

LG-23-057

June 26, 2023

U.S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, DC 20555-0001

Limerick Generating Station, Unit 1
Renewed Facility Operating License No. NPF-39
NRC Docket No. 50-352

Subject: LER 2023-001-00 Unit 1 Emergency Diesel Generator Lube Oil Pressure Sensing
Line Leak Resulting in a Condition Prohibited by Technical Specifications

In accordance with the requirements of 10 CFR 50.73(a)(2)(ii)(B), Limerick Generating Station hereby submits the enclosed Licensee Event Report.

There are no commitments contained in this letter.

If you have any questions, please contact Jordan Rajan at (610) 718-3400.

Respectfully,



Michael Gillin
Vice President – Limerick Generating Station
Constellation Generation Company, LLC

cc: Administrator Region I, USNRC
USNRC Senior Resident Inspector, Limerick Generating Station



LICENSEE EVENT REPORT (LER)

(See Page 3 for required number of digits/characters for each block)
(See NUREG-1022, R.3 for instruction and guidance for completing this form
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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 e-mail to Infocollects.Resource@nrc.gov, and the OMB reviewer at: OMB Office of Information and Regulatory Affairs, (3150-0104), Attn: Desk all: 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 Limerick Generating Station Unit 1	2. Docket Number 05000 352	3. Page 1 OF 4
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4. Title
Emergency Diesel Generator Lube Oil Pressure Sensing Line Leak Resulting 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
02	27	23	2023	001	00	06	26	23		05000
									Facility Name	Docket Number
										05000

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"/> 50.36(c)(2)	<input type="checkbox"/> 50.73(a)(2)(iv)(A)	<input type="checkbox"/> 50.73(a)(2)(x)
<input type="checkbox"/> 20.2201(b)	<input type="checkbox"/> 20.2203(a)(3)(i)	<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"/> 20.2201(d)	<input type="checkbox"/> 20.2203(a)(3)(ii)	<input type="checkbox"/> 50.69(g)	<input type="checkbox"/> 50.73(a)(2)(v)(B)	<input type="checkbox"/> 73.71(a)(4)
<input type="checkbox"/> 20.2203(a)(1)	<input type="checkbox"/> 20.2203(a)(4)	<input type="checkbox"/> 50.73(a)(2)(i)(A)	<input type="checkbox"/> 50.73(a)(2)(v)(C)	<input type="checkbox"/> 73.71(a)(5)
<input type="checkbox"/> 20.2203(a)(2)(i)	<input type="checkbox"/> 10 CFR Part 21	<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)(1)(i)
<input type="checkbox"/> 20.2203(a)(2)(ii)	<input type="checkbox"/> 21.2(c)	<input type="checkbox"/> 50.73(a)(2)(i)(C)	<input type="checkbox"/> 50.73(a)(2)(vii)	<input type="checkbox"/> 73.77(a)(2)(i)
<input type="checkbox"/> 20.2203(a)(2)(iii)	<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"/> 73.77(a)(2)(ii)
<input type="checkbox"/> 20.2203(a)(2)(iv)	<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"/> 20.2203(a)(2)(v)	<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)	

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

12. Licensee Contact for this LER

Licensee Contact Jordan Rajan, Regulatory Assurance Manager	Phone Number (Include area code) 610-718-3400
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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
B	EK	PSF	N/A	Yes					

14. Supplemental Report Expected

<input type="checkbox"/> No	<input type="checkbox"/> Yes (If yes, complete 15. Expected Submission Date)	15. Expected Submission Date	Month	Day	Year

16. Abstract (Limit to 1560 spaces, i.e., approximately 15 single-spaced typewritten lines)

On February 27, 2023, approximately 10 hours into a planned 24-hour endurance run for the D11 Emergency Diesel Generator (EDG), an oil leak was identified at a threaded fitting for an oil pressure indicator instrument line. The D11 EDG was emergently secured and declared inoperable. Subsequent investigation identified a crack in a threaded pipe nipple for the affected oil pressure indicator instrument line. Forensic analysis of the removed pipe nipple identified a crack initiated in the threaded fitting. The corrective action was to move the connection to a different location that does not experience high vibration. Although D11 EDG was not inoperable for greater than the allowed out of service time a second EDG was inoperable for greater than the allowed out of service time for two EDGs. This event is being reported as a condition prohibited by Technical Specifications (TS) in accordance with 10 CFR 50.73(a)(2)(i)(B).



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

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1. FACILITY NAME Limerick Generating Station Unit 1	2. DOCKET NUMBER 05000- 352	3. LER NUMBER		
		YEAR 2023	SEQUENTIAL NUMBER 001	REV NO. 00

NARRATIVE

Unit Condition

Prior to the event, Unit 1 was in Operational Condition (OPCON) 1 (Power Operation) at approximately 100% power. There were no structures, systems, or components out of service that contributed to this event.

Description of the Event

On February 27, 2023, during planned 24-hour endurance run of the D11 Emergency Diesel Generator (EDG) [EIS-EK], an oil leak was identified at a threaded fitting for an oil pressure indicator instrument line. The one-quarter inch instrument line threaded connection tees off the 4-inch main lube oil piping near the discharge of the engine driven lube oil pump.

