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Exelon Nuclear

10CFR 50.73

September 18, 2001

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

Subject: LER 1-01-002 Unanalyzed Condition-Fire Safe Shutdown
Limerick Generating Station, Unit 1 & Unit 2
Facility Operating License Nos. NPF-39 & NPF-89
NRC Docket No. 50-352 & 50-353

This Licensee Event Report (LER) addresses an unanalyzed condition that could degrade plant safety resulting from the failure of a Division 1 125/250VDC inverter. This inverter has the potential to fail as a result of a ground on the negative 125 VDC portion of the system. This ground would cause a failure that would disable the sole credited post fire safe shutdown method for a fire in the Main Control Room. The Unit 1 inverter and the Unit 2 inverter were both modified.

Report Number:	1-01-002
Revision:	00
Event Date:	July 20, 2001
Discovered Date:	July 20, 2001
Report Date:	September 18, 2001
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)(ii)(B).

Very truly yours,

William Levis
Vice President

cc: H. J. Miller, Administrator Region I, USNRC
A. L. Burritt, USNRC Senior Resident Inspector, LGS

IE22

NRC FORM 366 (1-2001)

U.S. NUCLEAR REGULATORY COMMISSION

APPROVED BY OMB NO. 3150-0104 EXPIRES 6-30-2001

Estimated burden per response to comply with this mandatory information 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 Management Branch (T-6 E6), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by internet e-mail to bjs1@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 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.

LICENSEE EVENT REPORT (LER)

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

FACILITY NAME (1)	DOCKET NUMBER (2)	PAGE (3)
Limerick Generating Station Units 1 & 2	05000 352 & 353	1 OF 3

TITLE (4)

Unanalyzed Condition-Fire Safe Shutdown

EVENT DATE (5)			LER NUMBER (6)			REPORT DATE (7)			OTHER FACILITIES INVOLVED (8)	
MO	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REV NO	MO	DAY	YEAR	FACILITY NAME	DOCKET NUMBER
										05000
07	20	01	01	0 02	00	09	18	01	FACILITY NAME	DOCKET NUMBER
										05000

OPERATING	1	THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check all that apply) (11)			
POWER LEVEL (10)	100	20.2201(b)	20.2203(a)(3)(ii)	x 50.73(a)(2)(ii)(B)	50.73(a)(2)(ix)(A)
		20.2201(d)	20.2203(a)(4)	50.73(a)(2)(iii)	50.73(a)(2)(x)
		20.2203(a)(1)	50.36(c)(1)(i)(A)	50.73(a)(2)(iv)(A)	73.71(a)(4)
		20.2203(a)(2)(i)	50.36(c)(1)(ii)(A)	50.73(a)(2)(v)(A)	73.71(a)(5)
		20.2203(a)(2)(ii)	50.36(c)(2)	50.73(a)(2)(v)(B)	OTHER Specify in Abstract below or in
		20.2203(a)(2)(iii)	50.46(a)(3)(ii)	50.73(a)(2)(v)(C)	
		20.2203(a)(2)(iv)	50.73(a)(2)(i)(A)	50.73(a)(2)(v)(D)	
		20.2203(a)(2)(v)	50.73(a)(2)(i)(B)	50.73(a)(2)(vii)	
		20.2203(a)(2)(vi)	50.73(a)(2)(i)(C)	50.73(a)(2)(viii)(A)	
		20.2203(a)(3)(i)	50.73(a)(2)(ii)(A)	50.73(a)(2)(viii)(B)	

LICENSEE CONTACT FOR THIS LER (12)

NAME	TELEPHONE NUMBER (Include Area Code)
Marino Kaminski Manager-Experience Assessment	(610) 718-3400

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

CAUSE	SYSTEM	COMPONENT	MANU-FACTURER	REPORTABLE TO EPIX	CAUSE	SYSTEM	COMPONENT	MANU-FACTURER	REPORTABLE TO EPIX
X	EL	INVT		N					

