient combustibles vary widely in different areas of the plant. However, the establishment of a "design basis fire" for specific fire areas or zones is a prerequisite to performance of a valid fire hazards analysis (See Appendix R Section II.B(1) and BTP CMEB 9.5-1 Sections C.b(1) and (2)).

3.8.3 Redundant Trains/Alternate Shutdown

QUESTION

Confusion exists as to what will be classified as an alternate shutdown system and thus what systems might be required to be protected by suppression and detection under Section III.G.3.b. For example, while we are relying upon the turbine-building condensate system for a reactor building fire and the RHR system for a turbine building fire, would one system be considered the alternative to the other. If so, would suppression and detection be required for either or both systems under III.G.3.b? An explanation of alternative shutdown needs to be advanced for all licensees.

RESPONSE

If the system is being used to provide its design function, it generally is considered redundant. If the system is being used in lieu of the preferred system because the redundant components of the preferred system does not meet the separation criteria of Section III.G.2, the system is considered an alternative shutdown capability. Thus, for the example above, it appears that the condensate system is providing alternative shutdown capability in lieu of separating redundant components of the RHR System. Fire detection and a fixed fire suppression system would be required in the area where separation of redundant components of the RHR system is not provided. However, in the event of a turbine building fire, the RHR system would be used for safe shutdown and is not considered an alternative capability. However, one train of the RHR system must be separated from the turbine building.

3.8.4 Control Room Fire Considerations

QUESTION

What considerations should be taken into account in a control room fire? What is the damage that is considered? What actions can the operators take before evacuating the CR? When can the control room be considered safe after a fire for the operator to return?

RESPONSE

The control room fire area contains the controls and instrumental redundant shutdown systems in close proximity (i.e. usually separation is a few inches). Because it is possible to provide shutdown capability that is physically and electrically independent of the fire area, it is our opinion that alternative or dedicated shutdown capability and its associated circuits for the control room be independent of the cables system and components in the control room fire area.

The damage to the system in the control room for a fire that causes evacuation of the control room cannot be predicted. A bounding analysis should be made to assure that safe conditions can be maintained from outside the control room. This analysis is dependent to the specific design. The usual assumptions are:

1. The reactor is tripped in the control room.

2. Offsite power is lost as well as automatic starting of the onsite a.c. generators and the automatic function of valves and pumps whose control circuits could be affected by a control room fire.

The analysis should demonstrate that capability exists to manually achieve safe shutdown conditions from outside the control room by restoring a.c. power to designated pumps, assuring that valve lineups are correct, and assuming that any malfunctions of valves that permit the loss of reactor coolant can be corrected before unrestorable conditions occur.

Note that the only manual action in the control room prior to evacuation usually given credit for is the reactor trip. For any additional control room actions deemed necessary prior to evacuation, a demonstration of the capability of performing such actions would have to be provided. Additionally, assurance would have to be provided that such actions could not be negated by subsequent spurious actuation signals resulting from the postulated fire.

After the fire, the operators could return to the control room when the following conditions have been met:

1. The fire has been extinguished and so verified by appropriate fire protection personnel.

2. The control room has been deemed habitable by appropriate fire protection personnel and the shift supervisor.

3. Damage has been assessed and, if necessary, corrective action has been taken to assure necessary safety, control and information systems are functional (some operators may assist with these tasks) and the shift supervisor has authorized return of plant control to the control room.

4. Turnover procedures which assure an orderly transfer of control from the alternate shutdown panel to the control room has been completed.

After returning to the control room, the operators can take any actions compatible with the condition of the control room. Controls in any area (cabinet) where the fire occurred would not be available. Smoke and fire suppressant

damage in other areas (cabinets) must also be assessed and corrective action taken before controls in such cabinets are deemed functional. Controls in undamaged area (cabinets) could be operated as required. Minor modifications inside the control room may be performed to reach cold shutdown.

4. EMERGENCY LIGHTING

4.1 Illumination Levels

QUESTION

What is the requisite intensity level for emergency lighting for egress routes and areas where shutdown functions must be performed? What are the bases for determining these levels of lighting?

RESPONSE

The level of illumination provided by emergency lighting in access routes to and in areas where shutdown functions must be performed is a level that is sufficient to enable an operator to reach that area and perform the shutdown functions. At the remote shutdown panels the illumination levels should be sufficient for control panel operators.

The bases for estimating these levels of lighting are the guidelines contained in Section 9.5.3 of the Standard Review Plan, which are based on industry standards (i.e., Illuminating Engineering Society Handbook).

Where a licensee has provided emergency lighting per Section III.J Appendix R, we would expect that the licensee verify by field testing that this lighting is adequate to perform the intended tasks.

5. ALTERNATIVE AND DEDICATED SHUTDOWN CAPABILITY

5.1 Safe and Alternative Shutdown

5.1.1 Previously Accepted Alternative Shutdown Capability

QUESTION

As part of the Appendix A review process, some plants had committed to an alternative shutdown system in the form of a remote shutdown panel or remote shutdown system. Footnote 2 to Appendix R describes alternative shutdown capability as being associated with "Rerouting, relocating, or modifying of existing systems." To the extent that an existing remote shutdown system previously reviewed and approved under Appendix A to BTP 9.5-1 does not require modifications, rerouting, or relocating of existing systems, are the requirements of Section III.L of Appendix R backfit?

RESPONSE

Yes. Existing remote shutdown capabilities previously reviewed and approved under Appendix A to BTP APCSB 9.5-1 do not categorically comply with Section III.G.3 of Appendix R. Licensees were requested to re-analyze their plants to determine compliance with Section III.G. If the licensee chooses to use the

option of III.G.3 for provision of safe shutdown capability for certain areas, the criteria of Section III.L are applicable to that capability for that area. See also the response to 5.1.3.

5.1.2 Pre-Existing Alternative Shutdown Capability

QUESTIONS

Some licensees defined safe shutdown capability for purposes of analysis to Section III.G criteria as being composed of both the normal safe shutdown capability and the pre-existing redundant or remote safe shutdown capability which was previously installed as part of the Appendix A process. This definition often took the form of two "safe shutdown trains" comprising (1) one of the two normal safe shutdown trains, and (2) a second safe shutdown train capability which was being provided by the pre-existing remote shutdown capability. This definitional process, which was undertaken by a number of licensees, makes a significant difference in the implementation of Appendix R. Under such a definition, does Section III.L criteria apply when the Commission did not call out Section III.L as a backfit?

