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

In accordance with 10 CFR 50.12, "Specific exemptions," Dominion Nuclear Connecticut, Inc. (DNC) hereby requests an exemption from the provisions of 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 (OMAs) in lieu of the requirements of Paragraph III.G.2. This exemption is requested in accordance with the requirements of 10 CFR 50.12(a)(2)(ii) since application of Appendix R, Paragraph III.G.2 in this particular circumstance is not necessary to achieve the underlying purpose of the rule.

The OMAs addressed in this exemption request are those contained in the MPS2 Appendix R Compliance Report. The MPS2 Appendix R Compliance Report was submitted to the NRC for review on May 29, 1987 and found acceptable by an NRC safety evaluation report (SER) dated July 17, 1990. However, the SER did not specifically address the OMAs.

This exemption request is provided in accordance with the guidance contained in Regulatory Issue Summary (RIS) 2006-10, "Regulatory Expectations with Appendix R Paragraph III.G.2 Operator Manual Actions". The guidance in RIS 2006-10 states an approved 10 CFR 50.12 exemption is required for all OMAs, even those accepted in a previously issued NRC SER. This exemption request is limited to those OMAs that were previously submitted to the NRC in the MPS2 Appendix R Compliance Report. Attachment 1, Table 1 contains a list of the specific OMAs for which an exemption is being requested.

This exemption request has been reviewed and approved by the Facility Safety Review Committee. This exemption request will not result in undue risk to the public health and safety because DNC has determined that the subject manual actions are feasible for use in achieving post-fire safe shutdown. This exemption request includes no new regulatory commitments.

Information supporting the exemption request is contained in Attachments 1 and 2 to this letter. DNC requests approval of this exemption request by July 1, 2012.

A006
NRR

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

Sincerely,

J. A. Price
Vice President – Nuclear Engineering

Attachments:

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

2. Appendix R Fire Area Boundaries, Emergency Lights, and Access/Egress Routes

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Attachment 1

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

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Introduction

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This exemption request is provided in accordance with the guidance contained in Regulatory Issue Summary (RIS) 2006-10, "Regulatory Expectations with Appendix R Paragraph III.G.2 Operator Manual Actions". The guidance in RIS 2006-10 states an approved 10 CFR 50.12 exemption is required for all OMAs, even those accepted in a previously issued NRC SER. This exemption request is limited to those OMAs that were previously submitted to the NRC in the MPS2 Appendix R Compliance Report. Attachment 1, Table 1 contains a list of the specific OMAs for which an exemption is being requested.

Background

Millstone Power Station Unit 2 (MPS2) is located on an approximately 500 acre site in the town of Waterford, Connecticut. MPS2 is a two steam generator (SG), four-coolant-loop, pressurized light water reactor with a nuclear steam supply system supplied by Combustion Engineering, Inc. and a turbine generator furnished by General Electric Corporation. The balance of plant was originally designed and constructed by Northeast Nuclear Energy Company with the assistance of its agent, Bechtel Corporation. The reactor unit was initially operated at a licensed power output of 2560 MWt, with a gross electrical output of approximately 865 MWe. In 1979, the unit was uprated to a core power output of 2700 MWt with a gross electrical output of approximately 895 MWe. MPS2 shares the site with Millstone Power Station Unit 1, a permanently defueled boiling water reactor nuclear unit, and Millstone Power Station Unit 3, a pressurized water reactor nuclear unit.

At the time of the design and construction of MPS2, the fire protection features in effect at nuclear power plants were those specified by the AEC-proposed 10 CFR Part 50, Appendix A, General Design Criterion 3 - "Fire Protection". MPS2 fire protection systems have been provided in accordance with 10 CFR Part 50 Appendix A criteria, and recognized guidelines of the Nuclear Energy Property Insurance Association (NEPIA) and the National Fire Protection Association (NFPA). The MPS2 Appendix R Compliance Report documents the ability for MPS2 to be placed in a cold shutdown condition following a design basis fire as required by the rules of 10 CFR Part 50, Appendix R , "Fire Protection Program for Nuclear Power Facilities Operating Prior to January 1, 1979" (hereafter referred to as Appendix R). Based on the Fire Protection safety evaluation report (SER) for Millstone Unit 2 dated September 19, 1978 (Reference 1), MPS2 committed to implement and maintain a quality assurance program for fire protection features that meets the guidelines of Branch Technical Position (BTP) Auxiliary and Power Conversion Systems Branch (APCSB) 9.5-1 and Appendix A thereto, and "Nuclear Plant Fire Protection Functional Responsibilities, Administrative Control and Quality Assurance," dated June 14, 1977 (Reference 11).

MPS2 implements and maintains in effect, all provisions of the approved fire protection program as described in the MPS2 Final Safety Analysis Report and as approved in the NRC SER dated September 19, 1978, and supplements dated October 21, 1980, November 11, 1981, April 15, 1986, January 15, 1987, April 29, 1988, July 17, 1990, November 3, 1995 and March 16, 1999 (References 1-9) subject to the following provision: The licensee may make changes to the approved Fire Protection Program without prior approval of the Commission only if those changes would not adversely affect the ability to achieve and maintain safe shutdown in the event of a fire.

The requested exemption is for OMAs that were previously identified in the MPS2 Appendix R Compliance Report submitted and determined to be acceptable in an SER dated July 17, 1990. Additionally, during an extended mid-cycle shutdown in the late 1990's, the OMAs were incorporated into the MPS2 Significant Item List (SIL) 21. The SIL included NRC approved Appendix R exemptions, the MPS2 Appendix R Compliance Report with Engineering, Planning and Management Inc.'s (EPM) computer analysis which identified OMAs and Appendix R components required to verify the MPS2 Appendix R Compliance Report, and Abnormal Operating Procedure (AOP) procedure steps for achieving safe shutdown. This 26 volume SIL package was reviewed by the NRC and included in the body of documentation the NRC Commission used in the deliberations regarding MPS2 restart approval in 1998 -1999.

For each OMA, the current MPS2 Appendix R Compliance Report indicates operator access is assured either by an alternate path or access is not required until after the fire has been suppressed. The AOP's were validated and performance of the actions was verified as reasonable within the timeframes required. However, these OMAs were not previously approved by an exemption. RIS 2006-10,"Regulatory Expectations with Appendix R paragraph III.G.2 Operator Manual Actions," contains guidance indicating that an exemption request is required for this category of OMAs. Additionally, MPS2

utilizes an alternate shutdown capability (per Appendix R paragraph III.G.3) for Fire Areas R-1, R-3, R-11 and R-16. These fire areas were accepted as alternative shutdown areas (among others) in the SER dated July 17, 1990 (Reference 7) and later clarified in correspondence (Reference 10). As such, there are no exemption requests submitted in this document for those fire areas.

Conclusion

This exemption request will not result in undue risk to the public health and safety because DNC has determined that the subject OMAs are feasible for use in achieving post-fire safe shutdown. The intent of 10 CFR 50, Appendix R, Section III.G.2, is to ensure that one train of systems necessary to achieve and maintain hot shutdown will remain available in the event of a fire. The OMAs discussed in this exemption request provide that assurance. If these OMAs are not used to meet the underlying purpose of the rule, modifications to: (1) provide additional fire suppression systems, detection systems, or fire barriers, or (2) re-route cabling or wrap cabling, would be required to achieve compliance. Such modifications represent an unwarranted burden on DNC since they are not necessary to meet the underlying purpose of the rule.

Therefore, the special circumstances for issuance of the exemption are satisfied in accordance with the requirements of 10 CFR 50.12(a)(2)(ii), since application of the rule is not necessary to achieve the underlying purpose of the rule. Furthermore, the requested exemption is authorized by law and is consistent with the common defense and security. Therefore, the requirements of 10 CFR 50.12(a)(1) are satisfied.

The Fire Protection Program at MPS2, including defense-in-depth features such as fire detection and suppression systems installed in specific fire areas/zones within the plant, has been previously reviewed and approved by the NRC. Due to the mitigating factors and existing defense-in-depth features already provided and discussed in this attachment, the existing level of defense-in-depth is considered acceptable for the OMAs contained in this exemption request.

Technical Discussion

1.0 Overview

In case of an Appendix R fire, the reactor is shutdown using the Control Element Assemblies (CEAs) and the Reactor Coolant System (RCS) is placed into a hot shutdown condition by isolating potential paths for loss of reactor coolant and establishing natural circulation cooldown by transferring heat to the SG(s). The RCS is borated through the charging system prior to achieving cold shutdown conditions. System pressure is decreased as part of the cooldown phase and charging pump flow provides a source for auxiliary pressurizer spray, as needed.

1.1 Reactivity Control Function

Reactivity control is accomplished by insertion of the control rods and results from an automatic Reactor Protection System (RPS) trip or from operator initiation of a manual trip.

Only control rods are necessary to achieve and maintain hot shutdown. Addition of boron is used to counter the effects of positive reactivity addition during cooldown to cold shutdown conditions.

1.2 RCS Pressure and Inventory Control Function

Maintaining the RCS pressure boundary integrity is necessary to achieve inventory and pressure control. The RCS and the Chemical and Volume Control System (CVCS) are used to achieve, or to assist in the achievement of the reactivity control function, the RCS inventory/pressure control function, and the decay heat removal function.

The RCS is isolated to maintain inventory control by minimizing system losses. This is achieved by de-energizing system components that could spuriously operate. The RCS letdown line is isolated to conserve RCS inventory. The RCP controlled bleedoff lines are isolated to avoid overfilling the Volume Control Tank (VCT). It is assumed the RCS leak rate during this time will be less than 13 gpm. Assuming these activities, plant calculations show that the pressurizer will remain on scale with the Charging system shutdown for up to 3 hours following a reactor trip. MPS2's AOPs for Hot Standby due to an Appendix R Fire requires operators to restore charging within 3 hours to provide makeup to the RCS and to begin borating.

Under normal conditions, makeup to the RCS is provided from the VCT and from the Boric Acid Storage Tanks (BASTs) using the Boric Acid Pumps. The Appendix R analysis assumes the VCT and Boric Acid Pumps are unavailable. After a reactor trip, RCS makeup is initially provided from the BASTs to quickly increase the RCS boron concentration. Boric acid is provided to the charging pump suction by gravity feed valves (open 2-CH-508 or -509). The remainder of the lineup is accomplished by

isolating the VCT and Refueling Water Storage Tank (RWST) (close 2-CH-501 and -504), and opening (or verifying open) the charging valves (2-CH-429, -518 and -519). For the purposes of re-establishing charging, either 2-CH-518 or 2-CH-519 is required. These air operated valves (2-CH-518 and 2-CH-519) are designed with independent backup air supplies in case normal instrument air is lost. The safety-related backup air supplies are capable of opening their respective valve and maintaining it open for over 13 hours or providing air for two valve strokes with a 5-1/2 hour hold. Switchover to the RWST (the backup makeup water supply) is required when the BASTs approach depletion. The air operated valve utilized to align to the RWST also has a safety-related backup air supply which allows for a single stroke of 2-CH-192 with a 3 hour hold. Level transmitters (LT-206 and -208) provide remote indication of BAST level, and local level indicators (LI-206A and -208A) provide local indication of BAST level.

RCS inventory makeup and reactivity control are provided by the contents of the BASTs. The charging pump suction would be diverted from the VCT to both of the BASTs. Boric acid would then be provided through gravity feed lines to the charging pumps.

RCS makeup is also available from the RWST, if the BASTs has less than the expected inventory or after the BASTs are emptied. RCS makeup would be accomplished through the normal charging lines. To achieve cold shutdown, the RCS must be depressurized. The charging pumps provide borated water to the pressurizer via the pressurizer auxiliary spray line and valve 2-CH-517. This water cools the steam bubble in the pressurizer, causing RCS pressure to decrease. RCS shrinkage due to cooling is offset by charging water flowing directly into RCS loops 1A and 2A.

1.3 Decay Heat Removal Function

Removal of reactor decay heat starts immediately after reactor shutdown and continues through stabilization of the plant at cold shutdown conditions. Multiple systems are credited to reach cold shutdown conditions. The Appendix R approach requires that the water inventory in at least one SG is maintained while in hot standby conditions while the other SG may be allowed to initially steam itself dry and be refilled prior to entering cold shutdown.

(a) Main Steam (MS) System

Reactor decay heat removal is accomplished either by dumping steam to the atmosphere using either the Atmospheric Dump Valves (ADVs) (2-MS-190A or -190B) or the main steam safety valves (MSSVs). Operation of the ADVs is not necessary to place the plant in Hot Standby but is necessary for initiation of the transition to Cold Shutdown. Therefore, there is no required timeframe to operate the ADVs. Cold shutdown may be achieved by remote or handwheel-operation of the ADVs in conjunction with operation of other systems (e.g., shutdown cooling, Reactor Building Closed Cooling Water system (RBCCW), and service water). The Main Steam System

(MSS) also supplies steam to the turbine-driven auxiliary feedwater pump. To prevent excessive RCS cooldown and maintain SG inventory, the various MSS boundary paths must be isolated.

Following a fire, the portion of the MSS from the SGs to the Main Steam Isolation Valves (MSIVs) is isolated from the main condenser. This ensures availability of steam to drive the turbine-driven auxiliary feedwater pump, while maintain a flow path to dump steam to atmosphere to initiate plant cooldown from hot to cold shutdown conditions.

Steam is provided to the turbine-driven auxiliary feedwater pump, via valve 2-MS-201 or -202. Disconnect switch, NS6202, for the power cables of motor operated valve 2-MS-202 is procedurally maintained "open" during normal plant power operation (Modes 1, 2, and 3). The valve is normally open. Therefore, this pre-fire action eliminates the possibility for spurious closing of 2-MS-202, and addresses an NRC Information Notice (IN) 92-18 recommendation to verify post-fire manual operation capability for this valve.

