



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

November 12, 2021

Mr. Daniel G. Stoddard
Senior Vice President and Chief Nuclear Officer
Dominion Energy, Inc.
Innsbrook Technical Center
5000 Dominion Blvd.
Glenn Allen, VA 23060-6711

**SUBJECT: MILLSTONE POWER STATION, UNITS 2 AND 3 – INTEGRATED INSPECTION
REPORT 05000336/2021003 AND 05000423/2021003**

Dear Mr. Stoddard:

On September 30, 2021, the U.S. Nuclear Regulatory Commission (NRC) completed an inspection at Millstone Power Station, Units 2 and 3. On October 14, 2021, the 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.

Two findings of very low safety significance (Green) are documented in this report. These findings involved violations of NRC requirements. We are treating these violations as non-cited violations (NCVs) consistent with Section 2.3.2 of the Enforcement Policy.

If you contest the violations or the significance or severity of the violations documented in this inspection report, you should provide a response within 30 days of the date of this inspection report, with the basis for your denial, to the U.S. 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 Power Station, Units 2 and 3.

If you disagree with a cross-cutting aspect assignment in this report, you should provide a response within 30 days of the date of this inspection report, with the basis for your disagreement, to the 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 Power Station, Units 2 and 3.

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 at the NRC Public Document Room in accordance with Title 10 of the *Code of Federal Regulations* 2.390, "Public Inspections, Exemptions, Requests for Withholding."

Sincerely,

Daniel L. Schroeder, Chief
Projects Branch 2
Division of Operating Reactor Safety

Docket Nos. 05000336 and 05000423
License Nos. DPR-65 and NPF-49

Enclosure:
As stated

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SUBJECT: MILLSTONE POWER STATION, UNITS 2 AND 3 – INTEGRATED INSPECTION REPORT 05000336/2021003 AND 05000423/2021003 DATED NOVEMBER 12, 2021

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**U.S. NUCLEAR REGULATORY COMMISSION
Inspection Report**

Docket Numbers: 05000336 and 05000423

License Numbers: DPR-65 and NPF-49

Report Numbers: 05000336/2021003 and 05000423/2021003

Enterprise Identifier: I-2021-003-0012

Licensee: Dominion Energy Nuclear Connecticut, Inc.

Facility: Millstone Power Station, Units 2 and 3

Location: Waterford, CT 06385

Inspection Dates: July 1, 2021, to September 30, 2021

Inspectors: J. Fuller, Senior Resident Inspector
E. Allen, Resident Inspector
E. Bousquet, Resident Inspector
C. Bickett, Senior Reactor Inspector
P. Cataldo, Senior Reactor Inspector
J. Demarshall, Senior Operations Engineer
L. Grimes, Resident Inspector
T. Hedigan, Operations Engineer
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S. Wilson, Senior Health Physicist

Approved By: Daniel L. Schroeder, Chief
Projects Branch 2
Division of Operating Reactor Safety

Enclosure

SUMMARY

The U.S. Nuclear Regulatory Commission (NRC) continued monitoring the licensee’s performance by conducting an integrated inspection at Millstone Power Station, Units 2 and 3, in accordance with the Reactor Oversight Process. The Reactor Oversight Process is the NRC’s program for overseeing the safe operation of commercial nuclear power reactors. Refer to <https://www.nrc.gov/reactors/operating/oversight.html> for more information.

List of Findings and Violations

The Licensee Did Not Implement Abnormal Operating Procedure for Predicted Local Intense Precipitation Event Prior to the Storm Arrival On-Site			
Cornerstone	Significance	Cross-Cutting Aspect	Report Section
Mitigating Systems	Green NCV 05000336/2021003-01 Open/Closed	[H.14] - Conservative Bias	71111.01
The inspectors identified a Green finding and associated non-cited violation (NCV) of Technical Specification (TS) 6.8, “Procedures,” when the licensee did not recognize that the entry conditions for Abnormal Operating Procedure (AOP) 2560, “Storms, High Winds, and High Tides,” were met on September 1, 2021, and failed to initiate actions described in Attachment C, “Response to a Local Intense Precipitation Event,” of AOP 2560 prior to the storm arrival on-site.			

Failure to Control Activities in a High Radiation Area <1000 mrem/hr			
Cornerstone	Significance	Cross-Cutting Aspect	Report Section
Occupational Radiation Safety	Green NCV 05000336,05000423/2021003-02 Open/Closed	[H.8] - Procedure Adherence	71124.02
A finding of very low safety significance (Green) and associated NCV of TS 6.12, “High Radiation Area,” was self-revealed on June 15, 2021, for failure to provide access to, and activities in a high radiation area controlled by means of a radiation work permit (RWP) that includes specification of radiation dose rates in the immediate work area(s). Specifically, two site workers conducted activities in a high radiation area without being knowledgeable of the dose rates in that specific area and without benefit of any other radiation protection equipment and measures that may have been prescribed for the activity, as required by the TS. This resulted in the workers receiving unplanned dose exposures and one receiving a dose rate alarm.			

Additional Tracking Items

None.

PLANT STATUS

Units 2 and 3 began the inspection period at rated thermal power. On August 22, 2021, both units proactively reduced power to 82 percent prior to the arrival of Tropical Storm Henri. Both units returned to rated thermal power on August 23, 2021, and remained at or near rated thermal power for the remainder of the inspection period.

INSPECTION SCOPES

Inspections were conducted using the appropriate portions of the inspection procedures (IPs) in effect at the beginning of the inspection unless otherwise noted. Currently approved IPs with their attached revision histories are located on the public website at <http://www.nrc.gov/reading-rm/doc-collections/insp-manual/inspection-procedure/index.html>. Samples were declared complete when the IP requirements most appropriate to the inspection activity were met consistent with Inspection Manual Chapter (IMC) 2515, "Light-Water Reactor Inspection Program - Operations Phase." The inspectors reviewed selected procedures and records, observed activities, and interviewed personnel to assess licensee performance and compliance with Commission rules and regulations, license conditions, site procedures, and standards.

