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10 CFR 50.12

RA-10-026

April 2, 2010

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

Oyster Creek Nuclear Generating Station
Renewed Facility Operating License No. DPR-16
NRC Docket No. 50-219

Subject: Response to Request for Additional Information
Request for Exemption from 10 CFR 50, Appendix R,
Section III.G, "Fire Protection of Safe Shutdown Capability"

References:

1. Letter from P. B. Cowan, Exelon Generation Company, LLC, to U.S. Nuclear Regulatory Commission, "Request for Exemption from 10 CFR 50, Appendix R, Section III.G, 'Fire Protection of Safe Shutdown Capability'," dated March 3, 2009.

2. Letter from P. B. Cowan, Exelon Generation Company, LLC, to U.S. Nuclear Regulatory Commission, "Request for Exemption from 10 CFR 50, Appendix R, Section III.G, 'Fire Protection of Safe Shutdown Capability'," dated March 4, 2009.

3. Letter from G. E. Miller, U.S. Nuclear Regulatory Commission, to C. G. Pardee, Exelon Generation Company, LLC, "Oyster Creek Nuclear Generating Station - Request for Additional Information Regarding Requested Exemptions to Fire Protection Requirements in 10 CFR 50, Appendix R (TAC Nos. ME0756 and ME0780)," dated January 7, 2010.

4. Regulatory Guide 1.189, Revision 2, "Fire Protection for Nuclear Power Plants," dated October 2009.

5. NEI 00-01, "Guidance for Post-Fire Safe-Shutdown Circuit Analysis," Revision 2, Nuclear Energy Institute, Washington, DC, May 2009.

In References 1 and 2, Exelon Generation Company, LLC (Exelon) submitted requests for exemption from the provisions of 10 CFR 50, Appendix R, Section III.G, "Fire Protection of Safe Shutdown Capability," for the use of operator manual actions (OMAs) for Oyster Creek Nuclear Generating Station (OCNGS), in lieu of the requirements specified in Section III.G.2. The NRC reviewed the exemption requests and identified the need for additional information in order to complete their evaluation of the exemption requests. Draft questions were sent to Exelon to ensure that the questions were understandable, the regulatory basis for the questions was clear, and to determine if the information was previously docketed. On December 18, 2009, a teleconference was held between the NRC and Exelon to further discuss the additional information requested by the NRC. In Reference 3, the NRC formally issued the request for

additional information (RAI). Attachment 1 to this letter provides a restatement of the questions along with Exelon's responses. Attachments 2, 4, 5, and 6 provide supporting information.

Subsequent to the Reference 1 and Reference 2 exemption requests, the NRC issued regulatory guidance clarifying when an exemption from Appendix R, Section III.G.2 is required. Specifically, in October 2009, Regulatory Guide (RG) 1.189, Revision 2 (Reference 4) was issued. RG 1.189, Rev. 2 provides guidance relative to equipment on the hot shutdown success path (i.e., equipment required to achieve and maintain hot shutdown), versus equipment that is important to safe shutdown. The RG states that OMAs may be credited with mitigating fire-induced operation or maloperation of components that are not part of the protected success path. Furthermore, the RG endorses Appendix H of NEI 00-01, Rev. 2 (Reference 5), which contains additional guidance. Based on this guidance, Exelon has re-evaluated the OMAs that were the subject of the original exemption requests and determined that a number of the OMAs are credited with mitigating fire-induced operation or maloperation of components that are not part of the protected success path, and as a result, are not within the scope of Appendix R, Section III.G.2. Therefore, Exelon hereby withdraws these OMAs from the exemption requests. The specific OMAs being withdrawn and the reasons for their withdrawal are indicated in Attachment 3 to this letter. As a result, the responses to the RAI questions address the OMAs remaining in the exemption requests.

Exelon has determined that the information provided in response to the RAI does not impact the conclusions of the original exemption requests as stated in References 1 and 2.

This response to the request for additional information contains no regulatory commitments.

If you have any questions or require additional information, please contact Glenn Stewart at 610-765-5529.

Respectfully,

/s/ Pamela B. Cowan

Pamela B. Cowan
Director, Licensing and Regulatory Affairs
Exelon Generation Company, LLC

Attachment 1: Response to Request for Additional Information
Attachment 2: Supporting Fire Hazards Analysis for OMA Initiating Fire Areas/Zones
Attachment 3: Withdrawal of Certain Operator Manual Actions from the Exemption Requests
Attachment 4: Tabulation of Ignition Sources for Each Fire Area/Zone
Attachment 5: RAI-08 and RAI-17 Response Supporting Information
Attachment 6: RAI-09 Response Supporting Information

| | | |
|---|---|---|
| cc: | Regional Administrator - NRC Region I | w/attachments |
| | NRC Senior Resident Inspector – OCNGS | " |
| | NRC Project Manager, NRR – OCNGS | " |
| | Director, Bureau of Nuclear Engineering, New Jersey Department of Environmental Protection | " |
| | Mayor of Lacey Township, Forked River, New Jersey | " |

**RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION**
**10 CFR 50, APPENDIX R, SECTION III.G.2 EXEMPTION REQUEST**

In References 1 and 2, Exelon Generation Company, LLC (Exelon) submitted requests for exemption from the provisions of 10 CFR 50, Appendix R, Section III.G, “Fire Protection of Safe Shutdown Capability," for the use of operator manual actions (OMAs) for Oyster Creek Nuclear Generating Station (OCNGS), in lieu of the requirements specified in Section III.G.2. The NRC reviewed the exemption requests and identified the need for additional information in order to complete their evaluation of the exemption requests. Draft questions were sent to Exelon to ensure that the questions were understandable, the regulatory basis for the questions was clear, and to determine if the information was previously docketed. On December 18, 2009, a teleconference was held between the NRC and Exelon to further discuss the additional information requested by the NRC. In Reference 3, the NRC formally issued the request for additional information. The attachment to this letter provides a restatement of the questions along with Exelon's responses (RAI). The questions are restated below along with Exelon's responses. Since a number of the OMAs are being withdrawn from the exemption requests (see Attachment 3), the responses to the RAIs below are applicable only to those OMAs remaining in the exemption requests.

**RAI-01 Circumstances for Review**
Section II of the submittal Attachments contains background information on the proposed OMAs but does not contain a technical justification for the application of special circumstances in accordance with 10 CFR 50.12. Since, according to Section II, it is the licensee's position that the protective measures prescribed by III.G.2 represent an unwarranted burden on Exelon and are not necessary to meet the underlying purpose of the rule, provide the relevant details to support this position in response to RAI-01.1 and RAI-01.2 below. The response should demonstrate that defense-in-depth is provided such that operators are able to safely and reliably achieve and maintain safe shutdown capability. Note that it is the NRC staff's position that OMAs alone, regardless of their feasibility and reliability, do not meet the underlying purpose of the rule without specific consideration of the overall concept of defense-in-depth that is being applied in a particular fire area.

RAI-01.1: Provide a technical justification of how the proposed arrangement achieves the underlying purpose of the rule.

**RESPONSE**

Appendix R, Section III.G.2 requires the following, in part:

> Except as provided for in paragraph G.3 of this section, where cables or equipment, including associated non-safety circuits that could prevent operation or cause maloperation due to hot shorts, open circuits, or shorts to ground, of redundant trains of systems necessary to achieve and maintain hot shutdown conditions are located within the same fire area outside of primary containment, one of the following means of ensuring that one of the redundant trains is free of fire damage shall be provided:
>
> a. Separation of cables and equipment and associated non-safety circuits of redundant trains by a fire barrier having a three-hour rating. Structural steel forming a part of or supporting such fire barriers shall be protected to provide fire resistance equivalent to that required of the barrier;

b. Separation of cables and equipment and associated non-safety circuits of redundant trains by a horizontal distance of more than 20 feet with no intervening combustible or fire hazards. In addition, fire detectors and an automatic fire suppression system shall be installed in the fire area; or

c. Enclosure of cable and equipment and associated non-safety circuits of one redundant train in a fire barrier having a one-hour rating, In addition, fire detectors and an automatic fire suppression system shall be installed in the fire area.

The underlying purpose of the rule is to accomplish safe shutdown in the event of a fire and maintain the plant in a safe shutdown condition. The OMAs in this exemption request are required because not all required fire protection (e.g., fire barrier, fire wrap, etc.) and/or suppression requirements in Appendix R, Section III.G.2 are met nor are they practical or deemed necessary to achieve the underlying purpose of the rule.

As indicated in Reference 1, each Phase 1 OMA was evaluated against the feasibility criteria listed in the March 6, 2003 revision of NRC Inspection Procedure 71111.05, "Fire Protection." As indicated in Reference 2, each Phase 2 OMA was evaluated against the feasibility and reliability criteria provided in NUREG-1852, "Demonstrating the Feasibility and Reliability of Operator Manual Actions in Response to Fire." Exelon's evaluations concluded that OMAs required for achieving and maintaining hot shutdown conditions are feasible, or feasible and reliable, and not impacted by environmental conditions associated with fires in Appendix R, Section III.G.2 areas. In addition, the equipment needed to implement OMAs remains available and the fire areas remain accessible during or following the event. The OMAs are directed by plant procedures, and the operators are trained in the use of the procedures. The evaluation also concluded that staffing is adequate to perform the OMAs.

Walkdowns and demonstrations have shown that adequate time is available to perform the OMAs, and that time margin is available to account for uncertainties that may arise during a fire event. Moreover, most of the initiating fire areas/zones have low combustible loading with administrative limits that maintain the low loading. The remaining initiating fire areas/zones that have a moderate or high loading due to lubricating oils, transformer liquid, etc. are provided with fixed automatic detection and fire suppression systems for rapid suppression and detection of an initiating fire. The OMAs covered by the exemption requests are similar to activities performed by plant operators as part of their normal work assignments, and as a result, are straightforward.

OCNGS adheres to the principles of fire protection defense-in-depth. The principles of fire protection defense-in-depth are:

- to prevent fires from starting,
- to detect rapidly, control, and extinguish promptly those fires that do occur, and
- to provide protection for structures, systems and components important to safety so that a fire that is not promptly extinguished by the fire suppression activities will not prevent the safe shutdown of the plant.

OCNGS has a Fire Protection administrative control program that addresses controls on ignition sources, hot work activities, combustibles, and fire system impairments. These

controls are reviewed by NRC Regional Inspectors, insurance inspectors and Nuclear Oversight auditors. The administrative control program is described in the OCNGS Fire Protection Program (FPP), which is incorporated into the Updated Final Safety Analysis Report (UFSAR).

OCNGS has fire detection and suppression in many areas of the plant. Those rooms without fire detection and/or suppression which contain safety related equipment, or safe shutdown cables or equipment were reviewed as part of the OMA effort and of the 22 fire areas/zones that remain in the exemption requests (refer to Attachment 3 for the fire areas/zones that were removed), 11 fire areas/zones were modified to add or upgrade either the detection, suppression or both. The remaining areas either already had adequate detection and suppression or it was determined that an upgrade was not necessary based on the in-situ hazards in the area. Refer to Attachment 2 for a more detailed discussion of the fire protection features that are available in each of the areas.

OCNGS has been divided into fire areas and subdivided into fire zones, as described in the OCNGS FPP. Three-hour fire barriers are normally used to provide fire resistive separation between adjacent fire areas. Subdivision of fire areas into fire zones utilizes non fire rated boundaries. This is described in more detail in the response to RAI-04 and in Attachment 2. For the purposes of analysis, subdivision of fire areas into fire zones takes into consideration the physical boundaries which exist between one fire zone and another within the same fire area. Reasonable assurance that a fire will not propagate from one fire zone to another is provided in the plant fire hazards analysis by passive and active fire protection features. Through this assurance, it can be justified that fire zones within a fire area can be analyzed by themselves.

In some cases, rated barriers with a fire resistance rating of less than three hours are credited but exemptions have been approved, fire detection or suppression systems are provided or engineering evaluations have been performed in accordance with Generic Letter 86-10. The OCNGS FPP provides the rating of the fire barriers separating adjacent fire areas and categorizes subdivided fire zone boundaries to criteria which have been accepted by the NRC. Information regarding the specific fire protection defense-in-depth features in each of the initiating fire areas addressed by the exemption requests was discussed previously and is described in more detail in Attachment 2. This information is a summary to what is available in the OCNGS FPP.

Appendix R continues to be satisfied by the requested exemptions since the existing analysis described in the exemption requests and in this response to request for additional information demonstrates that the plant can achieve safe shutdown in the event of a single fire and be maintained in a safe shutdown condition, and therefore, provides an equivalent level of safe shutdown capability through the combination of defense-in-depth fire protection features and the use of the OMAs. Therefore, the underlying purpose of the rule, to achieve safe shutdown in the event of a postulated fire, is met using the defense-in-depth and OMAs described in the exemption requests.

RAI-01.2: Provide an analysis that substantiates the claim of unwarranted burden and demonstrates that the hardship or other costs associated with the modifications noted as being required to achieve compliance are significantly in excess of those contemplated at the time the regulation was adopted, or are significantly in excess of those incurred by others similarly situated.

**RESPONSE**

In responding to this RAI, Exelon has reassessed the need for a number of OMAs and has withdrawn specific actions from the exemption request (see Attachment 3). If the remaining OMAs are not used to achieve safe shutdown in the event of a fire, modifications to: 1) provide additional fire suppression systems, detection systems, or fire barriers, 2) redundant instrument air supply lines and accumulators, 3) redundant instrument level loops, 4) installation of a redundant motor control center (MCC) for Isolation Condenser make-up pump, or 5) reroute cables or wrap cables, that involve issues such as accessibility, dose, structural interferences, design limitations, ampacity derating, etc., would be required to achieve compliance with Appendix R, Section III.G.2. The costs associated with engineering, procurement of material, fabrication and installation of the aforementioned modifications represent an unwarranted burden on Exelon with negligible increase in safety compared to the intended costs to implement the requirements of Appendix R, Section III.G.2 when the rule was originally put into effect.

The original exemption requests intended to address the special circumstances from both 10 CFR 50.12(a)(2)(ii) [underlying purpose of the rule] and 10 CFR 50.12(a)(2)(iii) [undue hardship], even though demonstrating special circumstances in accordance with only one 10 CFR 50.12(a)(2) criterion is required. Exelon considers that the combination of defense-in-depth and the feasibility and reliability of the OMAs, as described in the original exemption requests and in the response to this RAI, including Attachments 1, 2, 4, 5, and 6 demonstrates that the underlying purpose of the rule is met in accordance with 10 CFR 50.12(a)(2)(ii). Therefore, regardless of the burden on Exelon as described above, demonstrating undue hardship in accordance with 10 CFR 50.12(a)(2)(iii) is no longer considered necessary.

Therefore, based on the discussion above, special circumstances are present that warrant granting exemptions to 10 CFR 50, Appendix R, Section III.G.2.

**RAI-02 Ensuring That One of the Redundant Trains Is Free of Fire Damage**

Section IV.A of the March 3, 2009, request and Section lll.A of the March 4, 2009, request identifies 34 and 35 fire areas or zones, respectively, which are not in compliance with Appendix R, Section III.G.2 because hot shutdown OMAs would be required to align redundant train systems to achieve safe shutdown. The requests also state that the analyses assume a worst-case fire. In fact, Section III.B of the March 4, 2009, request states that the analysis assumed that all of the potential loss of equipment that could occur in a fire area would occur concurrently.

The method described in the request appears to demonstrate safe shutdown capability independent of the fire area of origin consistent with III.G.3, yet the request is for an Exemption from the requirements of III.G.2. III.G.2 specifically states that measures must be taken to ensure that one of the redundant trains remains free of fire damage within the fire area. Section III.G.3 of Appendix R addresses alternative or dedicated shutdown capability independent of the fire area of origin and establishes a series of requirements to achieve and maintain safe shutdown capability.

RAI-02.1: Confirm and state whether an Exemption from III.G.2 requirements is the appropriate request, since safe shutdown capability is provided independent of the fire area of origin.

**RESPONSE**

The areas identified in the exemption requests have been considered III.G.2 since the initial Appendix R submittal as indicated in the letter from P. B. Fiedler to D. M. Crutchfield, dated June 30, 1982 (Reference 4). In this letter it indicates that only the control room (Fire Zone OB-FZ-05), lower cable spreading room (Fire Zone OB-FZ-04) and the upper cable spreading room (Fire Zone OB-FZ-22A) are designated as III.G.3 areas. The letter from P. B. Fiedler to J. A. Zwolinski, dated August 25, 1986 (Reference 5) added two more fire zones as III.G.3 areas (both cable bridge tunnels – Fire Zones OB-FZ-22B and OB-FZ-22C). NRC SER dated March 24, 1986 (Reference 6) indicated in section 8.0 that the five fire zones listed above were the only areas where alternate safe shutdown (III.G.3) was required and the remaining areas would meet section III.G.2 of Appendix R unless an exemption request was approved by the NRC.

The OCNGS Fire Safe Shutdown (FSSD) methodology assumes that all equipment in a fire area is lost to determine which shutdown method remains available (Isolation Condenser/CRD or Electromatic Relief Valve (EMRV)/Core Spray). If the shutdown method did not survive, separation using encapsulation was used or cables were rerouted out of the area or certain OMAs were originally credited and these are the exemptions that were requested in the March 3, 2009 exemption request (Reference 1). These actions were originally accepted by the NRC in their SERs; however, an exemption was not granted for them. The OMAs that are identified in the March 4, 2009 exemption request (Reference 2) were added due to one of the following reasons: identical OMAs as contained in the March 3, 2009 exemption request that are needed for additional fire areas/zones that were not initially identified, variation of the original OMA (e.g., tripping of the recirculation pumps field breaker versus tripping the 4160V breaker) from the March 3, 2009 exemption request to improve accessibility of the existing action, contingency actions added as a result of a more detailed review of accessibility issues with the existing actions, or the original FPP did not specifically state that the OMA was needed (e.g., discussed Isolation Condenser accumulators but did not specifically discuss recharging them). At Oyster Creek, additional OMAs were not added because of the Thermo-Lag upgrade project.

The OMAs that are the subject of these exemption requests are not part of a methodology to shutdown the plant from outside the control room. Each of the OMAs is taken to permit shutdown of the plant from the control room. In all cases, reactor pressure vessel (RPV) cool down is controlled and monitored from the control room. Therefore, the exemptions for the OMAs are requested from the requirements of Section III.G.2.

RAI-02.2: State the specific requirements of III.G.2 that are not met for each of the requested exemptions, e.g., a lack of fire barriers, spatial separation, automatic suppression, etc.

**RESPONSE**

The lack of a one-hour fire barrier is selected as the Appendix R, Section III.G.2 noncompliance for fire areas/zones that do contain area-wide detection and suppression.

Conversely, the three-hour barrier noncompliance was selected where area-wide detection and/or suppression is not present (refer to Attachment 2 for detection and suppression that is present in each fire area/zone).

**Remaining OMAs from the March 3, 2009 (Phase 1) Exemption Request**
(Note: the numbering corresponds to the numbering in Attachment 2 of Reference 1)

| Item | Equipment | Manual Action Required | Fire Areas/Zones that credit this manual action* | Phase 1 Appendix R Section III.G.2 non-compliance |
|---|---|---|---|---|
| 1 | 4160V Switchgear 1D and LSP-1D | Manual actions for Hot Shutdown are required to isolate damaged cables and reestablish control locally for the 4160V Switchgear 1D. Also, trip 4160V breakers and lockout using the 69 Switch for all Feeder Breakers except 1B2P and 1B3P. Use Local Shutdown Panels to control equipment as follows:<br><br>LSP-1D 4160V Switchgear 1D Breakers for USS 1B2 and 1B3 (Operate Transfer Switch to "Alternate" and operate Control Switch for feeder breakers for USS 1B2 and 1B3) | TB-FA-26, TB-FZ-11D | Lack of one-hour fire barriers protecting control cables for 1D 4160V breakers for 1D Main breaker, USS 1B2 breaker and USS 1B3 breaker. |
| | | | TB-FZ-11B, TB-FZ-11C, TB-FZ-11E | Lack of three-hour fire barriers protecting control cables for 1D 4160V breakers for 1D Main breaker, USS 1B2 breaker and USS 1B3 breaker. |
| 2 | LI-424-993 | Condensate Storage Tank (CST) level Ind. LI-424-993 Local Gauge Used (Read Local CST Gauge) | OB-FZ-6A, OB-FZ-8C | Lack of one-hour fire barriers protecting instrument loop cables and equipment for the CST level indicator. |
| | | | OB-FA-9, TB-FZ-11B, TB-FZ-11E | Lack of three-hour fire barriers protecting instrument loop cables and equipment for the CST level indicator. |

| Item | Equipment | Manual Action Required | Fire Areas/Zones that credit this manual action* | Phase 1 Appendix R Section III.G.2 non-compliance |
|---|---|---|---|---|
| 3 | LSP-1B3 | Manual actions for Hot Shutdown are required to isolate damaged cables and reestablish control locally for 480V USS 1B3 electrical power breakers. Use Local Shutdown Panels to control equipment as follows:<br><br>LSP-1B3 480V USS 1B3 incoming breaker. (Operate transfer Switch to "Alternate" and then operate Control Switch for USS 1B3 Breaker 1B3M) | TB-FA-26, TB-FZ-11D | Lack of one-hour fire barriers protecting control cables for USS 1B3 Main breaker. |
| | | | TB-FZ-11B, TB-FZ-11C, TB-FZ-11E | Lack of three-hour fire barriers protecting control cables for USS 1B3 Main breaker. |
| 4 | LSP-1B32 | Manual actions for Hot Shutdown are required to isolate damaged cables and reestablish control locally for the Condensate Transfer Pump. Use Local Shutdown Panels to control equipment as follows:<br><br>LSP-1B32 Condensate Transfer Pump 1-2 (Operate transfer switch to "Alternate" and operate Control Switch for Condensate Transfer Pump 1-2) | TB-FZ-11B, TB-FZ-11E | Lack of three-hour fire barriers protecting control cables for one condensate transfer pump. |
| 5 | LSP-DG2 | Manual actions for Hot Shutdown are required to isolate damaged cables and reestablish control locally for Emergency Diesel Generator #2 (EDG2). Use Local Shutdown Panels to control equipment as follows:<br><br>LSP-DG2, EDG2 and its Switchgear (Operate transfer Switches (3 total) to "Alternate" and operate Control Switch on Diesel Panel to start diesel) | TB-FZ-11D | Lack of one-hour fire barriers protecting control cables for EDG2. |
| | | | TB-FZ-11E | Lack of three-hour fire barriers protecting control cables for EDG2. |

| Item | Equipment | Manual Action Required | Fire Areas/Zones that credit this manual action* | Phase 1 Appendix R Section III.G.2 non-compliance |
|---|---|---|---|---|
| 6 | USS-1B3 Breaker 062C | MCC 1B32 Feeder Breaker at USS 1B3 shall be manually re-closed after Diesel Generator start due to an undervoltage trip. | TB-FA-26, TB-FZ-11D | Lack of one-hour fire barriers protecting control cables for 1D 4160V breakers for 1D Main breaker and USS 1B3 breaker. |
| | | | TB-FZ-11B, TB-FZ-11C, TB-FZ-11E | Lack of three-hour fire barriers protecting control cables for 1D 4160V breakers for 1D Main breaker and USS 1B3 breaker. |
| 7 | V-9-2099 (formerly V-11-44), V-11-49, V-11-63, V-11-41 | Manual actions for Hot Shutdown are required to align the Fire System water to the Isolation Condenser shell side for makeup. Manual valves V-9-2099 (formerly V-11-44) and V-11-49 are opened, and manual valves V-11-63 and V-11-41 are closed to provide makeup. This action is required because there is no power ("B" Train) available to the Condensate Transfer System. | OB-FZ-6B, OB-FZ-8C | Lack of one-hour fire barriers protecting control cables for 1D 4160V Main breaker. |
| | | | OB-FZ-8A, OB-FZ-8B, TB-FZ-11F, TB-FZ-11H, CW-FA-14 | Lack of three-hour fire barriers protecting control cables for 1D 4160V Main breaker.<br><br>For CW-FA-14, lack of three-hour fire barriers protecting power cables and equipment for one condensate transfer pump. |
| 8 | LSP-1A2 | Manual actions for Hot Shutdown are required to isolate damaged cables and reestablish control locally for Unit Substation (USS) 1A2 electrical breakers. Use Local Shutdown Panels to control equipment as follows:<br><br>LSP-1A2, CRD Hydraulic PP NC08A and 480V USS 1A2 Incoming breaker (Operate transfer switch to "Alternate" and operate Control Switch for USS-1A2 Main Breaker 1A2M and A CRD Pump). | OB-FZ-8C | Lack of one-hour fire barriers protecting control cables for USS 1A2 Main breaker. |

| Item | Equipment | Manual Action Required | Fire Areas/Zones that credit this manual action* | Phase 1 Appendix R Section III.G.2 non-compliance |
|---|---|---|---|---|
| 9 | Remote Shutdown Panel | Manual actions for Hot Shutdown are required to isolate damaged cables and reestablish control locally for Unit Substation (USS) 1B2 electrical breakers and CRD Hydraulic. Use Remote Shutdown Panel to control equipment: RSP, CRD Hydraulic PP NC08B and 480V USS 1B2 Incoming breaker (Operate USS 1B2/CRD Transfer Switch (Partial initiation) to "Alternate" and operate Control Switches for USS-1B2 Main Breaker and B CRD Pump). | OB-FZ-6A | Lack of one-hour fire barriers protecting control cables for USS 1B2 Main breaker and B CRD Pump. |
| 11 | FI-225-998 | Use CRD local flow gauge FI-225-998 due to cable damage to the normal control room flow indicator. | RB-FZ-1E | Lack of one-hour fire barriers protecting instrument loop cables and equipment for the CRD flow indicator. |
| | | | RB-FZ-1G | Lack of three-hour fire barriers protecting instrument loop cables and equipment for the CRD flow indicator. |
| 12 | V-15-30, V-15-52, V-15-237, FI-225-2 | Manually open V-15-237, throttle V-15-30 using local flow indicator (FI-225-2) and close V-15-52 to establish CRD flow to Reactor due to the loss of instrument air to the CRD Flow Control Valve | RB-FZ-1D, RB-FZ-1E, OB-FZ-6A, OB-FZ-6B, OB-FZ-8C, OB-FZ-10A, TB-FA-26, TB-FZ-11D | Lack of one-hour fire barriers protecting cables (both control and power) and equipment for the instrument air system and lack of barriers for instrument loop cables for the CRD Flow Control valve and flow indicator. |

| Item | Equipment | Manual Action Required | Fire Areas/Zones that credit this manual action* | Phase 1 Appendix R Section III.G.2 non-compliance |
|---|---|---|---|---|
| 12 (Cont.) | V-15-30, V-15-52, V-15-237, FI-225-2 | Manually open V-15-237, throttle V-15-30 using local flow indicator (FI-225-2) and close V-15-52 to establish CRD flow to Reactor due to the loss of instrument air to the CRD Flow Control Valve | RB-FZ-1F5, RB-FZ-1G, TB-FA-3A, OB-FZ-8A, OB-FZ-8B, OB-FA-9, TB-FZ-11B, TB-FZ-11C, TB-FZ-11E, TB-FZ-11F, TB-FZ-11H, CW-FA-14 | Lack of three-hour fire barriers protecting cables (both control and power) and equipment for the instrument air system and lack of barriers for instrument loop cables for the CRD Flow Control valve and flow indicator. |
| 13 | V-20-2 and V-20-4 | Core Spray System II manual valves V-20-1 and V-20-2 are opened and V-20-4 is closed to provide Reactor Coolant Makeup using Core Spray Pump instead of the CRD Pump (manipulate valves to align Core Spray to CST). This action is required because the fire damages both CRD Pumps. | RB-FZ-1F3 | Lack of three-hour fire barriers protecting power cables and equipment for one CRD pump. |
| 16 | 4160V Switchgear. 1A Breakers A3, A5 and A9 and Switchgear. 1B Breakers B4 and B8 | All five Reactor Recirculation Pumps (NG01-A, NG01-B, NG01-C, NG01D and NG01E) must be tripped to use fuel zone level instruments and to prevent the Isolation Condenser from tripping on high flow. Also, lockout the 4160V breakers using the 69 Switch. | OB-FZ-8C | Lack of one-hour fire barriers protecting control cables for the Reactor Recirculation Pumps. |
| | | | TB-FZ-11B, TB-FZ-11E | Lack of three-hour fire barriers protecting control cables for the Reactor Recirculation Pumps. |

**Remaining OMAs from the March 4, 2009 (Phase 2) Exemption Request**
(Note: the numbering corresponds to the numbering in Attachment 2 of Reference 2)

| Action | Equipment | Manual Action Required | Fire Areas/Zones that credit this manual action* | Phase 2 Appendix R Section III.G.2 non-compliance |
|---|---|---|---|---|
| 1 | RY21 Panels | Trip Field Breakers for Recirculation Pumps A through E | TB-FA-26, TB-FZ-11D | Lack of one-hour fire barriers protecting control cables and equipment for the Reactor Recirculation Pumps. |
| | | | TB-FZ-11C | Lack of three-hour fire barriers protecting control cables and equipment for the Reactor Recirculation Pumps. |
| 2 | V-9-2099, V-11-49, V-11-63, V-11-41 | Manually manipulate valves to align Fire Water for makeup to Isolation Condenser. | TB-FA-26, TB-FZ-11D | Lack of one-hour fire barriers protecting control cables for 1D 4160V breakers for 1D Main breaker and USS 1B3 breaker. |
| | | | TB-FZ-11C | Lack of three-hour fire barriers protecting control cables for 1D 4160V breakers for 1D Main breaker and USS 1B3 breaker. |
| 3 | RSP | Operate transfer switch at RSP for USS-1B2 Main Breaker and "B" CRD Pump. Operate equipment as necessary. | TB-FA-26, TB-FZ-11D | Lack of one-hour fire barriers protecting control cables for USS 1B2 main breaker and B CRD Pump. |
| | | | TB-FZ-11B, TB-FZ-11C, TB-FZ-11E | Lack of three-hour fire barriers protecting control cables for USS 1B2 main breaker and B CRD Pump. |
| 7 | V-11-36 | Manually open V-11-36 to makeup to the Isolation Condenser | TB-FA-26, TB-FZ-11D | Lack of one-hour fire barriers protecting control cables for 1D 4160V breakers for 1D Main breaker and USS 1B3 breaker. |

| Action | Equipment | Manual Action Required | Fire Areas/Zones that credit this manual action* | Phase 2 Appendix R Section III.G.2 non-compliance |
|---|---|---|---|---|
| 7 (Cont.) | V-11-36 | Manually open V-11-36 to makeup to the Isolation Condenser | TB-FZ-11C | Lack of three-hour fire barriers protecting control cables for 1D 4160V breakers for 1D Main breaker and USS 1B3 breaker. |
| 8 | LI-211-1214 | Obtain "A" Isolation Condenser shell level using local mechanical gauge | TB-FA-26, TB-FZ-11D | Lack of one-hour fire barriers protecting control cables for 1D 4160V breakers for 1D Main breaker and USS 1B3 breaker. |
| | | | TB-FZ-11C | Lack of three-hour fire barriers protecting control cables for 1D 4160V breakers for 1D Main breaker and USS 1B3 breaker. |
| 9 | V-15-30, V-15-52, V-15-237, FI-225-2 | Manually manipulate valves for CRD flow path and use local indicator. | YARD | Lack of three-hour fire barriers protecting equipment for the instrument air system. |
| 17 | V-11-34 | Connect H.P. air cylinder to drain port of accumulator to recharge | RB-FZ-1D, RB-FZ-1E, OB-FZ-6A, OB-FZ-8C | Lack of one-hour fire barriers protecting cables (both control and power) and equipment for the instrument air system. |
| | | | RB-FZ-1F3, RB-FZ-1F5, RB-FZ-1G, TB-FA-3A, OB-FZ-8A, OB-FZ-8B, OB-FA-9, CW-FA-14, YARD | Lack of three-hour fire barriers protecting cables (both control and power) and equipment for the instrument air system. |

| Action | Equipment | Manual Action Required | Fire Areas/Zones that credit this manual action* | Phase 2 Appendix R Section III.G.2 non-compliance |
|---|---|---|---|---|
| 18 | V-11-36 | Connect H.P. air cylinder to drain port of accumulator to recharge | OB-FZ-6B, OB-FZ-10A, TB-FA-26, TB-FZ-11D | Lack of one-hour fire barriers protecting cables (both control and power) and equipment for the instrument air system. |
| | | | TB-FZ-11B, TB-FZ-11C, TB-FZ-11E, TB-FZ-11F, TB-FZ-11H | Lack of three-hour fire barriers protecting cables (both control and power) and equipment for the instrument air system. |

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 exemptions. 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**

The fire hazards analysis for each fire area/zone in Attachment 2 provides the response for the information requested above. The following discussions are generic to all fire areas/zones where OMAs are required.

Administrative controls are in place to prevent fires from starting. These controls include:

- Controls on hot work activities and ignition sources (involving cutting, welding, grinding, open flames or other heat producing activities) per procedure OP-AA-201-004;
- Fire Protection System Impairment Control per procedure OP-MA-201-007 ensures appropriate compensatory measures are implemented and tracks restoration of the impaired fire protection feature;
- Control of Transient Combustible Material per procedure OP-AA-201-009 governs the handling and limits the use of ordinary combustible materials, and combustible and flammable liquids and gases within critical buildings in the plant. Use of wood is limited and restricted to fire retardant wood (except for large cribbing);
- Review of configuration changes to the plant per procedures CC-AA-102 and CC-AA-209 to ensure the FPP (e.g., detection, suppression, combustible loading, barriers, etc.) is not adversely impacted;
- Station Housekeeping/Material Condition Program per procedure MA-AA-716-026 ensures that the station remains clean and free of debris; and
- Use of fire retardant cables for new installations (qualified to IEEE-383 unless it is an approved specialty cable).

The OCNGS Fire Brigade responds to all confirmed fire alarms and manually suppresses the fire if necessary using hose stations and/or fire extinguishers staged throughout the Plant.

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 concept of defense-in-depth is defined in Appendix R as follows:

- To prevent fires from starting;
- To detect rapidly, control, and extinguish promptly those fires that do occur; and
- To provide protection for structures, systems, and components important to safety so that a fire that is not promptly extinguished by the fire suppression activities will not prevent the safe shutdown of the plant.

The March 3, 2009 exemption request (Reference 1) provided a detailed review and comparison of the OCNGS OMAs against the feasibility criteria stipulated in NRC Inspection Procedure 71111.05. The March 4, 2009 exemption request (Reference 2) provided a detailed review and comparison of the OCNGS OMAs and NUREG-1852, which provides the NRC position on what constitutes feasible and reliable OMAs. These reviews remain valid. The OCNGS OMAs are straightforward and consistent with actions that equipment operators normally perform in their daily duties. Additional details regarding defense-in-depth is provided in the fire hazards analysis in Attachment 2. The combination of the reliability and feasibility of the OMAs in conjunction with the defense-in-depth features described in the fire hazards analysis meets the underlying intent of the rule in assuring the ability to safely shutdown the plant following a fire.

**RAI-03 Other Evaluations**

Fire areas may have other exemptions or engineering evaluations that affect fire protection systems or safe shutdown capabilities.

For example, Section III.A of the March 4, 2009, request states that the staff's approval of an exemption for a lack of automatic fire detection in Fire Zone TB-FZ-11D was based on the following:

- the fire will not be of significant magnitude or duration,
- it will be promptly extinguished by one of the two automatic sprinkler systems installed in this fire zone, and
- the flow alarms will promptly alert the fire brigade who will respond to manually fight the fire.

As described in Section 6.2 of the June 25, 1990, SER, however, this list of considerations is not complete, as it does not include fire protection features provided for the credited train of hot shutdown cables (e.g., a one-hour rated fire wrap or relocating cables).

In addition, Section III of the March 4, 2009, request states that the manual operator actions are required as a result of:

- changes to the original safe shutdown analysis, or
- were implied in the original safe shutdown analysis but for which an SER does not exist.

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 these requests in any way and provide a justification for why such impact should be considered acceptable.

**RESPONSE**

A complete discussion of exemptions or evaluations applicable to each fire area/fire zone is maintained in the OCNGS FPP, which is incorporated into the UFSAR. Where an exemption request or evaluation impacts the fire hazards analysis for separation of cables within the fire area, or detection and suppression, the exemption or evaluation is addressed in the fire hazards analysis for that specific action provided in Attachment 2. Exemptions or evaluations that address fire area/zone boundaries are based on assuring that the boundary is adequate for the hazard, and therefore, are not addressed in this response unless there is an impact to the OMA being addressed.

**RAI-04 Fire Protection System and Fire Barrier Design Criteria**

Attachment 1 of the requests notes that several areas are equipped with various fire detection and suppression systems. However, the requests do not state whether the systems have been designed and installed in accordance with applicable design standards or requirements.

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.

For example:

The March 3, 2009, request states that Fire Zones DG-FA-15 and OB-FZ-6A are separated from other plant areas by rated fire barriers but does not mention what the rating is or whether openings and penetrations in the assembly are protected.

The requests state that areas such as, Fire Zone OB-FZ-6A, are equipped with smoke detectors but does not state whether the detectors have been installed and maintained in accordance with a particular design standard or basis, e.g. National Fire Protection Association (NFPA) 72: National Fire Alarm Code, 1985 Edition.

Section III of the March 4, 2009, request states that Fire Zone OB-FA-9 is protected by a fixed, total flooding, automatic Halon 1301 extinguishing system but the request does not state whether the Halon system was installed and maintained in accordance with a particular design standard or basis, e.g. NFPA Standard 12A, 1985 Edition.

**RESPONSE**

Where fire protection features, such as detection and suppression systems and fire rated assemblies, are addressed in the fire hazards analysis provided in Attachment 2, the applicable code, UL Design or Test Protocol is described. The following discussions are generic to all fire areas/zones where OMAs are required.

Manual suppression is provided by fire hydrants and fire hose houses located outside, by interior fire hose stations or by fire extinguishers. Fire hydrants were installed in accordance with NFPA 24, 1966 Edition. Fire hose stations were installed in accordance with NFPA 14, 1979 Edition. Fire hydrants and fire hose stations are surveillance tested in accordance with station surveillance procedure 645.6.003, “Fire Hose Station, Hose House and Fire Hydrant Inspection.”

Portable fire extinguishers were selected and installed in accordance with commitments made against Appendix A to Branch Technical Position (BTP) APCSB 9.5-1 following the guidance provided in NFPA 10, 1975 Edition. Portable fire extinguishers are inspected and maintained in accordance with station procedure 2400-GMM-3681.04, “Inspection and Maintenance of Portable Fire Extinguishers," under monthly recurring task number PM00306F and yearly recurring task number PM00345F.

In general, fire rated assemblies consist of reinforced concrete or concrete block walls which have commonly accepted fire endurance ratings based upon thickness. Cable raceway fire barrier envelope systems were tested in accordance with Supplement 1 to Generic Letter (GL) 86-10, “Fire Endurance Test Acceptance Criteria for Fire Barrier Systems Used to Separate Redundant Safe Shutdown Trains within the Same Fire Area.” OCNGS employs the Mecatiss fire barrier system for cable raceway fire barrier envelopes for the majority of these envelopes. A small percentage of raceway envelope systems are protected by the 3M Interam Flexible Fire Wrap System also tested in accordance with Supplement 1 to GL 86-10.

The Mecatiss test program was witnessed by members of the NRC staff. Documentation concerning the results of the test program was submitted for review to the NRC. The NRC issued a safety evaluation on the basis of the submittals. In particular, the staff concluded “the Mecatiss fire barrier system, when designed and installed with the techniques utilized for the test specimens meets the acceptance criteria specified in Supplement 1 to GL 86-10 and is, therefore, considered acceptable for fire barrier systems relied upon by the licensee to meet NRC fire protection requirements.” OCNGS inspects the conduit envelope fire barrier assemblies every 18 months in accordance with surveillance 645.6.028, “Thermo-Lag and Mecatiss Envelope System Fire Barriers.” Note that the 3M Interam envelopes are also inspected by this surveillance even though the title does not indicate it. Also, there is no stand alone Thermo-Lag protecting electrical raceway fire barrier systems at OCNGS.

Penetration seals match the fire resistance rating of the barriers in which they are installed unless adequately evaluated as acceptable based on the hazards in the area and documented as such as allowed by GL 86-10. Penetration seals are constructed using grout, RTV silicone foam or equivalent. To demonstrate the adequacy of fire barrier walls, floors, ceilings, enclosures and penetration seals, designs were verified by fire endurance testing as required by Appendix A to BTP 9.5-1. At OCNGS, the guidance offered by IEEE Std. 634-1978, "Cable Penetration Fire Stop Qualification Test," is followed as an

acceptable test method for demonstrating fire endurance performance relative to through-penetration stops. Fire barriers and penetrations are inspected in accordance with surveillance procedure 645.6.017, “Fire Barrier Penetration Surveillance.”

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**

The fire protection systems or barriers are addressed in the response to RAI-04.3 and/or Attachment 2.

RAI-04.3: Provide a technical justification for any non-rated fire protection assemblies.

**RESPONSE**

A general discussion is provided here with respect to the technical justification for fire area/zone boundaries in the plant. Fire zone boundaries and penetrating elements of these boundaries are not considered “rated” fire barrier assemblies. Specific fire zone boundaries are discussed in Attachment 2.

The following are the definitions of a fire area and fire zone as provided in BTP APCSB 9.5-1, "Guidelines for Fire Protection for Nuclear Power Plants."

Fire Area - That portion of a building or plant that is separated from other areas by rated boundary fire barriers (walls, floors or roofs) with any opening or penetrations protected with seals or closures having a fire resistance rating equal to that of the barriers.

Fire Zones - Subdivisions of fire areas in which the fire suppression systems are designed to combat particular types of fires. The concept of fire zone aids in defining to the fire fighter the fire parameters and the actions which would be necessary.

The plant as defined in the FPP was analyzed based upon the guidelines established by Appendix A to BTP APCSB 9.5-1 (Reference 8). Fire area boundaries are identified in the FPP and were approved in NRC SER dated March 3, 1978 (Reference 9) issued after the review of the JCP&L letter to the NRC dated December 3, 1976 (Reference 10). These boundaries are of ratable construction including doors, dampers, and penetration seals.

For the purposes of analysis, certain fire areas are subdivided into fire zones taking into consideration the physical boundaries which exist between one fire zone and another within the same fire area. It should be noted that Appendix R suggests evaluation of the plant on a fire area basis while Appendix A to BTP APCSB 9.5-1 did not specifically require fire area separation of safe shutdown components. Reasonable assurance that a fire will not propagate from one fire zone to another is provided in the plant FPP by passive and active fire protection features, to support the conclusion that the barrier is adequate for the hazard. Through this assurance, it can be justified that fire zones within a fire area can be analyzed by themselves.

The delineation of fire areas was established taking into consideration the location of redundant safety related components with respect to each other, existing building construction and the presence of in-situ fire hazards. The three (3) major structures (Reactor, Office and Turbine Buildings), which contain safety related systems and components required for safe plant shutdown have been subdivided into separate fire zones.

The following criteria is utilized in evaluating the adequacy of fire zone boundaries. This permits separate fire zone analysis to determine compliance with Appendix R, Section III.G. In general, only those boundaries which are not continuous wall-to-wall, floor-to-ceiling boundaries of fire rated construction are addressed. Those boundaries which are of rated construction and controlled as rated boundaries are addressed where they constitute a portion of a fire zone boundary or where a justification is required for a specific penetrating element which is unrated. Those boundaries in fire zones which are adjacent to other fire areas or fire zones have been addressed as described below and accepted under NRC SER dated March 24, 1986 (Reference 6).

A. Examination beyond an evaluation of existing active and passive features is not required to support justification of the following zone boundaries:

    1. Any zone boundary which is not adjacent to other fire zones or areas. The basis is that there is no interaction.

    2. Any zone boundary which is protected by area-wide automatic fire suppression on at least one side of the boundary.

    3. Any zone boundary contained within the area served by a common automatic suppression system.

B. Further examination of a zone boundary as described below not meeting the criteria of "A" above will establish acceptability provided the combustible loading on either side of that zone boundary is less than 40,000 BTU/sq. ft. A computation for calculating the fire duration corresponds to the combustible loading is conservatively based on the ASTM E119 time vs. temperature curve. This was done for comparison purposes. If the combustible loading values were compared to the appropriate curve (A through E) of Figure 6-8E on page 6-83 of the NFPA Fire Protection Handbook, 14th Edition, 1976, (Reference 11) the fires depicted would frequently be slower burning fires that would reach relatively low temperatures.

    1. The zone boundary consists of non-rated physical boundaries with penetrations sealed or protected with fire suppression, or

    2. The zone boundary is not relied on to separate/protect redundant trains of safe shutdown equipment on either side of that zone boundary, or

    3. Partial non-rated barriers and separation distance provide adequate physical horizontal separation where vertical separation is not a concern, or

    4. Partial non-rated horizontal barriers and separation distance provide adequate physical horizontal and vertical separation.

The Reactor, Office and Turbine Buildings as indicated in the OCNGS FPP have been subdivided into separate fire zones as depicted below.

| Fire Zone Designation | Fire Zone Description | North | South | East | West | Floor | Ceiling |
|---|---|---|---|---|---|---|---|
| RB-FZ-1D | Reactor Building, 51'-3" El | A1 | A1 | A1 | RATED | B1/A2 | B1/A2 |
| RB-FZ-1E | Reactor Building, 23'-6" El | RATED | A1 | A1 | RATED | B1/A2 | B1/B2/A2 |
| RB-FZ-1F3 | Reactor Building, -19'-6" El | A1 | B2 | B2 | RATED/A1 | A1 | RATED |
| RB-FZ-1F5 | Reactor Building, -19'-6" El | A1/B2 | A1/B2 | A1/B2 | A1/B2 | A1 | B1/RATED/B4 |
| RB-FZ-1G | 38' Level and 51'-3" Level | B1 | RATED/B2 | B1 | B1 | B2 | B1 |
| OB-FZ-6A | A 480 V Switchgear Room | RATED | A2/RATED | RATED | RATED | A2/RATED | A2/RATED |
| OB-FZ-6B | B 480 Switchgear Room | B4/RATED | RATED | RATED | RATED | A2/RATED | A2/RATED |
| OB-FZ-8A | MG Set Room | A2/RATED | A1/RATED | RATED | RATED | A2/RATED | A2/RATED |
| OB-FZ-8B | Mechanical Equipment Room | A2 | RATED | RATED | RATED | A2 | B2/RATED |
| OB-FZ-8C | A/B Battery Room, Tunnel & Electric Tray Room, 35'-0" El | A2/RATED | A2/RATED | RATED | RATED | A2/RATED | A2/RATED |
| OB-FZ-10A | Monitor & Change Room Area & Operations Support Area, 46'-6" El | A1/A2 | A2/RATED | RATED | RATED | A2/RATED | A1/A2/ RATED |
| TB-FZ-11B | Turbine Lube Oil Storage, Pumping & Purification Areas, El 0'-0" & 27'-0" | A1 | B1/A2/ RATED | RATED | A1 | A1 | B2/RATED |
| TB-FZ-11C | A&B Switchgear Room, West Mezzanine, El 23'-6" | A2 | A1 | B2/A2 | A1/A2 | A2 | A1/B2/A2 |
| TB-FZ-11D | Basement Floor South, El 3'-6" | A2 | A1/A2 | A2 | A1/A2 | A1/A2 | A2 |
| TB-FZ-11E | Condenser Bay, El 3'-6" Heater Bay | A2/B1 RATED | A2 B1 | A2/RATED RATED | A1/A2 N/A | A1 B1 | A2 A1/B2 |
| TB-FZ-11F | Feedwater Pumps, El. 0'-0" & 3'-6" | B1 | B2 | RATED | A2 | A1 | B1 |
| TB-FZ-11H | Demineralizer Tank and SJAE Area, El 23'-6" | B2/B1 | A1 | A1/RATED | A2/B1 | A1 | A1/B2 |

All penetrations in non-fire rated zone boundaries separating shutdown paths, not protected on either side of the boundary by area-wide fire suppression systems, are sealed except where specifically described below and in Attachment 2. The sealing of penetrations in non fire rated zone boundaries is accomplished utilizing a 6-inch minimum depth of silicone RTV foam, light density silicone elastomer, six inches of ceramic fiber (Kaowool), grout, or Hilti FS–One and Hilti FS–657. Openings around hot pipes or pipes subject to movement have the annular space of the penetration sealed with RTV foam or with a boot seal similar to a one (1) hour fire rated boot seal. These penetrations are not fire rated; however, they are constructed of materials and installed in accordance with configurations similar to a one (1) hour minimum fire barrier.

Penetration sealing or protection is not provided where there exists in the adjacent zone a minimum physical separation of 50 feet horizontal distance between the penetration and any cable or equipment forming the available shutdown path for the zone under consideration.

Doors between zone boundaries are constructed of steel and are similar in construction to fire rated doors.

Equipment hatches that cannot be permanently sealed with fire resistant materials are provided with steel covers or concrete plugs. Where steel plate covers are utilized as part of a zone boundary, there is fire detection equipment in the vicinity of the hatches. In most cases, where these sealed hatches are relied upon for fire separation, the fire zones also contain suppression systems over the principal combustibles (i.e., electrical cable trays). All areas in which these covers or plugs are located have low fire loadings, less than 40,000 BTU/sq. ft. The steel covers or concrete plugs insure that fire, smoke, and hot gases cannot pass through the zone boundary. The detection systems will provide alarm and indication to ensure that the plant fire brigade can manually extinguish the fire, if necessary.

Conduit penetrations through fire rated fire area boundaries and non-fire rated fire zone boundaries that existed before the Appendix R modifications, were not sealed internally. Where fire rated boundaries or non-rated fire zone boundaries are utilized for separation of shutdown circuits or equipment, the conduit penetrations are internally sealed to prevent the passage of fire or smoke and hot gases across the boundary. The internal sealing criteria of the conduits that is indicated below was developed using information obtained from the Professional Loss Control, Inc. “Conduit Fire Protection Research Program,” dated June 1, 1987 (Reference 15) in combination with the criteria for fire zone boundaries stipulated above that was accepted under NRC SER dated March 24, 1986. The fire testing performed by Reference 15 showed that fire does not propagate by the transmission of heat due to flames, hot gases or radiant energy through unsealed conduits of four inches or less in diameter. However, in some conduits, products of combustion (smoke) generated by the cables within the conduit can propagate to adjacent areas. Therefore, the following criteria were developed for the sealing of conduits using a graded approach based on the size of the conduit and/or whether there is an automatic suppression system on at least one side of the boundary:

(a) Conduits Greater than four inches in Diameter

Internal conduit seals for penetrations through fire rated boundaries have a fire rating equal to or greater than the boundary fire rating. Internal conduit seals for penetrations through non-fire rated boundaries are similar to a one-hour (minimum) fire rated penetration seal.

(b) Conduits three inches to four inches in Diameter (inclusive)

Internal conduit seals for penetrations through fire rated and non-fire rated boundaries are fabricated from noncombustible materials to prevent the passage of smoke and hot gases.

An internal conduit seal is not required to be installed in conduits four inches or less that are protected on either side of the barrier with an automatic fire suppression system on at least one side.

(c) Conduits Less than three inches in Diameter

Internal conduit seals for penetrations through fire rated and non-fire rated boundaries are fabricated from noncombustible materials to prevent the passage of smoke and hot gases.

An internal conduit seal is not required to be installed in the conduit if the first break in the conduit occurred a distance greater than 10 feet from the boundary as measured along the conduit run or there is an area-wide or partial coverage automatic suppression system on one side of the barrier.

**RAI-05 Ignition Sources and Combustible Fuel Load**

The requests use terms such as "low" or "moderate" to describe the combustible fuel loading in the fire areas included in the request.

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. This 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**

A tabulation of potential ignition sources as well as the equipment that may exhibit high energy arcing faults for each fire area/zone is contained in Attachment 4.

Administrative controls are covered in the response to RAI-02.3.

The dimensions of the room and the ceiling height plus the type of combustibles in the area are covered in the fire hazards analysis for each fire area/zone in Attachment 2. The fire area layout drawings are part of the FPP, which is part of the UFSAR by reference. These drawings show the ignition sources of significance that are listed in Attachment 4.

The type of cable used at OCNGS is described as follows:

In the JCP&L letter to the NRC dated December 3, 1976 (Reference 10), Section D.3.c states “When safety related cables do not satisfy the provisions of Regulatory Guide 1.75, all exposed cables should be covered with an approved fire retardant coating and a fixed automatic water fire suppression system should be provided.” JCP&L responded in Reference 10 as follows: “Halon 1301 total flooding systems will be put in the cable spreading room, electric tray room, control room panels, and battery room. Automatic spray with detection for the cabling on the 23'-6" and 51'-3" levels of the Reactor Building with hose and portable extinguisher backup will be installed. Hose stations will be installed on the other levels of the Reactor Building along with an automatic detection system. Safety

related cables below the 4160 volt switchgear vault and above the monitor and change room will also be protected by automatic water spray and detection. As mentioned above, safety related cables will be protected with a Halon suppression system with early warning detection or automatic water spray with automatic detection, all of which will be supervised in the control room. 98% of the Oyster Creek Nuclear Generating Station cables are jacketed with Vulkene, which passes the horizontal flame test of the Underwriter's Laboratory. Based on the planned suppression and detection equipment and the Vulkene cable insulation, no coating is deemed necessary"

NRC SER, dated March 3, 1978 (Reference 9), Section 4.8, "Electrical Cable Combustibility," states: "The licensee has stated that 98% of all the cables used in the facility are Vulkene jacketed (cross-linked polyethylene). These cables have been subjected to and passed the Underwriter's Laboratory horizontal flame test indicating some degree of flame retardance. In our fire protection reviews, all organic insulated cables are treated as combustible. Tests have shown that such cables burn when the test conditions are made conducive by appropriate arrangement, tray loading and ignition sources. The cables have not been subjected to the IEEE-383 flame test; however, in areas containing significant quantities of exposed cables, the licensee proposed to protect safety related cables with automatic suppression systems actuated by early warning smoke detection systems. We find that retest to the IEEE-383 procedure and criteria would not provide information that would alter our recommendations or conclusions. Accordingly, we find the electrical cables used at the Oyster Creek plant acceptable."