During plant cooldown, the ADVs (2-MS-190A or -190B) are opened to vent steam to atmosphere after auxiliary feedwater flow has been established. Normally, these valves can be modulated from the control room, or the Hot Shutdown Panel (C-21) in the West 480 VAC Switchgear Room. Following a fire, it may be necessary to manually modulate these valves to cool down the RCS. The control circuit for 2-MS-190B is routed to the Fire Shutdown Panel (C-10) and this valve can also be modulated from there. If instrument air is lost, the atmospheric dump valves must be manually opened.

(b) Auxiliary Feedwater (AFW) System

The AFW system is required to remove decay heat from the RCS to maintain hot shutdown conditions and to remove decay and latent heat to cool the RCS to conditions allowing initiation of shutdown cooling (300°F).

The AFW system supplies water to the secondary side of the SGs, thus maintaining a secondary heat sink for decay heat removal. Two motor driven (MDAFW) and one steam turbine-driven auxiliary feedwater (TDAFW) pumps are available to supply the SGs. Each pump is capable of supplying the required feedwater flow to both SGs. The auxiliary feedwater pumps are normally aligned to take suction from the Condensate Storage Tank (CST), and can also be aligned to the fire water system if additional makeup is required. Each motor-driven pump supplies 300 gpm and the turbine-driven pump supplies 600 gpm. Level transmitter LT-5282 monitors the water level in the CST, and local level indication (LIS-5489) is available in the event LT-5282 is disabled as a result of a fire.

Any single AFW pump can be used to cooldown the plant. The adequacy of auxiliary feedwater flow from one MDAFW pump has been verified to be adequate to support post-fire shutdown for fires in Fire Areas R-2 and R-10

Regulating valves 2-FW-43A and -43B control AFW flow to each SG. A cross-connect valve (2-FW-44) allows flow from any AFW pump to any SG. An alternate set of controls has been provided for the TDAFW pump at the Fire Shutdown Panel (C-10). Operation of each regulating valve is controlled by a solenoid that supplies/dumps positioner air and a circuit that provides a position signal. The solenoid for each regulating valve can be de-energized by tripping the appropriate 125 VDC breaker or by energizing 120 VAC relays in each train of the AFW automatic initiation circuit (two out of two). This action will dump positioner air and cause the valves to open. The relays can be energized from the control room or at the Hot Shutdown Panel (C-21 in Fire Area R-13). When air is supplied to a regulating valve, a positioner can be used to regulate feedwater flow. The positioner is controlled from the control room or C-21. Upon loss of position signal, the regulating valves fail open. The valves can be closed or throttled using hand wheels. Each auxiliary feed regulating valve also has a safety-related back-up air supply which requires no operator alignment for operation. This backup air supply provides for 20 cycles, fully closed to open and then to closed, for each valve with a final three hour hold in the last position. Once the backup air supply is depleted, the valves will fail open.

An alternate set of controls has been provided at the Fire Shutdown Panel (C-10) for valve 2-FW-43B. These controls will allow the valve to be fully opened by disconnecting the 125 VDC solenoid circuit, or position controlled using the positioner circuit if instrument air is available. The cables associated with the disconnect switch are protected with a three-hour, fire rated material in the Facility Z1 4.16kV Switchgear Room, and one-hour fire rated material in the R-14 Cable Vault.

A plant calculation shows that AFW is required to be established within 45 minutes of a reactor trip and loss of main feedwater. The 45 minute requirement assumes one MDAFW pump is used to provide flow to both SGs. The preferred method of supplying AFW to the SGs is to utilize the TDAFW pump. Utilizing the TDAFW pump allows flow to be regulated through the failed open AFW regulating valves by utilizing turbine speed control. As a defense-in-depth approach, at least one MDAFW pump is available during fires in all fire areas, except those fires where an alternate shutdown capability is credited (R-1, R-3, R-11 and R-16) and a fire in the West 480 VAC Switchgear Room (R-13). If the TDAFW pump is not available, or as part of the defense-in-depth, operators will regulate flow to the SGs by cycling the MDAFW pump(s) through the failed open AFW regulating valves.

The instrument air system has not been analyzed. Therefore, its availability to operate components is not credited, even if the actuated component and its control circuit are undamaged by the fire. If required, air operated valves (AOV's) are repositioned manually, or by using backup air sources. Additionally, for defense-in-depth, MPS2 can cross-tie to the Millstone Power Station Unit 3 (MPS3) air system to provide MPS2 with sufficient instrument air to manipulate Appendix R valves.

2.0 Fire Areas Requiring OMAs

The following section describes the Fire Area/Fire Hazards Analysis (FHA) Fire Zones where, in the event of a fire, OMA would be needed to achieve safe shutdown.

Fire Area R-14/FHA Area T-7

The lower 6.9 and 4.16 kV Switchgear Room, which is located on the 31'-6" elevation of the MPS2 Turbine Building, is part of Appendix R Fire Area R-14, and is designated as Fire Area T-7 in the FHA.

Fire Area T-7 has a floor area of 2,520 ft^2 and has low combustible loading. Major combustibles in this fire area consist predominantly of cable insulation and Thermo-Lag fire resistant wrap. Potential ignition sources include electrical faults. Thermo-Lag wrap, while considered combustible, has been fire tested and qualifies as a three-hour fire-rated protective covering for cabling in this area.

Fire Area T-7 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. Hose stations and additional fire extinguishers are located in adjacent fire areas/zones for use in this area.

A fire in Fire Area T-7 that could potentially impact cables of concern would likely involve cable insulation resulting from an electrical fault in one of the cable trays routed over Bus 24E or failure of Bus 24E itself. Combustibles in this fire area consist predominantly of 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. Since there is a minimal amount of Class A combustibles in this area, there is little chance of a fire occurring, outside of a switchgear failure, which could act as a pilot ignition source for the cable insulation. A switchgear failure normally results in a high intensity fire that lasts for a short duration, which makes it unlikely that it will cause sustained combustion of IEEE 383 qualified cables.

In the unlikely event of a fire, it would be rapidly detected by the ionization smoke detection system installed in the area. The smoke detection system, which consists of an ionization smoke detector located directly over each switchgear cabinet in the area, will aid in providing prompt fire brigade response and rapid extinguishment of a fire.

Fire Area R-2/FHA Area T-8

The west cable vault, which is located on the 45'-0" elevation of the MPS2 Turbine Building, is part of Appendix R Fire Area R-2, and is designated as Fire Area T-8 in the FHA.

Fire Area T-8 has a floor area of 1,315 ft^2 and has low combustible loading. Major combustibles in this fire area consist predominantly of cable insulation. Potential ignition sources include electrical faults.

Fire Area T-8 is provided with an automatic wet-pipe sprinkler system designed to protect structural steel in this area from the adverse affects of a fire. This area is also protected by an ionization smoke detection system that alarms at the main fire alarm panel in the control room. The vertical cable chase that leads down the auxiliary building cable vault is protected by an automatic deluge spray system which is actuated by a cross-zoned smoke detection system. This system alarms at a local panel and at the main fire alarm panel in the control room. Hose stations and portable fire extinguishers are located in adjacent fire areas/zones for use in this area.

A fire in Fire Area T-8 that could potentially impact a cable of concern would likely involve cable insulation and result from an electrical fault. Combustibles in this fire area consist predominantly of IEEE 383 qualified cable insulation or cable that has 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. Since there is a minimal amount of Class A combustibles in this area, there is little chance of a fire occurring which could act as a pilot ignition source for the cable insulation.

Were a cable fire to occur in this area, it would be rapidly detected in its incipient stage by the installed smoke detection system, which will aid in providing rapid response by the fire brigade. In the unlikely event the fire advanced beyond its incipient stage (unlikely based on type of cable insulation and fire brigade suppression activities), it would actuate the installed automatic wet-pipe suppression system provided in this area. This system consists of upright sprinklers located in each beam pocket, and was originally installed for the protection of structural steel. This system will, at a minimum, provide reasonable assurance that a cable tray fire in this area will be controlled and confined to the immediate area of origin, and will limit fire exposure/damage.

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

The east electrical penetration area, which is located on the 14'-6" elevation of the MPS2 auxiliary building, is part of Appendix R Fire Area R-17, and is designated as Fire Zone A-10B in the FHA.

Fire Zone A-10B has a floor area of 2,104 ft^2 and has low to moderate combustible loading. Major combustibles in this fire zone consist predominantly of cable insulation, and small amounts of plastics. Potential ignition sources include electrical faults. This fire zone is provided with an ionization smoke detection system which alarms at the main fire alarm panel in the control room. Hose stations and portable fire extinguishers are located in adjacent fire areas/zones for use in this zone.

A fire in Fire Zone A-10B that could potentially impact a cable of concern would likely involve cable insulation resulting from an electrical fault. Combustibles in this fire zone consist predominantly of IEEE 383 qualified cable insulation or cable that has 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. The cable trays in this zone are predominantly located towards the southern and eastern end of the room, while the Class A combustibles are located predominantly towards the northern end of the room.

Based on the location of the Class A combustibles in relation to the cable trays in this zone, there is little chance of a fire occurring which could act as a pilot ignition source for the cable insulation. A failure of motor control center (MCC) B-31B could also serve as an ignition source. An MCC failure normally results in a high intensity fire that lasts for a short duration, which makes it unlikely that it will cause sustained combustion of IEEE 383 qualified cables. In order to impact the subject cable trays, an MCC failure would have to ignite a cable tray located immediately overhead of the MCC, and the fire would have to propagate via the cable tray until it reached any cables of concern. Based on the discussion above, this is not a likely scenario. The characteristics of an MCC failure and the fire retardant properties of IEEE 383 cabling also make it implausible that failure of hydrogen analyzers C86 or C87 would result in the ignition of a cable tray located several feet above the analyzers. The heavy construction of the hydrogen analyzer cabinets would further preclude this event.

In the event of a fire in this zone, it would be rapidly detected in its incipient stage by the installed smoke detection system, which will aid in providing rapid response by the fire brigade.

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

The east main steam safety valve/blowdown tank room, which is located on the 38'-6" elevation of the MPS2 auxiliary building, is part of Appendix R Fire Area R-17, and is designated as Fire Zone A-10C in the FHA.

Fire Zone A-10C has a floor area of 1,725 ft^2 and has low combustible loading. Combustibles in this fire zone consist entirely of cable insulation. Potential ignition sources include electrical faults. A hose station and portable fire extinguishers are located in adjacent fire areas/zones for use in this zone.

A fire in Fire Zone A-10C that could potentially impact the cables of concern would likely involve cable insulation resulting from an electrical fault. Combustibles in this fire area consist of IEEE 383 qualified cable insulation or cable that has 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. Since the amount of Class A combustibles in this fire zone is negligible, there is little chance of a fire occurring which could act as a pilot ignition source for the cable insulation.

In the unlikely event of a fire in this fire zone, the high ceiling and the large volume of this room would preclude a large rise in temperature in the areas where the subject cable trays/conduits are routed, lessening the likelihood that they would be damaged by the fire.

Fire Area R-2/FHA Area T-10

The upper 6.9 and 4.16 kV switchgear room, which is located on the 56'-6" elevation of the MPS2 Turbine Building, is part of Appendix R Fire Area R-2, and is designated as Fire Area T-10 in the FHA.

Fire Area T-10 has a floor area of 2,760 ft^2 and has low combustible loading. Major combustibles in this fire area consist predominantly of cable insulation. Potential ignition sources include electrical faults.

Fire Area T-10 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. Hose stations and additional fire extinguishers are located in adjacent fire areas/zones for use in this area.

A fire in Fire Area T-10 that could potentially impact any cables of concern would likely involve cable insulation resulting from an electrical fault or failure of Bus 25B, which is located several feet away from the subject cable tray. Combustibles in this fire area consist predominantly of 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.

Since there is a minimal amount of Class A combustibles in this area, there is little chance of a fire occurring, outside of a switchgear failure, which could act as a pilot ignition source for the cable insulation. A switchgear failure normally results in a high intensity fire that lasts for a short duration, which makes it unlikely that it will cause sustained combustion of IEEE 383 qualified cables.

In the unlikely event of a fire, it would be rapidly detected by the ionization smoke detection system installed in the area. The smoke detection system, which consists of an ionization smoke detector located directly over each of switchgear cabinet in the area, will aid in providing prompt fire brigade response and rapid extinguishment of a fire.

Fire Area R-14/FHA Area T-9

The east cable vault, which is located on the 45'-0" elevation of the MPS2 Turbine Building, is part of Appendix R Fire Area R-14, and is designated as Fire Area T-9 in the FHA.

Fire Area T-9 has a floor area of 1,520 ft^2 and has moderate combustible loading. Major combustibles in this fire area consist predominantly of cable insulation, with smaller amounts of Thermo-Lag fire resistant wrap also in the area. Potential ignition sources include electrical faults. Thermo-Lag wrap, while considered combustible, has been fire tested and qualifies as a one-hour fire rated protective covering for cabling in this area. Based on its fire resistive properties and its minimal BTU contribution in relation to that of cable insulation in this fire area, its overall fire impact is considered negligible and is bounded by the analysis of cable insulation fires provided below.

Fire Area T-9 is provided with an automatic wet-pipe sprinkler system designed to protect structural steel in this area from the adverse affects of a fire. This area is also protected by an ionization smoke detection system that alarms at the main fire alarm panel in the control room. The vertical cable chase that leads down the auxiliary building cable vault is protected by an automatic deluge spray system which is actuated by a cross-zoned smoke detection system. This system alarms at a local panel and at the main fire alarm panel in the control room. Hose stations and portable fire extinguishers are located in adjacent fire areas/zones for use in this area.

A fire in Fire Area T-9 that could potentially impact any cables of concern would likely involve cable insulation resulting from an electrical fault. Combustibles in this fire area consist predominantly of IEEE 383 qualified cable insulation or cable that has 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. Since there is a minimal amount of Class A combustibles in this area, there is little chance of a fire occurring which could act as a pilot ignition source for the cable insulation. Thermo-Lag, while considered combustible, is one-hour fire rated in this area. Based on its fire resistive qualities and lack of ignition sources, a fire involving the Thermo-Lag wrap is not credible.

