

August 28, 1989

DO NOT REMOVE

Dockets Nos. 50-277/278

POSTED  
Amdt. 149 to DPR-56

Mr. George A. Hunger, Jr.  
Director-Licensing, MC 5-2A-5  
Philadelphia Electric Company  
Correspondence Control Desk  
955 Chesterbrook Boulevard  
Wayne, Pennsylvania 19087-5691

Dear Mr. Hunger:

SUBJECT: SOURCE RANGE MONITOR MINIMUM COUNT RATE FOR REFUELING  
(TAC NOS. 72636/72637)

RE: PEACH BOTTOM ATOMIC POWER STATION, UNIT NOS. 2 AND 3

The Commission has issued the enclosed Amendments Nos. 147 and 149 to Facility Operating License Nos. DPR-44 and DPR-56 for the Peach Bottom Atomic Power Station, Unit Nos. 2 and 3. These amendments consist of changes to the Technical Specifications in response to your application dated December 28, 1988.

These amendments revise the minimum count rate required on the source range monitors for refueling.

A copy of the Safety Evaluation is also enclosed. Notice of Issuance will be included in the Commission's Bi-Weekly Federal Register Notice.

Sincerely,

/s/

Robert E. Martin, Project Manager  
Project Directorate I-2  
Division of Reactor Projects I/II  
Office of Nuclear Reactor Regulation

Enclosures:

1. Amendment No. 147 to DPR-44
2. Amendment No. 149 to DPR-56
3. Safety Evaluation

cc w/enclosures:  
See next page

DISTRIBUTION w/enclosures:

Docket File	ACRS(10)	JDyer	NRC PDR	GPA/PA	EWenzinger
Local PDR	OGC	PDI-2 Rdg.	RDiggs, ARM/LFMB		SVarga
TMeek(8)	BBoger	EJordan	WButler		DHagan
REMartin(2)	Wanda Jones	RClark	HRichings		MO'Brien(2)
JCalvo	BGrimes				

\*Previously concurred  
[PB AMEND]

*[Handwritten signature]*  
MO'Brien  
8/1/89

PDI-2/PM\*  
REMartin  
08/08/89

SRXB *[Handwritten initials]*  
HRichings  
8/15/89

OGC  
*[Handwritten initials]*  
8/16/89

PDI-2/D  
WButler  
8/28/89

*[Handwritten initials]*



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

August 28, 1989

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Office of Nuclear Reactor Regulation

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See next page

Mr. George A. Hunger, Jr.  
Philadelphia Electric Company

Peach Bottom Atomic Power Station,  
Units 2 and 3

cc:

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Board of Supervisors  
Peach Bottom Township  
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Resident Inspector  
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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. 50-277

PEACH BOTTOM ATOMIC POWER STATION, UNIT NO. 2

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 147  
License No. DPR-44

1. The Nuclear Regulatory Commission (the Commission) has found that:
  - A. The application for amendment by Philadelphia Electric Company, et al. (the licensee) dated December 28, 1988, 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 or 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-44 is hereby amended to read as follows:

(2) Technical Specifications

The Technical Specifications contained in Appendices A and B, as revised through Amendment No. 147, are hereby incorporated in the license. PECO shall operate the facility in accordance with the Technical Specifications.

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

FOR THE NUCLEAR REGULATORY COMMISSION



Walter R. Butler, Director  
Project Directorate I-2  
Division of Reactor Projects I/II

Attachment:  
Changes to the Technical  
Specifications

Date of Issuance: August 28, 1989

ATTACHMENT TO LICENSE AMENDMENT NO. 147

FACILITY OPERATING LICENSE NO. DPR-44

DOCKET NO. 50-277

Replace the following pages of the Appendix A Technical Specifications with the enclosed pages. The revised areas are indicated by marginal lines.

<u>Remove</u>	<u>Insert</u>
103	103
110	110
228	228
231	231

PBAPS

LIMITING CONDITIONS FOR OPERATION

SURVEILLANCE REQUIREMENTS

3.3.B Control Rods (Cont'd.)

4.3.B Control Rods (Cont'd.)

- 4. Control rods shall not be withdrawn for startup or refueling unless at least two source range channels have an observed count rate equal to or greater than three counts per second.\*
  
- 5. During operation with limiting control rod patterns, as determined by the designated qualified personnel, either:
  - a. Both RBM channels shall be operable, or
  - b. Control rod withdrawal shall be blocked, or
  - c. The operating power level shall be limited so that the MCPR will remain above the fuel cladding integrity safety limit assuming a single error that results in complete withdrawal of a single operable control rod.

- 4. Prior to control rod withdrawal for startup or during refueling, verify that at least two source range channels have an observed count rate of at least three counts per second.\*
  
- 5. When a limiting control rod pattern exists, an instrument functional test of the RBM shall be performed prior to withdrawal of the designated rod(s).