NRC SER, dated March 3, 1978 (Reference 9), Section 4.10, "Separation Criteria," states: "No separation criteria for redundant circuits were established for the original routing of electrical cable at the Oyster Creek plant. Subsequent modification of the emergency core cooling system provided separation of redundant cabling required for emergency core cooling to meet existing criteria, although in some cases even this separation is not adequate." Also, the same section of the SER states: "Despite the above described modifications to OC cabling, fires in various areas may still cause loss of control of redundant safe shutdown equipment. Although control from the control room may be lost under such situations, safe shutdown can still be achieved by manually closing breakers and manually manipulating valves. However, such methods of shutting down the plant may require as many as five operators. Sufficient personnel may not be available to perform shutdown of the plant using such methods, as well as fighting a fire. Accordingly, the licensee has proposed to provide a remote shutdown station with cabling independent of cabling used for control from the control room. Cabling for the remote shutdown station will be routed away from other cabling and provided with adequate fire protection so that a fire will not cause loss of control from both the control room and the remote shutdown station." In addition, the SER further states in the same section: "We find that, subject to implementation of the above described modifications and other modifications proposed by the licensee and described in other sections of this report, adequate separation will be provided so that fires will not prevent the safe shutdown of the plant. Accordingly, we find the criteria for the separation of redundant circuits to be acceptable."

The cables were purchased in accordance with Burns and Roe Specification S-2299-51 (Reference 14) showing the requirement for the use of the GE Vulkene cables. However, some cables are jacketed with Polyvinyl Chloride (PVC), which is a thermoplastic insulation. PVC cables are used for low voltage (mv) or low current (ma) instrument signals (e.g., RTDs, thermocouples, neutron monitoring instruments, etc.) and are not considered a

credible ignition source. Most trays contain one or two PVC cables; in some instances, the cable tray may contain up to approximately 25% fill with PVC instrument cables based on walk downs (e.g., Tray 26 in Fire Zone OB-FZ-8C, A/B Battery Room). The use of PVC (specialty cables) when substitute noncombustible materials are not available is minimized as required by Appendix A to BTP APCSB 9.5-1. No new cables are installed in the original cable tray system so as not to compromise any Class 1E cable separation. A new cable tray system was installed in approximately 1989 meeting the requirements of IEEE 384 and new cables installed since that time are either installed in these new trays or the cables are routed in conduit. Also, all new cables (except specialty type cables) installed at Oyster Creek are qualified to IEEE-383 and this has occurred since the mid-to-late 1970's.

Vulkene is cross-linked polyethylene insulation with a flame retardant neoprene jacket. Both the conductor insulation and jacket insulation are thermoset materials. The flame test standard for cables, IEEE-383-1974, was not in effect at the time these cables were initially purchased and installed. General Electric Vulkene Control Cable Specification performed a Vertical Rack Burlap Rag test in 1972 (Reference 13) where the cables were installed on a vertical rack and an oil-soaked burlap rag was used as the flame source. This test is essentially the oily rag test outlined in IEEE-383-1974, Section 2.5.4.5 (Reference 12). However, OCNGS cables were manufactured in the 1960's and it is not certain whether these cables are made exactly the same as the cables from the early 1970's. There is reasonable assurance that these cables are similar to IEEE-383, but there is no retrievable documentation showing this. Based on the proper use of circuit protective devices and the use of automatic suppression, there is adequate defense-in-depth to prevent the propagation of fire damage in the trays from one tray to the other and the propagation outside the affected fire area/zone. Circuits at OCNGS are individually protected via fuses or circuit breakers with selective coordination to properly isolate faults from power supplies. The majority of the scheduled cables exposed (in trays) in the plant can pass the horizontal flame test requirements as indicated in Reference 9. The original tray system contains non-safety related, associated circuit, and safety-related redundant cables in the same trays and is typically provided with automatic suppression and detection in the area. In addition, adequate ampacity deratings were performed as required for any enclosed cable (e.g., fire barrier envelope systems, etc.) to ensure that the cables do not overheat.

**RAI-06 Fire Scenarios**

The requests identify the OMAs needed in each fire area or zone, but do not describe the fire scenarios that have been considered for the postulated events.

For example:

In the event of fire in Fire Zones TB-FA-26, TB-FZ-11B, TB-FZ-11C, TB-FZ-11D, TB-FZ-11E (March 3, 2009, request), OMAs may be required to isolate damaged cables and reestablish control locally for 4160V Switchgear 1D. However, no information is provided to describe the separation between the redundant train cables. It is also not clear where the cables are located relative to the floor, walls and other trains or whether any spatial separation exists between the two trains.

Attachment 2 of the March 4, 2009, request contains a description of a scenario for Action 14, which states:

*This action is being performed because there is the potential that the normal ventilation system would not be available due to cable damage.*

The description does not provide any further information regarding the fire hazards in the area and their proximity to redundant trains.

RAI-06.1: Provide a description of the proximity of the redundant train equipment to 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 distinct 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 fire hazards analysis for each fire area/zone in Attachment 2 provides the response for the information requested above. The following discussions are generic to all fire areas/zones where OMAs are required to recover from an assumed Loss of Instrument Air or OMAs are required for the use of fire water for making up to the Isolation Condenser.

**1. Loss of Instrument Air Generic OMA Response**

Item #12 from Attachment 2 of the March 3, 2009 exemption request and Actions #17 and #18 from the March 4, 2009 exemption request assume the loss of the station instrument air system in order to invoke the respective OMA. These scenarios are potentially implemented in numerous fire areas/zones throughout the plant. They are addressed here in a comprehensive response in order to avoid duplication throughout this response.

OCNGS conservatively assumes that instrument air is lost for all Appendix R fires based on the fact that instrument air lines run throughout many areas of the plant. The air lines are either threaded or swagelok fittings and the lines are made of red brass, copper or stainless steel. The melting point for brass is 1652 to 1724 degrees Fahrenheit while copper is 1981 degrees Fahrenheit and stainless steel is 2550 degrees Fahrenheit. Also, the end devices (e.g., controllers, valve operators, etc.) utilize rubber gaskets, diaphragms, etc. that could potentially be affected by the fire. Utilizing the ASTM E119 time-temperature curve, the brass would potentially melt in approximately 45 minutes. The air lines, air compressors and support systems (e.g., electrical cables, cooling water, dryers, etc.) for the air compressors were not modeled for FSSD in the original plant analysis.

Therefore, the following OMAs are postulated as being required if the Isolation Condenser/CRD systems are utilized for Hot Shutdown:

- The first OMA is to open the CRD bypass line manual valves within 204 minutes to obtain flow around the CRD flow control valves that fail closed on the loss of instrument air. Although the two CRD pumps are fed from redundant safety-related power supplies, the normal CRD flow control valve is a single component and does not have a redundant counterpart available for use from the control room; however, a manual bypass is provided. This valve may fail to operate due to control cable damage, or due to the assumed loss of instrument air. If the normal flow control valve were not available due to

the loss of instrument air or cable damage, then the operator would have to manually align the three manual valves (March 3, 2009 exemption request, Item #12, and March 4, 2009 exemption request, Action #9) to bypass the flow control valve.

This OMA affects the following fire zones from the Phase 1 exemption request, with the exception noted below:

| | |
|---|---|
| CW-FA-14 | OB-FA-9 |
| OB-FZ-10A | OB-FZ-6A |
| OB-FZ-6B | OB-FZ-8A |
| OB-FZ-8B | OB-FZ-8C |
| RB-FZ-1D | RB-FZ-1G |
| RB-FZ-1F5 | TB-FA-11C |
| TB-FA-3A | TB-FZ-11B |
| TB-FZ-11D | TB-FZ-11E |
| TB-FZ-11F | TB-FZ-11H |
| TB-FA-26 | YARD (Phase 2) |

- The second OMA connects a high pressure air cylinder to the accumulator of Condensate Transfer System valve V-11-34 or V-11-36. These air-operated valves are used to control makeup to the Isolation Condensers. Each valve is provided with an air accumulator that provides a minimum of six full cycles. As a result, this OMA is only necessary to ensure long-term operation of these valves and makeup to the Isolation Condensers. Only five fire areas/zones (CW-FA-14, OB-FZ-6A, OB-FZ-6B, RB-FZ-1D and RB-FZ-1E) require this OMA to be utilized due to the need to make cold shutdown repairs, which may require the unit to remain in hot shutdown until the repairs are completed. The remaining 17 fire areas/zones listed below should not require this OMA to be performed since the plant could commence cold shutdown before the action is required (March 4, 2009 exemption request, Actions #17 and #18). However, the OMA will still be requested for all fire areas/zones to allow maximum capability and flexibility for plant operators.

  This OMA affects the following fire areas/zones from the Phase 2 exemption request:

| | |
|---|---|
| CW-FA-14 | OB-FA-9 |
| OB-FZ-10A | OB-FZ-6A |
| OB-FZ-6B | OB-FZ-8A |
| OB-FZ-8B | OB-FZ-8C |
| RB-FZ-1D | RB-FZ-1E |
| RB-FZ-1F3 | RB-FZ-1F5 |
| RB-FZ-1G | TB-FA-26 |
| TB-FA-11C | TB-FA-3A |
| TB-FZ-11B | TB-FZ-11D |
| TB-FZ-11E | TB-FZ-11F |
| TB-FZ-11H | YARD |

Since the balance of plant cables and instrument air lines were not modeled, a spatial separation review and fire hazards analysis of the cable locations was not performed.

The fire support procedures provide guidance to perform these OMAs if instrument air is lost. ABN-35, “Loss of Instrument Air,” indicates that there are four annunciator alarm windows that monitor instrument air pressure plus a pressure gauge on a panel in the

control room for instrument air pressure. If all of these instruments are not available, then ABN-35 further indicates that the control rods will start to drift into the core and the main steam isolation valves (MSIVs) (plant configuration assures that indication would be available for one valve on each train) will close, as well as multiple air-operated valves changing state. Also, reactor pressure vessel (RPV) level indication is available for all fire areas/zones. All of these indications would help the operator diagnose the loss of instrument air. In addition, OMA Item #12 listed above essentially duplicates the Emergency Operating Procedure (EOP) actions for RPV level control. Therefore, if a fire occurred in these fire areas/zones and was not immediately discovered, any delay in the entry into the appropriate Fire Support Procedure (FSP) or delay in suppression of the fire would not significantly affect the performance of this OMA, since the EOPs would direct the same action to be performed if required.

The two OMAs discussed above are not time critical with the time being 204 minutes (three hours and 24 minutes) for aligning the CRD System, and five hours for providing makeup to the Isolation Condenser accumulators.

2. **Fire Water Valve Generic OMA Response**

The Isolation Condenser shell side make-up is provided by either the demineralized water system, the condensate transfer system, or the fire protection system. The FSSD analysis only credits the condensate transfer system or the fire protection system. The OCNGS original design of the condensate transfer system is such that both condensate transfer pumps are powered from the "B" train of power (MCC 1B32). Therefore, both pumps will potentially lose power because of the fact that the "B" train of power may be lost due to a fire in the fire areas/zones listed below. When the condensate transfer system is not available, the fire water system provides a redundant means to provide makeup to the isolation condensers via manual valves. The "A" train of power is the Safe Shutdown Success Path SSC for these fire areas/zones. The fire protection system is not dependant on the "A" or "B" train of power since the fire protection system valves are manual valves and not associated with either train of power. The fire diesels have their own batteries that are installed locally (remote out building) by the diesels. The fire diesels start automatically upon demand based on a decrease in fire water system header pressure. Therefore, utilizing the fire protection system when the "B" train of power is not available requires this OMA (March 3, 2009 exemption request, Item #7, and March 4, 2009 exemption request, Action #2).

This OMA affects the following fire areas/zones from the Phase 1 exemption request, with the exceptions noted below:

| | |
|---|---|
| OB-FZ-6B | OB-FZ-8A |
| OB-FZ-8B | OB-FZ-8C |
| TB-FA-11F | TB-FZ-11C (Phase 2) |
| CW-FA-14 | TB-FZ-11D (Phase 2) |
| TB-FZ-11H | TB-FA-26 (Phase 2) |

**RAI-07 Initiation of Procedures**

Section lll.C of the March 4, 2009, request states that the timeline for operator actions for a specific fire area assumes that all potential fire damage identified for that fire area occurs instantaneously at the point of plant shutdown. This section also states that the procedural

direction in ABN-29, "Plant Fires," requires that the Fire Support Procedures (FSPs) be entered as soon as the existence of a fire is confirmed.

The requests lack a detailed description of the series of events that may occur prior to initiating the OMA. Specifically, the requests do not describe the conditions that must be satisfied in order for operators to enter the FSP containing the OMA. For example, it is not clear if the analysis assumed an initiating time (i.e., Time 0) as the time at which the fire is detected, the time at which the fire is determined to pose a threat to safe shutdown equipment, the time the reactor is scrammed, the time that a spurious signal or actuation is observed in the control room, or some other point in the fire scenario.

RAI-07.1: Since the point of plant shutdown could be considerably later than the time the fire was first confirmed, provide a technical justification to support the validity of the chosen time line.

**RESPONSE**

Generally, operator training and procedural guidance places importance on not relying on a single indication in order to make a decision. Fire diagnosis also follows this protocol. A confirmed fire is defined in operations procedures, guidance, and training as multiple complimentary indications that a fire exists. Examples of indications or symptoms that would be considered a confirmed fire include:

- Fire detection alarm and equipment malfunction indication or alarms within the same area;
- Fire pump start and either sprinkler flow alarm or deluge flow alarm;
- Gaseous suppression system actuation;
- Report from the field of an actual smoke condition or actual fire condition.
- Fire detection alarm with follow up confirmation by field operator.

While an incipient fire may not cause a detection alarm, an incipient fire would also not be of concern in terms of damaging significant amounts of plant equipment. Subsequently, if the fire continues to propagate causing a detection alarm, an operator would be dispatched and would likely be able to extinguish this type of fire using available fire protection features (e.g., fire extinguishers, etc.). If the fire is too large for the responding operator, then the fire brigade would be dispatched. Any fire of greater significance than an incipient fire would generate multiple indications immediately, and therefore be classified as a confirmed fire immediately.

Once a fire is confirmed, the operator will enter the FSP for the affected area. Entering the FSP means that the operator will review the FSP, identify equipment that could be affected, identify equipment that will be available, monitor plant equipment from the control room and communicate with the fire brigade leader. Based on the symptoms received in the control room and the feedback from the fire brigade leader, the operator will decide using the procedure what mitigating actions are necessary. The FSPs will be used in conjunction with the EOPs and the ABNs.

Although it is true that the point of plant shutdown could be considerably later than the time the fire was first confirmed, the OMAs involving control of plant critical functions (i.e., decay heat removal) are only required after the shutdown has occurred. This shutdown point is

independent of the FSPs, and therefore, is not a requirement for entry into these procedures. In the event that a plant shutdown has occurred before the FSP is entered, the operator will still enter the FSP based on the fire and initiate the OMAs as appropriate.

From an OMA timeline perspective, the worst case scenario is if the plant is scrammed and all OMAs have to be implemented at the point of the scram (T=0). For example, tripping of the recirculation pumps has to occur 30 minutes after the scram while the Isolation Condenser make-up would have to be provided within 45 minutes after initiating the Isolation Condenser. Likewise, the loss of instrument air itself does not require an OMA. It is when the plant scrams (MSIVs close due to loss of instrument air, control rods drift in on loss of scram air header pressure) that the OMAs would be required (e.g., bypassing the CRD flow control valve).

Other fire scenarios, where shutdown is delayed, provide a lesser impact on the operators and provide operators with more overall time to implement the OMAs.

The assumptions used in development of the timelines for this submittal assume a reactor scram early in the event to ensure the greatest challenge to operator response is evaluated.

RAI-07.2: 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 and/or technical justification to evaluate scenarios where the redundant components are damaged, before a fire has been detected.

**RESPONSE**

Attachment 2 provides a detailed discussion of the detection and suppression systems that are installed in the affected fire areas/zones and provides a fire hazards analysis for the redundant cables. Fires that would be postulated to create heat release rates sufficient to damage cables will produce smoke and heat of a magnitude to promptly actuate detection in the vicinity of the cable subject to fire damage. The two types of fires that could damage cables are as follows:

1) Failures of electrical equipment (switchgear, load centers and MCCs). Failures of these components will be immediately identified in the control room due to associated alarms on the loss of components and electrical supplies.

2) Lube oil or transformer liquid fires create high heat and smoke conditions that will be immediately identified by installed detection or suppression systems or by the catastrophic failure of the equipment itself. Unit Sub Station (USS) transformers are located in Fire Zones OB-FZ-6A (transformer liquid approximately 15% of loading), OB-FZ-6B (transformer liquid approximately 30% of loading), CW-FA-14 (two transformers in outside area) and TB-FZ-11D (two transformers and Hydrogen seal oil, which is approximately 55% of loading) and the failure of this equipment would be quickly recognized by the loads that were lost. However, the transformer liquid fire is expected to be short in duration. Refer to fire area/zone descriptions in References 1 and 2 for more detailed information on the transformer liquid installed at OCNGS. Fire Zone OB-FZ-8A has lube oil in the Recirculation Pump MG sets (oil approximately 83% of loading) while Fire Zone TB-FZ-11B has a lube oil storage

tank for the Turbine (oil is approximately 99% of loading) and the loss of the Recirculation Pump or Turbine will be immediately obvious to the control room.

The loss of certain equipment results in a control room alarm. Receipt of a plant equipment alarm alerts the control room of the condition and equipment operators would be dispatched to investigate. OCNGS procedure ABN-29 is entered whenever a fire or indication of a fire occurs on the main fire alarm panel in the control room or at any local fire alarm panel. The procedure also dispatches a radio-equipped operator to the alarming location. In addition, the procedure dispatches the fire brigade when a fire suppression system has actuated (sprinkler, deluge, Halon, $CO_2$) or a fire is confirmed. ABN-29 directs immediate entry into the Fire Support Procedure for the affected fire area. OMAs that are considered “prompt” are identified in both ABN-29 and in the applicable Fire Support Procedures as an item requiring immediate attention.

**RAI-08 Prompt Actions**

The March 3, 2009, request states that the shutdown methodology incorporates both "symptom based" and "prompt" (prescriptive) OMAs.

RAI-08.1: For each of the OMAs, identify the type of action being performed (prompt or symptom based) and provide a discussion of the required time versus the observed or calculated completion time.

**RESPONSE**

Refer to Attachment 5 for whether the action is prompt or symptom based and refer to the March 4, 2009 exemption request, Section III.B, for the required time versus the calculated completion time (Allowable Time Limit from Section III.B tables). In addition, refer to Attachment 6 (RAI-06 response), Time Available column, which correlates to the required time requested above and the Implementation Time column, which correlates to the calculated completion time requested above.

RAI-08.2: For "symptom based" OMAs, provide a justification to support the time assumed to be available to perform the actions, including confirmation that there is adequate time for the operators to diagnose the need for the actions, travel to action location(s), perform the actions, and confirm the expected response before an undesired consequence occurs.

**RESPONSE**

Refer to Attachment 5 for a discussion of each OMA and estimated diagnostic time. Also, refer to the March 4, 2009 exemption request, Section III.B, for the generic diagnostic time allotted, travel time, action time, allowable time and margin available. Each OMA was determined to be feasible.

RAI-08.3: For OMAs identified as "Prompt Actions," provide a justification for selecting 45 minutes for classifying OMAs as "Prompt Actions," and clarification and justification of when this 45 minute time period is assumed to start.

**RESPONSE**

The use of 45 minutes to designate "prompt actions" was chosen based on the use of a single Isolation Condenser (IC) without additional make-up to the shell of the condenser. For extended use of an IC, a make-up source must be established by the end of the 45 minute period or continued use of the IC is not available. This is not dependent upon whether or not symptoms are available.

The 45 minutes in this case starts when the IC is first initiated. This will always be subsequent to a scram/shutdown of the reactor, so the action time cannot start until the reactor is shutdown.

Operators will take action early in the use of the IC to make-up to the shell of the condenser using the Demineralized Water or Condensate Transfer Systems. This action is specified in the FSPs taking credit for use of the ICs. In the event that these sources are unavailable or unreliable, the FSPs direct the operators to establish an alternate make-up source using the Fire Water System. Using the generic 10 minutes for diagnosis of the need to use alternate make-up sources still provides sufficient time to line-up Fire Water as the IC make-up source. As indicated in Attachment 5, the diagnostic time is expected to be less than 10 minutes.

**RAI-09 Time and Sequence Assumptions**

An action is considered feasible if it is shown that it is possible to be performed within the available time (considering relevant uncertainties in estimating the time available). The tables provided in Section III.B of the March 4, 2009, request do not provide a clear justification for determining feasibility. For example, the notes accompanying the table state that the "allowable time limit" was obtained from safe shutdown calculations and it is not clear whether any diagnosis time has been accounted for.

RAI-09.1: Provide a justification that demonstrates that the proposed OMAs are feasible.

**RESPONSE**

Diagnostic Time

A diagnostic time (generic 10 or 30 minutes was used) was applied to the first OMA performed for each operator (operators 3 and 4 in Section III.B Tables of the March 4, 2009 exemption request). In Section III.B, under the Consideration of Combined Operator Manual Actions, it states that other than for prompt actions (those that require completion in 45 minutes or less), the diagnostic time is assumed to be 30 minutes, which is conservative as discussed under Section III.C, "Review of Operator Manual Actions," in Reference 2.

In Reference 2, Section III.C, Step 1, under Diagnosis, it states “Each of the safe shutdown calculations that provide the technical basis for the FSPs contains a timeline for operator actions for the specific fire area. This timeline assumes that all potential fire damage identified for that fire area occurs instantaneously at the point of plant shutdown. The safe shutdown calculation timeline considers a generic 10 or 30-minute diagnosis time (depending upon whether the action is prompt or not) to assess the need for operator actions."

The first time that the operator is dispatched, a generic diagnostic time of either 10 minutes (prompt action) or 30 minutes (for the remaining actions) was applied and, since the control room staff will be in a state of continual diagnosis in parallel with the safe shutdown operators performing their actions, no additional diagnosis time was allotted for subsequent actions for the same operator. This application of generic diagnostic time can be seen in Column 4 of the Section III.B tables in Reference 2 for the first OMA performed by each operator.

Walk down Time

Also, under Column 4 description in Section III.B of Reference 2, it states “Provides the walk down time plus the time to obtain any required portable equipment, PPE, etc." Therefore, included in this column for each OMA is the time to travel to the location of the OMA as well as the time for obtaining and donning any equipment needed to perform the OMA.

Once the safe shutdown operator completes the first (or subsequent) action, the total time for that action, as listed in Column 6 of Section III. B of Reference 2, is utilized as the starting time of the subsequent action (actions are shown in series with each other).

Time to Execute

Column 5 of the Section III.B tables of Reference 2 documents the time determined in the safe shutdown calculations for the performance of each OMA. This time was determined through detailed and multiple operator walk downs and interviews. Additional time was added for multiple components and extra time was added to account for different response times of different operators in accordance with the guidance of NUREG-1852.

Total Time

Column 6 of the Section III.B tables of Reference 2 documents the sum of the times in Columns 4 and 5 to provide a conservative time for each OMA. This time includes the required diagnostic time, time to actually get to the area, and the time for preparation and performance of each OMA.

This total time is compared to the time available to perform the OMA (Column 7, "Allowable Time Limit," of Reference 2) to ensure that margin exists between the time required to perform an OMA under worst case conditions and the time available to perform this action.

Locations of OMA

All OMAs contained in the Section III.B tables of the March 4, 2009 exemption request for Phase 2 OMAs are performed in locations other than the affected fire zone or area that requires the mitigating action. In addition, the walk down path for each OMA used to determine the walk down times discussed above does not lead through any area or zone that requires the mitigating action. Any equipment or personnel protective equipment that is required is located within access of the area where the OMA is located, and sufficient lighting exists to allow access to the area and performance of the OMA. For Phase 1 OMAs that require re-entry, refer to the response to RAI-11.

Based on the above discussions it has been determined that it is feasible to perform each OMA as described in the safe shutdown calculations.

RAI-09.2: 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 for how it has been incorporated into the timelines. If not, justify why the stated times are sufficient to assure safety.

**RESPONSE**

Phase 1 response

It should be noted that there was no requirement to compare the OMAs from the March 3, 2009 exemption request (Phase 1) to NUREG-1852 since these OMAs were previously reviewed and accepted by the NRC. A feasibility review was completed for these OMAs.

NRC Triennial Inspection Report 05000219/2008008, dated July 28, 2008, reviewed Fire Zones OB-FZ-04, OB-FZ-6A, OB-FZ-8C and RB-FZ-1E. The report states the following in the report details section:

> "The team reviewed the adequacy of procedures utilized for post-fire shutdown and performed an independent walk through of procedure steps to ensure the implementation and human factors adequacy of the procedures. The team also verified that the operators could be reasonably expected to perform specific actions within the time required to maintain plant parameters within specified limits. Time critical actions which were verified, included restoration of alternating current (ac) electrical power, establishing the remote shutdown and local shutdown panels, establishing reactor coolant makeup, and establishing decay heat removal."

The report further stated:

> "The team reviewed manual actions to ensure that they had been properly reviewed and approved and that the actions could be implemented in accordance with plant procedures in the time necessary to support the safe shutdown method for each fire area."

No deficiencies were noted in any of the areas that were reviewed during the triennial fire inspection.

Phase 2 response

Refer to Section III.C of the March 4, 2009 exemption request (Phase 2) under the review of OMAs against NUREG-1852 in Step 2, "Adequate Time Available to Ensure Reliability." It states the following:

"There are several sources of conservatism built into the time analysis for the manual actions. First, the fire safe shutdown calculation for each fire area identifies all the potential instruments and equipment that could fail as a result of the fire in that specific fire area. The FSPs have captured the worst-case loss considerations by assuming all fire damage occurs instantaneously and thus all operator manual actions will be required. However, in a real fire event, it is not credible that all the potential fire damage will occur instantaneously. The use of the EOPs in conjunction with the applicable FSPs will permit the use of any mitigating system available first, and if a desired system is not available, the FSP provides a contingency action to restore the system or provide another means to perform the function. The initiating fire zones with the least amount of time margin are the Turbine Building fire zones (TB-FZ-11B, 11C, 11D & 11E) and the A/B Battery Room fire zone (OB-FZ-8C). These fire zones have fire suppression on the significant combustible hazards in the area as described in the OCNGS FPP. Furthermore, the Turbine Building fire zones are large areas, which supports the conclusion that it is not credible that all potential fire damage will occur instantaneously.

A second source of conservatism is the assumption of a 30-minute generic diagnostic time, except when there is a prompt action; for prompt actions, 10 minutes is utilized. The control room operators will know a fire condition exists from the onset of the event. They will also be aware of the location and size of the fire based on reports from the fire brigade. Procedural direction in ABN-29, "Plant Fires," requires that the FSPs be entered when the existence of a fire is confirmed. Thus, the control room will be in a position to closely monitor for the malfunctions discussed in the FSPs and dispatch operators to perform contingency actions in the FSPs earlier in the event than 30 minutes, and may be able to anticipate the potential for the contingency actions before the postulated fire damage were to occur. The conservatisms factored into this generic diagnostic approach to the operator manual actions used at OCNGS provides a level of additional margin.

A third source of conservatism is that the times documented in the safe shutdown calculations are more conservative than the equipment operator validation times. Two different crews were utilized for the validation times and the times for each crew were generally close to each other, and were less than the times specified in the safe shutdown calculations.

Finally, the assumption that all the required fire actions would have to be performed concurrently is not representative of conditions anticipated in real fire conditions. The Individual Plant Evaluation of External Events (IPEEE) for fire and a subsequent fire PRA performed for OCNGS found that, in most cases, the in-situ hazards within the fire area would not create a fire event of a magnitude sufficient to damage cables or equipment to require any operator manual actions. Also, CAROLFIRE (Reference 10) and NEI/EPRI fire testing (Reference 11) showed that spurious actuations do not occur immediately in a fire event. CAROLFIRE stated that there are many variables such as the relative location of various cables relative to the fire source, the routing configuration (e.g., open cable trays or air drops versus conduits), the thermal robustness of the cable insulation material, and the characteristics of the fire source. Cable trays in most locations in the Turbine and Reactor Buildings at OCNGS are approximately 10 feet off of the ground (except for the vertical cable trays), which will provide some additional time

until the fire affects these cable trays. Also, the majority of the cable trays are protected by a suppression system in the affected fire areas.

Uncertainties in performance of operator manual actions in a real fire event such as unanticipated environmental conditions (e.g., inclement weather), human performance issues (e.g., emotional response to the event, cognitive differences) and equipment issues (e.g., locked doors, stiff valve hand wheels) can occur. Foreseeable impediments such as smoke, heat, and dose have been addressed, as discussed below in Section III.C.3. The additional time to perform the actions in the event that uncertainties are encountered are enveloped by the combination of the time available to perform most of the actions as described in the individual action summaries in Attachment 2 and in the conservatisms built into the Appendix R analysis as described above."

Any prompt actions (i.e., those that must be done within 45 minutes or less) identified for a specific fire area are prescribed at the front of the applicable FSP. With the prompt action identified at the beginning of the FSP, the operators are trained to perform prompt actions first and prioritize them based upon existing plant conditions. Operator training, including simulator demonstrations and plant walk downs, has been performed to ensure consistency in operator and team response for each OMA.

Based on the discussion above, there is sufficient margin to meet the allotted time assumed in the safe shutdown calculations.

RAI-09.3: For each of the OMAs contained in the requests, describe the circumstances and criteria needed to enter the OMA procedure and identify:

1) Fire area of fire origin -the fire area, or zone, in which the postulated fire event occurs.
2) OMA location -the fire area in which the associated OMA is performed.
3) Time available -the period of time from a presentation of a cue for an action to the time of adverse consequences if the action is not taken.
4) 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.
5) Implementation time -the time required by the operator(s) to successfully perform the manipulative aspects of an action (i.e., not the diagnosis aspects themselves, but typically as a result of the diagnosis aspects), including obtaining any necessary equipment, procedures, or other aids or devices; traveling to the necessary location; implementing the action; and checking that the action has had its desired effect.

**RESPONSE**

The circumstances and criteria needed to enter the OMA procedure (i.e., the FSPs), are described in the response to RAI-07. Attachment 6 was created to summarize the time required for diagnosis and implementation time for performance of an individual OMA. For the combined performance of all OMAs for a particular fire area/zone, refer to Section III.B.3 tables of the March 4, 2009 exemption request. The specific information requested in Items 1 through 5 is addressed below.

1. Refer to the Attachment 6 Table, Column 5.
2. Refer to the Attachment 6 Table, Column 4.
3. Refer to the Attachment 6 Table, Column 8.
4. Refer to the Attachment 6 Table, Column 6 for the generic diagnosis times (refer to the response to RAI-09.1 for more detailed information). Also, refer to Attachment 5 for expected actual diagnosis times.
5. Refer to the Attachment 6 Table, Column 7.

**RAI-10 Fire Zone Proximity and Access**

The requests state that the performance of certain OMAs may require the use of a self-contained breathing apparatus (SCBA). The submittal includes a discussion of circumstances and features that may preclude the need for SCBAs.

For example, Section IV.B.6 of the March 3, 2009, request states that for a fire in OB-FZ-8C actions 17 and 18 may require the use of SCBAs for either traveling to the "C" or "D" 4160V Switchgear Rooms, or if $CO_2$ is present in the area. However, the discussion then provides a rationale for why operators would not be expected to need SCBAs to perform these actions. As a result, it is not clear if the discussion of the use of SCBAs is intended to portray environmental conditions operators may be reasonably expected to encounter or if the request is seeking staff approval of the rationale provided so the need for SCBAs may be eliminated.

RAI-10.1: State whether operators are procedurally directed to don SCBAs and whether the time needed to don the SCBAs was included in the analysis of the time available to perform the action.

**RESPONSE**

OMAs 17 and 18 that are referred to above have been removed from the March 3, 2009 exemption request, (Reference 1). Refer to Attachment 3 for more information.

Also as stated in Section IV.B.6 of the March 3, 2009, this is only applicable to “Turbine Building fire zones,” which are Fire Areas/Zones TB-FA-3A, TB-FA-26, TB-FZ-11G, TB-FZ-11D and TB-FZ-11C and not applicable to Fire Zone OB-FZ-8C as stated above. The Walkdown Time column of the Section III.B Table of the March 4, 2009 exemption request shows that donning SCBA was accounted for in these areas except for Fire Zone TB-FZ-11G. Fire Zone TB-FZ-11G has been removed from the exemption requests (see Attachment 3 for more information).

Referring to comments in RAI-10, the discussion of the use of SCBAs in Reference 1 is intended to portray environmental conditions operators may reasonably be expected to encounter and is conservative realizing that environmental conditions are subject to numerous factors including location of and severity of the fire, and availability of HVAC systems (i.e., with or without power). However, the presence of some smoke or the worst case of heavier smoke or a $CO_2$ suppression system discharge has been considered and SCBAs made available and time provided to don them as a conservative action for operator safety.

ABN-29, “Plant Fire,” procedure identifies the necessary FSP for each of the plant fire areas/zones which provides the details related to required OMAs for these fire areas/zones.

The FSPs identify to the operators that SCBAs may be required to access the affected area due to smoke or $CO_2$.

Usage of SCBA is a field judgment by trained personnel based on as-found conditions. The time to don SCBA has been considered in the OMA time lines (5 minutes) in Reference 2. Additionally, the FSPs provide "Suggested Access/Egress Paths" along with SCBA locations, which are staged enroute to the identified OMA.

RAI-10.2: For adjacent fire areas included in the request, provide a technical justification that demonstrates that a fire in the fire area of fire origin would not impact the performance of the OMA.

**RESPONSE**

The following discussions are in regards to the March 3, 2009 exemption request:

1) Six of the OMAs (Items 2-6 and 14 from the Attachment 2 Table) are either located in the Diesel Building, intake area or yard area, and the initiating fires either occur in the Turbine Building or Main Office Building, which are separate buildings from where the OMAs occur; hence, no smoke or toxic gas issues are of concern.

2) One of the OMAs (Item 7 from the Attachment 2 Table) is in the Reactor Building, and the initiating fires either occur in the Turbine Building, Office Building or Intake Area, which are separate buildings from where the OMAs occur; hence, no smoke or toxic gas issues are of concern.

3) Three of the OMAs (Items 8, 10 and 19 from the Attachment 2 Table) occur either in "A" 480V Room (Fire Zone OB-FZ-6A), "B" 480V Room (Fire Zone OB-FZ-6B) or "A/B" Battery Room (Fire Zone OB-FZ-8C). All of these fire zones are separated from the initiating fire by rated barriers and all of the rooms have separate ventilation systems. Note: Items 10 and 19 have been removed from the exemption request, and for Item #8 there is no smoke or toxic gas issues of concern.

4) Two of the OMAs (Items 11 and 13 from the Attachment 2 Table) are in separate fire zones in the Reactor Building that have the same ventilation system. However, the ventilation system for the Reactor Building is a "once thru" type system that has no recirculation so it is not expected that the ventilation system would disperse smoke throughout the building. There are 204 minutes (3.4 hours) between the start of the event and when the OMAs have to occur. The one fire starts in Fire Zone RB-FZ-1F3 while the OMA (Item 13) is in Fire Zone RB-FZ-1F2, which are two separate corner rooms that are separated by approximately 50 feet. The second fire occurs in Fire Zone RB-FZ-1E and the OMA (Item 11) is in Fire Zone RB-FZ-1D, which is the next elevation above Fire Zone RB-FZ-1E. The fire will be extinguished and the smoke vented from the area long before the action needs to be performed. The Reactor Building has a significant volume with its high ceilings and open equipment hatches and stairwells. This provides an advantage for the types of fires that are anticipated in this area because most loading is from the cables in the trays. There will be significant dilution of smoke and self-venting to the refuel floor (Reactor Building 119'-3" elevation), which has no OMAs and also contains an automatic wet pipe sprinkler system. Additionally, for the openings between the 23'-6" to 51'-3"

elevations and 51'-3" to 75'-3" elevations, a water curtain is available (automatic or manual operation), which will provide reasonable assurance of preventing the passage of fire, smoke and hot gases and will also help with cooling and general improvement of overall environmental conditions. The operators will not have any delay nor are they likely to need SCBA to perform either of these actions. The second OMA is worked in conjunction with OMA Item 12, which for this particular OMA, the operator has to re-enter Fire Zone RB-FZ-1E. Refer to RAI-11 for more detailed information.

5) One of the OMAs (Item 16 from the Attachment 2 Table) is in the Turbine Building Switchgear Room (Fire Zone TB-FZ-11C) and the initiating fires occurred in separate fire zones in the Turbine Building Condenser Bay (Fire Zone TB-FZ-11E), Turbine Building Lube Oil Bay (Fire Zone TB-FZ-11B) or "A/B" Battery Room (Fire ZoneOB-FZ-8C). The ventilation system is a common system in the Turbine Building but the system exhausts away from the Switchgear Room towards the Condenser Bay and eventually up the plant stack (no recirculation occurs in this part of the Turbine Building). The Condenser Bay is the only fire zone that is in close proximity to the Switchgear Room. The fire zone boundary separating the Switchgear Room from the Condenser Bay is a concrete wall with all openings sealed with noncombustible materials in this area. Also, there is a pre-action sprinkler system installed on the switchgear side of the fire zone boundary and a wet-pipe sprinkler system installed on the Condenser Bay side that protects this boundary. Therefore, there should not be any fire effects for this particular OMA.

6) One of the OMAs (Item 1 from the Attachment 2 Table) may require the use of an SCBA to travel to the "D" 4160V Switchgear Room or to perform the OMA if $CO_2$ is actuated. The OMA is in the Turbine Building Switchgear Room (Fire Area TB-FA-3B) and the initiating fires are in separate fire zones but there are some unsealed openings (Turbine Building fire zones) to the areas where access/egress is required. There are open equipment hatches that exist in the northeast corner of the ceiling of the Turbine Basement (Fire Zone TB-FZ-11D), which goes to the Turbine Mezzanine (Fire Zone TB-FZ-11G) area on 23'-6" elevation. The equipment hatch also continues in the ceiling of Fire Zone TB-FZ-11G up to the Turbine Operating floor (Fire Zone TB-FZ-11A) on 46'-6" elevation. There is also a larger equipment hatch in the ceiling of Fire Zone TB-FZ-11G in the truck bay area in the southwest corner. The only access to the Switchgear Room is through Fire Zone TB-FZ-11G on the south side, which is approximately 55 feet south of the equipment hatch in the northeast corner. There is a closed-head, automatic sprinkler system installed throughout the general area in the Turbine Basement and there is a water spray system with closed head directional nozzles that protects the hydrogen seal oil unit. It is expected that the installed suppression systems will limit the amount of smoke and hot gases that rise up into the Turbine Mezzanine area; additionally, any smoke that does enter into this area will tend to continue to rise towards the Turbine Operating floor. In addition, the Turbine Operating floor large volume will dilute and stratify the smoke at the ceiling, providing for a less hostile environment at floor level. Also, the ventilation will pull the smoke towards the Turbine Operating floor as long as it continues to operate. Finally, in the area where the OMA is performed, there are two smoke detectors installed in each 4160V Vault area near the ceiling (total of 4 detectors) and the fire dampers in the "C" and "D" 4160V vaults would close immediately upon detection of smoke in either the "C" or "D" 4160V vaults.

Therefore, it is unlikely that the SCBA would be required once the operator was inside the "C" and "D" 4160V vaults. Thus, there is reasonable assurance that the Turbine Mezzanine or the "C" and "D" 4160V area environment (e.g., visibility, heat, etc.) will not reach a point that will prohibit performance of these actions.

For a fire in Fire Zone TB-FZ-11C, smoke may be present in Fire Zone TB-FZ-11G due to unsealed openings or $CO_2$ may be present due to a spurious actuation of the $CO_2$ system. The Fire Brigade will be in the area for a fire in Fire Zone TB-FZ-11C, and could assist with performing this OMA. Also, re-entry has to occur through Fire Zone TB-FZ-11C to get to Fire Area TB-FA-3B. Refer to the response to RAI-11 for more information.

This OMA is initiating Local Shutdown Panel LSP-1D to isolate damaged cable and to control the breakers required to restore power to the required "D" 4160V switchgear loads. Power needs to be restored within 45 minutes from the time that the Isolation Condenser is placed in service per the FSSD calculations so that the Condensate Transfer System can provide makeup to the Isolation Condenser. However, if access is not available due to excessive smoke, then firewater could be utilized until access is available as directed by the FSSD procedures and the EOPs. The water inventory study indicates that reactor vessel makeup would not be required for three hours and 24 minutes and the "B" Battery that is utilized for the Isolation Condenser is sized to provide power for all connected loads for up to three hours. After 60 minutes, when the fire is expected to be extinguished, the smoke/ $CO_2$ would be vented from the areas (refer to the response to RAI-11 for more information) allowing the OMA to be performed and power to be easily restored within the three hours.

7) Two of the OMAs (Items 9 and 20 from the Attachment 2 Table) may require the use of an SCBA to access the "B" 480V Switchgear Room to trip a breaker and remove its close fuse and/or to partially initiate the Remote Shutdown Panel (RSP) (operating control switches). Note that Item #20 has been removed from this Phase 1 exemption request and will not be discussed any further. Refer to Attachment 3 for more information. The barriers between the two fire zones (OB-FZ-6A and OB-FZ-6B) are rated and they both have their own ventilation system; however, fire-fighting activities may allow smoke to enter this area. The SCBA is staged in this area and the operators are all trained on the use of SCBA since they are all members of the fire brigade. It is not expected that a large amount of smoke will be in this area because the initiating area is protected by automatic Halon system and the fire brigade is trained to allow a 20-minute soak time before entering. Additionally, if the first discharge did not work, then a second discharge of Halon will be initiated with another soak time. The OMA would not have to be performed for at least 180 minutes; therefore, if necessary, the actions could be delayed until the fire is extinguished and the area vented. Also, the five fire brigade members would be in the area to assist since they would be in standby while the Halon was soaking.

8) One of the OMAs (Item 12 from the Attachment 2 Table) requires re-entry into the fire zone (RB-FZ-1E) where the fire initiated (refer to the response to RAI-11 for more information). The action is to manually manipulate three two-inch valves that are located within approximately four feet of each other. There are 204 minutes between the start of the event and when the actions need to occur to restore CRD

flow. The fire will be extinguished and the smoke vented from the area long before the action needs to be performed. The operators will not have any delay or need SCBA to perform this action. SER dated June 25, 1990, Section 3.3.2 (Reference 7), approved operating one of the valves (V-15-30) and the SER concluded the following:

> "Since the fire in this fire zone would not be of significant magnitude, the duration of the fire will be short due to automatic extinguishment or extinguishment by the plant fire brigade. The valve is located within the spray area of a deluge system and the heat conduction to the water filled piping will provide cooling of the valve. The valve is not required to operate for almost 3.5 hours after the fire. Therefore manual operation of the valve is considered to be achievable without the addition of any further protection."

9) Three of the OMAs (Items 15, 17, and 18 from the Attachment 2 Table) have been removed from this exemption request, and will not be discussed any further. Refer to Attachment 3 for more information.

The following discussions are in regards to the March 4, 2009 exemption request:

1) Seven of the OMAs (Actions 1 through 3, 5, 6, 7, and 8 from the Attachment 2 Table) are either located in the Diesel Generator Building, Office Building or Reactor Building area, and the initiating fires occur in the Turbine Building, which is a separate building from where the OMAs occur and access/egress will not be affected. Note: Actions #5 & 6 have been removed from the exemption request. Refer to Attachment 3 for more information.

2) Two of the OMAs (Actions 9 and 18 from the Attachment 2 Table) are in the Reactor Building and the initiating fire occurs either in the Yard Area, Diesel Generator Building, Office Building or Turbine Building, which is a separate area from where the OMAs occur and access/egress will not be affected.

3) One of the OMAs (Action 17 from the Attachment 2 Table) is in a separate fire zone in the Reactor Building (RB-FZ-1B) from the initiating fire zones (RB-FZ-1D, RB-FZ-1E, RB-FZ-1F3, RB-FZ-1F5, and RB-FZ-1G) that share the same ventilation system. However, the exhaust from these zones goes directly to the plant stack and does not recirculate in the affected fire zones. Note that there are other initiating fire locations for this action but they are all located in separate buildings and no further discussion is required to address this action for those fire areas/zones. There are 300 minutes provided in the safe shutdown calculation between the start of the event and when this OMA has to occur. Therefore, the fire will be extinguished and the smoke vented from the area long before the OMA needs to be performed. In addition, the Reactor Building has a significant volume with high ceilings and open equipment hatches and stairwells. This will provide an advantage for the types of fires that are anticipated in this area. There will be significant dilution of smoke and self-venting to the refuel floor (Reactor Building 119'-3" elevation), which has no OMAs and also contains an automatic wet pipe sprinkler system. Additionally, for the openings between the 23'-6" to 51'-3" elevations and 51'-3" to 75'-3" elevations, a water curtain is available (automatic or manual operation), which provides reasonable assurance that the water curtain will prevent the passage of fire, smoke and hot gases and will

also help with cooling and general improvement of overall environmental conditions. The operators will not need an SCBA to perform this action and the action can be performed within the allotted time.

4) A number of the OMAs (Actions 4, 10, 11, 12, 13, 14, 15, and 16 from the Attachment 2 Table) have been removed from the exemption request and will not be discussed any further. Refer to Attachment 3 for more information.

RAI-10.3: State whether identified ventilation systems are used for smoke evacuation or fire brigade operations and provide a justification for the systems capabilities.

**RESPONSE**

The pre fire plans include discussion on supply and exhaust fans designated for affected fire areas. If the normal ventilation systems are available (e.g., no thermal links actuated on dampers, no cable failures, etc.), then the installed plant systems are the preferred way to ventilate a fire affected area. The majority of the OCNGS ventilation systems have a bypass feature that allows the operation of the normal system with smoke detectors actuated. The Plant Fires Procedure (ABN-29) also provides information regarding the need to re-open fire dampers, which may have closed due to a fire. OCNGS does not have separate smoke removal documented evaluations; however, there is reasonable assurance that the supply and exhaust system, which have provided adequate conditions during temperature extremes (e.g., Summer, etc.) will be adequate to provide smoke removal thru designed air exchanges provided. The ventilation system capabilities are available on plant P&IDs, and design calculations are available to demonstrate air exchange capabilities in support of plant equipment.

If normal ventilation is not available (e.g., loss of power or equipment damage), then the fire brigade has multiple exhaust fans and flexible ducts that are stored in the fire brigade area that would be utilized to ventilate fire areas. The fire brigade has portable smoke ejectors starting at 3200 cfm. The fire brigade training program includes exercises on the use of this portable ventilation equipment, and provides guidance on the routing of the exhaust duct (e.g., outdoors, to an area capable of using plant systems for exhaust or to a larger volume area providing adequate dilution). Operators and fire brigade members are also aware of the capabilities of the offsite fire department, and if this was an Appendix R fire, offsite assistance would be called and obtained in a timely manner as was experienced during a transformer fire in 2009. The offsite fire department can assist with more portable ventilation equipment, including portable generators if needed.

If portable smoke ejectors are used they are capable of quickly ventilating most small to moderate size rooms (e.g., battery room, switchgear room, reactor building corner rooms, etc.); however, they are less effective for the larger areas such as open floor areas in the reactor building, turbine building mezzanine, etc. As previously stated, both of these areas are large volumes and contain equipment hatches that communicate to significant volumes above. Also, both areas have at least partial automatic suppression systems. In addition, the turbine mezzanine area (Fire Zone TB-FZ-11G) has a truck bay roll-up door that is available to assist ventilating this area.

**RAI-11 Fire Area of Origin Re-entry**

Section III.B of the March 4, 2009, request states that, depending on the fire scenario, operators may be required to re-enter certain fire areas, including Fire Zone TB-FZ-11C and TB-FA-26 to perform an action following a fire event. However, Sections III.C.3 and III.C.4 state: *"all operator manual actions addressed in this exemption request are performed in separate fire zones from the initiating fire area (no re-entry required)."*

The March 3, 2009, request states that operators are required to re-enter certain fire areas, including RB-FZ-1E and RB-FZ-1F to perform an action following a fire event and that the assessment of OMAs in fire-affected areas assumes that the area can be reentered within 90 minutes. The request also indicates that all unprotected equipment located in a fire affected area or zone is assumed lost or damaged as a result of the fire.

RAI-11.1: Confirm whether reentry is required and whether unprotected equipment is assumed lost or provide a justification for why the assumption that all equipment located in the fire area of origin is lost during a fire does not apply.

**RESPONSE**

There are three fire areas/zones that require re-entry which are described below. Also, refer to Attachment 2 for additional fire hazards analysis for these fire areas/zones.

RB-FZ-1E Reactor Building El. 23'-6"

When CRD is credited for Reactor Inventory makeup, a single CRD pump is required within three hours and 24 minutes. Although the two CRD pumps are fed from redundant safety-related power supplies, the normal CRD flow control valve is a single component and does not have a redundant counterpart available for use from the control room. This valve may fail to operate due to control or power cable damage, or due to the fire-induced loss of instrument air. If the normal flow control valve were not available due to the loss of instrument air or cable damage, then the operator would have to manually align three manual valves to bypass the flow control valve.

CRD Flow Gauge FI-225-998 is located in Fire Zone RB-FZ-1D. Re-entry is required into Fire Zone RB-FZ-1E to manually control CRD System valves V-15-237, V-15-30 and V-15-52 located in this fire zone while monitoring flow at FI-225-998 to establish CRD flow to the reactor due to the loss of instrument air to the CRD flow control valve. These valves are physically located within the spray area of the automatic localized fixed water spray deluge system (cable trays) in this fire zone which is actuated by a cross-zoned fire detection system in this fire zone.

An exemption was granted in NRC SER dated June 25, 1990 from Appendix R, Section III.G.2 for not providing either additional separation from in-situ combustibles or protection for CRD System valve V-15-30. Valves V-15-237, V-15-52 and V-15-30 are physically within four feet of each other; therefore, the technical basis of the exemption is considered to be equally valid for these two additional valves.

RB-FZ-1F3 Reactor Building Northwest Corner El. -19'-6"

The CRD system is designed such that both CRD system pumps and associated redundant circuits are located in this fire zone. Re-entry is required into this fire zone to perform the OMA which is to align core spray valve V-20-1 to provide Reactor Coolant Makeup using a

Core Spray Pump instead of the CRD pump. This action is not required for at least three hours and 24 minutes.

As indicated in the March 4, 2009 exemption request, an exemption was previously granted in NRC SER dated June 25, 1990 from Appendix R, Section III.G.2 for re-entry into the fire zone and manually operating core spray valve V-20-1 based on not providing either additional separation from in-situ combustibles or protection for the valve.

TB-FA-26 125V DC Battery Room C and TB-FZ-11C 4160V Switchgear Room 1A and 1B
Section III.C.3 of the March 4, 2009 exemption request states “The potential impact of smoke on the ability to perform the operator manual actions is addressed for each manual action as described above. For this exemption, none of the operator manual actions require re-entry into the initiating fire area to perform the operator manual actions."

Section III.C.4 of the March 4, 2009 exemption request states “As identified in the section above, regarding Environmental Factors, all operator manual actions addressed in this exemption request are performed in separate fire zones from the initiating fire area (no re-entry required)."

These statements were indicating that the March 4, 2009 exemption request OMAs did not require re-entry because the OMA that would require traversing Fire Zone TB-FZ-11C is utilizing LSP-1D, which is a Phase I OMA exemption request (addressed by the March 3, 2009 exemption request, Attachment 2, Item #1). Section III.B of the March 4, 2009 exemption request tabulates all of the OMAs from both Phase 1 and Phase 2.

This fire area and zone covers the "C" Battery Room and Switchgear Room 1A and 1B which is the west end of the Turbine Building on Mezzanine Level 23'-6" elevation. Fire Zone TB-FZ-11C totally envelopes Fire Areas TB-FA-3A/3B and TB-FA-26. Entrance into Fire Area TB-FA-3B can be accomplished by either going through the main portion of Fire Zone TB-FZ-11C (where 'A' and 'B' switchgear are located), or entering through the east side of Fire Area TB-FA-3A, which is adjacent to Fire Area TB-FA-3B.

The OMA required by the safe shutdown analysis for a fire in these two locations is to actuate LSP-1D. Re-entry is required into this fire area/zone to perform OMAs in different fire areas (TB-FA-3A/B). The reason re-entry is required into this fire area/zone is because operators would require traversing Fire Zone TB-FZ-11C (not Fire Area TB-FA-26) to access equipment to perform OMAs in separate Fire Areas TB-FA-3A/B if a fire were to occur in Fire Zone TB-FZ-11C. A fire in Fire Zone TB-FZ-11C or Fire Area TB-FA-26 will not cause a loss of equipment in Fire Areas TB-FA-3A/B. For details on the acceptability of fire area/zone boundaries discussed above, refer to the supporting fire hazards analysis provided in Attachment 2.

RAI-11.2: Provide critical details or assumptions 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**

This response is applicable to the three fire areas/zones described below. Also, refer to Attachment 2 for additional fire hazards analysis for these fire areas/zones.

RB-FZ-1E Reactor Building El. 23'-6"
As documented in NRC SER dated June 25, 1990, if a fire were to occur in this fire zone, it would not be of significant size or duration due to the low combustible loading and the nature of the combustibles. Prompt detection and extinguishment of the principal combustible, cable insulation, will be accomplished by the automatic localized fixed water spray deluge system (cable trays) and/or by plant fire brigade. Fusing of the unprotected valves V-15-237, V-15-30 and V-15-52 by heat from a fire resulting in the valves becoming inoperable is not considered credible because of the low fire loading in the vicinity of the valves, the provision of automatic fire detection and suppression, manual suppression capability and the heat sink capability of the water filled piping connected to the valve.

RB-FZ-1F3 Reactor Building Northwest Corner El. -19'-6"
As documented in NRC SER dated June 25, 1990, if a fire were to occur in this fire zone, it would not be of significant size or duration due to the low combustible loading and the nature of the combustibles. Prompt detection and extinguishment will be accomplished by the plant fire brigade. Fusing of the unprotected valve V-20-1 by heat from a fire resulting in the valves becoming inoperable is not considered credible because of the negligible fire loading, the provision of automatic fire detection and manual suppression capability and the heat sink capability of the water filled piping connected to the valve.

