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OFFICE OF SECRETARY
RULEMAKINGS AND
ADJUDICATIONS STAFF

8

Reference: Federal Register, Vol. 70, No. 43, at 10901

Subject: Comments on Proposed Rulemaking and Draft Regulatory Guide
Regarding Fire Protection Program - Post-Fire Operator Manual Actions

As requested in the referenced Federal Register Notice (FRN), Exelon Generation Company, LLC (Exelon) and AmerGen Energy Company, LLC (AmerGen) are submitting the following comments on the proposed rulemaking and draft regulatory guide regarding post-fire manual actions in the fire protection program.

Exelon and AmerGen endorse the comments provided by the Nuclear Energy Institute (NEI) in a letter from NEI on this topic dated May 23, 2005. In addition, we provide the following comments as summarized below and further detailed in the attachments to this letter.

The proposed rulemaking represents a significant change in the current regulatory approach to operator manual actions in response to a fire. Specifically, the rulemaking places significant new restrictions on operator manual actions that licensees have previously credited in accordance with published NRC guidance. These restrictions include a time margin factor and the necessity for fire detection and suppression systems when taking credit for operator manual actions in place of fire barriers or separation as described in 10 CFR 50 Appendix R, Section III.G.2.

It is our position the proposed rulemaking essentially represents a backfit in accordance with 10 CFR 50.109, "Backfitting." As described in Attachment 1, credit for operator manual actions for compliance with Section III.G without these proposed restrictions has been allowed by the NRC in various guidance documents. The referenced FRN states that proposed rulemaking is not a backfit, because it allows additional options for compliance with 10 CFR 50 Appendix R, Section III.G.2. Because the NRC has previously allowed manual actions without these restrictions for situations covered by Section III.G.2, the imposition of new requirements represents a backfit.

When considered as new requirements, the added restrictions represent a substantial cost to licensees for a marginal improvement in safety. Installing fire detection and suppression systems to allow credit for operator manual actions in place of fire barriers or separation in accordance with the proposed rulemaking would represent a substantial cost to achieve a decrease in the estimated annual core damage frequency that is an order of magnitude less than the current core damage frequency.

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SEC4-02

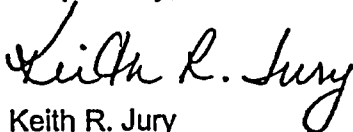
Additionally, as further detailed in Attachments 2 and 3, the proposed rulemaking and draft Regulatory Guide introduce problems that are contrary to the expressed goals of the NRC or propose positions that go well beyond previous requirements.

- The proposed rulemaking will ultimately require some licensees to seek exemptions, contrary to the NRC's goal of reducing the need for exemptions. Some licensees sought and received exemptions from the existing Section III.G.2 for operator manual actions prior to the issuance of clarifying guidance that exemptions were not necessary (i.e., as cited in Attachment 1). Implementation of the proposed rulemaking would require revision and re-approval of these exemptions, since the exemptions would no longer be consistent with the revised rule.
- The time margin factor introduces an unprecedented 100% penalty against the timing of an operator's ability to execute a manual action. The time margin factor for actions is unnecessary as significant margin is already embedded into fire protection programs via a number of existing elements.
- The safety benefit associated with the installation of water-based suppression systems ignores the potential adverse impact that may arise due to internal flooding and water impingement on equipment. The use of gaseous suppression systems raises safety issues associated with gaseous agent migration and temperature extremes affecting equipment. The added risk of installation of suppression systems could exceed the benefit gained by their addition.

Instead of revising Section III.G.2, Exelon and AmerGen recommend issuing guidance (or re-affirming existing guidance) clarifying that manual actions are permissible. This proposed guidance could also promulgate NRC's current expectations for feasibility of all manual actions. This approach maintains the maximum consistency with existing NRC guidance, and avoids the creation of a separate set of standards only applicable to Section III.G.2 manual actions. Establishing criteria specifically applicable to Section III.G.2 manual actions will lead to new disputes about whether an action is a Section III.G.1.a action or a Section III.G.2 action.

If you have any questions on this issue, please contact Mr. Allan R. Haeger at 630 657-2807.

Respectfully,



Keith R. Jury
Director, Licensing
Exelon Generation Company, LLC
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Attachments: Attachment 1 - NRC Guidance Regarding Manual Operator Actions
Attachment 2 - Comments on the Rulemaking
Attachment 3 - Comments on the Draft Regulatory Guide

Attachment 1
NRC Guidance Regarding Manual Operator Actions

NOTE: Exelon/AmerGen comments within this Attachment are provided to clarify the reference. These comments are provided in *italicized text*. Quotations are provided in normal text.

