



**UNITED STATES  
NUCLEAR REGULATORY COMMISSION**

REGION I  
2100 RENAISSANCE BOULEVARD, SUITE 100  
KING OF PRUSSIA, PENNSYLVANIA 19406-2713

August 9, 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 05000336/2021002 AND 05000423/2021002 AND INDEPENDENT  
SPENT FUEL STORAGE INSTALLATION INSPECTION REPORT  
07200047/2021002**

Dear Mr. Stoddard:

On June 30, 2021, the U.S. Nuclear Regulatory Commission (NRC) completed an inspection at Millstone Power Station, Units 2 and 3. On July 8, 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.

One finding of very low safety significance (Green) is documented in this report. This finding did not involve a violation of NRC requirements.

If you disagree with a cross-cutting aspect assignment or a finding not associated with a regulatory requirement in this report, you should provide a response within 30 days of the date of this inspection report, with the basis for your disagreement, to the 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, 05000423, and 07200047  
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 05000336/2021002 AND 05000423/2021002 AND INDEPENDENT SPENT FUEL STORAGE INSTALLATION INSPECTION REPORT 07200047/2021002 DATED AUGUST 9, 2021

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

Docket Numbers: 05000336, 05000423, and 07200047

License Numbers: DPR-65 and NPF-49

Report Numbers: 05000336/2021002, 05000423/2021002, and 07200047/2021002

Enterprise Identifier: I-2021-002-0020  
I-2021-002-0007

Licensee: Dominion Energy Nuclear Connecticut, Inc.

Facility: Millstone Power Station, Units 2 and 3

Location: Waterford, CT 06385

Inspection Dates: April 1, 2021, to June 30, 2021

Inspectors: J. Fuller, Senior Resident Inspector  
E. Allen, Resident Inspector  
E. Bousquet, Resident Inspector  
B. DeBoer, Health Physicist  
E. Dipaolo, Senior Reactor Inspector  
O. Masnyk Bailey, Health Physicist  
J. Nicholson, Senior Health Physicist  
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

| Failure to Install Normal Station Service Transformers' (NSSTs) Isolated-Phase Bus Duct (IPBD) with Adequate Automatic Drains as Required by Procurement Specification   |   |                                   |                |
|--|---|-----------------------------------|----------------|
| Cornerstone  | Significance                                    | Cross-Cutting Aspect              | Report Section |
| Initiating Events  | Green<br>FIN 05000423/2021002-01<br>Open/Closed | [H.13] -<br>Consistent<br>Process | 71152          |
| A self-revealing finding (FIN) of very low safety significance (Green) was identified for failure to install adequate automatic drains in the NSSTs IPBD in accordance with design change requirements and Procurement Specification MPSPEC-PS-EE-1240. As a result, moisture buildup through a deficient access door gasket collected at a low point of the NSSTs IPBD and resulted in a ground fault on the 'C' phase and a turbine generator and reactor trip on April 1, 2020. |   |                                   |                |

### Additional Tracking Items

| Type | Issue Number         | Title  | Report Section | Status |
|------|----------------------|--|----------------|--------|
| LER  | 05000423/2020-002-00 | LER 2020-002-00 for Millstone Power Station 3, Automatic Reactor Trip Due to Main Generator Ground Fault | 71153          | Closed |

## PLANT STATUS

Unit 2 operated at or near 100 percent rated thermal power (RTP) for the entire inspection period.

Unit 3 began the inspection period at 100 percent RTP. On June 10, 2021, the unit was shut down to Mode 5 to repair the 'A' reactor coolant system pump seal. The unit was returned to 100 percent RTP on June 19, 2021, and remained at or near 100 percent RTP 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 onsite activities, resident inspectors conducted plant status activities as described in IMC 2515, Appendix D; 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

#### External Flooding Sample (IP Section 03.03) (1 Sample)

- (1) The inspectors evaluated Unit 2 intake flood protection barriers, mitigation plans, procedures, and equipment were consistent with the licensee's design requirements and risk analysis assumptions for coping with external flooding on June 4, 2021.