TB-FA-26 125V DC Battery Room C and TB-FZ-11C 4160V Switchgear Room 1A and 1B
As stated in the response to RAI-11.1 above, the required equipment in Fire Area TB-FA-3B remains free of fire damage for a fire occurring in Fire Zone TB-FZ-11C or Fire Area TB-FA-26. The safe shutdown analysis credits using CRD Hydraulic "B" and Isolation Condenser "A" for hot shutdown in the event of a fire in this fire zone. If access is not available to the 4160V area as determined by the fire brigade leader, then makeup to the Isolation Condenser will be done using fire water (OMA Actions 2, 7 and 8 on Attachment 2 of March 4, 2009 exemption request) until access is available. Fire Zone TB-FZ-11C will be accessible to allow operators to reach required equipment in Fire Area TB-FA-3B within 90 minutes as assumed in Section III.B of the March 4, 2009 exemption request.

RAI-11.3: Provide a technical justification for why the assumed 90-minute reentry period is appropriate and an explanation for what is assumed to be included in this time.

**RESPONSE**

This response is applicable to the three fire areas/zones described below. Also, refer to Attachment 2 for additional fire hazards analysis for these fire areas/zones.

RB-FZ-1E Reactor Building El. 23'-6"
For a fire initiating in this fire zone, two radio equipped operators would be required to manually adjust CRD system flow. One operator would re-enter Fire Zone RB-FZ-1E to manually operate the valves while the second operator would monitor the flow indicator on a different elevation (Fire Zone RB-FZ-1D) than the valves. The operator can re-enter Fire

Zone RB-FZ-1E as soon as the fire is out but it is assumed that the fire would be detected and extinguished in this fire zone in 60 minutes for analysis purposes allowing re-entry within 90 minutes. Operators would take approximately 100 minutes (one hour and 40 minutes) for access to the areas and for performing the actions, which is well within the allotted time of three hours and 24 minutes with sufficient margin to ensure completion of the task.

90 minutes was conservatively selected based on the following:

- There is area-wide detection in this area but the open head deluge system is only installed on the majority of the cable trays in this area. An exemption was granted in NRC SER dated June 25, 1990 from Appendix R, Section III.G.2 for not having area-wide suppression and this was based on low combustible loading, automatic fire detection capability which alarms locally and in the control room, and the fact that two automatic open-head water spray deluge systems are installed to protect the cable trays, the open equipment hatch and open stairwell. Each deluge system is controlled by its own cross-zoned automatic fire detection system. Standpipe and hose station and portable extinguishers for manual fire fighting capability supplement the automatic fire suppression capability. Therefore, the exemption concluded that any fire in Fire Zone RB-FZ-lE, elevation 23 feet, will be promptly detected and extinguished, and that automatic fire suppression need not be expanded to provide coverage for the entire zone.

  In addition, the deluge system would provide a significant cooling affect in this area, thus retarding the formation of a hot gas layer and subsequent flashover conditions.

- Attachment 3 to NRC letter to GPUN, "August 1985 Progress Review Meeting on Licensing Actions," dated October 29, 1985 (Reference 16), states: "Manual actions are required within 45 minutes for postulated fires in numerous locations. Credit cannot be taken for manual actions, within the affected fire areas, in less than 1 hour."

  This statement indicates that the NRC had reasonable assurance that the fire would be extinguished and normal access restored within 60 minutes based on a review of the OCNGS FPP. The time was extended to 90 minutes to allow for smoke removal and to show that time margin exists.

- The Reactor Building has a significant volume with its high ceilings and open equipment hatches and stairwells. This provides an advantage for the types of fires that are anticipated in this area because there will be significant dilution of the smoke and self-venting to the refuel floor (Reactor Building 119'-3" elevation) which has no manual actions and also contains an automatic wet pipe sprinkler system. This sprinkler system would cool any hot gas layer, thus preventing a flashover condition from occurring. Additionally, for the openings between the Reactor Building 23'-6" to 51'-3" and 51'-3" to 75'-3" elevations, a water curtain is available (automatic or manual operation), which will also help with cooling and general improvement of overall environmental conditions.

- This area has an administrative fire loading limit of 40,000 BTU/sq. ft. which corresponds to a fire severity of less than 30 minutes as determined by the ASTM E119 time-temperature curve. This limit is tied to an NRC-approved approach for dealing with fire zone boundaries (refer to the response to RAI-04 for more details).

- The fire brigade typical response to a confirmed fire is that the fire brigade will muster outside of the fire area fully dressed with SCBA available within 15 minutes.

Therefore, it is reasonable to conclude that the fire will be out in 60 minutes based on the above discussion, and then an additional 30 minutes was allotted for the fire brigade to ventilate the area (e.g., any residual pockets of smoke), if needed.

RB-FZ-1F3 Reactor Building Northwest Corner El. -19'-6"
The two OMAs (i.e., close V-20-4 and open V-20-2) that are being requested by this exemption request are in a different fire zone (RB-FZ-1F2) than the initiating fire zone (RB-FZ-1F3). The two fire zones are at least 50 feet apart, and therefore, these OMAs should not be affected. The Core Spray pump cannot be utilized until V-20-1 is also re-positioned manually. This was approved in a previous exemption request as described in the response to RAI-11.1. Therefore, no further discussion is required for this OMA.

TB-FA-26 125V DC Battery Room C and TB-FZ-11C 4160V Switchgear Room 1A and 1B
The assumed 90-minute re-entry period for Fire Zone TB-FZ-11C or Fire Area TB-FA-26 remains appropriate as justified in Section III.B of the March 3, 2009 exemption request. 90 minutes was conservatively selected based on the following:

- Fire Area TB-FA-26 and Fire Zone TB-FZ-11C have area-wide detection and suppression except for a small area on the east side of Fire Zone TB-FZ-11C. The sprinkler system would cool any hot gas layer thus preventing a flashover condition from occurring.

  Attachment 3 to NRC letter to GPUN, "August 1985 Progress Review Meeting on Licensing Actions," dated October 29, 1985, states: "Manual actions are required within 45 minutes for postulated fires in numerous locations. Credit cannot be taken for manual actions, within the affected fire areas, in less than 1 hour."

  This statement indicates that the NRC had reasonable assurance that the fire would be extinguished and normal access restored within 60 minutes based on a review of the OCNGS FPP. The time was extended to 90 minutes to allow for smoke removal and to show that time margin exists.

- It is expected that any smoke from a fire in this area will tend to continue to rise towards the Turbine Operating floor through the large open equipment hatch. In addition, the Turbine Operating floor large volume will dilute and stratify the smoke at the ceiling, providing for a less hostile environment at floor level. Also, the ventilation will pull the smoke towards the Turbine Operating floor as long as it continues to operate.

- Fire Zone TB-FZ-11C has an administrative fire loading limit of 40,000 BTU/sq. ft. which corresponds to a fire severity of less than 30-minutes as determined by the ASTM E119 time-temperature curve. This limit is tied to an NRC-approved approach for dealing with fire zone boundaries (refer to the response to RAI-04 for more details).

- The fire brigade typical response to a confirmed fire is that the fire brigade will muster outside of the fire area fully dressed with SCBA available within 15 minutes.

Therefore, it is reasonable to conclude that the fire will be out in 60 minutes based on the above discussion, and then an additional 30 minutes was allotted for the fire brigade to ventilate the area (e.g., any residual pockets of smoke), if needed.

**RAI-12 Simulator Demonstrations**

Section III.C.4.11 of the March 4, 2009, request describes simulator exercises that were performed to demonstrate that the operator manual actions can be performed reliably within the times allotted by the fire safe shutdown calculations. This section also states that Fire Zones TB-FZ-11D and OB-FZ-8C were selected because they include manual actions that are prompt actions in other fire areas and include a number of common operator manual actions to perform within the first 45 minutes.

RAI-12.1: Provide a detailed justification that demonstrates that the simulator exercises performed for fires in fire zones TB-FZ-11D and OB-FZ-8C bound all other fire scenarios.

**RESPONSE**

When the simulator demonstrations were planned, the effort was made to choose the fire zones with the most challenging operator actions, both in number of actions required, time criticalness and in complication. Fire Zone TB-FZ-11D had 10 OMAs that were performed, while Fire Zone OB-FZ-8C had seven OMAs that were performed. The simulator demonstration proved that all of the OMAs for each fire zone could be accomplished as required with the exception of recharging the air accumulator for the Isolation Condenser Makeup Valve. Recharging of the accumulator was not demonstrated because it is not needed for five-hours and it is significantly later than all other OMAs. Further, there will be additional personnel available to perform this OMA (e.g., fire brigade, emergency plan personnel, etc.). Therefore, this was deemed acceptable.

Since the 17 OMAs demonstrated in the two simulator exercises are also included in many other fire area OMAs, only a small number of OMAs were not addressed by these scenarios. Three additional OMAs from the March 3, 2009 Phase 1 exemption request were not demonstrated, and nine additional OMAs from the March 4, 2009 Phase 2 exemption request were not demonstrated. Of the 12 OMAs that were not included in the simulator demonstrations, nine are being removed from the exemption requests due either to additional guidance from RG 1.189 (refer to Attachment 3 for more detailed information) or because different fire safe shutdown (FSSD) path strategies exist for the area (e.g., EMRV/Core Spray versus Isolation Condenser/CRD) and it was determined that the OMA was not needed.

It should be noted that even though the remaining three OMAs were not part of the simulator demonstrations, equipment operators have validated all of the OMAs by either performing the OMA or simulating the OMA during plant walk downs. A tabulation of each fire area/zone remaining in the exemption requests as well as the number of OMAs for each fire area/zone that will remain in the exemption requests is listed below.

| Row | Fire Area / Zone (Room) Designation | Fire Area / Zone Description | Number of OMAs Remaining in Exemption Request | Comments |
|---|---|---|---|---|
| 1 | OB-FZ-6A | A 480 V Switchgear Room | 4 | All OMAs included in demonstration. |
| 2 | RB-FZ-1D | 51'-3" Elevation | 2 | All OMAs included in demonstration. |
| 3 | RB-FZ-1E | 23'-6" Elevation | 3 | One OMA for reading a local indicator FI-225-998 was not included in the demonstration. Refer to discussion 1 below. |
| 4 | RB-FZ-1G | 51'-3" Elevation SDC Room | 3 | One OMA for reading a local indicator FI-225-998 was not included in the demonstration. Refer to discussion 1 below. |
| 5 | OB-FZ-6B | B 480 Switchgear Room | 3 | All OMAs included in demonstration. |
| 6 | TB-FA-26 | Battery Room South of 4160V Switchgear | 10 | All OMAs included in demonstration. |
| 7 | TB-FZ-11C | AB 4160V Switchgear | 10 | All OMAs included in demonstration. |
| 8 | CW-FA-14 | Circulatory Water Intake Area | 3 | All OMAs included in demonstration. |
| 9 | OB-FZ-10A | Monitoring & Change Room Area and Operations Support Area | 2 | All OMAs included in demonstration. |
| 10 | RB-FZ-1F3 | Corner Room | 2 | One OMA for manually closing valve V-20-4 and opening valve V-20-2 was not included in the demonstration. Refer to discussion 2 below. |

| Row | Fire Area / Zone (Room) Designation | Fire Area / Zone Description | Number of OMAs Remaining in Exemption Request | Comments |
|---|---|---|---|---|
| 11 | RB-FZ-1F5 | Torus Room | 2 | All OMAs included in demonstration. |
| 12 | TB-FZ-11B | Turbine Lube Oil Storage, Pumping & Purification Areas, Elevs. 0'-0" and 27'-0" | 9 | One OMA for operating control switches on local shutdown panel LSP-1B32 was not included in the demonstration. Refer to discussion 3 below. |
| 13 | TB-FZ-11E | Condenser Bay, Elev. 3'-6" | 10 | One OMA for operating control switches on local shutdown panel LSP-1B32 was not included in the demonstration. Refer to discussion 3 below. |
| 14 | TB-FZ-11F | Feedwater Pumps, Elevs. 0'-6" and 3'-6" | 3 | All OMAs included in demonstration. |
| 15 | TB-FZ-11H | Demin Tank and Steam Jet Air Ejector Area, Elev. 23'-6" | 3 | All OMAs included in demonstration. |
| 16 | OB-FA-9 | Office Building | 3 | All OMAs included in demonstration. |
| 17 | OB-FZ-8A | MG Set Room | 3 | All OMAs included in demonstration. |
| 18 | OB-FZ-8B | Mechanical Equipment Room | 3 | All OMAs included in demonstration. |
| 19 | YARD | Exterior Yard Areas | 2 | All OMAs included in demonstration. |
| 20 | TB-FA-3A | 1C 4160 Vault | 2 | All OMAs included in demonstration. |

| Row | Fire Area / Zone (Room) Designation | Fire Area / Zone Description | Number of OMAs Remaining in Exemption Request | Comments |
|---|---|---|---|---|
| 21 | TB-FZ-11D | Turbine Basement | 11 | Simulator demonstration performed for this area. Aligning of fire water valves was performed by OB-FZ-8C demonstration. |
| 22 | OB-FZ-8C | A/B Battery Room | 6 | Simulator demonstration performed for this area. |

The three OMAs that were not demonstrated for the March 3, 2009 exemption request are as follows:

1. The OMA discussed in rows 3 and 4 above uses the CRD local mechanical flow gauge FI-225-998 (Phase 1 OMA Item #11 on Attachment 2 of the March 3, 2009 exemption request) due to the potential cable damage to the normal control room flow indicator and the potential damage (not readable) to the other local mechanical flow indicator, FI-225-2 (Phase 1 OMA Item #12 on Attachment 2 of the March 3, 2009 exemption request).

   The FSSD procedure states that this OMA may be needed and is in close proximity to where it is normally read remotely. If the normal indicator is not available in the control room, then this indicator has to be utilized. This is considered a skill of the craft activity to read this local indicator. The indicator is clearly labeled and this action is not needed for approximately 204 minutes. The use of this equipment is assured to be free of fire damage and capable of being operated in the time required. No demonstration was deemed necessary.

2. The OMA discussed in row 10 above opens Core Spray System II manual valves V-20-1 and V-20-2 and closes V-20-4 to provide Reactor Coolant Makeup using Core Spray Pump instead of the CRD Pump (manipulate valves to align Core Spray to Condensate Storage Tank). This action is required because the fire damages both CRD Pumps (Phase 1 OMA Item #13 on Attachment 2 of the March 3, 2009 exemption request). NRC SER dated June 25, 1990 provides an exemption for operating V-20-1 (manual 12" gate valve) since it is located in the area where the fire is located (Fire Zone RB-FZ-1F3). The other two valves are located in a separate fire zone (Fire Zone RB-FZ-1F2) and will not be affected by the fire.

   The FSSD procedure states that these OMAs may be needed based on the fact that both CRD pumps are located in this fire zone and the operators have indicating lights available to let them know if power has been lost to these pumps. Also, reactor pressure vessel (RPV) level indication is available to the operators to determine the need for make-up. Manually manipulating valves is considered to be a required skill by plant equipment operators and operation of these components is performed during normal work functions and is a common part of many work activities. V-20-2 is a 12" manual

gate valve while V-20-4 is a 12" motor operated valve. There are no cables (control or power) associated with V-20-4 that are affected by this fire but the valve is being manually manipulated since power may not be available to this valve. Therefore, V-20-4 will not be damaged by the fire and is available to be manually operated. The use of this equipment is capable of being operated in the time required. The valves are clearly labeled and this action is not needed for approximately 204 minutes. No demonstration was deemed necessary.

3. The OMA discussed in rows 12 and 13 above is required to isolate damaged cables and reestablish control locally for the Condensate Transfer Pump (OMA Item #4 on Attachment 2 of the March 3, 2009 exemption request). This involves operating LSP-1B32 transfer switch to "Alternate" and positioning the Control Switch for Condensate Transfer Pump 1-2 to Start.

   The FSSD procedure states that this OMA may be needed based on the fact that cables may be damaged for the condensate transfer pumps and the operators have indicating lights available to let them know if power has been lost to these pumps. Also, Isolation Condenser level indicators are available for the operators so that they can determine when make-up is required. LSP-1B32 is a local shutdown panel that is utilized to operate the condensate transfer pump to provide makeup to the isolation condenser within 45 minutes from the time that the Isolation Condenser is placed in service. There are only two switches (one key locked) that have to be operated to put the pump in service. Operating switches is considered a skill of the craft activity. The switches are clearly labeled and these switches are identical to the switches that are on other panels (e.g., LSP-DG2, RSP, LSP-1D, LSP-1B3, etc.) that were included as part of the demonstration. The keys for the switches are staged at LSP-1B32. LSP-1B32 is located less than one minute from LSP-1B3, and LSP-1B3 was part of the Fire Zone TB-FZ-11D demonstration. The use of this equipment is assured to be free of fire damage and capable of being operated in the time required. The switches are clearly labeled and based on the above discussion, no demonstration was deemed necessary.

**SUMMARY:**
Fire Areas/Zones TB-FA-26, TB-FZ-11B, TB-FZ-11C and TB-FZ-11E OMAs are identical or very similar to the OMAs contained in Fire Zone TB-FZ-11D. Fire Areas/Zones OB-FA-9, OB-FZ-6A, OB-FZ-6B, OB-FZ-8A, OB-FZ-8B, RB-FZ-1E, RB-FZ-1G, TB-FZ-11F, TB-FZ-11H and CW-FA-14 each have only three or four OMAs and they are identical or very similar to the OMAs that were performed in Fire Zone OB-FZ-8C. The remaining six fire areas/zones only have two OMAs each and these OMAs are performed to restore RPV make-up by aligning manual valves and providing make-up air to accumulators; both Fire Zones OB-FZ-8C and TB-FZ-11D demonstrated the need for these OMAs. Based on the above discussions, it is concluded that the Fire Zones TB-FZ-11D and OB-FZ-8C demonstrations bound the other fire areas/zones that are tabulated above.

**RAI-13 Required Operator Stations**
The tables provided in Section III.B of the March 4, 2009, request indicate that the 2 field equipment operators were assumed to be located in the main control room at the start of the fire event.

However, the location or activities of required plant personnel when the fire starts could delay their participation in executing the operator manual actions (e.g., they may be in a location that

is on the opposite side of the plant from the main control room or may need to restore certain equipment before being able to participate or both).

RAI-13.1: Provide a justification for the assumption that operators will be located in the main control room, or other assumed locations, when the OMA procedure begins. If there isn't assurance that the operators will be at the assumed locations, provide the times required for them to reach the locations and indicate how these times are reflected in the analysis.

**RESPONSE**

Prior to assuming the duty each shift, operators are assigned specific roles per OP-OC-100-1001, "Shift Coverage Log," to ensure proper emergency response for Fire Safe Shutdown (FSSD), Fire Brigade and Emergency Planning (EP). The FSSD crew consists typically of the three operators that are assigned responsibilities in the control room while the fourth operator is responsible for activities at the Intake Structure. The Intake Operator duties consist of performing rounds and activities at the Intake area, including surrounding yard area, plus a once per shift tour of the Low Level Radwaste Building. The operators always stay in the Protected Area (on site) in accordance with 10 CFR 50, Appendix R, Section III.L.4, requirements.

The time critical OMAs (less than 45 minutes) are either located in the Diesel Building, Office Building MG Set Room, Turbine Building 4160V Switchgear Area, Intake Area, Condensate Transfer Building or Reactor Building. Travel from the Intake Area takes approximately the following times based on equipment operator walk downs: two minutes to the Diesel Building, one minute to the Condensate Transfer Building, three minutes to the Turbine Building and five minutes to the control room. Procedures are staged at the Diesel Building, Intake Area, 4160V Switchgear Area and Condensate Transfer Building for operating the local shutdown panels for restoring power. Therefore, the operator would be closer to the majority of the OMAs if at the Intake area and this operator could be dispatched by radio or by the page system.

It has been determined based on walk downs that the Low Level Radwaste Building is the worst-case location for OMA response. If the operator was at the Low Level Radwaste Building, the operator would be approximately three minutes further away from the Intake Area and the other areas described above. The exemption request allowed 10 minutes for diagnostic/briefing of the operator and then four minutes to get to the Diesel Building. If the operator was at the Low Level Radwaste Building, it would take approximately five minutes to get to the Diesel Building. This is deemed acceptable based on the fact that the operator only goes to this area at the most once per shift. Also, margin is available for the performance of the OMA (refer to the March 4, 2009, Section III.B tables), and diagnosing the loss of offsite power should not take 10 minutes (refer to Attachment 5 for more information). In addition, there is conservatism in the analysis (e.g., all OMAs required at start of the fire, etc.) and one of the operators in the control room is also available for performing the OMAs, which includes the OMAs in the Reactor Building.

**RAI-14 Use of Water Curtains**

Section IV.B.4 of the March 3, 2009, request states that a water curtain is installed at openings between the 23'-6" to 51'-3" elevations and 51'-3" to 75'-3" elevations of Fire Zones RB-FZ-1D

and RB-FZ-1F2 in the Reactor Building which will provide reasonable assurance of extinguishing any postulated fire and improve overall environmental conditions.

RAI-14.1: Provide a technical basis to support this statement and the licensee's reliance on water curtains for fire extinguishment.

**RESPONSE**

The water curtains are not relied upon for fire extinguishment but are relied on to retard the passage of fire, smoke and hot gases. This approach was considered an acceptable alternative to sealing as documented in the NRC SER dated March 24, 1986.

The majority of the combustibles in the Reactor Building elevation 23'-6" (Fire Zone RB-RZ-1E) and 51'-3" (Fire Zone RB-FZ-1D) are attributed to cable insulation (approximately 84% of loading). Therefore, four open head deluge systems were installed on the majority of the cable trays (original construction cable trays) for these areas. The water curtains on the open stairway and equipment hatch is an extension from two of the deluge systems that is installed on the cable trays. The water curtain was installed to protect the equipment hatch which is common to Fire Zones RB-FZ-1E (Reactor Building elevation 23'-6"), RB-FZ-1D (Reactor Building elevation 51'-3") and RB-FZ-1C (Reactor Building elevation 75'-3") because it is not practical to seal this opening to prevent the passage of smoke and hot gases across these fire zone boundaries. This water curtain is discussed in more detail as a part of the technical justification of non-rated fire protection assemblies in the response to RAI-04.3. Also, refer to the supporting fire hazards analysis for these fire zones in Attachment 2.

**RAI-15 Spurious Actuation of Containment Spray Pump**

Attachment 2 of the March 4, 2009, request states that the purpose of Action 10 (trip two breakers at USS 1B2 and remove the closed fuses) is to prevent spurious start of the Containment Spray Pumps. The Attachment states further that this action has no upper time limit and is only performed to *"ensure their availability for use later in the event"* (i.e., cold shutdown).

RAI-15.1: Confirm that spurious operation of the containment spray pumps would have no impact on the stated OMA times, expected performance of other shut down systems (e.g., cause an electrical overload) or the operator's ability to achieve and maintain hot shutdown conditions.

**RESPONSE**

This OMA is being removed from the exemption request (refer to Attachment 3 for more detailed information).

**RAI-16 Feedwater Regulating Valve Leakage Rate**

The description of OMA Item No. 15 provided in the March 3, 2009, request states that the action is needed to stop the pumps at the switchgear since air leakage may cause the feedwater regulating valves to drift back open. Based on an assumed "minor" leakage rate, the analysis further states that there will be 180 minutes to perform this action.

RAI-16.1: Confirm that the leakage rate will remain "minor" and provide a technical justification for why the leakage will not impact the OMA or the 180-minute time limit.

**RESPONSE**

This OMA is being removed from the exemption request (refer to Attachment 3 for more detailed information).

**RAI-17 Diagnostic Instrumentation**

Several sections of the requests state that the need for an operator to perform a required OMA can be *"readily diagnosed from the control room due to the numerous indications and symptoms available."*

For example:

The March 3, 2009, request states that for Fire Area OB-FZ-8C, any delay in the entry into the appropriate FSP or delay in suppression of the fire would not significantly affect the performance of the operator actions, *since the EOPs would direct the same actions to be performed, based on system status.*

Section III.C.1 of the March 4, 2009, request states that the FSPs provide a symptom-based approach to achieving safe shutdown and provide the operators with information as to the available equipment (including instrumentation) that can be relied upon following a fire. Because the operator remains within the symptom-based EOP procedure framework, the operator retains the ability to use any mitigating system that is unaffected by the fire.

RAI-17.1: For each OMA that relies on control room indications to detect the need for the action, provide information which demonstrates that suitable diagnostic instrumentation has been identified and that the credited indications are: (a) known to remain unaffected by a postulated fire, (b) identified in the safe shutdown equipment list and fire response procedures, (c) capable of promptly identifying the need for the action without forcing operators to enter complex diagnosis procedures and (d) sufficient to indicate that the action has achieved its objective.

**RESPONSE**

Refer to Attachment 5 for the response to this question.

**RAI-18 Enhanced Protective Measures**

On page 18 of the March 3, 2009, request, it is noted that an enhancement to the existing automatic sprinkler system is being made in Fire Zone OB-FZ-10A to make the system area-wide.

The requests also state that areas such as, Fire Zone OB-FZ-6A, are equipped with smoke detectors and that an enhancement is being made to OB-FZ-8B to install area-wide smoke detection.

RAI-18.1: Clarify whether the enhancements are needed as part of this exemption. If so, confirm whether the enhancements have been completed or provide a commitment for its completion. If not, explain why area wide suppression and detection are not necessary.

**RESPONSE**

Enhancements and status of enhancements discussed in the March 3, 2009 and March 4, 2009 exemption requests are detailed below by fire area/zone. Note that justification for lack of area-wide suppression and detection is provided in the Response to RAI-02.4 that is contained in Attachment 2.

OB-FZ-6B "B" 480V Switchgear Room
The March 4, 2009 exemption request documented an enhancement to install a new damper control switch in the control room so that manual operation of dampers DM-56-15, DM-56-16 and DM-56-17 will not be required from outside of the control room to re-establish ventilation for a fire in Zone OB-FZ-6B, "B" 480V Switchgear Room. This OMA is being removed from the exemption request. Refer to Attachment 3 for more information.

OB-FZ-8B Mechanical Equipment Room
The March 3, 2009 and March 4, 2009 exemption requests documented an enhancement for Fire Zone OB-FZ-8B which was to install an area-wide smoke detection system.

The enhancement has been completed to install area-wide smoke detection in this Fire Zone (OB-FZ-8B) to provide for improved operator notification capability, thereby providing a quicker response time for any required actions. This system is now credited as a supporting basis for the remaining OMAs in the exemption request (refer to Attachment 2 for more details).

OB-FZ-10A Monitor and Change Room Area
The March 3, 2009 and March 4, 2009 exemption requests documented an enhancement to add sprinkler heads to the existing automatic sprinkler system in the Monitor and Change Room, stairway area and Operations Support Area to make it area-wide, thereby improving survivability of area cables and reducing the likelihood of the fire spreading. Also, an enhancement was noted to add additional smoke detection to this zone to provide area-wide detection.

The enhancement has been completed to add sprinkler heads to the existing automatic sprinkler system in the Monitor and Change Room, stairway area and Operations Support Area to make it area-wide. Also, additional smoke detection has been added to this Fire Zone to provide area-wide detection. This system is now credited as a supporting basis for the remaining OMAs in the exemption request (refer to Attachment 2 for more details).

TB-FA-26 125V DC Battery Room C
The March 3, 2009 and March 4, 2009 exemption requests documented an enhancement to install new sprinkler heads (area-wide) in the 'C' 125 VDC Battery Room from the existing pre-action fire sprinkler system in the 4160V Switchgear 1A and 1B zone.

The enhancement has been completed to install new sprinkler heads (area-wide) in the 'C' 125 VDC Battery Room from the existing pre-action fire sprinkler system in the 4160V

Switchgear 1A and 1B zone. This system is now credited as a supporting basis for the remaining OMAs in the exemption request (refer to Attachment 2 for more details).

TB-FZ-11C 4160V Switchgear Room 1A and 1B
The March 3, 2009 and March 4, 2009 exemption requests documented an enhancement to install additional sprinkler heads on the existing pre-action fire sprinkler system so that the sprinkler system within Fire Zone TB-FZ-11C is area-wide (except for the small caged area to the east of the "C" 4160V Switchgear Room), thereby improving survivability of area components and cables (hazards protected) and reducing the likelihood of the fire spreading.

The enhancement has been completed to install additional sprinkler heads on the existing pre-action fire sprinkler system so that the sprinkler system within Fire Zone TB-FZ-11C is area-wide (except for the small caged area to the east of the "C" 4160V Switchgear Room). This system is now credited as a supporting basis for the remaining OMAs in the exemption request (refer to Attachment 2 for more details).

TB-FZ-11F Feedwater Pump Room
The March 3, 2009 and March 4, 2009 exemption requests documented an enhancement to enhancing fire detection in Fire Zone TB-FZ-11F by installing an area-wide rate compensated/fixed temperature thermal detection system.

The enhancement has been completed to install area-wide rate compensated/fixed temperature thermal detection in this Fire Zone (TB-FZ-11F) to provide for improved operator notification ability, thereby providing a quicker response time for any required actions. This system is now credited as a supporting basis for the remaining OMAs in the exemption request (refer to Attachment 2 for more details).

TB-FZ-11G Turbine Building Mezzanine South El 23'-6"
The March 3, 2009 and March 4, 2009 exemption requests documented an enhancement to install fire detection in Fire Zone TB-FZ-11G by installing an area-wide rate compensated/fixed temperature thermal detection system. All of the OMAs from this area are being removed from the exemption request. Refer to Attachment 3 for more information.

**RAI-19 Operator Dose During Performance of Manual Actions**
Attachment 1, page 36 of 49, of the March 3, 2009, exemption request, states that the maximum dose to an operator performing a manual action would be 100 millirem, based upon anticipated plant conditions.

RAI-19.1: With respect to the manual actions discussed in the March 4, 2009, exemption request, please provide the maximum dose an operator is expected to receive while performing the manual actions.

**RESPONSE**

The maximum dose that is expected to be received is associated with the OMAs for the Isolation Condenser. Based on actual surveys that were obtained with the Isolation Condenser in service, it is estimated that the maximum dose to an operator performing these OMAs would be less than 100 millirem.

**REFERENCES**

1. Letter from P. B. Cowan, Exelon Generation Company, LLC, to U.S. Nuclear Regulatory Commission, "Request for Exemption from 10 CFR 50, Appendix R, Section III.G, 'Fire Protection of Safe Shutdown Capability'," dated March 3, 2009.

2. Letter from P. B. Cowan, Exelon Generation Company, LLC, to U.S. Nuclear Regulatory Commission, "Request for Exemption from 10 CFR 50, Appendix R, Section III.G, 'Fire Protection of Safe Shutdown Capability'," dated March 4, 2009.

3. Letter from G. E. Miller, U.S. Nuclear Regulatory Commission, to C. G. Pardee, Exelon Generation Company, LLC, "Oyster Creek Nuclear Generating Station - Request for Additional Information Regarding Requested Exemptions to Fire Protection Requirements in 10 CFR 50, Appendix R (TAC Nos. ME0756 and ME0780)," dated January 7, 2010.

4. Letter from P. Fiedler, GPU Nuclear, to D. M. Crutchfield, USNRC, Oyster Creek Nuclear Generating Station, “Fire Protection,” dated June 30, 1982.

5. Letter from P. Fiedler, GPU Nuclear, to J. Zwolinski, USNRC, Oyster Creek Nuclear Generating Station, “Fire Protection,” dated August 25, 1986.

6. Letter from J. Zwolinski, USNRC, to P. Fiedler, Oyster Creek Nuclear Generating Station, "Exemptions from Requirements of Appendix R to 10 CFR Part 50, Section III.G.2 and the Post Fire Safe Shutdown Capability (TAC 56740, 56786)," dated March 24, 1986.

7. Letter from J. Zwolinski, USNRC, to P. Fiedler, Oyster Creek Nuclear Generating Station, "Exemptions from Requirements of Appendix R to 10 CFR Part 50, Section III.G.2 and the Post Fire Safe Shutdown Capability (TAC 56740, 56786)," dated June 25,1990.

8. Appendix A to Branch Technical Position APCSB 9.5-1, "Guidelines for Fire Protection for Nuclear Power Plants," dated August 23, 1976.

9. Fire Protection Safety Evaluation Report by the Office of Nuclear Reactor Regulation, U.S. Nuclear Regulatory Commission in the Matter of Jersey Central Power and Light Company Oyster Creek Nuclear Generating Station Docket No. 50-219, dated March 3, 1978.

10. Letter from I. R. Finfrock, JCP&L Vice President, to V. Stello, U.S. Nuclear Regulatory Commission, “Oyster Creek Nuclear Generating Station Docket No. 50-219 Fire Protection Program – Comparison to Standard Review Plan 9.5.1, Appendix A,” dated December 3, 1976.

11. National Fire Protection Association (NFPA) Fire Protection Handbook, 14th Edition, dated 1976.

12. IEEE 383-1974, Standard for Type Test of Class 1E Electric Cables, Field Splices, Connections for Nuclear Power Generating Stations.

13. General Electric Product Data Sheet, Vulkene Flame-Resistant Control Cable, dated August 31, 1972.

14. Burns and Roe Specification S-2299-51, "Electrical Installation for Jersey Central Power and Light Company Oyster Creek, New Jersey – General Electric Company Atomic Power Equipment Dept. San Jose, California – Addendum No. 3," dated August 12, 1966.

15. Professional Loss Control, Inc., “Conduit Fire Protection Research Program,” dated June 1, 1987.

16. NRC letter to GPU Nuclear, “August 1985 Progress Review Meeting on Licensing Actions,” dated October 29, 1985.

17. Letter from I. R. Finfrock, JCP&L Vice President, to G. Lear, U.S. Nuclear Regulatory Commission, “Oyster Creek Nuclear Generating Station Docket No. 50-219 Fire Protection Program,” dated October 3, 1977.

18. Regulatory Guide 1.75, "Physical Independence of Electrical Systems," Revision 1, dated January 1975.

# ATTACHMENT 2

## 10 CFR 50.12 Exemption Request

## Oyster Creek Nuclear Power Station
## NRC Docket No. 50-219

## Request for Exemption from 10 CFR 50, Appendix R, Section III.G, “Fire Protection of Safe Shutdown Capability"

## Supporting Fire Hazards Analysis for OMA Initiating Fire Areas/Zones

## SUPPORTING FIRE HAZARDS ANALYSIS FOR OMA INITIATING FIRE AREAS/ZONES

To address the defense-in-depth aspects of the questions, a composite description which includes a fire hazards analysis was performed for each OMA that remains in the exemption requests by fire area/zone. The information in this attachment addresses RAI questions RAI-02.3, RAI-02.4, RAI-03.1, RAI-04.1, RAI-04.2, RAI-04.3, RAI-05.1 and RAI-06.1. It was determined that the consolidation of these responses into a single response on a fire area/fire zone basis would allow for a more comprehensive overview of the OMAs, provide synergy between complementing elements of the fire protection program and eliminate duplicate information.

### CW-FA-14 Circulating Water Intake

Fire Area Description

Fire Area CW-FA-14 is an outdoor structure with no walls or ceiling. There are no physical fire area boundaries, and therefore, no fire rated or non-fire rated assemblies in this fire area.

Combustible loading is not tracked in this area since it is an outside area. A fire in this area would not be contained by walls and a ceiling, and the plume of a fire would be liberated into the air and not produce a heated gas layer. The main combustible in this area that could result in the need for the OMAs is Dow Corning 561 Silicon transformer liquid. The transformer liquid has characteristics that minimize the likelihood of a fire involving the insulating liquid itself (refer to the March 3, 2009 or March 4, 2009 exemption request for more information). The remaining significant combustibles (e.g., circulating water pump motors, grating, etc.) are approximately 20 feet from the unit substations.

Fire Protection Features

This fire area is provided with the following fixed defense-in-depth features:

- Portable fire extinguishers,
- Yard hydrants, and
- Hose house.

This fire area consists of a structure that is remote from the power block and other outdoor equipment (e.g., main transformers, etc.) that is open to the environment. There is no fire detection or fixed fire suppression systems in this fire area. However, a security tower monitors this area continuously; therefore, any fire of significance would be detected and responded to appropriately by the station fire brigade.

Manual suppression is provided by a fire hydrant and fire hose house located approximately 75 feet from USS 1B3 and associated transformer. The spacing of the fire hydrant to the USS/Circulatory Water Intake Structure allows for the fire brigade to connect to the hydrant, pull fire hose and manually fight a fire from a safe distance. Refer to the response to RAI-04.1 in Attachment 1 for a discussion on manual suppression capabilities.

Evaluations and Deviations

There are no deviations from fire protection codes, standards and listings by independent laboratories in this fire area that could impact this evaluation.

Exemptions

There are no previously approved exemptions for this fire area that could impact this evaluation.

Manual Actions

There are three (3) manual actions required for this fire area.

OMA Phase 1, #7 (Align Fire Water to Isolation Condenser)

Manually open V-9-2099 and V-11-49 and close V-11-63 and V-11-41 to align the fire water system for make-up water to Isolation Condenser "B" since there is no power ("B" Train) available to the Condensate Transfer System. (Item #7 from the March 3, 2009 exemption request.)

- Refer to the fire water valve generic OMA response in RAI-06.1 in Attachment 1 for additional information on this OMA.

  The loss of the “B” Train of power is attributed to the fact that USS 1B3 and associated cables are located in this fire zone. MCC 1B32 is powered from USS 1B3 and the MCC powers both condensate transfer pumps. The OMA for utilizing fire water would be required if USS 1B3 and/or the feeder cable to MCC 1B32 was lost. The “A” train of power is credited and available for this fire area.

  USS 1B3 is located in this outside area on the west side of the power block. It is located on a raised concrete foundation that sits approximately 5 feet above grade. USS 1B3 is considered as a potential ignition source as well as its associated adjacent transformer, USS 1A3. USS 1B3 is located approximately 15 feet east of USS 1A3. Both of these unit substations share the same foundation. These unit substations are located approximately 20 feet from any plant operating equipment (e.g., circulating water pump motor, etc.). The storage of transient combustibles in the near vicinity of USS 1B3 (on elevated pad) is unlikely since there is limited space and this area must remain clear for operator access to the USS. Transients can be stored off of the raised pad but it is not expected that the transients would affect the USS due to the configuration of the USS raised pad and the fact that it is an outside area.

OMA Phase 1, #12 (Establish CRD Flow to Reactor)

Manually open V-15-237, throttle V-15-30 while monitoring flow at FI-225-2 and close V-15-52 to establish CRD flow to reactor due to the loss of instrument air to the CRD flow control valve. (Item #12 from Attachment 2 of the March 3, 2009 exemption request.)

- Refer to the loss of instrument air generic response in RAI-06.1 in Attachment 1 for additional information on this OMA.

OMA Phase 2, #17 (Provide Makeup Air to Isolation Condenser Valve V-11-34 Accumulator)

Provide makeup control air to the accumulator for V-11-34 for the Isolation Condenser makeup line due to the loss of instrument air. (Action #17 from Attachment 2 of the March 4, 2009 exemption request.)

- Refer to the loss of instrument air generic response in RAI-06.1 in Attachment 1 for additional information on this OMA.

Fire Hazards Analysis

As discussed in the response to RAI-02.4 in Attachment 1, the Oyster Creek Nuclear Generating Station (OCNGS) Fire Protection Program (FPP) encompasses the concept of defense-in-depth. Administrative controls are in place as discussed in the response to RAI-02.3 in Attachment 1 to reduce the likelihood of fires from starting and to minimize the magnitude of a fire if one would occur.

The Circulating Water Intake fire area is an outside area greater than 100 feet from any building except for the fish sample pool enclosure (sheet metal enclosure) that is located in this area and the small metal miscellaneous shed-type enclosures in close proximity to this area, which are constructed of noncombustible material. Combustible loading consists of transformer liquid and electrical motors although it is not quantified because there is nothing to contain the heat release in the event of a fire. There is constant observation of the site (intake structure), both by humans and electronic devices (security cameras), so that if a fire of significance would occur, it would be detected and appropriate actions taken without significant delay. Also, the OMA for the loss of USS 1B3 would be readily detected in the control room based on the loads that are lost (e.g., control room ventilation, service water pump, etc.) and a fire at USS 1B3 would be visible from the security tower monitoring this area. Fire protection features in this open area are considered the most practical given the nature of the area and the fire hazards. Therefore, area-wide detection and suppression do not significantly enhance the fire protection features of this area.

The OMAs for this fire area vary from a 45-minute time limit to 300 minutes (refer to Reference 2 of Attachment 1, Section III.B for actual time limits). All of the OMAs are independent of this fire zone and no SCBA is required for access/egress. In addition, two of the OMAs occur due to the loss of instrument air and there are numerous other indications (e.g., main steam isolation valve (MSIV) closure, control rods drifting in, instrument air pressure indication and alarms, etc.) that will initiate these OMAs. Also, the loss of instrument air procedure, ABN-35, indicates that these OMAs are necessary.

This fire protection configuration achieves a level of protection commensurate with that intended by Appendix R, Section III.G.2.

**OB-FA-9 Office Building Elev. 23'-6", 35'-0", 46'-6"**

Fire Area Description

Fire Area OB-FA-9 consists of three floors of the Office Building.
First floor area is approximately 2069 sq. ft.
Second floor area is approximately 3670 sq. ft.

Third floor area is approximately 6486 sq. ft.
MUX Corridor area (third floor) is approximately 513 sq. ft.

The ceiling heights in all three floor areas are approximately 10'-6" to the concrete ceiling and approximately 8' to the drop ceiling. The ceiling height of the MUX enclosure is approximately 8'. The ceiling height of the MUX corridor where the MUX enclosure is located is approximately 16'-3". The end of the corridor has a ceiling height of approximately 26'-6" that has a stairway that accesses the Upper Cable Spreading Room.

This area has an administrative fire loading limit of less than 1.5 hours as determined by the ASTM E119 time-temperature curve. The major combustibles in the MUX Corridor are cable insulation and a wood ceiling on top of the MUX enclosure.

Fire Protection Features

This fire area is provided with the following fixed defense-in-depth features:

- Localized hallway smoke detection system,
- Partial area coverage sprinkler system (MUX room corridor over MUX enclosure),
- Hose stations,
- Fire barriers (rated assemblies),
- Portable extinguishers, and
- Yard hydrants.

A cable for the CST level indication is located in a cable tray in Fire Area OB-FA-9 in the MUX Room corridor (corridor on south side of control room). The MUX Room corridor smoke detection system was designed, installed and tested in accordance with National Fire Protection Association (NFPA) 72D, 1975 Edition and NFPA 72E, 1974 Edition.

The MUX Room corridor smoke detection system is surveillance tested in accordance with station procedure 645.6.033, "Fire Detection System Alarm Circuitry Test for control room & Upper and Lower Cable Spreading Room." This surveillance procedure tests the alarm and supervisory circuits for the control room and Upper and Lower Cable Spreading Room fire detection system. Each smoke detector is demonstrated operable by a channel functional test using a test gas once per 12 months.

There is a partial area coverage closed head sprinkler system in the MUX room corridor over the MUX enclosure. This system was installed for insurance purposes to protect the press board ceiling of the MUX enclosure. The system protects the majority of this corridor area including the cable trays except for the beam pocket in the northwest corner of the room and the east one-third portion of the corridor (there are no cable trays in this east section of the area). The closed head sprinkler system protecting the MUX enclosure is an extension of the Upper Cable Spreading Room closed head sprinkler system. This system was designed, installed and tested in accordance with NFPA 13, 1976 Edition.

The MUX Room corridor closed head automatic sprinkler system is inspected in accordance with station procedures 645.4.004, "Fire Suppression Water System Valve Lineup," 645.4.009, "Cycling of Fire Protection System Valves," and 645.6.011, "Deluge and Sprinkler System Inspection." The alarm circuitry for the Upper Cable Spreading Room/MUX Room corridor closed head sprinkler system is confirmed by a flow test at the inspectors test connection in

accordance with station procedure 645.6.033, “Fire Detection System Alarm Circuitry Test for control room & Upper Cable Spreading Room.”

Refer to the response to RAI-04.1 in Attachment 1 for a discussion on manual suppression capabilities.

Rated boundaries consist of:

- Floors and roof consisting of reinforced concrete. The roof is not adjacent to any other plant fire areas/zones. The floor of the MUX Room corridor is three-hour rated to the Condenser Bay (Fire Zone TB-FZ-11E) and the floor on the northeast corner of the third floor is adjacent to the A/B Battery Room (Fire Zone OB-FZ-8C) and is three-hour rated with unprotected openings sealed with noncombustible materials.

- Exterior walls are concrete; interior partitions between offices generally have a ¾-hour fire resistance rating. Stairway walls have two-hour fire resistance rating with fire sealed openings. West wall to the Turbine Building has either a two or three-hour rating. The majority of the east wall is unrated because it is not adjacent to any other areas except for approximately 90 feet on the third floor that is three-hour rated between the office building and the Reactor Building (Fire Zone RB-FZ-1D). The south wall is not adjacent to any other areas and is unrated. The north wall on the third floor is adjacent to the Monitor and Change Area (Fire Zone OB-FZ-10A) and is rated for one hour except for a small portion of the masonry block wall above the door to the operations support area which is unrated with all openings sealed with noncombustible materials (area-wide suppression on Fire Zone OB-FZ-10A side). The north wall on the second floor is adjacent to the mechanical equipment room (Fire Zone OB-FZ-10B) and to the A/B battery room (Fire Zone OB-FZ-8C) and is one-hour rated, while the north wall on the first floor to the MG set room is rated for two hours (stairway area).

Evaluations and Deviations

A deviation exists from NFPA 72D, 1975 Edition and NFPA 72E, 1974 Edition regarding a surveillance testing frequency change from six months to one year for fire detectors, supervised circuits, water flow switches and pressure switches. This deviation has been justified in Safety Evaluation SE No. 000665-015 in accordance with NRC GL 86-10. This deviation will not impact the capability to detect a fire in this area and therefore will not impact the basis for the manual action exemption request.

Other evaluations have been performed justifying minor deviations from UL fire tests to establish the integrity of rated fire barriers which make up the fire area boundaries but these evaluations do not impact the basis of the OMA exemption requests.

There are no other deviations from fire protection codes, standards, testing programs and listings by independent laboratories in this fire area that could impact this evaluation.

Exemptions

There are no previously approved exemptions for this fire area that could impact this evaluation.

Manual Actions

There are three (3) manual actions required for this fire area.

OMA Phase 1, #2 (Read Condensate Storage Tank Local Level Indicator LI-424-993)

Locally read Condensate Storage Tank (CST) level at LI-424-993. (Item #2 of Attachment 2 of the March 3, 2009 exemption request.)

- There is no redundant train of equipment for the credited method of obtaining CST level indication due to the plant's original design. Should the primary indicator (5F-27) fail, indication can only be obtained by reading the local indicator (LI-242-993) located at the CST. The safe shutdown success path SSC cable for the level indicator is routed in a cable tray in this area (MUX corridor). The cable tray is routed approximately 12 feet to 15 feet above the floor. The cable enters the room in the northwest corner and is routed in a cable tray for approximately 15 feet. It then air drops vertically down into a cabinet inside a small enclosed room known as the MUX Enclosure. The credited cable is routed in a cable tray with other cables, thus putting it in close proximity to in-situ combustibles. Another significant combustible in this area is the wooden ceiling of the MUX enclosure. The cable for the level indicator penetrates this ceiling as it runs from the cable tray to the cabinet. There is also some rubber piping insulation on top of the wooden ceiling. The wooden ceiling and the piping insulation are in close proximity to the cable in the cable tray and when the cables air drops to the enclosed room. There are no ignition sources in this area. Therefore, due to the lack of ignition sources, it is not expected that a fire would occur in this area and it is unlikely that the OMA would be required.

  This portion of Fire Area OB-FA-9 is not a normally traveled area due to its location. The primary in-situ combustible hazards are as described above and transient combustibles are controlled by administrative procedures. Also, the limited space within this corridor area is not conducive to the storage of transient combustibles.

OMA Phase 1, #12 (Establish CRD Flow to Reactor)

Manually open V-15-237, throttle V-15-30 while monitoring flow at FI-225-2 and close V-15-52 to establish CRD flow to reactor due to the loss of instrument air to the CRD flow control valve. (Item #12 from Attachment 2 of the March 3, 2009 exemption request.)

- Refer to the loss of instrument air generic response in RAI-06.1 in Attachment 1 for additional information on this OMA.

OMA Phase 2, #17 (Provide Makeup Air to Isolation Condenser Valve V-11-34 Accumulator)

Provide makeup control air to the accumulator for V-11-34 for the Isolation Condenser makeup line due to the loss of instrument air. (Action #17 from Attachment 2 of the March 4, 2009 exemption request.)

- Refer to the loss of instrument air generic response in RAI-06.1 in Attachment 1 for additional information on this OMA.

Fire Hazards Analysis

As discussed in the response to RAI-02.4 in Attachment 1, the OCNGS FPP encompasses the concept of defense-in-depth. Administrative controls are in place as discussed in the response to RAI-02.3 in Attachment 1 to reduce the likelihood of fires from starting and to minimize the magnitude of a fire if one would occur.

Fire loading in this fire area is low, consisting primarily of general office supplies, minimal plastics and cable insulation. The hallway automatic fire detection which alarms locally and in the control room will promptly detect a fire. The majority of this fire area is normally traveled since it is the main path to the control room but the MUX corridor, which is adjacent to the south wall of the control room, is not a normally traveled area. If a fire were to occur, it would not be of significant size or duration due to the lack of ignition sources, the low combustible loading and the nature of the combustibles. Detection of a fire in the MUX corridor above the MUX enclosure would be by the installed suppression system in that area. Prompt detection in the remaining portion of the area would be by the installed detection in the main hallways and inside of the MUX room enclosure or by personnel since this is a high traffic area. Extinguishment of a fire in the majority of this area will be accomplished by the plant fire brigade. Therefore, area-wide detection and suppression do not significantly enhance the fire protection features of this area. Also, the fire area boundaries have been evaluated as acceptable as indicated above.

The OMAs for this fire area vary from a 73-minute time limit to 300 minutes (refer to Reference 2 of Attachment 1, Section III.B for actual time limits). With the exception of the unprotected cables/equipment discussed above all required hot shutdown systems are separated such that at least one redundant train survives a fire. Also, all of the OMAs discussed above that are required as a result of a fire in this fire area are independent of this fire area and do not require an SCBA for access/egress.

This fire protection configuration achieves a level of protection commensurate with that intended by Appendix R, Section III.G.2.

**OB-FZ-6A Office Bldg. "A" 480V Switchgear Room Elev. 23'-6"**

Fire Zone Description

Fire Zone OB-FZ-6A floor area is approximately 1157 sq. ft.
The ceiling height is approximately 10'-8".

This area has an administrative fire loading limit of less than three-hours as determined by the ASTM E119 time-temperature curve. The main combustibles in this area are cable insulation (approximately 81% of loading) and Dow Corning 561 Silicon transformer liquid (approximately 15% of loading). The transformer liquid has characteristics that minimize the likelihood of a fire involving the insulating liquid itself (refer to the March 3, 2009 or March 4, 2009 exemption request for more information).

Fire Protection Features

This fire zone is provided with the following fixed defense-in-depth features:

- Area-wide smoke detection,

- Total flooding automatic Halon 1301 system,
- Portable fire extinguishers,
- Fire barriers (rated assemblies) including one-hour fire cable raceway barriers,
- Hose stations, and
- Yard hydrants.

The “A” 480V Switchgear Room fire detection system was designed, installed and tested in accordance with NFPA 72D, 1975 Edition and NFPA 72E, 1974 Edition.

The “A” 480V Switchgear fire detection system is surveillance tested in accordance with station procedure 645.6.034, “Fire Detection System Alarm Circuitry Test and 480V Switchgear Rooms, A/B Battery Room and MG Set Room." This surveillance procedure tests the alarm and supervisory circuits for the 480V Switchgear Rooms, A/B Battery Room and MG Set Room fire detection system. Each smoke detector is demonstrated operable by a channel functional test using a test gas once per 12 months.

The Halon 1301 suppression system was designed and installed in accordance with NFPA 12A, 1977 Edition. The system was designed and installed to deliver a concentration of 6% for a soak time of ten (10) minutes (Reference 17 of Attachment 1). The system was pre-operationally tested to demonstrate that a 6% concentration could be maintained for the 10-minute hold time.

The Halon 1301 suppression system is surveillance tested to demonstrate operability at least once per six months by verifying Halon storage tank weight or level and pressure and by verifying at least once per 18 months that the system, including associated ventilation dampers, actuates manually and automatically, upon the receipt of a simulated test signal and the performance of a flow test through the headers and nozzles to assure no blockage in accordance with station surveillance test procedures 645.6.013, “Fire Suppression System Halon Functional Test,” and 645.6.014, “Fire Suppression System Halon Cylinder Check."

Refer to the response to RAI-04.1 in Attachment 1 for a discussion on manual suppression capabilities.

Rated boundaries consist of:

- Reinforced concrete at least one foot thick with penetrations sealed to provide a rating equivalent to the boundary (three hours) for the south, east and west walls plus the floor. The ceiling is rated for at least three hours and is eight inches thick of concrete with all penetrations sealed to a rating of at least one hour.

- A partition wall separating Fire Zones OB-FZ-6A (north wall) and OB-FZ-6B (south wall) constructed of 2 layers of 5/8 inch gypsum board mounted on steel studs in accordance with UL Design no. U425 is rated at one hour.

- Cable raceway fire barriers (one hour) protecting cables required for safe shutdown consisting of standalone Mecatiss wrap (MTS-60) or a Mecatiss wrap overlay over Thermo-Lag (MPF-60). The Mecatiss Fire Barrier System was tested at Underwriter’s Laboratories to meet the criteria outlined in NRC Generic Letter 86-10 Supplement 1.

There are no non-rated fire protection assemblies that make up the fire zone boundaries in this fire zone.

Evaluations and Deviations

Engineering Evaluation ECR 08-00426 is documented in the OCNGS FPP evaluating the acceptability of two smoke detectors not being located at the ceiling and the slight recessing of some detectors in the marinite Class 1E separation boards due to congestion in the area. These deviations from codes were judged to be acceptable based upon a thorough review of the location of the detectors relative to the air flow patterns created by the location of the supply and exhaust registers in the local vicinity. Additionally, the manual Halon discharge station located inside the 480V Switchgear Room was reviewed. This deviation from NFPA 12A was judged to be acceptable because the Halon system could also be actuated from the Halon cylinders located in the nearby corridor by the fire brigade.

A deviation exists from NFPA 72D, 1975 Edition and NFPA 72E, 1974 Edition regarding surveillance testing frequency change from six months to one year for fire detectors, supervised circuits, water flow switches and pressure switches. This deviation has been justified in Safety Evaluation SE No. 000665-015 in accordance with NRC GL 86-10.

These deviations will not impact the capability to detect a fire or the capability to manually initiate the Halon in this area, and therefore, will not impact the basis for the OMA exemption request.

