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J.E. Pollock
Site Vice President

March 6, 2009

Re: Indian Point Unit 2
Docket No. 50-247
NL-09-031

U.S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, DC 20555-0001

Subject: **Request for Exemption from 10 CFR 50, Appendix R, Paragraph III.G.2 for Use of Operator Manual Actions for Indian Point Unit No. 2**

- References:
1. NRC Regulatory Issue Summary (RIS) 2006-010, "Regulatory Expectations with Appendix R Paragraph III.G.2 Operator Manual Actions"
 2. Inspection Procedure 71111.05T, "Fire Protection (Triennial)"

Dear Sir or Madam:

The purpose of this letter is to request exemptions from the requirements of 10 CFR 50, Appendix R in accordance with the guidance contained in NRC RIS 2006-010 (Reference 1), and in accordance with 10 CFR 50.12, "Specific exemptions." The Exemption Request is contained in Attachment 1.

Entergy Nuclear Operations, Inc, (Entergy) has reviewed the fire protection licensing bases for Indian Point Unit 2 (IP2) relative to 10 CFR 50, Appendix R, Paragraph III.G and the use of operator manual actions (OMAs) to mitigate certain potential spurious operations or maloperation of credited safe-shutdown components that could be caused by fire damage to components and/or cables.

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Reference 1 allows licensees to differentiate between those credited OMAs that have been previously reviewed by the Staff with approval, acknowledgement, or concurrence of these actions documented in one or more Safety Evaluation Reports, and those credited OMAs for which there is no record of prior Staff review and approval or concurrence of the OMAs. As exemptions are required in either case, Entergy has chosen to include all OMAs in one grouping as identified in Attachment 2.

The credited OMAs have been evaluated against the acceptance criteria of NRC Inspection Procedure 71111.05T (Reference 2) and confirmed to be feasible and reliable operator actions during the post-fire coping scenario. Further, these OMAs are consistent with the Staff's acceptance criteria for use as interim compensatory actions, and it is Entergy's position that these same credited OMAs are suitable and appropriate as permanent elements of the post-fire safe-shutdown strategy. The alternate shutdown strategy that is implemented for III.G.3 areas relies extensively on local OMAs for achieving and maintaining hot shutdown conditions, and utilizes further local OMAs, augmented by post-fire repairs for achieving and maintaining cold shutdown conditions. In contrast, the OMAs described for the listed III.G.2 fire areas are in each case representative of only a small subset of the OMAs credited for implementation of the more extensive alternate shutdown strategy.

The credited but unapproved OMAs described in Attachment 2 affect seven fire areas in which compliance with one or more elements of Appendix R Paragraph III.G.2 is claimed. These OMAs, or more appropriately, sets of OMAs, in each case consist of a small number of manual actions that can be accomplished in a timely manner using the normal operations shift staff. These groupings of OMAs, in any of the affected fire areas, are bounded by the scenario presented to the operations shift staff in implementing the alternate shutdown methodology for those fire areas in which compliance with Appendix R Paragraph III.G.3 is necessary.

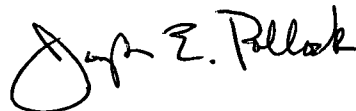
It is Entergy's belief that the requested exemption(s) should be granted, as:

- The identified OMAs are feasible and reliably implemented with the available operations shift staff, even considering the adverse conditions encountered during the post-fire environment and in consideration of possible multiple spurious actuations;
- Limited hazards and existing fire protection features provide assurance that the need to implement the OMAs is remote;
- No demonstrable fire/nuclear safety benefit would be gained by implementation of additional modifications in lieu of continued crediting of the defined OMAs, as credible and reliable means of achieving and maintaining safe-shutdown conditions.

- As required by 10 CFR 50.12(a)(1), the exemption is authorized by law, will not present an undue risk to the public health and safety, and is consistent with the common defense and security.

There are no new commitments being made in this submittal. If you have any questions or require additional information, please contact Mr. Robert W. Walpole, IPEC Licensing Manager at (914) 734-6710.

Sincerely,



Joseph E. Pollock
Site Vice President
Indian Point Energy Center

Attachments:

1. Request for Exemption from 10 CFR 50, Appendix R, Paragraph III.G.2 For Use of Operator Manual Actions
2. Technical Basis in Support of Exemption Request

cc: Mr. John P. Boska, Senior Project Manager, NRC NRR DORL
Mr. Samuel J. Collins, Regional Administrator, NRC Region I
NRC Resident Inspector's Office, Indian Point Energy Center
Mr. Paul Eddy, New York State Department of Public Service
Mr. Robert Callender, Vice President NYSERDA

ATTACHMENT 1

**Request for Exemption from 10 CFR 50, Appendix R, Paragraph III.G.2
For Use of Operator Manual Actions**

**ENERGY NUCLEAR OPERATIONS, INC.
Indian Point Nuclear Generating Unit No. 2
Docket No. 50-247**

**Request for Exemption from 10 CFR 50, Appendix R, Paragraph III.G.2
For Use of Operator Manual Actions**

1.0 EXEMPTION REQUEST

10 CFR 50, Appendix R, Paragraph III.G.2 requires the following:

Except as provided for in paragraph G.3 of this section, where cables or equipment, including associated non-safety circuits that could prevent operation or cause maloperation due to hot shorts, open circuits, or shorts to ground, of redundant trains of systems necessary to achieve and maintain hot shutdown conditions are located within the same fire area outside of primary containment, one of the following means of ensuring that one of the redundant trains is free of fire damage shall be provided:

- a. Separation of cables and equipment and associated non-safety circuits of redundant trains by a fire barrier having a 3-hour rating. Structural steel forming a part of or supporting such fire barriers shall be protected to provide fire resistance equivalent to that required of the barrier;
- b. Separation of cables and equipment and associated non-safety circuits of redundant trains by a horizontal distance of more than 20 feet with no intervening combustible or fire hazards. In addition, fire detectors and an automatic fire suppression system shall be installed in the fire area; or
- c. Enclosure of cable and equipment and associated non-safety circuits of one redundant train in a fire barrier having a 1-hour rating. In addition, fire detectors and an automatic fire suppression system shall be installed in the fire area;

Inside noninerted containments one of the fire protection means specified above or one of the following fire protection means shall be provided:

- d. Separation of cables and equipment and associated non-safety circuits of redundant trains by a horizontal distance of more than 20 feet with no intervening combustibles or fire hazards;
- e. Installation of fire detectors and an automatic fire suppression system in the fire area; or
- f. Separation of cables and equipment and associated non-safety circuits of redundant trains by a noncombustible radiant energy shield.

10 CFR 50, Appendix R, Paragraph III.G.3 requires the following:

Alternative or dedicated shutdown capability and its associated circuits, independent of cables, systems or components in the area, room, zone under consideration should be provided:

- a. Where the protection of systems whose function is required for hot shutdown does not satisfy the requirement of paragraph G.2 of this section; or
- b. Where redundant trains of systems required for hot shutdown located in the same fire area may be subject to damage from fire suppression activities or from the rupture or inadvertent operation of fire suppression systems.

In addition, fire detection and a fixed fire suppression system shall be installed in the area, room, or zone under consideration.

Consequently, unless alternative or dedicated shutdown capability is provided or an exemption from paragraph III.G.2 is granted, circuits which could cause maloperation or prevent operation of redundant trains for post-fire safe shutdown and are located in the same fire area must be protected in accordance with paragraph III.G.2.

As detailed in Attachment 2, Indian Point Unit 2 (IP2) credits a number of manual actions in lieu of one of the means specified in paragraph III.G.2 to ensure a train is free of fire damage when redundant trains are in the same fire area. Therefore, Entergy Nuclear Operations, Inc. (Entergy) hereby requests an exemption from the requirements of 10 CFR 50, Appendix R, Paragraph III.G.2 for IP2 to the extent that operator manual actions are necessary to achieve and maintain hot shutdown for fire areas in which both trains of safe-shutdown cables/equipment are located in the same fire area. The fire areas involved are Fire Areas C, F, H, J, K, P, and YD.

2.0 BACKGROUND

As understood by many licensees (including Entergy) since the issuance of 10CFR50, Appendix R, the use of local operator manual actions (OMAs) to facilitate post-fire safe-shutdown was not explicitly prohibited by Paragraph III.G.2, and therefore in many cases, licensees' post-fire shutdown procedures include the use of such actions to mitigate situations in which cables or components could be damaged in a given fire scenario. However, the regulatory activities leading up to the proposed (now-withdrawn) "Manual Action Rule," and the issuance of RIS 2006-010 (Reference 7.1 of Attachment 2), have confirmed the NRC Staff's position that the crediting of OMAs was not explicitly or implicitly permitted by the regulation, and that any crediting of such manual actions for

compliance with III.G.2, without prior review and approval by the Staff in the form of an exemption, is unacceptable and noncompliant with Appendix R.

As evidenced by the development of the draft Manual Action Rule, the NRC Staff recognized this "misinterpretation" of III.G.2 was widespread among licensees, and that OMAs had been broadly integrated into the compliance basis and shutdown models for many fire areas in which compliance with III.G.2 was identified. It was further recognized and in many cases acknowledged during NRC audits/inspections that many of these OMAs had been demonstrated to be well proceduralized, feasible to implement in a sufficiently timely manner, and capable of ensuring with high confidence that the post-fire shutdown capability could be sustained through use of these specific manual actions. However, as the crediting of these OMAs without prior NRC review and approval technically constitutes noncompliance with Appendix R Paragraph III.G.2, the Staff has established guidance in RIS 2006-010 for interim acceptance of these OMAs (subject to specific conditions), pending permanent resolution of the noncompliance concerns.

The permanent resolution of "manual action" noncompliance may be achieved through the exemption process, shutdown methodology changes, plant modifications, or a combination of these approaches.

3.0 LICENSING BASIS

For the fire areas for which this exemption is requested (Fire Areas C, F, H, J, K, P, and YD), the plant's fire protection licensing basis indicates that IP2 is committed to compliance with 10CFR50, Appendix R, Paragraph III.G.2. The explicit requirements of 10CFR50, Appendix R, Paragraph III.G.2 mandate that (using one of the options given by III.G.2) the redundant trains should be adequately separated and protected, such that in the event of a fire in that area, at least one train will remain free of fire damage, and therefore OMAs (for mitigation or recovery) should not be required. However, as contained in the IP2 Appendix R Safe-Shutdown Analysis (Reference 7.4 of Attachment 2), in the event of a fire in one of the fire areas that are the subject of this exemption request, certain local OMAs are credited to prevent or mitigate certain undesirable equipment operations that may occur due to fire damage to cables or components located in that fire area. In each case, the OMAs described are taken in another area (outside the area affected by the fire) or, in certain cases, are implemented in the affected fire area, after 60 minutes have elapsed, to conservatively ensure that reentry to the fire-affected area is feasible.

