



PECO NUCLEAR

A Unit of PECO Energy

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10CFR50.73

September 19, 1996

Docket Nos. 50-352
50-353
License Nos. NPF-39
NPF-85

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

SUBJECT: Licensee Event Report
Limerick Generating Station - Units 1 and 2

This LER reports the inoperability of four Emergency Diesel Generators (EDGs) that resulted from separate crankcase pressurization events which occurred on the D13, D14, D21 and D22 EDGs between November 29, 1995, and July 24, 1996, due to a common cause. These events resulted from plugging of the exhaust stack bird screens by rust debris from the exhaust stack piping which entered the exhaust stream gas flow while the EDGs were operating.

Reference:	Docket Nos. 50-352 50-353
Report Number:	1-96-017
Revision Number:	1
Event Dates:	November 29, 1995 - July 24, 1996
Reportability Date:	August 20, 1996
Report Date:	September 19, 1996
Facility:	Limerick Generating Station P.O. Box 2300, Sanatoga, PA 19464-2300

This LER is being submitted pursuant to the requirements of 10CFR50.73(a)(2)(vii)(D). Additionally, this LER is being utilized to supplement the EDG Special Reports dated December 28, 1995 and June 6, 1996, pursuant to the requirements of Technical Specifications Surveillance Requirement 4.8.1.1.3.

Very truly yours,

Robert W. Boyce

SMM/DMS

cc: H. J. Miller, Administrator Region I, USNRC
N. S. Perry, USNRC Senior Resident Inspector, LGS

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LICENSEE EVENT REPORT (LER)

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ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH
THIS INFORMATION COLLECTION REQUEST: 50.0 HRS.
FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO
THE INFORMATION AND RECORDS MANAGEMENT BRANCH
(MNB 7714), U.S. NUCLEAR REGULATORY COMMISSION,
WASHINGTON, DC 20555-0001, AND TO THE PAPERWORK
REDUCTION PROJECT (3150-0104), OFFICE OF
MANAGEMENT AND BUDGET, WASHINGTON, DC 20503FACILITY NAME (1)
Limerick Generating Station, Unit 1DOCKET NUMBER (2)
05000 352PAGE (3)
1 OF 5TITLE (4) Inoperability of four Emergency Diesel Generators that Resulted from Separate
Crankcase Pressurization Events due to a Common Cause.

EVENT DATE (5)			LER NUMBER (6)			REPORT DATE (7)			OTHER FACILITIES INVOLVED (8)	
MONTH	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	MONTH	DAY	YEAR	FACILITY NAME	DOCKET NUMBER
08	20	96	96	-- 017 --	0	09	19	96	Limerick Unit 2	05000 353
									FACILITY NAME	DOCKET NUMBER
										05000

OPERATING MODE (9)	1	THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more) (11)			
POWER LEVEL (10)	100	20.402(b)	20.405(c)	50.73(a)(2)(iv)	73.71(b)
		20.405(a)(i)(i)	50.36(c)(1)	50.73(a)(2)(v)	73.71(c)
		20.405(a)(1)(ii)	50.36(c)(2)	X 50.73(a)(2)(vii)	OTHER
		20.405(a)(1)(iii)	50.73(a)(2)(i)	50.73(a)(2)(viii)(A)	(Specify in Abstract below and in Text, NRC Form 366A)
		20.405(a)(1)(iv)	50.73(a)(2)(ii)	50.73(a)(2)(viii)(B)	
		20.405(a)(1)(v)	50.73(a)(2)(iii)	50.73(a)(2)(x)	

LICENSEE CONTACT FOR THIS LER (12)

NAME
J. L. Kantner, Manager - Experience Assessment, LGS

TELEPHONE NUMBER (Include Area Code)

(610) 718-3400

COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT (13)

CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPRDS	CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPRDS

SUPPLEMENTAL REPORT EXPECTED (14)

YES

(If yes, complete EXPECTED SUBMISSION DATE)

X

NO

EXPECTED
SUBMISSION
DATE (15)

MONTH DAY YEAR

ABSTRACT (Limit to 1400 spaces, i.e., approximately 15 single-spaced typewritten lines) (16)

This LER reports the inoperability of 4 Emergency Diesel Generators (EDGs) that resulted from separate crankcase pressurization events which occurred on the D14, D21, D22 and D13 EDGs between 11/29/95, and 07/24/96, at the Limerick Generating Station. Original evaluations of the D14 and D21 EDG events indicated that the Flexmaster type fittings connected to the crankcase piping may have caused the pressurization events for these EDGs. Further evaluation has concluded that the D14, D22, and D13 EDGs and possibly the D21 EDG became inoperable due to blockage of the exhaust bird screens by rust debris originating from the inside of the exhaust piping. Review of previous industry events revealed no similar rust blockage events. The actual consequences of these events were minimal in that there were no transients requiring the Unit 1 or Unit 2 EDGs to perform their design function and only 1 EDG was inoperable at a time. All EDGs were successfully run immediately following each of the EDG pressurization transients. Scale was removed from all EDG exhaust stack sidewalls, the stacks were cleaned and vacuumed, and the EDG exhaust stack bird screens were modified to provide additional surface area. An independent assessment confirmed the root causes and corrective actions.

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TEXT (If more space is required, use additional copies of NRC Form 366A) (17)

Unit Conditions Prior to the Events

Unit 1 and Unit 2 were in Operational Condition 1 (Power Operation) at 100% power level during each of the four Emergency Diesel Generator (EDG, EIDS:DG) crankcase pressurization events. There were no systems, structures, or components out of service which contributed to these events.