Other evaluations have been performed justifying minor deviations from UL fire tests to establish the integrity of rated fire barriers which make up the fire zone boundaries and cable raceway barriers but these evaluations do not impact the basis of the OMA exemption requests.

No other deviations from fire protection codes, standards, testing programs and listings by independent laboratories in this fire zone impact this evaluation.

Exemptions

An exemption was granted in NRC SER dated June 25, 1990 from Appendix R, Section III.G.2 for not providing at least one hot shutdown path free from fire damage without any repair. The exemption allows minor repairs and permits OMAs to restore power to Bus USS 1B2 to power needed equipment required for Hot Shutdown as follows:

1) De-energize Bus USS 1B2 locally in Fire Zone OB-FZ-6B,
2) In the control room, trip the feeder breaker at 4160V Switchgear 1C feeding Bus USS 1A2,
3) Disconnect the cable bus tie which is directly bolted to the bus bars in USS 1B2 in Fire Zone OB-FZ-6B, and
4) Re-energize Bus USS 1B2.

These activities: (1) involve one minor hot shutdown repair, namely, disconnecting the cable bus tie; (2) involve an activity that can be completed well before an unrecoverable reactor condition occurs (three hours); (3) do not involve any transit through the fire affected zone; and (4) do not require any offsite components or tools.

With the completion of these actions including the minor repair, there is reasonable assurance that hot shutdown can be achieved and maintained. Therefore, this exemption does not impact the basis for the OMA exemption request.

Manual Actions

There are four (4) manual actions required for this fire zone. Note that the acceptability of the RG 1.75 (Reference 18 in Attachment 1) noncompliances in regards to the credited and redundant cables being located in the same cable tray are addressed in the response to RAI-05 in Attachment 1.

OMA Phase 1, #2 (Read Condensate Storage Tank Local Level Indicator LI-424-993)

Locally read Condensate Storage Tank (CST) level at LI-424-993. (Item #2 from Attachment 2 of the March 3, 2009 exemption request.)

- There is no redundant train of equipment for the credited method of obtaining CST level indication due to the plant's original design. Should the primary indicator (5F-27) fail, indication can only be obtained by reading the local indicator (LI-242-993) located at the CST. The safe shutdown success path SSC cable for the level indicator is routed in a conduit and a cable tray in this fire zone. The cable leaves a 120 VAC distribution panel and goes up approximately five feet in conduit to a cable tray that is approximately nine feet off of the floor. The cable is in the cable tray for approximately 15 feet until the cable tray goes up through the ceiling. The cable is routed in a cable tray with other cables, thus putting it in close proximity to in-situ combustibles. Another significant combustible in this area is a liquid filled transformer located approximately 10 feet north from the cable. However, there is a partial non-rated concrete block wall between the transformer and cable tray that would provide some protection of direct flame impingement on the cable tray. The ignition sources in this fire zone consist of electrical cabinets (120 VAC and 125 VDC circuits) and the liquid filled transformer (4160 VAC to 480 VAC). The electrical cabinets are enclosed metal cabinets that are located throughout the room with some of the cabinets being approximately 10 feet from the credited cable.

  Fire Zone OB-FZ-6A is not a normally traveled area and has only one door for access/egress. Transient combustibles are controlled by administrative procedures. Since there is no redundant train of cables for this credited method, damage to the credited train would make the manual action necessary.

OMA Phase 1, #9 (Manually Control 480V Breakers from Remote Shutdown Panel)

Manually control 480V USS 1B2 breakers for CRD Pump NC08B and 1B2M from the Remote Shutdown Panel. (Item #9 from Attachment 2 of the March 3, 2009 exemption request.)

- The credited train cables and redundant train cables are located in the same cable tray approximately seven feet off of the floor in this fire zone. Damage to this cable tray could result in damage to both trains of cables and equipment. The cable is routed in a cable tray with other cables, thus putting it in close proximity to in-situ combustibles. Another significant combustible in this area is a liquid filled transformer located approximately seven feet from the cable tray. The ignition sources in this fire zone

consist of electrical cabinets (120 VAC and 125 VDC circuits) and the liquid filled transformer (4160 VAC to 480 VAC). The electrical cabinets are enclosed metal cabinets and are located throughout the room with some of the cabinets being approximately two feet from both trains of cables.

Fire Zone OB-FZ-6A is not a normally traveled area and has only one door for access/egress. Transient combustibles are controlled by administrative procedures. Damage to this cable tray would impact both the credited and redundant train of cables and would therefore make the manual action necessary.

OMA Phase 1, #12 (Establish CRD Flow to Reactor)

Manually open V-15-237, throttle V-15-30 while monitoring flow at FI-225-2 and close V-15-52 to establish CRD flow to reactor due to the loss of instrument air to the CRD flow control valve. (Item #12 from Attachment 2 of the March 3, 2009 exemption request.)

- Refer to the loss of instrument air generic response in RAI-06.1 in Attachment 1 for additional information on this OMA.

OMA Phase 2, #17 (Provide Makeup Air to Isolation Condenser Valve V-11-34 Accumulator)

Provide makeup control air to the accumulator for V-11-34 for the Isolation Condenser makeup line due to the loss of instrument air. (Action #17 from Attachment 2 of the March 4, 2009 exemption request.)

- Refer to the loss of instrument air generic response in RAI-06.1 in Attachment 1 for additional information on this OMA.

Fire Hazards Analysis

As discussed in the response to RAI-02.4 in Attachment 1, OCNGS FPP encompasses the concept of defense-in-depth. Administrative controls are in place as discussed in the response to RAI-02.3 in Attachment 1 to reduce the likelihood of fires from starting and to minimize the magnitude of a fire if one would occur.

Fire loading in this fire zone is moderate, consisting primarily of cable insulation and transformer liquid. Automatic fire detection which alarms locally and in the control room will promptly detect a fire. In addition to its alarm function, the automatic detection system will actuate the total flooding Halon 1301 System. If a fire were to occur in this fire zone, the duration would be short due to prompt detection and extinguishment of the principal combustibles, cable insulation and transformer liquid, by the total flooding Automatic Halon 1301 System or by the plant fire brigade. Due to the fire protection features installed in this fire zone, it is not expected that a total consuming fire would occur in this fire zone, and therefore, most or all of the OMAs would not be required.

The fire zone boundaries have been evaluated as acceptable as indicated above. Even if the fire were not promptly extinguished, all hot shutdown systems required in this area with the exception of the unprotected components and cables listed above are protected by a one-hour rated fire barrier.

The OMAs for this fire zone vary from a 73-minute time limit to 300 minutes (refer to Reference 2 of Attachment 1, Section III.B for actual time limits). All of the OMAs discussed above that are required as a result of a fire in this fire zone are independent of this fire zone.

This fire protection configuration achieves a level of protection commensurate with that intended by Appendix R, Section III.G.2.

**OB-FZ-6B Office Building "B" 480V Switchgear Room Elev. 23'-6"**

Fire Zone Description

Fire Zone OB-FZ-6B floor area is approximately 679 sq. ft.
The ceiling height is approximately 10'-8".

This area has an administrative fire loading limit of less than two hours as determined by the ASTM E119 time-temperature curve. The main combustibles in this area are cable insulation (approximately 28% of loading), Thermo-Lag (approximately 29% of loading) and Dow Corning 561 Silicon transformer liquid (approximately 31% of loading). The transformer liquid has characteristics that minimize the likelihood of a fire involving the insulating liquid itself (refer to the March 3, 2009 or March 4, 2009 exemption request for more information).

Fire Protection Features

This fire zone is provided with the following fixed defense-in-depth features:

- Area-wide smoke detection,
- Total flooding automatic Halon 1301 system inside "B" switchgear room portion of fire zone,
- Portable fire extinguishers,
- Fire barriers (rated assemblies) including one-hour fire cable raceway barriers,
- Hose stations, and
- Yard hydrants.

The "B" 480V Switchgear Room fire detection system was designed, installed and tested in accordance with NFPA 72D, 1975 Edition and NFPA 72E, 1974 Edition.

The "B" 480V Switchgear fire detection system is surveillance tested in accordance with station procedure 645.6.034, "Fire Detection System Alarm Circuitry Test and 480V Switchgear Rooms, A/B Battery Room and MG Set Room." This surveillance procedure tests the alarm and supervisory circuits for the 480V Switchgear Rooms, A/B Battery Room and MG Set Room fire detection system. Each smoke detector is demonstrated operable by a channel functional test using a test gas once per 12 months.

The Halon 1301 suppression system was designed and installed in accordance with NFPA 12A, 1977 Edition. The system was designed and installed to deliver a concentration of 6% for a soak time of ten (10) minutes (Reference 17 of Attachment 1). The system was pre-operationally tested to demonstrate that a 6% concentration could be maintained for the 10-minute hold time.

The Halon 1301 suppression system is surveillance tested to demonstrate operability at least once per six months by verifying Halon storage tank weight or level and pressure and by verifying at least once per 18 months that the system, including associated ventilation dampers, actuates manually and automatically, upon the receipt of a simulated test signal and the performance of a flow test through the headers and nozzles to assure no blockage in accordance with station surveillance test procedures 645.6.013, “Fire Suppression System Halon Functional Test” and 645.6.014, “Fire Suppression System Halon Cylinder Check."

Refer to the response to RAI-04.1 in Attachment 1 for a discussion on manual suppression capabilities.

Rated boundaries consist of:

- Reinforced concrete at least one foot thick with penetrations sealed to provide a rating equivalent to the boundary (three hours) for the north, east and west walls plus the floor. The ceiling is rated for at least three hours and is eight inches thick of concrete with all penetrations sealed to a rating of at least one hour.

- A partition wall separating Fire Zones OB-FZ-6A (north wall) and OB-FZ-6B (south wall) constructed of two layers of 5/8 inch gypsum board mounted on steel studs in accordance with UL Design no. U425 is rated at one hour.

- Cable raceway fire barriers (one hour) protecting cables required for safe shutdown consisting of standalone Mecatiss wrap (MTS-60) or a Mecatiss wrap overlay over Thermo-Lag (MPF-60). The Mecatiss Fire Barrier System was tested at Underwriter’s Laboratories to meet the criteria outlined in NRC Generic Letter 86-10 Supplement 1.

There are no non-rated fire protection assemblies that make up the fire zone boundaries in this fire zone. However, there is a non-rated wall that is credited for Halon containment and this wall is located between the main portion of the room and the corridor area, which is considered the same fire zone (refer to exemption below).

Evaluations and Deviations

Engineering Evaluation ECR 08-00426 is documented in the OCNGS FPP evaluating the acceptability of the manual Halon discharge station being located inside the 480V Switchgear Room. This deviation from NFPA 12A was judged to be acceptable because the Halon system could also be actuated from the Halon cylinders located in the nearby corridor by the fire brigade.

A deviation exists from NFPA 72D, 1975 Edition and NFPA 72E, 1974 Edition regarding surveillance testing frequency change from six months to one year for fire detectors, supervised circuits, water flow switches and pressure switches. This deviation has been justified in Safety Evaluation SE No. 000665-015 in accordance with NRC GL 86-10.

These deviations will not impact the capability to detect a fire or the capability to manually initiate the Halon in this area and therefore will not impact the basis for the OMA exemption request.

Other evaluations have been performed justifying minor deviations from UL fire tests to establish the integrity of rated fire barriers which make up the fire area boundaries or cable raceway fire barriers but these evaluations will not impact the basis of the OMA exemption requests.

There are no other deviations from fire protection codes, standards, testing programs and listings by independent laboratories in this fire area that could impact this evaluation.

Exemptions

An exemption was granted in NRC SER dated March 24, 1986 from Appendix R, Section III.G.2 for not having area-wide suppression (no suppression in corridor outside “B” Switchgear Room). The basis for the exemption is that area-wide detection is provided which covers the corridor, manual suppression capability is available to extinguish a fire and either one-hour fire barrier protection is provided for circuits required for safe shutdown or alternate means of safe shutdown are available outside this fire zone. Since defense-in-depth features have been determined to be adequate to assure safe shutdown in the event of a fire, this exemption does not impact the basis for the OMA exemption request which takes credit for the defense-in-depth fire protection features provided for the fire zone including the corridor outside the “B” Switchgear Room.

Manual Actions

There are three (3) manual actions required for this fire zone.

OMA Phase 1, #7 (Align Fire Water to Isolation Condenser)

Manually open V-9-2099 and V-11-49 and close V-11-63 and V-11-41 to align the fire water system for make-up water to Isolation Condenser "B" since there is no power ("B" Train) available to the Condensate Transfer System. (Item #7 from the March 3, 2009 exemption request.)

- Refer to the fire water valve generic OMA Response in RAI-06.1 in Attachment 1 for additional information on this OMA.

  The loss of the “B” Train of power is attributed to the fact that USS 1B2 and MCC 1B21 and associated cables are located in this fire zone. MCC 1B21 is powered from USS 1B2 and the MCC is required to power the static charger, which is ultimately required for charging the “B” Battery. USS 1B2 and MCC 1B21 are ignition sources and a failure of either one will require the OMA. MCC 1B21 is located approximately five feet from USS 1B2. A credited power cable for the static charger enters the fire zone through the ceiling of the corridor and then enters the main portion of the room through the north wall approximately 9 feet about the floor. It then runs east and down into MCC 1B21. It is located approximately two feet above the potential ignition source USS 1B2 and runs directly into ignition source MCC1B21. MCC 1B21 credited power cable is routed from USS 1B2 to MCC 1B21 in a cable tray. This cable tray runs approximately 10 feet above the floor and about two feet above the potential ignition source USS 1B2 and MCC 1B21 but it also enters into both as indicated above. However, both of these ignition sources are contained in enclosed metal cabinets and are not high voltage. The cable tray is located approximately 10 feet from the ignition source of the USS 1B2

transformer which is located near the west end of the room. Transient combustibles in this area are controlled by administrative procedures and the likelihood of transient combustibles is low since the area is not a routinely traveled area and has only one door for access/egress to the adjoining hallway. Also, the limited space within this area is not conducive to the storage of transient combustibles. In the unlikely event of a fire in this room, the automatic Halon system in the room should serve to quickly control and extinguish the fire. The "A" train of power is credited and available for this fire zone. The redundant cable is associated with the "C" battery charger and this cable is fire wrapped with a 1-hour barrier in this fire zone.

OMA Phase 1, #12 (Establish CRD Flow to Reactor)

Manually open V-15-237, throttle V-15-30 while monitoring flow at FI-225-2 and close V-15-52 to establish CRD flow to reactor due to the loss of instrument air to the CRD flow control valve. (Item #12 from Attachment 2 of the March 3, 2009 exemption request.)

- Refer to the loss of instrument air generic response in RAI-06.1 in Attachment 1 for additional information on this OMA.

OMA Phase 2, #18 (Provide Makeup Air to Isolation Condenser Valve V-11-36 Accumulator)

Provide makeup control air to the accumulator for V-11-36 for the Isolation Condenser makeup line due to the loss of instrument air. (Action #18 from Attachment 2 of the March 4, 2009 exemption request.)

- Refer to the loss of instrument air generic response in RAI-06.1 in Attachment 1 for additional information on this OMA.

Fire Hazards Analysis

As discussed in the response to RAI-02.4 in Attachment 1, the OCNGS FPP encompasses the concept of defense-in-depth. Administrative controls are in place as discussed in the response to RAI-02.3 in Attachment 1 to reduce the likelihood of fires from starting and to minimize the magnitude of a fire if one would occur.

Fire loading in this fire zone is moderate, consisting primarily of cable insulation and transformer liquid. Automatic fire detection which alarms locally and in the control room will promptly detect a fire. In addition to its alarm function, the automatic detection system will actuate the total flooding Halon 1301 System in the Switchgear Room portion of this fire zone. If a fire were to occur in this fire zone, the duration would be short due to prompt detection and extinguishment of the principal combustibles, cable insulation and transformer liquid, by the total flooding Automatic Halon 1301 System (Switchgear Portion) or by the plant fire brigade. Due to the fire protection features installed in this fire zone, it is not expected that a total consuming fire would occur in this fire zone, and therefore, most or all of the OMAs would not be required.

The fire zone boundaries have been evaluated as acceptable as indicated above. Even if the fire were not promptly extinguished, all hot shutdown systems required in this area with the exception of the unprotected components and cables listed above are protected by a one-hour rated fire barrier.

The OMAs for this fire zone vary from a 45-minute time limit to 300 minutes (refer to Reference 2 of Attachment 1, Section III.B for actual time limits). All of the OMAs discussed above that are required as a result of a fire in this fire zone are independent of this fire zone and do not require an SCBA for access/egress.

This fire protection configuration achieves a level of protection commensurate with that intended by Appendix R, Section III.G.2.

**OB-FZ-8A Office Bldg. Reactor Recirculation MG Set Room & OB-FZ-8B Mechanical Equipment Room Elev. 23'-6" & 35'-0"**

Fire Zone Description

Fire Zone OB-FZ-8A floor area is approximately 2,128 sq. ft.
The ceiling height is approximately 10'-10".

Fire Zone OB-FZ-8B floor area is approximately 479 sq. ft.
The ceiling height is approximately 11'-0".

Fire Zones OB-FZ-8A and 8B are evaluated together for the combustible loading and FSSD analysis. These fire zones have an administrative fire loading limit of less than 45 minutes as determined by the ASTM E119 time-temperature curve. There are very minimal combustibles in Fire Zone OB-FZ-8B. The major combustibles in Fire Zone OB-FZ-8A are lubricating oil (approximately 83% of loading) and cable insulation (approximately 13% of loading).

Fire Protection Features

These fire zones are provided with the following fixed defense-in-depth features:

- Partial automatic wet pipe sprinklers in Fire Zone OB-FZ-8A with flow alarm actuated to control room,
- Area detection in fire zone OB-FZ-8B,
- Duct smoke detection in fire zone OB-FZ-8A,
- Portable fire extinguishers,
- Fire barriers (rated assemblies),
- Fire zone boundaries (non-rated assemblies),
- Hose stations, and
- Yard hydrants.

A partial area coverage closed head automatic sprinkler system in Fire Zone OB-FZ-8A was designed, installed and tested in accordance with NFPA 13, 1976 Edition.

The closed head automatic sprinkler system is surveillance tested to demonstrated operability at least once per 12 months by performing a system functional test, which includes simulated automatic actuation of the system and verifying that the automatic valves in the flow path actuate to their correct position.

The closed head automatic sprinkler system is inspected in accordance with station procedures 645.4.004, "Fire Suppression Water System Valve Lineup," 645.4.009 "Cycling of Fire Protection System Valves," and 645.6.011, "Deluge and Sprinkler System Inspection." The

alarm circuitry is confirmed by a flow test at the inspection test connection in accordance with station procedure 645.6.034, “Fire Detection System Alarm Circuitry Test for 480V Switchgear Rooms, A/B Battery Rooms & MG Set Room."

There is no area-wide detection system provided for Fire Zone OB-FZ-8A. A duct smoke detector is provided in the exhaust duct of fan EF-1-20 and is surveillance tested in accordance with station procedure 645.6.034, “Fire Detection System Alarm Circuitry Test for 480V Switchgear Rooms, A/B Battery Rooms & MG Set Room."

A new fire detection system has been installed in the Mechanical Equipment Room (Fire Zone OB-FZ-8B-35’ elevation) and the adjacent corridor where the fire alarm panel (LFAP #8) is installed. Local Fire Alarm Panel (LFAP) #8 was expanded to provide smoke detection capability for these two rooms. The new fire detection layout for the Mechanical Equipment Room and adjacent corridor was designed, installed and acceptance tested in accordance with NFPA 72, 2007 Edition which was the latest Edition of the standard at the time of design. The system alarms locally and in the control room.

The Mechanical Equipment Room and Corridor fire detection system is surveillance tested in accordance with station procedure 645.6.034, “Fire Detection System Alarm Circuitry Test and 480V Switchgear Rooms, A/B Battery Room and MG Set Room." This surveillance procedure tests the alarm and supervisory circuits for the Mechanical Equipment Room and adjacent corridor fire detection system. Each smoke detector is demonstrated operable by a channel functional test using a test gas once per 12 months. Refer to the response to RAI-04.1 in Attachment 1 for a discussion on manual suppression capabilities.

Fire Zone OB-FZ-8A zone boundaries consist of reinforced concrete for the north, east and west walls, floor and ceiling. The south wall is of hollow concrete block separating Fire Area OB-FA-9 from this zone. The north, east and west walls are adjacent to Fire Zones RB-FZ-IH, RB-FZ-1E and TB-FZ-11E, respectively. These walls are three-hour rated fire barriers. The south wall is a two-hour rated fire barrier except for a portion of the wall that is non-rated that is adjacent to the outside which is constructed of metal siding. The floor is adjacent to Fire Zone RB-FZ-1F which is a three-hour rated fire barrier. The ceiling adjacent to Fire Zone OB-FZ-8B is unrated with unsealed openings. The ceiling adjacent to Fire Zone OB-FZ-8C is an unrated zone boundary with all penetrations sealed with noncombustible materials for Halon containment. The remainder of the ceiling is adjacent to Fire Area OB-FA-9 which is a three-hour rated fire barrier.

Fire Zone OB-FZ-8B zone boundaries consist of reinforced concrete for the west wall, floor and ceiling. The east, south and north walls are hollow concrete block separating Fire Area OB-FA-9 (east and south walls) and Fire Zone OB-FZ-8C (north wall). The east and south walls are rated at one hour and the north wall is unrated but sealed with noncombustible materials to contain a Halon discharge in Fire Zone OB-FZ-8C. The floor is adjacent to Fire Zone OB-FZ-8A with unprotected openings. The west wall is a three-hour fire barrier and is adjacent to Fire Zone TB-FZ-11E. The ceiling is adjacent to the Fire Area OB-FA-9 and is a three-hour fire barrier.

These boundaries have been evaluated as acceptable consistent with the criteria outlined in the response to RAI-04.3 in Attachment 1.

Evaluations and Deviations

A deviation from NFPA 72D, 1975 Edition and NFPA 72E, 1974 Edition regarding the surveillance testing frequency change from six months to one year for the supervised circuits has been justified in Safety Evaluation SE No. 000665-015 in accordance with NRC GL 86-10. (Note: The new detectors in Fire Zone OB-FZ-8B were designed, installed and tested in accordance with NFPA 72, 2007 Edition which allows functional testing of detectors annually).

This deviation will not impact the capability to detect a fire, and therefore, will not impact the basis for the OMA exemption request.

Other evaluations have been performed to justify minor deviations from UL fire tests plus the application of the criteria for unrated zone boundaries (stipulated in the response to RAI-04.3 in Attachment 1) combine to make up the fire zone boundaries. These evaluations will not impact the basis of the OMA exemption requests.

There are no other deviations from fire protection codes, standards, testing programs and listings by independent laboratories in this fire zone impact this evaluation.

Exemptions

An exemption was granted from the requirements of Appendix R, Section III.G.2, for not providing area detection. This exemption was approved in the NRC SER dated June 25, 1990 based on the fact that any fire which might occur in Fire Zone OB-FZ-8A will be relatively small and will be controlled by the automatic sprinkler system. Since operation of the sprinkler system will alarm in the control room, prompt notification of and response by, the fire brigade for any required manual fire fighting activities is expected. Therefore, the installation of a separate automatic fire detection system would not provide a significant increase in fire protection for this fire zone and the requested exemption should be granted.

The defense-in-depth features have been determined to be adequate to assure safe shutdown in the event of a fire; therefore, this exemption does not impact the basis for the OMA exemption request.

Manual Actions

There are three (3) manual actions required for this fire zone.

OMA Phase 1, #7 (Align Fire Water to Isolation Condenser)

Manually open V-9-2099 and V-11-49 and close V-11-63 and V-11-41 to align the fire water system for make-up water to Isolation Condenser "B" since there is no power ("B" Train) available to the Condensate Transfer System. (Item #7 from the March 3, 2009 exemption request.)

- Refer to the fire water valve generic OMA Response in RAI-06.1 in Attachment 1 for additional information on this OMA.

  The loss of the “B” Train of power is attributed to a cable that traverses through this fire zone. The cable for the 125 VDC control power is in conduit and the conduit enters this

zone through the ceiling in the northwest corner and then travels south along the ceiling near the west wall and then leaves through the floor (approximately 50 feet in length). While running along the ceiling of the room, the conduit is approximately nine feet above the floor. The primary ignition sources in the room are the MG Sets. The conduit is approximately two feet from the "E" MG-Set where it enters the floor. As it runs along the ceiling, it is approximately seven feet from the MG Sets. This area is not a normally traveled area and has only one door for access and egress. Transient combustibles are controlled by administrative procedures and are typically not stored in this room. However, the placement of transient combustibles along the west wall underneath the conduit could potentially impact the conduit. The "A" train of power is credited and available for this fire zone. The redundant cable is associated with the "C" battery and this cable is not located in this fire zone.

Fire Zone OB-FZ-8B is analyzed in the safe shutdown analysis with Fire Zone OB-FZ-8A so the OMAs that are listed for Fire Zone OB-FZ-8A are also listed for Fire Zone OB-FZ-8B. There are no components or cables that will cause the loss of the "B" Train of Power in Fire Zone OB-FZ-8B. This area has minimal in-situ combustibles and is accessed only through a single locked door with a vital access door lock so access into the room is restricted. Hence, the room is rarely occupied and the potential for a fire to impact the credited cable below is unlikely. There are no credible ignition sources in this room that would impact the credited cables in conduit in the room below.

OMA Phase 1, #12 (Establish CRD Flow to Reactor)

Manually open V-15-237, throttle V-15-30 while monitoring flow at FI-225-2 and close V-15-52 to establish CRD flow to reactor due to the loss of instrument air to the CRD flow control valve. (Item #12 from Attachment 2 of the March 3, 2009 exemption request.)

- Refer to the loss of instrument air generic response in RAI-06.1 in Attachment 1 for additional information on this OMA.

OMA Phase 2, #17 (Provide Makeup Air to Isolation Condenser Valve V-11-34 Accumulator)

Provide makeup control air to the accumulator for V-11-34 for the Isolation Condenser makeup line due to the loss of instrument air. (Action #17 from Attachment 2 of the March 4, 2009 exemption request.)

- Refer to the loss of instrument air generic response in RAI-06.1 in Attachment 1 for additional information on this OMA.

Fire Hazards Analysis

As discussed in the response to RAI-02.4 in Attachment 1, the OCNGS FPP encompasses the concept of defense-in-depth. Administrative controls are in place as discussed in the response to RAI-02.3 in Attachment 1 to reduce the likelihood of fires from starting and to minimize the magnitude of a fire if one would occur.

Fire loading in this fire zone is low, consisting primarily of lubricating oil and cable insulation. Duct smoke detection and area-wide detection in Fire Zone OB-FZ-8B which alarms locally and

in the control room will promptly detect a fire. When the automatic fire suppression system operates, an alarm will sound in the control room.

If a fire were to occur in this fire zone, the duration would be short due to prompt detection and/or extinguishment of the principal combustibles, cable insulation and lube oil, which will be accomplished by automatic fixed suppression system and the plant fire brigade. Due to the fire protection features installed in this fire zone and low combustible loading, it is not expected that a total consuming fire would occur in this room, and therefore, most or all of the OMAs would not be required. Therefore, area-wide detection and suppression do not significantly enhance the fire protection features of this area. Also, the fire zone boundaries have been evaluated as acceptable as indicated above. Even if the fire were not promptly extinguished, all hot shutdown systems required in this area with the exception of the unprotected cables/equipment discussed above, are separated such that at least one redundant train survives a fire.

The OMAs for this fire zone vary from a 45-minute time limit to 300 minutes (refer to Reference 2 of Attachment 1, Section III.B for actual time limits). All of the OMAs discussed above that are required as a result of a fire in this fire zone are independent of this fire zone and do not require an SCBA for access/egress.

This fire protection configuration achieves a level of protection commensurate with that intended by Appendix R, Section III.G.2.

**OB-FZ-8C Office Bldg. A/B Battery Room, Tunnel and Electrical Tray Room Elev. 35'-0"**

Fire Zone Description

Fire Zone OB-FZ-8C floor area is approximately 1292 sq. ft.
The ceiling height is approximately 11'-0".

This zone consists of three areas that are interconnected. The A/B Battery Room is on the south side of the zone and contains the batteries as well as 125V distribution centers and MG Sets. The Electric Tray Room is on the north side of the zone. Both of these areas have an approximate 11'-0" ceiling height. The Tunnel connects these two areas. The tunnel is approximately 25 feet in length and is about four feet high by six feet wide. The tunnel is approximately seven feet above floor level.

This area has an administrative fire loading limit of less than 1.5 hours as determined by the ASTM E119 time-temperature curve. The main combustibles in this area are the plastic battery cases and racks (approximately 56% of loading) and cable insulation (approximately 39% of loading). It should be noted that it is unlikely that the battery cases would be involved in a large fire due to the configuration of the room (limited room for transient combustibles near batteries) and the fact that the battery cases are filled with water.

Fire Protection Features

This fire zone is provided with the following fixed defense-in-depth features:

- Area-wide smoke detection,
- Total flooding automatic Halon 1301 system,
- Portable fire extinguishers,

- Fire barriers (rated assemblies), and
- Fire zone boundaries (non-rated assemblies).

The fire detection system for the A/B Battery Room, Tunnel and Electrical Tray Room was designed, installed and acceptance tested in accordance with NFPA 72D, 1975 Edition and NFPA 72E, 1974 Edition which were the latest edition of the standards at the time of design.

The fire detection system is maintained and surveillance tested in accordance with procedure 645-6-034, Fire Detection System Alarm Circuitry Test for 480V Switchgear Rooms, A/B Battery Rooms & MG Set Room."

The Halon 1301 System was designed, installed and tested in accordance with NFPA 12A, 1977 Edition.

The system was designed and installed to deliver a concentration of 6% for a soak time of ten (10) minutes.

In response to NRC Information Notice 92-28, "Inadequate Fire Suppression System Testing," OCNGS reexamined the Halon system acceptance criteria and determined that additional improvements were necessary. OCNGS implemented modifications to minimize leakage of Halon from the protected space and confirmed through door fan testing that the Halon System is capable of maintaining a 6% concentration for a minimum 10-minute soak time (Reference 17 of Attachment 1).

The Halon 1301 suppression system is surveillance tested to demonstrate operability at least once per six months by verifying Halon storage tank weight or level and pressure and by verifying at least once per 18 months that the system, including associated ventilation dampers, actuates manually and automatically, upon the receipt of a simulated test signal and the performance of a flow test through the headers and nozzles to assure no blockage in accordance with station surveillance test procedures 645.6.013, “Fire Suppression System Halon Functional Test” and 645.6.014, “Fire Suppression System Halon Cylinder Check."

Refer to the response to RAI-04.1 in Attachment 1 for a discussion on manual suppression capabilities.

Zone boundaries for the main portion of the A/B Battery Room consist of reinforced concrete for the north, east and west walls, and the floor and ceiling. The south wall is of hollow concrete block separating Fire Area OB-FA-9; this zone is rated at one hour. In addition, a sealed hollow concrete block wall separates Fire Zone OB-FZ-8B that is unrated but sealed with noncombustible materials. The north, east and west walls are adjacent to Fire Zones RB-FZ-1H, RB-FZ-1E and TB-FZ-11E, respectively and these walls are three-hour rated fire barriers. The floor is adjacent to Fire Zone OB-FZ-8A, and is unrated with unprotected openings that are sealed with noncombustible materials. The floor of the Electrical Tray Room is adjacent to Fire Zone OB-FZ-6A and is a three-hour fire barrier, but the penetrations have a minimum of a one-hour rating. The ceiling is a three-hour fire rated barrier to Fire Area OB-FA-09 and Fire Zone OB-FZ-10A but the penetrations only have at least a one-hour rating. The Tunnel is enclosed with a three-hour rated fire barrier. The east and north walls of the electric tray room are 6-inch hollow block walls and are adjacent to Fire Zone OB-FZ-10B with a one-hour rating. The west wall is adjacent to Fire Zone OB-FZ-4 and is hollow block with a two-hour fire resistance rating. All penetrations in zone boundaries for this zone are sealed to the rating

of the barrier or evaluated as acceptable, and all zone boundaries are sealed with noncombustible materials to contain a Halon discharge.

These boundaries have been evaluated as acceptable consistent with the criteria outlined in RAI-04.3 in Attachment 1.

Evaluations and Deviations

A deviation exists from NFPA 72D, 1975 Edition and NFPA 72E, 1974 Edition regarding a surveillance testing frequency change from six months to one year for fire detectors, supervised circuits, water flow switches and pressure switches. This deviation has been justified in Safety Evaluation SE No. 000665-015 in accordance with NRC GL 86-10. This deviation will not impact the capability to detect a fire and therefore will not impact the basis for the manual action exemption request.

The following engineering evaluations are documented in the OCNGS FPP for this fire zone:

- AR A2046137-52: Evaluation of Detector on Beam in A/B Battery Room. This engineering evaluation documents the acceptability of a smoke detector installed on the bottom of a beam which is not in compliance with NFPA 72. The evaluation concluded that the detector will perform its function as intended. Since the fire detection system is expected to operate as designed, this evaluation does not impact the basis for the manual action exemption request which takes credit for the defense-in-depth afforded by the Fire Detection System.

- AR 776443-02: Evaluation of the acceptability of no detector being located in a beam pocket in the southwest corner of the room. This engineering evaluation concluded that the lack of a detector in a beam pocket does not impact the performance of the area detection in the room. Since the fire detection system is expected to operate as designed, this evaluation does not impact the basis for the manual action exemption request.

Other evaluations have been performed to justify minor deviations from UL fire tests plus the application of the criteria for unrated zone boundaries (stipulated in the response to RAI-04.3 in Attachment 1) combine to make up the fire zone boundaries. These evaluations will not impact the basis of the OMA exemption requests.

There are no other deviations from fire protection codes, standards, testing programs and listings by independent laboratories in this fire zone that impact this evaluation.

Exemptions

There are no previously approved exemptions for this fire area that could impact this evaluation.

Manual Actions

There are six (6) manual actions required for this fire zone. Note that the acceptability of the RG 1.75 noncompliances in regards to the credited and redundant cables being located in the same cable tray are addressed in the response to RAI-05 in Attachment 1.

OMA Phase 1, #2 (Read Condensate Storage Tank Local Level Indicator LI-424-993)

Locally read Condensate Storage Tank (CST) level at LI-424-993. (Item #2 from Attachment 2 of the March 3, 2009 exemption request.)

- There is no redundant train of equipment for the credited source of obtaining CST level indication. Should the credited indicator (5F-27) fail, indication can only be obtained by reading the local indicator (LI-242-993) located at the CST. The credited train cable for the level indicator is installed in a cable tray in this fire zone. The cable tray is in the Electric Tray Room portion of this room, which is separated from the main battery room by approximately a 25 foot cable tunnel that is located approximately seven feet off of the floor. The tray in question enters through the floor and turns and exits through the lower cable spreading room (Fire Zone OB-FZ-4) east wall (approximately 15 feet in length). The credited train cable runs in a cable tray with other cables, thus putting it in close proximity to in-situ hazards.

  The only combustibles in this portion of the fire zone are the cables in the cable tray. There are no ignition sources in this portion of the room. The placement of transient combustibles in this portion of the fire zone is remote since it is a small room with limited floor space that has only one door for access/egress. Entry is controlled to the A/B Battery Room area by a single vital access door and entry to the Electric Tray portion of the room is locked with a vital access door lock. Both of these rooms (as well as the tunnel) have restricted access such that neither of these rooms are a normally traveled area. Due to the lack of ignition sources in this portion of the fire zone and the fire protection features that exist in this fire zone, it is unlikely that the OMA would be required. However, in the unlikely event that a fire did occur in this particular cable tray, the OMA would be required.

OMA Phase 1, #7 (Align Fire Water to Isolation Condenser)

Manually open V-9-2099 and V-11-49 and close V-11-63 and V-11-41 to align the fire water system for make-up water to Isolation Condenser "B" since there is no power ("B" Train) available to the Condensate Transfer System. (Item #7 from the March 3, 2009 exemption request.)

- Refer to the fire water valve generic OMA response in RAI-06.1 in Attachment 1 for additional information on this OMA.

  The loss of the “B” Train of power is attributed to the fact that the 125 VDC “B” Battery, “B” Distribution Center and control power cable could be lost, which supplies control power to the 1B and 1D 4160V Switchgears. The credited cable is located in the A/B Battery Room portion (main portion) of this fire zone. The credited cable runs in a conduit that begins at 125V DC Distribution Panel B which is on the north wall of the room. The cable is routed in a conduit that runs up to the ceiling and then towards the west wall of the room. The conduit is then routed towards the northwest corner of the room where it runs down to the floor and penetrates the floor to enter the fire zone below. During its travel, it runs approximately one foot above a series of vertical cable trays. It also runs approximately eight feet above the potential ignition source of the “B” MG Set. However, the “B” MG Set is not normally energized since the static charger is utilized normally for charging the “B” Battery. It also enters the 125V DC “B” Distribution

Center (potential ignition source) and then runs approximately three feet over the top of the 125V DC “B” Distribution Center. The battery banks are another potential ignition source in the room but are located greater than 15 feet from this conduit but the failure of the battery itself will also require the OMA. The “A” train of power is credited and available for this fire zone. The redundant cable, “C” battery, “C” Distribution center, etc. are not located in this fire zone.

Transient combustibles may impact this conduit if they are stored in the immediate vicinity of the 125V DC Distribution Center “B." Entry is controlled to the A/B Battery Room area by a single vital access door and entry to the Electric Tray Room is locked with a vital access door lock so access into the room is restricted. Neither of these rooms are a normally traveled area.

OMA Phase 1, #8 (Manually Control USS 1A2 “A” CRD Pump & 1A2M from LSP-1A2)

Manually control 480V USS 1A2 Breakers for "A" CRD Pump and 1A2M from LSP-1A2. (Item #8 from March 3, 2009 exemption request.)

- The credited control cables (1A2M & A CRD Pump) and the redundant control cables (1B2M and B CRD Pump) impacting this manual action are run in the same cable tray in the Electric Tray Room portion of this fire area, which is separated from the main battery room by approximately a 25 foot cable tunnel that is located approximately seven feet off of the floor. The tray in question enters through the floor and turns and exits through the lower cable spreading room east wall (approximately 15 feet in length). The credited train cable and the redundant cable run in the same cable tray with other cables, thus putting them in close proximity to in-situ cable hazards. Damage to this cable tray would affect both the credited train and redundant train cable and would make the manual action necessary.

  The only combustibles in this portion of the fire zone are the cables in the cable tray. There are no ignition sources in this room. The placement of transient combustibles in this portion of the fire zone is remote since it is a small room that has only one door for access/egress. Also, the door is normally locked with a vital access door lock so access into the room is restricted.

  The placement of transient combustibles in the tunnel portion of the fire zone is remote since this is a small area and difficult for personnel to access. The placement of transient combustibles in the Electric Tray portion of the fire zone is remote since it is a small room with limited floor space that has only one door for access/egress. Entry is controlled to the A/B Battery Room area by a single vital access door and entry to the Electric Tray portion of the room is locked with a vital access door lock so access into the room is restricted. Neither of these rooms are a normally traveled area. Due to the lack of ignition sources in this portion of the fire zone and the fire protection features that exist in this fire zone, it is unlikely that the OMA would be required. However, in the unlikely event that a fire did occur in this particular cable tray, the OMA would be required.

OMA Phase 1, #16 (Manually Trip Rx Recirculation Pumps at 4160V Switchgear)

Manually trip Reactor Recirculation Pumps ("A," "C," and "E") 4160V Switchgear 1A and 1B. (Item #16 from Attachment 2 of the March 3, 2009 exemption request.)

- The credited cables for tripping the recirculation pumps are run in cable trays and conduit in this fire zone. Also, the loss of the 125 VDC "B" Battery and "B" Distribution Center (ignition sources) in the main portion of the room will prevent the tripping of the pumps. The control power conduit routing is described above in OMA #7 (aligning fire water to the isolation condenser). The cable trays run from the Electric Tray Room through the Tunnel and into the A/B Battery Room. The cable tray runs are stacked together in both a horizontal and vertical configuration. The only combustibles in the Electric Tray Room and the Tunnel are the cables in the cable tray. There are no ignition sources in the Tunnel or the Electric Tray Room. The placement of transient combustibles in these areas is remote since access is limited and both areas are small. The door to the Electric Tray Room is normally locked with a vital access door lock so access into the room is restricted.

  The cable tray configuration in the A/B Battery Room is a series of vertical trays closely stacked together. These trays are located approximately 4 feet from the potential ignition source of the "B" MG Set. However, the "B" MG Set is not normally energized since the static charger is utilized normally for charging the "B" Battery. Transient combustibles are administratively controlled in this area and the room has only one entrance door (vital access door) for access/egress and it is not a normally traveled area.

OMA Phase 1, #12 (Establish CRD Flow to Reactor)

Manually open V-15-237, throttle V-15-30 while monitoring flow at FI-225-2 and close V-15-52 to establish CRD flow to reactor due to the loss of instrument air to the CRD flow control valve. (Item #12 from Attachment 2 of the March 3, 2009 exemption request.)

- Refer to the loss of instrument air generic response in RAI-06.1 in Attachment 1 for additional information on this OMA.

OMA Phase 2, #17 (Provide Makeup Air to Isolation Condenser Valve V-11-34 Accumulator)

Provide makeup control air to the accumulator for V-11-34 for the Isolation Condenser makeup line due to the loss of instrument air. (Action #17 from Attachment 2 of the March 4, 2009 exemption request.)

- Refer to the loss of instrument air generic response in RAI-06.1 in Attachment 1 for additional information on this OMA.

Fire Hazards Analysis

As discussed in the response to RAI-02.4 in Attachment 1, the OCNGS FPP encompasses the concept of defense-in-depth. Administrative controls are in place as discussed in the response to RAI-02.3 in Attachment 1 to reduce the likelihood of fires from starting and to minimize the magnitude of a fire if one would occur.

Fire loading in this fire zone is low, consisting primarily of cable insulation and plastic battery cases and battery racks. Automatic fire detection which alarms locally and in the control room will promptly detect a fire. In addition to its alarm function, the automatic detection system will actuate the total flooding Automatic Halon 1301 System. Also, the fire zone boundaries have been evaluated as acceptable as indicated above.

If a fire were to occur in this fire zone, the duration would be short due to prompt detection and extinguishment of the principal combustibles, cable insulation and plastic battery cases, by the total flooding Automatic Halon 1301 System or by the plant fire brigade. Due to the fire protection features installed in this fire zone, it is not expected that a total consuming fire would occur in this fire zone, and therefore, most or all of the OMAs would not be required. Even if the fire were not promptly extinguished, all hot shutdown systems required in this area with the exception of the unprotected components and cables listed above, are separated such that at least one redundant train survives a fire.

The OMAs for this fire zone vary from a 30-minute time limit to 300 minutes (refer to Reference 2 of Attachment 1, Section III.B for actual time limits). All of the OMAs discussed above that are required as a result of a fire in this fire zone are independent of this fire zone and do not require an SCBA for access/egress.

This fire protection configuration achieves a level of protection commensurate with that intended by Appendix R, Section III.G.2.

**OB-FZ-10A Office Bldg. Monitor and Change Room and Operations Support Area Elev.35'-0" & 46'-6"**

Fire Zone Description

Fire Zone OB-FZ-10A floor area is approximately 2019 sq. ft.
The ceiling height is approximately 8'-8" for the drop ceiling and approximately 13'-0" for the concrete ceiling.

This area has an administrative fire loading limit of less than 30 minutes as determined by the ASTM E119 time-temperature curve. This limit is tied to an NRC-accepted approach for dealing with fire zone boundaries (refer to the response to RAI-04.3 in Attachment 1 for more details). The major combustibles in this area are cable insulation (approximate 27% of loading), rubber flooring (approximately 31% of loading), miscellaneous plastics (approximately 17% of loading) and Protective Clothing (PC) supplies (approximately 20% of loading). However, the PCs have recently been placed in metal cans with self-closing lids so they are no longer considered a contribution to the combustibles in this area.

Fire Protection Features

This fire zone is provided with the following fixed defense-in-depth features:

- Area-wide automatic wet pipe sprinklers,
- Area-wide smoke detection system,
- Hose stations,
- Portable fire extinguishers,

- Fire barriers (rated assemblies), and
- Fire zone boundaries (non-rated assemblies).

The Monitor and Change Room and Operations Support Area was originally protected by a partial area closed head sprinkler system that was designed, installed and tested in accordance with NFPA 13, 1979 Edition.

This system has recently been extended to cover the entire fire zone. The extended portion of the closed head automatic sprinkler system was designed, installed and tested in accordance with NFPA 13, 2007 Edition, which was the latest edition of this code at the time of design.

The closed head automatic sprinkler system is surveillance tested to demonstrate operability at least once per 12 months by performing a system functional test, which includes simulated automatic actuation of the system and verifying that the automatic valves in the flow path actuate to their correct position.

The closed head automatic sprinkler system is inspected in accordance with station surveillance procedures 645.6.009, “Cycling of Fire Protection System Valves" and 645.6.011, “Deluge and Sprinkler System Inspection,” and flow tested annually in accordance with station surveillance procedure 645.6.035, “Fire Detection System Alarm Circuitry Test for Office Bldg., Service Area, Old Radwaste, Boiler House, Diesel Generator, & Fire Pump House."

The recently extended area-wide smoke detection system was designed and installed and is tested in accordance with NFPA 72, 2007 Edition, which is the latest edition of this code at the time of design.

The Monitor and Change Area and Operations Support Area smoke detection system is surveillance tested in accordance with station procedure 645.6.035, “Fire Detection System Alarm Circuitry Test for Office Bldg., Service Area, Old Radwaste, Boiler House, Diesel Generator, & Fire Pump House." This surveillance procedure tests the alarm and supervisory circuits for the fire detection system. Each smoke detector is demonstrated operable by a channel functional test using a test gas once per 12 months.

Refer to the response to RAI-04.1 in Attachment 1 for a discussion on manual suppression capabilities.

Zone boundaries consist of reinforced concrete and concrete block walls, and a reinforced concrete floor and ceiling. The north wall is not adjacent to any other plant areas. The portion of the ceiling adjacent to Fire Zone OB-FZ-22A is a three-hour fire barrier. The east wall is adjacent to Fire Zones RB-FZ-1D and RB-FZ-1E and is a three-hour rated wall. The west wall is adjacent to the control room at elevation 46 feet, and is a three-hour fire barrier. The portion of the west wall at elevation 36'-0" adjacent to Fire Zone TB-FZ-11B is a two-hour rated wall. The floor is adjacent to Fire Zone OB-FZ-10B at elevation 46'-6" and is not fire rated. A small portion of the floor at elevation 36'-0" (stairwell area) is adjacent to Fire Zone OB-FZ-6B and is a three-hour fire barrier. The doors in this area either have a three-hour rating or a 1.5 hour rating. The south wall at elevation 46 feet is adjacent to the Office Building Fire Area OB-FA-9 and is a minimum of a one-hour fire barrier with the exception of a portion of the masonry block wall over the entrance to the Operations Support Area that is non-rated with all openings sealed with noncombustible materials.

These boundaries have been evaluated as acceptable consistent with the criteria outlined in RAI-04.3 in Attachment 1.

Evaluations and Deviations

A deviation exists from NFPA 72D, 1975 Edition and NFPA 72E, 1974 Edition regarding a surveillance testing frequency change from six months to one year for supervised circuits, water flow switches and pressure switches. This deviation has been justified in Safety Evaluation SE No. 000665-015 in accordance with NRC GL 86-10. This deviation will not impact the capability to detect a fire and therefore will not impact the basis for the manual action exemption request. (Note: The new detectors in Fire Zone OB-FZ-10A were designed, installed and tested in accordance with NFPA 72 which allows functional testing of detectors annually.)

Other evaluations have been performed to justify minor deviations from UL fire tests plus the application of the criteria for unrated zone boundaries (stipulated in the response to RAI-04.3 in Attachment 1) combine to make up the fire zone boundaries. These evaluations will not impact the basis of the OMA exemption requests.

There are no other deviations from fire protection codes, standards, testing programs and listings by independent laboratories in this fire zone that impact this evaluation.

Exemptions

There are no previously approved exemptions for this fire zone that could impact this evaluation.

Manual Actions

There are two (2) manual actions required for this fire zone.

OMA Phase 1, #12 (Establish CRD Flow to Reactor)

Manually open V-15-237, throttle V-15-30 while monitoring flow at FI-225-2 and close V-15-52 to establish CRD flow to reactor due to the loss of instrument air to the CRD flow control valve. (Item #12 from Attachment 2 of the March 3, 2009 exemption request.)

- Refer to the loss of instrument air generic response in RAI-06.1 in Attachment 1 for additional information on this OMA.

OMA Phase 2, #18 (Provide Makeup Air to Isolation Condenser Valve V-11-36 Accumulator)

Provide makeup control air to the accumulator for V-11-36 for the Isolation Condenser makeup line due to the loss of instrument air. (Action #18 from Attachment 2 of the March 4, 2009 exemption request.)

- Refer to the loss of instrument air generic response in RAI-06.1 in Attachment 1 for additional information on this OMA.

Fire Hazards Analysis

As discussed in the response to RAI-02.4 in Attachment 1, the OCNGS FPP encompasses the concept of defense-in-depth. Administrative controls are in place as discussed in the response to RAI-02.3 in Attachment 1 to reduce the likelihood of fires from starting and to minimize the magnitude of a fire if one would occur.

The existing defense-in-depth features are listed above. In addition to these features, fire loading in this fire zone is low, consisting primarily of electrical cable insulation located above the suspended ceiling and rubber flooring. Other combustibles include health physics materials, wood, and other miscellaneous materials. Area-wide automatic fire detection which alarms locally and in the control room will promptly detect a fire. A closed head area-wide automatic sprinkler system is installed above and below the ceiling in the Monitor and Change Area, Electric Tray Room, stairway area and Operations Support Area.

If a fire were to occur in this fire zone, it would not be of significant size or duration due to the low combustible loading and the nature of the combustibles. Prompt detection and extinguishment of the combustibles will be accomplished by the area automatic sprinkler system and the plant fire brigade. Due to the fire protection features installed in this fire zone and the low combustible loading, it is not expected that a total consuming fire would occur in this fire zone, and therefore, most or all of the OMAs would not be required.

The fire zone boundaries have been evaluated as acceptable as indicated above. Even if the fire were not promptly extinguished, all hot shutdown systems required in this area, with the exception of the unprotected components and cables discussed above, are separated such that at least one redundant train survives a fire.

The OMAs for this fire zone vary from a 204-minute time limit to 300 minutes (refer to Reference 2 of Attachment 1, Section III.B for actual time limits). All of the OMAs discussed above that are required as a result of a fire in this fire zone are independent of this fire zone and do not require an SCBA for access/egress.

This fire protection configuration achieves a level of protection commensurate with that intended by Appendix R, Section III.G.2.

**RB-FZ-1D Reactor Building El. 51'-3"**

Fire Zone Description

Fire Zone RB-FZ-1D floor area is approximately 9100 sq. ft.
The ceiling height is approximately 21'-0".

This area has an administrative fire loading limit of less than 30 minutes as determined by the ASTM E119 time-temperature curve. This limit is tied to an NRC-accepted approach for dealing with fire zone boundaries (refer to the response to RAI-04.3 in Attachment 1 for more details). The main combustible in this area is attributed to cable insulation (approximately 84% of loading).

Fire Protection Features

This fire zone is provided with the following fixed defense-in-depth features:

- Area-wide smoke detection system,
- Automatic localized fixed deluge water spray system (cable trays and open hatches),
- Hose stations,
- Portable fire extinguishers,
- Fire barriers (rated assemblies) including one-hour fire cable raceway barriers, and
- Fire zone boundaries (non-rated assemblies).

The deluge suppression system protecting safety related cable trays is automatically activated by a cross-zoned detection system consisting of linear heat detection wire located on top of the cables in each original safety related cable tray as was committed to in the comparison to BTP 9.5-1, Appendix A, and intelligent smoke detectors are located in each beam pocket at the ceiling. The deluge water spray systems were designed, installed and tested in accordance with NFPA 15, 1977 Edition, which was the latest edition of the standard at the time of design.

The deluge suppression system is surveillance tested to demonstrate operability at least once per 18 months by performing a system functional test, which includes simulated automatic actuation of the system and verifying that the automatic valves in the flow path actuate to their correct position.

The fire suppression system is maintained and surveillance tested in accordance with station procedures 645.4.004, “Fire Suppression Water System Valve Lineup," 645.4.009, “Fire Protection System Valves," and 645.6.010, “Fire Suppression Deluge Valve Functional Test." The system deluge valve is trip tested in accordance with station procedure 645.6.011, “Deluge and Sprinkler System Inspection."

The existing (Fire Zone RB-FZ-1D) Reactor Building elevation 51’-3” smoke detection system has been replaced with the new intelligent smoke detection system in combination with a linear heat detection system within the cable trays.

The upgraded smoke detection system and linear heat detection system for Fire Zone RB-FZ-1D were designed and installed in accordance with NFPA 72, 2007 Edition, which was the latest edition of the standard at the time of design.

The Reactor Building 51’-3” smoke detection system is surveillance tested in accordance with station procedure 645.6.031, “Fire Detection System Alarm Circuitry Test for Reactor Building." This surveillance procedure tests the alarm and supervisory circuits for the fire detection system. Each smoke detector is demonstrated operable by a channel functional test using a test gas once per 12 months.

Refer to the response to RAI-04.1 in Attachment 1 for a discussion on manual suppression capabilities.

Zone boundaries consist of reinforced concrete walls, floor and ceiling. The north, south and east walls are not adjacent to any other plant area. The west wall is a three-hour rated wall and portions of this wall are adjacent to Fire Zones OB-FZ-10A and OB-FZ-22B. However, the airlock going to Fire Zone OB-FZ-10A has a minimum rating of at least 1.5 hours. The floor is

adjacent to Fire Zone RB-FZ-1E and a portion of Fire Zone RB-FZ-1G. The penetrations to Fire Zones RB-FZ-1C (ceiling) and RB-FZ-1E (floor) are sealed with noncombustible materials except for the equipment hatch and stairwell area. The equipment hatch and stairwell area are protected by an automatic water curtain to retard the passage of smoke and hot gases from one fire zone in the Reactor Building to another fire zone. There are no penetrations in the floor that communicates with Fire Zone RB-FZ-1G. The ceiling is also adjacent to the floor of the Spent Fuel Pool (Fire Zone RB-FZ-1A) and is three-hour rated. The drywell is surrounded by this zone and is three-hour rated. This zone is also adjacent to a small portion of the ceiling of Fire Zone RB-FZ-1H. Since the interface with Fire Zone RB-FZ-1H is within the concrete drywell wall, there is no interaction between Fire Zones RB-FZ-1D and RB-FZ-1H and the interface is therefore not treated as a common boundary.