As documented by RIS 2006-010, while the stated hot shutdown OMAs may be reasonable, achievable, and an effective means of ensuring the post-fire safe-shutdown (hot shutdown) capability, the crediting of such actions without an approved exemption is not permitted within the options listed under Appendix R, Paragraph III.G.2. Therefore, as it appears that IP2 does not have documentation of prior NRC review and approval in the form of an existing

exemption for the OMAs contained herein, the requirements of Paragraph III.G.2 of Appendix R are not met for the affected fire areas. Therefore, in accordance with RIS 2006-010, the permanent resolution of the OMA noncompliance is to include an approved exemption from the requirements of 10 CFR 50, Appendix R, Paragraph III.G.2 in the licensing basis for the affected fire areas.

It should be noted that not all plant fire areas require an exemption. Fires occurring in some areas require no OMAs, and fires in certain other areas are mitigated in accordance with Appendix R, Paragraph III.G.3 (alternate shutdown), which incorporates the use of OMAs that do not require prior NRC review and approval. The focus of the exemption request is limited to those fire areas for which compliance with Appendix R, Paragraph III.G.2 is claimed and OMAs are credited, in part, for coping with the effects of a fire in that area, and are required to achieve and maintain hot shutdown.

4.0 TECHNICAL BASIS

The technical basis to support this exemption request is contained in Attachment 2. It has been developed in accordance with the guidance of RIS 2006-010 (Reference 7.1 of Attachment 2), NRC Staff Memorandum dated July 19, 2006 (T. Dinh to S. Weerakkody) (Reference 7.2 of Attachment 2), and NRC Inspection Procedure (IP) 71111.05T (Reference 7.3 of Attachment 2). Additional guidance was obtained from SECY 08-0093 (Reference 7.5 of Attachment 2), in the screening of OMAs that require explicit NRC review and approval via the exemption process.

5.0 REGULATORY ANALYSIS

Pursuant to 10 CFR 50.12, the Commission may grant exemptions from the requirements of 10 CFR 50 that are (1) authorized by law; (2) will not present an undue risk to the public health and safety; (3) consistent with the common defense and security; and, (4) special circumstances, as listed in 10 CFR 50.12(a)(2) are present. This exemption request meets the criteria set forth in 10 CFR 50.12, as discussed herein.

5.1 The requested exemption is authorized by law

10 CFR 50.12(a) authorizes the NRC to grant exemptions from its regulations, and no law is known that precludes the NRC from granting the requested exemption. As discussed below, since the exemption request does not present an undue risk to public health and safety, will not endanger the common defense and security, and special circumstances exist, the NRC is authorized to issue the exemption.

5.2 The requested exemption does not present an undue risk to the public health and safety

The credited OMA in Tables 2 through 8 of Attachment 2 have been evaluated against the acceptance criteria of IP 71111.05T and have been confirmed to be feasible and reliable actions during the post-fire coping scenario. These OMAs, or more appropriately, sets of OMAs, affect seven fire areas and in each case consist of a small number of manual actions that can be accomplished in a timely manner using the normal operations shift staff, even considering the potentially adverse conditions encountered during the post-fire environment and in consideration of possible multiple spurious actuations. Use of the OMAs ensures that the effectiveness of the fire protection program is not degraded, and that the credited post-fire safe-shutdown capability is not challenged since at least one train of safe shutdown equipment will remain operable. Further, these OMAs are unlikely to be required to be implemented given the defense-in-depth features of the fire protection program, and the associated low likelihood of a significant fire in any of the fire areas of concern. Based on this and on the determination that safe shutdown even in the event of a fire can be achieved and maintained through the use of OMAs instead of meeting the requirements of Paragraph III.G.2 of Appendix R in all cases, the requested exemption does not present an undue risk to the public health and safety.

5.3 The requested exemption is consistent with the common defense and security

To ensure that the common defense and security are not endangered, the exemption request must demonstrate that the loss or diversion of Special Nuclear Material (SNM) is precluded. As a part of the Indian Point Energy Center (IPEC), IP2 has systems and processes in place that provide protection for the public from diversion of SNM that is licensed to be possessed on site. These systems and processes are those embodied in the "IPEC Physical Security Plan," the "IPEC Security Training and Qualification Plan," the "IPEC Safeguards Contingency Plan," and the "IPEC Security Implementing Procedures." The exemption request contained herein does not involve or affect the systems and processes contained in those documents/programs. Therefore, this exemption does not affect the common defense and security.

5.4. Special circumstances are present

10 CFR 50.12(a) requires that special circumstances be present in order for the Commission to consider granting an exemption. Per 10 CFR 50.12(a)(2)(ii), one special circumstance is that application of the regulation in the particular circumstances would not serve the underlying purpose of the rule or is not necessary to achieve the underlying purpose of the rule.

The underlying purpose of 10 CFR 50, Appendix R is to provide reasonable assurance that safe shutdown of the reactor can be achieved and maintained in the event of a postulated fire in any plant area. Circuits which could cause maloperation or prevent operation of redundant trains for post-fire safe shutdown and are located in the same fire area must be protected in accordance with Paragraph III.G.2 of Appendix R. If such protection is not provided, then Paragraph III.G.2 specifies that alternative or dedicated shutdown capability be provided or an exemption from Paragraph III.G.2 be granted. The NRC permits exemptions from III.G.2, as described in RIS 2006-10 via the use of OMAs as long as those actions are feasible and can be reliably implemented. The NRC has provided acceptance criteria set forth in NRC Inspection Procedure 71111.05T in order to evaluate if OMAs are feasible and reliably implemented.

The credited OMAs listed in Tables 2 through 8 of Attachment 2 have been evaluated against the acceptance criteria of IP 71111.05T and have been confirmed to be feasible and reliable operator actions during the post-fire coping scenario. Therefore, since an acceptable alternative to the regulation that has been provided by the NRC has been demonstrated to be acceptable for the OMAs listed in Tables 2 through 8 of Attachment 2, no demonstrable fire/nuclear safety benefit would be gained by the installation of additional modifications to comply with Paragraph III.G.2 of Appendix R in lieu of the crediting of the defined OMAs as credible and reliable means of achieving and maintaining safe-shutdown conditions. Therefore, the underlying purpose of the rule is satisfied and the application of the regulation in these particular circumstances is not necessary to achieve the underlying purpose of the rule.

6.0 CONCLUSION

This request for exemption is warranted under the provisions of 10 CFR 50.12, in that it is authorized by law, does not present an undue risk to the public health and safety, and is consistent with the common defense and security. Further, it meets the requirement for a special circumstance in that it satisfies the underlying purpose of 10 CFR 50 Appendix R by providing reasonable assurance that safe shutdown of the reactor can be achieved and maintained in the event of a fire using operator manual actions in certain fire areas in lieu of the separation and protection requirements of Appendix R.

ATTACHMENT 2

Technical Basis in Support of Exemption Request

**ENTERGY NUCLEAR OPERATIONS, INC.
Indian Point Nuclear Generating Unit No. 2
Docket No. 50-247**

Technical Basis in Support of Exemption Request

1. Background and Identification of Manual Actions

The explicit requirements of 10CFR50, Appendix R, Paragraph III.G.2 mandate that (using one of the options given by III.G.2) redundant trains of safe-shutdown equipment should be adequately separated and protected, such that in the event of a fire in that area, at least one train will remain free of fire damage, and therefore operator manual actions (for mitigation or recovery) should not be required. In response to a review of the IP2 post-fire shutdown methodology and Appendix R compliance bases to address NRC RIS 2006-010 (Reference 7.1), it was noted that in certain fire areas in which separation would typically be expected to meet the requirements of Appendix R, Paragraph III.G.2, the use of operator manual actions (OMAs) is credited in the IP2 Appendix R Safe-Shutdown Analysis (Reference 7.4) to mitigate certain undesirable equipment operations that may occur due to fire damage to cables or components located in those fire areas in order to restore or maintain the associated safe (hot) shutdown functions.

The fire areas where OMAs are credited are Fire Areas C, F, H, J, K, P, and YD. Table 1 provides a summary of the Fire Hazards Analysis for each fire zone in those fire areas. Tables 2 through 8 list the specific OMAs that may be required to be performed in each of these III.G.2 fire areas. The OMAs have been reviewed in accordance with the guidance of RIS 2006-010, NRC Staff Memorandum dated July 19, 2006 (T. Dinh to S. Weerakkody) (Reference 7.2), and the acceptance criteria provided by Enclosure 2 of NRC Inspection Procedure 71111.05, (Reference 7.3) and have been determined to provide feasible and reliable mitigating actions to compensate for the potential fire-induced failure or spurious actuation of the identified safe-shutdown components.

It should be noted that not all IP2 fire areas are listed in Table 1. Fires occurring in some areas require no OMAs, and fires in certain other areas are mitigated in accordance with Appendix R, Paragraph III.G.3 (alternate shutdown). The focus of the issue addressed herein is limited to those fire areas in which compliance with Appendix R, Paragraph III.G.2 is claimed and manual actions are credited, in part, for mitigation or recovery of certain elements of the post-fire safe-shutdown capability in the event that a postulated fire in any one of the listed fire areas causes damage to redundant safe-shutdown equipment trains located in that fire area. In each case, the manual actions described are taken in another area (outside the area affected by the fire), or in certain cases are implemented in the affected fire area, after 60 minutes have elapsed, to conservatively ensure that reentry to the fire-affected area is feasible.

Consistent with the guidance given by References 7.1 and 7.2, the OMAs listed in Tables 2 through 8 have been implemented as interim compensatory measures, in lieu of fire watches, pending permanent resolution of the stated Appendix R

compliance concerns. The basis for acceptability of these actions, both as interim compensatory measures and as the long-term Appendix R, Paragraph III.G.2 compliance basis (pending NRC approval via the requested exemption) in this regard is discussed herein.

