UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION I
2100 RENAISSANCE BOULEVARD, SUITE 100
KING OF PRUSSIA, PENNSYLVANIA 19406-2713

September 16, 2013

Mr. David A. Heacock
President and Chief Nuclear Officer
Dominion Resources
5000 Dominion Blvd.
Glen Allen, VA 23060-6711

SUBJECT: MILLSTONE POWER STATION - NRC TRIENNIAL FIRE PROTECTION INSPECTION REPORT 05000336/2013010 AND 05000423/2013010

Dear Mr. Heacock:

On August 8, 2013, the U.S. Nuclear Regulatory Commission (NRC) completed a triennial fire protection inspection at Millstone Power Station Unit 2 and Unit 3. The enclosed inspection report documents the inspection results, which were discussed on August 8, 2013, with Mr. Matt Adams, Millstone Power Station Plant Manager, and other members of your staff. On September 12, 2013, the NRC conducted an exit meeting by telephone with members of your staff to further discuss the inspection results.

The inspection examined activities conducted under your license as they relate to safety and compliance with the Commission's rules and regulations, and with the conditions of your license. The inspectors reviewed selected procedures and records, observed activities, and interviewed station personnel. The inspectors also reviewed mitigation strategies for addressing large fires and explosions.

The report documents one NRC-identified apparent violation (AV) concerning a Millstone Power Station Unit 2 alternate safe shutdown procedure deficiency for restoration of 4kV AC electrical power. This finding could not be screened to Green in Phase 1 or 2 of NRC Inspection Manual Chapter 0609, Appendix F, "Fire Protection Significance Determination Process," and is pending a significance determination. This violation does not represent an immediate safety concern because Dominion Nuclear Connecticut, Inc. has completed corrective actions to revise the procedure and eliminate the procedure deficiency. This violation, with the supporting circumstances and details, is documented in the inspection report.

This report also documents two NRC-identified findings of very low safety significance (Green). These findings were determined to be violations of NRC requirements. However, because of their very low safety significance, and because they were entered into your corrective action program, the NRC is treating these findings as non-cited violations (NCVs) consistent with Section 2.3.2 of the NRC Enforcement Policy. If you contest any NCV in this report, you should provide a written response within 30 days of the date of this inspection report with the basis for your denial, to the Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington D.C. 20555-0001; with copies to the Regional Administrator, Region I; the Director, Office of Enforcement; and the NRC Senior Resident Inspector at Millstone Power Station.

In addition, if you disagree with the cross-cutting aspect assigned to any finding in this report, you should provide a response within 30 days of the date of this inspection report, with the basis for your disagreement to the Regional Administrator, Region I, and the Senior Resident Inspector at the Millstone Power Station.

In accordance with Title 10 of the *Code of Federal Regulations* (10 CFR) 2.390 of the NRC's "Rules of Practice," a copy of this letter, its enclosure, and your response (if any) will be available electronically for public inspection in the NRC Public Document Room or from the Publicly Available Records System (PARS) component of the NRC's document system, Agencywide Documents Access and Management System (ADAMS). ADAMS is accessible from the NRC Web Site at http://www.nrc.gov/reading-rm/adams.html (the Public Electronic Reading Room).

Sincerely,

/RA/

David L. Werkheiser
Acting Branch Chief
Engineering Branch 3
Division of Reactor Safety

Docket Nos. 50-336, 50-423
License Nos. DPR-65, NPF-49

Enclosure:
Inspection Report 05000336/2013010
and 05000423/2013010
w/Attachment: Supplemental Information

cc w/encl: Distribution via ListServ

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U.S. NUCLEAR REGULATORY COMMISSION

REGION I

Docket Nos.:	50-336, 50-423
License Nos.:	DPR-65, NPF-49
Report Nos.:	05000336/2013010 and 05000423/2013010
Licensee:	Dominion Nuclear Connecticut, Inc.
Facility:	Millstone Power Station, Units 2 and 3
Location:	P.O. Box 128 Waterford, CT 06385
Dates:	July 22, 2013 through August 8, 2013
Inspectors:	D. Orr, Senior Reactor Inspector (Team Leader) Division of Reactor Safety (DRS) W. Schmidt, Senior Reactor Analyst, DRS R. Fuhrmeister, Senior Reactor Inspector, DRS J. Richmond, Senior Reactor Inspector, DRS K. Young, Senior Reactor Inspector, DRS J. Lilliendahl, Reactor Inspector, DRS J. Rady, Reactor Inspector, DRS
Approved by:	David L. Werkheiser, Acting Branch Chief Engineering Branch 3 Division of Reactor Safety

SUMMARY OF FINDINGS

IR 05000336/2013010, 05000423/2013010; 07/22/2013 - 08/08/2013; Dominion Nuclear Connecticut, Inc.; Millstone Power Station Units 2 and 3; Triennial Fire Protection Baseline Inspection.

This report covered a 2 week on-site triennial fire protection team inspection by specialist inspectors. Two findings of very low significance and one AV pending significance determination were identified. The findings were determined to be non-cited violations. The significance of most findings is indicated by their color (Green, White, Yellow, Red) using Inspection Manual Chapter (IMC) 0609, “Significance Determination Process.” Cross-cutting aspects associated with findings are determined using IMC 0310, "Components Within The Cross-Cutting Areas." Findings for which the significance determination process (SDP) does not apply may be Green or be assigned a severity level after NRC management review. The NRC's program for overseeing the safe operation of commercial nuclear power reactors is described in NUREG-1649, “Reactor Oversight Process,” Revision 4, dated December 2006.

Cornerstone: Mitigating Systems

- TBD. The team identified an apparent violation of Millstone Unit 2 Operating License Condition 2.C. (3) for failure to implement and maintain all aspects of the approved Fire Protection Program (FPP). Specifically, Dominion had not adequately implemented an alternative shutdown procedure, as required by 10 CFR 50 Appendix R Section III.L.3 and the approved FPP. The procedure for a Unit 2 fire which could lead to control room abandonment did not ensure the electrical distribution system was correctly configured prior to re-energizing AC buses. As a result, an over-current condition could occur and trip the 4kV supply breaker complicating safe shutdown operations and delaying AC bus recovery. In response to this issue, Dominion promptly revised their fire safe shutdown operating procedure prior to the end of the inspection to correct this deficiency.

  This finding was more than minor because it was associated with the Protection Against External Factors (e.g., fire) attribute of the Mitigating Systems Cornerstone and adversely affected the cornerstone objective to ensure the availability and reliability of systems that respond to initiating events to prevent undesirable consequences. The team performed a Phase 1 Significance Determination Process (SDP) screening in accordance with NRC Inspection Manual Chapter 0609, Appendix F, and “Fire Protection Significance Determination Process." This finding affected the post-fire safe shutdown category, and was determined to have a high degradation rating because the alternative shutdown procedure lacked adequate instructions to ensure correct equipment alignment. Therefore, the team concluded that a more appropriate and accurate characterization of the risk significance of this issue would be obtained by performing a Phase 3 SDP analysis because the Phase 2 SDP analysis does not explicitly address alternative safe shutdown fire scenarios. The Phase 3 SDP analysis cannot be accurately calculated until additional cable routing and ignition source information is presented by Dominion and is necessary to develop the fire scenarios that would require the alternative shutdown procedure to be implemented. This finding did not have a cross-cutting aspect because it was a legacy issue and was considered to not be indicative of current licensee performance. (Section 1R05.05.1)

- Green. The team identified a finding of very low safety significance involving a non-cited violation of Millstone Unit 2 Operating License Condition 2.C. (3) for failure to implement and maintain all aspects of the approved Fire Protection Program. Specifically, Dominion's safe shutdown methodology postulated spurious operation of the pressurizer spray valves, but had not analyzed the effect of the spurious operations and mitigation actions were not implemented to ensure operators could achieve safe shutdown if the spray valves spuriously opened. In response to this issue, Dominion revised their fire safe shutdown operating procedure prior to the end of the inspection to mitigate spurious opening of the spray valves.

  The finding was more than minor because it was similar to Example 3.k of NRC Inspection Manual Chapter (IMC) 0612, Appendix E, and was associated with the Protection Against External Factors (e.g., Fire) attribute of the Mitigating Systems Cornerstone and affected the cornerstone objective to ensure the reliability and capability of systems that respond to initiating events to prevent undesirable consequences. The team performed a Significance Determination Process (SDP) screening, in accordance with IMC 0609, Appendix F, and "Fire Protection Significance Determination Process." This finding affected the post-fire safe shutdown category, and was determined to have a low degradation rating because a subsequent evaluation determined that that the performance requirements of Appendix R Section III.L.1 were satisfied. This finding did not have a cross-cutting aspect because it was a legacy issue and was considered to not be indicative of current licensee performance. (Section 1R05.05.2)

- Green. The team identified a finding of very low safety significance, involving a non-cited violation of Millstone Unit 2 Operating License Condition 2.C. (3) and Unit 3 Operating License Condition 2.H for the failure to implement and maintain all aspects of the approved Fire Protection Program. Specifically, Dominion used large motors, pre-staged in the on-site warehouse for Appendix R cold shutdown (CSD) repairs, as spare parts to accomplish preventative maintenance tasks. As a result, Dominion could not have performed the designated CSD repairs and achieved CSD conditions within 72 hours as required for both Units 2 and 3 during the time period that the old motors were off-site for refurbishment. In addition, Dominion had not taken any compensatory measures to reduce the likelihood of a fire or its consequence, in lieu of not having required repair material on-site. Dominion entered these issues into its corrective action program as condition reports 522722, 522740, 522848, and 522850 and has planned corrective actions to ensure CSD repair material is never intentionally made unavailable or removed from the site.

  This finding was more than minor because it was associated with the Protection Against External Factors (e.g., fire) attribute of the Mitigating Systems Cornerstone and adversely affected the cornerstone objective to ensure the availability and reliability of systems that respond to initiating events to prevent undesirable consequences. The team performed a Significance Determination Process (SDP) screening, in accordance with NRC Inspection Manual Chapter 0609, Appendix F, and "Fire Protection Significance Determination Process." This finding screened to very low safety significance in Phase 1 of the SDP because it only affected the ability to reach and maintain cold shutdown conditions. This finding did not have a cross-cutting aspect because it was a legacy issue and was considered to not be indicative of current licensee performance. (Section 1R05.05.9)

Other Findings

None.

REPORT DETAILS

Background

This report presents the results of a triennial fire protection inspection conducted in accordance with the U.S. Nuclear Regulatory Commission (NRC) Inspection Procedure (IP) 71111.05T, "Fire Protection (Triennial)." The objective of the inspection was to assess whether Dominion Nuclear Connecticut, Inc. (Dominion) has implemented an adequate fire protection program (FPP) and that post-fire safe shutdown capabilities have been established and are being properly maintained at the Millstone Power Station Unit 2 and Unit 3 (Millstone). The following fire areas (FA) and/or fire zones (FZ) were selected for detailed review based on risk insights from the Millstone Individual Plant Examination of External Events (IPEEE).

Unit 2 Fire Areas / Fire Zones

- R-1 / A-25, Control Room
- R-1 / A-1G, Auxiliary Building 5' General Area
- R-3 / T-1F, Operating Floor and Turbine Deck
- R-16 / I-1, Intake Structure

Unit 3 Fire Areas

- CB-2, East Switchgear Area
- CB-12, Kitchen Area in Main Control Room
- CB-14, Mechanical Equipment Room
- SB-3, South Cable Tunnel

Inspection of these areas/zones fulfills the inspection procedure requirement to inspect a minimum of three samples.