Letter from R. Mattson to D. Eisenhut, "Fire Protection Rule - Appendix R", dated March 22, 1982 (provides clarification to Generic Letter 81-12, "Fire Protection Rule")

NRC's clarification of Generic Letter 81-12 provides an initial discussion of operator actions (as an alternative to protection of cables or equipment), in Enclosure 2, "Safe Shutdown Capability." This guidance is provided in the general context of all safe shutdown strategies, and is not limited to the Alternative Shutdown capability, except where specifically stated in the text of the Generic Letter.

For circuits of equipment and/or components whose spurious operation would affect the capability to safely shutdown:

- (1) provide a means to isolate the equipment and/or components from the fire area prior to the fire (i.e., remove power cables, open circuit breakers); or
- (2) provide electrical isolation that prevents spurious operation. Potential isolation devices include breakers, fuses, amplifiers, control switches, current XFRS, fiber optic couplers, relays and transducers; or
- (3) provide a means to detect spurious operations and then procedures to defeat the maloperation of equipment (i.e., closure of the block valve if PORV spuriously operates, opening of the breakers to remove spurious operation of safety injection);

Internal NRC Memorandum dated July 2, 1982, from R. Mattson to R. Vollmer (Vollmer Memo).

Although the title of the Vollmer Memo refers to "Alternate Shutdown," it is clear from other documents as well as the context of the memo that the discussion of "free of fire damage" applies to both redundant safe shutdown and "Alternate Shutdown" locations.

Section III.G.1 of Appendix R states that one train of systems needed for hot shutdown must be free of fire damage. Thus, one train of systems needed for hot shutdown must be operable [emphasis added] during and following a fire. Operability of the hot shutdown systems, including the ability to overcome a fire or fire suppressant induced maloperation of hot shutdown equipment and the plant's power distribution system must exist without repairs. Manual operation of valves, switches and circuit breakers is allowed to operate equipment and isolate systems and is not considered a repair. However, the removal of fuses for isolation is not permitted. All manual operations must be achievable prior to the fire or fire suppressant induced maloperations reaching an unrecoverable plant condition.

NRC Meeting with Nuclear Utility Fire Protection Group (NUFPG), 03/16/1983

On March 16, 1983, members of the Nuclear Utility Fire Protection Group (NUFPG) met with several NRC members from the Inspection and Enforcement branch. Members of NUFPG posed several questions and comments to the NRC on the inspection process, in particular to the language included in Temporary Instruction 2515/62, Inspection of Safe Shutdown Requirements of 10 CFR 50 Appendix R Section III.G at Nuclear Power

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Plants Licensed to Operate Before January 1, 1979, Rev. 1. Concerning the review of documents to determine areas of the plant containing both trains of redundant safe shutdown equipment, the meeting minutes (as published by NUFPG) contained the following:

- Q8. The following comments relate to Appendix 1 of the module on safe shutdown requirements for Appendix R:

a. Section A.2.d

Too much emphasis is to be placed on the routing and tracing of control circuits. In many instances, licensees, with the concurrence of ASB [Auxiliary Systems Branch], are taking manual control of pumps at switchgear or motor control centers. Alternatively, isolation devices and transfer switches are used to provide isolation from potentially damaged control circuits. Also, recognition of the use of manual operation of valves, recognized by ASB, should be embodied in the general guidance given here.

- A8. I&E (Inspection and Enforcement) will accept the ASB perspectives on this issue.

SECY-83-269, Attachment C, 07/05/1983

The NRC position that exemptions were not required for manual actions was ultimately promulgated in SECY-83-269, Attachment C.

SECY 83-269 (July 5, 1983) was generated to provide the Commission with the current status of the fire protection programs throughout the nuclear industry. Section b of Attachment C to the SECY addressed allowable repairs to achieve safe shutdown. To provide background, a discussion of "fire damage" was provided which included the above quoted paragraph, verbatim. In addition, as noted above, Section III.G.1 and III.G.2 (i.e. redundant safe shutdown locations) both refer to "free of fire Damage."

On August 13, 1982, by memorandum from S. J. Chilk to W. J. Dircks, the Commission requested that the staff submit a report summarizing the licensees' fire protection exemption requests, the staff's disposition of those requests, and any generic issues that may be raised by these requests. The Commission also requested a description of the types of exemptions requested, the safety significance of the requests, a summary of the research results obtained, including a discussion of the impact that the results may have on fire protection requirements, and the need for revisions, if any, to the present fire protection requirements.