As shown in Table 1, each of the affected fire areas has one or more mitigating fire protection characteristics that provide a level of defense-in-depth protection, thus minimizing the necessity to use post-fire shutdown procedures for credible fire scenarios in these areas. When these defense-in-depth features are considered in concert with the station fire prevention measures of housekeeping controls, hot work constraints, and transient combustible controls, and the fire brigade manual suppression capabilities, the likelihood of the need for the identified OMAs is reduced further.

2. Binning of Manual Actions Per Guidance of SECY-08-0093

The credited OMAs have been screened to establish those that are credited for protection or recovery of the REQUIRED safe-shutdown train, versus those OMAs that are credited for protection or recovery of equipment that is "Important to Safe Shutdown," as outlined by SECY-08-0093 (Reference 7.5). Those OMAs that are identified as credited for protection of the REQUIRED SSD train, and that are not documented as acceptable OMAs in a previously granted exemption to Appendix R are the subject of this exemption request. Those OMAs that are identified as credited for protection or recovery of equipment "important to safe shutdown," i.e., that are NOT part of the REQUIRED SSD train, are considered acceptable actions, provided that they are demonstrated to be feasible and reliable, without requiring exemption from the requirements of Appendix R.

The IP2 Appendix R Safe-Shutdown Analysis was reviewed to identify all cases in which OMAs have been credited as an element of the safe-shutdown methodology in III.G.2 fire areas. These OMAs were then screened based on criteria given by SECY-08-0093 and NEI-00-01, Draft Rev. 2(c) (Reference 7.6), to isolate those OMAs that are credited for the protection or recovery of the required/credited safe-shutdown train in the affected fire areas. The screening criteria that were applied, and the resultant tabulation of the OMAs of concern, is captured in engineering report IP-RPT-08-00072 (Reference 7.7).

3. Review of Credited Manual Actions as Acceptable Compensatory Measures Per IP 71111.05

The guidance of Enclosure 2 of Inspection Procedure (IP) 71111.05 is referenced in the July 19, 2006 NRC Staff memorandum (T. Dinh to S. Weerakkody). Enclosure 2 of IP 71111.05 describes the criteria that must be considered when determining whether an OMA, credited as an interim compensatory measure, is appropriate and feasible to credit in this capacity. The criteria, along with the IP2-specific responses, are discussed below.

i. Applicability

The identified OMAs are those which are credited in fire areas under which compliance to Appendix R, Paragraph III.G.2 is credited, and for which manual actions there is apparently no record of prior NRC review and approval, in an SER or approved exemption, of the use of these actions to establish equivalent compliance with III.G.2 requirements.

ii. Diagnostic Instrumentation

For fire scenarios occurring in III.G.2 fire areas, evacuation of the Central Control Room (CCR) and comprehensive implementation of alternative shutdown methods is not required or credited. As such, key diagnostic instrumentation can be expected to remain available in the CCR to alert operators to implement the contingency OMAs as credited in the IP2 Appendix R Safe-Shutdown Analysis. Key indicators that trigger the need for local operator intervention for the credited set of OMAs include not only the RCS and secondary system instrumentation, but also the failure of components to respond or reliably indicate status in the CCR. Based on field notes compiled from simulator exercises in which bounding fire area scenarios were modeled, it is judged that the available CCR instruments and indicators, combined with operator response in accordance with EOPs, AOPs, fire safe shutdown procedures, and other supporting procedures, provide reasonable assurance of timely diagnosis of conditions requiring the dispatch of operator(s) to perform the credited OMAs outside the CCR.

iii. Environmental Considerations

Radiation levels: None of the identified OMAs require an operator to enter high radiation fields.

Emergency lighting per Appendix R, Paragraph III.J: Emergency lighting is installed per Appendix R, Paragraph III.J, except where ER-IP2-04-20592 (Reference 7.8) has identified the need for emergency lighting enhancements at a number of locations. Pending fulfillment of that engineering request through the installation of additional 8-hour rated emergency lighting units, portable 8-hour lanterns are provided for operator use to ensure an equivalent and reliable lighting capability is available.

Temperature and humidity: The credited OMAs are generally not conducted in the area directly affected by the fire, and given that they are performed in support of hot shutdown operation, they are performed relatively early in the coping period. As a result, in the event of the failure of normal HVAC systems early in the scenario, zone/room heatup that creates habitability concerns is not expected. However, for those specific cases in which it is necessary to reenter the fire area no less than one hour after the postulated fire event, sufficient time is available to initiate

smoke/heat venting through fixed ventilation systems and augmented by portable smoke ejectors, consistent with the Pre-Fire Plans, to ensure operator habitability to implement the necessary OMAs.

Smoke and toxic gases: The identified OMAs are generally not conducted in the area directly affected by a postulated fire, and thus significant quantities of smoke and toxic gases impacting the areas where OMAs are performed are not typically expected. However, for those specific cases in which it is necessary to reenter the affected fire area, reentry is not credited in less than one hour after the start of the fire event, ensuring adequate time for extinguishment of the fire and initiation of smoke venting from the affected area. Pre-staged SCBAs, sufficient to equip the full operating crew, are available for deployment in response to post-fire environmental conditions.

iv. Staffing

Timed field walkthroughs of Abnormal Operating Procedure 2-AOP-SSD-1 (Reference 7.9) have been performed to validate that the number of operators available on the watch staff (7) can safely accomplish all required actions within the required time period to meet Appendix R safe-shutdown performance goals. The broad set of operator manual actions required in implementing 2-AOP-SSD-1 bounds the smaller set of manual actions credited for coping with III.G.2 fire area scenarios. The OMAs required for the III.G.2 fire areas are directed by Off-Normal Operating Procedure 2-ONOP-FP-001 (Reference 7.10).

v. Communications

Reliance is placed on radios for communication between plant operators during a post-fire shutdown event. Radio repeaters are located outside the protected area and are not subject to disruption caused by fire events within the protected area/power block. The repeaters are also equipped with uninterruptible power supplies to ensure continued operation in the event of the loss of normal power to the buildings in which they are located. Field verifications of radio system functionality have validated that communications between the designated control and monitoring locations are feasible and reliable.

vi. Special Tools

Any tools that are required in support of post-fire hot shutdown OMAs are pre-staged at the locations where they would be used. These consist of common tools such as wrenches, banding cutters, pliers. Where special tools/equipment are required, these are designated for post-fire cold shutdown repairs, and the necessary tools and supplies are pre-staged in

designated locations. The staging of necessary tools is confirmed via periodic surveillance.

vii. Training

The fire scenarios that may be encountered in III.G.2 fire areas may involve the use of EOPs and AOPs, as well as post-fire safe-shutdown procedure(s), in coping with the fire scenario. Initial and periodic requalification Operator training typically is provided on these procedures, consistent with standard licensed and non-licensed operator training programs, as well as emergent needs as identified by training evaluation action requests.

viii. Accessibility

Where ladders are required for access to components to perform OMAs, appropriate ladders are staged in accordance with plant procedures and the presence of these ladders is verified periodically in accordance with plant surveillance procedures.

ix. Procedures

Post-fire operator manual actions are clearly defined in procedures 2-ONOP-FP-001 and 2-AOP-SSD-1. Where CCR controls and indication are not assured to be reliably operable, sufficiently detailed guidance is provided in these procedures to direct the operators to an alternate component or operating method that is assured to be available and viable for the specific fire scenario under consideration.

x. Verification and Validation

The post-fire OMAs have been validated through timed operator walkthroughs, using as the basis an enveloping scenario addressed by 2-AOP-SSD-1. When utilizing 2-AOP-SSD-1, the most challenging set of local manual operator actions (number of actions and time sensitivity of actions) is presented to the operations shift crew, and this set of actions is considered to adequately bound the limited set of manual actions that are credited in 2-ONOP-FP-001, and as listed for the fire areas shown in Tables 2 through 8. Note that 2-ONOP-FP-001 also relies principally on shutdown from the CCR. The timed walkthroughs of 2-AOP-SSD-1 have consistently demonstrated that the key safe-shutdown tasks (e.g., restoration of RCS makeup; restoration of auxiliary feedwater to steam generators; mitigation of key potential spurious actuation concerns) can be accomplished in a timely manner to meet the Appendix R safe-shutdown performance goals.

In addition to the validation of key OMAs credited in alternate safe-shutdown procedure 2-AOP-SSD-1, the plant simulator was utilized to perform evaluations of bounding III.G.2 fire scenarios, and based on the field notes compiled from these exercises, there is reasonable assurance that conditions requiring the implementation of the identified OMAs can be identified and mitigated in a sufficiently timely manner to ensure Appendix R performance goals are met.

4. Tabulation of Credited Hot Shutdown Operator Manual Actions

The attached Tables 2 through 8 list, on a fire area basis, the specific OMAs credited for recovery or protection of the credited equipment train for achieving and maintaining hot shutdown conditions in these Appendix R Paragraph III.G.2 fire areas. The manual action lists were extracted from the component, cable, and raceway database used for preparation of the IP2 Appendix R Safe-Shutdown Analysis. As shown by Tables 2 through 8, the total number of OMAs that may be required in response to any single III.G.2 fire scenario to restore or protect the credited/required equipment train is minimal.

The manual action sequences in all of the III.G.2 areas are considered to be bounded by the sequences represented by alternate shutdown (III.G.3) Fire Area A. The alternate shutdown scenario represented by Fire Area A has been drilled through performance of procedure 2-AOP-SSD-1, and successful accomplishment of actions and required time targets has been demonstrated. It is further noted that in Fire Area A (which encompasses the CCR, Cable Spreading Room, 480V Switchgear Room, and others), the high concentration of control, power, and instrumentation cables presents the greatest potential for multiple circuit damage and multiple spurious operation scenarios, and thus presents the greatest potential for the entire set of credited manual actions for this area to be performed. In the III.G.2 fire areas addressed by Tables 2 through 8, the cable densities and commonality of routing paths is a small fraction of those represented in Fire Area A.

5. Defense-In-Depth

The IP2 Fire Protection Program, consistent with NRC guidance as given by BTP APCS 9.5-1, 10 CFR 50, Appendix R, and supporting generic communications, is designed and implemented based on a foundation of defense-in-depth protection. The three tiers of defense in depth consist of:

- Fire Prevention – Preventing fires from starting, through control of fuel and ignition sources and conditions.
- Fire Detection and Suppression – Providing the capability to promptly detect any fires that may occur, and the capability to promptly and effectively control and extinguish any such fire.