Starting on March 20, 2020, in response to the National Emergency declared by the President of the United States on the public health risks of the coronavirus (COVID-19), resident and regional inspectors were directed to begin telework and to remotely access licensee information using available technology. During this time, the resident inspectors performed periodic site visits each week, increasing the amount of time on-site as local COVID-19 conditions permitted. As part of their on-site activities, resident inspectors conducted plant status activities as described in IMC 2515, Appendix D, "Plant Status"; conducted routine reviews using IP 71152, "Problem Identification and Resolution"; observed risk significant activities; and completed on-site portions of IPs. In addition, resident and regional baseline inspections were evaluated to determine if all or a portion of the objectives and requirements stated in the IP could be performed remotely. If the inspections could be performed remotely, they were conducted per the applicable IP. In some cases, portions of an IP were completed remotely and on-site. The inspections documented below met the objectives and requirements for completion of the IP.

REACTOR SAFETY

71111.01 - Adverse Weather Protection

Impending Severe Weather (IP Section 03.02) (2 Samples)

- (1) The inspectors evaluated the adequacy of the overall preparations to protect risk-significant systems from impending severe weather associated with Tropical Storm Henri on August 22, 2021.
- (2) The inspectors evaluated the adequacy of the overall preparations to protect risk-significant systems from impending severe weather associated with the remnants of Hurricane Ida on September 1, 2021.

71111.04 - Equipment Alignment

Partial Walkdown (IP Section 03.01) (2 Samples)

The inspectors evaluated system configurations during partial walkdowns of the following systems/trains:

- (1) Unit 2 'B' containment spray system on August 19, 2021
- (2) Unit 3 'C' component cooling system on September 10, 2021

71111.05 - Fire Protection

Fire Area Walkdown and Inspection (IP Section 03.01) (7 Samples)

The inspectors evaluated the implementation of the fire protection program by conducting a walkdown and performing a review to verify program compliance, equipment functionality, material condition, and operational readiness of the following fire areas:

- (1) Unit 3 waste disposal building liquid waste floor area (fire area WBD-1A on the 24'-6" elevation) on July 1, 2021
- (2) Unit 3 turbine building lube oil reservoir and conditioner (fire area TB-4) and battery room number 6 (fire area TB-3) on July 7, 2021
- (3) Unit 2 enclosure building filtration room (fire area A-14D on the 14'-6" elevation) on July 15, 2021
- (4) Unit 3 boron recovery tank enclosure (fire area BRT-1) on July 26, 2021
- (5) Unit 3 refueling water recirculation pump cubicle (fire area ESF-7) on July 27, 2021
- (6) Unit 2 cask washdown pit (fire area A-14E) on August 12, 2021
- (7) Unit 2 security diesel enclosure building (fire area Y-14) on August 17, 2021

71111.07A - Heat Sink Performance

Annual Review (IP Section 03.01) (1 Sample)

The inspectors evaluated readiness and performance of:

- (1) Unit 3 'B' component cooling water heat exchanger on September 8, 2021

71111.11B - Licensed Operator Requalification Program and Licensed Operator Performance

Licensed Operator Requalification Program (IP Section 03.04) (1 Sample)

- (1) Biennial Requalification Written Examinations

The inspectors evaluated the quality of the licensed operator biennial requalification written examination administered November to December 2020.

Annual Requalification Operating Tests

The inspectors evaluated the adequacy of the facility licensee's annual requalification operating test.

Administration of an Annual Requalification Operating Test

The inspectors evaluated the effectiveness of the facility licensee in administering requalification operating tests required by 10 CFR 55.59(a)(2) and that the facility licensee is effectively evaluating their licensed operators for mastery of training objectives.

Requalification Examination Security

The inspectors evaluated the ability of the facility licensee to safeguard examination material, such that the examination is not compromised.

Remedial Training and Re-examinations

The inspectors evaluated the effectiveness of remedial training conducted by the licensee and reviewed the adequacy of re-examinations for licensed operators who did not pass a required requalification examination.

Operator License Conditions

The inspectors evaluated the licensee's program for ensuring that licensed operators meet the conditions of their licenses.

Control Room Simulator

The inspectors evaluated the adequacy of the facility licensee's control room simulator in modeling the actual plant and for meeting the requirements contained in 10 CFR 55.46.

Problem Identification and Resolution

The inspectors evaluated the licensee's ability to identify and resolve problems associated with licensed operator performance.

71111.11Q - Licensed Operator Requalification Program and Licensed Operator Performance

Licensed Operator Performance in the Actual Plant/Main Control Room (IP Section 03.01) (2 Samples)

- (1) The inspectors observed and evaluated licensed operator performance in the Unit 2 control room during a 4.5 gallon per minute identified leak from the reactor coolant system to the primary drains tank on July 27, 2021
- (2) The inspectors observed and evaluated licensed operator performance in the Unit 3 control room during Tropical Storm Henri on August 22, 2021.

Licensed Operator Requalification Training/Examinations (IP Section 03.02) (2 Samples)

- (1) The inspectors observed and evaluated licensed operator performance during requalification training in the Unit 3 simulator on July 14, 2021.
- (2) The inspectors observed and evaluated licensed operator performance during requalification training in the Unit 2 simulator on September 8, 2021.