The inspection team evaluated Dominion's FPP against applicable requirements which included Unit 2 Operating License Condition 2.C.(3), Unit 3 Operating License Conditions 2.H, NRC Safety Evaluation Reports (SERs), Title 10 of the *Code of Federal Regulations* (10 CFR) 50.48, 10 CFR Part 50, Appendix R and Branch Technical Position (BTP) Chemical Engineering Branch (CMEB) 9.5-1. The team also reviewed related documents that included the Updated Final Safety Analysis Report (UFSAR), Fire Protection Program, Fire Hazards Analyses (FHA), and post-fire Safe Shutdown Analyses Reports.

The team also evaluated one common unit, two Unit 2, and two Unit 3 licensee mitigating strategies for addressing large fires and explosions as required by Unit 2 Operating License Condition 2.C.(13), Unit 3 Operating License Condition 2.C.(10), and 10 CFR 50.54 (hh)(2). Inspection of these strategies fulfills the inspection procedure requirement to inspect a minimum of one sample.

Specific documents reviewed by the team are listed in the Attachment to this report.

1. REACTOR SAFETY

Cornerstones: Initiating Events, Mitigating Systems, and Barrier Integrity

1R05 Fire Protection (IP 71111.05T)

.01 Protection of Safe Shutdown Capabilities

a. Inspection Scope

The team reviewed the FHA, safe shutdown analyses, and supporting drawings and documentation to verify that post-fire safe shutdown capabilities were properly protected. The team ensured that applicable separation requirements of Section III.G of 10 CFR Part 50, Appendix R for Unit 2 and BTP CMEB 9.5-1 for Unit 3 as well as the licensee's design and licensing bases were maintained for the credited safe shutdown equipment and their supporting power, control, and instrumentation cables. This review included an assessment of the adequacy of the selected systems for reactivity control, reactor coolant makeup, reactor heat removal, process monitoring, and associated support system functions.

b. Findings

No findings were identified.

.02 Passive Fire Protection

a. Inspection Scope

The team walked down accessible portions of the selected fire areas to evaluate whether the material conditions of the fire area boundaries were adequate for the fire hazards in the area. The team compared the fire area boundaries, including walls, ceilings, floors, fire doors, fire dampers, penetration seals, and redundant equipment fire barriers to design and licensing basis requirements, industry standards, and the Millstone Power Station Unit 2 and Unit 3 FPPs, as approved by the NRC, to identify any potential degradation or non-conformances.

The team reviewed selected engineering evaluations, installation and repair work orders, and qualification records for a sample of penetration seals to determine whether the fill material was properly installed and whether the as-left configuration satisfied design requirements for the intended fire rating.

The team also reviewed recent inspection and functional test records for fire dampers, and the inspection records for penetration seals and fire barriers, to verify whether the inspection and testing was adequately conducted, the acceptance criteria were met, and any potential performance degradation was identified.

b. Findings

No findings were identified.

.03 **Active Fire Protection**

a. Inspection Scope

The team evaluated manual and automatic fire suppression and detection systems in the selected fire areas to determine whether they were installed, tested, maintained, and operated in accordance with NRC requirements, National Fire Protection Association (NFPA) codes of record, and the Millstone FPPs, as approved by the NRC. The team also assessed whether the suppression systems capabilities were adequate to control and/or extinguish fires associated with the hazards in the selected areas.

The team reviewed the as-built capability of the fire water supply system to verify the design and licensing basis and NFPA code of record requirements were satisfied, and to assess whether those capabilities were adequate for the hazards involved. The team reviewed the fire water system hydraulic analyses to assess the adequacy of a single fire water pump to supply the largest single hydraulic load on the fire water system plus concurrent fire hose usage. The team evaluated the fire pump performance tests to assess the adequacy of the test acceptance criteria for pump minimum discharge pressure at the required flow rate, to verify the criteria was adequate to ensure that the design basis and hydraulic analysis requirements were satisfied. The team also evaluated the underground fire loop flow tests to verify the tests adequately demonstrated that the flow distribution circuits were able to meet design basis requirements. In addition, the team reviewed recent pump and loop flow test results to verify the testing was adequately conducted, the acceptance criteria were met, and any potential performance degradation was identified.

The team reviewed design specifications, NFPA code compliance reviews and routine functional testing for the CO_2 suppression systems for the Unit 2 main turbine generator exciter. The team walked down accessible portions of the CO_2 system, including storage tanks and supply systems, to independently assess the material condition, operational lineup, and availability of the system. The team also reviewed and walked down the associated fire fighting strategies and CO_2 system operating procedures.

The team walked down accessible portions of the detection and water suppression systems in the selected areas and major portions of the fire water supply system, including motor and diesel driven fire pumps, interviewed system and program engineers, and reviewed selected corrective action program documents (condition reports) to independently assess the material condition of the systems and components. In addition, the team reviewed recent test results for the fire detection and suppression systems for the selected fire areas to verify the testing was adequately conducted, the acceptance criteria were met, and any performance degradation was identified.

The team assessed the fire brigade capabilities by reviewing training, qualification, and drill critique records. The team also reviewed Millstone's firefighting strategies (i.e. pre-fire plans) and smoke removal plans for the selected fire areas to determine if appropriate information was provided to fire brigade members and plant operators to identify safe shutdown equipment and instrumentation, and to facilitate suppression of a fire that could impact post-fire safe shutdown capability. The team independently inspected the fire brigade equipment, including personnel protective gear (e.g. turnout gear) and smoke removal equipment, to determine operational readiness for firefighting. In addition, the team reviewed Millstone's fire brigade equipment inventory and inspection procedure and recent inspection and inventory results to verify adequate equipment was available, and any potential material deficiencies were identified.

b. Findings

No findings were identified.

.04 **Protection from Damage from Fire Suppression Activities**

a. Inspection Scope

The team walked down the selected fire areas and adjacent areas, and reviewed selected documents to determine whether redundant safe shutdown trains could be potentially damaged from fire suppression activities or from the rupture or inadvertent operation of fire suppression systems. During the walkdowns, the team evaluated the adequacy and condition of floor drains, equipment elevations, and spray protection. Specifically, to determine whether a potential existed to damage redundant safe shutdown trains, the team evaluated whether:

- A fire in one of the selected fire areas would not release smoke, heat, or hot gases that could cause unintended activation of suppression systems in adjacent fire areas which could potentially damage all redundant safe shutdown trains; or

- A fire suppression system rupture, inadvertent actuation, or actuation due to a fire, in one of the selected fire areas, could not directly damage all redundant trains (e.g. sprinkler caused flooding of other than the locally affected train); and

- Adequate drainage was provided in areas protected by water suppression systems.

b. Findings

No findings were identified.

.05 **Post-Fire Safe Shutdown Capability – Normal and Alternative**

a. Inspection Scope

The team reviewed the safe shutdown analysis, thermal-hydraulic analysis, operating procedures, time critical operator action validation studies, piping and instrumentation drawings (P&IDs), electrical drawings, the UFSAR, and other supporting documents for the selected fire areas to verify whether Dominion had properly identified the systems and components necessary to achieve and maintain post-fire safe shutdown conditions. The team evaluated selected systems and components credited by the safe shutdown analysis for reactor pressure control, reactivity control, reactor coolant makeup, decay heat removal, process monitoring, and support system functions to assess the adequacy of Dominion's alternative shutdown methodology. The team also assessed whether alternative post-fire shutdown could be performed both with and without the availability of off-site power. The team walked down selected plant configurations to verify whether they were consistent with the assumptions and descriptions in the safe shutdown and fire hazards analyses. In addition, the team evaluated whether the systems and components credited for use during post-fire safe shutdown would remain free from fire damage.

The team reviewed the training program for licensed and non-licensed operators to verify whether it included alternative shutdown capability. The team also verified whether personnel required for post-fire safe shutdown, using either the normal or alternative shutdown methods, were trained and available on-site at all times, exclusive of those assigned as fire brigade members.

The team reviewed the adequacy of procedures utilized for post-fire shutdown and performed an independent walk through of procedure steps (i.e., a procedure tabletop) to assess the adequacy of implementation and human factors within the procedures. The team also evaluated the time required to perform specific actions to verify whether operators could reasonably be expected to perform those actions within sufficient time to maintain plant parameters within specified limits.

Specific procedures reviewed for normal and alternative post-fire shutdown included the following:

Unit 2

- AOP 2579A, Unit 2 Fire Procedure for Hot Standby for Appendix R Fire Area R-1;
- AOP 2579C, Unit 2 Fire Procedure for Hot Standby for Appendix R Fire Area R-3; and,
- AOP 2579P, Unit 2 Fire Procedure for Hot Standby for Appendix R Fire Area R-16

Unit 3

- EOP 3509.1, Control Room, Cable Spreading Area, or Instrument Rack Room Fire;
- EOP 3509.9, Control Building Elevation 4′ 6″ East SWGR Area Fire;
- EOP 3509.12, Control Building Chiller Room/Mechanical Equipment Room Fire; and,
- EOP 3509.31, Service Building South Cable Tunnel Fire

The team reviewed selected operator manual actions to verify whether they had been properly reviewed and approved and whether the actions could be implemented in accordance with plant procedures in the time necessary to support the safe shutdown method for each fire area. The team also reviewed the periodic testing of the alternative shutdown transfer and isolation capability, and instrumentation and control functions, to evaluate whether the tests were adequate to ensure the functionality of the alternative shutdown capability.

b. Findings

.1 **Inadequate Unit 2 Alternative Shutdown Procedure**

Introduction: The team identified an apparent violation of Millstone Unit 2 Operating License Condition 2.C. (3) for failure to implement and maintain all aspects of the approved FPP. Specifically, Dominion had not adequately implemented an alternative shutdown procedure, as required by 10 CFR 50 *Appendix R Section* III.L.3 and the approved FPP. The procedure for a Unit 2 control room fire did not ensure the electrical distribution system was correctly configured prior to re-energizing AC buses. As a result, an over-current condition could occur and trip the 4kV supply breaker complicating safe shutdown operations and delaying AC bus recovery. In response to this issue, Dominion promptly revised their fire safe shutdown operating procedure prior to the end of the inspection to correct this deficiency.

Description: The team reviewed Dominion's methodology to achieve stable hot shutdown for a postulated fire in Unit 2 Appendix R Fire Area R-1, which included the main control room, cable spreading room, and portions of the auxiliary building. The team determined that in response to a fire in area R-1, Dominion initially would de-energize all 6.9kV and 4kV AC buses in order to prevent fire-induced spurious equipment operation, performed local breaker manipulations, and then recovered two AC buses via a cross-tie bus from Unit 3.

The team evaluated the following sequence of procedure steps in AOP 2579A:

- Step 2 directed operators to close main steam isolation valves which initiated an automatic reactor trip.
- Step 10 directed operators to perform Attachment 2, "Breaker Alignment in DC Switchgear Rooms," which removed DC control power from the AC switchgear, emergency diesel generators (EDGs), and other plant electric loads.
- Steps 12 & 13 directed operators to emergency stop and inhibit both EDGs.

- Step 14 required operators to direct Connecticut Valley Electric Exchange (CONVEX) to de-energize the Unit 2 reserve station service transformer (RSST), i.e. off-site power and ensure the main generator output breakers are open.
- Step 15 directed operators to perform Attachment 6, "Breaker Alignment in 4160 Switchgear Rooms." Attachment 6, Step 1 stated "If CONVEX was unable to de-energize the RSST, OPEN the following breakers."
- Step 20 directed operators to perform Attachment 7, "Supplying Facility 2 Power from Unit 3," and align power to Bus 24D from Unit 3. A Note before Step 20 stated "Step 15, breaker alignment in the 4160 rooms must be completed before continuing."

