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Docket No. 50-278

Philadelphia Electric Company
ATTN: Mr. Edward G. Bauer, Jr., Esquire
Vice President and General Counsel
2301 Market Street
Philadelphia, Pennsylvania 19101

Gentlemen:

The Commission has issued the enclosed Amendment No. 34 to Facility Operating License No. DPR-56 for the Peach Bottom Atomic Power Station Unit No. 3. The amendment consists of changes to the Technical Specifications in response to your application dated January 26, 1977 and supplement dated March 18, 1977.

This amendment will incorporate exposure-dependent minimum critical power ratio (MCPR) operating limits into the Peach Bottom Unit No. 3 Technical Specifications.

Copies of the Safety Evaluation and the FEDERAL REGISTER Notice are also enclosed.

Sincerely,

Original signed by

George Lear, Chief
Operating Reactors Branch #3
Division of Operating Reactors

Enclosures:

1. Amendment No. 34
2. Safety Evaluation
3. FEDERAL REGISTER Notice

cc w/encs:

See next page

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OFFICE >	ORB #3	ORB #3	OELD	ORB #3	RS/DOR	RS/DOR
SURNAME >	CParrish	EVerdery:mjf	LUTCHIN	GLear	FLUBIN	R. Bauer
DATE >	3/29/77	3/29/77	4/13/77	4/14/77	4/4/77	4/5/77



UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

April 14, 1977

Docket No. 50-278

Philadelphia Electric Company
ATTN: Mr. Edward G. Bauer, Jr., Esquire
Vice President and General Counsel
2301 Market Street
Philadelphia, Pennsylvania 19101

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This amendment will incorporate exposure-dependent minimum critical power ratio (MCPR) operating limits into the Peach Bottom Unit No. 3 Technical Specifications.

Copies of the Safety Evaluation and the FEDERAL REGISTER Notice are also enclosed.

Sincerely,

A handwritten signature in black ink, reading "George Lear", is written over a horizontal line.

George Lear, Chief
Operating Reactors Branch #3
Division of Operating Reactors

Enclosures:

1. Amendment No. 34
2. Safety Evaluation
3. FEDERAL REGISTER Notice

cc w/encls:
See next page

Philadelphia Electric Company

- 2 -

cc:

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Philadelphia Electric Company
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Peach Bottom Atomic
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Delta, Pennsylvania 17314

Mr. R. A. Heiss, Coordinator
Pennsylvania State Clearinghouse
Governor's Office of State Planning
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Harrisburg, Pennsylvania 17120

Albert R. Steel, Chairman
Board of Supervisors
Peach Bottom Township
R. D. #1
Delta, Pennsylvania 17314

Chief, Energy Systems Analysis Branch (AW-45)
Office of Radiation Programs
U. S. Environmental Protection Agency
Room 645, East Tower
401 M Street, S. W.
Washington, D. C. 20460

U. S. Environmental Protection Agency
Region III Office
ATTN: EIS COORDINATOR
Curtis Building (Sixth Floor)
6th and Walnut Streets
Philadelphia, Pennsylvania 19106

Martin Memorial Library
159 E. Market Street
York, Pennsylvania 17401



UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

PHILADELPHIA ELECTRIC COMPANY
PUBLIC SERVICE ELECTRIC AND GAS COMPANY
DELMARVA POWER AND LIGHT COMPANY
ATLANTIC CITY ELECTRIC COMPANY

DOCKET NO. 50-278

PEACH BOTTOM ATOMIC POWER STATION, UNIT NO. 3

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 34
License No. DPR-56

1. The Nuclear Regulatory Commission (the Commission) has found that:
 - A. The application for amendment by Philadelphia Electric Company, Public Service Electric and Gas Company, Delmarva Power and Light Company, and Atlantic City Electric Company (the licensees), dated January 26, 1977 as supplemented by letter dated March 18, 1977, complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act), and the Commission's rules and regulations set forth in 10 CFR Chapter I;
 - B. The facility will operate in conformity with the application, the provisions of the Act, and the rules and regulations of the Commission;
 - C. There is reasonable assurance (i) that the activities authorized by this amendment can be conducted without endangering the health and safety of the public, and (ii) that such activities will be conducted in compliance with the Commission's regulations;
 - D. The issuance of this amendment will not be inimical to the common defense and security or to the health and safety of the public; and
 - E. The issuance of this amendment is in accordance with 10 CFR Part 51 of the Commission's regulations and all applicable requirements have been satisfied.