\*May be reduced provided at least three source range channels for startup or at least two source range channels for refueling have an observed count rate and a signal-to-noise ratio on or above the curve shown on Figure 3.3.1.

C. Scram Insertion Times

C. Scram Insertion Times

- 1. The average scram insertion time, based on the deenergization of the scram pilot valve solenoids as time zero, of all operable control rods in the reactor power operation condition shall be no greater than:

- 1. After each refueling outage, and prior to synchronizing the main turbine generator initially following restart of the plant, all operable fully withdrawn insequence rods shall be scram time tested during operational hydrostatic testing or during startup from the fully withdrawn position with the nuclear system pressure above 800 psig.

<u>% Inserted from Fully Withdrawn</u>	<u>Avg. Scram Insertion Times (sec)</u>
5	0.375
20	0.90
50	2.0
90	3.5

3.3.B and 4.3.B BASES (Cont'd.)

The requirement of at least 3 counts per second (may be reduced provided the count rate and signal-to-noise ratio is on or above the curve shown on Figure 3.3.1) assures that any transient, should it occur begins at or above the initial value of  $10^{-8}$  of rated power used in analyses of transient cold conditions. One operable SRM channel would be adequate to monitor the approach to criticality using homogeneous patterns of scattered control rod withdrawal. Increasing the required number of operable SRM's is provided as an added conservatism.

5. The Rod Block Monitor (RBM) is designed to automatically prevent fuel damage in the event of erroneous rod withdrawal from locations of high power density during high power level operation. Two channels are provided, and one of these may be bypassed from the console for maintenance and/or testing. Tripping of one of the channels will block erroneous rod withdrawal soon enough to prevent fuel damage. This system backs up the operator who withdraws control rods according to written sequences. The specified restrictions with one channel out of service conservatively assure that fuel damage will not occur due to rod withdrawal errors when this condition exists.

A limiting control rod pattern is a pattern which results in the core being on a thermal hydraulic limit (i.e., operating on a limiting value for APLHGR, LHGR, or MCPR as defined in Technical Specifications 3.5.I., 3.5.J and 3.5.K). During use of such patterns, it is judged that testing of the RBM system prior to withdrawal of such rods to assure its operability will assure that improper withdrawal does not occur. It is the responsibility of the Reactor Engineer to identify these limiting patterns and the designated rods either when the patterns are initially established or as they develop due to the occurrence of inoperable control rods in other than limiting patterns. Other personnel qualified to perform this function may be designated by the Plant Manager.



LIMITING CONDITIONS FOR OPERATIONSURVEILLANCE REQUIREMENTS

## 3.10.B (Cont'd)

- a. The SRM shall be inserted to the normal operating level. (Use of special movable, dunking type detectors during fuel loading and major core alterations in place of normal detectors is permissible as long as the detector is connected to the normal SRM circuit.)
  - b. The SRM shall have a minimum of 3 cps\* with all rods fully inserted in the core.
2. Prior to unloading of fuel, the SRM's shall be proven operable as stated above; however, during unloading of fuel, the SRM count rate may drop below 3 cps, provided all control rods are full inserted and rendered electrically inoperable with the exception of the following provision. Individual control rods outside the periphery of the then existing fuel matrix may be electrically armed and moved after all fuel in the cell containing that control rod have been removed from the reactor core.
  3. Prior to reloading of fuel, two, three or four fuel assemblies may be returned to their previous core positions adjacent to each of the 4 SRM's to obtain the required 3 cps\*. Until these assemblies are loaded, the SRM minimum count rate is not required.
  4. The SRM minimum count rate is not required with all fuel removed from the core.
  5. During the unloading and reloading of fuel, intermediate arrays of fuel shall always contain at least one SRM.

## 4.10.B (Cont'd)

2. Prior to unloading or reloading of fuel as provided for in sections 3.10.B.2 & 3.10.B.3, the SRM's shall be functionally tested. Prior to unloading of fuel, the SRM's should also be checked for neutron response.

\*May be reduced provided the SRM has an observed count rate and signal-to-noise ratio on or above the curve shown on Figure 3.3.1.

### 3.10 BASES (Cont'd)

The requirements for SRM Operability during these core alterations assure sufficient core monitoring.

#### B. Core Monitoring

The SRM's are provided to monitor the core during periods of station shutdown and to guide the operator during refueling operations and station startup. Requiring two operable SRM's in or adjacent to any core quadrant where fuel or control rods are being moved assures adequate monitoring of that quadrant during such alterations. The requirement of 3 counts per second\* provides assurance that neutron flux is being monitored and insures that startup is conducted only if the source range flux level is above the minimum assumed in the control rod drop accident.

