UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION I
2100 RENAISSANCE BLVD., SUITE 100
KING OF PRUSSIA, PA 19406-2713

May 11, 2017

Mr. Daniel G. Stoddard
President and Chief Nuclear Officer
Dominion Resources
5000 Dominion Boulevard
Glen Allen, VA 23060-6711

SUBJECT: MILLSTONE POWER STATION – INTEGRATED INSPECTION REPORT 05000336/2017001 AND 05000423/2017001

Dear Mr. Stoddard:

On March 31, 2017, the U.S. Nuclear Regulatory Commission (NRC) completed an inspection at Millstone Power Station (Millstone), Units 2 and 3. On April 11, 2017, NRC inspectors discussed the results of this inspection with Mr. John Daugherty, Site Vice President, and other members of your staff. The results of this inspection are documented in the enclosed report.

NRC inspectors documented two findings of very low safety significance (Green) in this report. These findings involved violations of NRC requirements. Further, inspectors documented a licensee-identified violation which was determined to be of very low safety significance in this report. The NRC is treating these violations as non-cited violations (NCVs) consistent with Section 2.3.2.a of the Enforcement Policy.

If you contest the violations or significance of these NCVs, 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; and the NRC Resident Inspector at Millstone. In addition, if you disagree with a cross-cutting aspect assignment, you should provide a response within 30 days of the date of this inspection report, with the basis for your disagreement, to the U. S. Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington, DC, 20555-0001; with copies to the Regional Administrator, Region I, and the NRC Resident Inspector at Millstone.

This letter, its enclosure, and your response (if any) will be made available for public inspection and copying at http://www.nrc.gov/reading-rm/adams.html and the NRC Public Document Room in accordance with 10 CFR 2.390, "Public Inspections, Exemptions, Requests for Withholding."

Sincerely,

/RA/

Thomas C. Setzer, Chief
Reactor Projects Branch 2
Division of Reactor Projects

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

Enclosure:
Inspection Report 05000336/2017001
and 05000423/2017001 w/Attachment:
Supplementary Information

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REGION I

Docket Nos.	50-336 and 50-423
License Nos.	DPR-65 and NPF-49
Report No.	05000336/2017001 and 05000423/2017001
Licensee:	Dominion Nuclear Connecticut, Inc. (Dominion)
Facility:	Millstone Power Station, Units 2 and 3
Location:	P.O. Box 128 Waterford, CT 06385
Dates:	January 1 through March 31, 2017
Inspectors:	J. Ambrosini, Sr. Resident Inspector, Division of Reactor Projects (DRP) L. McKown, Resident Inspector, DRP C. Highley, Resident Inspector, DRP H. Anagnostopoulos, Sr. Health Physicist, Division of Reactor Safety (DRS) J. Furia, Sr. Health Physicist, DRS S. Pindale, Sr. Reactor Inspector, DRS
Approved By:	Thomas C. Setzer, Chief Reactor Projects Branch 2 Division of Reactor Projects

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SUMMARY

IR 05000336/2017001 and 05000423/2017001; 01/01/2017 – 03/31/2017; Millstone Units 2 and 3; Adverse Weather Protection and Surveillance Testing.

This report covered a three-month period of inspection by resident inspectors and announced baseline inspections performed by regional inspectors. The inspectors identified two non-cited violations (NCVs), both of which were of very low safety significance (Green). 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 November 1, 2016. The NRC's program for overseeing the safe operation of commercial nuclear power reactors is described in NUREG-1649, "Reactor Oversight Process," Revision 6.

Cornerstone: Mitigating Systems

- Green. The inspectors identified a Green NCV of Title 10 of the *Code of Federal Regulations* (10 CFR) Part 50, Appendix B, Criterion V, "Instructions, Procedures, and Drawings," for the failure to adequately implement Operating Procedure (OP) 2319B, "Condensate Storage and Surge System." Specifically, Dominion failed to maintain the Millstone Unit 2 condensate storage tank (CST) temperature above procedural requirements. Dominion has documented this condition within their corrective action program (CAP) as condition report (CR) 1066291.

  The inspectors determined this finding was more than minor as it adversely affected the protection from external factors 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 the mitigating systems heat removal function was challenged based upon the reasonable doubt of lost operability of the CST to provide a sufficient supply of water to the auxiliary feedwater (AFW) system. There was reasonable doubt of lost operability due to indications of CST water temperature below OP 2319B prescribed limitations, winter temperatures falling, and an inability to restore CST recirculation system in a timely manner. The finding was determined to be of very low safety significance (Green), when all screening questions were answered "No" as the conditions discussed in the Dominion engineering evaluation, approved on January 7, 2017, were capable of showing that no safety systems or functions were lost. This finding has a cross-cutting aspect in the Problem Identification and Resolution, Resolution, in that Dominion did not take effective corrective actions or corrective maintenance to address CST recirculation pump degradation in a timely manner, prior to the onset of winter, commensurate with their safety significance such that operations could maintain CST water temperature above procedurally defined limitations. [P.3] (Section 1R01)

- Green. The inspectors identified a Green NCV of 10 CFR 50.55a(f) because Dominion did not perform all required inservice testing (IST) of the Unit 3 'C' charging pump, 3CHS*P3C, in accordance with the American Society of Mechanical Engineers (ASME) Operation and Maintenance (OM) Code. Specifically, from April 15, 2016, to the end of the inspection period, Dominion stopped the required Group A quarterly surveillances which could result in a condition where degradation of the charging pump would remain undetected by IST testing. Dominion entered this issue into their CAP as CR 1064337.

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 adversely affected 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. Eliminating quarterly IST surveillance tests could challenge the reliability of the ‘C’ charging pump and allow 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 ‘C’ charging pump has not yet experienced any failures. This finding has a cross-cutting aspect in Human Performance, Change Management, in accordance with IMC 0310, “Aspects within the Cross-Cutting Areas,” where leaders use a systematic process for evaluating and implementing change so that nuclear safety remains the overriding priority. Specifically, Dominion evaluated this change to the IST program without requesting relief from the ASME Code requirements. [H.3] (Section 1R22)

Other Findings

The inspectors reviewed a violation of very low safety significance that was identified by Dominion. Dominion entered corrective actions taken or planned into the CAP. 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 full power until March 28, when the unit entered end-of-cycle coastdown operations in preparation for refueling outage 2R24 which began on April 1.

Unit 3 remained at or near 100 percent power for the duration of this inspection period.

1. REACTOR SAFETY

Cornerstones: Initiating Events, Mitigating Systems, and Barrier Integrity

1R01 Adverse Weather Protection (71111.01 – 2 samples)

.1 Readiness for Impending Adverse Weather Conditions

a. Inspection Scope

The inspectors reviewed Dominion's preparations for the onset of a severe winter storm on January 6 through 8, at Unit 2. The inspectors reviewed the implementation of adverse weather preparation procedures before the onset of and during this adverse weather condition. The inspectors walked down the emergency diesel generators (EDGs), service water, and the CST to assess station readiness. The inspectors discussed readiness and staff availability for adverse weather response with operations and work control personnel.

The inspectors reviewed Dominion's preparations for the onset of a severe storms with heavy rain and high winds on January 24, at Unit 3. The inspectors reviewed the implementation of adverse weather preparation procedures before the onset of and during this adverse weather condition. The inspectors walked down the EDGs, main and reserve station transformers, offsite power lines, and the demineralized water storage tank to assess station readiness. The inspectors discussed readiness and staff availability for adverse weather response with operations and work control personnel. Documents reviewed for each section of this inspection report are listed in the Attachment.

b. Findings

Introduction. The inspectors identified a Green NCV of 10 CFR Part 50, Appendix B, Criterion V, "Instructions, Procedures, and Drawings," for the failure to adequately implement procedure OP 2319B, "Condensate Storage and Surge System." Specifically, Dominion failed to maintain the Millstone Unit 2 CST temperature above procedural requirements.

Discussion. The Millstone Unit 2 CST is a 250,000 gallon safety-related structure located outdoors which contains a sufficient supply of water for the AFW system for the safe shutdown of the reactor during normal, abnormal, and design basis event conditions. OP 2319B, "Condensate Storage and Surge System," states in part, "CST temperature must not be allowed to decrease below 45°F. When outside air

temperature is less than 50°F, CST Circulation System should be in service." The CST circulation system provides freeze protection by utilizing the CST recirculation pump, P76, circulating CST water at 100 gallons per minute in a closed loop through the heat exchanger, X46. The temperature of the CST water is maintained above 50° F by a temperature controller, TIC-5369, which regulates the position of the steam admission valve to the X46 heat exchanger. A temperature switch, TS-5381, located on the CST provides an alarm in the control room when the CST temperature reaches 45°F.

On January 15, 2016, Dominion identified (CR 1024216) that the CST recirculation pump discharge pressure was fluctuating with the indication of cavitation. Dominion determined that the pump could be run 'as-is,' but it needed to be repaired or replaced "as soon as it can be supported" by the Maintenance department. On January 28, 2016, Dominion's Engineering completed an evaluation and provided a recommendation to use 40° F as the "minimum temperature functionality criterion" instead of 45°F limit established in the procedure. This recommendation was not based on any calculation or design bases information. It was based on engineering judgement. This recommendation was used by Operations to declare the CST operable on February 19, 2016, when control room received an alarm for the CST water temperature reaching to 45°F (CR 1027735). On February 21, 2017, the alarm was cleared when the outside temperature warmed up. During this instance, Dominion did not establish any compensatory actions for procedural requirement or corrective actions to document the assumptions in a formal evaluation or calculation.

Dominion encountered discharge pressure fluctuation and cavitation of the pump again on August 21, 2016 when operators attempted to start the pump (CR 1045212). This CR was coded as 'condition adverse to quality' and in accordance with their CAP a work order ((WO) 53102921781) was generated to correct the condition. However, this WO was scheduled for execution on May 20, 2017, which is after the 2017 winter season.