- Protection of Safe Shutdown Capability – Providing protection for systems, structures, and components important to safety, such that any fire that is not promptly detected and extinguished will not prevent the safe shutdown of the plant.

The Fire Prevention layer of defense in depth is composed of administrative controls as well as inherent plant design features. Noncombustible materials have been used to the maximum extent practicable in original plant design and in any subsequent plant modifications, including not only structural components, but also (for example) the use of flame-resistant electrical cable insulation. Introduction of combustible materials into the power block is strictly controlled by administrative procedure EN-DC-161 (Reference 7.11) that requires fire protection engineering review and approval prior to the introduction of any significant quantity of transient combustibles into key plant areas. Routine housekeeping inspections ensure validation and enforcement of the controls on transient combustibles and fire hazards. Hot work in key areas of the plant is also controlled administratively, for processes including open-flame work, cutting, welding, and grinding. As a result of the above, the potential for exposure fires (in transient combustibles) and fires resulting from the introduction of significant ignition sources (hot work) is sharply limited.

The Fire Detection and Suppression layer of defense in depth is represented by fire detection and suppression systems that are installed in those plant areas that contain significant combustible hazards. Fire detection includes both smoke and heat detection systems that provide alarms to the CCR. Suppression systems include pre-action, deluge and wet pipe sprinkler systems, aqueous film-forming foam (AFFF) automatic suppression systems, and a manually-actuated Halon 1301 total-flooding suppression system. A summary of the fire detection and suppression features in all of the fire areas included in the subject exemption request is provided in Table 1.

Hose stations and fire extinguishers are located throughout the plant to facilitate firefighting activities by the fire brigade. As shown in Table 1, areas containing unique or significant hazards are provided with fire detection and/or automatic fire suppression systems. The installed fire detection and automatic suppression systems, in conjunction with fire brigade response and deployment of the available manual fire suppression features, provides assurance that a fire will be precluded from rapidly growing and involving other fire zones or areas.

The Protection of Safe-Shutdown Capability layer of defense in depth is represented by the fire barriers enclosing each fire area that provide assurance that a fire that is not promptly detected and/or not promptly controlled and suppressed, will ultimately be contained within the fire area of origination. As the IP2 Appendix R Safe-Shutdown Analysis places reliance on a postulated fire being confined to the fire area of origin, the passive (fire barrier) features ensure the continued integrity of the post-fire safe-shutdown analysis and the post-fire safe-shutdown procedures that have been developed based on that analysis.

Each fire area is separated from adjacent fire areas with a barrier commensurate with the hazards of the area. The fire barriers typically have a 3-hour fire resistance rating, including the barrier, doors, HVAC fire dampers, and penetration seals. However, other barrier types, including spatial separation, are used to divide fire areas. These fire area boundaries are described in the IP2 Fire Hazards Analysis (Reference 7.12). The IP2 Appendix R Safe-Shutdown Analysis documents the basis for achieving safe shutdown following a fire in any given fire area. The equipment lost and the equipment available has been reviewed and the actions necessary to ensure shutdown have been identified in the post-fire safe-shutdown procedures for each fire area. The OMA's addressed by the subject exemption request are part of the actions that may be necessary in support of the safe-shutdown methodology established by the IP2 Appendix R Safe-Shutdown Analysis.

6. Fire Hazards and Fire Protection Features in III.G.2 Fire Areas

An initiating fire area is the area in which one or more OMA's are credited to mitigate maloperation of equipment in the required/credited equipment train caused by potential fire-induced damage to components or cables located in that area. The seven III.G.2 fire areas in which the OMA's discussed herein are credited are:

Fire Area C	Auxiliary Feedwater Pump Room
Fire Area F	Primary Auxiliary Building and Fan House
Fire Area H	Vapor (Reactor) Containment
Fire Area J	Unit 1 Turbine Building, Unit 2 Turbine Building, Superheater Building, Nuclear Service Building, Chemical Systems Building, Administration Building, Screenwell House, and Unit 1 Control Room
Fire Area K	Auxiliary Feedwater Pump Building (Except AFW Pump Room)
Fire Area P	Component Cooling Water Pump Room
Fire Area YD	Outdoor (Yard) Area

The details of combustible loading/fire severity and active fire protection features for all fire zones comprising the seven fire areas of concern are listed in Table 1. Note that most of these fire areas are comprised of a number of fire zones consisting of separate compartments, or fire zone delineations based on spatial separation. As described below, the character of the localization of the hazards and combustibles by fire zone, combined with the separation between fire zones by spatial and barrier separation, provide reasonable assurance that fires that occur within a given zone will be confined to the zone of origination.

As shown in Table 1, most fire zones comprising the above seven fire areas are characterized by LOW combustible loading, corresponding to less than 100,000 BTU/ft², or an equivalent fire severity of 75 minutes or less. All fire zones characterized as having a HIGH combustible loading (greater than or equal to 200,000 BTU/ft², or an equivalent fire severity of at least 150 minutes) are equipped with automatic fire suppression systems appropriate for the hazards of the area

(with the exception of Fire Zone 600), thus sharply limiting the expected extent of any fire that may occur. Fire Zone 600 is the roof area of the Unit 1 Screenwell House, which is located remote from any safety-related SSCs, and which contains only equipment associated with the alternate shutdown capability. The remaining fire zones are characterized by MODERATE combustibility loading, with a combustibility load of 100-200,000 BTU/ft², or an equivalent fire severity of 75 to 150 minutes. Of the fire zones classified as containing MODERATE combustibility loading, nine fire zones are not provided with automatic fire suppression or detection systems, although manual fire suppression equipment is available, as shown in Table 1. Of these nine fire zones, only Fire Zones 5A, 11A and 33A in Fire Area F, Fire Zones 76A and 77A in Fire Area H, and Fire Zones 52A in Fire Area J contain safe-shutdown related cables or components. These fire zones are discussed further as follows:

- **Fire Area F, Fire Zone 5A** (Primary Auxiliary Building, El. 80', Sampling Room) exhibits a MODERATE combustibility loading that is largely driven by the small floor area of the zone (150 ft²). There are no significant ignition sources in the zone, and the potential for a fire event of any significance is low.
- **Fire Area F, Fire Zone 11A** (Primary Auxiliary Building, El. 80', Waste Condensate Tank Room) exhibits a MODERATE combustibility loading. There are no significant ignition sources in the zone, and the potential for a fire event of any significance is low.
- **Fire Area F, Fire Zone 33A** (Primary Auxiliary Building, El. 98', MCC-26AA and 26BB Room) contains several safe-shutdown related cables as well as safe-shutdown MCCs. The postulated fire scenario in this zone involves an MCC compartment fire. The MCCs can be deenergized from outside this fire area (from Fire Area A) if necessary to mitigate a fire condition.
- **Fire Area H, Fire Zones 76A and 77A** (Reactor (Vapor) Containment, El. 46', Outer Annulus Area), exhibit a MODERATE combustibility loading. Normal safe-shutdown instrumentation cables are located in these zones. There are no significant ignition sources in these zones, and the potential for a fire event of any significance is low. The restricted access to Containment during plant operation, and stringent transient combustibility and FME controls for this area, provide further assurance that the likelihood of a fire of significance in this area is low.
- **Fire Area J, Fire Zone 52A** (Turbine Building, El. 36'-9", Mezzanine Area) contains several safe-shutdown related cables. The postulated fire scenario in this zone involves a slow-developing cable tray fire, or an exposure fire in transient combustibles. Note that the combustibility content of this zone as shown by Table 1 also reflects the conservative consideration of a substantial quantity of main turbine lubricating oil, but the presence of this oil would require postulation of a nonmechanistic lube oil line rupture/failure.

Summary descriptions of each of the III.G.2 fire areas are provided below. The combustible loading, types of combustibles, postulated fires, available detection and suppression, and smoke/hot gas ejection methods are identified.

Fire Area C, AFW Pump Building Elevation 18'-6" (AFW Pump Room)

This fire area consists of a single room (the AFW Pump Room), and it is also designated Fire Zone 23. Alternate safe shutdown and safety-related equipment and cabling are located in the zone.

The overall combustible loading for this fire area is LOW. Combustibles in this fire area include: cable insulation, small quantities of lube oil, and small quantities of Class A combustibles. Based on the types and amounts of combustibles, the postulated fire is a slow developing cable fire or lubricating oil fire. Early warning detection is provided by ionization detectors that alarm in the CCR to ensure subsequent response by the fire brigade to extinguish the fire. Smoke and hot gases can be evacuated to the exterior via wall exhaust fans and portable smoke ejectors.

OMAs that may need to be performed as a result of a fire in Fire Area C consist of five discrete action sets that are listed in Table 2.

Fire Area F, Primary Auxiliary Building and Fan House

Fire Area F consists of 20 discrete fire zones, characterized by LOW or MODERATE combustible loading, with the exception of Fire Zone 59A, which contains charcoal filters (which are in turn provided with a deluge spray fire suppression system). Alternate safe shutdown and safety-related equipment and cabling are located in a number of the zones.

Within Fire Area F, the most significant fire hazards involve the charcoal filters in Fire Zone 59A, the lubricating oil in the charging pumps in Fire Zones 6 and 7, and the motor control centers in Fire Zones 27A and 33A. Early warning detection in the charging pump rooms and in other fire zones containing significant fire hazards and combustibles is provided by ionization detectors that alarm in the CCR. Thermistor wire is provided in the charcoal filters in Fire Zone 59A and upon activation will result in a CCR alarm followed by actuation of the automatic deluge water spray system, which is designed to control the fire in the charcoal filters. The CCR alarm for these zones ensures subsequent response by the fire brigade. Smoke and hot gases can be evacuated to the exterior via the Primary Auxiliary Building Ventilation System and portable smoke ejectors.

OMAs that may need to be performed as a result of a fire in Fire Area F consist of four discrete action sets that are listed in Table 3.

Fire Area H, Vapor (Reactor) Containment

Fire Area H encompasses the entire reactor containment structure, and is in turn comprised of 15 discrete fire zones, which are delineated by spatial separation. Alternate safe shutdown and safety-related equipment and cabling are located in the fire area. The overall combustible loading in this fire area is LOW (an equivalent fire severity of less than 75 minutes). Combustibles in this area include cable insulation, Reactor Coolant Pump (RCP) lube oil, and moderate quantities of Class A combustibles. The postulated fires in this area include electrical cable fires (note that all exposed cables have fire resistant insulation) or an RCP lube oil fire.

