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U.S. Nuclear Regulatory Commission
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Washington, DC 20555

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DOMINION NUCLEAR CONNECTICUT, INC.
MILLSTONE POWER STATION UNIT 2
RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION
REQUEST FOR EXEMPTION FROM 10 CFR 50, APPENDIX R, SECTION III.G.,
"FIRE PROTECTION OF SAFE SHUTDOWN CAPABILITY"

By letter dated June 30, 2011, Dominion Nuclear Connecticut, Inc. (DNC) submitted a request for exemption from 10 CFR 50, Appendix R, Section III.G, "Fire Protection of Safe Shutdown Capability" for Millstone Power Station Unit 2 (MPS2). The proposed exemption request would allow the use of operator manual actions in lieu of the requirements of Paragraph III.G.2.

By letter dated January 13, 2012, the NRC requested additional information regarding the MPS2 exemption request. The requested information is provided in the attachment.

If you have any questions regarding this submittal, please contact Mr. William D. Bartron at (860) 444-4301.

Sincerely,


L. N. Hartz
Vice President – Nuclear Support Services

Attachment:

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

Commitments made in this letter:

None

A006
NRR

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Attachment 1

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

**DOMINION NUCLEAR CONNECTICUT, INC.
MILLSTONE POWER STATION UNIT 2**

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

RAI-01 Circumstances for Review

In accordance with 10 CFR 50.12, the NRC will not consider granting an exemption unless special circumstances are present. Special circumstances are described in 10 CFR 50.12(a)(2). Only one circumstance needs to be met. Although 10 CFR 50.12(a)(2)(ii) is cited in the application, unwarranted burden is also mentioned. Unwarranted burden is the special circumstance described in 10 CFR 50.12(a)(2)(iii). In addition, the information supporting the special circumstances is inadequate. For example if 10 CFR 50.12(a)(2)(ii) is the special circumstance being met in this exemption, additional information on how the OMAs provide assurance that the underlying purpose of the rule is met is needed.

Please provide the following:

RAI-01.1 Question:

Clarify which special circumstance is being met?

DNC Response:

This exemption is being requested in accordance with the requirements of 10 CFR 50.12(a)(2)(ii) since the application of the regulation in this particular circumstance would not serve the underlying purpose of the rule or is not necessary to achieve the underlying purpose of the rule.

RAI-01.2 Question:

Provide additional information supporting the special circumstance that is being met.

DNC Response:

The intent of 10 CFR 50, Appendix R, Section III.G.2, is to ensure one train of systems necessary to achieve and maintain hot shutdown will remain available in the event of a fire. The operator manual actions (OMAs) discussed in this exemption request provide that assurance.

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

Attachment 1, Page 3, "Conclusion" of the submittal asserts that the OMAs discussed in the request provide assurance that one train of systems necessary to achieve and maintain hot shutdown remains available in the event of a fire. Attachment 1, Sections 3.0 and 4.0 of the submittal contain a description of each of the OMAs and the time required to perform them, but does not state whether or how one of the redundant trains in a particular fire area is maintained free of fire damage. There is no discussion regarding fire damage and when it will occur.

RAI-02.1 Question:

State the specific requirements of 10 CFR 50, Appendix R, Section 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.

DNC Response:

The specific requirements of 10 CFR 50, Appendix R, Section III.G.2 that are not met are identified below for each of the requested exemptions.

Please note that the following items have been revised from the initially submitted Exemption Request:

- OMA 3 has been removed in its entirety (see below).
- Loss of instrument air (IA) is no longer postulated and has been deleted from the exemption requests for Fire Areas R-9, R-10, R-13 or R-14. As a result, the following OMAs are modified.
 - OMA 1 is no longer required and has been deleted from the exemption requests for Fire Areas R-9, R-10, R-13 and R-14.
 - OMA 9 is no longer required and has been deleted from the exemption requests for Fire Areas R-13 and R-14.
 - OMA 10 is no longer required and has been deleted from the exemption requests for Fire Area R-10.

- OMA 11 is no longer required and has been deleted from the exemption requests for Fire Areas R-9, R-13 and R-14
- OMA 20 is now required and being added to the exemption request for Fire Area R-8. In addition, OMA 20 is no longer required and has been deleted from the exemption request for fire area Yard.

Otherwise, the loss of IA is postulated if there is any IA piping or IA operated components within the fire area being analyzed.

The following simplified sketches are contained in attachment 2 to aid with the understanding of system configuration and facility alignment:

1. Sketch 25203-26131 SH.5 "Auxiliary Feedwater System"
2. Sketch 25203-26131 SH. 7 "Main Steam System"
3. Sketch 25203-26131 SH. 8 "Chemical and Volume Control System" and
4. Sketch SKE-3.1-Elect Dist "One Line Diagram for Appendix R".

OMA 1: Manually Open Valve 2-CH-192

Valve 2-CH-192 (Z1 power) is part of the single flow path which provides charging pump suction from the Refueling Water Storage Tank (RWST). This single path supply does not meet III.G.2 requirements, because there is no redundant pathway. This flow path is used after the Boric Acid Storage Tanks (BASTs) are depleted. However, aligning pump suction to the RWST is not required for up to 72 minutes after charging flow is reestablished, which itself is not required for 180 minutes after a loss of charging, which provides sufficient time to implement OMA 1.

OMA 2: Manually Open Valve 2-CH-429

Valve 2-CH-429 (Z2 power) is part of the single flow path which provides charging pump discharge to the Reactor Coolant System (RCS). This single path supply does not meet III.G.2 requirements because there is no redundant pathway. However, charging flow is not required for 180 minutes after a loss of charging, which provides sufficient time to implement OMA 2.

OMA 3: Open Breaker to Fail Valve 2-CH-506 Closed

This item has been removed from the exemption request. The bleed-off from the reactor coolant pumps is taken into account in the thermal hydraulic flow analysis that establishes a 180 minute criteria to return the charging system to service. Therefore, this diversion flow path is not required to be isolated prior to or after reestablishing charging flow. Thus, this is no longer needed as a safe shutdown success path and the OMA is no longer required.

OMA 4: Manually Open Valve 2-CH-508

Valve 2-CH-508 (Z1) is a motor-operated valve (MOV) which provides a gravity drain path from the 'B' BAST to the suction for the charging pumps. This valve can fail as is (closed) for fires in Fire Areas R-7, R-9, R-13, R-14 and R-17 due to the loss of the Z1 alternating current (AC) power source to the motor control center (MCC). The alternate flow path for obtaining charging pump suction from the RWST via valves 2-CS-13.1B, 2-CH-192 and 2-CH-504 does not meet the III.G.2 spatial separation criterion. In a fire, valve 2-CH-192 could fail closed due to loss of IA or direct current (DC) power for those areas that could fail valve 2-CH-508. Specifically, in Fire Area R-9, the power supply for valve 2-CH-192 and the DC control power for the AC breakers to valve 2-CH-508 are in the same panel. Also, for Fire Areas R-7 and R-17, the cables for valve 2-CH-508 are in the same fire hazard analysis (FHA) Fire Area/Zone as IA piping for valve 2-CH-192.

OMA 5: Manually Open Valve 2-CH-509

Valve 2-CH-509 (Z1) is a MOV which provides a gravity drain path from the 'A' BAST to the suction for the charging pumps. This valve can fail as is (closed) for fires in Fire Area R-7, R-9, R-13, R-14 and R-17 due to the loss of the Z1 AC power source to the MCC. The alternate flow path of obtaining charging pump suction from the RWST via valves 2-CS-13.1B, 2-CH-192 and 2-CH-504 does not meet the III.G.2 spatial separation criterion. Valve 2-CH-192 could fail closed due to loss of IA or DC power for those areas that could fail valve 2-CH-509. Specifically, in Fire Area R-9, the power supply for valve 2-CH-192 and the DC control power for the AC breakers to valve 2-CH-509 are in the same panel. Also, for Fire Areas R-7 and R-17, the cables for valve 2-CH-509 are in the same FHA Fire Area/Zone as IA piping for valve 2-CH-192.

OMA 6: Open Breaker to Fail Valve 2-CH-517 Closed

Valve 2-CH-517 (Z2 power) is part of the of the single flow path which provides auxiliary spray to the pressurizer. This single path supply does not meet III.G.2 requirements because there is no redundant pathway. Valve 2-CH-517 is an air-operated valve (AOV) with a safety related air accumulator which supplies sufficient air to stroke the valve and maintain its position for 13.3 hours. In addition, a loss of IA will fail the valve to its desired position (closed).

OMA 7: Open Breaker to Fail Valve 2-CH-519 Open

Valve 2-CH-519 (Z2) is an AOV which controls inventory to the RCS. This OMA is required due to inadequate separation with (Z1) valve 2-CH-518 in locations inside containment. The cables for each valve enter containment separated by the North/South axis, but the valves are within close proximity to one another (less than 5 feet separation) which does not meet the 20 foot separation criteria of III.G.2.

OMA 8: Manually Open Valve 2-CS-13.1B

Valve 2-CS-13.1B (Z2 power) is part of the single flow path which provides suction-side flow to the charging pumps from the RWST. This single path supply does not meet III.G.2 requirements because there is no redundant pathway. Thus, OMA 8 is required.

OMA 9: Control Valve 2-FW-43B at Panel C10 or Local Manual Operation

Valve 2-FW-43B (Z2) is an AOV which controls flow from the Auxiliary Feedwater (AFW) pumps to Steam Generator No. 2. A fire in Fire Areas R-13 and R-14 directly impacts the (Z1) AFW train. Circuits for valve 2-FW-43B traverse through Fire Area R-13 (detection no automatic suppression) and terminate in the same panel (C-21) as valve 2-FW-43A. In Fire Area R-14 (detection, no automatic suppression) the conduit carrying cable for valve 2-FW-43B is less than a foot away from the conduit for valve 2-FW-43A. Since the conduit is within close proximity to the other train conduit, the 20 foot separation criteria of III.G.2 is not met and OMA 9 is required.

OMA 10: Manually Operate Valve 2-MS-190A

Valve 2-MS-190A (Z1) is the Atmospheric Dump Valve (ADV) which provides a steam path to atmosphere for cooling the RCS via Steam Generator No. 1. The OMA for this valve is the result of loss of IA (Fire Areas R-2, R-5, R-6, R-8, R-12 and R-15). Loss of IA, which is a single train system and therefore does not meet III.G.2 requirements because there is no redundant train, will result in both valves 2-MS-190A and 2-MS-190B failing closed. Thus, OMA 10 is required to open the valve and restore the pathway.

OMA 11: Control Valve 2-MS-190B at Panel C10 or Local Manual Operation

Valve 2-MS-190B is an ADV which provides a steam path for cooling the RCS via Steam Generator No. 2. The OMA for this valve is the result of loss of IA (Fire Areas R-4, R-7, R-15, and R-17). Loss of IA, which is a single train system (therefore does not meet III.G.2 requirements because there is no redundant train available for separation), will result in the loss of both valves 2-MS-190A and 2-MS-190B.

OMA 12: Pull Control Power Fuses for Breaker A305 and Ensure Breaker is Open

Control of breaker A305 (Z1, 24C to 24E tie breaker) may be impacted by a fire in Fire Area R-2 (FHA Fire Area T-10) due to a lack of separation (less than 5 feet) of A305's closing control circuits. DC control power for breaker A305 control circuits enters bus 24D via breaker cubicle A408 in bus 24D (Z2). This creates the potential to spuriously close breaker A305. Furthermore, bus 24E could fail due to feeder cables to/from bus 24D due to a lack of separation

(common cubicle) with detection but no automatic suppression. This does not meet the separation requirements of III.G.2.

OMA 13: Pull Control Power Fuses for Breaker A408 and Ensure Breaker is Open

Control of breaker A408 (Z2, 24D to 24E tie breaker) could be impacted by a fire in Fire Area R-14 (FHA Fire Area T-7) due to a lack of separation, with detection but no automatic suppression. DC control power for breaker A408 closing control circuit enters breaker cubicle A305 located in bus 24C (Z1). This creates the potential to spuriously close breaker A408. This does not meet the separation requirements of III.G.2.

OMA 14: Pull Control Power Fuses for Breaker A410 and Ensure Breaker is Open

Control of breaker A410 (Z2, 24D to 24B tie breaker) could be impacted by a fire in Fire Area R-14 (FHA Fire Area T-7) due to a lack of separation, with detection but no automatic suppression. DC control power for breaker A410 closing control circuit enters breaker cubicle A505 located in bus 24E (Z5) creating a lack of separation. This creates the potential to spuriously close A410. This does not meet the separation requirements of III.G.2.

OMA 15: Pull Control Power Fuses for Breaker A411 and Ensure Breaker is Open

Control of breaker A411 (Z2, Reserve Station Service Transformer (RSST) feeder breaker to 24D) could be impacted by a fire in Fire Area R-14 (FHA Fire Area T-7) due to a lack of separation, with detection but no automatic suppression. DC control power for breaker A411 closing control circuit enters breaker cubicle A301 located in bus 24C (Z1). This creates the potential to spuriously close breaker A411. This does not meet the separation requirements of III.G.2.

OMA 16: Pull Control Power Fuses for Breaker A406 and Ensure Breaker is Open

DC control power for breaker A406, Z2 'B' motor-driven AFW pump, is routed to the remote shutdown panel, C21, located in the West 480V Load Center room, Fire Area R-13/FHA Fire Area T-6. This is not separated (therefore does not meet III.G.2) from the Z1 train AFW pump controls and has detection but no automatic suppression.

OMA 17: Operate Turbine Driven AFW Pump Speed Control Circuit H-21 from Panel C10

Circuit H-21 is the turbine-driven AFW (TDAFW) pump speed control circuit. This circuit, in conjunction with SV-4188 (AFW turbine steam supply valve) controls flow to the steam generator(s). A fire in Fire Area R-13 directly impacts

the Z1 powered AFW train (therefore does not meet III.G.2 separation criteria). Cables for circuit H21 traverse through Fire Area R-13 (FHA Fire Area T-6) and terminate at panel C21 with only detection provided but no automatic suppression.

OMA 18: Obtain BAST Level at Local Level Indicator LI-206A

Level transmitter LT-206 is a Z2 powered transmitter which is the only transmitter (single train) that provides 'A' BAST level to the control room. This does not meet III.G.2 requirements because there is no redundant train available for separation. A fire in Fire Areas R-2 (FHA Fire Area T-10 and Zone A-8D) and R-10 (FHA Fire Areas T-7 and T-10) directly impact the Z2 train.

OMA 19: Obtain BAST Level at Local Level Indicator LI-208A

Level transmitter LT-208 is a Z2 powered transmitter which is the only transmitter (single train) that provides 'B' BAST level to the control room. This does not meet III.G.2 requirements because there is no redundant train available for separation. A fire in Fire Areas R-2 (FHA Fire Area T-10 and Zone A-8D) and R-10 (FHA Fire Areas T-7 and T-10) directly impact the Z2 train.

OMA 20: Obtain CST Level at Local Level Indicating Switch LIS-5489A

Level transmitter LT-5282 is a Z2 powered transmitter which is the only transmitter (single train) that provides Condensate Storage Tank (CST) level to the control room. This does not meet III.G.2 requirements because there is no redundant train available for separation. A fire in Fire Areas R-2 (FHA Fire Area T-10 and Zone A-8D), R-8 (FHA Fire Area A-16) or in R-10 (FHA Fire Areas T-7 and T-10) or in R-13 (FHA Fire Area T-6) directly impact the Z2 powered train.

OMA 21: Operate Pump P18C from Panel C10

The three charging pump controls and automatic standby response interface with the Hot Shutdown Panel C21, located in the West 480V Load Center room, Fire Area R13 (FHA Fire Area T-6). The wiring supporting these pumps' controls does not meet the separation requirements of III.G.2. Detection is provided but no automatic suppression.

OMA 22: Operate Supply Valve SV-4188 from Panel C10

Valve SV-4188 is the TDAFW turbine steam supply valve. This valve, in conjunction with circuit H-21 (AFW pump speed control circuit) allows for controlling flow to the steam generator(s). A fire in Fire Area R-13 directly impacts the Z1 AFW train (therefore does not meet III.G.2 separation criteria). Circuits for valve SV-4188 traverse through Fire Area R-13 (FHA Fire Area T-6) and terminate at panel C-21 with detection provided but no automatic suppression.

OMA 23: Pull Control Power Fuses for Breaker A401 and Ensure Breaker is Closed

Control of breaker A401 (Z2, 'B' Emergency Diesel Generator (EDG) feeder breaker to 24D) could be impacted by a fire in Fire Area R-14 (FHA Fire Area T-7) due to a lack of separation, with detection but no automatic suppression (therefore does not meet III.G.2 separation criteria). DC control power for breaker A401 control circuit enters breaker cubicle A505 located in bus 24E (Z5). This creates the potential to spuriously trip breaker A401.

OMA 24: Locally Close Breaker DV2021

Control wiring from the motor driven AFW pump breaker A406 in bus 24D enters the C21 panel, located in the West 480V Switchgear room (R13). Due to breaker/fuse coordination between breaker 21 on panel DV20 (DV2021) and breaker control power fuses in breaker A406, a fire in the West 480V Switchgear room may cause a loss of DC control power to 24D. Similarly, control power to bus 24D, located in the Upper 4.16 kV Switchgear (R-2, FHA Area T-10), may be lost while bus 24D is aligned to 24E, located in the Lower 4.16 kV Switchgear (R-14, FHA Fire Area T-7), due to breaker fuse coordination.

In both cases, control wiring from Facility Z2 is in close proximity to Facility Z1 (therefore does not meet III.G.2 separation criteria) with detection but no automatic suppression.

RAI-02.2 Question:

Provide a summary of the plant-specific features that compensate for the lack of 10 CFR 50, Appendix R, Section III.G.2-required features identified in RAI-02.1, for each of the requested exemptions. For example, note any enhanced defense-in-depth measures such as a lack of ignition sources and/or combustibles, more robust and/or supplemental detection and suppression systems and other physical or administrative controls.

DNC Response:

At Millstone Power Station (MPS), the storage of combustibles is administratively controlled by the site's fire protection program procedures (Reference A and B) to limit the effects of transient fire exposures on the plant. Additionally, hot work (i.e., welding, cutting, grinding) is administratively controlled by the site fire protection program procedure, CM-AA-FPA-100 (Ref. 11 from original exemption request).

For fire areas/zones discussed in the exemption request, the predominant combustible in all but four fire areas/zones (Fire Area R-7/FHA Area A-15, Fire Area R-8/FHA Area A-16, Fire Area R-17/FHA Zone A-10A and Fire Area R-12/FHA Area T-4) is IEEE 383 qualified cable insulation or cables that have been tested and found to have similar fire resistive characteristics. IEEE 383 qualified cables are not self-igniting, nor will they propagate flame once a pilot ignition source is removed. Based on the minor quantities of combustibles that could serve as an ignition source for cabling in these fire areas/zones and administrative controls in place for transient combustibles and hot work evolutions, it is improbable that they could serve as a pilot ignition source for the cables. While high energy arcing faults resulting from a switchgear failure are a potential pilot ignition source for the cable insulation in some areas, a switchgear failure normally results in a high intensity fire that lasts for a short duration, making it unlikely that it will cause sustained combustion of IEEE 383 qualified cables. The major combustibles in Fire Area R-7/FHA Area A-15 and Fire Area R-8/FHA Area A-16 ('A' and 'B' EDGs) consists of fuel oil and lube oil. These areas are protected by automatic pre-action fire suppression systems. Fire Area R-17/FHA Zone A-10A and Fire Area R-12/FHA Area T-4 contain negligible combustible loading (equivalent fire severities for these areas are less than 5 minutes), with combustibles in these areas consisting of Class A combustibles and lube oil, respectively.

For fire areas/zones discussed in the exemption request, combustible loading is low (equivalent fire severity of 75 minutes or less) (Reference C) for all but four fire areas/zones (Fire Area R-7/FHA Area A-15, Fire Area R-8/FHA Area A-16, Fire Area R-14/FHA Area T-9 and Fire Area R-17/FHA Zone A-10B). Fire Area R-7/FHA Area A-15 and Fire Area R-8/FHA Area A-16 have high combustible loading (equivalent fire severity of greater than 150 minutes) (Ref. C), but are protected by automatic pre-action fire suppression systems. Fire Area R-14/FHA Area T-9 has moderate combustible loading (equivalent fire severity between 75 and 150 minutes) (Ref. C), but is protected by an automatic wet-pipe sprinkler system. Fire Area R-17/FHA Zone A-10B, which also has moderate combustible loading, is protected by a smoke detection system, which would provide early detection in the event of a fire. While no automatic suppression is provided in this fire zone, the majority of combustibles in this area consist of IEEE 383 qualified insulation. Further, the high ceiling in this room (approximately 23 feet) with openings to fire zones along the containment wall would preclude the buildup of hot gasses that could damage cabling or equipment in this zone.

All installed fire suppression and fire detection systems for the individual fire areas/zones are discussed in Section 2.0 of the exemption request.

References:

- A. Control of Combustible and Flammable Materials, Procedure Number CM-AA-FPA-101, Rev. 3, dated January 11, 2011.
- B. Fire Prevention Inspections, Procedure Number SFP-10, Rev. 005-02, dated August 5, 2010.
- C. Millstone Unit 2 Combustible Loading Re-Analysis Calculation, Rev. 1, dated December 2001.

RAI-02.3 Question:

10 CFR 50 Appendix R establishes the concept of defense-in-depth and 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 10 CFR 50, Appendix R, Section III.G.2.