Again, on December 24, 2016, operators received an alarm in a control room for CST water temperature reaching 45°F as measure by TS-5381. TIC-5369 indicated 48°F at this time and continued to drop over the course of the day. At that time, the outside temperature was recorded below 40°F, and in accordance with the operation procedure OP 2319B, Dominion was required to place the CST recirculation system in service for freeze protection. However, due to the degraded pump condition, Dominion was unable to meet the required actions in the procedure. Further, the inspectors identified that Dominion did not enter this inability to meet the procedure requirements into corrective action program. On January 3, 2017, the inspectors observed the CST water low temperature alarm remained lit in the control room, as it resets at 50°F increasing temperature. The inspectors found that the alarm resets at 50°F increasing temperature. However, the inspectors discovered that from December 25, 2016, through January 9, 2017, on multiple occasions, the CST water temperature drop below the alarm setpoint of 45°F. The inspectors questioned why Dominion had not performed an evaluation to support the engineering recommendation to use 40°F as an acceptable value. The inspectors also noted that from January 6 through 8, a winter storm affected the outside temperature causing it to drop in low twenties. On January 7, 2017, with no means to warm the CST, the low temperature alarm still in, and TIC-5369 beginning to challenge the 45°F limit, Dominion approved a detailed engineering technical evaluation (ETE-MP-2017-1004) assessing the impact upon multiple design bases conditions including the operability of AFW system; and the impact of thermal shock on steam generators, feedwater, and AFW system piping from CST. This evaluation identified a new lower

operability limit for CST temperature of 40°F. However, Dominion did not make this change in the operating procedure. On January 8, 2017, Dominion completed maintenance on the CST recirculation pump and restored it to service. CST water temperature returned to normal level and the control room alarm was cleared. Based on untimely response of Dominion to restore the system to normal configuration, the inspectors determined that from December 24, 2016 to January 9, 2017, Dominion did not meet procedure OP 2319B requirements.

Analysis. The inspectors determined that Dominion's failure to accomplish activities affecting quality as prescribed in documented procedures was a performance deficiency that was reasonably within licensee's ability to foresee and prevent. Specifically, from December 24, 2016, to January 9, 2017, Dominion did not maintain the safety-related CST water temperature above the prescribed temperature limit in the operation procedure OP 2319B due to degraded CST recirculation pump. The inspectors determined that this performance deficiency was more than minor because it adversely affected the protection from external factors 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 the mitigating systems heat removal function was challenged based upon the reasonable doubt of operability of the AFW system. This issue was similar to examples 2.f and 3.j in Appendix E of IMC 0612. Specifically, consistent with example 2.f, Dominion did not maintain temperature of CST water as prescribed in the operating procedure. Consistent with example 3.j, this performance deficiency was more than minor because low CST water temperature raised a reasonable doubt of the operability of the AFW system, which needed to be justified with the generation of a detail engineering technical evaluation, ETE-MP-2017-1004.

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 all screening questions were answered "No" as the conditions discussed in the engineering evaluation approved on January 7, 2017, were capable of showing that no safety systems or functions were lost.

The inspectors determined in accordance with IMC 0310, "Aspects within the Cross-Cutting Areas," dated December 4, 2014, that this finding has a cross-cutting aspect in Problem Identification and Resolution, Resolution, in that Dominion did not take effective corrective actions or corrective maintenance to address CST recirculation pump degradation in a timely manner, prior to the onset of winter, commensurate with their safety significance such that operations could maintain CST temperature above procedurally defined limitations. [P.3]

Enforcement. 10 CFR Part 50, Appendix B, Criterion V, "Instructions, Procedures, and Drawings," states, in part, "Activities affecting quality shall be prescribed by documented instructions, procedures, or drawings, of a type appropriate to the circumstances and shall be accomplished in accordance with these instructions, procedures, or drawings." Contrary to the above, from December 24, 2016, to January 9, 2017, Dominion did not accomplish activities affecting quality as prescribed in documented procedures. Specifically, operators did not maintain the safety-related CST temperature above prescribed limitations documented in OP 2319B. Because this issue is of very low safety

significance (Green) and Dominion has entered this issue into their CAP (CR 1066291), this finding is being treated as an NCV consistent with Section 2.3.2.a of the NRC Enforcement Policy. **(NCV 05000336/2017001-01, Failure to Maintain CST Temperature in Accordance with Procedural Requirements)**

1R04 Equipment Alignment

.1 Partial System Walkdowns (71111.04 – 6 samples)

a. Inspection Scope

The inspectors performed partial walkdowns of the following systems:

Unit 2

- Reactor building closed cooling water (RBCCW) pump and heat exchanger train alignment with 'A' heat exchanger out of service for service water inlet valve actuator replacement on February 23
- Service water Intake pump and strainer trains following 'C' intake bay outage on March 1
- Containment radiation monitors during RM8123 filter change on March 16

Unit 3

- Safety injection high pressure pump 'B' train following system restoration from testing and maintenance on February 2
- Alternative cooling lineup for steam generator sampling on March 3
- 'A' EDG protected equipment during 'B' EDG surveillance testing operational run on March 28

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 Updated Final Safety Analysis Report (UFSAR), technical specifications (TSs), WOs, 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 CAP for resolution with the appropriate significance characterization.

b. Findings

No findings were identified.

1R05 Fire Protection

.1 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

- Steam driven auxiliary feed pump pit (Fire Area T-4) on January 13
- Fire areas C-1, containment entry at power for 'A' reactor coolant pump oil addition on January 18
- Fire areas A-21, west switch gear room following elevated temperature due to chiller failure on March 3
- Fire area A-20, east switch gear rooms following identification of unusual odor on March 22

Unit 3

- Turbine building lube oil reservoir and conditioner (Fire Area TB-4) on February 28
- Intake building and 'A' service water bay (Fire Area CWS1A and CWS4) on January 4
- 'A' EDG building (Fire Area EG3A) on March 28

b. Findings

No findings were identified.

1R06 Flood Protection Measures (71111.06 – 1 sample)

.1 Internal Flooding Review

a. Inspection Scope

The inspectors reviewed the UFSAR, the site flooding analysis, and plant procedures to identify internal flooding susceptibilities for the site. The inspectors review focused on the ultrasonic testing and visual inspections of the service water pipe in control building enclosure tube SWP08 on February 22. This review verified the adequacy of equipment seals located below the flood line, floor and water penetration seals, watertight door seals, common drain lines and sumps, sump pumps, level alarms, control circuits, and temporary or removable flood barriers. It assessed the adequacy of operator actions that Dominion had identified as necessary to cope with flooding in this area and also

reviewed the CAP to determine if Dominion was identifying and correcting problems associated with both flood mitigation features and site procedures for responding to flooding.

b. Findings

No findings were identified.

1R07 Heat Sink Performance (711111.07A – 1 sample)

a. Inspection Scope

The inspectors reviewed the Unit 2 'A' RBCCW heat exchanger to determine its readiness and availability to perform its safety functions on March 3. The inspectors reviewed the design basis for the component and verified Dominion's commitments to NRC Generic Letter 89-13, "Service Water System Requirements Affecting Safety-Related Equipment." The inspectors observed maintenance as well as reviewed the results of 'as found' and previous inspections of Unit 2 'A' RBCCW heat exchanger. 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.

b. Findings

No findings were identified.

1R11 Licensed Operator Requalification Program and Licensed Operator Performance (71111.11Q – 4 samples)

.1 Quarterly Review of Licensed Operator Requalification Testing and Training

a. Inspection Scope

Unit 2

The inspectors observed Unit 2 control room simulator training for downpower for turbine valve testing and moisture separator reheater maintenance on January 20. 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 classifications made by the shift manager and the TS action statements entered by the unit supervisor. Additionally, the inspectors assessed the ability of the crew and training staff to identify and document crew performance problems.

Unit 3

The inspectors observed Unit 3 licensed operator simulator training during an emergency preparedness drill on March 22, which included damage to the station blackout diesel generator, a fire in the west switchgear room, and the failure of the normal station transformer breaker. 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 classifications made by the shift manager and the TS action statements entered by the unit supervisor. 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

Unit 2

The inspectors observed Unit 2 operator performance during downpower for turbine valve testing and moisture separator reheater maintenance on January 23. The inspectors observed crew briefings and focus briefings to verify that the briefings met the criteria specified in Dominion's Operations Section Expectations Handbook. Additionally, the inspectors observed test performance to verify that procedure use, crew communications, and coordination of activities between work groups similarly met established expectations and standards.

Unit 3

The inspectors observed shift turnover, operator logs, general control room operations, and foreign material exclusion controls for the 'A' EDG jacket water pipe repair on February 19, 2017. The inspectors observed crew focus briefings, pre-job briefings, and crew plant interactions during log taking to verify that briefings and interactions met the criteria set for in the Dominion procedure, "Conduct of Operations." Additionally, the inspectors observed performance to verify that procedure use, crew communications, and coordination of activities between work groups similarly met established expectations and standards.

b. Findings

No findings were identified.

1R13 Maintenance Risk Assessments and Emergent Work Control (71111.13 – 7 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 technical specification requirements and inspected portions of redundant safety systems, when applicable, to verify risk analysis assumptions were valid and applicable requirements were met.

- Unit 2 elevated unit risk during containment entry at power to add oil to 'A' reactor coolant pump on January 18
- Unit 2 yellow risk during 'A' AFW and engineered safeguards actuation system undervoltage testing concurrently on January 10
- Unit 2 work on protected train containment radiation and particulate monitor 8262 on February 6
- Unit 2 yellow risk during 'A' RBCCW heat exchanger maintenance, 'A' power operated relief valve surveillance testing, 'A' high pressure safety injection (HPSI) IST surveillance testing on February 16
- Unit 2 work on protected train equipment of 'B' HPSI cooling valves, 2-RB-15C & 2-RB-15D on March 1
- Unit 2 emergent recovery from #1 feedwater regulating valve control fuse failure on March 18
- Unit 2 outage shutdown risk assessment on March 30

b. Findings

No findings were identified.