Within Fire Area H, the worst case postulated fire is a rapidly developing oil fire associated with the RCPs in either Fire Zone 70A or 71A. However, the probability of a fire involving the RCPs is remote, given that they are equipped with an oil collection system in accordance with 10CFR50, Appendix R, Paragraph III.O that is designed to capture any potential leakage and conduct the leakage away from the RCP area to oil collection tanks in an adjacent zone. In addition, early warning detection of the fire is provided by ionization detectors, resulting in a CCR alarm and subsequent response by the fire brigade. The worst-case postulated cable fire is a slow developing cable fire in the electrical penetration area (Fire Zone 75A). This zone is also equipped with ionization detectors that alarm in the CCR to provide early warning detection and subsequent response by the fire brigade. Smoke and hot gases from a fire in any one of these zones can be evacuated to the exterior via the purge supply and exhaust system.

OMAs that may need to be performed as a result of a fire in Fire Area H consist of two discrete action sets that are listed in Table 4.

Fire Area J, Unit 1 Turbine Building, Unit 2 Turbine Building, Superheater Building, Nuclear Service Building, Chemical Systems Building, Administration Building, Screenwell House, and Unit 1 Control Room

Fire Area J consists of 92 fire zones that are characterized as balance-of-plant areas that do not contain safety-related systems or components. Alternate shutdown equipment is located in this fire area, as well as several cables associated with normal safe-shutdown equipment.

Within Fire Area J, the most significant fire hazards within the plant power block would involve one of the turbine oil hazards associated with Fire Zones 16, 17, 18, 20, or 21. The anticipated fire is a rapidly developing lube oil fire. Trenches surrounding the fire zones prevent the accumulation and spread of lube oil beyond the zone boundaries. Early warning detection is provided by thermal detectors which alarm in the CCR, followed by activation of automatic foam spray suppression systems, which are designed to control the fire, and subsequent response by the fire brigade. Smoke and hot gases can be evacuated to the exterior via the Turbine Building Ventilation System roof ventilators and area doors using portable smoke exhausters.

OMAs that may need to be performed as a result of a fire in Fire Area J consist of four discrete action sets that are listed in Table 5.

Fire Area K, Auxiliary Feed Pump Building (All elevations except 18'-6")

Fire Area K consists of four fire zones that are characterized by extremely LOW combustible loading and few credible ignition sources. Alternate safe shutdown and safety-related equipment and cabling are located in this fire area.

Within Fire Area K, the worst-case postulated fire is a slow developing cable fire or a fire in transient combustibles. Although no automatic suppression or early warning detection is available in Fire Area K, any credible fire is expected to be contained within the boundaries of Fire Area K based on the minimal amount of combustibles and small fire size. Smoke and hot gases can be evacuated to the exterior via the building exhaust fans and portable smoke ejectors.

OMAs that may need to be performed as a result of a fire in Fire Area K consist of four discrete action sets that are listed in Table 6.

Fire Area P, Component Cooling Pump Room (PAB El. 68')

This fire area (also designated Fire Zone 1) consists of a single room (the Component Cooling Pump Room) that is characterized by extremely LOW combustible loading, with a postulated fire consisting of a motor/lube oil fire or a fire in transient combustibles. The zone is provided with ionization smoke detectors for early warning detection by alarm in the CCR, enabling subsequent response by the fire brigade to contain and extinguish the fire before significant damage could occur to safe-shutdown related SSCs. Smoke and heat generated by any fire in this zone would be dissipated to the balance of the PAB, via the fully open (steel grating) roof of this zone. Smoke can then be exhausted from the PAB to the exterior using the building exhaust fan and/or portable smoke exhausters.

OMAs that may need to be performed as a result of a fire in Fire Area P consist of two discrete action sets that are listed in Table 7.

Fire Area YD, Exterior Yard

Fire Area YD consists of seven fire zones that are exterior to the plant buildings.

Within Fire Area YD, the most significant fire hazard is associated with the Main, Station Auxiliary, or Unit Auxiliary Transformers. The postulated fire is a rapidly developing transformer oil fire. Early warning detection by thermal sensors alarm in the Control Room, followed by actuation of the automatic deluge water spray system, which is designed to control the fire, and subsequent response by the fire brigade. The fire zones containing the Main, Station Auxiliary, and Unit Auxiliary

Transformers are naturally vented to the outside and require no special ventilation actions.

OMAs that may need to be performed as a result of a fire in Fire Area YD consist of one discrete action set that is listed in Table 8.

In summary, given the limited fire hazards in most fire zones comprising the III.G.2 fire areas, and the provision of appropriate active fire protection features in zones containing significant hazards, combined with the compartmental and/or spatial separation between fire zones within the III.G.2 fire areas, there is reasonable assurance that in the event of a fire in any of the affected fire areas, the likelihood of the need to invoke and implement the credited OMA would be minimal. The likelihood to implement most or all of the potential OMAs designated for any given fire area is of even lower likelihood, given the multiple fire-induced failures that would be required to necessitate the use of these OMA measures.

6. References

- 7.1 NRC Regulatory Issue Summary (RIS) 2006-010, "Regulatory Expectations With Appendix R Paragraph III.G.2 Operator Manual Actions"
- 7.2 NRC Staff Memorandum dated July 19, 2006, T. Dinh to S. Weerakkody, "Summary of June 9, 2006 Category 3 Meeting on Technical Issues Clarifications on Post-Fire Operator Manual Actions"
- 7.3 NRC Inspection Procedure 71111.05, "Fire Protection (Triennial)," revised March 6, 2003
- 7.4 IP2 Appendix R Safe-Shutdown Analysis IP-RPT-05-00071, Rev. 1
- 7.5 SECY-08-0093, "Resolution of Issues Related to Fire-Induced Circuit Failures"
- 7.6 NEI 00-01, Draft Revision 2(c), Guidance for Post-Fire Safe Shutdown Circuit Analysis; Appendix H: "Required for Hot Shutdown Versus Important to SSD Components"
- 7.7 Engineering Report IP-RPT-08-00072, Rev. 0; "Operator Manual Action Screening for Appendix R, Section III.G: IP2 and IP3"
- 7.8 Engineering Request IP2-04-20592 – Install Additional Appendix R Emergency Lighting Units
- 7.9 2-AOP-SSD-1, "Control Room Inaccessibility Safe-Shutdown Control," Rev. 12
- 7.10 2-ONOP-FP-001, "Plant Fires," Rev. 5
- 7.11 Procedure EN-DC-161, Control of Combustibles, Rev. 2
- 7.12 IP2 Fire Hazards Analysis IP2-RPT-03-00015, Rev. 3

Table 1
IP2 Fire Hazards Analysis Summary
/+For Appendix R, Paragraph III.G.2 Fire Areas in Which OMAs Are Credited

Fire Area	Fire Zone	Equiv. Fire Severity (min)	Category	Fire Detection		Fixed Fire Suppression		Manual Fire Suppression (see Note 1)	Adjacent Manual Suppression	
				Type	Coverage	Type	Coverage		Equipment (see Note 1)	Fire Zone
C	23	25	Low	Ionization	Area Wide	None	N/A	CO ₂	Hydrant	900
F	5A	108	Moderate	None	N/A	None	N/A	None	CO ₂ Hose Station	7A
F	6	38	Low	Ionization	Area Wide	None	N/A	None	CO ₂ Hose Station	7A
F	7	38	Low	Ionization	Area Wide	None	N/A	None	CO ₂ Hose Station	7A
F	7A	58	Low	Ionization	Area Wide	None	N/A	CO ₂ Wheeled Dry Chem Hose Stations	--	--
F	8	38	Low	Ionization	Area Wide	None	N/A	None	CO ₂ Wheeled Dry Chem Hose Station	7A
F	8A	31	Low	None	N/A	None	N/A	None	CO ₂ Hose Station	7A
F	9A	31	Low	None	N/A	None	N/A	None	CO ₂ Hose Station	7A
F	10A	7	Low	None	N/A	None	N/A	None	CO ₂ Hose Station	7A
F	11A	86	Moderate	None	N/A	None	N/A	None	CO ₂ Hose Station	7A
F	20A	4	Low	None	N/A	None	N/A	None	CO ₂ Hose Station	27A
F	21A	6	Low	None	N/A	None	N/A	None	CO ₂ Hose Station	27A
F	22A	9	Low	None	N/A	None	N/A	None	CO ₂ Hose Station	27A
F	23A	8	Low	None	N/A	None	N/A	None	CO ₂ Hose Station	27A

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Fire Area	Fire Zone	Equiv. Fire Severity (min)	Category	Fire Detection		Fixed Fire Suppression		Manual Fire Suppression (see Note 1)	Adjacent Manual Suppression	
				Type	Coverage	Type	Coverage		Equipment (see Note 1)	Fire Zone
F	24A	45	Low	None	N/A	None	N/A	None	CO ₂ Hose Station	27A
F	25A	22	Low	None	N/A	None	N/A	None	CO ₂ Hose Station	27A
F	26A	3	Low	None	N/A	None	N/A	None	CO ₂ Hose Station	27A
F	27A	91	Moderate	Ionization	Area Wide	None	N/A	CO ₂ Hose Stations	--	--
F	28A	6	Low	None	N/A	None	N/A	None	CO ₂ Hose Station	27A
F	33A	107	Moderate	None	N/A	None	N/A	None	CO ₂ Hose Station	27A
F	59A	353	High	Thermistor Ionization	Charcoal Filters Outside Charcoal Filter Enclosure	Deluge Water Spray	PAB and Containment Ventilation Charcoal Filters	CO ₂	--	--
H	70A	25	Low	Ionization	RCPs 23&24	None	N/A	None	CO ₂ Hose Station	76A 77A
H	71A	33	Low	Ionization	RCPs 21&22	None	N/A	None	CO ₂ Hose Station	76A 72A
H	72A	24	Low	None	N/A	None	N/A	CO ₂ Hose Station	--	--
H	75A	79	Moderate	Ionization	N/A	None	N/A	None	CO ₂ Hose Station	72A
H	76A	101	Moderate	None	N/A	None	N/A	CO ₂	Hose Station	77A
H	77A	116	Moderate	None	N/A	None	N/A	CO ₂ Hose Station	--	--
H	78A	10	Low	None	N/A	None	N/A	None	CO ₂ Hose Station	76A 72A

