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Sent:	Tuesday, September 08, 2009 11:16 AM
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Subject:	Proposes changes to NEI 00-01 R2 Section 3.5.1 and Appendix E to address NRC Comments
Attachments:	NEI 00-01 R2 Revised Circuit Failure Criteria post ACRS Mtg.pdf; Appendix E - Proposed Change to Rev 2.pdf

Dan. In an effort to resolve the remaining differences between NEI 00-01, Rev.2 and RG 1.189, R2, here are some changes NEI will be making to NEI 00-01, Rev.2. If agreed, we will issue an addendum to the NEI document, so the revision number will not change.

We believe these changes can resolve the last of the Industry / NRC comments on both Reg Guide 1.189, Rev 2 and NEI 00-01, Rev 2.

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E-mail Properties

Mail Envelope Properties (136042581996114A86735A4C1081D86E0309EEB8)

Subject: Proposes changes to NEI 00-01 R2 Section 3.5.1 and Appendix E to address NRC Comments
Sent Date: 9/8/2009 11:16:01 AM
Received Date: 9/8/2009 11:16:01 AM
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Files	Size	Date & Time
MESSAGE	105831	9/8/2009
NEI 00-01 R2 Revised Circuit Failure Criteria post ACRS Mtg.pdf	32706	
Appendix E - Proposed Change to Rev 2.pdf	54083	

Options
Expiration Date:
Priority: olImportanceNormal
ReplyRequested: False
Return Notification: False

Sensitivity: olNormal
Recipients received:

3.5.1 CRITERIA/ASSUMPTIONS

Apply the following criteria/assumptions when performing fire-induced circuit failure evaluations. Refer to the assessment of the NEI/EPRI and CAROLFIRE Cable Test Results in Appendix B to this document for the basis for these criteria and for further elaboration on the application of the criteria.

3.5.1.1 **Circuit Failure Criteria**: The criteria provided below addresses the effects of multiple fire-induced circuit failures impacting circuits for components classified as either "required for hot shutdown" or "important to safe shutdown". Consider the following circuit failure types on each conductor of each unprotected cable. Criteria differences, however, do apply depending on whether the component is classified as required for hot shutdown or important to safe shutdown.

- A hot short may result from a fire-induced insulation breakdown between conductors of the same cable, a different cable or from some other external source resulting in a compatible but undesired impressed voltage or signal on a specific conductor. A hot short may cause a spurious operation of safe shutdown equipment.

    - A hot short in the control circuitry for an MOV can bypass the MOV protective devices, i.e. torque and limit switches. This is the condition described in NRC Information Notice 92-18. In this condition, the potential exists to damage the MOV motor and/or valve. Damage to the MOV could result in an inability to operate the MOV either remotely, using separate controls with separate control power, or manually using the MOV hand wheel. This condition could be a concern in two instances: (1) For fires requiring Control Room evacuation and remote operation from the Remote Shutdown Panel, the Auxiliary Control Panel or Auxiliary Shutdown Panel; (2) For fires where the selected means of addressing the effects of fire induced damage is the use of an operator manual action. In each case, analysis must be performed to demonstrate that the MOV can be subsequently operated electrically or manually, as required by the safe shutdown analysis.

- An open circuit may result from a fire-induced break in a conductor resulting in the loss of circuit continuity. An open circuit may prevent the ability to control or power the affected equipment. An open circuit may also result in a change of state for normally energized equipment. (e.g. [for BWRs] loss of power to the Main Steam Isolation Valve (MSIV) solenoid valves due to an open circuit will result in the closure of the MSIVs). [Note: Open

circuits as a result of conductor melting have not occurred in any of the recent cable fire testing and they are not considered to be a viable form of cable failure.]

- A short-to-ground may result from a fire-induced breakdown of a cable insulation system, resulting in the potential on the conductor being applied to ground potential. A short-to-ground may have all of the same effects as an open circuit and, in addition, a short-to-ground may also cause an impact to the control circuit or power train of which it is a part. A short-to-ground may also result in a change of state for normally energized equipment.