1R15 Operability Determinations and Functionality Assessments (71111.15 – 7 samples)

a. Inspection Scope

The inspectors reviewed operability determinations for the following degraded or non-conforming conditions based on the risk significance of the associated components and systems:

Unit 2

- CR1065262 CST low temperature annunciator in without CST recirculation capability on January 6
- CR1058675 oil identified on containment particulate radiation monitor sample filter on January 26
- CR1059770 'A' EDG jacket water leakage on January 27
- CR1058469 UAC4 regulating transformer out of adjustment on January 27
- CR1061348 'B' boric acid pump through-wall leakage on March 15

Unit 3

- 'A' EDG jacket water leakage on January 19
- Reactor plant closed cooling water non-conforming bolts on March 28

The inspectors evaluated the technical adequacy of the operability determinations 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. Where compensatory measures were required to maintain operability, the inspectors determined whether the measures in place would function as intended and were properly controlled by Dominion.

b. Findings

No findings were identified.

1R18 Plant Modifications (71111.18 – 1 sample)

.1 Temporary Modifications

a. Inspection Scope

The inspectors reviewed the temporary modifications 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.

- Unit 2 procedurally controlled temporary modification for alarm window C02/3 AA-18 "RCP A REV ROTATION" that was disabled on January 11

b. Findings

No findings were identified.

1R19 Post-Maintenance Testing (71111.19 – 6 samples)

a. Inspection Scope

The inspectors reviewed the post-maintenance tests for the maintenance activities listed below to verify that procedures and test activities 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 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

- Acoustic valve monitoring restoration on February 2
- 'A' RBCCW heat exchanger service water inlet isolation valve testing on February 22
- Inverter 4 troubleshooting on March 1

Unit 3

- Leading edge flow meter power supply replacement on January 12
- Turbine driven AFW pump rack setting adjustment on February 16
- Containment isolation phase 'A' slave relay testing for train 'A' sliding link failure on March 16

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 2604D-002, 'B' low pressure safety injection (LPSI) pump and minimum flow header check IST on January 30
- Reactor coolant gas sampling and analysis (reactor coolant system leakage detection) on March 20

Unit 3

- Reactor coolant gas sampling and analysis (reactor coolant sytem leakage detection) on January 18
- Reactor plant sampling valve stroke time surveillance IST failure on January 19
- 'C' charging pump IST frequency change on January 25

b. Findings

Introduction. The inspectors identified a Green NCV of 10 CFR 50.55a(f), "Inservice testing requirements," subsection (4), "Inservice testing standards requirements for operating plants," because Dominion did not implement the IST Program in accordance with the ASME OM Code of Record, 2001 through 2003 incorporated addenda. On August 20, 2015, Dominion changed the testing requirements for the 'C' charging pump (3CHS*P3C) to eliminate the required quarterly Group A surveillance testing.

Description. Unit 3 has three identical centrifugal charging pumps that can perform emergency core cooling system (ECCS) functions as well as chemical volume and control functions. The 'A' and 'B' pumps each have a dedicated emergency power source, Bus 34C for the 'A' pump and Bus 34D for the 'B' pump. The 'C' pump does not have its own dedicated source of electrical power, but instead can be aligned to either bus 34C or 34D. For this lineup to work, Dominion must remove either the 'A' or 'B' pump breaker and install it into the appropriate 'C' breaker cubicle. At any given time, only two pumps can be energized, with both pumps lined up to separate emergency buses. During normal operations, one charging pump is running, one is in standby (available to be run), and one would need to be aligned for use. Dominion asserted that the 'C' charging pump does not need to meet the same IST requirements as 'A' and 'B' due to this electrical lineup difference. As a result, the last surveillance test for the 'C' charging pump happened on April 15, 2016.

Millstone is committed to the ASME OM Code 2001 through 2003 Addenda. ISTA-1100 states the scope of IST requirements applies to "pumps and valves that are required to perform a specific function in shutting down a reactor to the safe shutdown condition, in maintaining the safe shutdown condition, or in mitigating the consequences of an accident." Millstone Unit 3 credits all three charging pumps in the safety analysis for inventory and reactivity control. Although only two pumps are needed (and only two pumps are able to run at any given time), the three charging pumps are considered equivalent in both the UFSAR (Table 6.3-10, "Failure Mode and Effects Analysis – Emergency Core Cooling System – Active Components") and the safety function requirements manual (Table 2.2-1, "Chemical and Volume Control System Components Credited in Safety Analysis"). Consequently, prior to the August 2015 testing change, all three charging pumps were subject to the testing requirements of ISTB-3400. The charging pumps are considered to be IST Group A pumps, which are subject to quarterly

Group A surveillance tests and biennial comprehensive tests (Table ISTB-3400-1, "Inservice Test Frequency"). This is reflected in Dominion's IST program and testing plan.

Dominion's test philosophy is based on two assertions that the inspectors questioned. First, Dominion asserted that the applicability requirements of ISTB-1100 do not apply to the 'C' charging pump. ISTB-1100 states that the testing requirements "apply to certain centrifugal and positive displacement pumps that have an emergency power source." The inspectors disagreed with this assertion, based on the availability of an emergency power source for the 'C' charging pump. The inspectors noted that ISTB-1100 makes no mention of having a dedicated emergency power source, just that the pump has one. Second, Dominion asserted that the requirements of ISTB-3200 do not apply to the 'C' charging pump. ISTB-3200 states that "inservice testing of a pump in accordance with this Subsection shall commence when the pump is required to be operable (see ISTB-1100)." Dominion considered the 'C' charging pump to be inoperable. The current schedule calls for biennial comprehensive testing during refueling outages and quarterly Group A testing prior to the 'C' charging pump being put in service (as when it would be used as an alternate pump to perform extended maintenance on the 'A' or 'B' pump). Dominion would then consider the 'C' pump to be operable. The inspectors disagreed with this assertion, because the purpose of IST is to assess the operational readiness of systems, structures, and components to perform its specified functions. Inoperable systems, structures, and components should be restored to operable through corrective actions in accordance with ISTB-6200, "Corrective Action". This subsection does not provide for a mechanism to do what Dominion proposes, which is switching components administratively between operable and inoperable.

In addition, Dominion has kept the requirements listed in the IST program plan and basis document the same for all three pumps, with quarterly Group A and biennial comprehensive testing. The rationale behind this decision is that when Dominion considers the 'C' pump to be operable (i.e. when it is connected to an emergency power source), it will be subject to the same testing requirements as the 'A' and 'B' charging pumps. The inspectors noted this approach is not described in the OM Code nor is it discussed in NUREG 1482, "Guidelines for Inservice Testing at Nuclear Power Plants," Revision 2. The inspectors determined this does not preclude Dominion from taking this approach, but that it may require a relief request from the ASME Code requirements. As a result of the inspectors' questioning, Dominion submitted a Code Inquiry (#17-603) in March 2017 to gain clarity on the two assertions discussed above. The Code Committee responded and did agree that pumps not connected to emergency power sources did not need to be included in the scope of the IST Program. Similarly, the Code Committee agreed that inoperable pumps are not required to be tested in accordance with the IST program. However, the Code Committee did not offer any analysis on whether the 'C' charging pump met the conditions to be considered inoperable or without an emergency power source. Regardless of the Code Committee's conclusions, the inspectors determined that these discussions should have happened prior to implementing changes, not after.

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 administratively removed the Group A quarterly surveillance testing requirements, which is not in accordance with the ASME OM Code of Record, 2001

through 2003 incorporated addenda. 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 adversely affected 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. Eliminating quarterly IST surveillance tests could challenge the reliability of the 'C' charging pump and allow 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 'C' charging pump has not yet experienced any failures.

This finding has a cross-cutting aspect in Human Performance, Change Management, in accordance with IMC 0310, "Aspects within the Cross-Cutting Areas," where leaders use a systematic process for evaluating and implementing change so that nuclear safety remains the overriding priority. Specifically, Dominion evaluated this change to the IST Program without requesting relief from the ASME Code requirements. [H.3]

Enforcement. 10 CFR 50.55a(f) requires, in part, that systems and components of boiling and pressurized water nuclear power reactors must meet the requirements of the ASME Code for Operation and Maintenance of Nuclear Power Plants. Contrary to the above, from April 15, 2016, to present, Dominion did not perform all required testing of IST Program component 3CHS*P3C in accordance with the ASME OM Code. Specifically, Dominion stopped the required Group A quarterly surveillances which could result in a condition where degradation of the charging pump would remain undetected by IST. Because this issue is of very low safety significance (Green) and Dominion has taken corrective action and entered this issue into their CAP as CR 1064337, this finding is being treated as an NCV consistent with Section 2.3.2.a of the NRC Enforcement Policy. **(NCV 05000423/2017001-02, Change of 'C' Charging Pump Testing Requirements Contrary to ASME OM)**

Cornerstone: Emergency Preparedness

1EP6 Drill Evaluation (71114.06 – 1 sample)

.1 Emergency Preparedness Drill Observation

a. Inspection Scope

The inspectors evaluated the conduct of a routine Dominion emergency drill on March 22 to identify any weaknesses and deficiencies in the classification, notification, and protective action recommendation development activities. The inspectors observed emergency response operations in the simulator, technical support center, and emergency operations facility to determine whether the event classification, notifications, and protective action recommendations were performed in accordance with procedures. The inspectors also attended the station drill critique to compare inspector observations with those identified by Dominion staff in order to evaluate Dominion's critique and to

verify whether the Dominion staff was properly identifying weaknesses and entering them into the CAP.

b. Findings

No findings were identified.

2. RADIATION SAFETY

Cornerstone: Occupational and Public Radiation Safety

2RS2 Occupational ALARA Planning and Controls (71124.02 – 4 samples)

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 Part 20, Regulatory Guides 8.8 and 8.10, 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; previous post-outage ALARA reviews; radiological source term history and trends; and ALARA dose estimating and tracking procedures.

Radiological Work Planning (1 sample)

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

- ALARA Plan 3-16-13, Scaffold Installation and Removal
- ALARA Plan 3-16-03, Steam Generator Secondary Side Work
- ALARA Plan 3-16-26, Radiation Protection Activities to Support Unit Outage
- ALARA Plan 3-16-14, Insulation Installation and Removal
- ALARA Plan 3-16-11, Valve Inspections and Repair

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 (1 sample)

The inspectors reviewed the current annual collective dose estimate; basis methodology; and measures to track, trend, and reduce occupational doses for ongoing work activities. The inspectors evaluated the adjustment of exposure estimates or re-planning of work. The inspectors reviewed post-job ALARA evaluations of excessive exposure.