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Fire Area	Fire Zone	Equiv. Fire Severity (min)	Category	Fire Detection		Fixed Fire Suppression		Manual Fire Suppression (see Note 1)	Adjacent Manual Suppression	
				Type	Coverage	Type	Coverage		Equipment (see Note 1)	Fire Zone
H	80A	19	Low	None	N/A	None	N/A	CO ₂	Hose Station	72A
H	81A	16	Low	None	N/A	None	N/A	CO ₂	Hose Station	72A
H	82A	18	Low	None	N/A	None	N/A	CO ₂	Hose Station	77A
H	83A	19	Low	None	N/A	None	N/A	CO ₂	Hose Station	77A
H	84A	20	Low	None	N/A	None	N/A	CO ₂	Hose Station	72A
H	85A	60	Low	None	N/A	None	N/A	CO ₂	Hose Station	72A
H	86A	1	Low	None	N/A	None	N/A	None	CO ₂ Hose Station	87A
H	87A	23	Low	None	N/A	None	N/A	CO ₂ Hose Stations	--	--
J	16	3,051	High	Thermal	Clean and Dirty Oil Storage Tanks	Automatic Foam Spray	Clean and Dirty Oil Storage Tanks	None	CO ₂ Hose Stations (foam and water)	47A
J	17	1,143	High	Thermal	Turbine Lube Oil Reservoir	Automatic Foam Spray	Turbine Lube Oil Reservoir	None	CO ₂ Hose Stations (foam and water)	47A
J	18	363	High	Thermal	Turbine Lube Oil Conditioner	Automatic Foam Spray	Turbine Lube Oil Conditioner	None	CO ₂ Hose Stations (foam and water)	47A
J	19	18	Low	None	N/A	None	N/A	None	CO ₂ Hose Stations (foam and water)	44A 46A
J	20	572	High	Thermal	Boiler Feed Pump Oil Console and Accumulators	Automatic Foam Spray	Boiler Feed Pump Oil Console and Accumulators	None	CO ₂ Hose Stations (foam and water)	44A 46A
J	21	22	Low	Thermal	Hydrogen Seal Oil Unit	Automatic Foam Spray	Hydrogen Seal Oil Unit	None	CO ₂ Foam Hose Station	44A 43A

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Fire Area	Fire Zone	Equiv. Fire Severity (min)	Category	Fire Detection		Fixed Fire Suppression		Manual Fire Suppression (see Note 1)	Adjacent Manual Suppression	
				Type	Coverage	Type	Coverage		Equipment (see Note 1)	Fire Zone
J	25	48	Low	None	N/A	None	N/A	None	CO ₂ Hose Station	270 201
J	39A	132	Moderate	None	N/A	Automatic Wet Pipe Sprinkler	Computer Office	CO ₂ Hose Station	--	--
J	40A	81	Moderate	None	N/A	None	N/A	CO ₂ Dry Chemical Hose Station	--	--
J	41A	46	Low	None	N/A	None	N/A	CO ₂ Wheeled Dry Chem Hose Station	--	--
J	42A	2	Low	None	N/A	None	N/A	CO ₂ Dry Chemical Hose Station	--	--
J	43A	61	Low	None	N/A	None	N/A	CO ₂ Wheeled Dry Chem Hose Stations (foam & water)	--	--
J	44A	30	Low	None	N/A	None	N/A	CO ₂ Hose Station	--	--
J	45A	15	Low	None	N/A	Automatic Foam Spray	Boiler Feed Pump Oil Console	CO ₂ Hose Station (foam & water)	--	--
J	46A	42	Low	None	N/A	None	N/A	Hose Station	CO ₂	47A
J	47A	10	Low	None	N/A	None	N/A	CO ₂ Foam Hose Stations	--	--
J	48A	11	Low	None	N/A	None	N/A	CO ₂ Hose Stations (water & foam)	--	--

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Fire Area	Fire Zone	Equiv. Fire Severity (min)	Category	Fire Detection		Fixed Fire Suppression		Manual Fire Suppression (see Note 1)	Adjacent Manual Suppression	
				Type	Coverage	Type	Coverage		Equipment (see Note 1)	Fire Zone
J	49A	2	Low	None	N/A	None	N/A	None	CO ₂ Hose Station	39A
J	50A	44	Low	None	N/A	None	N/A	CO ₂ Hose Stations	--	--
J	51A	1	Low	None	N/A	None	N/A	CO ₂	Hose Station	50A
J	52A	149	Moderate	None	N/A	None	N/A	CO ₂ Wheeled Dry Chem Hose Station	--	--
J	53A	75	Low	None	N/A	None	N/A	CO ₂	Hose Station	52A
J	64A	<1	Low	None	N/A	None	N/A	None	Hydrants	900
J	115	74	Low	Ionization	CCR Panels, Exhaust Ducts	None	N/A	CO ₂ Pressurized Water	Hose Stations	141 201
J	130	1	Low	None	N/A	None	N/A	None	CO ₂ Hose Station	141 540
J	140	3	Low	Ionization	Return Air Ducts	None	N/A	CO ₂	Hose Stations	141 201
J	141	1	Low	None	N/A	None	N/A	Hose Stations	--	--
J	150	2	Low	None	N/A	None	N/A	Pressurized Water	Hose Station	141
J	160	15	Low	Ionization	Cabinets / Ceiling	None	N/A	CO ₂	Hose Station	141
J	170	24	Low	Ionization	Cabinets / Ceiling	None	N/A	CO ₂	Hose Stations	141 201
J	171	39	Low	Ionization	N/A	None	N/A	None	CO ₂ Hose Stations	170 141 201
J	180	5	Low	None	N/A	None	N/A	CO ₂ Dry Chemical	Hose Stations	141 201
J	200	52	Low	None	N/A	None	N/A	CO ₂ Pressurized Water	Hose Station	201

Table 1
IP2 Fire Hazards Analysis Summary
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Fire Area	Fire Zone	Equiv. Fire Severity (min)	Category	Fire Detection		Fixed Fire Suppression		Manual Fire Suppression (see Note 1)	Adjacent Manual Suppression	
				Type	Coverage	Type	Coverage		Equipment (see Note 1)	Fire Zone
J	201	<1	Low	None	N/A	None	N/A	Hose Stations	--	--
J	210	53	Low	None	N/A	None	N/A	CO ₂ Pressurized Water	Hose Station	201
J	220	102	Moderate	None	N/A	None	N/A	CO ₂ Pressurized Water	Hose Station	201
J	230	56	Low	None	N/A	None	N/A	CO ₂ Pressurized Water	Hose Station	201
J	240	87	Moderate	None	N/A	Automatic Wet Pipe Sprinkler	Throughout Office Areas	CO ₂ Pressurized Water Dry Chemical	Hose Station	201 244
J	241	20	Low	Thermistor	Charcoal Filter Enclosure	Manual Closed Head Water Spray	Charcoal Filter Enclosure	CO ₂ Dry Chemical	Hose Station	244
J	242	11	Low	None	N/A	None	N/A	Pressurized Water	Hose Station	201
J	243	1	Low	None	N/A	None	N/A	Dry Chemical Hose Station	--	--
J	244	1	Low	None	N/A	None	N/A	Hose Stations	--	--

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Fire Area	Fire Zone	Equiv. Fire Severity (min)	Category	Fire Detection		Fixed Fire Suppression		Manual Fire Suppression (see Note 1)	Adjacent Manual Suppression	
				Type	Coverage	Type	Coverage		Equipment (see Note 1)	Fire Zone
J	250	66	Low	Ionization	Office Areas	Automatic Preaction Sprinkler	Computer Room, Repair and Parts Rooms #1 & #2, and Tape Library	CO ₂ Pressurized Water	Hose Stations	201 243 244
						Automatic Wet Pipe Sprinkler	TSC Office Area, NRC Office Area, Central Files Work Area			
J	251	14	Low	None	N/A	Automatic Wet Pipe Sprinkler	Radwaste Office Area	CO ₂ Pressurized Water Dry Chemical	Hose Stations	201 243 244
J	252	112	Moderate	None	N/A	Automatic Wet Pipe Sprinkler	Area Wide	Dry Chemical	Hose Station	243
J	253	1,420	High	None	N/A	Automatic Wet Pipe Sprinkler	Area Wide	Dry Chemical	Hose Station	243
J	254	59	Low	None	N/A	None	N/A	Dry Chemical	Hose Station	243
J	260	<1	Low	None	N/A	None	N/A	None	CO ₂ Hose Station	160 141 243
J	270	10	Low	None	N/A	None	N/A	CO ₂ Dry Chemical	Hose Stations	201 243 244
J	271	17	Low	None	N/A	None	N/A	None	Dry Chemical Hose Station	270 201

Table 1
IP2 Fire Hazards Analysis Summary
/+For Appendix R, Paragraph III.G.2 Fire Areas in Which OMAs Are Credited

Fire Area	Fire Zone	Equiv. Fire Severity (min)	Category	Fire Detection		Fixed Fire Suppression		Manual Fire Suppression (see Note 1)	Adjacent Manual Suppression	
				Type	Coverage	Type	Coverage		Equipment (see Note 1)	Fire Zone
J	272	47	Low	Ionization / Thermal	UPS room	Automatic Preaction Sprinkler	UPS room	CO ₂	Hose Station	243
J	273	47	Low	None	N/A	None	N/A	CO ₂	Hose Stations	201 244
J	274	42	Low	None	N/A	None	N/A	CO ₂ Dry Chemical	Hose Station	244
J	275	91	Moderate	None	N/A	None	N/A	Dry Chemical	Hose Station	243
J	280	523	High	None	N/A	Automatic Wet Pipe Sprinkler	Former Oil Storage Room and Tool Room	CO ₂ Dry Chemical Pressurized Water	Hose Stations	201 243 244
J	350	15	Low	None	N/A	Automatic Wet Pipe Sprinkler	Work Control Center and One Stop Shop	Pressurized Water Hose Station	--	--
J	360	21	Low	None	N/A	Automatic Wet Pipe Sprinkler	I&C M&TE Office	CO ₂ Dry Chemical Hose Station	--	--
J	361	28	Low	None	N/A	None	N/A	CO ₂ Dry Chemical	Hose Stations	244 453
J	362	3	Low	None	N/A	None	N/A	None	Dry Chemical Hose Station	360 453
J	370	10	Low	None	N/A	Automatic Wet Pipe Sprinkler	Unit 1 Turbine Building El. 15'	CO ₂ Dry Chemical Pressurized Water Hose Station	--	--
J	371	9	Low	None	N/A	None	N/A	CO ₂	Hose Station	244

