

10CFR50.73

June 2, 2005

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

Limerick Generating Station, Unit 1 and Unit 2
Facility Operating License Nos. NPF-39 and NPF-85
NRC Docket Nos. 50-352 and 50-353

Subject: LER 1-05-002, Loss Of One Offsite Source

This Licensee Event Report (LER) addresses a valid automatic actuation of the emergency AC electrical power system and the emergency service water system due to a trip of one offsite source. The 4B transformer tripped on a false actuation of protective relays due to water intrusion into the winding hot-spot temperature switch.

Report Number: 1-05-002
Revision: 00
Event Date: April 6, 2005
Discovered Date: April 6, 2005
Report Date: June 2, 2005

This LER is being submitted pursuant to the requirements of 10CFR50.73(a)(2)(iv)(A).

If you have any questions or require additional information, please do not hesitate to contact us.

Sincerely,

Original signed by

Ron J. DeGregorio
Vice President – Limerick
Exelon Generation Company, LLC

cc: S. J. Collins, Administrator Region I, USNRC
S. L. Hansell, USNRC Senior Resident Inspector, LGS

SUMMARY OF EXELON NUCLEAR COMMITMENTS
LS-AA-117-1003 Rev.2

The following table identifies commitments made in this document. (Any other actions discussed in the submittal represent intended or planned actions. They are described to the NRC for the NRC's information and are not regulatory commitments.)

Commitment #1	Committed date (or "outage"): None
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None

LICENSEE EVENT REPORT (LER)

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

Estimated burden per response to comply with this mandatory collection request: 50 hours. Reported lessons learned are incorporated into the licensing process and fed back to industry. Send comments regarding burden estimate to the Records and FOIA/Privacy Service Branch (T-5 F52), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by internet e-mail to infocollects@nrc.gov, and to the Desk Officer, Office of Information and Regulatory Affairs, NEOB-10202, (3150-0104), Office of Management and Budget, Washington, DC 20503. If a means used to impose an information collection does not display a currently valid OMB control number, the NRC may not conduct or sponsor, and a person is not required to respond to, the information collection.

1. FACILITY NAME Limerick Generating Station, Unit 1	2. DOCKET NUMBER 05000352	3. PAGE 1 OF 4
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4. TITLE
Offsite Source Trip Due To Water Intrusion Into Transformer Winding Temperature Switch

5. EVENT DATE			6. LER NUMBER			7. REPORT DATE			8. OTHER FACILITIES INVOLVED	
MONTH	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REV NO.	MONTH	DAY	YEAR	FACILITY NAME	DOCKET NUMBER
04	06	2005	2005	- 002 -	0	06	02	2005	Limerick Unit 2	05000353
									FACILITY NAME	DOCKET NUMBER
										05000

9. OPERATING MODE 1	11. THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR§: (Check all that apply)			
10. POWER LEVEL 100	<input type="checkbox"/> 20.2201(b)	<input type="checkbox"/> 20.2203(a)(3)(i)	<input type="checkbox"/> 50.73(a)(2)(i)(C)	<input type="checkbox"/> 50.73(a)(2)(vii)
	<input type="checkbox"/> 20.2201(d)	<input type="checkbox"/> 20.2203(a)(3)(ii)	<input type="checkbox"/> 50.73(a)(2)(ii)(A)	<input type="checkbox"/> 50.73(a)(2)(viii)(A)
	<input type="checkbox"/> 20.2203(a)(1)	<input type="checkbox"/> 20.2203(a)(4)	<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)(i)	<input type="checkbox"/> 50.36(c)(1)(i)(A)	<input type="checkbox"/> 50.73(a)(2)(iii)	<input type="checkbox"/> 50.73(a)(2)(ix)(A)
	<input type="checkbox"/> 20.2203(a)(2)(ii)	<input type="checkbox"/> 50.36(c)(1)(ii)(A)	<input checked="" type="checkbox"/> 50.73(a)(2)(iv)(A)	<input type="checkbox"/> 50.73(a)(2)(x)
	<input type="checkbox"/> 20.2203(a)(2)(iii)	<input type="checkbox"/> 50.36(c)(2)	<input type="checkbox"/> 50.73(a)(2)(v)(A)	<input type="checkbox"/> 73.71(a)(4)
	<input type="checkbox"/> 20.2203(a)(2)(iv)	<input type="checkbox"/> 50.46(a)(3)(ii)	<input type="checkbox"/> 50.73(a)(2)(v)(B)	<input type="checkbox"/> 73.71(a)(5)
<input type="checkbox"/> 20.2203(a)(2)(v)	<input type="checkbox"/> 50.73(a)(2)(i)(A)	<input type="checkbox"/> 50.73(a)(2)(v)(C)	<input type="checkbox"/> OTHER	
<input type="checkbox"/> 20.2203(a)(2)(vi)	<input type="checkbox"/> 50.73(a)(2)(i)(B)	<input type="checkbox"/> 50.73(a)(2)(v)(D)	Specify in Abstract below or in NRC Form 366A	

12. LICENSEE CONTACT FOR THIS LER

FACILITY NAME John G. Hunter III, Acting Manager – Regulatory Assurance	TELEPHONE 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	MANU-FACTURER	REPORTABLE TO EPIX	CAUSE	SYSTEM	COMPONENT	MANU-FACTURER	REPORTABLE TO EPIX
B	FK	TIS	G080	Y					

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

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

One of two offsite sources tripped due to a false actuation of the 4B transformer protective relays. The false actuation was caused by water intrusion into the B phase winding hot spot high temperature switch. The tripping of the transformer de-energized the 13 kV feed from the 500 kV substation to the safeguard transformer. Four of eight 4kV safeguard busses were de-energized which resulted in four of eight emergency diesel generators (EDGs) automatically starting and running unloaded as designed. The 4 kV safeguard busses were automatically re-energized when the four feeder breakers from the energized offsite source automatically closed as designed. Both loops of emergency service water (ESW) automatically started due to the start of the EDGs. The 4B transformer temperature switch was removed from service and the offsite source was re-energized.