Based on operator interviews, procedure tabletop demonstrations, and plant walkdowns, the team determined that CONVEX would likely be successful in de-energizing off-site power and that the DC control power would probably be removed from the AC buses prior to the buses being de-energized. This configuration would result in the 4kV busses de-energized, all load and supply breakers closed, and no tripping power to the 4kV breakers. Based on further interviews with plant staff, the team determined that if CONVEX was successful (which was the expected outcome), then the actual steps in Attachment 6, to locally manually open the 4kV breakers, may not be completed because of the conditional statement “If CONVEX was unable to de-energize the RSST, OPEN the following breakers,” that existed at the beginning of the attachment. Since Step 15 would have been successfully completed (i.e., perform Attachment 6), operators would proceeded with Step 20 to re-energize Buses 24E and 24D from Unit 3. The team further determined that Step 20 did not contain any prerequisites or additional checks to ensure that large loads had been removed from the 4kV buses by verifying that the breakers were open. The team concluded that the Unit 3 cross-tie power source could potentially be over-loaded in this configuration when operators attempted to re-energize the Unit 2 buses.

In response to this issue, Dominion evaluated the sequence and timing of operator actions as directed by AOP 2579A, and concluded operators may attempt to re-energize the Unit 2 buses without first locally manually opening the associated 4kV breakers. In addition, Dominion performed a preliminary ETAP analysis to assess the impact of re-energizing Unit 2 Buses 24D and 24E from the cross-tie line to Unit 3 Bus 34B, without opening the Unit 2 4kV breakers. Based on the analysis, Dominion determined that Unit 3 breaker 34B1-2 (i.e., Unit 3 cross-tie supply to Unit 2) would trip on over-current when the operators locally manually closed the Unit 2 cross-tie breaker A505 on Bus 24E if the previously running loads were not stripped. Dominion's review further determined that the over-current condition was within the rating of the associated electrical components, including the various breakers, and concluded no damage or unrecoverable condition was expected. Dominion entered this issue into their corrective action program as condition reports (CR) 521824 and 522851, and revised the AOP 2579A prior to the end of the inspection to correct this deficiency. The team reviewed Dominion's preliminary analysis and the revised AOP and concluded the corrective actions were reasonable.

Analysis: The failure to ensure Bus 24D was reliably restored in response to an R-1 fire control room abandonment scenario was a performance deficiency. Specifically, AOP 2579A did not contain adequate instructions to ensure the AC electrical distribution system was correctly configured prior to re-energizing Buses 24D and 24E. In order to prevent fire-induced spurious equipment operation, the AOP contained steps to remove DC control power from the buses and de-energize the buses by removing off-site power in the switchyard and disabling the EDGs. Subsequent steps to re-energize the buses from the Unit 3 cross-tie did not ensure that the Unit 2 bus breakers were open prior to closing the cross-tie breaker to Unit 3. Dominion's preliminary analysis determined that the electrical load on the buses, due to potentially, normally closed breakers would exceed the over-current trip setpoint of the Unit 3 supply breaker 34B1-2, and trip open the breaker, thus complicating and delaying the fire recovery actions. Following the Unit 3 breaker tripping on over-current, the Unit 2 and 3 operators would have the ability to identify the reason for the overload, open the closed breakers and reenergize the Unit 2 loads. Dominion revised the AOP prior to the end of the inspection to correct this deficiency.

This finding was more than minor because it was associated with the Protection Against External Factors (e.g., fire) attribute of the Mitigating Systems Cornerstone and adversely affected the cornerstone objective to ensure the availability and reliability of systems that respond to initiating events to prevent undesirable consequences. The team performed a Phase 1 Significance Determination Process (SDP) screening, in accordance with NRC Inspection Manual Chapter 0609, Appendix F, and “Fire Protection Significance Determination Process." This finding affected the post-fire safe shutdown category, and was determined to have a high degradation rating because the alternative shutdown procedure lacked adequate instructions to ensure correct equipment alignment. Therefore, the team concluded that a more appropriate and accurate characterization of the risk significance of this issue would be obtained by performing a Phase 3 SDP analysis because the Phase 2 SDP analysis does not explicitly address alternative safe shutdown fire scenarios. The Phase 3 SDP analysis and an estimate of the core damage frequency increase cannot be accurately calculated until additional information is presented by Dominion and is necessary to develop the fire scenarios that would require the alternative shutdown procedure to be implemented specifically for restoration of AC power during a control room abandonment scenario. The additional information needed from Dominion includes frequencies that fires, in specific plant areas, would present the operators with conditions which lead to control room abandonment and estimating the increased probability that AC power would not have been recovered due to the procedural error.

This finding did not have a cross-cutting aspect because it was a legacy issue and was considered to not be indicative of current licensee performance.

Enforcement: Unit 2 License Condition 2.C.(3), in part, required Dominion to implement and maintain in effect all provisions of the approved FPP as described in the FSAR, and as approved by the NRC. 25203-SP-M2-SU-1046, "Millstone Unit 2 Appendix R Compliance Report," Section 1.2, stated that Unit 2 complied with 10 CFR 50 *Appendix R Sections* III.G, J, L and O. Appendix R, Section III.L.3, in part, stated that procedures shall be in effect to implement alternative shutdown capability.

Contrary to the above, from about 1999 until August 5, 2013, Dominion had not implemented an adequate alternative shutdown procedure. Specifically, AOP 2579A did not contain adequate instructions to ensure the electrical distribution system was correctly configured prior to re-energizing Buses 24D and 24E. Dominion subsequently determined that the Unit 3 cross-tie breaker 34B1-2 could trip open on over-current, thus complicating and delaying the fire recovery actions. Dominion entered this issue into its corrective action program (CRs 521824 and 522851) and revised AOP 2579A prior to the end of the inspection to correct this deficiency. This issue is being characterized as an apparent violation in accordance with the NRC's Enforcement Policy, and its final significance will be dispositioned in separate future correspondence.
(AV 05000336/2013010-01, Inadequate Alternative Shutdown Procedure)

.2 **Unit 2 Spurious Operation of Pressurizer Spray Valves Not Analyzed**

Introduction: The team identified a finding of very low safety significance (Green) involving a non-cited violation of Millstone Unit 2 Operating License Condition 2.C. (3) for the failure to implement and maintain all aspects of the approved FPP. Specifically, Dominion's safe shutdown methodology postulated spurious operation of the pressurizer spray valves, but had not analyzed the effect of the spurious operations and mitigation actions were not implemented to ensure operators could achieve safe shutdown if the spray valves spuriously opened.

Description: The team reviewed the Millstone Unit 2 safe shutdown methodology for a fire in Area R-1 to evaluate whether a spurious operation of pressurizer spray valves could have an adverse effect on achieving hot shutdown.

UFSAR Section 9.10.6.1, "Safe Shutdown Safety Functions," in part, stated that the safe shutdown functions assure that the reactor will be safely shut down and precludes the occurrence of an unrecoverable plant condition, such as an uncontrolled primary depressurization. UFSAR Section 9.10.6.2, "Analysis of Safe Shutdown Systems and Components," in part, stated that unprotected electrical equipment within the affected fire area was assumed to be damaged by the fire, and an analysis was done to confirm that operators could achieve safe shutdown. 25203-SP-M2-SU-1046, "Unit 2, Appendix R Compliance Report," Section 3.1, "Shutdown Systems and Methods," in part, stated:

- Although the pressurizer spray valves are not required to support a post fire safe shutdown, they are included in the safe shutdown model to identify those fire areas where they might spuriously open. Spurious opening of these valves while the reactor coolant pumps (RCP) are operating would result in an uncontrolled depressurization of the reactor coolant system (RCS). Therefore, to support the reactor pressure control function, these valves along with the RCPs are included in the safe shutdown model.

25203-SP-M2-SU-1046, Section 3.5, "Safe Shutdown Fire Area Summary for Area R-1," in part, stated that spurious operation (opening) of pressurizer spray valves was mitigated by de-energizing off-site power or manually tripping all RCP breakers. The team identified that W2-517-00744RE, "Unit 2 Thermo-hydraulic Analysis for Fire Area R-1 Safe Shutdown," assumed the RCPs continued to operation for 30 minutes after the plant trip, but non-conservatively assumed that the spray valves remained closed. In addition, AOP 2579A did not contain any main control room actions to trip the RCPs, and relied upon operator actions outside of the control room to de-energize the RCPs. Those manual actions were not considered time critical, had not been time-line validated, and were not included in C-OP-200.18, "Time Critical Action Validation and Verification."

The team concluded that, for a fire in Area R-1, the pressurizer spray valves could spuriously open and de-pressurize the RCS until the RCPs were de-energized from outside the control room. Although the analytical time to stop the RCPs was 30 minutes, the action was not recognized as time critical and could potentially take more time. Since Dominion had not analyzed the effect of spurious spray operation, the team was unable to determine whether a spurious opening of the spray valves might result in an uncontrolled primary depressurization and adversely impact Dominion's ability to achieve safe shutdown.

In response to this issue, Dominion evaluated the effects of spurious operation (opening) of the pressurizer spray valves during the postulated 30 minute time period that the RCPs could continue to run following a fire induced plant trip and control room evacuation. Dominion concluded that critical plant parameters remained within an acceptable range, satisfying the performance requirements of Appendix R Section III.L.1. Specifically, the additional depressurization of the RCS, as a result of the postulated spurious spray operations, would not result in a loss of RCS sub-cooling, natural circulation would be fully established after the RCPs were tripped, and pressurizer level was expected to remain within the indicated range until charging was re-established at 3 hours post-trip. Dominion entered this issue into their corrective action program as CRs 521646 and 522852, and revised AOP 2579A prior to the end of the inspection to trip the RCPs prior to abandoning the main control room. The team assessed Dominion's evaluation using the guidance from NRC Memorandum "Resolution of Questions Concerning Compliance with Section III.L.2 of Appendix R," (ML050330417) and concluded it was reasonable.

Analysis: Failure to analyze the effects of spurious operation of pressurizer spray valves is a performance deficiency. Specifically, Dominion's safe shutdown methodology postulated spurious operation of the pressurizer spray valves, but had not analyzed the effect of spurious spray operation. Dominion's safe shutdown analysis assumed the RCPs continued to operate for 30 minutes after the plant trip, but non-conservatively assumed that the spray valves remained closed. In addition, Dominion relied upon a non-time critical operator manual action to trip the RCPs from outside the control room after control room abandonment. Dominion revised the AOP prior to the end of the inspection to trip all RCPs prior to control room abandonment. The finding was more than minor because it was similar to Example 3.k of IMC 0612, Appendix E, and "Examples of Minor Issues," which determined that calculation errors would be more than minor if, as a result of the errors, there was reasonable doubt of the operability of the component. For this issue, the team had a reasonable doubt of operability as to whether saturated conditions would be reached in the RCS if pressurizer sprays operated for a 30 minute post-trip period. In addition, the finding was associated with the Protection Against External Factors (e.g., Fire) attribute of the Mitigating Systems cornerstone and affected the objective to ensure the reliability and capability of systems that respond to initiating events to prevent undesirable consequences (i.e., core damage).