DNC Response:

The fire protection program enforces the concept of defense-in-depth, both procedurally and physically, to meet the following objectives:

- Prevent fires from starting,
- Rapidly detect, control, and extinguish promptly, those fires that do occur,
- Provide protection for structures, systems, and components (SSCs) 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 integration of the program, personnel, and procedures, which are then collectively applied to the facility, reinforce this defense in-depth aspect of the fire protection program. Strict enforcement of ignition source and transient combustible control activities (through permitting), and monthly fire prevention inspections by the site fire marshal, ensure that this work is actively monitored to prevent fires. The design of MPS2 has been reviewed by qualified fire protection engineers for the protection from fire, as documented in both the Fire Hazard Analysis and the Fire Fighting Strategies. Modifications to the plant are reviewed and documented for impact to the program through the use of the Detailed Fire Protection Review checklist. The means to safely shutdown MPS2 in the event of a fire that does occur and is not rapidly extinguished, as expected, has been documented in the Appendix R Compliance report.

There are a series of Appendix R Abnormal Operating Procedures (AOPs) corresponding to each Appendix R fire area which are entered when an Appendix R fire is declared. Operations personnel train to these AOPs which identify, among other things, the steps to perform each OMA. Time critical OMAs are also identified within operating procedures which require that Operations personnel train to perform these time critical activities. The OMAs presented in this request are encompassed in the time critical procedure. Additionally, during verification and validation of these AOPs it was identified that for a fire in Fire Area R-14 an additional operator might be necessary to place the plant into hot standby. To that end, the staffing requirements for MPS2 were changed to add one licensed or non-licensed operator over the minimum technical specification requirement to be on duty each shift during Modes 1, 2, 3, or 4. This operator is designated as the Appendix R operator, and is not part of the credited five man fire brigade crew.

Additionally, MPS has a Station Emergency Response Organization (SERO) and appropriate emergency response facilities (ERFs). The declaration of an ALERT (events which are in progress or have occurred and involving an actual or potential substantial degradation of the level of safety of the plant, with releases expected to be limited to small fractions of the Environmental Protection Agency, Protective Action Guideline exposure levels) at MPS activates the SERO organization, which is immediately staffed by on-site personnel and is fully established with on-call personnel within 60 minutes of the ALERT being declared. After this time, off-shift Operations staff (e.g. personnel in training, performing administrative functions, etc.) may be called in as requested by the Shift Manager (SM). Many of the following OMAs are not required prior to the establishment of SERO. The additional staff available through SERO will improve the reliability of these OMAs. The responding Fire Brigade lead may request the SM augment the on-shift five member Fire Brigade with outside resources from the Town of Waterford Fire Department. The Town of Waterford Fire Department, in a letter of agreement with MPS, will respond to the site (when requested) in the event of a fire emergency or rescue and will attempt to control the situation with available resources.

In establishing the assumed times for operators to perform various tasks, a significant margin (i.e., a factor of two) was used with respect to the required time to establish the system function for all fire area scenarios identified in the exemption request (with the exception of RWST flow to charging). For example, the time critical action (TCA) to establish AFW flow is validated to be able to be completed within 22.5 minutes, which is one half of the 45 minute timeframe used in the fire scenario analysis. Similarly, the time to establish charging is validated to be able to be completed within 90 minutes, whereas the fire scenario analysis is based on 180 minutes. COP 200.18, "Time Critical Action Validation and Verification" will be revised to include the factor of two margin.

The less than 100% margin for establishing RWST flow is justified as this action may not be required until up to 252 minutes into the Appendix R event.

Additionally, the analyzed required switchover time (72 minutes) from the BASTs to RWST is based on technical requirements manual (TRM) minimum BAST inventory. With normal operating levels in the BASTs, considerably more margin is provided.

OMA 1: Manually Open Valve 2-CH-192

The valve is located in Fire Area R-4/FHA Fire Zone A-6A. Valve 2-CH-192 is an AOV that is normally closed and fails closed with loss of IA or power. It is provided with a back-up air accumulator. The OMA required for this component is necessary for: (1) loss of IA only (Fire Areas R-2, R-5, R-6, R-8, R-12 and R-15), (2) cable damage causing loss of DC power due to fire (R-9, R-13 and R-14) or (3) a combination of both loss of IA and cable damage (R-4, R-7, and R-17).

Loss of IA

Valve 2-CH-192 is an AOV with a safety related back-up air accumulator which allows it to be stroked open and held open for three hours after loss of IA from the control room. No operator action is required to align this back-up air supply.

Cable Damage

For a fire in Fire Area R-9, the OMA is required 72 minutes after charging is reestablished (which is not required for 180 minutes). For a fire in Fire Areas R-13 and R-14, the valve may be manipulated from the control room for up to 480 minutes using plant batteries as its power source.

Loss of IA and Cable Damage

For Fire Areas R-7 and R-17, the valve may be stroked open from the control room using back-up air (180 minutes) and plant batteries (480 minutes) for power. For a fire in Fire Area R-4, the OMA is required 72 minutes after charging is reestablished (which is not required for up 180 minutes). The Fire Area R-4 fire requires the operator to go into the fire affected area to perform the OMA. The applicable AOP discusses this and the OMA is performed after the fire is extinguished. By the time this OMA is required, the SERO will be fully staffed.

Added defense-in-depth is achieved by meeting the safe shutdown performance goals without the need to perform this OMA for 252 minutes after an event that causes loss of charging. Alternately, valve 2-CH-192 can be controlled from the control room for at least 180 minutes for fires in Fire Areas R-2, R-5, R-6, R-7, R-8, R-12, R-15 and R-17. For fires in Fire Areas R-13 and R-14, the valve can be controlled from the control room for up to 480 minutes. A Fire Area R-9 fire could cause an immediate loss of control of the valve; however, Fire Area R-9 is

equipped with detection and automatic suppression. Fire Area R-4 (charging pump cubicle area) has a prior approved exemption regarding pump separation. Based on the conclusions of the exemption, a fire would not cause the loss of all charging pumps because of the: (1) charging pump room configuration, (2) low combustible loading, (3) cable separation modifications, (4) in-place fire detection systems, (5) Fire Brigade and availability of manual fire suppression equipment, and (6) pre-planned fire fighting strategies. Only a fire directly impacting the 'C' charging pump cubicle could result in an immediate loss of control to valve 2-CH-192. Additional defense in depth for this action is that the 72 minute requirement to switch over to the RWST (after charging is reestablished) is based on the TRM minimum tank level for one tank and full charging flow at 44 gpm. The BASTs have a low level alarm at 70% and typically Operations maintains levels above 90% for both BASTs. Furthermore, if charging is not lost during the event then it is utilized to make up for RCS leakage. This leakage is postulated to be a maximum of 14 gpm. Both these factors can sustain charging, on the BASTs for significantly longer than 72 minutes before switching to the RWST.

OMA 2: Manually Open Valve 2-CH-429

Reestablishing the charging flow to the RCS is not required for 180 minutes from Reactor Trip/Loss of Charging. Valve 2-CH-429 is a normally open MOV (located in Fire Area R-2/FHA Fire Zone A-8C) which will fail as-is (open) on loss of power. Spurious operation of valve 2-CH-429 could result in the non-intentioned closure of the valve. Spurious operation of valve 2-CH-429 could occur from a fire in Fire Area R-2/FHA Fire Zones A-8D, A-13 or T-10. This OMA does not require the operator to enter the affected fire areas/zones as a fire in Zone A-8C will cause the valve to fail as-is (open). By the time this OMA is required, the SERO will be fully staffed.

Added defense-in-depth is achieved by meeting the safe shutdown performance goals without the need to perform this OMA for the first 180 minutes of the event. FHA Fire Areas/Zones A-8D, A-13 or T-10 are equipped with detection but no automatic suppression.

OMA 3: Open Breaker to Fail Valve 2-CH-506 Closed

N/A

OMA 4: Manually Open Valve 2-CH-508

Reestablishing the charging flow to the RCS is not required for 180 minutes from Reactor Trip/Loss of Charging. Valve 2-CH-508 is a MOV (located in Fire Area R-1 FHA Fire Zone A-1G) which will fail as-is (closed) on loss of power. With a loss of charging pump suction from the BASTs, flow can be established from the RWST via valves 2-CH-504, 2-CH-192 and 2-CS-13.1B. Valves 2-CH-508 and 2-CH-192 are both impacted due to a fire in R-7, R-9, R-13, R-14 and R-17. However, only in an R-9 fire could valve 2-CH-192 fail to operate immediately

due to a loss of DC power. Valve 2-CH-192 remains functional during a fire in R-13 or R-14 for up to 480 minutes on the station batteries as IA is not impacted. It also remains functional for at least 180 minutes during a fire in R-7 or R-17 due to a loss of IA or 480 minutes on the battery due to the loss of the EDG. These actions are identified in the applicable AOPs for each fire area.

Added defense-in-depth is achieved by meeting the safe shutdown performance goals without the need to perform this OMA for the first 180 minutes of the event. RWST suction flow path is available from the control room for the impacted fire areas except Fire Area R-9. Fire Area R-9 is equipped with both detection and automatic suppression. By the time this OMA is required, the SERO will be fully staffed.

OMA 5: Manually Open Valve 2-CH-509

Reestablishing the charging flow to the RCS is not required for 180 minutes from Reactor Trip/Loss of Charging. Valve 2-CH-509 is a MOV (located in Fire Area R-1/FHA Fire Zone A-1G) which will fail as-is (closed) on loss of power. With a loss of charging pump suction from the BASTs, flow can be established from the RWST via valves 2-CH-504, 2-CH-192 and 2-CS-13.1B. Valves 2-CH-509 and 2-CH-192 are both impacted due to a fire in Fire Areas R-7, R-9, R-13, R-14 and R-17. However, only in a Fire Area R-9 fire could 2-CH-192 fail closed immediately due to a loss of DC power. Valve 2-CH-192 remains functional during a fire in Fire Areas R-13 or R-14 for up to 480 minutes on the station batteries since IA is not impacted. It also remains functional for at least 180 minutes during a fire in Fire Areas R-7 or R-17 due to a loss of IA or 480 minutes on the battery due to the loss of the EDG. These actions are identified in the applicable AOPs for each fire area.

Added defense-in-depth is achieved by meeting the safe shutdown performance goals without the need to perform this OMA for the first 180 minutes of the event. RWST suction flow path is available from the control room for the impacted fire areas except Fire Area R-9. Fire Area R-9 is equipped with both detection and automatic suppression. By the time this OMA is required, the SERO will be fully staffed.

OMA 6: Open Breaker to Fail Valve 2-CH-517 closed

For a fire in Fire Areas R-2 and R-15 the OMA is not required for 180 minutes and does not require the operator to traverse the fire affected area in order to perform this action. For Fire Areas R-2 and R-15, the valve may spuriously open due to cable damage and provide a path for auxiliary spray. The cables are located in Fire Area R-2/FHA Fire Zone A-8D while the OMA is performed in Fire Area R-10/FHA Fire Area A-21. By the time this OMA is required, the SERO will be fully staffed.

Added defense-in-depth is achieved by meeting the safe shutdown performance goals without the need to perform this OMA for the first 180 minutes of the event. Both fire areas involved are equipped with detection but no automatic suppression.

OMA 7: Open Breaker to Fail Valve 2-CH-519 open

For a fire in the vicinity of the two valves 2-CH-519 and 2-CH-518, located in Fire Area R-15, the OMA is not required for 180 minutes. This OMA, which is performed in Fire Area R-10/FHA Fire Area A-21, does not require the operator to traverse the fire affected area (Fire Area R-15/FHA Fire Area C-1) in order to perform this action. By the time this OMA is required, the SERO will be fully staffed.

Added defense-in-depth is achieved by meeting the safe shutdown performance goals without the need to perform this OMA for the first 180 minutes of the event. The fire area involved is equipped with detection but no automatic suppression.

OMA 8: Manually Open Valve 2-CS-13.1B

Charging flow is not required for 180 minutes after loss of charging. This flow path is not required until the BASTs are drained, which is postulated to happen 72 minutes after charging is reestablished. Therefore this operation is not needed until 252 minutes after loss of charging. This valve is a normally open MOV which will fail as is (desired position) upon a loss of power. This OMA, which is performed outside the power block, does not require the operator to traverse the fire affected area (Fire Area R-2/FHA Fire Area A-13, MCC B61 enclosure) to perform this action. By the time this OMA is required, the SERO will be fully staffed.

Added defense-in-depth is achieved by meeting the safe shutdown performance goals without the need to perform this OMA for the first 252 minutes of the event. The fire area involved is equipped with detection but no automatic suppression.

OMA 9: Control Valve 2-FW-43B at Panel C10 or Local Manual Operation

AFW is not required until 45 minutes after a loss of main feedwater to maintain the decay heat removal function. The cables which may be affected by a fire are in Fire Area R-13/FHA Fire Area T-6 and Fire Area R-14/FHA Fire Areas T-7 and T-9. The cables are routed in conduit and are used to open, as well as modulate, the valve. These cables are isolated at the C-10 panel. A loss of IA or power fails the valve open.

Added defense-in-depth is achieved by meeting the safe shutdown performance goals without the need to perform this OMA for the first 45 minutes of the event. Fire Areas T-6 and T-7 are equipped with detection but no automatic suppression while Fire Area T-9 is equipped with detection and automatic suppression. A

loss of IA is not postulated for these areas. With a failed open valve, for a Fire Area R-13 fire, the TDAFW pump speed can be controlled from the C10 panel. Thus, the AFW flow rate can be controlled with a failed open AFW regulating valve. The cables for this equipment do not traverse Fire Area R-13/FHA Fire Area T-6 but enter this area through the floor in conduit, within 3 feet of the C-21 panel and access this panel near the floor from the cable vault (III.G.3 area). Therefore, only a fire which impacts the C-21 panel will require this OMA. For a Fire Area R-14 fire, the TDAFW pump speed can be controlled from the control room.

OMA 10: Manually Operate Valve 2-MS-190A

Valve 2-MS-190A is an ADV which provides a steam path for cooling the RCS via Steam Generator No. 1. The OMA for this valve is the result of loss of IA (Fire Areas R-2, R-5, R-6, R-8, R-12 and R-15). Loss of IA, which is a single train system, will result in the loss of both valves 2-MS-190A and 2-MS-190B. Valve 2-MS-190B is an AOV and has no back-up air supply. A loss of IA fails the valve closed and the initial secondary side steam release is from the MSSVs. The ADVs are desired to be used after AFW is established to provide a decay heat path in addition to the MSSVs. At that point, operating valve 2-MS-190A is desired. Therefore this OMA is performed after establishing AFW. AFW is not required until 45 minutes after loss of main feedwater.

Added defense-in-depth is achieved by meeting the safe shutdown performance goals without the need to perform this OMA. Prior to using this OMA, decay heat removal will be maintained by the MSSVs. The MSSVs can be relied upon until the control of steam release is achieved by this OMA. The fire areas for this OMA have detection and/or automatic suppression except for two FHA Fire Zones (A-8B and A-8E). As discussed in Attachment 1, Section 2.0, of the original submittal dated June 30, 2011, the combustible loading in FHA Fire Zone A-8B is low (equivalent fire severity in this zone is less than 15 minutes), with a majority of the combustible loading consisting of IEEE 383 qualified cable insulation. Additionally, combustible loading in FHA Fire Zone A-8E is also low (equivalent fire severity in this zone is less than 15 minutes). Ignition sources in this zone are negligible. Further, the installation of detection in FHA Fire Zone A-8E would be ineffective and would not provide additional protection, as the ceiling height of this zone is approximately 120 feet above the floor.

OMA 11: Control Valve 2-MS-190B at Panel C10 or Local Manual Operation

Valve 2-MS-190B is an ADV which provides a steam path for cooling the RCS via Steam Generator No. 2. The OMA for this valve is the result of loss of IA (Fire Areas R-4, R-7, R-15, and R-17). Loss of IA, which is a single train system, will result in the loss of both valves 2-MS-190A and 2-MS-190B. A fire in Fire Area R-13 may impact valve 2-MS-190B due to cable damage. Valve 2-MS-190B is an AOV and has no back-up air supply. A loss of air fails the valve

closed and initial secondary side steam release is from the MSSVs. The ADVs are desired to be used after AFW is established to provide a decay heat path in addition to the MSSVs. At that point operating valve 2-MS-190B is desired. Therefore this OMA is performed after establishing AFW. AFW is not required until 45 minutes after loss of main feedwater. The Fire Area R-13/FHA Fire Area T-6 involved, is equipped with detection but no automatic suppression.

Added defense-in-depth is achieved by meeting the safe shutdown performance goals without the need to perform this OMA. Prior to using this OMA, decay heat removal will be maintained by the MSSVs. The MSSVs can be relied upon until the control of steam release is achieved by this OMA. The cables for this equipment do not traverse Fire Area T-6 but enter the C-21 panel directly through the floor from the cable vault (III.G.3 area). Therefore, only a fire originating in the C-21 panel will impact this component. The fire areas for this OMA have detection and/or automatic suppression except for two FHA fire zones (A-10A and A-10C). As discussed in Attachment 1, Section 2.0, of the original submittal dated June 30, 2011, the combustible loading in FHA Fire Zone A-10A is low (equivalent fire severity in this zone is less than 15 minutes). While this zone does not have detection, it opens up directly to FHA Fire Zone A-10B above, which is provided with a smoke detection system. As a result, a fire in FHA Fire Zone A-10A may be detected by the smoke detection in FHA Fire Zone A-10B. Combustible loading in FHA Fire Zone A-10C is also low (equivalent fire severity in this zone is approximately 5 minutes), with a majority of the combustible loading consisting of IEEE 383 qualified cable insulation. Further, the installation of detection in FHA Fire Zone A-10C would be ineffective and would not provide additional protection, as the ceiling height of this zone is approximately 120 feet above the floor.

OMA 12: Pull Control Power Fuses for Breaker A305 and Ensure Breaker is Open

Only a fire directly involving bus 24D, located in the Upper 4.16 kV Switchgear room, has the potential to impact the control power circuits to buses 24C and 24E. Normal alignment of the swing bus 24E has the non-aligned breaker racked down and its control power fuses removed. If bus 24C is aligned to bus 24E then breaker A408 (24D supply breaker) would be racked down and its control power fuses removed.

This OMA presupposes that bus 24E is aligned to bus 24C (breaker A305 racked up and closed) and a fire in bus 24D causes a fault on the cables located in cubicle A408, bus 24D to bus 24E interconnecting cables. This effectively puts faults on bus 24E. Given the presupposed alignment, bus 24C's automatic protection devices may isolate the fault prior to bus 24E protection devices. This would cause the loss of the credited bus (24C). The actions for this OMA isolate the fault to bus 24E and occur in the Lower 4.16 kV switchgear, which is a short

distance from the Control Room and separated from the fire by the 45 Foot Cable Vaults' ceiling and floor.

Added defense-in-depth is achieved by meeting the safe shutdown performance goals without the need to perform this OMA for the first 45 minutes of the event. The breaker A305 ground fault protection or the over current protection circuit should trip and isolate the fault to bus 24E. The action restores the credited AC source to a fully capable and functional state with full control from the control room. Fire Area R-2/FHA Fire Area T-10 is equipped with detection but no automatic suppression.

OMA 13: Pull Control Power Fuses for Breaker A408 and Ensure Breaker is Open

Only a fire directly involving buses 24E or 24C, located in the Lower 4.16 kV Switchgear room, has the potential to impact the control power circuits to breaker A408. Normal alignment of the swing bus 24E has the non-aligned breaker racked down and its control power fuses removed.

This OMA presupposes that bus 24E is aligned to bus 24D (breaker A408 racked up and closed) and a fire in bus 24E or in bus 24C which causes a fault on the cables located in cubicle A305, 24C to 24E interconnecting cables. Either possibility effectively puts faults on bus 24E. Given the presupposed alignment, bus 24D's automatic protection devices may isolate the fault prior to bus 24E protection devices. This would cause the loss of the credited bus (24D). The action for this OMA to isolate the fault to bus 24E precludes a spurious closure of breaker A408 and occurs in the Upper 4.16 kV Switchgear, which is separated from the fire by the 45 Foot Cable Vaults' ceiling and floor.

Added defense-in-depth is achieved by meeting the safe shutdown performance goals without the need to perform this OMA for the first 180 minutes of the event. The action restores power to the credited AC loads and full control from the control room. FHA Fire Area T-7 has detection but no automatic suppression.

OMA 14: Pull Control Power Fuses for Breaker A410 and Ensure Breaker is Open

Only a fire directly involving bus 24E, located in the Lower 4.16 kV Switchgear room, has the potential to impact the control power circuits to breaker A410, Tie Feeder Breaker from bus 24B. Breaker A410 closing control circuitry enter breaker cubicle A505 for bus alignment breaker coordination. Normal alignment of the swing bus 24E has the non-aligned breaker is racked down and its control power fuses removed. Breaker A410 is normally closed powering bus 24D from bus 24B, which is powered from the Normal Station Service Transformer (NSST). Breaker A410 is open when bus 24D is aligned to the RSST or when the 'B' EDG is powering bus 24D, in isolated mode.

This OMA presupposes that bus 24E is aligned to bus 24D (breaker A408 racked up and closed) and a fire in bus 24E could cause a spurious closure of breaker A410. The action for this OMA ensures bus 24D stays isolated protecting the vital loads. This action occurs in the Upper 4.16 kV Switchgear, which is separated from the fire by the ceiling of the Lower 4.16 kV Switchgear room and the 45 Foot Cable Vault and the floor of the Upper 4.16 kV Switchgear room.

Added defense-in-depth is achieved by meeting the safe shutdown performance goals without the need to perform this OMA for the first 180 minutes of the event. The action restores power to the credited AC loads and full control from the control room. FHA Fire Area T-7 has detection but no automatic suppression.