RESPONSE

The definitional process mentioned considers an alternative shutdown capability provided under the Appendix A review as a redundant shutdown capability under the Appendix R review. This definitional process is incorrect. For the purpose of analysis to Section III.G.2 criteria, the safe shutdown capability is defined as one of the two normal safe shutdown trains. If the criteria of Section III.G.2 are not met, an alternative shutdown capability is required. The alternative shutdown capability may utilize existing remote shutdown capabilities and must meet the criteria of Sections III.G.3 and III.L of Appendix R. See also the response to 5.1.3.

5.1.3 III.L Backfit

QUESTION

Why do the Staff interpretive memoranda regarding the criteria for satisfaction of Section III.L form the auditable basis for determining compliance to Appendix R when the Commission failed to backfit this section to all plants?

RESPONSE

Although 10 CFR 50.48(b) does not specifically include Section III.L with Sections III.G, J, and O of Appendix R as a requirement applicable to all power reactors licensed prior to January 1, 1979, the Appendix, read as a whole, and the Court of Appeals decision on the Appendix, Connecticut Light and Power, et al. v. NRC, 673 F2d. 525 (D.C. Cir., 1982), demonstrate that Section III.L applies to the alternative safe shutdown option under Section III.G if and where that option is chosen by the licensee. This does not preclude licensees from proposing and justifying other methods, e.g., see Section #1, Process Monitoring Instrumentation, of the "Interpretations of Appendix R."

5.2 Procedures

5.2.1 Shutdown and Repair Basis

QUESTION

With regard to the term "post-fire procedures" the Commission states that it is impossible to predict the course and extent of a fire. Given this, how does one write post-fire shutdown and repair procedures that are both symptomatic and usable to an operator?

RESPONSE

Safe shutdown capabilities including alternative shutdown capabilities are all designed for some maximum level of fire-damage (system unavailabilities, spurious actuations). Since the extent of the fire cannot be predicted, it seems prudent to have the post-fire shutdown procedures guide the operator from full system availability to the minimum shutdown capability. As for repair procedure, similar conditions exist. A repair procedure can be written based on the maximum level of damage that is expected. This procedure would then provide shutdown capability without accurately predicting likely fire damage.

5.2.2 Post Fire Operating Procedures

QUESTION

Does the NRC have any requirements regarding whether post-fire operating procedures should be based upon fire areas, systems, or be symptom-based?

RESPONSE

The NRC does not have requirements, nor do we propose any requirements regarding whether post-fire operating procedures should be based upon fire areas, systems or be symptom-based. We suggest that the post-fire shutdown capabilities designs be reviewed with the plant operation staff and procedures written with their input. See also responses to 5.2.1 and 5.2.3.

5.2.3 Alternative Shutdown Capability

QUESTION

Is it acceptable to develop post-fire operating procedures only for those areas where alternative shutdown is required? (For other areas standard, emergency operating procedures would be utilized in the presence of potential fire damage to a single train.)

RESPONSE

Yes. The only requirement for post-fire operating procedures is for those areas where alternative shutdown is required. For other areas of the plant, shutdown would be achieved utilizing one of the two normal trains of shutdown system. Shutdown in degraded modes (one train unavailable) should be covered by present operator training and abnormal and emergency operating procedures. If the degraded modes of operation are not presently covered, we would suggest

that the operation staff of the plant determine whether additional training or procedures are needed.

5.2.4 Post Fire Procedures Guidance Documents

QUESTION

Do any NRC Staff guidance documents exist relative to the extent, form, nature, etc. of Appendix R post-fire operating procedures?

RESPONSE

No. Other than the criteria of Section III.L, no specific post-fire shutdown procedure guidance has been developed. See also responses to 5.2.1, 5.2.2 and 5.2.3. The inspection process will be flexible in this regard as long as the licensee can show compliance with the criteria of Section III.L.

5.3 Safe Shutdown and Fire Damage

5.3.1 Circuit Failure Modes

QUESTION

What circuit failure modes must be considered in identifying circuits associated by spurious actuation?

RESPONSE

Sections III.G.2 and III.L.7 of Appendix R define the circuit failure modes as hot shorts, open circuits, and shorts to ground. For consideration of spurious actuations, all possible functional failure states must be evaluated, that is, the component could be energized or de-energized by one or more of the above failure modes. Therefore, valves could fail open or closed; pumps could fail running or not running; electrical distribution breakers could fail open or closed. For three-phase AC circuits, the probability of getting a hot short on all three phases in the proper sequence to cause spurious operation of a motor is considered sufficiently low as to not require evaluation except for any cases involving Hi/Lo pressure interfaces. For ungrounded DC circuits, if it can be shown that only two hot shorts of the proper polarity without grounding could cause spurious operation, no further evaluation is necessary except for any cases involving Hi/Lo pressure interfaces.

5.3.2 "Hot Short" Duration

QUESTION

If one mode of fire damage involves a "hot short" how long does that condition exist as a result of fire damage prior to terminating in a ground or open circuit and stopping the spurious actuation?

RESPONSE

We would postulate that a "hot short" condition exists until action has been taken to isolate the given circuit from the fire area, or other actions as

appropriate have been taken to negate the effects of the spurious actuation. We do not postulate that the fire would eventually clear the "hot short."

5.3.3 Hot Shutdown Duration

QUESTION

Since hot shutdown cannot be maintained indefinitely, hot shutdown equipment needs to be protected for only a limited period of time. How long must a plant remain in that condition in order to meet the requirement for achieving hot shutdown with a single train of equipment?

RESPONSE

Section III.G.1 requires that the one train of systems needed to achieve and maintain hot shutdown be free of fire damage. Thus, the systems needed are to be completely protected from the fire regardless of time. If the intent of the question concerns how long these systems must operate, these systems must be capable of operating until the systems needed to achieve and maintain cold shutdown are available.