Source Term Reduction and Control (1 sample)

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.

The inspectors observed radiological work activities and evaluated the use of shielding and other engineering work controls based on the radiological controls and ALARA plans for those activities.

Problem Identification and Resolution (1 sample)

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

b. Findings

No findings were identified.

2RS8 Radioactive Solid Waste Processing and Radioactive Material Handling, Storage, and Transportation (71124.08 – 6 samples)

a. Inspection Scope

The inspectors verified the effectiveness of Dominion's programs for processing, handling, storage, and transportation of radioactive material. The inspectors used the requirements of 49 CFR Parts 170-177; 10 CFR Parts 20, 61, and 71; applicable industry standards; regulatory guides; and procedures required by TSs as criteria for determining compliance.

Inspection Planning

The inspectors conducted an in-office review of the solid radioactive waste system description in the UFSAR, the Process Control Program, and the recent radiological effluent release report for information on the types, amounts, and processing of radioactive waste disposed. The inspectors reviewed the scope of quality assurance audits performed for this area since the last inspection.

Radioactive Material Storage (1 sample)

The inspectors observed radioactive waste container storage areas and verified the postings and controls and that Dominion had established a process for monitoring the impact of long-term storage of the waste.

Radioactive Waste System Walkdown (1 sample)

The inspectors walked down the following:

- Accessible portions of liquid and solid radioactive waste processing systems to verify current system alignment and material condition

- Abandoned in place radioactive waste processing equipment to review the controls in place to ensure protection of personnel
- Changes made to the radioactive waste processing systems since the last inspection
- Processes for mixing and transferring radioactive waste resin and/or sludge discharges into shipping/disposal containers
- Current methods and procedures for dewatering waste

Waste Characterization and Classification (1 sample)

The inspectors identified radioactive waste streams and reviewed radiochemical sample analysis results to support radioactive waste characterization. The inspectors reviewed the use of scaling factors and calculations to account for difficult-to-measure radionuclides.

Shipment Preparation (1 sample)

The inspectors reviewed the records of shipment packaging, surveying, labeling, marking, placarding, vehicle checks, emergency instructions, disposal manifest, shipping papers provided to the driver, and licensee verification of shipment readiness.

Shipping Records (1 sample)

The inspectors reviewed selected non-excepted package shipment records.

Problem Identification and Resolution (1 sample)

The inspectors assessed whether problems associated with radioactive waste processing, handling, storage, and transportation were identified at an appropriate threshold and properly addressed in Dominion's CAP.

b. Findings

No findings were identified.

4. OTHER ACTIVITIES

4OA1 Performance Indicator Verification (71151)

Reactor Coolant System Specific Activity and Reactor Coolant System Leak Rate (2 sample)

a. Inspection Scope

The inspectors reviewed Dominion's submittal for the reactor coolant system specific activity and reactor coolant system leak rate performance indicators for both Unit 2 and Unit 3 for the period of January 1, 2016, through December 31, 2016. To determine the accuracy of the performance indicator data reported during those periods, the inspectors used definitions and guidance contained in Nuclear Energy Institute Document 99-02, "Regulatory Assessment Performance Indicator Guideline," Revision 7. The inspectors also reviewed reactor coolant system sample analysis and control room logs of daily

measurements of reactor coolant system leakage, and compared that information to the data reported by the performance indicator. Additionally, the inspectors observed surveillance activities that determined the reactor coolant system identified leakage rate, and chemistry personnel taking and analyzing a reactor coolant system sample.

b. Findings

No findings were identified.

4OA2 Problem Identification and Resolution (71152 – 2 samples)

.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 Dominion entered issues into the CAP 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 CAP and periodically attended CR screening meetings.

b. Findings

No findings were identified.

.2 Annual Sample: Unit 2 Degraded Emergency Core Cooling System Check Valve

a. Inspection Scope

The inspectors performed an in-depth review of Dominion's evaluation and corrective actions associated with an IST during which back-leakage was identified on the Unit 2 'A' containment spray (CS) system minimum flow recirculation check valve (2-CS-6A). Specifically, operators were performing a quarterly IST pump test on the 'B' HPSI system pump on June 11, 2015, when the back-leakage was identified. All seven ECCS pumps at Unit 2 share a common minimum flow recirculation line back to the refueling water storage tank (RWST), and each minimum flow recirculation line associated with each ECCS pump contains a check valve on the individual recirculation lines upstream of the common line to the RWST.

The inspectors assessed Dominion's problem identification threshold, problem analysis, extent of condition reviews, compensatory actions, and the prioritization and timeliness of their corrective actions to determine whether they were 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 Dominion's CAP and 10 CFR Part 50, Appendix B. The inspectors reviewed associated documents and interviewed engineering personnel to assess the reasonableness of Dominion's evaluations and of the planned and completed corrective actions.

b. Findings and Observations

One violation of very low safety significance was identified by Dominion during their investigation of the degraded condition (leaking check valve) that occurred during the June 11, 2015, test. It is a violation of NRC requirements and is being characterized as a licensee-identified violation (See Section 4OA7 of this report).

The inspectors reviewed the 'B' HPSI pump test results, CRs and associated evaluations, and interviewed station personnel to evaluate the details of the check valve back-leakage. Although the June 11, 2015, test yielded an acceptable flow value, Dominion staff noted a flow decrease of about 4 - 5 gallons per minute from typical HPSI pump flow rates and initiated a review for further evaluation.

After they confirmed the 2-CS-6A check valve back-leakage, Dominion staff disassembled the valve and found that the plug for the piston check valve was stuck in the partially open position, and once a minimal amount of pressure was placed on the plug, it broke free and free motion was subsequently exhibited. Maintenance technicians identified some wear on the guiding surface of the plug, however, no significant debris or degradation was apparent. This valve had previously been disassembled and inspected satisfactorily during the prior refueling outage in accordance with Dominion's check valve condition monitoring program.

During their evaluation of the check valve failure, Dominion identified that the back-leakage flow path was not previously considered or evaluated in their radiological release analysis. Specifically, if only one train of ECCS operates (in the event of a loss of electrical power) and leakage past a minimum flow recirculation check valve in a non-operating train is assumed, then ECCS flow (radioactively contaminated water from the containment sump during the recirculation phase of a postulated accident) can reach the RWST. In this scenario, leakage would also have to leak past the single, common ECCS pump suction check valve (one common check valve per ECCS train) from the RWST, 2-CS-14A(B). The 2-CS-14A(B) check valves are leak rate tested as per the IST Program (acceptance criterion is 7 gallons per minute), however, the ECCS pump minimum flow recirculation check valves are not leak tested to an acceptance criteria in the Millstone Unit 2 IST Program.

Further, if it is assumed that RWST 2-CS-14A or -14B (i.e., the ECCS suction check valve associated with the non-operating train) does not leak as described in the above postulated scenario, then the suction piping of the non-operating ECCS train could exceed the suction header design pressure and reach 500 psig, which is the lift setpoint of the shutdown cooling system heat exchanger relief valves (located downstream of the ECCS pumps). Discharge from those relief valves are located outside the filtered ventilation boundary and similarly represented a potential radiological release path not previously considered or evaluated.

While this scenario was for the non-operating CS train, back-leakage from a non-operating LPSI or HPSI train minimum flow recirculation check valve were similarly affected. Dominion staff evaluated the potentially affected components and piping, and concluded that the stress levels were acceptable for continued operation.

Dominion reported this event, including the associated assessment of safety consequences and corrective actions, in Licensee Event Report (LER) 2015-002, as supplemented in LER 2015-002-01 (See Section 4OA3.1 of this report).

The inspectors reviewed Dominion's IST Program and the IST Bases Document for the ECCS check valves. In particular, check valve 2-CS-6A was not identified as a Category A valve in the IST program. Category A valves, as defined in ASME Code for Operation and Maintenance of Nuclear Power Plants (ASME OM Code - 2001), are those valves for which seat leakage is limited to a specific maximum amount in the closed position for fulfillment of their required function(s). Leak rate tests are required for Category A valves. Further, the IST Bases Document stated that 2-CS-6A has only an open safety function (it states its close function is not required for accident mitigation).

While Dominion had appropriately identified the RWST suction check valves 2-CS-14A/B as Category A valves (and conducted periodic leak rate tests), the seven ECCS pump minimum flow recirculation check valves were Category C valves, and did not include a leak rate test. The inspectors concluded that, based on the design basis assumption of a loss of a single electrical train, the postulated scenarios described above would have required the ECCS pump minimum flow recirculation check valves to be Category A and leak rate tested.

Dominion's immediate corrective actions included performing an immediate operability assessment for the 'A' CS pump with 2-CS-6A isolated (by closing an upstream isolation valve). Maintenance was subsequently performed, and the valve internals were replaced. There was no indication that any of the remaining six ECCS minimum flow recirculation valves were leaking in a fashion similar to 2-CS-6A. Then, during the fall 2015 refueling outage, Dominion leak tested all seven ECCS minimum flow recirculation check valves; only one exhibited slight leakage (less than 0.1 gallon per minute). At that time, although the leakage was small, Dominion completed a prompt operability determination in October 2015, which formally evaluated potential leakage paths from any of the CS, LPSI, or HPSI minimum flow recirculation check valves. That determination concluded that the component and pipe stress levels were acceptable for continued operation; and for potential leakage paths during the postulated accident scenarios, the control room and offsite radiological dose consequences would be within regulatory limits.

Dominion addressed the elevated ECCS suction pressure concern (during the postulated accident scenarios) by developing a modification to install relief valves in the ECCS suction headers; to be installed during the upcoming spring 2017 refueling outage. Finally, Dominion plans on continuing to perform leak rate testing of all seven minimum flow recirculation check valves, and was evaluating changes to formally re-characterize the check valves as Category A valves with a safety function to close in the IST Program (leak rate test required).

The inspectors reviewed Dominion's completed and planned corrective actions and the associated evaluations and found them to be acceptable.