The team performed an SDP Phase 1 screening, in accordance with IMC 0609, Appendix F, and "Fire Protection Significance Determination Process." This deficiency affected the post-fire safe shutdown category because Dominion's safe shutdown analysis was incomplete. This finding was screened to very low safety significance (Green) because it was assigned a low degradation rating. The team determined this issue had a low degradation rating because Dominion's subsequent evaluation determined that the performance requirements of Appendix R Section III.L.1 were still satisfied. This finding did not have a cross-cutting aspect because it was determined to be a legacy issue and was considered to not be indicative of current licensee performance.

Enforcement: Unit 2 License Condition 2.C.(3), in part, required Dominion to implement and maintain in effect all provisions of the approved FPP as described in the FSAR, and as approved by the NRC. UFSAR Section 9.10.6.2, "Analysis of Safe Shutdown Systems and Components," in part, stated that unprotected electrical equipment within the affected fire area was assumed to be damaged by the fire, and an analysis was done to confirm that operators could achieve safe shutdown. The initial assumptions for the analysis included spurious equipment operations that could be postulated to occur as a result of the fire.

Contrary to the above, from about 1999 until August 5, 2013, Dominion had not analyzed the effect of spurious operation of the pressurizer spray valves and therefore, had not adequately determined that safe shutdown could be achieved. Specifically, Dominion's safe shutdown methodology was described in 25203-SP-M2-SU-1046, which stated that spurious opening of pressurizer spray valves was mitigated by de-energizing off-site power or manually tripping all RCP breakers. Although the thermo-hydraulic safe

shutdown analysis (W2-517-00744-RE) modeled continued operation of all RCPs for 30 minutes after the plant trip, which would allow spray operation during that same time period, spurious operation of the pressurizer spray valves was not analyzed, and non-conservatively assumed the valves remained closed. Dominion completed a preliminary analysis and revised AOP 2579A prior to the end of the inspection to correct this deficiency. Because this violation was of very low safety significance (Green) and was entered into Dominion's corrective action program (CRs 521646 and 522852), this violation is being treated as a non-cited violation (NCV), consistent with Section 2.3.2.a of the NRC Enforcement Policy. **(NCV 05000336/2013010-02, Spurious Operation of Pressurizer Spray Valves Not Analyzed)**

.06 **Circuit Analysis**

a. Inspection Scope

The team verified that the licensee performed a post-fire safe shutdown analysis for the selected fire areas and the analysis appropriately identified the structures, systems, and components important to achieving and maintaining safe shutdown. Additionally, the team verified that the licensee's analysis ensured that necessary electrical circuits were properly protected and that circuits that could adversely impact safe shutdown due to hot shorts or shorts to ground were identified, evaluated, and dispositioned to ensure spurious actuations would not prevent safe shutdown.

The team's review considered fire and cable attributes, cable routing, potential undesirable consequences and common power supply/bus concerns. Specific items included the credibility of the fire threat, cable insulation attributes, cable failure modes, and actuations resulting in flow diversion or loss of coolant events.

The team also reviewed cable raceway drawings and/or cable routing databases for a sample of components required for post-fire safe shutdown to verify that cables were routed as described in the safe-shutdown analysis. The team also reviewed equipment important to safe shutdown, but not part of the success path, to verify that the licensee had taken appropriate actions in accordance with the design and licensing basis and NRC Regulatory Guide 1.189, Revision 2.

Cable failure modes were reviewed for the following components:

Unit 2

- HV5279 (2-FW-43B), TDAFW Flow Control Valve to #2 Steam Generator;
- FI-5278B, Flow Indication TDAFW to #2 Steam Generator;
- HV4189 (2-MS-202), TDAFW Steam Stop Valve;
- MP18C, Charging Pump #3; and,
- SV4188 (2-MS-464), TDAFW Speed Control Motor.

Unit 3

- 3RCS*PI 405B, RCS Channel 1 Wide Range Pressure Indication;
- 3CHS*HCV190A, Charging Header Flow Control Valve; and,
- 3RCS-PCV455A, Pressurizer Power Operated Relief Valve.

The team reviewed a sample of circuit breaker coordination studies to ensure equipment needed to conduct post-fire safe shutdown activities would not be impacted due to a lack of coordination that could result in a common power supply or common bus concern.

The team verified that the transfer of control from the control room to the alternative shutdown location(s) would not be affected by fire-induced circuit faults (e.g. by the provision of separate fuses and power supplies for alternative shutdown control circuits).

b. Findings

No findings were identified.

.07 **Communications**

a. Inspection Scope

The team reviewed safe shutdown procedures, the safe shutdown analysis, and associated documents to verify an adequate method of communications would be available to plant operators following a fire. During this review the team considered the effects of ambient noise levels, clarity of reception, reliability, and coverage patterns. The team also inspected the designated emergency storage lockers to verify the availability of portable radios for the fire brigade and for plant operators. The team also verified that communications equipment such as repeaters and transmitters would not be affected by a fire.

b. Findings

No findings were identified.

.08 **Emergency Lighting**

a. Inspection Scope

The team observed the placement and coverage area of eight-hour emergency lights throughout the selected fire areas to evaluate their adequacy for illuminating access and egress pathways and any equipment requiring local operation or instrumentation monitoring for post-fire safe shutdown. The team also verified that the battery power supplies were rated for at least an eight-hour capacity. Preventive maintenance procedures, the vendor manual, completed surveillance tests, and battery replacement practices were also reviewed to verify that the emergency lighting was being maintained consistent with the manufacturer's recommendations and in a manner that would ensure reliable operation.

c. Findings

No findings were identified.

.09 **Cold Shutdown Repairs**

a. Inspection Scope

The team reviewed Dominion's dedicated repair procedures, for components which might be damaged by fire and were required to achieve post-fire cold shutdown (CSD). The team evaluated selected CSD repairs to determine whether they could be achieved within the time frames assumed in the design and licensing bases. In addition, the team verified whether the necessary repair equipment, tools, and materials (e.g., pre-cut cables with prepared attachment lugs) were available and accessible on site.

b. Findings

Introduction: The team identified a finding of very low safety significance (Green), involving a non-cited violation of Millstone Unit 2 Operating License Condition 2.C. (3) and Unit 3 Operating License Condition 2.H for failure to implement and maintain all aspects of the approved FPP. Specifically, Dominion used large motors, pre-staged in the on-site warehouse for Appendix R CSD repairs, as spare parts to accomplish preventative maintenance (PM) tasks. As a result, Dominion could not have performed the designated CSD repairs and achieved CSD conditions within 72 hours as required for both Units 2 and 3 during the time period that the old motors were off-site for refurbishment.

Description: During a walkdown of Dominion's pre-staged material for post-fire CSD repairs, the team identified an issue regarding material usage to support maintenance activities. Specifically, in the warehouse Appendix R cage, the team identified warehouse receipt tags with recent dates on two large motors. In follow-up to team questions, Dominion determined that the pre-staged motors had been used to replace operating motors in the plant. The removed plant motors were sent off-site for refurbishment and later returned to the warehouse Appendix R cage. Dominion Engineering stated that the removed motors were to remain functional, and only supposed to be off-site for refurbishment during refueling outages.

Subsequently, Dominion determined that both motors were off-site while the respective unit was operated at modes above cold shutdown, i.e. modes 1 through 4, (cold shutdown is mode 5), with no other replacement motor on-site, as follows:

- Unit 2 service water (SW) pump motor was off-site from March 1 to 17, 2011 while Unit 2 was in mode 1 for the duration.

- Unit 3 component cooling water (CCW) pump motor was off-site from April 11 to May 23, 2013. The motor was sent off-site 3 days before Unit 3 entered mode 5 on April 14 for a maintenance outage, and returned to the site 8 days after Unit 3 ascended above mode 5 on May 15.

The team determined that Dominion had licensing basis requirements to maintain CSD repair material on-site, and to be able to make CSD repairs and achieve CSD conditions within 72 hours for both Units 2 and 3.

- Unit 2 License Condition 2.C.(3), in part, required Dominion to implement and maintain in effect all provisions of the approved FPP as described in the FSAR, and as approved in the NRC Safety Evaluation Report (SER) and Supplements. Unit 2 UFSAR Section 9.10.6, "Safe Shutdown Design Basis," in part, stated systems necessary to achieve CSD can be repaired with 72 hours. Unit 2 safe shutdown analysis 25203-SP-M2-SU-1046 Section 1.2 stated that Unit 2 complied with 10 CFR 50 Appendix R Sections III.G, J, L and O. Appendix R III.G and III.L, in part, stated that systems necessary to achieve CSD can be repaired within 72 hours, and CSD repair materials shall be readily available on site. In addition, 25203-SP-M2-SU-1046 Section 6.12, "Repairs Prior to Cold Shutdown," stated that material needed to perform CSD repairs was stored on-site and inventoried regularly. MP-2720U4, "Cold Shutdown Repair Procedure for Fire Area R-16 [intake building]," described replacement of a SW pump motor, following a fire in the intake building.

- Unit 3 License Condition 2.H, in part, required Dominion to implement and maintain in effect all provisions of the approved FPP as described in the FSAR, and as approved in the NRC SER and Supplements. SER Supplement No. 2, Section 9.5.1.4, in part, stated that all CCW pumps could be damaged by fire, and that one pump was required to bring the plant to CSD. It also stated that the applicant committed to provide the capability to repair or replace one pump motor or cabling using only on-site material and still achieve CSD within 72 hours. In addition, the Unit 3 Fire Protection Evaluation Report Section 6.1, "Safe Shutdown Basis and Assumptions," in part, stated systems required for CSD can be repaired and CSD achieved within 72 hours using on-site resources, and the required materials are from a dedicated supply on the site.

The team concluded that a Unit 2 SW pump motor replacement was credited for achieving CSD within 72 hours of a fire in Unit 2 fire area R-16, the intake structure. In addition, the team also concluded that a Unit 3 CCW pump motor replacement was credited for achieving CSD within 72 hours of a fire in Unit 3 fire area AB-1 North, the auxiliary building. Therefore, the team determined that Dominion had not complied with its licensing requirements regarding the ability to make CSD repairs and achieve CSD within 72 hours. Dominion entered this issue into their corrective action program as CRs 522722, 522848, and 522850.

The team identified an inconsistency and apparent non-compliance between Dominion's fire protection licensing requirements and Millstone administrative control procedures in that the Technical Requirements Manual (TRM) for both Units 2 and 3 allowed CSD repair material to be non-functional or missing for up to 14 days before any compensatory measure was required (i.e., Unit 2 TRM 7.1, and Unit 3 TRM 7.4.1).

After 14 days, both TRMs required a one hour fire watch, verification that the suppression and detection systems were functional, and checks on transient combustibles in the affected areas. In addition, the TRMs did not place any restrictions on the maximum time period that the CSD repair material could be missing as long as the post-14 day actions were in-place. The team determined that an operator log entry, to acknowledge missing material, was insufficient to be credited as a compensatory action because it did not reduce the likelihood of a fire and did not reduce the consequences of a fire. Therefore, the team concluded that Dominion had not established adequate compensatory measures during the initial 14 day period when the motors were off-site. Dominion entered this issue into their corrective action program as CR 522740.