OMA 15: Pull Control Power Fuses for Breaker A411 and Ensure Breaker is Open

Only a fire directly involving bus 24E or 24C, located in the Lower 4.16 kV Switchgear room, has the potential to impact the control power circuits to breaker A411, Main Feeder Breaker from the RSST. Breaker A411 control circuitry enter breaker cubicle A301 for bus alignment breaker coordination. Normal alignment of the swing bus 24E has the non-aligned breaker racked down and its control power fuses removed. Breaker A411 is normally open and is closed when bus 24D is aligned to the RSST.

This OMA presupposes that bus 24E is aligned to bus 24D (breaker A408 racked up and closed). The action for this OMA ensures bus 24D stays isolated protecting the vital loads. This action occurs in the Upper 4.16 kV Switchgear, which is separated from the fire by the ceiling of the Lower 4.16 kV Switchgear room and the 45 Foot Cable Vault and the floor of the Upper 4.16 kV Switchgear room.

Added defense-in-depth is achieved by meeting the safe shutdown performance goals without the need to perform this OMA for the first 180 minutes of the event. The action restores power to the credited AC loads and full control from the control room. FHA Fire Area T-7 has detection but no automatic suppression.

OMA 16: Pull Control Power Fuses for Breaker A406 and Ensure Breaker is Open

The target wires are the control circuits for the 'B' AFW pump located internal to the C21 panel. A fire internal to the C21 panel or in the immediate vicinity, located in Fire Area R-13/FHA Fire Area T-6, could possibly impact these wires. The result of this impact could be the spurious starting of the 'B' AFW or an instantaneous fault current of 520 amps or greater could cause the 24D DC control power supply breaker to trip prior to the breaker A406 control power fuses clearing due to breaker – fuse coordination.

Added defense-in-depth is achieved by meeting the safe shutdown performance goals without the need to perform this OMA for the first 180 minutes of the event. Fire Area R-13/FHA Fire Area T-6 is equipped with detection but no automatic suppression. It is located near the control room. A fire in Fire Area R-13/FHA Fire Area T-6, if it were to occur, would not impact the operator's ability to perform this OMA. At the completion of this action, full control of the credited safe shutdown equipment is restored to the control room. The cables for this equipment do not traverse FHA Fire Area T-6 but enter this area through the floor in conduit, within 3 feet of the C-21 panel, and access this panel near the floor from the cable vault (III.G.3 area). Therefore, only a fire which impacts the C-21 panel will require this OMA.

OMA 17: Operate H-21 from Panel C10

AFW is not necessary until 45 minutes after a loss of main feedwater. The cables which may be affected by a fire are in Fire Area R-13/FHA Fire Area T-6. The cables are routed in conduit and are used to control TDAFW pump speed. These cables are isolated, from a fire in Fire Area R-13/FHA Fire Area T-6, at the C-10 panel. Control of circuit H-21, in conjunction with control of valve SV-4188 (TDAFW turbine steam supply valve) from the C-10 panel, allows for flow control to the required steam generator. The OMA is performed in Fire Area R-2/FHA Fire Area T-10 and does not require the operator to transverse the fire impacted area.

Added defense-in-depth is achieved by meeting the safe shutdown performance goals without the need to perform this OMA for the first 45 minutes of the event. Fire Area R-13/FHA Fire Area T-6 is equipped with detection but no automatic suppression and is in close proximity to the control room. The cables for this equipment do not traverse Fire Area R-13/FHA Fire Area T-6 but enter this area through the floor in conduit, within 3 feet of C-21 panel, and access this panel near the floor from the cable vault (III.G.3 area). Therefore, only a fire which impacts the C-21 panel will require this OMA.

OMA 18: Obtain BAST Level at Local Level Indicator LI-206A

Level transmitter LT-206 is the Z2 powered level transmitter for the 'A' BAST. The BASTs provide initial suction flow to the charging pumps. Charging flow is not required for 180 minutes after a loss of charging. The BAST minimum level is set by the TRM and provides at least 72 minutes of continuous flow to the charging system before requiring a switch over to the RWST for charging pump suction. Therefore, once charging flow is reestablished, the operating staff has a minimum of 72 minutes of flow regardless of the transmitter functionality. The fire areas of concern, Fire Area R-2/FHA Fire Area T-10 and Zone A-8D) and Fire Area R-10/FHA Fire Area A-21, do not require the operator to transverse the

fire affected area to perform the OMA (Fire Area R-1/FHA Fire Zone A-1G). By the time this OMA is required, the SERO will be fully staffed.

Added defense-in-depth is achieved by meeting the safe shutdown performance goals without the need to perform this OMA for the first 252 minutes of the event. A fire in Fire Area R-2/FHA Fire Area T-10 will not impact the electrical cables for valves 2-CH-192 or 2-CS-13.1B. These two valves can be operated from the control room to provide a suction path for the charging pumps from the RWST. A loss of IA will impact valve 2-CH-192 and cause the valve to fail closed after 180 minutes. This area is equipped with detection but no automatic suppression. For a fire in Fire Area R-10, the suction path from the RWST to the charging pumps remains free of cable damage and can be controlled from the control room. Additionally, Fire Area R-10 has detection and automatic suppression.

OMA 19: Obtain BAST Level at Local Level Indicator LI-208A

Level transmitter LT-208 is the Z2 powered level transmitter for the 'B' BAST. The BASTs provide initial suction flow to the charging pumps. Charging flow is not required for 180 minutes after a loss of charging. The BAST minimum level is set by the TRM and provides at least 72 minutes of continuous flow to the charging system before requiring a switch over to the RWST for charging pump suction. Therefore, once charging flow is reestablished, the operating staff has a minimum of 72 minutes of flow regardless of the transmitter functionality. The fire areas of concern, Fire Area R-2/FHA Fire Area T-10 and Zone A-8D and Fire Area R-10/FHA Fire Area A-21, do not require the operator to transverse the fire affected area to perform the OMA (Fire Area R-1/FHA Fire Zone A-1G). By the time this OMA is required, the SERO will be fully staffed.

Added defense-in-depth is achieved by meeting the safe shutdown performance goals without the need to perform this OMA for the first 252 minutes of the event. A fire in Fire Area R-2/FHA Fire Area T-10 will not impact the electrical cables for valves 2-CH-192 or 2-CS-13.1B. These two valves can be operated from the control room to provide a suction path for the charging pumps from the RWST. A loss of IA will impact valve 2-CH-192 and cause it to fail closed after 180 minutes. This area is equipped with detection but no automatic suppression. For a fire in Fire Area R-10/FHA Fire Area A-21, the suction path from the RWST to the charging pumps remains free of cable damage and can be controlled from the control room. Additionally, Fire Area R-10/FHA Fire Area A-21 has detection and automatic suppression.

OMA 20: Obtain CST Level at Local Level Indicating Switch LIS-5489A

Level transmitter LT-5282 is the Z2 powered level transmitter for the CST. The CST provides initial suction flow to the AFW pumps. The MPS2 Technical Specifications (Section 3.7.1.3) require a minimum CST level such that the AFW system can be supplied with sufficient water to maintain flow for 10 hours. Level

transmitter LT-5282 indication cables are routed through Fire Area R-2 (FHA Fire Area T-10 and Zone A-8D) and Fire Area R-13/FHA Fire Area T-6 and could be damaged due to a fire in one of these areas. A fire in Fire Area R-8/FHA Fire Area A-16 could cause a loss of the 'B' EDG resulting in the depletion of the 'B' battery after 480 minutes causing a loss of level transmitter LT-5282. A fire in Fire Area R-10/FHA Fire Area A-21 could cause a loss of the 'B' battery which causes the loss of level transmitter LT-5282.

Both the level transmitter LT-5282 and the level indicating switch LIS-5489A are identified in the TRM. The functionality of both of their surveillances are in accordance with the TRM technical surveillance requirements (Table 7.1.16-1 and Table 7.1.16-2). By the time this OMA is required, the SERO will be fully staffed.

Added defense-in-depth is achieved by meeting the safe shutdown performance goals without the need to perform this OMA for the first 600 minutes of the event. There is detection in each of the fire areas which could impact this level transmitter. The cables for this equipment do not traverse Fire Area R-13/FHA Fire Area T-6 but enter the C-21 panel directly through the floor from the cable vault (III.G.3 area). Therefore, only a fire originating in the C-21 panel will impact this component.

Although not included in the Appendix R program, the CST level alarms generated by instruments Level Indicating Switch LIS-5489 and Level Transmitter LT-5280 add another level of defense in depth as they are not impacted by fires in Fire Areas R-2 or R-13. The cables for LIS-5489 and LT-5280 do not route through these fire areas and they are Facility Z2 components. Level controller LC-5280C initiates the C-12 window (red window), "Condensate Storage Tank at Minimum Level" at 63% CST level (reference Alarm Response Procedure (ARP) 2590D-047). Level Indicating Switch LIS-5489 initiates the B-12 window, "Condensate Storage Tank Level LO LO" at 21.3% CST level (reference ARP 2590D-046).

OMA 21: Operate Charging Pump P18C from Panel C10

Charging pump P18C is Z2 powered. Charging flow is not required for 180 minutes after loss of charging. The C10 panel isolates the pump circuitry from Fire Area R-13/FHA Fire Area T-6 and allows for control of pump P18C from the panel. The C10 panel is located in Fire Area R-2/FHA Fire Area T-10 and does not require the operator to transverse the fire impacted area (Fire Area R-13/FHA Fire Area T-6). By the time this OMA is required SERO will be fully staffed.

Added defense-in-depth is achieved by meeting the safe shutdown performance goals without the need to perform this OMA for the first 180 minutes of the event. Fire Area R-13/FHA Fire Area T-6 is equipped with detection but no automatic

suppression and is in close proximity to the control room. The cables for this equipment do not traverse Fire Area R-13/FHA Fire Area T-6 but enter C-21 panel directly through the floor from the cable vault (III.G.3 area). Therefore, only a fire originating in the C-21 panel will impact this component.

OMA 22: Operate Valve SV-4188 from Panel C10

AFW is not necessary until 45 minutes after a loss of main feedwater. Valve SV-4188 is a normally closed MOV. The cables which may be affected by a fire are in Fire Area R-13/FHA Fire Area T-6. The cables are routed in conduit and are used to control the valve. These cables are isolated, from a fire in Fire Area R-13/FHA Fire Area T-6 at panel C-10. Control of valve SV-4188, in conjunction with control of circuit H-21 (AFW pump speed control) from the C-10 panel, allows for flow control to the required steam generator. The OMA is performed in Fire Area R-2/FHA Fire Area T-10 and does not require the operator to traverse the fire impacted area.

Added defense-in-depth is achieved by meeting the safe shutdown performance goals without the need to perform this OMA for the first 45 minutes of the event. Fire Area R-13/FHA Fire Area T-6 is equipped with detection but no automatic suppression and is in close proximity to the control room. The cables for this equipment do not traverse Fire Area R-13/FHA Fire Area T-6 but enter this area through the floor in conduit, within 3 feet of panel C-21, and enter this panel near the floor from the cable vault (III.G.3 area). Therefore, only a fire which impacts panel C-21 will require this OMA.

OMA 23: Pull Control Power Fuses for Breaker A401 and Ensure Breaker is Closed

Only a fire directly involving bus 24E, located in the Lower 4.16 kV Switchgear room, has the potential to impact the control power circuits to breaker A401, 'B' EDG Feeder Breaker to Bus 24D. Breaker A401 tripping circuitry enter breaker cubicle A505 for bus alignment breaker coordination. Normal alignment of the swing bus 24E has the non-aligned breaker racked down and its control power fuses removed.

This OMA presupposes that bus 24E is aligned to bus 24D (breaker A408 racked up and closed) and a fire impacting cubicle A505 could spuriously trip breaker A401, impacting emergency power to bus 24D. The action for this OMA occurs in the Upper 4.16 kV Switchgear, and is separated from the fire by the 45 Foot Cable Vaults' ceiling and floor.

Added defense in depth is achieved by meeting the safe shutdown performance goals without the need to perform this OMA for the first 180 minutes of the event. The action restores power to the credited AC loads and full control from the

control room. Fire Area R-14/FHA Fire Area T-7 has detection but no automatic suppression.

OMA 24: Locally Close Breaker DV2021

A fire in Fire Area R-13/FHA Fire Area T-6 has the potential to cause a loss of DC control power to bus 24D. If bus 24D is aligned to bus 24E, a fire in Fire Area R-14/FHA Fire Area T-7 also has the potential to cause a loss of DC control power to bus 24D. This action restores DC control power to credited equipment.

Added defense-in-depth is achieved by meeting the safe shutdown performance goals without the need to perform this OMA for the first 180 minutes of the event. The action restores power to the credited AC loads and full control from the control room. FHA Fire Areas T-6 and T-7 are equipped with detection but no automatic suppression. The cables for this equipment do not traverse Fire Area T-6 but enter panel C-21 directly through the floor from the cable vault (III.G.3 area). Therefore, only a fire originating in panel C-21 will impact this component.

RAI-02.4 Question:

Attachment 1, Page 28, Section 4.0, "Fire Area R-2" of the submittal states that a fire will affect all Facility Z2 shutdown components and that Facility Z1 is used to achieve and maintain hot standby. Similar statements are made throughout the submittal including Attachment 1, page 34 for Fire Area R-7, page 35 for Fire Area R-8, etc. Provide a description of Facility Z1 and Facility Z2 shutdown components including all components, their locations, separation from each other, etc.

DNC Response:

The 4.16 kV subsystems are divided into two specific "Facilities". Facility Z1 begins with load center 24C which powers one train of Engineered Safety Features (ESFs) and is provided with an emergency power supply by the 'A' EDG. Facility Z2 begins with load center 24D and powers a redundant second train of ESF and is provided with an emergency power supply by the 'B' EDG.

Vital power and control cables fall mainly into two redundancy classifications; Channel Z1 and Channel Z2. In a few cases there is also a Channel Z5, which is a system that can be transferred from one source to another, and is run as described below.

Channel Z5 is associated with the spare units fed from 4.16 kV emergency bus A5; namely, service water pump P5B, Reactor Building Closed Cooling Water

(RBCCW) pump P11B, and High Pressure Safety Injection (HPSI) pump P41B. The power circuits and the control circuits for this equipment are all transferred simultaneously to Channel Z1 or Z2 sources. Thus, their circuits are routed together as Channel Z5. The Z5 control circuit and power circuit for the spare 480 volt charging pump P18B are transferred to Z1 or Z2 sources, independent of the above circuits. Hence, the Z5 charging pump circuits are routed separately from those associated with bus A-5. Non-vital Channel 5 circuits are those associated with instrument loops or metering circuits. Channel 5 and Z5 circuits are routed together only where it can be demonstrated that their transfer to Channel 1 (Z1) or 2 (Z2) sources does not impair the separation of redundant safety related circuits.

The TDAFW pump, associated steam inlet valve, and speed adjuster motor have the capability of being transferred from their normal power supply Facility Z2 125VDC (Panel DV-20) to Facility Z1 125VDC (Panel DV-10). The transfer is accomplished by switching the position of two key-locked isolation switches on panel C-05 in the event of a loss of Facility Z2 125VDC or a loss of DC panel DV-20. The associated wiring from panel C-05 is routed in dedicated Z5 conduit to panel C-21, panel C-10, and ultimately to the steam inlet valve and the speed adjuster motor.

In summary, Facility Z1 would be synonymous with 'A' train while Facility Z2 would be synonymous with 'B' train.

RAI-03 Other Evaluations

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

RAI-03.1 Question:

Provide a discussion of any other exemptions or evaluations, including licensee-developed evaluations, e.g., Generic Letter 86-10 evaluations that impact this request in any way and provide a justification for why such impact should be considered acceptable and how the analysis remains valid in light of this exemption request.

DNC Response:

Fire Area R-14/FHA Area T-7

There are four Generic Letter 86-10 evaluations and no exemptions that are applicable to this fire area. Three of these evaluations (No. 102, FP-EV-03-0004,

and FP-EV-06-0002) address issues pertaining to fire barriers. These evaluations concluded that this area is sufficiently bounded to withstand the hazards associated with the area and, as necessary, to protect equipment within the fire area from a fire outside the area. Further, none of the fire barrier issues addressed by these evaluations would adversely impact, through the spread of fire or products of combustion, plant areas where OMAs are performed or the respective travel paths necessary to reach these areas (see also response to RAI-02.3 and RAI-09.3). The final evaluation (FP-EV-98-0007) documents the acceptability of partial suppression in Appendix R Fire Area R-14. Appendix R Fire Area R-14 consists of the lower 6.9 kV and 4.16 kV switchgear room (FHA Fire Area T-7) and the east cable vault (FHA Fire Area T-9). FHA Fire Area T-7 contains redundant safe shutdown cabling protected with 3-hour fire-rated wrap and is provided with smoke detection, while FHA Fire Area T-9 contains redundant safe shutdown cabling with 1-hour fire-rated wrap and is provided with automatic suppression and detection. While these areas are independently compliant with III.G.2 requirements, the fact that 1-hour fire wrap was used in Fire Area T-9 requires area wide suppression for all of Appendix R Fire Area R-14. The evaluation documents the acceptability of not having automatic suppression in FHA Fire Area T-7 based on the independent compliance to Appendix R separation requirements of each of these fire areas, low combustible loading in FHA Fire Area T-7, and the fact that these are two individual rooms that are separated from one another by fire rated construction that would be sufficient to prevent a fire in FHA Fire Area T-7 from spreading to FHA Fire Area T-9. Based on the subject matter of the Generic Letter 86-10 evaluations and the conclusions drawn by the evaluations, there is no adverse impact on the ability to perform OMAs and the conclusions of the Generic Letter 86-10 evaluations would remain valid with OMAs in place.

Fire Area R-2/FHA Area T-8

There are four Generic Letter 86-10 evaluations and no exemptions that are applicable to this fire area. The evaluations (No. 087, FP-EV-98-0051, FP-EV-03-0001 and FP-EV-06-0002) address issues pertaining to fire barriers. These evaluations concluded that this area is sufficiently bounded to withstand the hazards associated with the area and, as necessary, to protect equipment within the fire area from a fire outside the area. Further, none of the fire barrier issues addressed by these evaluations would adversely impact, through the spread of fire or products of combustion, plant areas where OMAs are performed or the respective travel paths necessary to reach these areas (see also response to RAI-02.3 and RAI-09.3). Based on the subject matter of the Generic Letter 86-10 evaluations and the conclusions drawn by the evaluations, there is no adverse impact on the ability to perform OMAs and the conclusions of the Generic Letter 86-10 evaluations would remain valid with OMAs in place.

Fire Area R-17/FHA Zone A-10B

There are five Generic Letter 86-10 evaluations and no exemptions that are applicable to this fire zone. The evaluations (FP-EV-98-0008, FP-EV-98-0024, FP-EV-98-0025, FP-EV-99-0003 and FP-EV-09-0001) address issues pertaining to fire barriers. These evaluations concluded that this area is sufficiently bounded to withstand the hazards associated with the area and, as necessary, to protect equipment within the area from a fire outside the area. Further, none of the fire barrier issues addressed by these evaluations would adversely impact, through the spread of fire or products of combustion, plant areas where OMAs are performed or the respective travel paths necessary to reach these areas (see also response to RAI-02.3 and RAI 09.3). Based on the subject matter of the Generic Letter 86-10 evaluations and the conclusions drawn by the evaluations, there is no adverse impact on the ability to perform OMAs and the conclusions of the Generic Letter 86-10 evaluations would remain valid with OMAs in place.

Fire Area R-17/FHA Zone A-10C

There are six Generic Letter 86-10 evaluations and no exemptions that are applicable to this fire zone. The evaluations (FP-EV-98-0004, FP-EV-98-0008, FP-EV-98-0020, FP-EV-98-0022, FP-EV-98-0030, and FP-EV-99-0003) address issues pertaining to fire barriers. These evaluations concluded that this area is sufficiently bounded to withstand the hazards associated with the area and, as necessary, to protect equipment within this area from a fire outside the area. A fire in this area may require an OMA in Fire Area R-2/FHA Fire Zone A-8E, which is located a minimum of 20 feet away from Fire Area R-17/FHA Fire Zone A-10C. Fire Area R-2/FHA Fire Zone A-8E and Fire Area R-17/FHA Fire Zone A-10C indirectly communicate with one another via partial height walls (approximately 10 feet) which were evaluated as acceptable as part of evaluation FP-EV-98-0022. Despite communication between these zones, the OMA in Fire Area R-2/FHA Fire Zone A-8E as a result of a fire in Fire Area R-17/FHA Fire Zone A-10C would not be impacted. This is based on the lack of intervening combustibles between the fire zones, low combustible loading in Fire Area R-17/FHA Fire Zone A-10C which consists almost entirely of fire retardant IEEE 383 cable, and the fact that the ceiling height in this zone is approximately 120 feet above the floor level which would preclude the buildup of smoke and hot gasses that could impede the performance of the OMA in Fire Area R-2/FHA Fire Zone A-8E. The OMA is performed after AFW is established (which is required within 45 minutes after a loss of main feedwater). Access for the OMA is such that it would not be interfered with by the fire fighting activities for Fire Area R-17/FHA Fire Zone A-10C. Further, smoke removal efforts from Fire Area R-17/FHA Fire Zone A-10C would not interfere with the OMA activity. As such, none of the fire barrier issues addressed by these evaluations would adversely impact, through the spread of fire or products of combustion, plant areas where the OMA is performed or the respective travel paths necessary to reach this area (see also response to RAI-02.3 and RAI-09.3). Based on the subject matter of

the Generic Letter 86-10 evaluations and the conclusions drawn by the evaluations, there is no adverse impact on the ability to perform the OMA and the conclusions of the Generic Letter 86-10 evaluations would remain valid with the OMA in place.