Table 1
IP2 Fire Hazards Analysis Summary
/+For Appendix R, Paragraph III.G.2 Fire Areas in Which OMAs Are Credited

Fire Area	Fire Zone	Equiv. Fire Severity (min)	Category	Fire Detection		Fixed Fire Suppression		Manual Fire Suppression (see Note 1)	Adjacent Manual Suppression	
				Type	Coverage	Type	Coverage		Equipment (see Note 1)	Fire Zone
J	372	81	Moderate	None	N/A	Automatic Wet Pipe Sprinkler	Area Wide (including within pallet storage racks)	CO ₂ Dry Chemical Pressurized Water Hose Station	--	--
J	380	4	Low	None	N/A	Automatic Wet Pipe Sprinkler	North Portion of the fire zone (partial)	CO ₂ Dry Chemical Hose Stations	--	--
J	381	18	Low	None	N/A	Automatic Wet Pipe Sprinkler	Area Wide	None	CO ₂ Hose Station	380
J	450	27	Low	None	N/A	None	N/A	CO ₂ Pressurized Water	Hose Station	452
J	451	6	Low	None	N/A	None	N/A	CO ₂	Hose Station	452
J	452	1	Low	None	N/A	None	N/A	Hose Stations	--	--
J	453	1	Low	None	N/A	None	N/A	Hose Stations	--	--
J	460	68	Low	None	N/A	None	N/A	CO ₂ Dry Chemical Pressurized Water	Hose Stations	452 453
J	470	7	Low	None	N/A	None	N/A	CO ₂ Dry Chemical Pressurized Water	Hose Stations	452 453
J	480	39	Low	Ionization	Telephone Equipment Room and Cafeteria	Automatic Wet Pipe Sprinkler Dry Chemical Exting. System	Kitchen Area Kitchen Hood	CO ₂ Dry Chemical Pressurized Water	Hose Stations	452 453
J	500	<1	Low	None	N/A	None	N/A	CO ₂	Hose Station	452

Table 1
IP2 Fire Hazards Analysis Summary
/+For Appendix R, Paragraph III.G.2 Fire Areas in Which OMAs Are Credited

Fire Area	Fire Zone	Equiv. Fire Severity (min)	Category	Fire Detection		Fixed Fire Suppression		Manual Fire Suppression (see Note 1)	Adjacent Manual Suppression	
				Type	Coverage	Type	Coverage		Equipment (see Note 1)	Fire Zone
J	510	4	Low	None	N/A	None	N/A	CO ₂	Hose Station	452
J	520	19	Low	None	N/A	None	N/A	CO ₂ Pressurized Water	Hose Station	452
J	530	2	Low	None	N/A	None	N/A	Hose Stations	--	--
J	540	34	Low	None	N/A	None	N/A	CO ₂ Dry Chemical Pressurized Water	Hose Station	452
J	550	<1	Low	Ionization	Area Wide	None	N/A	CO ₂	Hose Station	452
J	560	3	Low	None	N/A	None	N/A	CO ₂ Pressurized Water	Hose Station	452
J	600	1,902	High	None	N/A	None	N/A	None	Hydrants	900
J	610	8	Low	Thermal	Hydrogen Storage Bank	Automatic Wet Pipe Sprinkler Deluge Water Spray	Maintenance Library Hydrogen Storage Bank	CO ₂ Dry Chemical Pressurized Water	Hydrants	900
J	700	62	Low	None	N/A	None	N/A	CO ₂ Hose Station	Hose Stations	Stairwells 8 & 9
J	710	337	High	None	N/A	Automatic Wet Pipe Sprinkler	Oil & Mixed Waste Storage Room	None	CO ₂ Hose Station	Stairwell 9
J	720	2	Low	None	N/A	None	N/A	CO ₂	Hose Stations	Stairwells 8 & 9
J	730	51	Low	None	N/A	None	N/A	CO ₂ Hose Station	--	--
J	740	<1	Low	None	N/A	None	N/A	None	CO ₂ Hose Stations	Stairwells 8 & 9

Table 1
IP2 Fire Hazards Analysis Summary
/+For Appendix R, Paragraph III.G.2 Fire Areas in Which OMAs Are Credited

Fire Area	Fire Zone	Equiv. Fire Severity (min)	Category	Fire Detection		Fixed Fire Suppression		Manual Fire Suppression (see Note 1)	Adjacent Manual Suppression	
				Type	Coverage	Type	Coverage		Equipment (see Note 1)	Fire Zone
J	750	15	Low	Ionization	CCR and corridor outside Fire Zone 710	None	N/A	CO ₂ Hose Station Wheeled Dry Chem	--	--
J	760	<1	Low	None	N/A	None	N/A	None	CO ₂ Hose Stations	Stairwells 8 & 9
J	770	1	Low	None	N/A	None	N/A	None	CO ₂ Hose Stations	Stairwells 8 & 9
J	780	10	Low	None	N/A	None	N/A	CO ₂ Dry Chemical		
J	790	25	Low	None	N/A	None	N/A	CO ₂ Dry Chemical Hose Station		
J	800	<1	Low	Flame	Interim Onsite Storage Facility	None	N/A	None	Hose Stations	Stairwell 1 & FHB
J	910	<1	Low	Thermistor	Utility Tunnel	None	N/A	CO ₂ Hose Stations	--	--
K	60A	1	Low	None	N/A	None	N/A	CO ₂	Hydrants	900
K	61A	1	Low	None	N/A	None	N/A	None	CO ₂ Hydrant	65A 900
K	62A	1	Low	None	N/A	None	N/A	None	CO ₂ Hydrant	23 900
K	65A	5	Low	None	N/A	None	N/A	CO ₂	Hydrants Hose Station	900 52A
P	1	2	Low	Ionization	Area Wide	None	N/A	None	CO ₂ Hose Station	8 7A
YD	55	<1	Low	None	N/A	None	N/A	CO ₂	--	--
YD	55A	Note 2		Thermistor	21 Main Transformer	Deluge Water Spray	21 Main Transformer	None	Hydrants	900

Table 1
IP2 Fire Hazards Analysis Summary
/+For Appendix R, Paragraph III.G.2 Fire Areas in Which OMAs Are Credited

Fire Area	Fire Zone	Equiv. Fire Severity (min)	Category	Fire Detection		Fixed Fire Suppression		Manual Fire Suppression (see Note 1)	Adjacent Manual Suppression	
				Type	Coverage	Type	Coverage		Equipment (see Note 1)	Fire Zone
YD	56A	Note 2		Thermistor	22 Main Transformer	Deluge Water Spray	22 Main Transformer	None	Hydrants	900
YD	57A	Note 2		Thermistor	Unit Auxiliary Transformer	Deluge Water Spray	Unit Auxiliary Transformer	None	Hydrants	900
YD	58A	Note 2		Thermistor	Station Auxiliary Transformer	Deluge Water Spray	Station Auxiliary Transformer	None	Hydrants	900
YD	900	Note 2		Thermistor	Carbon Filter on CCR Ventilation Room roof	Deluge Water Spray	Spare Transformer	Hydrants Hose Houses	pre-staged 1½" jumper fire hose and CCR charcoal filter deluge inlet stop valve FP-1105 at the hose station on elevation 72'-0"	141
YD	920	Note 2		None	N/A	Wet Pipe Sprinkler	Area Wide	CO ₂ Dry Chemical	Hydrants Hose Houses	900

NOTES

1. In this column, CO₂, Dry Chemical, Wheeled Dry Chem[ical], Pressurized Water, and Halon are types of Extinguishers – there is at least one in the zone when listed for a zone. Extinguishers in Area H are stored outside Containment during normal operation. Hose stations are water unless otherwise noted.
2. Combustible loading is not computed for the outdoor (YD) areas given the absence of compartmentalization and the recognition that heat and products of combustion from a fire in any of these zones will be dissipated to the outdoor environment, with the principal challenge to adjacent SSCs resulting from radiant heat flux from the postulated fire scenario.

**TABLE 2
FIRE AREA C
CREDITED III.G.2 OPERATOR MANUAL ACTIONS**

Required OMA	Required Time to Complete	Basis	Actual Time to Complete	OMA Location and Comments
Implement FR-H.1 if necessary to establish alternate secondary heat sink	34 m	Steam Generator (SG) boil-dry calculation NEA-00031	NA – no OMAs required	<p>Implement EOP FR-H.1 as directed by EOPs and Status Trees, pending recovery of AFW by reentry to Fire Area C after 60 minutes. See Note below.</p> <p>Interim implementation of FR-H.1, which is <u>NOT</u> the sole credited means for restoration of secondary heat sink, is conducted from the CCR (Fire Area A). No OMAs are required in the field to support FR-H.1 implementation during the initial hour of the fire scenario.</p>
Operate Steam Generator Atmospheric Dump Valve(s) (SGADV)	4 hours	Initiate cooldown to RHR entry conditions which is required within 29 hrs per Calculation IP-CALC-05-01034	13 m	Operate at least one SGADV (PCV-1134, 1135, 1136, or 1137) from local control stations on El. 43' AFW Pump Building (Fire Area K) as necessary to control cooldown via secondary system to reach RHR entry conditions
Operate 22AFW Pump (steam-driven)	>1 hr	Transition to use of AFW following initial 1-hour exclusion period during which access to Fire Area C is prohibited	22 m	Operate 22AFW Pump upon reentry to the room following the initial hour of the post-fire scenario. Open PCV-1139 to admit steam, operate HCV-1118 at pump to control speed, operate PCV-1213 as necessary to regulate pump bearing cooling water. All 3 valves are near 22AFW Pump (Fire Area C / Fire Zone 23).

