



**UNITED STATES  
NUCLEAR REGULATORY COMMISSION**

REGION I  
2100 RENAISSANCE BLVD., SUITE 100  
KING OF PRUSSIA, PA 19406-2713

November 10, 2015

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

**SUBJECT: MILLSTONE POWER STATION – INTEGRATED INSPECTION REPORT  
05000336/2015003 AND 05000423/2015003**

Dear Mr. Heacock:

On September 30, 2015, the U.S. Nuclear Regulatory Commission (NRC) completed an inspection at your Millstone Power Station (Millstone), Units 2 and 3. The enclosed inspection report documents the inspection results, which were discussed on October 14, 2015, with Mr. John Daugherty, Site Vice President, and other members of your staff.

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 personnel.

This report documents two violations of NRC requirements, both of which were of very low safety significance (Green). Additionally, a licensee-identified violation, which was determined to be of very low safety significance, is listed in this report. However, because of the very low safety significance, and because they are entered into your corrective action program, the NRC is treating these findings as non-cited violations, consistent with Section 2.3.2.a of the NRC Enforcement Policy. If you contest the non-cited violations in this report, you should provide a 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, DC 20555-0001; with copies to the Regional Administrator, Region I; the Director, Office of Enforcement, United States Nuclear Regulatory Commission, Washington, DC 20555-0001; and the NRC Resident Inspector at Millstone. In addition, if you disagree with the cross-cutting aspect assigned to any finding, or a finding not associated with a regulatory requirement 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 NRC Resident Inspector at Millstone.

D. Heacock

-2-

In accordance with Title 10 of the *Code of Federal Regulations* (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's Public Document Room or from the Publicly Available Records component of the NRC's Agencywide Documents Access and Management System (ADAMS). ADAMS is accessible from the NRC website at <http://www.nrc.gov/reading-rm/adams.html> (the Public Electronic Reading Room).

Sincerely,

**/RA/**

Raymond R. McKinley, Chief  
Reactor Projects Branch 5  
Division of Reactor Projects

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

Enclosure:  
Inspection Report 05000336/2015003 and 05000423/2015003  
w/Attachment: Supplementary Information

cc w/encl: Distribution via ListServ

D. Heacock

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Sincerely,

*/RA/*

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**U.S. NUCLEAR REGULATORY COMMISSION**

REGION I

Docket Nos. 50-336 and 50-423

License Nos. DPR-65 and NPF-49

Report Nos. 05000336/2015003 and 05000423/2015003

Licensee: Dominion Nuclear Connecticut, Inc. (Dominion)

Facility: Millstone Power Station, Units 2 and 3

Location: P.O. Box 128  
Waterford, CT 06385

Dates: July 1 through September 30, 2015

Inspectors: J. Ambrosini, Sr. Resident Inspector, Division of Reactor Projects (DRP)  
B. Haagensen, Resident Inspector, DRP  
L. McKown, Resident Inspector, DRP  
K. Reid, Reactor Engineer, DRP  
H. Anagnostopoulos, Health Physicist, Division of Reactor Safety (DRS)  
S. Barr, Senior Emergency Preparedness Inspector, DRS  
S. Chaudhary, Senior Reactor Inspector, DRS  
E. DiPaolo, Senior Project Engineer, DRP  
D. Silk, Senior Operations Examiner, DRS

Approved By: Raymond R. McKinley, Chief  
Reactor Projects Branch 5  
Division of Reactor Projects

Enclosure

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## SUMMARY

Inspection Report 05000336/2015003, 05000423/2015003; 07/01/2015 – 09/30/2015; Millstone Power Station (Millstone), Units 2 and 3; Surveillance Testing, Event Follow-up.

This report covered a three-month period of inspection by resident inspectors and announced baseline inspections performed by regional inspectors. The inspectors identified two findings of very low safety significance (Green), both of which were non-cited violations (NCVs). The significance of most findings is indicated by their color (i.e., greater than Green, or Green, White, Yellow, Red) and determined using Inspection Manual Chapter (IMC) 0609, "Significance Determination Process," dated April 29, 2015. Cross-cutting aspects are determined using IMC 0310, "Aspects Within Cross-Cutting Areas," dated December 4, 2014. All violations of NRC requirements are dispositioned in accordance with the NRC's Enforcement Policy, dated February 4, 2015. The NRC's program for overseeing the safe operation of commercial nuclear power reactors is described in NUREG-1649, "Reactor Oversight Process," Revision 5.

### Cornerstone: Mitigating Systems

- Green. The inspectors identified a Green NCV of Millstone Unit 3 Technical Specification (TS) Surveillance Requirement 4.0.5 because Dominion did not implement the Inservice Testing (IST) Program in accordance with the American Society of Mechanical Engineers (ASME) Operation and Maintenance (OM) Code of Record, 2001 through 2003 incorporated addenda. On July 18, 2015, Dominion changed the reference values of the 'B' control building air conditioning booster pump, 3SWP\*P2B, prior to determining the cause of the condition which resulted in the pump performing in the Action Range (ISTB-6200(b)) in April 2015.

This finding was more than minor in accordance with IMC 0612, "Power Reactor Inspection Reports," Appendix B, "Issue Screening," dated September 7, 2012, as it represented a challenge to the equipment performance attribute of the Mitigating Systems cornerstone objective to ensure the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. The reliability of 3SWP\*P2B was challenged based upon Dominion's change in the pump's reference values contrary to the ASME OM code of record for Millstone Unit 3 which could result in the degradation of the equipment remaining undetected. The finding screened to be of very low safety significance (Green) because the safety function of 3SWP\*P2B was not lost based on analysis of design basis flow requirements. The inspectors determined the finding has a cross-cutting aspect in Problem Identification and Resolution, Evaluation, in that the organization failed to evaluate the issue to ensure that resolution addressed causes and extent of conditions commensurate with their safety significance. Specifically, Dominion's analysis of the April 2015 pump failures was not thorough enough to understand a new potential failure mode (impeller movement) and how it may impact system performance. [P.2] (Section 1R22)

### Cornerstone: Barrier Integrity

- Green. The inspectors identified a Green NCV of Millstone Unit 3 TS 6.8.1, as specified by Regulatory Guide (RG) 1.33, associated with Dominion's failure to implement adequate procedures to address a hypothetical large break loss of coolant accident (LBLOCA) inside containment with a failure of a recirculation spray system (RSS) heat exchanger tube resulting in a loss of coolant accident (LOCA) that bypasses the containment barrier.

Dominion did not provide adequate procedural direction or training to the operators for the control of the emergency core cooling systems (ECCS) during this hypothetical event in June of 2015. Dominion entered the issue into their corrective action program as condition report (CR) 1008205.

The finding was more than minor in accordance with IMC 0612, "Power Reactor Inspection Reports," Appendix B, "Issue Screening," dated September 7, 2012, as it represented a challenge to the procedure quality attribute of the Barrier Integrity cornerstone to provide reasonable assurance that physical design barriers protect the public from radionuclide releases caused by accidents or events. The finding was screened to be of very low safety significance (Green) as the deficiency did not represent an actual open pathway in the physical integrity of reactor containment in accordance with IMC 0609, "Significance Determination Process," Attachment 4, "Initial Characterization of Findings," and IMC 0609, Appendix A, Exhibit 3, "Barrier integrity Screening Questions," Section B, "Reactor Containment." The inspectors identified a cross-cutting aspect in Problem Identification and Resolution, Evaluation, because the organization failed to evaluate the issue to ensure that resolution addressed causes and extent of conditions commensurate with their safety significance. [P.2] (Section 4OA3)

### **Other Findings**

A violation of very low safety significance that was identified by Dominion was reviewed by the inspectors. Corrective actions taken or planned by Dominion have been entered into Dominion's corrective action program. This violation and corrective action tracking number are listed in Section 4OA7 of this report.

## REPORT DETAILS

### Summary of Plant Status

Unit 2 began the inspection period at 100 percent power and operated at or near full power until September 25, when the unit entered end-of-cycle coastdown operations in preparation for a planned refueling outage in October (2R23).

Unit 3 remained at or near 100 percent power for the entire inspection period.

### 1. REACTOR SAFETY

#### **Cornerstones: Initiating Events, Mitigating Systems, and Barrier Integrity**

#### 1R01 Adverse Weather Protection (71111.01 – 1 sample)

##### External Flooding

##### a. Inspection Scope

During the week of July 13, the inspectors performed a review of plant features and procedures for the actions to be taken for the site to cope with external flooding. The inspectors focused on the site response to combined effects flooding, local intense precipitation, and a tsunami. The inspectors reviewed documents such as abnormal operating procedures (AOPs), the Updated Final Safety Analysis Report (UFSAR), and Dominion's Flooding Hazard Reevaluation Report for Millstone Units 2 and 3. The inspectors completed walk downs which included all of the flood doors in Unit 2 and all the areas where sandbag walls would be erected during severe conditions to ensure that Dominion would be able to complete the actions in accordance with their procedures. The inspectors also toured the hardened onsite structure where some of the beyond design basis equipment is housed to determine if the beyond design basis equipment would be able to be operated as needed. Documents reviewed for each section of this inspection report are listed in the Attachment.

##### b. Findings

No findings were identified.

#### 1R04 Equipment Alignment

##### .1 Partial System Walkdowns (71111.04 – 4 samples)

##### a. Inspection Scope

The inspectors performed partial walkdowns of the following systems:

##### Unit 3

- Train 'B' containment RSS when the 'A' low pressure safety injection pump was out of service for testing on July 27
- Charging system following maintenance on the 'C' charging pump on August 20



- Turbine driven auxiliary feedwater pump during 'A' emergency diesel generator (EDG) endurance run on September 9
- Quench spray train 'A' during 'B' train quarterly surveillance testing on September 10

The inspectors selected these systems based on their risk-significance relative to the reactor safety cornerstones at the time they were inspected. The inspectors reviewed applicable operating procedures, system diagrams, the UFSAR, TSS, work orders, CRs, and the impact of ongoing work activities on redundant trains of equipment in order to identify conditions that could have impacted the system's performance of its intended safety functions. The inspectors also performed field walkdowns of accessible portions of the systems to verify system components and support equipment were aligned correctly and were operable. The inspectors examined the material condition of the components and observed operating parameters of equipment to verify that there were no deficiencies. The inspectors also reviewed whether Dominion staff had properly identified equipment issues and entered them into the corrective action program for resolution with the appropriate significance characterization.

b. Findings

No findings were identified.

1R05 Fire Protection

Resident Inspector Quarterly Walkdowns (71111.05Q – 7 samples)

a. Inspection Scope

The inspectors conducted tours of the areas listed below to assess the material condition and operational status of fire protection features. The inspectors verified that Dominion controlled combustible materials and ignition sources in accordance with administrative procedures. The inspectors verified that fire protection and suppression equipment was available for use as specified in the area pre-fire plan, and passive fire barriers were maintained in good material condition. The inspectors also verified that station personnel implemented compensatory measures for out of service, degraded, or inoperable fire protection equipment, as applicable, in accordance with procedures.

Unit 2

- East DC Vital Switchgear Room, Fire Area 2A-20 / R-9 on August 17
- Upper 4160 volts alternating current (VAC) Vital Switchgear Room, Fire Area 2T-10 on August 18
- Turbine Building 54' elevation, Fire Area T-1F on August 18

Unit 3

- East Switchgear Room, Fire Area CB 2 on July 8
- Auxiliary Building 66' elevation, Fire Area AB-2 on July 30
- Station Blackout Diesel Generator Enclosure, SBO-1 during 'A' EDG endurance run on September 2
- 'A' Emergency Generator Enclosure, Fire Area EG-3 on September 8

b. Findings

No findings were identified.

1R07 Heat Sink Performance (711111.07A – 3 samples)

a. Inspection Scope

The inspectors reviewed the following in-plant safety related heat exchangers listed below to determine their readiness and availability to perform safety functions. The inspectors reviewed the design basis for these components and verified Dominion's commitments to NRC Generic Letter 89-13, "Service Water System Requirements Affecting Safety-Related Equipment." The inspectors observed actual performance tests for the heat exchangers and/or reviewed the results of previous inspections of the heat exchangers. The inspectors discussed the results of the most recent inspection with engineering staff and reviewed pictures of the as-found and as-left conditions. The inspectors verified that Dominion initiated appropriate corrective actions for identified deficiencies. The inspectors also verified that the number of tubes plugged within the heat exchanger did not exceed the maximum amount allowed.