5.3.4 Cooldown Equipment

QUESTION

Certain equipment is necessary only in the cooldown phase when the plant is neither in hot nor cold shutdown condition as defined by technical specifications. Is this equipment considered hot or cold shutdown in nature?

RESPONSE

As stated in Section III.G.1, one train of systems needed to achieve and maintain hot shutdown conditions must be free of fire damage. Systems necessary to achieve and maintain cold shutdown can be repaired within 72 hours. Thus, if this certain equipment necessary only in the cooldown phase, is used to achieve cold shutdown, it can be repaired within 72 hours. If the certain equipment is maintaining hot shutdown while repairs are being made, one train must be free of fire damage. See also Section #2 of the "Interpretations of Appendix R."

5.3.5 Pressurizer Heaters

QUESTION

Most PWRs do not require pressurizer heaters to maintain stable conditions. In fact, the Commission does not consider heaters to be important to safety and they are not required to meet Class IE requirements. Are they required for hot shutdown under Appendix R? If yes, then how does a plant meet the separation requirements of Section III.G.2.d,e. or f without major structural alterations to the pressurizer?

RESPONSE

One train of systems necessary to achieve and maintain hot shutdown conditions must be free of fire damage. PWR licensees have demonstrated the capability to achieve and maintain stable hot shutdown conditions without the use of pressurizer heaters by utilizing the charging pump and a water solid pressurizer for reactor coolant pressure control.

5.3.6 On-Site Power

QUESTION

Appendix R, Section III.L.4 states in part, "If such equipment and systems will not be capable of being powered by both on-site and off-site electrical power systems because of fire damage, an independent on-site power system shall be provided." Again, in Appendix R, Section III.L.5, the statement is made "If such equipment and systems used prior to 72 hours after the fire will not be capable of being powered by both onsite and offsite electrical power systems because of fire damage, an independent onsite power system shall be provided." An interpretation is needed of the meaning and the applicability of these two quotes relative to alternative shutdown capabilities.

RESPONSE

These statements are meant to indicate that the alternative shutdown capability should be powered from an onsite power system independent (both electrically and physically) from the area under consideration. Further, if the normal emergency onsite power supplies (diesel generators) are not available because of fire damage, then a separate and independent onsite power system shall be provided. As an example, some plants are utilizing a dedicated onsite diesel generator or gas turbine to power instrumentation and control panels which are a part of the alternative shutdown capability.

5.3.7 Torus Level Indication

QUESTION

For BWRs, I&E Information Notice 84-09 suggests that licensees need to have torus level indication post-fire. If an analysis shows that a level does not change significantly during any operational modes or worse case conditions, is level indication still required? Is an analysis in file adequate or is an exemption request required?

RESPONSE

It continues to be our position that torus (suppression pool) level indication is the preferred post-fire monitoring instrumentation in order to confirm the availability of the torus (suppression pool) as a heat sink. We recognize that existing analyses indicate that suppression pool level is not significantly changed during emergency shutdown conditions. However, we believe the operator should be able to confirm that spurious operations or other unanticipated occurrences have not affected the torus function. An analysis of torus level change by itself is not considered an acceptable basis.

5.3.8 Short Circuit Coordination Studies

QUESTION

Should circuit coordination studies consider high impedance faults?

RESPONSE

Yes, in those coordination studies performed to assess the vulnerability of safe shutdown capability due to fires involving associated circuits. To meet the separation criteria of Section III.G.2 and III.G.3 of Appendix R, high impedance faults should be considered for all associated circuits located in the fire area of concern. Thus, simultaneous high impedance faults (below the trip point for the breaker on each individual circuit) for all associated circuits located in the fire area should be considered in the evaluation of the safe shutdown capability. Clearing such faults on associated circuits which may effect safe shutdown may be accomplished by manual breaker trips governed by written procedures. Circuit coordination studies need not be performed if it is assumed that shutdown capability will be disabled by such high impedance faults and appropriate written procedures for clearing them are provided.

5.3.9 Diagnostic Instrumentation

QUESTION

What is diagnostic instrumentation?

RESPONSE

Diagnostic instrumentation is instrumentation, beyond that previously identified in Attachment 1 to I&E Information Notice 84-09, needed to assure proper actuation and functioning of safe shutdown equipment and support equipment (e.g., flow rate, pump discharge pressure). The diagnostic instrumentation needed depends on the design of the alternative shutdown capability. Diagnostic instrumentation, if needed, will be evaluated during the staff's review of the licensee's proposal for the alternative shutdown capability.

5.3.10 Design Basis Plant Transients

QUESTION

What plant transients should be considered in the design of the alternative or dedicated shutdown systems?

RESPONSE

Per the criteria of Section III.L of Appendix R a loss of offsite power shall be assumed for a fire in any fire area concurrent with the following assumptions:

a. The safe shutdown capability should not be adversely affected by any one spurious actuation or signal resulting from a fire in any plant area; and

b. The safe shutdown capability should not be adversely affected by a fire in any plant area which results in the loss of all automatic function (signals, logic) from the circuits located in the area in conjunction with one worst case spurious actuation or signal resulting from the fire; and

c. The safe shutdown capability should not be adversely affected by a fire in any plant area which results in simultaneous spurious actuation of all valves in high-low pressure interface lines.

5.3.11 Alternative/Dedicated Shutdown v. Remote Shutdown Systems

QUESTION

What is the difference between the alternate/dedicated shutdown systems required for fire protection and the remote shutdown systems recommended under Chapter 7 of the SRP?

RESPONSE

The remote shutdown systems recommended under Chapter 7 of the SRP are needed to meet GDC 19. These remote shutdown systems need to be redundant and physically independent of the control room in order to meet GDC 19. For GDC 19, damage to the control room is not considered. Alternate shutdown systems for Appendix R need not be redundant but must be both physically and electrically independent of the control room.

6. OIL COLLECTION SYSTEMS FOR REACTOR COOLANT PUMP

6.1 Lube Oil System Seismic Design

QUESTION

If the reactor coolant pump lube oil system and associated appurtenances are seismically designed, does the lube oil collection system also require seismic design? Is an exemption required?

