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NL-10-043

May 4, 2010

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

**Subject:** Response to January 20, 2010 Request for Additional Information Regarding Request for Exemption from 10 CFR 50, Appendix R, Paragraph III.G.2 for Use of Operator Manual Actions for Indian Point Unit No. 3 (TAC No. ME0799)  
Indian Point Unit No. 3  
Docket No. 50-286  
License No. DPR-64

- References:**
1. NRC letter dated January 20, 2010, "Indian Point Nuclear Generating Unit Nos. 2 and 3 – Request for Additional Information Regarding Request for Exemption (TAC Nos. ME0798 and ME0799)
  2. Entergy letter NL-09-117, "Revision to Request for Exemption from 10 CFR 50, Appendix R, Paragraph III.G.2 for Use of Operator Manual Actions for Indian Point Unit No. 3," dated October 1, 2009
  3. Entergy letter NL-09-032, "Request for Exemption from 10 CFR 50, Appendix R, Paragraph III.G.2 for Use of Operator Manual Actions for Indian Point Unit No. 3," dated March 6, 2009

Dear Sir or Madam:

By letter dated March 6, 2009 (Reference 3), Entergy Nuclear Operations, Inc. (Entergy) requested exemptions from the requirements of 10 CFR 50, Appendix R in accordance with the guidance contained in NRC Regulatory Issue Summary 2006-010 (Regulatory Expectations with Appendix R Paragraph III.G.2 Operator Manual Actions), and in accordance with 10 CFR 50.12, "Specific exemptions." A revision to the exemption request was submitted by letter dated October 1, 2009 (Reference 2). The purpose of this letter is to provide responses to the Request for Additional Information contained in letter dated January 20, 2010 (Reference 1). Note that Reference 1 indicated that a

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response would be provided within 60 days – this was changed to 104 days in discussions with the Senior Project Manager.

As explained in the response to RAI-02.1 it has been determined that the operator manual action involving the local operation of Steam Generator Atmospheric Dump Valves does not require an exemption from the requirements of Appendix R, Paragraph III.G.2. This action is performed in the event of a fire in one of four Fire Areas. It has also been determined that only one OMA associated with local operation of one Auxiliary Feedwater Pump requires an exemption from the requirements of Paragraph III.G.2. Therefore, two OMAs for local operation of Auxiliary Feedwater equipment in one Fire Area are herein withdrawn from the Request for Exemption. Tables RAI-08.1-1, RAI-08.1-2, RAI-08.1-4, and RAI-08.1-7 in Attachment 1 reflect those changes.

Note that some of the information contained in Tables RAI-08.1-1 through RAI-08.1-8 of Attachment 1 differs from the information previously provided in Tables 2 through 8 in Attachment 2 of References 2 and 3, and notes in the tables explain those differences.

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,



JEP/gd

Attachment:

1. Response to January 20, 2010 Request for Additional Information Regarding Request for Exemption from 10 CFR 50, Appendix R, Paragraph III.G.2 for Use of Operator Manual Actions

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**

**Response to January 20, 2010 Request for Additional Information Regarding  
Request for Exemption from 10 CFR 50, Appendix R, Paragraph III.G.2 for  
Use of Operator Manual Actions**

**ENTERGY NUCLEAR OPERATIONS, INC.  
Indian Point Nuclear Generating Unit No. 3  
Docket No. 50-286  
License No. DPR-64**

**Response to January 20, 2010 Request for Additional Information Regarding  
Request for Exemption from 10 CFR 50, Appendix R, Paragraph III.G.2 for  
Use of Operator Manual Actions**

**RAI-01.1**

Provide a discussion of how the proposed arrangement achieves the underlying purpose of the rule.

**RESPONSE**

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 single postulated fire in any plant area. Circuits which could cause maloperation or prevent the operation of redundant trains for post-fire safe-shutdown (SSD) and which are located in the same fire area must be protected in accordance with Paragraph III.G.2 of Appendix R. The intent of Paragraph III.G.2 is to ensure that one SSD equipment train remains "free of fire damage," and several alternatives are provided to establish a level of protection that provides reasonable assurance that one SSD equipment train will remain "free of fire damage." 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.

For the fire areas for which this exemption is requested (Fire Areas AFW-6, PAB-2, ETN-4, TBL-5, and YARD-7), the plant's fire protection licensing basis indicates that Indian Point Unit No. 3 (IP3) is committed to compliance with Paragraph III.G.2. The explicit requirements of 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 operator manual actions (OMAs) for mitigation or recovery should not be required. However, as contained in the IP3 Appendix R Safe-Shutdown Analysis, 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.

The NRC permits exemptions from Paragraph III.G.2, as described in Regulatory Information Summary (RIS) 2006-10 (Regulatory Expectations With Appendix R Paragraph III.G.2 Operator Manual Actions), via the use of OMAs as long as those actions are feasible and can be reliably implemented. Given that the OMAs can be shown to be performed feasibly and reliably, with the operating resources available, the underlying intent of Paragraph III.G.2 (i.e., of being capable of using one of the redundant SSD equipment trains to achieve and maintain hot shutdown conditions) is met. The required SSD function may be temporarily rendered non-functional due to fire.

damage, but the OMAs discussed herein are structured to recover the SSD function in a sufficiently timely manner to support the Appendix R performance goals and ensure that hot shutdown conditions are achieved and maintained.

The credited OMAs listed in Tables 08.1-1 through 0.8.1-8 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 that are the subject of this Request for Exemption, no demonstrable fire/nuclear safety benefit would be gained by the installation of additional modifications to comply with Paragraph III.G.2 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, which is to provide reasonable assurance that safe shutdown of the reactor can be achieved and maintained in the event of a single postulated fire in any plant area, is satisfied and the application of the prescriptive requirements of Paragraph III.G.2 in these particular circumstances is not necessary to achieve the underlying purpose of the rule.

#### RAI-02.1

Confirm and state whether an Exemption from III.G.2 requirements is the appropriate request for all of the OMAs [Operator Manual Actions] in the request, since safe shutdown capability is provided independent of the fire area of origin for many of the fire areas.

#### RESPONSE

##### General

The OMAs for which exemption is requested are credited for use in the event of fire events that require a predominantly Central Control Room (CCR) based shutdown. Certain elements of the safe-shutdown (SSD) capability for each of these areas is independent of the fire area of origin, but not all of the features required to meet the Appendix R SSD performance goals are independent of the area. Hence it was Entergy's understanding at the time of submittal of the Request for Exemption dated March 6, 2009 and the Revision to the Request for Exemption dated October 1, 2009, that an exemption from the literal requirements of Paragraph III.G.2 is necessary to restore Appendix R compliance. Post-fire safe-shutdown is principally accomplished for these areas by remaining in the CCR and conducting a normal (non-alternative) shutdown.

In response to RAI-02.1, Entergy has reviewed the initial request for exemption and researched whether several of the OMAs for which exemption was requested in predominantly III.G.2 areas may be properly classifiable as III.G.3 alternative shutdown actions, based on the specific alternative (not redundant) hardware that is utilized by these OMAs. However, the results of this review did not conclusively establish that an exemption from the requirements of Paragraph III.G.2 is not required for these actions.

As such, a request for exemption from the requirements of Paragraph III.G.2 appears to be necessary for these OMAs, with two exceptions.

It has been determined that the OMA involving the operation of the Steam Generator Atmospheric Dump Valves (SGADVs) using local control racks does not require an exemption from the requirements of Paragraph III.G.2 to allow the continued crediting of this action. The SGADVs have two functional/operational requirements in the IP3 safe-shutdown model: (1) they are required to be closed during hot shutdown to minimize Steam Generator inventory loss, and (2) they are required to be operable, at slightly over 4 hours into the scenario, to commence a controlled cooldown to permit reaching Residual Heat Removal shutdown cooling mode entry conditions. As such, the active function of the SGADVs is a cooldown/transition action, and not an action required to support achieving and maintaining hot shutdown conditions. Per the guidance of SECY 08-0093 dated June 30, 2008 (Resolution of Issues Related to Fire-Induced Circuit Failures), the passive hot shutdown function of the SGADVs is that of "components important to safety that could adversely affect safe shutdown," and therefore exemption from the literal requirements of Appendix R Paragraph III.G.2 is not required to maintain compliance.

Accordingly, the OMA to locally operate the SGADVs is withdrawn from the Request for Exemption as applicable to Fire Areas AFW-6, ETN-4{1}, ETN-4{4}, and TBL-5. This change is reflected in the data tables presented herein.

For Fire Area AFW-6, Entergy has revisited the Request for Exemption dated August 16, 1984 and the SER dated January 7, 1987 granted for this area, and has determined that the only OMA requiring a request for exemption under the purview of RIS 2006-10 is that for locally operating the circuit breaker for 33 Auxiliary Feedwater (AFW) Pump. The principal single-point vulnerability of the redundant AFW trains is the common pump control panel in the south end of the room. A fire involving this panel could render all AFW pumps inoperable due to control circuit failure caused by fire effects, but as noted in the referenced SER and listed on Table RAI-08.1-1, the ability to locally close the circuit breaker (in Fire Area CTL-3) provides a means to remotely start one of the motor-driven AFW pumps. As the intent of the January 7, 1987 SER is understood by Entergy, the insignificant combustible content of the zone, minimal ignition sources, spatial separation of trains, and the full-area coverage smoke detection and wet-pipe sprinkler systems provide assurance that at least one of the valve trains will remain operable from the CCR, and motor-driven 33 AFW Pump located at the north end of the zone can be expected to remain operable. However, as noted above and in Table RAI-08.1-1, an OMA may be required to manually close the breaker for 33 AFW Pump, if all pump control circuits are damaged by a fire at the south end of the zone. Consequently, post-fire reentry to the AFW pump room would not be required. Accordingly, with reference to the specific OMAs described for Fire Area AFW-6 in the Request for Exemption dated March 6, 2009 and the Revision to the Request for Exemption dated October 1, 2009, the requests for exemption for all OMAs in Fire Area AFW-6, with the exception of the OMA to manually operate the circuit breaker for 33 AFW Pump, are withdrawn.

The specific elements of the safe-shutdown performance goals that necessitate the Request for Exemption in each of the affected fire areas are as follows:

Fire Area AFW-6

Area AFW-6 anticipates a predominantly CCR-based shutdown, with the exception of the local OMA required to protect/recover the credited SSD train, and is considered a III.G.2 area, in that the specific circuit impacts resulting from a fire in this area may impair one of the credited SSD equipment trains. Therefore, it is Entergy's belief that a request for an exemption from the requirements of Paragraph III.G.2 is appropriate to continue crediting this OMA.

SSD Performance Goal Impacted:

1. Reactor Coolant Heat Removal

OMA to locally start one AFW pump

Fire Area ETN-4{1}

Area ETN-4{1} anticipates a predominantly CCR-based shutdown, with the exception of the local OMAs required to protect/recover the credited SSD train, and is considered a III.G.2 area, in that the specific circuit impacts resulting from a fire in this area may impair one of the credited SSD equipment trains. The designated OMAs are structured to recover an impacted redundant SSD train. While these actions are performed outside of Area ETN-4{1}, they are not considered to constitute alternative safe-shutdown features in the context of Paragraph III.G.3, and hence it is Entergy's belief that a request for an exemption from the requirements of Paragraph III.G.2 for the use of the below listed OMAs is appropriate.

SSD Performance Goals Impacted:

1. Support (Electrical Power)

As the availability of offsite power cannot be assured for a fire in this area, OMAs are credited for restoration of 480V buses via use of the Appendix R Diesel Generator. The credited OMAs also include the necessary circuit breaker manipulations.

2. Reactor Coolant Makeup and Reactivity Control

Fire-induced cable damage may render the normal and alternate charging pump suction supply valves LCV-112C and LCV-112B inoperable. An OMA in the PAB is credited to locally close LCV-112C and open LCV-112B bypass valve 288. In addition, an OMA may be necessary to restore the charging makeup path to the RCS by opening bypass valve 227. OMAs in Fire Area PAB-2{2} and Fire Area TBL-5 may be necessary to align an alternate power source to 31 or 32 Charging Pump.

3. Support (Component Cooling)

Fire damage to Component Cooling pump cables may require the use of an OMA to repower the 32 CCW Pump from the alternate power supply, thereby recovering one of the redundant required safe-shutdown trains, or alternatively, to align City Water for cooling of the selected Charging pump. The OMAs, if required, are performed in Fire Areas TBL-5, PAB-2{2}, and/or PAB-2{4}.

4. Support (Service Water)

Damage to power supply cables may require the use of an OMA to periodically manually backwash the strainer associated with the selected Service Water pump.

5. Reactor Coolant Heat Removal

Damage to power and/or control cables may require the use of OMAs to locally operate motor-driven 31 AFW Pump or the turbine-driven 32 AFW Pump, along with the associated AFW flow control valve(s) (FCV-405B or D; FCV-406B) and steam supply, isolation, and control valves PCV-1310A, PCV-1310B, PCV-1139, and HCV-1118.

Fire Area ETN-4{3}

Area ETN-4{3} anticipates a predominantly CCR-based shutdown, with the exception of the local OMAs required to protect/recover the credited SSD train, and is considered a III.G.2 area, in that the specific circuit impacts resulting from a fire in this area may impair one of the credited SSD equipment trains. Since the designated OMAs are structured to recover an impacted redundant SSD train, it is Entergy's belief that a request for an exemption from the requirements of Paragraph III.G.2 for the use of these OMAs is appropriate.

SSD Performance Goal Impacted:

1. Reactor Coolant Heat Removal

Damage to power and/or control cables may require the use of OMAs to locally operate turbine-driven 32 AFW Pump, along with the associated AFW flow control valve(s) (FCV-405C or D) and steam supply, isolation, and control valves PCV-1310A, PCV-1310B, PCV-1139, and HCV-1118.

Fire Area PAB-2{3}

Area PAB-2{3} anticipates a predominantly CCR-based shutdown, with the exception of the local OMAs required to protect/recover the credited SSD train, and is considered a III.G.2 area, in that the specific circuit impacts resulting from a fire in this area may impair one of the credited SSD equipment trains. Since the designated OMAs are structured to recover an impacted redundant SSD train, it is Entergy's belief that a

request for an exemption from the requirements of Paragraph III.G.2 for the use of this OMA is appropriate.

SSD Performance Goals Impacted:

1. Reactor Coolant Makeup and Reactivity Control

Fire-induced cable damage may render the normal and alternate Charging pump suction supply valves LCV-112C and LCV-112B inoperable. An OMA in the PAB is credited to locally close LCV-112C and open LCV-112B bypass valve 288.

Fire Area PAB-2{5}

Area PAB-2{5} anticipates a predominantly CCR-based shutdown, with the exception of the local OMAs required to protect/recover the credited SSD train, and is considered a III.G.2 area, in that the specific circuit impacts resulting from a fire in this area may impair one of the credited SSD equipment trains. Since the designated OMAs are structured to recover an impacted redundant SSD train, it is Entergy's belief that a request for an exemption from the requirements of Paragraph III.G.2 for the use of these OMAs is appropriate.

SSD Performance Goals Impacted:

1. Reactor Coolant Makeup and Reactivity Control

OMAs that may be required in response to fire-induced equipment maloperation due to a fire in this area include local closure of the 32 Charging Pump circuit breaker, local operation of the 32 Charging Pump speed control (scoop tube); aligning alternate Charging pump suction by locally closing LCV-112C and opening LCV-112B bypass valve 288; and alignment of the Charging makeup path to the RCS by locally opening bypass valve 227.

Fire Area TBL-5

Area TBL-5 anticipates a predominantly CCR-based shutdown, with the exception of the local OMAs required to protect/recover the credited SSD train, and is considered a III.G.2 area, in that the specific circuit impacts resulting from a fire in this area may impair one of the credited SSD equipment trains. Since the designated OMAs are structured to recover an impacted redundant SSD train, it is Entergy's belief that a request for an exemption from the requirements of Paragraph III.G.2 for the use of these OMAs is appropriate.

SSD Performance Goals Impacted:

1. Support (Service Water)

Damage to power and/or control cables may require periodic manual backwash of the strainer associated with the selected Service Water pump.

## 2. Reactor Coolant Heat Removal

Damage to power and/or control cables may require local manual operation of AFW flow control valve FCV-406A and/or FCV-406B, and operation of the 31 AFW Pump recirculation valve FCV-1121 bypass valve.

### Fire Area YARD-7

Area YARD-7 anticipates a predominantly CCR-based shutdown, with the exception of the local OMAs required to protect/recover the credited SSD train, and is considered a III.G.2 area, in that the specific circuit impacts resulting from a fire in this area may impair one of the credited SSD equipment trains. Since the designated OMAs are structured to recover an impacted redundant SSD train, it is Entergy's belief that a request for an exemption from the requirements of Paragraph III.G.2 for the use of these OMAs is appropriate.

#### SSD Performance Goal Impacted:

##### 1. Support (Service Water)

Damage to power and/or control cables may require periodic manual backwash of the strainer associated with the selected Service Water pump, in Area YARD-7, and to align alternate power to a Service Water pump, in Fire Area TBL-5.

### RAI-02.2

State the specific requirements of III.G.2 that are not met for each of the requested OMAs, e.g., a lack of fire barriers, spatial separation, automatic suppression, etc.

### RESPONSE

For each of the fire zones where OMAs are requested, the compliance with Paragraph III.G.2 is summarized in Tables RAI-GEN-1 through RAI-GEN-23. For each subject fire zone, the line item "App R III.G.2 Compliance" identifies compliance (Yes or No) for 3-hr Barrier, 20 ft Separation, or one-hour Enclosure. Also, the availability of suppression and/or detection in the fire zone is identified in the line item.

### RAI-02.3

Provide a summary of the plant-specific features that compensate for the lack of III.G.2-required features, identified in RAI-02.2, for each of the requested OMAs. For example, note any enhanced defense-in-depth measures such as a lack of ignition sources or combustibles, more robust or supplemental detection and suppression systems and other physical or administrative controls.

## RESPONSE

For each of the fire zones where OMAs are requested, Tables RAI-GEN-1 through RAI-GEN-23 provide a summary of plant-specific fire protection features in each fire zone. The tables provide an account of combustible loading (both fixed and transient), ignition sources, detection, suppression, administrative controls, and any additional fire protection features in the fire zone.

### RAI-02.4

Appendix R establishes the concept of defense-in-depth and III.G.2 requires operators be able to safely and reliably achieve and maintain hot shutdown capability from the control room. Provide a technical explanation that justifies how the proposed methods will result in a level of protection that is commensurate with that intended by III.G.2.