### 71111.04 - Equipment Alignment

#### Partial Walkdown Sample (IP Section 03.01) (6 Samples)

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

- (1) Unit 2 'C' high pressure safety injection system on April 2, 2021
- (2) Unit 2 'B' low pressure safety injection system on April 4, 2021
- (3) Unit 2 4160-volt electrical system vital bus (24E) alignment on May 18, 2021
- (4) Unit 3 'B' auxiliary feed water train after one-time only procedure change to support leak inspection of piping not normally pressurized during routine surveillance testing on May 20, 2021
- (5) Unit 3 control room air conditioning system on June 4, 2021
- (6) Unit 3 residual heat removal system on June 11, 2021

Complete Walkdown Sample (IP Section 03.02) (1 Sample)

- (1) The inspectors evaluated system configurations during a complete walkdown of the Unit 3 emergency diesel generator fuel oil system on June 2, 2021.

71111.05 - Fire Protection

Fire Area Walkdown and Inspection Sample (IP Section 03.01) (6 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 2 boric acid evaporator and tank on the 5'-6" elevation of the auxiliary building (fire area A-1J) on April 2, 2021
- (2) Unit 2 'C' safeguards pump room on the 45'-6" elevation of the auxiliary building (fire area A-4) on April 2, 2021
- (3) Unit 2 east and west battery rooms (fire areas A-22 and A-23) on the 14'-6" elevation on April 6, 2021
- (4) Unit 2 containment recirculation valve room (fire area A-8B) on the 25'-6" elevation on May 7, 2021.
- (5) Unit 3 main transformer deluge building (fire area XR-11) on April 23, 2021
- (6) Unit 3 hydrogen recombiner building (fire area HR-1) on April 28, 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' reactor plant component cooling water heat exchanger on April 27, 2021

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 work planning, risk assessment, scheduling shift priorities, operator work arounds, reactivity manipulations, troubleshooting the safety injection system, and crew turnover on June 2, 2021.

- (2) The inspectors observed and evaluated licensed operator performance in the Unit 3 control room during the plant shutdown, cooldown, and solid reactor coolant system conditions on June 10 and June 11, 2021.

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

- (1) The inspectors observed and evaluated licensed operator requalification training in the Unit 2 simulator on May 11, 2021.
- (2) The inspectors observed and evaluated licensed operator requalification training in the Unit 3 simulator on April 13, 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 (SSCs) remain capable of performing their intended function:

- (1) Unit 2 sump and drains failure to collect water from the refueling water storage tank trench on May 26, 2021
- (2) Unit 3 Maintenance Rule (a)(1) evaluation for plant level event due to plant trip on April 1, 2020

Quality Control (IP Section 03.02) (1 Sample)

The inspectors evaluated the effectiveness of maintenance and quality control activities to ensure the following SSC remains capable of performing its intended function:

- (1) Evaluation of potential suspect counterfeit or fraudulent circuit breakers installed at Millstone Units 2 and 3 (CR1170582)

Aging Management (IP Section 03.03) (1 Sample)

The inspectors evaluated the effectiveness of the aging management program for the following SSCs that did not meet their inspection or test acceptance criteria:

- (1) Licensee-identified degradation (concrete cracking and spalling) of the Unit 2 intake structure during 5-year structural inspection performed in accordance with the structures monitoring program on June 2, 2021

71111.13 - Maintenance Risk Assessments and Emergent Work Control

Risk Assessment and Management Sample (IP Section 03.01) (8 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) Units 2 and 3 elevated risk during offsite line outage from April 19 to April 23, 2021
- (2) Unit 2 elevated risk due to 4160-volt bus 24E aligned to receive power from bus 24C, 383 offsite line outage, and unexpected entry into abnormal operating procedure, Circulating Water Malfunctions (AOP 2517), on June 3 2021
- (3) Unit 2 elevated risk due to hazardous weather outlook, 4160-volt bus 24E aligned to receive power from bus 24C, 'A' charging pump outage, and 'A' diesel generator outage on June 8, 2021
- (4) Unit 2 elevated risk due to 'B' emergency diesel generator maintenance outage from June 21 to June 25, 2021
- (5) Unit 3 high trip risk associated with circulating water system timer relay troubleshooting on April 6, 2021
- (6) Unit 3 elevated risk during 'B' component cooling water train outage, 'B' emergency diesel generator testing, and oscillating 'A' reactor coolant pump seal outlet temperatures on April 27, 2021
- (7) Unit 3 high risk due to circulating water pump 'D' unable to pump in either variable frequency or bypass modes on April 28, 2021
- (8) Unit 3 high shutdown risk during solid reactor coolant system conditions, which is an infrequently conducted or complex evolution, on June 11, 2021