RESPONSE

Where the RCP lube oil system is capable of withstanding the safe shutdown earthquake (SSE), the analysis should assume that only random oil leaks from the joints could occur during the lifetime of the plant. The oil collection system, therefore, should be designed to safely channel the quantity of oil from one pump to a vented closed container. Under this set of circumstances, the oil collection system would not have to be seismically designed.

An exemption is required for a non-seismically designed oil collection system. The basis for this exemption would be that random leaks are not assumed to occur simultaneously with the seismic event, since the lube oil system is designed to withstand the seismic event. However, the Rule, as written, does not make this allowance.

6.2 Container

QUESTION

It would appear that a literal reading of Section III.O regarding the oil collection system for the reactor coolant pump could be met by a combination of seismically designed splash shields and a sump with sufficient capacity to contain the entire lube oil system inventory. If the reactor coolant pump is seismically designed and the nearby piping hot surfaces are protected by seismically designed splash shields such that any spilled lube oil would contact only cold surfaces, does this design concept conform to the requirements of the rule?

RESPONSE

If the reactor coolant pump, including the oil system, is seismically designed and the nearby hot surfaces of piping are protected by seismically designed splash shields such that any spilled lube oil would contact only cold surfaces, and it could be demonstrated by engineering analysis that sump and splash shields would be capable of preventing a fire during normal and design basis accident conditions, the safety objective of Section III.O would be achieved. Such a design concept would have to be evaluated under the exemption process. The justification for the exemption should provide reasonable assurance that oil from all potential pressurized and unpressurized leakage points would be safely collected and drained to the sump. The sump should be shown capable of safely containing all of the anticipated oil leakage. The analysis should verify that there are no electric sources of ignition.

7 BRANCH TECHNICAL POSITION CMEB 9.5-1

7.1 Fire Protection and Seismic Events

QUESTION

For which situations other than the reactor coolant pump lube oil system are seismic events assumed to be initiators of a fire?

RESPONSE

The guidelines for the seismic design of fire protection systems which cover other general situations is delineated in BTP CMEB 9.5-1 C.1.C(3) and (4):

"(3) As a minimum, the fire suppression system should be capable of delivering water to manual hose stations located within hose reach of areas containing equipment required for safe plant shutdown following the safe shutdown earthquake (SSE). In areas of high seismic activity, the staff will consider on a case-by-case basis the need to design the fire detection and suppression systems to be functional following the SSE.

(4) The fire protection systems should retain their original design capability for (a) natural phenomena of less severity and greater frequency than the most severe natural phenomena (approximately once in 10 years) such as tornadoes, hurricanes, floods, ice storms, or small-intensity earthquakes

that are characteristic of the geographic region, and (b) potential man-made site-related events such as oil barge collisions or aircraft crashes that have a reasonable probability of occurring at a specific plant site. The effects of lightning strikes should be included in the overall plant fire protection program."

We have considered California as being a high seismic activity area.

For those plants reviewed under Appendix A, our position is (A.4):

"Postulated fires or fire protection system failures need not be considered concurrent with other plant accidents or the most severe natural phenomena."

Our guidelines on the seismic design of fire protection systems installed in safety related areas are delineated in Regulatory Guide 1.29 "Seismic Design Classification," paragraph C.2. The failure of any system should not affect a system from performing its safety function.

Our guidelines on the seismic design of hydrogen lines is delineated in BTP CMEB 9.5-1 Section C.5.d(5):

(5) Hydrogen lines in safety-related areas should be either designed to seismic Class I requirements, or seleved such that the outer pipe is directly vented to the outside, or should be equipped with excess flow valves so that in case of a line break, the hydrogen concentration in the affected areas will not exceed 2%.

All PWR's have a hydrogen line going to the Volume Control Tank (Make-up Tank) that needs to be protected.

To identify plant specific situations in which seismic events could initiate a fire in a specific plant area, the fire protection engineer and systems engineer performing the fire hazards analysis should be concerned with in-situ combustible materials which can be released in a manner such that they could contact in-situ ignition sources by a seismic event. An example of this would be the rupture of the RCP lube oil line directly above the hot reactor coolant piping. The fire protection engineer should also be concerned with seismic induced ignition sources, electrical or mechanical, which could contact nearby in-situ combustible materials.

It should be noted that the guidelines cited above from BTP CMEB 9.5-1 are not applicable to plants reviewed and approved under BTP APCSB 9.5-1.

7.2 Random Fire and Seismic Events

QUESTION

Is a random fire to be postulated concurrent with a seismic event?

RESPONSE

Our position, as stated in Section C.1.6 of BTP CMEB 9.5-1, is "Worst case fire need not be postulated to be simultaneous with nonfire-related failures in safety systems, plant accidents, or the most severe natural phenomena."

Where plant systems are designed to prevent the release of combustible materials caused by a seismic event, such as a dike around a fuel oil tank transformer, or seismic supports for hydrogen lines, then no fire need to be arbitrarily assumed to take place in the fire hazards analysis.

Because it is impossible to completely preclude the occurrence of a seismically induced fire, Section C.6.c(4) of CMEB 9.5-1 states:

> "Provisions should be made to supply water at least to standpipes and hose connections for manual firefighting in areas containing equipment required for safe plant shutdown in the event of a safe shutdown earthquake. The piping system serving such hose stations should be analyzed for SSE loading and should be provided with supports to ensure system pressure integrity. The piping and valves for the portion of hose standpipe system affected by this functional requirement should, as a minimum, satisfy ANSI B31.1, 'Power Piping.' The water supply for this condition may be obtained by manual operator actuation of valves in a connection to the hose standpipe header from a normal seismic Category I water system such as the essential service water system. The cross connection should be (a) capable of providing flow to at least two hose stations (approximately 75 gpm per hose station), and (b) designed to the same standards as the seismic Category I water system; it should not degrade the performance of the seismic Category I water system."

The post-seismic procedures should include a damage survey, and a determination of whether any fires were initiated as a result of the seismic event. See also the response to Question 7.1.
It should be noted that the guidelines cited above from BTP CMEB 9.5-1 are not applicable to plants reviewed and approved under BTP APCSB 9.5-1.