Unit 2

- 'A' Reactor building closed loop cooling (RBCCW) heat exchanger on July 28

Unit 3

- 'A' Reactor plant closed loop cooling (RPCCW) heat exchanger on July 1
- 'A', 'B', 'C' and 'D' RSS heat exchangers on July 27

b. Findings

No findings were identified.

1R11 Licensed Operator Regualification Program and Licensed Operator Performance (71111.11Q – 3 samples; 71111.11B – 1 sample)

.1 Quarterly Review of Licensed Operator Regualification Testing and Training

a. Inspection Scope

The inspectors observed Unit 2 licensed operator simulator training on August 19, which was just in time training for transient response with a degraded control element assembly (CEA), CEA 40. The scenarios for training session MB-02323 included a dropped control rod and a failure of a heater drain pump. The inspectors evaluated operator performance during the simulated event and verified completion of risk significant operator actions, including the use of abnormal and emergency operating procedures. The inspectors assessed the clarity and effectiveness of communications, implementation of actions in response to alarms and degrading plant conditions, and the oversight and direction provided by the control room supervisor. The inspectors verified the accuracy and timeliness of the TS action statements entered by the crew.

Additionally, the inspectors assessed the ability of the crew and training staff to identify and document crew performance problems.

The inspectors observed a Unit 3 licensed operator simulator drill on September 9 which included a hostile action based scenario resulting in a plant shutdown and cooldown complicated by a loss of turbine driven auxiliary feedwater pump, 'B' service water pump, 'D' circulating water pump, and both primary grade water storage tanks. The inspectors evaluated operator performance during the simulated event and verified completion of risk significant operator actions, including the use of abnormal and emergency operating procedures. The inspectors assessed the clarity and effectiveness of communications, implementation of actions in response to alarms and degrading plant conditions, and the oversight and direction provided by the control room supervisor. The inspectors verified the accuracy and timeliness of the emergency classification made by the shift manager and the TS action statements entered by the shift technical advisor. Additionally, the inspectors assessed the ability of the crew and training staff to identify and document crew performance problems.

b. Findings

No findings were identified.

.2 Quarterly Review of Licensed Operator Performance in the Main Control Room

a. Inspection Scope

The inspectors observed Unit 2 operator response to a loss of instrument air and electrical ground on the 22E 480 VAC vital bus on August 18, 2015. The inspectors observed the control room operators conducting component manipulations, use of procedures, crew communications, and diagnosis of events. Additionally, the inspectors observed coordination of activities between work groups similarly met established expectations and standards.

b. Findings

No findings were identified.

.3 Licensed Operator Regualification (71111.11B)

a. Inspection Scope

The following inspection activities were performed using NUREG-1021, "Operator Licensing Examination Standards for Power Reactors," Revision 9, Supplement 1 and Inspection Procedure Attachment 71111.11, "Licensed Operator Regualification Program."

Examination Results

On September 30, 2015, the results of the annual operating tests for both units were reviewed in-office to determine if pass/fail rates were consistent with the guidance of NUREG-1021, "Operator Licensing Examination Standards for Power Reactors," Revision 10, and NRC IMC 0609, Appendix I, "Operator Regualification Human

Performance Significance Determination Process (SDP).” The Revision verified that the failure rate (individual or crew) did not exceed 20 percent. (No biennial written examinations were administered in 2015.)

### Unit 2

- Two out of 49 operators failed at least one section of the Annual Exam. The overall individual failure rate was 4.1 percent.
- Zero out of 10 crews failed the simulator test. The crew failure rate was 0.0 percent.

### Unit 3

- One out of 42 operators failed at least one section of the Annual Exam. The overall individual failure rate was 2.4 percent.
- Zero out of nine crews failed the simulator test. The crew failure rate was 0.0 percent.

### Written Examination Quality

The inspectors reviewed a Unit 3 written examination administered during week of December 18, 2014, for qualitative and quantitative attributes as specified in Appendix B of Attachment 71111.11, Licensed Operator Requalification.

### Operating Test Quality

The operating tests for the weeks of August 24, 2015, and September 14, 2015, were reviewed for quality. Twelve job performance measures (JPMs) and four scenarios were reviewed for qualitative and quantitative attributes as specified in Appendix C of 71111.11, “Licensed Operator Requalification Program.”

### Licensee Administration of Operating Tests

Observations were made of the dynamic simulator exams and JPMs administered during the week of August 24, 2015. These observations included facility evaluations of crew and individual performance during the dynamic simulator exams and individual performance of five JPMs.

### Examination Security

The inspectors assessed whether facility staff properly safeguarded exam material. JPMs, scenarios, and written examinations (2014) were checked for excessive overlap of test items.

### Remedial Training and Re-Examinations

The remediation plans for fourteen operators, who had failed scenarios, JPMs, written exams, or emergency plan classifications throughout the training year, were reviewed to assess the effectiveness of the remedial training. Remediation of these individuals was checked for compliance with site procedures.

### Conformance with Operator License Conditions

Medical records for seven senior reactor operator licenses and four reactor operator licenses were reviewed to assess conformance with license conditions.

Proficiency watch standing records were reviewed for the last two quarters of 2014, and the first two quarters of 2015.

The reactivation plans for three senior reactor operator licenses were reviewed to assess the effectiveness of the reactivation process and to check for compliance with site procedures.

Records were reviewed for the participation of the licensed operators of Crew "C" in the requalification program from Cycle 14-01 through Cycle 15-03.

### Simulator Performance

Simulator performance and fidelity was reviewed for conformance to the reference plant control room. A sample of simulator CRs was also reviewed to ensure facility staff addressed identified and addressed performance modeling problems. Simulator test documentation was also reviewed.

### Problem Identification and Resolution

A review was conducted of recent operating history documentation found in inspection reports, Dominion's corrective action program, and the most recent NRC plant issues matrix. The inspectors also reviewed specific events from Dominion's corrective action program related to operator performance, such as root and apparent cause evaluations (ACEs), to verify that they had been appropriately addressed. The inspectors reviewed operator training and simulator issues to ensure that issues were being tracked and corrected by Dominion. The resident inspectors were also consulted for insights regarding licensed operators' performance. These reviews did not detect any operational events that were indicative of possible training deficiencies.

#### b. Findings

No findings were identified.

#### 1R12 Maintenance Effectiveness (71111.12Q – 2 samples)

##### a. Inspection Scope

The inspectors reviewed the samples listed below to assess the effectiveness of maintenance activities on structure, system, and component performance and reliability. The inspectors reviewed system health reports, corrective action program documents, maintenance work orders, and maintenance rule basis documents to ensure that Dominion was identifying and properly evaluating performance problems within the scope of the maintenance rule. For each sample selected, the inspectors verified that the structure, system, or component was properly scoped into the maintenance rule in accordance with Title 10 of the *Code of Federal Regulations* (10 CFR) 50.65 and verified that the (a)(2) performance criteria established by Dominion staff was reasonable. As

applicable, for structures, systems, and components classified as (a)(1), the inspectors assessed the adequacy of goals and corrective actions to return these structures, systems, and components to (a)(2). Additionally, the inspectors ensured that Dominion staff was identifying and addressing common cause failures that occurred within and across maintenance rule system boundaries.

#### Unit 2

- RBCCW System maintenance effectiveness on July 22

#### Unit 3

- RSS heat exchanger maintenance effectiveness on September 18

#### b. Findings

No findings were identified.

### 1R13 Maintenance Risk Assessments and Emergent Work Control (71111.13 – 6 samples)

#### a. Inspection Scope

The inspectors reviewed station evaluation and management of plant risk for the maintenance and emergent work activities listed below to verify that Dominion performed the appropriate risk assessments prior to removing equipment for work. The inspectors selected these activities based on potential risk significance relative to the reactor safety cornerstones. As applicable for each activity, the inspectors verified that Dominion personnel performed risk assessments as required by 10 CFR 50.65(a)(4) and that the assessments were accurate and complete. When Dominion performed emergent work, the inspectors verified that operations personnel promptly assessed and managed plant risk. The inspectors reviewed the scope of maintenance work and discussed the results of the assessment with the station's probabilistic risk analyst to verify plant conditions were consistent with the risk assessment. The inspectors also reviewed the TS requirements and inspected portions of redundant safety systems, when applicable, to verify risk analysis assumptions were valid and applicable requirements were met.

#### Unit 2

- Emergent risk assessment for seagull discovered entangled in U3 reserve station service transformer disconnect during Unit 2 'B' EDG 6-month work window on July 15
- Planned entry in Yellow risk for ECCS suction header testing on August 3
- Planned Yellow risk for diesel fire pump testing on August 5 and 6
- Emergent work on through-wall leak on X182 vital switchgear cooler discharge line on August 6
- Emergent risk assessment for loss of Unit 3 diesel driven fire pump for degraded battery charger on September 21

Unit 3

- Risk assessment during 'A' EDG 24 hour endurance run on September 2

b. Findings

No findings were identified.

1R15 Operability Determinations and Functionality Assessments (71111.15 – 7 samples)a. Inspection Scope

The inspectors reviewed operability determinations (ODs) for the following degraded or non-conforming conditions:

Unit 2

- CR 1005852, CEA 40 automatic CEA computer module alarm on August 7
- CR 1006375, Power Ratio Calculator/Recorder 'Y' channel reactor regulation input degraded on August 14

Unit 3

- CR 1000616, Elevated RPCCW heat exchanger leakage on July 1
- CR 1005218, EDG 'A' Cylinder 4 test valve discovered open on August 4
- CR 1007488, Reasonable assurance of safety for control building chiller on August 26
- CR 1008567, Common cause analysis of EDG 'B' following failure of 'A' EDG local annunciators on September 3
- CA 3009445, Reasonable assurance of safety for diesel driven fire pump battery charger on September 18

The inspectors selected these issues based on the risk significance of the associated components and systems. The inspectors evaluated the technical adequacy of the ODs to assess whether TS operability was properly justified and the subject component or system remained available such that no unrecognized increase in risk occurred. The inspectors compared the operability and design criteria in the appropriate sections of the TSs and UFSAR to Dominion's evaluations to determine whether the components or systems were operable. The inspectors confirmed, where appropriate, compliance with bounding limitations associated with the evaluations.

b. Findings

No findings were identified.

1R18 Plant Modifications (71111.18 – 1 sample)Temporary Modificationsa. Inspection Scope

The inspectors reviewed the temporary modification listed below to determine whether the modifications affected the safety functions of systems that are important to safety. The inspectors reviewed 10 CFR 50.59 documentation and post-modification testing results, and conducted field walkdowns of the modifications to verify that the temporary modifications did not degrade the design bases, licensing bases, and performance capability of the affected systems.

- TCC-MP-2015-013, Bypass 2B EDG Low Lube Oil Level Alarm to Restore Engine Hour Meter on August 27

b. Findings

No findings were identified.

1R19 Post-Maintenance Testing (71111.19 – 7 samples)a. Inspection Scope

The inspectors reviewed the post-maintenance tests for the maintenance activities listed below to verify that procedures and test activities ensured system operability and functional capability. The inspectors reviewed the test procedure to verify that the procedure adequately tested the safety functions that may have been affected by the maintenance activity, that the acceptance criteria in the procedure were consistent with the information in the applicable licensing basis and/or design basis documents, and that the test results were properly reviewed and accepted and problems were appropriately documented. The inspectors also walked down the affected job site, observed the pre-job brief and post-job critique where possible, confirmed work site cleanliness was maintained, and witnessed the test or reviewed test data to verify quality control hold point were performed and checked, and that results adequately demonstrated restoration of the affected safety functions.