The enclosure is the staff response to the Commission's request. It includes our evaluation of the impact of Appendix R exemption requests and the results of research on NRC fire protection guidelines. Section 1 of the enclosure provides a summary of the types of exemptions that have been approved. Section 2 provides a summary of fire protection research sponsored by the NRC, utilities and other organizations that impact the fire protection guidelines. Section 3 discusses areas where we experienced problems with proper implementation of Appendix R because of differences in interpretation of our requirements. As a result, we have developed staff positions which clarify several of these requirements and have presented them in Attachments B and C. These

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positions were discussed with licensees during meetings and were described in the safety evaluation reports. We plan to transmit the staff positions in Attachment B to all licensees, construction permit holders and applicants for construction permits for information. Finally, Section 4 of the enclosure discusses the impact of research results on our fire protection requirements.

Attachment C

Section III.G of Appendix R states that repairs are permitted to provide the cold shutdown capability. Additionally, Section III.L indicates that procedures for these repairs must be developed and materials needed for the repairs stored on site. To establish consistency in the plant designs, the staff issued the following guidelines concerning repairs. (Memorandum R. Mattson to R. Vollmer, dated July 2, 1982)

Section.III.G.1 of Appendix R states that one train of systems needed for hot shutdown must be free of-fire damage. Thus, one train of systems needed for safe shutdown has to be operable during and following the fire. Operability of the hot shutdown systems, including the ability to overcome a fire or fire suppressant induced maloperation of hot shutdown equipment and the plant's power distribution system, must exist without repairs. Manual operation of valves, switches and circuit breakers is allowed to operate equipment and isolate systems and is not considered a repair. However, the removal of fuses for isolation is not permitted. All manual operations must be achievable prior to the fire or fire suppressant induced maloperations reaching an unrecoverable plant condition.

09/2/1999 NRC Memo, Stephen Dembeck to Stuart Richards, "Summary of Meeting With the Boiling Water Reactors Owners Group (BWROG) Appendix R Committee on Post-Fire Safe Shutdown Circuit Analysis Issues (Fire Induced Circuit Failures)" (Meeting Aug 18-19, 1999)

Discussions with NRC indicated that operator actions were acceptable. NRC requested that the BWROG include guidance in their topical report, discussing manual actions, in order to improve consistency going forward.

The NRC considerations regarding manual actions were addressed by the BWROG. These considerations were added to BWROG document GE-NE-T43-00002-00-02, and subsequently to NEI 00-01.

Attachment 4 "NRC Staff and BWROG Appendix R Committee Meeting on Circuit Analysis - Summary of Topics Covered and Agreements Reached"

The final BWROG circuit analysis methodology document:

- Will identify manual action considerations to be addressed to ensure comprehensive and effective analysis of both redundant train and alternative/dedicated post-fire safe shutdown capabilities, such as:
 - Operator actions to address reactor transients from the panels in the control room (before the control room evacuation decision is made) and from the remote/alternative/dedicated shutdown stations in the plant.
 - Personnel hazards (radiation, steam, heat, smoke, fire, heights, etc.)

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- The limits on shutdown procedure complexity when the following human factors issues are considered: training, walkdown, and simulation frequency and depth (relative to operator familiarity with the manual actions and the locations at which they are conducted); communications equipment and their limitations and adequacy; on shift staffing requirements; numbers of independent operators; procedural action timing requirements; and plant conditions (lighting, temperature, noise, etc.); procedure feasibility, and the availability and practicality of the application of operator aids.
- The availability of materials for, and practicality of procedures for cold shutdown repairs. This discussion will include a definition of the term "cold shutdown repair" as distinct from the definition of the term "manual action."
- Discussions/definitions of terms such as "remote control," "local control," "manual control," "remote shutdown panel," and "remote shutdown location," and any limitations on remote or local actions based on the type of shutdown being conducted (redundant train/alternate/dedicated).

Sandia was tasked with auditing the agreements made between the NRC and the Boiling Water Reactor Owners Group (BWROG), during an August 1999 meeting concerning the methodology.

Agreement 4 addressed "Free of Fire Damage." Sandia's review (with NRC concurrence) states:

Commentary

The BWROG Committee provides the following definition for the term "Free of Fire" Damage in Section 4.0:

The structure, system or component under consideration is capable of performing its intended function during and after the postulated fire, as needed. It may perform this function automatically, by remote control, or by manual operations.

The first sentence of the above definition is a word-for-word duplicate of the NRC definition provided in Generic Letter 86-10. The second sentence of the definition appears to be a clarification of the various means by which the intended function may be initiated and controlled, and does not in any way reduce the inherent requirement or intent of NRC's definition.

