



PECO ENERGY

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10CFR50.73

May 20, 1994
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 inadvertent actuation of the Unit 1 and Unit 2 Primary Containment and Reactor Vessel Isolation Control Systems (PCRVICS), an Engineered Safety Feature (ESF), and other ESFs, as a result of a blown Unit 2 PCRVICS fuse due to personnel error.

Reference:	Docket Nos. 50-352 50-353
Report Number:	2-94-003
Revision Number:	00
Event Date:	April 20, 1994
Report Date:	May 20, 1994
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)(iv).

Very truly yours,

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)

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TITLE (4) **Primary Containment and Reactor Vessel Isolation Control System (PCRVICS) Engineered Safety Feature Actuations resulting from a PCRVICS fuse which blew due to personnel error.**

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 NAMES		DOCKET NUMBER (5)
0	4	20	9	4	0	0	3	0	Limerick, Unit 1		0 5 0 0 0 3 5 1
0	4	20	9	4	0	0	3	0			0 5 0 0 0 3 5 1

OPERATING MODE (9) 1	THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR § (Check one or more of the following) (11)									
	20.402(b)	<input type="checkbox"/>	20.405(c)	<input checked="" type="checkbox"/>	50.73(a)(2)(iv)	<input type="checkbox"/>	73.71(b)	<input type="checkbox"/>		
POWER LEVEL (10) 100	20.405(a)(1)(i)	<input type="checkbox"/>	50.36(c)(1)	<input type="checkbox"/>	50.73(a)(2)(v)	<input type="checkbox"/>	73.71(c)	<input type="checkbox"/>		
	20.405(a)(1)(ii)	<input type="checkbox"/>	50.36(c)(2)	<input type="checkbox"/>	50.73(a)(2)(vi)	<input type="checkbox"/>	OTHER (Specify in Abstract below and in Text, NRC Form 366A)			
	20.405(a)(1)(iii)	<input type="checkbox"/>	50.73(a)(2)(i)	<input type="checkbox"/>	50.73(a)(2)(vii)(A)	<input type="checkbox"/>				
	20.405(a)(1)(iv)	<input type="checkbox"/>	50.73(a)(2)(ii)	<input type="checkbox"/>	50.73(a)(2)(vii)(B)	<input type="checkbox"/>				
	20.405(a)(1)(v)	<input type="checkbox"/>	50.73(a)(2)(iii)	<input type="checkbox"/>	50.73(a)(2)(ix)	<input type="checkbox"/>				

LICENSEE CONTACT FOR THIS LER (12)		TELEPHONE NUMBER	
NAME J. L. Kantner, Manager - Experience Assessment, LGS		AREA CODE 610	327-1200

COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT (13)										
CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPROS	CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPROS	

SUPPLEMENTAL REPORT EXPECTED (14)		EXPECTED SUBMISSION DATE (15)	MONTH	DAY	YEAR
<input type="checkbox"/> YES (If yes, complete EXPECTED SUBMISSION DATE) <input checked="" type="checkbox"/> NO					

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

On April 20, 1994, during performance of a Surveillance Test (ST) procedure, various actuations of the Units 1 and 2 Primary Containment and Reactor Vessel Isolation Control System (PCRVICS), and a Unit 2 Reactor Enclosure Secondary Containment isolation occurred due to a blown fuse on Unit 2. These are Engineered Safety Feature actuations. The fuse blew after an Instrumentation and Controls (I&C) technician inadvertently grounded an electrical lead while attempting to reconnect the lead using a self-holding screwdriver. The fuse was replaced and all isolations were reset within 45 minutes. The actual consequences of this event were minimal. All affected systems responded as designed and there was no release of radioactive material to the environment as a result of this event. The cause of the isolations was the blowing of Unit 2 PCRVICS fuse B21H-F15D. The cause of the blown fuse was personnel error. The I&C technician involved in this event was counselled regarding the importance of attention to detail. An analysis of the techniques and tools used to lift and reconnect energized electrical leads is currently being performed, and corrective actions will be implemented as necessary.

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TEXT (If more space is required, use additional NRC Form 365A's) (17)

Unit Conditions Prior to the Event:

Unit 1 was in Operational Condition 1 (Power Operation) operating at 100% power. Unit 2 was in Operational Condition 1 operating at 100% power level. There were no structures, systems, or components out of service that contributed to this event.

Description of the Event:

On April 20, 1994, Instrumentation and Controls (I&C) technicians were performing Surveillance Test (ST) procedure ST-2-042-938-2, "RPS/NS4 Drywell Pressure High, Division IIA, Channel C Response Time Test." At 1113 hours, while performing a procedural step to reconnect an energized electrical lead to a terminal board, a screw, being utilized to secure the electrical lead, inadvertently dislodged from the I&C technicians's "starter" (i.e., self-holding) screwdriver. Subsequently, the energized electrical lead contacted a relay retaining clip, thereby short circuiting to ground.

The short circuit caused the Unit 2 Primary Containment and Reactor Vessel Isolation Control System (PCRVICES, EIIS:JM) fuse B21H-F15D to blow, causing a loss of power to the outboard PCRVICES logic that resulted in various actuations of the Units 1 and 2 PCRVICES. Additionally, a Unit 2 Reactor Enclosure Secondary Containment isolation occurred. These are Engineered Safety Feature (ESF) actuations.