These boundaries have been evaluated as acceptable consistent with the criteria outlined in Attachment 1 in the response to RAI-04.3.

Evaluations and Deviations

A deviation exists from NFPA 72D, 1975 Edition and NFPA 72E, 1974 Edition regarding a surveillance testing frequency change from six months to one year for supervised circuits, water flow switches and pressure switches. This deviation has been justified in Safety Evaluation SE No. 000665-015 in accordance with NRC GL 86-10. This deviation will not impact the capability to detect a fire and therefore will not impact the basis for the manual action exemption request. (Note: The new detectors in Fire Zone RB-FZ-1D were designed, installed and tested in accordance with NFPA 72, 2007 Edition which allows functional testing of detectors annually.)

Other evaluations have been performed to justify minor deviations from UL fire tests plus the application of the criteria for unrated zone boundaries (stipulated in the response to RAI-04.3 in Attachment 1) combine to make up the fire zone boundaries. These evaluations will not impact the basis of the OMA exemption requests.

There are no other deviations from fire protection codes, standards, testing programs and listings by independent laboratories in this fire zone that impact this evaluation.

Exemptions

An exemption was granted from the requirements of Appendix R, Section III.G.2 in SERs dated March 24, 1986 and June 25, 1990 for not having area-wide suppression in Fire Zone RB-FZ-1D. The primary basis for this exemption is that the primary combustible for this area is cable insulation which is considered low and is protected by automatic open head deluge water spray systems. This exemption does not impact the basis for the manual action exemption request.

Manual Actions

There are two (2) manual actions required for this fire zone.

OMA Phase 1, #12 (Establish CRD Flow to Reactor)

Manually open V-15-237, throttle V-15-30 while monitoring flow at FI-225-2 and close V-15-52 to establish CRD flow to reactor due to the loss of instrument air to the CRD flow control valve. (Item #12 from Attachment 2 of the March 3, 2009 exemption request.)

- Refer to the loss of instrument air generic response in RAI-06.1 in Attachment 1 for additional information on this OMA.

OMA Phase 2, #17 (Provide Makeup Air to Isolation Condenser Valve V-11-34 Accumulator)

Provide makeup control air to the accumulator for V-11-34 for the Isolation Condenser makeup line due to the loss of instrument air. (Action #17 from Attachment 2 of the March 4, 2009 exemption request.)

- Refer to the loss of instrument air generic response in RAI-06.1 in Attachment 1 for additional information on this OMA.

Fire Hazards Analysis

As discussed in the response to RAI-02.4 in Attachment 1, the OCNGS FPP encompasses the concept of defense-in-depth. Administrative controls are in place as discussed in the response to RAI-02.3 in Attachment 1 to reduce the likelihood of fires from starting and to minimize the magnitude of a fire if one would occur.

The existing defense-in-depth features are listed above. In addition to these features, fire loading in this fire zone is low, consisting primarily of cable insulation. Automatic fire detection which alarms locally and in the control room will promptly detect a fire. In addition to its alarm function, the automatic detection system will actuate the two fixed water spray systems which specifically protect grouped cable trays.

If a fire were to occur in this fire zone, it would be slow to develop and would not be significant due to the low combustible loading and the nature of the combustibles. The duration would be short due to prompt detection and extinguishment of the principal combustible by the fixed deluge water spray system protecting the cable trays or by the plant fire brigade. Due to the fire protection features installed in this fire zone and low combustible loading, it is not expected that a total consuming fire would occur in this fire zone, and therefore, most or all of the OMAs would not be required.

The fire zone boundaries have been evaluated as acceptable as indicated above. Even if the fire were not promptly extinguished, all hot shutdown systems required in this area, with the exception of the above mentioned components and cables, are protected by a one-hour rated fire barrier.

The OMAs for this fire zone vary from a 204-minute time limit to 300 minutes (refer to Reference 2 of Attachment 1, Section III.B for actual time limits). All of the OMAs discussed above that are required as a result of a fire in this fire zone are independent of this fire zone and do not require an SCBA for access/egress.

This fire protection configuration achieves a level of protection commensurate with that intended by Appendix R, Section III.G.2.

**RB-FZ-1E Reactor Building El. 23'-6"**

Fire Zone Description

Fire Zone RB-FZ-1E floor area is approximately 12140 sq. ft.
The ceiling height is approximately 26'-9".

This area has an administrative fire loading limit of less than 30 minutes as determined by the ASTM E119 time-temperature curve. This limit is tied to an NRC-accepted approach for dealing with fire zone boundaries (refer to the response to RAI-04.3 in Attachment 1 for more details). The main combustible in this area is attributed to cable insulation (approximately 84% of loading).

Fire Protection Features

This fire zone is provided with the following fixed defense-in-depth features:

- Smoke detection system,
- Automatic localized fixed water spray system (cable trays and open hatches),
- Hose stations,
- Portable fire extinguishers,
- Fire barriers (rated assemblies) including one-hour fire cable raceway barriers, and
- Fire zone boundaries (non-rated assemblies).

The deluge suppression system protecting safety related cable trays is automatically activated by a cross-zoned smoke detection system. The deluge system is divided into two zones, one protecting safety related cable trays on the north side of the reactor and the other protecting safety related cable trays on the south side of the reactor. The deluge water spray systems were designed, installed and tested in accordance with NFPA 15, 1977 Edition, which was the latest edition of the standard at the time of design.

The deluge suppression system is surveillance tested to demonstrate operability at least once per 18 months by performing a system functional test, which includes simulated automatic actuation of the system and verifying that the automatic valves in the flow path actuate to their correct position.

The fire suppression system is maintained and surveillance tested in accordance with station procedures 645.4.004, "Fire Suppression Water System Valve Lineup," 645.4.009, "Fire Protection System Valves," and 645.6.010, "Fire Suppression Deluge Valve Functional Test." The system deluge valve is trip tested in accordance with station procedure 645.6.011, "Deluge and Sprinkler System Inspection."

The existing (Fire Zone RB-FZ-1E) Reactor Building elevation 23'-6" fire detection system is provided with cross-zoned smoke detectors which alarm locally and in the control room.

The existing smoke detection system for Fire Zone RB-FZ-1E was designed, installed and acceptance tested in accordance with NFPA 72D, 1975 Edition and NFPA 72E, 1974 Edition which were the latest edition of the standards at the time of design.

The Reactor Building 23'-6" smoke detection system is surveillance tested in accordance with station procedure 645.6.031, "Fire Detection System Alarm Circuitry Test for Reactor Building." This surveillance procedure tests the alarm and supervisory circuits for the fire detection system. Each smoke detector is demonstrated operable by a channel functional test using a test gas once per 12 months.

Refer to the response to RAI-04.1 in Attachment 1 for a discussion on manual suppression capabilities.

Zone boundaries consist of reinforced concrete walls, floor and ceiling. The north, south and east walls are not adjacent to any other plant areas but only the north wall and small portion of the east wall (northeast corner) have a three-hour rating. The west wall is adjacent to Fire Zones OB-FZ-6A, OB-FZ-6B and OB-FZ-8A, OB-FZ-8C, OB-FZ-10A and OB-FZ-10B, and all penetrations are sealed to the rating of the boundary (three-hour rating) or evaluated as acceptable. This zone is also adjacent to a small portion of the wall of Fire Zone RB-FZ-1H. Since the interface with Fire Zone RB-FZ-1H is within the concrete drywell wall, there is no interaction between Fire Zones RB-FZ-1E and RB-FZ-1H and the interface is therefore not treated as a common boundary. The floor is unrated and adjacent to the four triangular corner rooms (Fire Zones RB-FZ-1F1, 2, 3, 4) and the Torus Room (Fire Zone RB-FZ-1F5), and all penetrations are sealed with noncombustible materials. The ceiling is adjacent to Fire Zones RB-FZ-1D and RB-FZ-1G. There are unsealed openings to RB-FZ-1G and RB-FZ-1E (equipment hatch and stairwell). The equipment hatch and stairwell area are protected by an automatic water curtain to retard the passage of smoke and hot gases from one fire zone in the Reactor Building to another fire zone. The drywell is surrounded by this zone and the drywell boundaries are rated at three hours.

These boundaries have been evaluated as acceptable consistent with the criteria outlined in Attachment 1 in the response to RAI-04.3.

Evaluations and Deviations

A deviation exists from NFPA 72D, 1975 Edition and NFPA 72E, 1974 Edition regarding a surveillance testing frequency change from six months to one year for fire detectors, supervised circuits, water flow switches and pressure switches. This deviation has been justified in Safety Evaluation SE No. 000665-015 in accordance with NRC GL 86-10. This deviation will not impact the capability to detect a fire and therefore will not impact the basis for the manual action exemption request.

The following engineering evaluation is documented in the OCNGS FPP for this fire zone:

- AR 78160-02: Evaluation for no Detector in Two Beam Pockets for Reactor Building 23'-6" Elevation. The evaluation concluded that adding additional detectors into these beam pockets would not significantly improve detection response time. Therefore, this deviation will not impact the capability to detect a fire and will not impact the basis for the manual action exemption request.

Other evaluations have been performed to justify minor deviations from UL fire tests plus the application of the criteria for unrated zone boundaries (stipulated in the response to RAI-04.3 in Attachment 1) combine to make up the fire zone boundaries. These evaluations will not impact the basis of the OMA exemption requests.

There are no other deviations from fire protection codes, standards, testing programs and listings by independent laboratories in this fire zone that impact this evaluation.

Exemptions

An exemption was granted from the requirements of Appendix R, Section III.G.2 in SERs dated March 24, 1986 and June 25, 1990 for not having area-wide suppression in Fire Zone RB-FZ-1E. The primary basis for this exemption is that the primary combustible for this area is cable insulation which is considered low and is protected by automatic open head deluge water spray systems. Since a fire in this area would not impede the plant's capability for safe shutdown, this exemption does not impact the basis for the OMA exemption request.

An exemption was granted in NRC SER dated June 25, 1990 from Appendix R, Section III.G.2 for not providing either additional separation from in-situ combustibles or protection for CRD hydraulic system bypass valve V-15-30. This valve will be manually opened to provide a flow path for reactor coolant makeup which is not required for three hours and 24 minutes after reactor scram. The primary combustible is cable insulation which is considered low and is protected by automatic open head deluge water spray systems. Also, the valve is located in the spray area of the deluge spray systems. Since a fire in this area would not impede the plant's capability for safe shutdown, this exemption does not impact the basis for the OMA exemption request.

Two other exemptions (reactor scram system circuitry and drywell penetration box) were granted for this fire zone for not providing protection for the identified circuits in this same SER, dated June 25, 1990, which have no impact on the basis for the OMA exemption request.

Manual Actions

There are three (3) manual actions required for this fire zone.

OMA Phase 1, #11 (Locally Read CRD Flow Gauge FI-225-998)
(Item #11 from Attachment 2 of the March 3, 2009 exemption request.)

- The normal local gauge for CRD flow is FI-225-2 which is located on the containment wall on the southeast area of this fire zone. There are no in-situ combustibles in the immediate area of this flow gauge. The storage of transient combustibles near this flow gauge is remote since the flow gauge is surrounded by piping and tubing that would make it difficult to store transient combustibles in this location where they would impinge upon the flow gauge. The nearest ignition source is MCC 1A21B which is located approximately eight feet from the flow gauge. However, the solid steel rear of the MCC faces the flow gauge making it highly unlikely that this potential ignition source would adversely impact the flow gauge.

  In the unlikely event that this flow gauge is unable to be read, flow gauge FI-225-998 is the redundant instrument that provides the same data. FI-225-998 is mounted on an instrument rack in the southeast side of Fire Zone RB-FZ-1D. FI-225-998 is located approximately 19 feet from an open equipment hatch that communicates with Elevation 23'-6". This equipment hatch is protected by an automatic water curtain.

OMA Phase 1, #12 (Establish CRD Flow to Reactor)

Manually open V-15-237, throttle V-15-30 while monitoring flow at FI-225-2 and close V-15-52 to establish CRD flow to reactor due to the loss of instrument air to the CRD flow control valve. (Item #12 from Attachment 2 of the March 3, 2009 exemption request.)

- Refer to the loss of instrument air generic response in RAI-06.1 in Attachment 1 for additional information on this OMA.

OMA Phase 2, #17 (Provide Makeup Air to Isolation Condenser Valve V-11-34 Accumulator)

Provide makeup control air to the accumulator for V-11-34 for the Isolation Condenser makeup line due to the loss of instrument air. (Action #17 from Attachment 2 of the March 4, 2009 exemption request.)

- Refer to the loss of instrument air generic response in RAI-06.1 in Attachment 1 for additional information on this OMA.

Fire Hazards Analysis

As discussed in the response to RAI-02.4 in Attachment 1, the OCNGS FPP encompasses the concept of defense-in-depth. Administrative controls are in place as discussed in the response to RAI-02.3 in Attachment 1 to reduce the likelihood of fires from starting and to minimize the magnitude of a fire if one would occur.

The existing defense-in-depth features are listed above. In addition to these features, fire loading in this fire zone is low, consisting primarily of cable insulation. Automatic fire detection which alarms locally and in the control room will promptly detect a fire. In addition to its alarm function, the automatic detection system will actuate the two fixed water spray systems which specifically protect grouped cable trays in this fire zone.

If a fire were to occur in this fire zone, it would be slow to develop and would not be significant due to the low combustible loading and the nature of the combustibles. The duration would be short due to prompt detection and extinguishment of the principal combustible by the fixed water spray system protecting the cable trays or by the plant fire brigade. Due to the fire protection features installed in this fire zone and the low combustible loading, it is not expected that a total consuming fire would occur in this fire zone, and therefore, most or all of the OMAs would not be required.

The fire zone boundaries have been evaluated as acceptable as indicated above. Even if the fire were not promptly extinguished, all hot shutdown systems required in this area with the exception of the cables and equipment discussed above, are protected with one-hour fire barriers or are located outside of this area.

Re-entry is required into this fire zone to operate the above mentioned unprotected CRD valves. Details regarding re-entry are discussed in response to RAI-11 in Attachment 1. Fusing of the unprotected CRD valves by heat from a fire resulting in the valves becoming inoperable is not considered credible because of the low fire loading, the provision of automatic fire detection and suppression capability and the heat sink capability of the water filled piping connected to the valve. Operation of one of the valves that is in close proximity to these valves was previously

approved in the exemption discussed above. The OMAs for this fire zone vary from a 204-minute time limit to 300 minutes (refer to Reference 2 of Attachment 1, Section III.B for actual time limits).

This fire protection configuration achieves a level of protection commensurate with that intended by Appendix R, Section III.G.2.

**RB-FZ-1F3 Reactor Bldg. Northwest Corner Elev. -19'-6"**

Fire Zone Description

Fire Zone RB-FZ-1F3 floor area is approximately 560 sq. ft.
The ceiling height is approximately 41'-6".

This area has an administrative fire loading limit of less than 30 minutes as determined by the ASTM E119 time-temperature curve. This limit is tied to an NRC-accepted approach for dealing with fire zone boundaries (refer to the response to RAI-04.3 in Attachment 1 for more details). The major combustibles in this area are cable insulation (approximately 58% of loading), ladders (approximately 16% of loading) and lubricating oil in pumps (approximately 16% of loading).

Fire Protection Features

This fire zone is provided with the following fixed defense-in-depth features:

- Smoke detection system over hazards,
- Hose stations,
- Portable fire extinguishers,
- Fire barriers (rated assemblies), and
- Fire zone boundaries (non-rated assemblies).

The existing Reactor Building elevation -19'-6" smoke detection system is provided with smoke detectors located over the hazards which alarm locally and in the control room.

The existing smoke detection system was designed, installed and acceptance tested in accordance with NFPA 72D, 1975 Edition and NFPA 72E, 1974 Edition which were the latest editions of the standards at the time of design. The smoke detectors are located in the vicinity of the hazards in this room and are not located at the ceiling.

The Reactor Building Basement elevation -19'-6" smoke detection system is surveillance tested in accordance with station procedure 645.6.031, "Fire Detection System Alarm Circuitry Test for Reactor Building." This surveillance procedure tests the alarm and supervisory circuits for the fire detection system. Each smoke detector is demonstrated operable by a channel functional test using a test gas once per 12 months.

Refer to the response to RAI-04.1 in Attachment 1 for a discussion on manual suppression capabilities.

Zone boundaries consist of reinforced concrete walls, floor and ceiling. Fire Zone RB-FZ-1F consists of four triangular shaped rooms located at the north (east and west) and south (east

and west) corners of the -19'-6" elevation plus the Torus Room. These corner rooms are identified as Fire Zones RB-FZ-1F1, RB-FZ-1F2, RB-FZ-1F3, and RB-FZ-1F4. The Torus Room is identified as Fire Zone RB-FZ-1F5. RB-FZ-1F3 is the northwest corner room. The north wall and the floor of this room are not adjacent to any other plant areas (below grade). The west wall is adjacent to Fire Zone TB-FZ-11B, and is a three-hour rated wall. The ceiling for the northwest room is adjacent to Fire Zones OB-FZ-6A and OB-FZ-6B and is a three-hour rated barrier. A small portion of the ceiling is also adjacent to RB-FZ-1E which is a sealed fire zone boundary. The interior wall on the east side for this room is adjacent to the Torus Room with an unprotected opening.

These boundaries have been evaluated as acceptable consistent with the criteria outlined in Attachment 1 in the response to RAI-04.3.

Evaluations and Deviations

A deviation exists from NFPA 72D, 1975 Edition and NFPA 72E, 1974 Edition regarding a surveillance testing frequency change from six months to one year for supervised circuits, water flow switches and pressure switches. This deviation has been justified in Safety Evaluation SE No. 000665-015 in accordance with NRC GL 86-10. This deviation will not impact the capability to detect a fire and therefore will not impact the basis for the manual action exemption request.

The following deviation from NFPA 72E, 1974 Edition is documented in the OCNGS FPP:

The detectors located in Fire Zone RB-FZ-1F3 are not mounted at the ceiling in the corner room. The detectors are located in close proximity to the hazard in these rooms (i.e., over pumps and cable tray). This is a very tall room with a relatively small floor area, with the significant fire hazards located in the lower portions of the room. Considering air flow and potential stratification, fire protection engineering has been utilized to place the detectors close to the hazards, in order to improve the detectors' responsiveness to the major hazards in the area. Therefore, this deviation will not impact the capability to detect a fire and will not impact the basis for the manual action exemption request.

Other evaluations have been performed to justify minor deviations from UL fire tests plus the application of the criteria for unrated zone boundaries (stipulated in the response to RAI-04.3 in Attachment 1) combine to make up the fire zone boundaries. These evaluations will not impact the basis of the OMA exemption requests.

There are no other deviations from fire protection codes, standards, testing programs and listings by independent laboratories in this fire zone that impact this evaluation.

Exemptions

An exemption was granted in NRC SER dated June 25, 1990 from Appendix R, Section III.G.2 for not providing either additional separation from in-situ combustibles or protection for Core Spray System valve V-20-1. Fusing of this valve by heat from a fire in this zone resulting in the valve becoming inoperable is considered not credible because of (1) the low fuel loading in the zone, (2) the provision of automatic fire detection and manual fire suppression capability, and (3) the heat sink capability of the water filled piping connected to the valve. The primary basis for this exemption is that the combustible loading is low and the remaining fire protection features provide adequate defense-in-depth to assure safe shutdown. Therefore, providing

additional protection for this valve will not significantly enhance fire protection in this zone. Since a fire in this area would not impede the plant's capability for safe shutdown, this exemption does not impact the basis for the OMA exemption request.

Manual Actions

There are two (2) manual actions required for this fire zone.

OMA Phase 1, #13 (Manually Align Core Spray to CST to provide Reactor Coolant Makeup)

Manually open Core Spray valves V-20-1 and V-20-2 and close V-20-4 (V-20-2 and V-20-4 are located in Fire Zone RB-FZ-1F2) to provide Reactor Coolant Makeup from the Condensate Storage Tank for Fire Zone RB-FZ-1F3. (Item #13 from Attachment 2 of the March 3, 2009 exemption request.) V-20-1 is covered by the exemption listed above.

- Both CRD Pumps are located in this area as part of the plant's original design. The pumps are separated by a horizontal distance of approximately six feet. The associated cables and conduits for these pumps are also located in close proximity to each other. The ignition sources are the two CRD pumps and the two Core Spray pumps. The CRD pumps are located on steel grating at elevation (-)1'-11". The Core Spray pumps are located at the base of the room at elevation -19'-6". The other ignition source for this room is an HVAC fan located near the ceiling of the room. It is not expected that the Core Spray pumps or HVAC fans would affect the CRD pumps due to the distance between them (approximately 18 feet). Also, the grating will prevent fire from spreading on the floor (e.g., oil fire). In the unlikely event of the loss of both CRD pumps due to fire, this OMA would be required.

  Fire zone RB-FZ-1F3 is not a normally traveled area and has only one door for access/egress. Transient combustibles are controlled by administrative procedures.

OMA Phase 2, #17 (Provide Makeup Air to Isolation Condenser Valve V-11-34 Accumulator)

Provide makeup control air to the accumulator for V-11-34 for the Isolation Condenser makeup line due to the loss of instrument air. (Action #17 from Attachment 2 of the March 4, 2009 exemption request.)

- Refer to the loss of instrument air generic response in RAI-06.1 in Attachment 1 for additional information on this OMA.

Fire Hazards Analysis

As discussed in the response to RAI-02.4 in Attachment 1, the OCNGS FPP encompasses the concept of defense-in-depth. Administrative controls are in place as discussed in the response to RAI-02.3 in Attachment 1 to reduce the likelihood of fires from starting and to minimize the magnitude of a fire if one would occur.

The existing defense-in-depth features are listed above. In addition to these features, fire loading in this fire zone is low, consisting primarily of cable insulation. Automatic fire detection which alarms locally and in the control room will promptly detect a fire.

If a fire were to occur in this fire zone, it would not be of significant size or duration due to the low combustible loading and the nature of the combustibles. Prompt detection (installed detection or the loss of the equipment itself) and extinguishment of the principal combustible will be accomplished by the plant fire brigade. Due to the fire detection installed in this fire zone and the low combustible loading, it is not expected that a total consuming fire would occur in this room, and therefore, most or all of the OMAs would not be required. Because of this, redesigning the CRD System (which would require relocating one of the CRD Pumps and associated components) will not significantly enhance fire protection and safe shutdown capability. Also, area-wide detection and suppression do not significantly enhance the fire protection features of this area.

The fire zone boundaries have been evaluated as acceptable as indicated above. Even if the fire were not promptly extinguished, all hot shutdown systems required in this fire zone with the exception of the OMAs listed above, are separated such that at least one redundant train survives a fire.

Re-entry is required into this fire zone to operate the above mentioned unprotected valve as granted by previous exemption. Details regarding re-entry are discussed in response to RAI-11 in Attachment 1. The OMAs listed above for this fire zone vary from a 204-minute time limit to 300 minutes (refer to Reference 2 of Attachment 1, Section III.B for actual time limits) and they are required due to the lack of a three-hour fire barrier.

This fire protection configuration achieves a level of protection commensurate with that intended by Appendix R, Section III.G.2.

**RB-FZ-1F5 Reactor Bldg. Torus Room Elev. -19'-6"**

Fire Zone Description

Fire Zone RB-FZ-1F5 floor area is approximately 11,450 sq. ft.
The ceiling height is approximately 41'-6".

This area has an administrative fire loading limit of less than 30 minutes as determined by the ASTM E119 time-temperature curve. This limit is tied to an NRC-accepted approach for dealing with fire zone boundaries (refer to the response to RAI-04.3 in Attachment 1 for more details). The major combustibles in this area are cable insulation (approximately 19% of loading) and gratings (approximately 76% of loading). The grating, which is the largest plastic material in this area, has a flame spread of less than 25.

Fire Protection Features

This fire zone is provided with the following fixed defense-in-depth features:

- Hose stations,
- Portable fire extinguishers,
- Fire barriers (rated assemblies), and
- Fire zone boundaries (non-rated assemblies).

Refer to the response to RAI-04.1 in Attachment 1 for a discussion on manual suppression capabilities.

Zone boundaries consist of reinforced concrete walls, floor and ceiling. Fire Zone RB-FZ-1F consists of four triangular shaped rooms located at the north (east and west) and south (east and west) corners of the -19'-6" elevation plus the Torus Room. These corner rooms are identified as Fire Zones RB-FZ-1F1, RB-FZ-1F2, RB-FZ-1F3, and RB-FZ-1F4. The Torus Room is identified as Fire Zone RB-FZ-1F5. The north, west and south walls and the floor of this room are not adjacent to any other plant areas (below grade). The east wall is adjacent to SGTS-FZ-31 (ventilation tunnel) and the barrier and penetrations have a three-hour rating. The corners of the Torus Room are adjacent to the corner rooms with unprotected openings. The ceiling for the Torus Room is a three-hour rated barrier with openings sealed with noncombustible materials.

These boundaries have been evaluated as acceptable consistent with the criteria outlined in Attachment 1 in the response to RAI-04.3.

Evaluations and Deviations

Evaluations have been performed to justify minor deviations to UL fire tests to establish the integrity of rated fire barriers and unrated zone boundaries which make up the fire zone boundaries but these evaluations will not impact the basis of the OMA exemption request.

There are no other deviations from fire protection codes, standards, testing programs and listings by independent laboratories in this fire zone that impact this evaluation.

Exemptions

There are no previously approved exemptions for this fire area that could impact this evaluation.

Manual Actions

There are two (2) manual actions required for this fire zone.

OMA Phase 1, #12 (Establish CRD Flow to Reactor)

Manually open V-15-237, throttle V-15-30 while monitoring flow at FI-225-2 and close V-15-52 to establish CRD flow to reactor due to the loss of instrument air to the CRD flow control valve. (Item #12 from Attachment 2 of the March 3, 2009 exemption request.)

- Refer to the loss of instrument air generic response in RAI-06.1 in Attachment 1 for additional information on this OMA.

OMA Phase 2, #17 (Provide Makeup Air to Isolation Condenser Valve V-11-34 Accumulator)

Provide makeup control air to the accumulator for V-11-34 for the Isolation Condenser makeup line due to the loss of instrument air. (Action #17 from Attachment 2 of the March 4, 2009 exemption request.)

- Refer to the loss of instrument air generic response in RAI-06.1 in Attachment 1 for additional information on this OMA.

Fire Hazards Analysis

As discussed in the response to RAI-02.4 in Attachment 1, the OCNGS FPP encompasses the concept of defense-in-depth. Administrative controls are in place as discussed in the response to RAI-02.3 in Attachment 1 to reduce the likelihood of fires from starting and to minimize the magnitude of a fire if one would occur.

The existing defense-in-depth features are listed above. In addition to these features, fire loading in this fire zone is negligible, consisting primarily of cable insulation and grating.

If a fire were to occur in this fire zone, it would not be of significant size or duration due to the negligible combustible loading and the nature of the combustibles. Extinguishment of the combustibles will be accomplished by the plant fire brigade. Therefore, area-wide detection and suppression do not significantly enhance the fire protection features of this area.

The fire zone boundaries have been evaluated as acceptable as indicated above. Even if the fire were not promptly extinguished, all hot shutdown systems required in this fire zone with the exception of the OMAs listed above, are separated such that at least one redundant train survives a fire.

The OMAs needed because instrument air tubing is assumed lost and not protected by a three-hour barrier are not required for a minimum of three hours and 24 minutes and are independent of this fire zone. Since there is no detection in this area and the fact that the OMAs occur due to the loss of instrument air, there are numerous other indications (e.g., MSIV closure, control rods drifting in, instrument air pressure indication and alarms, etc.) that will initiate these OMAs. Also, the loss of instrument air procedure, ABN-35, indicates that these OMAs are necessary.

This fire protection configuration achieves a level of protection commensurate with that intended by Appendix R, Section III.G.2.

**RB-FZ-1G Reactor Bldg. Shutdown Cooling Room Elev. 38’-0” & 51’-3”**

Fire Zone Description

Fire Zone RB-FZ-1G floor area is approximately 1609 sq. ft.
The ceiling height is approximately 21’-0” from the 51'-3” elevation.

This area has an administrative fire loading limit of less than 30 minutes as determined by the ASTM E119 time-temperature curve. This limit is tied to an NRC-accepted approach for dealing with fire zone boundaries (refer to the response to RAI-04.3 in Attachment 1 for more details). The main combustibles in this area are cable insulation (approximately 12% of loading), plastic (approximately 57% of loading) and Class A combustibles (approximately 14% of loading). The grating, which is the majority of the plastic material in this area, has a flame spread of less than 25.

Fire Protection Features

This fire zone is provided with the following fixed defense-in-depth features:

- Smoke detection system,

- Hose stations,
- Portable fire extinguishers, and
- Fire zone boundaries (non-rated assemblies).

The Reactor Building elevations 38'-0" and 51'-3" fire detection system has been replaced with a new intelligent smoke detection system, which alarms locally and in the control room. The new smoke detection system was designed and installed in accordance with NFPA 72, 2007 Edition which was the latest edition of the standard at the time of design.

The Shutdown Cooling Room smoke detection system is surveillance tested in accordance with station procedure 645.6.031, "Fire Detection System Alarm Circuitry Test for Reactor Building." This surveillance procedure tests the alarm and supervisory circuits for the fire detection system. Each smoke detector is demonstrated operable by a channel functional test using a test gas once per 12 months.

Refer to the response to RAI-04.1 in Attachment 1 for a discussion on manual suppression capabilities.

Zone boundaries consist of reinforced concrete interior walls, floor and ceiling. The north, west, and east walls and part of the south wall (elevations 38' and 51'-3") are adjacent to fire zones RB-FZ-1D and RB-FZ-1E. All openings are sealed with noncombustible material except for one opening to Fire Zone RB-FZ-1D and one opening to Fire Zone RB-FZ-1E. The south wall is adjacent to the drywell and is three-hour fire rated. The floor is adjacent to Fire Zone RB-FZ-1E. The ceilings are adjacent to fire zones Fire Zones RB-FZ-1A, 1C, and 1D. There are no penetrations in the ceilings to these adjacent fire zones. Note: the ceiling of this zone is adjacent to the floor of the Spent Fuel Storage Pool (Fire Zone RB-FZ-1A).

These boundaries have been evaluated as acceptable consistent with the criteria outlined in Attachment 1 in the response to RAI-04.3.

Evaluations and Deviations

A deviation exists from NFPA 72D, 1975 Edition and NFPA 72E, 1974 Edition regarding a surveillance testing frequency change from six months to one year for supervised circuits, water flow switches and pressure switches. This deviation has been justified in Safety Evaluation SE No. 000665-015 in accordance with NRC GL 86-10. This deviation will not impact the capability to detect a fire and therefore will not impact the basis for the manual action exemption request. (Note: The new detectors in Fire Zone RB-FZ-1G were designed, installed and tested in accordance with NFPA 72 which allows functional testing of detectors annually.)

Other evaluations have been performed to justify minor deviations from UL fire tests plus the application of the criteria for unrated zone boundaries (stipulated in the response to RAI-04.3 in Attachment 1) combine to make up the fire zone boundaries. These evaluations will not impact the basis of the OMA exemption requests.

There are no other deviations from fire protection codes, standards, testing programs and listings by independent laboratories in this fire zone that impact this evaluation.

Exemptions

There are no previously approved exemptions for this fire area that could impact this evaluation.

Manual Actions

There are three (3) manual actions required for this fire zone.

OMA Phase 1, #11 (Locally Read CRD Flow Gauge FI-225-998)
(Item #11 from Attachment 2 of the March 3, 2009 exemption request.)

The normal local gauge for CRD flow is FI-225-2 which is located on the containment wall on the southeast area of Fire Zone RB-FZ-1E. It is not expected that a fire in RB-FZ-1G would affect gauge FI-225-2, and therefore, it is unlikely that this OMA would be needed.

OMA Phase 1, #12 (Establish CRD Flow to Reactor)

Manually open V-15-237, throttle V-15-30 while monitoring flow at FI-225-2 and close V-15-52 to establish CRD flow to reactor due to the loss of instrument air to the CRD flow control valve. (Item #12 from Attachment 2 of the March 3, 2009 exemption request.)

- Refer to the loss of instrument air generic response in RAI-06.1 in Attachment 1 for additional information on this OMA.

OMA Phase 2, #17 (Provide Makeup Air to Isolation Condenser Valve V-11-34 Accumulator)

Provide makeup control air to the accumulator for V-11-34 for the Isolation Condenser makeup line due to the loss of instrument air. (Action #17 from Attachment 2 of the March 4, 2009 exemption request.)

- Refer to the loss of instrument air generic response in RAI-06.1 in Attachment 1 for additional information on this OMA.

Fire Hazards Analysis

As discussed in the response to RAI-02.4 in Attachment 1, the OCNGS FPP encompasses the concept of defense-in-depth. Administrative controls are in place as discussed in the response to RAI-02.3 in Attachment 1 to reduce the likelihood of fires from starting and to minimize the magnitude of a fire if one would occur.

If a fire were to occur in this fire zone, it would not be of significant size or duration due to the low combustible loading and the nature of the combustibles. Prompt detection and extinguishment of the fire will be accomplished by the plant fire brigade. Therefore, area-wide suppression does not significantly enhance the fire protection features of this area. Due to the fire detection installed in this fire zone and the low combustible loading, it is not expected that a total consuming fire would occur in this room, and therefore, most or all of the OMAs would not be required.

The fire zone boundaries have been evaluated as acceptable as indicated above. Even if the fire were not promptly extinguished, all hot shutdown systems required in this fire zone with the

exception of the OMAs listed above, are separated such that at least one redundant train survives a fire.

The OMAs for this fire zone vary from a 204-minute time limit to 300 minutes (refer to Reference 2 of Attachment 1, Section III.B for actual time limits). All of the OMAs discussed above that are required as a result of a fire in this fire zone are independent of this fire zone and do not require an SCBA for access/egress.

This fire protection configuration achieves a level of protection commensurate with that intended by Appendix R, Section III.G.2.

**TB-FA-3A Turbine Bldg. 4160V Emergency Switchgear Vault 1C Elev. 23'-6"**

Fire Area Description

Fire Area TB-FA-3A floor area is approximately 336 sq. ft.
The ceiling height is approximately 21'-0".

This area has an administrative fire loading limit of less than 30 minutes as determined by the ASTM E119 time-temperature curve. There are minimal amounts of cable insulation (approximately 5% of loading) miscellaneous plastic (approximately 73% of loading) and class A combustibles such as paper for procedures (approximately 20% of loading) in this area.

Fire Protection Features

This fire area is provided with the following fixed defense-in-depth features:

- Area-wide smoke detection,
- Total flooding fixed $CO_2$ system (manual),
- Hose stations,
- Portable fire extinguishers, and
- Fire barriers (rated assemblies).

The manually actuated $CO_2$ system was designed, installed and tested in accordance with NFPA 12, 1977 Edition. The use of a manually actuated $CO_2$ system was approved in SER dated March 3, 1978 (Reference 9 in Attachment 1). The $CO_2$ system was designed to achieve a 50% concentration which is maintained for a minimum of seven minutes (Reference 17 of Attachment 1).

The $CO_2$ suppression system is surveillance tested to demonstrate operability at least once a week by verifying that the storage tank level is greater than or equal to half full and the pressure is at least 275 psig, by verifying at least once a month that each manual valve in the flow path is in its correct position, and by verifying at least once per 18 months that the system valves and associated ventilation dampers actuate automatically upon receipt of a simulated actuation signal, and flow is observed from each nozzle during a "puff test" in accordance with station surveillance test procedure 645.6.016, "Fire Suppression Low Pressure $CO_2$ System Functional Test."

The (Fire Area TB-FA-3A) 4160V Emergency Switchgear Room 1C Vault smoke detection system was replaced with new intelligent smoke detection system. The new smoke detection

system for Fire Area TB-FA-3A was designed, installed and acceptance tested in accordance with NFPA 72, 2007 Edition which was the latest edition of the standard at the time of design.

The 4160V Emergency Switchgear Room 1C Vault smoke detection system is surveillance tested in accordance with station procedure 645.6.032, “Fire Detection System Alarm Circuitry Test for Turbine Building & 4160V Switchgear Room." This surveillance procedure tests the alarm and supervisory circuits for the fire detection system. Each smoke detector is demonstrated operable by a channel functional test using a test gas once per 12 months.

Refer to the response to RAI-04.1 in Attachment 1 for a discussion on manual suppression capabilities other than the $CO_2$ system. Note that manual suppression is also provided by fire hose stations that have recently been installed in the Turbine Building outside the 4160V Emergency Switchgear 1C Vault area.

Regarding rated boundaries:

- Reinforced concrete floor has a rating of a minimum of three hours.

- Walls consist of metal lath on steel with fire resistant coating (Pyrocrete) on the exterior of the walls that provides a three-hour resistance rating from fires originating in Fire Zone TB-FZ-11C except for the small portion of the beam directly in front of the two three-hour fire rated rollup door assemblies and the beam next to the Iso-phase bus duct. These two beams could not be upgraded due to limited space; therefore, automatic suppression was installed in this area for defense-in-depth. Both of these beams have a minimum of a two-hour rating but the remaining beams are coated adequately for a three-hour rating. The interior walls of Fire Area TB-FA-3A are not protected. The wall that separates Fire Areas TB-FA-3A and TB-FA-3B is protected with a fire resistant coating that provides approximately a two-hour rating.

- The ceiling consists of Metal lath on steel with fire resistant coating (Pyrocrete) providing a minimum two-hour fire resistance rating; (Note: fire resistant coating provided on outside surface of ceiling only).

- Preaction sprinkler system #22 in Fire Zone TB-FZ-11C was installed to supplement this protection.

There are no non-rated fire protection assemblies that make up the boundaries in this fire area.

Evaluations and Deviations

A deviation exists from NFPA 72D, 1975 Edition and NFPA 72E, 1974 Edition regarding a surveillance testing frequency change from six months to one year for supervised circuits, water flow switches and pressure switches. This deviation has been justified in Safety Evaluation SE No. 000665-015 in accordance with NRC GL 86-10. This deviation will not impact the capability to detect a fire and therefore will not impact the basis for the manual action exemption request. (Note: The new detectors in Fire Area TB-FA-3A were designed, installed and tested in accordance with NFPA 72 which allows functional testing of detectors annually.)

Other evaluations have been performed to justify minor deviations from UL fire tests to establish the integrity of fire rated assemblies which make up the fire area boundaries but these evaluations will not impact the basis of the OMA exemption requests.

There are no other deviations from fire protection codes, standards, testing programs and listings by independent laboratories in this fire zone that impact this evaluation.

Exemptions

There are no previously approved exemptions for this fire area that could impact this evaluation.

Manual Actions

There are two (2) manual actions required for this fire zone.

OMA Phase 1, #12 (Establish CRD Flow to Reactor)

Manually open V-15-237, throttle V-15-30 while monitoring flow at FI-225-2 and close V-15-52 to establish CRD flow to reactor due to the loss of instrument air to the CRD flow control valve. (Item #12 from Attachment 2 of the March 3, 2009 exemption request.)

- Refer to the loss of instrument air generic response in RAI-06.1 in Attachment 1 for additional information on this OMA.

OMA Phase 2, #17 (Provide Makeup Air to Isolation Condenser Valve V-11-34 Accumulator)

Provide makeup control air to the accumulator for V-11-34 for the Isolation Condenser makeup line due to the loss of instrument air. (Action #17 from Attachment 2 of the March 4, 2009 exemption request.)

- Refer to the loss of instrument air generic response in RAI-06.1 in Attachment 1 for additional information on this OMA.

Fire Hazards Analysis

As discussed in the response to RAI-02.4 in Attachment 1, the OCNGS FPP encompasses the concept of defense-in-depth. Administrative controls are in place as discussed in the response to RAI-02.3 in Attachment 1 to reduce the likelihood of fires from starting and to minimize the magnitude of a fire if one would occur.

The existing defense-in-depth features are listed in the response to RAI-02.2 above. In addition to these features, fire loading in this fire area is low, consisting primarily of cable insulation and miscellaneous plastics. Automatic fire detection which alarms locally and in the control room will promptly detect a fire. A manual, total flooding $CO_2$ system supplied by a low pressure $CO_2$ tank protects both sets of switchgear. The system may be activated by an operator as necessary after receipt of an alarm in accordance with plant procedures.

If a fire were to occur in this fire area, it would not be of significant size or duration due to the low combustible loading and the nature of the combustibles. Prompt detection and extinguishment of the fire will be accomplished by the manually actuated total Flooding $CO_2$

System or the plant fire brigade. Due to the fire protection features installed in this fire area and the low combustible loading, it is not expected that a total consuming fire would occur in this room, and therefore, most or all of the OMAs would not be required. Therefore, area-wide automatic suppression does not significantly enhance the fire protection features of this area.

The fire area boundaries have been evaluated as acceptable as indicated above. Even if the fire were not promptly extinguished, all hot shutdown systems required in this fire area with the exception of the OMAs listed above, are separated such that at least one redundant train survives a fire.

The OMAs for this fire zone vary from a 204-minute time limit to 300 minutes (refer to Reference 2 of Attachment 1, Section III.B for actual time limits). All of the OMAs discussed above that are required as a result of a fire in this fire zone are independent of this fire zone and do not require an SCBA for access/egress.

This fire protection configuration achieves a level of protection commensurate with that intended by Appendix R, Section III.G.2.

**TB-FA-26 Turbine Bldg. 125V DC Battery Room C, Elev. 23'-6"**

Fire Area Description

Fire Area TB-FA-26 floor area is approximately 140 sq. ft.
The ceiling height is approximately 11'-0".

This area requires an administrative fire loading limit of less than 90 minutes as determined by the ASTM E119 time-temperature curve. The major combustibles in this area are plastic, which is contributed by the battery cases (approximately 92% of loading) and cable insulation (approximately 6% of loading). It should be noted that it is unlikely that the battery cases would be involved in a large fire due to the configuration of the room (limited room for transient combustibles near batteries) and the fact that the battery cases are filled with water.

Fire Protection Features

This fire area is provided with the following fixed defense-in-depth features:

- Area-wide automatic preaction sprinkler protection (extension from pre-action fire sprinkler system in Fire Zone TB-FZ-11C).
- Area-wide smoke detection,
- Hose stations,
- Yard hydrants,
- Portable fire extinguishers, and
- Fire barriers (rated assemblies).

The automatic preaction sprinkler system installed overtop of Fire Areas TB-FA-3A and TB-FA-3B, 4160V Emergency Switchgear (1C and 1D) vaults has been expanded to also protect the 125V Battery Room 'C'. This system expansion was designed, installed and tested in accordance with NFPA 13, 2007 Edition.

The automatic preaction sprinkler system is surveillance tested to demonstrate operability at least once per 12 months by performing a system functional test, which includes simulated automatic actuation of the system and verifying that the automatic valves in the flow path actuate to their correct position.

The fire suppression system is maintained and surveillance tested in accordance with station procedures 645.4.004, “Fire Suppression Water System Valve Lineup," 645.4.009, “Fire Protection System Valves," and 645.6.010, “Fire Suppression Deluge Valve Functional Test."

The (Fire Area TB-FA-26) 125V Battery Room ‘C’ elevation 23’-6” smoke detection system has been replaced with new intelligent smoke detection system. The new smoke detection system for Fire Area TB-FA-26 was designed, installed and acceptance tested in accordance with NFPA 72, 2007 Edition which was the latest edition of the standard at the time of design.

The 125V Battery Room smoke detection system is surveillance tested in accordance with station procedure 645.6.032, “Fire Detection System Alarm Circuitry Test for Turbine Building & 4160V Switchgear Room." This surveillance procedure tests the alarm and supervisory circuits for the fire detection system. Each smoke detector is demonstrated operable by a channel functional test using a test gas once per 12 months.

Refer to the response to RAI-04.1 in Attachment 1 for a discussion on manual suppression capabilities. Note that manual suppression is also provided by fire hose stations that have recently been installed in the Turbine Building outside the 4160V Emergency Switchgear 1C Vault area.

Regarding rated boundaries:

- Reinforced concrete floor has a rating greater than three hours.
- Walls are constructed of steel covered with a coating with three-hour fire resistant rating.
- The ceiling is constructed of steel covered with a coating with approximately one-hour fire resistant rating. (Note: fire resistant coating provided on outside surface of ceiling only.)

There are no non-rated fire protection assemblies that make up the boundaries in this fire area.

Evaluations and Deviations

A deviation exists from NFPA 72D, 1975 Edition and NFPA 72E, 1974 Edition regarding a surveillance testing frequency change from six months to one year for supervised circuits, water flow switches and pressure switches. This deviation has been justified in Safety Evaluation SE No. 000665-015 in accordance with NRC GL 86-10. This deviation will not impact the capability to detect a fire and therefore will not impact the basis for the manual action exemption request. (Note: The new detectors in Fire Area TB-FA-26 were designed, installed and tested in accordance with NFPA 72 which allows functional testing of detectors annually.)

Other evaluations have been performed to justify minor deviations from UL fire tests to establish the integrity of fire rated assemblies which make up the fire area boundaries but these evaluations will not impact the basis of the OMA exemption requests.

There are no other deviations from fire protection codes, standards, testing programs and listings by independent laboratories in this fire zone that impact this evaluation.

Exemptions

There are no previously approved exemptions for this fire area that could impact this evaluation.

Manual Actions

There are no specific cables in this fire area associated with the manual actions identified for Fire Area TB-FA-26. The only FSSD component and cable located in this fire area is associated with the "C" battery. This fire area was included in the exemption requests with adjacent Fire Zone TB-FZ-11C (A and B 4160V Room) since the FSSD analysis combines them. Therefore, for this fire area, refer to the manual actions and the dispositions that are included in Fire Zone TB-FZ-11C.

Fire Hazards Analysis

As discussed in the response to RAI-02.4 in Attachment 1, the OCNGS FPP encompasses the concept of defense-in-depth. Administrative controls are in place as discussed in the response to RAI-02.3 in Attachment 1 to reduce the likelihood of fires from starting and to minimize the magnitude of a fire if one would occur.

The existing defense-in-depth features are listed above. In addition to these features, fire loading in this fire area is moderate due to the small size of the room. The fire loading consists primarily of battery cases and as stated above, it is unlikely that the battery cases would be involved in a large fire due to the configuration of the room (limited room for transient combustibles near batteries) and the fact that the battery cases are filled with water and would tend to self extinguish if a fire did occur. Automatic fire detection alarms locally and in the control room.

If a fire were to occur in this fire area, it would not be of significant size or duration due to the nature of the combustibles and the presence of automatic sprinklers protecting this room. Prompt detection and extinguishment of the fire will be accomplished by the automatic detection and preaction sprinkler system and the plant fire brigade.

The fire area boundaries have been evaluated as acceptable as indicated above. Even if the fire were not promptly extinguished, all hot shutdown systems required in this fire area are separated such that at least one redundant train survives a fire.

There are no specific cables in this fire area associated with the manual actions identified for Fire Area TB-FA-26. This fire area was included in the exemption requests with adjacent Fire Zone TB-FZ-11C (A and B 4160V Room) since the FSSD analysis combines them. Therefore, for this fire area, it is not expected that the OMAs would be required due to the defense-in-depth features described above. If a fire in this fire area did cause the OMAs to occur, all of the OMAs are independent of this fire area and do not require an SCBA for access/egress.

This fire protection configuration achieves a level of protection commensurate with that intended by Appendix R, Section III.G.2.

**TB-FZ-11B Turbine Bldg. Lube Oil Storage, Purification and Pumping Area Elev. 0'-0", 27'-0", and 36'-0"**

Fire Zone Description

Fire Zone TB-FZ-11B floor area at elevation 0'-0" is approximately 3,175 sq. ft.

The main part of the room has two floor elevations (0'-0" and 27'-0" elevation).
The ceiling height varies as follows: basement hallway is approximately 9'-0", basement stairs is approximately 19'-0", first floor of room is approximately 26'-0", and second floor of room is approximately 42'-0".

This fire zone has administrative controls such that additional combustible materials are not introduced into this zone and defense-in-depth features to control a potential oil fire in this zone (refer to the response to RAI-04.3 in Attachment 1 for more details). The major combustibles in this area are lubricating oil (approximately 99% of loading) and cable insulation (approximately 0.3% of loading). The amount of oil contained in the lube oil storage tanks in this fire zone drives the combustible loading in this fire zone to approximately 14 hours.

Fire Protection Features

This fire zone is provided with the following fixed defense-in-depth features:

- Automatic sprinkler system,
- Automatic bearing lift pump sprinkler system,
- Automatic oil handling equipment and oil storage tank water spray system (deluge system),
- Rate of rise/fixed temperature fire detection system at lube oil tank,
- Hose stations,
- Yard hydrants,
- Portable fire extinguishers,
- Fire barriers (rated assemblies), and
- Fire zone boundaries (non-rated assemblies).

The closed head automatic sprinkler system protecting cable trays was designed, installed and tested in accordance with NFPA 13, 1976 Edition.

The open head water spray deluge system protecting oil handling equipment and the oil storage tank was designed, installed and tested in accordance with NFPA 15, 1977 Edition. This system was installed to protect the largest hazard in this area.

The closed head automatic sprinkler system is surveillance tested to demonstrate operability at least once per 12 months by performing a system functional test, which includes simulated automatic actuation of the system and verifying that the automatic valves in the flow path actuate to their correct position.

The fire suppression system is maintained and surveillance tested in accordance with station surveillance procedures 645.4.004, "Fire Suppression Water System Valve Lineup," 645.4.009, "Cycling of Fire Protection System Valves," 645.6.011, "Deluge and Sprinkler System Inspection," and 645.6.022, "Non-Tech. Requirement Fire Protection System Test."

The open head water spray system is actuated by rate-of-rise/fixed temperature thermal detectors that were designed, installed and tested in accordance with NFPA 72D, 1975 Edition and NFPA 72E, 1974 Edition which were the latest editions of the standards at the time of design.

Refer to the response to RAI-04.1 in Attachment 1 for a discussion on manual suppression capabilities.

Rated boundaries consist of reinforced concrete at least one foot thick (except for a small block wall to the lower cable spreading room, which is eight inches thick) with penetrations sealed to provide a rating equivalent to the boundary.

The main part of the room has two floor elevations (0'-0" and 27'-0" elevation). The main area is separated from a stairway/long hallway area (same fire zone) at elevation 3'-6" by a non-rated block wall with a Class B fire door. As indicated above, the main floor elevation is at 0'-0" elevation so there is basically a 3'-6" dike preventing oil from leaving the main part of this area, which is protected by a suppression system. There is also a sealed non-rated block wall with a steel door (similar in construction to a fire rated door) separating the main area from a hallway/stairway (same fire zone) outside of the lower cable spreading room at elevation 36'-0". Zone boundaries consist of a reinforced concrete ceiling and south wall with unsealed openings to Fire Zones TB-FZ-11A and TB-FZ-11E, respectively. A portion of the ceiling is adjacent to Fire Zone OB-FZ-5 and is rated at three hours. In addition, the south wall (elevation 36'-0") and a portion of the east wall (elevation 36'-0") adjoining Fire Zone OB-FZ-4, Cable Spreading Room, is rated for two-hour fire resistance with a Class B fire door. The east wall at elevations 36'-0", 23'-6" and 3'-6" is rated and is adjacent to Fire Zones OB-FZ-10A (two-hour rating), OB-FZ-6B (three-hour rating) and RB-FZ-1F3 (three-hour rating), respectively. The north and west walls and the floor are not adjacent to any other plant areas.

Evaluations and Deviations

A deviation exists from NFPA 72D, 1975 Edition and NFPA 72E, 1974 Edition regarding surveillance testing frequency change from six months to one year for fire detectors, supervised circuits, water flow switches and pressure switches. This deviation has been justified in Safety Evaluation SE No. 000665-015 in accordance with NRC GL 86-10. This deviation will not impact the capability to detect a fire and therefore will not impact the basis for the manual action exemption request.

The thermal detectors are located in close proximity to the lube oil tank so that a lube oil fire would be quickly detected, which in turn would activate the deluge system for extinguishment. This system was designed for the suppression of the hazard from the lube oil storage tank. The lube oil deluge system is in addition to the automatic sprinkler system installed at the ceiling area, which alarms to the control room.

Other evaluations have been performed to justify minor deviations from UL fire tests plus the application of the criteria for unrated zone boundaries (stipulated in the response to RAI-04.3 in Attachment 1) combine to make up the fire zone boundaries. These evaluations will not impact the basis of the OMA exemption requests.

There are no other deviations from fire protection codes, standards, testing programs and listings by independent laboratories in this fire zone that impact this evaluation.

Exemptions

An exemption was granted in NRC SER dated June 25, 1990 from Appendix R, Section III.G.2 regarding the separation between redundant circuits by a three-hour barrier. Cable 14-25 is the power feeder providing power to unit substation USS 1B2. This cable is located in a pit area. Based on the separation of this pull pit from the remainder of the Fire Zone TB-FZ-11B by the minimum six inches of sand; the lack of combustibles in the pit; all cables routed in conduits; negligible fuel loading in the area above the pit; and the fact that all conduits enter and leave the pit through the sand walls; a fire is considered not to be a credible event in this pull pit. Therefore, further fire protection modifications or additional protection for circuit 14-25 in the pull pit is not required. Since a fire in this area would not impede the plant's capability for safe shutdown, this exemption does not impact the basis for the OMA exemption request.

Manual Actions

There are nine (9) manual actions required for this fire zone. Note that the acceptability of the RG 1.75 noncompliances in regards to the credited and redundant cables being located in the same cable tray are addressed in the response to RAI-05 in Attachment 1.

OMA Phase 1, #1 (Manually Trip 4160V 1D Breakers and Control USS 1B2 & 1B3 Breakers Locally at LSP-1D)

Manually trip 4160V 1D Breakers and control USS 1B2 and 1B3 480V Breakers locally at LSP-1D. (Item #1 from Attachment 2 of the March 3, 2009 exemption request.)

- Credited cables and redundant train cables are located in the same cable trays in this fire zone. Damage to these cable trays could result in damage to both trains of cables and equipment. Additional cables are routed in this cable tray with the credited and redundant cables. Thus, the credited and redundant trains are in close proximity to each other as well as in close proximity with other in-situ potentially combustible cables. Damage to this cable tray would impact both the credited and redundant train and would therefore make the manual action necessary.