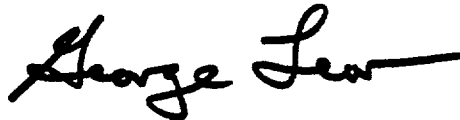
2. Accordingly, the license is amended by changes to the Technical Specifications as indicated in the attachment to this license amendment, and paragraph 2.C(2) of Facility Operating License No. DPR-56 is hereby amended to read as follows:

(2) Technical Specifications

The Technical Specifications contained in Appendices A and B, as revised through Amendment No. 34, are hereby incorporated in the license. The licensee shall operate the facility in accordance with the Technical Specifications.

3. This license amendment is effective as of the date of its issuance.

FOR THE NUCLEAR REGULATORY COMMISSION



George Lear, Chief
Operating Reactors Branch #3
Division of Operating Reactors

Attachment:
Changes to the Technical
Specifications

Date of Issuance: April 14, 1977

ATTACHMENT TO LICENSE AMENDMENT NO. 34

TO THE TECHNICAL SPECIFICATIONS

FACILITY OPERATING LICENSE NO. DPR-56

DOCKET NO. 50-278

Replace the following pages of the Appendix "A" Technical Specifications with the enclosed pages. The revised pages are identified by amendment number and contain vertical lines indicating the area of change. The corresponding overleaf pages are also provided to maintain document completeness. No changes were made on the overleaf pages which are identified below by an asterisk:

Remove

133b
140d

Insert

133b
133c (new)
140d

LIMITING CONDITION OF OPERATION

SURVEILLANCE REQUIREMENT

3.5.J. Local LHGR (Cont'd)

If at any time during operation it is determined by normal surveillance that limiting value for LHGR is being exceeded, action shall be initiated within one (1) hour to restore LHGR to within prescribed limits. If the LHGR is not returned to within prescribed limits within five (5) hours, reactor power shall be decreased at a rate which would bring the reactor to the cold shutdown condition within 36 hours unless LHGR is returned to within limits during this period. Surveillance and corresponding action shall continue until reactor operation is within the prescribed limits.

3.5.K. Minimum Critical Power Ratio (MCPR)

During power operation, the MCPR for the applicable incremental cycle core average exposure and for each type of fuel shall be equal to or greater than the value given in Table 3.5-2 times k_f , where k_f is as shown in Figure 3.5.1-E. If any any time during operation it is determined by normal surveillance that the limiting value for MCPR is being exceeded, action shall be initiated within one (1) hour to restore MCPR to within prescribed limits. If the MCPR is not returned to within prescribed limits within five (5) hours, reactor power shall be decreased at a rate which would bring the reactor to the cold shutdown condition within 36 hours unless MCPR is returned to within limits during this period. Surveillance and corresponding action shall continue until reactor operation is within prescribed limits.

4.5.K. Minimum Critical Power Ratio (MCPR)

MCPR shall be checked daily during reactor power operation at $\geq 25\%$ rated thermal power.

Table 3.5-2

OPERATING LIMIT MCPR VALUES AS DETERMINED FROM
INDICATED TRANSIENTS FOR VARIOUS CORE EXPOSURES

<u>Fuel Type</u>	<u>MCPR Operating Limit</u> <u>For Incremental Cycle 2 Core Average Exposure</u>	
	<u>BOC to 1330 MWD/t</u> <u>Before EOC</u>	<u>1330 MWD/t before EOC</u> <u>To EOC</u>
7x7	1.31 (FLE)	1.26 (RWE)
8x8	1.27 (FLE)	1.29 (TT)
8x8 PTA	1.23 (LH)	1.31 (TT)

FLE - Fuel Loading Error

RWE - Rod Withdrawal Error

TT - Turbine trip with failure of bypass valves to open

LH - Loss of 100°F Feedwater Heating

M. References

1. "Fuel Densification Effects on General Electric Boiling Water Reactor Fuel", Supplements 6, 7, and 8 NEDM-10735, August 1973.
2. Supplement 1 to Technical Report on Densifications of General Electric Reactor Fuels, December 14, 1974 (Regulatory Staff).
3. Communication: V. A. Moore to I. S. Mitchell, "Modified GE Model for Fuel Densification", Docket 50-321, March 27, 1974.
4. General Electric Company Analytical Model for Loss-of-Coolant Analysis in Accordance with 10 CFR 50, Appendix K, NEDE-20566 (Draft), August 1974.
5. General Electric Refill Reflood Calculation (Supplement to SAFE Code Description) transmitted to the USNRC by letter, G. L. Gyorey to Victor Stello, Jr., dated December, 1974.
6. "General Electric Boiling Water Reactor Reload-1 License Amendment for Peach Bottom Atomic Power Station Unit 3 Reanalysis Supplement," NEDO-21363-3, Supplement 3, January 1977.
7. General Electric BWR Generic Reload Application for 8x8 fuel, NEDO-20360, Revision 1, Supplement 4, April 1976.
8. "Pressurized Test Assembly Supplemental Information for Reload-1 Licensing Amendment for Peach Bottom Atomic Power Station Unit 3 Reanalysis Supplement," NEDO-21363-4, Supplement 4, January, 1977.



UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

SUPPORTING AMENDMENT NO. 34 TO FACILITY LICENSE NO. DPR-56

PHILADELPHIA ELECTRIC COMPANY

PEACH BOTTOM ATOMIC POWER STATION

UNIT NO. 3

DOCKET NO. 50-278

Introduction

By letter dated January 26, 1977, Philadelphia Electric Company (PECO) requested an amendment to a previous application dated November 17, 1977 for Facility Operating License No. DPR-56 for the Peach Bottom Atomic Power Station Unit No. 3. The proposed amendment would incorporate exposure-dependent minimum critical power ratio (MCPR) operating limits into the Peach Bottom Unit No. 3 Technical Specifications.

Background and Discussion

On March 23, 1977 the NRC issued License Amendment No. 33 for Peach Bottom Unit No. 3 which authorized operation during cycle 2 with a Safety Limit Minimum Critical Power Ratio (MCPR) of 1.06 and MCPR Operating Limits of 1.32 for 7x7 fuel, 1.40 for 8x8 fuel and 1.41 for the 8x8 Pressurized Test Assembly (PTA). These limits were based on a thermal-hydraulic analysis of the Peach Bottom Unit No. 3 core using the General Electric Thermal Analysis Basis (GETAB). The analysis was performed using extrapolated cycle 1 axial and radial exposure shapes, which provided conservative control rod worths and scram reactivity curves. Furthermore, the analysis was performed using an end of cycle 2 (EOC-2) scram reactivity insertion rate which conservatively bounds the exposure dependent scram reactivity insertion rates for fuel cycle 2.

In order to provide greater operating flexibility during cycle 2, PECO has reanalyzed (1,2) the core thermal-hydraulic performance of Peach Bottom Unit No. 3 using 1) nuclear characteristics based on updated cycle 1 core exposure date, 2) burnup dependent nuclear characteristics which are conservative and 3) as-built main steam line volumes. The reanalysis resulted in the calculation of two sets of MCPR Operating Limits, each of which is applicable during a particular portion of cycle 2. The exposure intervals correspond to BOC-2 to 1330 Mwd/t before EOC-2 and 1330 Mwd/t before EOC-2 to EOC-2. Additionally, since the reanalysis used as-built main steam line volumes rather than conservative design values, the calculated consequences of the pressurization transients decreased. The proposed Technical Specification

changes, if approved, would have the effect of significantly lowering the MCPR Operating Limits from the previously approved values for all (7x7, 8x8 and PTA) fuel types. The previously approved cycle 2 Safety Limit MCPR would not be changed, however.

Evaluation

Operating Limit MCPR

The Fuel Cladding Integrity Safety Limit MCPR for Peach Bottom Unit No. 3 during cycle 2 is 1.06. This safety limit, based on the GETAB statistical analysis, assures that 99.9% of the fuel rods in the core are not expected to experience transition boiling for abnormal operational transients. To assure that the Safety Limit MCPR is not violated during anticipated abnormal operational transients, the most limiting transients have been analyzed to determine which results in the largest reduction in the critical power ratio. The licensee has submitted (1,2) the results of analyses of those transients which produce the most significant decrease in MCPR, i.e., Δ CPR. The types of anticipated abnormal operational transients evaluated were reactor pressure increase, feedwater temperature decrease, coolant flow increase, etc. Addition of the largest Δ CPR within these categories, for each fuel type, to the Safety Limit MCPR provides the minimum Operating Limit MCPR which will assure that the fuel cladding integrity Safety Limit MCPR of 1.06 will not be violated should the most limiting operational transient occur.

To provide exposure-dependent Operating Limit MCPR's, the plant transient analyses and GETAB analyses were performed at cycle burnups corresponding to 1330 Mwd before EOC 2 and EOC 2. The exposure-dependent nuclear and thermal-hydraulic input used in the analyses are shown in Tables 4-3 and 6-1 of Reference 1, and Table 4-2 of Reference 2.