Agreement 10 addressed manual actions as:

The final BWROG circuit analysis methodology document will identify manual action considerations to be addressed to ensure comprehensive and effective analysis of both redundant train and alternate/dedicated post-fire safe shutdown capabilities such as:

By requesting the inclusion of specific guidance concerning manual actions. The NRC has clearly implied (if not approved) the acceptance of manual actions for both redundant and alternate shutdown areas.

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**Regulatory Guide (RG) 1.189, "Fire Protection for Operating Nuclear Power Plants,"
April 2001**

The NRC's stated purpose in developing RG 1.189 was to collect all previous guidance, which had been issued by a variety of means, into a single comprehensive guidance document. In some cases, conflicting guidance had been issued in the past. Where previous conflicts existed in guidance, NRC provided the corrected guidance, based on current NRC positions. The definitions of "free of fire damage" are essentially the same as those discussed with the BWROG immediately prior to the development of the Reg Guide, and permit the use of manual operator actions.

The development of this Reg Guide is directed by SECY-98-058, Staff Requirements Memorandum, as follows [emphasis added] "Continue to consolidate existing regulatory positions to generate a comprehensive fire protection regulatory guide to be used in meeting the existing fire protection regulations."

As illustrated in the preceding discussion, the Commission's fire protection requirements and guidelines consist of a multitude of rules, generic communications, staff guidance, and other related documents. Current industry and regulatory issues have prompted action on the part of the NRC to compile the current fire protection regulations and guidelines for operating reactors into this comprehensive guide.

This regulatory guide does not require a backfit analysis as described in 10 CFR 50.109(c) because it does not impose a new or amended provision in the NRC's rules or a regulatory staff position interpreting the Commission rules that is either new or different from a previous applicable staff position.

Definition, Emergency Control Station - Location outside the main control room where actions are taken by operations personnel to manipulate plant systems and controls to achieve safe shutdown of the reactor.

Definition, Free of Fire Damage — The structure, system, or component under consideration is capable of performing its intended function during and after the postulated fire, as needed, without repair.

Section 5.3, Hot Standby (PWR) Hot Shutdown (BWR) Systems and Instrumentation

One success path of equipment necessary to achieve hot standby (PWR) or hot shutdown (BWR) from either the control room or emergency control stations should be maintained free of fire damage by a single fire, including an exposure fire. Manual operation of valves, switches, and circuit breakers is allowed to operate equipment and isolate systems and is not considered a repair. Damage considerations should also include damage to equipment from the normal or inadvertent operation of fire suppression systems.

GPU letter to NRC 5211-87-2195 Dated October 27, 1987; "Submittal of Fire Hazards Analysis Report, Revision 9"

Rev 9 of the FHAR included a significant improvement in the identification and discussion of manual actions. Additional information was provided regarding manual action timing, and detailed action descriptions.

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As discussed with the NRC on September 10, 1987, GPUN has reconsidered its current methodology that manual actions taken at specific components or local control panels require exemption requests. These actions can be interpreted as being "emergency control station(s)" per 10CFR50 Appendix R, Section III.G.1(a) and as such no exemption from the regulation is required. Therefore, manual actions required for Appendix R safe shutdown scenarios may be evaluated by the appropriate Fire Hazards Analysis and internal 10CFR50.59 safety evaluations and if acceptable the manual actions will be incorporated into emergency fire procedures without prior NRC approval. NRC will continue to be notified of such changes through the 10CFR50.59 annual report and the annual update of the TMI-1 FHAR.

Attachment 2 Comments on the Rulemaking

General Comments on the Rulemaking Package

Although by the mid-1980's, the NRC had made it clear that no exemptions were required for operator actions, prior to that time, a small number of plants had requested specific exemptions from III.G.2, to permit manual operation of components. The NRC has stated that those plants are not the target of this rulemaking, since they have already submitted exemptions that have been reviewed and approved. No text could be found in the rulemaking or rule language itself that would prevent these plants from having to resubmit their existing exemptions. Since NRC proposes to change the language of the rule itself (e.g., adding the new III.P requirement), all plants, including those with existing approved exemptions, would need to come into compliance with the new added requirements, or submit new exemptions for those new criteria that are not met.

The rulemaking states that criteria for operator actions are consistent with past NRC practice. This is not true. The NRC has established past precedent for reviewing operator actions. These past precedents include Section III.G.3 procedure walkthroughs, routine inspections, and review of a small number of exemptions. Plant dockets contain numerous such examples. Past NRC practice has been to perform a whole crew walkthrough of the one or two most complicated fire zones procedures, and treat them as bounding for other areas. NRC says that rulemaking reflects the review process used originally for Alternative Shutdown, but this is also not true. Past practice has not included a time margin factor, or other conservatisms discussed in the rulemaking such as suppression and detection.