Analysis: The team determined that failure to maintain the ability to repair systems necessary to achieve CSD within 72 hours, without taking appropriate compensatory actions, was a performance deficiency. Specifically, Dominion used material, pre-staged in the on-site warehouse for Appendix R post-fire CSD repairs, as spare parts to accomplish PM tasks. Dominion's PM program for large motors required operating plant motors to be sent off-site and refurbished at prescribed intervals. During these PM tasks Dominion used motors that were pre-staged for CSD repairs and did not maintain other replacement motors available on-site. The PMs were performed while the plants were above cold shutdown and without any compensatory action. As a result, Dominion could not have performed the designated CSD repairs and achieved CSD within 72 hours, as required, during the time period that the motors were off-site for refurbishment.

This finding was more than minor because it was associated with the Protection Against External Factors (e.g., fire) attribute of the Mitigating Systems Cornerstone and adversely affected the cornerstone objective to ensure the availability of systems that respond to initiating events to prevent undesirable consequences (i.e., core damage). The team performed a SDP screening, in accordance with IMC 0609, Appendix F, and “Fire Protection Significance Determination Process." This finding screened to very low safety significance (Green) in Phase 1 of the SDP because it only affected the ability to reach and maintain CSD conditions. This finding did not have a cross-cutting aspect because it was determined to be a legacy issue and was considered to not be indicative of current licensee performance.

Enforcement: Unit 2 License Condition 2.C.(3), in part, required Dominion to implement and maintain in effect all provisions of the approved FPP as described in the FSAR, and as approved by the NRC. Unit 2 UFSAR Section 9.10.6, "Safe Shutdown Design Basis," in part, stated systems necessary to achieve CSD can be repaired with 72 hours. In addition, 25203-SP-M2-SU-1046 Section 1.2 stated that Unit 2 complied with 10 CFR 50 Appendix R Sections III.G, J, L and O. Appendix R, Section III.G.1.b, in part, stated that systems necessary to achieve CSD can be repaired within 72 hours. Appendix R, Section III.L.1.d, in part, stated to achieve CSD conditions within 72 hours. Appendix R, Section III.L.5, in part, stated that CSD repair materials shall be readily available on site. Unit 3 License Condition 2.H, in part, required Dominion to implement and maintain in effect all provisions of the approved FPP as described in the FSAR, and as approved in the NRC SER and Supplements Nos. 2, 4, and 5. SER Supplement No. 2, dated

September 1985, Section 9.5.1.4, in part, stated that all CCW pumps could be damaged by fire, and that one pump was required to bring the plant to CSD. It also stated that the applicant committed to provide the capability to repair or replace one pump motor or cabling using only on-site material and still achieve CSD within 72 hours. In addition, Unit 3 Fire Protection Evaluation Report Section 6.1, "Safe Shutdown Basis and Assumptions," in part, stated systems required for CSD can be repaired and CSD achieved within 72 hours using on-site resources, and the required materials are from a dedicated supply on the site.

Contrary to the above, from March 1 to March 17, 2011 (Unit 2); and from April 11 to April 14, 2013 and May 15 to May 23, 2013 (Unit 3), Dominion did not maintain material on-site necessary to repair fire damage to equipment required to achieve CSD within 72 hours. Specifically, in March 2011, Dominion sent a Unit 2 SW pump motor, required for post-fire CSD repairs, off-site for refurbishment while Unit 2 was above CSD, with no other replacement motor on-site. Specifically, in April and May, 2013, Dominion sent a Unit 3 CCW pump motor, required for post-fire CSD repairs, off-site for refurbishment while Unit 3 was above CSD, with no other replacement motor on-site. Because this finding was of very low safety significance (Green) and was entered into Dominion's corrective action program (CRs 522722, 522740, 522848, and 522850), this violation is being treated as a non-cited violation (NCV), consistent with Section 2.3.2.a of the NRC Enforcement Policy. **(NCV 05000336, 423/2013010-03, Failure to Maintain Cold Shutdown Material On-Site)**

.10 **Compensatory Measures**

a. Inspection Scope

The team verified compensatory measures were in place for out-of-service, degraded, or inoperable fire protection and post-fire safe shutdown equipment, systems, or features (e.g., detection and suppression systems and equipment, passive fire barriers, pumps, valves, or electrical devices providing safe shutdown functions or capabilities). The team evaluated whether the short term compensatory measures adequately compensated for the degraded function or feature until appropriate corrective action could be taken and that the licensee was effective in returning the equipment to service in a reasonable period of time.

b. Findings

No findings were identified.

.11 **Fire Protection Program Changes**

a. Inspection Scope

The team reviewed recent changes to the approved fire protection program to verify that the changes did not constitute an adverse effect on the ability to safely shutdown.

b. Findings

No findings were identified.

.12 **Control of Transient Combustibles and Ignition Sources**

a. Inspection Scope

The team reviewed the licensee's procedures and programs for the control of ignition sources and transient combustibles to assess their effectiveness in preventing fires and in controlling combustible loading within limits established in the FHA. A sample of hot work and transient combustible control permits were also reviewed. The team performed plant walkdowns to verify that transient combustibles and ignition sources were being implemented in accordance with the administrative controls.

b. Findings

No findings were identified.

.13 **Large Fires and Explosions Mitigation Strategies**

a. Inspection Scope

The team conducted a review of selected mitigation strategies intended to maintain or restore core cooling, containment integrity, and spent fuel pool cooling capabilities under the circumstances associated with the loss of large areas of the plant due to explosions and/or fires. The team assessed whether Dominion continued to meet the requirements of Operating License Condition 2.C. (13) and 2.C. (10), for Unit 2 and Unit 3 respectively, 10 CFR 50.54(hh) (2).

The team reviewed the following mitigation strategies:

- C OP 200.2AIR, Airborne Threat, Rev 2-01;
- EDMG 2.01, MP2 B.5.b Event Control Room Response, Rev 4;
  - Section 4.3 – Refilling the CST from the Fire Header;
- EDMG 2.02, MP2 B.5.b Event TSC Response, Rev 8;
  - Attachment 4, Alternate Instrumentation Methods;
  - Attachment 8, Alternate Methods To Inject Into Containment;
- SACRG-3, Severe Accident CR Guideline for MP3 B.5.b Initial Event Response (EDMG), Rev. 3;
  - Attachment B – Refilling DWST from Fire Header; and,
- SAG 9, MP3 B.5.b Event TSC Response (EDMG), Rev 13;
  - Appendix D, Alternate Instrumentation Methods

The team's review included: a detailed assessment of the procedural guidance; a walkdown of the strategy with trained operators to assess the feasibility of the strategy and operator familiarity; maintenance and surveillance testing of all designated strategy equipment; and an inventory check of strategy equipment to ensure the appropriateness of equipment storage and availability. The team also evaluated the adequacy of corrective actions associated with issues identified during previous inspections in this area.

b. Findings

No findings were identified.

4. OTHER ACTIVITIES [OA]

4OA2 Identification and Resolution of Problems (IP 71152)

.01 Corrective Actions for Fire Protection Deficiencies

a. Inspection Scope

The team reviewed a sample of condition reports associated with fire protection program and post-fire safe shutdown issues to determine whether Millstone was appropriately identifying, characterizing, and correcting problems in these areas, and to assess whether the planned or completed corrective actions were appropriate. The condition reports reviewed are listed in the attachment.

b. Findings

No findings were identified.

4OA6 **Meetings, Including Exit**

Exit Meeting Summary

The team presented their preliminary inspection results to Mr. Matt Adams, Millstone Plant Manager, and other members of the site staff at an exit meeting on August 8, 2013. On September 12, 2013, the NRC conducted an exit meeting by telephone with Ms. Lori Armstrong, Director, Nuclear Safety and Licensing, and other members of the site staff to further discuss the inspection results. No proprietary information was included in this inspection report.

ATTACHMENT: SUPPLEMENTAL INFORMATION

SUPPLEMENTAL INFORMATION

KEY POINTS OF CONTACT

Licensee Personnel
M. Adams, Millstone Power Station Plant Manager
L. Armstrong, Director, Nuclear Safety and Licensing
P. Anastas, Fire Safe Shutdown Engineer
D. Bajumpaa, Thermodynamics Design Engineer
G. Closius, Licensing Engineer
R. Donovan, Instrument and Control Supervisor
T. Faraci, Electrical Design Engineer
T. Fisher, Unit 3 Senior Reactor Operator
N. Grant, Engineering Intern
J. Houghland, Unit 2 Senior Reactor Operator
K. Perkins, Safe Shutdown Program Engineer
J. Plourde, System Engineer
J. Rein, B.5.b System Engineer
W. Saputo, System Engineer
P. Sikorski, Senior Reactor Operator, Shift Manager

NRC Personnel
D. Werkheiser, Acting Branch Chief, Engineering Branch 3, Division of Reactor Safety
J. Ambrosini, Senior Resident Inspector, Millstone Power Station
B. Haagensen, Resident Inspector, Millstone Power Station
J. Krafty, Resident Inspector, Millstone Power Station

LIST OF ITEMS OPENED, CLOSED, AND DISCUSSED

Opened

AV	05000336/2013010-01	Inadequate Alternative Shutdown Procedure (Section 1R05.05.1)

Opened and Closed

NCV	05000336/2013010-02	Spurious Operation of Pressurizer Spray Valves Not Analyzed (Section 1R05.05.2)
NCV	05000336, 423/2013010-03	Failure to Maintain Cold Shutdown Material On-site (Section 1R05.05.9)

Closed
NONE

Discussed
NONE

Attachment

LIST OF DOCUMENTS REVIEWED

Fire Protection Licensing Documents
25203-SP-M2-SU-1046, Millstone Unit 2 Appendix R Compliance Report, Rev. 1
25212-BTP-9.5-1, Unit 3 Branch Technical Position 9.5-1 Compliance Report, Rev. 3
CM-AA-FPA-100, Fire Protection Appendix R (Fire Safe Shutdown) Program, Rev. 7
Millstone Unit 2 Safety Evaluation Report (SER) dated 9/19/78
Millstone Unit 2 SER Supplement dated 1/15/87
Millstone Unit 2 SER Supplement dated 10/21/80
Millstone Unit 2 SER Supplement dated 10/31/85
Millstone Unit 2 SER Supplement dated 11/11/81
Millstone Unit 2 SER Supplement dated 11/3/95
Millstone Unit 2 SER Supplement dated 12/18/12
Millstone Unit 2 SER Supplement dated 3/16/99
Millstone Unit 2 SER Supplement dated 4/15/86
Millstone Unit 2 SER Supplement dated 4/29/88
Millstone Unit 2 SER Supplement dated 7/17/90
Millstone Unit 2 SER Supplement dated 7/7/00
Millstone Unit 2 Technical Requirement Manual, Section 3/4.7.9, Fire Protection Sys., 2/2/10
MPS2 Individual Plant Examinations for External Events, dated 12/95
MPS2 TRM Section 7.1, Appendix-R Safe Shutdown Requirements, Rev. 160
MPS2 UFSAR Section 9.10, Fire Protection System, Rev. 28
MPS3 FSAR Fire Protection Evaluation Report, Rev. 23
MPS3 TRM Section 7.4.1, Fire Related Safe Shutdown Components, Rev. 177
NRC NUREG-1031 Supplement No. 2, Unit 3 Safety Evaluation Report, dated 9/85
U2-24-FPP-FHA, Fire Hazard Analysis, Rev. 12

Design Basis Documents
Fire Test of a Steel Composite Wall, March 1986
Unit 3 Step Deviation Document EOP 3509.1, Rev. 13
Unit 3 Step Deviation Document EOP 3509.12, Rev. 0
Unit 3 Step Deviation Document EOP 3509.9, Rev. 4