Circuits for "required for hot shutdown" components: Because Appendix R Section III.G.1 requires that the hot shutdown capability remain "free of fire damage", there is no limit on the number of concurrent/simultaneous fire-induced circuit failures that must be considered for circuits for components "required for hot shutdown: located within the same fire area. For components classified as "required for hot shutdown", there is no limit on the duration of the hot short. It must be assumed to exist until an action is taken to mitigate its effects. Circuits required for the operation of or that can cause the mal-operation of "required for hot shutdown" components that are impacted by a fire are considered to render the component unavailable for performing its hot shutdown function unless these circuits are properly protected as described in the next sentence. The required circuits for any "required for hot shutdown" component, if located within the same fire area where they are credited for achieving hot shutdown, must be protected in accordance with one of the requirements of Appendix R Section III.G.2 or plant specific license conditions.

Circuits for "important to safe shutdown" components: Circuits for components classified as "important to safe shutdown" are not specifically governed by the requirements of Appendix R Section III.G.1, III.G.2 or III.G.3. To address fire-induced impacts on these circuits, consider the three types of circuit failures identified above to occur individually on each conductor with the potential to impact any "important to safe shutdown" component with the potential to impact components "required for hot shutdown". In addition, consider the following additional circuit failure criteria for circuits for "important to safe shutdown" components located within the same fire area with the potential to impact components "required for hot shutdown":

- As explained in Figure 3.5.2-3, multiple shorts-to-ground are to be evaluated for their impact on ungrounded circuits.

- As explained in Figure 3.5.2-5, for ungrounded DC circuits, a single hot short from the same source is assumed to occur unless it can be demonstrated that the occurrence of a same source short is not possible in the affected fire area. If this approach is used, a means to configuration control this condition must be developed and maintained.

- For the double DC break solenoid circuit design discussed in the NRC Memo from Gary Holahan, Deputy Director Division of Systems Technology, dated December 4, 1990 and filed under ML062300013, the effect of two hot shorts of the proper polarity in the same multi-conductor cable should be analyzed for non-high low pressure interface components. [Reference Figure B.3.3 (f) of NFPA 805-2001.]

- Multiple spurious operations resulting from a fire-induced circuit failure affecting a single conductor must be included in the post-fire safe shutdown analysis.

- Multiple fire-induced circuit failures affecting multiple conductors within the same multi-conductor cable with the potential to cause a spurious operation of an "important to safe shutdown" component must be assumed to exist concurrently.

- Multiple fire-induced circuit failures affecting separate conductors in separate cables with the potential to cause a spurious operation of an "important to safe shutdown" component must be assumed to exist concurrently when the effect of the fire-induced circuit failure is sealed-in or latched.

- Conversely, multiple fire-induced circuit failures affecting separate conductors in separate cables with the potential to cause a spurious operation of an "important to safe shutdown" component need not be assumed to exist concurrently when the effect of the fire-induced circuit failure is not sealed-in or latched and when conductors in two or more additional cables in a secondary circuit are required to combine with hot shorts in a cable in the primary circuit to cause the spurious operation. Additionally, if three or more individual conductors in the cable in the secondary circuit are required to be involved in a selected sequence for the spurious operation to occur, then the condition is considered to be beyond the required design basis for Appendix R. This criterion applies to consideration of concurrent hot shorts in secondary circuits and to their effect on a components primary control circuit. It is not to be applied to concurrent single hot shorts in primary control circuit for separate components in an MSO combination.

- For components classified as “important to safe shutdown”, the duration of a hot short may be limited to 20 minutes for ac circuits. (If the effect of the spurious actuation involves a "sealing in" or "latching" mechanism, that is addressed separately from the duration of the spurious actuation, as discussed above.) This criterion will be revised, as appropriate, to address the results of the NRC dc cable testing program. Until revised, hot shorts in dc circuits must be assumed to exists until an action is taken to isolate the circuit as outlined in NRC Generic Letter 86-10 Questions 5.3.2.

- For any impacted circuits for “important to safe shutdown” components that are located within the same fire area, protection in accordance with the requirements of Appendix R Section III.G.2 or plant specific license conditions may be used. In addition, consideration may be given to the use of fire modeling or operator manual actions, as an alternative to the requirements of Appendix R Section III.G.2. (Other resolution options may also be acceptable, if accepted by the Authority Having Jurisdiction.)