Unit 2

- 'B' EDG overhaul on July 16
- 'A' EDG overhaul on July 27
- Inverter #4 maintenance on August 6

Unit 3

- Service water booster pump P2B IST pump rebuild on July 18
- 'B' Service water pump packing adjustment on July 20
- 'B' Auxiliary building filter train flow rate low out of specification corrective maintenance on July 23



- Corrective maintenance following the failure of 'A' EDG local annunciators during endurance run on September 8

b. Findings

No findings were identified.

1R22 Surveillance Testing (71111.22 – 5 samples)

a. Inspection Scope

The inspectors observed performance of surveillance tests and/or reviewed test data of selected risk-significant structures, systems, and components to assess whether test results satisfied TSs, the UFSAR, and Dominion procedure requirements. The inspectors verified that test acceptance criteria were clear, tests demonstrated operational readiness and were consistent with design documentation, test instrumentation had current calibrations and the range and accuracy for the application, tests were performed as written, and applicable test prerequisites were satisfied. Upon test completion, the inspectors considered whether the test results supported that equipment was capable of performing the required safety functions. The inspectors reviewed the following surveillance tests:

Unit 2

- SP 2401I Local Power Density Monitor on July 22

Unit 3

- SP 3626.9, Control Building Air Conditioning Booster Pump 3SWP\*P2B Comprehensive Test, Revision 000-10 on July 18 (IST)
- SP 3626.5-011, Service Water Pump 3SWP\*P1B Comprehensive Test on July 20 (IST)
- SP 3646A.2, Emergency Diesel Generator B Operability Tests, 24 hour endurance run on August 22
- SP3609.2, Quench Spray Pump 3QSS\*P3B Operational Readiness Test, Revision 011-07 on September 10

b. Findings

Introduction. The inspectors identified a Green NCV of Millstone Unit 3 TS Surveillance Requirement 4.0.5 because Dominions did not implement the IST Program in accordance with the ASME OM Code of Record, 2001 through 2003 incorporated addenda. On July 18, 2015, Dominion changed the reference values of the 'B' control building air conditioning booster pump, 3SWP\*P2B, prior to determining the cause of the condition which resulted in the pump performing in the Action Range (ISTB-6200(b)) in April 2015.

Description. On April 22, 2015, the service water booster pump P2B, 3SWP\*P2B, failed an IST comprehensive test. The test results place the pump performance in ASME Code Required Action Range. The Code required Dominion to declare the pump

inoperable and then determine the cause of the deviation and correct the condition or perform an analysis and establish new reference operating values for the pump in accordance with ISTB-6200(c).

Through troubleshooting, Dominion identified that impeller clearance had unexpectedly changed and then adjusted the impeller. The pump was retested in accordance with an IST Group A test which did not have the same acceptance criteria as the initially performed comprehensive test, on April 24, 2015, and failed again. The retest results remained in the Required Action Range. Dominion performed another impeller adjustment that same day and the pump passed a Group A test on the night shift. At this point, Dominion declared the pump operable and restored it to service, but did not determine the cause of the change in impeller clearance as required by the Code. Section ISTB-6200(b) states that if the measured test parameter values fall within the Required Action Range “the pump shall be declared inoperable until either the cause of the deviation has been determined and corrected, or an analysis of the pump is performed and new reference values are established in accordance with ISTB-6200(c).” In this instance, the “deviation” is the unexpected change in impeller clearance. The Code requires Dominion to understand the cause of the unexpected change in impeller clearance as well as correcting it by adjusting the clearance. Alternatively, Dominion could have determined a new set of reference values for the pump at this time in accordance with ISTB-6200(c), which requires an “analysis of pump level and system level of operational readiness, the cause of the change in pump performance, and an evaluation of all trends indicated by available data.” The inspectors determined that Dominion improperly declared the pump operable without performing all required Code functions.

Dominion had previously been monitoring the service water booster pump performance for degradation by another potential failure mode. The pump casings and impellers are constructed of Aluminum Bronze C95400 which are susceptible to erosion due to the high design impeller speeds. Additionally, the pump casing and impeller material is susceptible to Aluminum dealloying due to the metal's interaction with the service water. To mitigate these degradation mechanisms, Dominion has established a long term plan to replace the pumps in 2016. In the short term, Dominion has established a maintenance strategy of pump casing coating and impeller replacements based upon performance monitoring (IST program). Dominion performed additional maintenance on the 'B' service water booster pump in July to inspect this coating degradation. During the July 15 through July 17 maintenance window, inspection of the pump casing identified blistering and expected wear. Inspection of the impeller did not identify any degradation that would have impacted performance. However, Dominion chose to conservatively replace the impeller. The casing was recoated and machined to fit the new impeller. During post-maintenance testing, the pump performed worse than prior to the maintenance, twice failing into the Action Range.

On July 18, 2015, Dominion changed the pump reference values in accordance with ISTB-3310. This section of the Code allows Dominion to determine a new set of reference values when the previous reference values may have been affected by “repair, replacement, or routine servicing” of a pump. However, because Dominion never properly addressed the requirements of Section ISTB-6200 (b) in April, the inspectors determined they did not follow all the Code requirements to change the reference values in July. In order to change the reference values in July, Dominion needed to meet all the requirements for analysis in ISTB-6200(c), not just the requirements of ISTB-3310.

Changing IST component reference values in a manner contrary to the IST program could result in undetected degradation of a component important to safety. Dominion evaluated the lost design basis event margin associated with 3SWP\*P2B's performance under CR 1003089. Dominion has entered the concern associated with implementation of the IST Program into their corrective action program under CR 1014358.

Analysis. The inspectors determined that failure to implement the IST Program in accordance with TS Surveillance Requirement 4.0.5 was a performance deficiency that was reasonably within the licensee's ability to foresee and correct. Specifically, Dominion failed to determine the cause of the deviation, displacement of the pump impeller, which resulted in service water booster pump P2B performing in an IST Corrective Action condition as described in ASME Code of record section ISTB-6200 in April 2015 and, subsequently, did not perform analyses in accordance with ISTB-6200(c) prior to changing reference values of the pump in July 2015. This finding was more than minor in accordance with IMC 0612, "Power Reactor Inspection Reports," Appendix B, "Issue Screening," dated September 7, 2012, as it represented a challenge to the equipment performance attribute of the Mitigating Systems cornerstone objective to ensure the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. The reliability of 3SWP\*P2B was challenged based upon Dominion's change in the pump's reference values contrary to the ASME OM code of record for Millstone Unit 3 which could result in the degradation of the equipment remaining undetected.

In accordance with IMC 0609, "Significance Determination Process," Attachment 4, "Initial Characterization of Findings," and IMC 0609, Appendix A, Exhibit 2, "Mitigating Systems Screening Questions," Section A, "Mitigating Systems, Structures or Components and Functionality," the finding screened to be of very low safety significance (Green), when the deficiency affecting the design or qualification whereupon the component maintains operability or functionality question was answered "yes." The safety function of 3SWP\*P2B was not lost based on analysis of design basis flow requirements.

This finding in accordance with IMC 0310, "Aspects within the Cross-Cutting Areas," dated December 4, 2014, has a cross-cutting aspect in Problem Identification and Resolution, Evaluation, in that the organization failed to evaluate the issue to ensure that resolution addressed causes and extent of conditions commensurate with their safety significance. Specifically, Dominion's analysis of the April 2015 pump failures was not thorough enough to understand a new potential failure mode (impeller movement) and how it may impact system performance. [P.2]

Enforcement. Millstone Unit 3 TS Surveillance Requirement 4.0.5 states, in part, "Surveillance Requirements for inservice testing of ASME Code Class 1, 2, and 3 components shall be performed in accordance with the ASME Code for Operation and Maintenance of Nuclear Power Plants (ASME OM Code)." Contrary to the above, from April 24, 2015, to present, Dominion did not perform inservice testing of IST Program component 3SWP\*P2B in accordance with the ASME OM Code. Specifically Dominion reset the pump 3SWP\*P2B IST reference values in July without having determined the cause of the inoperable condition in April. This could result in a condition where degradation of the 3SWP\*P2B would remain undetected by IST testing. Because this

issue is of very low safety significance (Green) and Dominion has taken corrective action and entered this issue into their corrective action program as CR 1014358, this finding is being treated as an NCV consistent with Section 2.3.2 of the NRC Enforcement Policy. **(NCV 05000423/2015003-01, Change of Pump Reference Values Contrary to ASME OM)**

### **Cornerstone: Emergency Preparedness**

#### 1EP2 Alert and Notification System Evaluation (71114.02 – 1 sample)

##### a. Inspection Scope

An onsite review was conducted to assess the maintenance and testing of the alert and notification system (ANS). During this inspection, the inspectors conducted a review of the Millstone siren testing and maintenance programs. The inspectors reviewed the associated ANS procedures and the Federal Emergency Management Agency approved ANS Design Report to ensure Dominion's compliance with design report commitments for system maintenance and testing. The inspection was conducted in accordance with NRC Inspection Procedure 71114.02. 10 CFR 50.47(b)(5) and the related requirements of 10 CFR Part 50, Appendix E, were used as reference criteria.

##### b. Findings

No findings were identified.

#### 1EP3 Emergency Response Organization Staffing and Augmentation System (71114.03 – 1 sample)

##### a. Inspection Scope

The inspectors conducted a review of the Millstone Emergency Response Organization (ERO) augmentation staffing requirements and the process for notifying and augmenting the ERO. The review was performed to verify the readiness of key Dominion staff to respond to an emergency event and to verify Dominion's ability to activate their emergency response facilities (ERF) in a timely manner. The inspectors reviewed: the Millstone Power Station Emergency Plan for ERF activation and ERO staffing requirements; the ERO duty roster; applicable station procedures; augmentation test reports; the most recent drive-in drill reports; and corrective action reports related to this inspection area. The inspectors also reviewed a sample of ERO responder training records to verify training and qualifications were up to date. The inspection was conducted in accordance with NRC Inspection Procedure 71114.03. 10 CFR 50.47(b)(2) and related requirements of 10 CFR 50, Appendix E, were used as reference criteria.

##### b. Findings

No findings were identified.

1EP5 Maintaining Emergency Preparedness (71114.05 – 1 sample)

a. Inspection Scope

The inspectors reviewed a number of activities to evaluate the efficacy of Dominion's efforts to maintain the Millstone emergency preparedness programs. The inspectors reviewed: memorandums of agreement with offsite agencies; the 10 CFR 50.54(q) Emergency Plan change process and practice; Millstone's maintenance of equipment important to emergency preparedness; records of evacuation time estimate population evaluation; and provisions for, and implementation of, primary, backup, and alternative ERF maintenance. The inspectors also verified Dominion's compliance at Millstone with NRC emergency preparedness regulations regarding: emergency action levels for hostile action events; protective actions for on-site personnel during events; emergency declaration timeliness; ERO augmentation and alternate facility capability; evacuation time estimate updates; on-shift ERO staffing analysis; and, ANS back-up means.

The inspectors further evaluated Dominion's ability to maintain the Millstone emergency preparedness programs through their identification and correction of emergency preparedness weaknesses, by reviewing a sample of drill reports, self-assessments, and 10 CFR 50.54(t) reviews. Also, the inspectors reviewed a sample of emergency preparedness-related CRs initiated at Millstone from January 2014 through July 2015. The inspection was conducted in accordance with NRC Inspection Procedure 71114.05. 10 CFR 50.47(b) and the related requirements of 10 CFR 50, Appendix E, were used as reference criteria.

b. Findings

No findings were identified.

**2. RADIATION SAFETY**

**Cornerstone: Occupational and Public Radiation Safety**

2RS2 Occupational ALARA Planning and Controls (71124.02 – 1 sample)

a. Inspection Scope

The inspectors assessed Dominion's performance with respect to maintaining occupational individual and collective radiation exposures as low as is reasonably achievable (ALARA). The inspectors used the requirements contained in 10 CFR 20, applicable RGs, TSs, and procedures required by TSs as criteria for determining compliance.

Inspection Planning

The inspectors conducted a review of Millstone's collective dose history and trends; ongoing and planned radiological work activities; radiological source term history and trends; and ALARA dose estimating and tracking procedures.