During unloading of fuel, it is permissible to allow the SRM count rate to decrease below 3 cps. Since all fuel moves during core unloading will reduce reactivity, the lower number of counts will not present a hazard. Requiring the SRM's to be functionally tested prior to fuel removal assures that the SRM's will be operable at the start of fuel removal. The daily response check of the SRM's ensures their continued operability until the count rate diminishes due to fuel removal. Control rods in cells from which all fuel has been removed and which are outside the periphery of the then existing fuel matrix may be armed electrically and moved for maintenance purposes during fuel removal, provided all rods that control fuel are fully inserted and electrically disarmed.

During core loading, the loading of adjacent assemblies around the four SRM's before attaining the minimum count rate of 3 cps\* is permissible because these assemblies were in a subcritical configuration when they were removed and therefore will remain subcritical when the same assemblies are placed back into their previous positions. Since specification 3.10.A.2 requires that all control rods be fully inserted prior to loading fuel, inadvertent criticality is precluded during core loading.

#### C. Spent Fuel Pool Water Level

The intent of the Technical Specification is to provide, adequate water coverage for cooling and shielding at all times. With the water at elevation 233' (its normal operating level at the top of the pool weir), approximately 23 ft. of water is maintained above fuel stored in the spent fuel storage racks. The physical arrangement of the spent fuel pool overflow to the skimmer surge tanks may be adjusted such that the minimum operating water level provides 22 ft. of water coverage over irradiated fuel in the storage racks. For this reason, the specification for minimum water coverage has been established at 22 ft. This level provides adequate

\*May be reduced provided the count rate and signal-to-noise ratio are on or above the curve shown on Figure 3.3.1.



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. 50-277

PEACH BOTTOM ATOMIC POWER STATION, UNIT NO. 3

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 149  
License No. DPR-44

1. The Nuclear Regulatory Commission (the Commission) has found that:
  - A. The application for amendment by Philadelphia Electric Company, et al. (the licensee) dated December 28, 1988, 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 or 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. 149, are hereby incorporated in the license. PECO shall operate the facility in accordance with the Technical Specifications.

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

FOR THE NUCLEAR REGULATORY COMMISSION



Walter R. Butler, Director  
Project Directorate I-2  
Division of Reactor Projects I/II

Attachment:  
Changes to the Technical  
Specifications

Date of Issuance: August 28, 1989

ATTACHMENT TO LICENSE AMENDMENT NO. 149

FACILITY OPERATING LICENSE NO. DPR-56

DOCKET NO. 50-278

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<u>Remove</u>	<u>Insert</u>
103	103
110	110
228	228
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The intent of the Technical Specification is to provide, adequate water coverage for cooling and shielding at all times. With the water at elevation 233' (its normal operating level at the top of the pool weir), approximately 23 ft. of water is maintained above fuel stored in the spent fuel storage racks. The physical arrangement of the spent fuel pool overflow to the skimmer surge tanks may be adjusted such that the minimum operating water level provides 22 ft. of water coverage over irradiated fuel in the storage racks. For this reason, the specification for minimum water coverage has been established at 22 ft. This level provides adequate

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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION SUPPORTING

AMENDMENT NOS. 147 AND 149 TO FACILITY OPERATING

LICENSE NOS. DPR-44 and DPR-56

PHILADELPHIA ELECTRIC COMPANY

PUBLIC SERVICE ELECTRIC AND GAS COMPANY

DELMARVA POWER AND LIGHT COMPANY

ATLANTIC CITY ELECTRIC COMPANY

PEACH BOTTOM ATOMIC POWER STATION, UNIT NOS. 2 AND 3

DOCKET NOS. 50-277 AND 50-278

1.0 INTRODUCTION

By letter dated December 28, 1988, the Philadelphia Electric Company requested an amendment to Facility Operating License Nos. DPR-44 and DPR-56 for Peach Bottom Atomic Power Station (PBAPS), Unit Nos. 2 and 3. The request was to change the requirement for the Source Range Monitor (SRM) minimum count rate during refueling from 3 counts per second (cps) to a relationship which specifies the minimum required count rate as a function of the signal to noise ratio. A similar amendment incorporating a revised minimum SRM count rate for startup activities, as set forth in a new Figure 3.3.1, was issued as amendment nos. 140 and 142 to the PBAPS licenses on March 15, 1989.

2.0 EVALUATION

The current PBAPS Technical Specifications (TSs) require the SRM to have a minimum count rate of 3 cps for refueling. Because of a long shutdown time, the licensee anticipates that Unit 3 may not be able to achieve this count rate for the forthcoming reloading of fuel. The licensee has therefore proposed changes to the TS which would permit such refueling operations, when necessary, with a count rate less than 3 cps. Unit 2 would also be changed so that consistent TS would be provided for both units. The revised count rate remains within the range of the SRM and no hardware changes are required to the SRM.

