

LICENSEE EVENT REPORT (LER)

FACILITY NAME (1) DOCKET NUMBER (2) PAGE (3)
 Limerick Generating Station, Unit 1 0 5 0 0 0 3 5 2 1 OF 0 6

This LER reports a condition prohibited by Technical Specifications in that certain electrical equipment required for Unit 1 operation were found not to be environmentally qualified and therefore considered inoperable.

EVENT DATE (5)			LER NUMBER (1)		REPORT DATE (7)			OTHER FACILITIES INVOLVED (8)																	
MONTH	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	MONTH	DAY	YEAR	FACILITY NAMES	DOCKET NUMBER(S)															
0	3	1	4	8	9	8	9	-	0	1	9	-	0	0	0	3	1	4	8	9	0	5	0	0	0

OPERATING MODE (9) * THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR 8: (Check one or more of the following) (11)

POWER LEVEL (10) 0 0 0	<input type="checkbox"/> 20.402(b)	<input type="checkbox"/> 20.405(c)	<input type="checkbox"/> 50.73(a)(2)(iv)	<input type="checkbox"/> 73.71(b)
	<input type="checkbox"/> 20.406(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"/> 20.406(a)(1)(ii)	<input type="checkbox"/> 50.36(c)(2)	<input type="checkbox"/> 50.73(a)(2)(vii)	OTHER (Specify in Abstract below and in Text, NRC Form 366A)
	<input type="checkbox"/> 20.406(a)(1)(iii)	<input checked="" type="checkbox"/> 50.73(a)(2)(i)	<input type="checkbox"/> 50.73(a)(2)(viii)(A)	
	<input type="checkbox"/> 20.406(a)(1)(iv)	<input checked="" type="checkbox"/> 50.73(a)(2)(ii)	<input type="checkbox"/> 50.73(a)(2)(viii)(B)	
<input type="checkbox"/> 20.406(a)(1)(v)	<input type="checkbox"/> 50.73(a)(2)(iii)	<input type="checkbox"/> 50.73(a)(2)(ix)		

LICENSEE CONTACT FOR THIS LER (12)

NAME: C. R. Endriss, Regulatory Engineer Limerick Generating Station

TELEPHONE NUMBER: 2 | 1 | 5 | 3 | 2 | 7 | - | 1 | 2 | 0 | 0

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)

YES (If yes, complete EXPECTED SUBMISSION DATE) NO

EXPECTED SUBMISSION DATE (15)

MONTH	DAY	YEAR

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

Abstract: LER 89-019

On March 15, 1989, at 1030 hours, with Unit 1 in a refueling outage, Unit 1 station personnel were informed that certain electrical equipment located in High Energy Line Break (HELB) compartments might not perform their safety function because their conduit entries were not properly sealed or protected against moisture intrusion. As a result of this unqualified configuration, the electrical equipment could not be relied upon to perform their intended safety function needed to mitigate the consequences of a postulated HELB, since moisture intrusion into the equipment could have rendered them inoperable. A HELB did not occur during the time in which the electrical equipment was not sealed and therefore the safety function of the affected electrical equipment was not needed. There was no release of radioactive material to the environment as a result of this condition. The cause of this condition was a less conservative design philosophy that did not require conduit sealing to maintain environmental qualification in all HELB areas. Modification 5977 adds the environmental seals and low point drains to the electrical equipment in question, and will be completed prior to Unit 1 start-up from the current refueling outage.

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LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

FACILITY NAME (1) Limerick Generating Station, Unit 1	DOCKET NUMBER (2) 0 5 0 0 0 3 5 2 8 9 - 0 1 9 - 0 0 0 2 OF 0 6	LER NUMBER (6)			PAGE (3)	
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER		

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

Background

The Limerick Generating Station (LGS) Final Safety Analysis Report (FSAR), Section 3.11, "Environmental Design of Mechanical and Electrical Equipment," states that the requirements of 10 CFR 50.49 "Environmental Qualification of Electrical Equipment Important to Safety for Nuclear Power Plants," shall be met such that all affected safety related electrical equipment must be capable of performing its safety function and/or remain in a safe mode under all conditions postulated to occur during its installed life.

The Unit 1 environmental qualification (EQ) program includes all the systems and equipment located in a potentially harsh environment which is required to mitigate the consequences of a Loss of Coolant Accident (LOCA) and a High Energy Line Break (HELB).

The EQ requirements of electrical equipment are determined by performing a review of qualification tests and analyses which were conducted using methodologies which conform to NRC requirements.

As part of the start-up activities for Unit 2 of LGS (currently under construction), an engineering review of the overall implementation of the Unit 2 EQ program was conducted. To assure that program enhancements had been implemented, detailed walkdowns of Unit 2 were performed in accordance with procedures. During these walkdowns (performed in December 1988), Philadelphia Electric Company (PECo) identified that certain safety related electrical equipment (temperature elements, limit switches, solenoid valves, and pressure switches) lacked conduit seals or conduit low point drains, which were required to support the EQ of the equipment. The NRC was notified on March 16, 1989, of the condition in Unit 2 in accordance with the requirements of 10CFR 50.55(e).