3.5.1.2 **Spurious Operation Criteria:** The following criteria address the effect of multiple spurious operations of components classified as either “required for hot shutdown” or “important to safe shutdown” on post-fire safe shutdown. These criteria are to be applied to the population of components whose spurious operation has been determined to be possible based on an application of the circuit failure criteria described above when assessing impacts to post-fire safe shutdown capability in any fire area.

- The set of concurrent combinations of spurious operations provided through the MSO Process outlined in Section 4 and the list of MSO contained in Appendix G must be included in the analysis of MSO’s.

- MSO’s do not need to be combined, except as explained in Section 4.4.3.4 of this document.

    - Section 4.4.3.4 states that the expert panel should review the plant specific list of MSOs to determine whether any of the individual MSOs should be combined due to the combined MSO resulting in a condition significantly worse than either MSO individually.

    - In this review, consideration of key aspects of the MSOs should be factored in, such as the overall number of spurious

operations in the combined MSOs, the circuit attributes in Appendix B, and other physical attributes of the scenarios.

- Specifically, if the combined MSOs involve more than a total of four components or if the MSO scenario requires consideration of sequentially selected cable faults of a prescribed type, at a prescribed time, in a prescribed sequence in order for the postulated MSO combination to occur, then this is considered to be beyond the required design basis for MSO's.

3.5.1.3 Assume that circuit contacts are initially positioned (i.e., open or closed) consistent with the normal mode/position of the "required for hot shutdown" or "important to safe shutdown" equipment as shown on the schematic drawings. The analyst must consider the position of the "required for hot shutdown" and "important to safe shutdown" equipment for each specific shutdown scenario when determining the impact that fire damage to a particular circuit may have on the operation of the "required for hot shutdown" and "important to safe shutdown equipment".

APPENDIX E
ACCEPTANCE CRITERIA OPERATOR MANUAL ACTIONS AND REPAIRS

I. PURPOSE

This appendix provides guidance regarding the use of operator manual actions and repairs to equipment required for post-fire safe shutdown.

II. INTRODUCTION

Operator manual actions may involve manual control, local control or manual operation of equipment. Operator manual actions on equipment in support of achieving safe shutdown are allowed as follows:

- For components classified as either required for hot shutdown or important to safe shutdown where:

    - The operator manual action is taken inside of the Control Room or at the Emergency Control Station. [Note: The Emergency Control Station includes specific plant locations where remote controls have been provided for operating plant equipment and where such controls are included as a part of the safe shutdown component list for a particular safe shutdown path and their circuits are protected from the effects of fires as outlined in Section 3 of this document, e.g. keylock switches in a Relay Room for operation of SRVs on a BWR where the keylock switch is designed to function as the manual operation capability in the event that the automatic functioning of the system is lost.] "Any actions taken by the operator in the Control Room are not considered to be operator manual actions and are considered to be an acceptable means of effecting safe shutdown for the selected success path. Similarly, an action taken by an operator at a location outside of the Control Room, e.g. Remote Shutdown Panel, Local Control Station, that is specifically designed with local controls, e.g. hand switches, for the purpose operating plant equipment is not considered to be an operator manual action. The use of this latter set of equipment, however, must be assured to be free of fire damage and capable of being operated in the time required given the potential environmental conditions caused by the fire at the location of the equipment and along the travel path to the equipment."

    - The operator manual action or repair is taken to achieve and maintain cold shutdown. [Note: By definition this category applies to important to safe shutdown components only.]

- The operator manual action manually operates a valve specifically designed for accomplishing the function, e.g. operation of a manual valve designed into the system specifically for system isolation.

- The operator manual action is taken for Appendix R Section III.G.3/III.L.

- The operator manual action is approved by the NRC.

Repairs may be performed to equipment required for cold shutdown. This appendix provides the criteria to assure that the reliance on operator manual actions or repairs is appropriate. These criteria are intended to assure that the actions specified are capable of being performed, and that reliance on them is balanced within the overall safe shutdown strategy for a given fire area.

III. RELIANCE ON OPERATOR MANUAL ACTIONS

Automatic control functions are a design feature provided to mitigate or limit the consequences of one or more design basis accidents. NRC Generic letter 86-10 Section 5.3.10 suggests that post-fire safe shutdown be able to be accomplished without reliance on these automatic functions. Therefore, automatic control functions are not required for post-fire safe shutdown. As a result, manual operation of the systems available for mitigating the effects of plant fires is required. This Appendix provides the criteria for determining when an operator manual action is allowed by NRC and when NRC approval for the use of an operator manual action in support of post-fire safe shutdown is required.