8. LICENSING POLICY

8.1 Fire Hazard Analysis/Fire Protection Plan Updating

QUESTION

What constitutes the fire protection plan required by 50.48(a)? Should licensees have programs to maintain the fire hazards analysis and the fire protection plan current or updated periodically? How often should the plan be updated? Must revisions be provided to the NRC?

RESPONSE

The basic elements required in the fire protection plan are described in 10 CFR 50.48(a). The fire protection program that implements that plan should include the details of the fire hazards analysis. The plan and program may be separate or combined documents and must be kept current with the fire hazards analysis updated prior to making modifications. We would expect that for most plants licensed after January 1, 1979, the fire protection plan and program would be part of the FSAR and therefore, would be updated and sumitted to the NRC in conformance with the requirements of 10 CFR 50.71(e). For plants whose fire protection plans and programs are not part of the FSAR, we would expect that they would be updated prior to making modifications and kept at the site in an auditable form for NRC inspection.

8.2 Fire Protection License Condition

QUESTION

What is the significance of the fire protection license condition?

RESPONSE

For those plants licensed prior to January 1, 1979 (Appendix R plants), the license condition is the legally enforceable requirement for the fire protection features other than those required by III.G, III.J and III.O that were accepted by the NRC staff as satisfying the provisions of Appendix A to Branch Technical Position BTP APCSB 9.5-1.

For those plants licensed after January 1, 1979, the license condition is the legally enforceable requirement for all fire protection features at the facility.

Appendix R is only enforceable on Post 1979 plants through the license condition. 10 CFR 50.48 makes Appendix R applicable only to plants licensed prior to January 1, 1979. Refer to 10 CFR 50.48(e).

The NRC has drafted new language for this license condition which delineates the circumstances under which the fire protection plan may be revised. We are now including this language in all new licenses and are considering amending present licenses. The revised language is as follows.

"9.5 Fire Protection Program (Section 9.5, SER)

a. The licensee shall implement and maintain in effect all provisions of the approved fire protection program as described in the Final Safety Analysis Report for the facility (or as described in submittals dated _____) and as approved dated _____ in the SER (and supplements dated _____) subject to provisions b & c below.

b. The licensee ma make no change to the approved fire protection program which would decrease the level of fire protection in the plant without prior approval of the Commission. To make such a change the licensee must submit an application for license amendment pursuant to 10 CFR 50.90.

c. The licensee may make changes to features of the approved fire protection program which do not significantly decrease the level of fire protection without prior Commission approval provided (a) such changes do not otherwise involve a change in a license condition or technical specification or result in an unreviewed safety question (see 10 CFR 50.59), and (b) such changes do not result in failure to complete the fire protection program approved by the Commission prior to license issuance. The licensee shall maintain, in an auditable form, a current record of all such changes including an analysis of the effects of the change on the fire protection program, and shall make such records available to NRC inspectors upon request. All changes to the approved program shall be reported annually to the Director of the Office of Nuclear Reactor Regulation, along with the FSAR revisions required by 10 CFR 50.71(e).

8.3 III G, J and O Exemptions for Future Modifications

QUESTION

Is an exemption required from Appendix R Sections other than III.G, III.J and III.O for future modifications that do not comply with such sections?

RESPONSE

Yes, for those modifications which deviate from the previously accepted fire protection configurations. The exclusion of the applicability of Sections of Appendix R other than III.G, III.J, and III.O is limited to those features "accepted by the NRC staff as satisfying the provisions of Appendix A to Branch Technical Position BTP APCSB 9.5-1 reflected in staff fire protection safety evaluation reports issued prior to the effective date of the rule." No re-analysis is required except for proposed modifications which would alter previously approved features. This position is based directly on CFR 50.48(b). Also see response to Question 8.2.

8.4 Future Changes

QUESTION

Will future changes (no matter how minor) to approved configurations be required to be reviewed by the Staff in an exemption request? At what point may the process of 10 CFR 50.59 be invoked?

RESPONSE

If a future modification involves a change to a license condition or technical specification, a license amendment request must be submitted. When a modification not involving a technical specification or license condition is planned, the evaluation made in conformance with 10 CFR 50.59 to determine whether an unreviewed safety question is involved must include an assessment of the modification's impact on the existing fire hazards analysis for the area. This part of the evaluation must be performed by the person responsible for the fire safety program for the plant. The assessment must include the effect on combustible loading and distribution and the consideration of whether circuits or components, including asociated circuits, for a train of equipment needed for safe shutdown are being affected or a new element introduced in the area. If this evaluation concludes that there is no significant impact, this conclusion and its basis must be documented as part of the 50.59 evaluation and be available for future inspection and reference. If the evaluation finds that there is an impact that could result in the area either not being in conformance with Appendix R, or some other aspect of the approved fire protection program, or being outside the basis for an exemption that was granted for the area involved, the licensee must either make modifications to achieve conformance or justify and request exemption (or, for the post 1979 plants, approval) from the NRC. See also responses to Questions 8.1 and 8.2.

8.5 Schedular and Blanket Exemptions

QUESTION

If an exemption is warranted and at the same time the provisions of the rule indicate that the appropriate schedular deadlines have passed, should a scheduler exemption be filed at the same time as the technical exemption request?

If as part of the exemption request the utility is proposing to make modifications to achieve a reasonable level of conformance with Appendix R, and if the associated "clock" has run out for that type of modification, should the technical exemption request and the description of the modification be filed with a schedular exemption?

When filing a schedular exemption under §50.12, it is not always clear from what specific paragraphs of §50.48 an exemption should be sought. Is it acceptable to request a blanket exemption from the schedular provisions of 10 CFR §50.48 without a specification by paragraph?

If an exemption request is submitted to meet newly published interpretations of Appendix R, when does the licensee need to be in compliance? Is the schedule presented in Appendix R still the guideline or must a new schedule be developed under a different criteria?

RESPONSE

We do not intend to issue any further extensions of the 50.48(c) schedules. When a licensee determines that a 50.48(c) schedule cannot be met, the appropriate NRC Region must be notified. This policy is further explained in the generic letter transmitting this package.