Design Changes
DM2-00-0042-07, Emergency Diesel Generator: Implementation of Ultra Low Sulfur Diesel Fuel, 6/8/07
DM3-00-0049-07, Emergency Diesel Generator: Implementation of Ultra Low Sulfur Diesel Fuel, 6/5/07
DMG-00-0013-07, Implementation of Ultra Low Sulfur Diesel Fuel Oil for the SBO, EOF, Emergency Security and Fire Pump, 8/8/07

Calculations/Engineering Evaluation Reports

03-5734-001, Fire Qualification Test on Floor Penetration Seals, 11/30/79
12179-P(R)-1087, Control Building Flood Study, Rev. 0
25203-ER-99-0060, AFW Performance during Appendix R Shutdown, Rev. 0
25203-ER-99-0092, Appendix-R Cooldown Analysis Assumptions & Results, Rev. 3
25205-ER-09-0002, Time Critical Operator Action References, Rev. 0
25205-ER-09-0002, Unit 2 & 3 Fire Protection Time Critical Operator Actions, Rev. 0
25212-ER-01-0033, Cable Spreading Area Fire Protection Strategy Engineering Bases, Rev. 0
25212-ER-04-0030, Validation and Verification of EOP 3509.1 Using Simulator, Field and Table Top Validation, Rev. 0
4-416-SH, Turbine Bearing Suppression System Hydraulic Calc. 10/23/74
98-ENG-02411-C2, MPS Evaluation of Flooding Outside Containment, Rev. 1
98-ENG-02621-M2, Instrument Air Requirement for Safety Related Valves, Rev. 3
98FP-02687-M2, U2 Fire Protection and Deluge, Rev. 0
98FP-02687-M2, U2 Fire Protection Hydraulic Calculation-Various Turbine Building Suppression Systems, Rev. 0
99-026, Millstone Site Fire Loop Flow Model Benchmarking (3 new main transformers), Rev. 1
99-026, Millstone Site Fire Loop Flow Model Benchmarking (mod. Piping to MRRF) Rev. 1
99-026, Millstone Site Fire Loop Flow Model Benchmarking (relocation of post indicator valve 2 FIRE-11), Rev. 1
99-026, Millstone Site Fire Loop Hydraulic Calculation, Rev. 0
CN-LIS-07-2, Millstone Unit 3 Loss of Charging Fire Safety Analysis, Rev. 1
CN-SEE-01-91, Unit 3 Component Cooling Water Pump Lube Oil Temperature Following Loss of Cooling, Rev. 0
C-OP-200.18, Time Critical Action Validation and Verification, Rev. 0
DM2-00-0370-08, Charging Pump Control Hand Switch Pull-to-Lock Modification, Rev. 7
ETE-CEP-2011-0008, Multiple Spurious Operation (MSO) Identification – Millstone Unit 2, Rev. 0
ETE-CEP-2011-0009, Multiple Spurious Operation (MSO) Identification – Millstone Unit 3, Rev. 0
ETE-MP-2011-0101, Millstone 3 Fire Shutdown and Calculation S-04263S3 R2 Addendum A Implementation, Rev. 0
ETE-MP-2012-1153, MP3 Multiple Spurious Operation (MSO) Resolution, Rev. 0
ETE-MP-2012-1204, MP2 Multiple Spurious Operation (MSO) Resolution, Rev. 0
FP-EV-00-0009, Silicon RTV Foam Fire Stop in the Fire Barrier Separating Control Room (Fire Area A-25) and Operator Break Room (Fire Area A-26), Rev. 0
FP-EV-01-0001, Technical Evaluation for the Separation of U1 and U2 Control Rooms, Rev. 0
GMB-87-472, Fire Door Assembly Justification, 12/25/87
ICMS, U2, Fire and Hose-Stream Tests for Penetration Seal Systems (C-01-02, M-01-09), 4/82
ICMS, U2, Fire and Hose-Stream Tests for Penetration Seal Systems, 4/4/83
ICMS, U2, Fire Barrier Seal Design Evaluation (C-01-02, M-01-09), 11/86
ICMS, U2, Power Cable Ampacities in Trays with Various Firestops, 2/86
MS-12179-300be, Auxiliary Building Flooding Evaluation, Rev. 0
MS-12179-300bn, East Switchgear Room and Adjacent Battery Rooms Flooding Evaluation, Rev. 0

MS-12179-300bq, West Switchgear Room and Adjacent Battery Rooms Flooding Evaluation, Rev. 0
MS-12179-300bv, Cable Spreading Room and Control Room Areas Flooding Evaluation, Rev. 0
P1117-021-001, Millstone U2, Inadvertent Operation or Rupture of Fire Suppression Systems Report, 1/98
P1164-MP2-COORD, Breaker/Fuse Coordination for the Circuits of Panels D11, D12, D21, and D22, Rev. 0
PA-085-082-00812GE, MP2 125V DC Coordination Study, Rev. 3-5
S-02824-S2, Fire Area R-2 Fire Appendix R Analysis, Rev. 2
S-04263S3, MP3 BTP 9.5-1 RELAP5 Fire Shutdown Analysis, Rev. 2
SE-92-1450, Millstone Unit 2 Code Compliance Report, 12/18/92
SP-M3-EE-269, Electrical Design Criteria, Rev. 3
SP-ME-522, Steam Generator Replacement Subassemblies, Rev. 7
W2-517-744-RE, Fire Area R-1 Appendix R Cooldown Analysis, Rev. 3

Procedures

C OP 200.18, Time Critical Action Validation and Verification, Rev. 0
C SP 600.13, U2 P-82 Electric Fire Pump Monthly Operability Demonstration, Rev. 2-3
C SP 600.14, U2 P-82 Electric Fire Pump Annual Operability Demonstration, Rev. 2-2
C SP 600.16, Fire Protection System Underground Main Flush and Flow Test, Rev. 0-4
C SP 600.18, Fire Hose Station Inspection, Rev. 0-1
C SP 600.22, Fire Hose Station Flow Test, Rev. 0-4
C SP 600.24, Fire Brigade Equipment Inspection, Rev. 0-4
C SP 600.25, Fire Door Inspections, Rev. 0-3
C SP 600.5, QA Diesel Fuel Oil Ordering, Delivery and Sampling Requirements, Rev. 2-3
C SP 600.6, Electric Fire Pump M7-8 Monthly Operability Demonstration, Rev. 3-4
C SP 600.7, Electric Fire Pump M7-8 Annual Operability Demonstration, Rev. 4-3
C SP 600.8, Diesel Fire Pump M7-7 Monthly Operability Demonstration, Rev, 3-6
C SP 600.9, Diesel Fire Pump M7-7 Annual Operability Demonstration, Rev. 4-3
CM-AA-FPA-100, Fire Protection/Appendix R (Fire Safe Shutdown Program), Rev. 7
CM-AA-FPA-101, Control of Combustible and Flammable Materials, Rev. 4
CM-AA-FPA-102, Fire Protection, Fire Safe Shutdown Review, and Preparation Process and Design Change Process, Rev. 4
C-MP-782AE, Overcurrent Device Testing for MCC and Molded Case Breakers, Rev. 3-3
CY-AA-AUX-310, Diesel Fuel Oil Sampling and Testing, Rev. 5
Dominion Safety Policy, Corporate Safety, 1/3/12
IC 2429A4, U2 Generator Exciter Enclosure CO_2 Fire Suppression System, Rev. 2-3
MP 2720U1, Cold Shutdown Fire Damage Repair Procedure for Fire Area R-1, Rev. 4
MP 2720U2, Cold Shutdown Fire Damage Repair Procedure for Fire Area R-3, Rev. 4
MP 2720U4, Cold Shutdown Fire Damage Repair Procedure for Fire Area R-16, Rev. 4
MP 3783EA, Component Cooling Pump Motor Replacement for Fire Protection, Rev. 5
MP-3782DB, AKR-30 and AKR-50 Breaker Preventative Maintenance, Rev. 9
SFP 10, Fire Prevention Inspections, Rev. 5-3
SFP 17, Fire Penetration Seal and Barrier Inspections, Rev. 3
SFP 21, Appendix R Fire Cage Inventory, Rev. 2
SFP 9, Fire Extinguisher Inspections and Maintenance, Rev. 3

SP 2618C, U2 Fire Protection System Smoke and Heat Detector Test, Rev. 13-8
SP 2618D, U2 Fire Protection System Sprinkler and Deluge Design Function Test, Rev. 12-8
SP 2618G, Fire Damper Operability Verification, Rev. 6
SP 2618H, Fire Protection System Deluge nozzle Flow Test, Rev. 9-6
SP 2618L, Fire Protection Coating Inspection, Rev. 2-3
SP 3641C.1, Fire Protection CO2 System Valve Lineup Verification, Rev. 4
SP 3641C.2, Functional Check of the CO2 Fire Protection, Rev. 15-7
SP 3641D.3, Fire Detection and Control System Operability Check, Rev. 12-9
SP 3641D.5, Fire Damper Operability Verification, Rev. 11-0
SP 3641F.1, Functional Checks of East and West Switchgear Breathing Air, Rev. 1-1
SP3442A02, Reactor Coolant System Wide Range Cold Leg Temperature Calibration Data Sheet, Rev. 9

Operations Procedures

AD-AA-102, Procedure Use and Adherence, Rev. 9
AOP 2559, Fire, Rev. 8
AOP 2579A Basis Document, Rev. 10
AOP 2579A, Fire Procedure for Hot Standby Appendix R Fire Area R-1, Rev.10-1 & 10-2
AOP 2579AA, Fire Procedure for Cooldown and Cold Shutdown Fire Area R-1, Rev. 4
AOP 2579C, Fire Procedure for Hot Standby Appendix R Fire Area R-3, Rev. 5
AOP 2579CC, Fire Procedure for Cooldown and Cold Shutdown Fire Area R-3, Rev. 5
AOP 2579P, Fire Procedure for Hot Standby Appendix R Fire Area R-16, Rev. 7
AOP 2579PP, Fire Procedure for Cooldown and Cold Shutdown Fire Area R-16, Rev. 6
EOP 2525, Standard Post Trip Actions, Rev. 24
EOP 3509, Fire Emergency, Rev. 24
EOP 3509.1, Control Room, Cable Spreading Area, or Instrument Rack Room Fire, Rev. 13
EOP 3509.12, Control Building Chiller Room/Mechanical Equipment Room Fire, Rev. 0
EOP 3509.31, Service Building South Cable Tunnel Fire, Rev. 1
EOP 3509.9, Control Building Elevation 4′ 6″ East SWGR Area Fire, Rev. 4
OP 2255, Unit 2 AOP Upgrade User's Guide, Rev. 1
OP 2260, Unit 2 EOP User's Guide, Rev. 10
OP 2304C, Make Up (Boration and Dilution) Portion of CVCS, Rev. 24
OP-AA-100, Conduct of Operations, Rev. 24
OP-AP-104, Emergency and Abnormal Operating Procedures, Rev. 2

Large Fires and Explosions Mitigation Strategies Documents

C-OP-200.2AIR, Airborne Threat, Rev. 2-1
EDMG 2.01, MP2 B.5.b Event Control Room Response, Rev. 4
EDMG 2.02, MP2 B.5.b Event TSC Response, Rev. 8
MP-26-EPI-FAP01, Control Room Emergency Operations, Rev. 5-2
SACRG-3, Severe Accident CR Guideline for MP3 B.5.b Initial Event Response (EDMG), Rev. 3
SAG 9, MP3 B.5.b Event TSC Response (EDMG), Rev. 13
SAG-8, MP3 Containment Flooding, Rev. 8
SFP-21, Surveillance Form B.5.b Materials Inventory, Rev. 0-5
SFP-31, Surveillance Form Backup Pump Service Test, Rev. 0