### Radiological Work Planning

The inspectors selected the following radiological work activities based on exposure significance for review:

- Radiation Work Permit (RWP) 3140331, Scaffolding
- RWP 3140301, Reactor Disassembly & Reassembly
- RWP 3140308, Steam Generator Secondary Side
- RWP 3140327, Valve Repairs
- RWP 3140400, Reactor Coolant Pump Seal Modification

For each of these activities, the inspectors reviewed: ALARA work activity evaluations; exposure estimates; exposure reduction requirements; results achieved (dose rate reductions, actual dose); person-hour estimates and results achieved; and post-job reviews that were conducted to identify lessons learned.

### Verification of Dose Estimates and Exposure Tracking Systems

The inspectors reviewed the current annual collective dose estimate; basis methodology; and measures to track, trend, and reduce occupational doses for ongoing work activities.

### Source Term Reduction and Control

The inspectors reviewed the current plant radiological source term and historical trend, plans for plant source term reduction, and contingency plans for changes in the source term as the result of changes in plant fuel performance or changes in plant primary chemistry.

### Problem Identification and Resolution

The inspectors evaluated whether problems associated with ALARA planning and controls were identified at an appropriate threshold and properly addressed in the corrective action program.

#### b. Findings

No findings were identified.

## **4. OTHER ACTIVITIES**

### 4OA1 Performance Indicator Verification (71151)

#### .1 Mitigating Systems Performance Index (10 samples)

##### a. Inspection Scope

The inspectors reviewed Dominion's submittal of the Mitigating Systems Performance Index for the following systems for the period of July 1, 2014, through June 30, 2015:

- Unit 2 Emergency AC Power System
- Unit 3 Emergency AC Power System
- Unit 2 High Pressure Injection System
- Unit 3 High Pressure Injection System
- Unit 2 Heat Removal System
- Unit 3 Heat Removal System
- Unit 2 Residual Heat Removal System
- Unit 3 Residual Heat Removal System
- Unit 2 Cooling Water System
- Unit 3 Cooling Water System

To determine the accuracy of the performance indicator data reported during those periods, the inspectors used definitions and guidance contained in Nuclear Energy Institute (NEI) Document 99-02, "Regulatory Assessment Performance Indicator Guideline," Revision 7. The inspectors also reviewed Dominion's operator narrative logs, CRs, mitigating systems performance index derivation reports, event reports, and NRC integrated inspection reports to validate the accuracy of the submittals.

b. Findings

No findings were identified.

.2 Drill/Exercise Performance, ERO Drill Participation, and ANS Reliability (3 samples)

a. Inspection Scope

The inspectors reviewed data for the following three Emergency Preparedness performance indicators: (1) drill and exercise performance; (2) ERO drill participation; and, (3) ANS reliability. The last NRC emergency preparedness inspection at Millstone was conducted in the third calendar quarter of 2014. Therefore, the inspectors reviewed supporting documentation from emergency preparedness drills and equipment tests from the third calendar quarter of 2014 through the second calendar quarter of 2015 to verify the accuracy of the reported performance indicator data. The review of the performance indicators was conducted in accordance with NRC Inspection Procedure 71151. The acceptance criteria documented in NEI 99-02, "Regulatory Assessment Performance Indicator Guidelines," Revision 7, was used as reference criteria.

b. No findings were identified.

40A2 Problem Identification and Resolution (71152 – 1 sample)

.1 Routine Review of Problem Identification and Resolution Activities

a. Inspection Scope

As required by Inspection Procedure 71152, "Problem Identification and Resolution," the inspectors routinely reviewed issues during baseline inspection activities and plant status reviews to verify that Dominion entered issues into the corrective action program at an appropriate threshold, gave adequate attention to timely corrective actions, and identified and addressed adverse trends. In order to assist with the identification of

repetitive equipment failures and specific human performance issues for follow-up, the inspectors performed a daily screening of items entered into the corrective action program. The inspectors also confirmed, on a sampling basis, that, as applicable, for identified defects and non-conformances, Dominion performed an evaluation in accordance with 10 CFR Part 21.

b. Findings

No findings were identified.

.2 Annual Sample: Unit 2 Compensatory Cooling for Vital Switchgear

a. Inspection Scope

The inspectors performed an in-depth review of Dominion's root cause analysis and corrective actions associated with CR 569509. Specifically, a through-wall service water leak occurred on the chiller X181A/B vital switchgear cooler service discharge piping. The leak was caused by flow accelerated erosion of the pipe downstream of flow measuring orifice FE-6922. This condition required the removal from service of the X181A/B cooler and the establishment of compensatory cooling in the West 480V Switchgear Room. Compensatory cooling procedures are used to provide supplementary ventilation and cooling to maintain vital switchgear room temperature below the required limits in the Technical Requirements Manual (TRM) and TSs. As a result, the inspectors reviewed the design calculations and engineering technical evaluations (ETE) that demonstrated that vital switchgear could be maintained in an operable condition with supplementary ventilation.

The inspectors walked down the lower 4160 VAC vital switchgear room when the room was being cooled by compensatory measures to verify temperature limits of vital equipment. The inspectors assessed Dominion's problem identification threshold, cause analyses, extent of condition reviews, compensatory actions, and the prioritization and timeliness of corrective actions to determine whether Dominion was appropriately identifying, characterizing, and correcting problems associated with this issue and whether the planned or completed corrective actions were appropriate. The inspectors compared the actions taken to the requirements of the corrective action program and 10 CFR 50, Appendix B. In addition, the inspectors performed field walkdowns and interviewed engineering personnel to assess the effectiveness of the implemented corrective actions.

b. Findings and Observations

No findings were identified.

Dominion determined the most probable cause was flow accelerated corrosion downstream of a flow measuring orifice. Dominion conducted a technical review of the flow accelerated corrosion induced failure, including a comprehensive failure analysis. Corrective actions included replacing the affected pipe section.

The inspectors also reviewed selected copper-nickel (Cu-Ni) service water piping maintenance records and did not identify additional issues. The inspectors determined Dominion's overall response to the issue was commensurate with the safety



significance, was timely, and included appropriate compensatory actions. The inspectors determined that the actions taken were reasonable to resolve both the through-wall leak and the impact from elevated operating temperatures to relay service life.

However, the inspectors' noted that quarantine procedures for the degraded pipe piece that had been removed were ineffective in preventing maintenance personnel from deburring the pipe section and removing the oxide coating surrounding the hole in the pipe. Premature, inadvertent modification of the as-found condition of the pipe prevented a complete forensic analysis of the cause of the hole.

The inspectors noted that the normal operating loads in the lower 4160 VAC vital switchgear room provide a higher heat load inside the room than would be present for operation of emergency equipment. Despite the higher heat load, room temperatures were able to be maintained less than TRM limits with compensatory cooling procedures during a summer day when outside ambient temperatures were around 90°F.

#### 4OA3 Follow-Up of Events and Notices of Enforcement Discretion (71153 – 2 samples)

##### .1 Plant Events

###### a. Inspection Scope

The inspectors reviewed the retraction of Event Report 51161, Millstone Unit 3 Service Water Radiation Monitor Out of Service on September 30, 2015. The inspectors verified the reporting requirements of 10 CFR Part 50.72 and reviewed Dominion's follow-up actions related to the events to assure that Dominion implemented appropriate corrective actions commensurate with their safety significance.

###### b. Findings

Introduction. The inspectors identified a Green NCV of Millstone Unit 3 TS 6.8.1 because Dominion did not implement adequate procedures to address a LBLOCA inside containment that bypasses the containment barrier. Specifically, Dominion did not provide adequate procedural direction or training to the operators for control of the ECCS during a LOCA and a loss of containment caused by a RSS heat exchanger tube rupture.

Description. On September 30, the inspectors reviewed the retraction of a prompt notification under 10 CFR 50.72(b)(3)(xiii) for event report 51161 dated June 17, 2015 for a major loss of emergency preparedness assessment capability when 3SWP\*RE60B failed. Dominion had determined that the loss of 3SWP\*RE60B did not represent a major loss of emergency assessment capability and should not have been reported to the NRC. The inspectors noted that while the event retraction met the specific criteria in NUREG-1022 (Event Reporting Guidelines: 10 CFR 50.72 and 50.73), the Dominion evaluation was narrowly focused and did not assess the larger implications of the removal of the service water radiation monitors 3SWP\*RE60A/B from service. In the course of reviewing this event retraction, the inspectors determined that Dominion did not have adequate procedural direction to mitigate the failure of an RSS heat exchanger tube during a LOCA event.

The RSS heat exchangers are used to provide cooling for containment sump water after the ECCS injection phase has been completed and the containment sump Recirculation Actuation Signal (RAS) has occurred. The Millstone Unit 3 ECCS system is designed and operated differently than the standard Westinghouse-designed ECCS system for core cooling. During the sump recirculation phase of a LOCA, the four RSS heat exchangers are used to cool the reactor coolant system (RCS) water in the containment sump by transferring the heat directly to service water without an intermediate closed loop cooling system. Essentially, the RSS heat exchanger tubes form part of the containment boundary. A rupture in the RSS heat exchanger tube results in a containment bypass event. Two radiation monitors (3SWP\*RE60A/B – one per RSS/service water train) were designed to monitor the integrity of the RSS heat exchanger tubes that comprise the containment fission product barrier to the environment in post-accident conditions.

The generic Westinghouse emergency operating procedures (EOPs) provide direction to identify and isolate any leakage of RCS coolant that bypasses the containment barrier in ECA-1.2 (LOCA Outside of Containment). The Dominion site-specific EOPs did not provide a clear path to transition from EOP-35-E-1 (Loss of Coolant Accident) to EOP-35-ECA-1.2 (LOCA Outside of Containment) to mitigate a tube rupture in an RSS heat exchanger. Instead, Dominion relied on concurrent implementation of AOP 3573 (Radiation Monitor Alarm Response) to mitigate the event. The inspectors identified that the operators were required to respond to a main board alarm in the control room to direct the operator's attention to a plant computer screen that showed the status of numerous in-plant radiation monitors. The operators had to recognize that one of the 3SWP\*RE60 process monitors was in alarm among the numerous radiation monitor alarms that would annunciate simultaneously when RAS occurred in order to enter AOP 3573. AOP 3573 attachment A directed the operators to consult with the technical support center and determine if the following should be performed: shutdown the affected RSS train and isolate service water to the affected heat exchanger. No explicit direction was provided regarding the criteria to isolate a release, how to complete these actions (such as which valves to close and in what order), and how to maintain containment cooling.

During a large break LOCA, the most likely time for the RSS heat exchanger tube to rupture would be when the heat exchanger is pressurized at the initiation of RAS, approximately 30 minutes from the time the RCS barrier was breached. The technical support center is not activated until 60 minutes following the declaration of the emergency event and would likely not be available to formulate a plan and provide clear direction to the operators. A tube rupture in an RSS heat exchanger during a LOCA would cause containment sump water to be pumped into Long Island Sound and would challenge the integrity of the long term cooling of the containment structure due to a loss of containment sump inventory. The long term preservation of the containment barrier relies on cooling the core by cooling the water in the containment sump.

Dominion did not provide adequate procedural direction to ensure that a release would be promptly terminated and that long term core and containment cooling functions are maintained. Furthermore, Dominion did not train their operators to respond to the failure of an RSS heat exchanger tube. There were no simulator training scenarios or classroom training plans for licensed operators that would prepare the operators to take effective mitigating actions, determine the emergency classification of this potential event, and formulate effective protective action recommendations.

Analysis. The inspectors determined that failure to provide adequate procedural direction to mitigate an RSS heat exchanger tube leak in accordance with TS 6.8.1 was a performance deficiency that was reasonably within the licensee's ability to foresee and correct. Specifically, Dominion did not provide adequate procedures to address a LOCA into containment with a tube leak in an RSS heat exchanger. This finding was more than minor in accordance with IMC 0612, "Power Reactor Inspection Reports," Appendix B, "Issue Screening," dated September 7, 2012, as it represented a challenge to the procedure quality attribute of the Barrier Integrity cornerstone to provide reasonable assurance that physical design barriers protect the public from radionuclide releases caused by accidents or events. The lack of procedural direction to mitigate an RSS heat exchanger tube rupture during a LOCA could result in challenging the integrity of the containment barrier.

