

Dominion Energy Nuclear Connecticut, Inc.
Millstone Power Station
314 Rope Ferry Road, Waterford, CT 06385
DominionEnergy.com



U. S. Nuclear Regulatory Commission
Attention: Document Control Desk
Washington, DC 20555

Serial No.: 23-281
MPS Lic/JP R0
Docket No.: 50-423
License No.: NPF-49

OCT 28 2023

DOMINION ENERGY NUCLEAR CONNECTICUT, INC.
MILLSTONE POWER STATION UNIT 3
LICENSEE EVENT REPORT 2022-003-00

GAS VOID IN THE EMERGENCY CORE COOLING SYSTEM RESULTED IN A CONDITION PROHIBITED BY TECHNICAL SPECIFICATIONS

This letter forwards Licensee Event Report (LER) 2022-003-00, documenting a condition that was discovered at Millstone Power Station Unit 3 (MPS3) on August 31, 2023. This LER is being submitted pursuant to 10 CFR 50.73 (a)(2)(i)(B) as a condition prohibited by technical specifications.

There are no regulatory commitments contained in this letter or its enclosure.
Should you have any questions, please contact Mr. Dean E. Rowe at (860) 444-5292.

Sincerely,

A handwritten signature in black ink, appearing to read "Michael J. O'Connor".

Michael J. O'Connor
Site Vice President – Millstone

Enclosure: LER 423/2022-003-00

cc: U.S. Nuclear Regulatory Commission
Region I
475 Allendale Road, Suite 102,
King of Prussia, PA 19406-1415.

R. V. Guzman
NRC Project Manager Millstone Units 2 and 3
U.S. Nuclear Regulatory Commission
One White Flint North, Mail Stop 08 C2
11555 Rockville Pike
Rockville, MD 20852-2738

NRC Senior Resident Inspector
Millstone Power Station

ATTACHMENT

LICENSEE EVENT REPORT 2022-003-00
GAS VOID IN THE EMERGENCY CORE COOLING SYSTEM RESULTED IN A CONDITION
PROHIBITED BY TECHNICAL SPECIFICATIONS

MILLSTONE POWER STATION UNIT 3
DOMINION ENERGY NUCLEAR CONNECTICUT, INC.



LICENSEE EVENT REPORT (LER)

(See Page 2 for required number of digits/characters for each block)

(See NUREG-1022, R.3 for instruction and guidance for completing this form
<http://www.nrc.gov/reading-rm/doc-collections/nuregs/staff/sr1022/r3/>)

Estimated burden per response to comply with this mandatory collection request: 80 hours. Reported lessons learned are incorporated into the licensing process and fed back to industry. Send comments regarding burden estimate to the FOIA, Library, and Information Collections Branch (T-6 A10M), U. S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by email to Infocollections.Resource@nrc.gov, and the OMB reviewer at: OMB Office of Information and Regulatory Affairs, (3150-0104), Attn: Desk Officer for the Nuclear Regulatory Commission, 725 17th Street NW, Washington, DC 20503; email: oir-submission@omb.eop.gov. The NRC may not conduct or sponsor, and a person is not required to respond to, a collection of information unless the document requesting or requiring the collection displays a currently valid OMB control number.

1. Facility Name Millstone Power Station - Unit 3	<input checked="" type="checkbox"/> 050	2. Docket Number 423	3. Page 1 OF 4
	<input type="checkbox"/> 052		

4. Title

Gas Void in the Emergency Core Cooling System Resulted In a Condition Prohibited By Technical Specifications.

5. Event Date			6. LER Number			7. Report Date			8. Other Facilities Involved	
Month	Day	Year	Year	Sequential Number	Revision No.	Month	Day	Year	Facility Name	Docket Number
10	06	2022	2022	003	00	10	28	2023	<input type="checkbox"/> 050	
									Facility Name	<input type="checkbox"/> 052

9. Operating Mode 1	10. Power Level 100
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11. This Report is Submitted Pursuant to the Requirements of 10 CFR §: (Check all that apply)