Fire Area R-2/FHA Area T-10

There are four Generic Letter 86-10 evaluations and no exemptions that are applicable to this fire area. The evaluations (FP-EV-98-0042, FP-EV-98-0051, FP-EV-99-0012, and FP-EV-99-0019) address issues pertaining to fire barriers. These evaluations concluded that this area is sufficiently bounded to withstand the hazards associated with the area and, as necessary, to protect equipment within the area from a fire outside the area. Further, none of the fire barrier issues addressed by these evaluations would adversely impact, through the spread of fire or products of combustion, plant areas where OMAs are performed or the respective travel paths necessary to reach these areas (see also response to RAI-02.3 and RAI-09.3). Based on the subject matter of the Generic Letter 86-10 evaluations and the conclusions drawn by the evaluations, there is no adverse impact on the ability to perform OMAs and the conclusions of the Generic Letter 86-10 evaluations would remain valid with OMAs in place.

Fire Area R-14/FHA Area T-9

There are eight Generic Letter 86-10 evaluations and no exemptions that are applicable to this fire area. Seven of these evaluations (No. 087, FP-EV-98-0051, FP-EV-98-0052, FP-EV-99-0012, FP-RV-03-0001, FP-EV-03-0004 and FP-EV-06-0002) address issues pertaining to fire barriers. These evaluations concluded that this area was sufficiently bounded to withstand the hazards associated with the area and, as necessary, to protect equipment within the fire area from a fire outside the area. A fire in this area may require OMAs in Fire Area R-2/FHA Fire Area T-10 above. Engineering evaluation FP-EV-98-0051 documents the acceptability of penetration seals in the ceiling of this fire area (floor of Fire Area R-2/FHA Fire Area T-10) due to the installed depth of seal material being slightly less than that required for a full 3-hour fire rating. Despite this fact, OMAs in Fire Area R-2/FHA Fire Area T-10 would not be impacted due to a fire in Fire Area R-14/FHA Fire Area T-9. This is based on the equivalent fire loading in Fire Area R-14/FHA Fire Area T-9 (approximately 101 minutes) being much less than the 3-hour fire test the qualified seal was exposed to and installed suppression and detection in Fire Area R-14/FHA Fire Area T-9. Further, the combustibles in Fire Area R-14/FHA Fire Area T-9 consist of fire-retardant Thermo-lag wrap and IEEE 383 cable, making a large fire in this area unlikely. Engineering evaluation FP-EV-98-0052 documents the acceptability of several unsealed steel deck rib voids that may allow for the spread of smoke and hot gasses between Fire Area R-14/FHA Fire Area T-9 and Fire Area R-13/FHA Fire Area T-6. Despite this fact, there would be no impact on OMAs, as areas requiring OMAs for a fire in Fire Area R-14/FHA Fire Area T-9 are independent of

Fire Area R-13/FHA Fire Area T-6. Further, travel paths to reach these areas exist that are independent of Fire Area R-13/FHA Area T-6. As such, none of the fire barrier issues addressed by these evaluations would adversely impact, through the spread of fire or products of combustion, plant areas where OMAs are performed or the respective travel paths necessary to reach these areas (see also response to RAI-02.3 and RAI-09.3). The final evaluation (FP-EV-98-0007) documents the acceptability of partial suppression in Fire Area R-14. Appendix R Fire Area R-14 consists of the lower 6.9 kV and 4.16 kV switchgear room (FHA Fire Area T-7) and the east cable vault (FHA Fire Area T-9). FHA Fire Area T-7 contains redundant safe shutdown cabling protected with 3-hour fire-rated wrap and is provided with smoke detection, while FHA Fire Area T-9 contains redundant safe shutdown cabling with 1-hour fire-rated wrap and is provided with automatic suppression and detection. While these areas are independently compliant with III.G.2 requirements, the fact that 1-hour fire-rated wrap was used in Fire Area T-9, requires area wide suppression for all of Fire Area R-14. The evaluation documents the acceptability of not having automatic suppression in FHA Fire Area T-7 based on the independent compliance to Appendix R separation requirements of each of these fire areas, low combustible loading in FHA Fire Area T-7 and the fact that these are two individual rooms that are separated from one another by fire rated construction that would be sufficient to prevent a fire in Fire Area T-7 from spreading to FHA Fire Area T-9. Based on the subject matter of the Generic Letter 86-10 evaluations and the conclusions drawn by the evaluations, there is no adverse impact on the ability to perform OMAs and the conclusions of the Generic Letter 86-10 evaluations would remain valid with OMAs in place.

Fire Area R-2/FHA Area A-13

There are three Generic Letter 86-10 evaluations and one exemption that are applicable to this fire area. The exemption documents the acceptability of the use of a water curtain in lieu of a 3-hour rated fire barrier to provide intra-fire area separation between B51 and B61 due to the presence of intervening combustibles as defined in Section III.G.2 of Appendix R. At the time of this exemption, Fire Area A-13 was part of Appendix R Fire Area R-1. Two of the evaluations (FP-EV-98-0013, FP-EV-98-0044) address issues pertaining to fire barriers, with FP-EV-98-0013 addressing the acceptability of the aforementioned water curtain to provide adequate separation between Appendix R Fire Areas R-1 and R-2. This evaluation was necessary after Fire Area A-13 was converted to Appendix R Fire Area R-2. These evaluations concluded that this area was sufficiently bounded to withstand the hazards associated with the area and, as necessary, to protect equipment within the area from a fire outside the area. Further, none of the fire barrier issues addressed by these evaluations would adversely impact, through the spread of fire or products of combustion, plant areas where OMAs are performed or the respective travel paths necessary to reach these areas (see also response to RAI-02.3 and RAI-09.3). The final

evaluation (FP-EV-98-0059) documented that the cooling unit for the MCC B61 High Energy Line Break (HELB) enclosure would remain operable following a fire in adjacent Fire Area R-1/FHA Fire Zone A-12A. As such, the design basis temperature within the HELB enclosure would be maintained, eliminating the need to provide portable fans to cool the enclosure following a fire in Fire Area R-1/FHA Fire Zone A-12A. Based on the conclusions drawn by the exemption and GL 86-10, there is no adverse impact on the ability to perform OMAs and the conclusions of these documents would remain valid with OMAs in place.

Fire Area R-2/FHA Zone A-8C

There are three Generic Letter 86-10 evaluations and no exemptions that are applicable to this fire zone. All of these evaluations (FP-EV-98-0041, FP-EV-99-0007 and FP-EV-99-0013) address issues pertaining to fire barriers. These evaluations concluded that this area was sufficiently bounded to withstand the hazards associated with the area and, as necessary, to protect equipment within this area from a fire outside the area. A fire in this area may require manual actions within Fire Area R-4/FHA Fire Zone A-6A. Although engineering evaluation FP-EV-98-0041 documents the acceptability of the metal partition wall that separates the charging pump cubicles (Fire Zone A-6A) from Fire Zone A-8C, a worst case scenario of the metal partition failure has also been evaluated. Fire zones A-6A and A-8C are located on the (-) 25 foot-6 inch and (-) 5 foot-0 inch elevations of the auxiliary building, respectively. An opening exists in the floor of FHA Fire Zone A-8C which could result in direct communication between Fire Zones A-6A and A-8C in the event of the failure of the metal partition wall. Despite the non-fire rated metal partition and the opening in the floor of Fire Area R-2/FHA Fire Zone A-8C, OMAs in Fire Area R-4/FHA Fire Zone A-6A, as a result of a fire in Fire Area R-2/FHA Fire Zone A-8C, would not be impacted. This is based on the lack of intervening combustibles between the fire zones, low combustible loading in Fire Area R-2/FHA Fire Zone A-8C which consists almost entirely of fire retardant IEEE 383 cable and the fact that heat and products of combustion from a fire in Fire Area R-2/FHA Fire Zone A-8C would not travel to lower elevations and spread past the metal partition wall to Fire Area R-4/FHA Fire Zone A-6A. As such, none of the fire barrier issues addressed by these evaluations would adversely impact, through the spread of fire or products of combustion, plant areas where OMAs are performed or the respective travel paths necessary to reach these areas (see also response to RAI-02.3 and RAI-09.3). Based on the subject matter of the Generic Letter 86-10 evaluations and the conclusions drawn by the evaluations, there is no adverse impact on the ability to perform OMAs and the conclusions of the Generic Letter 86-10 evaluations would remain valid with OMAs in place.

Fire Area R-2/FHA Zone A-8D

There are three Generic Letter 86-10 evaluations and no exemptions that are applicable to this fire zone. All of these evaluations (FP-EV-98-0008, FP-EV-98-

0043 and FP-EV-99-0013) address issues pertaining to fire barriers. These evaluations concluded that this area was sufficiently bounded to withstand the hazards associated with the area and, as necessary, to protect equipment within the area from a fire outside the area. A fire in this area may require OMAs within adjacent Fire Area R-2/FHA Fire Zone A-8C below. Despite the fact that Fire Area R-2/FHA Fire Zone A-8D and A-8C communicate via a narrow opening between the floor/ceiling assembly and the containment wall, OMAs in Fire Area R-2/FHA Fire Zone A-8C, as a result of a fire in Fire Area R-2/FHA Fire Zone A-8D, would not be impacted. This is based on the low combustible loading in Fire Area R-2/FHA Fire Zone A-8D which consists almost entirely of fire retardant IEEE 383 cable and the fact that heat and products of combustion from a fire in Fire Area R-2/FHA Fire Zone A-8D would not travel to lower elevations and spread to Fire Area R-2/FHA Fire Zone A-8C. Further, none of the fire barrier issues addressed by these evaluations would adversely impact, through the spread of fire or products of combustion, plant areas where OMAs are performed or the respective travel paths necessary to reach these areas (see also response to RAI-02.3 and RAI-09.3). Based on the subject matter of the Generic Letter 86-10 evaluations and the conclusions drawn by the evaluations, there is no adverse impact on the ability to perform OMAs and the conclusions of the Generic Letter 86-10 evaluations would remain valid with OMAs in place.

Fire Area R-9/FHA Area A-20

There are four Generic Letter 86-10 evaluations and no exemptions that are applicable to this fire area. All of these evaluations (No. 086, FP-EV-99-0005, FP-EV-99-0006 and FP-EV-99-0015) address issues pertaining to fire barriers. These evaluations concluded that this area was sufficiently bounded to withstand the hazards associated with the area and, as necessary, to protect equipment within the area from a fire outside the area. Further, none of the fire barrier issues addressed by these evaluations would adversely impact, through the spread of fire or products of combustion, plant areas where OMAs are performed or the respective travel paths necessary to reach these areas (see also response to RAI-02.3 and RAI-09.3). Based on the subject matter of the Generic Letter 86-10 evaluations and the conclusions drawn by the evaluations, there is no adverse impact on the ability to perform OMAs and the conclusions of the Generic Letter 86-10 evaluations would remain valid with OMAs in place.

Fire Area R-10/FHA Area A-21

There are five Generic Letter 86-10 evaluations and no exemptions that are applicable to this fire area. All of these evaluations (FP-EV-98-0042, FP-EV-99-0002, FP-EV-99-0005, FP-EV-99-0006 and FP-EV-99-0015) address issues pertaining to fire barriers. These evaluations concluded that this area was sufficiently bounded to withstand the hazards associated with the area and, as necessary, to protect equipment within the area from a fire outside the area. Further, none of the fire barrier issues addressed by these evaluations would

adversely impact, through the spread of fire or products of combustion, plant areas where OMAs are performed or the respective travel paths necessary to reach these areas (see also response to RAI-02.3 and RAI-09.3). Based on the subject matter of the Generic Letter 86-10 evaluations and the conclusions drawn by the evaluations, there is no adverse impact on the ability to perform OMAs and the conclusions of the Generic Letter 86-10 evaluations would remain valid with OMAs in place.

Fire Area R-4/FHA Zone A-6A

There are two Generic Letter 86-10 evaluations and one exemption that are applicable to this fire zone. The exemption documents the acceptability of the configuration of the charging pumps, which do not meet the fire separation requirements as defined in Section III.G.2 of Appendix R.

Both of the evaluations (FP-EV-98-0010 and FP-EV-98-0041) address issues pertaining to fire barriers. These evaluations concluded that this area was sufficiently bounded to withstand the hazards associated with the area and, as necessary, to protect equipment within the area from a fire outside the area. Engineering evaluation FP-EV-98-0010 documents the acceptability of using a water curtain in lieu of a fire-rated barrier for separation of FHA Fire Zones A-6A and A-6B (Fire Area R-4) from adjacent FHA Fire Zone A-1B (part of Fire Area R-1). In the event of a fire in Fire Area R-4/FHA Fire Zone A-6A, absence of a physical barrier may allow for the spread of smoke and hot gasses into Fire Area R-1/FHA Fire Zone A-1B via Fire Area R-4/FHA Fire Zone A-6B. The OMA travel path for a fire in Fire Area R-4/FHA Fire Zone A-6A, which requires OMAs to be performed within the fire zone itself (Reference OMA No. 1 in Table 1 of the exemption request), requires travel through Fire Area R-1/FHA Fire Zone A-1B (and Fire Area R-4/FHA Fire Zone A-6B). Despite the communication between Fire Area R-4/FHA Fire Zones A-6A and Fire Area R-1/FHA A-1B, FHA Fire Zone A-1B would remain viable as an OMA travel path. This is based on the installation of smoke detection in Fire Area R-4/FHA Fire Zone A-6A providing early warning of a fire, low combustible loading in Fire Area R-4/FHA Fire Zone A-6A and the fact that the high ceilings (approximately 19 feet) and large combined volume of Fire Area R-1/FHA Fire Zones A-1B, Fire Area R-4/FHA A-6A and Fire Area R-4/FHA A-6B (>6,500 square feet floor area with approximately 19 foot ceilings) would preclude the buildup of smoke and hot gasses near the floor level. Actuation of the water curtain would also limit the spread of smoke and hot gasses from Fire Area R-4/FHA Fire Zone A-6A to Fire Area R-1/FHA Fire Zone A-1B. Lastly, the OMA in FHA Fire Zone A-6A is required to be accomplished within 72 minutes after restoring charging, which itself is required to be accomplished 180 minutes after losing charging. Within this timeframe (252 minutes), it is expected that any fire in Fire Area R-4/FHA Fire Zone A-6A would be extinguished and products of combustion would have been evacuated from the area. Although not the subject of the evaluation, many

of the aforementioned arguments would also serve as the basis for the ability to perform OMAs in the room of fire origin (Fire Area R-4/FHA Fire Zone A-6A) and for the availability of Fire Area R-4/FHA Fire Zone A-6B (which is adjacent to and communicates directly with Fire Area R-4/FHA Fire Zone A-6A) as an OMA travel path. As such, none of the fire barrier issues addressed by these evaluations or the fire separation issue addressed in the exemption would adversely impact, through the spread of fire or products of combustion, plant areas where OMAs are performed or the respective travel paths necessary to reach these areas (see also response to RAI-02.3 and RAI-09.3). Based on the subject matter of the exemption, the Generic Letter 86-10 evaluations, and the conclusions drawn by these documents, there is no adverse impact on the ability to perform OMAs and the conclusions of these documents would remain valid with OMAs in place.

Fire Area R-4/FHA Zone A-6B

There is one Generic Letter 86-10 evaluation and one exemption that are applicable to this fire zone. The exemption documents the acceptability of the configuration of the charging pumps in adjacent Fire Area R-4/FHA Fire Zone A-6A, which do not meet the fire separation requirements as defined in Section III.G.2. of Appendix R. The evaluation (FP-EV-98-0010) addresses issues pertaining to fire barriers. This evaluation concluded that this area was sufficiently bounded to withstand the hazards associated with the area and, as necessary, to protect equipment within the area from a fire outside the area. Engineering evaluation FP-EV-98-0010 documents the acceptability of using a water curtain in lieu of a fire-rated barrier for separation of FHA Fire Zones A-6A and A-6B (Fire Area R-4) from FHA Fire Zone A-1B (part of Fire Area R-1). In the event of a fire in Fire Area R-4/FHA Fire Zone A-6B, absence of a physical barrier may allow for the spread of smoke and hot gasses into Fire Area R-1/FHA Fire Zone A-1B (and into Fire Area R-4/FHA Fire Zone A-6A). A fire in Fire Area R-4/FHA Fire Zone A-6B may require OMAs to be performed within adjacent Fire Area R-4/FHA Fire Zone A-6A (Ref. OMA No. 1 in Table 1 of the exemption request, Attachment 1, section 3.0), with the OMA travel path traversing through Fire Area R-1/FHA Fire Zone A-1B (and through the zone itself). Despite the communication between Fire Area R-4/FHA Fire Zone A-6B and Fire Area R-1/FHA Fire Zone A-1B, FHA Fire Zone A-1B would remain viable as OMA travel path. This is based on the installation of smoke detection in Fire Area R-4/FHA Fire Zone A-6B providing early warning of a fire, low combustible loading in Fire Area R-4/FHA Fire Zone A-6B and the fact that the high ceilings (approximately 19 feet) and large combined volume of Fire Area R-1/FHA Fire Zones A-1B, Fire Area R-4/FHA Fire Zones A-6A and A-6B (>6,500 square feet floor area with approximately 19 foot ceilings) would preclude the buildup of smoke and hot gasses near the floor level. Actuation of the water curtain would also limit the spread of smoke and hot gasses from Fire Area R-4/FHA Fire Zone A-6B to Fire Area R-1/FHA Fire Zone A-1B. Lastly, the OMA in Fire Area R-4/FHA Fire Zone A-6A is required to be accomplished within 72 minutes after restoring charging,

which itself is required to be accomplished 180 minutes after losing charging. Within this timeframe (252 minutes), it is expected that any fire in Fire Area R-4/FHA Fire Zone A-6B would be extinguished and products of combustion would have been evacuated from the area. Although not the subject of the evaluation, many of the aforementioned arguments would also serve as the basis for the ability to perform OMAs in Fire Area R-4/FHA Fire Zone A-6A (which is adjacent to and communicates directly with Fire Area R-4/FHA Fire Zone A-6B) and for the availability of Fire Area R-4/FHA Fire Zone A-6B (which is the room of fire origin) as an OMA travel path. As such, neither the fire barrier issue addressed by this evaluation nor the fire separation issue addressed in the exemption would adversely impact, through the spread of fire or products of combustion, plant areas where OMAs are performed or the respective travel paths necessary to reach these areas (see also response to RAI-02.3 and RAI-09.3). Based on the subject matter of the exemption, the Generic Letter 86-10 evaluations, and the conclusions drawn by these documents, there is no adverse impact on the ability to perform OMAs and the conclusions of these documents would remain valid with OMAs in place.

Fire Area R-7/FHA Area A-15

There are one Generic Letter 86-10 evaluation and no exemptions that are applicable to this fire area. This evaluation (No. 086) addresses issues pertaining to potential fire exposures to exterior walls. This evaluation concluded that this area was sufficiently bounded to withstand the hazards associated with exterior fire exposures. Further, the fire barrier issue addressed by this evaluation would not adversely impact, through the spread of fire or products of combustion, plant areas where OMAs are performed or the respective travel paths necessary to reach these areas (see also response to RAI-02.3 and RAI-09.3). Based on the subject matter of the Generic Letter 86-10 evaluations and the conclusions drawn by the evaluation, there is no adverse impact on the ability to perform OMAs and the conclusions of the Generic Letter 86-10 evaluation would remain valid with OMAs in place.

Fire Area R-15/FHA Area C-1

There are three Generic Letter 86-10 evaluations and one exemption that are applicable to this fire area. The exemption documents the acceptability of the Reactor Coolant Pump (RCP) Oil Collection system, which does not meet seismic requirements as defined in Section III.O of Appendix R. The three evaluations (No. 085, FP-EV-98-0027 and FP-EV-98-0029) address issues pertaining to separation of equipment/instrument/cabling necessary for safe shutdown of the plant. These evaluations concluded that adequate separation of redundant trains exists inside containment and safe shutdown would be achieved in the event of a fire in containment. None of the issues addressed by these evaluations would adversely impact, through the spread of fire or products of combustion, plant areas where OMAs are performed or the respective travel

paths necessary to reach these areas (see also response to RAI-02.3 and RAI-09.3), all of which are outside of containment. Based on the subject matter of the exemption, the Generic Letter 86-10 evaluations, and the conclusions drawn by these documents, there is no adverse impact on the ability to perform OMAs and the conclusions of these documents would remain valid with OMAs in place.