#### 71111.15 - Operability Determinations and Functionality Assessments

##### Operability Determination or Functionality Assessment (IP Section 03.01) (7 Samples)

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

- (1) Unit 2 'A' service water strainer discharge external corrosion in excess of design wall thickness on April 8, 2021 (CR1169729)
- (2) Unit 2 operability evaluation for leakage outside of containment associated with 'A' charging pump packing leakage identified on May 9, 2021 (CR1172397)
- (3) Unit 2 'B' safety injection system loop high pressure conditions due to reactor coolant system back leakage through SI-227 (reactor coolant system (RCS) Loop 1B Boundary Check Valve) on May 25, 2021 (CR1172773)
- (4) Operability evaluation for Unit 2 high pressure safety injection crosstie valve motor with one of the four mounting fasteners found loose on June 1, 2021 (CR1174307)
- (5) Unit 3 engineered safety features building supply fan control flow switch calibrated with out-of-tolerance measuring and test equipment on April 15, 2021 (CR1170263)
- (6) Unit 3 operational decisional making evaluation for elevated and oscillating seal temperatures on the 'A' reactor coolant pump on April 25, 2021 (CR1171060)
- (7) Unit 3 pressurizer level channel 1 (RCS\*LT459) indication exceeded maximum allowable deviation limit on April 29, 2021 (CR1171175, CR1171373, CR1171561)

#### 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 installation of a temporary pressure gauge for monitoring back leakage through RCS loop 1B check valve number 2-SI-227 on May 28, 2021

- (2) Unit 2 replacement of a permanent emergency diesel generator cooling water temperature control switch on June 7, 2021 (WO53203268482)

#### 71111.19 - Post-Maintenance Testing

##### Post-Maintenance Test Sample (IP Section 03.01) (9 Samples)

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

- (1) Unit 2 inboard containment isolation valve 2-GR-11.1, pressurizer drain tank and quench tank vent header isolation, after repair to the limit switch striker arm when the valve failed surveillance testing on March 24, 2021
- (2) Unit 2 low pressure safety injection valve stroke time testing after preventive maintenance (cleaning and inspection) of breaker B5119 for valve 2-SI-625 on April 13, 2021
- (3) Unit 2 lower 4160-volt vital switchgear room cooling after inspection of fan belts, fan bearing lubrication, and inspection of casing, rotating assembly, and drain line on May 5, 2021 (WO53203162201)
- (4) Unit 2 enclosure building filter testing efficiency after replacement of the high efficient particulate air filters and carbon absorbers on June 3, 2021 (WO53203220051)
- (5) Unit 2 'A' emergency diesel generator after planned maintenance outage from June 6 to June 12, 2021 (CR1175038)
- (6) Unit 2 'A' safeguards room recirculation fan after breaker preventive maintenance and 6-year coil cleaning on June 28, 2021 (WO53203151946 and WO53102858147)
- (7) Unit 2 reactor building component cooling water heat exchanger outlet temperature control valve limit switch (2-SW-8.1A) repair on June 30, 2021
- (8) Unit 3 reserve station service transformer 'A' to bus 34C feeder breaker after six-year preventive maintenance and testing on May 10, 2021
- (9) Unit 3 'B' motor driven auxiliary feed water pump after six-year grease replacement in the motor to pump coupling on May 19, 2021 (WO53102837369)

#### 71111.20 - Refueling and Other Outage Activities

##### Refueling/Other Outage Sample (IP Section 03.01) (1 Sample)

- (1) The inspectors evaluated planned maintenance outage activities at Unit 3 from June 10 to June 19, 2021

#### 71111.22 - Surveillance Testing

The inspectors evaluated the following surveillance tests:

##### Surveillance Tests (other) (IP Section 03.01) (3 Samples)

- (1) Unit 2 'B' high pressure safety injection pump test on April 13, 2021
- (2) Unit 2 turbine driven auxiliary feed water pump and recirculation check valve testing on April 28, 2021
- (3) Unit 3 'B' emergency diesel generator fast start operability test on April 27, 2021

FLEX Testing (IP Section 03.02) (1 Sample)

