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) Unit 1 maximum power level of 100% exceeded by 3.4% due to an unanticipated response of the 1B Reactor Recirculation pump following a decrease speed signal.

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
07	19	95	95	-- 003 --	00	08	18	95	FACILITY NAME	DOCKET NUMBER 05000

OPERATING MODE (9)	1	THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more) (11)			
POWER LEVEL (10)	100	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)	X OTHER
		20.405(a)(1)(iii)	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)	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 July 19, 1995, at 1642 hours, Unit 1 experienced a power transient due to the 1B reactor recirculation pump (RRP) response following a decrease speed signal with the 1B RRP motor-generator (MG) set on its high speed electrical stop. As indicated by APRM neutron flux, power dropped to approximately 60% and increased to 110% over a 28 second period. Analysis indicates that actual peak heat flux was 103.4%. This event was bounded by the licensing basis of the core. This report is submitted in accordance with Facility Operating License Condition 2.F, since this event resulted in non-compliance with License Condition 2.C.1, which authorizes Unit 1 to operate at a maximum reactor power level of 100%. The cause of this event was personnel error regarding communications relative to the actual MG set stop settings when increasing reactor power earlier in the day. A system operating procedure will be revised to provide a formalized mechanism for communicating MG set stop settings to Operations.

Unit Conditions Prior to the Event

Unit 1 was in Operational Condition 1 (Power Operation) at 100% power at the time of the event. Core flow was required to be maintained greater than 100% at the time of the event to allow Unit 1 to operate at full power until a control rod pattern adjustment could be performed.

Description of the Event

On July 17, 1995, Unit 1 was reduced in power to 97% due to high turbine backpressure.

On July 18, 1995, at 2115 hours, the Unit 1 licensed Reactor Operator (RO) began increasing reactor power using reactor recirculation flow (EIIS:AD) in accordance with General Plant (GP) procedure GP-5, "Power Operations."

On July 19, 1995, at 0630 hours (shift turnover), reactor power was 99.5%. The night shift RO informed his relief that reactor power was not increased to 100% due to a concern over encountering the reactor recirculation pump (RRP) (EIIS:P) motor-generator (MG) (EIIS:MG) set high speed electrical stops.

At approximately 1000 hours, the Unit 1 day shift RO contacted Reactor Engineering and was informed that core flow could be increased to 104% without encountering the high speed stops. The RO informed the licensed Main Control Room (MCR) Supervisor and received permission to increase core flow, but stop at a value less than 104%. At approximately 1430 hours, 100% reactor power was achieved with a total core flow of 103.8%. At 1620 hours, the RO obtained a printout of core parameters and realized core thermal power (CTP) was slightly above rated thermal power (RTP) of 3293 MWth. The RO adjusted the 1B RRP controller (EIIS:SC) to reduce core flow and maintain RTP. At 1630 hours, the day shift RO was relieved for the remainder of the shift by a another RO.

At 1642 hours, the following alarms (EIIS:ALM) annunciated in the MCR: Reactor Hi/Lo Level; Rod Out Block; Rod Block Monitor (RBM) Downscale; 1B RRP Mist Eliminator; RBM Upscale; and Average Power Range Monitor (APRM) Upscale. The RO observed a reactor water level of 42" and the MCR Supervisor entered Operational Transient (OT) procedure OT-110,

"Reactor High Level." The RO restored normal reactor water level using the feedwater level control system master controller (EIIS:TC).

At approximately 1650 hours, after review of operational data, the licensed Assistant Control Room Supervisor (ACRS) noted that the power transient involved a decrease in indicated APRM neutron flux to approximately 60% and a subsequent increase in indicated APRM neutron flux to approximately 110%. Operations immediately reduced power to 98% by lowering core flow using the 1A RRP and then subsequently reduced power to 95% as a conservative measure during investigation of the incident.