Fire Area R-13/FHA Fire Area T-6

There are nine Generic Letter 86-10 evaluations and no exemptions that are applicable to this fire area. Eight of these evaluations (FP-EV-98-0042, FP-EV-98-0047, FP-EV-98-0052, FP-EV-99-0002, FP-EV-99-0019, FP-EV-03-0001, FP-EV-03-0002, and FP-EV-03-0003) address issues pertaining to fire barriers. These evaluations concluded that this area was sufficiently bounded to withstand the hazards associated with the area and, as necessary, to protect equipment within the fire area from a fire outside the area. Several of these evaluations address barriers that separate Fire Area R-13/FHA Fire Area T-6 from areas that contain travel paths for OMAs required for a fire in this area. Despite this fact, none of these fire barrier issues would adversely impact, through the spread of fire or products of combustion, plant areas where OMAs are performed or their respective travel paths (see also response to RAI-02.3 and RAI-09.3). This is based on barrier continuity (absence of openings), inherent fire resistance of the barriers, low combustible loading in Fire Area R-13/FHA Fire Area T-6 (consisting almost entirely of fire retardant IEEE 383 cable) and installed smoke detection in Fire Area R-13/FHA Fire Area T-6 (which would allow for early response by the fire brigade). Engineering evaluation FP-EV-98-0052 documents the acceptability of several unsealed steel deck rib voids that may allow for the spread of smoke and hot gasses between Fire Area R-13/FHA Fire Area T-6 and Fire Area R-14/FHA Area T-9. Despite this fact, there would be no impact on OMAs, as areas requiring OMAs for a fire in Fire Area R-13/FHA Fire Area T-6 and the respective travel paths to reach these areas are independent of Fire Area R-14/FHA Fire Area T-9. The final evaluation (FP-EV-98-0002) documents that a fire in Fire Area R-13/FHA Fire Area T-6 would not be of sufficient magnitude to activate the fire dampers installed in the heating, ventilation and air conditioning ductwork that provides cooling for the East 480V Load Center room (Fire Area R-11/FHA Fire Area A-28). Closure of these dampers may result in the loss of credited safe shutdown equipment in East 480V Load Center room due to overheating. One of the fire dampers discussed in this evaluation is located in the floor/ceiling assembly that separates Fire Area R-13/FHA Fire Area T-6 from Fire Area R-2/FHA Fire Area T-10. Fire Area R-2/FHA Fire Area T-10 may require OMAs in the event of a fire in Fire Area R-13/FHA Fire Area T-6. Despite the fact that this fire damper would not activate, OMAs in Fire Area R-2/FHA Fire Area T-10 would not be impacted. This is based on low combustible loading in Fire Area R-13/FHA Fire Area T-6 which consists almost entirely of fire retardant IEEE 383 cable, the configuration of the combustibles prevents direct fire exposure to the barrier separating these areas, and the fact that storage of

transient combustibles is prohibited in the vicinity of this barrier by the site's fire protection program procedures (Reference A and B, see RAI-02.2). Based on the subject matter of the Generic Letter 86-10 evaluations, and the conclusions drawn by the evaluations, there is no adverse impact on the ability to perform OMAs and the conclusions of the Generic Letter 86-10 evaluations would remain valid with OMAs in place.

Fire Area R-17/FHA Zone A-10A

There is one Generic Letter 86-10 evaluation and no exemptions that are applicable to this fire zone. This evaluation (FP-EV-99-0003), which addresses issues pertaining to fire barriers, concluded that this area was sufficiently bounded to withstand the hazards associated with the area and, as necessary, to protect equipment within the area from a fire outside the area. Further, none of the fire barrier issues addressed by this evaluation would adversely impact, through the spread of fire or products of combustion, plant areas where OMAs are performed or the respective travel paths necessary to reach these areas (see also response to RAI-02.3 and RAI-09.3). Based on the subject matter of this Generic Letter 86-10 evaluation and the conclusions drawn by this evaluation, there is no adverse impact on the ability to perform OMAs and the conclusions of the Generic Letter 86-10 evaluation would remain valid with OMAs in place.

Fire Area R-8/FHA Area A-16

There is one Generic Letter 86-10 evaluation and no exemptions that are applicable to this fire area. This evaluation (No. 086) addresses issues pertaining to potential fire exposures to exterior walls. This evaluation concluded that this area was sufficiently bounded to withstand the hazards associated with exterior fire exposures. Further, the fire barrier issue addressed by this evaluation would not adversely impact, through the spread of fire or products of combustion, plant areas where OMAs are performed or the respective travel paths necessary to reach these areas (see also response to RAI-02.3 and RAI-09.3). Based on the subject matter of the Generic Letter 86-10 and the conclusions drawn by the evaluation, there is no adverse impact on the ability to perform OMAs and the conclusions of the Generic Letter 86-10 evaluation would remain valid with OMAs in place.

Fire Area R-12/FHA Fire Area T-4

There is one Generic Letter 86-10 evaluation and one exemption that are applicable to this fire area. The exemption documents the acceptability of a fire barrier with a non-rated door, which does not meet the fire separation requirements of hot shutdown equipment as defined in Section III.G.2.a of Appendix R. The evaluation (FP-EV-98-0001) addresses issues pertaining to fire barriers. This evaluation concluded that this area was sufficiently bounded to withstand the hazards associated with the area and, as necessary, to protect equipment within the area from a fire outside the area. Further, neither the fire

barrier issue addressed by this evaluation nor the fire separation issue addressed in the exemption would adversely impact, through the spread of fire or products of combustion, plant areas where OMAs are performed or the respective travel paths necessary to reach these areas (see also response to RAI-02.3 and RAI-09.3). Based on the subject matter of the exemption, the Generic Letter 86-10 evaluation, and the conclusions drawn by these documents, there is no adverse impact on the ability to perform OMAs and the conclusions of these documents would remain valid with OMAs in place.

Fire Area R-5/FHA Fire Zone A-8A

There are six Generic Letter 86-10 evaluations and no exemptions that are applicable to this fire zone. All of these evaluations (FP-EV-98-0014, FP-EV-98-0016, FP-EV-98-0018, FP-EV-98-0021, FP-EV-98-0035 and FP-EV-99-0002) address issues pertaining to fire barriers. These evaluations concluded that this area was sufficiently bounded to withstand the hazards associated with the area and, as necessary, to protect equipment within the area from a fire outside the area. Further, none of the fire barrier issues addressed by these evaluations would adversely impact, through the spread of fire or products of combustion, plant areas where OMAs are performed or the respective travel paths necessary to reach these areas (see also response to RAI-02.3 and RAI-09.3). Based on the subject matter of the Generic Letter 86-10 evaluations and the conclusions drawn by the evaluations, there is no adverse impact on the ability to perform OMAs and the conclusions of the Generic Letter 86-10 evaluations would remain valid with OMAs in place.

Fire Area R-6/FHA Fire Area A-3

There are six Generic Letter 86-10 evaluations and no exemptions that are applicable to this fire area. All of these evaluations (FP-EV-98-0012, FP-EV-98-0015, FP-EV-98-0017, FP-EV-98-0019, FP-EV-98-0021 and FP-EV-98-0035) address issues pertaining to fire barriers. These evaluations concluded that this area was sufficiently bounded to withstand the hazards associated with the area and, as necessary, to protect equipment within the area from a fire outside the area. Further, none of the fire barrier issues addressed by these evaluations would adversely impact, through the spread of fire or products of combustion, plant areas where OMAs are performed or the respective travel paths necessary to reach these areas (see also response to RAI-02.3 and RAI-09.3). Based on the subject matter of the Generic Letter 86-10 evaluations and the conclusions drawn by the evaluations, there is no adverse impact on the ability to perform OMAs and the conclusions of the Generic Letter 86-10 evaluations would remain valid with OMAs in place.

RAI-04 Fire Protection System and Fire Barrier Design Criteria

Attachment 1, Section 2.0 of the submittal notes that several areas are equipped with various fire detection and suppression systems. However, the request does not state whether the systems have been designed and installed in accordance with recognized design standards.

RAI-04.1 Question:

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:

Attachment 1, Section 2.0 of the submittal states that Fire Area R-14 contains portable fire extinguishers for suppression purposes, as well as ionization smoke detection that alarms at the main fire alarm panel in the control room. The submittal also states that hose stations and additional fire extinguishers are located in adjacent fire areas/zones. However, Attachment 1, Section 2.0 of the submittal does not state whether these systems equipment 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.

DNC Response:

Fire Detection

The smoke detection systems in Fire Area R-14/FHA Fire Area T-7, Fire Area R-2/FHA Fire Area T-8, Fire Area R-17/FHA Fire Zone A-10B, Fire Area R-2/FHA Fire Area T-10, Fire Area R-14/FHA Fire Area T-9, Fire Area R-2/FHA Fire Zone A-8D, Fire Area R-15/FHA Fire Area C-1 (limited smoke detection only) and Fire Area R-13/FHA Fire Area T-6 were designed and installed using the guidance of the requirements set forth in the 1967 Edition of NFPA 72D, "Standard for the Installation, Maintenance and Use of Proprietary Protective Signaling Systems for Watchman, Fire Alarm and Supervisory Service."

The smoke detection systems in Fire Area R-2/FHA Fire Area A-13, Fire Area R-2/FHA Fire Zone A-8C, Fire Area R-4/FHA Fire Zone A-6A, Fire Area R-4/FHA Zone A-6B, Fire Area R-15/FHA Fire Area C-1 (RCP heat detection and a majority of the smoke detection), Fire Area R-5/FHA Fire Zone A-8A and Fire

Area R-6/FHA Fire Area A-3 were designed in general compliance with, and to meet the intent of the requirements set forth in the 1979 Edition of NFPA 72D, "Standard for the Installation, Maintenance and Use of Proprietary Protective Signaling Systems" and the 1978 Edition of NFPA 72E, "Standard on Automatic Fire Detectors."

The cross-zoned smoke detection systems in Fire Area R-9/FHA Fire Area A-20 and Fire Area R-10/FHA Fire Area A-21, which actuates the respective area's total-flooding Halon 1301 gaseous suppression systems, were designed in general compliance with, and to meet the intent of the requirements set forth in the 1986 Edition of NFPA 72D, "Standard for the Installation, Maintenance and Use of Proprietary Protective Signaling Systems" and the 1984 Edition of NFPA 72E, "Standard on Automatic Fire Detectors."

The heat detection systems in Fire Area R-7/FHA Fire Area A-15 and Fire Area R-8/FHA Fire Area A-16, which trip the deluge valves for the pre-action fire suppression systems that are provided in these areas, were designed in general compliance with, and to meet the intent of the requirements set forth in the 1979 Edition of NFPA 72D, "Standard for the Installation, Maintenance and Use of Proprietary Protective Signaling Systems" and the 1984 Edition of NFPA 72E, "Standard on Automatic Fire Detectors". Smoke detection in Fire Area R-12/FHA Fire Area T-4 and the cross-zoned smoke detection system that actuates the deluge system separating Fire Area R-2/FHA Fire Area T-8 and Fire Area R-14/FHA Fire Area T-9 from the auxiliary building cable vault (FHA Fire Area A-24) were also designed and installed to these NFPA standards.

Fire Suppression

In general, fire extinguishers and hose stations at MPS2 have been installed in accordance with the requirements of the 1968 Edition of NFPA 10, "Standard for the Installation of Portable Fire Extinguishers" and the 1978 Edition of NFPA 14, "Standard for the Installation of Standpipe and Hose Systems," respectively.

The automatic wet-pipe sprinkler systems in Fire Area R-2/FHA Area T-8 and Fire Area R-14/FHA Fire Area T-9 and the automatic pre-action sprinkler systems in Fire Area R-7/FHA Fire Area A-15 and Fire Area R-8/FHA Fire Area A-16 were designed in general compliance with, and to meet the intent of the requirements set forth in the 1985 Edition of NFPA 13, "Standard for the Installation of Sprinkler Systems."

The automatic deluge system that separates Fire Areas R-2/FHA Fire Area T-8 and R-14/FHA Fire Area T-9 from the auxiliary building cable vault (FHA Fire Area A-24), was designed in general compliance with, and to meet the intent of the requirements set forth in the 1985 Edition of NFPA 13, "Standard for the

Installation of Sprinkler Systems” and the 1985 Edition of NFPA 15, “Standard for Water Spray Fixed Systems For Fire Protection.” The water curtain that separates Fire Areas R-4/FHA Fire Zone A-6A and R-4/FHA Fire Zone A-6B from the (-) 25 foot-6 inch elevation general area (FHA Fire Zone A-1B) and the water curtain that provides additional separation between Fire Area R-2/FHA Fire Area A-13 and the 14 foot-6 inch elevation general area were also designed and installed to these NFPA standards.

The total-flooding Halon 1301 systems in Fire Area R-9/FHA Fire Area A-20 and Fire Area R-10/FHA Fire Area A-21 were designed and installed using the guidance of the requirements set forth in the 1987 Edition of NFPA 12A, “Standard on Halon 1301 Fire Extinguishing Systems.”

Fire Rated Assemblies

In general, fire rated assemblies separating Appendix R fire areas meet Underwriters Laboratories/Factory Mutual (UL/FM) design criteria and the requirements of ASTM E-119, “Fire Test of Building Construction and Materials” for 3-hour rated fire assemblies. Openings created in fire rated assemblies are sealed utilizing penetration seal details that have been tested in accordance with ASTM E-119 and are qualified for a 3-hour fire rating. Fireproof coating of structural steel conforms to UL-recognized details and is qualified for a 3-hour fire rating. Fire dampers are UL-Listed and have been installed in accordance with the requirements of NFPA 90A, “Standard for the Installation of Air Conditioning and Ventilation Systems.” In general, the code of record for fire dampers at MPS2 is either the NFPA 90A code in effect at the time of original plant construction (late 1960s) or the 1985 Edition of NFPA 90A. Fire doors are UL-Listed and have been installed in accordance with the edition of NFPA 80, “Standard for Fire Doors and Windows” in effect at the time of plant construction (late 1960s).

Consistent with the requirements for evaluation in GL 86-10, deviations to fire barrier assemblies, penetration seals, fire doors and fire dampers have been evaluated and concluded to sufficiently bound an area to withstand the hazards associated with the area and, as necessary, to protect equipment within the area from a fire outside the area. These evaluations are discussed in the response to RAI-03.1.

RAI-04.2 Question:

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.

DNC Response:

Fire suppression and detection systems installed in the plant areas discussed in the exemption request have been designed in general compliance with, and installed to meet the intent of the requirements set forth in NFPA codes and standards as discussed in the response to RAI-04-1. There are no Generic Letter 86-10 evaluations or exemptions for the areas discussed in the exemption request that pertain to fire suppression or detection system deviations from NFPA codes.

There are numerous Generic Letter 86-10 evaluations and exemptions for the plant areas discussed in the exemption request that document the acceptability of fire barrier deviations. The subject of these barrier deviations include the use of water curtains in lieu of rated fire barriers, insufficient barrier/seal depth to meet a full 3-hour fire rating, fire damper installations that do not conform to manufacturer's instructions, exposed steel in fire barriers, use of non-rated doors in fire barriers and use of partial height walls as fire barriers. Barrier deviations that could allow the spread of products of combustion of a fire to an adjacent area that either serves as a travel path for OMAs or is an action location for an OMA have been discussed in the response to RAI-03.1 and have been found to not adversely impact OMA travel paths or action areas.

RAI-05 Ignition Sources and Combustible Fuel Load

The submittal includes information for each of the fire areas including floor area, combustible loading, potential ignition sources, available fire protection equipment and systems, and fire prevention methods. Additional information is required for the NRC staff to complete its review.

RAI-05.1 Question:

Provide the following additional information regarding the in situ and transient fire hazards that could threaten redundant equipment for each fire area included in the request:

- *The cable type, e.g., thermoplastic or thermoset. If thermoplastic cables are used, provide a discussion of self-ignited cable fires.*
- *Actual dimensions of the rooms including ceiling heights (L x W x H).*

DNC Response:

A review of the original Bechtel cable specifications and orders indicate that cabling at MPS2 is of the thermoset type. MPS2 uses thermoset Kerite FR cable, which has a lower failure temperature than typical thermoset insulation materials. Cabling installed since the unit's original construction was to applicable MPS2 specifications which utilize cable of the thermosetting type. Installation of cabling in the plant is reviewed by the Fire Protection and Appendix R engineers as required by the MPS design change process. In rare instances, where thermoplastic cable is requested to be used (Security modifications, non power block applications, etc); it is restricted to installation in conduit. The request is only considered in non safe-shutdown applications and is reviewed to ensure that safe shutdown equipment and cable is not impacted.

- *Actual dimensions of the rooms including ceiling heights (L x W x H).*

The following are approximate room measurements for use with the fire area/zone drawings provided in Attachment 2 of the original exemption request:

Fire Area R-14/FHA Fire Area T-7

Fire Area T-7 measures approximately 126 feet x 20 feet with a ceiling height of approximately 13 feet.

Fire Area R-2/FHA Fire Area T-8

Fire Area T-8 measures approximately 131 feet x 10 feet with a ceiling height of approximately 10 feet.

Fire Area R-17/FHA Fire Zone A-10B

FHA Fire Area A-10B consists of a 73 foot south wall and a 55 foot east wall while the northwest wall is formed by a portion of the containment wall. The ceiling height of this zone is approximately 23 feet.

Fire Area R-17/FHA Fire Zone A-10C

Fire Zone A-10C measures approximately 70 feet x 58 feet along the south and east walls, respectively, with a ceiling height of approximately 120 feet. The northwest wall of this fire zone is formed by a portion of the containment wall.

Fire Area R-2/FHA Fire Area T-10

Fire Area T-7 measures approximately 138 feet x 20 feet with a ceiling height of approximately 14 feet.

Fire Area R-14/FHA Fire Area T-9

Fire Area T-9 measures approximately 152 feet x 10 feet with a ceiling height of approximately 10 feet.

Fire Area R-2/FHA Fire Area A-13

Fire Area A-13 measures approximately 22 feet x 12 feet with a ceiling height of approximately 10 feet.

Fire Area R-2/FHA Fire Zone A-8C

Fire Zone A-8C measures approximately 71 feet x 46 feet along the south and west walls, respectively, with a ceiling height of approximately 18 feet. The northeast wall of this fire zone is formed by a portion of the containment wall.

Fire Area R-2/FHA Fire Zone A-8D

Fire Zone A-8D measures approximately 71 feet x 46 feet along the south and west walls, respectively, with a ceiling height of approximately 23 feet. The northeast wall of this fire zone is formed by a portion of the containment wall.

Fire Area R-9/FHA Fire Area A-20

Fire Area A-20 measures approximately 43 feet x 39 feet with a ceiling height of approximately 10 feet. There is an approximate 15 feet x 5 feet jog into the southeast corner of the room associated with Stair No. 10 and an approximate 20 feet x 9 feet jog into the northwest corner of the room.

Fire Area R-10/FHA Fire Area A-21

Fire Area A-21 measures approximately 33 feet x 28 feet along the west and north walls, respectively, with an additional area in the southeast corner of the room that measures approximately 12 feet x 5 feet. The ceiling height of this room is approximately 10 feet.

Fire Area R-4/FHA Fire Zone A-6A

Fire Zone A-6A measures approximately 36 feet and 62 feet along the east and west walls, respectively, and is approximately 25 feet wide. The ceiling height of this fire zone is approximately 19 feet. Partial height walls measuring approximately 2 feet thick x 18 feet long and 10 feet high separate the three charging pumps in this zone.

Fire Area R-4/FHA Fire Zone A-6B

The western portion of this fire zone measures approximately 17 feet x 23 feet along the west and south walls, respectively, with an approximate 2 feet thick x 12 feet long wall separating the degassifier tank and pump rooms. The eastern portion of this fire zone is a hallway measuring approximately 6 feet x 16 feet. The ceiling height of this fire zone is approximately 19 feet.

Fire Area R-7/FHA Fire Area A-15

Fire Area A-15 measures approximately 19 feet x 49 feet with a ceiling height of approximately 23 feet.

Fire Area R-15/FHA Fire Area C-1

Fire Area C-1 is a circular enclosure with a diameter of approximately 130 feet and a ceiling height of approximately 178 feet.

Fire Area R-13/FHA Fire Area T-6

Fire Area T-6 measures approximately 23 feet x 83 feet along the west and south walls, respectively, with a ceiling height of approximately 17 feet. There are two approximately 10 feet x 10 feet jogs into the northeast corner of the room.

Fire Area R-17/FHA Fire Zone A-10A

Fire Zone A-10A measures approximately 46 feet x 36 feet along the south and east walls, respectively, on the (-) 5 foot-0 inch elevation and approximately 12 feet x 8 feet (on average) along the south and east walls, respectively, on the (-) 25 foot-6 inch elevation. The (-) 25 foot-6 inch elevation opens entirely to the (-) 5 foot-0 inch elevation, while the ceiling of the (-) 5 foot-0 inch elevation, which is partially open to Fire Zone A-10B above, is approximately 18 feet in height. The northern wall of this fire zone on both elevations is formed by a portion of the containment wall.

Fire Area R-8/FHA Fire Area A-16

Fire Area A-16 measures approximately 20 feet x 49 feet with a ceiling height of approximately 23 feet.

Fire Area R-12/FHA Fire Area T-4

Fire Area T-4 measures approximately 16 feet x 25 feet with a ceiling height of approximately 9 feet.

Fire Area R-5/FHA Fire Zone A-8A

Fire Zone A-8A measures approximately 33 feet x 38 feet along the west and south walls, respectively, with an additional area in the northeast corner of the room that measures approximately 11 feet x 9 feet. The ceiling height of this room is approximately 19 feet.

Fire Area R-6/FHA Fire Area A-3

Fire Area A-3 measures approximately 36 feet x 38 feet along the west and north walls, respectively. The ceiling height of this room is approximately 19 feet. There is an approximate 6 feet x 6 feet jog into the room along the east wall at the room entrance. The 'C' HPSI pump room projects into the southeast corner of this fire area and measures approximately 18 feet x 18 feet with a ceiling height of approximately 10 feet.

RAI-06 Fire Scenarios

The submittal identifies fire scenarios and the OMAs needed in each fire area, but does not describe, in detail, the fire scenarios that have been considered for the postulated events. The request mentions “cables of concern” and “the subject cables” but the NRC staff could not identify specifically what cables were being referred to.

For example:

A fire that could potentially impact any cables of concern would likely involve diesel fuel oil. For a fire in Fire Area R-7, OMAs are required to provide decay heat removal and restore charging system flow to the RCS. 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.

RAI-06.1 Question:

Provide a description of the proximity of the credited redundant train equipment to in situ hazards. Also describe the spatial relationship between two redundant trains in the fire area such that if the redundant trains are damaged, manual actions would be necessary. Provide information on “cables of concern” or “subject cables” to indicate cable type, quantity, function, location, etc.