## RESPONSE

The intent of Paragraph III.G.2 is to ensure that one SSD equipment train remains “free of fire damage,” and several alternatives are provided to establish a level of protection that provides reasonable assurance that one SSD equipment train will remain “free of fire damage.” As elaborated in the response to Generic Letter 86-10 (Implementation of Fire Protection Requirements), Question 3, which clarifies the definition of “free of fire damage,” the intent of the requirements of Paragraphs III.G.2.a, III.G.2.b, and III.G.2.c is to ensure that at least one of the redundant trains is capable of performing its intended function during and after the postulated fire, as needed. The supporting IP3 thermal-hydraulic analyses demonstrate that the operation of the affected components is not needed during the actual fire, but that timely restoration of the function via appropriate OMAs is adequate to ensure the requisite safe-shutdown capability. The timely recovery of the affected safe-shutdown functions to ensure that the required functions are available in sufficient time to support the Appendix R safe-shutdown performance goals, meets the intent of the train protection requirements of Paragraph III.G.2. Tables RAI-08.1-1 through 08.1-8 describe the required OMAs, the time required to diagnose and perform these actions, and the resultant available time margin, defining the basis for ensuring that at least one SSD train is capable of performing its function, post-fire, as needed. Table RAI-06.1-1 describes the hazards and ignition sources in each of the fire areas and fire zones containing the cables and/or components of concern, and their general proximity and the expected effects of the fire hazards on the SSD cables and components. In each case, the IP3 safe-shutdown analysis and safe-shutdown coping methodology accommodates the expected fire-induced failure of the cables/components of concern, and is structured to ensure the restoration of function in an adequately timely manner.

The underlying intent of Paragraph III.G.2 – which is to ensure that at least one SSD equipment train remains functional despite a postulated fire event – is met by virtue of strategic OMAs that are structured to prevent or recover from postulated fire damage to the credited SSD train, serving to ensure the train remains in service or is returned to service in a timely manner, to support achieving and maintaining safe, stable hot

shutdown conditions. The requirement of Paragraph III.G.2 to maintain one train free of fire damage is intended to ensure that, despite a fire in an area containing both redundant safe-shutdown equipment trains, one of the redundant SSD equipment trains can be relied upon to perform the necessary safe-shutdown function, without need to rely on alternative shutdown measures. If the credited SSD train is maintained free of fire damage by one of the methodologies presented by Paragraph III.G.2, or if the credited SSD train is successfully restored to functionality by a feasible and reliable OMA method, there is no adverse impact on the required post-fire safe-shutdown capability.

The potential fire challenges in each fire area and fire zone containing cables and/or components of concern are described in Table RAI-06.1-1 and Tables RAI-GEN-1 through RAI-GEN-23.

Given that the OMAs can be shown to be performed feasibly and reliably, with the operating resources available, the underlying intent of Paragraph III.G.2 (i.e., of being capable of using one of the redundant SSD equipment trains to achieve and maintain hot shutdown conditions) is met. As discussed above, the required SSD function may be temporarily rendered non-functional due to fire damage, but the OMAs discussed herein are structured to recover the SSD function in a sufficiently timely manner to support the Appendix R performance goals and ensure that hot shutdown conditions are achieved and maintained.

The benchmark timed procedural evolutions and supporting analyses performed by Entergy have provided confirmation (as discussed herein in the responses to RAI-07.1, RAI-08.1, RAI-08.2, and RAI-09.1) that the credited OMAs can indeed be relied upon to ensure the post-fire functionality of one of the redundant SSD equipment trains.

### **RAI-03.1**

Provide a discussion of any other Exemptions or evaluations, including licensee-developed evaluations, e.g., Generic Letter 86-10 evaluations, which impact this request in any way and provide a justification for why such impact should be considered acceptable.

### **RESPONSE**

For each of the fire zones where OMAs are performed, Tables RAI-GEN-1 through RAI-GEN-23 provide a listing of approved exemptions, engineering evaluations (i.e., 86-10 evaluations), and Fire Hazards Evaluations applicable to the fire zone. Line item "App R III.G.2 Exemptions" identifies if an exemption(s) is approved for the fire zone and cites the applicable SER letter granting the approval. Line item "Other Evaluations (i.e., 86-10)" lists applicable engineering evaluations by title and Entergy document number. A summary discussion of the applicable SERs or engineering evaluations is provided below.

### **Fire Area AFW-6 / Fire Zone 23**

**SER dated January 7, 1987** approved an exemption from the requirements of Paragraph III.G.2 for the AFW Pump Room (Fire Zone 23) based on low fire hazard, area wide detection, and automatic water suppression. It is anticipated that the installed smoke detectors will provide early warning of fire conditions and initiate rapid fire brigade response before significant damage would occur. If fire were to occur, the automatic sprinkler system would actuate to control the fire, reduce room temperature, and protect shutdown cables and components.

**Engineering Report IP3-ANAL-FP-01052** (Fire Barrier Analysis: Auxiliary Boiler Feedwater Area AFW-6 to Turbine Building TBL-5) evaluated the non-rated penetrations (an unrated fire door assembly and a non-rated ventilation damper) through the 3-hour fire barrier between the AFW Pump Room (Fire Area AFW-6) and the Turbine Building (Fire Area TBL-5). The report concluded that potential fire propagation between Fire Areas AFW-6 and TBL-5 through the non-rated penetrations is not a credible event due to low fire loading on both sides of the barrier, area wide wet pipe sprinklers, and area wide detection in AFW-6. Therefore, the barrier penetrations provide an acceptable degree of separation between the two fire areas for the hazards present.

**Engineering Report IP3-ANAL-FP-01048** (Exterior Fire Area Boundary Analysis for the Auxiliary Feedwater Pump Room to Yard Area) evaluated the exterior fire area boundary of the AFW Pump Room (AFW-6). The report concluded that the existing external wall configuration is adequate to prevent the postulated exterior yard fire from impacting the operation of the AFW pumps based on greater than 20 foot separation, limited combustibles, and the automatic sprinkler system in the fire zone.

### **Fire Area ETN-4 / Fire Zone 7A**

**SER dated February 2, 1984** approved an exemption from the requirements of Paragraph III.G.2 for the Electrical Tunnel and Electrical Penetration Area, Fire Zones 7A, 60A, and 73A based on low fire hazard, area wide detection, and automatic water suppression in the fire zones. The installed smoke detectors will provide early warning of fire conditions and rapid fire brigade response before significant damage would occur. If fire were to occur, the automatic sprinkler system would actuate to limit fire damage. Additionally, the spatial separation between shutdown systems of 12 to 40 feet provides reasonable assurance that at least one train of shutdown cabling will remain free of fire damage.

**SER dated January 7, 1987** approved an exemption from the requirements of Paragraph III.G.2 for the Electrical Tunnel and Electrical Penetration Area, Fire Zones 7A, 60A, 73A, and 74A. The SER affirmed that the exemption approved by the SER of February 2, 1984 was still valid and addressed additional redundant instrument cabling not previously reviewed by the previous SER. As approved by the SER, the exemption was extended to include the Lower Penetration Area (Fire Zone 74A) based on 1-hour fire wrap installed on redundant instrument cabling in the Upper Penetration Area

protecting the cabling until it entered the Lower Penetration Area, and automatic suppression and detection systems installed in the areas.

#### **Fire Area ETN-4 / Fire Zones 7A and 60A**

**Engineering Report IP3-ANAL-FP-01053** (Evaluation of Supports Penetrating Barriers between Turbine Building and Cable Spreading Room and between Cable Spreading Room and Electrical Tunnels) evaluated unprotected cable tray supports for cable trays penetrating through the fire rated barrier wall between the Cable Spreading Room and the Electrical Tunnel at elevation 33'-0". The report concluded that the potential for the failure of the tray supports is unlikely based on:

- The configuration of trays, the location of tray supports and strength of materials utilized.
- The automatic suppression capabilities on both sides of the barrier of concern present high reliability that agent discharge will occur and extinguish a potential fire.
- The cable characteristics of IP3 cable insulation has previously been accepted by the NRC for exclusion as an intervening combustible.
- The actual fuel load due to storage of bulk or transient combustible materials is low. The fuel load is due mainly to actual cable insulation throughout the area.
- The actuation of automatic detection and/or suppression systems will initiate prompt fire brigade response and manual fire fighting activities.

**Engineering Report IP3-ANAL-FP-01049** (Fire Barrier Analysis: Cable Spreading Room to Electrical Tunnels) evaluated the fire barrier between the Electrical Tunnel (Fire Zones 7A & 60A / Fire Area ETN-4) and the Cable Spreading Room (Fire Zone 11 / Fire Area CTL-3). The evaluation concluded that:

- Although the wall is not a rated assembly, the existing fire barrier wall will perform its intended function to prevent the spread of fire between the cable spreading room and the common area of the electrical tunnels.
- The overall construction of the wall is such that it possesses a high structural stability and a high fire resistance rating.
- Early warning detection is provided in both the Electrical Tunnel and Cable Spreading Room. The actuation of automatic detection and/or suppression systems will initiate prompt fire brigade response and manual fire fighting activities.
- Penetrations through the barrier are sealed to an equivalent 3-hour fire rating.
- Fire loading primarily consists of cable insulation. The characteristics of IP3 cable insulation has previously been accepted by the NRC for exclusion as an intervening combustible.
- The automatic suppression capabilities on both sides of the barrier of concern present high reliability that agent discharge will occur and extinguish a potential fire.
- The anticipated fire load due to transient combustible materials is low.

**Engineering Report IP3-ANAL-FP-01325 (Fire Damper Assembly Analysis: Fire Dampers 4 and 9 Separating the Control Building from the Electrical Tunnel and the Turbine Building)** evaluated the fire damper assembly between Fire Zone 7A (Fire Area ETN-4) and Fire Zone 35A (Fire Area CTL-3). The evaluation concluded that:

- Although the damper assembly exceeds the UL listing for maximum size for multiple panel assemblies; the fire damper assemblies are considered adequate based on the configuration of the fire damper assemblies and the fire protection and prevention measures taken by the plant.
- The construction of the damper assemblies is such that they possess high structural stability and integrity.
- Postulated fires for either side of the damper assemblies do not present severe exposures to the dampers.

**Fire Area PAB-2 / Fire Zones 5, 6, 7, and 21A**

**SER dated January 7, 1987** approved an exemption from the requirements of Paragraph III.G.2 for the Primary Auxiliary Building (PAB), Fire Zones 5, 6, 7, and 21A, based on substantial wall construction, low fire load, and area wide detection. The installed smoke detectors will provide early warning of fire conditions and rapid fire brigade response before significant damage would occur.

**Fire Area PAB-2 / Fire Zone 27A**

**Engineering Report IP3-ANAL-FP-01047 (Fire Barrier Analysis: Primary Auxiliary Building to Radioactive Machine Shop)** evaluated the potential for a fire in the Radioactive Machine Shop (RAMS) Building at elevations 54' and 73' to spread into the PAB at elevations 55' and 73' and affect the operation of safe shutdown equipment. Both the PAB and the RAMS Building are part of Fire Area PAB-2. The report concluded that based upon the minimal fire loading in both the RAMS Building and the PAB in the vicinity of the door, the presence of early warning fire detection, and the location of fire suppression equipment for use by the onsite fire brigade, the spread of fire from the RAMS Building into the PAB is not considered a credible event.

**Fire Area PAB-2 / Fire Zones 1 and 58A**

**SER dated January 7, 1987** approved an exemption from the requirements of Paragraph III.G.2 for the PAB, Fire Zones 1 and 58A, based on low combustible loading, automatic detection in the area, a partial height noncombustible barrier to protect 33 CCW Pump, and fire wrap to protect the normal power feed for 33 CCW Pump.

**Fire Area YARD-7 / Fire Zones 22 and 222**

**SER dated January 7, 1987** approved an exemption from the requirements of Paragraph III.G.2 for the Service Water Pumps (Back-up and Normal) based on large spatial separation between the pump groups (i.e., >100 ft), no significant combustibles or fire hazards between the pump groups, and anticipation that if a fire were to occur, it

would be rapidly detected by operations or security personnel initiating a fire brigade response using manual fire fighting equipment in the area.

#### **RAI-04.1**

Where fire protection features such as detection and suppression systems and fire rated assemblies are installed, describe the technical basis for such installations including the applicable codes, standards, and listings.

#### **RESPONSE**

For each of the fire zones where OMAs are performed, Tables RAI-GEN-1 through RAI-GEN-23 provide a listing of the applicable Code of Record for the installed detection or suppression systems. A review of the installed systems was provided to the Staff in the evaluation of IP3 against the requirements of Appendix A to BTP 9.5-1 by letters submitted in 1976 through 1980. NRC SER of March 6, 1979 and the Supplement dated May 2, 1980 subsequently approved the IP3 Fire Protection Program and related systems.

#### **RAI-04.2**

Provide a technical justification for any deviations from codes, standards and listings by independent testing laboratories in the fire areas that could impact this evaluation.

#### **RESPONSE**

Reviews of conformance for the IP3 NFPA Codes of Record have been performed, and deviations, where identified, have been dispositioned within these engineering reports. Where other deviations from other applicable codes, standards, or listings have been identified, these are documented and dispositioned within the IP3 Corrective Action Program. Additional specific deviations have been addressed in individual engineering analyses, as documented on Tables RAI-GEN-1 through RAI-GEN-23.

#### **RAI-04.3**

Provide a technical justification for any non-rated fire protection assemblies.

#### **RESPONSE**

For each of the fire zones where OMAs are performed, non-rated assemblies (i.e., fire barriers) were evaluated to determine if the barriers are adequate for the fire hazards present, thereby meeting the requirements for fire area separation as required by Appendix R. The conclusions and technical basis for each evaluation as applicable to the subject fire zone are summarized below.

### **Fire Area AFW-6 / Fire Zone 23**

**Engineering Report IP3-ANAL-FP-01052** evaluated the non-rated penetrations (an unrated fire door assembly and a non-rated ventilation damper) through the 3-hour fire barrier between the AFW Pump Room (Fire Area AFW-6) and the Turbine Building (Fire Area TBL-5). The report concluded that potential fire propagation between Fire Areas AFW-6 and TBL-5 through the non-rated penetrations is not a credible event due to low fire loading on both side of the barrier, area wide wet pipe sprinklers and area wide detection in AFW-6. Therefore, the barrier penetrations provide an acceptable degree of separation between the two fire areas for the hazards present.

**Engineering Report IP3-ANAL-FP-01048** evaluated the exterior fire area boundary of the AFW Pump Room (AFW-6). The southwest exterior walls of the AFW Pump Room face toward the Transformer Yard and border the passageway between the AFW room and the Turbine Building. The report concluded that the substantial construction and configuration of the existing external wall, along with greater than 20 foot separation from the fire hazard, limited combustibles, and the automatic sprinkler system in the fire zone, are adequate to prevent the postulated exterior yard fire from impacting the operation of the AFW pumps.

### **Fire Area ETN-4 / Fire Zones 7A and 60A**

**Engineering Report IP3-ANAL-FP-01053** evaluated unprotected cable tray supports for cable trays penetrating through the fire rated barrier wall between the Cable Spreading Room and the Electrical Tunnel at elevation 33'-0". The report concluded that the potential for the failure of the tray supports is unlikely based on:

- The configuration of trays, the location of tray supports and strength of materials utilized.
- The automatic suppression capabilities on both sides of the barrier of concern present high reliability that agent discharge will occur and extinguish a potential fire.
- The fire load consists mainly of cable insulation. The cable characteristics of IP3 cable insulation has previously been accepted by the NRC for exclusion as an intervening combustible.
- The anticipated fire load due to transient combustible materials is low.
- The actuation of automatic detection and/or suppression systems will initiate prompt fire brigade response and manual fire fighting activities.

**Engineering Report IP3-ANAL-FP-01049** evaluated the fire barrier between the Electrical Tunnel (Fire Zones 7A & 60A / Fire Area ETN-4) and the Cable Spreading Room (Fire Zone 11 / Fire Area CTL-3). The evaluation concluded that:

- Although the wall is not a rated assembly, the existing fire barrier wall will perform its intended function to prevent the spread of fire between the cable spreading room and the common area of the electrical tunnels.

- The overall construction of the wall is such that it possesses a high structural stability and a high fire resistance rating.
- Early warning detection is provided in both the Electrical Tunnel and Cable Spreading Room. The actuation of automatic detection and/or suppression systems will initiate prompt fire brigade response and manual fire fighting activities.
- Penetrations through the barrier are sealed to an equivalent 3-hour fire rating.
- Fire loading primarily consists of cable insulation. The characteristics of IP3 cable insulation has previously been accepted by the NRC for exclusion as an intervening combustible.
- The automatic suppression capabilities on both sides of the barrier of concern present high reliability that agent discharge will occur and extinguish a potential fire.
- The anticipated fire load due to transient combustible materials is low.

**Engineering Report IP3-ANAL-FP-01325** evaluated the fire damper assembly between Fire Zone 7A (Fire Area ETN-4) and Fire Zone 35A (Fire Area CTL-3). The evaluation concluded that:

- Although the damper assembly exceeds the UL listing for maximum size for multiple panel assemblies, the fire damper assemblies are considered adequate based on the configuration of the fire damper assemblies and the fire protection and prevention measures taken by the plant.
- The construction of the damper assemblies is such that they possess high structural stability and integrity.
- Postulated fires for either side of the damper assemblies do not present severe exposures to the dampers.

#### **Fire Area PAB-2 / Fire Zone 27A**

**Engineering Report IP3-ANAL-FP-01047** evaluated the potential for a fire in the RAMS Building at elevations 54' and 73' to spread into the PAB at elevations 55' and 73' and affect the operation of safe shutdown equipment. Both the PAB and the RAMS Building are part of Fire Area PAB-2. The report concluded that based upon the minimal fire loading in both the RAMS Building and the PAB in the vicinity of the door, the presence of early warning fire detection, and the location of fire suppression equipment for use by the onsite fire brigade, the spread of fire from the RAMS Building into the PAB is not considered a credible event.

#### **RAI-05.1**

Provide critical details or assumptions regarding the in situ and transient fire hazards that could threaten redundant equipment for each fire area included in the requests. The information may include, but is not limited to:

- The number, type, and location of potential ignition sources,

- The number and types of equipment that may exhibit high energy arcing faults, and the relationship between this equipment and any secondary combustibles,
- The quantity of cables and other secondary combustibles and their relationship to potential ignition sources,
- The cable type, e.g., thermoplastic or thermoset. If thermoplastic cables are used, provide a discussion of self-ignited cable fires,
- Ratings for cables, e.g., IEEE-383, etc. If not rated, justify why fire spread would be assumed to be slow,
- Controls on hot work and transient combustibles in the area, and the proximity of secondary combustibles that could be impacted by a transient fire, and
- Dimensions of the rooms including ceiling heights.

## RESPONSE

The request for additional detail relative to fire hazards in the fire areas of concern is considered to be adequately addressed by the seven discussion points as itemized above. Accordingly, Entergy's response is presented below on a point-by-point basis.