- (1) Triennial testing of MP-BDB-2UB (480 VAC generator) and MP-BDB-1UB (120/240 VAC generator), beyond design basis FLEX equipment on June 9, 2021 (WO53203222503 and WO53203222895)

71114.06 - Drill Evaluation

Drill/Training Evolution Observation (IP Section 03.02) (1 Sample)

The inspectors evaluated:

- (1) Millstone Unit 2 emergency planning drill contributing to the drill and exercise performance and emergency response organization performance indicators on May 4, 2021

**RADIATION SAFETY**

71124.05 - Radiation Monitoring Instrumentation

Walkdowns and Observations (IP Section 03.01) (8 Samples)

The inspectors evaluated the following radiation detection instrumentation during plant walkdowns on May 3 and May 6, 2021:

- (1) Units 1, 2, and 3 area radiation monitors
- (2) Units 2 and 3 portable ion chamber survey instruments available for use
- (3) Units 2 and 3 telepole survey instruments stored 'ready for use'
- (4) Units 2 and 3 personnel contamination monitors at the radiologically controlled area exits
- (5) Units 2 and 3 tool and personal item contamination monitors at the radiologically controlled area exits
- (6) Unit 3 portable ion chamber survey instruments in use on the spent fuel floor
- (7) Unit 3 telepole survey instruments in use on the spent fuel floor
- (8) Ion chamber survey instruments in use in the radioactive waste shipping and storage building

Effluent Monitoring Calibration and Testing Program Sample (IP Sample 03.03) (3 Samples)

The inspectors evaluated the calibration and maintenance of the following radioactive effluent monitoring and measurement instrumentation on May 7, 2021:

- (1) Unit 2 effluent wide range gas monitor number RM-8168
- (2) Unit 2 effluent wide range gas monitor number RM-8169
- (3) Unit 3 gaseous effluent radiation monitor numbers 3HVR19B, 3HVR10B, and 3HVQ49

71124.08 - Radioactive Solid Waste Processing & Radioactive Material Handling, Storage, & Transportation

Radioactive Material Storage (IP Section 03.01) (2 Samples)

- (1) The inspectors walked down and observed all storage areas within the protected area and inspected the postings, labels, and material condition of all containers on May 5, 2021.
- (2) The inspectors evaluated the licensee's performance in controlling, labeling, and securing radioactive materials in the 'bunker' area within the owner-controlled area on May 6, 2021.

Radioactive Waste System Walkdown (IP Section 03.02) (3 Samples)

The inspectors conducted a walkdown and assessed the configuration and functionality of the following radioactive waste processing systems on May 6 and 7, 2021.

- (1) Accessible portions of the Unit 2 solid radioactive waste systems.
- (2) Accessible portions of the Unit 2 liquid radioactive waste systems.
- (3) Accessible portions of the Unit 3 liquid radioactive waste systems.

Shipment Preparation (IP Section 03.04) (1 Sample)

- (1) The inspectors observed that a shipment of valve parts containing limited quantities of radioactive material was prepared according to requirements.

Shipping Records (IP Section 03.05) (1 Sample)

The inspectors evaluated the following non-excepted radioactive material shipment through direct observation of the shipment packaging and preparation as well as a review of the associated records:

- (1) Class B waste shipment, Department of Transportation Package Class Type A, Low Specific Activity-II, Shipment Number 20-073.

**OTHER ACTIVITIES – BASELINE**

71151 - Performance Indicator Verification

The inspectors verified licensee performance indicators submittals listed below:

IE01: Unplanned Scrams per 7000 Critical Hours Sample (IP Section 02.01) (2 Samples)

- (1) Unit 2 (April 1, 2020 - March 31, 2021)
- (2) Unit 3 (April 1, 2020 - March 31, 2021)

IE03: Unplanned Power Changes per 7000 Critical Hours Sample (IP Section 02.02)  
(2 Samples)

- (1) Unit 2 (April 1, 2020 - March 31, 2021)
- (2) Unit 3 (April 1, 2020 - March 31, 2021)

IE04: Unplanned Scrams with Complications Sample (IP Section 02.03) (2 Samples)

- (1) Unit 2 (April 1, 2020 - March 31, 2021)
- (2) Unit 3 (April 1, 2020 - March 31, 2021)