8.6 Trivial Deviations

QUESTION

What guidance can the NRC Staff give the industry regarding when a deviation from the literal interpretation of Appendix R is sufficiently trivial as to not require a specific exemption?

RESPONSE

The significance of a deviation must be judged as part of a fire hazards analysis. The conclusion of this analysis is always subject to review by the NRC inspector.

8.7 Revised Modifications

QUESTION

What is the process for altering configurations not yet implemented for plants with Appendix R SERs?

RESPONSE

If licensees propose changes to their NRC approved modifications, they must submit their new proposal and revised schedule for implementation for NRC approval.

This change must be justified as to (1) the reason for the change, (2) the basis for the revised schedule, and (3) the interim measures that will be provided to assure post fire shutdown capability until the final modifications are implemented. Whether or not enforcement action will be taken based upon continued noncompliance with Appendix R will be decided by the NRC Regional Administrator in consultation with NRC Headquarters.

8.8 Smallest Opening in a Fire Barrier

QUESTION

What is the smallest opening allowed in a fire area barrier for which an exemption request is not needed?

RESPONSE

Unsealed openings in the configuration for which approval was obtained by an approved laboratory or the NRC staff would be acceptable.

Our position on openings is given in Section 5.a(3) of BTP CMEB 9.5-1:

"(3) Openings through fire barriers for pipe, conduit, and cable trays which separate fire areas should be sealed or closed to provide a fire resistance rating at least equal to that required of the barrier itself. Openings inside conduit larger than 4 inches in diameter should be sealed at the fire barrier penetration. Openings inside conduit 4 inches or less in diameter should be sealed on each side of the fire barrier and sealed either at both ends or at the fire barrier with non-combustible material to prevent the passage of smoke and hot gases. Fire barrier penetrations that must maintain environmental isolation or pressure differentials should be qualified by test to maintain the barrier integrity under such conditions."

The unsealed opening(s) allowed in a fire area boundary or a barrier which separates redundant shutdown divisions should not permit flame, radiant energy, smoke and hot gases to pass through the barrier and cause damage to redundant shutdown divisions on the other side. The licensee should assess the adequacy of existing protection and should determine the minimum size based on a fire hazards analysis and conservative fire protection engineering judgment. If the significance of openings in fire barriers is marginal, a formal exemption request could be submitted or the staff consulted. The basis for the lack of significance should be available for review by NRC Inspectors.

Our acceptance of unprotected openings in fire barriers would depend upon the quantity and nature of combustible materials on either side of the barrier; the location of the opening(s) in relation to the ceiling (for openings in walls); the location, vulnerability and importance of shutdown systems on either side of the barrier; and compensating fire protection.

See also Section #4 of the "Interpretations of Appendix R."

8.9 NFPA Code Deviation

QUESTION

Is an exemption/deviation required for deviations from NFPA Codes?

RESPONSE

Deviations from the codes should be identified and justified in the FSAR or FHA.

An exemption is not required for NFPA codes. NRC guidelines reference certain NFPA codes as guidelines to the systems acceptable to the staff, and therefore such codes may be accorded the same status as Regulatory Guides.

When the applicant/licensee states that its design "meets the NFPA codes" or, "meets the Intent of the NFPA Codes" and does not identify any deviations from such codes, NRR and the Regions expect that the design conforms to the code and the design is subject to inspection against the NFPA codes.

8.10 "ASTM E-119" Design Basis

QUESTION

Is an exemption/deviation required, if components are designed to withstand an "ASTM E-119" fire?

RESPONSE

Some cables are being developed for high temperature (e.g., 1700°F) applications. An exemption would be required if such cable is used in lieu of the alternatives of III.G.2 or III.G.3 in a pre-1979 plant. A deviation from the guidelines would be required for similar applications in a post 1979 plant.

8.11 Plants Licensed After January 1, 1979

QUESTION

What fire protection guidelines and requirements apply to the plants licensed after January 1, 1979?

RESPONSE

Post-1979 plants are subject to:

- GDC 3
- 10 CFR 50.48(a) and (e)
- The guidelines identified in the footnotes to 50.48(a)
- Guidelines documents issued after January 1, 1979.

- Commitments made to meet the requirements of Appendix R; or specific sections such as III.G, III.J, III.O; or Appendix A to BTP APSCB 9.5-1; or BTP CMEB 9.5-1, which includes the requirements of Appendix R* and the previous guidance documents incorporated into the Branch Technical Position.

The license for each plant licensed after January 1, 1979 contains a license condition which identifies by reference the approved fire protection program for that plant.

*A deficiency in the BTP CMEB 9.5-1 has been noted in that a requirement in Appendix R Section III.G.3.b to provide alternative or dedicated shutdown capability in an area where both redundant safe shutdown trains could be damaged by suppression activities or inadvertent operation or rupture of fire suppression systems is not included. This requirement will be added in the next revision of the BTP.

8.12 Cold Shutdown Equipment Availability

QUESTION

A. Can a licensee achieve compliance with III.G.1(b) by demonstrating that one train of cold shutdown equipment will remain free of fire damage?

B. In demonstrating that one train of cold shutdown equipment will remain free of fire damage, is a licensee limited to the three alternatives in III.G.2?

RESPONSE

A. Yes.

B. No.

8.13 Guidance Documents

QUESTION

Please list all NRR guidance documents and position papers issued since Appendix R was promulgated.

RESPONSE

Fire Protection Guidance Issued Since January 1, 1975:

IE Information Notices

No. 83-41: Actuation of fire suppression systems causing inoperability of safety related equipment.

No. 83-69: Improperly installed fire dampers at nuclear power plants.

No. 83-83: Use of portable radio transmitters inside nuclear power plants.

*No. 84-09: Lessons Learned From NRC Inspections of Fire Protection Safe Shutdown Systems (10 CFR 50, Appendix R)

Standard Review Plan

9.5.1, Rev. 1 Fire Protection System, dated 5/1/76

9.5.1, Rev. 2 Fire Protection Program, dated 03/78

9.5.1, Rev. 3 Fire Protection Program, July 1981.

Regulations

10 CFR Part 50: Proposed fire protection program for nuclear power plants operating prior to January 1, 1979, dated May 29, 1980. Federal Register Vol. 45, No. 105, 36082.