In the event of a fire in this area, it would be rapidly detected in its incipient stage by the installed smoke detection system, which will aid in providing rapid response by the fire brigade. In the unlikely event the fire advanced beyond its incipient stage (unlikely based on type of cable insulation and fire brigade suppression activities), it would actuate the installed automatic wet-pipe suppression system provided in this area. This system consists of upright sprinklers located in each beam pocket, and was originally installed for the protection of structural steel. This system will, at a minimum, provide reasonable assurance that a cable tray fire in this area will be controlled and confined to the immediate area of origin.

Fire Area R-2/FHA Area A-13

The 480V MCC B61 and B41A enclosure, which is located on the 14'-6" elevation of the auxiliary building, is part of Appendix R Fire Area R-2, and is designated as Fire Area A-13 in the FHA.

Fire Area A-13 has a floor area of 267 ft^2 and has low combustible loading. Major combustibles in this fire area consist predominantly of cable insulation. Potential ignition sources include electrical faults. This fire area is provided with ionization smoke detection that alarms at a local panel and at the main fire alarm panel in the control room. Hose stations and fire extinguishers are located in adjacent fire areas/zones for use in this area. The steel enclosure of the MCC room is protected by a wet pipe water spray system in lieu of a three hour fire barrier.

A fire in Fire Area A-13 that could potentially impact any cables of concern would likely involve cable insulation resulting from an electrical fault or failure of one of the MCC's located in the room. Combustibles in this fire area consist predominantly of 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. Since there is a minimal amount of Class A combustibles in this area, there is little chance of a fire occurring, outside of a MCC failure, which could act as a pilot ignition source for the cable insulation. A MCC failure normally results in a high intensity fire that lasts for a short duration, which makes it unlikely that it will cause sustained combustion of IEEE 383 qualified cables.

In the unlikely event of a fire, it would be rapidly detected by the ionization smoke detection system installed in the area. The smoke detection system, which consists of an ionization smoke detector located directly over MCC B61, will aid in providing prompt fire brigade response and rapid extinguishment of a fire.

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

The west piping penetration area, which is located on the (-)5'-0" elevation of the auxiliary building, is part of Appendix R Fire Area R-2, and is designated as Fire Zone A-8C in the FHA.

Fire Zone A-8C has a floor area of 1,591 ft^2 and has low combustible loading. Major combustibles in this fire zone consist predominantly of cable insulation. Potential ignition sources include electrical faults. This fire zone is provided with an ionization smoke detection system which alarms at a local panel and at the main fire alarm panel in the control room. Hose stations and portable fire extinguishers are located in adjacent fire areas/zones for use in this zone.

A fire in Fire Zone A-8C that could potentially impact any cables of concern would likely involve cable insulation resulting from an electrical fault. Combustibles in this fire area consist predominantly of IEEE 383 qualified cable insulation or cable that has 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. Since there are a minimal amount of Class A combustibles in this zone, there is little chance of a fire occurring which could act as a pilot ignition source for the cable insulation. The fact that the subject cable trays are enclosed in cable tray covers and are located near the ceiling level would further serve to protect these trays. Much of the northern portion of this fire zone is a locked high-radiation area, which would preclude the buildup of transient combustibles in the area. In the event of a fire in this zone, it would be rapidly detected in its incipient stage by the installed smoke detection system, which will aid in providing rapid response by the fire brigade.

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

The west electrical penetration area, which is located on the 14'-6" elevation of the MPS2 auxiliary building, is part of Appendix R Fire Area R-2, and is designated as Fire Zone A-8D in the FHA.

Fire Zone A-8D has a floor area of 1,555 ft^2 and has low to moderate combustible loading. Major combustibles in this fire zone consist predominantly of cable insulation and small amounts of plastics and cellulosics. Potential ignition sources include electrical faults. This fire zone is provided with an ionization smoke detection system which alarms at the main fire alarm panel in the control room. A portable fire extinguisher is available in this fire zone, while additional portable fire extinguishers and hose stations are available in adjacent fire areas/zones for use in this zone.

A fire in Fire Zone A-8D that could potentially impact any cables of concern would likely involve cable insulation resulting from an electrical fault. Combustibles in this fire area consist predominantly of IEEE 383 qualified cable insulation or cable that has 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. The Class A combustibles in this zone are predominantly located in storage areas at the south side of the room near the room entrance and in the southwest corner of the room. There are no cable trays located near the southern storage area.

There is a small room of combustible construction located along the west wall of the fire zone just north of the southwest storage area. A majority of the combustibles located in the southwest storage area are located within metal enclosures. Based on administrative controls placed on hot work (cutting, grinding, welding), there are no credible ignition sources that would ignite the remaining exposed combustibles in this storage area or the adjacent room. Based on the above, there is little chance of a fire occurring which could act as a pilot ignition source for the cable insulation.

A failure of MCC B-41B could also serve as an ignition source. A MCC failure normally results in a high intensity fire that lasts for a short duration, which makes it unlikely that it will cause sustained combustion of IEEE 383 qualified cables despite the fact that the subject cable trays are located approximately 6-8' above the MCC.

In the event of a fire in this zone, it would be rapidly detected in its incipient stage by the installed smoke detection system, which will aid in providing rapid response by the fire brigade.

Fire Area R-9/FHA Area A-20

The "A" (east) DC equipment room, which is located on the 14'-6" elevation of the auxiliary building, is part of Appendix R Fire Area R-9, and is designated as Fire Area A-20 in the FHA.

Fire Area A-20 has a floor area of 1,417 ft^2 and has low combustible loading. Major combustibles in this fire area consist predominantly of cable insulation. Potential ignition sources include electrical faults. This fire area is provided with a cross-zoned ionization and photoelectric smoke detection system that activates a total flooding Halon 1301 fire suppression system. The Halon 1301 suppression system has manual release stations at each doorway and an abort switch located at the doorway to the east control room/cable vault stairway. This system alarms locally at the Halon control panel and at the main fire alarm panel in the control room.

Duct smoke detection is provided between this fire area, the "B" (West) DC Equipment Room (FHA Fire Area A-21), and the auxiliary building cable vault (FHA Fire Area A-24). This system alarms at a local panel and at the main fire alarm panel in the control room. A portable fire extinguisher is available in this fire area, while additional portable fire extinguishers and hose stations are available in adjacent fire areas/zones for use in this area.

A fire in Fire Area A-20 that could potentially impact any cables of concern would likely involve cable insulation resulting from an electrical fault or failure of a bus or electrical panel located in the room. Combustibles in this fire area consist predominantly of 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.

Since there is a minimal amount of Class A combustibles in this area, there is little chance of a fire occurring, outside of a bus/electrical panel failure, which could act as a pilot ignition source for the cable insulation. A bus/electrical panel failure normally results in a high intensity fire that lasts for a short duration, which makes it unlikely that it will cause sustained combustion of IEEE 383 qualified cables.

In the unlikely event of a fire in this area, it would be rapidly detected by the cross-zoned ionization and photoelectric smoke detection smoke detection system and subsequently extinguished by the total flooding Halon 1301 suppression system. The smoke detection system would also aid in providing prompt fire brigade response.

Fire Area R-10/FHA Area A-21

The "B" (west) DC equipment room, which is located on the 14'-6" elevation of the auxiliary building, is part of Appendix R Fire Area R-10, and is designated as Fire Area A-21 in the FHA.

Fire Area A-21 has a floor area of 983 ft^2 and has low combustible loading. Major combustibles in this fire area consist predominantly of cable insulation. Potential ignition sources include electrical faults. This fire area is provided with a cross-zoned ionization and photoelectric smoke detection system that activates a total flooding Halon 1301 fire suppression system. The Halon 1301 suppression system has manual release stations at each doorway and an abort switch located at the doorway to the "A" (East) DC equipment room (FHA Fire Area A-20). This system alarms locally on the halon control panel and at the main fire alarm panel in the control room.

Duct smoke detection is provided between this fire area, the "A" (East) DC Equipment Room (FHA Fire Area A-20), and the auxiliary building cable vault (FHA Fire Area A-24). This system alarms at a local panel and at the main fire alarm panel in the control room. Portable fire extinguishers and hose stations are available in adjacent fire areas/zones for use in this area.

A fire in Fire Area A-21 that could potentially impact any cables of concern would likely involve cable insulation resulting from an electrical fault or failure of a bus or electrical panel located in the room. Combustibles in this fire area consist predominantly of 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.

Since there is a minimal amount of Class A combustibles in this area, there is little chance of a fire occurring, outside of a bus/electrical panel failure, which could act as a pilot ignition source for the cable insulation. A bus/electrical panel failure normally results in a high intensity fire that lasts for a short duration, which makes it unlikely that it will cause sustained combustion of IEEE 383 qualified cables.

In the unlikely event of a fire in this area, it would be rapidly detected by the cross-zoned ionization and photoelectric smoke detection smoke detection system and subsequently extinguished by the total flooding Halon 1301 suppression system installed in this area. The smoke detection system would also aid in providing prompt fire brigade response.

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

The charging pump room, which is located on the (-) 25'-6" elevation of the MPS2 auxiliary building, is part of Appendix R Fire Area R-4, and is designated as Fire Zone A-6A in the FHA.

Fire Zone A-6A has a floor area of 1,179 ft^2 and has low combustible loading. Major combustibles in this fire zone consist predominantly of cable insulation and small amounts of lube oil. Potential ignition sources include electrical faults, pump motors, mechanical failure, and hot surfaces.

This fire zone is provided with an ionization smoke detection system which alarms at a local panel and at the main fire alarm panel in the control room. A fixed water curtain is provided at the entrance to the Degasifier Area (FHA Fire Zone A-6B), which provides protection for the charging pump area from a fire in the RBCCW Pump and Heat Exchanger Area (FHA Fire Zone A-1B). Actuation of this system results in an alarm (waterflow) at the main fire alarm panel in the control room. Portable fire extinguishers and hose stations are available in adjacent fire areas/zones for use in this zone. Curbs are installed between each charging pump to protect each pump from a combustible liquid spill within a neighboring charging pump cubicle.

A fire in Fire Zone A-6A that could potentially impact any cables of concern would likely involve cable insulation resulting from an electrical fault or a lube oil fire resulting from a charging pump failure. Combustibles in this fire zone consist predominantly of 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.

Since there is a minimal amount of Class A combustibles in this area, there is little chance of a fire occurring which could act as a pilot ignition source for the cable insulation. Each charging pump contains just over 10 gallons of lube oil which could also serve as a pilot ignition source for cable insulation in the event of a pump/motor failure with the resultant ignition of the lube oil. Based on the elevated ignition temperature of the lube oil and the low probability of a pump/motor assembly failure with subsequent ignition of the entire quantity of lube oil, it is unlikely that a lube oil fire from a charging pump failure would serve as an ignition source for IEEE 383 qualified cable insulation.

In the event of a fire in this zone, it would be rapidly detected in its incipient stage by the installed smoke detection system, which will aid in providing rapid response by the fire brigade.

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

The degasifier area, which is located on the (-) 25'-6" elevation of the MPS2 auxiliary building, is part of Appendix R Fire Area R-4, and is designated as Fire Zone A-6B in the FHA.

Fire Zone A-6B has a floor area of 462 ft^2 and has low combustible loading. Major combustibles in this fire zone consist predominantly of cable insulation. Potential ignition sources include electrical faults. This fire zone is provided with an ionization smoke detection system which alarms at a local panel and at the main fire alarm panel in the control room. A fixed water curtain is provided at the entrance to this fire zone and serves to provide protection for the Charging Pump Room (FHA Fire Zone A-6A) from a fire in the RBCCW Pump and Heat Exchanger Area (FHA Fire Zone A-1B). Actuation of this system results in an alarm (waterflow) to the main fire panel in the control room. Portable fire extinguishers and hose stations are available in adjacent fire areas/zones for use in this zone.

A fire in Fire Zone A-6B that could potentially impact any cables of concern would likely involve cable insulation resulting from an electrical fault. Combustibles in this fire zone consist predominantly of 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. Since there is a minimal amount of Class A combustibles in this area, there is little chance of a fire occurring which could act as a pilot ignition source for the cable insulation.

In the event of a fire in this zone, it would be rapidly detected in its incipient stage by the installed smoke detection system, which will aid in providing rapid response by the fire brigade.

Fire Area R-7/FHA Area A-15

The "A" diesel generator room, which is located on the 14'-6" elevation of the auxiliary building, is part of Appendix R Fire Area R-7, and is designated as Fire Area A-15 in the FHA.

Fire Area A-15 has a floor area of 931 ft^2 and has high combustible loading. Major combustibles in this fire area consist predominantly of diesel fuel oil, small amounts of lube oil, and cable insulation. Potential ignition sources include electrical faults, motors, mechanical failure, and hot surfaces. This fire area is provided with automatic preaction sprinkler protection to provide automatic suppression in/around the diesel generator as well as to provide cooling to the structural steel overhead. The deluge valve for this system is opened by the installed heat detection system. The detection system alarms

at the main fire alarm panel in the control room while the preaction sprinkler system alarms at a local panel and at the main fire alarm panel in the control room. Portable fire extinguishers are available in this fire area, while additional portable fire extinguishers and hose stations are available in adjacent fire areas/zones for use in this area.

A fire in Fire Area A-15 that could potentially impact any cables of concern would likely involve diesel fuel oil and/or lube oil resulting from a mechanical failure of the diesel generator or cable insulation resulting from an electrical fault. Combustibles in this fire area consists predominantly of 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. Since there is a minimal amount of Class A combustibles in this area, there is little chance of a fire involving Class A combustibles occurring which could act as a pilot ignition source for the cable insulation. While a fuel oil or lube oil fire could serve as a pilot ignition source to the cabling, it is expected that a fire involving Class B combustibles (flammable/combustible liquids) would be rapidly detected by the installed heat detection system and be suppressed by the installed suppression system and/or manual firefighting. The heat detection system would also aid in providing prompt fire brigade response were a fire to occur in this area.

Fire Area R-15/FHA Area C-1

The containment building, which is comprised of four elevations ((-)22'-6", (-)3'-6", 14'-6" and 38'-6"), makes up Appendix R Fire Area R-15, and is designated as Fire Area C-1 in the FHA.