**TABLE 2
FIRE AREA C
CREDITED III.G.2 OPERATOR MANUAL ACTIONS**

Required OMA	Required Time to Complete	Basis	Actual Time to Complete	OMA Location and Comments
Open/check open 22AFW Pump steam supply isolation valves	>1 hr	Transition to use of AFW following initial 1-hour exclusion period during which access to Fire Area C is prohibited	15 m	Open/check open 22AFW Pump steam supply pressure control valves PCV-1310A and PCV-1310B in adjacent zone on AFW Pump Building el. 43' (Fire Area K)
Operate 22AFW Pump flow control valves to align AFW flow to selected steam generator(s)	>1 hr	Transition to use of AFW following initial 1-hour exclusion period during which access to Fire Area C is prohibited	22 m	Operate FCV-405A (discharge to 21SG), FCV-405B (discharge to 22SG), FCV-405C (discharge to 23SG), and/or FCV-405D (discharge to 24SG) in AFW Pump Room (Fire Area C) as required

NOTE

By SER dated October 16, 1984, the separation configuration within Fire Area C was established to be acceptable for compliance with the intent of Appendix R, Paragraph III.G.2. In response to Con Edison letter dated September 11, 1985, the shutdown methodology as acknowledged by NRC staff included the prohibition on crediting reentry to the ABFP Room for the initial hour of the fire scenario, thereby impacting the ability to restore AFW to the steam generators if local manual operation of components within the room could not be performed during the initial hour. As restoration of AFW to the steam generators is required within nominally 30 minutes to preclude reaching dryout conditions, Con Edison indicated that the decay heat removal methodologies of EOP FR-H.1 could be entered, as the FR-H.1 methodologies utilize equipment that is independent of the AFW Pump Room (Fire Area C). The FR-H.1 loss-of-secondary heat sink mitigation methodologies include restoration of makeup to the S/Gs via use of the condensate system or a main boiler feed pump, or the use of reactor coolant system bleed-and-feed operation. These methods were described by Con Edison by letter dated September 14, 1988 and acknowledged by the NRC staff in an SER dated January 12, 1989. It is, however, the intent to only utilize the FR-H.1 methodologies if driven to FR-H.1 as an interim response, as directed by EOPs following a plant trip resulting from a fire in Fire Area C. The long-term decay-heat removal strategy is to restore AFW to operation following the initial hour of the fire scenario, when reentry to the AFW Pump Room is permitted. Decay heat removal via the secondary system (utilizing AFW and SGADV) is therefore credited for the balance of the shutdown scenario, until RHR-shutdown cooling mode entry conditions are reached.

**TABLE 3
FIRE AREA F
CREDITED III.G.2 OPERATOR MANUAL ACTIONS**

Required OMA	Required Time to Complete	Basis	Actual Time to Complete	OMA Location and Comments
Operate SGADVs	4 hours	Initiate cooldown to RHR entry conditions which is required within 29 hrs per Calculation IP-CALC-05-01034	13 m	Operate one SGADV (PCV-1134, 1135, 1136, or 1137) as necessary from local control stations on El. 43' AFW Pump Building (Fire Area K) to initiate cooldown via secondary system to reach RHR entry conditions
Align Charging Pump makeup path to RCS	75 m	Pressurizer level maintained within indicating range of WR channel, per Calculation IP-CALC-05-01034	4 m	Open valve 227 on El. 51' PAB (Fire Area A) to bypass spuriously closed valve HCV-142 (charging flow to Regenerative Heat Exchanger). Supply breaker on MCC26BB is normally open, thus no deenergization is required before manipulating valve. Action is taken following extinguishment of and securing from fire, >1 hour from start of event.
Align Charging Pump suction source to Refueling Water Storage Tank (RWST)	75 m	Pressurizer level maintained within indicating range of WR channel, per Calculation IP-CALC-05-01034	8 m	Close valve LCV-112C (VCT drain) and open valve 288 (RWST manual bypass around LCV-112B) on El. 80' PAB (Fire Area F). Actions taken following extinguishment of and securing from fire, >1 hour from start of event.

**TABLE 3
FIRE AREA F
CREDITED III.G.2 OPERATOR MANUAL ACTIONS**

Required OMA	Required Time to Complete	Basis	Actual Time to Complete	OMA Location and Comments
Transfer Instrument Buses 23 and 23A to alternate power	30 m	Recover normal instrumentation power supplies consistent with time frame for deployment of ASSS instrumentation.	2 m	Power source transfer accomplished in Cable Spreading Room (Fire Area A)

**TABLE 4
FIRE AREA H
CREDITED III.G.2 OPERATOR MANUAL ACTIONS**

Required OMA	Required Time to Complete	Basis	Actual Time to Complete	OMA Location and Comments
Align Charging Pump makeup path to RCS	75 m	Pressurizer level maintained within indicating range of WR channel, per Calculation IP-CALC-05-01034	4 m	Fail open valves 204A (charging flow to Loop 2 hot leg) and 204B (charging flow to Loop 1 cold leg) by opening two 125VDC breakers (5 and 15 in Distribution Panels 21 and 22, respectively) in CCR (Fire Area A). This is also backed up by isolation of IA to Containment by closing IA-501 in Piping Penetration Area on PAB El. 51' (Fire Area A), which is considered the sole OMA for this mitigation, since the operation of circuit breakers in the CCR is an "Allowed" action that does not meet the OMA screening criteria of IP-RPT-08-00072.
Activate/enable ASSS pneumatic instruments (SG level, Pressurizer pressure and level) at Fan House local control panel	30+ m	Restore monitoring capability for key primary and secondary system parameters as soon as practicable. Parametric envelope during the period of initial instrumentation unavailability is well understood, per the sensitivity studies conducted in Calculation IP-CALC-05-01034.	13 m	Open instrument isolation valves IIP-500 through IIP-507 in Piping Penetration Area on PAB El. 51' (Fire Area A). All eight root valves are located within inches of each other and the simple opening of these small hand valves is considered to constitute one OMA.

**TABLE 5
FIRE AREA J
CREDITED III.G.2 OPERATOR MANUAL ACTIONS**

Required OMA	Required Time to Complete	Basis	Actual Time to Complete	OMA Location and Comments
Trip breakers 52/5A and 52-SAC on Bus 5A and 52/6A and 52/TAO at Bus 6A and remove control power fuses	1 hour	Fire-induced faults on bus tie circuits could prevent loading of Buses 5 and 6 from EDGs	10 m	Trip listed breakers and remove control power fuses in 480V Switchgear Room (Fire Area A). Actual time to complete in this case is an estimated value, based on equivalent breaker tripping actions that have been validated.
Transfer Instrument Buses 23 and 23A to emergency power source	30 m	Recover normal instrumentation power supplies consistent with time frame for deployment of ASSS instrumentation	2 m	Action to transfer power source is taken at Static Inverter 23 manual bypass switch EDC1 in the Cable Spreading Room (Fire Area A)
Align Charging Pump suction source to RWST	75m	Pressurizer level maintained within indicating range of WR channel, per Calculation IP-CALC-05-01034	8 m	Close valve LCV-112C (VCT drain) and open valve 288 (RWST manual bypass around LCV-112B) on El. 80' PAB (Fire Area F). Actions taken following extinguishment of and securing from fire, >1 hour from start of event.
Operate 22AFW Pump flow control valves to align AFW flow to selected steam generator(s)	34 m	Preclude SG boil-dry per Calculation NEA-00031	17 m	Operate FCV-405A (discharge to 21SG), FCV-405B (discharge to 22SG), FCV-405C (discharge to 23SG), and/or FCV-405D (discharge to 24SG) in AFW Pump Room (Fire Area C) as required

**TABLE 6
FIRE AREA K
CREDITED III.G.2 OPERATOR MANUAL ACTIONS**

Required OMA	Required Time to Complete	Basis	Actual Time to Complete	OMA Location and Comments
Transfer 21AFW Pump to ASSS power source	34 m	Preclude SG boil-dry per calculation NEA-00031	5 m	Operate transfer switch EDC5 in AFW Pump Room (Fire Area C) and close supply breaker at Substation 12FD3 at the Unit 1 Screenwell House (Fire Area J)
Operate SGADVs as required to control secondary system cooldown	4 hours	Steam relief via SG safeties credited until SGADV local station can be accessed to control cooldown. IP-CALC-05-01034 provides basis for taking control of SGADVs at 4 hours.	13 m	SGADVs are initially closed, and spurious actuation prevented, by isolating instrument air at IA-53 in AFW Pump Room (Fire Area C). Reentry to Fire Area K 4 hours following securing from the fire enables use of at least one available SGADV local control station for manual operation of two SGADVs to permit cooldown to progress.
Open 21AFW Pump recirculation bypass valve	34 m	Preclude SG boil-dry per calculation NEA-00031	5 m	Open BFD-77 (21AFW Pump recirculation bypass valve) in AFW Pump Room (Fire Area C) to mitigate loss of control of FCV-1121 (21AFW Pump recirculation regulator)
Operate 21AFW Pump flow control valve to control AFW flow to SGs 21 & 22	34 m	Preclude SG boil-dry per calculation NEA-00031	7 m	Action performed in AFW Pump Room (Fire Area C)

**TABLE 7
FIRE AREA P
CREDITED III.G.2 OPERATOR MANUAL ACTIONS**

Required OMA	Required Time to Complete	Basis	Actual Time to Complete	OMA Location and Comments
Transfer 23CCW Pump to ASSS power feed if normal power/control is lost	> 1 hour	Calculation IP-CALC-05-01034	7 m	Transfer of power source is performed on PAB El. 80' (Fire Area F), followed by breaker closure at 12FD3 at Unit 1 Screenwell House (Fire Area J)
Start Appendix R Diesel Generator (ARDG) if normal power and offsite power are lost	1 hour	Calculation IP-CALC-05-01034; limiting condition is the start of one Charging Pump by 70 minutes into the scenario, to maintain Pressurizer level within the indicating range of WR channel.	17 m	Start of ARDG and alignment of distribution breakers is performed on Unit 1 Turbine Building El. 33' (Fire Area J)

**TABLE 8
FIRE AREA YD
CREDITED III.G.2 OPERATOR MANUAL ACTIONS**

Required OMA	Required Time to Complete	Basis	Actual Time to Complete	OMA Location and Comments
Align Charging Pump makeup path to RCS	75 m	Pressurizer level maintained within indicating range of WR channel, per Calculation IP-CALC-05-01034	4 m	Open valve 227 on El. 51' PAB (Fire Area A) to bypass spuriously closed valve HCV-142 (charging flow to Regenerative Heat Exchanger). Supply breaker on MCC26BB is normally open, thus no deenergization is required before manipulating valve. Action is taken following extinguishment of and securing from fire, >1 hour from start of event.