10 CFR Part 50: Fire protection program for operating nuclear power plants, dated November 19, 1980. Federal Register Vol. 45, No. 225, 76602.

10 CFR Part 50: Fire protection rule corrections, dated September 8, 1981. Federal Register Vol. 46, No. 173, 44734.

Generic Letters

NOTE: The following documents were obtained from the Palisades file Docket No. 50-255. Similar documents should be in the file for other operating facilities. The dates may vary slightly.

1. Letter dated 9/28/76 - Enclosing App. A to BTP APCSB 9.5-1 and supplementary guidance on information needed for fire protection program evaluation.

2. Letter dated 12/1/76 - Enclosing sample Technical Specifications and an errata sheet.

3. Letter dated 8/19/77 - Enclosing "Nuclear Plant Fire Protection Functional Responsibilities, Administrative Controls and Quality Assurance."

4. Letter dated 6/8/78 - Re: Manpower requirements for operating reactors.

5. Letter dated 9/7/79 - Re: Minimum fire brigade shift size.

6. Letter dated 9/14/79 - Enclosing staff positions - safe shutdown capability.

7. Letter dated 10/31/80 - Enclosing new 10 CFR 50.48 regarding fire protection schedules for operating nuclear power plants.

8. Letter dated 11/24/80 - Enclosing a copy of revised 10 CFR 50.48 and new App. R to 10 CFR 50, and a summary of open items from the SER for the BTP APCSB 9.5-1 review.

9. Letter dated 2/20/81 - Generic Letter 81-12 identifying information needed for NRC review of modifications for alternative shutdown capability.

10. Letter dated 4/7/82 - Provided clarification to Generic Letter 81-12 and guidance on information needed for NRC review of exemption requests.

11. Letter dated 10/6/82 - Generic Letter 82-21; provided criteria for annual, biennial, and triennial audits required by Technical Specifications.

*12. Letter dated 10/19/83 - Generic Letter 83-33; NRC Positions on Certain Requirements of Appendix R to 10 CFR 50.

Staff Generic Positions

1. Letter, Denton to Bernsen, dated 4/20/82 - Control room fires.

*2. SECY 83-269, dated July 5, 1983 - Attachments B and C.

3. Memo, Eisenhut to Olshinski, dated 12/30/83 - Physical independence of electrical systems.

4. Memo, Eisenhut to Jordan, dated 10/24/83 - Bullet resistant fire doors.

*Staff positions regarding the need for certain exemptions delineated in this guidance document have been revised per the "Interpretations of Appendix R".

8.14 Deviation From Guidance Documents

QUESTION

If a utility determines that a deviation from a guidance document exists, does an exemption request need to be filed? If so, what is the legal basis for this requirement?

RESPONSE

No.

8.15 Staff Interpretation of Appendix R

QUESTION

How does the Staff initiate interpretations of Appendix R in a manner which ensures their technical adequacy and consistency with the rule's objectives (e.g., presentation to ACRS, issue for comment as in draft regulatory guides, etc.)?

RESPONSE

Staff positions are initiated when our experience shows that generic issues are identified that require clarification. These positions are reviewed for accuracy and consistency by the cognizant Division Directors. Usually, they are not issued for comment. However, Generic Letter 83-33 was commented on by the NUFPG since it was initiated, in part, at their request.

8.16 Dissemination of New Staff Positions

QUESTION

Will licensees be automatically sent a copy of new Staff position papers as they are developed?

RESPONSE

The Staff positions on generic subjects are considered for issuance in Generic Letters from ONRR and Information Notices or Bulletins from OI&E. Staff positions issued for specific questions on specific plants are not given generic promulgation because they normally involve plant specific design considerations.

8.17 Equivalent Alternatives

QUESTION

How does a licensee demonstrate that alternative measures are equivalent to the measures of Section III.G.2 in order to obtain an exemption lacking a formal definition of the term "free of fire damage"?

RESPONSE

See Item #3 of "Interpretations of Appendix R."

8.18 Coordination Study Update

QUESTION

Circuit modifications are an ongoing process. How recent must a coordination study be in order to be valid in protecting circuits associated by common power source?

RESPONSE

We would expect that as circuit modifications are made, the design package would address the electrical protection required and the effects of this protection on the coordination of the protection for the power distribution system. This type of consideration should be included in the evaluation required by 10 CFR 50.59 Changes, Tests and Experiments. The design package and modification evaluation could not be complete without consideration of the coordination study. Therefore, we would expect that the coordination studies would be current with the last circuit modification made.

8.19 Exemption Request Threshold

QUESTION

(a) What is the threshold for exemption requests? (b) Is it necessary to file a request for each and every possible deviation from Appendix R?

RESPONSE

Typical examples are discussed in the response to Questions 8.19.1 through 8.19.4.

(a) The licensee must develop its criteria for an exemption request threshold.

(b) No.

8.19.1 Penetration Designs Not Laboratory Approved

QUESTION

Where penetration designs have been reviewed and approved by NRC but have not been classified by an approval laboratory, will it be necessary to submit an exemption request?

RESPONSE

No.

8.19.2 Individual vs. Package Exemptions

QUESTION

How do we submit future modification exemption requests, etc.? Would NRC prefer them individually, or developed and submitted in packages for review and approval?

RESPONSE

Future exemptions should be submitted individually, if they are independent of each other.

8.19.3 Exemption Request Supporting Detail

QUESTION

When an exemption request is filed, what criteria are used to determine the level of detail needed to support the request?

RESPONSE

See Enclosure 2 of NRC's letter to all licensees dated April-May 1982.

8.19.4 50.12 vs. 50.48 Exemption Requests

QUESTION

With regard to exemption requests for future modifications, will they be submitted under 50.12 or 50.48?

RESPONSE

10 CFR 50.12.

8.20 Post January 1, 1979 Plants and Exemption Requests

QUESTION

Do plants licensed after January 1, 1979 which have committed to meet the requirements of Section III.G, III.J and III.O and are required to do so as a license condition, need to request exemptions for alternative configurations?