Fire Area C-1 has a floor area of 13,274 ft^2 and has low combustible loading. Major combustibles in this fire area consist predominantly of cable insulation, and small amounts of lube oil. Potential ignition sources include electrical faults, motors, mechanical failure, and hot surfaces.

This fire area is provided with smoke detection at each of the east and west electrical penetration areas on the 14'-6" elevation. This system alarms at a local panel and at the main fire alarm panel in the control room. Heat detection is provided for each of the reactor coolant pumps. During refueling outages, the fire protection header within Containment is charged, with hose stations available on all elevations with the exception of the (-) 3'-6" elevation. Portable fire extinguishers are available on each Containment elevation during outages. During normal plant operation, fire protection piping within the Containment is not charged and fire extinguishers and hose packs are located outside of Containment adjacent to the Containment Personnel Air Lock.

A fire in Fire Area C-1 that could potentially impact any cables of concern would likely involve cable insulation resulting from an electrical fault. Combustibles in this fire area

consist predominantly of 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. During plant operation, there are negligible amounts of Class A combustibles in this area. Therefore, there is little chance of a fire occurring which could act as a pilot ignition source for the cable insulation. In a cable fire does occur, it would be rapidly detected by the smoke detection system installed at the east and west electrical penetration areas on the 14'-6" elevation of the Containment Building, alerting the control room to a fire condition in Containment.

A lube oil fire serving as a pilot ignition source to cable in the Containment Building is not a realistic scenario. The lube oil in this fire area is predominantly associated with the four RCPs. While a failure of one of these RCP motors and a subsequent lube oil fire could be postulated, each of the RCP motors (located on the 14'-6" Elevation of Containment) is partially enclosed in reinforced concrete compartments and the floor beneath the RCPs drains to the lowest elevation of Containment ((-)22'-6" Elevation). Cabling in the Containment Building is routed outside of these concrete compartments along the outer annulus of the Containment Building and would be shielded from an RCP motor fire.

Based on the large volume of the Containment, the heat and hot gasses generated by an RCP motor lube oil fire would rise to the upper elevations of the Containment Building away from the cable tray concentrations located at the east and west electrical penetration areas on the 14'-6" elevation of the Containment Building. If an RCP motor lube oil fire does occur, it would be rapidly detected in its incipient stage by the installed heat detection system that protects the RCP motors, alerting the control room to a fire condition in Containment.

Fire Area R-13/FHA Area T-6

The west 480 volt load center room, which is located on the 31'-6" elevation of the MPS2 Turbine Building, makes up Appendix R Fire Area R-13, and is designated as Fire Area T-6 in the FHA.

Fire Area T-6 has a floor area of 1,609 ft^2 and has low combustible loading. Major combustibles in this fire area consist predominantly of cable insulation. Potential ignition sources include electrical faults. This fire are 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. Hose stations and additional fire extinguishers are located in adjacent fire areas/zones for use in this area. The portion of this fire area east of column line E has been designated as a transient combustible free zone.

A fire in Fire Area T-6 that could potentially impact any cables of concern would likely involve cable insulation resulting from an electrical fault or a bus failure. Combustibles in this fire area consist predominantly of 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.

Since there is a minimal amount of Class A combustibles in this area, there is little chance of a fire occurring, outside of a bus failure, which could act as a pilot ignition source for the cable insulation. A bus failure normally results in a high intensity fire that lasts for a short duration, which makes it unlikely that it will cause sustained combustion of IEEE 383 qualified cables.

In the unlikely event of a fire, it would be rapidly detected by the ionization smoke detection system installed in the area. The smoke detection system will aid in providing prompt fire brigade response and rapid extinguishment of a fire while in its incipient stages.

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

The east piping penetration area, which is located on the (-) 25'-6" and (-)5'-0" elevations of the MPS2 auxiliary building, is part of Appendix R Fire Area R-17, and is designated as Fire Zone A-10A in the FHA.

Fire Zone A-10A has a floor area of 939 ft^2 and has low combustible loading. Combustibles in this fire zone consist entirely of Class A combustibles (e.g., rubber). Potential ignition sources include transient ignition sources (e.g. hot work). This fire zone is not provided with a smoke detection system. However, due to the openings in the ceiling of this fire zone, the ionization smoke detection system located at the ceiling of the east electrical penetration area (FHA Fire Zone A-10B) may eventually detect a fire in this zone. A hose station and portable fire extinguishers are located in adjacent fire areas/zones for use in this zone.

A fire in Fire Zone A-10A that could potentially impact any cables of concern would likely involve Class A combustibles from a transient ignition source. Based on the controls placed on transient combustibles and transient ignition sources, it is unlikely a fire would occur in this zone. All hot work evolutions in the plant are procedurally required to have a hot work fire watch in place. Hot work fire watches are individuals stationed in plant areas for the purpose of fire safety for workers and welders, detecting and suppressing smoke, fire, flames, or sparks as a result of hot work such as welding, cutting, or grinding. Therefore, if a fire starts as a result of hot work, it would be rapidly detected and extinguished in its incipient stages.

Since the amount of Class A combustibles in this fire zone is small, a fire in this room (an unlikely event for the reasons described above) would be of low intensity and would not likely be of sufficient magnitude to impact cable routed in conduit. The high ceiling of this room and the fact that this fire zone opens up to the east electrical penetration area above (FHA Fire Zone A-10B) would preclude a large rise in temperature in the

areas where the subject conduits are routed, lessening the likelihood that they would be damaged by the fire.

Fire Area R-8/FHA Area A-16

The "B" diesel generator room, which is located on the 14'-6" elevation of the auxiliary building, is part of Appendix R Fire Area R-8, and is designated as Fire Area A-16 in the FHA.

Fire Area A-16 has a floor area of 980 ft^2 and has high combustible loading. Major combustibles in this fire area consist predominantly of diesel fuel oil, with small amounts of lube oil also located in this area. There is negligible cable insulation located in this fire area. Potential ignition sources include electrical faults, motors, mechanical failure, and hot surfaces.

This fire area is provided with automatic preaction sprinkler protection to provide automatic suppression in/around the diesel generator as well as to provide cooling to the structural steel overhead. The deluge valve for this system is opened by the installed heat detection system. The detection system alarms at the main fire alarm panel in the control room while the preaction sprinkler system alarms at a local panel and at the main fire alarm panel in the control room. A portable fire extinguisher is available in this fire area, while additional portable fire extinguishers and hose stations are available in adjacent fire areas/zones for use in this area.

A fire in Fire Area A-16 that could potentially impact any cables of concern would likely involve diesel fuel oil and/or lube oil resulting from a mechanical failure of the diesel generator or cable insulation resulting from an electrical fault. Combustibles in this fire area consists of 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.

Since there is a minimal amount of Class A combustibles in this area, there is little chance of a fire involving Class A combustibles occurring which could act as a pilot ignition source for the cable insulation. While a fuel oil or lube oil fire could serve as a pilot ignition source to the cabling, it is expected that a fire involving Class B flammable/combustible liquids would be rapidly detected by the installed heat detection system and be suppressed by the installed suppression system and/or manual firefighting. The heat detection system would also aid in providing prompt fire brigade response were a fire to occur in this area.

Fire Area R-12/FHA Area T-4

The steam driven auxiliary feed pump pit, which is located on the 1'-6" elevation of the MPS2 Turbine Building, makes up Appendix R Fire Area R-12, and is designated as Fire Area T-4 in the FHA.

Fire Area T-4 has a floor area of 414 ft^2 and has low combustible loading. Combustibles in this fire area consist solely of lube oil. There is no cable insulation and Class A combustibles located in this fire area. Potential ignition sources include an electrical fault or the over-heating of a pump bearing. This fire area is provided with an ionization smoke detection system which alarms at a local panel and at the main fire alarm panel in the control room. A portable fire extinguisher is available in this fire area, while additional portable fire extinguishers and hose stations are available in adjacent fire areas/zones for use in this area.

A fire in Fire Area T-4 that could potentially impact any cables of concern would likely involve a lube oil fire resulting from an auxiliary feedwater pump failure. Lube oil found within the steam driven auxiliary feedwater pump is the only contributing factor to the combustible loading of this room. The lube oil is completely enclosed within the pump housing, which would help in preventing ignition of the oil from an external ignition source. There are no external ignition sources for the lube oil in this room. The restrictive access to this pump room limits the amount of transient combustibles and ignition sources in this room. In the event of a fire in this room (an unlikely event for the reasons described above), the low combustible loading would result in a low intensity fire. Further, it would be rapidly detected in its incipient stage by the installed smoke detection system, which will aid in providing rapid response by the fire brigade.

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

The containment spray and high pressure safety injection (HPSI)/low pressure safety injection (LPSI) pump room, which is located on the (-) 45'-6" elevation of the MPS2 auxiliary building, makes up Appendix R Fire Area R-5 ("A" ESF Room), and is designated as Fire Zone A-8A in the FHA.

Fire Zone A-8A has a floor area of 1,350 ft^2 and has low combustible loading. Major combustibles in this fire zone consist predominantly of cable insulation, with small amounts of lube oil also located in this zone. Potential ignition sources include electrical faults, pump motors, mechanical failure, and hot surfaces. This fire zone is provided with an ionization smoke detection system which alarms at a local panel and at the main fire alarm panel in the control room. Portable fire extinguishers and hose stations are available in adjacent fire areas/zones for use in this zone.

A fire in Fire Zone A-8A that could potentially impact any cables of concern would likely involve cable insulation resulting from an electrical fault or a lube oil fire resulting from a pump and/or motor failure. Combustibles in this fire zone consist predominantly of 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.

Since there is a minimal amount of Class A combustibles in this fire zone, there is little chance of a fire occurring which could act as a pilot ignition source for the cable insulation. While lube oil could also serve as a pilot ignition source for cable insulation, the small quantities of lube oil would result in a low intensity fire. Based on the elevated ignition temperature of the lube oil and the low probability of a pump and/or motor assembly failure with subsequent ignition of the entire quantity of lube oil, it is unlikely that a lube oil fire from a pump and/or motor failure would serve as an ignition source for IEEE 383 qualified cable insulation. In the event of a fire in this zone, it would be rapidly detected in its incipient stage by the installed smoke detection system, which will aid in providing rapid response by the fire brigade.

Fire Area R-6/FHA Area A-3

The low pressure safety injection (LPSI) pump room, which is located on the (-)45'-6" elevation of the MPS2 auxiliary building, makes up Appendix R Fire Area R-6 ("B" ESF Room), and is designated as Fire Area A-3 in the FHA.

Fire Area A-3 has a floor area of 1,011 ft^2 and has low combustible loading. Major combustibles in this fire area consist predominantly of cable insulation and small amounts of lube oil. Potential ignition sources include electrical faults, pump motors, mechanical failure, and hot surfaces. This fire area is provided with an ionization smoke detection system which alarms at a local panel and at the main fire alarm panel in the control room. Portable fire extinguishers and hose stations are available in adjacent fire areas/zones for use in this area.

A fire in Fire Area A-3 that could potentially impact any cables of concern would likely involve cable insulation resulting from an electrical fault or a lube oil fire resulting from a pump and/or motor failure. Combustibles in this fire area consist predominantly of 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.

Since there is a minimal amount of Class A combustibles in this fire area, there is little chance of a fire occurring which could act as a pilot ignition source for the cable insulation. While lube oil could also serve as a pilot ignition source for cable insulation, the small quantities of lube oil would result in a low intensity fire. Based on the elevated ignition temperature of the lube oil and the low probability of a pump and/or motor assembly failure with subsequent ignition of the entire quantity of lube oil, it is unlikely that a lube oil fire from a pump and/or motor failure would serve as an ignition source for IEEE 383 qualified cable insulation. In the event of a fire in this area, it would be rapidly detected in its incipient stage by the installed smoke detection system, which will aid in providing rapid response by the fire brigade.

3.0 OMA List

The OMAs in this exemption request are identified in Table 1 below. To aid in reviewing the OMAs, drawings AppR-1 through AppR-11 from MPS2 Compliance Report 25203-SP-M2-SU-1046, Rev.1 are included in Attachment 2). These drawings identify the Appendix R Fire Areas throughout the plant and provide equipment locations for the OMAs in this exemption request. The drawings also depict locations for equipment which is not in the required flow path.

