



PECO NUCLEAR

A UNIT OF PECO ENERGY

PECO Energy Company
PO Box 2300
Sanatoga, PA 19464-0920

10CFR 50.73

March 5, 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 & 2

This LER reports automatic actuations of the Unit 1 Primary Containment and Reactor Vessel Isolation Control System, an Engineered Safety Feature, and other Unit 1 and Unit 2 system actuations due to a loss of power to the '1A' Reactor Protection System/Uninterruptible Power Supply power distribution panel. This event was the result of a spurious actuation of an underfrequency relay.

Reference:	Docket Nos. 50-352 50-353
Report Number:	1-96-003
Revision Number:	00
Event Date:	February 4, 1996
Report Date:	March 5, 1996
Facility:	Limerick Generating Station P.O. Box 2300, Sanatoga, PA 19464-2300

This LER is being submitted pursuant to the requirements of 10 CFR 50.73(a)(2)(iv).

Very truly yours,

James S. Hantz for
Robert W. Boyce, Plant Manager

DMS:cah

cc: T. T. Martin, Administrator Region I, USNRC
N. S. Perry, USNRC Senior Resident Inspector, LGS

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LICENSEE EVENT REPORT (LER)

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

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 20503.

FACILITY NAME (1) Limerick Generating Station, Unit 1

DOCKET NUMBER (2)
05000 352PAGE (3)
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TITLE (4) Engineered Safety Feature Actuations Due to a Loss of Power to an RPS/UPS Power Distribution Panel Caused by the Spurious Actuation of an Underfrequency Relay.

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
02	04	96	96	-- 003 --	0	03	05	96	Limerick, Unit 2	05000353
									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)							
		20.402(b)		20.405(c)	X	50.73(a)(2)(iv)		73.71(b)	
POWER LEVEL (10)	80.7	20.405(a)(1)(i)		50.36(c)(1)		50.73(a)(2)(v)		73.71(c)	
		20.405(a)(1)(ii)		50.36(c)(2)		50.73(a)(2)(vii)		OTHER	
		20.405(a)(1)(iii)		50.73(a)(2)(i)		50.73(a)(2)(viii)(A)		(Specify in	
		20.405(a)(1)(iv)		50.73(a)(2)(ii)		50.73(a)(2)(viii)(B)		Abstract below	
		20.405(a)(1)(v)		50.73(a)(2)(iii)		50.73(a)(2)(x)		and in Text,	
								NRC Form 366A)	

LICENSEE CONTACT FOR THIS LER (12)

NAME
J. L. Kantner, Manager - Experience AssessmentTELEPHONE 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
X	EE	81	G080	Y					

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)

On February 4, 1996, a spurious actuation of an underfrequency relay resulted in a trip of the '1A' Reactor Protection System (RPS) inverter output series circuit breaker which caused a loss of power to the '1A' RPS/Uninterruptible Power Supply power distribution panel 1AY160. This loss of power resulted in automatic actuations of the Primary Containment and Reactor Vessel Isolation Control System, an Engineered Safety Feature. Following an investigation, Operations personnel reset the underfrequency relay and reclosed the breaker thereby restoring power to panel 1AY160. The isolations were bypassed or reset in accordance with plant procedures and the affected systems were restored. The cause of this event was the spurious actuation of an underfrequency relay. An analysis of the underfrequency relay performed after the event indicated that the relay functioned within specifications; however, it is possible that an intermittent degradation of the relay's printed circuit board had existed that could not be repeated under test conditions. The relay was replaced on February 5, 1996, and no further actions are planned.

LICENSEE EVENT REPORT (LER)
TEXT CONTINUATION

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

Unit Conditions Prior to the Event:

Unit 1 was in Operational Condition 1 (Power Operation) in end of cycle coastdown at 80.7% power level.

Unit 2 was in Operational Condition 1 at 100% power level.

There were no structures, systems or components out of service that contributed to this event.

Description of the Event:

On February 4, 1996 at 1140 hours, a spurious actuation of underfrequency relay 81-AY24801 resulted in a trip of the '1A' Reactor Protection System (RPS) inverter output series circuit breaker 52-AY24801. This caused a loss of power to the '1A' RPS/Uninterruptible Power Supply (UPS) power distribution panel 1AY160. This loss of power resulted in automatic actuations of the Primary Containment and Reactor Vessel Isolation Control System (PCRIVICS; EIIS:JM), an Engineered Safety Feature (ESF), causing isolations of the following Unit 1 systems or subsystems by closing their outboard primary containment isolation valves:

- Drywell Chilled Water (DWCW; EIIS:KM),
- Reactor Enclosure Cooling Water (RECW; EIIS:CC),
- Primary Containment Instrument Gas (PCIG; EIIS:LK), and
- Reactor Water Cleanup (RWCU; EIIS:CE).

The following system lines received isolation signals but no valve motion occurred since the associated valves were in the normally closed position:

- Unit 1 Shutdown Cooling Mode of the Residual Heat Removal (RHR) system (EIIS:BO),
- Unit 1 RHR Heat Exchanger Sample Drains and RHR Drain to Radwaste lines,
- Unit 1 RHR Heat Exchanger Vacuum Breaker (EIIS:VACB) lines,
- Unit 1 and Unit 2 Primary Containment Nitrogen Inerting,
- Unit 1 and Unit 2 Primary Containment Purge Supply and Exhaust,
- Unit 1 and Unit 2 Primary Containment Exhaust to Reactor Enclosure Equipment.