The proposed changes are to TS 3/4.3.B, 3/4.10.B and associated BASES. The changes to TS 3/4.3.B modify the asterisked footnote, which was added by amendment nos. 140 and 142 for startup operations, to make it also applicable to refueling activities. The footnote is also added to TS 3/4.10 which governs core alterations. A portion of the staff's evaluation as included with amendment nos. 140 and 142 is also applicable to this amendment and is included herein for completeness.

SRM minimum count rates have previously been lowered for several reactors, with GE concurrence, to 0.7 cps with a S/N ratio of 2 for first cycle startup with weak neutron sources resulting from delayed schedules. GE later evaluated this reduction for reload cores (with increased noise) and found that an increased S/N limit is required to achieve the same probability of detecting real signals. This analysis was done at PECO's request (as a plant specific analysis) for Peach Bottom 2 and 3. This analysis (for SRM downscale trip setpoint determination) involves several assumptions about the signal and noise characteristics and probability requirements, and uses the new standard GE setpoint methodology for setpoint uncertainties. The assumed signal characteristics are straightforward and acceptable. A primary assumption is that there will be only a 5 percent probability of incorrectly detecting neutrons when they are absent and a 95 percent probability of detecting them when present. This is a reasonable criterion. The NRC review of these various assumptions and probability requirements, and of the analysis methodology concludes that an acceptable analysis has been developed to provide the SRM downscale setpoint and corresponding TS limit for SRM operability.

As noted above, the primary statistical basis for the values on the count rate to signal-to-noise curve of Figure 3.3.1 is the same as for the minimum value of 3 cps, namely that there is a statistical neutron monitoring confidence of 95% that the indicated signal is correct. The licensee has found no need to modify this basis for events related to refueling activities. The staff has compared the UFSAR analyzed events for the startup activities (the control rod drop accident and the continuous rod withdrawal) with those analyzed for refueling activities (the control rod removal error during refueling and the fuel assembly insertion error) and concludes that the primary issue for either startup or refueling is whether the SRMs provide an acceptable level of confidence of detecting neutrons when they are present. Having found the licensee's rationale to be acceptable in this regard the staff concludes that the proposed change to TS 3/4.3.B, 3/4.10.B and BASES, providing alternate limits for refueling as set forth in Figure 3.3.1, is acceptable. This approval is specific to the Peach Bottom units.

The staff notes that the licensee's analysis in its December 28, 1988 application discusses the correlation of the lowest allowable count rate on Figure 3.3.1 (0.7 cps) to a value of approximately  $7 \times 10^{-9}$  of rated power. The licensee then relates this power level to an assurance that the assumptions used in the transient analyses are not invalidated. This is clearly applicable for the startup events analyzed in the UFSAR, however, the staff finds no similar criterion referenced in the FSAR for the refueling events, namely that they are assumed to be initiated at or above about  $10^{-8}$  of rated power, and therefore this appears to be an extraneous comment for the refueling events analyzed by the application.

This does not detract from the staff's findings as noted above since the principle issue is whether the relationship of Figure 3.3.1 provides the same confidence level as the former limit of 3 cps.

A change in the title of the station superintendent to "Plant Manager" on TS BASES page 110 is also made to provide consistency with changes to the organization that were reviewed and approved in amendment nos 132 and 135 on June 22, 1988. This change is straight forward and is acceptable.

### 3.0 ENVIRONMENTAL CONSIDERATIONS

These amendments involve a change to a requirement with respect to the installation or use of a facility component located within the restricted area as defined in 10 CFR Part 20 and changes to the surveillance requirements. The staff has determined that the amendments involve no significant increase in the amounts, and no significant change in the types, of any effluents that may be released offsite and that there is no significant increase in individual or cumulative occupational radiation exposure. The Commission has previously issued a proposed finding that the amendments involve no significant hazards consideration and there has been no public comment on such finding. Accordingly, the amendments meet the eligibility criteria for categorical exclusion set forth in 10 CFR 51.22(c)(9). Pursuant to 10 CFR 51.22(b), no environmental impact statement nor environmental assessment need be prepared in connection with the issuance of the amendments.

### 4.0 CONCLUSION

The Commission made a proposed determination that the amendments involve no significant hazards consideration which was published in the Federal Register (54 FR 27232) on June 28, 1989 and consulted with the State of Pennsylvania. No public comments were received and the State of Pennsylvania did not have any comments.

The staff has concluded, based on the considerations discussed above, that:

- (1) there is reasonable assurance that the health and safety of the public will not be endangered by operation in the proposed manner, and
- (2) such activities will be conducted in compliance with the Commission's regulations, and the issuance of the amendments will not be inimical to the common defense and security or to the health and safety of the public.

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Dated: August 28, 1989