- The number, type, and location of potential ignition sources

The potential ignition sources in each fire zone of concern within the fire areas identified in the Request for Exemption have been tabulated consistent with the guidance of NUREG/CR-6850(EPRI/NRC-RES Fire PRA Methodology for Nuclear Power Facilities), Task 6. The ignition source information is presented for the fire areas of concern in Tables RAI-GEN-1 through RAI-GEN-23. The relationship of ignition source location to the safe-shutdown features of concern is discussed in Table RAI-06.1-1.

- The number and types of equipment that may exhibit high energy arcing faults (HEAFs), and the relationship between this equipment and any secondary combustibles

The number and types of equipment that present the potential for HEAFs in each fire zone of concern within the fire areas identified in the Request for Exemption have been identified consistent with the guidance of NUREG/CR-6850, Task 6. The ignition source information is presented for the fire areas of concern on Tables RAI-GEN-1 through RAI-GEN-23. Note that the potential for HEAFs only exists in Fire Area TBL-5, Fire Zone 37A. The relationship of ignition source location to the safe-shutdown features of concern is discussed in Table RAI-06.1-1.

- The quantity of cables and other secondary combustibles and their relationship to potential ignition sources

The quantity and character of fixed/in-situ combustibles in each fire zone of concern within the fire areas identified in the Request for Exemption are presented for the fire areas of concern on Tables RAI-GEN-1 through

RAI-GEN-23. Cable in each fire zone is quantified by its British Thermal Unit (BTU) contribution to the fixed combustible loading for that fire zone. Table line item "Cable Insulation Quantity in BTU" lists the specific cable BTU contribution and loading in BTU/sq ft. Fire severity is given in minutes based on an equivalent fire severity of 80,000 BTU/sq ft/hour.

- The cable type, e.g., thermoplastic or thermoset. If thermoplastic cables are used, provide a discussion of self-ignited cable fires

Cable types installed at IP3 during original construction include both thermoplastic and thermoset cables, as described below. Cables installed via subsequent plant modifications and cable replacement/maintenance activities are of thermoset construction, as discussed below.

As noted below, one category of original plant cables is of thermoplastic (PVC-insulated) construction, but given the asbestos-glass braid outer jacket construction, the performance of this cable can be expected to more closely approximate that of a thermoset cable construction. Glass braid jacketed cable is marketed for use in factories where molten steel or glass may make contact with the cable, for use in high temperature equipment such as heaters and transformers, and as internal wiring for cooking appliances, typical - Bay Associated High-Temperature Wire and Cable. Cables with glass braid jacket material are also marketed for Appendix R as rated fire cables (i.e., 1-hour, typical - Rockbestos-Surprenant Corp. Firezone CRC Cable, Spec. RSS-5-142).

With respect to the significance of self-ignited cable fires involving the thermoplastic-insulated cables, these scenarios are considered to be of low likelihood, based on overcurrent protection provided for power and control circuits, and the current-limited characteristics of instrumentation cables, in addition to the substantial construction of the outer asbestos-glass fiber jacket on these cables. However, based on the consistent use of flame-retardant cables throughout IP3, there is reasonable assurance that any cable tray fire (whether self-ignited or externally initiated) will be limited in scope and severity.

- Ratings for cables, e.g., IEEE-383, etc. If not rated, justify why fire spread would be assumed to be slow

The cable originally specified for low power and control applications for IP3 is described in Design Basis Document IP3-DBD-307 (480V AC Electrical Distribution System), which in turn includes references to United Engineers and Constructors Specification 9321-05-113-7, and WEDCO letter IPP-4620 dated April 3, 1974, which described flame test requirements for original plant cables.

Original IP3 plant cable is of flame-retardant construction, predominantly constructed of PVC insulation, with a lead or asbestos-glass braid jacket.

The fire retardant properties of the original IP3 cables were demonstrated by the following tests for flame retardance:

CON ED Bonfire Test (EO-6068-3)  
Standard Vertical Flame Test (ASTM-D-470-59T)  
Five Minute Vertical Flame Test

With these types of fire resistant cable, a fire will not propagate along the cable. This characteristic was illustrated by a fire which occurred at Indian Point Unit No. 2 (IP2) – which utilizes original plant cable with the same construction and flame test qualification as IP3 - in November 1971 during IP2 plant construction. The fire was of such intensity that building structural steel and electrical equipment were damaged, yet the cable in overhead trays was not damaged beyond the exposure area, nor did it re-ignite after the external sources of combustion had been extinguished. New low power control and instrumentation cable is required to meet similar flame resistance requirements as the original cable, via qualification to IEEE 383 Flame Test requirements, as documented in Design Basis Document IP3-DBD-307.

- Controls on hot work and transient combustibles in the area, and the proximity of secondary combustibles that could be impacted by a transient fire

Hot work in all of the fire areas identified in the Request for Exemption is subject to control of hot work activities in accordance with procedure EN-DC-127 (Control of Hot Work and Ignition Sources). All hot work requires review and approval by a qualified Hot Work Supervisor and/or Fire Protection Engineering, and a hot work permit issued for such activities is not valid for more than 24 hours. If required, the activity may be reevaluated by a Hot Work Supervisor and/or Fire Protection Engineering, and the permit may be extended on a daily basis to a maximum valid duration of 31 days. In summary, hot work activities are strictly controlled, and qualified Hot Work Supervisors and/or Fire Protection Engineering remain cognizant of all active hot work permits.

With the exception of Fire Areas TBL-5 and YARD-7, all of the fire areas identified in the Request for Exemption are subject to the Indian Point Energy Center Transient Combustible Control Program, as implemented via procedure EN-DC-161 (Control of Combustibles), and are controlled as “Level 2” combustible control areas. Small quantities of combustibles are permitted in these areas, but unattended combustibles exceeding any of the following quantities require formal prior review and approval by Fire Protection Engineering, with imposition of additional compensatory actions or protective measures, as determined to be required:

- 100 lbs of fire-retardant treated lumber
- 25 lbs of loose ordinary combustibles
- 5 gallons of combustible liquid in an approved container
- One pint of flammable liquid in an approved container
- One 20-oz flammable aerosol can

With respect to the effects of the proximity of transient combustibles to “secondary combustibles,” the guidance of procedure EN-DC-161 includes consideration by Fire Protection Engineering of any structures, systems, and components (SSCs) or other combustible materials in the affected area that could be impacted by the presence and staging of the transient combustibles. Where the performance of a Transient Combustible Evaluation is indicated, these parameters are reviewed, and additional guidance is provided in the Transient Combustible Evaluation, as needed, to protect adjacent combustibles, provide protection for combustibles located within a defined footprint, to constrain the staging location of the transient combustibles, or to specify other measures as deemed appropriate by Fire Protection Engineering.

Fire Area TBL-5, consisting of the Turbine Building and certain adjacent fire zones, does not contain safety-related SSCs and is not subject to the explicit transient combustible controls of EN-DC-161. However, procedure OAP-017 (Plant Surveillance and Operator Rounds) includes inspection guidelines for operator rounds, which include monitoring for general area cleanliness, and for any housekeeping problems that may present a fire or safety concern. Consequently, operator rounds performed each shift provide for the monitoring of Area TBL-5 and other plant areas for accumulations of combustibles that could present an unacceptable fire safety challenge. Similarly, procedure EN-MA-132 (Housekeeping) includes guidance for monitoring general area cleanliness as well as monitoring for accumulations of combustibles.

- Dimensions of the rooms including ceiling heights

Room dimensions (square footage), including ceiling heights, for the fire zones of concern within the fire areas identified in the Request for Exemption are presented in Tables RAI-GEN-1 through RAI-GEN-23.

#### **RAI-06.1**

Provide a description of the proximity of the redundant train equipment or in situ hazards and the spatial relationship between the redundant trains in the fire area such that if they are damaged, manual actions would be necessary. Note, that this question is distance from the RAI addressing Ignition Sources and Combustible Loading, which is generally focused on the combustibles in an area, whereas, this RAI addresses the specific relationship between ignition sources and combustibles and the redundant trains.

#### **RESPONSE**

The Appendix R safe-shutdown analysis (SSA) evaluates the adequacy of train separation on a fire area basis, and where determined to be an appropriate means of protecting or recovering an affected equipment train, the SSA identifies OMA that can be taken to mitigate a fire-induced failure of both trains. However, with few exceptions (e.g., Fire Area AFW-6), the IP3 fire areas are comprised of a number of fire zones, separated from each other by spatial separation and/or barriers of various types and

construction. Table RAI-06.1-1 and supporting Tables RAI-GEN-1 through RAI-GEN-23 are based on the recognition, as established by the IP3 Fire Hazards Analysis, that the fire hazards, mitigating features, and resultant fire effects are fundamentally addressed at the fire zone level. For many fire zones, there is a reasonable expectation that the damage footprint from the credible fire scenario would be confined to the boundaries of the zone of origin, and not involve an all-consuming fire that would engulf all fire zones within a given fire area.

To that end, the referenced tables provide a view of the discrete challenges to the cables and/or components necessary to achieve and maintain safe hot shutdown conditions. In most cases, a fire in any given zone would create conditions that could require the invocation of only a small subset of the OMAs that have been credited for the affected fire area, as listed on Tables RAI-08.1-1 through RAI-08.1-8. As such, the operational challenge imposed by any given fire zone scenario can be expected to be less severe than the operator action set tabulated for the overall fire area. This reduced challenge, in turn, is supportive of enhanced feasibility and reliability of the credited OMAs.

#### **RAI-06.2**

Provide a description of the suppression, detection, and any other systems that are present and capable of mitigating the postulated events for the fire areas included in this request.

#### **RESPONSE**

The requested information is summarized in Table RAI-06.1-1 under "Comments."

**Table RAI-06.1-1  
Proximity of Redundant Safe-Shutdown Cables/Components,  
Fire Hazards, and Ignition Sources Within Fire Areas and Fire Zones of Concern**

Fire Area / Zone	SSD Feature	Proximity to Significant Fixed Combustibles	Proximity to Ignition Sources	Comments
AFW-6 / 23	All three AFW pumps, flow control valves, and associated cables	Small quantities of cable in overhead trays, with pumps and valves at floor elevation. The trays containing cables serving the AFW flow control valves are also located in the overhead area.	The cable runs and pump motors are the credible ignition sources. Cables serving the AFW pumps and flow control valves are located in or adjacent to overhead trays above the AFW pumps.	<p>Nonmechanistic ignition of control or instrument cables in the overhead trays would present an immediate impact on redundant AFW trains, as the trays contain (in part) control cables serving the AFW flow control valves</p> <p>The remaining fixed combustibles, consisting of a minute quantity of lube oil and electrical cabinets, present no credible challenge to the AFW components in the zone</p> <p>The smoke detection system provides assurance of early warning of a fire condition, enabling brigade response prior to significant fire development. The automatic wet-pipe sprinkler system provides assurance of effective control of any significant fire that may occur, sharply limiting the scope of any fire damage.</p>

**Table RAI-06.1-1  
Proximity of Redundant Safe-Shutdown Cables/Components,  
Fire Hazards, and Ignition Sources Within Fire Areas and Fire Zones of Concern**

Fire Area / Zone	SSD Feature	Proximity to Significant Fixed Combustibles	Proximity to Ignition Sources	Comments
ETN-4{1} / 7AS  South region of Fire Zone 7A as described herein	Cables associated with: 32 CCW pump; AFW flow control valves FCV-405B, D; FCV-406B	The dominant combustible material in the zone is cable in trays. The subject cables, in part, are located in these trays.	Ignition sources consist only of cable tray runs in the zone	<p>Combustibles other than cables in trays are minimal throughout the zone. The credible fire scenario would involve transient combustibles, which are tightly controlled to "Level 2" limits, per administrative control procedure.</p> <p>The flame-retardant characteristics of the cables ensure that any fire would be limited in scope and severity.</p> <p>The smoke detection system provides assurance of early warning of a fire condition, enabling brigade response prior to significant fire development. The automatic preaction sprinkler system for all cable trays in the area provides assurance of prompt control of any credible fire, sharply minimizing the potential area of damage.</p>
ETN-4{1} / 7AN  North region of Fire Zone 7A as described herein	Cables associated with: 31 AFW Pump; 31 AFW Pump recirculation valve FCV-1121; AFW flow control valves FCV-405B, D; FCV-406B; 32 Charging Pump	The dominant combustible material in the zone is cable in trays. The subject cables, in part, are located in these trays.	Ignition sources consist only of cable tray runs in the zone	<p>Combustibles other than cables in trays are minimal throughout the zone. The credible fire scenario would involve transient combustibles, which are tightly controlled to "Level 2" limits, per administrative control procedure.</p> <p>The flame-retardant characteristics of the cables ensure that any fire would be limited in scope and severity.</p> <p>The smoke detection system provides assurance of early warning of a fire condition, enabling brigade response prior to significant fire development. The automatic preaction sprinkler system for all cable trays in the area provides assurance of prompt control of any credible fire, sharply minimizing the potential area of damage.</p>

**Table RAI-06.1-1  
Proximity of Redundant Safe-Shutdown Cables/Components,  
Fire Hazards, and Ignition Sources Within Fire Areas and Fire Zones of Concern**

Fire Area / Zone	SSD Feature	Proximity to Significant Fixed Combustibles	Proximity to Ignition Sources	Comments
ETN-4{1} / 60AS	Cables associated with: 32 AFW Pump steam supply valve PCV-1139, steam supply isolation valves PCV-1310A, 1310B, and speed control valve HCV-1118; 31 Charging Pump; AFW flow control valves FCV-405B, D, FCV-406B; Charging makeup path valve(s) HCV-142/227; Charging suction path valves LCV-112B/C	The dominant combustible material in the zone is cable in trays. The subject cables, in part, are located in these trays.	Ignition sources consist only of cable tray runs in the zone	<p>Combustibles other than cables in trays are minimal throughout the zone. The credible fire scenario would involve transient combustibles, which are tightly controlled to "Level 2" limits, per administrative control procedure.</p> <p>The flame-retardant characteristics of the cables ensure that any fire would be limited in scope and severity.</p> <p>The smoke detection system provides assurance of early warning of a fire condition, enabling brigade response prior to significant fire development. The automatic preaction sprinkler system for all cable trays in the area provides assurance of prompt control of any credible fire, sharply minimizing the potential area of damage.</p>

**Table RAI-06.1-1  
Proximity of Redundant Safe-Shutdown Cables/Components,  
Fire Hazards, and Ignition Sources Within Fire Areas and Fire Zones of Concern**

Fire Area / Zone	SSD Feature	Proximity to Significant Fixed Combustibles	Proximity to Ignition Sources	Comments
ETN-4{1} / 60AN	Cables associated with: 32 AFW Pump steam supply isolation valves PCV-1310A, 1310B; 38 Service Water Pump strainer	The dominant combustible material in the zone is cable in trays. The subject cables, in part, are located in these trays.	Ignition sources consist only of cable tray runs in the zone	<p>Combustibles other than cables in trays are minimal throughout the zone. The credible fire scenario would involve transient combustibles, which are tightly controlled to "Level 2" limits, per administrative control procedure.</p> <p>The flame-retardant characteristics of the cables ensure that any fire would be limited in scope and severity</p> <p>The smoke detection system provides assurance of early warning of a fire condition, enabling brigade response prior to significant fire development. The automatic preaction sprinkler system for all cable trays in the area provides assurance of prompt control of any credible fire, sharply minimizing the potential area of damage.</p>

**Table RAI-06.1-1  
Proximity of Redundant Safe-Shutdown Cables/Components,  
Fire Hazards, and Ignition Sources Within Fire Areas and Fire Zones of Concern**

Fire Area / Zone	SSD Feature	Proximity to Significant Fixed Combustibles	Proximity to Ignition Sources	Comments
ETN-4{3} / 73A	Cables associated with: 32 AFW Pump speed control valve HCV-1118; 32 AFW Pump steam supply valve PCV-1139; 32 AFW Pump steam isolation valves PCV-1310A/B; AFW flow control valves FCV-405C, D	The dominant combustible material in the zone is cable in trays. The subject cables, in part, are located in these trays.	Principal ignition sources consist of cable tray runs, junction boxes, and electrical cabinets distributed throughout the zone, and one dry transformer, located near the north end of the zone. The cables of concern are located in or adjacent to trays that are above one or more of the junction boxes and electrical cabinets.	<p>Combustibles other than cables in trays are minimal throughout the zone. The credible fire scenario would involve transient combustibles, which are tightly controlled to "Level 2" limits, per administrative control procedure, or a fire initiating at the single transformer in the zone.</p> <p>The flame-retardant characteristics of the cables ensure that any fire would be limited in scope and severity, whether the cables are involved as primary or secondary combustibles (as in the case of a fire initiated at the transformer in the zone)</p> <p>The smoke detection system provides assurance of early warning of a fire condition, enabling brigade response prior to significant fire development. The automatic preaction sprinkler system for all cable trays in the area provides assurance of prompt control of any credible fire, sharply minimizing the potential area of damage.</p>
PAB-2{3} / 6	Cables associated with Charging pump suction path valves LCV-112C/B  Manual valve 288 is also located in this zone	Cables and valve LCV-112B are located adjacent to the Charging pump, containing lubricating oil, the dominant combustible in the zone	The only credible ignition source, the Charging pump motor, is located at the midpoint of the zone, while LCV-112B and cables are located at the south end of the zone.	<p>There is no clear mechanism for ignition of the lubricating oil contained within the pump</p> <p>The smoke detection system provides assurance of early warning of a fire condition, enabling brigade response prior to significant fire development</p>

**Table RAI-06.1-1  
Proximity of Redundant Safe-Shutdown Cables/Components,  
Fire Hazards, and Ignition Sources Within Fire Areas and Fire Zones of Concern**

Fire Area / Zone	SSD Feature	Proximity to Significant Fixed Combustibles	Proximity to Ignition Sources	Comments
PAB-2{5} / 4A	Cables associated with 32 Charging Pump	Fixed combustibles in the zone are minimal, consisting of a small quantity of cable in trays, and incidental combustibles. Cables associated with 32 Charging Pump are routed in the overhead of the zone.	Ignition sources are three electrical cabinets, widely spaced in the zone, and one dry-type transformer, located in the southeast end of the zone. The cables of concern are routed above one or more ignition sources.	The open arrangement of the corridor and spacing between ignition sources, and small inventory of cables, provides reasonable assurance that any fire occurring in the zone will be minimal in scope of damage incurred
PAB-2{5} / 18A	Cables associated with 32 Charging Pump	Fixed combustibles in the zone are minimal, consisting of a small quantity of cable in trays, and incidental combustibles. Cables associated with 32 Charging Pump are routed in the overhead of the zone.	Ignition sources are two waste gas compressor motors and a cable run. The cables of concern are routed above one or more of the ignition sources.	The minimal ignition sources and small inventory of cables provide reasonable assurance that any fire occurring in the zone will be minimal in scope of damage incurred