.3 Annual Sample: Unit Circulating Water Pump Variable Frequency Drive Loss of Control Power

a. Inspection Scope

The inspectors performed an in-depth review of Dominion's root cause analysis and corrective actions associated with CR 1044529, "Unit 2 Reactor Trip/Circulating Water (CW) Pump Variable Frequency Drive (VFD) Loss of Control Power." Specifically, a failure of the power supplies to the 'A' and 'C' CW pump VFD caused the pumps to stop, which led to degrading condenser vacuum and a manual reactor trip.

The inspectors assessed Dominion's problem identification threshold, cause analyses, extent of condition reviews, compensatory actions, and the prioritization and timeliness of Dominion's 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 Dominion's CAP and 10 CFR Part 50, Appendix B.

b. Findings and Observations

No findings were identified.

Dominion determined the direct cause was a failure of uninterruptible power supplies (UPS) UPS-1A and UPS-1B to provide battery backup power to the CW pump VFD when an electrical grid disturbance interrupted the normal VFD power supply. Dominion determined the root cause of the event was the lack of an adequate preventive maintenance strategy for the UPS batteries. When Dominion installed the VFD in 2009 to provide the capability to control CW pump speed, the intent was to implement a service contract through a vendor to maintain this non-safety-related equipment. After project completion, Dominion used the vendor for corrective maintenance only and did not perform any preventive maintenance. As a result, the batteries remained in service from the time of installation, well beyond the manufacturer's suggested three to five year service life.

Dominion conducted a thorough review of the technical and programmatic issues that resulted in the UPS failures and identified a contributing cause where the work management process did not adequately review, schedule, or prioritize corrective actions when operators identified degraded battery conditions in 2014. Dominion replaced batteries in other Unit 2 UPS and evaluated the maintenance strategy of UPS units at both Unit 2 and Unit 3 in addition to the development of a preventive maintenance strategy for the CW VFD UPS. Corrective actions also included briefing sheets for outage and planning, the condition review team, and the corrective action assignment review team to share lessons learned on performing adequate reviews of equipment deficiencies to highlight potential consequences to plant operation.

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 the initial UPS failure, but the inspectors noted deficiencies with some of the long term corrective actions. Specifically, the corrective action to prevent recurrence for the event was for

system engineering to develop and implement a plan to replace the VFD UPS batteries every three years, as documented in CA3046870. When the inspectors reviewed CA3046870, they noted Dominion had changed the battery replacement frequency to every five years, with a note stating this change had been discussed at a plant health steering committee meeting. While a five year replacement frequency may still be within the manufacturer's guidelines of three to five years, making this change at a plant health steering committee meeting was not in accordance with station procedures. PI-AA-300, "Cause Evaluation", Revision 12, states that "scope changes for corrective action assignments from significance level 1 and 2 apparent cause evaluations and root cause evaluations" are within the scope of the corrective action review board charter. CR 1044529 was a significance level 1 root cause and any changes in scope to its corrective actions should have been reviewed and approved by the corrective action review board. In addition, CA3046870 was closed without all actions taken. Dominion made new preventive maintenance requests but had not developed the strategy or scheduled the next battery replacements at the time of the inspection.

The inspectors determined these issues were minor because no equipment operability or functionality was significantly affected. In accordance with IMC 0612, "Power Reactor Inspection Reports," the above issue constituted a violation of minor significance that is not subject to enforcement action in accordance with the Enforcement Policy. Dominion entered the inspector's observations into their CAP as CR 1063143.

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

.1 (Closed) LER 05000336/2015-002 and LER 05000336/2015-002-01 (Supplemental Report): Degraded Emergency Core Cooling System Check Valve

Following the performance of an IST on the HPSI system on June 11, 2015, engineering staff identified that, due to a degraded check valve in the minimum flow recirculation line of the CS system, the post-accident radioactivity release rates assumed in the UFSAR could be affected. The details of this issue are described in Section 4OA2.2 of this report.

This condition was reportable under 10 CFR 50.73(a)(2)(v)(C) as an event or condition that could have prevented fulfillment of a safety function to control the release of radioactive material. Dominion originally reported this issue to the NRC on August 10, 2015, with a preliminary assessment of safety consequences; and provided a supplemental report on December 11, 2015, after a final assessment was completed.

The inspectors reviewed Dominion's apparent cause evaluation and supporting documentation, and interviewed members of station staff regarding the issue. Dominion's assessment of the safety consequences of the condition was evaluated for the specific postulated accident and associated assumptions (small break loss-of-coolant accident with a concurrent loss electrical power to one train of ECCS). In their assessment, Dominion assumed a 5 gallons per minute to bound the leakage past the leaking 2-CS-6A check valve (actual leakage was determined to be 4.7 gallons per minute). The control room and offsite radiological dose consequences remained within regulatory limits, and therefore, the safety consequences were minimal.

The inspectors had questions regarding the Assessment of Safety Consequences section of the LER. Specifically, the LER indicated that a 5 gallons per minute leak rate

value was analyzed and that the maximum as-found ECCS train leakage was 0.089, such that the 0.089 gallons per minute value was "well below the 5 gallons per minute limit." The inspectors identified to Dominion staff that the 5 gallons per minute was appropriate because it bounded the actual 4.7 gallons per minute leakage past 2-CS-6A. The inspectors confirmed the 0.089 gallons per minute leakage value was the sum of ECCS train leakage, including leakage measured past all seven minimum flow recirculation valves that was subsequently determined a few months later after the 2-CS-6A check valve had been repaired. As a result, this value did not indicate the as-found leakage value when the condition was identified on June 11, 2015. The inspectors concluded Dominion's analysis could have been clearer in their discussion of the 0.089 gallons per minute leak rate, but that this had no impact on their assessment because Dominion staff applied a bounding leak rate of 5 gallons per minute, also described in their assessment section.

A licensee-identified finding of very low safety significance was identified for this issue and the enforcement aspects of this violation are discussed in Section 4OA7 of this report. This LER is closed.

.2 (Closed) LER 05000336/2016-002-00: Manual Reactor Trip Due to Loss of Two Circulating Water Pumps

On August 11, 2016, operators manually tripped the Unit 2 reactor due to degraded condenser vacuum caused by the loss of two CW pumps. The cause and corrective actions for this issue are discussed in Section 4OA2.3. The inspectors did not identify any new issues during the review of the LER. This LER is closed.

4OA5 Other Activities

.1 Temporary Instruction (TI) 2515/192, "Inspection of the Licensee's Interim Compensatory Measures Associated with the Open Phase Condition Design Vulnerabilities in Electric Power Systems."

a. Inspection Scope:

The objective of this performance based TI is to verify implementation of interim compensatory measures associated with an open phase condition (OPC) design vulnerability in electric power system for operating reactors. The inspectors conducted an inspection to determine if Dominion had implemented the following interim compensatory measures. These compensatory measures are to remain in place until permanent automatic detection and protection schemes are installed and declared operable for OPC design vulnerability. The inspectors verified the following:

- Dominion had identified and discussed with plant staff the lessons-learned from the OPC events at other U.S. operating plants, including the Byron Station OPC event and its consequences. This includes conducting operator training for promptly diagnosing, recognizing consequences, and responding to an OPC event.

- Dominion had updated plant operating procedures to help operators promptly diagnose and respond to OPC events on off-site power sources credited for safe shutdown of the plant.

- Dominion had established and continue to implement periodic walkdown activities to inspect switchyard equipment such as insulators, disconnect switches, and transmission line and transformer connections associated with the offsite power circuits to detect a visible OPC.

- Dominion had ensured that routine maintenance and testing activities on switchyard components have been implemented and maintained. As part of the maintenance and testing activities, Dominion assessed and managed plant risk in accordance with 10 CFR 50.65(a) (4) requirements.

b. Findings and Observations:

No findings were identified.

The inspectors identified that Dominion's response letter to the NRC Request for Additional Information regarding the initial response to NRC Bulletin 2012-01, "Design Vulnerability in Electrical Power System," dated February 3, 2014, (Agencywide Documents Access and Management System Accession Number ML14035A458) stated, in part, that "these interim corrective actions ensure that plant operators can promptly diagnose and respond to open phase condition." The inspectors also noted that Dominion identified during a self-assessment, PIR1055780, that they did not meet all of the criteria for completing the training objective. Specifically, the self-assessment identified that operators did not fully train on prompt diagnosing and responding to an OPC. Dominion entered this issue into their CAP as CR 1057647 and took actions to ensure operators eventually met the training objective.

4OA6 Meetings, Including Exit

On April 11, 2017, the inspectors presented the inspection results to Mr. John Daugherty, Site Vice President, and other members of the Dominion staff. The inspectors verified that no proprietary information was retained by the inspectors or documented in this report.

4OA7 Licensee-Identified Violations

The following licensee-identified violation of NRC requirements was determined to be of very low safety significance and met the NRC Enforcement Policy criteria for being dispositioned as an NCV.

- As discussed in Section 4OA2.2 of this report, the inspectors concluded that the ECCS minimum flow recirculation check valves should have been characterized as Category A valves, and should have been leak rate tested as per the IST Program. The associated LER is discussed in Section 4OA3.1.

  Title 10 CFR 50.55a, "Codes and Standards," Section (f)(4), required in part, that throughout the service life of a pressurized water-cooled nuclear power facility, valves that are classified as Class 1, 2, or 3 must meet the IST requirements set forth in the ASME OM Code. Dominion's Code of Record, ASME OM Code - 2001 Edition, Subsection ISTC-1300, "Valve Categories," required that valves within the scope of Subsection ISTC-1300 shall be placed in one or more of the following categories, which included Category A (those valves for which seat leakage is limited

to a specific maximum amount in the closed position for fulfillment of their required function). The inspectors concluded that minimum flow recirculation check valve 2-CS-6A should have been a Category A valve, and leak rate tested, to assure fulfillment of its safety function (to mitigate the dose consequences of a postulated accident). Contrary to the above, since 1975, when the check valve 2-CS-6A was initially categorized, Dominion failed to appropriately categorize the subject valve and therefore did not meet the ASME OM Code requirements and 10 CFR 50.55a requirements. Specifically, failure to categorize the check valve as a Category A resulted in the valve not being subject to leak rate testing.

