



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

March 17, 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 – TEMPORARY
INSTRUCTION 2515/194 INSPECTION REPORT 05000336/2021012 AND
05000423/2021012

Dear Mr. Stoddard:

On March 4, 2021, the U.S. Nuclear Regulatory Commission (NRC) completed an inspection at Millstone Power Station, Units 2 and 3 and 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.

No findings or violations of more than minor significance were identified during this inspection.

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,

X /RA/

Signed by: Glenn T. Dentel
Glenn T. Dentel, Chief
Engineering Branch 2
Division of 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 – TEMPORARY
 INSTRUCTION 2515/194 INSPECTION REPORT 05000336/2021012 AND
 05000423/2021012 DATED MARCH 17, 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: 05000336/2021012 and 05000423/2021012

Enterprise Identifier: I-2021-012-0004

Licensee: Dominion Energy Nuclear Connecticut, Inc.

Facility: Millstone Power Station, Units 2 and 3

Location: Waterford, CT 06385

Inspection Dates: March 1, 2021 to March 4, 2021

Inspectors: L. Dumont, Reactor Inspector
D. Werkheiser, Senior Reactor Analyst

Approved By: Glenn T. Dentel, Chief
Engineering Branch 2
Division of Reactor Safety

Enclosure

SUMMARY

The U.S. Nuclear Regulatory Commission (NRC) continued monitoring the licensee's performance by conducting a Temporary Instruction 2515/194 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

No findings or violations of more than minor significance were identified.

Additional Tracking Items

None.

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), inspectors were directed to begin telework. In addition, regional baseline inspections were evaluated to determine if all or 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.

OTHER ACTIVITIES – TEMPORARY INSTRUCTIONS, INFREQUENT AND ABNORMAL

2515/194 - Inspection of the Licensee's Implementation of Industry Initiative Associated with the Open Phase Condition Design Vulnerabilities In Electric Power Systems (NRC Bulletin 2012-01) (1 Sample)

- (1) Dominion Energy Nuclear Connecticut, Inc., selected the open phase detection system designed and manufactured by Power System Sentinel Technologies, LLC, (PSSTech) as the design vendor for the open phase condition (OPC) system at Millstone Power Station. The open phase protection system is designed to protect the offsite power sources from a loss of phase condition.

The offsite electrical distribution system is functionally the same for both Millstone Unit 2 and Unit 3. At each unit the offsite power system includes the transmission system and the 345-kV switchyard. Included in the system are main generator step-up transformers (GSUs) and the reserve station service transformers (RSSTs) of both Unit 2 and Unit 3.

The PSSTechs were in the "Detect" mode of operation. The trip function was bypassed and will remain disabled on Unit 2 transformers and was not installed on the Unit 3 transformers. Dominion Energy Nuclear Connecticut, Inc. uses the risk-informed method, which utilizes manual actions for protective action measures for Unit 2 and Unit 3, to comply with the open phase detection initiative. At the end of this inspection the PSSTech system was monitoring and would alarm the control room if a loss of one- or two-phase conditions is detected.

INSPECTION RESULTS

Observation: Temporary Instruction 2515/194-03.01 - Voluntary Industry Initiative	2515/194
<p>Based on discussions with Dominion staff, review of design and testing documentation, and walkdowns of installed equipment, the inspectors had reasonable assurance that Dominion is appropriately implementing, with a noted exception discussed below, the voluntary industry initiative at Millstone Power Station, Units 2 and 3. The inspectors verified the following criteria:</p> <p><u>Detection, Alarms and General Criteria</u></p> <ol style="list-style-type: none">1. [03.01(a)(1)] Open phase conditions are detected and alarmed in the control room.2. [03.01(a)(2)] Detection circuits are sensitive enough to identify an open phase condition for credited loaded conditions (i.e. high and low loading).3. [03.01(a)(4)] No Class 1E circuits were being replaced with non-Class 1E circuits in this design.4. [03.01(a)(5)] The Final Safety Analysis Report was updated to discuss the design features and analyses related to the effects of any open phase condition design vulnerability.5. [03.01(a)(6)] The open phase condition detection and alarm components are maintained in accordance with Dominion's procedures or maintenance program, and periodic tests, calibrations setpoint verifications or inspections (as applicable) have been established. <p><u>Use of Risk-Informed Evaluation Method</u></p> <ol style="list-style-type: none">1. [03.01(c)(1)] The plant configuration matched the changes made to the probabilistic risk assessment model to address an open phase condition, and the logic of the probabilistic risk assessment model changes is sound. One exception was noted by the inspectors and documented in a separate observation.2. [03.01(c)(2)] The procedures which validate that the open phase condition alarm would identify the proper indication to validate the open phase conditions at all possible locations.3. [03.01(c)(3)] Observations associated with procedure(s) and operator actions required to respond to an open phase condition alarm and potential equipment trip match the Human Reliability Analysis.4. [03.01(c)(4)] Assumptions listed in the NEI 19-02 Appendix A evaluation and the sensitivity analyses listed in Section 5 of the evaluation were verified.5. [03.01(c)(5)] Assumptions, procedures, operator actions and Dominion's analyses specified above are consistent with the plant-specific design and licensing basis, including:<ol style="list-style-type: none">a. Initiating events considered in the analysisb. Boundary conditions specified in Attachment 1 of the NEI Voluntary Industry Initiative, Revision 3c. Operating procedures for steps taken to recover equipment assumed tripped/locked out or damaged due to the open phase conditions (or use of alternate equipment)	