**Table RAI-06.1-1  
Proximity of Redundant Safe-Shutdown Cables/Components,  
Fire Hazards, and Ignition Sources Within Fire Areas and Fire Zones of Concern**

Fire Area / Zone	SSD Feature	Proximity to Significant Fixed Combustibles	Proximity to Ignition Sources	Comments
PAB-2{5} / 19A	Cables associated with 32 Charging Pump	Fixed combustibles in the zone are minimal, consisting of a small quantity of cable in trays, and incidental combustibles. Cables associated with 32 Charging Pump are routed in the overhead of the zone.	Ignition sources include a cable run, electrical cabinets, and transformers located in the northeast and northwest corners of the zone. The cables of concern are routed above one or more of the ignition sources.	The minimal ignition sources and small inventory of cables provide reasonable assurance that any fire occurring in the zone will be minimal in scope of damage incurred
PAB-2{5} / 27A	Cables associated with Charging pump suction path valves LCV-112B/C	The fixed combustibles in the zone are minimal, consisting principally of Operations and Rad Pro materials and supplies, and a small quantity of cables in trays	Ignition sources consist of several widely spaced electrical boxes, a cable run, and a water heater. The cables of concern are routed in the vicinity of one or more of the ignition sources.	Combustibles other than cables in trays are minimal, throughout the zone. The credible fire scenario would involve transient combustibles, which are tightly controlled to "Level 2" limits, per administrative control procedure.  Combustibles in this large zone are widely distributed, presenting minimal potential for significant involvement, in response to initiation by any single ignition source in the zone

**Table RAI-06.1-1  
Proximity of Redundant Safe-Shutdown Cables/Components,  
Fire Hazards, and Ignition Sources Within Fire Areas and Fire Zones of Concern**

Fire Area / Zone	SSD Feature	Proximity to Significant Fixed Combustibles	Proximity to Ignition Sources	Comments
PAB-2{5} / 30A	Cables associated with Charging pump suction path valves LCV-112B/C	Combustibles in the zone consist of a small quantity of cables in trays and incidental materials. The cables of concern are routed in or adjacent to the trays in the zone.	The sole ignition source is the cable tray run, presenting a minimal potential for fire initiation	The minimal ignition sources and small inventory of cables provide reasonable assurance that any fire occurring in the zone will be minimal in scope of damage incurred
PAB-2{5} / 58A	Cables associated with 32 Charging Pump	Combustibles in the zone consist of a small quantity of cables in trays and incidental materials. The cables of concern are routed in or adjacent to the trays in the zone.	The sole ignition source is the cable tray run, presenting a minimal potential for fire initiation	The minimal ignition sources and small inventory of cables provide reasonable assurance that any fire occurring in the zone will be minimal in scope of damage incurred  The smoke detection system provides assurance of early warning of a fire condition, enabling brigade response prior to significant fire development
PAB-2{5} / 59A	Cables associated with Charging makeup path valve(s) HCV-142/227	Combustibles in the zone consist of a small quantity of cables in trays and incidental materials. The cables of concern are routed in or adjacent to the trays in the zone.	The ignition sources consist of the cable tray run and a junction box, presenting a minimal potential for fire initiation	The minimal ignition sources and small inventory of cables provide reasonable assurance that any fire occurring in the zone will be minimal in scope of damage incurred  The smoke detection system provides assurance of early warning of a fire condition, enabling brigade response prior to significant fire development

**Table RAI-06.1-1  
Proximity of Redundant Safe-Shutdown Cables/Components,  
Fire Hazards, and Ignition Sources Within Fire Areas and Fire Zones of Concern**

Fire Area / Zone	SSD Feature	Proximity to Significant Fixed Combustibles	Proximity to Ignition Sources	Comments
PAB-2{5} / 62A	Cables associated with Charging makeup path valve(s) HCV-142/227	Combustibles in the zone consist of a small quantity of cables in trays and incidental materials. The cables of concern are routed in or adjacent to the trays in the zone.	The sole ignition source is the cable tray run, presenting a minimal potential for fire initiation.	The minimal ignition sources and small inventory of cables provide reasonable assurance that any fire occurring in the zone will be minimal in scope of damage incurred
TBL-5 / 37A	Cables associated with all (31 through 36) Service Water pump strainers	Combustibles in the zone include cables in trays, lube oil, and electrical cabinets distributed throughout the zone. A flammable liquids storage cabinet is located at the south end of the zone. The cables of concern are routed in the overhead, above one or more of the combustible elements in the zone.	Ignition sources include cable runs, switchgear, MCCs, transformers, and electrical cabinets. The cables of concern are in proximity to one or more ignition sources in the zone.	This zone contains 6.9kV switchgear, presenting the potential for a HEAF concern, if circuit breaker operational failures are postulated  Fire detection provided in the 6.9kV switchgear area and above an MCC, as well as in battery and charger rooms, provides assurance of prompt notification of a developing fire at these locations. The general area coverage sprinkler system provides assurance of control of the likely fire scenario involving transient materials, minimizing the scope and severity of any fire damage.

**Table RAI-06.1-1  
Proximity of Redundant Safe-Shutdown Cables/Components,  
Fire Hazards, and Ignition Sources Within Fire Areas and Fire Zones of Concern**

Fire Area / Zone	SSD Feature	Proximity to Significant Fixed Combustibles	Proximity to Ignition Sources	Comments
TBL-5 / 38A	Cables associated with all (31 through 36, 38) Service Water pump strainers	Combustibles in the zone include cables in trays, electrical cabinet, MCC, and flammable liquids storage cabinets, distributed throughout the zone, as well as a range of chemicals in the chemical storage area. The cables of concern are routed in the overhead, above one or more of the combustible elements in the zone.	Ignition sources include the MCC and electrical cabinet. The cables of concern are in proximity to one or more ignition sources in the zone.	<p>The minimal ignition sources and spatial separation of combustibles provide reasonable assurance that any fire occurring in the zone will be minimal in scope of damage incurred</p> <p>The sprinkler system in the chemical storage area and the smoke detection provided above the MCC located in the zone, provide reasonable assurance of annunciation and control of any fire development at either of these hazards</p>

**Table RAI-06.1-1  
Proximity of Redundant Safe-Shutdown Cables/Components,  
Fire Hazards, and Ignition Sources Within Fire Areas and Fire Zones of Concern**

Fire Area / Zone	SSD Feature	Proximity to Significant Fixed Combustibles	Proximity to Ignition Sources	Comments
TBL-5 / 43A	Cables associated with all (31 through 36, 38) Service Water pump strainers	Combustibles in the zone include cables in trays, electrical cabinets, MCC, switchgear, and flammable liquids storage cabinets, distributed throughout the zone, as well as a range of chemicals in the chemical storage area. The cables of concern are routed in the overhead, above one or more of the combustible elements in the zone.	Ignition sources include the cable runs, switchgear, MCC, electrical cabinets, and transformer, which are distributed throughout the zone. The cables of concern are in proximity to one or more ignition sources in the zone.	This zone is provided with a full-area wet-pipe sprinkler system, providing assurance of effective control of any fire that may occur in the area. Water flow alarms received in the CCR upon actuation of the sprinkler system provide effective notification to enable deployment of the fire brigade. Given the broad distribution of combustibles in the area, there is reasonable assurance that a fire would be constrained to a limited fire damage footprint within the zone.

**Table RAI-06.1-1  
Proximity of Redundant Safe-Shutdown Cables/Components,  
Fire Hazards, and Ignition Sources Within Fire Areas and Fire Zones of Concern**

Fire Area / Zone	SSD Feature	Proximity to Significant Fixed Combustibles	Proximity to Ignition Sources	Comments
TBL-5 / 44A	Cables associated with all (31 through 36, 38) Service Water pump strainers	Combustibles in the zone include cables in trays, electrical cabinets, one dry-type transformer, and incidental combustibles. The cables of concern are routed in the overhead, above one or more of the combustible elements in the zone.	Ignition sources include the cable runs, electrical cabinets, and transformer, which are distributed throughout the zone. The cables of concern are in proximity to one or more ignition sources in the zone.	The minimal combustibles in the zone, and the distribution of the combustibles and ignition sources throughout the zone, provide reasonable assurance that a credible fire scenario would be limited in scope and severity of fire damage
TBL-5 / 52A	Cables associated with: 31 AFW Pump recirculation valve FCV-1121; 31 AFW Pump flow control valves FCV-406A, B	The zone contains negligible fixed combustibles	Motors on two penetration blowers, and two electrical cabinets, represent the ignition sources in this zone. The ignition sources are located in the south end of the zone, as are the SSD cables listed as SSD Features.	This area is devoid of significant fixed combustibles, and a substantial fire capable of challenging the integrity of the cables of concern is not considered a credible event

**Table RAI-06.1-1  
Proximity of Redundant Safe-Shutdown Cables/Components,  
Fire Hazards, and Ignition Sources Within Fire Areas and Fire Zones of Concern**

Fire Area / Zone	SSD Feature	Proximity to Significant Fixed Combustibles	Proximity to Ignition Sources	Comments
TBL-5 / 54A	Cables associated with 31 AFW Pump flow control valves FCV-406A, B	The zone contains negligible fixed combustibles	Ignition sources consist of a cable run, electrical cabinet, and motors on valve operators. The cables of concern are proximate to the cable runs.	The minimal combustibles in the zone, and the distribution of the combustibles and ignition sources throughout the zone, provide reasonable assurance that a credible fire scenario would be limited in scope and severity of fire damage
YARD-7 / 22	Cables associated with (as well as the components themselves): 31-36 SW Pump, 31-36 SW Pump Strainer	The service water pumps and strainers are segregated from the significant combustibles of the zone by a security barrier enclosure. Combustibles within the enclosure are insignificant.	Ignition sources consist of several electrical boxes and the SW pump motors themselves	Fire detection provided in the zone would annunciate any developing fire condition, enabling fire brigade response for manual suppression of the fire. The limited ignition sources and combustibles within the zone do not present a significant fire challenge capable of rendering all SW pumps inoperable.

**Table RAI-06.1-1  
Proximity of Redundant Safe-Shutdown Cables/Components,  
Fire Hazards, and Ignition Sources Within Fire Areas and Fire Zones of Concern**

Fire Area / Zone	SSD Feature	Proximity to Significant Fixed Combustibles	Proximity to Ignition Sources	Comments
YARD-7 / 222	Cables associated with 38 SW Pump Strainer	This zone contains only small quantities of cables, consisting of the cables serving the backup SW pump and strainer. The required cables for BU SW Pump/SW System operation are the combustibles in the zone.	Ignition sources consist of the BU SW Pump and strainer motors. A fire ignited by one of these components would simply result in the use of one of the redundant pump/strainer combinations in the area.	The fire challenge in the zone is insignificant, and any accumulation of transient combustibles that could present a significant fire challenge would not concurrently challenge the redundant SW Pumps 31 through 36, located in Zone 22

### RAI-07.1

Provide an analysis or technical justification that demonstrates that the ability to detect a fire is sufficient to provide notification of a postulated event before damage to the redundant trains occurs or provide an analysis or technical justification to evaluate scenarios where the redundant components are damaged before a fire has been reported.

### RESPONSE

No credit has been taken for immediate and proactive OMA response by plant operators upon the receipt of a fire detection alarm in any of the identified fire areas or fire zones. Rather, the OMA responses are initiated upon the detection of operating abnormalities or failures caused by the postulated fire.

The evaluation of the feasibility of the credited OMAs for the fire areas addressed herein was conducted using the presumption that fire damage would occur to the cables/components of concern, and that symptomatic response to mitigate these failures would be required. While a fire was postulated and announced to plant operators at the outset of event simulations, no attempt was made to credit preventive actions; i.e., proactive actions that could be taken immediately upon receipt of a fire alarm. Exercises were conducted using the plant simulator, with a fire condition announced at the outset or a spontaneous reactor trip (caused by the fire) was presented at the outset, followed by the failure of discrete components that are subject to impairment due to fire damage to cables or components resulting from a fire in the area of concern. The component failures were selected from the Appendix R Safe-Shutdown Analysis list of component failures for a fire in the selected fire area. Using this evaluation approach, the operating team was observed and as the discrete failures were discovered by the operators the associated time values were recorded.

For purposes of the simulator exercises, the plant was assumed to be in Mode 1 (100% power), with no equipment out of service (except for that potentially failed by the postulated fire). The simulator model was modified to impair certain components, prior to starting the exercise. The impairment flags in the simulator model database were applied so as to create no cues or advance warning to the operators that the affected components would be impaired or unavailable. The time values discussed in the response to RAI-08.1 reflect the diagnosis times developed through these exercises.

Conversely, the simulated performance of the OMAs, which by definition are actions outside the CCR, was accomplished in a separate set of evolutions, by dispatching operator(s) from the CCR (or where an operator is normally stationed in the Radiologically Controlled Area, dispatched from that location via radio). The operator(s) were dispatched to the OMA locations as directed by procedures, and the total time recorded was the time to travel from the dispatch location, perform the OMA, and communicate to the CCR that the action was completed.

The total of simulator-based Time to Diagnose was added to the field-based time to travel to the OMA Location, complete the OMA, and notify the CCR of completion. Note that the time values shown in the Request for Exemption dated March 6, 2009 and in the Revision to the Request for Exemption dated October 1, 2009, were only those associated with the Actual Time

to Complete the OMA (travel time + performance time + confirmation/notification time), as shown in Tables RAI-08.1-1 through RAI-08.1-8.

Notwithstanding the reasonableness of expectation that a fire in the affected area would be detected and annunciated in the CCR well in advance of the occurrence of substantive cable/component damage, the OMA evaluation approach in all cases presumed that the postulated fire damage did in fact occur, and therefore the implementation of the OMA was required in all cases. No credit was taken for anticipation of the various component failures as the result of early warning fire detection alarms. Instead, the discrete failures were imposed by the simulator on the operating team, and they were challenged to diagnose the failure, determine the appropriate response, and dispatch operators as applicable to perform OMAs in the field to mitigate the equipment maloperation.

### **RAI-08.1**

For each of the OMAs contained in the requests, describe the circumstances and criteria needed to enter the OMA procedure and identify:

- 1) Diagnosis time – the time required for an operator to examine and evaluate data to determine the need for, and to make the decision to implement, an action.
- 2) Implementation time – the time required by the operator(s) to successfully perform the action including:
  - Obtaining any necessary equipment, procedures, or other devices,
  - Traveling to the necessary location,
  - Implementing the action, and
  - Confirming that the action has had its desired effect

### **RESPONSE**

The actions required to implement the subject OMAs are detailed in Tables 2 through 9 of Attachment 2 to Entergy letter NL-09-032, dated March 6, 2009 and Entergy letter NL-09-117, dated October 1, 2009. The details of the time required to diagnose each of the failure scenarios requiring the use of the subject OMAs, as well as the time required to implement the OMAs, are herein provided in Tables RAI-08.1-1 through RAI-08.1-8. For each OMA sequence, the Required Time to Complete and the Total Time to Complete are provided, along with the Resultant Margin available for each OMA.

Note that in revisiting the timed validation data sets in developing the response to RAI-08.1, it was determined that in several cases the OMA-specific timing data as presented in the Request for Exemption dated March 6, 2009 and in the Revision dated October 1, 2009, required revision to accurately reflect the components of the timing elements and the overall completion times. In addition, the OMA descriptive text has been clarified in several cases from that shown in the referenced submittals. None of these changes impact Entergy's conclusions relative to the feasibility or reliability of the subject OMAs.

Also shown in Tables RAI-08.1-1 through RAI-08.1-8 are the fire area and fire zone(s) that contain cables and/or components presenting the fire vulnerability that may initiate the need to implement the credited OMA, along with the fire area and fire zone(s) in which the OMA is performed. For the few cases in which reentry to the fire-affected area is credited, the constraints of such reentry are described.

### **RAI-08.2**

Provide a justification that demonstrates that the proposed OMAs are feasible as well as a technical justification for the times discussed in the response to RAI-08.01 above.

### **RESPONSE**

The credited OMAs have been demonstrated to be feasible through timed evolutions performed using a combination of simulator drills and dispatch of operators to (simulate) performance of the OMAs within the physical plant. In all cases, as shown by Tables RAI-08.1-1 through RAI-08.1-8, the OMAs are completed, with available margin, within the time constraints established by the supporting safe-shutdown thermal-hydraulic analyses.

The time values presented in Tables RAI-08.1-1 through RAI-08.1-8 have been shown to be consistently achievable, and the Operations resource demand to support any one of the fire area scenarios is a fraction of the 7-operator complement available to support a post-fire safe-shutdown scenario. Note that the time to diagnose and the resultant total time to complete OMAs were not shown in the Request for Exemption dated March 6, 2009 or in the Revision to the Request for Exemption dated October 1, 2009. Tables RAI-08.1-1 through RAI-08.1-8 expand on the timing information presented in the March 6, 2009 and October 1, 2009 submittals.

The accomplishment of the small OMA subsets for any of the III.G.2 fire areas for which exemption is sought is fully bounded by the limiting III.G.3 fire scenario, e.g., a Control Building fire. In the case of a III.G.3 scenario, involving CCR evacuation, the guidance of procedure 3-AOP-SSD-1 (Control Room Inaccessibility Safe Shutdown Control) applies, and the ability to accomplish the key time-sensitive action sets in 3-AOP-SSD-1 has been demonstrated repeatedly.