DNC Response:

Fire Area R-14/FHA Fire Area T-7

Fire Area R-14/FHA Fire Area T-7, lower 4.16 kV switchgear room, is located on the 31 foot-6 inch elevation of the turbine building. Located in this fire area are 6.9 kV bus 25A which house breakers H101 through H107, 4.16 kV bus 24A which house breakers A101 through A107, bus 24C which house breakers A301 through A412 and the swing bus 24E which houses breakers A501 through A505. Cables of concern in this room are for valves 2-FW-43B, 2-CH-192, 2-CH-508, 2-CH-509, and breakers A411, A408, A410, A401 and breaker DV2021 associated loads.

The control and indication cabling for 2-FW-43B runs in a conduit from floor to ceiling located against the east wall and midway between bus 25A and 24C. The control and indication cabling for 2-FW-43A, the other train valve, is located in a conduit next to the 2-FW-43B conduit, and enters the cable tray above bus 24C. The conduit for 2-FW-43B power traverses the room from floor to ceiling on the east wall, 6 feet or more horizontally from any ignition source. The closest fixed

ignition source is switchgear bus 24C potential transformer (PT) in cubicle A301, which is 6 feet away. Thus only a transient fire in the vicinity of the conduit can impact this conduit. The portion of the floor area in which a transient load can be placed in the zone of influence of the conduit is assumed to be approximately 5% of the total room area. Therefore, analysis indicates there is a very low likelihood that a fire can occur in Fire Area R-14/FHA Fire Area T-7 which will impact 2-FW-43B. Breaker A401, located in the Upper 4.16 kV switchgear room, Fire Area R-2/FHA Fire Area T-10, is the 'B' EDG supply breaker to bus 24D, Facility Z2. The corresponding Facility Z1 component is breaker A312, 'A' EDG feed to bus 24C, is located in the Lower 4.16 kV Switchgear room, Fire Area R-14/FHA Fire Area T-7.

Breaker A410, located in the Upper 4.16 kV Switchgear room, Fire Area R-2/FHA Fire Area T-10, is the bus 24B to bus 24D tie breaker, Facility Z2. The corresponding Facility Z1 component is breaker A304, 24C to 24B tie breaker, located in the Lower 4.16 kV Switchgear room, Fire Area R-14/FHA Fire Area T-7.

Breaker DV2021, Facility Z2, is the 125VDC supply to bus 24D DC control power and is located in the West DC Switchgear room, Fire Area R-10/FHA Fire Area A-21. This breaker supplies control power to all the breakers on bus 24D and to bus 24E when bus 24D is aligned to bus 24E. The Facility Z1 corresponding breaker is DV1021, located in the East DC Switchgear room Fire Area R-9/FHA Fire Area A-20. This breaker supplies control power to all the breakers on bus 24C and to bus 24E when bus 24C is aligned to bus 24E. The DV2021 cabling only enters Fire Area R-14/FHA Fire Area T-7 through associated loads through the breaker control circuits for breakers A401 and A408. The breaker control cabling from breakers A401 and A410 enter the Lower 4.16 kV Switchgear room, Fire Area R-14/FHA Fire Area T-7 in a conduit through the west wall near the ceiling across from breaker cubicle A505. The conduit travels east, in the overhead, and enters cubicle A505 through the top of the cubicle. Ignition sources that can potentially impact this conduit are the PT in cubicles A501 and A505A, and breakers A502, A503, A504, and A505, each by either a high energy arcing fault or by a fire. Damage is based on the conduit being directly connected to breaker A505, a fire in PT A501 or breakers A502, A503, or A504 damaging the cables due to the conduit being a distance of 2.5 feet above the fire, and damage due to the target being in the plume. Also the conduit is postulated to be 1 foot from the flames for a fire in PT A505A as well as damage due to flame radiation. Therefore, analysis indicates there is a moderate likelihood that a fire can occur in Fire Area R-14/FHA Fire Area T-7 which will impact breaker A401 or breaker A410.

Breaker A408, located in the Upper 4.16 kV Switchgear room, Fire Area R-2/FHA Fire Area T-10, is the bus 24D to bus 24E tie breaker, Facility Z2. The corresponding Facility Z1 component is breaker A305, bus 24C to bus 24E tie

breaker, located in the Lower 4.16 kV Switchgear room, Fire Area R-14/FHA Fire Area T-7.

Breaker A411, located in the Upper 4.16 kV Switchgear room, Fire Area R-2/FHA Fire Area T-10, is the RSST feed to bus 24D, Facility Z2. The corresponding Facility Z1 component is breaker A302, RSST feed to bus 24C, located in the Lower 4.16 kV Switchgear room, Fire Area R-14/FHA Fire Area T-7.

The breaker control cabling for A408 and A411 enter the Lower 4.16 kV Switchgear room, Fire Area R-14/FHA Fire Area T-7 in a conduit through the west wall near the ceiling across from breaker cubicle A311. The conduit runs north along the west wall to a junction box. The cabling exits the junction box in separate conduit and terminates in breaker cubicles A305 and A301 respectively, through the top of the cubicles. Ignition sources that can potentially impact the conduit carrying breaker A411 cabling are bus 24C PT cubicle A301, the PTs in cubicle A301 and breaker A302, by either a high energy arcing fault or by a fire. Damage is based on the conduit being connected directly to PT A301, heat release from a fire in breaker A302 (since the conduit is at a distance of 1 foot from the flames) and damage due to flame radiation. Therefore, analysis indicates there is a low likelihood that a fire can occur in FHA Fire Area T-7 which will impact breaker A411. Ignition sources that can potentially impact the conduit carrying cabling from breaker A408 that connects the junction box on the north wall to bus 24C breaker A305 are breakers A304, A305, and A306, each by either a high energy arcing fault or by a fire. Damage is based on the conduit being connected directly to breaker A305, heat release from a fire in breaker A305 (since the conduit is at a distance of 1 foot from the flames), and damage due to flame radiation. Therefore, analysis indicates there is a low likelihood that a fire can occur in FHA Fire Area T-7 which will impact breaker A408.

Cables for valves 2-CH-192, 2-CH-508 and 2-CH-509 are not located in this room. Valves 2-CH-508 and 2-CH-509 are impacted due to the potential loss of bus 22E which results in the loss of power to these valves. Valve 2-CH-192 is impacted due to the potential loss of bus 22E which results in the loss of power to the battery charger and the resulting loss of DC power to the valve.

Fire Area R-2/ FHA Fire Area T-8

Fire Area R-2/ FHA Fire Area T-8, West 45 Foot Cable Vault, is bounded by the East 45 Foot Cable Vault along the east wall, the turbine building along the north and west walls and the West 480V Load Center Switchgear room on the south. The OMAs associated with a fire in this area are related to failure of the feed to the 480V load center bus 22F or the 'B' EDG's control and power cables. Loss of bus 22F results in the loss of the 'B' battery charger and the eventual depletion of the 'B' battery. This in turn results in the loss of level transmitter LT-5282. Cables for LT-5282 do not pass through this area. The feed cables for the 480V

load center bus 22F and the 'B' EDG's cables traverse Fire Area R-2/FHA Fire Area T-8 in cable trays at the south end of the room and are only impacted by fire from transient loading. Therefore, analysis indicates there is a very low likelihood that a fire can occur in Fire Area R-2/FHA Fire Area T-8 which could impact the cables of concern.

Fire Area R-17/ FHA Fire Zone A-10B

Fire Area R-17/FHA Fire Zone A-10B consists of the east electrical penetration room. The OMAs associated with a fire in this zone are related to failure of the 'A' EDG's power or control cables resulting in the loss of power to buses 24C, 22E, B51 and the battery charger, resulting in the depletion of the 'A' battery. Fire in this area could also cause the failure of IA. 'A' EDG power and control cables enter this area through the east wall through various penetrations and traverse along the east wall in a cable tray. These cables exit this area through the south wall above the access door. Cables for valves 2-MS-190B, 2-CH-192, 2-CH-508 and 2-CH-509 do not pass through this room. The OMAs would be needed if bus B51 lost power for valves 2-CH-508 and 2-CH-509. The only tray (Z16HA10), which has a credible fire impact and carries the 'A' EDG's power and control cables, is approximately 11 feet above the floor in the southeast corner of the room, runs north and passes approximately 4 feet above the H2 analyzer cabinets C87 and C86. Ignition sources that could potentially impact this tray are cabinets C87 and C86. The tray is outside the zone of influence of a credible transient fire. The severity factor for a fire in cabinet C87 or C86 damaging the cables in tray Z16HA10 is based on a critical heat release rate at a distance of 4 feet above the fire, a cabinet with multiple cable bundles, and damage due to target in the plume. Therefore, analysis indicates there is a low likelihood that a fire can occur in Fire Area R-17/FHA Fire Zone A-10B which will impact valves 2-CH-508 and 2-CH-509. The OMA for valves 2-CH-192 and 2-MS-190B would be needed due to a loss of IA.

Fire Area R-17/FHA Fire Zone A-10C

Fire Area R-17/FHA Fire Zone A-10C consists of the East MSSV room/Blowdown Tank room. The OMAs associated with a fire in this area are related to failure of IA. Cables for valves 2-CH-192 and 2-MS-190B do not enter this room.

Fire Area R-2/FHA Fire Area T-10

Fire Area R-2/FHA Fire Area T-10, the Upper 4.16 kV Switchgear room, is located on the 54 foot-6 inch elevation of the turbine building. Located in this fire area are the 6.9 kV bus 25B which house breakers H201 through H206, 4.16 kV bus 24B which house breakers A201 through A206, and bus 24D which houses breakers A401 through A411. The cables of concern in this room are for valves 2-CH-429 and 2-CH-517, level transmitters LT-5282, LT-206 and LT-208 and breaker A305. The control and indication cabling for valves 2-CH-429 and 2-CH-517 and the indication loop cabling for LT-5282, LT-206 and LT-208, enter this

room through the floor near the northeast corner of the room, rise into the overhead and enter panels C09 and C10, located in the northeast corner, through the top of the panels. The breaker control cabling for breaker A305 enters the room through the floor midway between bus 24B and 24D next to the west wall, goes into the overhead and routes its way into the top of breaker A408 cubicle (tie breaker to 24E) in bus 24D. Breaker A305 is the tie breaker between bus 24C and 24E. The cabling of concern is part of the breaker control logic and coordination between buses 24C, 24D and 24E. Components 2-CH-429, 2-CH-517, LT-5282, LT-206, and LT-208 are single train components. The worst case tray arrangement in Fire Area R-2/FHA Fire Area T-10 is the common tray for components 2-CH-429, 2-CH-517, LT-206, LT-208 and LT-5282. Ignition sources that can potentially impact this tray are panels C09 and C10, or a transient in the vicinity of the riser portion of the tray. Panel C10 has two sections. The tray is connected directly to panel C09. Also, the tray passes directly over panel C10. The portion of the floor area in which a transient load can be placed in the zone of influence of the tray is assumed to be approximately 5% of the total room area. Therefore, there is a moderate likelihood that a fire can occur in Fire Area R-2/FHA Fire Area T-10 which will impact components 2-CH-429, 2-CH-517, LT-206, LT-208 or LT-5282. The cables of concern, for breaker A305, reside in one conduit in Fire Area R-2/FHA Fire Area T-10. The ignition sources that can potentially impact this conduit are breakers A407, A408, A409, A410, and A411, each by either a high energy arcing fault or by a fire. The conduit is connected directly to breaker A408, and passes 4 feet above breakers. Based on this, and damage due to target in the plume, there is a low likelihood that a fire can occur in Fire Area R-2/FHA Fire Area T-10 which will impact breaker A305.

Fire Area R-14/FHA Fire Area T-9

Fire Area R-14/FHA Fire Area T-9, East 45 Foot Cable Vault, is bounded by the auxiliary building on the east wall, the turbine building on the north wall, the West 45 Foot Cable Vault on the west wall and the West 480V Load Center Switchgear room on the south wall. This zone is equipped with both detection and automatic suppression. The cables of concern in this area are the control and indication cabling for valve 2-FW-43B. These cables take two paths through this area. One path of the control and indication cables is routed in a cable tray, wrapped with 1-hour fire rated insulation, which enter this area in the northeast corner through the floor, turns horizontally and travels approximately 18 feet south, then turns vertically and exits this area through the ceiling. The other path the control and indication cables take is in a conduit which enters this area through the floor at a point midway along the horizontal run of the wrapped cable tray. The conduit travels upward and turns south near the ceiling for approximately 15 feet and then turns west and exits this area through the west wall. Cable routed in the conduit could only be fire impacted from a transient fire

in the area. Analysis indicates that there is a very low likelihood that a fire can occur in Fire Area R-14/FHA Fire Area T-9 which will impact 2-FW-43B.

Cables for valves 2-CH-192, 2-CH-508 and 2-CH-509 are not located in this room. However, valves 2-CH-508 and 2-CH-509 are impacted due to the potential loss of the feed cables for bus 22E or the 'A' EDG's control and power cables which results in the loss of power to these valves. Valve 2-CH-192 is impacted due to the potential loss of bus 22E which results in the loss of power to the battery charger and the resulting loss of DC power to the valve. The feed cables for the 480V load center bus 22E and the 'A' EDG's cables traverse Fire Area R-14/FHA Fire Area T-9 in cable trays at the south end of the room and are only impacted by fire from transient loading. Therefore, analysis indicates there is a very low likelihood that a fire can occur in Fire Area R-14/FHA Fire Area T-9 which could impact the cables of concern.

Fire Area R-2/FHA Fire Area A-13

Fire Area R-2/FHA Fire Area A-13 is the MCC B61 and B41A enclosure. In this zone the cables of concern are the power, indication and control cables for valves 2-CS-13.1B and 2-CH-429. These cables originate within their respective breaker cubicles on MCC B61. Controls for these valves leave this zone through the ceiling of the enclosure and enter the 25 foot cable vault (III.G.3 area). Valve 2-CS-13.1B power and indication cables leave through the floor of the MCC into fire area R1 (III.G.3 area) below. Valve 2-CH-429 power and indication cables exit through the floor of the MCC and turn north and enter Fire Area R-2/FHA Fire Zone A-8D, West Electrical Penetration Room. Both valves 2-CS-13.1B and 2-CH-429 are single train valves utilized in the charging system. The OMA for valve 2-CH-429 supports reestablishing charging flow (180 minute requirement) and valve 2-CS-13.1B provides extended charging pump suction from the RWST (72 minutes after reestablishing charging flow). Fire Area R-2/FHA Fire Area A-13 is a very small room, so it is assumed that any fire could result in a hot gas layer of sufficient temperature to damage all targets in the room. Ignition sources that could potentially impact these targets are MCCs B41A (11 sections) and B61 (8 sections), and transient fires. Therefore, for a fire that does occur in A-13, it very likely will impact valve 2-CH-429 or 2-CS-13.1B.

Fire Area R-2/FHA Fire Zone A-8C

Fire Area R-2/FHA Fire Zone A-8C, West Piping Penetration Room, is located on the (-) 5 foot-0 inch elevation of the auxiliary building. It is bounded by the auxiliary building R-1 (III.G.3) fire area on the south side, the containment building on the north and east side, and the turbine building on the west side. Valve 2-CH-429 is located in the north and west side of this room, near the containment building wall. Power and indication cabling for this valve is routed via conduit into a cable tray located along the west wall of this room. The tray goes along the west wall and turns east at the south wall. The tray exits this

room midway along the south wall and enters the auxiliary building R-1 Fire Area. Valve 2-CH-429 is a single train component. The cables of concern for valve 2-CH-429 are in trays and conduit that are approximately 13 feet above the floor. There are no credible fires that could impact these trays or conduit. Each is out of the zone of influence of all fixed and transient sources. There is likely no fire that can occur in Fire Area R-2/FHA Fire Area A-8C which will impact valve 2-CH-429. This is due to configuration, combustible loading and ignition sources. However, if there was an impact, the nature of the cables would fail the valve as-is, in the open (desired) position.

Fire Area R-2/FHA Fire Zone A-8D

Fire Area R-2/FHA Fire Zone A-8D, West Electrical Penetration Room, is located on the 14 foot-6 inch elevation of the auxiliary building bounded by the auxiliary building (Fire Area R-1) on the south side, containment (Fire Area R-15) on the north and east sides, and the turbine building 14 foot-6 inch elevation (Fire Area R-3) and the 25 foot East Cable Vault (Fire Area R-14) on the west side. The cables of concern in this zone service valves 2-CH-429 and 2-CH-517, and level transmitters LT-206, LT-208 and LT-5282. The indication loop cables for level transmitters LT-5282, LT-206, and LT-208 route together through this area through a penetration in the west wall from the 25 foot East Cable Vault into a cable tray. This tray runs south along the west wall and turns east and goes across the room, turns south and exits the room into the auxiliary building, Fire Area R-1 in the opposite corner. Control and indication cables for valves 2-CH-429 and 2-CH-517 route together through a penetration in the west wall from the 25 foot East Cable Vault into a cable tray. This tray runs south along the west wall to the south wall and turns east. The cables then separate midway along the south wall and penetrate the south wall at various locations as they enter the auxiliary building, Fire Area R-1. The control and indication cables for valve 2-CH-517 also travel from the south wall to the containment wall where they enter containment. Valves 2-CH-429 and 2-CH-517 and level transmitters LT-206, LT-208 and LT-5282 are single train components. For valves 2-CH-429 and 2-CH-517, there is one route of trays and conduit which carry cables of concern. The only ignition source that could potentially impact these routes is MCC B41C. The targets are approximately 5 feet above the MCC. Therefore, it is very unlikely that a fire can occur in Fire Area R-2/FHA Fire Zone A-8D which will impact valves 2-CH-429 or 2-CH-517. This is due to configuration, combustible loading and ignition sources. Cables for level transmitters LT-206, LT-208 and LT-5282 are routed such that there is one tray (common to all three components) which has a potential for fire impact. Ignition sources that could potentially impact this tray are MCC B41C and cabinet C33B. The tray is outside the zone of influence of a credible transient fire. The impact is based on the tray being two feet above B41C and damage due to target in the plume. The impact from a fire in cabinet C33B damaging the cables in this tray is based on the tray being 4 feet above the cabinet with multiple cable bundles, and damage due to target in the plume.

Therefore, analysis indicates there is a low likelihood that a fire in Fire Area R-2/FHA Fire Zone A-8D will impact LT-206, LT-208 and LT-5282.

Fire Area R-9/FHA Fire Area A-20

Fire Area R-9/FHA Fire Area A-20, 'A' DC Switchgear Room, is bounded by the auxiliary building Fire Area R-1 along the east and north walls, the 'B' DC Switchgear Room along the west wall and the East Battery Room along the south wall. The OMAs associated with a fire in this area are related to loss of power to 'A' DC buses (such as DV10). Cables for valves 2-CH-192, 2-CH-508 and 2-CH-509 do not pass through this room. The OMA to manually open valve 2-CH-192 would be needed if DV10 lost power. The OMA to manually open valves 2-CH-508 and 2-CH-509 would be needed if the loss of DV10 resulted in the loss of AC power to MCC B51 due to loss of 4.16 kV breaker DC control power. IA is not postulated to be lost due to a fire in Fire Area R-9/FHA Fire Area A-20. Based on walkdowns, the only ignition sources in the room that could have a direct impact on the targets are wall panels DV30, VA30, DV10, VA10, and VA15, cabinet VR11, cabinet UAC-3, and cabinets VS3, VIP3, VS1, and VIP1. This indicates that there is a moderate likelihood that a fire can occur in the 'A' (Z1) DC Switchgear Room (Fire Area R-9/FHA Fire Area A-20) which could impact these valves.

Fire Area R-10/FHA Fire Area A-21

Fire Area R-10/FHA Fire Area A-21, 'B' DC Switchgear Room, is bounded by the auxiliary building Fire Area R-1 along the west and north walls, the 'A' DC Switchgear Room along the east wall and the West Battery Room along the south wall. The OMAs associated with a fire in this area are related to loss of power to 'B' AC vital power panels (such as VA20). Cables for level transmitters LT-206, LT-208 and LT-5282 do not pass through this room. The OMA to locally monitor level instruments is due to loss of power to the transmitter loops due to a loss of panel VA20. Based on walkdowns, the only ignition sources in the room that could have a direct impact on the targets are wall panels VA25, VA20, DV20, VA40, and DV40, cabinets VS3, VIP3, VS1, and VIP1, and cabinet VR21. This indicates that there is a moderate likelihood that a fire can occur in the 'B' (Z2) DC Switchgear Room (Fire Area R-10/FHA Fire Area A-21) which could impact these level transmitters.

Fire Area R-4/FHA Fire Zone A-6A

Fire Area R-4/FHA Fire Zone A-6A, Charging Pump Room, is located on the (-) 25 foot-6 inch elevation of the auxiliary building. The cables of concern in this area are for control and indication of valve 2-CH-192. This valve is located in this zone against the wall separating the 'C' charging pump cubicle from the degasifier cubicle. Conduit carries the cabling from the valve through the overhead to the cable tray located between the 'B' and 'C' charging pumps. The tray travels east and southward out of Fire Area R-4/FHA Fire Zone A-6A into

Fire Area R-4/FHA Fire Zone A-6B through the fire curtain into auxiliary building Fire Area R-1. Valve 2-CH-192 is a single train component. The worse case configuration in Fire Area R-4/FHA Fire Zone A-6A for valve 2-CH-192 involves one tray. This is the third tray in a stack that proceeds around the outside of the 'C' charging pump (P18C) cubicle towards the northwest corner of the cubicle. The bottom tray is seven feet off the floor of the room. The tray is out of the zone of influence of a pump electrical fire. However, a pump oil fire or transient fire in the vicinity of the tray stack can impact this tray. An oil fire is assumed to spread throughout the 'C' cubicle and result in damage to the trays above. The portion of the floor area in which a transient load can be placed in the zone of influence of the tray stack is assumed to be approximately 15% of the total room area. Cable damage will result for a transient fire 2 feet above the floor under the tray stack and damage due to target in the plume. Therefore, analysis indicates there is a low likelihood that a fire can occur in Fire Area R-4/FHA Fire Zone A-6A which will impact valve 2-CH-192. Cables for valve 2-MS-190B do not pass through this area; however the OMA for this valve may be needed due to a loss of IA.