Table 1 OMA List

OMA No.	Equipment	OMA	Time to Accomplish OMA	Initiating Fire Area	Action Location Fire Area/FHA Zone*
1	2-CH-192	Manually open valve to establish Charging Pump suction from RWST	Within 72 minutes after restoring Charging	R-2, 4, 5, 6, 7, 8, 9, 10, 12, 13, 14, 15, 17	R-4/A-6A (Dwg AppR-2)
2	2-CH-429	Manually open valve to establish Charging flow path	To reestablish Charging within 3 hours after loss of Charging	R-2	R-2/A-8C (Dwg AppR-3)
3	2-CH-506	Deenergize panel DV20 by opening breaker D0208	To reestablish Charging within 3 hours after loss of Charging	R-2	R-10/ A-21 (Dwg AppR-4)
4	2-CH-508	Manually open valve to obtain charging pump suction from BAST	To reestablish Charging within 3 hours after loss of Charging	R-7, 9, 13, 14, 17	R-1/A-1G (Dwg AppR-3)
5	2-CH-509	Manually open valve to obtain charging pump suction from BAST	To reestablish Charging within 3 hours after loss of Charging	R-7, 9, 13, 14, 17	R-1/A-1G (Dwg AppR-3)
6	2-CH-517	Open breaker to fail valve closed	To reestablish Charging within 3 hours after loss of Charging	R-2, 15	R-10/ A-21 (Dwg AppR-3)
7	2-CH-519	Open breaker to fail valve open to establish charging flow path	To reestablish Charging within 3 hours after loss of Charging	R-15	R-10/ A-21 (Dwg AppR-3)

OMA No.	Equipment	OMA	Time to Accomplish OMA	Initiating Fire Area	Action Location Fire Area/FHA Zone*
8	2-CS-13.1B	Manually open valve to establish charging pump suction from RWST	Within 72 minutes after restoring Charging	R-2	Yard (Dwg AppR-10)
9	2-FW-43B	Control at C-10 panel until loss of backup air or local manual operation	Within 45 minutes after loss of Main Feedwater	R-13, 14	R-2/T-10 (Dwg AppR-9) R-3/T-1A (Dwg AppR-7)
10	2-MS-190A	Manually operate valve to transition from MSSVs	After establishing AFW	R-2, 5, 6, 8, 10, 12, 15	R-17/A-10C (Dwg AppR-6)
11	2-MS-190B	Control at C-10 (R-13 fire) until loss of air, manually operate valve to transition from MSSVs	After establishing AFW	R-4, 7, 9, 13, 14, 15, 17	R-2/T-10 (C-10) (Dwg AppR-9) R-2/A-8E (manual Op) (Dwg AppR-6)
12	A305	Pull control power fuses and ensure breaker is open	Within 45 minutes after loss of Main Feedwater	R-2	R-14/T-7 (Dwg AppR-8)
13	A408	Pull control power fuses and ensure breaker is open to isolate required bus	To reestablish Charging within 3 hours after loss of Charging	R-14	R-2/T-10 (Dwg AppR-9)
14	A410	Pull control power fuses and ensure breaker is open to isolate required bus	To reestablish Charging within 3 hours after loss of Charging	R-14	R-2/T-10 (Dwg AppR-9)
15	A411	Pull control power fuses and ensure breaker is open to isolate required bus	To reestablish Charging within 3 hours after loss of Charging	R-14	R-2/T-10 (Dwg AppR-9)
16	A406	Pull control power fuses and ensure breaker is open (A406)	To reestablish Charging within 3 hours after loss of Charging	R-13	R-2/T-10 (Dwg AppR-9)
17	H-21	Operate from C-10 to control TDAFW pump speed	Within 45 minutes after loss of Main Feedwater	R-13	R-2/T-10 (Dwg AppR-9)
18	LT-206	Local BAST level indication (LI-206A)	To reestablish Charging within 3 hours after	R-2, 10	R-1/A-1G (Dwg AppR-3)

OMA No.	Equipment	OMA	Time to Accomplish OMA	Initiating Fire Area	Action Location Fire Area/FHA Zone*
			loss of Charging		
19	LT-208	Local BAST level indication (LI-208A)	To reestablish Charging within 3 hours after loss of Charging	R-2, 10	R-1/A-1G (Dwg AppR-3)
20	LT-5282	Local CST level Indication (LIS-5489)	Within 10 hours after establishing AFW	R-2, 10, 13, Yard	Yard (Not shown).
21	P18C	Operate pump from C-10	To reestablish Charging within 3 hours after loss of Charging	R-13	R-2/T-10 (Dwg AppR-9)
22	SV-4188	Operate valve from C-10	Within 45 minutes after loss of Main Feedwater	R-13	R-2/T-10 (Dwg AppR-9)
23	A401	Pull control power fuses and ensure breaker is closed to power bus from the EGD (Bus A4)	To reestablish Charging within 3 hours after loss of Charging	R-14	R-2/T-10 (Dwg AppR-9)
24	DV2021	Close breaker at panel DV20	To reestablish Charging within 3 hours after loss of Charging	R-13, 14	R-10/A-21 (Dwg AppR-4)

* Refer to Attachment 2 for drawings

4.0 OMA by Fire Area

For the purposes of this section and as shown in the tables for each identified fire area, it is assumed that there are three Plant Equipment Operators (PEOs) and one Reactor Operator (RO) available to perform the required OMAs. MPS2 has an Appendix R PEO on shift in addition to the minimum staff identified in the Technical Specifications.

When an Operator is performing work in series to a previous action, the Operator's designation (PEO1, PEO2, etc.) is repeated in the Operator column and the total time from the previous action is added to the Walkdown Time column for the next Operator's action. Additionally, the Walkdown Time column includes diagnostic time as well as time to don appropriate personal protective equipment (PPE) and obtain necessary tools. During a series of OMAs for an Operator, the margin time is not calculated and thus is identified with an "N/A" in the Margin column. The margin time is only entered when the final result is accomplished. (For example, the time for PEO3 to perform the

multiple OMAs to restore Charging is identified up to the total time to accomplish each OMA. The time margin is not identified until Charging is restored, which is accomplished when 2-CH-429 is locally opened. The column "T=0" is the initiating event that necessitates the OMA.)

Fire Area R-2 (See Table 2)

A fire in the West Penetration Area, MCC B61, and the Facility Z2 Upper 4.16kV Switchgear Room and Cable Vault will affect all Facility Z2 shutdown components. Facility Z1 is used to achieve and maintain Hot Standby. Plant shutdown to Hot Standby can be accomplished using shutdown procedure AOP 2579B, "Fire Procedure for Hot Standby Appendix R Fire Area R-2."

For a fire in Fire Area R-2, OMAs are required to provide for Decay Heat Removal and restore Charging system flow to the RCS.

In order to establish AFW flow, Bus 24C is credited to provide power from H7A ("A" Emergency Diesel Generator) to P9A ("A" MDAFW Pump). Calculations conclude that AFW flow must be established within 45 minutes. Cable damage may result in a loss of remote breaker control capability for A305, which is the Bus 24C to Bus 24E cross-tie breaker. At A305 (Bus 24C), the OMA is to Deenergize Breaker Control circuit by pulling control power fuses and ensuring that the breaker is open. This prevents spurious closure of A305. This step establishes AFW flow and provides for a 36 minute time margin on the 45 minute time requirement. After AFW flow is established, the ADVs are utilized to remove decay heat. Prior to this, RCS decay heat removal is provided by utilizing the MSSVs. Steaming through the MSSVs is also acceptable after AFW flow is established but utilizing the ADVs, with 2-MS-190A credited for the fire in Fire Area R-2, is required for initiating the transition to Cold Shutdown.

Valve 2-MS-190A fails due to a postulated loss of instrument air. Its cables are not impacted by fire. PEO-2 will remain with the ADV to modulate steam flow per direction from the control room.

The remaining decay heat removal function is to locally monitor CST level (LIS-5489). Monitoring CST level is not a short-term requirement because there is sufficient inventory in the CST to provide over 10 hours of water flow to the AFW system. This activity will likely be repeated several times over the course of placing the plant in Cold Shutdown.

The Charging system has several OMAs to reestablish flow within the three hour required timeframe. To initially restore charging, the following OMAs are accomplished: Open 2-CH-429 or ensure it is open, and close valves 2-CH-506 and 2-CH-517. Valves 2-CH-506 and -517 are air operated valves that fail closed. The 2-CH-429 valve is a motor operated valve located in the fire area and will be locally manually operated post-fire. Valve 2-CH-429 has been evaluated with respect to the guidance contained in

NRC Information Notice IN 92-18. Valves 2-CH-506 and 2-CH-517 are both located in containment. The OMA is to deenergize their common power supply (DV20) and fail both valves closed. Once 2-CH-429 is manually opened, charging can be reestablished.

Assuming 60 minutes before being allowed into the fire affected area, the charging flow path can be established within 64 minutes and charging flow within 66 minutes. This provides 114 minutes of margin on the 180 minute required time.

After charging is restored, there are OMAs to switch the charging suction path from the BASTs to the RWST. This requires opening 2-CH-192 and 2-CS-13.1B. The 2-CH-192 valve is an air operated valve which may have failed closed due to a loss of instrument air. This valve has a safety-related air accumulator which provides sufficient air to stroke open the valve and maintains it open for three hours. After the air accumulator is exhausted, the valve will fail closed and an OMA is required to establish/maintain RWST flow to the charging system.

Valve 2-CS-13.1B is a MOV which may spuriously close due to fire cable damage. This valve will have to be manually opened in the field prior to switching over to the RWST. Based on TRM requirements, the BASTs can supply charging for more than 72 minutes, at which time the charging pump suction source is shifted to the RWST.

Due to fire cable damage, both LT-206 and LT-208 are not available from the control room. Both BAST levels require OMAs for local level indication at LI-206A and LI-208A. Both indicators are outside the R-2 Fire Area. This action is considered part of the restoration for the Charging system. As such, this action is not required until the three hour timeframe.

Table 2 OMAs for Fire Area R-2

Operator	**Action**	**T=0**	**Walkdown Time** (min.)	**Time to Execute** (min.)	**Total Time** (min.)	**Time Required** (min.)	**Margin** (min.)
PEO-1	A305 (OMA 12)	Reactor Trip	3	6	9	45	36
Activity Complete	Establish AFW	Reactor Trip	N/A	N/A	9	45	36
PEO-2	2-MS-190A (OMA 10)	Establishing AFW	10	7	17	N/A	N/A
PEO-1	LIS-5489 (OMA 20)	Establishing AFW	(9) + 2	1	12	600	N/A
PEO-3	2-CH-506* Deenergize Breaker (OMA 3)	Loss of Charging	2	1	3	180	N/A

Operator	Action	T=0	Walkdown Time (min.)	Time to Execute (min.)	Total Time (min.)	Time Required (min.)	Margin (min.)
PEO-3	2-CH-517* Deenergize Breaker (OMA 6)	Loss of Charging	2	1	3	180	N/A
PEO-3	LI-206A (OMA 18)	Loss of Charging	(3) + 10	1	14	180	N/A
PEO-3	LI-208A (OMA 19)	Loss of Charging	(14) + 1	1	16	180	N/A
PEO-3	2-CH-429 (OMA 2)	Loss of Charging	60[1]	4	64	180	116
Control Room	Restore Charging	Loss of Charging	**	2	66	180	114
PEO-3	2-CH-192 (OMA 1)	Restoration of Charging	10	22	32	72	N/A
PEO-1	2-CS-13.1B (OMA 8)	Restoration of Charging	10	30	40	72	32
Activity Complete	Establish Charging Suction from RWST	Restoration of Charging	N/A	N/A	40	72	32

() Carryover time from previous OMA
*Breaker manipulation closes both valves
** Allowed Control Room activity, no Walkdown required.
[1]60 minutes includes the wait time to extinguish the fire and allow for the Operator to enter the fire affected area.

Fire Area R-4 (See Table 3)

A fire in the charging pump cubicles will affect the charging pumps and several suction valves.

The compliance strategy relies on re-routing of Facility Z2 control and power cables for P18B and Facility Z2 power cable for P18C from the pump cubicles to outside of Fire Area R-4. An exemption request (which was approved by NRC in an SER dated April 15, 1986) provides technical justification of survivability of at least one charging pump following a fire in this area, even though the requirements of Appendix R, Section III.G.2 are not met. Survivability is justified based on existing physical spatial separation, partial height missile walls, curbing between pumps, and low intervening combustibles. Plant shutdown can be accomplished using shutdown procedure AOP 2579T, "Fire Procedure for Hot Standby Appendix R Fire Area R-4".

For a fire in area R-4, OMAs are required to provide for decay heat removal and restore Charging system flow to the RCS.

Establishing AFW flow to the credited SG is required to be accomplished within 45 minutes. For a fire in Fire Area R-9, the required flow path utilizes the TDAFW pump. Prior to AFW initiation, the plant is placed in the Hot Standby condition by steaming through the MSSVs. After AFW is established from the control room, operation of the ADV (2-MS-190B) is the required method of removing decay heat to maintain Hot Standby and transition to Cold Shutdown. There is no cable damage from a fire in Fire Area R-9 to the required ADV (2-MS-190B). The fire may however cause a loss of instrument air. Instrument air is required to operate the ADVs to support decay heat removal. Upon a loss of air, the ADV will fail closed. This "fail to closed" design prevents excessive RCS cooldown prior to AFW start. Therefore, in the event of a loss of instrument air, Operators will establish local manual control of 2-MS-190B after AFW flow is established. PEO-2 will remain with the ADV to modulate steam flow per direction from the control room.

After restoration of the Charging system, the BASTs are credited for maintaining RCS inventory. The BASTs have a minimum level specified in the TRM which ensures 72 minutes of flow. Once the BASTs are depleted, Operators switch over to the RWST. Due to fire damage, the 2-CH-192 valve may spuriously close. In order to establish the RWST as the suction path for the Charging system, an OMA is required to open the valve prior to BAST depletion.

Table 3 OMAs for Fire Area R-4

Operator	**Action**	**T=0**	**Walkdown Time** (min.)	**Time to Execute** (min.)	**Total Time** (min.)	**Time Required** (min.)	**Margin** (min.)
PEO-2	2-MS-190B (OMA 11)	Establishing AFW	10	7	17	N/A	N/A
PEO-1	2-CH-192 (OMA 1)	Restoration of Charging	10	22	32	72	40
Activity Complete	Establish Charging Suction from RWST	Restoration of Charging	N/A	N/A	32	72	40

<u>Fire Area R-5</u> (See Table 4)

A fire in the 'A' Safeguards Room will affect some Shutdown Cooling system components. Plant shutdown to Hot Standby can be accomplished using existing shutdown procedure AOP 2579R, "Fire Procedure for Hot Standby Appendix R Fire Area R-5."

For a fire in Fire Area R-5, two OMAs are identified to provide for decay heat removal and restore charging system flow to the RCS. The first OMA is to open and modulate 2-MS-190A (ADV) and the second is to open valve 2-CH-192. Both OMAs are needed to compensate for a postulated loss of instrument air. Neither valve will experience cable damage due to a fire in Fire Area R-5.

The ADVs are utilized after AFW flow is established. AFW is required to be established within 45 minutes. Prior to this, RCS decay heat removal is provided by utilizing the MSSVs. Steaming through the MSSVs is also acceptable after AFW flow is established, but utilizing the ADVs, with 2-MS-190A credited for a fire in Fire Area R-5, is required for maintaining the plant in Hot Standby and initiating the transition to Cold Shutdown. PEO-2 will remain with the ADV to modulate steam flow per direction from the control room.