The rulemaking limits its affect to paragraph III.G.2.c, by adding option III.G.2.c-1. It is not clear why the rulemaking is intentionally limiting itself to providing only an alternative to III.G.2.c of Appendix R. By narrowly limiting the scope, the rulemaking would not resolve cases where operator actions are performed for fires inside non-inerted containments. Nor would it resolve cases where operator actions are performed for fires in areas with 20 foot separation, no intervening combustibles, and automatic suppression and detection in the area. These situations would remain as outstanding non-compliances. This does not appear to be in agreement with the intent of the rulemaking plan.

The criteria that operator actions be "feasible" and "reliable" should be considered in light of the existing level of rigor that has been acceptable to the NRC historically in evaluating operator actions for Emergency Operating Procedures (EOPs) and other actions credited in the plant's safety analysis. The level of analysis that the NRC is requiring goes beyond what has been previously acceptable for other accidents.

Comments on Specific Rule Language

Section III.G.2.c-1.

The justification to require the use of detection and automatic suppression in conjunction with operator manual actions based on comparison of the significance between Sections III.G.2.b and III.G.2.c is incorrect. Sections III.G.2.b and c are both associated with a barrier rated for less than three hours. The need for the detection and suppression is there to ensure that the barrier remains intact or spatial separation is maintained. In the case of operator manual actions the assumption is that the entire fire area is lost due to

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the fire. The only case in which detection and suppression may be justified are those in which the operator manual action is actually performed within the same fire area. The cost of installing automatic suppression systems within the fire area requiring an operator manual action is well beyond the safety benefit derived.

Unintended consequences will be created by the installation of suppression systems in some plant areas. It is safe to assume that most suppression systems that would be installed to meet this rule would be sprinkler systems. The addition of water to the areas brings concerns regarding the flooding analysis and the impact of water on equipment in the event of a pipe break or inadvertent sprinkler head actuation or leakage. Some plant rooms were not equipped with floor drains or the floor drains are kept blocked due to waste water issues. Gaseous fire suppression systems create safety issues due to agent migration and temperature extremes created by agent discharge.

Installation of automatic suppression has been avoided where practical in radiological areas of nuclear plants. This is done by design by ensuring that combustibles are minimized and there is ample margin to ensure that the combustibles present do not challenge the capacity of fire barriers to confine a fire to the zone. Inadvertent actuation of sprinkler systems in these areas has the potential to increase liquid radioactive waste.

Section III.P

Section III.P.1 states, "For purposes of this section, operator manual actions means the integrated set of actions needed to ensure that a redundant train of systems necessary to achieve and maintain hot shutdown conditions located within the same area outside the primary containment is free of fire damage."

Comment: It is not clear why fires occurring inside non-inerted containments are being excluded from this rulemaking. This definition also adds no clarity as to whether the rulemaking is specifically interested in actions the operator performs inside the control room, or is limited to actions performed elsewhere in the plant. In meetings, NRC has stated that they are only interested in actions performed outside of the Control Room, however this definition does not provide that clarity.

Section III.P.2(a)[1] states, "The fire timeline shall extend from the time of initial fire detection until the time when the ability to achieve and maintain hot shutdown is reached, and shall include a time margin that reasonably accounts for all important variables, including (i) differences between the analyzed and actual conditions and (ii) human performance uncertainties that may be encountered."

Comment: This implies that $T=0$ is the point where fire detection occurs. Therefore, if an action has 15 minutes to be performed, then it needs to be performed 15 minutes after detection. This is unworkable. The dynamics of fire, including the phases of fire development from incipient phases are not considered. Over ninety percent of the entire combustible load in a typical nuclear power plant is due to cable insulation. The characteristics of cable fires involve the production of smoke during incipient phases of the fire that will involve setting off fire detection before the cable builds the critical heat flux needed to actuate a sprinkler head. Most cable fires (excluding explosion of electrical buses/breakers – for which additional suppression has no effect on the outcome) will likely build up enough smoke early during incipient phases to set off fire detection. The defense in depth approach to fire protection will ensure that time exists following detection. The wording in the rule

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should be revised to state from the time that component damage occurs, or the point where the control room determines that a fire meeting the Appendix R entry condition (typically termed a severe fire) occurs.