Specific plant protective functions, due to the nature of their design in assuring safe and reliable plant operation, require special consideration for a fire event. The Reactor Protection System (RPS) Scram function is one such system for a BWR. The Reactor Trip System (RTS) is one such system for a PWR. Due to the required design features of the RPS/RTS Scram System, automatic or manual Reactor Scram circuitry is impractical to fully protect from the effects of fire-induced circuit failures. Due to the importance of this system to reactor safe shutdown for multiple design conditions, re-design of the RPS Scram circuitry is not feasible. To assure the Reactor is scrammed for all fire conditions, it is recommended that each licensee assure that the Emergency Operating Procedure (EOP) action to implement the requirements of EO-113 to either de-power RPS/RTS or to vent the scram air header is linked to their post-fire safe shutdown procedures. This action is considered to be acceptable, feasible and reliable for all fire conditions, i.e. III.G.1/III.G.2 and/or III.G3./III.L. [Reference BWROG Paper on NRC IN 2007-07.]

IV. DIFFERENTIATING BETWEEN OPERATOR MANUAL ACTIONS AND REPAIRS

The fundamental difference between operator manual actions and repairs is definitional. Both are subject to timing limitations, feasibility, and resource constraints. The NRC has placed additional limitations on the use of repairs, such that they may only be used to achieve and maintain cold shutdown conditions. This distinction provides the

opportunity for licensees to maintain hot shutdown for an extended period of time, if necessary, while repairs are performed to equipment that is required to either transition to, or maintain cold shutdown.

From an operational perspective, there is no meaningful distinction whether an action is defined as an operator manual action or a repair, since the same considerations apply.

V. DEFINITIONS

This appendix on operator manual actions relies upon definitions contained in Section 6. For the definition of terms used in this appendix, refer to Section 6, Definitions.

VI. CRITERIA

To credit the use of operator manual actions or repairs to achieve post-fire safe shutdown, certain criteria must be met. The first criterion for operator manual actions is that the operator manual action must be allowed under the current regulations either through compliance with the criteria outlined in this document or based on an approved exemption, deviation request or license amendment. For those actions that are allowed, the remaining sections of this Appendix apply in determining whether the specific allowed action is feasible and reliable. For actions that are time critical, i.e. less than 1-hour to perform, it is recommended that the feasibility and reliability of the action be evaluated using the criteria contained in NUREG -1852.

To credit an operator manual action not allowed based on the criteria in this appendix, NRC approval through an exemption request or a license amendment is required. In processing an exemption request and/or license amendment, the licensee submitting the exemption request or amendment should consider the requirements of NUREG 1852. NRC has stated that exemption requests and license amendments for operator manual actions will be evaluated for feasibility and reliability against the criteria contained in NUREG 1852.

In assessing the acceptability of an operator manual action, timing is a consideration. To define the time available to perform an operator manual action, the time when fire damage to safe shutdown components and circuits occurs needs to be defined. This time is referred to as time zero. With time zero and a defined time line for the post-fire safe shutdown scenario defined, the time when specific fire-induced failures to specific systems performing specific safe shutdown functions result in adverse impacts to safe shutdown can be determined. The time line for post-fire safe shutdown is determined based on the capabilities of the systems and components being used to achieve and maintain post-fire safe shutdown in each particular fire area. This requires a plant unique analysis. Time zero, however, is an analytically assumed initial condition that must be specified and, when specified, justified as to its reasonableness.