In accordance with IMC 0609, "Significance Determination Process," Attachment 4, "Initial Characterization of Findings," and IMC 0609, Appendix A, Exhibit 3, "Barrier integrity Screening Questions," Section B, "Reactor Containment," the finding screened to be of very low safety significance (Green), when the deficiency did not represent an actual open pathway in the physical integrity of reactor containment (valves, airlocks, etc.), containment isolation system (logic and instrumentation), and heat removal components.

This finding has a cross-cutting aspect in Problem Identification and Resolution, Evaluation, because the organization did not adequately evaluate the issue to ensure that resolutions addressed causes and extent of conditions commensurate with their safety significance. Specifically, Dominion did not evaluate the adequacy of existing procedural direction to respond to a LOCA with a ruptured RSS heat exchanger tube. The inspectors determined that there was a gap in procedural guidance as operators transitioned from the loss of one fission product barrier (RCS) to the loss of two (RCS and containment). Although this performance deficiency had existed for many years, Dominion missed an opportunity to evaluate the problem and take effective corrective action when they reviewed and retracted the event report [P.2].

Enforcement. Millstone Unit 3 TS 6.8.1 states, in part, that written procedures shall be established, implemented, and maintained covering the applicable procedures recommended in Appendix A of RG 1.33, Revision 2, February 1978. RG 1.33 Appendix A, Section 6 lists procedures for combatting emergencies and other significant events including LOCAs and loss of containment integrity. Contrary to the above, from July 1, 2015 to present, Dominion did not establish, implement, or maintain adequate written procedures for combatting LOCAs and loss of containment integrity. Specifically, Dominion emergency procedures did not provide adequate procedural direction to mitigate and classify a LOCA with a concurrent loss of containment caused by an RSS heat exchanger tube rupture. Because this issue is of very low safety significance (Green) and Dominion entered this issue into their corrective action program (CR 108205), this finding is being treated as an NCV consistent with Section 2.3.2 of the NRC Enforcement Policy. **(NCV 05000423/2015003-02, Inadequate Procedural Direction to Mitigate a LOCA and Failure of an RSS Heat Exchanger Tube.**

.2 (Closed) Licensee Event Report (LER) 05000423/2014-004-00 & 2015-001-00: Unlatched Dual Train HELB Door Results in Potential Loss of Safety Function

On December 12, 2014, January 15, 2015, and February 19, 2015, at Millstone Unit 3, Dominion personnel discovered the east motor control center rod control area to containment air lock area door, A-24-8, would not latch closed upon use. A-24-8 is a dual train high energy line break boundary and fire protection door associated with the operability of both trains of 480 VAC safety-related switchgear. Each time upon identification that the door would not properly latch, the door was declared non-functional and TS 3.0.3 was entered. Dominion personnel, then, exercised and lubricated the door lockset mechanism and the latch would function properly. Each event lasted no more than 35 minutes from discovery to restoration upon which TS 3.0.3 was exited. The inspectors did not identify any new issues during the review of the LER. This LER is closed.

40A5 Other Activities

.1 (Closed) Notice of Violation VIO 05000423/2013004-01: Inadequate Corrective Actions to Restore Degraded Unit 3 Main Feedwater Isolation Valves

Follow-up on Traditional Enforcement Actions, Including Violations, Deviations, Confirmatory Action Letters, Confirmatory Orders, and Alternate Dispute Resolutions Confirmatory Orders. (92702)

a. Inspection Scope

The inspectors performed an on-site follow-up inspection for cited violation (VIO) 05000423/2013004-01, Inadequate Corrective Actions to Restore Degraded Unit 3 Main Feedwater Isolation Valves. The Green cited violation was associated with 10 CFR 50, Appendix B, Criterion XVI, "Corrective Action," for Dominion's failure to take timely and effective corrective actions for conditions adverse to quality involving the degraded closing capability of four Unit 3 feedwater isolation valves (FWIVs) due to undersized actuators.

The condition of the undersized actuators was discovered in 2007. Adequate compensatory measures were put in place and corrective actions to replace the actuators were planned during refueling outage 3R12 in October 2008. The modification to replace the actuators was deferred over the next two refueling outages (3R13 in the spring of 2010 and 3R14 in the fall of 2011). In Inspection Report 05000423/2012010, dated August 31, 2012, the NRC issued an NCV (NCV 05000423/2012010-01) for failure to take timely corrective action. At the time, the modification was scheduled to be implemented during spring 2013 (3R15) refueling outage. The modification was subsequently moved out of the spring 2013 refueling outage. Because the modification was not implemented, a cited violation of Criterion XVI was issued in Inspection Report 05000423/2013004, dated November 8, 2013. Subsequently, the modification to the FWIV actuators was completed in October 2014 during refueling outage 3R16.

The inspectors performed the follow-up inspection of the cited violation in accordance with NRC Inspection Procedure 92702, "Follow-up on Traditional Enforcement Actions Including Violations, Deviations, Confirmatory Action Letters, Confirmatory Orders, and

Alternate Dispute Resolution Confirmatory Orders.” The objectives of the inspection were to determine whether Dominion:

- Provided assurance that the cause of the violation is understood;
- Provided assurance that corrective action have been fully implemented; and
- Provided assurance that licensee programs and practices have been appropriately enhanced to prevent recurrence.

b. Findings and Observations

One licensee-identified violation was identified (documented in Section 4OA7).

Dominion replied to Notice of Violation VIO 05000423/2013004-01 in a letter dated December 9, 2013. Dominion stated that the reason for the violation was that the station did not appropriately plan for a project of the scope and complexity required. Dominion stated that full compliance would be achieved prior to plant restart from refueling outage 3R16 in the fall of 2014.

The inspectors reviewed CR 507299 and ACE 19230 which were credited by Dominion as part of the response to the VIO. The ACE identified the cause as the station did not support timely implementation of the modification to resolve the OD for the degraded FWIVs. A corrective action was established to review all open ODs to determine if (1) the OD and its corrective actions were tracked on the Plant Health Issues List and within the corrective action program process, and (2) for those items with open corrective actions, to determine if the planned resolution was in accordance with timeliness guidance. The inspectors found that of the 9 open ODs that were open when the VIO was issued, all were resolved with the exception of one which required a change to the TS. The TS amendment associated with the change had been submitted and was in review by NRC Headquarters staff. The inspectors reviewed the list of open ODs at the time of the inspection and assessed that the age of the ODs was reasonable given the complexity of the associated issues. Other corrective actions to assure projects were properly prioritized and periodically reviewed were completed by Dominion. The inspectors concluded that Dominion had taken adequate action to understand the cause of the VIO, had taken adequate actions to correct the cause of the VIO, and that Dominion programs and practices have been appropriately enhanced.

Additional review of Dominion processes was recommended by the corrective action review board to address behavioral and organizational issues that resulted in the necessity to reschedule the 3R15 project to replace the FWIV actuators. Dominion consulted an independent outside contractor regarding assessment of site project management. The inspectors reviewed the report associated with this review which recommended a number of programmatic and organizational changes to address project prioritization and implementation processes. This resulted in a number of procedural improvements being incorporated into the fleet procedures.

The design modification to the FWIV actuators was approved on November 5, 2013, to correct the degraded closing capability of the Millstone Unit 3 main feedwater isolation valves. The modification (Design Change MP3-09-01030) involved replacing the valves' gas-hydraulic actuators with pneumatic (nitrogen) actuators to provide additional valve thrust. The modification was installed on Unit 3 during refueling outage 3R16 in the fall of 2014. During the installation, several problems were encountered including design

issues. This included: 1) the inability to open the FWIVs once they were closed at the initial actuator thrust values; 2) an incorrect vendor valve weak link analysis (the valve backseat determined to be the weak link versus the valve stem coupling bolts); 3) actuator interference and alignment problems; 4) poor performance of nitrogen pressure regulators; and 5) foreign material exclusion problems. Dominion implemented corrective actions and design change updates (DCUs) to MP3-09-01030 to address the issues encountered.

The inspectors performed a review of all DCUs that were made during the installation of MP3-09-01030 to address the problems that were discovered. The inspectors did not identify any issues that would affect the ability of the FWIV actuators to perform their intended safety function. The inspectors noted that additional DCUs were in the planning stages to address performance issues with the nitrogen supply support system. For example, a change was planned to replace the nitrogen pressure regulators to improve their performance and to remove the operator burden of manually filling actuator accumulator receiver tanks. The inspectors reviewed the planned actions and assessed that the changes would enhance and improve system operation.

Dominion performed ACE 19891 following 3R16 to address the cause of the problems that were encountered during the installation of the new actuators and supporting equipment. The inspectors performed a review of the ACE. The apparent cause addressed all the problems encountered but mainly focused on the discovery of the inadequate weak link analysis that required several DCUs to fully address. The cause of the inadequate analysis was determined to be inadequate vendor design control. A contributing cause was determined to be inadequate owner control of the vendor design. A licensee-identified violation associated with the inadequate vendor design control was identified by the inspector and is documented in Section 4OA7.

The inspectors identified several minor observations during their review of ACE 19891. The observations were minor because they did not affect the ability of the FWIV actuators to perform their intended safety function. The observations were as follows:

- The corrective action to address the cause of inadequate vendor design control was to perform an audit of the vendor's quality assurance program. This action was closed without performing the audit. Instead, credit was taken for an audit that was performed in June 2014. The action was closed out based on a finding from the June 2014 audit of the vendor's design control process that was similar to the design control problems associated with the inadequate weak link analysis. The closeout remarks for the corrective action stated that corrective actions were implemented by the vendor.
- Action to address the contributing cause of inadequate owner control of the vendor design only included a reinforcement with project managers the expectations related to validating assumptions, extent of condition for as-found issues, review of risk, and initiating CRs when a deviating condition is found. No longer-term actions were planned to directly address the contributing cause. The inspectors noted that Dominion planned to complete an assist visit for project management by an industry group or, alternately, to conduct a formal self-assessment of project implementation. However, it was unclear whether the assist visit or self-assessment would address the contributing cause because the specifics these actions were not addressed in the ACE.

- No extent of condition of the inadequate vendor design control apparent cause was documented in the ACE. This was identified by a quality index review of the ACE and is a mandatory attribute for ACEs. Although no extent of condition was performed the quality index review gave credit that the requirement was partially met. The corrective action program requires that if a mandatory attribute is not met, then the ACE is unacceptable.

Dominion entered the inspector's observations into the corrective action program as CR 1010991 and planned to revise the corrective action plan for ACE 19891 to address the inspector's observations.

Based on the results of the inspection, the inspectors' concluded that Dominion had taken adequate action to address the degraded condition of the Unit 3 FWIV actuators. Therefore, VIO 05000423/2013004-01 is closed.

.2 Temporary Instruction 2515/190 – Inspection of the Proposed Interim Actions Associated with Near-Term Task Force Recommendation 2.1 Flooding Hazard Evaluations.

a. Inspection Scope

Inspectors verified that Dominion's interim actions will perform their intended function for flooding mitigation.

The inspectors independently verified that Dominion's proposed interim actions would perform their intended function for flooding mitigation.

- Visual inspection of the flood protection feature was performed if the flood protection feature was relevant. External visual inspection for indications of degradation that would prevent its credited function from being performed was performed
- Reasonable simulation, if applicable to the site
- Flood protection feature functionality was determined using either visual observation or by review of other documents

The inspectors verified that issues identified were entered into Dominion's corrective action program.

b. Findings

No findings were identified.

.3 Follow-up of Millstone Unit 2 Commitment 17 Activities (71003)

a. Inspection Scope

The inspectors reviewed Dominion's staff actions to address the effectiveness of their condition monitoring program for structures with painted surfaces that were the subject of prior monitoring. Specifically, the inspectors reviewed actions tracked in Dominion Corrective Action Process CR 580204. This CR was initiated during the inspectors' review of Commitment 17, to enhance the Millstone condition monitoring program for structures, as documented in NRC Inspection Report 05000336/2015009, dated

June 25, 2015 (Agencywide Documents Access and Management System Accession No. ML15176A473). The issue involved indications of cracks in structural concrete underneath painted surfaces and Dominion's staff actions to manage aging of structural concrete.

