Robert W. Boyce
Plant Manager
Limerick Generating Station

PECO NUCLEAR
A Unit of PECO Energy

PECO Energy Company
Limerick Generating Station
PO Box 2300
Sanatoga, PA 19464-0920
610 718 2000

March 21, 1996
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 the Unit 1 alternate reactor coolant circulation and decay heat removal method (Fuel Pool Cooling assisted natural circulation) was inadvertently lost resulting in operation prohibited by Technical Specifications and the loss of a safety function. Insufficient procedural guidance and preparations for a Residual Heat Removal (RHR) subsystem flush resulted in tripping of the Fuel Pool Cooling pumps on low skimmer surge tank level.

Reference:	Docket No. 50-352
Report Number:	1-96-007
Revision Number:	00
Event Date:	February 20, 1996
Report Date:	March 21, 1996
Facility:	Limerick Generating Station P.O. Box 2300, Sanatoga, PA 19464-2300

Very truly yours,

Robert W. Boyce

Robert W. Boyce, Plant Manager

DBN

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

IE22

NRC FORM 366 (5-92) U.S. NUCLEAR REGULATORY COMMISSION

APPROVED BY OMB NO. 3150-0104
EXPIRES 5/31/95

ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS INFORMATION COLLECTION REQUEST: 50.0 HRS. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE INFORMATION AND RECORDS MANAGEMENT BRANCH (MNBB 7714), U.S. NUCLEAR REGULATORY COMMISSION, WASHINGTON, DC 20555-0001, AND TO THE PAPERWORK REDUCTION PROJECT (3150-0104), OFFICE OF MANAGEMENT AND BUDGET, WASHINGTON, DC 20503.

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, Unit 1	05000 352	1 OF 5

TITLE (4) Trip of Fuel Pool Cooling Pumps Resulting in Loss of Core Circulation and Decay Heat Removal Due to Insufficient Procedural Guidance

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 NAME	DOCKET NUMBER
										05000
02	20	96	96	-- 007 --	00	03	21	96	FACILITY NAME	DOCKET NUMBER 05000

OPERATING MODE (9)	5
POWER LEVEL (10)	0

THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more) (11)

	20.402(b)		20.405(c)	50.73(a)(2)(iv)	73.71(b)
	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
	20.405(a)(1)(iii)	X	50.73(a)(2)(i)	50.73(a)(2)(viii)(A)	(Specify in Abstract below and in Text, NRC Form 366A)
	20.405(a)(1)(iv)		50.73(a)(2)(ii)	50.73(a)(2)(viii)(B)	
	20.405(a)(1)(v)	X	50.73(a)(2)(iii)	50.73(a)(2)(x)	

LICENSEE CONTACT FOR THIS LER (12)

NAME	TELEPHONE NUMBER (Include Area Code)
J. L. Kantner - Manager, Experience Assessment, LGS	(610) 718-3400

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 15 single-spaced typewritten lines) (16)

On 02/20/96 a licensed Unit 1 Reactor Operator was flushing the A Residual Heat Removal subsystem piping in accordance with procedure S51.5.C during the fifteenth day of a refueling outage. During the flush the water level in the reactor cavity and the fuel pool decreased causing a trip of the Fuel Pool Cooling System (FPCS) pumps and a loss of the operating alternate decay heat removal and reactor coolant circulation method. This resulted in operation prohibited by Technical Specifications and the interruption of the safety function required to remove residual heat. The FPCS pumps were restarted within fifty-two minutes. The operators were aware of the condition of the plant throughout this event and quickly restored the FPCS and limited the reactor coolant temperature increase to 2 degrees F. The primary cause of this event was insufficient procedural guidance. A contributing factor was insufficient preparation for a complex and infrequently performed evolution. Corrective actions include an assessment of the need and methodology for RHR subsystem flushes during FPCS operation. This assessment will encompass changes needed to the procedure, necessary operator training, and consideration for controlling this activity as a plant evolution/special test.

Unit Conditions Prior to the Event:

Unit 1 was in Operational Condition (OPCON) 5 (Refuel) and had been shutdown for fifteen (15) days. Reactor coolant level was being maintained twenty-two (22) feet above the reactor flange for refueling activities. As required by Technical Specifications (TS) Section 3.9.11.1, ACTION b, alternate reactor coolant circulation was being provided by natural circulation assisted by the Fuel Pool Cooling System (FPCS, EIIS:DA). This method of operation utilizes the cold water return from the FPCS to provide the downward flow of water outside of the core shroud and utilizes the heated water in the core region to provide the upward flow of water. The FPCS was also the alternate decay heat removal method required by TS Section 3.9.11.1, ACTION a. Operators were taking actions to restore the A loop of Residual Heat Removal (RHR, EIIS:BI) in the Shutdown Cooling Mode using System (S) procedure S51.5.C. The Reactor Water Cleanup (RWCU) system was in service providing some core circulation and was available to provide limited decay heat removal.