<input type="checkbox"/> 10 CFR Part 20	<input type="checkbox"/> 20.2203(a)(2)(vi)	<input type="checkbox"/> 10 CFR Part 50	<input type="checkbox"/> 50.73(a)(2)(ii)(A)	<input type="checkbox"/> 50.73(a)(2)(viii)(A)	<input type="checkbox"/> 73.1200(a)
<input type="checkbox"/> 20.2201(b)	<input type="checkbox"/> 20.2203(a)(3)(i)	<input type="checkbox"/> 50.36(c)(1)(i)(A)	<input type="checkbox"/> 50.73(a)(2)(ii)(B)	<input type="checkbox"/> 50.73(a)(2)(viii)(B)	<input type="checkbox"/> 73.1200(b)
<input type="checkbox"/> 20.2201(d)	<input type="checkbox"/> 20.2203(a)(3)(ii)	<input type="checkbox"/> 50.36(c)(1)(ii)(A)	<input type="checkbox"/> 50.73(a)(2)(iii)	<input type="checkbox"/> 50.73(a)(2)(ix)(A)	<input type="checkbox"/> 73.1200(c)
<input type="checkbox"/> 20.2203(a)(1)	<input type="checkbox"/> 20.2203(a)(4)	<input type="checkbox"/> 50.36(c)(2)	<input type="checkbox"/> 50.73(a)(2)(iv)(A)	<input type="checkbox"/> 50.73(a)(2)(x)	<input type="checkbox"/> 73.1200(d)
<input type="checkbox"/> 20.2203(a)(2)(i)	<input type="checkbox"/> 10 CFR Part 21	<input type="checkbox"/> 50.46(a)(3)(ii)	<input type="checkbox"/> 50.73(a)(2)(v)(A)	<input type="checkbox"/> 10 CFR Part 73	<input type="checkbox"/> 73.1200(e)
<input type="checkbox"/> 20.2203(a)(2)(ii)	<input type="checkbox"/> 21.2(c)	<input type="checkbox"/> 50.69(g)	<input type="checkbox"/> 50.73(a)(2)(v)(B)	<input type="checkbox"/> 73.77(a)(1)	<input type="checkbox"/> 73.1200(f)
<input type="checkbox"/> 20.2203(a)(2)(iii)		<input type="checkbox"/> 50.73(a)(2)(i)(A)	<input type="checkbox"/> 50.73(a)(2)(v)(C)	<input type="checkbox"/> 73.77(a)(2)(i)	<input type="checkbox"/> 73.1200(g)
<input type="checkbox"/> 20.2203(a)(2)(iv)		<input checked="" type="checkbox"/> 50.73(a)(2)(i)(B)	<input type="checkbox"/> 50.73(a)(2)(v)(D)	<input type="checkbox"/> 73.77(a)(2)(ii)	<input type="checkbox"/> 73.1200(h)
<input type="checkbox"/> 20.2203(a)(2)(v)		<input type="checkbox"/> 50.73(a)(2)(i)(C)	<input type="checkbox"/> 50.73(a)(2)(vii)		

OTHER (Specify here, in abstract, or NRC 366A).

12. Licensee Contact for this LER

Licensee Contact Dean E. Rowe, Manager Nuclear Emergency Preparedness and Licensing	Phone Number (Include area code) 860-444-5292
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13. Complete One Line for each Component Failure Described in this Report

Cause	System	Component	Manufacturer	Reportable to IRIS	Cause	System	Component	Manufacturer	Reportable to IRIS

14. Supplemental Report Expected

No Yes (If yes, complete 15. Expected Submission Date)

15. Expected Submission Date

Month	Day	Year

16. Abstract (Limit to 1326 spaces, i.e., approximately 13 single-spaced typewritten lines)

On October 6, 2022 at 1300 hours, with Millstone Power Station Unit 3 in Mode 1 at 100 percent reactor power, ultrasonic testing (UT) measurements on the "A" train residual heat removal (RHR) piping identified a gas void greater than acceptance criteria. The most likely source of gas voids in this section of pipe was determined to be inadequate guidance in the operating procedures used to perform filling and venting activities during system restorations following the refueling outage in May 2022. The entire length of piping was vented and UT measurements at multiple locations verified that the voids were reduced to within acceptable limits. This condition is being reported pursuant to 10 CFR 50.73(a)(2)(i)(B) as any operation or condition prohibited by the plant's Technical Specifications.