At the time of the inspection referenced above, Dominion's staff was not able to show a technically valid correlation, empirically or otherwise, correlating cracking in the coating of recently painted concrete surfaces with the degradation that might be occurring beneath the coating in the body of the structure. Dominion's staff had implemented their structures condition monitoring program in conformance with NUREG-1801, Revision 2, "Generic Aging Lessons Learned Report." As a result, the inspectors did not verify that XI.S6 Structures Monitoring, Evaluation and Technical Basis 5, Monitoring and Trending, was being implemented. Specifically, the inspectors were not able to determine if Regulatory Position 1.5, "Monitoring of Structures" in NRC RG 1.160, Revision 2 was being implemented. Dominion's staff entered this issue in its corrective action program via CR 580204.

The inspectors reviewed Dominion's staff follow-up actions regarding the condition of structural concrete underneath painted surfaces at crack locations documented in CR 580204.

b. Findings and Observations

No findings were identified.

The inspectors determined that Dominion's staff performed an engineering technical evaluation and initiated development of a new procedure for monitoring and measurements of significant cracks on repainted surfaces. Stainless steel pins had been installed to monitor movements and growth in cracks in vertical and horizontal directions on painted surfaces, and paint was removed from surfaces along-side the selected cracks. In discussion with Dominion's staff, the inspectors determined new procedures were in development stage with technical acceptance criteria, frequency of measurements, and evaluation requirements established and approved. The inspectors visually examined the installed pins and concluded they appeared to be appropriate for the purpose. The currently applicable procedure had been revised to reflect this monitoring activity. The inspectors concluded Commitment 17 was being implemented, and there is reasonable assurance that the effects of aging related to painted surfaces will be managed during the Millstone Unit 2 period of extended operation.

4OA6 Meetings, Including Exit

On October 14, 2015, the inspectors presented the inspection results to Mr. John Daugherty, Site Vice President, and other members of the Millstone staff. The inspectors verified that no proprietary information was retained by the inspectors or documented in this report.



#### 4OA7 Licensee-Identified Violations

The following violation of very low safety significance (Green) was identified by Dominion and is a violation of NRC requirements which meets the criteria of the NRC Enforcement Policy for being dispositioned as an NCV.

- 10 CFR 50, Appendix B, Criterion VII, "Control of Purchased Material, Equipment, and Services," requires, in part, that measures shall be established to assure that purchased services conform to the procurement documents. Contrary to Criterion VII, Design Change MP3-09-01030, "Replacement of Actuators on 3FWS\*CTV41 A/D (FWIVs)," was supplied by Dominion's vendor (Flowserve) and accepted by Dominion with an inadequate valve weak link analysis (valve backseat determined to be the weak link versus the steam coupling bolts). This was identified by Dominion during installation of MP3-09-01030 which required significant changes to the modification design prior to returning the FWIVs to service. This issue is more than minor because, if left uncorrected, the issue would have the potential to lead to a more significant safety concern. Specifically, not correcting the valve weak link analysis had the potential to lead to damage and/or failure of the FWIV stem coupling bolts rendering the valve inoperable. The inspectors evaluated this finding using IMC 0609.04, "Initial Characterization of Findings," and IMC 0609, Appendix A, Exhibit 3, "Barrier Integrity Screening Questions." The inspectors determined that the finding was of very low safety significance (Green) because the finding did not represent an actual open pathway in the physical integrity of reactor containment. Dominion documented the issue in CRs 564977 and 564801.

#### **ATTACHMENT: SUPPLEMENTARY INFORMATION**

## SUPPLEMENTARY INFORMATION

### KEY POINTS OF CONTACT

#### Licensee Personnel

L. Armstrong, Director of Performance Recovery  
S. Baker, Engineering Consultant of BDB  
P. Beck, Radiation Protection Technician  
J. Birch, Unit 3 Nuclear Training Supervisor  
D. Blakeny, Director of Safety and Licensing  
A. Bonamarte, Unit 2 Control Operator  
B. Bowen, Unit-2 HP Shift Supervisor  
B. Brown, Acting Licensing Supervisor  
J. Browning, Unit 2 Unit Supervisor  
D. Bucheit, Manager of BDB and Cyber Security  
T. Cleary, Licensing Supervisor  
G. Closius, Licensing Specialist  
M. Cote, Simulator Supervisor  
J. Daugherty, Site Vice President  
D. Delcore, ALARA Supervisor  
W. Faye, Project Engineer  
B. Ferguson, Unit 2 Shift Manager  
J. Gardner, System Engineer  
M. Garza, Unit 2 Shift Manager  
B. Gaynor, Unit 2 Shift Manager  
M. Gobeli, Unit 2 Shift Technical Advisor  
M. Goolsby, Unit 2 Operations Manager  
S. Hanerfeld, Supervisor of Corrective Actions  
S. Jackson, Simulator Testing  
R. McDonald, Unit 3 Operations Examination Coordinator  
D. MacNeil, Nuclear Engineering Supervisor  
J. Magyarick, Unit 2 Shift Technical Advisor  
T. McNatt, Nuclear Engineer III, Engineering Auxiliary Systems  
M. Morrisette, Unit 2 Reactor Operator  
L. Peduzzi, Unit 3 Operations Training Administrator  
K. Perkins, Engineering Program Supervisor  
J. Petrosky, Structural Engineering Supervisor  
L. Salyards, Licensing Lead  
D. Smith, Emergency Preparedness Manager  
G. Sturgeon, Unit-1 Operations  
H. Thompson, Contractor, Engineering Auxiliary Systems  
M. Turner, Feedwater System Manager  
S. Turowski, Radiation Protection & Chemistry Manager  
K. Underwood, Unit 3 Licensed Operator Requalification Program Coordinator  
W. Woolery, Unit 2 Shift Manager

**LIST OF ITEMS OPENED, CLOSED, DISCUSSED, AND UPDATED**Opened/Closed

05000423/2015003-01	NCV	Change of Pump Reference Values Contrary to ASME OM (Section 1R22)
05000423/2015003-02	NCV	Inadequate Procedural Direction to Mitigate a LOCA and Failure of an RSS Heat Exchanger Tube (Section 4OA3)

Closed

05000423/2014-004-00 & 05000423/2015-001-00	LER	Unlatched Dual Train HELB Door Results in Potential Loss of Safety Function (Section 4OA3)
05000423/2013004-01	VIO	Inadequate Corrective Actions to Restore Degraded Unit 3 Main Feedwater (Section 4OA5)

**LIST OF DOCUMENTS REVIEWED****Section 1R01: Adverse Weather Protection**Procedures

C OP 200.16, Beyond Design Basis Operator Aids, Rev. 000  
 C OP 200.6, Storms and Other Hazardous Phenomena (Preparation and Recovery), Rev. 003-02  
 Dominion HRP-N, Hurricane Response Plan (Nuclear), Rev. 12  
 MP 2601E, Unit 2 Flood Gates Installation and Removal, Rev. 000-01  
 AOP 2560, Storms, High Winds and High Tides, Rev. 012-00  
 AOP 2560 Attachment 6, Response to a Local Intense Precipitation (LIP) Event, Rev. 012-00  
 AOP 2560 Attachment 7, Response to Tsunami Warning, Rev. 012-00  
 AOP 2560, Storms, High Winds and High Tides, Rev. 010-17 (Draft Change)  
 AOP 2565, Loss of Service Water, Rev. 004-05  
 AOP 2565, Loss of Service Water, Rev. 004-05 (\*Draft Change)  
 AOP 3560, Loss of Service Water, Rev. 009-00  
 EOP 25 FSG-16, Alternate Service Water Supply, Rev. 0 (Draft)  
 EOP 35 FSG-16, Alternate Service Water Supply, Rev 0 (Draft)

Condition Reports

570724	576828	581747
571759	577950	582002
576113	578913	1002348
576569	578974	
576827	579004	

Standing Orders

SO-15-016

SO-15-013

Miscellaneous

EE 14 – E16, Dominion Flooding Hazard Reevaluation Report for Millstone Power Station Units 2 and 3, Rev. 1

ISO New England Inc. 2015 RTMKTS.0120.0010, Procedure: Implement Operations During Abnormal Conditions, Rev. 21

**Section 1R04: Equipment Alignment**

Procedures

OP 3304A, Charging and Letdown Lineup, Revision 013-08

OP 3306-002, RSS Train B Lineup, Revision 004-06

OP 3306-3, RSS Common Lineup, Revision 4

OP 3306-005, RSS Electrical Lineup, Revision

OP 3309, Quench Spray, Revision 013-09

SP3609.2, Quench Spray Pump 3QSS\*P3B Operational Readiness Test, Revision 011-07

Condition Reports

467553

530540

536035

1008775

Maintenance Orders/Work Orders

53102510905

53102692484

Miscellaneous

Unit 3 EOOS Online Risk Monitor for July 27

25212-26930, Sheet 2, P&ID Feedwater System, Revision 48

25212-26915, Sheet 1, P&ID Quench Spray and Hydrogen Recombiners, Revision 37

**Section 1R05: Fire Protection**

Procedures

U3-24-FFS, Millstone Unit 3 Fire Fighting Strategies, Revision 0

CM-AA-FPA-100, Fire Protection/Appendix R (Fire Safe Shutdown) Program, Revision 9

U2-24-FPP-FHA, Millstone Unit 2 Fire Hazards Analysis, Revision 12

U2-24-FFS, Millstone Unit 2 Firefighting Strategies BAP-01 480V, Revision 000-00

AOP 2559, Fire, Revision 008-03

AOP 2579E, Fire procedure for hot standby Appendix R Fire area R-9, Revision 006-10

Miscellaneous

FP-EV-98-0060, Technical Evaluation for the Availability of Compensatory Measures for Facility Z2 Vital Switchgear Cooling Due to a Fire in the Cable Spreading Room.

FP-EV-99-0006, Technical Evaluation for the Condition of Fire Dampers 2-HV-1 55A, 2-HV-1 55B, 2-FTV-156A, 2-HV-156B, 2-FTV-157A, 2-HV-157B, and 2-HV-157C in Auxiliary Building 14'-6" Elevation Fire Zones A- 12A, A-20 and A-21.  
 Millstone Unit 3 Fire Protection Evaluation Report, Revision 21.3  
 Millstone 3 SSER 4

### **Section 1R07: Heat Sink Performance**

#### Procedures

C MP 715E1, work Control for Threaded Fasteners, Revision 001-03  
 C MP 795, Heat Exchanger Tube Plugging, Revision 001-06  
 ER AA HTX-1002, Heat Exchanger program Visual Inspection and Leak Testing, Revision 1  
 MP 2701J-096, Service Water Cooled heat Exchanger Subject to Generic Letter 89-13, Revision 007-03  
 96-001-01065M3, MP3 SW System – Service Water System – NRC Generic Letter 89-13, Item No. IV, Design Basis Summary Report, Revision 2  
 97-011, MP3 CCP – Evaluation of CCP System Design Basis Minimum Flows, Revision 4  
 SP 3606.2, Containment Recirc Pump 3RSS\*P1B Operational Readiness Test, Revision 014-08  
 SP 3606.2-005, Containment Recirc Cooler 3RSS\*E1B Leak Test, Revision 001-06

#### Work Orders

53102811875  
 53102748952  
 53102857103

#### Condition Reports

1004166	404036	415362
1000807	704278	468176
1000715	114604	509309
1000616	117443	511812
1000618	322563	553758
1000658	378838	
1000954	380326	

#### Miscellaneous

EPRI NP-7552, Heat Exchanger Performance Monitoring Guidelines, Final Report dated December 1991  
 NRC Generic Letter 89-13, Service Water System Problems Affecting Safety-Related Equipment