**TABLE RAI-08.1-1  
FIRE AREA AFW-6  
CREDITED III.G.2 OPERATOR MANUAL ACTIONS**

Required OMA	Required Time to Complete	Actual Time to Diagnose Need for OMA <sup>2</sup>	Actual Time to Complete OMA <sup>3</sup>	Total Time to Complete and Resultant Margin <sup>4</sup>	OMA Initiator (I) Fire Area/Zone <sup>5</sup>	Comments
					OMA Performance (P) Fire Area/Zone <sup>6</sup>	
Locally start 33 AFW Pump from breaker on Bus 6A	30 m	4.5 m	13 m (a)	TTC: 17.5 m  Margin: 12.5 m; 41%	I: Area AFW-6, Zone 23  P: Area CTL-3, Zone 14	Target: 33 AFW Pump control cables
Locally operate valves FCV-1123, FCV-406C, FCV-406D	-	-	-	-	-	<b>WITHDRAWN</b> See response to RAI-02.1

(a) The Total Time to Complete is revised to 13 minutes, whereas the previous submittals showed a value of 7 minutes for the Actual Time to Complete

These notes apply to Tables RAI-08.1-1 through RAI-08.1- 8:

1. Represents the available time to complete the action to ensure fulfillment of the Appendix R performance goals
2. Elapsed time from start of announced fire event for operators in simulator environment to detect failure
3. Actual Time to Complete = travel time + time to execute OMA + time to report completion/validate action
4. Total Time to Complete (TTC) = Actual Time to Diagnose Need for OMA + Actual Time to Complete OMA  
Resultant Margin =  $100 \times (\text{Required Time to Complete} - \text{TTC}) / \text{Required Time to Complete}$
5. Fire Area/Zone in which the postulated fire may cause cable or component damage resulting in the need for the OMA to recover the required SSD function
6. Fire Area/Zone in which the OMA is actually performed

**TABLE RAI-08.1-1  
FIRE AREA AFW-6  
CREDITED III.G.2 OPERATOR MANUAL ACTIONS**

Required OMA	Required Time to Complete <sup>1</sup>	Actual Time to Diagnose Need for OMA <sup>2</sup>	Actual Time to Complete OMA <sup>3</sup>	Total Time to Complete and Resultant Margin <sup>4</sup>	OMA Initiator (I) Fire Area/Zone <sup>5</sup>	Comments
					OMA Performance (P) Fire Area/Zone <sup>6</sup>	
Locally operate PCV-1139, PCV-1310A, PCV-1310B, HCV-1118, FCV-405C or FCV-405D (if 32 AFW Pump is used)	-	-	-	-	-	<b>WITHDRAWN</b> See response to RAI-02.1
Locally operate Steam Generator Atmospheric Dump Valve (SGADV) PCV-1134, PCV-1135, PCV-1136, or PCV-1137	-	-	-	-	-	<b>WITHDRAWN</b> See response to RAI-02.1

**TABLE RAI-08.1-2  
FIRE AREA ETN-4{1}  
CREDITED III.G.2 OPERATOR MANUAL ACTIONS**

Required OMA	Required Time to Complete	Actual Time to Diagnose Need for OMA	Actual Time to Complete OMA	Total Time to Complete and Resultant Margin	OMA Initiator (I) Fire Area/Zone	Comments
					OMA Performance (P) Fire Area/Zone	
Swap 32 CCW Pump to alternate power supply OR align city water to Charging pumps	> 1 hour	< 1m	34 m (b)	TTC: 35 m  Margin: >25 m; >42%	I: Area ETN-4{1}, Zone 7AS  P: Area TBL-5, Zone 37A and Area PAB 2{2}, Zone 1; OR Area PAB-2{4}, Zone 17A	Target: 32 CCW Pump cables
Operate 480V Bus 3A breaker locally to start 31 AFW Pump	30 m	4.5 m	7 m	TTC: 11.5 m  Margin: 18.5 m; 61%	I: Area ETN-4{1}, Zone 7AN  P: Area CTL-3, Zone 11	Target: 31 AFW Pump control cable
Locally operate FCV-1121 in support of use of 31 AFW Pump, OR	30 m	4.5 m	8 m	TTC: 12.5 m  Margin: 17.5 m; 58%	I: Area ETN-4{1}, Zone 7AN  P: Area AFW-6, Zone 23	Target: FCV-1121 control cable
Operate HCV-1118 manually to control 32 AFW Pump	30 m	4.5 m	17 m	TTC: 21.5 m  Margin: 8.5 m; 28%	I: Area ETN-4{1}, Zone 60AS  P: Area AFW-6, Zone 23	Target: HCV-1118 control cable

(b) The Total Time to Complete is revised to 34 minutes, whereas the previous submittals showed a value of 10 minutes for the Actual Time to Complete

**TABLE RAI-08.1-2  
FIRE AREA ETN-4{1}  
CREDITED III.G.2 OPERATOR MANUAL ACTIONS**

Required OMA	Required Time to Complete	Actual Time to Diagnose Need for OMA	Actual Time to Complete OMA	Total Time to Complete and Resultant Margin	OMA Initiator (I) Fire Area/Zone	Comments
					OMA Performance (P) Fire Area/Zone	
Align Appendix R Diesel Generator (ARDG) to 480V Buses 2A, 3A, 5A, and 312 (c)	75 m	<1 m	50 m	TTC: <51 m Margin: 24 m; 32%	I: Area ETN-4{1}  P: Area TBL-5, Zone 37A; Area YARD-7, Zones 131, 131A; Area CTL-3, Zone 11	Nonmechanistic Loss of Offsite Power can be postulated at outset of scenario, effectively eliminating diagnosis time
Swap 31 or 32 Charging Pump to alternate power supply	75 m	30 m	8 m	TTC: 38 m Margin: 37 m; 49%	I: Area ETN-4{1}, Zone 7AN, 60AS  P: Area PAB-2-{3}	Target: 31 and 32 Charging Pump cables
Start ARDG and align power to 480V Buses 2A, 3A, 5A, and 312 (d)	-	-	-	-	-	Not a separate OMA
Locally operate FCV-405B, FCV-405D, or FCV-406B to control AFW flow to Steam Generators	30 m	4.5 m	17 m	TTC: 21.5 m Margin: 12.5 m; 37%	I: Area ETN-4{1}, Zone 7AN, 7AS, 60AS  P: Area AFW-6, Zone 23	Target: FCV-406A-D, FCV-405A-D control cables

(c) Buses 3A and 312 were inadvertently omitted in previous submittals

(d) This was a separate OMA in previous submittals but is herein correctly included in the OMA to "Align Appendix R Diesel Generator..."

**TABLE RAI-08.1-2  
FIRE AREA ETN-4{1}  
CREDITED III.G.2 OPERATOR MANUAL ACTIONS**

Required OMA	Required Time to Complete	Actual Time to Diagnose Need for OMA	Actual Time to Complete OMA	Total Time to Complete and Resultant Margin	OMA Initiator (I) Fire Area/Zone	Comments
					OMA Performance (P) Fire Area/Zone	
Locally open valve 227 to establish Charging [previously "CVCS"] makeup flowpath to RCS)	75 m	30 m	9 m	TTC: 39 m  Margin: 36 m; 48%	I: Area ETN-4{1}, Zone 60AS  P: Area PAB-2{5}, Zone 62A	Targets: Cables associated with HCV-142  Travel time conservatively taken to be 10 minutes, from CCR to PAB. Travel time is non-critical, since no attempt is made to perform the OMA for the initial 60 minutes of the scenario.
Locally close valve LCV-112C; open valve 288 to align Charging pump suction to the RWST	75 m	30 m	11 m	TTC: 41 m  Margin: 34 m; 45%	I: Area ETN-4{1}, Zone 60AS  P: Area PAB-2{3}, Zone 6 and Area PAB-2{5}, Zone 30A	Targets: cables associated with valves LCV-112B, LCV-112C  Travel time conservatively taken to be 10 minutes, from CCR to PAB. Travel time is non-critical, since no attempt is made to perform the OMA for the initial 60 minutes of the scenario.
Locally control SGADVs PCV-1135, PCV-1136	-	-	-	-	-	<b>WITHDRAWN</b> See response to RAI-02.1

**TABLE RAI-08.1-2  
FIRE AREA ETN-4{1}  
CREDITED III.G.2 OPERATOR MANUAL ACTIONS**

Required OMA	Required Time to Complete	Actual Time to Diagnose Need for OMA	Actual Time to Complete OMA	Total Time to Complete and Resultant Margin	OMA Initiator (I) Fire Area/Zone	Comments
					OMA Performance (P) Fire Area/Zone	
Locally operate PCV-1139 to ensure steam supply to 32 AFW Pump	30 m	4.5 m	17 m	TTC: 21.5 m  Margin: 8.5 m; 28%	I: Area ETN-4{1}, Zone 60AS  P: Area AFW-6, Zone 23	Target: PCV-1139 control cables
Locally operate PCV-1310A, 1310B to ensure steam supply to 32 AFW Pump	30 m	4.5 m	17 m	TTC: 21.5 m  Margin: 8.5 m; 28%	I: Area ETN-4{1}, Zone 60AS  P: Area TBL-5, Zones 52A and 57A	Target: PCV-1310A, B control cables
Locally manually perform Service Water (SW) pump strainer backwash as required	> 1 hour	> 1 hour	15 m	TTC: See Comments  Margin: See Comments	I: Area ETN-4{1}, Zone 60AN  P: Area YARD-7, Zone 222	The need for periodic manual backwash of the selected SW strainer is variable, depending on ultimate heat sink conditions and other factors. The Time to Diagnose shown is a nominal figure, and therefore TTC and Margin are not considered critical parameters for this occasional (as-needed) OMA.

**TABLE RAI-08.1-3  
FIRE AREA ETN-4{3}  
CREDITED III.G.2 OPERATOR MANUAL ACTIONS**

Required OMA	Required Time to Complete	Actual Time to Diagnose Need for OMA	Actual Time to Complete OMA	Total Time to Complete and Resultant Margin	OMA Initiator (I) Fire Area/Zone	Comments
					OMA Performance (P) Fire Area/Zone	
Operate HCV-1118 manually to control 32 AFW Pump	30 m	4.5 m	17 m	TTC: 21.5 m Margin: 8.5 m; 28%	I: Area ETN-4{3}, Zone 73A  P: Area AFW-6, Zone 23	Target: HCV-1118 control cables
Locally operate PCV-1139 to ensure steam supply to 32 AFW Pump	30 m	4.5 m	17 m	TTC: 21.5 m Margin: 8.5 m; 28%	I: Area ETN-4{3}, Zone 73A  P: Area AFW-6, Zone 23	Target PCV-1139 control cables
Locally operate PCV-1310A, PCV-1310B to ensure steam supply to 32 AFW Pump	30 m	4.5 m	17 m	TTC: 21.5 m Margin: 8.5 m; 28%	I: Area ETN-4{3}, Zone 73A  P: Area TBL-5, Zones 52A and 57A	Target: PCV-1310A, B control cables
Locally operate FCV-405C, 405D to control AFW flow to SG	30 m	4.5 m	17 m	TTC: 21.5 m Margin: 8.5 m; 28%	I: Area ETN-4{3}, Zone 73A  P: Area AFW-6, Zone 23	Target: FCV-405 control cables

**TABLE RAI-08.1-4  
FIRE AREA ETN-4{4}  
CREDITED III.G.2 OPERATOR MANUAL ACTIONS**

Required OMA	Required Time to Complete	Actual Time to Diagnose Need for OMA	Actual Time to Complete OMA	Total Time to Complete and Resultant Margin	OMA Initiator (I) Fire Area/Zone	Comments
					OMA Performance (P) Fire Area/Zone	
Locally operate SGADV PCV-1134, PCV-1135, PCV-1136, or PCV-1137 to support cooldown to RHR entry conditions	-	-	-	-	-	<b>WITHDRAWN</b> See response to RAI-02.1

**TABLE RAI-08.1-5  
FIRE AREA PAB-2{3}  
CREDITED III.G.2 OPERATOR MANUAL ACTIONS**

Required OMA	Required Time to Complete	Actual Time to Diagnose Need for OMA	Actual Time to Complete OMA	Total Time to Complete and Resultant Margin	OMA Initiator (I) Fire Area/Zone	Comments
					OMA Performance (P) Fire Area/Zone	
Locally close valve LCV-112C and open valve 288 to align Charging pump suction path to Refueling Water Storage Tank (RWST)	75 m	30 m	11 m	TTC: 41 m Margin: 34 m; 45%	I: Area PAB-2{3}, Zone 6  P: Area PAB-2{3}, Zone 6 and Area PAB-2{5}, Zone 30A	Targets: cables associated with valves LCV-112B, LCV-112C  Travel time conservatively taken to be 10 minutes, from CCR to PAB. Travel time is non-critical, since no attempt is made to perform the OMA for the initial 60 minutes of the scenario.

**TABLE RAI-08.1-6  
FIRE AREA PAB-2{5}  
CREDITED III.G.2 OPERATOR MANUAL ACTIONS**

Required OMA	Required Time to Complete	Actual Time to Diagnose Need for OMA	Actual Time to Complete OMA	Total Time to Complete and Resultant Margin	OMA Initiator (I) Fire Area/Zone	Comments
					OMA Performance (P) Fire Area/Zone	
Locally close supply breaker for 32 Charging [previously "CVCS"] Pump	75 m	30 m	7 m	TTC: 37 m Margin: 38 m; 51%	I: Area PAB-2{5}, Zone 4A, 18A, 19A, 58A P: Area CTL-3, Zone 11	Target: 32 Charging Pump control cables
Locally control 32 Charging [previously "CVCS"] Pump using scoop tube positioner	75 m	30 m	9 m	TTC: 39 m Margin: 36 m; 48%	I: Area PAB-2{5}, Zone 4A, 18A, 19A, 58A P: Area PAB-2{3}, Zone 6	Target: 32 Charging Pump control cables
Open valve 227 to establish Charging flowpath to RCS around potentially failed closed HCV-142	75 m	30 m	9 m	TTC: 39 m Margin: 36 m; 48%	I: Area PAB-2{5}, Zone 27A, 30A, 59A, 62A P: Area PAB-2{5}, Zone 62A	Targets: Cables associated with valve HCV-142  Travel time conservatively taken to be 10 minutes, from CCR to PAB. Travel time is non-critical, since no attempt is made to perform the OMA for the initial 60 minutes of the scenario.

**TABLE RAI-08.1-6  
FIRE AREA PAB-2{5}  
CREDITED III.G.2 OPERATOR MANUAL ACTIONS**

Required OMA	Required Time to Complete	Actual Time to Diagnose Need for OMA	Actual Time to Complete OMA	Total Time to Complete and Resultant Margin	OMA Initiator (I) Fire Area/Zone	Comments
					OMA Performance (P) Fire Area/Zone	
Locally close valve LCV-112C and open valve 288 to establish flowpath from RWST to Charging pump suction	75 m	30 m	11 m	TTC: 41 m Margin: 34 m; 45%	I: Area PAB-2{5}, Zone 21A, 27A, 30A  P: Area PAB-2{3}, Zone 6 and Area PAB-2{5}, Zone 30A	Targets: cables associated with valves LCV-112B, LCV-112C  Travel time conservatively taken to be 10 minutes, from CCR to PAB. Travel time is non-critical, since no attempt is made to perform the OMA for the initial 60 minutes of the scenario.

**TABLE RAI-08.1-7  
FIRE AREA TBL-5  
CREDITED III.G.2 OPERATOR MANUAL ACTIONS**

Required OMA	Required Time to Complete	Actual Time to Diagnose Need for OMA	Actual Time to Complete OMA	Total Time to Complete and Resultant Margin	OMA Initiator (I) Fire Area/Zone	Comments
					OMA Performance (P) Fire Area/Zone	
Locally operate [bypass valve for] FCV-1121 AFW Pump recirculation valve during pump startup (e)	30 m	4.5 m	8 m	TTC: 12.5 m Margin: 17.5 m; 58%	I: Area TBL-5, Zone 52A P: Area AFW-6, Zone 23	Target: FCV-1121 control cables
Locally operate FCV-406A, 406B to control AFW flow to SGs	30 m	4.5 m	17 m (d)	TTC: 21.5 m Margin: 8.5 m; 28%	I: Area TBL-5, Zone 52A, 54A P: Area AFW-6, Zone 23	Target: FCV-406 control cables
Locally operate SGADV PCV-1134, PCV-1135, PCV-1136, or PCV-1137 to control secondary system cooldown						<b>WITHDRAWN</b> See response to RAI-02.1

(d) The Total Time to Complete is revised to 17 minutes, whereas the referenced submittals showed a value of 8 minutes for the Actual Time to Complete

(e) Clarified that the bypass valve for FCV-1121 is the component that is manually operated

**TABLE RAI-08.1-7  
FIRE AREA TBL-5  
CREDITED III.G.2 OPERATOR MANUAL ACTIONS**

Required OMA	Required Time to Complete	Actual Time to Diagnose Need for OMA	Actual Time to Complete OMA	Total Time to Complete and Resultant Margin	OMA Initiator (I) Fire Area/Zone	Comments
					OMA Performance (P) Fire Area/Zone	
Locally/manually backwash SW pump strainer as required if power to strainer associated with selected SW pump is lost (use one of STR PMP-31 through STR PMP-36)	> 1 hour	> 1 hour	15 m	TTC: See Comments  Margin: See Comments	I: Area TBL-5, Zone 37A, 38A, 43A, 44A  P: Area YARD-7, Zone 222	The need for periodic manual backwash of the selected SW strainer is variable, depending on ultimate heat sink conditions and other factors. The Time to Diagnose shown is a nominal figure, and therefore TTC and Margin are not considered critical parameters for this occasional (as-needed) OMA.

**TABLE RAI-08.1-8  
FIRE AREA YARD-7  
CREDITED III.G.2 OPERATOR MANUAL ACTIONS**

Required OMA	Required Time to Complete	Actual Time to Diagnose Need for OMA	Actual Time to Complete OMA	Total Time to Complete and Resultant Margin	OMA Initiator (I) Fire Area/Zone	Comments
					OMA Performance (P) Fire Area/Zone	
Locally start ARDG to supply MCC 312A in support of the use of SW Pump 38	> 1 hour	<1 m	25 m	TTC: <26 m Margin: >34 m; >56%	I: Area YARD-7, Zone 22, YARD P: Area YARD-7, Zones 131, 131A, Area TBL-5, Zone 37A	Nonmechanistic Loss of Offsite Power can be postulated at outset of scenario, effectively eliminating diagnosis time
Locally/manually backwash SW pump strainer as required if power to strainer associated with selected SW pump is lost	> 1 hour	> 1 hour	15 m	TTC: See Comments Margin: See Comments	I: Area TBL-5, Zone 37A, 38A, 43A, 44A P: Area YARD-7, Zone 222	The need for periodic manual backwash of the selected SW strainer is variable, depending on ultimate heat sink conditions and other factors. The Time to Diagnose shown is a nominal figure, and therefore TTC and Margin are not considered critical parameters for this occasional (as-needed) OMA.

### RAI-09.1

Provide information that demonstrates that the actions are reliable including a justification that various uncertainties are accounted for in the time margins and that the margins are sufficient to ensure that they provide adequate time to cover potential variations in plant conditions and human performance. If a factor of safety or diagnosis time has been included in the stated times to complete the actions, provide an explanation of how it has been incorporated into the timelines. If not, justify why the stated times are sufficient to ensure safety.

### RESPONSE

The demonstration of the subject OMAs was accomplished via a two-phased effort, involving fire scenario modeling, failure diagnosis, and operator dispatch to perform the necessary OMAs using the plant simulator. This environment provided a realistic means of assessing operator response to the reported fire and response to the selected fire area-specific equipment failures that were flagged in the simulator model, and the assessment of the time necessary to reach the point at which operators were dispatched to perform the necessary mitigating OMAs.