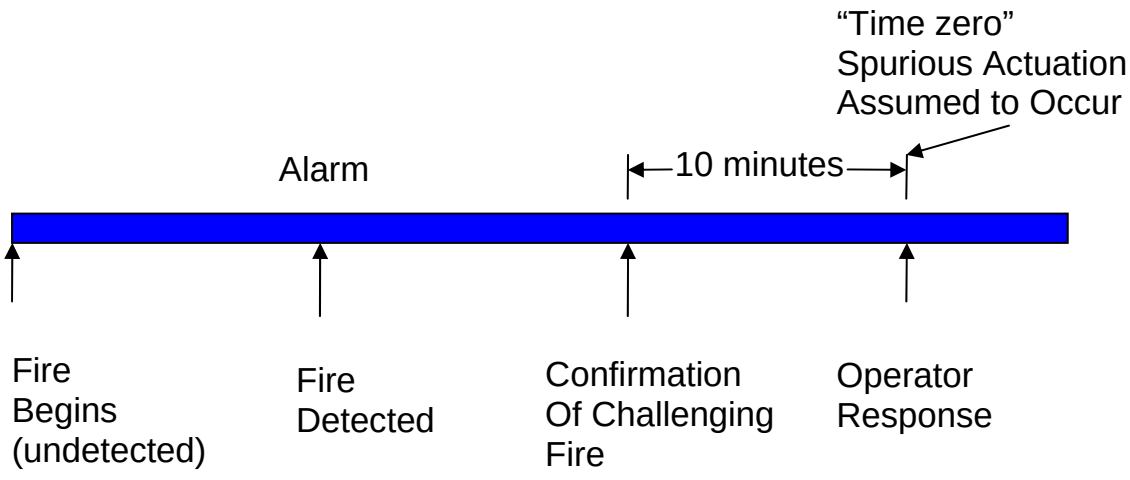
Based on this, time zero is specified to 10 minutes after the confirmation by plant personnel that the unit is experiencing a challenging fire. Indication of the fact that the fire being experienced is challenging is based on observations by plant operations

personnel that results in the need to scram the unit. ~~and to close the MSIVs.~~ Coupled with this assumption of a unit scram, assuming closure of the MSIVs (for BWRs) is a necessary assumption to provide boundary conditions on any analysis performed to determine the amount of time available prior to impacting safe shutdown. Assuming closure of the MSIVs (for BWRs) is a conservative assumption since many events will result in an MSIV closure. A fire induced loss of offsite power will result in a closure of the MSIVs (for BWRs). Additionally, the availability of multiple support systems, e.g. instrument air, is required to keep the MSIVs open (for BWRs). Finally, there are multiple automatic closure signals that will result in closure of the MSIVs (for BWRs). These closure signals could be simulated by fire-induced circuit failures.

Assuming the MSIVs (for BWRs) are closed is also conservative analytically in that it requires all decay heat to be rejected to the pressure suppression system and eliminates any make-up from steam driven systems, such as, a steam driven feedwater system. The analytical assumption that the MSIVs (for BWRs) are closed is acceptable provided an analysis of the circuits with the potential to prevent closure of both valves in any single main steam line has been conducted and fire induced spurious opening of both MSIVs in any single main steam line has been precluded.

Based on this ~~definition~~, unit scram and MSIV closure (for BWRs) may also be used as initial conditions applicable to any analysis assessing plant impacts as a result of fire-induced damage.

The figure below depicts this definition of time zero.



Linking confirmation of a challenging active fire and allowing a ~~to the beginning of the~~ 10 minute time frame for operator recognition and response before any fire-induced failures, including spurious equipment operations, occur is not only consistent with the current licensing basis, it is also consistent with the practical implementation of any safe shutdown strategy requiring operator initiation of plant safety systems. In actuality, if a

fire were to start, it would be detected at an early stage. At this point, actual fires have demonstrated over and over again for the vast majority of fires that plant equipment has not been damaged. The detection provides an alarm that initiates the dispatching of an individual to perform an assessment and confirmation of the fire condition. Feedback from this individual or the symptomatic information provided to the Operator in the Control Room by his available instrumentation would, for a challenging fire indicate, the need to scram the unit. This action is indicative of the presence of a challenging fire. The 10 minutes time frame is specified to allow a reasonable amount of time for the operator to receive feedback on the presence of a challenging fire and to take the appropriate action in response. Any other operator manual actions other than the scram, either automatic, manual in the Control Room or locally at the instrument air header or the RPS Panel, assumed to be performed by the operator in this time frame must be accepted by the NRC.