No evidence could be found on any Exelon plant's docket that there was any historical NRC precedent for constructing a fire timeline from the moment of detection, or for embedding a time margin to account for differences between analyzed and actual conditions or human performance uncertainties. If the NRC has not previously used this time margin factor when reviewing Alternative Shutdown submittals, applicable for control room evacuation scenarios where the likelihood of success is solely based on operator action and sequencing, what is the technical or regulatory basis for including these new extra conservatism requirements for fires occurring outside the control room, where most plant mitigating equipment will remain available from the control room? This level of conservatism was also not required for the few exemptions that the NRC did grant under III.G.2 for operator actions.

The application of additional conservatism to account for "(i) differences between the analyzed and actual conditions and (ii) human performance uncertainties that may be encountered" is inconsistent with the underlying assumptions of Appendix R analyses. Appendix R safe shutdown analyses are performed using worst case assumptions that a fire instantaneously damages all unprotected cables and equipment in the fire area. The analysis also assumes that all equipment is available prior to the fire, that single failure criteria need not be superimposed (beyond what is attributable to the fire damage itself), and that equipment that is not affected by the fire operates as expected (does not randomly fail). These assumptions are based on various NRC guidance documents which dictate that the worst case fire is not required to be postulated simultaneous with non-fire related failures in safety systems, plant accidents or the most severe natural phenomena. Applying additional margin uncertainties, on top of the postulated worst case event, is without prior NRC precedent in post-fire safe shutdown analysis.

Section III.P.2(a)(3) states, "The analysis must identify all equipment required to accomplish the operator manual action within the postulated timeline, including (but not limited to) (i) all indications necessary to identify the need for the operator manual actions, enable their performance, and verify their successful accomplishment, and (ii) any necessary communications, portable, and life support equipment."

Comment: The use of the verb "identify" in this section is not clear. Is the NRC looking for a list? If so, to whom is the list to be provided? Does "identify" imply that special labeling will be used? Would it be more appropriate to substitute the verb "determine?" Would it be more appropriate to substitute "assure the availability of?" Overlap and duplication with III.P.2(c) should be avoided, to prevent confusion.

Section III.P.2(b) states, "Plant procedures must include each operator manual action required to achieve and maintain hot shutdown. Each operator must be appropriately trained on those procedures."

Comment: The use of the term "must" in this section is not clear; would "shall" be more appropriate? The requirement to train "each" operator could be construed as a requirement to train "every" operator, including those that have no

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function during a post-fire shutdown event, are off shift on special assignment, etc. There may be a more appropriate way to word this sentence.

Section III.P.2(c) states, "The licensee shall ensure that all systems and equipment needed to accomplish each operator manual action are available and readily accessible consistent with the analysis required by paragraph 2(a). The number of operating shift personnel required to perform the operator manual actions shall be on site at all times."

Comment: Technical specifications, emergency plan staffing guidelines, and fire brigade technical requirements (formerly in tech specs) all contain a 2-hour allowance for unexpected absences. In a significant fire, the fire brigade is a front line of defense, and their prompt actions prevent the types of cable and equipment damage that could require a plant safe shutdown. Many fires occur, but the number of fires that require a plant safe shutdown (with operator actions no less) is vanishingly small. Therefore, it does follow that an operator whose duty it is to perform post-fire operator actions could not be granted the same allowance for unexpected absences that a fire brigade member currently is given. Also, for plants that can demonstrate an acceptable recall process with adequate time available for operator recall, it should be possible to permit these operators to travel to nearby plant structures that may not meet the definition of "on site," such as pump houses, sewage treatment stations, cooling towers, or switchyards. In any case, a more specific definition of "on site" may be needed to prevent interpretation issues from arising.

Section III.P.2(a)(3)(ii) states, "...any necessary communications, portable, and life support equipment."

Comment: Communication is noted later in the FRN explanatory section to be "constant and effective." The use of "constant" implies that radios would be necessary to meet the communication requirement in this proposed paragraph. Many plants use radios if available, but have not analyzed the radio system for post fire survivability. Analysis of the radio system and then any changes that may be required could have a significant cost impact. Eliminating the word "constant" and leaving the word "effective" will still meet the intent of communications between the control room and the operator.

Section III.P.2(c) states, that periodically, the licensee shall conduct demonstrations using an established crew of operators to demonstrate that operator manual actions required to achieve and maintain the plant in a hot shutdown condition can be accomplished consistent with the analysis in paragraph 2(a) of this section. The licensee may not rely upon any operator manual action until it has been demonstrated to be consistent with the analysis. The licensee shall take prompt corrective action if any subsequent periodic demonstration indicates that the operator manual actions can no longer be accomplished consistent with the analysis.