**LICENSEE EVENT REPORT (LER)
CONTINUATION SHEET**

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1. FACILITY NAME Millstone Power Station - Unit 3	<input checked="" type="checkbox"/> 050	2. DOCKET NUMBER 423	3. LER NUMBER		
	<input type="checkbox"/> 052		YEAR 2022	SEQUENTIAL NUMBER 003	REV NO. 00

NARRATIVE

On October 6, 2022 at 1300 hours, with Millstone Power Station Unit 3 in Mode 1 at 100 percent reactor power, ultrasonic testing (UT) measurement on "A" train residual heat removal (RHR) piping identified a gas void greater than the acceptance criteria. The UT measurement was taken during monthly performance of SP 3610A.3, "RHR System Vent and Valve Lineup Verification" on the "A" low pressure safety injection to charging pump suction line, 3-SIL-008-14-2, at Point 10. The "A" train of RHR was declared inoperable and Technical Specifications (TS) 3.5.2, Emergency Core Cooling System (ECCS) was entered. Venting was performed and the ECCS system was declared operable in accordance with SP 3610A.3 on October 6, 2022 at 1725 hours and TS 3.5.2 was exited.

On October 14, 2022, SP3610A.3 was performed at point 10 and a gas void greater than acceptance criteria was observed in the line 3-SIL-008-14-2. "A" train of RHR was declared inoperable, and TS 3.5.2 was entered on October 14, 2022, at 1005 hours. Point 10 was vented and a UT was performed and confirmed that the piping was 100% full of water. TS 3.5.2 was exited on October 14, 2022, at 1737 hours.

Troubleshooting was performed on October 15, 2022 to fully characterize the gas void in line 3-SIL-008-14-2. To support this troubleshooting, TS 3.5.2 was entered and "A" train of RHR was declared inoperable on October 15, 2022 at 0944 hours. This line was divided into 10 sections and full expanded ultrasonic testing measurements were taken at each section. Repeated venting and agitation of the line was performed to remove the gas voids.

After the initial expanded UT characterization, it was concluded that the remaining gas void volume was greater than the acceptable gas void volume. After repeated venting and agitation evolutions, the final UT characterization determined that the gas void volume was less than acceptable limits. An operability determination evaluated the as-left condition and determined that "A" train of RHR was able to perform its design function. The ECCS system was declared operable and TS 3.5.2 was exited on October 17, 2022 at 1441 hours.

On August 31, 2023, an NRC inspector identified a non-conservative error within the void volume calculation 14-ENG-04518M3 "MP3 GL2008-01 Pump Suction Side Gas Void Allowable Volume Using Westinghouse Simplified Equation Method" approved in 2015. Millstone engineering determined that the pressure used for evaluating a void volume in line 3-SIL-008-014-2 was incorrect and non-conservative. This error resulted in the reduction of the allowable void size acceptance criteria.

Based on the corrected acceptable void volume, the original as-found gas void volume identified on October 6, 2022, was greater than the allowable acceptable gas void volume; therefore, the plant was operating in a condition outside of plant Technical Specifications. Void volume greater than acceptable limits existed from May 18, 2022, when the plant entered Mode 3, until October 17, 2022 when void volume was verified to be less than acceptable limits.

SP 3610A.3 is performed monthly and the line 3-SIL-008-014-2 was verified to be full of water each month from the refueling outage until its performance on October 6, 2022. Prior to October 17, 2022, the procedure SP 3610A.3 directed that a single UT measurement to be taken at Point 10 on line 3-SIL-008-14-2 to measure the gas void volume. This did not fully characterize the void volume in line 3-SIL-008-14-2. The procedure SP 3610A.3 has been revised to include additional UT locations that fully characterize the void volume.



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NARRATIVE

In Modes 1, 2, and 3, Technical Specification (TS) 3.5.2 "ECCS Subsystems - Tavg Greater Than or Equal to 350°F," requires two independent ECCS subsystems be operable, with each subsystem comprised of a minimum of one charging pump (CHS), one safety injection pump (SIH), one residual heat removal pump (RHR), one containment recirculation pump (RSS), one RHR heat exchanger, and one RSS heat exchanger together with associated valves and piping to assure adequate core cooling in the event of a design basis loss of coolant accident (LOCA). In Modes 1, 2, and 3, Technical Specifications require that the ECCS be verified filled at least once every 31 days. The TS is met by venting ECCS pump casings and the accessible discharge piping high points.