Completed Tests/Surveillances

C OP 200.18, Time Critical Action Validation and Verification, Completed 12/21/2012
C SP 600, 6-001, Electric Fire Pump M7-8 Monthly Operability Demonstration, Completed 6/7/13
C SP 600.13, U2 P-82 Electric Fire Pump Monthly Operability Demonstration, Completed 5/24/13, 6/21/13
C SP 600.13-001, P-82 Electric Fire Pump Monthly Operability Demonstration, Completed 5/24/13, 6/21/13
C SP 600.14, P-82 Electric Fire Pump Annual Operability Demonstration, Completed 1/8/13
C SP 600.16-001, Fire Protection System Underground Main Flush and Flow Test, Completed10/7/10
C SP 600.18, U2 Fire Hose Station Inspection, Completed 5/29/13, 7/2/13
C SP 600.18-003, Unit 3 Fire Hose Station Inspection, Completed 4/11/13
C SP 600.22, U2 Fire Hose Station Flow Test, Completed 5/18/11, 4/30/12
C SP 600.24, U2 Fire Brigade Equipment Inspection, Completed 6/28/13
C SP 600.25, U2 Fire Door Inspection, Completed 9/27/11, 9/6/12
C SP 600.25-003, Unit 3 Fire Door Inspection, Completed 7/2/12
C SP 600.6-001, Electric Fire Pump M7-8 Monthly Operability Demonstration, Completed 5/17/13
C SP 600.7, Electric Fire Pump M7-8 Annual Operability Demonstration, Completed 2/20/12, 1/17/13
C SP 600.8-001, Diesel Fire Pump M7-7 Monthly Operability Demonstration, Completed 5/17/13, 6/16/13
C SP 600.9, Diesel Fire Pump M7-7 Annual Operability Demonstration, Completed 8/11/11, 8/9/12
IC 2439A4, Generator Exciter Enclosure CO2 Fire Suppression System Test, Completed 12/13/12, 12/18/12, 6/5/13
PT 21424B, MP2 Type AK Breakers with EC Trip Devices Test, Completed 6/28/05, 7/5/08, 10/23/09, 7/12/12
SFP 17, U2 Fire Penetration Seal & Barrier Inspection, Completed 3/5/13
SFP 21, Appendix 'R' Instrumentation Calibration, Completed 4/24/13
SFP 21, Unit 3 Safe Shutdown Fire Cage Inventory, Completed 2/23/13
SFP 21-1, Appendix R Fire Cage Inventory, Completed 2/20/13
SFP 21-2, HomeLite Generator Inspection & Operability Check, Completed 5/30/13
SFP 21-3, Honda Generator Inspection & Operability Check, Completed 5/30/13
SFP 21-5, Miller Generator Inspection & Operability Check, Completed 2/23/13
SFP 6, Fire Protection System Underground Main Flow & Flush Test, Completed 9/26/03, 2/22/07, 10/7/10
SFP 9, U2 Fire Extinguisher Inspection Data Sheet – Train A, Completed 1/17/12, 5/6/13, 6/4/13
SFP 9, U2 Fire Extinguisher Inspection Data Sheet – Train B, Completed 1/11/12, 1/7/13 4/29/13, 5/28/13
SP 2601P, CVCS Valve Operability Tests from C-10 and C-02, Completed 10/30/12
SP 2601P-1, CVCS Valve Operability Tests from C-10 & C-02, Completed 11/1/12
SP 2610BO, TDAFP Operational Tests from C-10, Completed 5/29/13
SP 2610BO-5, TDAFWP Operability Tests from C-10, Completed 5/29/13
SP 2610E-14, SG Blowdown Isolation Valve Closure Tests - C-70A & C-70B, Completed 2/5/13

SP 2610E-2, MSIV Closure Tests from Bottle-up Panel, Completed 11/5/12
SP 2610E-3, ADV Tests from C-10, C-70A, and C-70B, Completed 10/13/12
SP 2610M-1, PORV Hot Functional Test, Completed 11/16/12
SP 2618C, Smoke Detector Testing, Miscellaneous Areas (Intake Structure) & Supervisory Circuit Tests, Completed 12/1/12, 5/1/13
SP 2618C, U2 Smoke & Heat Detector Testing Auxiliary Building, Completed 1/4/13, 6/22/13
SP 2618C, U2 Smoke Detector Testing, Control Room Ventilation, Completed 9/15/12, 2/6/13
SP 2618D, U2 Fire Protection System Sprinkler & Deluge Design Function Test, Completed 7/1/09, 2/22/11, 6/16/12
SP 2618H, U2 Fire Protection System Deluge Nozzle Flow Test, Completed 1/6/09, 10/15/11
SP 2618L, U2 Fire Protection Coating Inspection, Completed 6/29/11, 11/27/12
SP 2657-2, Fire Shutdown Storage Box Inventory, Completed 3/19/12
SP 3442A02, Reactor Coolant System Wide Range Cold Leg Temperature Calibration Data Sheet, Completed 1/10/13
SP 3641C.2-002, Functional Check of the CO2 Fire Protection System, East Switchgear Room, Completed 9/14/12, 2/17/11
SP 3641C.2-007, Functional Check of the CO2 Fire Protection System, South Electrical Tunnel, Completed 2/1/11, 7/26/12
SP 3641D.3-009, Fire Detection Zone Panel 4E Detector Operability Checks, E&W Switchgear, Control Room, and Control Building 64' Level, Completed 3/3/13, 4/5/12
SP 3641D.3-017, Fire Detection Zone Panel 8C Panel Operability Check, Completed 11/12/12, 2/21/12
SP 3641D.6-001, Fire Rated Assemblies Inspection, Completed 11/23/12, 5/10/11
SP 3641F.1-001, Functional Check of the East and West Switchgear Breathing Air Systems, Completed 6/18/12
SP 3673.2, Fire Transfer Switch Panel Operational Testing – 3CHS*HCV190A, Completed 1/18/12
SP 3673.2, Fire Transfer Switch Panel Operational Testing - 3HVP*FN1A and FN1C, Completed 3/20/12
SP 3673.2, Fire Transfer Switch Panel Operational Testing - 3HVY*FN2A and AOD23A, Completed 12/18/12
SP 3673.4, Auxiliary Shutdown Panel Operability Test, Completed 4/10/13
SP 3673.4, Auxiliary Shutdown Panel Operational Testing – CCE*P1A Charging Pump Cooling Pump 'A', Completed 4/16/12
SP 3673.4, Auxiliary Shutdown Panel Operational Testing – Charging Isolation Path, Completed 5/7/13
SP 3673.4, Auxiliary Shutdown Panel Operational Testing – Safety Injection Accumulator Vent Valves, Completed 4/11/12
SP 3673.4, Auxiliary Shutdown Panel Operational Testing – Train 'A' CVCS Components, Completed 4/11/12

Operating Experience Evaluations

OE23519, Evaluation of Use of Ultra Low Sulfur Diesel Fuel (IN 2006-22), 9/14/06
OPEX001988, Evaluation of Use of Biodiesel in Fuel Could Adversely Impact Diesel Engine Performance (IN 2009-02), 12/16/09
OPEX002574, IN09-29 Potential Failure of Fire Eater Supply Pumps to Automatically Start due to Fire (IN 2009-29), 2/1/10

Quality Assurance Audits and Self Assessments

Audit 11-04, Fire Protection QA and Surrey Refueling, 7/5/11
Audit 12-05, Fire Protection Implementation, 8/1/12
Audit 13-04, Fire Protection QA Program and MPS Refueling, 7/3/13

System Health Reports

Millstone Program Health Report, Fire Protection/Appendix R, 4th Quarter 2012, 1st Quarter 2013
Millstone System Health Report, Safe Shutdown Lighting, 4th Quarter 2012, 1st Quarter 2013
Millstone U2 System Health Report, Fire Protection & Deluge, CO_2 Alterex, Halon Suppression, 4th Quarter 2011, 1st Quarter 2012

Drawings and Wiring Diagrams

12179-EE-25BM, Front View and Nameplates 3CES*PNLTSA and 3CES*PNLTSB, Rev. 8
12179-EE-25CP, Wiring Diagram Aux Shutdown Panel 3RPS*PNLAS, Rev. 4
25203-24071, Sh. 4, Unit 2 Fire Damper Schedule, Rev. 1
25203-24071, Sh. 5, Unit 2 Fire Damper Schedule, Rev. 1
25203-24091, Sh. C0102, Unit 2, Fire, Air, Water Seal Pipe or Conduit Silicone Foam Floor/Wall, Rev. 2
25203-24091, Sh. M0109, Unit 2, Fire, Air, Water Seal Pipe or Conduit Silicone Foam Floor/Wall, Rev. 2
25203-24092, Sh. A8CW3A, Unit 2, Penetration Seal Survey Map and Inspection Record, Rev. 2
25203-26131, Sh. 5, Appendix R Boundary and Component Diagram, Auxiliary Feedwater System, Rev. 0
25203-26131, Sh. 7, Appendix R Boundary and Component Diagram, Main Steam System, Rev. 0
25203-28500, Sh. 598, FT5278B Aux Feed To Gen #2 Loop Diagram, Rev. 7
25203-28500, Sh. 604A, AFW Flow Control Valve, Rev. 3
25203-28500, Sh. 604B, AFW Flow Control Valve, Rev. 6
25203-29126, Sh. 5, Unit 2 Fire Dampers, Rev. 1
25203-30001, Main Single Line Diagram, Rev. 35
25203-30024, Unit 2 Single Line Diagram 125VDC Emergency and 120VAC Vital Systems, Rev. 32
25203-30101, Arrangement Fire Shutdown Panel C10, Rev. 3
25203-32009 Sh. 41, Charging Pump Control Schematic, Rev. 22
25203-32009 Sh. 42, Charging Pump Control Power Supply Crossover Schematic, Rev. 13
25203-32009 Sh. 42A, Charging Pump Control Schematic, Rev. 2
25203-32009 Sh. D, Charging Pump Control Switch Development, Rev. 3
25203-32009, Sh. 43, Charging Pump MP18C Schematic, Rev. 17
25203-32009, Sh. 43A, Charging Pump MP18C Schematic, Rev. 6
25203-32009, Sh. D, Control Switch Development, Rev. 3
25203-32012, Sh. 22, Aux. Feedwater Control Valve HV5279, Rev. 14
25203-32012, Sh. 22A, Aux. Feedwater Control Valve HV5279, Rev. 6
25203-32012, Sh. B, Control Switch Development, Rev. 6
25203-32012, Sh. E, Control Switch Development, Rev. 4
25203-32020, Sh. 49, TDAFW SV4188 Schematic, Rev. 8