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Also as a result of the loss of power to the RPS/UPS distribution panel, the Unit 1 Reactor Enclosure (RE) Heating, Ventilation and Air Conditioning (HVAC) system isolated. The 'A' train of the Standby Gas Treatment System (SGTS; EIIS:BM), a common plant system, and the Unit 1 Reactor Enclosure Recirculation System (RERS; EIIS:VA) automatically initiated following the isolation of normal RE HVAC. Additionally, the common Refuel Floor HVAC system isolated.

An 'A' channel half scram signal was generated as designed due to the loss of power to the RPS/UPS power distribution panel.

Main Control Room (MCR) operations personnel restored the DWCW, RECW and PCIG systems by 1146 hours using the PCRVICS isolation bypass switches in accordance with the Event (E) procedure E-1AY160, "Loss of 1A RPS and UPS Power," Off Normal (ON) procedure ON-113, "Loss of RECW," and General Plant procedure GP-8, "Primary and Secondary Containment Station Verification and Reset."

Operations personnel attempted to reclose series circuit breaker 52-AY24801, however, the breaker tripped free (i.e., the trip signal from relay 81-AY24801 was still present). Since the 'C' channel underfrequency relay 81-CY24801 was monitoring the same inverter as relay 81-AY24801 and had not actuated, and the frequency meter on the inverter was at or near 60 Hz, it was concluded that no true underfrequency condition existed. The trip signal was isolated and the series circuit breaker 52-AY24801 was reclosed. Following re-energization of panel 1AY160 at 1320 hours, the half scram signal and the remaining system isolations were reset per procedure GP-8 by 1418 hours on February 4, 1996.

A four hour notification was made to the NRC at 1528 hours on February 4, 1996, in accordance with the requirements of 10CFR50.72(b)(2)(ii), since this event resulted in automatic ESF actuations. This report is being submitted in accordance with the requirements of 10CFR50.73(a)(2)(iv).

Analysis of the Event:

The isolations were bypassed or reset in accordance with plant procedures and the systems were expeditiously restored by operations

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personnel, thereby preventing additional challenges to plant operations. All systems responded as designed during the loss of power to the RPS/UPS power distribution panel. There was no release of radioactive material to the environment as a result of this event.

If licensed MCR operations personnel had not responded expeditiously, the potential exists that this event could have resulted in securing of the Reactor Recirculation Pumps due to a lack of pump and motor cooling, followed by a plant shutdown. Plant shutdown could have also been required due to Drywell temperature and pressure increases as a result of the isolation of the DWCW system and the resultant loss of Drywell cooling. Additionally, if the PCIG system remained isolated for an extended period of time, the Main Steam Isolation Valves (MSIVs) could have drifted closed, resulting in a reactor trip and subsequent challenges to safety-related systems.

Immediate and follow-up actions for this type of event, loss of power to an RPS/UPS power distribution panel, are provided in procedures E-AY160, ON-113, and GP-8. Licensed MCR operators receive requalification training to review and practice responses to simulated plant transients of this type. This training reinforces immediate operator actions, minimizing the time that systems are isolated, and reducing the impact on the plant. Therefore, as a result of this adequate procedural guidance, training, and prompt operator actions, the consequences of this type of event are minimized.

Cause of the Event:

The cause of this event was the spurious actuation of the underfrequency relay 81-AY24801. This caused the series circuit breaker 52-AY24801 to trip which resulted in a loss of power to panel 1AY160, and the subsequent isolations. The inverter was inspected and found to be within normal parameters, and the other inverter output relays did not actuate. When the operators attempted to reset the series circuit breaker, the underfrequency relay could not be reset even with the inverter output frequency above the reset setpoint. This indicates a malfunction within the underfrequency relay.

Corrective Actions:

Underfrequency relay 81-AY24801 was replaced on February 5, 1996, and later tested by the Corporate Laboratories Division. The test results

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indicated that the underfrequency relay functioned within specifications; however, it is possible that an intermittent degradation of the relay's printed circuit board had existed that could not be repeated under test conditions.

All 8 Unit 1 and Unit 2 RPS/UPS underfrequency relays are General Electric model 12SFF31C1A, type SFF31C. The reliability of the type SFF relays has been very good at the Limerick Generating Station (LGS) as well as throughout the industry under normal operating conditions. A review of the Nuclear Plant Reliability Data System (NPRDS) data has indicated only 3 similar industry underfrequency relay failures from 1984 to 1992. Therefore, it is concluded that the cause of the event was due to a spurious actuation of underfrequency relay 81-AY24801, and no further actions are planned.

Previous Similar Occurrences:

LGS LER 1-91-019 reported a trip of the '1A' RPS output series circuit breaker 52-AY24801 and the loss of power to RPS/UPS panel 1AY160 as a result of the spurious tripping of the underfrequency relay 81-AY24801. However, the corrective actions from this previous event are not expected to have prevented the event reported in this LER.

The underfrequency relay 81-AY24801 had been tested satisfactorily the day before the 1991 event and again the day of the event. Subsequent bench testing of the removed relay revealed no abnormalities. As a precautionary measure, however, the relay was replaced. Since an evaluation concluded that this type of relay had a good operating history and a more reliable relay could not be identified, no further actions were planned.