The D11 EDG was started at 09:35 and fully loaded at 10:05. A dirty drip pan alarm came in at 19:42 and subsequently the lube oil leak was identified at 19:47. The EDG was secured and declared inoperable. Prior to the failure there was no leaks or degradation observed from the connection.

The component was sent for failure analysis. The failure analysis identified a crack in a threaded pipe nipple for the affected oil pressure indicator instrument line. Forensic analysis of the removed pipe nipple concluded that the pipe nipple showed fatigue fracture that started from one side at the root of the last engaged thread, consistent with unidirectional cyclic bending loads due to vibration. The D11 EDG was determined to be inoperable from the last completed surveillance test on January 31, 2023, until restored to operable status following repair of the identified oil leak on February 28, 2023.

Following the D11 EDG failure on February 27, 2023, vibration data was again collected on the 4-inch engine driven lube oil pump discharge piping. Comparison of this vibration data to vibration data previously collected for the D11 EDG in February 2020 concluded that the vibration signature of the piping had changed and that the D11 EDG was now susceptible to the same failure mechanism previously identified for the D24 EDG. Inspection of the pipe clamp on the 4-inch engine driven lube oil pump discharge piping adjacent to the instrument line connection identified that the nuts of the U-bolt clamp were not tight. A work order history review was completed, and no maintenance activity was identified that altered or adjusted the 4-inch engine driven lube oil pump discharge piping since vibration data was previously collected in February 2020. No engine operating data or maintenance activity could be cited as the cause for the change in the vibration signature of the 4-inch engine driven lube oil pump discharge piping other than vibration causing loosening of the U-bolt nuts.

Analysis of the Event

The failure analysis of the instrument line on the D11 EDG concluded the EDG was inoperable from the last completed surveillance test on January 31, 2023, until restored to operable status following repair of the identified oil leak on February 28, 2023. During the period that the D11 EDG was inoperable, the D13 EDG was also inoperable for approximately 7 days between, February 12, 2023, and February 19, 2023, for a planned system outage window. Based on the completion of the failure analysis and the component history review the condition was determined to reportable on April 27, 2023.



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Limerick Generating Station Unit 1	05000- 352	2023	001	00

NARRATIVE

Technical Specification (TS) Limiting Condition for Operation (LCO) 3.8.1.1 Condition b requires all four diesel generators to be capable of supplying the onsite Class 1E AC electrical power distribution system. With one diesel generator inoperable, TS 3.8.1.1 Action a requires several actions to be completed at varying frequencies, including restoring the diesel generator to operable within 30 days. Although D11 EDG was restored to operable within 30 days, the other required actions were not performed. Additionally, TS LCO 3.8.1.1 Action b also requires several actions to be completed at varying frequencies when two EDGs are inoperable, including restoring at least one diesel generator to operable within 72 hours. These actions were not completed during the required time. This event is being reported as a violation of Technical Specifications in accordance with 10 CFR 50.73(a)(2)(i)(B).

Safety Consequences

The EDG and Auxiliary Systems are safety-related standby emergency power systems and consist of four diesel generator sets per unit. The operability of the AC power sources and associated distribution systems during operation ensures that sufficient power will be available to supply the safety-related equipment required for (1) the safe shutdown of the facility and (2) the mitigation and control of accident conditions within the facility. The TS action requirements specified for the levels of degradation of the power sources provide restriction upon continued facility operation commensurate with the level of degradation.

Due a planned system outage for the D13 EDG, both the D11 and D13 EDGs were inoperable concurrently from February 12, 2023, to February 19, 2023; therefore, the TS 3.8.1.1.b action to restore at least one of the inoperable diesel generators to operable status within 72 hours was not met. There were minimal safety consequences associated with the condition since there were no events during this period that required the D11 and D13 EDGs to perform their safety function. The remaining Limerick Unit 1 EDGs were operable during this period.

Cause of the Event

The cause of the failure was determined to be high cyclic fatigue driven by the change in the vibration of the 4-inch engine driven lube oil pump discharge piping.

Corrective Actions Completed

1. Replaced failed oil pressure indicator instrument line on the D11 EDG in kind on 2/28/23 to restore operability.
2. Relocated the affected oil pressure indicator instrument line on all EDGs with exception of the D24 EDG.

Corrective Actions Planned

1. Relocate the affected oil pressure indicator instrument line on the D24 EDG.

Previous Similar Occurrences

Failure of the same oil pressure indicator instrument line has occurred on two other Limerick EDGs. The D13 EDG experienced a failure of the same oil pressure indicator instrument line in 2016. The D24 EDG has experienced three failures of the same oil pressure indicator instrument line, once in 2013 and twice in 2019, the second failure resulted in LER 2019-002-00. The design of the D24 EDG oil pressure indicator instrument line was modified after the July 2019 failure.



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NARRATIVE

Component Data

System: EK Emergency On-Site Power Supply System
Component: PSF Pipe Fitting
Manufacturer: N/A