RESPONSE

No; however, deviations from the requirements of Section III.G, III.J and III.O should be identified and justified in the FSAR or FHA and the deviation would probably require a license amendment to change the license condition. See responses 8.1 and 8.2.

8.21 NRC Approval for BTP CMEB 9.5-1 Deviations

QUESTION

Do future deviations from BTP CMEB 9.5-1 guidelines require approval by the NRC? Do such deviations constitute a violation of license conditions?

RESPONSE

Compliance with guidelines in the BTP is only required to the extent that they were incorporated in the approved Fire Protection Program as identified in the license condition.

When the new license condition is in place (See Response 8.2), future deviations may be made in accordance with the procedure stated therein. With present non-uniform license conditions, such deviations may or may not require a license amendment. In the absence of a license amendment, a violation may exist.

9. INSPECTION POLICY

9.1 Safety Implications

QUESTION

Since the Commission states that fire damage cannot be defined and fire spread cannot be predicted, how does the Commission determine which Appendix R violations have "important safety implications?"

RESPONSE

III.G.2 provides alternatives to ensure that one of the redundant trains is free of fire damage. Fire spread within one area cannot be predicted, but damage is limited to one fire area.

the same fire area that are needed for safe shutdown or can adversely affect safe shutdown, and are not protected by the features of III.G.2, III.G.3 or an approved alternative.

9.2 Uniform Enforcement

QUESTION

How does the Commission ensure that violations of the rule are uniformly treated between regions?

RESPONSE

Each Region evaluates violations in accordance with the NRC Enforcement Policy, 10 CFR 2, Appendix C. The Policy provides guidance for the determination of appropriate enforcement sanctions for violations. The Office of Inspection and Enforcement provides guidance for and monitors Regional implementation of the Policy to ensure a uniform application. In addition, the policy requires that all escalated enforcement actions be approved by the Director of the Office of Inspection and Enforcement.

9.3 NTOL Inspections

QUESTION

Will NTOLs be subject to an Appendix R audit now being performed on plants licensed to operate prior to January 1, 1979? Or, will the current review and analysis being performed by the Staff be satisfactory?

RESPONSE

Yes, NTOLs will be subject to the Appendix R audit; the TI 2515/62 is being revised to reflect the appropriate requirements for NTOLs' and it is our intent to conduct such inspections prior to issuing the operating license.

10 CFR 50.48 requires each such plant to have a fire protection plan. Their operating license will contain a specific license condition to implement their approved fire protection program which must identify deviations from Appendix R. The fire protection inspections will be against the particular license conditions.

9.4 Future TI 2515/62 Revisions

QUESTION

Does the NRC plan to issue a new or revised version of Temporary Instruction 2515/62 for future Appendix R audits?

RESPONSE

Yes.

9.5 Documentation Supplied by Licensee

QUESTION

Temporary Instruction 2515/62 provided a list of documentation that the NRC needs to review as part of the audit process. In past audits, the NRC has requested additional information other than that contained on the list. Will a new list of documentation be developed?

RESPONSE

The documentation listing Provided in TI-2515/62 does not restrict the inspection team from enhancing inspection efficiency by requesting a licensee to provide additional relevant documentation. A new listing of documentation for TI-2515/62 is not being developed.

9.6 Subsequent Inspections

QUESTION

To what extent will Appendix R issues be raised at future Regional I&E Fire Protection Audits after a successful Appendix R audit? For example, if an area has already been reviewed and no noncompliance found, will it be subject to later review and reinterpretation by the Staff?

RESPONSE

The Appendix R inspections are conducted on a sample basis. These inspections do not certify that all possible items of noncompliance with Appendix R have been identified. The inspection results do provide a basis for a determination of the adequacy of a licensee's Appendix R reanalysis, modification and preparation.

When a noncompliance with Appendix R requirements is identified, a notice of violation will be issued to ensure adequate corrective action. In those cases in which the licensee believes that the staff has invoked a reinterpretation of adequacy in areas which had previously been reviewed, NRC's procedures for appeal would be applicable.

9.7 NRC List of Conforming Items

QUESTION

At the end of the audit, will the NRC provide a list of items that had been reviewed and found in conformance with Appendix R? To date, only areas of nonconformance have been specifically identified in exit interviews.

RESPONSE

Subsequent to an Appendix R inspection, the NRC will not provide a list of items reviewed and found to be in conformance with Appendix R.

We do list the areas inspected and where non-compliances were not found.

9.8 Inspection Re-review

QUESTION

Where assumptions are made and clearly stated within the analysis submitted to NRR for review, will such assumptions be subject to a second review by OI&E during the inspection process?

Where assumptions are made in conjunction with the analysis, should exemption requests be filed just to provide protection for the licensee?

If NRR accepts a licensee's selection of equipment and shutdown paths as being sufficient to meet the Appendix R shutdown criteria, will OI&E review and have the right to challenge the approved shutdown paths and approved equipment selection? Or will they only check the shutdown paths and equipment in question to see that they meet the Appendix R requirements, i.e., separation?

RESPONSE

To the extent that a licensee's submittal to NRR is comprehensive and sufficiently detailed, the basis for the OI&E Appendix R inspection will be the assumptions, shutdown paths and equipment selections approved by NRR. If the inspection results in new information that casts doubt upon the approved configuration, the Regional inspectors have the responsibility to resolve such doubts.

9.9 List of Shutdown Equipment

QUESTION

What lists of shutdown equipment will be used by the Regional inspectors, if the shutdown analysis has not been reviewed and approved by NRR?

RESPONSE

Regional Inspectors will use the lists of shutdown equipment the licensee has identified in his fire protection plan.

Generic Letter 81-12 and its clarification documents expect licensees to show how they will shutdown if a fire area is not provided with redundant train separation. Inherent within this expectation is the assumption that the licensee will identify the equipment to be used. It is because the licensees have not had fire hazard analyses at all for non-alternative shutdown fire areas that the inspectors to date have resorted to using the only lists available (the alternative shutdown equipment list used by NRR in their reviews).

It is unlikely there would not be a list of at least those systems to be used for alternate shutdown, since 10 CFR 50.48 requires NRR review and approval of the means of alternate shutdown.