The previous historic operability assessment performed for the gas void found in line 3-SIL-008-014-2 from October 17, 2022, has been reviewed and determined that an incorrect determination of historic operability was made. The historic gas void size has been determined to be unacceptable, and a Licensee Event Report (LER) should have been generated due to discovery on October 6, 2022 and submitted by December 5, 2022.

Event Date: October 6, 2022 – Gas void first discovered in the “A” RHR piping. Gas void was found greater than acceptance criteria per SP 3610A.3.

Discovery Date: August 31, 2023 – NRC inspector found non-conservative error in the calculation 14-ENG-041518M3 which resulted in the reduction of allowable void size acceptance criteria.

This report is being submitted pursuant to 10 CFR 50.73 (a)(2)(i)(B), as an operation or condition that was prohibited by the plant's Technical Specifications.

CAUSE

Most likely source of gas voids in this section of pipe was determined to be inadequate guidance in the operating procedures used to perform filling and venting activities during system restorations.

ASSESSMENT OF SAFETY CONSEQUENCES

The gas void at Point 10 was located in the 8” common suction header between the RSS pump discharge and the CHS pump suction. This section of piping only experiences flow during post Loss of Coolant Accident (LOCA) cold leg recirculation. Thus, the gas void at this location could only affect CHS pumps during the cold leg recirculation phase of a LOCA.

The core response of postulated Loss of Coolant Accidents is discussed in Section 15.6.5 of the Final Safety Analysis Report (FSAR). The acceptance criteria for the response to a LOCA are described in Title 10 of the Code of Federal Regulations 50.46 (10 CFR 50.46). Three of the acceptance criteria i.e., peak cladding temperature (PCT), maximum local oxidation (MLO) and core-wide oxidation (CWO) are approached prior to cold leg recirculation during the ECCS injection phase. Therefore, these criteria would be unaffected by the presence of a gas void in line 3-SIL-008-14-2.

The remaining 10 CFR 50.46 criteria addresses the core remaining amenable to cooling during, and after, the LOCA and reduction in core temperature by decay heat removal for an extended period of time. These criteria are met by demonstrating successful transition from the ECCS injection phase to the post LOCA cold leg recirculation phase.



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NARRATIVE

In the normal post LOCA cold leg recirculation configuration, the RSS pumps take suction from the containment sump to provide suction to the SIH pumps and CHS pumps. The high head CHS pumps and the intermediate head SIH pumps are aligned to provide injection into the reactor coolant system (RCS) cold legs.

Should the gas void interfere with the operation of a charging pump in establishing post LOCA cold leg recirculation, EOP 35 ES-1.3, "Transfer to cold leg recirculation", has instructions to open a RHR cold leg injection valve. Cold leg recirculation flow would then be provided from the RSS pumps through the RHR injection lines as well as through the SIH pumps. This would allow for successful cold leg recirculation to be established.

The containment response to a LOCA is discussed in FSAR Section 6.2.1. The peak containment temperature and pressure also occur early in the Engineered Safety Features (ESF) injection phase of the accident. The post ESF injection containment spray recirculation is not impacted by the point 10 void location.

Therefore, it is concluded that the plant response to a LOCA will be unchanged from the results as presented in the FSAR.

CORRECTIVE ACTIONS

The entire length of pipe was vented to remove gas voids. UT measurements were performed at multiple locations along the piping to verify that voids were reduced to within acceptable limits. Operating procedures have been enhanced to include instructions for filling and venting this line and assuring that ECCS piping is verified sufficiently full of water. Additional corrective actions will be taken in accordance with the station's corrective action program.

PREVIOUS OCCURANCES

There have been no similar events or conditions related to Unit 3 ECCS train inoperable for a period longer than the technical specification action statement allows over the last 5 years.

ENERGY INDUSTRY IDENTIFICATION SYSTEM (EIIS) CODES

None