PEO-1 will complete the second OMA by opening 2-CH-192 to establish the RWST as the source of water to the RCS. This is an air operated valve which may have failed closed due to a loss of instrument air. The valve has a safety-related air accumulator which supplies sufficient air to stroke open the valve and maintain it open for three hours. After the air accumulator is exhausted, the valve will fail closed. The required OMA establishes/maintains RWST flow to the charging system. The BASTs have a minimum level specified in the TRM which ensures charging flow for more than 72 minutes, at which time charging pump suction is shifted to the RWST. Calculations indicate that the Charging system must be restored within three hours. Therefore, the accumulator capacity and the minimum TRM BAST level requirement require the OMA to locally open 2-CH-192 be accomplished within three hours (prior to the air accumulator being exhausted).

Both OMAs have sufficient emergency lighting units (ELUs) to provide for access to the valves and lighting to perform the tasks.

Table 4 OMAs for Fire Area R-5

Operator	**Action**	**T=0**	**Walkdown Time** (min.)	**Time to Execute** (min.)	**Total Time** (min.)	**Time Required** (min.)	**Margin** (min.)
PEO-2	2-MS-190A (OMA 10)	Establishing AFW	10	7	17	N/A	N/A
PEO-1	2-CH-192 (OMA 1)	Restoration of Charging	10	22	32	72	40
Activity Complete	Establish Charging Suction from RWST	Restoration of Charging	N/A	N/A	32	72	40

Fire Area R-6 (See Table 5)

A fire in the 'B' Safeguards Room will affect some Shutdown Cooling System components. Hot Standby equipment will not be affected. Plant shutdown to Hot Standby can be accomplished using shutdown procedure AOP 2579S, "Fire Procedure for Hot Standby Appendix R Fire Area R-6".

For a fire in Fire Area R-6, two OMAs are identified. The first OMA is to open 2-MS-190A (ADV) and the second is to open 2-CH-192. Both OMAs are needed to compensate for a postulated loss of instrument air. Neither valve will experience cable damage due to a fire in Fire Area R-6.

The ADVs are utilized after AFW flow is established. AFW is not fire impacted and is required to be established within 45 minutes. Prior to this, RCS decay heat removal is provided by utilizing the MSSVs. Steaming through the MSSVs is also acceptable after AFW flow is established, but utilizing the ADVs, with 2-MS-190A credited for a fire in Fire Area R-6, is required for maintaining the plant in Hot Standby and initiating the transition to Cold Shutdown. PEO-2 will remain with the ADV to modulate steam flow per direction from the control room.

PEO-1 will complete the second OMA by opening 2-CH-192 to establish the RWST as the source of water to the RCS. This is an air operated valve which may have failed closed due to a loss of instrument air. The valve has a safety-related air accumulator which supplies sufficient air to stroke open the valve and maintain it open for three hours. After the air accumulator is exhausted, the valve will fail closed. The required OMA establishes/maintains RWST flow to the charging system. The BASTs have a minimum level specified in the TRM which ensures charging flow for more than 72 minutes, at which time charging pump suction is shifted to the RWST. Calculations indicate that the Charging system must be restored within three hours. Therefore, the accumulator and the minimum TRM BAST level requirement require the OMA to locally open 2-CH-192 be accomplished within three hours (prior to the accumulator being exhausted).

Both OMAs have sufficient ELUs to provide for access to the valves and lighting to perform the tasks.

Table 5 OMAs for Fire Area R-6

Operator	Action	T=0	Walkdown Time (min.)	Time to Execute (min.)	Total Time (min.)	Time Required (min.)	Margin (min.)
PEO-2	2-MS-190A (OMA 10)	Establishing AFW	10	7	17	N/A	N/A

PEO-1	2-CH-192 (OMA 1)	Restoration of Charging	10	22	32	72	40
Activity Complete	Establish Charging Suction from RWST	Restoration of Charging	N/A	N/A	32	72	40

Fire Area R-7 (See Table 6)

A fire in Diesel Generator Room A will affect all Facility Z1 shutdown components. Facility Z2 is used to achieve and maintain Hot Standby. Plant shutdown to Hot Standby can be accomplished using Procedure AOP 2579G, "Fire Procedure for Hot Standby Appendix R Fire Area R-7".

For a fire in Fire Area R-7, OMAs are required to provide decay heat removal and restore Charging system flow to the RCS.

AFW flow must be established to the credited SG within 45 minutes. For a fire in Fire Area R-7, the required AFW flow path utilizes the TDAFW pump which is not fire impacted. Once AFW flow is established from the control room, operation of an ADV (2-MS-190B) is the method of removing decay heat to maintain the plant in Hot Standby and for initiating the transition to Cold Shutdown. Prior to AFW initiation, the plant is placed in the Hot Standby condition by steaming through the MSSVs. There is no cable damage from a fire in Fire Area R-7 to the required ADV (2-MS-190B). However, the fire may cause a loss of instrument air. Instrument air is required to operate the ADVs to support decay heat removal. Upon a loss of instrument air, the ADV will fail closed. This "fail to closed" design prevents excessive RCS cooldown prior to AFW start. Therefore, in the event of a loss of instrument air, Operators will establish local manual control of 2-MS-190B after AFW is established. PEO-1 will remain with the ADV to modulate steam flow per direction from the control room.

For a fire in Fire Area R-7, the Charging system has OMAs identified. The BASTs gravity feed valves, 2-CH-508 and 2-CH-509, may fail as is (closed) due to a loss of power supply. An OMA is in place to locally open the valves as part of restoring the Charging system. Once these valves are opened, the control room can establish charging flow within 2-3 minutes. Establishing pump suction from the BASTs and restoring charging is required within three hours of reactor shutdown/loss of charging. Charging is re-established within 24 minutes (21 minutes to open BASTs valves and 3 minutes to establish charging flow in the control room) which provides a 156 minute margin.

After the BASTs have reached the 10% level, Operators switch the charging suction flow path to the RWST. The 2-CH-192 valve is required to be open to accomplish the

switch over. Evaluations conclude that the BASTs will last a minimum of 72 minutes after charging is re-established. Valve 2-CH-192 fails closed in the event of a loss of its power supply and/or instrument air. But valve 2-CH-192 will remain operable using its backup air source until it and/or the Facility Z1 battery is depleted. The backup air source is capable of opening the valve and maintaining it open for three hours. Battery depletion will not occur prior to exhausting the backup air source. The OMA is not required prior to this time.

Table 6 OMAs for Fire Area R-7

Operator	**Action**	**T=0**	**Walkdown Time** (min.)	**Time to Execute** (min.)	**Total Time** (min.)	**Time Required** (min.)	**Margin** (min.)
PEO-1	2-MS-190B (OMA 11)	Establishing AFW	10	7	17	N/A	N/A
PEO-2	2-CH-508 (OMA 4)	Loss of Charging	10	5	15	180	N/A
PEO-2	2-CH-509 (OMA 5)	Loss of Charging	(15) + 1	5	21	180	159
Control Room	Restore Charging	Loss of Charging	*	3	24	180	156
PEO-2 or PEO-3	2-CH-192 (OMA 1)	Restoration of Charging	10	22	32	72	40
Activity Complete	Establish Charging Suction from RWST	Restoration of Charging	N/A	N/A	32	72	40

().Carryover time from previous OMA
* allowed control room activity, no walkdown required.

<u>Fire Area R-8</u> (See Table 7)

A fire in Diesel Generator Room B will affect all Facility Z2 shutdown components. Facility Z1 is used to achieve and maintain Hot Standby. Plant shutdown to Hot Standby can be accomplished using Procedure AOP 2579H, "Fire Procedure for Hot Standby Appendix R Fire Area R-8".

For a fire in Fire Area R-8, two OMAs are identified. The first OMA is to open 2-MS-190A (ADV) and the second is to open 2-CH-192. Both OMAs are required to compensate for a postulated loss of instrument air. Neither valve will experience cable damage due to a fire in Fire Area R-8.

The ADVs are utilized after AFW flow is established. AFW is not fire impacted and is required to be established within 45 minutes. Prior to this, RCS decay heat removal is provided by utilizing the MSSVs. Steaming through the MSSVs is also acceptable after AFW flow is established, but utilizing the ADVs, with 2-MS-190A credited for the fire in Fire Area R-8, is required for maintaining the plant in Hot Standby and initiating the transition to Cold Shutdown. PEO-1 will remain with the ADV to modulate steam flow per direction from the control room.

PEO-2 will complete the second OMA by opening 2-CH-192 to establish the RWST as the source of water to the RCS. This is an air operated valve which may have failed closed due to a loss of instrument air. The valve has a safety-related air accumulator which supplies sufficient air to stroke open the valve and maintain it open for three hours. After the air accumulator is exhausted, the valve will fail closed. The required OMA establishes/maintains RWST flow to the charging system. The BASTs have a minimum level specified in the TRM which ensures charging flow for more than 72 minutes, at which time charging pump suction is shifted to the RWST. Calculations indicate that the Charging system is to be restored within three hours. Therefore, the accumulator and the minimum TRM BAST level requirement require the OMA to locally open 2-CH-192 be accomplished within three hours (prior to the accumulator being exhausted).

Both OMAs have sufficient ELUs to provide for access to the valves and lighting to perform the tasks.

Table 7 OMAs for Fire Area R-8

Operator	**Action**	**T=0**	**Walkdown Time** (min.)	**Time to Execute** (min.)	**Total Time** (min.)	**Time Required** (min.)	**Margin** (min.)
PEO-1	2-MS-190A (OMA 10)	Establishing AFW	10	7	17	N/A	N/A
PEO-2	2-CH-192 (OMA 1)	Restoration of Charging	10	22	32	72	40
Activity Complete	Establish Charging Suction from RWST	Restoration of Charging	N/A	N/A	32	72	40

Fire Area R-9 (See Table 8)

A fire in the Facility Z1 DC Switchgear Room and Battery Room will affect all Facility Z1 shutdown components. Facility Z2 is used to achieve and maintain Hot Standby. Plant shutdown to Hot Standby can be accomplished using Procedure AOP 2579E, "Fire Procedure for Hot Standby Appendix R Fire Area R-9".

For a fire in Fire Area R-9, OMAs are required to provide decay heat removal and restore charging system flow to the RCS.

Establishing AFW flow to the credited SG is required within 45 minutes. For a fire in Fire Area R-9, the required flow path utilizes the TDAFW pump, which is not fire impacted. After AFW is established from the control room, operation of an ADV (2-MS-190B) is the required method of removing decay heat for maintaining the plant in Hot Standby and for initiating the transition to Cold Shutdown. Prior to AFW initiation, the plant is placed in the Hot Standby condition by steaming through the MSSVs. There is no cable damage from a fire in Fire Area R-9 to the required ADV (2-MS-190B). However, the fire may cause a loss of instrument air. Instrument air is required to operate the ADVs to support decay heat removal. Upon a loss of instrument air, the ADV will fail closed. This "fail to closed" design prevents excessive RCS cooldown prior to AFW start. Therefore, in the event of a loss of instrument air, Operators will establish local manual control of 2-MS-190B after AFW is established. PEO-1 will remain with the ADV to modulate steam flow per direction from the control room.

For a fire in fire Area R-9, the Charging system has OMAs identified. The BASTs gravity feed valves, 2-CH-508 and 2-CH-509, may fail as is (closed) due to a loss of power supply. An OMA is in place to locally open the valves as part of restoring the Charging system. Once these valves are opened, the control room can establish charging flow within 2-3 minutes. Establishing charging pump suction from the BASTs and restoring charging is required within three hours of reactor shutdown/loss of charging. Charging is re-established within 24 minutes (21 minutes to open BASTs valves and 3 minutes to establish charging flow in the control room) which provides a 156 minute margin.

After the BASTs have reached the 10% level, Operators switch the charging pump suction over to the RWST to maintain charging flow. The 2-CH-192 valve is required to remain open after the BASTs supply is exhausted. Evaluations conclude that the BASTs will last a minimum of 72 minutes after charging is re-established. Valve 2-CH-192 fails closed in the event of a loss of power and will require local operation to open the valve. The OMA is not required prior to this time.

Table 8 OMAs for Fire Area R-9

Operator	Action	T=0	Walkdown Time (min.)	Time to Execute (min.)	Total Time (min.)	Time Required (min.)	Margin (min.)
PEO-1	2-MS-190B (OMA 11)	Establishing AFW	10	7	17	N/A	N/A
PEO-2	2-CH-508 (OMA 4)	Loss of Charging	10	5	15	180	N/A

Operator	Action	T=0	Walkdown Time (min.)	Time to Execute (min.)	Total Time (min.)	Time Required (min.)	Margin (min.)
PEO-2	2-CH-509 (OMA 5)	Loss of Charging	(15) +1	5	21	180	159
Control Room	Restore Charging	Loss of Charging	*	3	24	180	156
PEO-2	2-CH-192 (OMA 1)	Restoration of Charging	10	22	32	72	40
Activity Complete	Establish Charging Suction from RWST	Restoration of Charging	N/A	N/A	32	72	40

() Carryover time from previous OMA
* allowed control room activity, no walkdown required.

Fire Area R-10 (See Table 9)

A fire in the Facility Z2 DC Equipment Room and Battery Room will affect all Facility Z2 shutdown components. Facility Z1 is used to achieve and maintain Hot Standby. Plant shutdown to Hot Standby can be accomplished using Procedure AOP 2579F, "Fire Procedure for Hot Standby Appendix R Fire Area R-10".

The ADVs are utilized after AFW is established. Prior to AFW initiation, the plant is placed in the Hot Standby condition by steaming through the MSSVs. There is no cable damage to the credited ADV (2-MS-190A) from a fire in Fire Area R-10. However, the fire may cause a loss of instrument air. Instrument air is required to operate the ADVs to support decay heat removal. Upon a loss of instrument air, the ADV will fail closed. This "fail to closed" design prevents excessive RCS cooldown prior to AFW start. The AFW system must be established within 45 minutes of a plant trip with loss of Main Feedwater. Therefore, in the event of a loss of instrument air, Operators will establish local manual control of 2-MS-190A to maintain the plant in Hot Standby and to transition to Cold Shutdown. A route to the ADVs has been established which does not traverse the Fire Area R-10 and is illuminated with ELUs. PEO-1 will remain with the ADV to modulate steam flow per direction from the control room.