Description of the Event

This LER provides information regarding four (4) separate EDG crankcase pressurization events which occurred on the D14, D21, D22 and D13 EDGs between November 29, 1995, and July 24, 1996, at the Limerick Generating Station (LGS).

A Special Report to the NRC dated December 28, 1995, reported the valid failures of the Unit 1 D14 EDG and the Unit 2 D21 EDG which occurred on November 29, 1995, and November 30, 1995, respectively (Note: the D21 EDG experienced only slight pressurization). The original evaluation of these events documented in the Special Report, indicated that the Flexmaster type fittings connected to the crankcase piping may have caused the pressurization events for these EDGs. The Special Report dated June 6, 1996, reported a valid failure of the Unit 2 D22 EDG due to crankcase pressurization resulting from rust debris plugging of the exhaust stack bird screen. This LER reports a similar pressurization event which occurred on the Unit 1 D13 EDG on July 24, 1996.

On July 24, 1996, with Unit 1 at 100% power, Operations personnel were performing procedure ST-6-092-317-1, "D13 Diesel Generator Fast Start Operability Test Run." During performance of the ST procedure run, a crankcase pressurization event occurred. The event occurred after the EDG had been at full load for approximately one hour and 40 minutes. The D13 EDG was immediately shutdown from the Main Control Room and declared inoperable at 1115 hours.

Since previous crankcase pressurization events at LGS were accompanied by expulsion of iron oxide scale (rust) particles from the exhaust stacks, the area of the exhaust stacks was walked down for rust type debris. Some evidence of debris was found but the quantity was substantially less than the quantity observed following previous

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events. Also the debris particles were smaller and thinner (i.e., approximately 1/4" across and 1/16" thick or smaller).

An investigation concluded that the D13 EDG experienced a crankcase pressurization caused by exhaust back-pressure resulting from iron oxide scale accumulating on the exhaust stack bird screen. After completion of the investigation and subsequent testing, the D13 EDG was declared operable at 2345 hours on July 25, 1996.

On August 20, 1996, a reportability determination concluded that a condition existed for the Unit 1 D13, D14 and the Unit 2 D21, D22 EDGs such that at least two independent trains of a single safety system became inoperable due to a common cause. This report is being submitted in accordance with the requirements of 10CFR50.73

(a)(2)(vii)(D). Additionally, this LER is being utilized to supplement the EDG Special Reports dated December 28, 1995 and June 6, 1996. These Special Reports were submitted pursuant to the requirements of Technical Specifications Surveillance Requirement 4.8.1.1.3.

Analysis of the Events

The actual consequences of these events were minimal in that there were no plant events requiring the Unit 1 or Unit 2 EDGs to perform their design function. There was no release of radioactive material to the environment as a result of these events. In each of the four cases only one Unit 1 or Unit 2 EDG was inoperable, therefore, the three remaining Unit 1 or Unit 2 EDGs were operable during the time periods that one EDG was inoperable. Immediately following each event, the remaining seven Unit 1 and Unit 2 EDGs were successfully run without incident.

Had an accident occurred coincident with a loss of offsite power in which the onsite Emergency AC Power System was called upon to perform its design function, an analysis referenced in the LGS Updated Final Safety Analysis Report states that safe shutdown of either Unit 1 or Unit 2 could be assured with as few as two EDGs.

Cause of the Events

Follow-up investigations concluded that the D14, D22, and D13 EDGs and possibly the D21 EDG became inoperable as a result of plugging of the

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exhaust stack bird screens by rust debris which entered the exhaust stream gas flow while the EDGs were operating. The debris originated from either the walls of the carbon steel exhaust piping or the cast iron spool piece associated with each EDG exhaust system. This follow-up investigation concluded that the D21 EDG crankcase pressurization event could have been caused by either a leaking Flexmaster fitting on the crankcase piping or due to blockage of the exhaust stack bird screen and therefore, this event is included in this LER for completeness.

Contributing factors to the inoperability of the D22 and D13 EDG events were less than adequate previous diagnosis and corrective measures. Consultation with PECO Energy and industry experts involving a review of other EDG crankcase pressurization events concluded the most probable cause of the D14 and D21 EDG events was leaking Flexmaster type fittings. There were no previous similar events involving rust debris blockage of the exhaust piping. The diagnosis involving the leaking Flexmaster fittings resulted in corrective measures which did not address rust debris as a probable cause of the events. Subsequent evaluations revealed that rust debris blockage of the EDG exhaust stack bird screen was the most probable cause of these events. Leaking Flexmaster fittings may have contributed to the crankcase pressurization but is not considered to be a significant casual factor. The investigation revealed that the rust debris blockage is a LGS unique issue and coupled with the transient nature of the blockage the event diagnosis was made more difficult.

Corrective Actions

The following corrective actions have been completed to mitigate further pressurization events:

1. All Unit 1 and Unit 2 EDG exhaust stacks were scraped and cleaned, and the exhaust stacks were vacuumed to remove the rust particles.
2. All Unit 1 and Unit 2 EDG exhaust stack bird screens were modified to permit additional surface area to lessen the likelihood of exhaust stack blockage.

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3. Additional inspections were performed on the D13, D14, D21 and D22 EDGs with no evidence found indicating another cause of the crankcase pressurization conditions. All EDGs were successfully run after completion of these inspections.
4. An independent team was assembled and evaluated all of the EDG exhaust stack pressurization events. This independent review confirmed the root cause determination and identified no additional corrective actions to prevent recurrence.

Previous Similar Occurrences

Other than the EDG crankcase pressurization transients resulting from plugging of the exhaust stack bird screen by rust debris described in this LER, there have been no previous similar occurrences at LGS.