At approximately 1850 hours, an additional data review indicated that the power transient was initiated by an unusually large response of the 1B RRP to the slight decrease speed signal applied by the day shift RO just before his turnover. The 1B RRP MG set scoop tube was then locked in position pending investigation of the unexpected response. A review of the time history plots of reactor power, reactor level, reactor pressure, control station output, controller output, RRP speed, and RRP MG set scoop tube position indicated that the cause of the 1B RRP response was that the 1B RRP MG set was on the high speed electrical stop when the RO applied the slight decrease signal. As soon as the scoop tube positioner motor had built up sufficient torque to overcome the electric brake, which engages at the high speed electrical stop, the scoop tube moved and overshot the desired position relative to the speed demand signal.

On July 20, 1995, at 0115 hours, the 1B RRP MG set scoop tube was reset and reactor power was increased with an administrative limit of 100% core flow. This conservative parameter was established for Unit 1 until a control rod pattern adjustment could be made to increase the margin to both the 1A and 1B RRP MG set electrical stops.

A 24 hour notification was made to the NRC at 1255 hours on July 20, 1995, in accordance with the requirements of Facility Operating License, Condition 2.F, since this event resulted in a non-compliance with License Condition 2.C.1. License Condition 2.C.1 provides authorization to operate the Unit 1 reactor at a maximum reactor core power level of 100% rated power. This report is submitted in accordance with the requirements of License Condition 2.F, which requires a 30-day followup written report.

Analysis of the Event

The actual consequences of this event were minimal, and there was no release of radioactive material to the environment as a result of this event. Plant response to the 1B RRP transient was appropriate. All plant systems, with exception of a feedwater heater drain valve, responded as designed to the transient. There were no Engineered Safety Feature actuations during this event. Emergency Operating Procedures were entered and executed properly. Reactor power was conservatively reduced to 95% until plant staff determined that the problem resolution sufficiently addressed all concerns.

The transient lasted approximately 28 seconds with indicated APRM neutron flux greater than 100% for approximately 9.7 seconds. Fuel and Services Division performed an analysis of core thermal power using the neutron flux response from the 'A' APRM as input to a transient fuel bundle simulation model. The results of this analysis indicated that the peak heat flux during the transient was approximately 103.4% of the licensed limit.

Increasing core heat flux is a primary factor resulting in a decrease in the Minimum Critical Power Ratio (MCPR) of the fuel. The Supplemental Reload Licensing Report for Limerick Generating Station (LGS), Unit 1, Reload 5, Cycle 6, dated January 1994, provides the results of the analysis of the most limiting transient events. The peak core heat flux (Q/A) for the most limiting events (with no systems out of service) ranges from 111% to 115%. These results determine the Operating Limit MCPR (OLMCPR) for the cycle. The OLMCPR insures that the Safety Limit MCPR (SLMCPR) will not be violated in the event that a plant transient should occur. The peak core heat flux during this event was much less severe than that for the limiting events in the Reload Analysis. Therefore, the event was bounded by the licensing basis of the core and no Technical Specification thermal safety limit violation occurred.

Cause of the Event

The cause of this event was personnel error. Communications between Reactor Engineering and Operations concerning the RRP MG set high speed electrical stop settings was less than adequate. The Unit 1 MG set high speed electrical stops were last set on November 11, 1994, based on MG set speed. On July 13, 1995, a Troubleshooting Control Form

(TCF) was performed to confirm the stop settings. When Operations contacted Reactor Engineering about the stop settings, a limit based on core flow (i.e., 104%) was provided rather than MG set speed. Core flow is not an exact measurement. For any given MG set speed, core flow can vary slightly depending on other factors. The RO increased core flow to approximately 103.8%. Although this value was less than the limit specified by Reactor Engineering, the MG set speed had actually engaged the high speed electrical stop.

A contributing factor to this event was that there were no observable indications that the high speed stop had been encountered when core flow reached 103.8%. For example, there was no indicated deviation between the demand speed signal and the actual speed of the MG set.

Corrective Actions

An administrative limit of 100% core flow was established on July 20, 1995, pending evaluation of further corrective actions. In addition, a control rod pattern adjustment was subsequently performed to place the unit in the lower end of its core flow window.

System Operating Procedure S43.0.C, "Clearing an Electrical Stop," will be revised by October 1, 1995, to provide a formalized mechanism for communicating MG set stop settings to Operations as well as additional clarification for identification of being on the high speed stop.

Previous Similar Occurrences

None