SUPPLEMENTAL REPORT EXPECTED (14)			EXPECTED SUBMISSION	MONTH	DAY	YEAR
YES (If yes, complete EXPECTED SUBMISSION DATE).	X	NO				

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

During a review of the replacement of Topaz inverters with NLI inverters for the 125/250 VDC distribution system, it was discovered that the existing NLI design (designed in 1995 and installed in Unit 1 in 1998 and Unit 2 in 1999) introduced a new aspect of a failure mode which was not compatible with the center tap design of the DC system. This was not recognized during the original modification analysis. This failure mode, that would result from a ground on the negative 125 VDC portion of the system, would result in a potential across the inverters' surge suppression devices in excess of the design rating causing DC supply fuses to blow. This failure mode would disable credited fire safe shutdown equipment and methods. The affected NLI inverters were replaced with Topaz inverters for Unit 2 and the circuitry was altered on Unit 1 to prevent the failure mode. The cause of the condition was failure to identify that the design of the NLI inverters was not compatible with the center tap design of the ungrounded DC system.

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

Unit Conditions Prior to the Event

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

Description of the Event

On June 21, 2001, a DC system ground occurred at Limerick that resulted in the failure of power supply fuses associated with four Unit 2 NLI inverters. As a result of the event, 4 inverters were replaced with the Topaz design. It was determined that the NLI inverters failed as a result of a ground in the negative leg of the Division 1 125/250 VDC distribution system(EIIS:EI).

On July 20, 2001 during a future actions review of the earlier event, it was determined that for a fire in the Main Control Room, a fire induced ground on certain diesel generator cables had the potential to fail the remote shutdown panel inverter. Safe shutdown is directed from the remote shutdown panel using the Reactor Core Isolation Cooling (RCIC) system (EIIS:BN) for inventory control for a fire in the Main Control Room. If the inverter fails as a result of the ground on the diesel generator cables, there would be no power supply available for automatic or manual control of RCIC turbine flow. RCIC is the only analyzed system available for post-fire inventory control. The same inverter failure would result in the loss of reactor, drywell and suppression pool monitoring instruments at the remote shutdown panel.

This event involved an unanalyzed condition that potentially degrades plant safety. Therefore, an 8 hour ENS notification was made on July 20, 2001 at 21: 57 hours pursuant to 10CFR50.72(b)(3)(ii)(B). Also, this LER is being submitted pursuant to the requirements of 10CFR50.73(a)(2)(ii)(B) since an unanalyzed condition existed which degraded plant safety.

Analysis of the Event

There were no actual safety consequences associated with this event since there was no fire in the control room. The potential safety consequences of this event were also minimal.

The design basis fire in the control room assumes an all encompassing fire which is unlikely and would more likely be limited to a single panel. Even if the RCIC panel was impacted by the fire, capabilities exist with other balance of plant and fire safe shutdown systems to achieve and maintain safe shutdown. However, for the identified inverter failure mode, these capabilities are outside those credited in the licensing basis.

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

Cause of the Event

The cause of the condition was that the modification process failed to identify the design of the NLI inverters' surge suppressors was not compatible with the center tap design of the ungrounded system. A ground on the negative 125 VDC portion of the system would result in a potential across the inverters' surge suppressor devices in excess of the design rating (250Vdc vs. 170Vdc rating). The current would increase through the surge suppressors causing the supply fuses to blow, thus making the inverters unavailable.

Corrective Action Completed

The Unit 1 inverter in the remote shutdown panel was modified on July 22, 2001, and the Unit 2 inverter was replaced on June 23, 2001. A review was conducted of the remaining fire safe shutdown NLI inverters installed in the plant and concluded that the identified failure mode would not impact the ability to safely shutdown after a fire.

This modification was processed in 1995. The modification process was enhanced in 1997 to implement a procedure for failure modes and effects analysis to preclude recurrence of such an event. Also, the Fire Protection Review Checklist was enhanced in December 2000 to provide additional guidance on interdependencies of fire safe shutdown.

Corrective Actions Planned

None

Previous Similar Occurrences

None