A fire in Fire Area R-10 may cause cable damage to level transmitter LT-5282 (Condensate Storage Tank Level) which will necessitate obtaining level readings locally at the tank using level indicator LIS-5489. The route to the CST is illuminated by ELUs. Checking the level of the CST supports AFW system operation. Checking the level is not a short-term requirement as there is sufficient inventory in the CST to provide over 10 hours of water flow to the AFW system. If necessary, after the CST is depleted, Operators can switch over to the fire water system and maintain flow to the AFW system.

For a fire in Fire Area R-10, the Charging system has OMAs identified. Fire damage to cables may render level transmitters LT-206 and LT-208 (Boric Acid Storage Tank Level) inoperable from the control room. This would necessitate BAST level indication being obtained locally via level indicators LI-206A and LI-206B. The TRM requires a minimum level be maintained in the BASTs. Maintaining this level provides a minimum of 72 minutes of charging flow to the RCS after charging is re-established. Calculations indicate that charging must be restored within three hours of a reactor trip. There is sufficient ELU lighting and communication to allow Operators to locally monitor BAST level.

After the BASTs have reached the 10% level, Operators switch the charging pump suction over to the RWST. In order to establish RWST as the suction flow to the credited charging pump, Operators may be required to locally open valve 2-CH-192. For a fire in Fire Area R-10, there is no cable damage to 2-CH-192 as no cables transverse the fire area. Valve 2-CH-192 is an air operated valve which may have failed closed due to a loss of instrument air. The valve has a safety-related air accumulator which supplies sufficient air to stroke open the valve and maintain it open for three hours. After the air accumulator is exhausted, the valve will fail closed and the required OMA establishes/maintains RWST flow to the charging system.

Table 9 OMAs for Fire Area R-10

Operator	**Action**	**T=0**	**Walkdown Time** (min.)	**Time to Execute** (min.)	**Total Time** (min.)	**Time Required** (min.)	**Margin** (min.)
PEO-1	2-MS-190A (OMA 10)	Establishing AFW	10	7	17	N/A	N/A
PEO-2	LIS-5489 (OMA 20)	Establishing AFW	5	1	6	600	N/A
PEO-3	LI-206A (OMA 18)	Loss of Charging	10	1	11	180	N/A
PEO-3	LI-208A (OMA 19)	Loss of Charging	(11)	1	12	180	168
Activity Complete	Restore Charging	Loss of Charging	N/A	N/A	12	180	168
PEO-3	2-CH-192 (OMA 1)	Restoration of Charging	2	22	24	72	48
Activity Complete	Establish Charging Suction from RWST	Restoration of Charging	N/A	N/A	24	72	48

() Carryover time from previous OMA

Fire Area R-12 (See Table 10)

A fire in the TDAFW Pump Pit will affect only the TDAFW pump and its steam supply components. No other Hot Standby equipment will be affected and the motor driven AFW pumps may be used to feed the SGs. Plant shutdown to Hot Standby can be accomplished using existing shutdown procedures (e.g., Electrical Emergency, Loss of Instrument Air).

For a fire in Fire Area R-12, two OMAs are identified. The first is to open 2-MS-190A (ADV) and the second is to open 2-CH-192. Both OMAs are required to compensate for a postulated loss of instrument air. Neither valve will experience cable damage due to a fire in Fire Area R-12. The ADVs are utilized after AFW flow is established. AFW flow is required to be established within 45 minutes. Prior to this, RCS decay heat removal is provided by utilizing the MSSVs. Steaming through the MSSVs is also acceptable after AFW flow is established, but utilizing the ADVs, with 2-MS-190A credited for the fire in Fire Area R-12, is required for maintaining the plant in Hot Standby and the transition to Cold Shutdown. PEO-1 will remain with the ADV to modulate steam flow per direction from the control room.

PEO-2 will complete the second OMA by opening 2-CH-192 to establish the RWST as the source of water to the RCS. This is an air operated valve which may have failed closed due to a loss of instrument air. The valve has a safety-related air accumulator which supplies sufficient air to stroke open the valve and maintain it opened for three hours. After the air accumulator is exhausted, the valve will fail closed. The required OMA establishes/maintains RWST flow to the charging system. The BASTs have a minimum level specified in the TRM which ensures charging flow for more than 72 minutes, at which time charging pump suction is shifted to the RWST. Calculations indicate that the Charging system must be restored within 3 hours. Therefore, the accumulator capacity and the minimum TRM BAST level requirements require that this OMA be accomplished within three hours (prior to the accumulator being exhausted).

Both OMAs have sufficient ELUs to provide for access to the valves and lighting to perform the tasks.

Table 10 OMAs for Fire Area R-12

Operator	Action	T=0	Walkdown Time (min.)	Time to Execute (min.)	Total Time (min.)	Time Required (min.)	Margin (min.)
PEO-1	2-MS-190A (OMA 10)	Establishing AFW	10	7	17	N/A	N/A
PEO-2	2-CH-192 (OMA 1)	Restoration of Charging	10	22	32	72	40

Operator	Action	T=0	Walkdown Time (min.)	Time to Execute (min.)	Total Time (min.)	Time Required (min.)	Margin (min.)
Activity Complete	Establish Charging Suction from RWST	Restoration of Charging	N/A	N/A	32	72	40

Fire Area R-13 (See Table 11)

A fire in the West (Facility Z1) 480 VAC Switchgear Room will affect Facility Z1 safe shutdown equipment. Diesel Generator A will be unavailable due to a loss of the Facility Z1 power supply for the diesel room ventilation fan, F38A. Facility Z2 is used to achieve and maintain Hot Standby. Plant Shutdown to Hot Standby can be accomplished using Procedure AOP 2579L, "Fire Procedure for Hot Standby Appendix R Fire Area R-13". For a fire in Fire Area R-13, OMAs are required to provide decay heat removal and restore Charging system flow to the RCS.

Establishing AFW flow to the credited SG is required within 45 minutes. For a fire in Fire Area R-13, the required AFW flow path utilizes the TDAFW pump. Due to fire-induced cable damage, AFW regulating valve (2-FW-43B), AFW turbine steam supply valve (SV-4188), and TDAFW turbine speed control (H21) may not be available from the control room. The cable damage can be isolated and the TDAFW pump can be operated from the Fire Shutdown Panel (C-10) located in Fire Area R-2.

An OMA is necessary to isolate the damaged cables and operate the TDAFW turbine speed control to maintain level in the SG. In the case of 2-FW-43B, cable damage could result in spurious operation. Isolation of the affected cables and control of the valve can be accomplished at the C-10 panel. Thereafter, a loss of instrument air will fail the valve open. The AFW regulating valve has a safety-related accumulator which provides sufficient air to cycle the valve 20 times (full open to full closed) and then hold the valve in a fixed position for 3.27 hours. Thereafter, control of SG water level will be maintained using the speed control function of the TDAFW pump. The timeframe to establish control of TDAFW at the C-10 panel is 45 minutes. After RO-1 has established control of TDAFW pump speed at the C-10 panel (8 minutes), it will take an additional 2 minutes to establish AFW flow. This results in a total time to establish AFW flow of 10 minutes, leaving a 35 minute margin.

After AFW flow is established, the steam release path from the SG may be switched from the MSSVs to 2-MS-190B (ADV). Due to cable damage and loss of instrument air, this will require local manual operation of the valve. If instrument air is not lost, then 2-MS-190B and 2-FW-43B can be operated from the C-10 panel. The OMA for local or C-

10 operation of 2-MS-190B is not required until after AFW flow is established. PEO-1 will remain with the ADV to modulate steam flow per direction from the control room.

The final decay heat removal function is to monitor CST level from either the C-10 panel (LT-5282) or locally at the CST (LIS-5489). Checking the level is not a short-term requirement because there is sufficient inventory in the CST to provide over 10 hours of water flow to the AFW system.

A spurious start of the TDAFWP coupled with 2-FW-43B failing open should not result in a SG overfill. Nominal water level in the SG is maintained between 60-75% as indicated on the Narrow Range (NR) level instruments (i.e. the normal operating band). From the top of the normal operating band, more than 8000 gallons of water can be added before reaching 100% on the NR level instruments. Allotting 8 minutes to establish operations from the C-10 panel and assuming all the flow from the TDAFWP is filling one SG, approximately 4800 gallons can be added before regaining level control. There is also an additional 14,000 gallons of margin available before the SG would overfill (i.e. from 100% NR to the Main Steam nozzle).

For a fire in Fire Area R-13, the Charging system has OMAs identified. The BASTs gravity feed valves, 2-CH-508 and 2-CH-509, may fail as is, (closed) due to cable damage. An OMA is in place to locally open these valves as part of restoring the Charging system. Cable damage due to fire may also cause a spurious start of the P18C Charging Pump. The cable damage may be mitigated by isolating and operating P18C at the C-10 panel. RO-1 is at C-10 and must manipulate the controls for P18C. Establishing pump suction from the BASTs and operating P18C is required within 3 hours of reactor shutdown/loss of charging. Completing the OMAs to re-establish charging would take 23 minutes leaving a margin of 157 minutes. This includes the parallel actions of PEO-2 establishing control of Bus 24D (by pulling control power fuses to circuit breaker A406, ensuring A406 is open and closing breaker DV2021) and PEO-3 (by manually aligning valves 2-CH-508 and 2-CH-509).

After the BASTs have reached the 10% level, Operators switch charging pump suction over to the RWST. Valve 2-CH-192 may fail closed due to a loss of power supply but it can be controlled from the control room until either battery depletion or a loss of instrument air/backup air occurs. A backup air source allows for the opening of 2-CH-192 and alignment of charging to the RWST from the control room. The backup air source provides sufficient air to open the valve and maintain it open for three hours.

Table 11 OMAs for Fire Area R-13

Operator	Action	T=0	Walkdown Time (min.)	Time to Execute (min.)	Total Time (min.)	Time Required (min.)	Margin (min.)
RO-1	2-FW-43B (OMA 9)	Reactor Trip	3	1	4	45	N/A
RO-1	SV-4188 (OMA 22)	Reactor Trip	(4) + 1	1	6	45	N/A
RO-1	H21 (OMA 17)	Reactor Trip	(6) + 1	1	8	45	37
Control Room	Establish AFW	Reactor Trip	*	2	10	45	35
PEO-1	2-MS-190B (OMA 11)	Establishing AFW	10	7	17	N/A	N/A
PEO-2	LIS-5489 (OMA 20)	Establishing AFW	(17) + 2	1	20	600	N/A
PEO-2	A406 (OMA 16)	Loss of Charging	5	6	7	180	N/A
PEO-2	DV2021 (OMA 24)	Loss of Charging	(7) + 5	5	17	180	N/A
PEO-3	2-CH-508 (OMA 4)	Loss of Charging	10	5	15	180	N/A
PEO-3	2-CH-509 (OMA 5)	Loss of Charging	(15) + 1	5	21	180	N/A
RO-1	P18C (OMA 21)	Loss of Charging	1	1	2	180	157
Activity Complete	Restore Charging	Loss of Charging	N/A	N/A	23	180	157
PEO-3	2-CH-192 (OMA 1)	Restoration of Charging	10	22	32	72	40
Activity Complete	Establish Charging Suction from RWST	Restoration of Charging	N/A	N/A	32	72	40

() Carryover time from previous OMA
* Allowed control room activity, no walkdown required.

Fire Area R-14 (See Table 12)

A fire in the Facility Z1 Lower 4.16kV Switchgear Room and Cable Vault will affect all Facility Z1 shutdown components. Facility Z2 is used to achieve and maintain Hot Standby. Plant shutdown to Hot Standby can be accomplished using Procedure AOP 2579M, "Fire Procedure for Hot Standby Appendix R Fire Area R-14".

For a fire in Fire Area R-14, OMAs are required to provide decay heat removal and restore charging system flow to the RCS.

Establishing AFW flow to the credited SG is required within 45 minutes. For a fire in Fire Area R-14, the required AFW flow path utilizes the TDAFW pump. Due to fire-induced cable damage, AFW regulating valve (2-FW-43B) may not be operational from the control room. Damaged cables can be isolated at the Fire Shutdown Panel (C-10). Valve 2-FW-43B may be operated from the C-10 panel if instrument air is available or until its backup air source is exhausted. The AFW regulating valve has a safety-related accumulator which provides sufficient air to cycle the valve 20 times (full open to full closed) and then hold the valve in a fixed position for 3.27 hours. Thereafter, the valve will fail open and control of SG water level will be maintained using the speed control function of the TDAFW pump. Once the RO-1 has established control of 2-FW-43B at the C-10 panel (4 minutes) it will take an additional 2 minutes to establish AFW flow. This results in a total time to establish AFW flow as 6 minutes leaving a 39 minute margin.

The ADVs are utilized after AFW flow is established. Prior to AFW initiation, the plant is placed in the Hot Standby condition by steaming through the MSSVs. A fire in Fire Area R-14 does not damage any cable associated with ADV (2-MS-190B). However, the fire may cause a loss of instrument air. Instrument air is required to operate the ADVs and support decay heat removal. Upon a loss of instrument air the ADV will fail closed. This "fail to closed" design prevents excessive RCS cooldown prior to AFW start. AFW system flow must be established within 45 minutes of a plant trip with loss of main feedwater. Therefore, in the event of a loss of instrument air, Operators will establish local manual control of 2-MS-190B. PEO-2 will remain with the ADV to modulate steam flow per direction from the control room.

A spurious start of the TDAFW pump coupled with 2-FW-43B failing open should not result in a SG overfill. Nominal water level in the SG is maintained between 60-75% as indicated on the NR level instruments (i.e. the normal operating band). From the top of the normal operating band, more than 8000 gallons of water can be added before reaching 100% on the NR level instruments. Allotting 4 minutes to establish operations from the C-10 panel and assuming all the flow from the TDAFW pump is filling one SG, approximately 2400 gallons can be added before regaining level control. There is also an additional 14,000 gallon of margin available before the SG would overfill (i.e. 100% NR to the Main Steam nozzle).