This issue is more than minor because it was associated with the equipment performance attribute of the Mitigating Systems cornerstone and adversely affected the cornerstone objective of ensuring the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. The inspectors determined that the finding was of very low safety significance because it did not result in the loss of operability or functionality of a system or train, and the actual leakage through the check valve would not have resulted in a radiological dose in excess of regulatory requirements. Dominion entered the issue into the CAP as CR 582112 and CA 3013009. Because Dominion identified this issue of very low safety significance and it has been entered into their CAP, this finding is being treated as a licensee-identified NCV, consistent with Section 2.3.2.a of the NRC Enforcement Policy. This item was considered licensee-identified because it was identified by Dominion as a result of deliberate observation by licensee personnel, and was entered into their CAP.

ATTACHMENT: SUPPLEMENTARY INFORMATION

SUPPLEMENTARY INFORMATION

KEY POINTS OF CONTACT

Licensee Personnel
J. Daugherty, Site Vice President
C. Olsen, Plant Manager
L. Armstrong, Director, Performance Recovery
R. Borchart, Senior Reactor Engineer
B. Bowen, Shift Supervisor, Health Physics
M. Bradley, Manager, Radiation Protection and Chemistry
D. Brown, Supervisor, Nuclear Training
J. Burkirk, Outage Control Center Health Physics Representative
J. Chadbourne, Program Engineer
J. Chappell, Radiation Protection Technician
F. Cietek, Risk Analyst
T. Cleary, Licensing
G. Cochran, Supervisor, Nuclear Site Safety
M. Cote, Supervisor, Nuclear Training
L. Crone, Chemistry Manager
J. DaSilva, Primary Auxiliary Operator, U-3 Radwaste
B. Dawson, Mechanical Analysis Engineer
C. DeBiasi, Chemistry Technician
R. DeConto, Consulting Engineer
D. DelCore, Shift Supervisor, Health Physics
D. Dodson, Manager of Programs
D. Dougherty, Unit 2 RBCCW System Engineer
T. Dubay, System Engineer
M. Dunivan, Supervisor, Health Physics Auxiliary Building
W. Faye, Design Engineer
P. Fitzgerald, Exam Developer
K. Gannon, Supervisor, Health Physics
M. Garza, Unit 2 Senior Nuclear Shift Operator
J. Glaub, Chemistry Technician
T. Gleason, Radiation Protection Technician
W. Gorman, RMS Supervisor
M. Goolsby, Unit 2 Operations Manager
B. Graber, Supervisor, Radiological Analysis
M. Hall, Dominion Corporate Welding Engineer
K. Hacker, Dominion Corporate Level III
D. Jacobs, Exam Developer
C. Janus, Maintenance Rule Program Owner
A. Johnson, Health Physics
J. Langan, Manager, Nuclear Oversight
L. Lebaron, System Engineer
M. Marino, Supervisor, Mechanical Engineering Analysis
R. McGuinness, Mechanical Design Engineer (50.59 Subject Matter Expert)
G. Modzelewski, CFAM – Design Engineering
T. Morris, Secondary Chemist
J. Nelson, Health Physicist
T. Olsowy, Licensing

R. Parrette, Operations
A. Passwater, Sampling Program Team Lead, Preferred Licensing Services (PLS)
J. Preston, Primary Auxiliary Operator, U-2 Radwaste
M. Roche, Health Physicist III
B. Ross, Radiation Protection Supervisor Unit 3
D. Rowe, Unit 3 Operations
W. Saputo, System Engineer
D. Smith, Site Emergency Preparedness Manager
J. Stafford, Director, Nuclear Training
M. Sweet, Superintendent Health Physics Operations
A. Vargas, Licensing
C. Walsh, Superintendent, Nuclear Operations Training
M. Wood, Supervisor, Radiological Material Control

LIST OF ITEMS OPENED, CLOSED, DISCUSSED, AND UPDATED

Opened/Closed

05000336/2017001-01	NCV	Failure to Maintain CST Temperature in Accordance with Procedural Requirements (Section 1R01)
05000423/2017001-02	NCV	Change of 'C' Charging Pump Testing Requirements Contrary to ASME OM (Section 1R22)

Closed

0500000336/2015-002-00, 050000336/2015-002-01	LER	Degraded Emergency Core Cooling System Check Valve (Section 4OA3)
05000336/2016-002-00	LER	Manual Reactor Trip Due to Loss of Two Circulating Water Pumps (Section 4OA3)

LIST OF DOCUMENTS REVIEWED

Section 1R01: Adverse Weather Protection

Procedures
OP 2319B, Condensate Storage and Surge System, Revision 016
ARP 2590D-048, Condensate Storage Tank Temp Lo, Revision 000
AOP 3569, Severe Weather Conditions (MPS3), revision 019
C OP 200.13, Seasonal Weather Operations, Revision 004-04
C OP 200.13-003, Unit 3 Cold Weather Preparation Checklist, Revision 001-01

Condition Reports
1024216
1045212
1056985
1057098

Work Order
53102921781

Miscellaneous
ETE-MP-2017-1004, Millstone Unit 2 Condensate Storage Tank Minimum Temperature for Operability/Functionality
DBS-2319B, Condensate Storage and Transfer System, Revision 0

Section 1R04: Equipment Alignment

Procedures
OP 3308, High Pressure Safety Injection, Revision 012-01
OP 3330E, Safety Injection Pump Cooling System, Revision 008
SP 3608.4, High Pressure Safety Injection System Vent and Valve Lineup Verification, Revision 008
OP 3308-004, Train B High Pressure Safety Injection, Revision 004-00
OP 3311A, Reactor Plant Sampling, Revision 010-01
CP 3807F, Operation of Reactor Plant Sample Sink, Revision 007
OP 3330A, Reactor Plant Component Cooling Water, Revision 022
OP 3362, Radiation Monitor System Display and Control System, Revision 015
EOP 35 GA-30, Aligning RPCCW for RCS and SG Sampling, Revision 000
RPM 2.2.12, Unit 2 Containment Continuous Air Radiation Monitors, Revision 009

Condition Reports
485651
1061593
1060957
1062519

Drawings
25212-26913, High Pressure Safety Injection, Revision 41
25212-26944, Sheet 1, Reactor Plant Sampling, Revision 31
25212-26916, Sheet 1, EDG A Lube Oil and Cooling System, Revision 46
25212-26916, Sheet 2, EDG A Starting Air System, Revision 39
25212-26916, Sheet 5, Emergency Diesel Exhaust, Combustion Air, and Crankcase Vacuum System, Revision 9
2512-26917, Emergency Generator Fuel Oil System, Revision 23
25203-26008, Sheet 2, P&ID Service Water, Revision 115
25203-26015, Sheet 1, P&ID Reactor Building Closed Cooling Water System, Revision 45
25203-26008, Sheet 2, P&ID Service Water, Revision 115

Work Orders
53103049922

Miscellaneous
Receipt Inspection Report Package 4500357609-00003-000000255312

Section 1R05: Fire Protection

Procedures
U2-24-FFS-BAP01-INT, MSP2 Fire Fighting Strategies, Fire Area T-4, Steam Driven Auxiliary Feed Pump Pit
U2-24-FFS, Millstone Unit 2 Fire Fighting Strategies, Revision 0
U3-24-FFS, Millstone Unit 3 Fire Fighting Strategies, Revision 0
Millstone Unit 2 Fire Hazard Analysis, Revision 11

Condition Reports
1058675

Section 1R06: Flood Protection Measures

Procedures
SA-AA-110 Attachment 2, Job Hazard Assessment, dated 20 February, 2017
SA-AA-104 Attachment 2, Confined Space Evaluation Sheet, dated 23 February 2017
ER-AA-NDE-UT-701, Ultrasonic Thickness Measurement Procedure, Revision 6
C MP 715E, General Practices for Flange and Threaded Fasteners, Revision 003
MA-AA-101, Fleet Lifting and Handling, Revision 18

Condition Reports
1237085

Work Orders
53102917834
53102920825
53102947790
53103002857
53102947791

Section 1R07: Heat Sink Performance

Miscellaneous
ETE-MP2016-1136, RBCCW Heat Exchanger Cleaning and Inspection Frequency and Allowable Tube Plugging, Revision 0

Section 1R11: Licensed Operator Requalification Program

Procedures
SP 2651L, Main Stop Valve Operability Test, Revision 004-01
SP 2651M, Combined Intermediate Valves Operability Test, Revision 005
SP 2651N, Main Control Valve Operability Test, Revision 007
ARP 2590C-146, CEA Dropped Rod SW, Revision 0
AOP 2556, CEA Malfunctions, Revision 21

Work Orders
53103036866

Miscellaneous
Reactivity Management Plan, 01-22-17tcv_test_rev-0

Section 1R13: Maintenance Risk Assessments and Emergent Work Control

Procedures
OU-AA-200, Shutdown Risk Management, Revision 10
OU-M2-201, Shutdown Safety Assessment Checklist, Revision 021
NF-AA-PRA-370, Probable Risk Assessment Procedures and Methods: MRule (a)(4) Risk Monitor Guidance, Revision 16
OP-AA-600, Protected Equipment, Revision 4
OP-MP-601, Protected Equipment, Revision 23
RPM 2.2.12, Unit 2 Containment Continuous Air Radiation Monitors, Revision 008

Condition Reports
1062611

Work Orders
53103059899

Miscellaneous
ETE-MP-2017-1003, Millstone Unit 2 – SFP Best Estimate Determination of Heat Removal Requirements for 2R24 Full (or Partial) Core Offload
March 23, 2017 Memorandum on 2R24 Shutdown Risk Schedule Review
EOOS Version 4.1 for Millstone Unit 2 on 1/18/2017
EOOS Version 4.1 for Millstone Unit 2 on 1/10/2017
EOOS Version 4.1 for Millstone Unit 2 on 3/18/2017
EOOS Version 4.1 for Millstone Unit 2 on 2/6/2017
EOOS Version 4.1 for Millstone Unit 2 on 3/1/2017
EOOS Version 4.1 for Millstone Unit 2 on 2/16/2017

