Robert W. Boyce
Plant Manager
Limerick Generating Station

PECO ENERGY

PECO Energy Company
Limerick Generating Station
PO Box 2300
Sanatoga, PA 19464-0920
215 327 1200 Ext. 2000

March 14, 1994
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 an event where a Primary Containment Isolation Valve inadvertently isolated, an Engineered Safety Feature, resulting in the loss of the Residual Heat Removal shutdown cooling system to the Unit 1 reactor. The cause of this event was personnel error.

Reference:	Docket No. 50-352
Report Number:	1-94-004
Revision Number:	00
Event Date:	February 12, 1994
Report Date:	March 14, 1994
Facility:	Limerick Generating Station P.O. Box 2300, Sanatoga, PA 19464-2300

Very truly yours,

L A Hopkins for RWB

DMS:cah

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

JE22 1/1

NRC Form 366
(9-83)

U.S. NUCLEAR REGULATORY COMMISSION
APPROVED OMB NO. 3150-0104
EXPIRES: 8/31/88

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 5

TITLE (4) LER concerning an event where a Primary Containment Isolation Valve inadvertently isolated, an ESF, causing a loss of RHR shutdown cooling 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(S)
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0 2	1 2	9 4	9 4	— 0 0 4	— 0 0	0 3	1 4	9 4		0 5 0 0 0

OPERATING MODE (9)		THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more of the following) (11)			
	5	20.402(b)	20.405(c)	X 50.73(a)(2)(iv)	73.71(b)
POWER LEVEL (10)	0 0 0	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 (Specify in Abstract below and in Text, NRC Form 366A)
		20.405(a)(1)(iii)	50.73(a)(2)(i)	50.73(a)(2)(viii)(A)	
		20.405(a)(1)(iv)	50.73(a)(2)(ii)	50.73(a)(2)(viii)(B)	
		20.405(a)(1)(v)	50.73(a)(2)(iii)	50.73(a)(2)(x)	

LICENSEE CONTACT FOR THIS LER (12)

NAME	TELEPHONE NUMBER
	AREA CODE
J. L. Kantner - Manager, Experience Assessment, LGS	6 1 0 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 NPRDS		CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPRDS	

SUPPLEMENTAL REPORT EXPECTED (14)		EXPECTED SUBMISSION DATE (15)	MONTH	DAY	YEAR
YES (If yes, complete EXPECTED SUBMISSION DATE)	X NO				

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

On 02/12/94 at 0857 hours, I&C technicians were performing procedure ST-2-036-704-1, "Excess Flow Check Valve Functional Test." Per the procedure, an I&C technician notified the Main Control Room at 0915 hours to reset any isolations that were generated. Operations personnel discovered that valve HV-051-1F015B, a Primary Containment Isolation Valve (PCIV), had inadvertently isolated constituting an ESF actuation. The isolation was reset at 0915 hours and the PCIV was reopened. The consequences were minimal in that during the period of isolation the reactor cavity was flooded, and per the outage plan, the Fuel Pool Cooling and the Reactor Water Cleanup systems were in service and fully capable of removing decay heat. The cause of the event was personnel error by the I&C technician. Contributing factors include a weak pre-job briefing, poor self-check, procedure human factors, and improper response to an unexpected result. The corrective actions include counseling of the I&C technician and supervisor, enhancements to procedure ST-2-036-704-1, an I&C group all-hands meeting, and the issuance of a I&C Training Bulletin. Other I&C procedures are being reviewed for similar enhancements.

Unit Conditions Prior to the Event:

Unit 1 was in Operational Condition (OPCON) 5 (Refueling), with the reactor cavity flooded and reactor coolant temperature at approximately 80 degrees Fahrenheit (F). The 'B' loop of the Residual Heat Removal (RHR) (EIIS:BO) system was in the shutdown cooling mode of operation. The Fuel Pool Cooling (FPC) (EIIS:DA) and the Reactor Water Cleanup (RWCU) (EIIS:CE) systems were inservice and were fully capable of removing decay heat. Instrumentation and Controls (I&C) technicians were performing Surveillance Test (ST) Procedure ST-2-036-704-1, "Excess Flow Check Valve Functional Test (XV-42-1F045C, XV-42-1F047A, XV-42-1F049A, XV-42-1F065A)."

Background:

Performance of procedure ST-2-036-704-1 has the potential to isolate a number of Primary Containment Isolation Valves (PCIV) (EIIS:ISV). This potential was recognized and appropriate barriers were incorporated into the procedure to minimize the likelihood that isolations would occur.

One barrier incorporated into the ST procedure was the requirement to input simulated high reactor level signals to the level indicating switches (EIIS:LIS) LIS-42-1N680C and D by means of a trip unit calibration system. Another barrier that was incorporated was to open the breaker for selected PCIVs to prevent spurious signals from causing isolations.

The closure logic for the RHR shutdown cooling isolation valves normally requires a two out of two isolation logic input to initiate closure (i.e., trip signals from both LIS-42-1N680C and D). Prior to this event, the isolation logic had been reconfigured, such that, only a trip signal from LIS-42-1N680D was required to initiate isolation, due to work being performed on Division 1 and 3 instrumentation.

Description of the Event:

On February 12, 1994, at 0857 hours, the '1B RHR Pump Discharge HI/LO Pressure' alarm was received in the Main Control Room (MCR) along with numerous other alarms. The alarms were acknowledged and Operations personnel attributed the alarms to the performance of procedure ST-2-036-704-1.