Comment: This requirement exceeds the requirements currently in effect for Emergency Operating Procedures (EOP) validation. EOP validation may consist of a variety of techniques, depending on the nature of the procedure, nature of the action, and nature of the change involved. This is consistent with the Systematic Approach to Training concepts used by the NRC and INPO. Many actions are the same, or similar, to actions in other procedures (for other events or for other fire areas), thus requiring full crew walkthroughs as the only

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acceptable method of validation results in an ineffective use of limited operations resources.

Paragraph following III.P states, "For alternative or dedicated shutdown capability, the reactor coolant system process variables should be maintained within those predicted for a loss of normal ac power and fission product boundary integrity should not be affected."

Comment: Alternative or dedicated shutdown capability is not the subject of this rulemaking. The quoted text is only applicable to alternative or dedicated shutdown, therefore it not applicable to this rulemaking. Recommend the quoted text be removed, to prevent future confusion on this subject.

Time Margin Factor Comments

Time margin for operator actions is already embedded into fire protection programs via a number of existing elements. The defense in depth approach to fire protection prevents fires from starting, limits the extent of fires that do occur, rapidly suppresses the fires, and ensures the safe shutdown capability. The safe shutdown analysis contains inherent margin by ignoring the progression of fire development and growth, and simply assuming that all damage occurs simultaneously. Industry experience has been that (with the exception of explosive equipment failures) plant fires are promptly detected during the early stages of development, and consequential target damage affecting safe shutdown capability does not occur. Once a fire is detected, the Control Room can reference procedures, take prudent actions to prepare for a safe shutdown if one is required, including alerting equipment operators to prepare for action, and monitor the situation. This time is built into every real fire scenario that occurs in the plant, yet is not credited in the safe shutdown analysis. Modeling the fire growth and progress to capture this available margin would require the development of countless scenarios in each fire area. These models would be mostly assumption-driven, provide little if any actual benefit or new knowledge, and would likely be the source of contentious debates between the industry and the NRC regarding modeling techniques.

Requiring time margin to be demonstrable in procedure walkthroughs presents its own set of problems and unintended consequences. Many plants provide the operator with symptomatic procedures that provide the operators with cues and symptoms to diagnose a particular failure, and then actions to respond to the failure. These procedures are designed to be used concurrently with the plant's overall symptom-based EOPs, and much thought is put in to ensuring that the procedures provided consistent and complimentary guidance. It is important to not provide event-based procedures that interfere or conflict with the overall symptomatic EOPs (this is a requirement in the NRC's safety evaluation for the BWROG EOPs). In order to meet the NRC's proposed time margin factor, operator actions would need to be initiated sooner, in some cases before the actual symptom was received. This would put the operator in a situation where he/she was manipulating plant equipment based on the potential for future failure (based on a fire detection alarm), and not on the actual failure itself. This is important, since the safety evaluations that support many operator actions acknowledge that the operator may be affecting equipment important to safety, but that it is acceptable because the equipment would otherwise be unavailable if the remedial action were not taken. If instead the operator were told to take pre-emptive actions, then the operator would be affecting equipment that had not yet failed, and in fact might not ever fail,

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depending on the fire severity. Thus the operator could be shutting down perfectly functioning equipment that was capable of mitigating the event, because of the low likelihood that it could malfunction. This creates a conflict with the symptom-based approach of the EOPs, and also results in higher calculated fire CDF results, since the operator will be actively disabling mitigating systems that have not yet malfunctioned.

The expert panel suggested that a time margin factor of 2 be considered based on several considerations.

A time margin factor of at least 2 is assumed to absorb delays that might be caused by the following set of factors (1) the need to recover from or respond to unexpected difficulties or random problems associated with instruments or other equipment, or communication devices; (2) environmental and other effects that are not easily replicated in a demonstration, such as radiation, smoke, toxic gas effects, and increased noise levels; (3) limitations of the demonstration to account for all possible fire locations that may lend the need for such operator manual actions; (4) inability to show or duplicate the operator manual actions because of safety considerations while at power; and (5) individual operator performance factors, such as physical size and strength, cognitive differences, time pressure, and emotional responses.