71111.12 - Maintenance Effectiveness

Maintenance Effectiveness (IP Section 03.01) (2 Samples)

The inspectors evaluated the effectiveness of maintenance to ensure the following structures, systems, and components remain capable of performing their intended function:

- (1) Unit 3 maintenance rule functional failure evaluation for 'A' emergency diesel generator unable to start locally on July 13, 2021 (CR1176767)
- (2) Unit 3 auxiliary feedwater flow transmitter issues (CR1139572, CR1158749, CR1158754, and CR1158756) on September 15, 2021

71111.13 - Maintenance Risk Assessments and Emergent Work Control

Risk Assessment and Management (IP Section 03.01) (6 Samples)

The inspectors evaluated the accuracy and completeness of risk assessments for the following planned and emergent work activities to ensure configuration changes and appropriate work controls were addressed:

- (1) Unit 3 elevated risk and associated risk mitigation actions for the 'A' emergency diesel generator output breaker not closing from the local diesel panel during local operation testing on July 14, 2021
- (2) Unit 3 elevated risk due to station black out diesel maintenance, recirculation system maintenance, and failure of boric acid pump (3CHS*P2B) on July 19, 2021
- (3) Unit 3 elevated risk and associated risk mitigation actions for Bus 34D under-voltage testing, which was the protected train while A train of service water was inoperable on July 28, 2021
- (4) Unit 2 elevated risk and associated risk mitigation actions due to 'A' train of spent fuel pool cooling unavailability during maintenance to replace the heat exchanger relief valves on August 9, 2021
- (5) Unit 2 elevated risk and associated risk mitigation actions due to 'A' emergency diesel generator unavailability during maintenance on August 28, 2021
- (6) Unit 3 elevated risk from pressurizer power operated relief valve (3RCS*PCV455A) isolated, one service water pump out of service (3SWP*P1C), and associated risk mitigation actions for 'A' train solid state protection system operational test on September 8, 2021

71111.15 - Operability Determinations and Functionality Assessments

Operability Determination or Functionality Assessment (IP Section 03.01) (6 Samples)

The inspectors evaluated the licensee's justifications and actions associated with the following operability determinations and functionality assessments:

- (1) Unit 2 operability evaluation for engineered safeguards actuation system automatic testing system failure on July 1, 2021 (CR1176123)
- (2) Unit 3 operability evaluation for steam driven auxiliary feedwater pump turbine speed delay during quarterly surveillance testing on July 6, 2021 (CR1176384 and CR1177426)

- (3) Unit 3 'A' emergency diesel generator breaker would not close on July 13, 2021 (CR1176767)
- (4) Unit 3 operability evaluation, compensatory actions, and repair of through-wall leak on the 'A' train service water strainer blowdown line on July 26, 2021 (CR1177576)
- (5) Unit 2 operational decision-making checklist to operate the remainder of the cycle with pressurizer spray flow control valve (2-RC-100F) isolated due to excessive package leakage on July 27, 2021 (CR1177654)
- (6) Unit 3 instantaneous overcurrent relay associated with the "C" phase of 'A' emergency diesel generator breaker on August 6, 2021 (CR1178285)

71111.18 - Plant Modifications

Temporary Modifications and/or Permanent Modifications (IP Section 03.01 and/or 03.02) (2 Samples)

The inspectors evaluated the following temporary or permanent modifications:

- (1) Unit 2 temporary modification and alternate plant configuration for isolation of 4.5 gallon per minute reactor coolant system leakage from pressurizer spray valve packing (2-RC-100F) to the primary drain tank on July 27, 2021 (CR1177654)
- (2) Unit 3 permanent modification of the 'B' component cooling water heat exchanger (M33CCP*E1B) by adding epoxy coating to the tube-sheet on September 9, 2021 (CR1143479)

71111.19 - Post-Maintenance Testing

Post-Maintenance Test (IP Section 03.01) (7 Samples)

The inspectors evaluated the following post-maintenance test activities to verify system operability and functionality:

- (1) Unit 3 'A' emergency diesel generator output breaker repair and testing after output breaker failure to close from the local diesel panel during local operation testing on July 14, 2021
- (2) Units 2 and 3 station blackout diesel black start test after replacement of the batteries and performance of other preventive maintenance on July 21, 2021 (WO53203225332)
- (3) Unit 3 turbine driven auxiliary feedwater pump after replacement of pump relay and limit switches on July 27, 2021 (WO53203315762 and CR1177426)
- (4) Unit 3 'B' chilled water system (HVK) valve test after control building A/C chiller service water return valve (3SWP*48) failure to open on August 19, 2021 (WO53203317339 and CR1179018)
- (5) Unit 3 'A' emergency diesel generator after planned maintenance outage from August 30 to September 1, 2021
- (6) Unit 2 motor control center normal ventilation test after maintenance of the enclosure air cooler (M2A/C-3) and performance of other preventive maintenance on September 7, 2021 (WO53102835034)
- (7) Unit 3 'B' component cooling water heat exchanger after epoxy coatings applied to tube bundle sheet on September 21, 2021 (WO53203311053)

71111.20 - Refueling and Other Outage Activities

Refueling/Other Outage (IP Section 03.01) (1 Partial)

- (1) (Partial)
The inspectors reviewed licensee activities associated with the planning and preparation for the upcoming Unit 2 refueling outage (2R27).

71111.22 - Surveillance Testing

The inspectors evaluated the following surveillance tests:

Surveillance Tests (other) (IP Section 03.01) (2 Samples)

- (1) Unit 3 'B' emergency diesel generator 24-hour endurance testing on August 13, 2021
- (2) Unit 3 operability test on residual heat removal valve 3RHS*HCV606, 'A' heat exchanger flow control valve, on September 1, 2021 (SP 3610A.7, CR1179893, and WO53102523721)

Inservice Testing (IP Section 03.01) (1 Sample)

- (1) Unit 2 low pressure safety injection pump and minimum recirculation check valve inservice testing on August 2, 2021

RADIATION SAFETY

71124.02 - Occupational As Low As Reasonably Achievable (ALARA) Planning and Controls

Radiological Work Planning (IP Section 03.01) (4 Samples)

The inspectors evaluated the licensee's radiological work planning for the following activities:

- (1) Unit 2 in-core instrumentation ALARA plan number 2-18-04A, RWP number 2180115
- (2) Unit 3 ALARA plan number 3-19-02, work-in-process number 3-19-02B, RWP/task number 3190306
- (3) Millstone department ALARA committee meeting minutes for March 2, 2020, September 16, 2020, February 18, 2021, and September 14, 2021
- (4) Unit 2 dry fuel storage ALARA review, evaluation number AP-2-21-86, RWP number 2210086

Verification of Dose Estimates and Exposure Tracking Systems (IP Section 03.02) (5 Samples)

The inspectors evaluated dose estimates and exposure tracking:

- (1) The inspectors reviewed the following ALARA planning documents:
 - Unit 2 in-core detector replacement post job review for ALARA, evaluation number 2-18-04A, RWP number 2180115
- (2) Additionally, the inspectors reviewed the following radiological outcome evaluations:
 - Unit 2 dry fuel storage post job review for ALARA, evaluation number AP-2-21-86, RWP number 2210086

- (3) Work-in-progress ALARA review number 3-19-11A, April 2019, refueling outage valve work, RWP number 3190327
- (4) Unit 3 dry fuel storage ALARA plan, evaluation number AP-3-19-36, RWP number 3190086
- (5) Work-in-progress report for ALARA, review number 3-19-02B, April 2019, steam generator primary side work, RWP number 3190306

Implementation of ALARA and Radiological Work Controls (IP Section 03.03) (3 Samples)

The inspectors reviewed the following ALARA practices and radiological work control activities:

- (1) Unit 3 equipment operator activities in containment under RWP number 3210093, task 2
- (2) Unit 3 +24-foot elevation radiation streaming during initial fuel movement during refuel, condition report number 1158007
- (3) Grayloc disassembly and reassembly TEDE ALARA review dated March 24, 2020; respiratory protection was required based on the evaluation

Radiation Worker Performance (IP Section 03.04) (1 Sample)

The inspectors evaluated radiation worker and radiation protection technician performance during:

- (1) Unit 3 outage equipment operator reactor coolant sampling in containment under RWP number 3210093, task 2

71124.04 - Occupational Dose Assessment

Internal Dosimetry (IP Section 03.03) (1 Sample)

The inspectors evaluated the internal dosimetry program implementation.

- (1) The inspectors reviewed the following:
 - Internal and external dose assessment number RP-21-11, following personal contamination event number M3-L1-21-026, dated July 2, 2021

Special Dosimetric Situations (IP Section 03.04) (1 Sample)

The inspectors evaluated the following special dosimetric situation:

- (1) Licensee's implementation of requirements to manage radiation protection of declared pregnant workers for one worker

OTHER ACTIVITIES – BASELINE

71151 - Performance Indicator Verification

The inspectors verified licensee performance indicators submittals listed below:

MS05: Safety System Functional Failures (SSFFs) (IP Section 02.04) (2 Samples)

- (1) Unit 2 (July 1, 2020 - June 30, 2021)
- (2) Unit 3 (July 1, 2020 - June 30, 2021)

MS06: Emergency AC Power Systems (IP Section 02.05) (2 Samples)

- (1) Unit 2 (July 1, 2020 - June 30, 2021)
- (2) Unit 3 (July 1, 2020 - June 30, 2021)

MS07: High Pressure Injection Systems (IP Section 02.06) (2 Samples)

- (1) Unit 2 (July 1, 2020 - June 30, 2021)
- (2) Unit 3 (July 1, 2020 - June 30, 2021)

MS08: Heat Removal Systems (IP Section 02.07) (2 Samples)

- (1) Unit 2 (July 1, 2020 - June 30, 2021)
- (2) Unit 3 (July 1, 2020 - June 30, 2021)

MS09: Residual Heat Removal Systems (IP Section 02.08) (2 Samples)

- (1) Unit 2 (July 1, 2020 - June 30, 2021)
- (2) Unit 3 (July 1, 2020 - June 30, 2021)

MS10: Cooling Water Support Systems (IP Section 02.09) (2 Samples)

- (1) Unit 2 (July 1, 2020 - June 30, 2021)
- (2) Unit 3 (July 1, 2020 - June 30, 2021)

71152 - Problem Identification and Resolution

Semiannual Trend Review (IP Section 02.02) (1 Sample)

The inspectors reviewed the licensee's implementation of its corrective action program related to the following issues:

- (1) Units 2 and 3 instrument calibration trends

Annual Follow-up of Selected Issues (IP Section 02.03) (2 Samples)

The inspectors reviewed the licensee’s implementation of its corrective action program related to the following issues:

- (1) Unit 3 pressurizer steam space small line safety classification (CR1113539, CR317820, and CR324064)
- (2) Unit 3 post-trip undesired cooldown events

INSPECTION RESULTS

The Licensee Did Not Implement Abnormal Operating Procedure for Predicted Local Intense Precipitation Event Prior to the Storm Arrival On-Site			
Cornerstone	Significance	Cross-Cutting Aspect	Report Section
Mitigating Systems	Green NCV 05000336/2021003-01 Open/Closed	[H.14] - Conservative Bias	71111.01
<p>The inspectors identified a Green finding and associated NCV of TS 6.8, “Procedures,” when the licensee did not recognize that the entry conditions for AOP 2560, “Storms, High Winds, and High Tides,” were met on September 1, 2021, and failed to initiate actions described in Attachment C, “Response to a Local Intense Precipitation Event,” of AOP 2560 prior to the storm arrival on-site.</p> <p><u>Description:</u> On September 1, 2021, when the remnants of Hurricane Ida moved through the area, Unit 2 experienced a significant rainfall event.</p> <p>Official forecast information from the Connecticut Division of Emergency Management and Homeland Security (DEMHS) and the National Weather Service (NWS) had predicted rainfall rates that could meet the criteria for a local intense precipitation (LIP) event. An LIP event is defined as “rainfall greater than or equal to 3 inches in a 6-hour period within the next 12-hour period.” Unit 2 did not initiate actions in response to a predicted LIP event until 8:15 p.m. by which time the consequential rainfall event was in progress.</p> <p>Unit 2 had established AOP 2560, "Storms, High Winds, and High Tides," Revision 21, to provide operators with steps to place Unit 2 in a safe condition prior to an LIP event. One of the entry conditions for this AOP is notification of a predicted LIP event, which could come from any official local weather forecast. AOP 2560 includes a note that states, “the actions of this attachment should be initiated greater than or equal to 12 hours prior to the storm arrival on-site,” and the AOP assumes that all the LIP flood protection measures can be implemented within 5 hours from the LIP trigger, and that the requirement to initiate the LIP flood protection actions would start 12 to 24 hours prior to the arrival of the storm.</p> <p>On the morning of September 1, 2021, the NRC inspectors assessed the licensee's storm preparations, which included a meeting with plant supervision regarding current weather forecasts. The inspectors noted that licensee management was monitoring the storm and stated that they would enter the AOP if conditions met the entry criteria.</p> <p>The inspectors identified that the Connecticut DEMHS and other local weather data from the NWS warned of a possible LIP event as early as 11:00 a.m. on September 1, 2021.</p>			