71152 - Problem Identification and Resolution

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 turbine control valve transients (CR1169776, CR1164859, and CR1165242)
- (2) CR114409, Ground fault on Unit 3 24KV isophase bus duct resulted in a turbine and reactor trip on April 1, 2020

71153 - Follow-up of Events and Notices of Enforcement Discretion

Event Report (IP Section 03.02) (1 Sample)

The inspectors evaluated the following licensee event reports (LERs):

- (1) LER 05000423/2020-002-00, Automatic Reactor Trip Due to Main Generator Ground Fault (ADAMS Accession No. ML20149K547). The inspection conclusions associated with this LER are documented in this report under Inspection Results Section (FIN 05000423/2021002-01).

**OTHER ACTIVITIES – TEMPORARY INSTRUCTIONS, INFREQUENT, AND ABNORMAL**

60855 - Operation of an Independent Spent Fuel Storage Installation (ISFSI) (1 sample)

- (1) The inspectors evaluated Millstone Power Station's ISFSI cask loadings on May 10 to 14, 2021, and performed an in-office review of additional information on June 2, 2021. Specifically, the inspectors observed the following activities:
  - Fuel selection and fuel loading
  - Heavy load movement of transfer cask and loaded dry shielded canister
  - Drying and backfill evolutions
  - Closure welding and non-destructive weld evaluations
  - Radiological field surveys

## INSPECTION RESULTS

| Failure to Install Normal Station Service Transformers' (NSSTs) Isolated-Phase Bus Duct (IPBD) with Adequate Automatic Drains as Required by Procurement Specification  |   |                                   |                |
|---|---|-----------------------------------|----------------|
| Cornerstone   | Significance                                    | Cross-Cutting Aspect              | Report Section |
| Initiating Events   | Green<br>FIN 05000423/2021002-01<br>Open/Closed | [H.13] -<br>Consistent<br>Process | 71152          |
| <p>A self-revealing finding (FIN) of very low safety significance (Green) was identified for failure to install adequate automatic drains in the NSSTs IPBD in accordance with design change requirements and Procurement Specification MPSPEC-PS-EE-1240. As a result, moisture buildup through a deficient access door gasket collected at a low point of the NSSTs IPBD and resulted in a ground fault on the 'C' phase and a turbine generator and reactor trip on April 1, 2020.</p> <p><u>Description:</u></p> <p>The inspectors performed an in-depth review of Dominion's actions following the Unit 3 turbine generator and reactor trip on April 1, 2020 (LER 05000423/2020-002-00), due to a ground fault of the 'C' phase of the NSSTs IPBD. The inspectors reviewed the cause analysis, technical evaluations performed, and the corrective actions taken and planned. The inspectors assessed Dominion's problem identification threshold, prioritization of the issue, apparent cause analysis, use of operating experience, and timeliness of corrective actions. The sample was selected due to the impact on the Initiating Event cornerstone.</p> <p>On April 1, 2020, while Millstone Power Station Unit 3 was in Mode 1 at 100 percent reactor power, a main generator/turbine trip occurred that resulted in a reactor trip. The main generator/turbine trip was caused by ground fault on the 'C' phase of the NSSTs IPBD. During normal operation, plant power is provided to the plant (6.9kV) and emergency (4.16kV) buses through the two NSSTs. The NSSTs are supplied 24kV through the main generator IPBD. Following the main generator/turbine trip, station electrical buses fast transferred from the NSSTs to the Reserve Station Service Transformers that are powered from offsite power sources.</p> <p>Dominion determined that the direct cause of the ground fault on the 'C' phase of the NSSTs IPBD was due to moisture intrusion and water buildup in the transition section between the 54-inch diameter 24kV main generator IPBD and the 24-inch diameter NSSTs IPBD. Dominion replaced the NSSTs and associated IPBD in April 2019. Because the new NSSTs IPBD are self-cooled, Dominion installed an air flow seal-off barrier on the 54-inch main generator IPBD to prevent ventilation cooling air for the main generator IPBD from being diverted to the NSSTs IPBD. The air flow seal-off barrier provided an air and watertight seal between the two IPBDs. This created a low point (between the air flow seal-off barrier and a section of 54-inch diameter main generator IPBD before the duct transitioned to the 24-inch NSSTs IPBD) such that any moisture in the NSSTs IPBD would collect and accumulate. Dominion found that a deficient access panel gasket on the NSSTs IPBD allowed rainwater and moisture to enter the duct. With the absence of a drain at the low point in the 54-inch duct section, water accumulated over time and resulted in the ground fault on the 'C' phase of the NSSTs IPBD.</p> |   |                                   |                |