  The cable trays enter this area in the southwest corner of this area. They traverse the room along the west wall to the north wall and then turn east along the north wall. These cable trays are located approximately 14 feet above the floor at elevation 27'-0". They then go vertically up to approximately elevation 44' and turn south to enter the Cable Spreading Room north wall. While running along the north wall, these trays pass over the top of potential ignition sources MCC 1A12 and MCC 1B12. The trays are located approximately six to seven feet above these MCCs. The lube oil tanks are located one floor below (grating installed on floor above tanks at elevation 27'-0") with the top of the tanks being at approximately 15' elevation. The edge of the grating is approximately five feet south of the cable trays (grating not located directly below the cable tray). It is unlikely that a lube oil fire would affect these cable trays due to the installed suppression on the lube oil tank and the distance between the tank and the cable trays (approximately 26 feet). The other potential ignition sources (MCC 1A12A and 1B12A) are located along the south wall of this area at elevation 27'-0" and are located a

distance of approximately 20 feet from these cable trays. Transient combustibles in this area are controlled by administrative procedures and, since the cable trays are at least 14 feet off of the floor, it is not expected that transient combustibles will affect these cable trays. In the event that a fire affects this cable tray, the OMA would be required.

OMA Phase 1, #2 (Read Condensate Storage Tank Local Level Indicator LI-424-993)

Locally read Condensate Storage Tank (CST) level at LI-424-993. (Item #2 from Attachment 2 of the March 3, 2009 exemption request.)

- There is no redundant train of equipment for the credited method of obtaining CST level indication due to the plant's original design. Should the primary indicator (5F-27) fail, indication can only be obtained by reading the local indicator (LI-242-993) located at the CST.

  The cable enters this area in a cable tray in the southwest area of this fire zone. The cable tray then crosses the room and runs along the north wall to the east end of the room. This cable tray is located approximately 20 feet above the floor, which is at elevation 0'-0" . It then goes vertically up and enters the floor of the Cable Spreading Room at elevation 36'-0".

  The primary ignition sources in this area near the cable tray are the pumps and motors associated with the lube oil tank. The cable tray is located approximately 7 feet above the lube oil tank. Other potential ignition sources are located on the floor of this area. Transient combustibles are controlled by administrative procedures and, since the cable trays are at least 20 feet off of the floor, it is not expected that transient combustibles will affect the cable tray. In the event that a fire affects this cable tray, the OMA would be required.

OMA Phase 1, #3 (Manually Control 1B3M Breaker at LSP-1B3)

Manually control 1B3M Breaker from LSP-1B3. (Item #3 from Attachment 2 of the March 3, 2009 exemption request.)

- Credited cables and redundant train cable configuration is very similar to that described for LSP-1D in this fire zone. Refer to LSP-1D OMA for this fire zone for the discussion of the tray routing and the ignition sources.

OMA Phase 1, #4 (Manually Control Condensate Transfer Pump 1-2 from LSP-1B32)

Manually control Condensate Transfer Pump 1-2 from LSP-1B32. (Item #4 from Attachment 2 of the March 3, 2009 exemption request.)

- The credited cable and the redundant cable for this manual action are routed in the same cable tray. It is the same cable tray that is discussed in the OMA for local reading of the CST level indicator for this fire zone. For the discussion of the tray routing and the ignition sources, refer to the CST level indicator OMA for this fire zone.

OMA Phase 1, #6 (Manually Reclose Feeder Breaker MCC 1B32 at USS 1B3)

Manually Re-Close Feeder Breaker MCC 1B32 at USS 1B3 due to an under voltage trip. (Item #6 from Attachment 2 of the March 3, 2009 exemption request.)

- This OMA is only needed if power to USS 1B3 is lost. The cables that can cause the loss of USS 1B3 are associated with the OMA for LSP-1D. Also, the loss of the 1B 4160V switchgear will cause this OMA to occur and the cables that could cause the loss of the switchgear are also located in the same cable trays as the ones for LSP-1D. Therefore, refer to LSP-1D OMA for this fire zone for the discussion of the tray routing and the ignition sources.

OMA Phase 1, #12 (Establish CRD Flow to Reactor)

Manually open V-15-237, throttle V-15-30 while monitoring flow at FI-225-2 and close V-15-52 to establish CRD flow to reactor due to the loss of instrument air to the CRD flow control valve. (Item #12 from Attachment 2 of the March 3, 2009 exemption request.)

- Refer to the loss of instrument air generic response in RAI-06.1 in Attachment 1 for additional information on this OMA.

OMA Phase 1, #16 (Manually Trip Rx Recirculation Pumps at 4160V Switchgear)

Manually trip Reactor Recirculation Pumps (“A," “B," “C," “D” and “E”) 4160V Switchgear 1A and 1B. (Item #16 from Attachment 2 of the March 3, 2009 exemption request.)

- Credited cables for tripping the recirculation pumps are located in cable trays in this fire zone. The cable tray configuration is very similar to that described for the OMA for LSP-1D for this fire zone. Refer to the discussion on the cable tray configuration and the ignition sources for LSP-1D OMA for this fire zone for the required details.

OMA Phase 2, #3 (Manually Control 480V USS 1B2 Breakers for CRD Pump at Remote Shutdown Panel)

Manually control 480V USS 1B2 Breakers for CRD Pump NC08B and 1B2M from Remote Shutdown Panel due to control circuit damage. (Action #3 from Attachment 2 of the March 4, 2009 exemption request.)

- Credited cables and redundant train cables are located in the same cable trays in this fire zone. Damage to these cable trays could result in damage to both trains of cables and equipment. The cable tray configuration is very similar to that described for the OMA for LSP-1D for this fire zone. Refer to the discussion on the cable tray configuration and the ignition sources for LSP-1D OMA for this fire zone for the required details.

OMA Phase 2, #18 (Provide Makeup Air to Isolation Condenser Valve V-11-36 Accumulator)

Provide makeup control air to the accumulator for V-11-36 for the Isolation Condenser makeup line due to the loss of instrument air. (Action #18 from Attachment 2 of the March 4, 2009 exemption request.)

- Refer to the loss of instrument air generic response in RAI-06.1 in Attachment 1 for additional information on this OMA.

Fire Hazards Analysis

As discussed in the response to RAI-02.4 in Attachment 1, the OCNGS FPP encompasses the concept of defense-in-depth. Administrative controls are in place as discussed in the response to RAI-02.3 in Attachment 1 to reduce the likelihood of fires from starting and to minimize the magnitude of a fire if one would occur.

The existing defense-in-depth features are listed above. If a fire were to occur in this fire zone (Turbine lube oil is the major fuel loading), it would be contained by the localized automatic suppression systems protecting the specific hazards. In addition, the majority of the cable trays above the lube oil hazard are protected from fire exposure by an automatic sprinkler system. When any of the automatic fire suppression systems operate, an alarm will sound in the control room. Final extinguishment will be accomplished by automatic fixed suppression system in conjunction with the plant fire brigade. Detection and suppression systems are installed to protect against the lube oil hazard in the area. Due to the fire protection features installed in this fire zone, it is not expected that a total consuming fire would occur in this fire zone, and therefore, most or all of the OMAs would not be required. Therefore, area-wide detection and suppression do not significantly enhance the fire protection features of this area.

The fire zone boundaries have been evaluated as acceptable as indicated above.
Even if the fire were not promptly extinguished, all hot shutdown systems required in this fire zone with the exception of the components and cables listed above, are separated such that at least one redundant train survives a fire.

The OMAs for this fire zone vary from a 30-minute time limit to 300 minutes (refer to Reference 2 of Attachment 1, Section III.B for actual time limits). All of the OMAs discussed above that are required as a result of a fire in this fire zone are independent of this fire zone and do not require an SCBA for access/egress.

This fire protection configuration achieves a level of protection commensurate with that intended by Appendix R, Section III.G.2.

**TB-FZ-11C Turbine Bldg. 4160V Switchgear Room 1A and 1B Elev. 23'-6"**

Fire Zone Description

Fire Zone TB-FZ-11C floor area is approximately 2,666 sq. ft.
The ceiling height is approximately 21'-8"

This area has an administrative fire loading limit of less than 30 minutes as determined by the ASTM E119 time-temperature curve. This limit is tied to an NRC-accepted approach for dealing with fire zone boundaries (refer to the response to RAI-04.3 in Attachment 1 for more details). The main combustible loading is attributed to cable insulation (approximately 73% of loading) and plastic (approximately 17% of loading).

Fire Protection Features

This fire zone is provided with the following fixed defense-in-depth features:

- Area-wide smoke detection,
- Area-wide automatic fixed preaction sprinkler system (except for the small caged area to the east of Fire Area TB-FA-3A),
- Hose stations,
- Yard hydrants,
- Portable fire extinguishers,
- Fire barriers (rated assemblies), and
- Fire zone boundaries (non-rated assemblies).

The existing portion of the automatic preaction sprinkler system over the C & D switchgear vaults was designed, installed and tested in accordance with NFPA 13, 1999 Edition. The system was expanded to protect the 1A and 1B switchgear room. The expanded system was designed, installed and tested in accordance with NFPA 13, 2007 Edition.

The automatic preaction sprinkler system is surveillance tested to demonstrate operability at least once per 12 months by performing a system functional test, which includes simulated automatic actuation of the system and verifying that the automatic valves in the flow path actuate to their correct position.

The fire suppression system is maintained and surveillance tested in accordance with station surveillance procedures 645.4.004, “Fire Suppression Water System Valve Lineup," 645.4.009, “Cycling of Fire Protection System Valves," 645.6.011, “Deluge and Sprinkler System Inspection," and 645.6.022, “Non-Tech. Requirement Fire Protection System Test."

The (Fire Zone TB-FZ-11C) 4160V Switchgear Room 1A and 1B smoke detection system was replaced with a new intelligent smoke detection system. The new smoke detection system for Fire Zone TB-FZ-11C was designed, installed, and acceptance tested in accordance with NFPA 72, 2007 Edition which was the latest edition of the standard at the time of design.

The 4160V Emergency Switchgear Room 1A & 1B smoke detection system is surveillance tested in accordance with station procedure 645.6.032, “Fire Detection System Alarm Circuitry Test for Turbine Building & 4160V Switchgear Room." This surveillance procedure tests the alarm and supervisory circuits for the fire detection system. Each smoke detector is demonstrated operable by a channel functional test using a test gas once per 12 months.

Refer to the response to RAI-04.1 in Attachment 1 for a discussion on manual suppression capabilities.

Zone boundaries consist of a concrete floor with unsealed openings to Fire Zone TB-FZ-11D, concrete east wall with unsealed openings to Fire Zone TB-FZ-11G (Note that this wall does not extend the full height of the zone; however, no exposed cables pass through this opening). No fire barrier or wall exists between Fire Zone TB-FZ-11C and Fire Zone TB-FZ-11G (small caged area east of Fire Area TB-FA-3A). The north wall is a concrete wall and is adjacent to Fire Zone TB-FZ-11E with all penetrations sealed with noncombustible materials. This fire zone envelops Fire Areas TB-FA-3A, TB-FA-3B, and TB-FA-26 with three-hour fire resistive rated barriers including protected openings except for a couple of sections that have a two-hour rating for Fire

Areas TB-FA-3A and TB-FA-3B. Also, the ceiling for Fire Area TB-FA-26 has a minimum of a one-hour rating. The south wall and ceiling are not adjacent to any other plant areas. The west wall is an unrated concrete wall with all penetrations sealed with noncombustible materials and is adjacent to Fire Area MT-FA-12, the main transformer and condensate area. Fire Area MT-FA-12 is an outdoor area with an automatic water spray system (deluge) for each transformer; this deluge system also protects the Turbine Building wall where the bus duct enters the fire zone.

These boundaries have been evaluated as acceptable consistent with the criteria outlined in Attachment 1 in the response to RAI-04.3.

Evaluations and Deviations

A deviation exists from NFPA 72D, 1975 Edition and NFPA 72E, 1974 Edition regarding a surveillance testing frequency change from six months to one year for supervised circuits, water flow switches and pressure switches. This deviation has been justified in Safety Evaluation SE No. 000665-015 in accordance with NRC GL 86-10. This deviation will not impact the capability to detect a fire and therefore will not impact the basis for the manual action exemption request. (Note: The new detectors in Fire Zone TB-FZ-11C were designed, installed and tested in accordance with NFPA 72 which allows functional testing of detectors annually.)

Other evaluations have been performed to justify minor deviations from UL fire tests plus the application of the criteria for unrated zone boundaries (stipulated in the response to RAI-04.3 in Attachment 1) combine to make up the fire zone boundaries. These evaluations will not impact the basis of the OMA exemption requests.

There are no other deviations from fire protection codes, standards, testing programs and listings by independent laboratories in this fire zone that impact this evaluation.

Exemptions

There are no previously approved exemptions for this fire area that could impact this evaluation.

Manual Actions

There are ten (10) manual actions required for this fire zone. Note that the acceptability of the RG 1.75 noncompliances in regards to the credited and redundant cables being located in the same cable tray are addressed in the response to RAI-05 in Attachment 1.

OMA Phase 1, #1 (Manually Trip 4160V 1D Breakers and Control USS 1B2 & 1B3 Breakers Locally at LSP-1D)

Manually trip 4160V 1D Breakers and control USS 1B2 and 1B3 480V Breakers locally at LSP-1D. (Item #1 from Attachment 2 of the March 3, 2009 exemption request.)

- Both credited cables and redundant cables for this manual action are routed in the same horizontal and vertical cable trays in this fire zone. Damage to these cable trays could result in damage to both trains of cables and equipment. Additional cables are routed in this cable tray with the credited and redundant cables. Thus, the credited and redundant

trains are in close proximity to each other as well as in close proximity with other in-situ potentially combustible cables.

These trays come up out of the floor along the west wall and run vertically up to a height of approximately 17 to 18 feet above the floor. The trays then run north over top of the 'B' 4160V switchgear. The trays exit the room through the north wall. The vertical trays are located approximately three feet diagonally from the potential ignition source of the 'B' 4160V switchgear (the side of the switchgear). Also, there is an SBO control panel located within approximately five feet. This is a totally enclosed metal cabinet and the solid steel rear of the panel faces the vertical cable trays making it highly unlikely that this potential ignition source would adversely impact the cable trays.

The horizontal portions of the trays are located approximately nine feet above the potential ignition source of the 'B' 4160V switchgear and approximately three feet above the iso-phase bus duct. The bus duct is totally contained in a round steel duct. It is not expected that this bus duct will affect the cable trays due to its robust configuration. The iso-phase bus duct potential transformers are located approximately 25 feet east and approximately 12 feet lower than the cable trays, so these potential transformers will not affect the cable trays.

Transient combustibles are controlled by administrative procedures and could potentially impact the cable trays in the vertical runs where they rise up out of the floor. This is unlikely because there is limited space (approximately 5 feet) between the SBO control panel and the 'B' 4160V switchgear. This space is normally occupied by spare 4160V breakers (the breakers and the covers for the breakers are considered minimal combustibles). Also, it is not expected that transient combustibles will affect the horizontal portions of the trays since the trays are at least 17 feet above the floor. The cables are routed with other cables in the cable trays putting them in close proximity to in-situ combustibles in the fire zone.

With the credited and redundant trains of cables located in the same cable trays in this fire zone, damage to any one of the cable trays would require the OMA.

<u>OMA Phase 1, #3 (Manually Control 1B3M Breaker at LSP-1B3)</u>

Manually control 1B3M Breaker from LSP-1B3. (Item #3 from Attachment 2 of the March 3, 2009 exemption request.)

- Both credited cables and redundant cables for this manual action are routed in the same horizontal and vertical cable tray in this fire zone. The cables are routed very similar to the cables for the LSP-1D OMA above. Therefore, refer to the above OMA for LSP-1D for the details.

<u>OMA Phase 1, #6 (Manually Reclose Feeder Breaker MCC 1B32 at USS 1B3)</u>

Manually re-close Feeder Breaker MCC 1B32 at USS 1B3 due to an undervoltage trip. (Item #6 from Attachment 2 of the March 3, 2009 exemption request.)

- This OMA is only needed if power to USS 1B3 is lost. The cables that can cause the loss of USS 1B3 are associated with the OMA for LSP-1D. Also, the loss of the 1B

4160V switchgear will cause this OMA to occur and the switchgear itself is located in this area while the cables are located in the same trays as the OMA for LSP-1D. Therefore, refer to the above OMA for LSP-1D for the required details.

OMA Phase 1, #12 (Establish CRD Flow to Reactor)

Manually open V-15-237, throttle V-15-30 while monitoring flow at FI-225-2 and close V-15-52 to establish CRD flow to reactor due to the loss of instrument air to the CRD flow control valve. (Item #12 from Attachment 2 of the March 3, 2009 exemption request.)

- Refer to the loss of instrument air generic response in RAI-06.1 in Attachment 1 for additional information on this OMA.

OMA Phase 2, #1 (Trip Field Breakers for Recirculation Pumps MG Set)

Trip Field Breakers for Recirculation Pumps MG Set so that the Fuel Zone Level Indicators can be used. (Action #1 from Attachment 2 of the March 4, 2009 exemption request.)

- The 1A and 1B 4160V Switchgear Cabinets and the "C" Battery distribution panel are ignition sources located in this area. Damage to this equipment could prevent tripping of the recirculation pumps. The Recirculation Pump MG sets are powered from the 1A and 1B 4160 switchgear. Therefore, the control wiring needed to trip the breakers is inseparable from the switchgear. Should a fire occur in this area and the 4160V MG set breakers are not capable of being tripped, the Recirculation Pumps will be stopped by opening the MG set exciter field breakers, which are located in another building. The exciter breakers are not provided with control in the control room, so an OMA must be credited to trip the exciter breakers in the MG set room. Also, the credited cables for this OMA are routed in the same horizontal and vertical cable tray in this fire zone. The cables are routed very similar to the cables for LSP-1D above. Therefore, refer to the above OMA for LSP-1D for the required details.

OMA Phase 2, #2 (Align Fire Water to Isolation Condenser)
Provide Fire Water to Isolation Condenser shell by operating valves V-9-2099, V-11-49, V-11-63 and V-11-41 due to loss of power (contingency action). (Action #2 from Attachment 2 of the March 4, 2009 exemption request.)

- Refer to the fire water valve generic OMA Response in RAI-06.1 in Attachment 1 for additional information on this OMA.

  The "B" Train of power is the Safe Shutdown Success Path SSC for this area/zone but OMAs are required to restore power. If access is not immediately available to the "D" 4160V switchgear area, then the fire water system will be required to be utilized to make-up to the Isolation Condenser until normal access is restored. Thus, this OMA is dependent on the LSP-1D OMA and would not be required unless the OMA at the LSP-1D is required and access is not immediately available, and as such, this is considered a contingency action. Refer to LSP-1D OMA for the credited cables and in-situ hazards.

OMA Phase 2, #3 (Manually Control 480V USS 1B2 Breakers for CRD Pump at Remote Shutdown Panel)

Manually control 480V USS 1B2 Breakers for CRD Pump NC08B and 1B2M from Remote Shutdown Panel due to control circuit damage. (Action #3 from Attachment 2 of the March 4, 2009 exemption request.)

- Credited cables and redundant cables for this manual action are routed in the same horizontal and vertical cable tray in this fire zone. The cables are routed very similar to the cables for Manual Action #1 (LSP-1D) above. Therefore, refer to LSP-1D OMA for the credited cables and in-situ hazards.

OMA Phase 2, #7 (Provide Makeup to Isolation Condenser via V-11-36)

Manually open V-11-36 to provide makeup to Isolation Condenser due to loss of power (contingency action). (Action #7 from Attachment 2 of the March 4, 2009 exemption request.)

- The "B" Train of power is the Safe Shutdown Success Path SSC for this area/zone but OMAs are required to restore power. If access is not immediately available to the "D" 4160V switchgear area, then the fire water system will be required to be utilized to make-up to the Isolation Condenser until normal access is restored. Thus, this OMA is dependent on the LSP-1D OMA and would not be required unless the OMA at the LSP-1D is required and access is not immediately available, and as such, this is considered a contingency action. Refer to LSP-1D OMA for the credited cables and in-situ hazards.

OMA Phase 2, #8 (Locally Check Isolation Condenser Shell Level)

Check Isolation Condenser Shell level locally due to loss of power (contingency action). (Action #8 from Attachment 2 of the March 4, 2009 exemption request.)

- The "B" Train of power is the Safe Shutdown Success Path SSC for this area/zone but OMAs are required to restore power. If access is not immediately available to the "D" 4160V switchgear area, then the fire water system will be required to be utilized to make-up to the Isolation Condenser until normal access is restored. Thus, this OMA is dependent on the LSP-1D OMA and would not be required unless the OMA at the LSP-1D is required and access is not immediately available, and as such, this is considered a contingency action. Refer to LSP-1D OMA for the credited cables and in-situ hazards.

OMA Phase 2, #18 (Provide Makeup Air to Isolation Condenser Valve V-11-36 Accumulator)

Provide makeup control air to the accumulator for V-11-36 for the Isolation Condenser makeup line due to the loss of instrument air. (Action #18 from Attachment 2 of the March 4, 2009 exemption request.)

- Refer to the loss of instrument air generic response in RAI-06.1 in Attachment 1 for additional information on this OMA.

Fire Hazards Analysis

As discussed in the response to RAI-02.4 in Attachment 1, the OCNGS FPP encompasses the concept of defense-in-depth. Administrative controls are in place as discussed in the response to RAI-02.3 in Attachment 1 to reduce the likelihood of fires from starting and to minimize the magnitude of a fire if one would occur.

The existing defense-in-depth features are listed above. In addition to these features, fire loading in this fire zone is low, consisting primarily of cable insulation and plastics (e.g., ladders, switch handles, etc.). There are also miscellaneous ordinary combustibles. Automatic fire detection which alarms locally and in the control room will promptly detect a fire. In addition to its alarm function, the automatic detection system will actuate the automatic fixed preaction sprinkler system valve which will fill the pipe with water making it ready for actuation if needed.

If a fire were to occur in this fire zone, it would not be of significant size or duration due to the low combustible loading and the nature of the combustibles. Prompt detection and extinguishment of the principal combustible, cable insulation, will be accomplished by the automatic fixed preaction sprinkler system and the plant fire brigade. Due to the fire protection features installed in this fire zone and the low combustible loading, it is not expected that a total consuming fire would occur in this fire zone, and therefore, most or all of the OMAs would not be required. Therefore, area-wide detection and suppression do not significantly enhance the fire protection features of this area.

The fire zone boundaries have been evaluated as acceptable as indicated above. Even if the fire were not promptly extinguished, all hot shutdown systems required in this fire zone with the exception of the OMAs listed above, are separated such that at least one redundant train survives a fire.

Re-entry is required into this fire zone to perform an OMA (LSP-1D) in a different fire area (Fire Area TB-FA-3B). Details regarding re-entry are discussed in response to RAI-11 in Attachment 1. The OMAs for this fire zone vary from a 30-minute time limit to 300 minutes (refer to Reference 2 of Attachment 1, Section III.B for actual time limits). The majority of the OMAs (except LSP-1D OMA) discussed above that are required as a result of a fire in this fire zone are independent of this fire zone and do not require an SCBA for access/egress.

This fire protection configuration achieves a level of protection commensurate with that intended by Appendix R, Section III.G.2.

**TB-FZ-11D Turbine Bldg. Basement Floor South End Elev. 3’-6”**

Fire Zone Description

Fire Zone TB-FZ-11D floor area is approximately 9,668 sq. ft.

The ceiling height is approximately 19’-0”.

This area has an administrative fire loading limit of less than 30 minutes as determined by the ASTM E119 time-temperature curve. The major combustibles in this area are cable insulation (approximately 29% of loading), Dow Corning 561 Silicon transformer liquid (approximately 15% of loading) and lubricating oil (approximately 40% of loading). The transformer liquid has

characteristics that minimize the likelihood of a fire involving the insulating liquid itself (refer to the March 3, 2009 or March 4, 2009 exemption request for more information).

Fire Protection Features

This fire zone is provided with the following fixed defense-in-depth features:

- General area automatic wet pipe sprinkler system,
- Hydrogen Seal Oil Unit automatic water spray system with closed heads directional spray nozzles,
- Hose stations,
- Portable fire extinguishers,
- Fire barriers (rated assemblies) including one-hour fire cable raceway barriers, and
- Fire zone boundaries (non-rated assemblies).

The closed head automatic sprinkler and spray systems protecting the south end basement area and the hydrogen seal oil unit were designed, installed and tested in accordance with NFPA 13, 1976 Edition.

The closed head automatic sprinkler system protecting the south basement end area and the closed head spray system protecting the hydrogen seal oil unit are surveillance tested to demonstrate operability at least once per 12 months by performing a system functional test, which includes simulated automatic actuation of the system and verifying that the automatic valves in the flow path actuate to their correct position.

The fire suppression systems are maintained and surveillance tested in accordance with station surveillance procedures 645.4.004, “Fire Suppression Water System Valve Lineup," 645.4.009, “Cycling of Fire Protection System Valves," 645.6.011, “Deluge and Sprinkler System Inspection," 645.6.022, “Non-Tech. Requirement Fire Protection System Test” and 645.6.032, “Fire Detection System Alarm Circuitry Test for Turbine Building & 4160V Switchgear Room."

Refer to the response to RAI-04.1 in Attachment 1 for a discussion on manual suppression capabilities.

Zone boundaries consist of reinforced concrete floor on grade, and walls with unsealed openings to Fire Zones TB-FZ-11E and TB-FZ-11H. The ceiling has unsealed openings to Fire Zones TB-FZ-11C and TB-FZ-11G and three-hour fire resistance rating bounding Fire Areas TB-FA-3A, TB-FA-3B, and TB-FA-26. The floor, west wall and south wall are not adjacent (below grade) to any other plant areas. In addition, the stairwell has two-hour fire resistance rated walls and a Class B fire resistance rated door.

These boundaries have been evaluated as acceptable consistent with the criteria outlined in Attachment 1 in the response to RAI-04.3.

Evaluations and Deviations

Engineering evaluation AR 732552-02: Evaluation of acceptability of hydraulic analysis for sprinkler system #9 was performed to confirm that the suppression system was capable of controlling a fire in this area in accordance with NEIL requirements (i.e., 0.3 gpm/sq. ft. over the hydraulically most remote 5,000 sq. ft. with one fire pump operating). Since the sprinkler

system will perform as designed to extinguish a fire in this fire zone, this evaluation does not impact the basis for the manual action exemption request which takes credit for the defense-in-depth afforded by the sprinkler system.

A deviation exists from NFPA 72D, 1975 Edition and NFPA 72E, 1974 Edition regarding a surveillance testing frequency change from six months to one year for fire detectors, supervised circuits, water flow switches and pressure switches. This deviation has been justified in Safety Evaluation SE No. 000665-015 in accordance with NRC GL 86-10. This deviation will not impact the capability to detect a fire and therefore will not impact the basis for the manual action exemption request.

Other evaluations have been performed to justify minor deviations from UL fire tests plus the application of the criteria for unrated zone boundaries (stipulated in the response to RAI-04.3 in Attachment 1) combine to make up the fire zone boundaries. These evaluations will not impact the basis of the OMA exemption requests.

There are no other deviations from fire protection codes, standards, testing programs and listings by independent laboratories in this fire zone that impact this evaluation.

Exemptions

An exemption was granted from the requirements of Appendix R Section III.G.2 in SERs dated March 24, 1986 and June 25,1990 for not having area-wide automatic fire detection and suppression system in Fire Zone TB-FZ-11D. The primary basis for this exemption is the presence of the automatic wet pipe sprinkler system, low fire loading and the one-hour barrier protection for safe shutdown circuits. Also, the flow alarm will notify the control room of any sprinkler system activation. Since a fire in this area would not impede the plant's capability for safe shutdown, this exemption does not impact the basis for the manual exemption request**.** Note that this area does have an area-wide suppression system.

Manual Actions

There are eleven (11) manual actions required for this fire zone. Note that the acceptability of the RG 1.75 noncompliances in regards to the credited and redundant cables being located in the same cable tray are addressed in the response to RAI-05 in Attachment 1.

OMA Phase 1, #1 (Manually Trip 4160V 1D Breakers and Control USS 1B2 & 1B3 480V Breakers Locally at LSP-1D)

Manually trip 4160V 1D Breakers and control USS 1B2 and 1B3 480V Breakers locally at LSP-1D. (Item #1 from Attachment 2 of the March 3, 2009 exemption request.)

- Credited cables (for USS 1B2 and 1B3 4160V breakers) and redundant train cables (for USS 1A2 and 1A3 breakers) are located in the same cable trays in this fire zone. Damage to these cable trays could result in damage to both trains of cables. Additional cables are routed in this cable tray with the credited and redundant cables. Thus, the credited and redundant trains are in close proximity to each other as well as in close proximity with other in-situ potentially combustible cables. Damage to this cable tray would impact both the credited and redundant train and would therefore make the

manual action necessary. Also, one control cable for the 4160V 1D main breaker is routed in conduit.

The cable trays enter this area in the southwest corner of the room through the ceiling. Some of the cables run in a cable tray in the northerly direction near the west wall. The cable tray is approximately 17 feet above the floor. The credited cables terminate in the room by running back up through the ceiling and into the 1D 4160V Switchgear Room. The redundant cables are routed in a tray that first heads in a southerly direction, turns east and then loops back in a northerly direction to route some cables back up through the ceiling and into the 1C 4160V Switchgear Room. The 1D main breaker conduit runs along the north wall at approximately 10 feet above the floor and then goes through the ceiling into the 1D 4160V Switchgear Room.

The primary ignition sources in this area near the cable trays are the Turbine Building Closed Cooling Water Pumps and USS 1A1 and its associated transformer (4160V to 480V transformer). The Turbine Building Closed Cooling Water Pumps contain less than 5 gallons of oil and are enclosed in metal casings. The cable tray is approximately 13 feet from the top of the pumps/motors. It is unlikely that this ignition source would adversely impact the cables in the cable tray since the ignition sources only contain a small amount of combustibles and there is an approximate 13 foot distance between the ignition source and the target. There are no ignition sources in close proximity to the conduit. This area also has a wet pipe sprinkler system.

USS 1A1 and its associated transformer are located at a distance of approximately 30 feet diagonal distance from the credited cables where they exit the area through the ceiling to their respective switchgear room. The diagonal distance from the top of USS 1A1 to the redundant cables is approximately 15 feet. It is unlikely that this ignition source would adversely impact the cables in the cable tray due to the separation distance between the ignition source and cables. Additionally, in the ceiling of this area, there is a concrete ceiling beam that would provide some shielding for the cables from the heat gas layer generated by this ignition source. Further, once the sprinkler system actuated, it would create a water curtain off of this beam separating the transformer from the cables. Sprinkler heads are also located in a ceiling pocket between the ceiling concrete beam and the USS 1A1 and transformer (heads located above USS 1A1).

Transient combustible storage in the southwest corner is limited due to a sump and abandoned acid/caustic tanks located in this area. Transient combustibles can be stored in the remaining area but the cables are typically 15 feet or higher above the floor so the resultant transient fire would need to generate enough heat to adversely impact these cables. In the unlikely event that a fire affected this cable tray, this OMA would be required.

<u>OMA Phase 1, #3 (Manually Control 1B3M Breaker at LSP-1B3)</u>

Manually control 1B3M Breaker from LSP-1B3. (Item #3 from Attachment 2 of the March 3, 2009 exemption request.)

- The credited and redundant cable configuration is very similar to that described for the above manual action for LSP-1D. Therefore, refer to the OMA for LSP-1D for this area

for the cable routing and for the details regarding ignition sources and transient combustibles.

OMA Phase 1, #5 (Manually Control Diesel Generator #2 from LSP-DG2)

Manually control Emergency Diesel Generator #2 from LSP- DG2. (Item #5 from Attachment 2 of the March 3, 2009 exemption request.)

- Credited cables and redundant train cables are located in some of the same cable trays in this fire zone for a short distance. Damage to these cable trays could result in damage to both trains of cables. Additional cables are routed in this cable tray with the credited and redundant cables. Thus, the credited and redundant trains are in close proximity to each other as well as in close proximity with other in-situ potentially combustible cables. Damage to this cable tray would impact both the credited and redundant train and would therefore make the manual action necessary.

  The cables for Diesel Generator #1 enter the area through the west wall and are distributed throughout the area through a series of cable trays. The cables for Diesel Generator #2 also enter the area through the west wall approximately 25 feet south of the Diesel generator #1 cables. The cables for Diesel generator #2 are also distributed through the fire zone through a series of cable trays. Portions of the Diesel Generator #1 cables and the Diesel Generator #2 cables are routed in the same cable trays. The cable trays are approximately 17 feet above the floor in this area.

  A potential fire in the west end of this fire zone could impact both the credited and redundant trains of cables. The primary ignition sources in this area near the cable trays are the Turbine Building Closed Cooling Water Pumps and USS 1A1 and its associated transformer. The Turbine Building Closed Cooling Water Pumps contain less than five gallons of oil and are enclosed in metal casings. The cable tray is approximately 13 feet from the top of the pumps/motors. It is unlikely that this ignition source would adversely impact the cables in the cable tray since the ignition sources contain a small amount of combustibles and there is an approximate 13 foot distance between the ignition source and the target. This area also has a wet pipe sprinkler system.

  USS 1A1 and its associated transformer are located directly under some of the credited cables for Diesel Generator #2. The cables are in a cable tray and are approximately 8 feet above USS 1A1. Redundant cables are approximately 25 feet from this portion of the credited cables.

  Transient combustibles storage in the southwest corner is limited due to a sump and abandoned acid/caustic tanks located in this area. Transient combustibles can be stored in the remaining area along the west wall but the cables are typically 15 feet or higher above the floor so that a resultant transient fire would need to generate enough heat to adversely impact these cables.

OMA Phase 1, #6 (Manually Reclose Feeder Breaker MCC 1B32 at USS 1B3)

Manually re-close Feeder Breaker MCC1B32 at USS 1B3 due to an under voltage trip. (Item #6 from Attachment 2 of the March 3, 2009 Exemption request)

- This OMA is only needed if power to USS 1B3 is lost. The cables that can cause the loss of USS 1B3 are associated with the OMA for LSP-1D. Also, the loss of the 1B 4160V switchgear will cause this OMA to occur and the cables that could cause the loss of the switchgear are located in the same cable trays as the ones for LSP-1D. Therefore, refer to the OMA for LSP-1D for this area for the required details.

OMA Phase 1, #12 (Establish CRD Flow to Reactor)

Manually open V-15-237, throttle V-15-30 while monitoring flow at FI-225-2 and close V-15-52 to establish CRD flow to reactor due to the loss of instrument air to the CRD flow control valve. (Item #12 from Attachment 2 of the March 3, 2009 exemption request.)

- The air compressors, receivers and dryers are located in the southeast corner. The air compressors are powered from either USS 1A1 or 1B1, which are approximately 35 feet apart from each other. The power cables are in the same cable trays for approximately the first 45 feet and then they separate to go to the two USSs. The cables that go to the control room are in separate cable trays until prior to exiting this area on the north side where they come together in a common cable tray. There are instrument air lines throughout this fire zone. Refer to the loss of instrument air generic response in RAI-06.1 in Attachment 1 for additional information on this OMA

OMA Phase 2, #1 (Trip Field Breakers for Recirculation Pumps MG Set)

Trip Field Breakers for Recirculation Pumps MG Set so that the Fuel Zone Level Indicators can be used. (Action #1 from Attachment 2 of the March 4, 2009 exemption request.)

- The cables are routed very similar to the cables for LSP-1D above. Therefore, refer to the OMA for LSP-1D for this area for the cable routing and for the details regarding ignition sources and transient combustibles. Should a fire occur in this area and the MG set breakers are not capable of being tripped, the Recirculation pumps will be stopped by opening the MG set exciter field breakers, which are located in another building. The exciter breakers are not provided with control in the control room, so an OMA must be credited to trip the exciter breakers in the MG set room.

OMA Phase 2, #2 (Align Fire Water to Isolation Condenser)

Provide Fire water to Isolation Condenser shell by operating valves V-9-2099, V-11-49, V-11-63 and V-11-41 due to loss of power (contingency action). (Action #2 from Attachment 2 of the March 4, 2009 exemption request.)

- Refer to the fire water valve generic OMA response in RAI-06.1 in Attachment 1 for additional information on this OMA.

  The “B” Train of power is the Safe Shutdown Success Path SSC for this area/zone; however, OMAs are required to restore power. If access is not immediately available to the 4160V switchgear area, then the fire water system will be required to be utilized to make-up to the Isolation Condenser until normal access is restored. Thus, this OMA is dependent on the LSP-1D OMA and would not be required unless the OMA at the LSP-1D is required and access is not immediately available, and as such, this is considered a

contingency action. Refer to the LSP-1D OMA for this area for the credited cables and in-situ hazards.

OMA Phase 2, #3 (Manually Control 480V USS 1B2 Breakers for CRD Pump at Remote Shutdown Panel)

Manually control 480V USS 1B2 Breakers for CRD Pump NC08B and 1B2M from Remote Shutdown Panel due to control circuit damage. (Action #3 from Attachment 2 of the March 4, 2009 exemption request.)

The credited and redundant cable configuration is very similar to that described for the LSP-1D OMA for this fire zone. Therefore, refer to LSP-1D OMA above for the in-situ hazards.

OMA Phase 2, #7 (Provide Makeup to Isolation Condenser via V-11-36)

Manually open V-11-36 to provide makeup to Isolation Condenser due to loss of power (contingency action). (Action #7 from Attachment 2 of the March 4, 2009 exemption request.)

- The "B" Train of power is the Safe Shutdown Success Path SSC for this area/zone; however, OMAs are required to restore power. If access is not immediately available to the 4160V switchgear area, then the fire water system will be required to be utilized to make-up to the Isolation Condenser until normal access is restored. Thus, this OMA is dependent on the LSP-1D OMA and would not be required unless the OMA at the LSP-1D is required and access is not immediately available, and as such, this is considered a contingency action. Refer to the LSP-1D OMA for this area for the credited cables and in-situ hazards.

OMA Phase 2, #8 (Locally Check Isolation Condenser Shell Level)

Check Isolation Condenser Shell level locally due to loss of power (contingency action). (Action #8 from Attachment 2 of the March 4, 2009 exemption request.)

- The "B" Train of power is the Safe Shutdown Success Path SSC for this area/zone; however, OMAs are required to restore power. If access is not immediately available to the 4160V switchgear area, then the fire water system will be required to be utilized to make-up to the Isolation Condenser until normal access is restored. Thus, this OMA is dependent on the LSP-1D OMA and would not be required unless the OMA at the LSP-1D is required and access is not immediately available, and as such, this is considered a contingency action. Refer to the LSP-1D OMA for this area for the credited cables and in-situ hazards.

OMA Phase 2, #18 (Provide Makeup Air to Isolation Condenser Valve V-11-36 Accumulator)

Provide makeup control air to the accumulator for V-11-36 for the Isolation Condenser makeup line due to the loss of instrument air. (Action #18 from Attachment 2 of the March 4, 2009 exemption request.)

- Refer to the loss of instrument air generic response in RAI-06.1 in Attachment 1 for additional information on this OMA.

Fire Hazards Analysis

As discussed in the response to RAI-02.4 in Attachment 1, the OCNGS FPP encompasses the concept of defense-in-depth. Administrative controls are in place as discussed in the response to RAI-02.3 in Attachment 1 to reduce the likelihood of fires from starting and to minimize the magnitude of a fire if one would occur.

The existing defense-in-depth features are listed above. In addition to these features, fire loading in this fire zone is low. Cable insulation, lube oil and hydrogen seal oil provide the majority of the combustible loading. Miscellaneous ordinary combustibles, such as wood and paper, exist in small quantities. When either of the automatic fire suppression systems operates, an alarm will sound in the control room.

If a fire were to occur in this fire zone, it would not be of significant size or duration due to the low combustible loading and the nature of the combustibles. Prompt extinguishment will be accomplished by either one of the two automatic fixed suppression systems and the plant fire brigade. Due to the fire protection features installed in this fire zone and the low combustible loading, it is not expected that a total consuming fire would occur in this room, and therefore, most or all of the OMAs would not be required.

The fire zone boundaries have been evaluated as acceptable as indicated above. Even if the fire were not promptly extinguished, all hot shutdown systems required in this area with the exception of the unprotected components and cables listed above are protected by a one-hour rated fire barrier.

The OMAs for this fire zone vary from a 30-minute time limit to 300 minutes (refer to Reference 2 of Attachment 1, Section III.B for actual time limits). The majority of the OMAs (except LSP-1D OMA) discussed above that are required as a result of a fire in this fire zone are independent of this fire zone and do not require an SCBA for access/egress.

This fire protection configuration achieves a level of protection commensurate with that intended by Appendix R, Section III.G.2.

**TB-FZ-11E Turbine Bldg. Condenser Bay Area, Elev. 0'-0"**

Fire Zone Description

Fire Zone TB-FZ-11E floor area is approximately 26,427 sq. ft.

The ceiling height is greater than 40 feet.

The Condenser Bay is procedurally controlled as a transient combustible free area in procedure OP-AA-201-009 while the plant is operating. This area has an administrative fire loading limit of less than 30 minutes as determined by the ASTM E119 time-temperature curve. This limit is tied to an NRC-accepted approach for dealing with fire zone boundaries (refer to the response to RAI-04.3 in Attachment 1 for more details). The major combustibles in this area are cable insulation (approximately 40% of loading) and plastic (approximately 59% of loading). The grating, which is the largest plastic material in this area, is dispersed throughout this fire zone (not concentrated) and has a flame spread of less than 25.

The Condenser Area is a high radiation area during plant operation and is not normally accessed.

Fire Protection Features

This fire zone is provided with the following fixed defense-in-depth features:

- Automatic wet wipe sprinkler system,
- Hose stations,
- Portable fire extinguishers,
- Fire barriers (rated assemblies), and
- Fire zone boundaries (non-rated assemblies).

The closed head automatic sprinkler system in the condenser bay area was designed, installed and tested in accordance with NFPA 13, 1976 Edition, which was the latest edition of this code at the time of design. This system has recently been expanded to provide fire suppression over the cables in cable trays in the northeast side of the condenser bay. The recent expansion was designed, installed and tested in accordance with NFPA 13, 2007 Edition, which was the latest edition of this code at the time of the system expansion.

The closed head automatic sprinkler system is surveillance tested to demonstrate operability at least once per 12 months by performing a system functional test, which includes simulated automatic actuation of the system and verifying that the automatic valves in the flow path actuate to their correct position.

The closed head system is maintained and surveillance tested in accordance with station surveillance procedures 645.4.004, “Fire Suppression Water System Valve Lineup," and 645.4.009, “Cycling of Fire Protection System Valves."

Refer to the response to RAI-04.1 in Attachment 1 for a discussion on manual suppression capabilities.

Zone boundaries consist of reinforced concrete walls with unsealed openings to Fire Zones TB-FZ-11B, TB-FZ-11D, TB-FZ-11F, and TB-FZ-11H. Three-hour fire resistive rated walls exist for the north and east walls adjoining Fire Zone OB-FZ-4, Cable Spreading Room, and the east wall adjoining the reactor building and office building. The ceiling has unsealed openings to Fire Zone TB-FZ-11A and the floor is not adjacent to any other plant areas (slab below grade). The west wall is adjacent to MT-FA-12, the main transformer and condensate area, and is unrated; however, the concrete is greater than one-foot thick with no unsealed openings.

These boundaries have been evaluated as acceptable consistent with the criteria outlined in Attachment 1 in the response to RAI-04.3.

Evaluations and Deviations

A deviation exists from NFPA 72D, 1975 Edition and NFPA 72E, 1974 Edition regarding a surveillance testing frequency change from six months to one year for supervised circuits, water flow switches and pressure switches. This deviation has been justified in Safety Evaluation SE No. 000665-015 in accordance with NRC GL 86-10. This deviation will not impact the capability to detect a fire and therefore will not impact the basis for the manual action exemption request.

Other evaluations have been performed to justify minor deviations from UL fire tests plus the application of the criteria for unrated zone boundaries (stipulated in the response to RAI-04.3 in Attachment 1) combine to make up the fire zone boundaries. These evaluations will not impact the basis of the OMA exemption requests.

There are no other deviations from fire protection codes, standards, testing programs and listings by independent laboratories in this fire zone that impact this evaluation.

Exemptions

An exemption was granted from the requirements of Appendix R, Section III.G.2 in SERs dated March 24, 1986 and June 25, 1990 for not having a fixed fire detection system in this area. The primary basis for this exemption is the presence of the automatic wet pipe sprinkler system and low fire loading. Since a fire in this area would not impede the plant's capability for safe shutdown, this exemption does not impact the basis for the manual exemption request.

Manual Actions

There are ten (10) manual actions required for this fire zone. Note that the acceptability of the RG 1.75 noncompliances in regards to the credited and redundant cables being located in the same cable tray are addressed in the response to RAI-05 in Attachment 1.

OMA Phase 1, #1 (Manually Trip 4160V 1D Breakers and Control USS 1B2 & 1B3 Breakers Locally at LSP-1D)

Manually trip 4160V 1D Breakers and control USS 1B2 and 1B3 480V Breakers locally at LSP-1D. (Item #1 from Attachment 2 of the March 3, 2009 exemption request.)

- Credited cables and redundant train cables are located in the same cable trays in this fire zone along the west wall of this area. Damage to these cable trays could result in damage to both trains of cables and equipment. Additional cables are routed in this cable tray with the credited and redundant cables. Thus, the credited and redundant trains are in close proximity to each other as well as in close proximity with other in-situ potentially combustible cables. Damage to this cable tray would impact both the credited and redundant train and would therefore make the manual action necessary.

- The cable trays enter this area in the south wall, run north along the west wall and exit through the north wall. They are routed approximately 40 feet above the floor, which is at elevation 0'-0".

- There are no ignition sources or major combustibles other than the cables themselves located near the west wall of this area where the cable trays are located so it is unlikely that a fire would occur in this portion of the fire zone. The condensers and circulating water lines are located in this portion of the fire zone.

OMA Phase 1, #2 (Read Condensate Storage Tank Local Level Indicator LI-424-993)

Locally read Condensate Storage Tank (CST) level at LI-424-993. (Item #2 from Attachment 2 of the March 3, 2009 exemption request.)

- There is no redundant train of equipment for the credited method of obtaining CST level indication due to the plant's original design. Should the primary indicator (5F-27) fail, indication can only be obtained by reading the local indicator (LI-242-993) located at the CST.

  The cable for this action enters this area through a penetration in the west wall approximately 16 feet above the floor, which is at elevation 0'-0". The cable then runs in a cable tray along the west wall and exits the fire zone through the north wall. The cable tray is located approximately 16 to 18 feet above the floor. Refer to LSP-1D OMA above for the in-situ hazards since these cables are run similar to those cables.

OMA Phase 1, #3 (Manually Control 1B3M Breaker at LSP-1B3)

Manually control 1B3M Breaker from LSP-1B3. (Item #3 from Attachment 2 of the March 3, 2009 exemption request)

- Refer to the LSP-1D OMA above for the cable routing and in-situ hazards since these cables are run similar to those cables.

OMA Phase 1, #4 (Manually Control Condensate Transfer Pump 1-2 from LSP-1B32)

Manually control Condensate Transfer Pump 1-2 from LSP-1B32. (Item #4 from Attachment 2 of the March 3, 2009 exemption request.)

- Credited cables and redundant train cables are located in the same cable trays in this fire zone. The cable trays enter this area from a penetration in the west wall, run north along the west wall and exit through the north wall. They are routed approximately 18 feet above the floor, which is at elevation 0'-0". Refer to LSP-1D OMA above for the in-situ hazards since these cables are run similar to those cables.

OMA Phase 1, #5 (Manually Control Diesel Generator #2 from LSP-DG2)

Manual control Emergency Diesel Generator #2 from LSP- DG2. (Item #5 from Attachment 2 of the March 3, 2009 exemption request.)

- Credited cables and redundant train cables are separated in this fire zone by a horizontal distance of greater than 90 feet (cables are on opposite sides of the condenser). The credited cables enter the Condenser Bay through the south wall on the east side at approximately 17' elevation and then rise up to approximately 40' elevation in the northeast corner of the fire zone and enter into the Cable Spreading Room on the east wall. The redundant cables are located along the west wall and are approximately 41 feet above the floor, which is elevation 0'-0". The redundant cables are in a cable tray that enters the zone through the south wall and exits the fire zone through the north wall.

  There are no ignition sources near the west wall of this area where the redundant cable tray is located. The primary ignition sources on the east side near the credited cable trays are the moisture separator drain pumps and the area sump pumps. They are

located on the floor (elevation 0'-0") in an area approximately 20 feet further to the east of the cable trays plus the cable trays are approximately 17 feet off of the floor.

Due to the separation of the credited and redundant cables in this fire zone, the use of the manual action for this fire zone is highly unlikely.

OMA Phase 1, #6 (Manually Reclose Feeder Breaker MCC 1B32 at USS 1B3)

Manually re-close Feeder Breaker MCC 1B32 at USS 1B3 due to an undervoltage trip. (Item #6 from Attachment 2 of the March 3, 2009 exemption request.)

- This OMA is only needed if power to USS 1B3 is lost. The cables that can cause the loss of USS 1B3 are associated with the OMA for LSP-1D. Also, the loss of the 1B 4160V switchgear will require this OMA to occur and the cables are located in the same trays as the OMA for LSP-1D. Therefore, refer to the above OMA for LSP-1D for the required details.

OMA Phase 1, #12 (Establish CRD Flow to Reactor)

Manually open V-15-237, throttle V-15-30 while monitoring flow at FI-225-2 and close V-15-52 to establish CRD flow to reactor due to the loss of instrument air to the CRD flow control valve. (Item #12 from Attachment 2 of the March 3, 2009 exemption request.)

- Refer to the loss of instrument air generic response in RAI-06.1 in Attachment 1 for additional information on this OMA.

OMA Phase 1, #16 (Manually Trip Rx Recirculation Pumps at 4160V Switchgear)

Manually trip Reactor Recirculation Pumps ("A," "B," "C," "D" and "E") 4160V Switchgear 1A and 1B. (Item #16 from Attachment 2 of the March 3, 2009 exemption request.)

- The credited cables for tripping the recirculation pumps are run in the same cable tray or in the adjacent cable tray as the cables for the LSP-1D OMA. Refer to LSP-1D OMA above for the in-situ hazards since these cables are run similar to each other.

OMA Phase 2, #3 (Manually Control 480V USS 1B2 Breakers for CRD Pump at Remote Shutdown Panel)

Manually control 480V USS 1B2 Breakers for CRD Pump NC08B and 1B2M from Remote Shutdown Panel due to control circuit damage. (Action #3 from Attachment 2 of March 4, 2009 exemption request)

- Credited cables and redundant train cables are located in the same cable trays in this fire zone. Refer to LSP-1D OMA above for the cable routing and the in-situ hazards since these cables are run similar to the LSP-1D cables.

OMA Phase 2, #18 (Provide Makeup Air to Isolation Condenser Valve V-11-36 Accumulator)

Provide makeup control air to the accumulator for V-11-36 for the Isolation Condenser makeup line due to the loss of instrument air. (Action #18 from Attachment 2 of the March 4, 2009 exemption request.)

- Refer to the loss of instrument air generic response in RAI-06.1 in Attachment 1 for additional information on this OMA.

Fire Hazards Analysis

As discussed in the response to RAI-02.4 in Attachment 1, the OCNGS FPP encompasses the concept of defense-in-depth. Administrative controls are in place as discussed in the response to RAI-02.3 in Attachment 1 to reduce the likelihood of fires from starting and to minimize the magnitude of a fire if one would occur.

The existing defense-in-depth features are listed above. In addition to these features, fire loading in this fire zone is low. The majority of the combustible loading is from fiberglass reinforced polyester grating installed on permanent scaffolding, cable insulation, and a minor amount of lube oil in pumps. When the automatic fire suppression system operates, an alarm will sound in the control room.

If a fire were to occur in this fire zone, it would not be of significant size or duration due to the low combustible loading and the nature of the combustibles. Prompt extinguishment of the principal combustible will be accomplished by automatic fixed suppression system and the plant fire brigade. Due to the fire protection features installed in this fire zone and the low combustible loading, it is not expected that a total consuming fire would occur in this fire zone, and therefore, most or all of the OMAs would not be required. Therefore, area-wide suppression does not significantly enhance the fire protection features of this area.

The fire zone boundaries have been evaluated as acceptable as indicated above. Even if the fire were not promptly extinguished, all hot shutdown systems required in this fire zone with the exception of the OMAs listed above, are separated such that at least one redundant train survives a fire.

The OMAs for this fire zone vary from a 30-minute time limit to 300 minutes (refer to Reference 2 of Attachment 1, Section III.B for actual time limits). All of the OMAs discussed above that are required as a result of a fire in this fire zone are independent of this fire zone and do not require an SCBA for access/egress.

This fire protection configuration achieves a level of protection commensurate with that intended by Appendix R, Section III.G.2.

**TB-FZ-11F Turbine Bldg. Feedwater Pump Room, Elev. 0'-0" & 3'-6"**

Fire Zone Description

Fire Zone OB-FZ-11F floor area is approximately 5,650 sq. ft.
The ceiling height for approximately 70% of this room is approximately 16'-0". The ceiling height for the remainder of the room is approximately 19'-6".

This area has an administrative fire loading limit of less than 30 minutes as determined by the ASTM E119 time-temperature curve. This limit is tied to an NRC-approved approach for dealing with fire area boundaries (Refer to the response to RAI-04 in Attachment 1 for more details). The major combustible load consists of cable insulation (approximately 15% of loading), lubricating oil (approximately 39% of loading), rubber (approximately 21% of loading) and plastics (approximately 17% of loading). Note that the majority of the rubber and plastic listed above was due to storage of hoses in this area and at this time, there are no hoses in this area.

Fire Protection Features

This fire zone is provided with the following fixed defense-in-depth features:

- Area-wide thermal detection
- Hose stations,
- Portable fire extinguishers,
- Fire barriers (rated assemblies), and
- Fire zone boundaries (non-rated assemblies).

A new fire detection system (thermal detection) has recently been installed in the Turbine Building Feedwater Pump Room (0'-0" and 3'-6" elevation). The new fire detection layout for the Turbine Building Feedwater Pump Room was designed, installed and acceptance tested in accordance with NFPA 72, 2007 Edition which was the latest edition of the standard at the time of design. The system alarms locally and in the control room.

The fire detection system for this area is maintained and surveillance tested in accordance with procedure 645.6.032,"Fire Detection and Thermal Detector Alarm Circuitry Test for Turbine Building & 4160V Switchgear Room."