The abnormal operational transients were evaluated with burnup dependent scram reactivity insertion rates that included a design conservatism factor of .80. The analyses also included a design conservatism factor of 1.25 for the void coefficients. These design conservatism factors are acceptable as are the initial conditions used for the most severe abnormal operational transients. The initial MCPR's assumed in the transient analyses are equal to or conservatively greater than the established MCPR Operating Limits for the two fuel types.

The results of the thermal-hydraulic (GETAB) analyses for the limiting abnormal operational transients within the previously described exposure intervals are as follows:

TABLE 1

Event	Δ CPR 105% Rated Power BOC to EOC 2 - 1330 MWD/t			Δ CPR 105% Rated Power EOC 2 - 1330 MWD/t To EOC 2		
	7x7	8x8	8x8 PTA	7x7	8x8	8x8 PTA
Rod Withdrawal Error (RWE)	0.20	0.12	0.12	0.20	0.12	0.12
Loss of Feedwater Heater	0.15	0.16	0.17	0.15	0.16	0.17
Turbine Trip w/o Bypass	0.05	0.09	0.10	0.17	0.23	0.25

Addition of the largest Δ CPR for each fuel type and exposure increment to the Safety Limit MCPR would normally establish the minimum Operating Limit MCPR for each fuel type during each of the two cited cycle-2 burnup intervals. Such exposure-dependent Operating Limit MCPR's would assure that the Safety Limit MCPR would not be violated should these limiting abnormal operational transients occur during cycle 2.

The licensee also reports, however, in Section 6.3.2.5 of Reference 1 for the 8x8 fuel, and Section 6.1.1.2 of Reference 2 for the PTA, the results of the most severe fuel loading errors (FLE). The results of the FLE analyses are as follows:

TABLE 2

	Δ CPR BOC to EOC 2 - 1330 Mwd/t			EOC 2 - 1330 Mwd/t to EOC		
	7X7	8x8	8x8 PTA	7x7	8x8	8x8 PTA
Fuel Type						
Cell Type		7x7	7x7		7x7	7x7
Fuel Loading Error (FLE)	---	.25	.31	---	.18	.23

Thus, the most severe fuel loading error (FLE), should it occur, results in Δ CPR's which are greater than the Δ CPR's associated with the most limiting abnormal operational transients during the exposure interval from BOC 2 to EOC 2 minus 1330 Mwd/t. A fuel loading error would, therefore, decrease the MCPR below the safety limit MCPR if the Operating Limit MCPRs were based solely on the consideration of anticipated operational transients.

The staff has the fuel loading error under generic review. Until this issue is resolved, the staff requires, in the interim, that the Operating Limit MCPR be established such that the most severe FLE also does not result in a violation of the safety limit MCPR.

It is the staff's position, therefore, that with regard to the 7x7 and 8x8 fuel types, an additional .05 be added to the most limiting Δ CPR's in Table 1 between BOC 2 and 1330 Mwd/t before EOC 2 to account for the possibility of a FLE. Since the 7x7 and 8x8 Δ CPR's between 1330 Mwd/t before EOC 2 and EOC 2, appearing in Table 1 are greater than the Δ CPR in Table 2, no addition to the Table 1 Δ CPR's is required (i.e., the FLE is not limiting).

There is a remote possibility that an anticipated abnormal operational transient could occur during operation with a FLE. However, the NRC Staff considers the imposition of operating limit MCPR's based upon the simultaneous occurrence of a FLE and an abnormal operational transient to be unnecessary. This position is based upon the facts that (1) only one bundle of the 764 total fuel bundles would exceed the safety limit MCPR of 1.06 during such an event, (2) the affected (misloaded) bundle would reach transition boiling only if it were operating close to its operating limit MCPR based upon the FLE and (3) one bundle of 764 in transition boiling is consistent with the criteria that 99.9% of the fuel rods in the core will not experience transition boiling for abnormal operational transients.

With regard to a possible misloading of the PTA, the licensee has utilized especially detailed loading (position and orientation) verification procedures. The staff considers that these procedures provide reasonable assurance that the PTA will be properly loaded in the core. Thus, no adjustment to the PTA Δ CPR's shown in Table 1 is required.

Thus, based on the analyses of both the most severe abnormal operational transients and the fuel loading error, the staff requires that during cycle 2, while at rated power and flow, the Peach Bottom Unit No. 3 operating limit MCPR's be as shown in the following table:

TABLE 3

<u>Cell Type</u>	<u>Operating Limit MCPR</u>	
	<u>BOC 2 to 1330 Mwd/t Before EOC 2</u>	<u>1330 Mwd/t before EOC 2 to EOC 2</u>
7x7	1.31	1.26
8x8	1.27	1.29
PTA	1.23	1.31

The staff's position was discussed with the licensee on March 31, 1977 and he had agreed to the above MCPR operating limits for Peach Bottom Unit No. 3 during cycle 2. These values have been incorporated into the proposed changes in Technical Specifications.