At 0915 hours on February 12, 1994, the I&C technician performing procedure ST-2-036-704-1 notified the MCR in accordance with the procedure to reset any isolations that had been generated through performance of the ST procedure. Operations personnel immediately discovered that HV-051-1F015B, a PCIV, was in the closed position. The isolation logic was reset and HV-051-1F015B was reopened.

A four (4) hour notification was made to the NRC at 1246 hours on February 12, 1994, in accordance with 10CFR50.72(b)(2)(ii) since the automatic closure of PCIV HV-051-1F015B constitutes an Engineered Safety Feature actuation. This report is being submitted in accordance with the requirements of 10CFR50.73(a)(2)(iv).

Analysis:

There was no release of radioactive material to the environment or adverse consequences as a result of the PCIV isolation. The shutdown cooling mode of RHR was isolated for approximately eighteen minutes. Unit 1 reactor coolant temperature rose a maximum of 2 degrees F to 82 degrees F, which is well below the 140 degree F limit specified in the Definition Section for OPCON 5 of Technical Specifications. In accordance with the outage plan, the reactor cavity was flooded, and the FPC and RWCU systems were in service and fully capable of removing decay heat.

Cause of the Event:

This event was caused by personnel error, in that, the I&C technician did not properly follow procedure ST-2-036-704-1. An analysis of the cause of the event is as follows:

Procedure ST-2-036-704-1 requires the I&C technician to input simulated reactor high level signals to LIS-42-1N680C and D through the use of a trip unit calibration system. Prior to inserting the simulated signals, the procedure requires that the stable current adjustment knob on the trip unit be rotated fully clockwise. Instead of performing this step as stated, the I&C technician rotated the stable current adjustment knob fully counter-clockwise. Procedural steps that require a counter-clockwise rotation of this knob are found in many I&C ST procedures. As a result of this error, when the I&C technician inserted the simulated signal to one leg of the parallel

isolation logic, an unexpected response was noticed by the I&C technician in that the trip LED on LIS-42-1N680C was illuminated when it was expected to be off. However, since LIS-42-1N680C was in the test condition and LIS-42-1N680D was still energized (i.e., closed), no isolation of PCIV HV-051-1F015B occurred.

The performance of the ST procedure was stopped by the I&C technician after noticing the illuminated LED, and an I&C supervisor was contacted. The I&C supervisor determined that the trip unit LED was illuminated as a result of a false low level signal. He instructed the I&C technician to increase the simulated signal by rotating the stable current adjustment knob clockwise until the LED light cleared.
The I&C technician then proceeded to simulate a signal to the remaining half of the isolation logic through LIS-42-1N680D in the same manner previously employed (i.e., the I&C technician again incorrectly rotated the stable current adjustment knob counter-clockwise). The incorrect performance of this step resulted in the inadvertent automatic isolation of the PCIV HV-051-1F015B. The I&C technician then increased the stable current adjustment knob and cleared the LED as he had been previously instructed by the I&C supervisor. Two procedural steps later, the I&C technician notified Operations personnel to reset any isolations caused by performance of the ST procedure. Operations personnel identified that PCIV HV-051-1F015B had been isolated.

Contributing factors to the cause of this event are as follows:

- The pre-job briefing was weak in that a good task overview was not provided, the required non-standard rotation of the stable current adjustment knob was not highlighted, and the consequences of improper operation of the calibration trip unit were not discussed with the I&C technician.

- The I&C technician did not properly self-check.

- The human factors of procedure ST-2-036-704-1 could be improved to highlight the somewhat infrequent stable current adjustment clockwise manipulation that is required.

- The I&C technician did not fully understand the first unexpected response and proceeded with the ST procedure without processing a temporary change (TC) to the procedure.

Actions Taken to Prevent Recurrence

1. The I&C technician involved in this event was counseled on the importance of complying with procedures and performing adequate self-check, the importance of fully understanding unexpected responses prior to proceeding with an activity, and the importance of utilizing a TC when a procedural discrepancy is identified.

2. The I&C supervisor involved in this event was counseled on the importance of adequate pre-job briefings to ensure individual understanding of critical procedural steps, the importance of proper communication to ensure complete understanding of a task, and the importance of utilizing TCs for procedure discrepancies.

3. Procedure ST-2-036-704-1 was temporarily changed to incorporate human factor enhancements. A permanent revision to this ST procedure is expected to be completed by April 15, 1994. Similar Unit 1 and Unit 2 I&C procedures are being reviewed for the incorporation of comparable human factor enhancements.

4. An I&C group all-hands meeting was held to discuss this event to emphasize the importance of procedural compliance, and proper self-check and attention to detail.

5. An I&C Training Bulletin will be issued to I&C supervision by March 31, 1994, emphasizing the lessons learned from this event including the importance of utilizing an appropriate administrative control (e.g., TC) upon discovering a mismatch between conditions and procedure. This I&C Training Bulletin will be utilized for work group discussion of this incident.

Previous Similar Occurrences:

LERs 1-84-015, 1-86-003, 1-86-025, and 1-87-004 reported similar inadvertent isolations or improper operation of the calibration trip unit due to procedural noncompliance during the performance of I&C ST procedures. Each of these previous events and this event being reported involved a different I&C ST procedure. The corrective actions for these previous events involved the counseling of the individuals or correcting the ST procedure, and would not have prevented this event from occurring.