Fire Area R-4/FHA Fire Zone A-6B

Fire Area R-4/FHA Fire Zone A-6B, Degasifier Cubicle, located on the (-) 25 foot-6 inch elevation of the auxiliary building. The cables of concern pass through the hallway leading into this area and are for control and indication of valve 2-CH-192. Control and indication cables pass into this area in a cable tray through the water curtain and turn north prior to entering the degasifier cubicle and enter Fire Area R-4/FHA Fire Zone A-6A. The tray which carries these cables is the third tray in a tray stack that enters the location from the east and proceeds through the hallway towards the west. The bottom tray is seven feet off the floor of the room. Only a transient fire in the vicinity of the tray stack can impact this tray. The portion of the floor area in which a transient load can be placed in the zone of influence of the tray stack is assumed to be approximately 10% of the total room area. Analysis indicates there is a very low likelihood that a fire can occur in Fire Area R-4/FHA Fire Zone A-6A which will impact valve 2-CH-192. Cables for valve 2-MS-190B do not pass through this area; however the OMA for this valve may be needed due to a loss of IA.

Fire Area R-7/FHA Fire Area A-15

Fire Area R-7/FHA Fire Area A-15, 'A' EDG Room, is bounded by the Enclosure Building Filtration Actuation Signal (EBFAS) equipment area along the west wall, the 'B' EDG Room along the south wall and the yard along the east and north walls. Components of concern for this room are valves 2-CH-192, 2-CH-508 and 2-CH-509. Specifically, in Fire Area R-7/FHA Fire Area R-7 the loss of the EDG results in the loss of the Facility Z1 emergency power supply. This results in the loss of power to the battery charger supplying the battery for valve 2-CH-192. Also, the loss of the Facility Z1 emergency power causes the loss of power to

valves 2-CH-508 and 2-CH-509. Fire in this area could also cause the failure of IA. This would impact 2-CH-192 and 2-MS-190B. It is assumed that all of the sources in this room could damage something related to the EDG supply to the emergency bus. Based on the walkdown and analysis, there is an EDG, two 7.5 horsepower (hp) air compressors, and a bank of five electrical cabinets. This indicates that there is a high likelihood that a fire starting in the 'A' (Z1) EDG Room (Fire Area R-7/FHA Fire Area A-15) could impact the operation of these valves.

Fire Area R-15/FHA Fire Area C-1

Fire Area R-15/FHA Fire Area C-1 consists of the containment building. The cables of concern for this area are the power and indication cables for valves 2-CH-517 and 2-CH-519. These valves fail to the desired position upon loss of power. A hot short on these cables could cause these valves to spuriously operate. The power and indication cables for valves 2-CH-517 and 2-CH-519 both enter containment from the West Electrical Penetration Room on the 14 foot-6 inch elevation. Inside containment these cables traverse along the southwest and west wall in a cable tray. These cables follow the cableways down to the (-) 3 foot-6 inch elevation of containment, traverse back along the west and southwest wall of containment, and terminate at valves 2-CH-517 and 2-CH-519. These valves are located outside the shield wall of 'C' RCS loop and in close proximity to each other. This route does not bring the cables of concern in close proximity (within eight feet) of any ignition source. Based on this and the discussion regarding containment in Section 2 of the original exemption request there is a low likelihood that a fire can occur in Fire Area R-15/FHA Fire Area C-1 which will impact valves 2-CH-517 and 2-CH-519. OMA's for valves 2-CH-192, 2-MS-190A and 2-MS-190B are established for possible loss of IA due to a fire in Fire Area R-15/FHA Fire Area C-1.

Fire Area R-13/FHA Fire Area T-6

Fire Area R-13/FHA Fire Area T-6, West 480V Load Center Room, is bounded by the turbine building wall on the north, the East and West 45 Foot Cable Vault connection to the 25 Foot Cable Vault on the east wall, and the MPS1 Technical Service area on the south and west walls. Components of concern for this room are for valves 2-CH-192, 2-CH-508, 2-CH-509, 2-FW-43B and 2-MS-190B, breaker A406, H21 (TDAFW speed control circuit), level transmitter LT-5282, P18C ('C' charging pump), SV-4188 (TDAFW steam supply valve) and breaker DV2021. Control and indication cables for valves 2-MS-190B and P18C, the indication loop cabling for level transmitter LT-5282, and the breaker control cabling for breaker A406 enter through the floor of panel C21 directly from the 25 foot cable vault located below. The control and indication cabling for valve 2-FW-43B, H21 and SV-4188 enter this room in conduit through the floor near (within approximately 2 feet) panel C21, from the 25 foot cable vault located below, and enter panel C21 near the floor. Cables for breakers A406 and DV2021, valves 2-

CH-192, 2-CH-508 and 2-CH-509 are not located in this room. Valves 2-CH-508 and 2-CH-509 are impacted due to the potential loss of bus 22E which results in the loss of power to these valves. Valve 2-CH-192 is impacted due to the potential loss of bus 22E which results in the loss of power to the battery charger and the resulting loss of DC power to the valve. Breaker DV2021 is impacted due to the DC control power to 4.16 kV breaker controls interaction in panel C21 resulting from breaker A406 cabling. Bus 22E feeder cables travel along a cable tray starting at the east wall exiting the West 45 Foot Cable Vault and going west and then down into bus 22E. Damage is due to ignition sources in the vicinity of the tray, transient combustibles and bus 22E. Analysis indicates there is a medium likelihood that a fire in Fire Area R-13/FHA Fire Area T-6 could impact power to bus 22E. The remaining components, which terminate in panel C-21, have a low likelihood that a fire can occur in Fire Area R-13/FHA Fire Area T-6 which could impact valves 2-FW-43B, 2-MS-190B, breakers A406 and DV2021, circuit H21, level transmitter LT-5282, pump P18C and valve SV-4188.

Fire Area R-8/FHA Fire Area A-16

Fire Area R-8/FHA Fire Area A-16, 'B' EDG Room (Z2), is bounded by the EBFAS equipment area along the west wall, the Radwaste Drumming Station along the south wall, the yard along the east wall and the 'A' EDG Room along the north wall. The OMAs associated with a fire in this area are related to failure of the 'B' EDG resulting in the loss of power to breakers 24D, 22F and MCC B61, and the battery charger resulting in the depletion of the 'B' battery. Fire in this area could also cause the failure of IA. Cables for valves 2-CH-192, 2-MS-190A and level transmitter LT-5282 do not pass through this room. An OMA would be needed if the 'B' battery is depleted for level transmitter LT-5282. The OMA for valves 2-CH-192 and 2-MS-190A would be needed due to a loss of IA. It is assumed that all of the sources in this room could damage something related to the 'B' EDG supply to the emergency bus. Based on the walkdown and analysis, there is an EDG, two 7.5 hp air compressors, and a bank of five electrical cabinets. This indicates that there is a high likelihood that a fire can occur in the 'B' (Z2) EDG Room (Fire Area R-8/FHA Fire Area A-16) which could impact these valves.

OMAs needed based on a fire in Fire Area R-5, (FHA fire zone A-8A, 'A' ESF Room, Facility Z1), Fire Area R-6, (FHA fire area A-3, 'C' ESF Room, Facility Z2) and Fire Area R-12, (FHA fire area T-4, TDAFW pump pit) are a result of the potential for a loss of IA. Component cabling for valves 2-CH-192 and 2-MS-190A do not pass through these areas.

Cables for valves 2-CH-192, 2-CH-508, 2-CH-509 and 2-MS-190B do not pass through Fire Area R-17 (FHA Fire Zone A-10A, auxiliary building (-) 25 foot-6 inch elevation, East Piping Penetration area); however the OMAs for these valves may be needed due to a potential loss of IA.

RAI-07 Staffing

Attachment 1, Section 4.0 of the submittal states that it is assumed that there are three Plant Equipment Operators (PEOs) and a Reactor Operator available to perform the required OMAs and that there is an additional Appendix R PEO on shift in addition to the minimum staff indentified in the Technical Specifications (TSs).

RAI-07.1 Question:

Confirm that individuals that may be needed to perform the operator manual actions do not have collateral duties, such as firefighting, security duties, or control room operation, during a postulated fire event.

DNC Response:

The operations shift staffing requirements for MPS2 include one additional licensed or non-licensed operator over the minimum technical specification requirement to be on duty each shift during Modes 1, 2, 3, or 4. This operator is designated as the Appendix R operator and is specified in the TRM. Therefore the number of individuals available to respond to these OMAs is: one reactor operator (RO), two plant equipment operators (PEOs), and one additional licensed or non-licensed individual (Appendix R operator). The original exemption request allocated tasks to PEO-1, PEO-2, PEO-3 and RO-1. Per MPS2's minimal staffing requirements, one of the three PEOs would be the TRM-required Appendix R operator. Furthermore, with the exception of the panel C10 activities, the assignments are interchangeable between these four operators.

Since these individuals are specified by technical specifications and TRM, they are not members of the fire brigade and have no other collateral duties.

RAI-08 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). Attachment 1, Section 4.0 of the submittal states that the walkdown time column includes diagnostic time as well as time to don personal protective equipment and obtain necessary tools. The OMA tables provide the action time (time to execute) separately. It is not apparent from the request that confirmation time was included in the time and sequence assumptions.

RAI-08.1 Question:

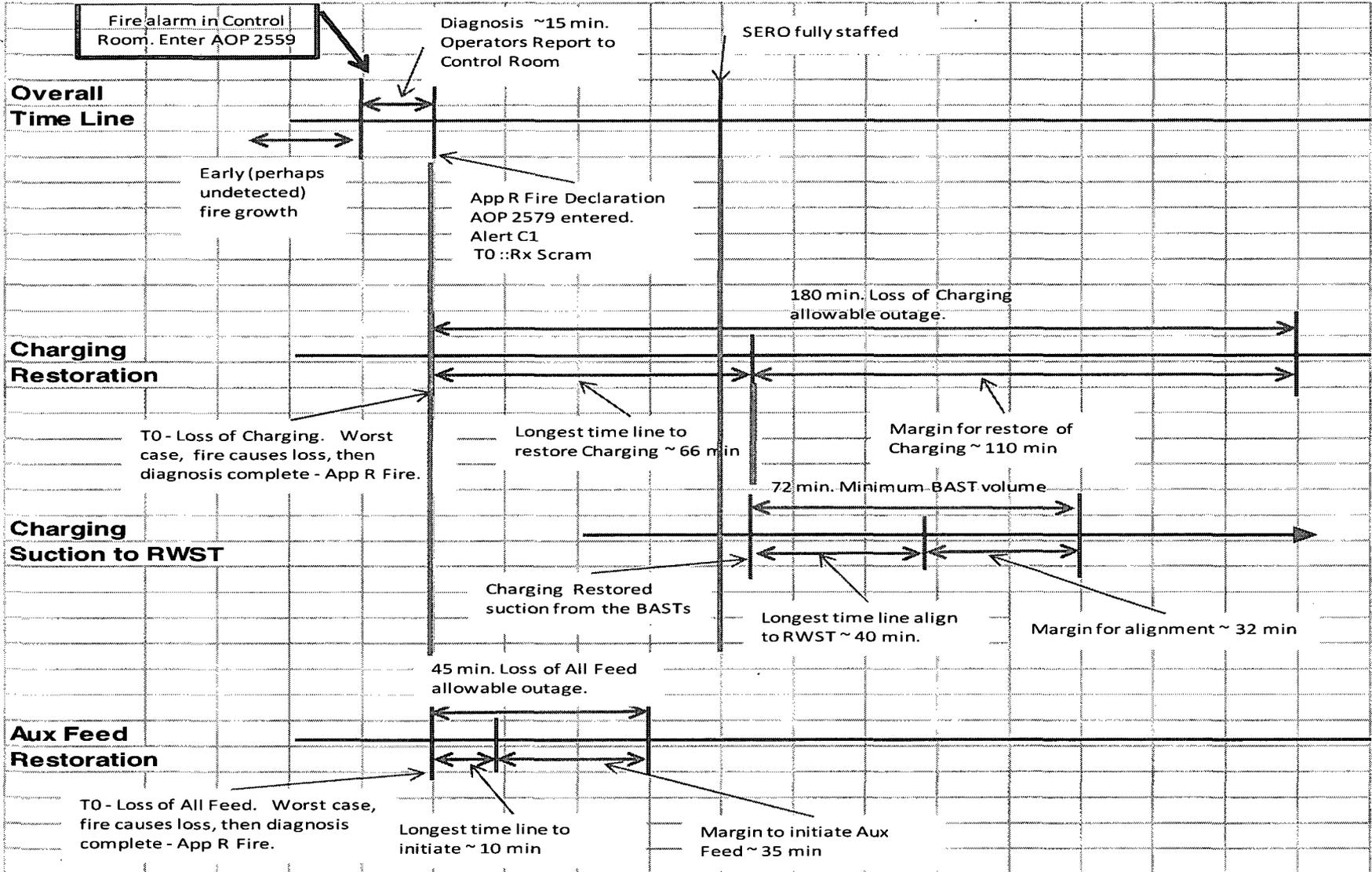
Provide additional information regarding the confirmation time including information that demonstrates that the proposed OMAs are feasible.

DNC Response:

Entry into AOP 2559 is at the first indication of a fire from a panel alarm or report from the field. If the fire is in an Appendix R area, the shift is directed to determine if a fire should be considered Appendix R (requiring use of the Appendix R AOPs) by:

- Actual or imminent damage to safe shutdown components, switchgear, MCCs, cable trays or conduit runs
- Spurious operation of plant components needed for safe shutdown
- Loss of indication, control, or function of safe shutdown plant systems or components
- Conflicting instrument indication for safe shutdown systems or components
- Parameters associated with safe shutdown systems or components not within expected limits for existing plant configuration

Fire Induced OMA Timeline



Confirmation time was included in the action time. For valves that are operated in the field, if they are being manually opened or closed, there is local indication plus the mechanical stops to confirm valve operation. For valves that are throttled, the field operator is in communication with the control room personnel who are monitoring control board indication to confirm the proper response. All breakers have local mechanical indication verifying its position (open or closed). All sequenced steps are coordinated from the control room. The times listed include this coordination.

The operators are provided with dedicated radio communication equipment. The Appendix R communication system utilizes a portion of the MPS 800 MHz trunked radio system. The system consists of 800 MHz portable radio units, a control room base station transmitter, antennas, a main communication console located inside the control room and redundant repeaters. The control room base station transmitter is provided to ensure two-way voice communications with the control room without affecting plant safety systems that may have sensitive electronic equipment located in the area. The resulting design configuration ensures communications capability for all Appendix R fire scenarios

RAI-09 Fire Area Proximity and Access

Attachment 1, Section 2.0 of the submittal describes each fire area and includes statements about floor area, combustible loading, potential ignition sources, available fire protection equipment and systems, and fire prevention methods, but does not include any information about the nature and rating of the fire area boundaries or whether openings and penetrations exist in any rated barriers. Information about ventilation systems, including how and when these systems activate and whether they have been designed to transport products of combustion without causing additional damage to equipment or relocating the smoke to other fire areas, has not been included.

RAI-09.1 Question:

Provide detailed information on the nature and rating of all fire area boundaries including whether opening and penetrations exist in rated barriers. Provide a technical justification for any non-rated fire protection assemblies.

DNC Response:

Information related to fire barriers is discussed in the responses to RAI-03.1, RAI-04.1, and RAI-04.2.

The general design criteria and ratings of fire barriers and the codes of record for fire doors and fire dampers are discussed in the response to RAI-04.1. The types of barrier deviations, including the use of water curtains in lieu of rated fire barriers, insufficient barrier/seal depth to meet a full 3-hour fire rating, fire damper installations that do not conform to manufacturer's instructions, exposed steel in fire barriers, use of non-rated doors in fire barriers and use of partial height walls as fire barriers, is discussed in the response to RAI-04.2. Generic Letter 86-10 evaluations and exemptions that document deviations to fire barrier assemblies for the plant areas discussed in the original exemption request are discussed in the response to RAI-03.1. Barrier deviations that could allow the spread of products of combustion of a fire to an adjacent area that either serves as a travel path for OMAs or is an action location for an OMA are also discussed in response to RAI-03.1 and have been found to not adversely impact OMA travel paths or action areas.

RAI-09.2 Question:

Indicate whether the use of self-contained breathing apparatuses is necessary for each fire area or zone included in the request.

DNC Response:

There are no fire areas within this exemption request which necessitate the use of a self-contained breathing apparatus.

RAI-09.3 Question:

For adjacent fire areas or where operators will pass within close proximity of the fire affected area, provide a technical justification that demonstrates that a fire in the fire area would not impact the performance of the OMA.

DNC Response:

In general, fire rated assemblies separating fire areas meet UL/FM design criteria and the requirements of ASTM E-119, "Fire Test of Building Construction and Materials" for 3-hour rated fire assemblies. Barrier deviations that could allow the spread of products of combustion of a fire to an adjacent area that either serves as a travel path for OMAs or is an action location for an OMA have been discussed in the response to RAI-03.1 and have been found to not adversely impact OMA travel paths or action areas. A review of ventilation systems for the fire areas/zones addressed by the original exemption request concluded that no

credible paths exist that could allow the spread of products of combustion from the fire area/zone of fire origin to an area that either serves as a travel path for OMAs or is an action location for an OMA.

RAI-09.4 Question:

Describe the ventilation systems in each area and state whether these ventilation systems are used for smoke evacuation or fire brigade operations and provide a justification for the systems capabilities.

DNC Response:

Due to the fact that the installed ventilation systems are not used to perform smoke removal activity for the fire areas/zones discussed in the original exemption request, a description of the ventilation system is not included in this response. Smoke evacuation for these areas would be accomplished by the site fire brigade utilizing portable mechanical ventilation.

RAI-10 Reliability of Actions

Attachment 1, Section 4.0 of the submittal includes data to show that adequate margin exists for all the operator manual actions, which is an indicator of feasibility and reliability.

RAI-10.1 Question:

Where a particular amount of time has been allocated for diagnosing an event, demonstrate that the additional uncertainties such as recovery from unexpected delays, environmental factors, operator response to stress, etc. are addressed by this time.

DNC Response:

The performances of all the OMAs for each of the fire areas have specific safe pathways for access and egress. In all cases, emergency lights (TRM listed Emergency Light Units) have been provided to ensure adequate lighting. During a fire event, the implementation of the control room actions ensure the radiation levels along these pathways, and at the location of the OMAs, are within the

normal and expected levels. Area temperatures may be slightly elevated due to a loss of normal ventilation however; in no case would the temperatures prevent access along the defined routes or prevent the performance of an OMA. Only one of the OMAs, OMA No. 1, could occur in the fire affected area. A fire in Fire Area R-4, charging pump cubicle, could impact valve 2-CH-192 requiring the OMA to manually open this valve. This action would be delayed until after the fire is extinguished and the area is ventilated. Opening valve 2-CH-192 would not be required until the BASTs are emptied. The most limiting time estimate is 72 minutes of charging operation injecting the contents of the BASTs based on the tanks being at the TRM minimum level at the start of the event. During the event, charging may be lost or secured, and RCS inventory can meet the Appendix R performance goal for 180 minutes. Analysis indicates that valve 2-CH-192 may not need to be opened until 252 minutes into the event.

AOP 2559, "FIRE" has various attachments that have Appendix R egress/access routes which provide a safe pathway to reach the required equipment necessary to complete the OMAs. Response to RAI 03.1 confirms the pathways will be free of hazards to the operators due to the subject fire. All of the OMAs identified in this request are contained in the abnormal operating procedures to respond to Appendix R Fire in the AOP Series 2579's fire procedures for Appendix R. During initial validation of these procedures, the OMAs were performed as outlined below. All of the time performance objectives were met as a result of the validation.

Operations personnel train to these procedures and these AOPs identify, among other things, the steps to perform each OMA. The times allotted to perform these tasks are easily achieved by experienced and inexperienced operators during training sessions, evaluated requalification training, and supervised walkdowns. For each case, there is sufficient margin to account for the uncertainties associated with stress, environmental factors, and unexpected delays.

The TCAs come from various sources:

- Safety analyses as documented in the Safety Function Requirement Manual (SFRM).
- MPS Appendix R Compliance report and supporting analyses.

All OMAs presented in this request are encompassed in procedure C OP 200.18, "Time Critical Action Validation and Verification." An enhancement to the tracking and training on TCAs has been developed and is currently being implemented at MPS2. C OP 200.18 is the single collection of all the TCAs at the plant and will be incorporated into operator training and job performance measures (JPMs).

RAI-10.2 Question:

Provide a clear description of how the time needed to perform potential corrective or reactive actions in the event the action did not accomplish the desired result (i.e., "response not obtained") was factored into the OMA performance time and provide the technical basis for the time allotted for each reactive action.

DNC Response:

There are a series of Appendix R AOPs corresponding to each Appendix R fire area which are entered once an Appendix R fire is declared. All corrective or reactive actions are contained in these AOPs. The time line estimates are based on complete performance of the AOP steps.