The subject OMAs were separately field-validated, with operators dispatched from the CCR (or other locations, as applicable to normal plant operating stations). The time to travel to the OMA location was recorded, as was the time to complete the (simulated) action. In each case, the operator progressed through the simulation of the action, including appropriate time delays consistent with that required to actually implement the action. For example, time was allocated for the manual opening or closing of designated valves, given the approximate number of handwheel turns necessary to achieve full travel of the valve.

Note that the "diagnosis" times as presented on Tables RAI-08.1-1 through RAI-08.1-8 are based on actual operator response in simulator exercises as described in the response to RAI-07.1. Arbitrary estimates of time required for failure diagnosis were not used, nor were arbitrary factors of safety applied. The fact that the aggregate time to complete each OMA, as shown on Tables RAI-08.1-1 through RAI-08.1-8, is consistently bounded by the analytically-based "Required time to complete," with margin, is considered to adequately bound the range of uncertainties that could reasonably be postulated.

None of the OMA operating locations are difficult to access, and the required operations are simple manual actions that do not require any special tools, processes, or unique personal capabilities. The OMAs involve:

- Manual operation of valves (manual valves, as well as operation of AOVs and MOVs via handwheels or installed jacking devices)
- Local manual trip or closure of circuit breakers
- Manual control of turbine-driven AFW pump

None of the OMAs involve complex instruction sets, the installation or removal of jumpers, the installation or removal of fuses, or any actions requiring uniquely specialized knowledge or fine motor skills. The OMA task assignments are within the capability of any licensed operator or nuclear plant operator, as applicable to his/her responsibility set. As such, the challenge presented for completion of these basic tasks within the prescribed time limits is within the

capability of the standard IP3 operating crew. Uncertainties that would be introduced by smoke obscuration or fire suppression activities are also expected to be minimal, given the minimal fire challenge in the affected plant areas, and the nature of the combustibles.

The data presented in Tables RAI-08.1-1 through RAI-08.1-8 include the time required for diagnosis of the failure that initiates the need for the respective OMAs, the time to accomplish the OMA (dispatch, travel to the OMA location, perform the OMA, and confirm), and the resultant remaining time margin. The data originally provided in the Request for Exemption dated March 6, 2009 and in the Revision to the Request for Exemption dated October 1, 2009, only included the time-to-perform the OMAs, hence the available time margin could not be readily discerned from the data originally provided.

### **RAI-10.1**

State whether operators are procedurally directed to don SCBAs [Self Contained Breathing Apparatus] and whether the time needed to don the SCBAs was included in the analysis of the time available to perform the action.

### **RESPONSE**

The post-fire safe-shutdown procedures do not include explicit instructions for operators to don SCBAs if post-fire entry into affected plant areas is required. However, plant operator qualifications include the use of SCBAs for purposes of fire brigade response, licensed operator qualification, and radiation worker qualification. All operators retain at least one of these SCBA qualifications. Successful SCBA qualification, per Entergy Instructor Lesson Plan IOLP-SAF-SCB01 (Self Contained Breathing Apparatus), requires an operator to demonstrate that they can don a SCBA within two minutes. As such, any operator that may be dispatched to perform local OMAs in fire-affected areas is prepared by training to don an SCBA, as appropriate, for entry into the affected plant area. Supplies of SCBAs for use by operators not dedicated to the fire brigade are located in the CCR and at a number of strategic locations throughout the plant. These SCBAs are dedicated for operator use, and are separate and distinct from the SCBAs designated and staged for use only by the fire brigade. There is a sufficient number of SCBAs available at all times to equip all operators that may need to be dispatched from the CCR to perform OMAs. Supplies of spare air bottles are also available at several plant locations. The inventory of SCBAs and spare bottles is verified monthly.

Given the relatively minimal OMAs that are required for response to fires in the III.G.2 areas discussed herein, the need for reentry to the fire-affected area typically involves only a small number of operators. The maintained supplies of SCBAs in the CCR and other strategic locations provides assurance that operators will not be impeded from performing necessary post-fire OMAs as the result of smoke or toxic gas conditions resulting from the postulated fire.

Based on the ready availability of an adequate supply of SCBAs to operators who may be dispatched to perform OMAs, and also recognizing that none of the OMA travel paths or access locations present unusually difficult access conditions (i.e., that would be exacerbated significantly by wearing an SCBA), the field evaluations of OMA performance did not include the use of SCBAs.

### RAI-11.1

Provide critical details or assumption of the analysis that demonstrates that the required safe shut down equipment or component located within the area is maintained free of fire damage and remains accessible and operable following the fire event.

### RESPONSE

The equipment to be operated via OMA following fire area reentry is as follows:

#### Fire Area PAB-2{3}

- Valve 288: Valve 288 is a manually-operated valve located in Fire Zone 6, which also contains 22 Charging Pump. This valve is required to be opened to support alignment of Charging pump suction to the alternate source (RWST). The combustible load in this zone is low, and the credible ignition source is the 32 Charging Pump motor. Valve 288 is located at the south end of this zone adjacent to the doorway, and is not immediately adjacent to the pump motor. Given the fire detection features in the room and the location of valve 288, there is reasonable assurance that this mechanical-only valve will remain operable following post-fire reentry. It should also be recognized that for a fire in Fire Zone 6 involving 32 Charging Pump, fire damage can be expected to be confined to the zone of origin, despite the lack of a door enclosing the room fully at the south end.

As the El. 55' corridor communicating with Fire Area PAB-2{3} is large and generally free of credible combustibles (with the exception of cables in overhead trays), there is reasonable assurance that access to valve 288, at 60 minutes following the start of the fire event, will remain sufficiently unencumbered, with the conditional use of SCBA by the operator(s), in the event that smoke venting throughout the area is incomplete at the time access to the area is needed.

#### Fire Area PAB-2{5}

- Motor-operated valve 227: This valve is required to be manually opened to support establishment of a makeup path to the RCS, by bypassing a spuriously closed normal makeup path control valve HCV-142. The combustible loading in the zone (Fire Zone 62A) containing this valve, as well as the adjacent zones, is insignificant, and Fire Zone 62A is devoid of any ignition sources other than a cable tray run, and does not present a substantive fire challenge to the integrity of the valve. Moreover, motor-operated valve 227 has been evaluated for potential vulnerability to the fire-induced failure mode postulated by IN 92-18 (Potential for Loss of Remote Shutdown Capability During a Control Room Fire), and the associated "weak link" analysis confirms that despite postulation of limit and torque switch failures as considered by IN 92-18, the valve actuator is incapable of causing damage that would render valve 227 inoperable by hand following the fire event. There is adequate assurance that valve 227 will remain manually operable, following the credible fire scenario that may be encountered in Fire Zone 6 or any of the adjoining zones.

- Motor-operated valve LCV-112C: This valve is required to be manually closed to support alignment of Charging pump suction to the alternate source (RWST). The combustible loading in the zone (Fire Zone 29A) containing this valve, as well as the adjacent zones, is insignificant, and Fire Zone 29A is devoid of any ignition sources and does not present a substantive fire challenge to the integrity of the valve. Moreover, motor-operated valve LCV-112C has been evaluated for potential vulnerability to the fire-induced failure mode postulated by IN 92-18, and the associated "weak link" analysis confirms that despite postulation of limit and torque switch failures as considered by IN 92-18, the valve actuator is incapable of causing damage that would render LCV-112C inoperable by hand following the fire event. There is adequate assurance that LCV-112C will remain manually operable, following the credible fire scenario that may be encountered in Fire Zone 29A or any of the adjoining zones.

### **Fire Area YARD-7**

OMAs credited to be performed through post-fire reentry to Fire Area YARD-7 consist of the conditional starting of the Appendix R Diesel Generator and periodic local/manual backwash of the 38 SW Pump strainer. Given the time available to perform these actions, the widely spaced combustibles in the area, and the recognition that this is an outdoor area, prompt dispersion of any smoke generated can be expected, and the unencumbered travel paths, save for traversing security delay gates, present minimal concern for impact on the ability of the operators to successfully perform the OMAs in a timely manner.

### **RAI-11.2**

Provide a technical justification for why the assumed 60-minute reentry period is appropriate and an explanation for what is assumed to be included in this time.

### **RESPONSE**

The stipulation for a 60-minute exclusion period for post-fire reentry to fire-affected areas PAB-2{3} and PAB-2{5} to perform OMAs is based in part on NRC guidance provided in response to a Con Edison letter dated September 11, 1985, specific to IP2 Fire Area C (the AFW Pump Room), and an exemption from the requirements of Paragraph III.G.2 granted for that room in an SER dated October 16, 1984 with subsequent clarifications as established in an NRC-Con Edison telephone conference of August 12, 1988, a Con Edison letter to NRC dated September 14, 1988, and ultimately an SER dated January 12, 1989. The potential need for post-fire reentry to this room was acknowledged, to allow local manual repositioning of AFW flow control valves that may be spuriously repositioned due to fire-induced circuit faults. However, the Staff determined that crediting of immediate reentry to this room was non-conservative, despite the insignificant fire hazard and minimal credible fire scenario, and established guidance in a follow-up telecon relative to the referenced SER that reentry to the room could not be credited for one hour following the initiation of the fire event. The NRC rationale appears to have been that there was insufficient basis to conclude that operators could safely reenter a fire-impacted zone until after one hour had elapsed, to allow reasonable time for a fire in the zone to be extinguished and smoke sufficiently vented. It should be noted that the significant delta between

IP2 and IP3 Auxiliary Feedwater Pump rooms is the absence of an automatic fire suppression system in the IP2 AFW Pump room.

The same guidance relative to reentry to the affected fire area has also been applied by Entergy in consideration of the credible fire scenarios in Fire Areas PAB-2{3} and PAB-2{5}, as discussed in Attachment 2 to Entergy letter NL-09-032, dated March 6, 2009 and Entergy letter NL-09-117 dated October 1, 2009.

The low combustible loading and minimal ignition sources in the fire zones of concern within Fire Areas PAB-2{3}, Fire Zone 6 and PAB-2{5}, Fire Zones 30A and 62A, and the minimal combustible loading and ignition sources in the adjoining zones of Fire Areas PAB-2{3} and PAB-2{5} provide reasonable assurance that reentry to the area after one hour following the postulated fire provides ample time for securing from the fire condition and allowing operators unencumbered access to the area. Note that none of the credited OMAs is reliant upon reentry to an affected fire area within one hour of initiation of the postulated fire event. Moreover, for those actions requiring reentry to the affected fire area after one hour has elapsed, the demonstrated time necessary to perform these actions is approximately 50% or less of the time available to complete the action. The affected OMAs are in Fire Areas PAB-2{3}, and PAB-2{5}, and are described in Tables RAI-08.1-5 and RAI-08.1-6, respectively.

**TABLES**

RAI-GEN-1 through RAI-GEN-23

Characteristics of Fire Areas

<b>TABLE RAI-GEN-1 CHARACTERISTICS OF FIRE AREA AFW-6 / FIRE ZONE 23</b>	
Fire Area / Description	AFW-6 / Auxiliary Boiler Feed Pump Room, Elevation 18'-6" of the Auxiliary Feed Pump Building
Fire Zone / Description	23 / Auxiliary Boiler Feed Pump Room, Elevation 18'-6"
Fire Zone Dimensions	1,254 sqft w/ 13 ft ceiling
App R III.G.2 Compliance	a) 3-hr barrier: No b) 20 ft separation: No c) 1-hour enclosure: No -- Detection: Yes -- Suppression: Yes
App R III.G.2 Exemptions	Yes – SER dated January 7, 1987
Fixed Combustible Materials	Cable, lube oil, electrical panels, incidental materials
Cable Insulation Quantity in BTU	2.2E+07 BTU
Total Fixed Combustible Loading / Fire Severity	17,950 BTU/sqft, / 13.5 minutes
Transient Combustible Materials	Lube oil, Solvent, Grease, Cleaning Materials, Wood
Transient Combustible Loading / Fire Severity	7400 BTU/sqft / 5.5 minute
Combustible Loading - Rating	Low (Fixed + Transient loads = < 100,000 BTU/sqft)
Ignition Sources	Cable run, Junction boxes, 2- Motors & Pumps, 1 - Electrical Cabinet

**TABLE RAI-GEN-1  
CHARACTERISTICS OF FIRE AREA AFW-6 / FIRE ZONE 23**

Detection Type / Coverage	Ionization / Area Wide
Code of Record	NFPA 72E-1974
Fixed Suppression Type	Wet Pipe Sprinkler / Area Wide
Code of Record	NFPA 13-1983
Manual Suppression Type	CO2 and DC (Dry Chemical) extinguishers
Adjacent Zone Manual Suppression	Yard hydrants
Additional FP Features	None
Administrative Controls	Transient Combustibles Control - Level 2 Area Control of Hot Work and Ignition Sources
Other Evaluations (i.e., 86-10)	Fire Barrier Analysis: Auxiliary Feedwater Building AFW-6 to Turbine Building TBL-5 (IP3-ANAL-FP-01052) Exterior Fire Area Boundary Analysis for the Auxiliary Feedwater Pump Room to the Yard Area (IP3-ANAL-FP-D1048)

**TABLE RAI-GEN-2  
CHARACTERISTICS OF ETN-4 / FIRE ZONE 60A**

Fire Area / Description	ETN-4 / Electrical Tunnels
Fire Zone / Description	60A / Upper Electrical Tunnel, Elevation 43'-0"
Fire Zone Dimensions	3,200 sqft w/ 10 ft ceiling
App R III.G.2 Compliance	a) 3-hr barrier: No b) 20 ft separation: No c) 1-hour enclosure: No -- Detection: Yes -- Suppression: Yes
App R III.G.2 Exemptions	Yes – SERs dated February 2, 1984, January 7, 1987, and September 28, 2007
Fixed Combustible Materials	Cable, Incidental materials
Cable Insulation Quantity in BTU	2.89E+08 BTU
Total Fixed Combustible Loading / Fire Severity	90,991 sqft / 68 minutes
Transient Combustible Materials	None
Transient Combustible Loading / Fire Severity	NA
Combustible Loading - Rating	Low (Fixed + Transient loads = < 100,000 BTU/sqft)
Ignition Sources	Cable run
Detection Type / Coverage	Ionization / Area Wide, Thermal Detection / In Cable Trays
Code of Record	NFPA 72E-1974
Fixed Suppression Type / Coverage	Dry Pipe Pre-action Sprinkler / In Cable Trays
Code of Record	NFPA 13-1978 and NFPA 15-1977

**TABLE RAI-GEN-2  
CHARACTERISTICS OF ETN-4 / FIRE ZONE 60A**

Manual Suppression Type	CO2 and DC extinguishers
Adjacent Zone Manual Suppression	CO2 and DC extinguishers
Additional FP Features	Conduit 1VA/JA (source range flux N31 instrumentation) is protected with fire barrier wrap from penetration H-20 in Fire Zone 73A through the upper electrical tunnel.
Administrative Controls	Transient Combustibles Control - Level 2 Area Control of Hot Work and Ignition Sources
Other Evaluations (i.e., 86-10)	The west wall separating Zone 60A from Fire Area CTL-3 is a controlled barrier constructed of 3/16 inch steel plate bolted on a steel channel frame with fireproofing applied to both sides. The barrier is credited as providing an adequate level of protection to withstand the hazards present.  The floor between Zones 60A and 7A has not been assigned a fire rating; however, it does provide an adequate level of protection given the fire hazards present and the electrical and mechanical penetrations of the barrier have been sealed to maintain a 3-hour fire rating.

**TABLE RAI-GEN-3  
CHARACTERISTICS OF ETN-4 / FIRE ZONE 73A**

Fire Area / Description	ETN-4 / Electrical Tunnels
Fire Zone / Description	73A / Upper Electrical Penetration Area, Elevation 46'-0"
Fire Zone Dimensions	1,350 sqft w/ 17 ft ceiling
App R III.G.2 Compliance	a) 3-hr barrier: No b) 20 ft separation: No c) 1-hour enclosure: No -- Detection: Yes -- Suppression: Yes
App R III.G.2 Exemptions	Yes – SERs dated February 2, 1984, January 7, 1987, and September 28, 2007
Fixed Combustible Materials	Cable, Incidental materials
Cable Insulation Quantity in BTU	1.72E+07 BTU
Total Fixed Combustible Loading / Fire Severity	127,239 BTU/sqft / 95 minutes
Transient Combustible Materials	None
Transient Combustible Loading / Fire Severity	NA
Combustible Loading - Rating	Moderate (Fixed + Transient loads = 100,000 - 200,000 BTU/sqft)
Ignition Sources	Cable run, Junction box, 12 - Electrical Cabinets, 1 - Transformer,
Detection Type / Coverage	Ionization / Area Wide, Thermal Detection / In Cable Trays
Code of Record	NFPA 72E-1974
Fixed Suppression Type / Coverage	Dry Pipe Pre-action Sprinkler / In Cable Trays

**TABLE RAI-GEN-3  
CHARACTERISTICS OF ETN-4 / FIRE ZONE 73A**

Code of Record	NFPA 13-1978 and NFPA 15-1977
Manual Suppression Type	CO2 and DC extinguishers
Adjacent Zone Manual Suppression	CO2 and DC extinguishers
Additional FP Features	Conduit 1VA/JA (source range flux N31 instrumentation) is protected with fire barrier wrap from the penetration box at penetration H-20 through the upper electrical tunnel FZ-60A. Cable trays 68J, 69J, 71J, 72J and part of 67J and 70J, and the cable bundles from penetrations H-28 and H-42 to the tray system are protected with a fire barrier wrap system (Channel IV instrumentation).
Administrative Controls	Transient Combustibles Control - Level 2 Area Control of Hot Work and Ignition Sources
Other Evaluations (i.e., 86-10)	The vertical stairwell separating Zones 73A and 74A is protected by a controlled barrier constructed of a 1/8 inch thick steel plate. The floor between Zones 73A and 74A has not been assigned a fire rating; however, it does provide an adequate level of protection given the fire hazards present and the electrical and mechanical penetrations of the barrier have been sealed to maintain a 3- hour fire rating.