This definition of time zero, along with the conservative assumption regarding MSIV closure, establishes a clear set of boundary conditions for any Thermal Hydraulic Analysis used to determine the amount of time available to take a particular OMA. Additionally, for plant's that take pre-emptive procedural actions to address fire effects, it also provides a clear starting point for taking these pre-emptive actions. For an actual plant fire, taking pre-emptive actions once it has been demonstrated to the operator that a challenging fire exists is much more reasonable than taking the same actions upon detection of a fire. Unit Scram in response to a challenging fire is reasonable. Unit Scram in response to detecting a fire is unrealistic. If detection of a fire is used as time zero, operators could become confused about taking specified procedurally required pre-emptive actions after a fire is detected in conditions when they know that there is no real threat to the plant. The use of the definition of time zero specified above will help to minimize Operator confusion during actual fire events.

Additionally, Industry test data as discussed in a recent draft revision to NEI 00-01 (ML080310056), while not conclusive, supports the assumption that fire-induced circuit failures, including spurious operations, will not occur immediately upon exposing cables to fire affects. According to the ~~draft revision to~~ NEI/EPRI cable fire test results, ~~00-01,~~ the average time to failure exceeded 30 minutes for thermoset and armored cables and 15 minutes for thermoplastic cables. ~~Finally, initiation of a unit scram and MSIV closure are actions that clearly state that the operation of the unit is being challenged.~~

Due to the similarity between operator manual actions and repairs from the operational perspective, most of these criteria in this appendix apply to both. There are, however, a small number of additional criteria applied only to repairs. These additional criteria for repairs only are identified as such below.

Criteria Applicable to Both Operator Manual Actions and Repairs

NOTE: The generic term "actions" is used below, in order to refer to operator manual actions and repairs collectively, without creating cumbersome language. If the specific term Operator Manual Action or Repair is used below, it is used intentionally to show some specific distinction.

- There shall be sufficient time to travel to each action location and perform the action. Actions should be verified and validated by plant walkdowns using the current procedure. The action must be capable of being identified and performed in the time required to support the associated shutdown function(s) such that an

unrecoverable condition does not occur. Previous action locations should be considered when sequential actions are required.

- There shall be a sufficient number of plant staff available to perform all of the required actions in the times required, based on the minimum shift staffing. The use of personnel to perform actions should not interfere with any collateral fire brigade or control room duties they may need to perform as a result of the fire. Administrative controls shall exist to ensure that the personnel necessary to perform actions are available when required, and that unexpected absences are promptly corrected. If staff augmentation consistent with the licensee's Emergency Plan Implementing Procedures is credited, then the licensee must demonstrate that un-recoverable conditions would not occur in the time period before staff augmentation is achieved.

- The action location shall be accessible. In evaluating actions and the route through the plant for performing any actions, consideration should be given to the potential effects of temperature, humidity, radiation levels, smoke, and toxic gases. Actions required in a fire area experiencing a fire, or that require travel through a fire area experiencing a fire, may be credited if it is demonstrated that these actions are not required until the fire has been sufficiently extinguished to allow completion of necessary actions in the fire area. Generally, one-hour post-fire start is a reasonable time frame for meeting this criterion. In addition, if the action required is to be performed in the fire area experiencing the fire, it must be assured that fire damage within the fire area does not prevent completion of the action.

- The action locations and the access and egress path for the actions shall be lit with 8-hour battery-backed emergency lighting. Tasks that are not required until after 8 hours do not require emergency lights as there is time to establish temporary lighting. The path to and from actions required at remote buildings (such as pump house structures) does not require outdoor battery backed lights, if other lighting provisions are available (portable lights, security lighting, etc.).

- There should be indication, which is unaffected by the postulated fire, that confirms that an action is necessary and that the action, once completed, has achieved its objective. This indication is not required to be a direct reading instrument and may be a system change (level, pressure, flow, amps, temperature, etc.). Additional instrumentation may be needed to properly assess spurious operation, however it may not be necessary to make a diagnosis of the specific spurious operation that occurred, if symptom-based plant procedures provide the appropriate guidance to respond to the situation. If pre-emptive actions will be taken to preclude spurious actuations, then event-based procedures should be provided for the situation.

- Administrative controls shall be provided to ensure that any tools, equipment or keys required for the action shall be functional, available, and accessible. This

includes consideration of self-contained breathing apparatus (SCBA) and personnel protective equipment, if required. This also includes the availability of ladders or special equipment, if these items are required for access.

- There shall be provisions for communications to allow coordination of actions with the main control room or the alternative shutdown facility, if required. The nature of the action, and the need for coordination with other related actions or the control room should be considered when determining what type of communication is required.

