10 CFR 50.73

BOSTON EDISON

Pilgrim Nuclear Power Station
Rocky Hill Road
Plymouth, Massachusetts 02360

Ralph G. Bird
Senior Vice President — Nuclear

March 30, 1990
BECo Ltr. 90- 045

U.S. Nuclear Regulatory Commission
Attn: Document Control Desk
Washington, D.C. 20555

Docket No. 50-293
License No. DPR-35

Dear Sir:

The enclosed Licensee Event Report (LER) 90-002-00, "Contrary to Technical Specifications, Maximum Fraction of Limiting Power Density Not Checked and Average Power Range Monitor Rod Block Not Flow Biased in Refuel and Startup", is submitted in accordance with 10 CFR Part 50.73.

Please do not hesitate to contact me if there are any questions regarding this report.

R. G. Bird

BPL/bal

Enclosure: LER 90-002-00

cc: Mr. William Russell
Regional Administrator, Region I
U.S. Nuclear Regulatory Commission
475 Allendale Rd.
King of Prussia, PA 19406

Sr. NRC Resident Inspector - Pilgrim Station

Standard BECo LER Distribution

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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)
Pilgrim Nuclear Power Station	0 5 0 0 0 2 9 3	1 OF 0 5

TITLE (4) Contrary to Technical Specifications, Maximum Fraction of Limiting Power Density Not Checked and Average Power Range Monitor Rod Block Not Flow Biased in Refuel and Startup

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)
										N/A	0 5 0 0 0
0 2	2 8	9 0	9 0	-	0 0 2	- 0 0	0 3	3 0	9 0	N/A	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)			
	N	20.402(b)	20.405(c)	50.73(a)(2)(iv)	73.71(b)
POWER LEVEL (10)	1 1 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)	X 50.73(a)(2)(i) (B)	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)(ix)	

LICENSEE CONTACT FOR THIS LER (12)

NAME	TELEPHONE NUMBER
Brian P. Lunn - Senior Plant Engineer	AREA CODE 5 1 0 | 7 4 7 - 8 1 2 4

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 February 28, 1990, it was determined that the Maximum Fraction of Limiting Power Density (MFLPD) was not checked daily during reactor power operation as required by Technical Specification (T.S.) 4.1.B. T.S. 1.0.H defines reactor power operation as "any operation with the mode switch in the Startup or Run position with the reactor critical and above one percent design power". For several days in February and March, 1989, the Reactor Mode Selector Switch (RMSS) was in the Startup position and reactor power ranged between one and five percent. On those days, MFLPD was not checked.

On March 23, 1990, while reviewing the MFLPD issue, an additional T.S. compliance issue was discovered. The operability requirements of T.S. 3.2.C and Table 3.2.C-1 were not met, when the RMSS was in the Startup or Refuel position. T.S. Amendment 110 (effective December 30, 1987) changed the operability requirements for the flow biased Average Power Range Monitor (APRM) rod block from Run mode to Refuel, Startup, and Run modes. The APRM rod block is not flow biased when the RMSS is in the Refuel or Startup position.

The Technical Specifications will be changed to be compatible with plant design and equipment capabilities.

There was no potential to adversely impact the public health and safety as a result of these events. When the RMSS was in the Refuel or Startup position, conservative APRM scram and rod block settings were achieved by the setdown function, at 13% and 11% reactor power respectively.

FACILITY NAME (1)	DOCKET NUMBER (2)	LER NUMBER (6)			PAGE (3)
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	
Pilgrim Nuclear Power Plant	0 5 0 0 0 2 9 3	9 0	— 0 0 2	— 0 0	0 2 OF 0 5

TEXT (If more space is required, use additional NRC Form 366A's) (17)

EVENT DESCRIPTION

On February 28, 1990, it was determined that the Maximum Fraction of Limiting Power Density (MFLPD) was not checked daily during reactor power operation, as required by Technical Specification (T.S.) 4.1.B. T.S. 1.0.H defines Reactor Power Operation as any operation with the Reactor Mode Selector Switch (RMSS) in the Startup or Run position, the reactor critical and above one percent power.

For several days in February, and March, 1989, the MFLPD was not checked. On those days, the RMSS was in the Startup position and reactor power was between one and five percent. The plant was operating at or below five percent reactor power in accordance with Pilgrim's Power Ascension Program.

On March 23, 1990, while reviewing the MFLPD issue, an additional T.S. compliance issue was discovered. The operability requirements of T.S.3.2.C and Table 3.2.C-1 were not met, when the RMSS was in the Startup or Refuel positions, since December 30, 1987. T.S. Amendment 110 (effective December 30, 1987) changed the operability requirements of the flow biased APRM rod block from Run mode to Refuel, Startup and Run mode. The APRM rod block is not flow biased when the RMSS is in the Refuel or Startup position.

PLANT CONDITIONS AT TIME OF DISCOVERY

On February 28, 1990, the RMSS was in the Run position, reactor power was at 100 percent, reactor vessel pressure was 1027 psig, and the reactor vessel water temperature was 547 degrees Fahrenheit.

On March 23, 1990, the RMSS was in the Shutdown position, reactor power was zero percent, reactor vessel pressure was zero, and the reactor vessel water temperature was approximately 100 degrees Fahrenheit.

BACKGROUND

The MFLPD is checked to determine if the flow biased APRM scram and rod block set points require adjustment. Adjustment is necessary if the Fraction of Rated Power (FRP) to MFLPD ratio is less than one. If the FRP/MFLPD is less than one, the flow biased APRM scram and rod block set points are adjusted per the following equations to prevent rod motion (rod block) or to shut down (scram) the reactor.