All equipment required to complete a required action is included in a preventative maintenance program and is also listed in the TRM. The TRM identifies surveillances for the equipment utilized in each OMA. MPS2 has evaluated/modified all MOVs relied upon by OMAs consistent with NRC Information Notice (IN) 92-18 (February 28, 1992). This IN detailed the potential for fires to damage MOVs that are required for safe shutdown so that they can no longer be remotely or manually operated. As a result of this evaluation/modification activities, the possibility that the desired result was not obtained is minimized. Furthermore, all the equipment operated to perform these OMAs are not fire affected and therefore are reasonably expected to operate as designed. The one exception to this is in Fire Area R-4, the performance of OMA No. 1. Valve 2-CH-192 could be fire affected, however this is an AOV that fails closed on loss of IA or power and is normally closed. A fire event in this area will not cause this valve be driven beyond its stops. The valve will not be over-tourqued. Additionally, operating valve 2-CH-192 is not required until the BASTs are nearly depleted; a minimum of 72 minutes after charging is reestablished (which is not required until 180 minutes). A fire directly impacting valve 2-CH-429 would result in the valve failing in the desired open position.

RAI-11 Required Operator Stations

The submittal does not specify what has been assumed for the location from which operators are dispatched to perform the OMAs or whether scenarios were evaluated where operators were not at their assumed locations at the beginning of an event.

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-11.1 Question:

Provide a justification for the assumption that operators will be located an assumed location 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.

DNC Response:

The operators are required and assumed to be within the protected area. The time lines account for the initial response by the field operator. Upon the announcement of a fire, the field operators are directed to report to the control room and await further directions. Initially, upon a report of a fire, the control room operators enter AOP 2559 "Fire." The flow path for MPS2 to get into an Appendix R fire scenario is that upon indication of a fire the fire brigade is dispatched and, based on their report or indications in the control room, an Appendix R fire may be declared. In the development of the time lines, the operators are allowed 5 minutes to respond and report to the control room.

RAI-11.2 Question:

State whether the assumed times for operators to perform various tasks, such as 32 minutes for PEO-2 to open 2-CH-192 (Attachment 1, Page 36, Table 7), are reasonable. For instance, provide a justification for assuming that it will take PEO-2 32 minutes from the time they are directed to open 2-CH-192 to travel to and open the valve and then confirm that it is open.

DNC Response:

All of the OMAs identified in this request are contained in the abnormal operating procedures to respond to Appendix R Fire in the AOP Series 2579's fire procedures for Appendix R. During initial validation of these procedures, the OMAs were performed as outlined below. All of the time performance objectives were met as a result of the validation.

Validation Process

1. Validation Objectives

- a. Ensure that the times are met as specified with a goal of completion within 80% of the time requirement.
 - b. Demonstrate that the language, level of information, sequencing and number of tasks in the procedure is compatible with the minimum staffing, qualifications training and experience of plant personnel.
 - c. Verify lighting, component labeling, accessibility of equipment, tools, keys, flashlights, and other devices or supplies are adequate for successful completion of the time critical task.
2. Validation shall be performed on a frequency in accordance with Licensed Operator Requalification Training (LORT) curriculum plan.

3. Validation shall be performed by one of the following methods:

- a. Simulator Scenario: Most effective method for testing control room procedures to ensure assumed time lines can be accomplished.
- b. In-Plant Walk Through: Most effective method for testing local TCAs or when simulator modeling constraints prevent effective simulator validation.
- c. Reasonable Engineering Judgment: Is to be used where the simulator scenarios and walk through methods are not appropriate for the task to be performed. Reasonable engineering judgment should be used in conjunction with simulator scenarios and walk through methods.
- d. Training records such as simulator scenarios and JPMs may be used to document validation of TCAs provided the requirements are met.

4. Validation Attributes

- a. A validation team should consist of the following:
 - Team Leader: Person in charge of performing the validation who is knowledgeable of the task and the TCA requirements.
 - TCA Performers: Minimum number of personnel required to perform the task per analysis.
 - Optional Personnel: Training, Engineering, Probabilistic Risk Assessment, Procedures may observe or participate in the validation process.
- b. Special equipment, tools, keys, flashlights or other devices or supplies that are required to support the TCA are readily available.

5. Validation Performance

a. Simulator

- Performers take their positions in the simulator control room.
- Briefing is performed on initial conditions and team member responsibilities, including recording of time data.
- Evaluation team is positioned so as not to interfere with, distract performers or inhibit traffic paths.
- Copies of applicable procedures and related support documents are available for use consistent with availability in the actual control room.
- The simulated event is executed according to the predetermined scenario.
- For periodic or unannounced validations, the scenario should continue until the TCA is completed. If the time requirement has been exceeded, the scenario should be continued to aid in determining required changes to accomplish the TCA within the required time. The team leader determines when there is no benefit to continuing the scenario.

b. Walk Through

- If the performer must obtain a procedure to perform the TCA, it should be done as he/she would during normal operations. For those procedures that are pre-staged, a working copy of the procedure should be available at the location where the performer would be expected to obtain it.
- Performers begin validation at a location where the performer may reasonably be expected to be, based on the event in progress.
- Evaluation team members are stationed at locations appropriate for the TCA.
- The team leader will instruct the performer to perform the procedure or section of the procedure, consistent with the method of notification expected during an actual event.
- Performers simulate the actions required by the applicable procedures:
 - Obtain required equipment such as keys, ladders, spool pieces, etc. and place where required by the procedure.
 - Locate the designated equipment.
 - Simulate using the equipment.
 - Locate and read required instrumentation.
 - Simulate communications necessary to perform the TCA

c. Equipment Operating Times:

- Actual operating time for plant equipment should be used, where available, including valve stroke times for remote and locally operated valves.
- Where it is not possible to obtain a stroke time for the specific valve to be operated or for a similar valve, an appropriate estimate of stroke time may be used.

d. Time Keeping:

Designated time members record the following information on the appropriate attachment:

- Procedure Number: Procedure being validated.
- Scenario/ JPM number: if used.
- Validation Date: Date of evaluation.
- Start Time: Actual time the procedure was started.
- Validation Personnel: Personnel performing actions required by the procedure being validated.
- Evaluation Personnel: Personnel monitoring the validation of the procedure.
- Initial Conditions/ Malfunctions/ Procedures Used.
- Timed Actions: Actions requiring to be timed.
- Critical Times: Times associated with the action as applicable.
- Clock Time: Completion time for each required action.
- Elapsed Time: Difference from action completion time to start time.

e. Human performance Protocols:

TCA validation includes the use of all current plant human performance protocols and standards for the tasks and procedures being performed. These include but may not be limited to:

- Communications standard.
- Procedure use and adherence standard.
- Briefing requirements.
- Place keeping requirements
- Verification techniques such as self checking, peer checking, independent verification, concurrent verification.
- Personal protection equipment requirements.
- Other plant specific human performance protocols.

f. Evaluation of Time Critical Action validation

- A completion time within 80% of the TCA required time is considered adequate assurance that the TCA can be reliably performed.
- If the TCA is completed within 80%-100% of the required time, then perform the following:
 - Consider additional validations of the TCA using other performers.
 - Submit a condition report to evaluate for a degrading trend in TCA completion time.
- IF, during the performance of periodic or unannounced validations, more than one shift or individual fails to meet the required time, submit a condition report to evaluate the ability to meet the plant licensing basis associated with the TCA.

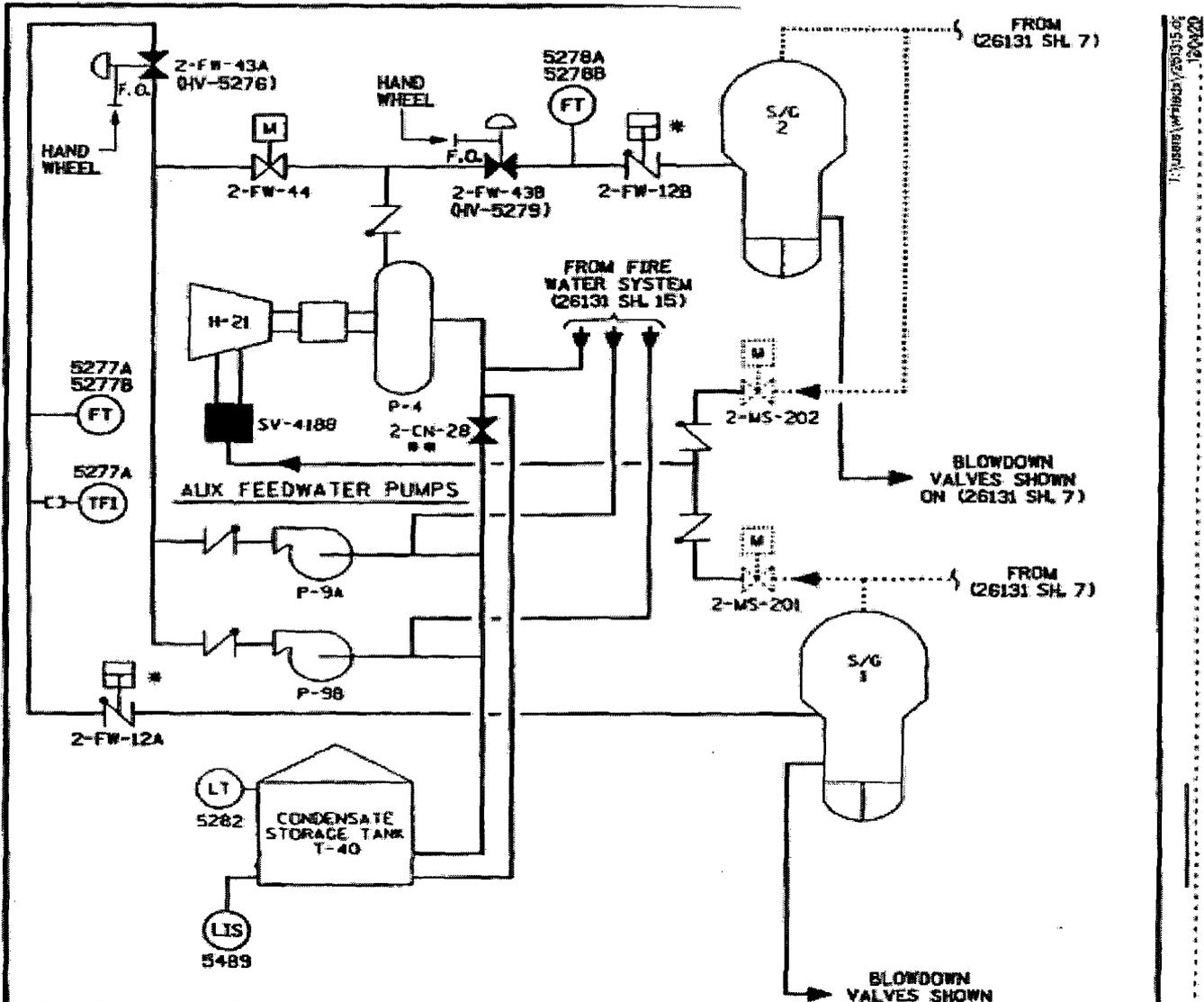
All OMAs presented in this request are encompassed in procedure C OP 200.18, "Time Critical Action Validation and Verification." An enhancement to the tracking and training on time critical actions (TCAs) has been developed and is currently being implemented at MPS2. C OP 200.18 is the single collection of all the TCAs at the plant and will be incorporated into operator training and JPMs.

Attachment 2

Simplified Sketches of System Configurations and Facility Alignment

**DOMINION NUCLEAR CONNECTICUT, INC.
MILLSTONE POWER STATION UNIT 2**

Sketch 25203-26131 SH. 5, Auxiliary Feedwater System



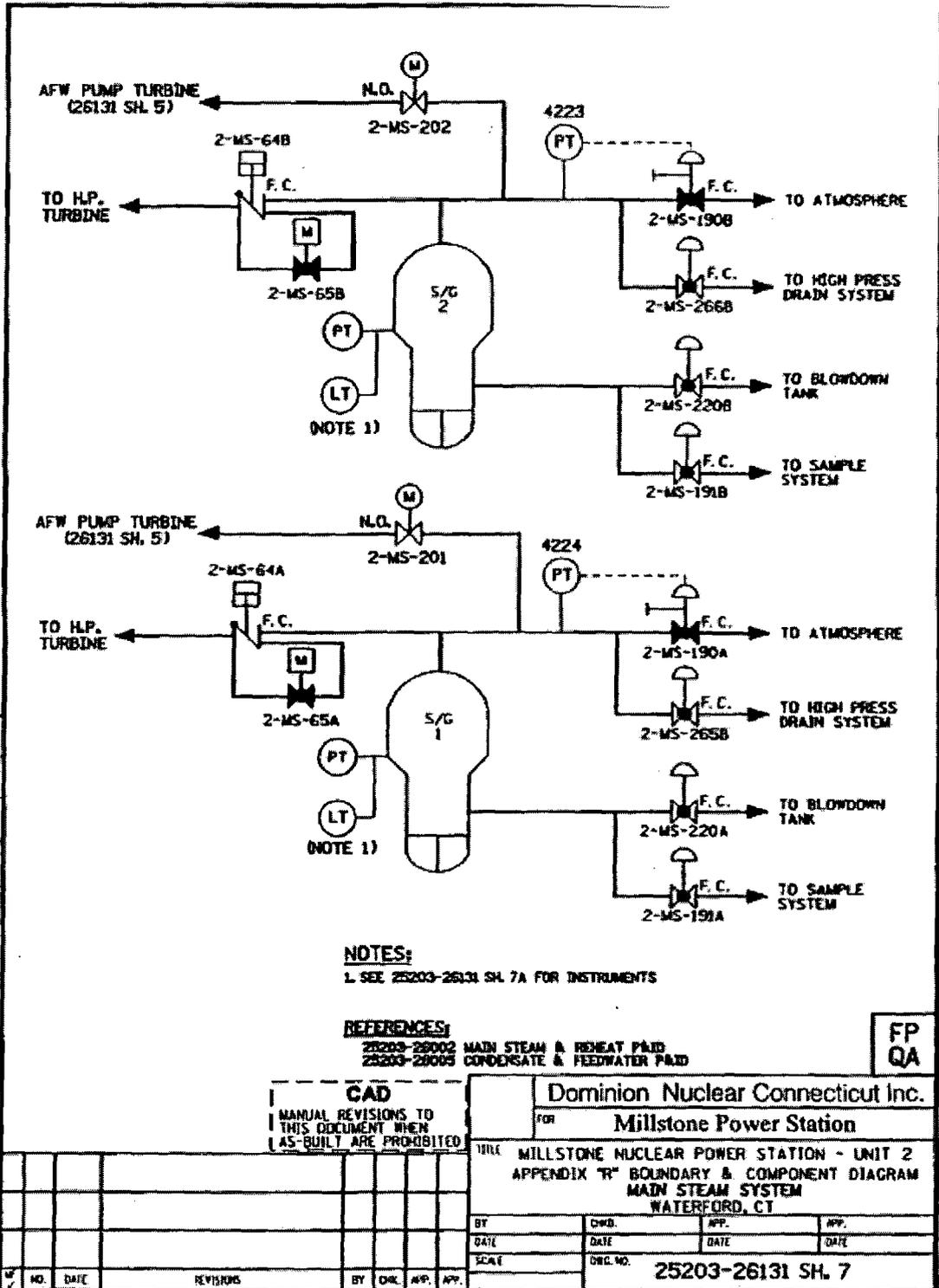
CAD
 NOTE:
 MANUAL REVISIONS TO THIS DOCUMENT
 WHEN AS-BUILT ARE PROHIBITED.

REFERENCES:
 25203-26006 CONDENSATE & FEEDWATER P&ID
NOTE:
 * AIR ASSIST TO OPEN
 ** NOT REQUIRED FOR APPENDIX "R"

FP
 QA

				Dominion Nuclear Connecticut Inc.			
				FOR Millstone Power Station			
				TITLE MILLSTONE NUCLEAR POWER STATION - UNIT 2 APPENDIX "R" BOUNDARY & COMPONENT DIAGRAM AUXILIARY FEEDWATER SYSTEM WATERFORD, CT			
BY		CHKD.		APP.		APP.	
DATE		DATE		DATE		DATE	
SCALE		DWG. NO.		25203-26131 SH. 5			
NO.	DATE	REVISIONS	BY	CHK.	APP.	APP.	
		DELETED VALVE 2-CN-241 AND LINE PER DCR M2-96073					

Sketch 25203-26131 SH. 7, Main Steam System



NOTES:

1. SEE 25203-26131 SH. 7A FOR INSTRUMENTS

REFERENCES:

25203-26002 MAIN STEAM & REHEAT PAID
 25203-26005 CONDENSATE & FEEDWATER PAID

FP
 QA

CAD
 MANUAL REVISIONS TO
 THIS DOCUMENT WHEN
 AS-BUILT ARE PROHIBITED

Dominion Nuclear Connecticut Inc.
 FOR Millstone Power Station

TITLE MILLSTONE NUCLEAR POWER STATION - UNIT 2
 APPENDIX TR BOUNDARY & COMPONENT DIAGRAM
 MAIN STEAM SYSTEM
 WATERFORD, CT

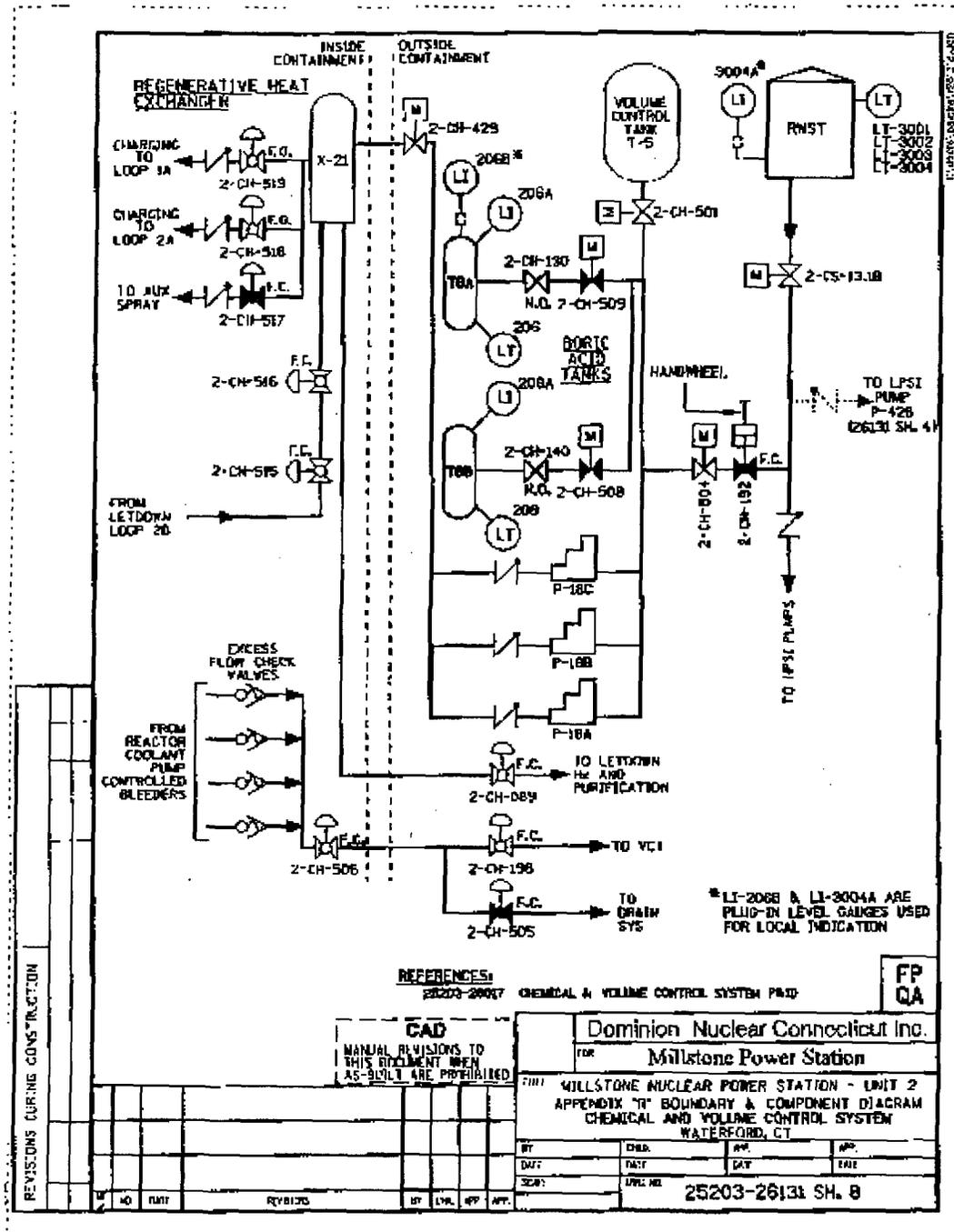
BY	CHKD.	APP.	APP.
DATE	DATE	DATE	DATE

SCALE _____ Dwg. No. 25203-26131 SH. 7

REVISIONS DURING CONSTRUCTION

NO.	DATE	REVISIONS	BY	CHKD.	APP.	APP.

Sketch 25203-26131 SH. 8, Chemical and Volume Control System



REVISIONS DURING CONSTRUCTION

NO	DATE	REVISION	BY	CHK	APP	APP

REFERENCES 25203-26007 CHEMICAL & VOLUME CONTROL SYSTEM P&ID			
FP QA			
CAD MANUAL REVISIONS TO THIS DOCUMENT WHEN AS-BUILT ARE PROHIBITED			
Dominion Nuclear Connecticut Inc. FOR Millstone Power Station			
UNIT 2 MILLSTONE NUCLEAR POWER STATION - UNIT 2 APPENDIX "R" BOUNDARY & COMPONENT DIAGRAM CHEMICAL AND VOLUME CONTROL SYSTEM WATERFORD, CT			
BY	CHK	APP	APP
DATE	DATE	DATE	DATE
SCALE	LINE NO.	25203-26131 SH. 8	

Sketch SKE-3.1-Electrical Distribution, One Line Diagram for Appendix R Sheet