The NSSTs and associated IPBD were modified per Design Change MP3-16-01121, MP3 NSSTs 3STX-XNS-A and 3STX-XNS-B Replacement Project Revision 26. MP3-16-01121 required the design, fabrication, and installation of the NSSTs IPBD to be in accordance with Procurement Specification MP-SPECMP-PS-EE-1240, Millstone Unit 3 NSST Isolated-Phase Bus Duct and Non-Segregated Bus, Revision 1. Specification 1.6.2.2 of MPSPEC-PS-EE-1240 required “A self-cooled isolated-phase bus, that connects both replacement normal station service transformers to main generator isolated-phase bus using the installed main generator isolated-phase bus taps, including conductors, insulators, inspection windows, auto-drains for moisture, dust-tight and weather-tight housing.”

The design, fabrication, and installation of the NSSTs IPBD were provided by an outside vendor under the direction of Dominion. Dominion completed an Engineering Challenge Review on March 28, 2018. This review accepted the design of the NSSTs IPBD; however, the review did not identify the lack of a low point drain on the 54-inch duct section where water could accumulate. Construction of the project was completed on April 12, 2019.

The inspectors determined that Dominion appropriately evaluated the issue, performed thorough extent of condition and extent of cause reviews, performed a thorough review of operating experience, and completed or planned timely corrective actions.

Corrective Actions: Dominion applied additional sealant on access door gaskets for the NSSTs IPBD to prevent water intrusion and installed automatic drains on each phase of the NSSTs IPBD to remove any moisture buildup.

Corrective Action References: CR1144097

Performance Assessment:

Performance Deficiency: The failure to install adequate automatic drains sufficient to remove moisture buildup in the NSSTs IPBD in accordance with MPSPEC-PS-EE-1240, was a performance deficiency that was reasonably within Dominion’s ability to foresee and prevent. As a result, moisture buildup through a deficient access door gasket collected at a low point of the NSSTs IPBD and resulted in a ground fault on the ‘C’ phase. This caused a turbine generator and reactor trip on April 1, 2020.

Screening: The inspectors determined the performance deficiency was more than minor because it was associated with the Design Control attribute of the Initiating Events cornerstone and adversely affected the cornerstone objective to limit the likelihood of events that upset plant stability and challenge critical safety functions during shutdown as well as power operations. Specifically, the failure to install adequate automatic drains sufficient to remove moisture in the NSSTs IPBD resulted in a ground fault and subsequent Unit 3 reactor trip. In addition, this finding was similar to Example 3.b of IMC 0612, Appendix E, “Examples of Minor Issues.” The design requirements of the IPBD were not correctly translated into the drawings and adversely affected the Initiating Events cornerstone objective.

Significance: The inspectors assessed the significance of the finding using Appendix A, “The Significance Determination Process (SDP) for Findings At-Power.” This issue screened as very low safety significance (Green). Although the finding caused a reactor trip, it did not result in the loss of mitigating equipment relied upon to transition to a stable shutdown condition. Upon a loss of the NSSTs, offsite power successfully transferred to the Reserve Service Station Transformers and the unit’s emergency diesel generators remained available.

Cross-Cutting Aspect: H.13 - Consistent Process: Individuals use a consistent, systematic approach to make decisions. Risk insights are incorporated as appropriate. Dominion did not ensure individuals used a consistent, systematic approach when reviewing vendor supplied designs. Dominion determined that engineering reviews of vendor supplied designs was not consistently rigorous or intrusive enough to understand and identify issues with vendor supplied products before design implementation.

Enforcement: The inspectors did not identify a violation of regulatory requirements associated with this finding.