Specifically, the 11:00 a.m. DEMHS forecast indicated the potential for up to 6 inches of rain between 9:00 p.m. (September 1, 2021) and 2:00 a.m. (September 2, 2021) and rainfall rates of 1 to 2 inches per hour. Subsequent reports from DEMHS at 5:15 p.m. and 7:00 p.m. on September 1, 2021, provided even more clarity that the site might experience an LIP event, with potential rainfall rates of 3 to 4 inches per hour. The 6-hour quantitative precipitation forecast issued by the NWS at 1:48 p.m. on September 1, 2021, indicated the potential for 2.5 to 4 inches of rain along the Connecticut coastline near Millstone Power Station. Subsequent forecasts issued at 4:39 p.m. and 6:10 p.m. also predicted a high probability of an LIP event.

The licensee determined that control room operators were not provided the most accurate and conservative forecast data. The licensee also stated that information provided to the operators did predict a significant rainfall event but did not meet the criteria for an LIP because 3 inches of rain was forecast to fall over a 7-hour period versus a 6-hour period.

The licensee stated that control room operators were not aware of the updates from DEMHS until 8:15 p.m., at which time they did enter Attachment C, "Response to a Local Precipitation Event," of AOP 2560 and took immediate action to begin closing the required flood gates. Given the limited staff and time available (heavy rains already beginning), plant personnel prioritized closure of flood gates for high-risk areas such as the fire pump house and emergency diesel generators. However, the inspectors noted that the flood door to the direct current switchgear room, which contains the safety-related batteries, inverters, and chargers, was not reported closed until 10:43 p.m. Moreover, flood gates number 5 (Unit 2 Health Physics Facility Door) and number 6 (Auxiliary Building Railroad Access Building) were not closed during the LIP event. This resulted in flooding of the Unit 2 radiologically controlled area, but no actual adverse impact to safety-related structures, systems, or components.

Historical weather data from the Groton airport indicates that 2.89 inches of rain fell in a 6-hour period, 3.21 inches fell in a 7-hour period, and 3.57 inches fell in a 9-hour period.

Corrective Actions: CR1180154 was written on September 7, 2021, after the NRC raised concerns about the timeliness of the licensee's entry into AOP 2560. The condition report recommends a revision to the AOP to provide more specific guidance regarding the sources of weather forecasting information to be used for determining AOP entry and how to handle significant differences in forecasts. The licensee also created a lesson learned summary that was distributed to the operations department.

Corrective Action References: CR1180154 and CR1181002

Performance Assessment:

Performance Deficiency: The licensee did not comply with TS 6.8 when it failed to recognize that the entry conditions for AOP 2560 were met on September 1, 2021, and did not initiate actions described in Attachment C of AOP 2560 prior to the storm arrival on-site.

Screening: The inspectors determined the performance deficiency was more than minor because it was associated with the Protection Against External Factors attribute of the Mitigating Systems cornerstone and adversely affected the cornerstone objective to ensure the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. Specifically, the failure to enter AOP 2560 when entry conditions were satisfied was a meaningful and substantive reduction of margin because required steps

to protect risk significant structures, systems, and components from external flooding were not taken until after the consequential rainfall event was in progress.

Significance: The inspectors assessed the significance of the finding using Appendix A, "The Significance Determination Process for Findings At-Power." The issue was screened using Exhibit 2, Mitigating Systems Screening Questions. The finding did not involve the loss or degradation of equipment or function specifically designed to mitigate a flooding or severe weather initiating event for greater than 14 days; therefore, the finding screened as Green.

Cross-Cutting Aspect: H.14 - Conservative Bias: Individuals use decision-making practices that emphasize prudent choices over those that are simply allowable. A proposed action is determined to be safe in order to proceed, rather than unsafe in order to stop. Specifically, licensee management did not take a conservative approach to decision making when considering the unpredictability of severe weather events and did not take timely actions to place the plant in a safe condition prior to the arrival of a major storm.

Enforcement:

Violation: TS 6.8, "Procedures," Section 1.a, requires, in part, that written procedures shall be established, implemented, and maintained covering "the applicable procedures recommended in Appendix A of Regulatory Guide 1.33, February 1978."

Section 6.w of Regulatory Guide 1.33, "Quality Assurance Program Requirements (Operation)," February 1978, requires in part, procedures for combatting, "Acts of Nature," including tornados and floods.

Section 1.0, "Purpose," of AOP 2560, "Storms, High Winds, and High Tides," Revision 21, states "This procedure provides the operators with steps to place Unit 2 and Unit 1 in a safe condition during a severe storm, high winds, or high tides."

Section 2.0, "Entry Conditions," of AOP 2560 states, in part, "this AOP is entered from any MODE and any of the following conditions are satisfied: ...Notification of a potential to exceed 3 inches of rainfall in any 6-hour period within the next 12 hours (Local Intense Precipitation - LIP)."

Attachment C, "Response to a Local Intense Precipitation Event," of AOP 2560 states that "the actions of this attachment should be initiated greater than or equal to 12 hours prior to the storm arrival on-site."

Contrary to the above, on September 1, 2021, from 11:00 a.m. to 8:15 p.m., when official weather updates from the Connecticut DEMHS and the National Weather Service warned of rainfall rates that could exceed the criteria for an LIP event beginning within the next 12 hours, the licensee did not recognize that the entry conditions for AOP 2560, "Storms, High Winds, and High Tides," were met. As a result, the licensee failed to initiate actions described in Attachment C, "Response to a Local Intense Precipitation Event," of AOP 2560 prior to the storm arrival on-site.