### **Section 1R11: Licensed Operator Regualification Program**

#### Procedures

AOP 2563, Loss of Instrument Air, Revision 010-01  
 OP 2332B, Instrument Air System, Revision 025-03  
 AOP 2575, Rapid Downpower, Revision 005-OTO1  
 AOP 2585, Immediate Operator Actions, Revision 001-01  
 EOP 2525, Standard Post Trip Actions, Revision 026-01  
 OP 2204, Load Changes, 026-01  
 C OP 200.2, Response to Security Events, Revision 5  
 EOP 35 E-0, Reactor Trip and Safety Injection, Revision 29

EOP 35 E-0.1, Reactor Trip Response, Revision 026-02  
 OP 3208, plant Cooldown, Revision 022-09  
 OP-AA-103, Operator Qualifications, Revision 6  
 TR-AA-400, Implementation, Revision 14  
 SA-AA-122, Medical Evaluation, Revision 4  
 MDI-14, Medical Department Instructions, Revision 5  
 TR-AA-730, Licensed Operator Biennial and Annual Operating Requalification Exam Process,  
 Revision 6  
 TR-AA-750, Conduct of Simulator Training and Evaluation, Revision 5

#### Condition Reports

1006785	569964	567587
1006794	567587	569964
1005852	567641	571255
1005656	578408	572090
1006415	578194	572709
1009381	575840	573744
578194	578408	576665
582505	522888	577339
577545	524436	582505
578200	524516	1000264
573015	558220	1002588
536130	558366	
575840		

#### Drawings

25203-3001, Emergency B52 (22-2E) Facility Z1 Load Summary, Revision 8

#### Miscellaneous

Lesson MB-02323, Just in Time Training CEA #40, Revision 1  
 Millstone Unit 3 Written Exam Sample Plan 2013/2014 LORT/STA Program 2015 MP3  
 LORP AOT Sample Plan  
 Watch standing records  
 Simulator Reactor Core Testing, Core Cycle 17, BOL  
 Simulator Reactor Core Testing, Core Cycle 17, MOL  
 Core Cycle 16 Steady State Operation Testing  
 Cycle 16 Transient Performance Testing

### **Section 1R12: Maintenance Effectiveness**

#### Procedures

ER-AA-MRL-10, Maintenance Rule Program, Revision 006-00  
 ER-AA-MRL-100, Implementing Maintenance Rule, Revision 009-00  
 C MP 715E1, Work Control for Threaded Fasteners, Revision 001-03  
 C MP 795, Heat Exchanger Tube Plugging, Revision 001-06  
 ER AA HTX-1002, Heat Exchanger program Visual Inspection and Leak Testing, Revision 1  
 MP 2701J-096, Service Water Cooled Heat Exchangers Subject to Generic Letter 89-13,  
 Revision 007-03  
 SP 3606.2, Containment Recirc Pump 3RSS\*P1B Operational Readiness Test, Revision 014-08  
 SP 3606.2-005, Containment Recirc Cooler 3RSS\*E1B Leak Test, Revision 001-06  
 SP 3612B.5, Primary Coolant Leakage Outside Containment, revision 001-00

SP 3612B.5-001, Primary Coolant Leakage Outside Containment – Summary Sheet, Revision 001-01

Condition Reports

404036	322563	468176
704278	378838	509309
114604	380326	511812
117443	415362	553758

Miscellaneous

EPRI NP-7552, Heat Exchanger Performance Monitoring Guidelines, Final Report dated December 1991

NRC Generic Letter 89-13, Service Water System Problems Affecting Safety-Related Equipment

RSS System Health Reports

RBCCW System Health Reports

**Section 1R13: Maintenance Risk Assessments and Emergent Work Control**

Procedures

SCPIP9, Potential Confirmed Tampering Vandalism Malicious Mischief, Revision 002-02

OP-AA-1300, Quarantine, Revision

NF-AA-PRA-101, Probabilistic Risk assessment and procedure Methods, Revision 7

NF-AA-PRA-370, Probabilistic Risk assessment and procedure Methods: MRule (a)(4) Risk Monitor, Revision 7

WM-AA-301, Operational Risk Assessment, Revision 11

Condition Reports

1005433

1007048

1010218

1010294

1010491

CA3009445

Drawings

25203-26008 Sheet 3, Service Water, Revision 113

Miscellaneous

Risk management action plan for ECCS suction header testing on August 3

Unit 2 EOOS Online Monitor Risk Assessment on July 15, August 3, 5, 6, and September 21

Unit 3 EOOS Online Monitor Risk Assessment on September 2

**Section 1R15: Operability Determinations and Functionality Assessments**

Procedures

OP-AA-102, Operability Determinations, Revision 013-00

IC 2421C3, CPP CEA Cable Disconnection, Termination and Testing, Revision 001-03

IC 2416B, Power Ratio Calculator Calibrations, Revision 006-10

SP 2401H, Axial Shape Index Alarm Setpoint Test, Revision 010-04

OP 3353.VP1A, Main Ventilation and Air Conditioning Panel VP1A Annunciator Response, Revision 006-00

OP 3353.EGPA, Emergency Generator Panel A Annunciator Response, Revision 004-11  
EOP 3509.15, North (A) EDG Enclosure or East (A) F. O. Vault Fire, Revision 001

OP 3353.MB8B, Main Board 8B Annunciator Response, Revision 004

AOP 3574, Loss of Main Board Annunciation, Revision 004

#### Drawings

25203-31102, Coil Power Programmer Section 16 Regulating, Revision 2

25201-31125 Sheet 8, Connections Diagram – Penetrations Type S, Revision 4

25201-31187, Connection Diagram Refuel Disconnect Panels T333 and T336, revision 8

25203-39056 Sheets 12 and 13, Interconnection Wiring Diagram CPPCC, Revision 7

25203-39069, Sheet 54, Power Ratio Signal Calculator Schematic, Revision 8

#### Condition Reports

1005656	1000807	1005218
1005852	1000715	1008567
1006415	1000616	1010218
1006442	1000618	1010294
1006473	1000658	1010491
1007488	1000954	CA3009445

#### Work Orders

53102866246

53102800967

53102748952

53102857103

#### Miscellaneous

ODMI CR1005852 and CR1005656, M2CEDM-40 Upper Gripper Coil

CED-01-C, Control Element Drive System Lesson Plan, Revision 4

Technical Evaluation, M2-EV-98-0147

MEPL MP2-DC-1514, Attachment 2

ETE-NAF-20220061, Revision 0

Calc 2-ENG-101, Power ratio Calculator Alarm Setpoints for Cycle 21 Operation, Revision 12

Troubleshooting Sheet 1006375, Power Ratio Calculator

NIS-01C, Nuclear Instrumentation System Lesson Plan, Revision 5 change 1

VTM-000-25212-061-001, Installation, Operation, and Maintenance of Mechanical Refrigeration  
Water Chiller

NEI 96-07, Guidelines for 10CFR50.59 Implementation, Revision 1

96-001-01065M3, MP3 SW System – Service Water System – NRC Generic Letter 89-13, Item  
No. IV, Design Basis Summary Report, Revision 2

97-011, MP3 CCP – Evaluation of CCP System Design Basis Minimum Flows, Revision 4

MPS-3 FSAR, Section 8.3.1.1.3, Emergency AC Power Source

### **Section 1R18: Plant Modifications**

#### Procedures

ARP 2591B, Alarm Response for B DG Panel C-39, Revision 005

ARP 2591B-001, Lube Oil Level Low, Revision 002



Condition Reports

1003734

Maintenance Orders/Work Orders

53102867486

Drawings

P&ID 25203-26018, Sheet 3, Emergency Diesel Generator H-7B Lube Oil, Air, and Jacket Water Cooling, Revision 028

Miscellaneous

TCC-MP-2015-013, Bypass M2LS-8796 2B EDG Low Lube Oil Level Alarm to Restore Engine Hour Meter

**Section 1R19: Post-Maintenance Testing**

Procedures

- OP 2345B, 120 Volt Vital Instrument AC System, Revision 017-12
- OP 2346A-004, "A" EDG Data Sheet, Revision 024-03
- OP 2346A-009, "A" EDG Air Roll, Revision 000-04
- OP 2346A014, "A" DG Lube Oil Valve Alignment, Revision 000-02
- OP 2346B-002, A DG Fuel Oil Alignment, Revision 000-00
- IC 2434A, Diesel Generator Governor Instrument Calibration, Rev. 001-08
- MP 2720E4, Diesel Generator Bearing Insulation Checks, Rev. 004-02
- SP 2613J, "B" Emergency DG Loss of Load Test, Rev. 004-02
- SP 2613L, Diesel Generator Slow Start Operability Test, Facility 2, Rev. 005 – 09
- OP 2345C-002, "B" DG Data Sheet, Rev. 002-03
- SP 2613L-001, Periodic DG Slow Start Operability Test, Facility 2, (Loaded Run), Rev. 004-05
- SP 2613J-001, "B" Emergency DG Loss of Load Test, Rev. 003
- MP 2720E4, Diesel Generator Bearing Insulation Checks Data Sheet Attachment 1, Rev. 005-00
- SP 3626.5-011, Service Water Pump 3SWP\*P1B Comprehensive Test, Revision 000-04
- OP 3353.EGPA, Emergency Generator Panel A Annunciator Response, Revision 004-11
- EOP 3509.15, North (A) EDG Enclosure or East (A) F. O. Vault Fire, Revision 001
- OP 3353.MB8B, Main Board 8B Annunciator Response, Revision 004
- AOP 3574, Loss of Main Board Annunciation, Revision 004
- SP 3626.9, Control Building Air Conditioning Booster Pump 3SWP\*P2B Comprehensive Test, Revision 000-10
- SP 3626.9, Control Building Air Conditioning Booster Pump 3SWP\*P2B Group A Test, Revision 011-07

Condition Reports

578294	1002883	1003088
1002759	1003706	1003091
1004606	1008567	527970
1006649	1003369	577481
1003249	1003089	577628

Maintenance Orders/Work Orders

53102700754	53102808775	53102701012
53102824937	53102861367	53102855550
53102709113	53102738690	53102739094

Miscellaneous

MPS-3 FSAR, Section 8.3.1.1, Emergency AC Power Source  
 U3-24-IST-ISTBD, MP3 IST Basis Document, Revision 4  
 ASME Code for Operation and Maintenance of Nuclear Power Plants, 2001 through 2003  
 incorporated addenda  
 ETE-CME-2015-1025, Functionality Evaluation of 'B' Train Control Building Service Water  
 Booster Pump, Revision 0

**Section 1R22: Surveillance Testing**Procedures

SP 2401I, Local Power Density Test, Revision 011-02  
 OP 3346A, DG B – Operating Log, Revision 014  
 SP 3646A.2-006, EDG B 24 Hour Run and Restart, Revision 001-03  
 SP 3646A.2-001, Emergency Diesel Generator B Operability Tests, Revision 020-09  
 SP 3626.5-011, Service Water Pump 3SWP\*P1B Comprehensive Test, Revision 000-04  
 OP 3309, Quench Spray, Revision 013-09  
 SP3609.2, Quench Spray Pump 3QSS\*P3B Operational Readiness Test, Revision 011-07  
 SP 3626.9, Control Building Air Conditioning Booster Pump 3SWP\*P2B Comprehensive Test,  
 Revision 000-10  
 SP 3626.9, Control Building Air Conditioning Booster Pump 3SWP\*P2B Group A Test, Revision  
 011-07

Condition Reports

1003457	1003089	577481
1003249	1003088	577628
1008775	1003091	
1003369	527970	

Work Orders

53102701012	53102824937	53102709113
53102738690	53102739094	

Miscellaneous

25212-26915, Sheet 1, P&ID Quench Spray and Hydrogen Recombiners, Revision 37  
 ASME Code for Operation and Maintenance of Nuclear Power Plants, 2001 through 2003  
 incorporated addenda  
 ETE-CME-2015-1025, Functionality Evaluation of 'B' Train Control Building Service Water  
 Booster Pump, Revision 0

**Section 1EP2: Alert and Notification System Evaluation**Procedures

MP-26-EPI-EPMP, Millstone Power Station Emergency Plan, Revision 50  
 MP-26-FAP08, Alert Notification System Administration, Revision 006  
 MP-26-FAP09, Alert Notification System Test and Maintenance, Revision 008