As a result of these deficiencies discovered in Unit 2, we recognized that similar conditions may exist in Unit 1, since the Unit 2 EQ requirements were developed directly from the Unit 1 EQ program.

In December 1988, PECo requested Architect/Engineer (A/E) personnel to perform a review of seal requirements for selected electrical equipment in the Unit 1 Reactor Building. As a result of the review, A/E personnel confirmed that seals were required for certain Unit 1 electrical equipment. In order to verify that the seals were in place, EQ walkdowns for Unit 1 reactor building were initiated on February 14, 1989. The walkdown results revealed that the seals were not installed.

LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

FACILITY NAME (1) Limerick Generating Station, Unit 1	DOCKET NUMBER (2) 0 5 0 0 0 3 5 2	LER NUMBER (6)			PAGE (3)		
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER			
		8 9	- 0 1 9	- 0 0	0 3	OF	0 6

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

Plant Conditions Prior to the Event:

Operating Mode: * (Handling irradiated fuel in secondary containment)

Reactor Power: 0% (Defueled)

Description of the Event:

On March 15, 1989, at 1030 hours, with Unit 1 in a refueling outage, Unit 1 station personnel were informed that certain electrical equipment located in High Energy Line Break (HELB) compartments might not perform their safety function because their conduit (EIIS:CN) entries were not properly sealed (EIIS:SEAL) or protected against moisture intrusion. During the Unit 1/Unit 2 comparison walkdown of the Unit 1 reactor building electrical equipment which began on February 14, 1989, while Unit 1 was shutdown for a refueling outage, walkdown personnel discovered that 107 temperature elements, 43 limit switches, 31 solenoid valves, and 31 pressure switches had not been installed in compliance with EQ requirements. The above electrical equipment is associated with the steam leak detection system, back pressure (steam-flooding) dampers, and the outboard Main Steam Isolation Valves (MSIVs). This equipment is required to function post-HELB to mitigate the HELB consequences. The temperature elements and the MSIV limit switches are required to be operable per Technical Specifications (TS) 3.3.2, "Isolation Actuation Instrumentation," and 3.3.1, "Reactor Protection System (RPS) Instrumentation," respectively. Since this equipment could not be relied upon to perform its intended safety function due to EQ inadequacies, we consider this equipment to have been inoperable. We have concluded that these conditions have existed since October 26, 1984, the date of issuance of the Unit 1 low power operating license.

This condition was recognized as reportable and a four hour notification was made at 1030 hours on March 15, 1989, in accordance with the requirements of 10 CFR 50.72(b)(2)(i), since the unanalyzed configuration of the electrical equipment could have prevented the fulfillment of the safety functions needed to mitigate the consequences of a postulated HELB. This LER is being submitted in accordance with the requirements of 10CFR50.73(a)(2)(ii)(A) since the electrical equipment in question could not be relied upon to perform its intended safety function to mitigate the consequences of an accident, and with the requirements of 10CFR50.73(a)(2)(i)(B) since the applicable action required by TS sections 3.3.1 and 3.3.2 were not taken within the specified time period.

LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

FACILITY NAME (1) Limerick Generating Station, Unit 1	DOCKET NUMBER (2) 0 5 0 0 0 3 5 2 8 9 - 0 1 9 - 0 0 0 4 OF 0 6	LER NUMBER (6)			PAGE (3)	
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER		

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

Consequences of the Event:

A HELB did not occur during the time in which the electrical equipment was not sealed, and therefore the affected electrical equipment was not called upon to perform its intended safety function in a harsh environment. There was no release of radioactive material to the environment as a result of this condition.

If a HELB had occurred during reactor operation, moisture intrusion into the backpressure damper devices (solenoid valves, pressure switches, and limit switches) might have prevented closure of the dampers. This could have allowed steam to enter areas of the reactor building not analyzed for a high pressure and temperature environment. The backpressure dampers in question serve the following areas of the reactor building:

- Reactor Core Isolation Cooling (RCIC), El. 201'
- Safeguard System Room, El. 217'
- Main Steam and Feedwater Pipe Chase, El. 253' and 283'
- Reactor Water Cleanup (RWCU) Recirculation Pump, El. 283'
- RWCU Non-Regenerative Heat Exchanger, El. 283'
- RWCU Renerative Heat Exchanger, El. 283'
- Steam Vent Tunnel, El. 283'

Failure of the leak detection system temperature elements could have precluded timely steam isolation for small steam line breaks up to the point where the flow sensing elements located in the system piping would initiate automatic system isolation valve closure upon a high flow situation. The temperature elements in question are located in the following areas:

- High Pressure Coolant Injection (HPCI) Room
- RCIC Room
- RWCU Room
- Along the Main Steam Lines
- Safeguard System Room, El. 217'

LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

FACILITY NAME (1) Limerick Generating Station, Unit 1	DOCKET NUMBER (2) 0 5 0 0 0 3 5 2 8 9	LER NUMBER (6)			PAGE (3)	
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER		
		— 0 1 9	— 0 0	0 5	OF	0 6

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Each of the four outboard MSIVs have 3 limit switches. Two of the limit switches function to indicate open or closed valve position. The third limit switch provides a trip signal to the RPS. Failure of an outboard MSIV limit switch which provides a trip signal to RPS, would have initiated an RPS half scram. Had all four limit switches to RPS been affected by moisture intrusion, the reactor would have tripped as designed. Failure of any of the eight limit switches used for outboard MSIV position indication, would have caused no adverse effects on the plant.

Although a detailed analysis of the consequences of a HELB event has not been performed, we believe that such an analysis would yield results indicating that dilution of the HELB effect (due to distance from the source, compartment volume, etc.) would result in findings that much of the safety-related equipment located in the affected areas would not have experienced environments exceeding their environmental qualification (i.e., ability to perform its safety-related function).

Cause of the Event:

The cause of this condition was a less conservative design philosophy that did not require conduit sealing to maintain environmental qualification in all HELB areas.

Prior to the issuance of NRC Information Notice No. 84-57, "Operating Experience Related to Moisture Intrusion in Safety-Related Electrical Equipment at Commercial Power Plants," the focus of conduit sealing was limited to those areas of the plant whose relative humidity was 100% during normal operation. Also, the focus of sealing conduits to maintain environmental qualification, at that time, was directed to equipment located inside primary containment. The only other area other than the primary containment which required environmental conduit seals was the Emergency Service Water (ESW)/Residual Heat Removal (RHR) pipe tunnel due to high humidity. NRC issued Information Notice 84-57 in August of 1984. At that time we did not consider, when reviewing test reports, that conduit seals were required to maintain equipment qualification in other HELB areas.

LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

FACILITY NAME (1) Limerick Generating Station, Unit 1	DOCKET NUMBER (2) 0 5 0 0 0 3 5 2 8 9	LER NUMBER (6)			PAGE (3)	
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER		
		89	019	00	06	OF 06

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

Corrective Actions:

Modification 5977 adds the environmental seals and low point drains to the Unit 1 safety related electrical equipment in question, in order that the equipment will detect and mitigate the affects of a HELB. This modification will be completed prior to Unit 1 start-up from the current refueling outage.

Actions Taken to Prevent Recurrence:

EQ documentation review procedures have been revised to reflect a more conservative design philosophy, including a more detailed evaluation of the electrical equipment EQ test configuration. Additionally, the scope of the Unit 1 EQ walkdown was expanded to give full confidence that Unit 1 electrical equipment, which is required to be environmentally qualified, was installed properly (i.e. in accordance with the more conservative design philosophy). If in the course of these EQ walkdowns a condition is discovered that is not in conformance with EQ criteria, it will be corrected and reported in a supplement to this LER.

Previous Similar Occurrences:

LER 89-017
Tracking codes: A99, Other Personnel Errors

PHILADELPHIA ELECTRIC COMPANY

LIMERICK GENERATING STATION

P. O. BOX A

SANATOGA, PENNSYLVANIA 19464

April 14 , 1989

Docket No. 50-352

License No. NPF-39

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

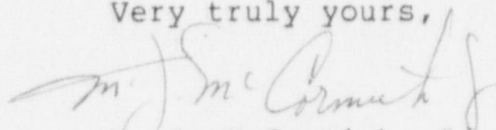
SUBJECT: Licensee Event Report
Limerick Generating Station - Unit 1

This LER reports a condition prohibited by Technical Specifications in that certain electrical equipment required for Unit 1 operation were found not to be environmentally qualified and therefore considered inoperable. Accordingly, this equipment would not have been available to mitigate the consequences of an accident and the proper Technical Specification action was not taken within the allowed period.

Reference:	Docket No. 50-352
Report Number:	89-019
Revision Number:	00
Event Date:	March 14, 1989
Report Date:	April 14, 1989
Facility:	Limerick Generating Station P.O. Box A, Sanatoga, PA 19464

This LER is being submitted pursuant to the requirements of 10CFR 50.73(a)(2)(ii)(A) and 10CFR 50.73(a)(2)(i)(B).

Very truly yours,



M. J. McCormick, Jr.
Plant Manager

DMS:sc

cc: W. T. Russell, Administrator, Region I, USNRC
T. J. Kenny, USNRC Senior Resident Inspector, LGS 1

TEL 2
11