Enforcement Action: This violation is being treated as an NCV, consistent with Section 2.3.2 of the Enforcement Policy.

Failure to Control Activities in a High Radiation Area <1000 mrem/hr			
Cornerstone	Significance	Cross-Cutting Aspect	Report Section
Occupational Radiation Safety	Green NCV 05000336,05000423/2021003-02 Open/Closed	[H.8] - Procedure Adherence	71124.02
<p>A finding of very low safety significance (Green) and associated NCV of TS 6.12, "High Radiation Area," was self-revealed on June 15, 2021, for failure to provide access to, and activities in a high radiation area controlled by means of a RWP that includes specification of radiation dose rates in the immediate work area(s). Specifically, two site workers conducted activities in a high radiation area without being knowledgeable of the dose rates in that specific area and without benefit of any other radiation protection equipment and measures that may have been prescribed for the activity, as required by the TS. This resulted in the workers receiving unplanned dose exposures and one receiving a dose rate alarm.</p> <p><u>Description:</u> On June 15, 2021, during a planned maintenance outage at Unit 3, two workers received a briefing on the radiological conditions for routine activities on RWP 3210093, Task 2, "High Radiation Area (HRA) Operations and Fire Protection activities in CTMT [containment] while Rx [reactor] is shutdown." The entirety of the containment building was posted as a high radiation area, but actual conditions varied throughout the building. The RWP special instructions stated, in part, the requirements for high radiation area entries such as: "Notify Radiation Protection PRIOR to entry (discuss work to be performed); understand the radiological conditions (dose rates) in your work area; and, if you are working in an HRA and get redirected to a different HRA (or any portion of the HRA which you have not been briefed to), then notify HP."</p> <p>While in containment, the workers were redirected by management to acquire a reactor coolant system sample. That activity had not been planned prior to entry and was not included in the radiological briefing the workers had received. The workers failed to notify Health Physics of their added scope and proceeded to a portion of the high radiation area for which they were not briefed. After acquiring the reactor coolant system sample, the workers observed sediment in the sample container and proceeded to clean the bucket that contained the sample. While cleaning the bucket, one operator received a dose rate alarm. Upon receiving the dose rate alarm, the operators placed the work in a safe condition; exited the area; and notified radiation protection as required by the RWP and site procedures.</p> <p>Upon exit from the radiologically controlled area, both individuals alarmed the personal contamination monitors and required skin decontamination before clearing the monitors. The licensee performed whole-body counts and determined that no radioactive materials were ingested or inhaled by the operators. The maximum dose rate measured by the worker's electronic dosimeter was 590 millirem per hour, and the alarm set point was 300 millirem per hour. Based on the licensee's evaluation, the two operators received approximately 21 and 25 millirem to the whole body and the operator who cleaned the sample container received an additional 242 mrem to the skin of the extremity hand.</p> <p>The workers failed to adhere to the RWP requirements for entry into high radiation areas by failing to contact the radiation protection staff when the areas they needed to access and the activities they needed to perform changed from what was described during the initial briefing to enter the high radiation area. The dose rates encountered during that evolution exceeded the anticipated dose rates for the entry causing one operator to experience a dose rate alarm on his self-reading dosimeter and both to receive an unanticipated dose.</p>			

Corrective Actions: Upon identification, the licensee's corrective actions included the following: restricting the workers' access to the radiologically controlled area, coaching the workers on RWP compliance expectations, performing a human performance evaluation, communicating the event to station staff, and providing training to personnel on the lessons learned from the event. This issue was documented in the licensee's corrective action program as condition report number 1175171.

Corrective Action References: CR1175171

Performance Assessment:

Performance Deficiency: The inspectors determined that the failure to control access to and activities in a high radiation area was contrary to TS 6.12, "High Radiation Areas with Dose Not Exceeding 1.0 Rem/Hour at 30 Centimeters from the Radiation Source or from Any Surface Penetrated by the Radiation," and the cause was reasonably within the licensee's ability to foresee and prevent; therefore, this issue is a performance deficiency.

Screening: The inspectors determined the performance deficiency was more than minor because it was associated with the Human Performance attribute of the Occupational Radiation Safety cornerstone and adversely affected the cornerstone objective to ensure the adequate protection of the workers' health and safety from exposure to radiation from radioactive material during routine civilian nuclear reactor operation. The inspectors also found that the performance deficiency rendered a radiation protection program barrier (the RWP) ineffective, and that further supported the more-than-minor determination.

Specifically, failing to adhere to TS 6.12.1, "High Radiation Areas with Dose Not Exceeding 1.0 Rem/Hour at 30 Centimeters from the Radiation Source or from Any Surface Penetrated by the Radiation," Sections (b) and (e), resulted in one worker receiving a dose rate alarm and two workers receiving unplanned dose exposures.

Significance: The inspectors assessed the significance of the finding using IMC 0609, Appendix C, "Occupational Radiation Safety Significance Determination Process." The inspectors determined this finding is of very low safety significance (Green) because it was not an ALARA planning or work control issue, there was no overexposure or substantial potential for an overexposure, and the licensee's ability to assess dose was not compromised.

Cross-Cutting Aspect: H.8 - Procedure Adherence: Individuals follow processes, procedures, and work instructions. The workers' failure to adhere to work instructions caused the workers' exposure to higher dose rates than expected and to receive additional exposure.

Enforcement:

Violation: Unit 3 TS 6.12.1, "High Radiation Areas with Dose Not Exceeding 1.0 Rem/Hour at 30 Centimeters from the Radiation Source or from Any Surface Penetrated by the Radiation," Section (b), states, in part, that "access to, and activities in, each such area shall be controlled by means of an RWP or equivalent; that includes specification of radiation dose rates in the immediate work area(s) and other appropriate radiation protection equipment and measures."

Unit 3 TS 6.12.1, Section (e), states, in part, "...except for individuals qualified in radiation protection procedures, or personnel continuously escorted by such individuals, entry into

such areas [high radiation areas] shall be made only after dose rates in the area have been determined and entry personnel are knowledgeable of them."