Observation: Unit 3 Turbine Control System Transients

71152

The inspectors reviewed corrective action number 8347169, which documented the level of effort evaluation associated with plant transients on January 29 and February 4, 2021, which occurred when the Unit 3 main turbine control valve (M33MSS-MCV1) unexpectedly closed and reopened without operator action. During both transients, reactor power decreased from approximately 99 percent to 90 percent RTP and then increased up to 95 percent RTP without operator action. The rapid reduction in secondary load caused RCS temperature to rise which was maintained within departure from nucleate boiling limits by automatic rod control and turbine steam dump operation. After rod insertion, followed by load increase (turbine control valve reopening), the rod insertion limit (RIL) was exceeded on control bank "D". A rapid boration was performed as required by technical specifications and rods were restored above the RIL. The initial rise in RCS temperature caused both pressurizer power operated relief valves to open in order to maintain RCS pressure less than 2,350 psia.

Dominion determined that the most probable direct cause was a "failure of the 1SB3-B101 circuit card and its associated K3-1 contact." Moreover, Dominion determined that the "risk mitigation actions associated with using the turbine standby load control were invalidated due to an un-identifiable equipment failure."

The non-safety-related EHC system protects and controls the main turbine under all operating conditions. The turbine control system automatically or manually controls the main turbine control valves, main turbine stop valves, and main turbine combined intercept valves which admit steam to the main turbine.

On January 29, 2021 (CR1164859), the turbine speed sensors leads were swapped and maintenance personnel were reinstalling the frequency to voltage converter card when a turbine valve transient occurred. Dominion formed a prompt issue review team on January 30, 2021 to review the transient and determine the cause. Dominion determined that the most probable cause of the January 29 transient was an equipment issue with the +/- 22-volt power supply. After this transient, station management decided not to perform any additional work on the turbine control system, but did instruct maintenance to remove the previously installed instrumentation and controls troubleshooting equipment.

On February 4, 2021 (CR1165242), when maintenance personnel were removing the test equipment, a second turbine valve transient occurred. The initiator of this event was coincident with removing the test lead installed at the primary speed amplifier output. During this transient, operators observed that CV-1 went full closed and reopened on its own. This was not identified during the first occurrence on January 29 and there was no computer point for this analog parameter.

With this new information, Dominion was able to determine that CV-1 could not be in "standby load control" like the other three control valves. Additional troubleshooting to validate this potential cause was not performed due to the possible risk of inducing a similar event.

During a planned maintenance outage to replace the 'A' reactor coolant pump seal on June 10, 2021, the licensee repaired the turbine control system and replaced the turbine speed sensors.

The inspectors noted that during the transients on January 29 and February 4, 2021, the automatic control systems operated correctly and operator performance was appropriate and in accordance with operating procedures. The inspectors determined that, after the first transient on January 29, it was not within Dominion's ability to identify that CV-1 was not in standby load control and the probable cause at the time, an issue with the power supply, was reasonable given the information available. The inspectors observed that Dominion appropriately evaluated both transients, performed thorough extent of condition and extent of cause reviews, performed a thorough review of operating experience, and completed or planned timely corrective actions. The inspectors also determined that the licensee followed its corrective action and troubleshooting procedures.

## **EXIT MEETINGS AND DEBRIEFS**

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

- On May 7, 2021, the inspectors presented the radiation protection inspection results to Mr. John Daugherty, Site Vice President, and other members of the licensee staff.
- On June 9, 2021, the inspectors presented the independent spent fuel storage installation inspection results to Mr. Michael O'Connor, Plant Manager, and other members of the licensee staff.
- On July 8, 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 |
|----------------------|---|--|---|------------------|
| 60855                | Corrective Action Documents                           | CR 1168712<br>CR 1169614<br>CR 1170065<br>CR 1170155 |   |                  |
|                      | Corrective Action Documents Resulting from Inspection | CR 1172829   |   |                  |
|                      | Engineering Evaluations                               | ETE-NAF-2021-0038                                    | ISFSI Fuel Certification and Loading Map for NUHOMS Canister MPS32PT-L125-A224-HZ042            | Revision 0       |
|                      | Procedures  | OP 2209H   | Dry Shielded Canister Loading (ISFSI)   | Revision 011-00  |
|                      |   | OPS-FH 216   | MPS Fuel Handling Procedure Spent Fuel Handling Operations                                      | Revision 009-00  |
|                      |   | VPROC ENG21-2-003                                    | NUHOMS 32PT DSC Closure Procedure (SPM 9.7)   | Revision 0       |
|                      |   | VPROC NDE 21-002                                     | High Temperature Liquid Penetrant Examination Using the Color Contrast Solvent Removable Method | Revision 0       |
| 71111.01             | Procedures  | AOP 2560   | Storms, High Winds, and High Tides  | Revision 20      |
|                      |   | MP 2721C   | Protection and Restoration of Service Water Pump and Strainer Motor During a PMH                | Revision 9       |
| 71111.04             | Drawings  | 25203-30001  | Millstone Power Station Unit No. 2 Main Single Line Diagram                                     | Revision 51      |
|                      | Procedures  | OP 2343  | 4160 Volt Electrical System   | Revision 25      |
| 71111.12             | Corrective Action Documents                           | CR 1143683<br>CR 1173422                             |   |                  |
|                      | Drawings  | MP-DWG-000-25203-11003                               | Paving Drainage and Fencing Plan and Details  | Revision 14      |
|                      | Miscellaneous   | 02-SSS2336A-1.07                                     | Function Basis Document for 2336A Station Sumps/Drains  | 05/26/2021       |
|                      | Work Orders   | WO 53102841573                                       | Building Structural Inspection - Intake Structure   | Revision 0       |
| 71111.13             | Corrective Action Documents Resulting from Inspection | CR 1174769   |   | 06/08/2021       |