- Guidance (e.g., procedures, pre-fire plan, etc.) should be provided to alert the operator as to when actions may be required in response to potential fire damage. This guidance shall be provided in locations that will be accessible during and after the fire. The guidance may be prescriptive or symptomatic. Specific event-based procedures are required for activities not addressed in existing operating procedures (normal, abnormal, emergency) for actions and repairs as a result of fire-induced failures that are pre-emptive. Pre-emptive specific event based procedures should be used for those situations where the fire-induced failure cannot be readily diagnosed using fire protected information, i.e. implicit or explicit indication, available to the operator. Use of Emergency Operating procedures is an acceptable approach for all other conditions, since EOPs direct the operator to use all available systems to achieve safe shutdown and, in all likelihood, fire damage to plant systems will be limited. The "skill of the craft" should be considered when determining the level of procedural guidance to provide. Typically, plant operators should be capable of performing actions without detailed instructions. Detailed instructions may be required for non-routine evolutions and, in these cases, should be readily available. Guidance should likewise be provided to the operator as to when to perform repairs in response to potential fire damage. The guidance shall provide the level of detail required to enable plant personnel to perform the task.

- Personnel shall be trained and qualified, as appropriate, to perform the specified actions, in accordance with INPO's Systematic Approach to Training.

- The complexity and number of operator manual actions required for safe shutdown shall be limited, such that their successful accomplishment under realistically severe conditions is ensured for a given fire scenario.

Additional Criteria Specific to Repairs

- Repairs may only be used to achieve and maintain cold shutdown (not hot shutdown).

- Hot shutdown must be capable of being maintained for the time required to perform any necessary repairs to equipment or systems needed to transition to and/or maintain cold shutdown.

- Additional non-operating personnel (e.g. maintenance, instrument and control technicians, electricians) may be relied upon to perform repairs, provided their availability is consistent with plant's Emergency Plan Implementing Procedures and/or the plant's licensing commitments.

Other Types of Actions

When performing the post-fire safe shutdown analysis, additional actions that are not credited in the post-fire safe shutdown analysis may be identified that have a positive benefit to the safe shutdown scenario such as minimizing the shutdown transient or reducing commercial property damage. Since these actions are not specifically required by the regulations or the safe shutdown analysis, it is not necessary to provide 8-hour emergency lighting or communication for these actions. It is also not required to specifically address the required timing for these actions. Similarly, operator manual actions specified as precautionary or confirmatory backup actions (prudent, but unnecessary or redundant) for a primary mitigating technique that are not credited in the post-fire safe shutdown analysis do not require 8-hour emergency lights, communications or timing considerations.

When these types of actions are included in the post-fire safe shutdown procedures, provisions should be made to identify which actions are "required" and/or which are "prudent" so that the operator is aware of which actions must be addressed on a priority basis and which are more discretionary. This will help assure that the operator is properly focused on those actions that are of most importance.

VII REFERENCES

10 CFR 50 Appendix R Fire Protection for Operating Nuclear Power Plants

Draft NRC Response to 03-29-06 EPM letter, May 25, 2006 (ML061440237)

Draft NRC Response to 05-03-06 NEI letter, May 25, 2006 (ML061440251)

NRC Inspection Procedure 71111.05, March 18, 2005

NRC letter to NEI, Use of Manual Actions to Achieve Safe Shutdown for Fire Events, dated May 16, 2002 (ML021410026)

NRC Meeting Summary of 06-09-06 OMA Meeting, July 19, 2006 (ML061950327)

NRC Revision to Draft Response to EPM March 2006 letter, July 19, 2006 (ML061980016)

NRC Revision to Draft Response to NEI May 2006 letter, July 19, 2006 (ML061980035)

NUREG-1778, Knowledge Base for Post-Fire Safe-Shutdown Analysis, January 2004

Public Meeting Notice 20060609 on Manual Action Clarifications, May 26, 2006 (ML061390156)

RIS 2006-10 Regulatory Expectations with Appendix R Paragraph III.G.2 Operator Manual Actions, June 30, 2006 (ML061650389)

SECY-03-0100, Rulemaking Plan on Post-Fire Operator Manual Actions, June 17, 2003