**TABLE RAI-GEN-4  
CHARACTERISTICS OF PAB-2 / SSA FIRE/ANALYSIS AREA PAB-2{3 } / FIRE ZONE 5**

Fire Area / Description	PAB-2 / Primary Auxiliary Building
Fire Zone / Description	5 / Charging Pump Room 31, Elevation 55'-0"
Fire Zone Dimensions	288 sqft w/ 16 ft ceiling
App R III.G.2 Compliance	a) 3-hr barrier: No b) 20 ft separation: No c) 1-hour enclosure: No -- Detection: Yes -- Suppression: No
App R III.G.2 Exemptions	Yes – SER dated January 7, 1987
Fixed Combustible Materials	Cable, Lube Oil, Incidental materials
Cable Insulation Quantity in BTU	1.57E+06 BTU
Total Fixed Combustible Loading / Fire Severity	28,946 BTU/sqft / 22 minutes
Transient Combustible Materials	Lube oil, Solvent, Grease, Cleaning Materials, Wood, Anti-C's, Plastic
Transient Combustible Loading / Fire Severity	84,151 BTU/sqft / 63 minutes
Combustible Loading – Rating	Moderate (Fixed + Transient loads = 100,000 – 200,000 BTU/sqft)
Ignition Sources	Cable run, Junction Box, 1 - Electrical Cabinet, Motor & Pump
Detection Type / Coverage	Ionization / Area-wide
Code of Record	NFPA 72E-1974
Fixed Suppression Type / Coverage	None

**TABLE RAI-GEN-4  
CHARACTERISTICS OF PAB-2 / SSA FIRE/ANALYSIS AREA PAB-2{3 } / FIRE ZONE 5**

Code of Record	NA
Manual Suppression Type	None
Adjacent Zone Manual Suppression	Hose stations (water), CO2 extinguishers
Additional FP Features	None
Administrative Controls	Transient Combustibles Control - Level 2 Area Control of Hot Work and Ignition Sources
Other Evaluations (i.e., 86-10)	The boundaries of Fire Zone 5 are not fire rated; however, the east wall of the fire zone is a controlled barrier maintained to provide the necessary separation of redundant Charging Pumps 31, 32 and 33 given the hazards present

<b>TABLE RAI-GEN-5  CHARACTERISTICS OF PAB-2 / SSA FIRE/ANALYSIS AREA PAB-2{3} / FIRE ZONE 6</b>	
Fire Area / Description	PAB-2 / Primary Auxiliary Building
Fire Zone / Description	6 / Charging Pump Room 32, Elevation 55'-0"
Fire Zone Dimensions	288 sqft w/ 16 ft ceiling
App R III.G.2 Compliance	a) 3-hr barrier: No b) 20 ft separation: No c) 1-hour enclosure: No -- Detection: Yes -- Suppression: No
App R III.G.2 Exemptions	Yes – SER dated January 7, 1987
Fixed Combustible Materials	Cable, Lube Oil, Incidental materials
Cable Insulation Quantity in BTU	1.39E+06 BTU
Total Fixed Combustible Loading / Fire Severity	28,323 BTU/sqft / 21 minutes
Transient Combustible Materials	Lube oil, Solvent, Grease, Cleaning Materials, Wood, Anti-C's, Plastic
Transient Combustible Loading / Fire Severity	84,151 BTU/sqft / 63 minutes
Combustible Loading - Rating	Moderate (Fixed + Transient loads = 100,000 – 200,000 BTU/sqft)
Ignition Sources	Cable run, Junction Box, 1 - Electrical cabinet, Motor, Pump
Detection Type / Coverage	Ionization / Area-wide
Code of Record	NFPA 72E-1974
Fixed Suppression Type / Coverage	None

**TABLE RAI-GEN-5  
CHARACTERISTICS OF PAB-2 / SSA FIRE/ANALYSIS AREA PAB-2{3} / FIRE ZONE 6**

Code of Record	NA
Manual Suppression Type	None
Adjacent Zone Manual Suppression	Hose stations (water), CO2 extinguishers
Additional FP Features	None
Administrative Controls	Transient Combustibles Control - Level 2 Area Control of Hot Work and Ignition Sources
Other Evaluations (i.e., 86-10)	The boundaries of Fire Zone 5 are not fire rated; however, the east wall of the fire zone is a controlled barrier maintained to provide the necessary separation of redundant Charging Pumps 31, 32 and 33 given the hazards present.

**TABLE RAI-GEN-6  
CHARACTERISTICS OF PAB-2 / SSA FIRE/ANALYSIS AREA PAB-2{3} / FIRE ZONE 7**

Fire Area / Description	PAB-2 / Primary Auxiliary Building
Fire Zone / Description	7 / Charging Pump Room 33, Elevation 55'-0"
Fire Zone Dimensions	303 sqft w/ 16 ft ceiling
App R III.G.2 Compliance	a) 3-hr barrier: No b) 20 ft separation: No c) 1-hour enclosure: No -- Detection: Yes -- Suppression: No
App R III.G.2 Exemptions	Yes – SER dated January 7, 1987
Fixed Combustible Materials	Lube Oil, Incidental materials
Cable Insulation Quantity in BTU	None
Total Fixed Combustible Loading / Fire Severity	2.23E+04 BTU/sqft / 17 minutes
Transient Combustible Materials	Lube oil, Solvent, Grease, Cleaning Materials, Wood, Anti-C's, Plastic
Transient Combustible Loading / Fire Severity	79,985 BTU/sqft / 60 minutes
Combustible Loading - Rating	Moderate (Fixed + Transient loads = 100,000 – 200,000 BTU/sqft)
Ignition Sources	Junction Box, Motor, Pump
Detection Type / Coverage	Ionization / Area-wide
Code of Record	NFPA 72E-1974
Fixed Suppression Type / Coverage	None

**TABLE RAI-GEN-6**  
**CHARACTERISTICS OF PAB-2 / SSA FIRE/ANALYSIS AREA PAB-2{3} / FIRE ZONE 7**

Code of Record	NA
Manual Suppression Type	None
Adjacent Zone Manual Suppression	Hose stations (water). CO2 extinguishers
Additional FP Features	None
Administrative Controls	Transient Combustibles Control - Level 2 Area Control of Hot Work and Ignition Sources
Other Evaluations (i.e., 86-10)	The boundaries of Fire Zone 7 are not fire rated; however, the west wall of the fire zone is a controlled barrier maintained to provide the necessary separation of redundant Charging Pumps 31, 32 and 33 given the hazards present.

<b>TABLE RAI-GEN-7  CHARACTERISTICS OF PAB-2 / SSA FIRE/ANALYSIS AREA PAB-2{5 } / FIRE ZONE 4A</b>	
Fire Area / Description	PAB-2 / Primary Auxiliary Building
Fire Zone / Description	4A / Corridor at elevation 34'-0"
Fire Zone Dimensions	477 sqft w/ 17 ft ceiling
App R III.G.2 Compliance	a) 3-hr Barrier: No b) 20 ft Separation: No c) 1-hr Enclosure: No -- Detection: No -- Suppression: No
App R III.G.2 Exemptions	None
Fixed Combustible Materials	Cable, Incidental materials, Cellulose, Plastic
Cable Insulation Quantity in BTU	5.8E+06 BTU
Total Fixed Combustible Loading / Fire Severity	26,915 BTU/sqft / 20 minutes
Transient Combustible Materials	Lube oil, Cleaning materials, Plastic, Paper, Wood, Anti-Cs
Transient Combustible Loading / Fire Severity	89,000 BTU/sqft / 67 minutes
Combustible Loading – Rating	Moderate (Fixed + Transient loads = 100,000 – 200,000 BTU/sqft)
Ignition Sources	Cable run, Junction Box, 1 Transformer (dry), 16 Electrical Cabinets
Detection Type / Coverage	None
Code of Record	NA
Fixed Suppression Type / Coverage	None

**TABLE RAI-GEN-7  
CHARACTERISTICS OF PAB-2 / SSA FIRE/ANALYSIS AREA PAB-2{5 } / FIRE ZONE 4A**

Code of Record	NA
Manual Suppression Type	Hose station (water), DC extinguisher
Adjacent Zone Manual Suppression	None
Additional FP Features	None
Administrative Controls	Transient Combustibles Control - Level 2 Area Control of Hot Work and Ignition Sources Maximum Permissible Combustible Loading 240,000 BTU/sqft
Other Evaluations (i.e., 86-10)	None

<b>TABLE RAI-GEN-8  CHARACTERISTICS OF PAB-2 / SSA FIRE/ANALYSIS AREA PAB-2{5} / FIRE ZONE 18A</b>	
Fire Area / Description	PAB-2 / Primary Auxiliary Building
Fire Zone / Description	18A / Waste Gas Compressor Room, Elevation 55'-0"
Fire Zone Dimensions	250 sqft w/16 ft ceiling
App R III.G.2 Compliance	a) 3-hr barrier: No b) 20 ft separation: No c) 1-hour enclosure: No -- Detection: No -- Suppression: No
App R III.G.2 Exemptions	None
Fixed Combustible Materials	Cable, Incidental materials
Cable Insulation Quantity in BTU	6.74E+06 BTU
Total Fixed Combustible Loading / Fire Severity	27,363 BTU/sqft / 21 minutes
Transient Combustible Materials	Grease, Cleaning Materials, Anti-Cs, Plastic, Wood
Transient Combustible Loading / Fire Severity	59,800 BTU/sqft / 45 minutes
Combustible Loading - Rating	Low (Fixed + Transient loads = <100,000 BTU/sqft)
Ignition Sources	Compressor, Motor, Cable run, Junction Boxes
Detection Type / Coverage	None
Code of Record	NA

<b>TABLE RAI-GEN-8 CHARACTERISTICS OF PAB-2 / SSA FIRE/ANALYSIS AREA PAB-2{5} / FIRE ZONE 18A</b>	
Fixed Suppression Type / Coverage	None
Code of Record	NA
Manual Suppression Type	None
Adjacent Zone Manual Suppression	Hose station (water), CO2 & DC extinguishers
Additional FP Features	None
Administrative Controls	Transient Combustibles Control - Level 2 Area Control of Hot Work and Ignition Sources
Other Evaluations (i.e., 86-10)	None

<b>TABLE RAI-GEN-9  CHARACTERISTICS OF PAB-2 / SSA FIRE/ANALYSIS AREA PAB-2{5} / FIRE ZONE 19A</b>	
Fire Area / Description	PAB-2 / Primary Auxiliary Building
Fire Zone / Description	19A / Waste Evaporator Room, Elevation 55'-0"
Fire Zone Dimensions	602 sqft w/ 16 ft ceiling
App R III.G.2 Compliance	a) 3-hr barrier: No b) 20 ft separation: No c) 1-hour enclosure: No -- Detection: No -- Suppression: No
App R III.G.2 Exemptions	None
Fixed Combustible Materials	Cable, Incidental materials
Cable Insulation Quantity in BTU	5.58E+06 BTU
Total Fixed Combustible Loading / Fire Severity	9,666 BTU/sqft / 7 minutes
Transient Combustible Materials	Anti-C, Plastic, Wood
Transient Combustible Loading / Fire Severity	24,834 BTU/sqft / 19 minutes
Combustible Loading - Rating	Low (Fixed + Transient loads = <100,000 BTU/sqft)
Ignition Sources	Cable run, Junction Box, 19 - Electrical Cabinets, 2 - Transformers (dry)
Detection Type / Coverage	None
Code of Record	NA
Fixed Suppression Type / Coverage	None

**TABLE RAI-GEN-9**  
**CHARACTERISTICS OF PAB-2 / SSA FIRE/ANALYSIS AREA PAB-2{5} / FIRE ZONE 19A**

Code of Record	NA
Manual Suppression Type	None
Adjacent Zone Manual Suppression	Hose station (water), CO2 & DC extinguishers
Additional FP Features	None
Administrative Controls	Transient Combustibles Control - Level 2 Area Control of Hot Work and Ignition Sources
Other Evaluations (i.e., 86-10)	None

**TABLE RAI-GEN-10  
CHARACTERISTICS OF PAB-2 / SSA FIRE/ANALYSIS AREA PAB-2{5} / FIRE ZONE 27A**

Fire Area / Description	PAB-2 / Primary Auxiliary Building
Fire Zone / Description	27A / Elevation 73'-0" PAB Corridor
Fire Zone Dimensions	5,532 sqft w/ 15 ½ ft ceiling
App R III.G.2 Compliance	a) 3-hr barrier: No b) 20 ft separation: No c) 1-hour enclosure: No -- Detection: No -- Suppression: No
App R III.G.2 Exemptions	None
Fixed Combustible Materials	Cable, Incidental material, Cellulose, Plastic, Flammable Liquid Locker
Cable Insulation Quantity in BTU	7.4E+06 BTU
Total Fixed Combustible Loading / Fire Severity	8,095 BTU/sqft / 6 minutes
Transient Combustible Materials	Solvent, Cleaning materials, lube oil, grease, Wood, Plastic, Paper, Anti-Cs
Transient Combustible Loading / Fire Severity	12,092 BTU/sqft / 9 minutes
Combustible Loading - Rating	Low (Fixed + Transient loads = <100,000 BTU/sqft)
Ignition Sources	Cable run, Junction Boxes, 1 – Transformer, Water heater
Detection Type / Coverage	None
Code of Record	NA
Fixed Suppression Type / Coverage	None

**TABLE RAI-GEN-10**  
**CHARACTERISTICS OF PAB-2 / SSA FIRE/ANALYSIS AREA PAB-2{5} / FIRE ZONE 27A**

Code of Record	NA
Manual Suppression Type	Hose stations (water), CO2 extinguishers
Adjacent Zone Manual Suppression	None
Additional FP Features	None
Administrative Controls	Transient Combustibles Control - Level 2 Area Control of Hot Work and Ignition Sources
Other Evaluations (i.e., 86-10)	Fire Barrier Analysis: Primary Auxiliary Building to Radioactive Machine Shop (IP3-ANAL-FP-01047)

**TABLE RAI-GEN-11  
CHARACTERISTICS OF PAB-2 / SSA FIRE/ANALYSIS AREA PAB-2{5} / FIRE ZONE 30A**

Fire Area / Description	PAB-2 / Primary Auxiliary Building
Fire Zone / Description	30A / Valve Corridor, Elevation 73'-0"
Fire Zone Dimensions	171 sqft w/ 17 ft ceiling
App R III.G.2 Compliance	a) 3-hr barrier: No b) 20 ft separation: No c) 1-hour enclosure: No -- Detection: No -- Suppression: No
App R III.G.2 Exemptions	None
Fixed Combustible Materials	Cable, Incidental materials
Cable Insulation Quantity in BTU	3.74E+05 BTU
Total Fixed Combustible Loading / Fire Severity	2,591 BTU/sqft / 2 minutes
Transient Combustible Materials	Lube oil, Solvent, Grease, Cleaning materials, Wood, Anti-Cs, Plastic
Transient Combustible Loading / Fire Severity	141,728 BTU/sqft / 106 minutes
Combustible Loading - Rating	Moderate (Fixed + Transient loads = 100,000 – 200,000 BTU/sqft)
Ignition Sources	Cable run
Detection Type / Coverage	None
Code of Record	NA
Fixed Suppression Type / Coverage	None

**TABLE RAI-GEN-11**  
**CHARACTERISTICS OF PAB-2 / SSA FIRE/ANALYSIS AREA PAB-2{5} / FIRE ZONE 30A**

Code of Record	NA
Manual Suppression Type	None
Adjacent Zone Manual Suppression	Hose station (water), CO2 & DC extinguishers
Additional FP Features	None
Administrative Controls	Transient Combustibles Control - Level 2 Area Control of Hot Work and Ignition Sources
Other Evaluations (i.e., 86-10)	None

**TABLE RAI-GEN-12  
CHARACTERISTICS OF PAB-2 / SSA FIRE/ANALYSIS AREA PAB-2{5} / FIRE ZONE 58A**

Fire Area / Description	PAB-2 / Primary Auxiliary Building
Fire Zone / Description	58A / Piping Tunnel, Elevation 41'-0"
Fire Zone Dimensions	1400 sqft w/ 10 to 12 ft ceiling
App R III.G.2 Compliance	a) 3-hr barrier: No b) 20 ft separation: No c) 1-hour enclosure: No -- Detection: Yes -- Suppression: No
App R III.G.2 Exemptions	Yes – SER dated January 7, 1987 (FZ-1 & 58A CCW Pump Area)
Fixed Combustible Materials	Cable, Incidental materials
Cable Insulation Quantity in BTU	4.31E+06 BTU
Total Fixed Combustible Loading / Fire Severity	3,477 BTU/sqft / 3 minutes
Transient Combustible Materials	Lube oil, Solvent, Grease, Cleaning materials, Wood, Anti-Cs, Plastic
Transient Combustible Loading / Fire Severity	17,311 BTU/sqft / 13 minutes
Combustible Loading - Rating	Low (Fixed + Transient loads = <100,000 BTU/sqft)
Ignition Sources	Cable run
Detection Type / Coverage	Ionization / Area wide
Code of Record	NFPA 72E-1974
Fixed Suppression Type / Coverage	None

**TABLE RAI-GEN-12**  
**CHARACTERISTICS OF PAB-2 / SSA FIRE/ANALYSIS AREA PAB-2{5} / FIRE ZONE 58A**

Code of Record	NA
Manual Suppression Type	None
Adjacent Zone Manual Suppression	Hose stations (water), CO2, DC extinguishers
Additional FP Features	None
Administrative Controls	Transient Combustibles Control - Level 2 Area Control of Hot Work and Ignition Sources
Other Evaluations (i.e., 86-10)	None

**TABLE RAI-GEN-13  
CHARACTERISTICS OF PAB-2 / SSA FIRE/ANALYSIS AREA PAB-2{5} / FIRE ZONE 59A**

Fire Area / Description	PAB-2 / Primary Auxiliary Building
Fire Zone / Description	59A / Pipe Penetration Area, Elevations 41'-0" and 51'-0" of the Fan House
Fire Zone Dimensions	3782 sqft w/ 8 to 26 ft ceiling
App R III.G.2 Compliance	a) 3-hr barrier: No b) 20 ft separation: No c) 1-hour enclosure: No -- Detection: Yes -- Suppression: No
App R III.G.2 Exemptions	None
Fixed Combustible Materials	Cable, Incidental materials
Cable Insulation Quantity in BTU	1.07E+07 BTU
Total Fixed Combustible Loading / Fire Severity	3,223 BTU/sqft / 2 minutes
Transient Combustible Materials	Grease, Cleaning materials, Anti-Cs, Plastic, Wood
Transient Combustible Loading / Fire Severity	3,967 BTU/sqft / 3 minutes
Combustible Loading - Rating	Low (Fixed + Transient loads = <100,000 BTU/sqft)
Ignition Sources	Cable run, Junction box
Detection Type / Coverage	Ionization / Area wide
Code of Record	NFPA 72E-1974
Fixed Suppression Type / Coverage	None

**TABLE RAI-GEN-13**  
**CHARACTERISTICS OF PAB-2 / SSA FIRE/ANALYSIS AREA PAB-2{5} / FIRE ZONE 59A**

Code of Record	NA
Manual Suppression Type	Hose stations (water), CO2 extinguishers
Adjacent Zone Manual Suppression	None
Additional FP Features	None
Administrative Controls	Transient Combustibles Control - Level 2 Area Control of Hot Work and Ignition Sources
Other Evaluations (i.e., 86-10)	None