Observation: Use of Risk-Informed Evaluation Method Exception	2515/194
<p><u>Use of Risk-Informed Evaluation Method</u></p> <p>Exception - [03.01(c)(1)] The plant configuration matched the changes made to the probabilistic risk assessment model to address an open phase condition, and the logic of the probabilistic risk assessment model changes is sound.</p> <p>Dominion's NEI 19-02 evaluation selected an OPC initiating event frequency and probability based on accepted industry data per guidance in NEI 19-02, Section 4.2. However, Dominion, in their analysis, modified this frequency and apportioned (divided by the number of potentially impacted transformer locations) it to different response models, thereby reducing the initiating event frequency for each response by this factor. In Millstone Unit 2 and Unit 3 cases the inspectors noted the initiating event frequency was divided by two and allotted to both locations for each response case evaluated.</p> <p>During discussions with Dominion, the licensee referenced assumptions and the use of apportionment in an NRC Preliminary Risk Estimate on the Impact of Open Phase Condition documented in 2017 (ADAMS Accession ML17234A631). Inspector discussions with NRC subject matter expert staff indicate that the apportionment was required in the noted example risk estimate due to the multiple line feeders to the offsite power source and is not the configuration for Millstone.</p> <p>The methodology the inspectors observed Dominion implement regarding OPC initiating event frequency and probability in their analysis, based on discussions with NRC subject matter expert staff, is not consistent with the guidance and methods described in NEI 19-02. This may affect the assessment of the change in risk as measured by delta core damage frequency (CDF) and delta large early release frequency (LERF) and other related results. This applies to both Millstone Units 2 and 3 and potentially other Dominion sites, based on discussions with Millstone staff.</p> <p>Inspector review and assessment of Millstone's NEI 19-02 analysis Section 5.0 results and sensitivity studies indicate that delta CDF and delta LERF results would be near 1E-6/yr and less than 1E-7/yr respectively, and that the CDF ceiling criteria would still be met (<1E-5/yr) even if the current results were doubled.</p>	

EXIT MEETINGS AND DEBRIEFS

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

- On March 4, 2021, the inspectors presented the Temporary Instruction 2515/194 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
2515/194	Calculations	MP2-ENG-EMTP-04447E2	MP2 Open Phase Condition EMTP Time Delay Limit Analysis	3
		MP3-ENG-EMTP-0454 7E3	MP3 Open Phase Condition Time Delay Limit Analysis	3
	Drawings	25203-39150	RSST Open Phase Cabinet C549-A Schematic	0
	Engineering Changes	MP2-17-00156	MP2 Open Phase Condition Detection System (Protection Phase)	9
		MP3-17-00157	MP3 Open Phase Condition Detection System (Protection Phase)	10
	Engineering Evaluations	MP3-ENG-EMTP-04548E3	MP3 Open Phase Detection Modeling and Analysis	2
		NOTEBK-PRA-MPS2-RA.031	Open Phase Mitigation Risk Evaluation	1
		NOTEBK-PRA-MPS3-RA.024	Open Phase Mitigation Risk Evaluation	1
	Procedures	EOP 2525	Standard Post Trip Actions	29
		EOP 35 E0	Emergency Operating Procedure	34
	Work Orders	53203264248 53203264249 53203264250 53203264251		