| Inspection Procedure | Type                        | Designation   | Description or Title  | Revision or Date |
|----------------------|-----------------------------|---|---|------------------|
|                      | Procedures                  | NF-AA-PRA-370   | Probabilistic Risk Assessment Procedures and Methods:<br>MRule (a)(4) Risk Monitor Guidance           | Revision 20      |
|                      |                             | OP 3211   | Solid Plant Pressure Control (ICCE)   | Revision 1       |
| 71111.15             | Corrective Action Documents | CR 1172773  |   | 05/13/2021       |
|                      | Drawings                    | 25203-26015   | Piping & Instrument Diagram L.P. Safety Injection System  | Revision 50      |
|                      | Operability Evaluations     | CA8490090   | Evaluate the High B Train Safety Injection Condition in Accordance with the Requirements of OP-AA-101 | 05/19/2021       |
| 71111.18             | Engineering Changes         | MP2-19-01207  | M2TS-8773, M2TS-8775, M2TC-8777, M2TS-8799, MP2 Diesel Gen 'A' Temperature Switch Upgrade             | Revision 0       |
|                      | Engineering Changes         | MP2-21-01117  | Temporary Pressure Gauge for Monitoring Excessive SI to Loop 1B Check Valve Back Leakage              | 05/27/2021       |
| 71111.19             | Corrective Action Documents | CR 1172935  |   | 05/14/2021       |
|                      | Procedures                  | C MP 780A   | GE Model AM Magne - Blast Circuit Breaker PM  | Revision 10      |
|                      |                             | MP-20-WP-GDL40  | Pre- and Post-Maintenance Testing   | Revision 14      |
|                      |                             | SP 2612C  | 2-SW-8.1A Stroke and Remote Position Indication IST   | Revision 2       |
|                      | Work Orders                 | WO 53102841102  | 2-SW-8.1A Valve Missing Its Open Limit Switch Arm   | Revision 0       |
| WO 53203311910       |                             | PM, 6A - 4160V Breaker Preventive Maintenance and Doble Testing | Revision 0  |                  |
| 71111.20             | Procedures                  | OP 3207   | Reactor Shutdown  | Revision 20      |
|                      |                             | OU-AA-200   | Shutdown Risk Management  | Revision 11      |
| 71152                | Corrective Action Documents | CR 1144097<br>CR 1144320  |   |                  |
|                      | Engineering Changes         | Design Change<br>MP3-16-01121                                   | MP3 NSSTs 3STX-XNS-A and 3STX-XNS-B Replacement Project   | Revision 26      |
|                      | Miscellaneous               | 03-NPS3347-1.02   | Maintenance Rule Evaluation, MP3 Plant Trip Due to Generator Protection Actuation                     | 04/15/2020       |
|                      |                             | CA 8039780  | Engineering to Conduct Performance Gap Analysis for Engineering Departments Review of Vendor Inputs   | 06/05/2020       |
|                      |                             | MP-SPECMP-PS-EE-1240  | Millstone Unit 2 NSST Isolated-Phase Bus Duct and Non-Segregated Bus                                  | Revision 1       |