Section 1R15: Operability Determinations and Functionality Assessments

Procedures
OP-AA-102, Operability Determinations, Revision 14
EN 31084, Operating Strategy for Service Water Systems, Revision 10
OP 3326, Service Water System, Revision 029
OP-AA-102-1001, Development of Technical Basis to Support Operability Determinations, Revision 11
OP-AA-102-1002, Non-code Repairs for Safety Class 3 Piping, Revision 1
OP-AA-102, Operability Determination, Revision 15
OP 2319B, Condensate Storage and Surge System, Revision 016
ARP 2590D-048, Condensate Storage Tank Temp Lo, Revision 000

Condition Reports

343051	349180	1024216	1045212
1048832	1051732	1056985	1057098
1058105	1058469	1058675	1059770
1061348	1063367	1065262	

Work Orders
53102921781

Miscellaneous
ETE-MP-2015-1083, Millstone Unit 3 Safety Equipment Mission Times
25203-30022, 120VAC Distribution Panel Schedule VR21, Sheet 21, Revision 21
25203-30024, Single Line Diagram 125VDC Emergency & 120VAC Vital Systems, Revision 39
DBS-2344A & B, 480VAC Electrical Distribution Systems, Revision 1
Safety Functional Requirements Manual, Millstone Power Station Unit 2, Revision 11
ETE-MP-2017-1004, Millstone Unit 2 Condensate Storage Tank Minimum Temperature for Operability/Functionality
DBS-2319B, Condensate Storage and Transfer System, Revision 0
RR-04-25, Dominion Nuclear Connecticut, Inc., Millstone Power Station Unit 2 ASME Section XI Relief Request

Section 1R18: Plant Modifications

Procedures
ARP 2590B-073, RCP A REV ROTATION, Revision 000
OP 2387A, Annunciator System Operation and Control, Revision 007-03

Condition Reports
1056613

Maintenance Orders/Work Orders
53103037079

Section 1R19: Post-Maintenance Testing

Procedures
SP 3622.3, Auxiliary Feedwater Pump 3FWA*P2 Operational Readiness Test, Revision 23 (one time use)
SP 3646A.8-009, Containment Isolation Phase A S917-Relay K623, Slave Relay Actuation Test-Train A, Revision 002-02 dated December 19, 2016
SP 3646A.8-009, Containment Isolation Phase A S917-Relay K623, Slave Relay Actuation Test-Train A, Revision 002-02 dated March 16, 2017
SA-AA-110-Attchment 2, Job Hazard Assessment for WO 53102595409, dated July 2, 2013

Condition Reports

1048832	1051732	1056206	1057633
1060140	1060622	1060957	1062497
1062511	1062555	1063470	

Maintenance Orders/Work Orders

53102595409	53102857192	53102866035	53103016319
53103020130	53103030831	53103035862	53103040697
53103049922	53103051779		

Miscellaneous
ETE-MP-2016-1150, MP3 TDAFW (3FWA*P2) Governor Rack Setting Data Acquisition

DM3-00-0374-07, Design Change Notice Add Generic Note for Sliding Link Terminal/Wiring Relocation for Damaged Terminals, dated February 07, 2008
P&ID 25212-31803, Main Control Board 1 Termination Cabinet 3CES*TB-MB10, Revision 19
IB0117, Vendor Technical Manual for Maintenance and Troubleshooting of the LEFM Check and LEFM CheckPlus, Revision 7 dated 24 November, 2003

Section 1R20: Refueling and Other Outage Activities

Procedures
OU-AA-200, Shutdown Risk Management, Revision 10
OU-M2-201, Shutdown Safety Assessment Checklist, Revision 021
OP 2301G, Vacuum Fill of the Reactor Coolant System, Revision 004
AOP 2582, Loss of Spent Fuel Pool Cooling, Revision 003
AOP 2572, Loss of Shutdown Cooling, Revision 012
AOP 2568A, RCS Leak, Mode 4, 5, 6, and Defueled, Revision 005
AOP 2578, Loss of Refuel Pool and Spent Fuel Pool Level, Revision 008
AOP 2558, Emergency Boration, Revision 005-04
OP 2664, Conduct of Outages, Revision 013-02
AOP 2580, Degraded Voltage, Revision 003-06
AOP 2501, Diagnostic for Loss of Electrical Power, Revision 001-06
AOP 2583, Loss of All AC Power During Shutdown Conditions, Revision 006
MP 2712B1, Control of Heavy Loads, Revision 012

Miscellaneous
ETE-MP-2017-1003, Millstone Unit 2 – SFP Best Estimate Determination of Heat Removal Requirements for 2R24 Full (or Partial) Core Offload
March 23, 2017 Memorandum on 2R24 Shutdown Risk Schedule Review

Section 1R22: Surveillance Testing

Procedures
EOP 3509.1, Control Room, Cable Spreading Area or Instrument Rack Room Fire, Revision 020-00
SP 3604A.4, 3CGS*P3C Biennial IST Comprehensive Pump Test, Revision 000-02
OP 3304A, Charging and Letdown, Revision 035
SP 2604D-002, 'B' LPSI Pump and Minimum Flow Header Check IST, Revision 004
CP 3802E, Reactor Coolant Gas Sampling and Analysis, Revision 003
CP 2802N, Primary Systems Sampling and Analysis, Revision 005
Technical Specifications 3.4.6, RCS Leakage Operational, both Units 2 and 3
COP 200.15, RCS Leakage Trending and Investigation, Revision 001-01
SP 3611A.1-002, SSR Valve Remote Position Indication Verification, Revision 010-03

Work Orders
53102986457

Miscellaneous
ETE-MP-2015-1075, 3CHS*P3C C Charging Pump Testing Requirements
25212-MP3-SFR, Safety Functions Requirement Manual, Revision 06
U3-24-IST-ISTBD, MP3 IST Basis Document, Revision 4-001
M2-EV-99-0014, IST Pump Performance Testing Acceptance Criteria Millstone Unit 2, Revision 7

Condition Reports
1058199 1057081 1057062 1057064

Section 1EP6: Drill Evaluation

Procedures
EOP 3509, Fire Emergency, Revision 028
EOP 35, E-0, Reactor Trip or Safety Injection, Revision 032
EOP 35, ES-0.1, Reactor Trip Response, Revision 028
AOP 3577, Loss of Normal and Offsite Power to 4.16kV Emergency Bus, Revision 004

Miscellaneous
March 2017 Unit 3 Training Drill Information

Section 2RS2: Occupational ALARA Planning and Controls

Procedures
MP-PROC-000-RP-AA-101, Radiological Protection Organization and Administration, Rev 2
MP-PROC-000-RP-AA-102, Health Physics Training and Qualification, Revision 1
MP-PROC-000-RP-AA-103, ALARA Program, Revision 2
MP-PROC-000-RP-AA-103-1000, Department, Station, and Fleet ALARA Committees, Rev 5
MP-PROC-000-RP-AA-106, Radiological Work Control Program, Revision 3
MP-PROC-000-RP-AA-107, Radioactive Contamination Control Program, Revision 6
MP-PROC-000-RP-AA-109, Radiological Survey Program, Revision 0
MP-PROC-000-RP-AA-274, Radiation Work Permits, Revision 6
MP-PROC-000-RP-AA-275, Radiological Risk Assessment Process, Revision 2
MP-PROC-000-RP-AA-300, ALARA Reviews and Reports, Revision 8
MP-PROC-000-RP-AA-301, ALARA Goals, Revision 3
MP-PROC-000-RP-AA-303, ALARA 5-Year Plan, Revision 1

Miscellaneous
3R17 Exposure Report
3R17 Outage Lessons Learned – Milestone 49 (for all Millstone groups)
Agenda package, Station ALARA Committee, 1/30/2017
ALARA Challenge Package, 2R23 Snubbers, Scaffolding, & Insulation
ALARA Challenge Package, 3R17 Steam Generator
ALARA Plan 3-16-03
ALARA Plan 3-16-11
ALARA Plan 3-16-13
ALARA Plan 3-16-14
ALARA Plan 3-16-26
ALARA Plan 3-16-35
ALARA Plan Briefing – 3R17 Insulation
ALARA Plan Briefing – 3R17 Scaffolding
ALARA Plan Briefing – 3R17 S/G Sludge Lance & Secondary Side
ALARA Plan Briefing – 3R17 Valve Team
Audit 16-04: “RP/Chemistry/PCP/Millstone Refueling”, dated 6/22/16
Benchmarking Report, “Collective Radiation Exposure – Use of Audio/Visuals in Job Coverage and Engineering Support of Permanent Scaffold Initiatives”, dated 6/30/15.
EPRI Surveys, 2R23
EPRI Surveys, 3R17

"HP Operations 3R17 Lessons Learned"
"Millstone Power Station 5 Year Exposure Reduction Plan", 2016-2021, Revision 0
PA3006414, Benchmarking Performance Improvement Item Related to Permanent Scaffolding for Engineering
PA3006421, Benchmarking Performance Improvement Item Related to a Permanent Scaffolding HIT Team
PIR1035663
Post-Job Review, AP-3-16-03
Post-Job Review, AP-3-16-13
Post-Job Review, AP-3-16-14
Post-Job Review, AP-3-16-26
Radiation Work Permit 3160201, Revision 0
Radiation Work Permit 3160307, Revision 0
Radiation Work Permit 3160308, Revision 1
Radiation Work Permit 3160326, Revision 0
Radiation Work Permit 3160327, Revision 0
Radiation Work Permit 3160331, Revision 0
Radiological Surveys, Unit-2 Containment, Shutdown Entry, on or about 10/3/2015
Radiological Surveys, Unit-3 Containment, Shutdown Entry, on or about 4/10/2016
Report, "3R17 ALARA Outage Report"
Station ALARA Committee Meeting Minutes, various, for 2016
Work In Progress Review, 3-16-03A dated 4/18/16
Work In Progress Review, 3-16-03B dated 4/18/16
Work In Progress Review, 3-16-03C dated 4/20/16
Work In Progress Review, 3-16-03D dated 4/21/16
Work In Progress Review, 3-16-03E dated 4/23/16
Work In Progress Review, 3-16-03F dated 4/23/16
Work In Progress Review, 3-16-11A dated 4/27/16
Work In Progress Review, 3-16-13A dated 4/23/16
Work In Progress Review, 3-16-13B dated 4/29/16
Work In Progress Review, 3-16-14A dated 4/28/16
Work In Progress Review, 3-16-14B dated 5/5/16
Work In Progress Review, 3-16-26B dated 4/22/16
Work In Progress Review, 3-16-26C dated 5/4/16
Work In Progress Review, 3-16-35A dated 10/29/16
Work In Progress Review, 3-16-35B dated 11/5/16
Work In Progress Review, 3-16-35C dated 11/11/16