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FACILITY NAME (1)	DOCKET (2)	LER NUMBER (6)			PAGE (3)
Limerick Generating Station, Unit 1	05000352	YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	2 OF 4
		2005	-- 002	-- 00	

NARRATIVE (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 (OPCON) 1 (Power Operation) at approximately 100% power. Unit 2 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 Wednesday April 6, 2005, at 16:32 hours the main control room (MCR) received alarms (EIS:ALM) "4A/4B Bus Tie & 20 Reg Trouble" and "500KV Sub Trouble". An Equipment Operator (EO) was dispatched to the 500 kV substation (EIS:FK). Concurrently the Power System Director (PSD) called the MCR and notified the operator of a high temperature alarm on 4A/4B transformer (EIS:XFMR). At 16:54 the 4B Transformer "General Trouble" alarm was acknowledged and reset in the 500 kV substation and the MCR alarms were reset. The EO investigation that was conducted using the annunciator response card (ARC) did not identify any alarm condition present on 4A/4B transformer.

At 16:55 hours, six circuit breakers (115, 315, 525, 625, 205, 15) tripped in the 500 kV and 220 kV substations. The 20 Bus off-site source was de-energized resulting in 4 of 8 (D12, D14, D21, D23) 4kV safeguard busses automatically transferring to the energized 10 Bus off-site source. In addition, 4 of 8 (D12, D14, D21, D23) emergency diesel generators (EDGs) (EIS:EK) automatically started and ran unloaded as designed. The 4kV transfer and EDG starts were as designed.

The investigation identified a flag on the 4B Aux Differential lockout relay (EIS:87). This relay operation caused all of the breakers connected to 4B transformer to trip. The cause of the lockout relay actuation was a false actuation of the 4B transformer B phase high winding temperature switch (EIS:TIS) caused by water intrusion. A solid DC ground was identified.

The 4B Transformer has relay protection for "Hot spot temperatures and total loss of coolers". When any of three phases exceeds 140 degrees Centigrade with no coolers operating the protective lock-out-relay is actuated. This relay trips all of the breakers connected to the transformer. This includes 500 kV breakers 115 and 315, 220 kV breakers 525 and 625, and 13 kV breakers 205 and 15. Breaker 205 is the 13 kV off-site source feed from the tertiary winding in 4A/4B transformer.

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4A and 4B transformers are parallel connected 500 kV to 220 kV transformers located in the 500 kV substation on the tie line between the 500 kV substation and the 220 kV substation. Each transformer has a 13 kV tertiary winding that is used to provide one of two off-site sources required by Technical Specifications.

Operations addressed several equipment challenges during the event (all expected for this transient). The most significant was an entry into procedure OT-116, Loss of Condenser Vacuum, due to the automatic closure of the air valves on the Unit 2 steam jet air ejector (SJAE). This required lowering Unit 2 power to 95% to provide operating margin.

An 8-hour NRC ENS notification was required by 10CFR50.72(b)(3)(iv)(A) for a valid actuation of the emergency AC power system. The ENS notification (#41573) was completed on Wednesday April 6, 2005 at 22:56 EST. Technical Specification 3.8.1.1, A.C. Sources – Operating, 72-hour action was entered on both units while the off-site source was inoperable (for approximately 10.5 hours).

This event involved a valid automatic actuation of the emergency AC electrical power system and the emergency service water system. Therefore, this LER is being submitted pursuant to the requirements of 10CFR50.73(a)(2)(iv)(A).

Analysis of the Event

There were no actual safety consequences associated with this event. The potential safety consequences of this event were minimal. All emergency AC electrical power systems functioned as designed to re-energize the affected 4kV safeguard busses. The D22 EDG was unavailable due to scheduled maintenance during the event but the power supply to D22 4 kV safeguard bus was not interrupted.

The examination of the degraded temperature gauge revealed evidence of water intrusion. In addition the gauge wires showed signs of arcing. The failed gauge was a General Electric, Qualitherm Winding Temperature Gauge, Type AWR.102, GEK-43770.

The 4A and 4B transformer protective relay scheme includes a loss of cooling concurrent with high winding temperature trip function that falsely actuated due to the water intrusion.

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Maintenance on the failed switch was last performed in October 2004 when a DC ground was repaired. The switch was inspected, cleaned and repaired. Screw holes were weather proofed and the gasket was turned. Routine inspections following the maintenance did not identify any signs of water intrusion on the gauge faceplate.

Cause of the Event

The false tripping of the 4A and 4B transformers was caused by water intrusion into the 4B transformer B phase winding hot spot temperature gauge.

Corrective Action Completed

The degraded 4B transformer B phase winding hot spot temperature gauge and the 4B transformer liquid temperature gauge were replaced and the other switches were inspected but no evidence of water intrusion was identified.

Previous Similar Occurrences

There were no previous similar occurrences of false transformer protective relay actuations due to water intrusion.

Component data:

Cause: B (Design, Manufacturing, Construction / Installation)
 System: FK (Switchyard System)
 Component: TIS (Switch, Indicating, Temperature)
 Manufacturer: G080 (General Electric)
 Type: AWR.102
 Model: GEK-43770
 Reportable to EPIX: Yes