Most of these considerations are already enveloped by the time margin that is inherent in the defense in depth concept of fire protection, and the conservatism in the underlying transient analyses that establish the time milestones. Others are not applicable or significant for a variety of reasons, including:

- (1) The need to recover from unexpected responses is inconsistent with the design basis assumption that all equipment that is not directly affected by the fire remains available (i.e., no single failure assumption). It is inconsistent to accept this assumption for the entire Appendix R analysis, yet not accept it when evaluating operator action time margin.
- (2) Environmental impacts are readily identified by plant walkdown, and typically included either implicitly or explicitly in operator action evaluations.
- (3) The concern with limitations of demonstration to account for all fire locations is not relevant. In each fire area, area-wide damage is assumed, thus bounding the effects of the more likely small localized fires.
- (4) Procedures are the primary tool to assure that operators can perform the actions as expected. Thus the day-to-day accessibility of a particular component for random inspection is not a factor when it becomes necessary to perform the action, the operator will be expected to perform the action as written in the procedure.
- (5) Individual operator performance factors are offset by a number of factors. The operators are professionals, the actions are evaluated to ensure that they are within the skill and capabilities of the craft, the operators are provided with multiple means of communication should unforeseen circumstances occur, and the operator is provided with procedures to direct the actions in a safe and accurate manner.

Attachment 3
Comments on the Draft Regulatory Guide

- 1) The term "Previously Approved" is not defined in the draft regulatory guide. As noted in the FRN this definition is critical in determining the impact of the proposed rule as currently drafted. At a minimum previously approved should be defined by using established NRC references defining current licensing basis.
- 2) As addressed in comments for the FRN, time margins are already inherent within the defense in depth approach to fire protection. The proposed rule assumes that $T=0$ (i.e. damage occurs) at the point of fire detection. That is not supported by industry experience in the fire databases that have been collected by various agencies. The only exception is when a failure of a piece of equipment is the initiator of the fire event and failure of that piece of equipment requires the manual action. This could occur in an electrical component. In that case no amount of suppression or detection would impact the need for a manual action, and thus would provide no additional margin or safety to that which already exists.
- 3) The use of a multiplicative approach for developing a time margin should be reconsidered. The issues that the Draft Regulatory Guide propose to be considered within the time margin are additive times. For example, donning a self contained breathing apparatus (SCBA) takes a set amount of time, regardless of the duration of the task. So, if the task is a two-minute duration breaker opening or a 20 minute valve cycle the time to don the SCBA is the same. The same logic can be applied to other factors, such as finding an access route or getting a portable light. All of these actions take the same amount of time regardless of the duration of the task being performed. Other intangibles, such as anxiety of the operator to perform the task are difficult to measure, but are likely the same regardless of the duration of the task. Therefore, a review of the feasibility of the manual actions can address these factors on an additive basis where they actually exist. The additive values can be used in the feasibility study on an individual task basis.
- 4) The Draft Regulatory Guide references NUREG-0800, "Standard Review Plan for the Review of Safety Analysis Reports for Nuclear Power Plants," in numerous locations as the source of expectations associated with the proposed rule. Specific examples can be found in sections C.2.3, C.2.6, C.2.8, C.2.10 (this is a partial list). The proposed rule addresses plants to which Appendix R applies, specifically those licensed prior to January 1, 1979. NUREG-0800 does not apply to those plants. The use of NUREG-0800 expectations in the Regulatory Guide results in regulatory creep. The Regional inspectors will use the information in the final version of this Regulatory Guide as the basis for compliance inspections. Thus, plants that were not subject to NUREG-0800 (specifically Appendix R plants) would be held to that standard. Even though information in the Regulatory Guide is not part of the rule, when the information within the Regulatory Guide is used as the guide for compliance inspections it does become a de-facto rule.
- 5) The training program that is implied within the proposed rule and explained within the Regulatory Guide would create a burden on operations training. For example, Peach Bottom Atomic Power Station has 47 fire areas and each fire area has a procedure for each unit, resulting in 94 procedures on which detailed training would be required. The rule must recognize that manual actions have varying degrees of complexity. Therefore, the training program requirements and guidelines should permit the licensees the flexibility of determining those manual actions and related

Attachment 3
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procedures that require detailed training. The proposed rule and guidance documents should also recognize that some manual actions credited by the fire safe shutdown program are covered by training for other procedures, such as the emergency operating procedures.

- 6) The initial demonstration of the ability to perform manual actions within the required time line is necessary for baseline documentation that the manual action is feasible. However, requiring subsequent demonstrations of these manual actions consistent with the training program frequencies per 10 CFR 50.120, "Training and qualification of nuclear power plant personnel," creates a significant training burden on the licensee. As noted throughout these comments, the rulemaking must recognize that manual actions have different degrees of complexity. The rule should permit the licensee to determine which manual actions and associated procedures require additional the additional level of training that would encompass the demonstration walk through or the procedures. This approach would be consistent with the systematic approach to training already governing operator training programs.

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