**TABLE RAI-GEN-14  
CHARACTERISTICS OF PAB-2 / SSA FIRE/ANALYSIS AREA PAB-2(5) / FIRE ZONE 62A**

Fire Area / Description	PAB-2 / Primary Auxiliary Building
Fire Zone / Description	62A / Pipe Tunnel, Elevation 35'-0" of the Fan House
Fire Zone Dimensions	792 sqft w/ 8 -14 ft ceiling
App R III.G.2 Compliance	a) 3-hr barrier: No b) 20 ft separation: No c) 1-hour enclosure: No -- Detection: No -- Suppression: No
App R III.G.2 Exemptions	None
Fixed Combustible Materials	Cable, Incidental materials
Cable Insulation Quantity in BTU	7.35E+05 BTU
Total Fixed Combustible Loading / Fire Severity	1,328 BTU/sqft / 1 minutes
Transient Combustible Materials	Grease, Cleaning materials, Anti-Cs, Plastic, Wood
Transient Combustible Loading / Fire Severity	18,944 BTU/sqft / 14 minutes
Combustible Loading - Rating	Low (Fixed + Transient loads = <100,000 BTU/sqft)
Ignition Sources	Cable run
Detection Type / Coverage	None
Code of Record	NA
Fixed Suppression Type / Coverage	None

**TABLE RAI-GEN-14**  
**CHARACTERISTICS OF PAB-2 / SSA FIRE/ANALYSIS AREA PAB-2{5} / FIRE ZONE 62A**

Code of Record	NA
Manual Suppression Type	DC extinguisher
Adjacent Zone Manual Suppression	None
Additional FP Features	None
Administrative Controls	Transient Combustibles Control - Level 2 Area Control of Hot Work and Ignition Sources
Other Evaluations (i.e., 86-10)	None

**TABLE RAI-GEN-15  
CHARACTERISTICS OF TBL-5 / FIRE ZONE 37A**

Fire Area / Description	TBL-5 / Turbine Building
Fire Zone / Description	37A / Ground Floor South, elevation 15'-0"
Fire Zone Dimensions	5,838 sqft w/ 119 ft ceiling
App R III.G.2 Compliance	a) 3-hr barrier: No b) 20 ft separation: No c) 1-hour enclosure: No -- Detection: Yes (Partial) -- Suppression: Yes (Full area sprinkler)
App R III.G.2 Exemptions	None
Fixed Combustible Materials	Cable, Incidental material, MCC-Switchgear, Cellulose, Plastic, Lube oil, Flammable Liquid Cab
Cable Insulation Quantity in BTU	1.99E+08 BTU
Total Fixed Combustible Loading / Fire Severity	70,064 BTU/sqft / 53 minutes
Transient Combustible Materials	None
Transient Combustible Loading / Fire Severity	NA
Combustible Loading – Rating	Low (Fixed + Transient loads = <100,000 BTU/sqft)
Ignition Sources	Cable run, Junction Box, Battery & Charger, 12 - Electrical Cabinet, 4 - Transformer, 33; 6.9 KV Switchgear vertical panels (HEAF potential source), 7 - MCC vertical panels, 1 - Dryer
Detection Type / Coverage	Ionization detectors over MCC 34 and 6.9 KV switchgear Thermal detection in battery and charger room
Code of Record	NFPA 72E-1974

<b>TABLE RAI-GEN-15 CHARACTERISTICS OF TBL-5 / FIRE ZONE 37A</b>	
Fixed Suppression Type / Coverage	Wet pipe sprinkler system, area wide except over switchgear Wet pipe sprinkler system area wide, battery and charger room Water spray curtain separating TBL-5 and transformer yard
Code of Record	Wet pipe sprinkler - NFPA 13-1983 Water spray curtain – NFPA 15-1977
Manual Suppression Type	Hose stations (water and foam), CO2 and DC extinguishers
Adjacent Zone Manual Suppression	Hose stations (water and foam), CO2 and DC extinguishers
Additional FP Features	None
Administrative Controls	Control of Hot Work and Ignition Sources
Other Evaluations (i.e., 86-10)	Evaluation of Fire Doors in Accordance with Generic Letter 86-10 (IP3-ANAL-FP-01050) Fire Barrier Analysis: Fire Door Nos. 201, 203 and 205 Separating the Turbine Building from the Control Building (IP3-ANAL-FP-01264) Fire Damper Assembly Analysis: Fire Dampers 4 and 9 Separating the Control Building from the Electrical Tunnel and the Turbine Building (IP3-ANAL-FP-01325)

<b>TABLE RAI-GEN-16 CHARACTERISTICS OF TBL-5 / FIRE ZONE 38A</b>	
Fire Area / Description	TBL-5 / Turbine Building
Fire Zone / Description	38A / Chemical Laboratory, elevation 15"
Fire Zone Dimensions	4,500 sqft w/ 8 ft ceiling
App R III.G.2 Compliance	a) 3-hr barrier: No b) 20 ft separation: No c) 1-hour enclosure: No -- Detection: Yes (Partial) -- Suppression: Yes (Full area sprinkler)
App R III.G.2 Exemptions	None
Fixed Combustible Materials	Cable, Cellulose, Plastic, Flammable Liquid Cab, Hydrogen, Chemicals, Incidental materials, MCC
Cable Insulation Quantity in BTU	3.23E+07 BTU
Total Fixed Combustible Loading / Fire Severity	19,639 BTU/sqft / 15 minutes
Transient Combustible Materials	None
Transient Combustible Loading / Fire Severity	NA
Combustible Loading – Rating	Low (Fixed + Transient loads = <100,000 BTU/sqft)
Ignition Sources	1 - Electrical Cabinet, MCC
Detection Type / Coverage	Ionization detector / Over MCC 32
Code of Record	NFPA 72E-1974

**TABLE RAI-GEN-16  
CHARACTERISTICS OF TBL-5 / FIRE ZONE 38A**

Fixed Suppression Type / Coverage	Wet pipe sprinkler system in chemical storage area
Code of Record	NFPA 13-1983
Manual Suppression Type	Hose stations (water and foam), CO2 and DC extinguishers
Adjacent Zone Manual Suppression	Hose stations (water and foam), CO2 and DC extinguishers
Additional FP Features	None
Administrative Controls	Control of Hot Work and Ignition Sources
Other Evaluations (i.e., 86-10)	None

<b>TABLE RAI-GEN-17 CHARACTERISTICS OF TBL-5 / FIRE ZONE 43A</b>	
Fire Area / Description	TBL-5 / Turbine Building
Fire Zone / Description	43A / South end. elevation 36'-9"
Fire Zone Dimensions	7,725 sqft w/ 97 ft ceiling
App R III.G.2 Compliance	a) 3-hr barrier: No b) 20 ft separation: No c) 1-hour enclosure: No -- Detection: No -- Suppression: Yes (Full area sprinkler)
App R III.G.2 Exemptions	None
Fixed Combustible Materials	Plastic, Wood, Paper, Rubber, Cable, Incidental materials, MCC - Switchgear
Cable Insulation Quantity in BTU	1.63E+08 BTU
Total Fixed Combustible Loading / Fire Severity	42,758 BTU/sqft / 32 minutes
Transient Combustible Materials	Lube oil, Solvent, Grease, Cleaning Material, Wood
Transient Combustible Loading / Fire Severity	1,202 BTU/sqft / 1 minutes
Combustible Loading – Rating	Low (Fixed + Transient loads = <100,000 BTU/sqft)
Ignition Sources	Cable run, Junction boxes, Exciter Switchgear, 2 – Transformer, 10 – Electrical Cabinets
Detection Type / Coverage	None
Code of Record	NA
Fixed Suppression Type / Coverage	Wet pipe sprinkler system / Area Wide

**TABLE RAI-GEN-17  
CHARACTERISTICS OF TBL-5 / FIRE ZONE 43A**

<i>Code of Record</i>	NFPA 13-1983
<i>Manual Suppression Type</i>	Hose stations (water), CO2, pressurized water, and Halon extinguishers
<i>Adjacent Zone Manual Suppression</i>	Hose stations (water and foam), CO2 and DC extinguishers
<i>Additional FP Features</i>	None
<i>Administrative Controls</i>	Control of Hot Work and Ignition Sources
<i>Other Evaluations (i.e., 86-10)</i>	<p>Evaluation of Fire Doors in Accordance with Generic Letter 86-10 (IP3-ANAL-FP-01050)</p> <p>Evaluation of Supports Penetrating Barriers between Turbine Building and Cable Spreading Room and between Cable Spreading Room and Electrical Tunnels (IP3-ANAL-FP-01053)</p> <p>Fire Door Assembly Analysis: Cable Spreading Room to Turbine Building (IP3-ANAL-FP-01051)</p> <p>Fire Barrier Analysis: Fire Door Nos. 201, 203 and 205 Separating the Turbine Building from the Control Building (IP3-ANAL-FP-01264)</p>

**TABLE RAI-GEN-18  
CHARACTERISTICS OF TBL-5 / FIRE ZONE 44A**

Fire Area / Description	TBL-5 / Turbine Building
Fire Zone / Description	44A / South End of Heater Bay, elevation 36'-9"
Fire Zone Dimensions	5,625 sqft w/ 29 ft ceiling
App R III.G.2 Compliance	a) 3-hr Barrier: No b) 20 ft Separation: No c) 1-hr Enclosure: No -- Detection: No -- Suppression: No
App R III.G.2 Exemptions	None
Fixed Combustible Materials	Cable, Incidental materials, Flammable Liquid Cab, Cellulose, Plastic, Wood, Rubber
Cable Insulation Quantity in BTU	8.41E+06 BTU
Total Fixed Combustible Loading / Fire Severity	15,512 BTU/sqft / 12 minutes
Transient Combustible Materials	Lube oil, Solvent, Grease, Cleaning materials, Wood
Transient Combustible Loading / Fire Severity	1,651 BTU/sqft / 1 minute
Combustible Loading – Rating	Low (Fixed + Transient loads = <100,000 BTU/sqft)
Ignition Sources	Cable run, Junction boxes, 3-Electrical Cabinets, 1-Transformer (dry)
Detection Type / Coverage	None
Code of Record	NA

**TABLE RAI-GEN-18  
CHARACTERISTICS OF TBL-5 / FIRE ZONE 44A**

Fixed Suppression Type / Coverage	None
Code of Record	NA
Manual Suppression Type	Pressurized water and CO2 Extinguishers
Adjacent Zone Manual Suppression	Hose stations (water), Pressurized water, Halon extinguishers
Additional FP Features	None
Administrative Controls	Control of Hot Work and Ignition Sources
Other Evaluations (i.e., 86-10)	None

**TABLE RAI-GEN-19  
CHARACTERISTICS OF TBL-5 / FIRE ZONE 52A**

Fire Area / Description	TBL-5 / Turbine Building
Fire Zone / Description	52A / Chemical Addition Area, elevation 32'-6" of AFW Bldg
Fire Zone Dimensions	1,254 sqft w/ 8 ½ ft ceiling
App R III.G.2 Compliance	a) 3-hr barrier: No b) 20 ft separation: No c) 1-hour enclosure: No -- Detection: No -- Suppression: No
App R III.G.2 Exemptions	None
Fixed Combustible Materials	Cable, Cellulose barrels, Rubber hose
Cable Insulation Quantity in BTU	4.47E+06 BTU
Total Fixed Combustible Loading / Fire Severity	6,161 BTU/sqft / 5 minutes
Transient Combustible Materials	Lube oil, Solvent, Grease, Cleaning Material, Wood
Transient Combustible Loading / Fire Severity	7,405 BTU/sqft / 6 minutes
Combustible Loading – Rating	Low (Fixed + Transient loads = <100,000 BTU/sqft)
Ignition Sources	2 – Motors & Compressors, Water heater
Detection Type / Coverage	None
Code of Record	NA
Fixed Suppression Type / Coverage	None

**TABLE RAI-GEN-19  
CHARACTERISTICS OF TBL-5 / FIRE ZONE 52A**

Code of Record	NA
Manual Suppression Type	DC extinguisher
Adjacent Zone Manual Suppression	None
Additional FP Features	None
Administrative Controls	Control of Hot Work and Ignition Sources
Other Evaluations (i.e., 86-10)	None

**TABLE RAI-GEN-20  
CHARACTERISTICS OF TBL-5 / FIRE ZONE 54A**

Fire Area / Description	TBL-5 / Turbine Building
Fire Zone / Description	Main Boiler Feedwater Regulator Area, elevation 18'-6" AFW Bldg
Fire Zone Dimensions	1,088 sqft w/ 70 ft ceiling
App R III.G.2 Compliance	a) 3-hr barrier: No b) 20 ft separation: No c) 1-hour enclosure: No -- Detection: No -- Suppression: No
App R III.G.2 Exemptions	None
Fixed Combustible Materials	Cable, Incidental material, Flammable Liquid Cab
Cable Insulation Quantity in BTU	1.61E+06 BTU
Total Fixed Combustible Loading / Fire Severity	9,851 BTU/sqft / 7 minutes
Transient Combustible Materials	Lube oil, Solvent, Grease, Cleaning Material, Wood
Transient Combustible Loading / Fire Severity	8,534 BTU/sqft / 6 minutes
Combustible Loading – Rating	Low (Fixed + Transient loads = <100,000 BTU/sqft)
Ignition Sources	Cable run, Junction boxes, 1-Electrical Cabinet, 4 – MOV Motors
Detection Type / Coverage	None
Code of Record	NA
Fixed Suppression Type / Coverage	None

**TABLE RAI-GEN-20  
CHARACTERISTICS OF TBL-5 / FIRE ZONE 54A**

Code of Record	NA
Manual Suppression Type	Hose station (water)
Adjacent Zone Manual Suppression	CO2 and DC extinguisher
Additional FP Features	None
Administrative Controls	Control of Hot Work and Ignition Sources
Other Evaluations (i.e., 86-10)	Fire Barrier Analysis: Auxiliary Boiler Feedwater Area AFW-6 to Turbine Building TBL-5 (IP3-ANAL-FP-01052)

**TABLE RAI-GEN-21  
CHARACTERISTICS OF TBL-5 / FIRE ZONE 57A**

Fire Area / Description	TBL-5 / Turbine Building
Fire Zone / Description	57A / Main Steam and Feedwater Valve Area, elevation 43'-0" AFW Bldg
Fire Zone Dimensions	1254 sqft w/ 45 ft ceiling
App R III.G.2 Compliance	a) 3-hr barrier: No b) 20 ft separation: No c) 1-hour enclosure: No -- Detection: Partial-coverage; detectors to actuate suppression system only -- Suppression: Water spray curtain for separation from adjacent Fire Area TBL-5
App R III.G.2 Exemptions	None
Fixed Combustible Materials	Cable, Incidental material
Cable Insulation Quantity in BTU	5.24E+07 BTU
Total Fixed Combustible Loading / Fire Severity	42,187 BTU/sqft / 32 minutes
Transient Combustible Materials	Lube oil, Solvent, Grease, Cleaning Material, Wood
Transient Combustible Loading / Fire Severity	7,405 BTU/sqft / 6 minutes
Combustible Loading – Rating	Low (Fixed + Transient loads = <100,000 BTU/sqft)
Ignition Sources	Cable run, Junction boxes, 2 - Electrical Cabinets, 2 – MCC vertical panels, 1 - Transformer
Detection Type / Coverage	Local thermal detectors to actuate water spray curtain
Code of Record	NFPA 72E-1974

**TABLE RAI-GEN-21  
CHARACTERISTICS OF TBL-5 / FIRE ZONE 57A**

Fixed Suppression Type / Coverage	Water spray curtain separates Turbine Building (Fire Zone 51A) from Auxiliary Boiler Feed Pump Building at pipe bridge
Code of Record	NFPA 15-1977
Manual Suppression Type	DC extinguisher
Adjacent Zone Manual Suppression	None
Additional FP Features	None
Administrative Controls	Control of Hot Work and Ignition Sources
Other Evaluations (i.e., 86-10)	None

**TABLE RAI-GEN-22  
CHARACTERISTICS OF YARD-7 / FIRE ZONE 22**

Fire Area / Description	YARD-7 / Exterior Yard
Fire Zone / Description	22 / Screenwell Area
Fire Zone Dimensions	784 sqft (outside)
App R III.G.2 Compliance	a) 3-hr barrier: No b) 20 ft separation: No c) 1-hour enclosure: No -- Detection: Yes -- Suppression: No
App R III.G.2 Exemptions	Yes – SER dated January 7, 1987
Fixed Combustible Materials	Cable, MCC – Switchgear, Plastic, Incidental materials
Cable Insulation Quantity in BTU	1.68E+07 BTU
Total Fixed Combustible Loading / Fire Severity	23,253 BTU/sqft / 17 minutes
Transient Combustible Materials	Grease, Cleaning materials, Solvent, Lube oil, Wood
Transient Combustible Loading / Fire Severity	12,499 BTU/sqft / 9 minutes
Combustible Loading – Rating	Low (Fixed + Transient loads = <100,000 BTU/sqft)
Ignition Sources	Cable run, Junction box, 1 - Transformer, 6 Motors & Pumps, 1 - Electrical Cabinet
Detection Type / Coverage	Photoelectric Detection / Area-wide
Code of Record	NFPA 72E-1987
Fixed Suppression Type / Coverage	None

**TABLE RAI-GEN-22  
CHARACTERISTICS OF YARD-7 / FIRE ZONE 22**

Code of Record	NA
Manual Suppression Type	DC Extinguisher
Adjacent Zone Manual Suppression	Yard Hydrants
Additional FP Features	None
Administrative Controls	Control of Hot Work and Ignition Sources
Other Evaluations (i.e., 86-10)	None

<b>TABLE RAI-GEN-23 CHARACTERISTICS OF YARD-7 / FIRE ZONE 222</b>	
Fire Area / Description	YARD-7 / Exterior Yard
Fire Zone / Description	222 / Backup Service Water Pit
Fire Zone Dimensions	Outside open area
App R III.G.2 Compliance	a) 3-hr barrier: No b) 20 ft separation: No c) 1-hour enclosure: No -- Detection: No -- Suppression: No
App R III.G.2 Exemptions	None
Fixed Combustible Materials	Cable
Cable Insulation Quantity in BTU	1.69E+06 BTU
Total Fixed Combustible Loading / Fire Severity	NA
Transient Combustible Materials	None
Transient Combustible Loading / Fire Severity	None
Combustible Loading – Rating	NA
Ignition Sources	3 – Motor & Pump
Detection Type / Coverage	None
Code of Record	NA
Fixed Suppression Type / Coverage	None

**TABLE RAI-GEN-23  
CHARACTERISTICS OF YARD-7 / FIRE ZONE 222**

Code of Record	NA
Manual Suppression Type	None
Adjacent Zone Manual Suppression	Yard hydrants
Additional FP Features	None
Administrative Controls	Control of Hot Work and Ignition Sources
Other Evaluations (i.e., 86-10)	None