Refer to the response to RAI-04.1 in Attachment 1 for a discussion on manual suppression capabilities.

Zone boundaries consist of reinforced concrete walls, floor and ceiling. The floor is not adjacent to any other plant area (slab on grade). The east wall is adjacent to Fire Zone RB-FZ-1F2 and this wall is a three-hour fire barrier. The north wall is unrated and adjacent to Fire Zones TB-FZ-11B (sealed with noncombustible materials) and TB-FZ-11E. The south wall is unrated and adjacent to Fire Zone TB-FZ-11H. The west wall is unrated and adjacent to Fire Zone TB-FZ-11E. The ceiling is adjacent to Fire Zone TB-FZ-11E (floor) and all openings are sealed with noncombustible materials.

These boundaries have been evaluated as acceptable consistent with the criteria outlined in Attachment 1 in the response to RAI-04.3.

Evaluations and Deviations

A deviation exists from NFPA 72D, 1975 Edition and NFPA 72E, 1974 Edition regarding a surveillance testing frequency change from six months to one year for supervised circuits, water flow switches and pressure switches. This deviation has been justified in Safety Evaluation SE No. 000665-015 in accordance with NRC GL 86-10. This deviation will not impact the capability to detect a fire and therefore will not impact the basis for the manual action exemption request.

(Note: The new detectors in Fire Zone TB-FZ-11F were designed, installed and tested in accordance with NFPA 72 which allows functional testing of detectors annually.)

Other evaluations have been performed to justify minor deviations from UL fire tests plus the application of the criteria for unrated zone boundaries (stipulated in the response to RAI-04.3 in Attachment 1) combine to make up the fire zone boundaries. These evaluations will not impact the basis of the OMA exemption requests.

There are no other deviations from fire protection codes, standards, testing programs and listings by independent laboratories in this fire zone that impact this evaluation.

Exemptions

There are no previously approved exemptions for this fire area that could impact this evaluation.

Manual Actions

There are three (3) manual actions required for this fire zone.

OMA Phase 1, #7 (Align Fire Water to Isolation Condenser)

Manually open V-9-2099 and V-11-49 and close V-11-63 and V-11-41 to align the fire water system for make-up water to Isolation Condenser "B" since there is no power ("B" Train) available to the Condensate Transfer System. (Item #7 of Attachment 2 of the March 3, 2009 exemption request)

- Refer to the fire water valve generic OMA Response in RAI-06.1 in Attachment 1 for additional information on this OMA.

  The loss of the “B” Train of power is attributed to the fact that the 125 VDC control power could be lost to the 1D 4160V Switchgear or the 1D 4160V main breaker could trip due to cables that traverse through this fire zone. The cables for the 125 VDC control power and the control circuit for the 1D main breaker are contained in separate conduits but are routed within approximately six inches of each other in a portion of this zone. Both conduits enter this zone from TB-FZ-11H at approximately five feet from the floor and then rise up approximately 18 feet along the ceiling area and then lower back down to approximately six feet from the floor on the other side of the room. The 125 VDC control cable then goes through the east wall into Fire Zone RB-FZ-1F2 while the 1D main breaker control cable continues along the east wall near the floor through the remaining portion of this zone and rises up to approximately six feet from the floor where it exits this zone. The ignition sources in this area are the Feedwater pumps and motors in the room. At its closest point, the conduits are separated from the nearest ignition source by a horizontal distance of approximately 10 feet. Although transient combustibles are controlled by administrative procedures, accumulation of transient combustibles along the east wall of the area near the junction box could potentially impact the cables. The majority of the conduits are routed such that it would be unlikely that a fire in this area would adversely impact the cables in the conduit. The “A” train of power is credited and available for this fire zone. The redundant cables are located outside of this fire zone. The OMA for utilizing fire water would be required if the above conduits are affected.

OMA Phase 1, #12 (Establish CRD Flow to Reactor)

Manually open V-15-237, throttle V-15-30 while monitoring flow at FI-225-2 and close V-15-52 to establish CRD flow to reactor due to the loss of instrument air to the CRD flow control valve. (Item #12 from Attachment 2 of the March 3, 2009 exemption request.)

- Refer to the loss of instrument air generic response in RAI-06.1 in Attachment 1 for additional information on this OMA.

OMA Phase 2, #18 (Provide Makeup Air to Isolation Condenser Valve V-11-36 Accumulator)

Provide makeup control air to the accumulator for V-11-36 for the Isolation Condenser makeup line due to the loss of instrument air. (Action #18 from Attachment 2 of the March 4, 2009 exemption request.)

- Refer to the loss of instrument air generic response in RAI-06.1 in Attachment 1 for additional information on this OMA.

Fire Hazards Analysis

As discussed in the response to RAI-02.4 in Attachment 1, the OCNGS FPP encompasses the concept of defense-in-depth. Administrative controls are in place as discussed in the response to RAI-02.3 in Attachment 1 to reduce the likelihood of fires from starting and to minimize the magnitude of a fire if one would occur.

The existing defense-in-depth features are listed above. In addition to these features, fire loading in this fire zone is low, consisting primarily of lube oil for the Feedwater Pumps.

The fire zone boundaries have been evaluated as acceptable as indicated above. If a fire were to occur in this fire zone, it would not be of significant size or duration due to the low combustible loading and the nature of the combustibles. Critical unprotected conduits are separated from the nearest ignition source by a horizontal distance of approximately 10 feet making a fire unlikely to damage the cables. Prompt extinguishment of the principal combustible will be accomplished by the plant fire brigade. Due to the fire detection installed in this fire zone and the low combustible loading, it is not expected that a total consuming fire would occur in this room, and therefore, most or all of the OMAs would not be required. Therefore, area-wide suppression does not significantly enhance the fire protection features of this area.

If damage to critical cables does occur, the OMAs for this fire zone vary from a 45-minute time limit to 300 minutes (refer to Reference 2 of Attachment 1, Section III.B for actual time limits). All OMAs resulting from a fire in this fire zone are independent of this fire zone and do not require an SCBA for access/egress.

This fire protection configuration achieves a level of protection commensurate with that intended by Appendix R, Section III.G.2.

**TB-FZ-11H Turbine Bldg. Demineralizer Tank and Steam Jet Air Ejector Area, Elev. 3'-6" & 23'-6"**

Fire Zone Description

Fire Zone TB-FZ-11H floor area (at elevation 23'-6") is approximately 4,366 sq. ft., while the area at elevation 3'-6" is approximately 3,944 sq. ft. The ceiling height is approximately 7'-0" for the low ceiling and approximately 19'-0" for the high ceiling.

This area has an administrative fire loading limit of less than 30 minutes as determined by the ASTM E119 time-temperature curve. This limit is tied to an NRC-accepted approach for dealing with fire zone boundaries (refer to the response to RAI-04.3 in Attachment 1 for more details). The major combustibles are cable insulation (approximately 23% of loading), ladders and other miscellaneous plastics (approximately 55% of loading) and miscellaneous ordinary combustibles.

Fire Protection Features

This fire zone is provided with the following fixed defense-in-depth features:

- Thermal detection,
- Hose stations,
- Portable fire extinguishers, and
- Fire zone boundaries (non-rated assemblies).

A new fire detector (thermal detection) has recently been installed in the stairwell area near the FSSD conduit located in Fire Zone TB-FZ-11H. The new fire detector layout for the stairwell area was designed, installed and acceptance tested in accordance with NFPA 72, 2007 Edition which was the latest edition of the standard at the time of design. The system alarms locally and in the control room.

The fire detection system for this area is maintained and surveillance tested in accordance with procedure 645.6.032,"Fire Detection and Thermal Detector Alarm Circuitry Test for Turbine Building & 4160V Switchgear Room."

Refer to the response to RAI-04.1 in Attachment 1 for a discussion on manual suppression capabilities.

Zone boundaries consist of reinforced concrete walls, floor and ceiling. The south and east walls are not adjacent to any other plant area. The north wall at elevation 23'-6" is adjacent to Fire Zone TB-FZ-11E and is sealed with noncombustible materials. The west wall at elevation 23'-6" is adjacent to Fire Zone TB-FZ-11G and is sealed with noncombustible materials. The west wall at elevation 3'-6" is adjacent to Fire Zone TB-FZ-11D while the north wall is adjacent to Fire Zone TB-FZ-11F with unsealed openings. The ceiling is adjacent to the outside and a small portion of Fire Zone TB-FZ-11E that has openings protected with an automatic closed head sprinkler system.

These boundaries have been evaluated as acceptable consistent with the criteria outlined in Attachment 1 in the response to RAI-04.3.

Evaluations and Deviations

Evaluations have been performed to establish the integrity of the unrated zone boundaries which make up the fire zone boundaries through the application of criteria for unrated zone boundaries (stipulated in the response to RAI-04.3 in Attachment 1). These evaluations will not impact the basis of the OMA exemption requests.

There are no other deviations from fire protection codes, standards, testing programs and listings by independent laboratories in this fire zone that impact this evaluation.

Exemptions

An exemption was granted in NRC SER dated June 25, 1990 from Appendix R, Section III.G.2 to provide a three-hour barrier in a pit area between redundant circuits. Train "A" electrical power system Cable 14-22 is a power circuit. (Note that the SER listed above states the incorrect number of 14-22. GPUN letter dated April 3, 1985 requested the exemption for cable 14-12, which is the correct number). This cable is located in a pit area. Based on the lack of exposed combustibles in the pull pit, the fact that the electrical cables for the Train "A" electrical power system circuit 14-12 are routed in conduits, and the fact that these conduits have a minimum cover of six inches of sand and the steel plate cover to the pull pit, provide protection at least equivalent to a three-hour fire rated barrier. Therefore, the provision of a three-hour rated fire barrier between the cables in the pull pit and the remainder of Fire Zone TB-FZ-11H would not provide significantly more fire protection than what is already available. Since a fire in this area would not impede the plant's capability for safe shutdown, this exemption does not impact the basis for the OMA exemption request.

Manual Actions

There are three (3) manual actions required for this fire zone.

OMA Phase 1, #7 (Align Fire Water to Isolation Condenser)

Manually open V-9-2099 and V-11-49 and close V-11-63 and V-11-41 to align the fire water system for make-up water to Isolation Condenser "B" since there is no power ("B" Train) available to the Condensate Transfer System. (Item #7 of Attachment 2 of the March 3, 2009 exemption request)

- Refer to the fire water valve generic OMA response to RAI-06.1 in Attachment 1 for additional information on this OMA.

  The loss of the "B" Train of power is attributed to the fact that the 125 VDC control power could be lost to the 1D 4160V Switchgear or the 1D 4160V main breaker could trip due to cables that traverse through this fire zone. The cables for the 125 VDC control power and the control circuit for the 1D main breaker are contained in separate conduits but are routed within approximately six inches of each other within this zone. The conduits enter this zone (stairwell area) on the west wall through a non-rated boundary at approximately five to six feet above the floor. The conduits then run in an easterly direction and turn north and exit the area through the north wall. The total length of conduits in this area is approximately 20 feet. There are no ignition sources in this portion of the fire zone. The combustible loading in this area of the fire zone is limited

since this is a stairway area. Although transient combustibles are controlled by administrative procedures, accumulation of transient combustibles directly under this conduit could potentially impact the cables. However, the placement of transient combustibles in this area is remote since it is a stairway and part of the floor area is blocked by a large ventilation duct. The "A" train of power is credited and available for this fire zone. The redundant cables are located outside of this fire zone. The OMA for utilizing fire water would be required if the above conduits are affected.

OMA Phase 1, #12 (Establish CRD Flow to Reactor)

Manually open V-15-237, throttle V-15-30 while monitoring flow at FI-225-2 and close V-15-52 to establish CRD flow to reactor due to the loss of instrument air to the CRD flow control valve. (Item #12 from Attachment 2 of the March 3, 2009 exemption request.)

- Refer to the loss of instrument air generic response in RAI-06.1 in Attachment 1 for additional information on this OMA.

OMA Phase 2, #18 (Provide Makeup Air to Isolation Condenser Valve V-11-36 Accumulator)

Provide makeup control air to the accumulator for V-11-36 for the Isolation Condenser makeup line due to the loss of instrument air. (Action #18 from Attachment 2 of the March 4, 2009 exemption request.)

- Refer to the loss of instrument air generic response in RAI-06.1 in Attachment 1 for additional information on this OMA.

Fire Hazards Analysis

As discussed in the response to RAI-02.4 in Attachment 1, the OCNGS FPP encompasses the concept of defense-in-depth. Administrative controls are in place as discussed in the response to RAI-02.3 in Attachment 1 to reduce the likelihood of fires from starting and to minimize the magnitude of a fire if one would occur.

This fire zone lacks ignition sources in the room where the FSSD conduits are routed. If a fire were to occur, it would not be of significant size or duration due to the low combustible loading and the nature of the combustibles. Prompt extinguishment of the fire will be accomplished by the plant fire brigade. Due to the partial fire detection installed in this fire zone and the low combustible loading, it is not expected that a total consuming fire would occur in this fire zone, and therefore, most or all of the OMAs would not be required. Therefore, area-wide detection and suppression do not significantly enhance the fire protection features of this area.

The fire zone boundaries have been evaluated as acceptable as indicated above. If damage to critical cables does occur, the OMAs for this fire zone vary from a 45-minute time limit to 300 minutes (refer to Reference 2 of Attachment 1, Section III.B for actual time limits). All OMAs resulting from a fire in this fire zone are independent of this fire zone and do not require an SCBA for access/egress.

This fire protection configuration achieves a level of protection commensurate with that intended by Appendix R, Section III.G.2.

**Office Building Roof, Turbine Building Roof and all remaining outside areas are classified as Yard Area**

Area Description

This is an outdoor area. There is no ceiling and no physical boundaries, and therefore, no fire rated or non-fire rated assemblies.

Combustible loading is not tracked in this area since it is an outside area.

Fire Protection Features

This area is provided with the following fixed defense-in-depth features:

- Yard hydrants, and
- Hose station inside Office Building.

There is no fire detection or fixed fire suppression systems. Manual suppression is provided by a hose station from the office building and by fire hydrants located throughout the yard area.

Refer to the response to RAI-04.1 in Attachment 1 for a discussion on manual suppression capabilities.

Evaluations and Deviations

There are no deviations from fire protection codes, standards and listings by independent laboratories in this fire area that could impact this evaluation.

Exemptions

There are no previously approved exemptions for this fire area that could impact this evaluation.

Manual Actions

There are two (2) manual actions required for this fire area.

OMA Phase 2, #9 (Establish CRD Flow to Reactor)

Manually open V-15-237, throttle V-15-30 while monitoring flow at FI-225-2 and close V-15-52 to establish CRD flow to Reactor due to the loss of instrument air to the CRD Flow Control Valve. (Action #9 from Attachment 2 of the March 4, 2009 exemption request.)

- Refer to the Loss of Instrument Air Generic Response in RAI-06.1 in Attachment 1 for additional information on this OMA.

OMA Phase 2, #17 (Provide Makeup Air to Isolation Condenser Valve V-11-34 Accumulator)

Provide makeup control air to the accumulator for V-11-34 for the Isolation Condenser makeup line due to the loss of instrument air. (Action #17 from Attachment 2 of the March 4, 2009 exemption request.)

- Refer to the loss of instrument air generic response in RAI-06.1 in Attachment 1 for additional information on this OMA.

Fire Hazards Analysis

As discussed in the response to RAI-02.4 in Attachment 1, the OCNGS FPP encompasses the concept of defense-in-depth. Administrative controls are in place as discussed in the response to RAI-02.3 in Attachment 1 to reduce the likelihood of fires from starting and to minimize the magnitude of a fire if one would occur.

There are no physical fire area boundaries, and therefore, no fire rated or non-fire rated assemblies exist in this fire area. Combustible loading is spread throughout the yard but is not quantified because there is nothing to contain the heat release in the event of a fire. There is constant observation of the site (yard area), both by humans and electronic devices (cameras), so that if a fire would occur, it would be detected and appropriate actions taken without significant delay. Also, significant hazards in this area are protected by a suppression system (e.g., SBO transformer, etc.). Fire protection features in this open area are considered the most practical given the nature of the area and the fire hazards. Therefore, area-wide detection and suppression do not significantly enhance the fire protection features of this area.

The OMAs are needed because instrument air tubing is assumed lost and not protected by a three-hour barrier. These OMAs are not required for a minimum of three hours and 24 minutes. Since there is no detection in this area and the fact that the OMAs occur due to the loss of instrument air, there are numerous other indications (e.g., MSIV closure, control rods drifting in, Instrument air pressure indication and alarms, etc.) that will initiate these OMAs. Also, the loss of instrument air procedure, ABN-35, indicates that these OMAs are necessary.

The OMAs for this fire zone vary from a 204-minute time limit to 300 minutes (refer to Reference 2 of Attachment 1, Section III.B for actual time limits). All of the OMAs discussed above that are required as a result of a fire in this fire zone are independent of this fire zone and do not require an SCBA for access/egress.

This fire protection configuration achieves a level of protection commensurate with that intended by Appendix R, Section III.G.2.

# ATTACHMENT 3

## 10 CFR 50.12 Exemption Request

## Oyster Creek Nuclear Generating Station
## NRC Docket No. 50-219

## Request for Exemption from 10 CFR 50, Appendix R, Section III.G, “Fire Protection of Safe Shutdown Capability"

## Withdrawal of Certain Operator Manual Actions from the Exemption Requests

## WITHDRAWAL OF CERTAIN OPERATOR MANUAL ACTIONS FROM THE EXEMPTION REQUESTS

The following requests for exemptions to allow use of operator manual actions (OMAs) (Attachment 2 of Reference 1 and Attachment 2 of Reference 2) are hereby withdrawn based on re-evaluation of the OMAs in accordance with the guidance provided in NEI 00-01, Revision 2 (Reference 3), NRC Regulatory Guide 1.189, Revision 2 (Reference 4) and other regulatory guidance (Reference 5).

Subsequent to the Reference 1 and 2 submittals, the NRC issued regulatory guidance clarifying when an exemption from Appendix R, Section III.G.2 is required. Specifically in October 2009, Regulatory Guide 1.189, Revision 2 was issued. RG 1.189, Rev. 2, Section 5.3.1.3 states, "When one of the redundant safe-shutdown trains in a fire area is maintained free of fire damage by one of the means specified in Regulatory Position 5.3.1.1, then the use of OMAs may be credited with mitigating fire-induced operation or maloperation of components that are not part of the protected success path." The RG also endorses Appendix H of NEI 00-01, Rev. 2, which provides additional guidance for this classification.

### LIST OF OPERATOR MANUAL ACTIONS BEING WITHDRAWN FROM THE MARCH 3, 2009 (PHASE 1) EXEMPTION REQUEST

(Note the numbering corresponds to original numbering in Attachment 2 of Reference 1)

| Item | Equipment | Manual Action Required | Fire Areas/Zones being withdrawn |
|---|---|---|---|
| 5 | LSP-DG2 (withdrawal of OMA for only the areas/zones listed) | Manual actions for Hot Shutdown are required to isolate damaged cables and reestablish control locally for Emergency Diesel Generator #2 (EDG2). Use Local Shutdown Panels to control equipment as follows:<br><br>LSP-DG2, EDG2 and its Switchgear (Operate transfer Switches (3 total) to "Alternate" and operate Control Switch on Diesel Panel to start diesel) | TB-FZ-11B |
| 7 | V-9-2099 (formerly V-11-44), V-11-49, V-11-63, V-11-41 (withdrawal of OMA for only the areas/zones listed) | Manual actions for Hot Shutdown are required to align the Fire System water to the Isolation Condenser shell side for makeup. Manual valves V-9-2099 (formerly V-11-44) and V-11-49 are opened, and manual valves V-11-63 and V-11-41 are closed to provide makeup. This action is required because there is no power ("B" Train) available to the Condensate Transfer System. | TB-FA-3B, OB-FZ-10A, OB-FZ-10B |
| 10 | 125V DC Distribution Center B and Static Charger | Use static charger instead of MG Set "B" due to damaged equipment and cables by aligning breakers at Distribution Center B. | OB-FZ-6A |

| Item | Equipment | Manual Action Required | Fire Areas/Zones being withdrawn |
|---|---|---|---|
| 12 | V-15-30, V-15-52, V-15-237, FI-225-2 (withdrawal of OMA for only the areas/zones listed) | Manually open V-15-237, throttle V-15-30 using local flow indicator (FI-225-2) and close V-15-52 to establish CRD flow to Reactor due to the loss of instrument air to the CRD Flow Control Valve | RB-FZ-1F1, RB-FZ-1F2, RB-FZ-1F4, RB-FZ-1H, TB-FA-3B, OB-FZ-10B, TB-FZ-11A, TB-FZ-11G, AB-FA-13, DG-FA-15, NR-FA-20, OG-FA-21, OR-FA-19 |
| 14 | USS 1B3 | Provide power to control room A/C unit from USS 1B1 by racking in and closing tiebreaker US1T between USS 1B1 and 1A1. Later changed to crosstie USS 1A3 & 1B3 to restore ventilation to the control room. | OB-FZ-8A, OB-FZ-8B, OB-FZ-8C |
| 15 | 4160V Switchgear. 1A Breaker A8 and 1B Breakers B2 and B10 | Trip Reactor Feedwater Pumps 1A (Breaker A8), 1B and 1C (Breakers B2 and B10) and lockout using 69 Switch. This manual action is being performed to prevent a reactor overfill condition due to cable damage and/or loss of control power to the normal feedwater trip circuit. | TB-FA-26, TB-FZ-11B, TB-FZ-11C, TB-FZ-11D, TB-FZ-11E, OB-FZ-8C |
| 17 | 4160V Switchgear 1C Breakers C0 and C5 | Trip Breakers for Main Core Spray Pumps NZ01A and NZ01D and lockout using 69 switch at 4160V Switchgear 1C. This manual action is being performed to prevent a reactor overfill condition due to cable damage and/or loss of control power to the normal Core Spray trip circuit. | OB-FZ-6A, OB-FZ-8C, TB-FA-26, TB-FZ-11B, TB-FZ-11C, TB-FZ-11D, TB-FZ-11E, TB-FZ-11G |
| 18 | 4160V Switchgear 1D Breakers D4 and D9 | Trip Breakers for Main Core Spray Pumps NZ01B and NZ01C and lockout using 69 switch at 4160V Switchgear 1D. This manual action is being performed to prevent a reactor overfill condition due to cable damage and/or loss of control power to the normal Core Spray trip circuit. | TB-FA-3A, OB-FZ-6A, OB-FZ-8A, OB-FZ-8B, OB-FZ-8C, TB-FA-26, TB-FZ-11B, TB-FZ-11C, TB-FZ-11D, TB-FZ-11E, TB-FZ-11G |

| Item | Equipment | Manual Action Required | Fire Areas/Zones being withdrawn |
|---|---|---|---|
| 19 | USS-1A2 Breakers 036B & 036C | Trip Breakers for Core Spray booster pumps NZ03A and NZ03D at 480V USS 1A2 and remove close fuses. This manual action is being performed to prevent a reactor overfill condition due to cable damage and/or loss of control power to the normal Core Spray trip circuit. | OB-FZ-8C, TB-FZ-11C, TB-FZ-11D, TB-FZ-11E, TB-FA-26, TB-FZ-11B |
| 20 | USS-1B2 Breakers 046B & 046C | Trip Breakers for Core Spray booster pumps NZ03B and NZ03C at 480V USS 1B2 and remove close fuses. This manual action is being performed to prevent a reactor overfill condition due to cable damage and/or loss of control power to the normal Core Spray trip circuit. | OB-FZ-6A, OB-FZ-8A, OB-FZ-8B, OB-FZ-8C |

**OMA #5** (being withdrawn for one fire zone; still requesting an exemption for two fire areas/zones) is being withdrawn since the emergency diesel #2 is not affected by a fire in this zone and is capable of being controlled from the control room.

**OMA #7** (being withdrawn for three fire areas/zones; still requesting an exemption for seven fire areas/zones) is an example of an action that is no longer required due to utilizing other Safe Shutdown Success Path structures, systems or components (SSCs) for these particular fire areas/zones or the fact that the “B” train of power is available so the condensate transfer pump will be utilized. Electromatic Relief Valve (EMRV)/Core Spray will be designated as the Safe Shutdown Success Path SSCs instead of utilizing an Isolation Condenser and CRD pump. No OMAs are required for Safe Shutdown Success Path SSCs when the EMRV/Core Spray Path is utilized.

**OMA #10** is being withdrawn since the static charger is normally aligned to the “B” Battery and therefore the failure of the “B” MG Set will not require an OMA to be performed since for Appendix R, abnormal line-ups do not have to be considered.

**OMA #12** (being withdrawn for 13 fire areas/zones; still requesting an exemption for 20 fire areas/zones) is an example of an action that is no longer required due to utilizing another Safe Shutdown Success Path SSCs for these particular fire areas/zones. EMRV/Core Spray will be designated as the Safe Shutdown Success Path SSCs instead of utilizing an Isolation Condenser and CRD pump. No OMAs are required for Safe Shutdown Success Path SSCs when the EMRV/Core Spray Path is utilized.

**OMAs #14, #15, #17, #18, #19, and #20** are all examples of actions that result from fire-induced failures of important to safe shutdown components, as described in RG 1.189, Section 5.3.1.5, “Examples of SSCs Important to Safe Shutdown.” One specific example of SSCs important to safe shutdown as depicted in Section 5.3.1.5 is, "Spurious start of equipment not relied on for a safe-shutdown success path, which could cause overfill conditions." This is the exact concern for OMAs #15, #17, #18, #19, and #20, since the actions are being taken to mitigate reactor pressure vessel (RPV) overfill due to cable damage and/or loss of control power to the normal trip circuit. While these

actions are still shown to be feasible and reliable, an exemption from Appendix R, Section III.G.2 requirements is not required since one Isolation Condenser and CRD pump are the Safe Shutdown Success Path SSCs for these particular fire areas/zones. Another specific example of SSCs important to safe shutdown as depicted in Section 5.3.1.5 is, "HVAC systems and components required to provide cooling to success path components to the extent that cooling is required for post fire safe shutdown." This is the exact concern for OMA #14 since the crosstie of USS 1A3 and 1B3 is being performed to restore ventilation to the control room. While these actions are still shown to be feasible and reliable, an exemption from Appendix R, Section III.G.2 requirements is not required since one Isolation Condenser and CRD pump are the Safe Shutdown Success Path SSCs for these particular fire areas/zones.

**LIST OF OPERATOR MANUAL ACTIONS BEING WITHDRAWN FROM THE MARCH 4, 2009 (PHASE 2) EXEMPTION REQUEST**

(Note the numbering corresponds to original numbering in Attachment 2 of Reference 2)

| Action | Equipment | Action Required | Fire Areas/Zones being withdrawn |
|---|---|---|---|
| 4 | V-2-90 | Close V-2-90 by opening breaker at PDP-734-023 and verify closed to prevent drain down of CST to hotwell due to spurious signal on hotwell level loop. | OB-FZ-6A, OB-FZ-8C, TB-FZ-11E, TB-FZ-11F |
| 5 | 4160V SWGR DG-1 (bkr DG-1) | Trip Breaker (Pull-To-Lock) for DG-1 and place EDG1 mode switch in stop to ensure Main Core Spray Pumps are tripped. | TB-FA-3A |
| 6 | 4160V SWGR DG-2 (bkr DG-2) | Trip Breaker (Pull-To-Lock) for DG-2 and place EDG2 mode switch in stop to ensure Main Core Spray Pumps are tripped. | TB-FA-3B |
| 10 | USS-1B2 (Bkrs 042A & 043A) | Trip breakers and remove close fuses for Containment Spray Pumps to protect pumps due to spurious start signal. | OB-FZ-6A |
| 11 | MCC 1A21 (bkr C02) | Open breaker for V-20-21 to ensure V-20-21 remains open after manually repositioning. | RB-FZ-1D |
| 12 | V-20-21 | Open Valve V-20-21 due to control circuit damage | RB-FZ-1D |
| 13 | MCC 1B21A (bkr D02) | Open breaker for V-20-4 | RB-FZ-1F3 |
| 14 | "B" 480V SWGR Room | 1) Monitor "B" 480V Switchgear Room and open doors as necessary<br>2) Provide temporary ventilation for "B" 480V Switchgear Room | OB-FZ-10A |
| 15 | DM-56-15, DM-56-16 DM-56-17 | Manually manipulate dampers to restore ventilation to the "A" 480V Switchgear Room. | OB-FZ-6B |

| Action | Equipment | Action Required | Fire Areas/Zones being withdrawn |
|---|---|---|---|
| 16 | V-9-11<br>V-9-9<br>V-11-247 | Manually manipulate valves to align firewater to the CST to makeup (contingency action). | OB-FZ-6A,<br>TB-FZ-11E |
| 17 | V-11-34 (withdrawal of OMA for only the areas/zones listed) | Connect H.P. air cylinder to drain port of accumulator to recharge | RB-FZ-1F1,<br>RB-FZ-1F2,<br>RB-FZ-1F4,<br>RB-FZ-1H,<br>AB-FA-13,<br>NR-FA-20,<br>OG FA-21,<br>OR-FA-19 |
| 18 | V-11-36 (withdrawal of OMA for only the areas/zones listed) | Connect H.P. air cylinder to drain port of accumulator to recharge | DG-FA-15,<br>OB-FZ-10B,<br>TB-FA-3B,<br>TB-FZ-11A,<br>TB-FZ-11G |

**OMAs #4, #5, #6, #10, #11, #12, #14, #15 and #16** are all examples of actions that result from fire-induced failures of important to safe shutdown components, as described in Section 5.3.1.5, “Examples of SSCs Important to Safe Shutdown." One specific example of SSCs important to safe shutdown as depicted in Section 5.3.1.5 is, "Spurious start of equipment not relied on for a safe-shutdown success path, which could cause overfill conditions." This is the exact concern for OMAs #5 and #6 since the actions are being taken to mitigate reactor pressure vessel (RPV) overfill due to cable damage and/or loss of control power to the normal trip circuit. While these actions are still shown to be feasible and reliable, an exemption from Appendix R III.G.2 requirements is not required since one Isolation Condenser and CRD pump are the Safe Shutdown Success Path SSCs for these particular fire areas/zones.

Another specific example of SSCs important to safe shutdown as depicted in Section 5.3.1.5 is, "HVAC systems and components required to provide cooling to success path components to the extent that cooling is required for post fire safe shutdown." This is the exact concern for OMAs #14 and #15 since the OMAs are being performed to restore ventilation to the “A” and “B” 480V Rooms. While these actions are still shown to be feasible and reliable, an exemption from Appendix R, Section III.G.2 requirements is not required since one Isolation Condenser and CRD pump are the Safe Shutdown Success Path SSCs for these particular fire areas/zones.

A third specific example of SSCs important to safe shutdown as depicted in Section 5.3.1.5 is, “Power-operated relief valves and safety relief valves not part of safe-shutdown success path.” This is the exact concern for OMAs #11 and #12 since the actions are being taken to mitigate a spuriously opened EMRV due to cable damage. While these actions are still shown to be feasible and reliable, an exemption from Appendix R, Section III.G.2 requirements is not required since one Isolation Condenser and CRD pump are the Safe Shutdown Success Path SSCs for this particular fire zone.

A fourth specific example of SSCs important to safe shutdown as depicted in Section 5.3.1.5 is, “Success path supply tank spurious drain or bypass.” This is the exact concern for OMA #4 since the action is being taken to mitigate a spuriously opened valve that drains the Condensate Storage Tank

(CST) to the hotwell. OMA #16 is a contingency action to make-up to the CST if OMA #4 is not completed in time. It is acceptable to utilize OMAs to deal with actions required for SSCs important to safe shutdown. While these actions are still shown to be feasible and reliable, an exemption from Appendix R, Section III.G.2 requirements is not required since one Isolation Condenser and CRD pump are the Safe Shutdown Success Path SSCs for these particular fire areas/zones.

**OMA #10** is being withdrawn since the Containment Spray Pump is only required for cold shutdown (CSD) and the OMA was conservatively being performed to ensure that at least one pump would be available for CSD. RG 1.189, Section 5.2 indicates that for normal safe shutdown, redundant systems necessary to achieve cold shutdown may be damaged by a single fire. Fire damage must be limited so that at least one success path can be repaired or made operable within 72 hours using onsite capability or within the time period required to achieve a safe-shutdown condition, if less than 72 hours. It should also be noted that for damage to occur to the pump, multiple spurious actuations would have to occur. While these actions are still shown to be feasible and reliable, an exemption from Appendix R, Section III.G.2 requirements is not required since OMAs are allowed for CSD.

**OMA #13** is being withdrawn since there are no cables (control or power) associated with V-20-4 that are affected by a fire in Fire Zone RB-FZ-1F3 causing it to spuriously operate. Therefore, the valve can be manually operated due to the potential loss of power to this valve without the concern of this valve spuriously re-positioning once it is in its correct position. This OMA is not required.

**OMA #17** (being withdrawn for eight fire areas/zones; still requesting an exemption for 13 fire areas/zones) is an example of an action that is no longer required due to utilizing other Safe Shutdown Success Path SSCs for these particular fire areas/zones. EMRV/Core Spray will be designated as the Safe Shutdown Success Path SSCs instead of utilizing an Isolation Condenser and CRD pump. No OMAs are required for Safe Shutdown Success Path SSCs when the EMRV/Core Spray Path is utilized.

**OMA #18** (being withdrawn for five fire areas/zones; still requesting an exemption for nine fire areas/zones) is an example of an action that is no longer required due to utilizing other Safe Shutdown Success Path SSCs for these particular fire areas/zones. EMRV/Core Spray will be designated as the Safe Shutdown Success Path SSCs instead of utilizing an Isolation Condenser and CRD pump. No OMAs are required for Safe Shutdown Success Path SSCs when the EMRV/Core Spray Path is utilized.

**SUMMARY:**
Based on the withdrawal of the OMAs listed above and based on utilizing other shutdown paths that eliminated fire areas/zones from requested OMAs, the fire areas/zones of origin that require OMAs in the March 3, 2009 and March 4, 2009 exemption requests have been reduced. The following fire areas/zones will no longer be considered as part of these exemption requests: RB-FZ-1F1, RB-FZ-1F2, RB-FZ-1F4, RB-FZ-1H, TB-FA-3B, OB-FZ-10B, TB-FZ-11A, TB-FZ-11G, AB-FA-13, DG-FA-15, NR-FA-20, OG-FA-21, OR-FA-19.

**REFERENCES:**

1. Letter from P. B. Cowan, Exelon Generation Company, LLC, to U.S. Nuclear Regulatory Commission, “Request for Exemption from 10 CFR 50, Appendix R, Section III.G, ‘Fire Protection of Safe Shutdown Capability’ (Phase 1),” dated March 3, 2009.

2. Letter from P. B. Cowan, Exelon Generation Company, LLC, to U.S. Nuclear Regulatory Commission, “Request for Exemption from 10 CFR 50, Appendix R, Section III.G, ‘Fire Protection of Safe Shutdown Capability’ (Phase 2),” dated March 4, 2009.

3. NEI 00-01, Revision 2, “Guidance for Post Fire Safe Shutdown circuit Analysis,” dated May 2009.

4. Regulatory Guide 1.189, Revision 2, “Fire Protection for Nuclear Power Plants,” dated October 2009.

5. Memorandum from Alexander Klein, U.S. Nuclear Regulatory Commission, “Close-out of National Fire Protection Association Standard 805 Frequently Asked Question 06-0012, On Determining Manual Actions That Require a Change Evaluation during Transition,” dated January 24, 2008.

# ATTACHMENT 4

## 10 CFR 50.12 Exemption Request

## Oyster Creek Nuclear Generating Station
## NRC Docket No. 50-219

## Request for Exemption from 10 CFR 50, Appendix R, Section III.G, “Fire Protection of Safe Shutdown Capability"

## Tabulation of Ignition Sources for Each Fire Area/Zone

## Tabulation of Ignition Sources for Each Fire Area/Zone

This attachment contains the list of potential ignition sources in the fire areas/fire zones within the scope of this RAI. The list of potential ignition sources was developed from the OCNGS Fire Probabilistic Risk Assessment Plant Partitioning and Fire Ignition Frequency Notebook. The methodology used in this report is consistent with the methodology in NUREG/CR-6850. This attachment list was obtained from the individual physical analysis unit ignition source data sheets and walk down sheets contained within that report.

| Fire Zone | Component ID | Component Description | Component Type (HEAF = High Energy Arcing Fault) |
|---|---|---|---|
| CW-FA-14 | FAP 1-1 | Circulating Water Motor Field Application Control Panel | Control Panel |
| CW-FA-14 | FAP 1-2 | Circulating Water Motor Field Application Control Panel | Control Panel |
| CW-FA-14 | FAP 1-3 | Circulating Water Motor Field Application Control Panel | Control Panel |
| CW-FA-14 | FAP 1-4 | Circulating Water Motor Field Application Control Panel | Control Panel |
| CW-FA-14 | ER-42 | LP Screen Wash Pumps Control Panel | Control Panel |
| CW-FA-14 | MCC 1A31 | Motor Control Center | 480V MCC |
| CW-FA-14 | MCC 1B31 | Motor Control Center | 480V MCC |
| CW-FA-14 | P-03-001A | Service Water Pump | 480V Motor |
| CW-FA-14 | P-03-001B | Service Water Pump | 480V Motor |
| CW-FA-14 | P-03-002A | Circulating Water Pump | 4160V Motor |
| CW-FA-14 | P-03-002B | Circulating Water Pump | 4160V Motor |
| CW-FA-14 | P-03-002C | Circulating Water Pump | 4160V Motor |
| CW-FA-14 | P-03-002D | Circulating Water Pump | 4160V Motor |
| CW-FA-14 | P-03-003A | Emergency Service Water Pump | 4160V Motor |
| CW-FA-14 | P-03-003B | Emergency Service Water Pump | 4160V Motor |
| CW-FA-14 | P-03-003C | Emergency Service Water Pump | 4160V Motor |
| CW-FA-14 | P-03-003D | Emergency Service Water Pump | 4160V Motor |
| CW-FA-14 | P-03-005A | HP Screen Wash Pump | 480V Motor |
| CW-FA-14 | P-03-005B | HP Screen Wash Pump | 480V Motor |

## Tabulation of Ignition Sources for Each Fire Area/Zone

| Fire Zone | Component ID | Component Description | Component Type (HEAF = High Energy Arcing Fault) |
|---|---|---|---|
| CW-FA-14 | P-03-006A | LP Screen Wash Pump | 480V Motor |
| CW-FA-14 | P-03-006B | LP Screen Wash Pump | 480V Motor |
| CW-FA-14 | SW-P-001A | New Radwaste Service Water Pump | 480V Motor |
| CW-FA-14 | SW-P-001B | New Radwaste Service Water Pump | 480V Motor |
| CW-FA-14 | USS 1A3 | Unit Substation | 480V Switchgear (HEAF – 3 stacks) |
| CW-FA-14 | USS 1A3 XFMR | Unit Substation Transformer | Load Center Transformer (4160V/480V) |
| CW-FA-14 | USS 1B3 | Unit Substation | 480V Switchgear (HEAF – 3 stacks) |
| CW-FA-14 | USS 1B3 XFMR | Unit Substation Transformer | Load Center Transformer (4160V/480V) |
| OB-FA-9 | None | None | None |
| OB-FZ-10A | XMR-651-025 | Regulating Transformer | 166V/208V Transformer |
| OB-FZ-6A | MCC 1A21 | Motor Control Center | 480V MCC |
| OB-FZ-6A | MCC 1A23 | Motor Control Center | 480V MCC |
| OB-FZ-6A | MCC 1B23 | Motor Control Center | 480V MCC |
| OB-FZ-6A | ER-18A | Electrical Panel | Control Panel |
| OB-FZ-6A | ER-18B | Electrical Panel | Control Panel |
| OB-FZ-6A | ER-8A | Electrical Panel | Control Panel |
| OB-FZ-6A | ER-8B | Electrical Panel | Control Panel |
| OB-FZ-6A | USS 1A2 | Unit Substation | 480V Switchgear (HEAF – 6 stacks) |
| OB-FZ-6A | USS 1A2 XFMR | Unit Substation Transformer | Load Center Transformer (4160V/480V) |
| OB-FZ-6A | VACP-1 | Transformer | 480/208/120V Transformer |
| OB-FZ-6A | VMCC 1A2 | Motor Control Center | 480V MCC |

## Tabulation of Ignition Sources for Each Fire Area/Zone

| Fire Zone | Component ID | Component Description | Component Type (HEAF = High Energy Arcing Fault) |
|---|---|---|---|
| OB-FZ-6A | VMCC 1B2 | Motor Control Center | 480V MCC |
| OB-FZ-6A | DP-C XFMR C | Transformer | 480/208/120V Transformer |
| OB-FZ-6A | DP-D XFMR D | Transformer | 480/208/120V Transformer |
| OB-FZ-6A | XFMR IT-4A | Transformer | 480/208/120V Transformer |
| OB-FZ-6A | XFMR IT-4B | Transformer | 480/208/120V Transformer |
| OB-FZ-6B | MCC 1B21 | Motor Control Center | 480V MCC |
| OB-FZ-6B | RSP | Remote Shutdown panel | Control Panel |
| OB-FZ-6B | USS 1B2 | Unit Substation | 480V Switchgear (HEAF – 6 stacks) |
| OB-FZ-6B | USS 1B2 XFMR | Unit Substation Transformer | Load Center Transformer (4160V/480V) |
| OB-FZ-8AB | FN 56-12 | Office Building Fan | 480V Fan |
| OB-FZ-8AB | FN 56-13 | Office Building Fan | 480V Fan |
| OB-FZ-8AB | FN-56-4 | Switchgear Room Ventilation Supply Fan | 480V Motor |
| OB-FZ-8AB | FN-56-8 | Switchgear Room Ventilation Exhaust Fan | 480V Motor |
| OB-FZ-8AB | NG-01A | Motor Generator | 4160V Motor |
| OB-FZ-8AB | NG-01B | Motor Generator | 4160V Motor |
| OB-FZ-8AB | NG-01C | Motor Generator | 4160V Motor |
| OB-FZ-8AB | NG-01D | Motor Generator | 4160V Motor |
| OB-FZ-8AB | NG-01E | Motor Generator | 4160V Motor |
| OB-FZ-8AB | Switchgear Room A Ventilation | Switchgear Room Ventilation Exhaust Fan | 480V Motor |
| OB-FZ-8AB | RY21 A-E | Generator Field Breakers | Low Voltage Switchgear (HEAF - 5 stacks) |
| OB-FZ-8AB | RY20 A-E | Generator Potential Transformers (PT) / Control Panel | 2400V/240V PT / Control Panel (HEAF - 5 stacks) |

## Tabulation of Ignition Sources for Each Fire Area/Zone

| Fire Zone | Component ID | Component Description | Component Type (HEAF = High Energy Arcing Fault) |
|---|---|---|---|
| OB-FZ-8AB | RY22A-E | A-E MG-Set Control Panel | Control Panel |
| OB-FZ-8AB | SF-1-19 | Ventilation Supply Fan | 480V Fan |
| OB-FZ-8C | Rotary Inverter\AC | Rotary Inverter AC Motor for Continuous Instrument Panel 3 (CIP-3) 120 VAC Supply | 480V Motor |
| OB-FZ-8C | Rotary Inverter\DC | Rotary Inverter Dc Motor for CIP-3 120 VAC Supply | 125 VDC Motor |
| OB-FZ-8C | Battery Bank A | Main Station Battery | 125 VDC Batteries |
| OB-FZ-8C | Battery Bank B | Main Station Battery | 125 VDC Batteries |
| OB-FZ-8C | CIP-3 | Rotary Inverter Control Panel | Control Panel |
| OB-FZ-8C | DC-A 125V | 125V DC Distribution Center A | 125 VDC Distribution Panel |
| OB-FZ-8C | DC-B 125V | 125V DC Distribution Center B | 125 VDC Distribution Panel |
| OB-FZ-8C | INV-735-001 | 120 VAC Inverter | 125 VDC/120 VAC Inverter |
| OB-FZ-8C | MG Set A (Generator) | 125V Station DC System MG SET A | 125 VDC Generator |
| OB-FZ-8C | MG Set A (Motor) | 125V Station DC System MG SET A | 480V Motor |
| OB-FZ-8C | MG Set B (Generator) | 125V Station DC System MG SET B | 125 VDC Generator |
| OB-FZ-8C | MG Set B (Motor) | 125V Station DC System MG SET B | 480V Motor |
| OB-FZ-8C | Static Battery Charger | Static Battery Charger | 125 VDC Battery Charger |
| RB-FZ-1D | MCC 1B21 | Motor Control Center | 480V MCC |
| RB-FZ-1D | P-05-01 | RBCCW Pump | 480V Motor |
| RB-FZ-1D | P-05-02 | RBCCW Pump | 480V Motor |
| RB-FZ-1D | P-16-01A | Clean Up Recirculation Pump | 4160V Motor |
| RB-FZ-1D | P-16-01B | Clean Up Recirculation Pump | 4160V Motor |
| RB-FZ-1D | P-16-02 | Clean Up Aux Pump | 480V Motor |
| RB-FZ-1D | P-16-04 | Clean Up Filter Sludge Pump | 480V Motor |
| RB-FZ-1D | P-20-02A | Core Spray Booster Pump | 480V Motor |
| RB-FZ-1D | P-20-02C | Core Spray Booster Pump | 480V Motor |

## Tabulation of Ignition Sources for Each Fire Area/Zone

| Fire Zone | Component ID | Component Description | Component Type (HEAF = High Energy Arcing Fault) |
|---|---|---|---|
| RB-FZ-1D | P-23-001 | Nitrogen Skid Pumps | 480V Compressor |
| RB-FZ-1D | P-23-002 | Nitrogen Skid Pumps | 480V Compressor |
| RB-FZ-1D | P-29-01 | RB Chromate Chemical Feed Pump | 1/4 HP Motor |
| RB-FZ-1D | PNL-663-2 | Security Cabinet | Control Panel |
| RB-FZ-1D | Electrical Panel | MSIV Vibration Panel | Control Panel |
| RB-FZ-1D | LP/MP-XFMR | Transformer | 480V/208V/120V Transformer |
| RB-FZ-1D | FN-28-16 | Fan | 480V Fan |
| RB-FZ-1E | MCC 1A21A | Motor Control Center | 480V MCC |
| RB-FZ-1E | MCC 1A21B | Motor Control Center | 480V MCC |
| RB-FZ-1E | MCC 1AB2 | Motor Control Center | 480V MCC |
| RB-FZ-1E | MCC 1B21A | Motor Control Center | 480V MCC |
| RB-FZ-1E | MCC 1B21B | Motor Control Center | 480V MCC |
| RB-FZ-1E | MCC DC-1 | Motor Control Center | 125 VDC MCC |
| RB-FZ-1E | ER-6A | HCU HI-LOW Pressure | Control Panel |
| RB-FZ-1E | ER-6B | HCU HI-LOW Pressure | Control Panel |
| RB-FZ-1E | M-888-13 | Overhead Crane | 480V Motor |
| RB-FZ-1E | P-20-02B | Core Spray Booster Pump | 480V Motor |
| RB-FZ-1E | P-20-02D | Core Spray Booster Pump | 480V Motor |
| RB-FZ-1E | P-22-02 | Laundry Drain Pump | 480V Motor |
| RB-FZ-1E | P-22-03 | Lab Drain Pump | 480V Motor |
| RB-FZ-1E | PNL-663-5 | Electrical Panel | Control Panel |
| RB-FZ-1E | TM-SF-1-2 | Ventilation Supply Fan | 480V Fan |
| RB-FZ-1E | TM-SF-3 | Ventilation Supply Fan | 480V Fan |
| RB-FZ-1E | TM-SF-4 | Ventilation Supply Fan | 480V Fan |
| RB-FZ-1E | TM-SF-5 | Ventilation Supply Fan | 480V Fan |
| RB-FZ-1F3 | P-15-01A | CRD Pump | 480V Motor |

## Tabulation of Ignition Sources for Each Fire Area/Zone

| Fire Zone | Component ID | Component Description | Component Type (HEAF = High Energy Arcing Fault) |
|---|---|---|---|
| RB-FZ-1F3 | P-15-01B | CRD Pump | 480V Motor |
| RB-FZ-1F3 | P-20-01A | Core Spray Pump | 4160V Motor |
| RB-FZ-1F3 | P-20-01C | Core Spray Pump | 4160V Motor |
| RB-FZ-1F3 | RF-1-8 | RB Air Handling Unit | 480V Air Handling Unit |
| RB-FZ-1G | P-17-01 | Reactor Shutdown Cooling Pump | 480V Motor |
| RB-FZ-1G | P-17-02 | Reactor Shutdown Cooling Pump | 480V Motor |
| RB-FZ-1G | P-17-03 | Reactor Shutdown Cooling Pump | 480V Motor |
| TB-FA-26 | H-59-5 | Heater | 480V Heater |
| TB-FA-26 | WCN 17 | Battery Banks | 125 VDC Batteries |
| TB-FA-3A | 1C-4160V | 4160V Emergency Switchgear 1C | Medium Voltage Switchgear (HEAF – 9 cubicles) |
| TB-FZ-11B | MCC 1A12 | Motor Control Center | 480V MCC |
| TB-FZ-11B | MCC 1A12A | Motor Control Center | 480V MCC |
| TB-FZ-11B | MCC 1B12 | Motor Control Center | 480V MCC |
| TB-FZ-11B | MCC 1B12A | Motor Control Center | 480V MCC |
| TB-FZ-11B | P-08-01 | Blower | 480V Motor |
| TB-FZ-11B | P-08-03 | Lube Oil Circulating Pump | 480V Motor |
| TB-FZ-11B | P-08-04 | Lube Oil Transfer Pump | 480V Motor |
| TB-FZ-11B | P-08-05 | DC Emergency Oil Pump | 125 VDC Motor |
| TB-FZ-11B | P-08-06 | Turning Gear Oil Pump | 480V Motor |
| TB-FZ-11B | P-08-07A | Aux Oil Pump | 480V Motor |
| TB-FZ-11B | P-08-07B | Aux Oil Pump | 480V Motor |
| TB-FZ-11B | P-08-09 | Lube Oil Centrifuge | 480V Motor |
| TB-FZ-11B | P-313-1 | High Pressure Lift Pump #1 | 480V Motor |
| TB-FZ-11B | P-313-2 | High Pressure Lift Pump #2 | 480V Motor |
| TB-FZ-11B | P-313-3 | High Pressure Lift Pump #3 | 480V Motor |

## Tabulation of Ignition Sources for Each Fire Area/Zone

| Fire Zone | Component ID | Component Description | Component Type (HEAF = High Energy Arcing Fault) |
|---|---|---|---|
| TB-FZ-11B | P-313-4 | High Pressure Lift Pump #4 | 480V Motor |
| TB-FZ-11B | P-313-5 | High Pressure Lift Pump #5 | 480V Motor |
| TB-FZ-11B | P-313-6 | High Pressure Lift Pump #6 | 480V Motor |
| TB-FZ-11B | SF-1-10 | Intake Heater and Blower | 480V Motor |
| TB-FZ-11B | SF-1-11 | Intake Heater and Blower | 480V Motor |
| TB-FZ-11B | SF-1-8 | Intake Heater and Blower | 480V Motor |
| TB-FZ-11B | SF-1-9 | Intake Heater and Blower | 480V Motor |
| TB-FZ-11B | XMR-734-026 | Distribution Transformer | 480V/208V/120V Transformer |
| TB-FZ-11C | 1A-4160V | 4160V Switchgear 1A | Medium Voltage Switchgear (HEAF – 12 cubicles) |
| TB-FZ-11C | 1B-4160V | 4160V Switchgear 1B | Medium Voltage Switchgear (HEAF – 12 cubicles) |
| TB-FZ-11C | C-1 | Battery Charger C-1 | 480 VAC/125 VDC Battery Charger |
| TB-FZ-11C | C-2 | Battery Charger C-2 | 490 VAC/125 VDC Battery Charger |
| TB-FZ-11C | DC-C 125V | 125V DC Distribution Center C | 125 VDC Panel |
| TB-FZ-11C | ER-743-189 | SBO Control Panel | Control Panel |
| TB-FZ-11C | Main Generator Iso-Phase Bus Ducts | Potential Transformers (PT) | 14,400 VAC/72 VAC (HEAF - 3 Potential Transformers) |
| TB-FZ-11D | MCC 1A11 | Motor Control Center | 480V MCC |
| TB-FZ-11D | MCC 1A13 | Motor Control Center | 480V MCC |
| TB-FZ-11D | MCC 1B11 | Motor Control Center | 480V MCC |
| TB-FZ-11D | MCC 1B13 | Motor Control Center | 480V MCC |
| TB-FZ-11D | DP-A1 | USS 1A1-014B Disconnect Switch & --- Panel | 480V Disconnect Sw. and Distribution Panel (HEAF – 1 switch and panel) |
| TB-FZ-11D | ANN 713-4 | Generator Cooling System Annunciator | Control Panel |

## Tabulation of Ignition Sources for Each Fire Area/Zone

| Fire Zone | Component ID | Component Description | Component Type (HEAF = High Energy Arcing Fault) |
|---|---|---|---|
| TB-FZ-11D | M-H-001 | Hydrogen Seal Oil Unit Pump | 480V Motor |
| TB-FZ-11D | MSOPM | Main Oil Seal Recirculation Pump | 480V Motor |
| TB-FZ-11D | P-05-03 | TBCCW Pump | 480V Motor |
| TB-FZ-11D | P-05-04 | TBCCW Pump | 480V Motor |
| TB-FZ-11D | P-05-05 | TBCCW Pump | 480V Motor |
| TB-FZ-11D | P-06-01 | AIR Compressor | 480V Compressor |
| TB-FZ-11D | P-06-02 | AIR Compressor | 480V Compressor |
| TB-FZ-11D | P-06-03 | AIR Compressor | 480V Compressor |
| TB-FZ-11D | P-13-01A | Condensate Return Pump | 480V Motor |
| TB-FZ-11D | P-13-01B | Condensate Return Pump | 480V Motor |
| TB-FZ-11D | Panel 421-001 | Main Condenser Conductivity Control Panel | Control Panel |
| TB-FZ-11D | SCP-A | Station Cooling Pump | 480V Motor |
| TB-FZ-11D | SCP-B | Station Cooling Pump | 480V Motor |
| TB-FZ-11D | SOVPM | Hydrogen Seal Oil Unit Motor | 2 HP Motor |
| TB-FZ-11D | CP1 | Water Conditioning System | Control Panel |
| TB-FZ-11D | USS 1A1 | 460V Unit Substation | 480V Switchgear (HEAF – 5 stacks) |
| TB-FZ-11D | USS 1A1 XFMR | 460V Unit Substation Transformer | Load Center Transformer (4160V/480V) |
| TB-FZ-11D | USS 1B1 | 460V Unit Substation | 480V Switchgear (HEAF – 5 stacks) |
| TB-FZ-11D | USS 1B1 XFMR | 460V Unit Substation Transformer | Load Center Transformer (4160V/480V) |
| TB-FZ-11E | EF-1-2 | Blower | 480V Motor |
| TB-FZ-11E | EF-1-3 | Blower | 480V Motor |
| TB-FZ-11E | P-04-03 | Electrical Panel DR Pump | 480V Motor |