25203-32020, Sh. 49A, TDAFW SV4188 Schematic, Rev. 4
25203-32020, Sh. 7, Aux FW Turbine Steam Stop Valve HV4189, Rev. 8
25203-32020, Sh. A, Control Switch Development, Rev. 10
25203-32020, Sh. B, Limit Switch Development, Rev. 8
25203-9331, Sh. 1A, Bottle-Up Panel C70A and C70B Nameplates, Rev. 2
25205-25003, Sh.00, Station Fire Loop Operating and Hydraulic Analysis Schematic, Rev. 13
25212-14047, Floor Plan El 4'-6" Control Bldg., SH.1, Rev. 11
25212-24274, Sh.CB107B, Wall Penetration Map Cont. Bldg. El 4'-6", Rev. 3
25212-24274, Sh.CB107C, Wall Penetration Map, Cont. Bldg. El 4'-6", Rev. 0
25212-24274, Sh.CB107D, Wall Penetration Map, Cont. Bldg., El 4'-6", Rev 0
25212-24274, Sh.CB107E, Wall Penetration Map, Cont. Bldg., El 4'-6", Rev 0
25212-24274, Sh.CB107F, Wall Penetration Map, Cont. Bldg., El 4'-6", Rev 0
25212-24274, Sh. CB107A, Wall Penetration Map, Control Bldg., El 4'-6", Rev. 1
25212-29680, Sh. 28, TCO-002 Medium Density Silicone Elastomer Seal for Cable Tray Openings in Hollow Steel Walls, Detail E19, Rev. 4
25212-30004, Main One Line 4160V Diagram, Rev. 19
25212-30217, Sh. 102A, Test Loop Diagram Chemical and Volume Control System Charging Header Flow Control, Rev. 3
25212-30343, Sh. 10A, Test Loop Diagram RCS WR Pressure Channel 1, Rev. 6
25212-30343, Sh. 10B, Test Loop Diagram RCS WR Pressure Channel 1, Rev. 5
25212-30343, Sh. 10C, Test Loop Diagram RCS WR Pressure Channel 1, Rev. 5
25212-30343, Sh. 10D, Test Loop Diagram RCS WR Pressure Channel 1, Rev. 2
25212-30343, Sh. 11, Test Loop Diagram RCS WR Pressure Channel 1, Rev. 5
25212-32001, Sh. 3AB, Control Switch Contact Diagram, Rev. 3
25212-32001, Sh. 7DW, Elementary Diagram Pressurizer Power Relief Valve 3RCS*PCV455A, Rev. 16
25212-32001, Sh. 7VC, Charging Header Flow Control Valves, Rev. 8

Piping and Instrumentation Diagrams

12179-EM-104A, Chemical and Volume Control, Rev. 54
12179-EM-105A, Charging Pump Sealing and Lubrication, Rev. 23
25212-26902, Sh. 3, Unit 3 Reactor Coolant System, Rev. 23
25203-26002, Sh. 1, Main Steam from Generators, Rev. 80
25203-26002, Sh. 4, Main Steam Turbine, Rev. 29
25203-26005, Sh. 3, Condensate Storage and Aux. Feed, Rev. 59
25205-25003, Station Fire Loop, Operating & Hydraulic Analysis Schematic, Rev. 13
25203-26011, Sh. 1, Unit 2 Fire Protection, Rev. 54
25203-26011, Sh. 3, Unit 2 Hose Station Details & Legend, Rev. 14
25203-26001, Sh. 4, Unit 2 Halon and Exciter CO_2 Fire Protection, Rev. 6
25203-26011, Sh. 5, Unit 2 Fire Protection Auto. Sprinkler Valve Details, Rev. 9
25203-26970, Sh.1, Unit 3 Fire Protection System, Fire Pump House & Yard), Rev. 9
25203-29242, Sh. 21, Unit 2 Suppression System – Feed Water Pumps at El. 54'-6", Rev. 1
25203-29242, Sh. 26, Unit 2 Suppression System – Turbine Generator Bearings, Rev. 625212
26970, Sh.1, Fire Protection System (Fire Pump House And Yard), Rev. 9

25212-26946, Sh.1, Fire Protection, Rev. 29
25212-26946, Sh.2, Fire Protection, Rev. 51
25212-26946, Sh.3, Fire Protection, Rev. 21
25212-26946, Sh.4, Fire Protection, Rev. 27
25212-26946, Sh.5, Fire Protection System Details, Rev. 3
25203-26017 Sh. 1, Charging System, Rev. 60

Pre-Fire Plans

MP-PROC-ENG-U2-24-FFS-BAP01-AB-14-38, Unit 2, Fire Area A-25, Control Room, Rev. 0 & 1
MP-PROC-ENG-U2-24-FFS-BAP01-AB-45-5, Unit 2, Fire Zone A-1G, General Area (-5'-6"), Rev. 0
MP-PROC-ENG-U2-24-FFS-BAP01-INT, Unit 2, Fire Zones I-1A, I-1B, I-1C, Intake Structure, Rev. 0
MP-PROC-ENG-U2-24-FFS-BAP01-TB, Unit 2, Fire Zone T-1F, Operating Floor/Turbine Deck, Rev. 0 & 1
MP-PROC-ENG-U2-24-FFS-BAP01-AB-MAP, Unit 2 Auxiliary Building – 5' Level, Rev. 0
MP-PROC-ENG-U2-24-FFS-BAP01-CB-MAP, Unit 2 Control Room, Rev. 0
MP-PROC-ENG-U2-24-FFS-BAP01-INT-MAP, Unit 2 Intake/Screen House Building, Rev. 0
MP-PROC-ENG-U2-24-FFS-BAP01-TB-MAP, Unit 2 Turbine Building 54'-6", Rev. 0

Fire Drills and Critiques

Fire in U2 Turbine Building, H_2 Seal Oil, 7/14/10
Fire in U2 Turbine Building, Lower Switchgear Bus 24A, Breaker A102 NSST, 3/18/11
Fire in U2 Auxiliary Building, 45' East Cable Vault, 5/13/11
Fire in U2 Auxiliary Building, East/West Cable Vault, 11/28/12
Fire in U2 Turbine Building, Motor Driven Auxiliary Feed Pump Pit (P9A), 3/21/13
Fire in U3 Turbine Building, MCC 32-2A Cabinet 14D, 3/11/11
Fire in U3 Turbine Building, Battery Room 6, 3/18/11

Fire Brigade Training

Fire Brigade Continuing Training Matrix, 2012, 2013
Fire Brigade Member Initial Training Lesson Plan, Fire Behavior (Power Point)
Fire Brigade Qualification Records, 12/11/12, 8/5/13
TR-MP-TPG-2300, Fire Protection Programs Training Program Guide, Rev. 3
Millstone Power Station, Off-site Fire Department Training/Walk Through, Completed 3/26/12
Millstone Power Station, Off-site Fire Department Training, Completed 5/28/13
Fire Brigade Lesson Plan BB-00019, Electrical Hazards and Fire Fighting

Operator Safe Shutdown Training

C98205L, Fire Safe Shutdown Overview, Rev. 0
C9888206L, EOP 3509.1 Procedure Overview, Rev. 0

Hot Work and Ignition Source Permits

30100-12-IS, U2 Aux. Building, Repair Flange on Spool, 10/11/12
30112-12-IS, U2 Control Room, New Component Installation, 10/12/12
30201-12-IS, U2 Aux. Building Let Down Heat Exchanger, 10/25/12
30289-12-IS, U2 Turbine Building, Main Steam Generator Feedwater Pump, 11/12/12
30297-12-IS, U2 Turbine Building, Repair Leak, 11/15/12
30415-13-IS, U2 Intake Structure Pump Repair Service Water Piping, 3/25/13
30439-13-IS, U2 Intake Structure, Repair Locking Bar, 5/13/13

Transient Combustible Permits and Evaluations

27481-08-FP, U2 Aux. Building, -5' Aerated Waste Filter Skid, 7/21/08
28294-09-FP, U2 Aux. Building, Along South Wall, 11/19/09
30484-13-FP, U2 Turbine Building, Storage of Turbine Parts, 7/3/13

Corrective Action Program Documents (Condition Reports)

195271	503831	517874	521578*
195272	503915	518588	521646*
362161	504024	519265	521650*
385501	504029	519385	521748*
388786	506415	519477	521824*
417954	508824	519487	522015*
460209	508848	519531	522466*
460214	509032	519564	522469*
467281	509732	519585	522632*
485253	509735	520023*	522710
485350	509738	520160*	522722*
485481	509781	520196*	522740*
487427	512736	520250	522747*
489703	513761	520640	522848*
493765	514065	520692	522850*
494623	514751	520698	522851*
499705	514961	520964*	522852*
500500	515097	521094	
500685	517808	521281	

***** NRC identified during this inspection.

Work Orders

53102234871	53102462076	53102566918
53102290455	53102509369	53102571838
53102344262	53102532262	53102581221
53102393308	53102535967	53102588225
53102401344	53102538299	53102589388
53102445346	53102550730	
53102449714	53102553016	

Vendor Manuals
25203-309-001, Charging Pumps Installation, Operation, and Maintenance, Rev. 12
Air Balance Inc., Model 319BLV Fire Dampers, 3 hour rating, Rev. 0
Birns Emergency Lighting Fixture, Model 4701 Instruction Manual, Rev. 3
Exide Lightguard, Model B200, Rev. 1
Exide Lightguard, Model F100, Rev. 1
Manville, Holophane M-19, Rev. 1
Ruskin Mfg. Co., Model FB-90A, 1.5 hour rating, Rev. 0

Industry Standards
NFPA 12-1975, CO2 Systems
NFPA 13-1972, Installation of Sprinkler Systems
NFPA 27-1978, Private Fire Brigades

Miscellaneous Documents
70102907, Motorola Radio Service Agreement (800 MHz), 3/1/13
Millstone Power Station U2, ELU PM List, 7/9/13
Millstone Power Station U2, Site Communication System PM/Surveillance Detail Report, 7/2/13
Millstone Unit 2 & 3 Fire Impairment Log, 7/22/13
NRC Memorandum, Resolution of Questions Concerning Compliance With Section III.L.2 of Appendix R (ML 050330417), dated 2-10-05
NRC NUREG/CR-6850 Volume 2, EPRI/NRC-RES Fire PRA Methodology, dated 9/05
Shift Roster (Day Shift), Unit 2 Control Room Ops., 7/5/13, 7/18/13
Shift Roster (Day Shift), Unit 3 Control Room Ops., 7/5/13, 7/18/13
Shift Roster (Night Shift), Unit 2 Control Room Ops., 7/5/13
Shift Roster (Night Shift), Unit 3 Control Room Ops., 7/5/13

LIST OF ACRONYMS

AC	Alternating Current
ADAMS	Agencywide Documents Access and Management System
AV	Apparent Violation
BTP	Branch Technical Position
CCW	Component Cooling Water
CFR	Code of Federal Regulations
CMEB	Chemical Engineering Branch
CO_2	Carbon Dioxide
CSD	Cold Shutdown
CONVEX	Connecticut Valley Electric Exchange
CR	Condition Report
Dominion	Dominion Nuclear Connecticut, Inc.
DRS	Division of Reactor Safety
EDG	Emergency Diesel Generator
FA	Fire Area
FHA	Fire Hazards Analysis
FPP	Fire Protection Program
FZ	Fire Zone
IMC	Inspection Manual Chapter
IP	Inspection Procedure
IPEEE	Individual Plant Examination of External Events
IR	Inspection Report
kV	kilovolt
Millstone	Millstone Power Station Unit 2 and Unit 3
NCV	Non-Cited Violation
NFPA	National Fire Protection Association
NRC	Nuclear Regulatory Commission
PARS	Publicly Available Records System
PM	Preventative Maintenance
P&ID	Piping and Instrumentation Drawing
RCP	Reactor Coolant Pump
RCS	Reactor Coolant System
RSST	Reserve Station Service Transformer
SDP	Significance Determination Process
SER	Safety Evaluation Report
SW	Service Water
TRM	Technical Requirements Manual
UFSAR	Updated Final Safety Analysis Report