Contrary to the above, on June 15, 2021, the licensee failed to control access for two workers with activities in a high radiation area by means of an RWP or equivalent and failed to ensure that entry into such areas were made only after dose rates in the area were determined and entry personnel were knowledgeable of them.

Enforcement Action: This violation is being treated as an NCV, consistent with Section 2.3.2 of the Enforcement Policy.

Observation: Unit 3 Pressurizer Steam Space Small Connected Line Safety Classification	71152
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The inspectors reviewed the licensee's corrective actions associated with Westinghouse Nuclear Safety Advisory Letter (NSAL), NSAL-00-006, "Pressurizer Upper Level Instrument Line Safety Classification," which identified an issue regarding the safety classification of the pressurizer upper level instrument lines. NSAL-00-006 was issued by Westinghouse on April 3, 2000. Westinghouse NSAL 07-09, "Safety Classification of Small Lines Connected to the Pressurizer Steam Space," Revision 1, expanded the scope of NSAL-00-006 to include all instrument lines and other small lines connected to the pressurizer steam space.

The NSAL indicates that a break in an instrument line for the upper (steam side) portion of the pressurizer level instrumentation may result in a rapid depressurization of the reactor coolant system sufficient to cause an emergency core cooling system actuation. This condition is not consistent with the existing classification of the line as Safety Class 2. Specifically, an instrument line connected to the pressurizer whose break results in an emergency core cooling system actuation should be classified as Safety Class 1 in accordance with American National Standards Institute (ANSI) N18.2-1973 and 10 CFR 50.55a(c).

The licensee entered this issue in its corrective action program on December 22, 2008, as CR317820. CR324064 was initiated on February 19, 2009, to track a corrective action to reclassify 10 Unit 3 small bore piping lines from American Society of Mechanical Engineers (ASME) Class 2 to ASME Class 1. This condition report stated that "action is required to bring Millstone Unit 3 in compliance with 10 CFR 50.55a and ANSI N18.2-1971." The licensee determined that the subject instrument lines were operable because "there is minimal quality difference between ASME III Class 1 and Class 2 small diameter piping. Thus, there is no adverse impact upon the capability of these lines to perform their intended safety related pressure boundary design function."

On January 8, 2019, the licensee initiated CR1113539, which documented that the corrective actions for CR317820 had not been completed and there was no active effort to restore compliance with the regulations. In response to CR1113539, the licensee created CA7573638 and CA7573607 to submit a relief request to the NRC. The reactor coolant system pressure boundary was considered operable but not fully qualified.

During the NRC inspection of this issue, the licensee completed engineering technical evaluation number ETE-MP-2021-1041, which established adequate technical justification to support the licensee's initial operability determination. Based on this engineering technical evaluation, the licensee determined that a relief request was not required. Albeit untimely, the licensee's evaluation was appropriate; therefore, the inspectors determined this did not

represent a finding of more-than-minor significance, and the licensee had self-identified the untimely corrective actions in CR1113539.

Observation: Unit 3 Post-Trip Undesired Cooldown Events

71152

The inspectors reviewed condition reports in the Millstone corrective action program related to undesired cooldown events that occurred on April 1 and 13, 2020, which prompted the closure of main steam isolation valves. This review included condition reports CR1163184 and CR1163257, as well as CR1163258 from January 3, 2021, following a minor cooldown transient that resulted from the inadvertent opening of the 'D' main steam atmospheric dump valve due to a controller malfunction.

Following the cooldown events, Millstone personnel implemented corrective actions that included troubleshooting activities conducted in January, February, and April 2021, to determine the source of suspected cycle isolation losses that were considered to be the main contribution to the reactor coolant system cooldowns. These troubleshooting activities utilized existing engineering procedures that contain leak source methodology, in particular, EN 31017, "Secondary Plant Performance Test," Revision 007, as well as the decision making within the troubleshooting process, under MA-AA-103, "Conduct of Troubleshooting," Revision 16.

During the review, the inspectors determined that corrective action and troubleshooting activities were generally consistent with applicable plant procedures, such as PI-AA-200, "Corrective Action," Revision 36. The inspectors, however, identified relevant information detailed in a turbine bypass valve troubleshooting summary data sheet. In particular, information from tailpipe temperatures from February and April 2021 described four of nine turbine bypass valves apparently were "helped" to reseal themselves, due to cycling the upstream isolation valves. As a result, this condition with valves being "not fully closed" allowed steam to flow into the main condenser and potentially contribute to the excessive cooldown events. Additionally, the inspectors identified this as-found condition was not further evaluated within the corrective action program, to determine the cause for the valves not being in a fully closed position, because turbine bypass valves being slightly open could have contributed to the leak-by that resulted in the cooldown events. In addition, the inspectors also identified that no action has been taken to evaluate the 'D' atmospheric dump valve controller malfunction, and no extent of condition had been requested to determine if the other controllers for the 'A', 'B', and 'C' atmospheric dump valves had similar potential malfunctions or other degraded conditions present. This was evidenced by the administrative closure of CR1163258 (written for the 'D' steam generator controller issue) without any corrective action. The inspectors considered these to be missed opportunities to identify these problems with non-safety-related equipment and noted that these issues were entered into their corrective action program as condition report CR1184669.

Notwithstanding, the inspectors determined that Millstone staff were successful in the overall search for cycle isolation losses that resulted in the early closure of main steam isolation valves. Specifically, from a problem identification and resolution perspective, the troubleshooting activities identified four large steam valves that significantly contributed to the cycle isolation losses and noted that these valves are scoped for overhaul during the next refueling outage in 2022, and will remove this major contribution to the cooldown events.

The inspectors determined that (1) the failure to address the cause of the controller malfunction and extent of condition evaluations, and (2) the failure to recognize and address the adverse condition revealed during the upstream isolation valve cycling that effectively

seated four of nine turbine bypass valves, were performance deficiencies. These performance deficiencies, however, regarding the implementation of corrective action program elements, were considered minor due to little or no safety impact; and Millstone entered these deficiencies into the corrective action program for resolution.