## Tabulation of Ignition Sources for Each Fire Area/Zone

| Fire Zone | Component ID | Component Description | Component Type (HEAF = High Energy Arcing Fault) |
|---|---|---|---|
| TB-FZ-11E | P-04-04 | Electrical Panel DR Pump | 480V Motor |
| TB-FZ-11E | P-22-30A & 30B | Sump Pumps | 480V Motor |
| TB-FZ-11F | ER-567-128 | HWC H2 Injection Control Cabinet | Control Panel |
| TB-FZ-11F | FN-59-27 | Ventilation Exhaust Fan | 480V Motor |
| TB-FZ-11F | P-02-01A | Condensate Pump | 4160V Motor |
| TB-FZ-11F | P-02-01B | Condensate Pump | 4160V Motor |
| TB-FZ-11F | P-02-01C | Condensate Pump | 4160V Motor |
| TB-FZ-11F | P-02-02A | Reactor Feedwater Pump | 4160V Motor |
| TB-FZ-11F | P-02-02B | Reactor Feedwater Pump | 4160V Motor |
| TB-FZ-11F | P-02-02C | Reactor Feedwater Pump | 4160V Motor |
| TB-FZ-11F | P-8-OC2 | Blower | Blower |
| TB-FZ-11H | 423 | Condensate Demin Control Panel | Control Panel |
| 0TB-FZ-11H | MCC 1A13 | Motor Control Center | 480V MCC |
| TB-FZ-11H | P-2-005 | Drain Pumps | 480V Motor |
| TB-FZ-11H | P-2-006 | Drain Pumps | 480V Motor |
| TB-FZ-11H | P-2-8 | Condensate Demin Recirculation Pump | 480V Motor |
| TB-FZ-11H | P-4-001 | Drain Transfer Tank Pump | 480V Motor |
| TB-FZ-11H | P-4-002 | Drain Transfer Tank Pump | 480V Motor |
| TB-FZ-11H | P-4-004 | Drain Transfer Tank Pump | 480V Motor |
| TB-FZ-11H | P-7-001 | Mechanical Vacuum Pump | 480V Motor |
| TB-FZ-11H | P-22-32A | Sump Pump | 480V Motor |
| TB-FZ-11H | UNK-CP | Demin Conductivity Panel | Control Panel |
| YARD | ER-661-100 | RAGEMS Control Panels | Control Panel |
| YARD | MCC 1A13A | Motor Control Center | 480V MCC |
| YARD | P-10-1A | Domestic Water System Feed Pump A | 480V Motor |
| YARD | P-10-1B | Domestic Water System Feed Pump B | 480V Motor |

## Tabulation of Ignition Sources for Each Fire Area/Zone

| Fire Zone | Component ID | Component Description | Component Type (HEAF = High Energy Arcing Fault) |
|---|---|---|---|
| YARD | P-10-1C | Domestic Water System Feed Pump C | 480V Motor |
| YARD | P-10-2A | Sludge Pump | 480V Motor |
| YARD | P-10-2B | Sludge Pump | 480V Motor |
| YARD | P-53-03 | Domestic water Air Compressor | 480V Compressor |
| YARD | SW-743-159 (A) | 13.8KV SBO Transformer Break Sw. | 13.8KV Switch |
| YARD | SW-743-159 (B) | 13.8KV SBO Transformer Break Sw. | 13.8KV Switch |
| YARD | SW-743-159 (C) | 13.8KV SBO Transformer Break Sw. | 13.8KV Switch |
| YARD | XFMR2E3 | Drywell Process Transformer - North Yard Power Distribution | 34.5KV/208V/120V Transformer |
| YARD | XMFR2E4 | Drywell Chiller Transformer - North Yard | 34.5KV/480V Transformer |
| YARD | XMR-743-159 | 13.8KV Station Blackout Transformer | 13.8KV/4160V Transformer |
| YARD (OBROOF) | EF-1-20 | Ventilation Fan | 480V Fan |
| YARD (OBROOF) | FN-56-10 | 480V SWOR Room | 480V Fan |
| YARD (OBROOF) | FN-56-18 EF-1-19 | OB HVAC Exhaust Fan | 480V Fan |
| YARD (OBROOF) | FN-56-2 | Ventilation Fan | 480V Fan |
| YARD (OBROOF) | FN-56-5 | Ventilation Fan | 480V Fan |
| YARD (OBROOF) | FN-56-9 | Ventilation Fan | 480V Fan |
| YARD (OBROOF) | FN-59-15 | Ventilation Fan | 480V Fan |
| YARD (OBROOF) | FN-59-16 | Ventilation Fan | 480V Fan |

## Tabulation of Ignition Sources for Each Fire Area/Zone

| Fire Zone | Component ID | Component Description | Component Type (HEAF = High Energy Arcing Fault) |
|---|---|---|---|
| YARD (OBROOF) | FN-847-28 | Ventilation Fan | 480V Fan |
| YARD (OBROOF) | M-56-2 | Ventilation Fan | 480V Fan |
| YARD (OBROOF) | M-56-7 | Office Building AC Unit | 480V Air Handling Unit |
| YARD (OBROOF) | SF-1-12 | Ventilation Supply Fan | 480V Fan |
| YARD (OBROOF) | SF-1-13 | Ventilation Supply Fan | 480V Fan |
| YARD (OBROOF) | SF-1-20 | 480V Fan | 480V Fan |
| YARD (OBROOF) | CRANE | 25 Ton Crane | 480V Motor |
| YARD (OBROOF) | XMR-734-044 | Transformer | 480-208/120V Transformer |
| YARD (OBROOF) | XMR-826-008 | Transformer | 480-208/120V Transformer |
| YARD (TBROOF) | SF-1-3 | TB Roof Ventilation Fan | 480V Motor |
| YARD (TBROOF) | SF-1-4 | TB Roof Ventilation Fan | 480V Motor |
| YARD (TBROOF) | SF-1-A-2 | TB Roof Ventilation Fan | 480V Motor |
| YARD (TBROOF) | SF-1-B-1 | TB Roof Ventilation Fan | 480V Motor |
| YARD (TBROOF) | SF-B-3 | TB Roof Ventilation Fan | 480V Motor |

# ATTACHMENT 5

**10 CFR 50.12 Exemption Request**

**Oyster Creek Nuclear Generating Station**
**Docket No. 50-219**

**Request for Exemption from 10 CFR 50, Appendix R,**
**Section III.G, "Fire Protection of Safe Shutdown Capability"**

**RAI-08 and RAI-17 Response Supporting Information**

**RAI-08 and RAI-17 Response Supporting Information**

(Note the numbering corresponds to original numbering in Attachment 2 of March 3, 2009 (Phase 1) exemption request)

| Item | Equipment | Manual Action Required | Symptom Based Or Prompt | Discussion | Diagnostic Equipment (refer to notes below) |
|---|---|---|---|---|---|
| 1 | 4160V Switchgear 1D and LSP-1D | Manual actions for Hot Shutdown are required to isolate damaged cables and reestablish control locally for the 4160V Switchgear 1D. Also, trip 4160V breakers and lockout using the 69 Switch for all Feeder Breakers except 1B2P and 1B3P. Use Local Shutdown Panels to control equipment as follows:<br><br>LSP-1D 4160V Switchgear 1D Breakers for USS 1B2 and 1B3 (Operate Transfer Switch to "Alternate" and operate Control Switch for feeder breakers for USS 1B2 and 1B3) | Symptom Based | The symptoms for this required action are one or more of the following:<br><br>• Loss of Off-Site Power<br>• Loss of power to loads powered from Bus 1D, including USS 1B2 and 1B3. This will be identified by the loss of loads powered from these USSs, including loss of indication lights for multiple loads powered from these USSs.<br>• Loss of Control Power to this bus, identified by the associated green indicating lights for the loads on this bus will be off due to a blown fuse.<br><br>Under these conditions, the EDGs either have powered up the vital buses or they haven't. Even if the EDGs are powering the vital buses, loss of equipment could still occur due to continued fire damage. Therefore there are steps in the Fire Support Procedures to dispatch operators to restore (worst case) or transfer control of the EDG and its associated buses to a protected control circuit when Off-Site Power is lost.<br><br>Additionally, the loss of control for the various motors and loads powered from Switchgear 1D provide the symptom for the required action of locally tripping load breakers.<br><br>**Diagnostic Time: ~ 7 min** | **Loss of Power Other indications:**<br>• Normal Lighting in control room off<br>• Normal Lighting restored in about 20 sec (EDG Start)<br>• Loss of power/flow indications for numerous systems<br>• Open indication on numerous 4160 breaker indications that were originally closed<br><br>**Load indications available**:<br>• CRD<br>• RBCCW<br>• Service Water<br>• Condensate Transfer Pumps<br>• 'B' control room HVAC<br>• Numerous valve status lights not lit<br><br>**Breaker indications available**:<br>• EDG 2 supplying Vital buses<br>• 1D 4160 Main breaker<br>• USS 1B2 Primary & Main<br>• USS 1B3 Primary & Main<br>• Feedwater Pumps<br>• Recirculation Pumps |

**RAI-08 and RAI-17 Response Supporting Information**

(Note the numbering corresponds to original numbering in Attachment 2 of March 3, 2009 (Phase 1) exemption request)

| Item | Equipment | Manual Action Required | Symptom Based Or Prompt | Discussion | Diagnostic Equipment (refer to notes below) |
|---|---|---|---|---|---|
| 2 | LI-424-993 | Condensate Storage Tank (CST) level Ind. LI-424-993 Local Gauge Used (Read Local CST Gauge) | Symptom Based | The symptom for this action would be the loss of CST level indication in the control room. Fire Support Procedures have a step that verifies that the CST level indicator in the control room is available. The Note included with this step has guidance on how much CST level is required for Plant shutdown. If the control room indication is not available, an operator is directed to use the local indication.<br><br>**Diagnostic Time: < 1 min** | **Indications available**:<br>CST level (5F-27) indicator in control room |

**RAI-08 and RAI-17 Response Supporting Information**

(Note the numbering corresponds to original numbering in Attachment 2 of March 3, 2009 (Phase 1) exemption request)

| Item | Equipment | Manual Action Required | Symptom Based Or Prompt | Discussion | Diagnostic Equipment (refer to notes below) |
|---|---|---|---|---|---|
| 3 | LSP-1B3 | Manual actions for Hot Shutdown are required to isolate damaged cables and reestablish control locally for 480V USS 1B3 electrical power breakers. Use Local Shutdown Panels to control equipment as follows:<br><br>LSP-1B3 480V USS 1B3 incoming breaker. (Operate transfer Switch to "Alternate" and then operate Control Switch for USS 1B3 Breaker 1B3M) | Symptom Based | The symptoms for this required action are one or more of the following:<br><br>• Loss of Off-Site Power<br>• Loss of power to USS 1B3. This will be identified by the loss of loads powered from this USS.<br>• Loss of Control Power to this bus identified by the associated green indicating lights for the loads on this bus will be off due to a blown fuse.<br><br>Under these conditions, the EDGs either have powered up the vital buses or they haven't. Even if the EDGs are powering the vital buses, loss of equipment could still occur due to continued fire damage. Therefore there are steps in the Fire Support Procedures to dispatch operators to restore (worst case) or transfer control of the EDG and its associated buses to a protected control circuit when Off-Site Power is lost.<br><br>**Diagnostic Time: ~ 7 min or could be part of action for Item 5** | **Loss of Power Other indications:**<br>• Normal Lighting in control room off<br>• Normal Lighting restored in about 20 sec (EDG Start)<br>• Loss of power/flow indications for numerous systems<br>• Open indication on numerous 4160 breaker indications that were originally closed<br><br>**Load indications available**:<br>• Service Water<br>• 'B' control room HVAC<br>• Condensate Transfer Pumps<br>• Numerous valve status lights not lit<br><br>**Breaker indications available**:<br>• EDG 2 supplying Vital buses<br>• 1D 4160 Main breaker<br>• USS 1B3 Primary & Main<br>• 'B' control room HVAC |

**RAI-08 and RAI-17 Response Supporting Information**

(Note the numbering corresponds to original numbering in Attachment 2 of March 3, 2009 (Phase 1) exemption request)

| Item | Equipment | Manual Action Required | Symptom Based Or Prompt | Discussion | Diagnostic Equipment (refer to notes below) |
|---|---|---|---|---|---|
| 4 | LSP-1B32 | Manual actions for Hot Shutdown are required to isolate damaged cables and reestablish control locally for the Condensate Transfer Pump. Use Local Shutdown Panels to control equipment as follows:<br><br>LSP-1B32 Condensate Transfer Pump 1-2 (Operate transfer switch to "Alternate" and operate Control Switch for Condensate Transfer Pump 1-2) | Symptom Based | The symptoms for this required action are one or more of the following:<br><br>• Loss of Off-Site Power<br>• Loss of power to USS 1B3. This will be identified by the loss of loads powered from this USS.<br>• Loss of control of the Condensate Transfer Pumps. This will be indicated by a loss of the indicating lights for the pumps. Also by the loss of flow to the Isolation Condensers as seen by Isolation Condenser level not increasing with pump control switch in "Run".<br><br>Under these conditions, the EDGs either have powered up the vital buses or they haven't. Even if the EDGs are powering the vital buses, loss of equipment could still occur due to continued fire damage. Therefore there are steps in the Fire Support Procedures to dispatch operators to restore (worst case) or transfer control of the EDG and its associated buses to a protected control circuit when Off-Site Power is lost.<br><br>**Diagnostic Time: ~ 7 min or could be part of action for Item 5** | **Loss of Power Other indications:**<br>• Normal Lighting in control room off<br>• Normal Lighting restored in about 20 sec (EDG Start)<br>• EDGs supplying Vital buses<br>• Loss of power/flow indications for numerous systems<br>• Open indication on numerous 4160 breaker indications that were originally closed<br><br>**Load indications available**:<br>• Service Water<br>• Control room ventilation Train 'B'<br>• Condensate Transfer Pumps<br><br>**Breaker indications available**:<br>• EDG 2 supplying Vital buses<br>• USS 1B3 Primary & Main<br>• Condensate transfer pumps<br>• 'B' control room HVAC<br><br>**Level Indications available**:<br>• LI-IG0007A/B, Isolation Condenser Level Indicators |

**RAI-08 and RAI-17 Response Supporting Information**

(Note the numbering corresponds to original numbering in Attachment 2 of March 3, 2009 (Phase 1) exemption request)

| Item | Equipment | Manual Action Required | Symptom Based Or Prompt | Discussion | Diagnostic Equipment (refer to notes below) |
|---|---|---|---|---|---|
| 5 | LSP-DG2 | Manual actions for Hot Shutdown are required to isolate damaged cables and reestablish control locally for Emergency Diesel Generator #2 (EDG2). Use Local Shutdown Panels to control equipment as follows:<br><br>LSP-DG2, EDG2 and its Switchgear (Operate transfer Switches (3 total) to "Alternate" and operate Control Switch on Diesel Panel to start diesel) | Symptom Based | The symptom for this required action is the loss of Off-Site power.<br><br>Under these conditions, the EDGs either have powered up the vital buses or they haven't. Even if the EDGs are powering the vital buses, loss of equipment could still occur due to continued fire damage. Therefore there are steps in the Fire Support Procedures to dispatch operators to restore (worst case) or transfer control of the EDG and its associated buses to a protected control circuit when Off-Site Power is lost.<br><br>**Diagnostic Time: ~ 7 min** | **Loss of Power Other indications:**<br>• Normal Lighting in control room off<br>• Normal Lighting restored in about 20 sec (EDG Start)<br>• Loss of power/flow indications for numerous systems<br>• Open indication on numerous 4160 breaker indications that were originally closed<br><br>**Load indications available**:<br>• CRD<br>• RBCCW<br>• Service Water<br>• 'B' control room HVAC<br><br>**Breaker indications available**:<br>• EDG 2 supplying Vital buses<br>• 1D 4160 Main breaker<br>• USS 1B2 Primary & Main<br>• USS 1B3 Primary & Main<br>• Recirculation pumps<br>• Feedwater pumps |

**RAI-08 and RAI-17 Response Supporting Information**

(Note the numbering corresponds to original numbering in Attachment 2 of March 3, 2009 (Phase 1) exemption request)

| Item | Equipment | Manual Action Required | Symptom Based Or Prompt | Discussion | Diagnostic Equipment (refer to notes below) |
|---|---|---|---|---|---|
| 6 | USS-1B3 Breaker 062C | MCC 1B32 Feeder Breaker at USS 1B3 shall be manually re-closed after Diesel Generator start due to an undervoltage trip. | Symptom Based | The symptoms for this required action are one or more of the following:<br>• Loss of Off-Site Power<br>• Loss of power to USS 1B3. This will be identified by the loss of loads powered from this USS.<br>• Loss of control of the Condensate Transfer Pumps. This will be indicated by a loss of the indicating lights for the pumps. Also by the loss of flow to the Isolation Condensers as seen by Isolation Condenser level not increasing with pump control switch in "run".<br>Under these conditions, the EDGs either have powered up the vital buses or they haven't. Even if the EDGs are powering the vital buses, loss of equipment could still occur due to continued fire damage. Therefore there are steps in the Fire Support Procedures to dispatch operators to restore (worst case) or transfer control of the EDG and its associated buses to a protected control circuit when Off-Site Power is lost.<br>As part of the recovery/transfer of control for the EDG and associated buses to protected sources, the operator will take action at USS 1B3 where this breaker is located. Included in the Fire Support Procedure actions at USS 1B3 is the guidance to reset and close the feeder breaker to MCC 1B32 to allow powering the Condensate Transfer Pumps. By design, the condensate transfer pump's breaker is load shed on a LOOP, and must be manually re-closed. This auto-trip feature is provided to satisfy other non-fire design requirements.<br><br>**Diagnostic Time: N/A (part of action for Items 1, 3 or 5)** | **Loss of Power Other indications:**<br>• Normal Lighting in control room off<br>• Normal Lighting restored in about 20 sec (EDG Start)<br>• Loss of power/flow indications for numerous systems<br>• Open indication on numerous 4160 breaker indications that were originally closed<br><br>**Load indications available**:<br>• Service Water<br>• 'B' control room HVAC<br>• Condensate Transfer Pumps<br><br>**Breaker indications available**:<br>• EDG 2 supplying Vital buses<br>• 1D 4160 Main breaker<br>• USS 1B3 Primary & Main<br>• Condensate Transfer Pumps<br>• 'B' control room HVAC<br><br>If power is lost to USS 1B3, then the procedure directs the operators to reclose this breaker (breaker trips on undervoltage). The impact for fire scenarios is that any time the D 4160 bus is swapped from offsite power to diesel generator, this breaker must be reset. |

**RAI-08 and RAI-17 Response Supporting Information**

(Note the numbering corresponds to original numbering in Attachment 2 of March 3, 2009 (Phase 1) exemption request)

| Item | Equipment | Manual Action Required | Symptom Based Or Prompt | Discussion | Diagnostic Equipment (refer to notes below) |
|---|---|---|---|---|---|
| 7 | V-9-2099 (formerly V-11-44), V-11-49, V-11-63, V-11-41 | Manual actions for Hot Shutdown are required to align the Fire System water to the Isolation Condenser shell side for makeup. Manual valves V-9-2099 (formerly V-11-44) and V-11-49 are opened, and manual valves V-11-63 and V-11-41 are closed to provide makeup. This action is required because there is no power ("B" Train) available to the Condensate Transfer System. There are no condensate transfer pumps powered from "A" train power, so fire water must be used when "A" train power is the train credited for shutdown. | Symptom Based | The symptoms for this required action would be the inability to fill the Isolation Condenser shells using the Condensate Transfer System. Indications for the loss of the Condensate Transfer Pumps would include:<br><br>• Loss of Off-Site Power for 'B' Train<br>• Loss of 1D 4160V Switchgear<br>• Loss of power to USS 1B3. This will be identified by the loss of loads powered from this USS.<br><br>The Fire Support procedures direct the operator to make-up once the Isolation Condensers are initiated to maintain shell level high. Subsequent loss of the Condensate Transfer system will be quickly recognized and action to lineup Fire Water will be directed. By maintaining shell water level high, maximum time is maintained for accomplishing the OMA.<br><br>**Diagnostic Time: <5 min** | **Loss of Power Other indications:**<br>• Loss of power/flow indications for numerous systems from 'B' Train<br>• Open indication on numerous 4160 breaker indications that were originally closed<br><br>**Load indications available**:<br>• Service Water<br>• Control room ventilation Train 'B'<br>• Condensate Transfer Pumps<br><br>**Breaker indications available**:<br>• EDG 2<br>• 1D 4160 Main breaker<br>• USS 1B3 Primary & Main<br>• P-11-1 or P-11-2 Condensate Transfer Pumps<br>• FN-826-8B control room ventilation fed from USS 1B3<br><br>**Level indications available**:<br>LI-IG0007A/B, Isolation Condenser Level Indicators |

**RAI-08 and RAI-17 Response Supporting Information**

(Note the numbering corresponds to original numbering in Attachment 2 of March 3, 2009 (Phase 1) exemption request)

| Item | Equipment | Manual Action Required | Symptom Based Or Prompt | Discussion | Diagnostic Equipment (refer to notes below) |
|---|---|---|---|---|---|
| 8 | LSP-1A2 | Manual actions for Hot Shutdown are required to isolate damaged cables and reestablish control locally for Unit Substation (USS) 1A2 electrical breakers. Use Local Shutdown Panels to control equipment as follows:<br><br>LSP-1A2, CRD Hydraulic PP NC08A and 480V USS 1A2 Incoming breaker (Operate transfer switch to "Alternate" and operate Control Switch for USS-1A2 Main Breaker 1A2M and 'A' CRD Pump). | Symptom Based | The symptom for this required action is the loss of power to USS 1A2 or its various loads due to a failure in the control circuits for this bus.<br><br>The indications for this event will be the loss of indication and ability to control one or more of the following components:<br><br>• USS 1A2 Main Breaker<br>• 'A' CRD Pump<br>• 'A' RBCCW Pump<br><br>Under these conditions, the Fire Support Procedure steps directs that if USS 1A2 cannot be reenergized or the 'A' CRD pump can't be controlled from the control room, the operator is to use the LSP-1A2 to close the supply breaker to USS 1A2 and operate the 'A' CRD pump.<br><br>**Diagnostic Time: ~ 7 min** | **Load indications available**:<br>• 'A 'CRD<br>• 'A' RBCCW<br><br>**Breaker indications available**:<br>• USS 1A2 Primary<br>• USS 1A2 Main<br>• 'A' CRD Pump indication<br>• 'A' RBCCW Pump Indication<br><br>**Other indications**:<br>• Alarms for loss of power to USS 1A2<br>• Loss of control room lighting<br>• Rx Bldg Ventilation loss |

**RAI-08 and RAI-17 Response Supporting Information**

(Note the numbering corresponds to original numbering in Attachment 2 of March 3, 2009 (Phase 1) exemption request)

| Item | Equipment | Manual Action Required | Symptom Based Or Prompt | Discussion | Diagnostic Equipment (refer to notes below) |
|---|---|---|---|---|---|
| 9 | Remote Shutdown Panel | Manual actions for Hot Shutdown are required to isolate damaged cables and reestablish control locally for Unit Substation (USS) 1B2 electrical breakers and CRD Hydraulic. Use Remote Shutdown Panel to control equipment: RSP, CRD Hydraulic PP NC08B and 480V USS 1B2 Incoming breaker (Operate USS 1B2/CRD Transfer Switch (Partial initiation) to "Alternate" and operate Control Switches for USS-1B2 Main Breaker and 'B' CRD Pump). | Symptom Based | The symptom for this required action is the loss of power to USS 1B2 due to a short circuit in the cross-tie cable to USS 1A2.<br><br>The indications for this event will be the loss of indication and ability to control one or more of the following components:<br><br>• USS 1B2 Main Breaker<br>• 'B' CRD Pump<br><br>Under these conditions, the Fire Support Procedure steps directs that if USS 1B2 cannot be reenergized or the 'B' CRD pump can't be controlled from the control room, the operator is to use the RSP to close the supply breaker to USS 1B2 and operate the 'B' CRD pump.<br><br>**Diagnostic Time: ~ 7 min** | **Load indications available**:<br>• 'B 'CRD<br>• 'B' RBCCW<br><br>**Breaker indications available**:<br>• USS 1B2 Primary<br>• USS 1B2 Main<br>• 'B' CRD Pump indication<br>• 'B' RBCCW Pump Indication<br><br>**Other indications**:<br>• Loss of control room lighting<br>• CIP-3 Shift to 'B' Battery<br>• Alarms for loss of power to USS 1B2<br>• Rx Bldg Ventilation loss |

**RAI-08 and RAI-17 Response Supporting Information**

(Note the numbering corresponds to original numbering in Attachment 2 of March 3, 2009 (Phase 1) exemption request)

| Item | Equipment | Manual Action Required | Symptom Based Or Prompt | Discussion | Diagnostic Equipment (refer to notes below) |
|---|---|---|---|---|---|
| 11 | FI-225-998 | Use CRD local flow gauge FI-225-998. due to cable damage to the normal control room flow indicator. | Symptom Based | The symptom for this required action is the loss of normal CRD indication in the control room. Section 5.0 of the Fire Support Procedures lists the normal control room CRD indication as one of the pieces of equipment potentially affected by a fire in these areas. The alternate indication location is the CRD local flow gauge FI-225-998. Operators are trained to use the list of affected equipment contained in the Fire Support Procedures to evaluate equipment that may be lost and understand the alternates that are available. CRD injection is controlled by the EOPs supported by the Fire Support Procedures.<br><br>**Diagnostic Time: < 2 min** | **Load indications available**:<br>• 'A' CRD<br>• 'B' CRD<br><br>**Other indications**:<br>• CRD Flow Indicator on 4F fails to indicate with CRD pumps available<br>• CRD Flow Control Valve position indication |

**RAI-08 and RAI-17 Response Supporting Information**

(Note the numbering corresponds to original numbering in Attachment 2 of March 3, 2009 (Phase 1) exemption request)

| Item | Equipment | Manual Action Required | Symptom Based Or Prompt | Discussion | Diagnostic Equipment (refer to notes below) |
|---|---|---|---|---|---|
| 12 | V-15-30, V-15-52, V-15-237, FI-225-2 | Manually open V-15-237, throttle V-15-30 using local flow indicator (FI-225-2) and close V-15-52 to establish CRD flow to Reactor due to the loss of instrument air to the CRD Flow Control Valve | Symptom Based | The symptom for this required action is loss of the ability to inject water into the RPV from the CRD System using the controls in the control room. This includes the loss of the Instrument Air supply to the CRD System Components.<br><br>The EOPs and ABN procedures direct the use of CRD for RPV level control. The Fire Support Procedures direct the use of the local indicator and the CRD bypass line in the event that normal CRD functions are unavailable. This includes loss of instrument air.<br><br>**Diagnostic Time: < 2 min** | **Indications available**:<br>• 'A' CRD<br>• 'B' CRD<br>• MSIV position indication (loss of air)<br><br>**Loss of Air Other Indications:**<br>• Alarms for Loss of Air<br>• Control Rod Drifting in<br>• Various air operated valves repositioning<br>• Air Header pressure decreasing<br>• Standby Air Compressor running<br><br>**Other indications**:<br>• CRD Flow Indicator on 4F fails to indicate with CRD pumps available<br>• CRD Flow Control Valve position indication |

**RAI-08 and RAI-17 Response Supporting Information**

(Note the numbering corresponds to original numbering in Attachment 2 of March 3, 2009 (Phase 1) exemption request)

| Item | Equipment | Manual Action Required | Symptom Based Or Prompt | Discussion | Diagnostic Equipment (refer to notes below) |
|---|---|---|---|---|---|
| 13 | V-20-2 and V-20-4 | Core Spray System II manual valves V-20-1 and V-20-2 are opened and V-20-4 is closed to provide Reactor Coolant Makeup using Core Spray Pump instead of the CRD Pump (manipulate valves to align Core Spray to CST). This action is required because the fire damages both CRD Pumps. | Symptom Based | These actions are included in the OCNGS EOPs. In the event that other makeup systems to the RPV are unavailable or inadequate, the EOPs direct that makeup from alternate sources, including the CST via Core Spray System I or II be used to inject water into the RPV.<br><br>This guidance is enhanced by the Fire Support Procedure for this area by directing the operator to use System II since System I is affected by the fire.<br><br>**Diagnostic Time: < 5 min** | **Indications available**:<br>• RPV Water level indications<br>• CRD Pump availability<br>• Feedwater breaker status<br>• Core Spray pump availability<br>• Torus level and temperature<br><br>**Other Indication:**<br>• Condensate breaker status |
| 16 | 4160V Switchgear. 1A Breakers A3, A5 and A9 and Switchgear. 1B Breakers B4 and B8 | All five Reactor Recirculation Pumps (NG01-A, NG01-B, NG01-C, NG01D and NG01E) must be tripped to use fuel zone level instruments and to prevent the Isolation Condenser from tripping on high flow. Also, lockout the 4160V breakers using the 69 Switch. | Symptom Based | The symptom for this required action is the inability to trip the Recirculation Pumps from the control room and this is detected using the associated pump breaker indicating lights, alarms and flow indications. The Fire Support Procedures direct the operator to trip the pumps using the pump control switches or the Recirculation Pump Trip circuitry (two trip coils for pumps). If both of these methods fail on one or more pumps, the guidance is given to trip the pumps from locations outside the control room.<br><br>**Diagnostic Time: < 2 min** | **Breaker indications available**:<br>• Recirculation pump breaker indications<br><br>**Level Indications available**:<br>• Fuel Zone ‘A’ & ‘B’ RPV Water Level ON lights on 5F<br>• Fuel Zone ‘A’, ‘B’, ‘C’ & ‘D’ Water Level indications<br><br>**Other indications**:<br>• Individual Recirculation Loop flow indications<br>• Total Core flow indication |

**RAI-08 and RAI-17 Response Supporting Information**

(Note the numbering corresponds to original numbering on Attachment 2 of March 4, 2009 (Phase 2) exemption request)

| Action | Equipment | Manual Action Required | Symptom Based Or Prompt | Discussion | Diagnostic Equipment (refer to notes below) |
|---|---|---|---|---|---|
| 1 | RY21 Panels | Trip Field Breakers for Recirculation Pumps A- E. | Symptom Based | The symptom for this required action is the inability to trip the Recirculation Pumps from the control room and this is detected using the associated pump breaker indicating lights, alarms and flow indications. The Fire Support Procedures direct the operator to trip the pumps using the control switches or the Recirculation Pump Trip circuitry (two trip coils). If both of these methods fail on one or more pumps, the guidance is given to trip the pumps from locations outside the control room.<br><br>**Diagnostic Time: < 2 min** | **Breaker indications available**:<br>• Recirculation pump breaker indications<br><br>**Level Indications available**:<br>• Fuel Zone 'A' & 'B' RPV Water Level ON lights on 5F<br>• Fuel Zone 'A', 'B', 'C' & 'D' Water Level indications<br><br>**Other indications**:<br>• Individual Recirculation Loop flow indications<br>• Total Core flow indication |

**RAI-08 and RAI-17 Response Supporting Information**

(Note the numbering corresponds to original numbering on Attachment 2 of March 4, 2009 (Phase 2) exemption request)

| Action | Equipment | Manual Action Required | Symptom Based Or Prompt | Discussion | Diagnostic Equipment (refer to notes below) |
|---|---|---|---|---|---|
| 2 | V-9-2099, V-11-49, V-11-63, V-11-41 | Manually manipulate valves to align Fire Water for makeup to Isolation Condenser. | Symptom Based | This OMA is a contingency action if access is not available to LSP-1D (OMA #1 for Phase 1). Fire water will be used until access is available. The fire brigade leader will let the control room know if access is available to the 'D' 4160V switchgear room.<br><br>The symptoms for this required action would be the inability to fill the Isolation Condenser shells using the Condensate Transfer System. Indications for the loss of the Condensate Transfer Pumps would include:<br><br>• Loss of Off-Site Power for 'B' Train<br>• Loss of power to USS 1B3. This will be identified by the loss of loads powered from this USS.<br><br>The Fire Support procedures direct the operator to make-up once the ICs are initiated to maintain shell level high. Subsequent loss of the Condensate Transfer system will be quickly recognized and action to lineup Fire Water will be directed. By maintaining shell water level high, maximum time is maintained for accomplishing the OMA.<br><br>**Diagnostic Time: < 10 min** | Fire Brigade Leader informs control room by radio whether access is available to the 4160V switchgear.<br><br>Refer to LSP-1D (OMA #1 for Phase 1), LSP-DG2 (OMA #5 for Phase 1), LSP-1B3 (OMA #3 for Phase 1) and LSP-1B32 (OMA #4 for Phase 1) for available indications in Phase 1 table above. |

**RAI-08 and RAI-17 Response Supporting Information**

(Note the numbering corresponds to original numbering on Attachment 2 of March 4, 2009 (Phase 2) exemption request)

| Action | Equipment | Manual Action Required | Symptom Based Or Prompt | Discussion | Diagnostic Equipment (refer to notes below) |
|---|---|---|---|---|---|
| 3 | RSP | Operate transfer switch at RSP for USS-1B2 Main Breaker and "B" CRD Pump. Operate equipment as necessary. | Symptom Based | The symptom for this required action is the loss of power to USS 1B2 or loss of control of the 'B' CRD pump due to control cable failures.<br><br>The indications for this event will be the loss of indication and ability to control one or more of the following components:<br><br>• USS 1B2 Main Breaker<br>• 'B' CRD Pump<br><br>Under these conditions, the Fire Support Procedure steps direct that if USS 1B2 cannot be reenergized or the 'B' CRD pump cannot be controlled from the control room, the operator is to use the RSP to close the supply breaker to USS 1B2 and operate the 'B' CRD pump.<br><br>**Diagnostic Time: ~ 7 min** | **Load indications available**:<br>• 'B 'CRD<br>• 'B' RBCCW<br><br>**Breaker indications available**:<br>• USS 1B2 Primary<br>• USS 1B2 Main<br>• 'B' CRD Pump indication<br>• 'B' RBCCW Pump Indication<br><br>**Other indications**:<br>• Normal Lighting in control room off<br>• CIP-3 Shift to 'B' Battery<br>• Alarms for loss of power to USS 1B2<br>• Rx Bldg Ventilation loss |
| 7 | V-11-36 | Manually open V-11-36 to makeup to the Isolation Condenser | Symptom Based | This OMA is a contingency action if access is not available to LSP-1D (OMA #1 for Phase 1) to restore offsite power. Fire water will be used until access is available. The fire brigade leader will let the control room know if access is available to the 'D' 4160V switchgear room – refer to LSP-1D discussion.<br><br>The symptom for this required action is the inability to operate V-11-36 from the control room.<br><br>**Diagnostic Time: <10 min** | Fire Brigade Leader informs control room by radio whether access is available to the 4160V switchgear.<br><br>**Indications available**:<br>The indicating lights for V-11-36 will be off due to the loss of power. |

**RAI-08 and RAI-17 Response Supporting Information**

(Note the numbering corresponds to original numbering on Attachment 2 of March 4, 2009 (Phase 2) exemption request)

| Action | Equipment | Manual Action Required | Symptom Based Or Prompt | Discussion | Diagnostic Equipment (refer to notes below) |
|---|---|---|---|---|---|
| 8 | LI-211-1214 | Obtain "A" Isolation Condenser shell level using local mechanical gauge | Symptom Based | This OMA is a contingency action if access is not available to LSP-1D (OMA #1 for Phase 1) to restore offsite power. Fire water will be used until access is available. The fire brigade leader will let the control room know if access is available to the 'D' 4160V switchgear room – refer to LSP-1D discussion. The FSSD procedure directs these actions to be performed if offsite power is not available and access is not immediately available to restore the power.<br><br>The symptom for this required action is the need to determine the 'A' Isolation Condenser shell water level and the indication in the control room is not available.<br><br>**Diagnostic Time: < 10 min** | Fire Brigade Leader informs control room by radio whether access is available to the 4160V switchgear.<br><br>**Indications available**:<br>The loss of 'A' Isolation Condenser shell level indicator LI-IG0007A in the control room. |

**RAI-08 and RAI-17 Response Supporting Information**

(Note the numbering corresponds to original numbering on Attachment 2 of March 4, 2009 (Phase 2) exemption request)

| Action | Equipment | Manual Action Required | Symptom Based Or Prompt | Discussion | Diagnostic Equipment (refer to notes below) |
|---|---|---|---|---|---|
| 9 | V-15-30, V-15-52, V-15-237, FI-225-2 | Manually manipulate valves for CRD flow path and use local indicator. | Symptom Based | The symptom for this required action is loss of the ability to inject water into the RPV from the CRD System using the controls in the control room. This includes the loss of the Instrument Air supply to the CRD System Components.<br><br>The EOPs and ABN procedures direct the use of CRD for RPV level control. The Fire Support procedures direct the use of the local indicator and the CRD bypass line in the event that normal CRD functions are unavailable. This includes loss of instrument air.<br><br>**Diagnostic Time: < 2 min** | **Indications available**:<br>• 'A' CRD<br>• 'B' CRD<br>• MSIV position indication (loss of instrument air)<br><br>**Loss of Air Other Indications:**<br>• Alarms for Loss of Air<br>• Control Rod Drifting in<br>• Various air operated valves repositioning<br>• Air Header pressure decreasing<br>• Standby Air Compressor running<br><br>**Other indications**:<br>• CRD Flow Indicator on 4F fails to indicate with CRD pumps available<br>• CRD Flow Control Valve position indication |
| 17 | V-11-34 | Connect H.P. air cylinder to drain port of accumulator to recharge | Symptom Based | The symptom for this required action is the inability to operate V-11-34 from the control room. Since the accumulator can provide for 6 cycles of the makeup valve, at least 5 hours of IC operation is available before this action will be required. At this point, each refill of the IC will handle decay heat for over 2 hours.<br><br>**Diagnostic Time: <10 min** | **Indications available**:<br>The indicating lights for V-11-34 will indicate that the valve does not open from the control room when make-up to the Isolation Condenser shell is initiated. |

**RAI-08 and RAI-17 Response Supporting Information**

(Note the numbering corresponds to original numbering on Attachment 2 of March 4, 2009 (Phase 2) exemption request)

| Action | Equipment | Manual Action Required | Symptom Based Or Prompt | Discussion | Diagnostic Equipment (refer to notes below) |
|---|---|---|---|---|---|
| 18 | V-11-36 | Connect H.P. air cylinder to drain port of accumulator to recharge | Symptom Based | The symptom for this required action is the inability to operate V-11-36 from the control room. Since the accumulator can provide for 6 cycles of the makeup valve, at least 5 hours of IC operation is available before this action will be required. At this point, each refill of the IC will handle decay heat for over 2 hours.<br><br>**Diagnostic Time: <10 min** | **Indications available**:<br>The indicating lights for V-11-36 will indicate that the valve does not open from the control room when make-up to the Isolation Condenser shell is initiated. |

## NOTES:

1. Headings within the diagnostic column of the table are as follows:

    - **Indication available** means that these indicating lights, instruments, etc. are identified in the FSSD analysis and procedures and will be utilized to determine whether the OMA is required or not. In some cases, it is known that control power is still available to electrical switchgear, USS, etc.; however, control cable failures may cause the associated fuse to blow, which in turn would cause the indicating lights to go out. The loss of the indicating lights is one of the diagnostic indications that the OMA is required. The majority of the OMAs tabulated above are self evident that the action has achieved its objective such as: restoration of offsite power, restoration of power to a USS, associated indicating lights are indicating properly, read a local mechanical gauge for flow, level, etc. or pump is operating and a level change occurs on known available level instruments. There are no challenging diagnostic evolutions required.

    - **Other indications** means that these diagnostic instruments are not in the FSSD analysis and it is not known whether they would be available or not. However, in some cases, the loss of a non-credited indicator (e.g., CRD flow indicator, loss of control room lights, etc.) will cause the operator to perform the OMA even though it is not in the FSSD analysis.

# ATTACHMENT 6

**10 CFR 50.12 Exemption Request**

**Oyster Creek Nuclear Generating Station**
**Docket No. 50-219**

**Request for Exemption from 10 CFR 50, Appendix R,**
**Section III.G, "Fire Protection of Safe Shutdown Capability"**

**RAI-09 Response Supporting Information**

**RAI-09 Response Supporting Information**

(Note the numbering corresponds to original numbering in Attachment 2 of March 3, 2009 (Phase 1) exemption request)

| Item | Equipment | Manual Action Required | OMA Location | Fire Areas/Zones of Fire Origin | Diagnosis Time (Refer to Att. 5) | Implementation Time | Time Available (Minutes) |
|---|---|---|---|---|---|---|---|
| 1 | 4160V Switchgear 1D and LSP-1D | Manual actions for Hot Shutdown are required to isolate damaged cables and reestablish control locally for the 4160V Switchgear 1D. Also, trip 4160V breakers and lockout using the 69 Switch for all Feeder Breakers except 1B2P and 1B3P. Use Local Shutdown Panels to control equipment as follows:<br><br>LSP-1D 4160V Switchgear 1D Breakers for USS 1B2 and 1B3 (Operate Transfer Switch to "Alternate" and operate Control Switch for feeder breakers for USS 1B2 and 1B3) | TB-FA-3B | TB-FA-26, TB-FZ-11B, TB-FZ-11E | 10 | 19 | 45 |
| | | | | TB-FZ-11C, TB-FZ-11D | 10 | 24<br>(5 min. added for SCBA) | 45 |
| 2 | LI-424-993 | Condensate Storage Tank (CST) level Ind. LI-424-993 Local Gauge Used (Read Local CST Gauge) | Yard | OB-FA-9, OB-FZ-6A, OB-FZ-8C, TB-FZ-11B, TB-FZ-11E | 30 | 7 | 73 |

**RAI-09 Response Supporting Information**

(Note the numbering corresponds to original numbering in Attachment 2 of March 3, 2009 (Phase 1) exemption request)

| Item | Equipment | Manual Action Required | OMA Location | Fire Areas/Zones of Fire Origin | Diagnosis Time (Refer to Att. 5) | Implementation Time | Time Available (Minutes) |
|---|---|---|---|---|---|---|---|
| 3 | LSP-1B3 | Manual actions for Hot Shutdown are required to isolate damaged cables and reestablish control locally for 480V USS 1B3 electrical power breakers. Use Local Shutdown Panels to control equipment as follows:<br><br>LSP-1B3 480V USS 1B3 incoming breaker. (Operate transfer Switch to "Alternate" and then operate Control Switch for USS 1B3 Breaker 1B3M) | CW-FA-14 | TB-FA-26, TB-FZ-11B, TB-FZ-11C, TB-FZ-11D, TB-FZ-11E | 10 | 10 | 45 |

**RAI-09 Response Supporting Information**

(Note the numbering corresponds to original numbering in Attachment 2 of March 3, 2009 (Phase 1) exemption request)

| Item | Equipment | Manual Action Required | OMA Location | Fire Areas/Zones of Fire Origin | Diagnosis Time (Refer to Att. 5) | Implementation Time | Time Available (Minutes) |
|---|---|---|---|---|---|---|---|
| 4 | LSP-1B32 | Manual actions for Hot Shutdown are required to isolate damaged cables and reestablish control locally for the Condensate Transfer Pump. Use Local Shutdown Panels to control equipment as follows:<br><br>LSP-1B32 Condensate Transfer Pump 1-2 (Operate transfer switch to "Alternate" and operate Control Switch for Condensate Transfer Pump 1-2) | MT-FA-12 | TB-FZ-11B, TB-FZ-11E | 10 | 10 | 45 |

**RAI-09 Response Supporting Information**

(Note the numbering corresponds to original numbering in Attachment 2 of March 3, 2009 (Phase 1) exemption request)

| Item | Equipment | Manual Action Required | OMA Location | Fire Areas/Zones of Fire Origin | Diagnosis Time (Refer to Att. 5) | Implementation Time | Time Available (Minutes) |
|---|---|---|---|---|---|---|---|
| 5 | LSP-DG2 | Manual actions for Hot Shutdown are required to isolate damaged cables and reestablish control locally for Emergency Diesel Generator #2 (EDG2). Use Local Shutdown Panels to control equipment as follows:<br><br>LSP-DG2, EDG2 and its Switchgear (Operate transfer Switches (3 total) to "Alternate" and operate Control Switch on Diesel Panel to start diesel) | DG-FA-17 | TB-FZ-11D, TB-FZ-11E | 10 | 14 | 45 |
| 6 | USS-1B3 Breaker 062C | MCC 1B32 Feeder Breaker at USS 1B3 shall be manually re-closed after Diesel Generator start due to an undervoltage trip. | CW-FA-14 | TB-FA-26, TB-FZ-11B, TB-FZ-11C, TB-FZ-11D, TB-FZ-11E | 10 | 6 | 45 |

**RAI-09 Response Supporting Information**

(Note the numbering corresponds to original numbering in Attachment 2 of March 3, 2009 (Phase 1) exemption request)

| Item | Equipment | Manual Action Required | OMA Location | Fire Areas/Zones of Fire Origin | Diagnosis Time (Refer to Att. 5) | Implementation Time | Time Available (Minutes) |
|---|---|---|---|---|---|---|---|
| 7 | V-9-2099 (formerly V-11-44), V-11-49, V-11-63, V-11-41 | Manual actions for Hot Shutdown are required to align the Fire System water to the Isolation Condenser shell side for makeup. Manual valves V-9-2099 (formerly V-11-44) and V-11-49 are opened, and manual valves V-11-63 and V-11-41 are closed to provide makeup. This action is required because there is no power ("B" Train) available to the Condensate Transfer System. | RB-FZ-1E | OB-FZ-6B, OB-FZ-8A, OB-FZ-8B, OB-FZ-8C, TB-FZ-11F, TB-FZ-11H, CW-FA-14 | 10 | 13 | 45 |

**RAI-09 Response Supporting Information**

(Note the numbering corresponds to original numbering in Attachment 2 of March 3, 2009 (Phase 1) exemption request)

| Item | Equipment | Manual Action Required | OMA Location | Fire Areas/Zones of Fire Origin | Diagnosis Time (Refer to Att. 5) | Implementation Time | Time Available (Minutes) |
|---|---|---|---|---|---|---|---|
| 8 | LSP-1A2 | Manual actions for Hot Shutdown are required to isolate damaged cables and reestablish control locally for Unit Substation (USS) 1A2 electrical breakers. Use Local Shutdown Panels to control equipment as follows:<br><br>LSP-1A2, CRD Hydraulic PP NC08A and 480V USS 1A2 Incoming breaker (Operate transfer switch to "Alternate" and operate Control Switch for USS-1A2 Main Breaker 1A2M and A CRD Pump). | OB-FZ-6A | OB-FZ-8C | 30 | 8 | 60 |

**RAI-09 Response Supporting Information**

(Note the numbering corresponds to original numbering in Attachment 2 of March 3, 2009 (Phase 1) exemption request)

| Item | Equipment | Manual Action Required | OMA Location | Fire Areas/Zones of Fire Origin | Diagnosis Time (Refer to Att. 5) | Implementation Time | Time Available (Minutes) |
|---|---|---|---|---|---|---|---|
| 9 | Remote Shutdown Panel | Manual actions for Hot Shutdown are required to isolate damaged cables and reestablish control locally for Unit Substation (USS) 1B2 electrical breakers and CRD Hydraulic. Use Remote Shutdown Panel to control equipment: RSP, CRD Hydraulic PP NC08B and 480V USS 1B2 Incoming breaker (Operate USS 1B2/CRD Transfer Switch (Partial initiation) to "Alternate" and operate Control Switches for USS-1B2 Main Breaker and B CRD Pump). | OB-FZ-6B | OB-FZ-6A | 30 | 13<br><br>(5 min. added for SCBA) | 180 |
| 11 | FI-225-998 | Use CRD local flow gauge FI-225-998 due to cable damage to the normal control room flow indicator. | RB-FZ-1D | RB-FZ-1E, RB-FZ-1G | 30 | 100<br><br>(90 min allotted for reentry) | 204 |

**RAI-09 Response Supporting Information**

(Note the numbering corresponds to original numbering in Attachment 2 of March 3, 2009 (Phase 1) exemption request)

| Item | Equipment | Manual Action Required | OMA Location | Fire Areas/Zones of Fire Origin | Diagnosis Time (Refer to Att. 5) | Implementation Time | Time Available (Minutes) |
|---|---|---|---|---|---|---|---|
| 12 | V-15-30,<br>V-15-52,<br>V-15-237,<br>FI-225-2 | Manually open V-15-237, throttle V-15-30 using local flow indicator (FI-225-2) and close V-15-52 to establish CRD flow to Reactor due to the loss of instrument air to the CRD Flow Control Valve | RB-FZ-1E | RB-FZ-1D,<br>RB-FZ-1F5,<br>TB-FA-3A,<br>OB-FZ-6A,<br>OB-FZ-6B,<br>OB-FZ-8A,<br>OB-FZ-8B,<br>OB-FZ-8C,<br>OB-FA-9,<br>TB-FA-26,<br>TB-FZ-11B,<br>TB-FZ-11C,<br>TB-FZ-11D,<br>TB-FZ-11E,<br>TB-FZ-11F,<br>TB-FZ-11H,<br>CW-FA-14 | 30 | 15 | 204 |
| | | | | OB-FZ-10A | 30 | 18 | 204 |
| | | | | RB-FZ-1E,<br>RB-FZ-1G | 30 | 100<br><br>(90 min allotted for reentry) | 204 |

**RAI-09 Response Supporting Information**

(Note the numbering corresponds to original numbering in Attachment 2 of March 3, 2009 (Phase 1) exemption request)

| Item | Equipment | Manual Action Required | OMA Location | Fire Areas/Zones of Fire Origin | Diagnosis Time (Refer to Att. 5) | Implementation Time | Time Available (Minutes) |
|---|---|---|---|---|---|---|---|
| 13 | V-20-2 and V-20-4 | Core Spray System II manual valves V-20-1 and V-20-2 are opened and V-20-4 is closed to provide Reactor Coolant Makeup using Core Spray Pump instead of the CRD Pump (manipulate valves to align Core Spray to CST). This action is required because the fire damages both CRD Pumps. | RB-FZ-1F2 | RB-FZ-1F3 | 30 | 35 | 204 |
| 16 | 4160V Switchgear. 1A Breakers A3, A5 and A9 and Switchgear. 1B Breakers B4 and B8 | All five Reactor Recirculation Pumps (NG01-A, NG01-B, NG01-C, NG01D and NG01E) must be tripped to use fuel zone level instruments and to prevent the Isolation Condenser from tripping on high flow. Also, lockout the 4160V breakers using the 69 Switch. | TB-FZ-11C | TB-FZ-11B, TB-FZ-11E, OB-FZ-8C | 10 | 13 | 30 |

**RAI-09 Response Supporting Information**

(Note the numbering corresponds to original numbering in Attachment 2 of March 4, 2009 (Phase 2) exemption request)

| Action | Equipment | Action Required | OMA Location | Fire Areas/Zones of Fire Origin | Diagnosis Time (Refer to Att. 5) | Implementation Time | Time Available (Minutes) |
|---|---|---|---|---|---|---|---|
| 1 | RY21 Panels | Trip Field Breakers for Recirculation Pumps A through E. | OB-FZ-8A | TB-FA-26, TB-FZ-11C, TB-FZ-11D | 10 | 8 | 30 |
| 2 | V-9-2099, V-11-49, V-11-63, V-11-41 | Manually manipulate valves to align Fire Water for makeup to Isolation Condenser. | RB-FZ-1E | TB-FA-26, TB-FZ-11C, TB-FZ-11D | 10 | 13 | 45 |
| 3 | RSP | Operate transfer switch at RSP for USS-1B2 Main Breaker and "B" CRD Pump. Operate equipment as necessary. | OB-FZ-6B | TB-FA-26, TB-FZ-11B, TB-FZ-11C, TB-FZ-11D, TB-FZ-11E | 30 | 8 | 180 |
| 7 | V-11-36 | Manually open V-11-36 to makeup to the Isolation Condenser | RB-FZ-1B | TB-FA-26, TB-FZ-11C, TB-FZ-11D | 10 | 16 | 45 |
| 8 | LI-211-1214 | Obtain "A" Isolation Condenser shell level using local mechanical gauge | RB-FZ-1B | TB-FA-26, TB-FZ-11C, TB-FZ-11D | 10 | 16 | 45 |
| 9 | V-15-30, V-15-52, V-15-237, FI-225-2 | Manually manipulate valves for CRD flow path and use local indicator. | RB-FZ-1E | YARD | 30 | 15 | 204 |

**RAI-09 Response Supporting Information**

(Note the numbering corresponds to original numbering in Attachment 2 of March 4, 2009 (Phase 2) exemption request)

| Action | Equipment | Action Required | OMA Location | Fire Areas/Zones of Fire Origin | Diagnosis Time (Refer to Att. 5) | Implementation Time | Time Available (Minutes) |
|---|---|---|---|---|---|---|---|
| 17 | V-11-34 | Connect H.P. air cylinder to drain port of accumulator to recharge | RB-FZ-1B | RB-FZ-1D, RB-FZ-1E, RB-FZ-1F3, RB-FZ-1F5, RB-FZ-1G, TB-FA-3A, OB-FZ-6A, OB-FZ-8A, OB-FZ-8B, OB-FZ-8C, OB-FA-9, CW-FA-14, YARD | 30 | 26 | 300 |
| 18 | V-11-36 | Connect H.P. air cylinder to drain port of accumulator to recharge | RB-FZ-1B | OB-FZ-6B, TB-FA-26, TB-FZ-11B, TB-FZ-11C, TB-FZ-11D, TB-FZ-11E, TB-FZ-11F, TB-FZ-11H | 30 | 26 | 300 |
| | | | | OB-FZ-10A | 30 | 29 | 300 |