NRC Form 366 (9-83)

U.S. NUCLEAR REGULATORY COMMISSION

APPROVED OMB NO. 3150-0104
EXPIRES: 8/31/85

LICENSEE EVENT REPORT (LER)

FACILITY NAME (1)	DOCKET NUMBER (2)	PAGE (3)
Peach Bottom Atomic Power Station - Unit 2	0 5 0 0 0 2 7 7	1 OF 0 1 4

TITLE (4)
Non-Conformance with Technical Specifications concerning Control Rod Operability

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)
										0 5 0 0 0
1 2	2 6	8 5	8 5	0 2 6	0 0	0 1	2 9	8 6		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)	0 3 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)	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
W. C. Birely, Senior Engineer - Licensing Section	AREA CODE 2 1 5 8 4 1 - 5 0 4 8

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)

Abstract: 2-85-26

During startup with Unit 2 at 30% power on December 26, 1985 at approximately 1255 hours, Unit 2 was found to be in non-conformance with Technical Specification 3.3.A.2.f. Technical Specification 3.3.A.2.f states that "during reactor power operation, no more than one control rod in any 5 X 5 array may be inoperable". Control rod 30-15 had been fully inserted and blocked and control rod 22-11 was pulled to the fully withdrawn position during startup. While fully withdrawn, control rod 22-11 was blocked at 1205 hours on December 26, 1985 to accommodate repair of a leak on its hydraulic control unit accumulator. The licensed operators failed to realize that blocking rod 22-11 was not in conformance with the Technical Specifications. Control rod 22-11 was made operable at 1355 hours on December 26, 1985. Unit 2 was also in non-conformance with Technical Specification 3.3.A.1, which requires that "A sufficient number of control rods shall be operable so that the core could be made subcritical...with the strongest control rod fully withdrawn and all other operable control rods fully inserted." With control rod 22-11 fully withdrawn and blocked, this Technical Specification was not satisfied. However, if all other control rods had inserted from a scram, with control rod 22-11 blocked full-out, the reactor would have been made subcritical.

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Unit Conditions Prior to Event:

30% reactor power
Unit 2 startup in progress
Mode switch in RUN

Description of the Event:

On December 26, 1985 at approximately 1255 hours, Unit 2 was found to be in non-conformance with Technical Specification 3.3.A.2.f, which states that "during reactor power operation, no more than one control rod in any 5 X 5 array may be inoperable". Control rod 30-15 had been fully inserted and blocked because it could not be fully withdrawn. Control rod 22-11 was pulled to the fully withdrawn position in accordance with the Rod Worth Minimizer/Rod Sequence Control System startup order. While fully withdrawn, control rod 22-11 was blocked at 1205 hours on December 26, 1985 to accommodate repair of a leak on its hydraulic control unit accumulator. The licensed operators failed to realize that they were violating the Technical Specification by blocking control rod 22-11 with control rod 30-15 fully inserted and blocked.

Control rod 22-11 was made operable at 1355 hours on December 26, 1985.

Analyses performed by General Electric Company and verified by the PECo Fuel Management Section indicate that Unit 2 was also in non-conformance with Technical Specification 3.3.A.1, which requires that "A sufficient number of control rods shall be operable so that the core could be made subcritical in the most reactive condition during the operating cycle with the strongest control rod fully withdrawn and all other operable control rods fully inserted". The fact that control rod 30-15 was inoperable is inconsequential because it was fully inserted and blocked. However, with control rod 22-11 fully withdrawn and blocked this Technical Specification was not satisfied, as explained in the following section.

The EIIS code for the affected system is AA, control rod drive system.

Consequences of the Event:

The shutdown margin (SDM) analysis and verification procedure, as normally performed, assumes that all control rods are operable (or completely inserted as in the case of rod 30-15) as the initial control rod status. The strongest control rod, from a reactivity standpoint, and its reactivity worth when fully withdrawn are analytically determined. Assuming the strongest rod is fully withdrawn and all others are fully inserted, the SDM analysis attempts to demonstrate that the reactor will be subcritical by at least 0.004 ΔK/K (K-effective = 0.996) with a moderator temperature of 68 degrees Fahrenheit. This SDM test criteria takes into account the most reactive condition during the operating cycle. For this Unit 2 operating cycle the SDM was calculated and demonstrated to be 0.015 ΔK/K (K-effective = 0.985).

If it is assumed that one control rod is fully withdrawn and not operable, the analytically determined strongest rod location changes. The face-adjacent rod to the fully withdrawn inoperable rod becomes the strongest rod. With control rod 22-11 fully withdrawn and blocked, the strongest rod became rod 26-11. The SDM calculation assuming these two rods fully withdrawn and a moderator temperature of 68 degrees Fahrenheit resulted in a core K-effective of 1.004. Additional calculations showed that a K-effective of 1.000 would have been achieved with a moderator temperature of approximately 168 degrees Fahrenheit. A K-effective of 0.996, the required value, would have been achieved with a moderator temperature of approximately 308 degrees Fahrenheit.

While control rod 22-11 was fully withdrawn and blocked (from 1205 to 1355), Unit 2 was at power and moderator temperature was approximately 540 degrees Fahrenheit. Therefore, the required shutdown margin was maintained. If a scram had occurred while control rod 22-11 was fully withdrawn and blocked, and the strongest control rod, rod 26-11, remained fully withdrawn, the reactor would have been made subcritical. The core would not have remained subcritical after the moderator temperature decreased to 168 degrees Fahrenheit. However, several hours would be available to remove the blocking from control rod 22-11 and insert it before moderator temperature decreased to 168 degrees Fahrenheit. If a scram had occurred and all control rods inserted fully except rod 22-11, the core would have been made subcritical even with a moderator temperature of 68 degrees Fahrenheit, as demonstrated by the SDM analysis and test. At 1412 hours on December 26, 1985 an automatic scram did occur and all control rods inserted.

Cause of the Event:

The licensed operators committed a personnel error by blocking control rod 22-11 in the withdrawn position.

Corrective Actions:

The blocking sequences for control rod drives will be revised by January 31, 1986 to include a verification that Technical Specifications 3.3.A.1, 3.3.A.2.b and 3.3.A.2.f are satisfied. Technical Specification 3.3.A.2.b. makes reference to 3.3.A.1. The licensed operators involved in application of the permit will be given additional training to increase their awareness of Technical Specification requirements and the procedural requirements for control of equipment.

Previous Similar Occurrences:

None.

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January 29, 1986

Docket No. 50-277

Document Control Desk
U.S. Nuclear Regulatory Commission
Washington, DC 20555

SUBJECT: Licensee Event Report
Peach Bottom Atomic Power Station - Unit 2

This LER concerns non-conformance with Technical Specifications concerning control rod operability.

Reference:	Docket No. 50-277
Report Number:	2-85-26
Revision Number:	00
Event Date:	December 26, 1985
Report Date:	January 29, 1986
Facility:	Peach Bottom Atomic Power Station RD 1, Box 208, Delta, PA 17314

This LER is being submitted pursuant to the requirements of 10 CFR 50.73(a)(2)(i)(B). We regret the delayed submittal of this LER and any inconvenience it may have caused.

Very truly yours,

W. T. Ullrich
Superintendent
Nuclear Generation Division

cc: Dr. Thomas E. Murley, Administrator, Region I, USNRC
T. P. Johnson, NRC Resident Inspector

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