Description of the Event:

On February 20, 1996, at 2013 hours, a licensed Unit 1 Reactor Operator (RO) was flushing the A RHR subsystem piping in accordance with procedure S51.5.C. This evolution involves opening the full flow test return valve, HV-051-1F024A, and flushing reactor cavity water through a portion of the RHR piping to the suppression pool.

During this evolution, the RO coordinates with several Equipment Operators (EO) to balance the flush flow rate with manual makeup water control for the reactor cavity (condensate transfer) and for the FPCS skimmer surge tank (demineralized water system). The FPCS pumps take suction from the skimmer surge tank which receives water from the top of the water surface in the reactor cavity (cavity level dependent) and from the demineralized water system.

During the flushing of the RHR piping, the skimmer surge tank water level increased and the RO further opened the full flow test return valve to compensate for the flush and fill imbalance. When the skimmer surge tank water level started to lower, the RO fully closed the full flow test valve. However, the level in the reactor cavity was already too low to support adequate makeup to the skimmer surge

tank and the level in the skimmer surge tank continued to decrease to below six (6) feet. The makeup water flow rates were not sufficient to recover the skimmer surge tank level before the FPCS pumps tripped on low tank level at approximately six (6) feet.

Operators immediately entered Off Normal (ON) Procedure ON-121 for the loss of shutdown cooling. The operators stabilized the reactor cavity and skimmer surge tank water levels and pursued the restart of the FPCS and the startup of the A RHR subsystem in the Shutdown Cooling mode. At 2105 hours, the FPCS was returned to service re-establishing the alternate reactor coolant circulation method and the alternate decay heat removal method. During the event the reactor coolant temperature remained stable between 108 and 110 degrees F.

With the FPCS pumps off, the alternate reactor coolant circulation method was not fully in service resulting in operation prohibited by TS Section 3.9.11.1. This report is being submitted in accordance with the requirements of 10CFR50.73(a)(2)(i)(B).

During the investigation into this event, it was determined that this event should be conservatively reported as a loss of a safety function needed to remove residual heat per 10CFR50.72(b)(2)(iii)(B). NUREG 1022 states that this reporting requirement applies to systems needed to mitigate an accident. The safety analysis for Limerick Generating Station (LGS) does not include an accident analysis for a loss of residual heat removal during shutdown conditions. However, the Shutdown Cooling mode of RHR and the FPCS are used to remove residual heat and prevent boiling of the reactor coolant. Even though the ability to remove residual heat with ample backup capability still existed, this event involved the inadvertent and temporary interruption of residual heat removal.

At 1430 hours on February 29, 1996, a four (4) hour notification to the NRC was made pursuant to the requirements of 10CFR50.72(b)(2)(iii)(B). This report is being submitted in accordance with the requirements of 10CFR50.73(a)(2)(vii)(B).

Analysis:

The actual and potential consequences of this event were minimal and there was no release of radioactivity as a result of this event. Both the A and C RHR pumps were operable and available to be aligned to the shutdown cooling mode of operation and the RWCU system was available to provide limited decay heat removal in the event that the FPCS could not be restarted. The operators pursued two paths to restore decay heat removal and reactor coolant circulation immediately following this event using the FPCS and RHR system. Since the reactor coolant temperature was stable and the A RHR subsystem flushing had not been completed, the operators decided the best alternative was to place the FPCS back into service. The FPCS was placed back into service within fifty-two (52) minutes.

With the reactor cavity water level twenty-two (22) feet above the reactor flange and the reactor shutdown for fifteen (15) days, the estimated time for the reactor coolant to boil with no decay heat removal was over thirty (30) hours. The A and C loops of the RHR system and the A loop of the Core Spray system were operable for the required safety injection function. The A loop of the RHR system was operable for the residual heat removal function. Additionally, the C RHR pump was available to be aligned to backup the A RHR pump for the residual heat removal function.

Cause of the Event:

The primary cause of this event was insufficient procedural guidance. Procedure S51.5.C did not provide sufficient guidance for preventing a loss of the FPCS pumps while in the natural circulation operation. The procedure did not provide sufficient instructions, cautions, contingency steps, and equipment and water level response information to prevent excessive lowering or raising of water level in the reactor cavity and the skimmer surge tank.

A contributing factor was insufficient preparation prior to the performance of a complex and infrequently performed evolution. A pre-job briefing was performed. However, preparations did not include sufficient procedural assessment and pre-evolution training and walk-throughs to ensure event free performance.

Corrective Actions:

An assessment will be performed of the need and methodology for performing RHR subsystem flushes during FPCS operation. This assessment will encompass changes needed to procedures, necessary operator training, and consideration for controlling this activity as a plant evolution/special test. This assessment will also determine whether additional flow or level indications are needed to assist the operator in controlling the reactor cavity and skimmer surge tank water levels. The appropriate actions from this assessment will be implemented prior to the next refueling outage.

By June 30, 1996, training will be provided to the appropriate operations personnel on the lessons learned from this event.

Previous Similar Occurrence:

There have been previous events involving the temporary loss of decay heat removal but not as a result of a trip of the FPCS pumps. Therefore, the corrective actions for the previous events would not have prevented the event reported in this LER.