Miscellaneous

ANS maintenance records, January 2014 – June 2015  
 ANS test records, January 2014 – June 2015

Dominion Millstone Alert and Notification System Upgrade Project FEMA REP-10 Design Report Addendum, Revision 0  
FEMA Memorandum re Dominion Millstone Alert Notification System Upgrade Project FEMA REP-10 Design Report Addendum, dated January 7, 2010

**Section 1EP3: Emergency Response Organization Staffing and Augmentation System**

Procedures

MP-26-EPA-FAP01, Management Program for Maintaining Emergency Preparedness, Revision 014  
MP-26-EPI-EPMP, Millstone Power Station Emergency Plan, Revision 50  
MP-26-EPI-FAP07, Notifications and Communications, Revision 022  
OP-AA-100, Conduct of Operations, Revision 27  
TR-MP-TPG-2400, Emergency Plan Training (EPLAN), Revision 27

Miscellaneous

SERO roster dated 8/3/2015  
SERO 2015 training records  
December 4, 2014, Millstone Station Training Drill (MDEC14TD) Management Critique Report  
Monthly SERO Unannounced ENRS Call In Summary Reports, January 2014-July 2015

**Section 1EP5: Correction of Emergency Preparedness Weaknesses**

Procedures

MP-26-EPA-FAP01, Management Program for Maintaining Emergency Preparedness, Revision 014  
MP-26-EPI-EPMP, Millstone Power Station Emergency Plan, Revision 50  
EP-AA-101, 10 CFR 50.54(q) Change Evaluation, Revision 5  
EP-AA-303, Equipment Important to Emergency Response, Revision 10

Miscellaneous

Nuclear Oversight Audit Report Audit 14-02, Emergency Preparedness  
Nuclear Oversight Audit Report Audit 15-02, Emergency Preparedness  
September 9, 2014, Millstone Power Station Unit 2 NRC/FEMA Evaluated Exercise (MSEP14BE) Management Critique Report  
March 18, 2015, Millstone Power Station Unit 2 Training Drill (MMAR15TD) Management Critique Report  
April 1, 2015, Millstone Power Station Unit 3 Training Drill (MAPR15TD) Management Critique Report  
June 17, 2015, Millstone Power Station Unit 2 Off-Year Exercise (MJUN15EX) Management Critique Report  
KLD TR-598, Millstone Power Station 2013 Population Update Analysis  
KLD TR-710, Millstone Power Station 2014 Population Update Analysis  
EP-Related Condition Reports, January 2014-June 2015

**Section 2RS2: Occupational ALARA Planning and Controls**

Procedures

RP-AA-103, ALARA Program, Revision 2  
RP-AA-103-1000, Station and Fleet ALARA Committees, Revision 4  
RP-AA-1003, ALARA Program Review, Revision 0

RP-AA-274, Radiation Work Permits, Revision 4  
 RP-AA-300, ALARA Reviews and Reports, Revision 8  
 RP-AA-301, ALARA Goals, Revision 3  
 RP-AA-303, ALARA 5-Year Plan, Revision 0

Condition Reports

CR546687	CR547073	CR549759
CR561792	CR572698	CR545657
CR550925	CR575698	CR540188
CR542176	CR546524	CR549695
CR550946	CR561792	CR561785
CR567539	CR567751	

Miscellaneous

2R23 Scaffolding planning packet  
 2R23 Valves planning packet  
 3R16 Daily Exposure Report, dated 11/17/2014  
 ALARA Plan AP-3-14-01  
 ALARA Plan AP-3-14-03  
 ALARA Plan AP-3-14-11  
 ALARA Plan AP-3-14-13  
 ALARA Plan AP-3-14-14  
 ALARA Plan AP-3-14-16  
 ALARA Plan AP-3-14-26  
 "Collective Radiation Exposure Action Item"  
 Daily Exposure Report, Unit-2, dated 7/27/2015  
 Millstone Power Station 5 Year Exposure Reduction Plan, 2015-2020, Revision 0.  
 Radiological Risk Plan for 3R16 Cavity Decontamination  
 Radiological Risk Plan for 3R16 Reactor Disassembly/Reassembly  
 Radiological Risk Plan for 3R16 Steam Generator Secondary Side FOSAR  
 RWP 3140201  
 RWP 3140202  
 RWP 3140221  
 RWP 3143005  
 RWP 3140301  
 RWP 3140302  
 RWP 3140303  
 RWP 3140304  
 RWP 3140306  
 RWP 3140307  
 RWP 3140308  
 RWP 3140310  
 RWP 3140318  
 RWP 3140326  
 RWP 3140327  
 RWP 3140331  
 RWP 3140351  
 RWP 3140352  
 RWP 3140353  
 RWP 3140400  
 Station ALARA Committee meeting minutes

TEDE ALARA Review for Reactor Cavity/North Saddle Decon and Floor Covering  
Unit-2 2R22 Shutdown radiation survey maps  
Unit-2 2R22 EPRI radiation survey  
Unit-3 3R16 Shutdown radiation survey maps  
Unit-3 3R16 EPRI radiation survey  
Work In-Progress Review WIP-3-14-03A  
Work In-Progress Review WIP-3-14-03B  
Work In-Progress Review WIP-3-14-03C  
Work In-Progress Review WIP-3-14-03D  
Work In-Progress Review WIP-3-14-03E  
Work In-Progress Review WIP-3-14-03F  
Work In-Progress Review WIP-3-14-03G  
Work In-Progress Review WIP-3-14-11A  
Work In-Progress Review WIP-3-14-11B  
Work In-Progress Review WIP-3-14-11C  
Work In-Progress Review WIP-3-14-11D  
Work In-Progress Review WIP-3-14-11E  
Work In-Progress Review WIP-3-14-11F  
Work In-Progress Review WIP-3-14-13A  
Work In-Progress Review WIP-3-14-13B  
Work In-Progress Review WIP-3-14-13C  
Work In-Progress Review WIP-3-14-13D  
Work In-Progress Review WIP-3-14-16A  
Work In-Progress Review WIP-3-14-16B  
Work In-Progress Review WIP-3-14-16C  
Work In-Progress Review WIP-3-14-16D  
Work In-Progress Review WIP-3-14-16E  
Work In-Progress Review WIP-3-14-16F

### **Section 4OA1: Performance Indicator Verification**

#### Miscellaneous

2Q2015 Derivation and Margin Reports for Millstone Unit 2 Mitigating System Performance Index Performance Indicator Emergency AC, High Pressure Injection, Heat Removal, Residual Heat Removal, and Cooling Water System inputs  
2Q2015 Derivation and Margin Reports for Millstone Unit 3 Mitigating System Performance Index Performance Indicator Emergency AC, High Pressure Injection, Heat Removal, Residual Heat Removal, and Cooling Water System inputs

### **Section 4OA2: Problem Identification and Resolution**

#### Procedures

OP 2315D 4160 VAC Vital Electrical Switchgear Room Cooling Systems, Revision 014-00  
TRM 3/4.8.2, Onsite Power AC Distribution Systems, Electrical Switchgear Ventilation System Description – BOP Ventilation  
EOOS Operator Risk Reports Scenarios for Compensatory Cooling Scenarios  
DWG 25203-20135, SH.100, Service Water Supply and Return to Vital Switchgears Cooling Coils Cooling X181A & B, 3"-HUD-130 & 131, 3"-HLD-1&2, Revision 8  
DWG 25203-20152 SH.394, Service Water to Vital Switchgear Room HUD-32, Revision 17

DWG 25203-26008, Service Water to Vital AC Switchgear Cooling Coil and AC Chillers, Revision 33

Condition Reports

568462  
568741  
569509

**Section 40A3: Follow-up of Events and Notices of Enforcement Discretion**

Condition Reports

565936	567744	1010005
569556	572169	567369
581130	583150	

Work Orders

WO 53102819526  
WO 53102623569

Miscellaneous

SP-M3-EE-0333, Revision 7  
US(B)-335, Auxiliary Building Limiting Line Ruptures for HELB Environments, NETM 26 Zone  
AB-69 HELB Environment, Revision 0

**Section 40A5: Other Activities**

Procedures

C OP 200.16, Beyond Design Basis Operator Aids, Rev. 000  
C OP 200.6, Storms and Other Hazardous Phenomena (Preparation and Recovery), Rev. 003-02  
Dominion HRP-N, Hurricane Response Plan (Nuclear), Rev. 12  
MP 2601E, Unit 2 Flood Gates Installation and Removal, Rev. 000-01  
AOP 2560, Storms, High Winds and High Tides, Rev. 012-00  
AOP 2560 Attachment 6, Response to a Local Intense Precipitation (LIP) Event, Rev. 012-00  
AOP 2560 Attachment 7, Response to Tsunami Warning, Rev. 012-00  
AOP 2560, Storms, High Winds and High Tides, Rev. 010-17 (Draft Change)  
AOP 2565, Loss of Service Water, Rev. 004-05  
AOP 2565, Loss of Service Water, Rev. 004-05 (\*Draft Change)  
AOP 3560, Loss of Service Water, Rev. 009-00  
EOP 25 FSG-16, Alternate Service Water Supply, Rev. 0 (Draft)  
EOP 35 FSG-16, Alternate Service Water Supply, Rev 0 (Draft)  
C-EN-1041, "Condition Monitoring of Structures", Revision 008-01

Condition Reports

570724	577950	1235173
571759	578913	316335
576113	578974	343975
576569	579004	572701
576827	581747	486477
576828	580204	563792

582002

1002348

1002923

Standing Orders

SO-15-016

SO-15-013

Miscellaneous

EE 14 – E16, Dominion Flooding Hazard Reevaluation Report for Millstone Power Station Units 2 and 3, Rev. 1

ISO New England Inc. 2015 RTMKTS.0120.0010, Procedure: Implement Operations During Abnormal Conditions, Rev. 21

Design Change MP3-09-01030, Replacement of Actuators on 3FWS\*CTV41A/D, dated November 5, 2013

Electric Power Research Institute (EPRI) NP TR-103232, MOV Performance Prediction Program, November 1994

Readiness Assessment for NRC Inspection of Unit 3 Feedwater Isolation Valve Operability Closure, dated July 31, 2015

3R15 Outage Lessons Learned-Milestone 49

ACI 349.3R-96, "Evaluation of Existing Nuclear-Safety Related Concrete Structures"

ACI 201.1R-08, "Guide for Conducting a Visual Inspection of Concrete in Service"

ETE-MP-2015-1062, Rev. 1, "MP2 Enhanced Structure Monitoring."

**LIST OF ACRONYMS**

10 CFR	Title 10 of the <i>Code of Federal Regulations</i>
ACE	apparent cause evaluation
ALARA	as low as is reasonably achievable
ANS	alert and notification system
AOP	abnormal operating procedure
ASME	American Society of Mechanical Engineers
CEA	control element assembly
CFR	Code of Federal Regulations
CR	condition report
DCU	design change update
DRP	Division of Reactor Projects
DRS	Division of Reactor Safety
ECCS	emergency core cooling system
EDG	emergency diesel generator
EOP	emergency operating procedure
ERF	emergency response facility
ERO	emergency response organization
ETE	engineering technical evaluation
FWIV	feedwater isolation valve
IMC	Inspection Manual Chapter
IST	inservice testing
JPM	job performance measures
LBLOCA	large break loss of coolant accident
LOCA	loss of coolant accident
LER	licensee event report
NCV	non-cited violation
NEI	Nuclear Energy Institute
NRC	Nuclear Regulatory Commission, U.S.
OD	operability determination
OM	Operation and Maintenance
RAS	recirculation actuation signal
RBCCW	reactor building closed loop cooling
RCS	reactor coolant system
RG	regulatory guide
RPCCW	reactor plant closed loop cooling
RSS	recirculation spray system
RWP	radiation work permit
TRM	technical requirements manual
TS	technical specifications
UFSAR	updated final safety analysis report
VAC	volts alternating current
VIO	violation