Observation: Units 2 and 3 Instrument Calibration Semi-Annual Trend Review	71152
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In reviewing a list of condition reports over the last 2 years related to instrument calibration issues, the inspectors noted several condition reports stating that values were found “outside of acceptance criteria.” The inspectors reviewed a sample of these condition reports to determine whether existing calibration frequencies, preventive maintenance, and corrective actions were adequate. The inspectors reviewed work orders, test results, and discussed instrument calibrations with the licensee engineering and maintenance personnel.

The inspectors noted that the calibration procedures required that condition reports be generated in the corrective action program only for as-found results that exceeded the “allowable range,” as this may indicate a potential impact on the operability of the instrument. The inspectors also noted that the procedures allowed technicians to “calibrate or repair as necessary” to bring as-left parameters into the more restrictive “acceptance criteria” bands. The stricter acceptance criteria bands helped ensure that the instrument remained within the allowable range until the next calibration. Though not required by the calibration procedure, the licensee generated condition reports any time a calibration adjustment was needed, regardless of whether the as-found results exceeded the allowable range. Though this resulted in an increased number of condition reports, this allowed the licensee to trend the calibration results more effectively and potentially detect degradation in instrument performance prior to inoperability. Based on the sample selected, the inspectors determined that the licensee’s actions related to instrument calibrations were appropriate.

EXIT MEETINGS AND DEBRIEFS

The inspectors verified no proprietary information was retained or documented in this report.

- On September 7, 2021, the inspectors presented the Unit 3 post-trip undesired cooldown events focused on problem identification and resolution inspection results to Mr. Jeffry Langan, Licensing Manager, and other members of the licensee staff.
- On September 15, 2021, the inspectors presented the instrument calibration semi-annual trend review inspection results to Mr. Landry Djoukam, Licensing Engineer, and other members of the licensee staff.
- On October 7, 2021, the inspectors presented the radiation protection occupational ALARA planning and control and dose assessment inspection results to Mr. John Dougherty, Site Vice President, and other members of the licensee staff.
- On October 14, 2021, the inspectors presented the integrated inspection results to Mr. John Daugherty, Site Vice President, and other members of the licensee staff.

DOCUMENTS REVIEWED

Inspection Procedure	Type	Designation	Description or Title	Revision or Date
71111.01	Corrective Action Documents Resulting from Inspection	CR1180154 CR1181400		
	Engineering Evaluations	ETE-MP-2018-1006	Millstone Power Station Unit 2 Local Probable Maximum Precipitation Trigger Recommendations	Revision 0
	Procedures	AOP 2560	Storms, High Winds, and High Tides	Revision 21
		BKG AOP 2560	Abnormal Operating Procedure Background Document	Revision 21
MP 2701E		Unit 2 Flood Gates Installation and Removal	Revision 1	
71111.04	Drawings	25212-26921	Reactor Plant Component Cooling System	Revision 34
	Procedures	MP-PROC-OPS-SP 3630A.3	Reactor Plant Component Cooling Water System Train C Valve Alignment Verification	Revision 2
71111.07A	Corrective Action Documents	CR1171579		
	Procedures	SP 3626.13	Service Water Heat Exchangers Fouling Determination	Revision 24
	Work Orders	53203311053		
71111.13	Corrective Action Documents	CR1177043		
	Procedures	NF-AA-PRA-370	Probabilistic Risk Assessment Procedures and Methods: MRule (a)(4) Risk Monitor Guidance	Revision 20
		OP-AA-600	Protected Equipment	Revision 5
		OP-MP-601	Protected Equipment	Revision 35
SP 3446B11		Train A Solid State Protection System Operational Test	Revision 18	
71111.15	Corrective Action Documents	CR1177916 CR1178285		
	Procedures	OP-AA-102	Operability and Functionality Determinations	Revision 15
71111.18	Calculations	12-350	Millstone Unit 3 Required SW Flow Rate to the CCP Heat Exchangers at 80°F During LOOP and During a SIS	Revision 1
		12-350 Addenda A	Millstone Unit 3 Required SW Flow Rate to the CCP Heat Exchangers at 80°F During LOOP and During a SIS	Revision 1

Inspection Procedure	Type	Designation	Description or Title	Revision or Date
	Corrective Action Documents	CR0581970 CR1143479 CR1180218		
	Engineering Evaluations	MP3-21-01114	Unit 3 RPCCW Heat Exchanger Tubesheet and Downtube Coating	Revision 0
71111.19	Procedures	MP-20-WP-GDL40	Pre and Post-Maintenance Testing	Revision 14
		OP-M2-MOP-VEN-007	B51 Vital Switchgear Room Cooling	Revision 2
	Work Orders	53102835034		
71111.22	Procedures	CM-M2-STI-101	Technical Specification Surveillance Test Interval (STI) List	Revision 8
		ER-AA-IST-PMP-101	ASME 1ST Program - Inservice Testing of Pumps Implementation	Revision 8
		MP-PROC-ENG-U2-24-IST-PLAN	MPS Unit 2 IST Program Plan Interval 5	Revision 2
		MP-RECORD-000-U2-24-IST-ISTBD	Pump and Valve Bases Document Interval 5	Revision 0
		SP 2604c	LPSI Pump and Min-Recirc Check Valve IST, Facility 1	Revision 18
71152	Corrective Action Documents	CR1139572 CR1158749 CR1158754 CR1158756 CR1159552 CR1159783 CR1160673 CR1160680 CR1161900 CR1165042 CR1171175 CR1171373 CR8325809		
	Engineering Evaluations	ETE-MP-2021-1041	VOA Review Basis Document for NRC Alternative Request IR-07-9/NSAL-07-9 PZR Small Bore Steam Space Lines	Revision 1
	Procedures	EN 31017	Secondary Plant Performance Test	Revision

Inspection Procedure	Type	Designation	Description or Title	Revision or Date
				007-02

71152	Work Orders	53203244211 53203244302 53203298780 53203305919		
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