Therefore, based on conservative analyses, the exposure dependent MCPR Operating Limits shown in Table 3 will assure that the fuel cladding integrity Safety Limit MCPR of 1.06 will not be violated during the most severe anticipated transients which may occur during cycle 2 nor during steady state operation with a possible fuel loading error. Thus, it is concluded that the MCPR Operating Limits shown in Table 3 are acceptable for Peach Bottom Unit No. 3 during cycle 2.

Environmental Considerations

We have determined that the amendment does not authorize a change in effluent types or total amounts nor an increase in power level and will not result in any significant environmental impact. Having made this determination, we have further concluded that the amendment involves an action which is insignificant from the standpoint of environmental impact and pursuant to 10 CFR §51.5(d)(4) that an environmental impact statement or negative declaration and environmental impact appraisal need not be prepared in connection with the issuance of this amendment.

Conclusion

We have concluded, based on the considerations discussed above, that: (1) because the change does not involve a significant increase in the probability or consequences of accidents previously considered and does not involve a significant decrease in a safety margin, the change does not involve a significant hazards consideration, (2) there is reasonable assurance that the health and safety of the public will not be endangered by operation in the proposed manner, and (3) such activities will be conducted in compliance with the Commission's regulations and the issuance of this amendment will not be inimical to the common defense and security or to the health and safety of the public.

Dated: April 14, 1977

References:

1. "General Electric Boiling Water Reactor Reload-1 License Amendment for Peach Bottom Atomic Power Station Unit No. 3. Reanalysis Supplement" NEDO-21363-3, Supplement 3, January 1977.
2. "Pressurized Test Assembly Supplemental Information for Reload-1 Licensing Amendment for Peach Bottom Atomic Power Station Unit No. 3 Reanalysis Supplement" NEDO-21363-4, Supplement 4, January 1977.

UNITED STATES NUCLEAR REGULATORY COMMISSION

DOCKET NO. 50-278

PHILADELPHIA ELECTRIC COMPANY

PUBLIC SERVICE ELECTRIC AND GAS COMPANY

DELMARVA POWER AND LIGHT COMPANY

ATLANTIC CITY ELECTRIC COMPANY

NOTICE OF ISSUANCE OF AMENDMENT TO FACILITY
OPERATING LICENSE

The U. S. Nuclear Regulatory Commission (the Commission) has issued Amendment No. 34 to Facility Operating License No. DPR-56 issued to Philadelphia Electric Company, Public Service Electric and Gas Company, Delmarva Power and Light Company, and Atlantic City Electric Company, which revised Technical Specifications for operation of the Peach Bottom Atomic Power Station, Unit No. 3. The amendment is effective as of its date of issuance.

The amendment consists of changes in the Technical Specifications to incorporate exposure-dependent minimum critical power ratio (MCPR) operating limits.

The application for the amendment complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act), and the Commission's rules and regulations. The Commission has made appropriate findings as required by the Act and the Commission's rules and regulations in 10 CFR Chapter I, which are set forth in the license amendment. Prior public notice of this amendment was not required since the amendment does not involve a significant hazards consideration.

The Commission has determined that the issuance of this amendment will not result in any significant environmental impact and that pursuant

10 CFR §51.5(d)(4) an environmental impact statement, negative declaration or environmental impact appraisal need not be prepared in connection with issuance of this amendment.

For further details with respect to this action, see (1) the application for amendment dated January 26, 1977, as supplemented by letter dated March 18, 1977, (2) Amendment No. 34 to License No. DPR-56, and (3) the Commission's related Safety Evaluation. All of these items are available for public inspection at the Commission's Public Document Room, 1717 H Street N. W., Washington, D. C. and at the Martin Memorial Library, 159 E. Market Street, York, Pennsylvania 17401.

A copy of items (2) and (3) may be obtained upon request addressed to the U. S. Nuclear Regulatory Commission, Washington, D. C. 20555, Attention: Director, Division of Operating Reactors.

Dated at Bethesda, Maryland, this 14th day of April 1977.

FOR THE NUCLEAR REGULATORY COMMISSION

A handwritten signature in black ink, appearing to read "George Lear". The signature is fluid and cursive, with a long horizontal stroke at the end.

George Lear, Chief
Operating Reactors Branch #3
Division of Operating Reactors