For a fire in Fire Area R-14, the Charging system has OMAs identified. The BASTs gravity feed valves, 2-CH-508 and 2-CH-509, may fail as is (closed) due to a loss of power supply. An OMA is in place to locally open these valves as part of restoring the Charging system. Establishing charging pump suction from the BASTs is required within 3 hours of reactor shutdown/loss of charging. RO-1 and PEO-3 will perform their OMAs in parallel to restore charging. Once RO-1 completes the OMAs, PEO-1 will then

reset and close breaker DV2021. It will then take approximately 3 minutes for the control room to re-establish charging flow. This provides a 153 minute margin.

After the BASTs reach the 10% level, Operators switch over to the RWST as the source for charging. Valve 2-CH-192 may fail closed due to a loss of power supply but it can be controlled from the control room until either battery depletion or loss of instrument air/backup air occurs. A backup air source allows for the opening of 2-CH-192 and hence alignment of charging to the RWST from the control room. The backup air source provides sufficient air to open the valve and maintain it opened for 3 hours.
As part of the restoration of Charging flow to the RCS, Bus 24D must be isolated from cross-ties to Bus 24B, Bus 24E and the RSST. This is due to fire-induced cable damage which may result in spurious operation/loss of control from the control room of breakers A401, A410, A408 and A411. The OMAs associated with these breakers are to pull the control power fuses and ensure that the breakers are open (A410, A408 and A411) or closed (A401).

Table 12 OMAs for Fire Area R-14

Operator	**Action**	**T=0**	**Walkdown Time** (min.)	**Time to Execute** (min.)	**Total Time** (min.)	**Time Required** (min.)	**Margin** (min.)
RO-1	2-FW-43B* (OMA 9)	Reactor Trip	3	1	4	45	41
C-10 Panel	Establish AFW	Reactor Trip	**	2	6	45	39
PEO-2	2-MS-190B (OMA 11)	Establishing AFW	10	7	17	N/A	N/A
PEO-3	2-CH-508 (OMA 4)	Loss of Charging	10	5	15	180	N/A
PEO-3	2-CH-509 (OMA 5)	Loss of Charging	(15 +1	5	21	180	N/A
RO-1	A410* (OMA 14)	Loss of Charging	(4) + 2	6 ***	12	180	N/A
RO-1	A408* (OMA 13)	Loss of Charging	(12) +1	1	14	180	N/A
RO-1	A401* (OMA 23)	Loss of Charging	(14) +1	1	16	180	N/A
RO-1	A411* (OMA 15)	Loss of Charging	(16) +1	1	18	180	N/A
PEO-1	DV2021 OMA 24	Loss of Charging	(18) +5	1	24	180	156

Operator	Action	T=0	Walkdown Time (min.)	Time to Execute (min.)	Total Time (min.)	Time Required (min.)	Margin (min.)
Control Room	Restore Charging	Loss of Charging	****	3	27	180	153
PEO-3	2-CH-192 (OMA 1)	Restoration of Charging	10	22	32	72	40
Activity Complete	Establish Charging Suction from RWST	Restoration of Charging	N/A	N/A	32	72	40

() Carryover time from previous OMA
*C-10 panel and breakers in the same room.
**C-10 panel activity, no walkdown required
*** 5 minutes to put on proper PPE and 1 minute to perform task
**** Allowed control room activity, no walkdown required.

Fire Area R-15 (See Table 13)

A fire in the Containment Building will affect a significant amount of instrumentation needed to monitor plant parameters. A review of all instrument cables inside the Containment indicates that compliance with separation criteria was achieved with the exception of the Pressurizer cubicle. The separation issues inside Containment have been evaluated as follows:

1. Separation criteria were evaluated for the Pressurizer cubicle to address instruments LT-110X, LT-110Y, PT-102A, and PT-102B (instruments located on Racks C140 and C211 in the NE quadrant of containment) and instruments PT-103 and PT-103-1.

2. Separation criteria were evaluated for the remainder of the instruments required for safe shutdown (RCS temperature, SG level and pressure, CETs, nuclear instruments (NIs), containment temperature) and the sensing lines for the pressurizer level and pressurizer pressure instruments.

Plant shutdown to Hot Standby can be accomplished using Procedure AOP 2579N, "Fire Protection for Hot Standby Appendix R Fire Area R-15". For a fire in Fire Area R-15, OMAs are required to provide decay heat removal and restore Charging system flow to the RCS.

For decay heat removal, after AFW flow is established Operators will transfer from steaming through the MSSVs to steaming through the ADVs. For a fire in area R-15, both ADVs (2-MS-190A and 2-MS-190B) are required. Operators must first determine which SG instruments are available. If SG1 instrumentation is available then 2-MS-

190A will be utilized for the decay heat steam path. If SG2 instrumentation is available then the 2-MS-190B ADV will be utilized for the decay heat steam path. Neither ADV is fire affected. However the fire may cause a loss of instrument air. Instrument air is required to operate the ADVs to support decay heat removal. Upon a loss of instrument air the ADV will fail closed. This "fail to closed" design prevents excessive RCS cooldown prior to AFW start. Therefore, in the event of a loss of instrument air, Operators will establish local manual control of 2-MS-190A or 2-MS-190B after AFW flow is established. PEO-1 will remain with the ADV to modulate steam flow per direction from the control room.

The Charging system OMAs are for possible spurious operation of valves 2-CH-517, 2-CH-518, and 2-CH-519, due to fire-induced cable damage. These valves are located in containment. PEO-3 opens breakers to place the valves in their required positions. For valve 2-CH-517, breaker DV2012 is opened which will fail the valve in the closed position. This breaker manipulation will also fail 2-CH-519 in its required open position. Valve 2-CH-518 is not required for a fire in Fire Area R-15 fire but will be failed open (desired position) when other power circuits are isolated. Once PEO-3 completes the OMA, it takes approximately 3 minutes for the control room to re-establish Charging flow. This will provide a 170 minute margin.

Although not fire affected, valve 2-CH-192 will be failed closed after the isolation of power to containment. This will necessitate an OMA to establish the RWST as the source of water to the RCS once the BASTs are depleted. A minimum switch-over time of 72 minutes, after charging has been restored, has been established based on the TRM BAST level requirements. Calculations conclude that the Charging system must be restored within 3 hours. Therefore, the initial alignment of 2-CH-517 and 2-CH-519 will take place within 3 hours. Establishing the RWST as a flow path to the RCS is not required until 1.2 hours after charging is re-established.

Table 13 OMAs for Fire Area R-15

Operator	**Action**	**T=0**	**Walkdown Time** (min.)	**Time to Execute** (min.)	**Total Time** (min.)	**Time Required** (min.)	**Margin** (min.)
PEO-1	2-MS-190A (OMA 10)	Establishing AFW	10	7	17	N/A	N/A
PEO-2	2-MS-190B (OMA 11)	Establishing AFW	10	7	17	N/A	N/A
PEO-3	2-CH-517* (OMA 6)	Loss of Charging	2	5	7	180	173
PEO-3	2-CH-519* (OMA 7)	Loss of Charging	2	5	7	180	173
Control Room	Restore Charging	Loss of Charging	**	3	10	180	170

Operator	Action	T=0	Walkdown Time (min.)	Time to Execute (min.)	Total Time (min.)	Time Required (min.)	Margin (min.)
PEO-3	2-CH-192 (OMA 1)	Restoration of Charging	10	22	32	72	40
Activity Complete	Establish Charging Suction from RWST	Restoration of Charging	N/A	N/A	32	72	40

*Opening breaker fails both valves in required position
** Allowed control room activity, no walkdown required.

Fire Area R-17 (See Table 14)

A fire in the East Penetration Area will affect Facility Z1 shutdown components. Facility Z2 is used to achieve and maintain Hot Standby. Plant shutdown to Hot Standby can be accomplished using Procedure AOP 2579Q, "Fire Procedure for Hot Standby Appendix R Fire Area R-17".

For a fire in Fire Area R-17, OMAs are required to provide decay heat removal and restore charging system flow to the RCS.

Establishing AFW flow to the credited SG is required within 45 minutes. For a fire in Fire Area R-17, the required AFW flow path utilizes the TDAFW pump. Once AFW flow is established from the control room, operation of the ADV (2-MS-190B) is the required method for maintaining the plant in Hot Standby and transitioning to Cold Shutdown. Prior to AFW initiation, the plant is placed in the Hot Standby condition by steaming through the MSSVs. A fire in Fire Area R-17 does not damage any cables associated with ADV (2-MS-190B). However, the fire may cause a loss of instrument air. Instrument air is required to operate the ADVs and support decay heat removal. Upon a loss of instrument air, the ADV will fail closed. This "failed to close" design prevents excessive RCS cooldown prior to AFW start. Therefore, in the event of a loss of instrument air, Operators will establish local manual control of 2-MS-190B after AFW flow is established. PEO-1 will remain with the ADV to modulate steam flow per direction from the control room.

For a fire in Fire Area R-17, the Charging system has OMAs identified. The BASTs gravity feed valves, 2-CH-508 and 2-CH-509, may fail as is (closed) due to a loss of power supply. An OMA is in place to locally open these valves as part of restoring the Charging system. Once these valves are opened, the control room can establish charging flow within 2-3 minutes. Establishing charging pump suction from the BASTs is required within 3 hours of reactor shutdown/loss of charging. Charging is therefore re-established within 24 minutes (21 minutes to open BASTs valves and 3 minutes to establish charging flow from the control room) which provides a 156 minute margin.

After the BASTs have reached the 10% level, Operators switch the charging pump suction over to the RWST. Valve 2-CH-192 will fail closed when DV1013 is opened to mitigate spurious operation of 2-CH-518. An OMA is required to open 2-CH-192 once the BASTs supply to charging is exhausted. Evaluations conclude that the BASTs will last a minimum of 72 minutes after charging is re-established. The OMA is not required to be performed prior to this time.

Table 14 OMAs for Fire Area R-17

Operator	Action	T=0	Walkdown Time (min.)	Time to Execute (min.)	Total Time (min.)	Time Required (min.)	Margin (min.)
PEO-1	2-MS-190B (OMA 11)	Establishing AFW	10	7	17	N/A	
PEO-2	2-CH-508 (OMA 4)	Loss of Charging	10	5	15	180	
PEO-2	2-CH-509 (OMA 5)	Loss of Charging	(15) +1	5	21	180	159
Control Room	Restore Charging	Loss of Charging	*	3	24	180	156
PEO-3	2-CH-192 (OMA 1)	Restoration of Charging	10	22 in	32	72	40
Activity Complete	Establish Charging Suction from RWST	Restoration of Charging	N/A	N/A	32	72	40

() Carryover time from previous OMA
* Allowed control room activity, no walkdown required.

Fire Area – Yard

Following a fire in the YARD fire area, plant shutdown can be accomplished using existing shutdown procedures (e.g., Electrical Emergency, Loss of Instrument Air). Alternative shutdown capability is not required and specific fire procedures for shutdown are not needed. There are no time critical actions required for a fire in the Yard area.

The following safe shutdown equipment is located in areas outside the power block:

- RWST: This area contains the four Refueling Water Storage Tank (RWST) level transmitters. In the event RWST level indication is not available in the Control Room, a spare level gauge, LI-3004A, is provided with quick connect capability. A minor modification (MMOD M2-98050) will be installed post-fire to ensure this monitoring parameter is available.

- CST: This area contains the Condensate Storage Tank (CST) level transmitter and motor-operated valve 2-CS-13.1B. CST level can be read on local indicator LIS-5489 (approximately 10 hours of water volume for AFW), and the valve is not subject to spurious operation for a fire at the valve.

- Unit 3 Alternate AC (Station Black Out) Diesel Generator: A loss of offsite power and/or Unit 3 AAC (SBO) Diesel (alternate AC power crosstie) does not impact the safe shutdown capability for Unit 2 as both trains of emergency diesel generators and service water will be unaffected and remain available.

5.0 References

1. R. W. Reid, NRC to W. G. Counsil, North East Energy Company, "Issuance of Amendment No. 43 to Facility Operating License No. DPR-65 for the Millstone Nuclear Power Station, Unit No. 2," dated September 19, 1978.
2. R. A. Clark, NRC to W. G. Counsil, North East Energy Company, "Safety Evaluation of Acceptable Fire Protection Items, Millstone Unit No. 2," Docket No 50-336, dated October 21, 1980.
3. H. R. Denton, NRC to W. G. Counsil, North East Energy Company, "Fire Protection Exemption – Haddam Neck Plant and Millstone Station Unit 2," dated November 11, 1981.
4. A. C. Thadani, NRC to J. F. Opeca, North East Energy Company, "Appendix R Exemption Requests for Millstone Unit 2," dated April 15, 1986.
5. A. C. Thadani, NRC to E. J. Mroczka, North East Energy Company, "Appendix R Exemption Requests for Millstone Unit 2," dated January 15, 1987.
6. A. C. Thadani, NRC to E. J. Mroczka, North East Energy Company, "Appendix R Exemption Requests for Millstone Unit 2," dated April 29, 1988.
7. S. A. Varga, NRC to E. J. Mroczka, North East Energy Company, "Revocation of Exemption from 10 CFR, Appendix R, Sections III.G and III.L for Certain Fire Areas – Millstone Nuclear Power Station, Unit No. 2," dated July 17, 1990.
8. G. S. Vissing, NRC to J. F. Opeca, North East Energy Company, "Millstone Power Station, Unit 2 – Issuance of Amendment No. 191," November 3, 1995.
9. E. G. Adensam, NRC to M. L. Bowling, North East Energy Company, "Millstone Power Station, Unit 2 – Exemption from the Requirements of 10 CFR Part 50, Appendix R – Millstone Power Station, Unit 2," dated March 16, 1999.
10. R. P. Necci, North East Energy Company, to NRC, "Millstone Nuclear Power Station, Unit No. 2, 10 CFR 50, Appendix R Exemptions and Fire Protection Safety Evaluation Report Comments," dated March 17, 1999.
11. Fire Protection/Appendix R (Fire Safe Shutdown) Program, Procedure Number CM-AA-FPA-100, Rev 3 dated March 23, 2011.