The PCRVICES actuations resulted in isolation of the following Unit 2 systems or subsystems:

- o Reactor Water Cleanup (RWCU, EIIS:CE),
- o Primary Containment Instrument Gas (PCIG, EIIS:LK),
- o Drywell Chilled Water (DWCW, EIIS:KM),
- o Reactor Enclosure Cooling Water (RECW, EIIS:CC) to Reactor Recirculation Pump Motor coolers, and
- o Drywell Liquid Radwaste Drains (EIIS:WD).

Additionally, the Unit 1 Low Volume Primary Containment Nitrogen Make-up and Primary Containment Exhaust to the Reactor Enclosure Equipment Compartment Exhaust valves closed upon receipt of the isolation signal.

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

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EXPIRES: 8/31/85

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TEXT (If more space is required, use additional NRC Form 368A's) (17)

- o Unit 2 RECW Tie-in to DWCW,
- o Unit 2 Main Steam Line Drain,
- o Unit 2 Main Steam Lines Sample and Reactor Water Sample,
- o Unit 2 Suppression Pool Clean-up Pump (EIIS:CG) Suction,
- o Unit 2 Residual Heat Removal (RHR, EIIS:BO) Heat Exchanger Sample and RHR Drain to Radwaste,
- o Unit 2 RHR Heat Exchanger Vacuum Breaker (EIIS:VACB),
- o Unit 2 Primary Containment Exhaust to Reactor Enclosure Equipment Compartment Exhaust,
- o Unit 1 and 2 Primary Containment Nitrogen Inerting (EIIS:BB), and
- o Unit 1 and 2 Primary Containment Purge Supply Exhaust.

The following ESFs also initiated as designed due to the PCRVICES actuations. The Unit 2 Reactor Enclosure (RE) Heating, Ventilation and Air Conditioning (HVAC) system isolated. The 'A' trains of the Standby Gas Treatment System (SGTS, EIIS:BM), a common plant system, and the Unit 2 Reactor Enclosure Recirculation System (RERS, EIIS:VA), automatically initiated thus completing the Unit 2 RE Secondary Containment isolation.

The I&C technicians immediately notified the Main Control Room (MCR) following the incident, and licensed MCR operators immediately bypassed the isolation signals for the isolated RECW valves to the Reactor Recirculation Pump Motor Cooler, and the DWCW valves in accordance with General Plant (GP) procedure GP-8.5, "Isolation Bypass of Crucial Systems." The operators restored the RECW and DWCW systems using PCRVICES isolation bypass switches. The Instrument Air system (EIIS:LD) was lined up to the unisolated PCIG header to serve as a back-up source of pressure. MCR operators replaced the blown fuse in the Auxiliary Equipment Room. All remaining isolations were restored by 1158 hours. The overall duration of the isolations was 45 minutes.

A four hour notification was made to the NRC at 1242 hours on April 20, 1994, in accordance with the requirements of 10CFR50.72(b)(2)(ii), since this event resulted in automatic ESF actuations. Accordingly, this report is being submitted in accordance with the requirements of 10CFR50.73(a)(2)(iv).

Analysis of the Event

The actual consequences of this event were minimal. All systems responded as designed. There was no release of radioactive material to the environment as a result of this event. The isolations were bypassed or reset in accordance with plant procedures and the affected systems were restored expeditiously by operators, thereby preventing any adverse impact on other plant systems.

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

If RECW flow was not restored to the reactor recirculation pumps, the potential existed that this event could have resulted in a rapid 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 ambient cooling. Additionally, if the PCIG system was isolated for an extended period of time without a backup source of pressure, the Main Steam Isolation Valves (MSIVs) could have drifted closed, resulting in a reactor trip and subsequent challenges to safety-related systems.

Procedure GP-8 provides bypass and reset actions for this type of event. 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 the isolations was the blowing of the PCRVICS fuse B21H-F15D. The cause of the blown fuse was personnel error. The I&C technician performing the ST procedure failed to ensure that the screw for reconnecting the energized lead was properly secured in its "starter" (i.e., self-holding) screwdriver. As a result, the screw dislodged from the screwdriver and the electrical lead short circuited to ground causing the isolations to occur.

Corrective Actions:

1. The I&C technician involved in this event was counselled regarding the importance of attention to detail while working with energized electrical leads.
2. An analysis of the techniques and tools used to lift and reconnect energized electrical leads is currently being performed. This analysis will determine if a more reliable method exists to accomplish the intended results. This analysis is expected to be completed by June 15, 1994, and will include a Nuclear Network inquiry to identify if other utilities have had similar incidents with "starter" (i.e., self-holding) screwdrivers and the improvements they have implemented.

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

Previous Similar Occurrences:

There have been previous events at the Limerick Generating Station where a fuse blew due to personnel error. These previous events were due to different causes such as the inadvertent grounding of test equipment leads, improper continuity checks, etc. None of these previous events involved the dislodging of a screw from a "starter" (i.e., self-holding) screwdriver resulting in an electrical lead short circuiting. Therefore, the corrective actions implemented for these previous events would not have prevented this event being reported from occurring.

On February 9, 1994, a similar non-reportable incident occurred during the unit 1 refueling outage. This incident concerned the inadvertent grounding of an electrical lead during the replacement of a relay for corrective maintenance. The corrective actions for this incident were limited to the proper reviews of work orders for replacing energized relays, and would not have prevented this event from occurring.