Condition Reports

1020900	1033546	1058100	1058208
1058462	1058567	1058807	

Section 2RS8: Radioactive Solid Waste Processing and Radioactive Material Handling, Storage, and Transportation

Procedures:
MP-27-RW-PRG, Radioactive Waste Process Control Program, Revision 2
OP-2338C, SRT Resin Transfer and Dewatering, Revision 4
VPROC-OPS16-016, Setup and Operation of Energy Solutions Self-Engaging Dewatering System (SEDS) for Bead Resin/Activated Carbon in 14-215 or Smaller Liners at Millstone Unit 3, Revision 1

VPROC-OPS16-001, ALPS Operation and Maintenance at Millstone Unit 3, Revision 1
RW-46052, Packaging Dry Active Waste, Revision 5-1
RW-46053, Packaging Radioactive Waste Filters, Revision 7
RW-46066, Vehicle Loading, Revision 5
RW-46016, Shipment of Radioactive Waste – Waste Processing Facility, Revision 11
RW-46021, Shipment of Radioactive Waste – Barnwell Waste Management Facility, Revision 13

Quality Assurance
NOD Field Observation Checklist (NODFOB-): 15-056; 15-071; 15-081; 15-111; 16-011; 16-045
Audit 16-04, RP/Chemistry/PCP/Millstone Refueling, 6/22/16
Self-Assessments: 1045315; SAR003135

10 CFR Part 61 Scaling Factors:
Teledyne Brown Engineering, Inc. Report of Analysis for: Unit 1 DAW; Unit 2 DAW; Unit 3 DAW; DMT Sediment; Unit 2 L-16 Filter; Unit 2 CW Filter; Unit 3 LWS 140 Filter; Unit 2 Resin; Unit 3 Resin

Condition Reports
570135
1010281
1028595
1038284

Training
Lion Technology Hazardous Materials Air Shipper Certification (IATA)
Lion Technology Hazardous Materials & Waste Transportation Certification
EnergySolutions DOT/NRC Radioactive Waste Packaging, Transportation and Disposal Training
EnergySolutions Load Securing for Radioactive Materials Training

Shipments
16-032; 16-033; 16-080; 16-135; 16-146

Section 4OA1: Performance Indicator Verification

Miscellaneous
Data Sheets for Unit 2 and 3 Specific Activity for Dose Equivalent Iodine 131
RCS Performance Indicators for RCS Activity for Unit 2 and 3
Data Sheets for Unit 2 and 3 Identified RCS Leakage

Section 4OA2: Problem Identification and Resolution

Procedures
PI-AA-200, Corrective Action, Revision 33
SP 2604AO, HPSI Pump In-service Testing, ≥1,750 psia, Facility 1, Revision 001-02, 002, 005
SP 2604AO-002, 'B' HPSI Pump and Check Valve IST, Facility 1, Revision 001-01, 002, 003
PI-AA-300, Cause Evaluation, Revision 12
PI-AA-300-3001, Root Cause Evaluation, Revision 9
ER-AA-PRS-1001, Plant Health Committee, Revision 10
ER-AA-PRS-1010, Preventive Maintenance Task Basis and Maintenance Strategy, Revision 10

Drawings
25203-26015, Sheet 1, Low Pressure Safety Injection System, Revision 46
25203-26015, Sheet 2, High Pressure Safety Injection System, Revision 48
25203-29048, Sheet 36, Bolted Bonnet Piston Check, Nuclear Class I and II, Revision 3

Condition Reports

0581911	0582013	0582112	1000989
1012769	1012891	1016381	1059508
1044529	1063143	560688	560979

Miscellaneous
M2-EV-98-0205, Technical Evaluation for Passive Failures at MP2, Revision 1
MP2-16-01085, Unit 2 ECCS Suction Header Relief Valve, 2/1/17
ACE 019952, Additional Failure Mode Identified During Development of OD000622, Revision 0
SP 2604AO-002, 'B' HPSI Pump and Check Valve IST, Facility 1, performed June 9, 2015
Plant Health Steering Committee Meeting Minutes, January 18, 2017 and February 1, 2017

Work Order
53102852117
RE107546
RE107548
RE107549
RE107550
RE107551
RE107552
RE107553
RE107554
RE107555

Section 4OA3: Follow-up of Events and Notices of Enforcement Discretion

Procedures
PI-AA-200, Corrective Action, Revision 33
SP 2604AO, HPSI Pump In-service Testing, ≥1,750 psia, Facility 1, Revision 001-02, 002, 005
SP 2604AO-002, 'B' HPSI Pump and Check Valve IST, Facility 1, Revision 001-01, 002, 003

Drawings
25203-26015, Sheet 1, Low Pressure Safety Injection System, Revision 46
25203-26015, Sheet 2, High Pressure Safety Injection System, Revision 48
25203-29048, Sheet 36, Bolted Bonnet Piston Check, Nuclear Class I and II, Revision 3

Condition Reports

0581911	0582013	0582112	1000989
1012769	1012891	1016381	1059508

Miscellaneous
M2-EV-98-0205, Technical Evaluation for Passive Failures at MP2, Revision 1
MP2-16-01085, Unit 2 ECCS Suction Header Relief Valve, 2/1/17
ACE 019952, Additional Failure Mode Identified During Development of OD000622, Revision 0
SP 2604AO-002, 'B' HPSI Pump and Check Valve IST, Facility 1, performed June 9, 2015

Section 4OA5: Other Activities

Procedures
OP 3353.MB7C, Main Board 7C Annunciator Response, Revision 009
OP 3353.MB7C 1-5, Generator Phase Unbalance, Revision 9
TR-AA-100 – Attachment 1, Training Request and Needs Analysis, dated November 18, 2016
OP 3353.MB2C-005-09, RHR Pump Auto Trip/Overcurrent, Revision 001
OP 3353.MB6B, Main Board 6 Annunciator Response, Revision 006
OP 3353.VP1A, Main Ventilation and Air Conditioning Panel VP1A Annunciator Response, Revision 009
ARP 2590E-025 AA-4, SW Pump A Overload/Trip, Revision 001
ARP 2590E-049 A-9, Circ Water Pump A Overload/Trip, Revision 001-00
ARP 2590E-083 C-17, Radwaste Area Supply Fan Overload/Trip, Revision 001
ARP 2590E-144 D-26, Turbine TGR Oil Pump Overload/Temp Hi
ARP 2590B-065 AA-17, RCP A Motor Trip, Revision 001
ARP 2590A-001 A-1, HPSI Pump A Overload/Trip, Revision –001-00
ARP 2590F-022 B-6, Negative Phase Sequence Alarm, Revision 001-00
ARP 2590F-021 A-6, Generator Negative Phase Sequence, Revision 001-00

Condition Reports
PIR1055780
1057647
582110
1057536
1053879
575805

Miscellaneous
ML14035A458
ML13052A711
NRC Bulletin 2012-01, Design Vulnerability In Electric Power System, dated February 26, 2013
NRC letter, Request for Additional Information Regarding Response to Bulletin 2012-01, dated December 20, 2013
U2 LORP Lesson # S13303, Degraded Grid, E Plan type Scenario, dated May 22, 2013
U3 LORP/STAC Training, dated April 20, 2013

Section 4OA7: Licensee Identified Violations

Procedures
PI-AA-200, Corrective Action, Revision 33
SP 2604AO, HPSI Pump In-service Testing, ≥1,750 psia, Facility 1, Revision 001-02, 002, 005
SP 2604AO-002, ‘B’ HPSI Pump and Check Valve IST, Facility 1, Revision 001-01, 002, 003

Drawings
25203-26015, Sheet 1, Low Pressure Safety Injection System, Revision 46
25203-26015, Sheet 2, High Pressure Safety Injection System, Revision 48
25203-29048, Sheet 36, Bolted Bonnet Piston Check, Nuclear Class I and II, Revision 3

Condition Reports

0581911	0582013	0582112	1000989
1012769	1012891	1016381	1059508

Miscellaneous
M2-EV-98-0205, Technical Evaluation for Passive Failures at MP2, Revision 1
MP2-16-01085, Unit 2 ECCS Suction Header Relief Valve, 2/1/17
ACE 019952, Additional Failure Mode Identified During Development of OD000622, Revision 0
SP 2604AO-002, 'B' HPSI Pump and Check Valve IST, Facility 1, performed June 9, 2015

LIST OF ACRONYMS

AFW	auxiliary feedwater
ALARA	as low as is reasonably achievable
ASME	American Society of Mechanical Engineers
CAP	corrective action program
CFR	*Code of Federal Regulations*
CR	condition report
CS	containment spray
CST	condensate storage tank
CW	circulating water
DRP	Division of Reactor Projects
DRS	Division of Reactor Safety
ECCS	emergency core cooling system
EDG	emergency diesel generator
HPSI	high pressure safety injection
IMC	Inspection Manual Chapter
IST	inservice test
LER	licensee event report
LPSI	low pressure safety injection
NCV	non-cited violation
NRC	Nuclear Regulatory Commission, U.S.
OP	operating procedure
OPC	open phase condition
OM	Operation and Maintenance
RBCCW	reactor building closed cooling water
RWST	refueling water storage tank
TI	temporary instruction
TS	technical specifications
UFSAR	Updated Final Safety Analysis Report
UPS	uninterruptible power supplies
VFD	variable frequency drive
WO	work order