- Flow Biased APRM Scram Setting (2 loop operation)

$$S \leq (.58W + 62\%) \left[\frac{FRP}{MFLPD} \right]$$

Where,

S = Setting in percent of rated thermal power (1998 megawatts thermal)

W = Percent of drive flow to produce a rated core flow of 69 million lb/hr.

- Flow Biased APRM Rod Block Setting (2 loop operation)

$$S_{RB} \leq (.58W + 50\%) \left[\frac{FRP}{MFLPD} \right]$$

Where,

S_{RB} = Rod block setting in percent of rated thermal power (1998 megawatts thermal).

W = Percent of drive flow to produce a rated core flow of 69 million lb/hr.

In accordance with plant design and installed configuration, the APRM scram and rod block are flow biased when the RMSS is in the Run position. When the RMSS is in the Refuel or Startup position, the APRM scram and rod block are set down and are not flow biased as the December, 1987, T.S. change indicates.

The APRM scram is set down in accordance with T.S. 2.1.A.1.b (required $\leq$ 15%) and is calibrated in accordance with Procedure 8.M.1-3.1 "APRM Set Down Functional" at 13% (12.5% - 13.5%). The set down APRM rod block is calibrated in accordance with Procedure 8.M.1-3.1 at 11% (10.5% - 11.5%). The set down APRM rod block is not addressed by the Technical Specifications.

MFLPD is checked daily when reactor power is $\geq$ 10 % in accordance with Procedure 2.1.15 "Daily Surveillance Log". The P-1 program of the Process Computer performs the MFLPD calculations. The program determines MFLPD at a particular fuel rod axial segment based on readings from the Local Power Range Monitors (LPRMs). The P-1 program does not function below 10% reactor power.

CAUSE

The requirement to check MFLPD daily during reactor power operation (T.S. 4.1.B) was inconsistent with equipment capabilities and plant procedures. Procedure 2.1.15 requires MFLPD to be checked daily when reactor power is greater than 10%. This is consistent with the capability of the P-1 program of the Process Computer. Typically, reactor power is increased from 1% to 10% in less than 24 hours, in which case, compliance with T.S. 4.1.B was achieved. In February and March, 1989, an unusual circumstance existed when reactor power ranged between 1% and 5% for several days with the RMSS in the Startup position. The plant was operating at or below 5% reactor power in accordance with Pilgrim's Power Ascension Program.

The flow biased APRM rod block operational requirements (RMSS in Refuel, Startup, and Run positions) were inconsistent with the plant design and installed configuration. The operability requirements for the flow biased APRM rod block were revised in T.S. Amendment 110, effective December 30, 1987. Prior to Amendment 110, operability of the flow biased APRM rod block was only required when the RMSS was in the Run position and was consistent with the operability requirement for the flow biased APRM scram (T.S. 2.1.A.1.a).

CORRECTIVE ACTIONS

- The Technical Specifications 3.2.C and 4.1.B will be changed, so the T.S. requirements match the plant's configuration and equipment capabilities.

- A T.S. review is ongoing (Long Term Plan No. 468) as part of Pilgrim's involvement in the BWR Owners Group Improved Technical Specifications program. If other similar T.S. compliance problems exist, this review will identify them.

- Unrelated to this event, the Compliance Division established a process to independently review T.S. changes for impact on operating procedures in February, 1989.

SAFETY CONSEQUENCES/SIGNIFICANCE

There were no adverse safety consequences for these situations.

When the RMSS is in the Refuel or Startup position, the set down APRM scram and rod block functions are set at 13% and 11% of rated reactor power respectively. These settings are far lower than could reasonably be achieved by adjusting the flow biased APRM scram and rod block setting per the FRP/MFLPD ratio. In fact, adjustment of the flow biased APRM scram and rod block settings has no affect on the scram or rod block function when the RMSS is in the Refuel or Startup position, because these functions are not in circuit.

The Intermediate Range Monitor System (IRMS) scram and rod block functions are a backup to the set down APRM scram and rod block functions when the RMSS is in the Refuel or Startup position. Each IRM has 10 ranges. The ranges are selected to monitor neutron flux from slightly above 0% reactor power to 32% reactor power. The IRM scram is set at $\leq$ 120 on the 125% full scale. The IRM rod block is set at $\leq$ 108 on the 125% full scale.

Additional protection is provided by the Rod Worth Minimizer (RWM) function of the Process Computer System. The RWM can initiate a rod insert block, a rod withdrawal block and a rod select block. The RWM functions to reinforce procedural controls that limit the reactivity worth of control rods under low power conditions. Adherence to prescribed control rod patterns is the procedural method by which this reactivity restriction is observed.

These situations had no potential to adversely impact the public health and safety.

REPORTABILITY

The plant was operating in conditions prohibited by the Technical Specifications. The events are reportable per 10 CFR 50.73(a)(2)(i). Failure and Malfunction Report No. 90-13 was written to document the apparent T.S. compliance problem.

SIMILARITY TO PREVIOUS EVENTS

A review of Licensee Event Reports submitted since January, 1984, in accordance with 10CFR 50.73(a)(2)(i) was conducted. No similar events were identified in which a T.S. could not be met because the requirement was incorrect relative to the plant design and installed configuration.

ENERGY INDUSTRY IDENTIFICATION SYSTEM (EIIS) CODES

Components	Codes
Meter	MTR
Monitor	MON
Rod	ROD

Systems

Computer System	IS
Incore/Excore Monitoring System	IG