

July 10, 1991

Docket No. 50-277

Mr. George J. Beck  
Manager-Licensing, MC 5-2A-5  
Philadelphia Electric Company  
Nuclear Group Headquarters  
Correspondence Control Desk  
P.O. Box No. 195  
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Dear Mr. Beck

SUBJECT: ALLOW OPERATION OF CONTROL ROD 38-23, UNCOUPLED FROM ITS DRIVE, FOR  
REMAINDER OF CYCLE 8, PEACH BOTTOM ATOMIC POWER STATION, UNIT NO. 3  
(TAC NO. 80547)

The Commission has issued the enclosed Amendment No. 166 to Facility  
Operating License No. DPR-56 for the Peach Bottom Atomic Power Station,  
Unit No. 3. This amendment consists of changes to the Technical Specifications  
(TSs) in response to your application dated June 14, 1991.

This amendment changes Sections 3.3.B.1 and 4.3.B.1 of Peach Bottom, Unit 3  
Technical Specifications to allow operation of control rod 38-23, uncoupled  
from its drive, for the remainder of Cycle 8, which is to be completed before  
October 30, 1991. The amendment specifies conditions under which Rod 38-23 may  
be operated and modifies existing surveillance requirements to verify rod  
position by use of neutron instrumentation.

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/

Patrick D. Milano, Project Manager  
Project Directorate I-2  
Division of Reactor Projects - I/II  
Office of Nuclear Reactor Regulation

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- Enclosures:  
1. Amendment No. 166 to  
License No. DPR-56  
2. Safety Evaluation

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NAME	: MO'Brien	: JShea	: PMilano	: rb:WButler	: mrobert	: R.Jones
DATE	: 7/1/91	: 7/1/91	: 7/1/91	: 7/10/91	: 7/3/91	: 7/2/91

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

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Sincerely,

A handwritten signature in cursive script, appearing to read "Patrick D. Milano".

Patrick D. Milano, Project Manager  
Project Directorate I-2  
Division of Reactor Projects - I/II  
Office of Nuclear Reactor Regulation

Enclosures:

1. Amendment No. 166 to  
License No. DPR-56
2. Safety Evaluation

cc w/enclosures:  
See next page

Mr. George J. Beck  
Philadelphia Electric Company

Peach Bottom Atomic Power Station,  
Units 2 and 3

cc:

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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. 50-278

PEACH BOTTOM ATOMIC POWER STATION, UNIT NO. 3

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 166  
License No. DPR-56

1. The Nuclear Regulatory Commission (the Commission) has found that:
  - A. The application for amendment by Philadelphia Electric Company, et. al. (the licensee) dated June 14, 1991, 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. 166, 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: July 10, 1991

ATTACHMENT TO LICENSE AMENDMENT NO. 166

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 areas are indicated by marginal lines.

REMOVE

101  
102

INSERT

101  
102

## LIMITING CONDITIONS FOR OPERATION

## SURVEILLANCE REQUIREMENTS

3.3.A Reactivity Limitations  
(Cont'd)

- f. Inoperable control rods shall be positioned such that specification 3.3.A.1 is met. In addition, during reactor power operation, no more than one control rod in any 5 x 5 array may be inoperable (at least 4 operable control rods must separate any 2 inoperable ones). If this Specification cannot be met the reactor shall not be started, or if at power, the reactor shall be brought to a cold shutdown condition within 24 hours.

B. Control Rods

1. Each control rod shall be coupled to its drive or completely inserted and the control rod directional control valves disarmed electrically except as in 3.3.B.1.a. This requirement does not apply in the refuel condition when the reactor is vented. Two control rod drives may be removed as long as Specification 3.3.A.1 is met.
- a. For control rod 38-23, for the remainder of cycle 8 (to be completed before 10/30/91).
- If coupling cannot be accomplished, the uncoupled control rod may be withdrawn when  $\geq 10\%$  of rated thermal power only if all the following conditions are satisfied:
- 1) no other uncoupled control rod is withdrawn;
  - 2) the uncoupled control rod may not be withdrawn past notch position 46.

4.3.A Reactivity Limitations  
(Cont'd)B. Control Rods

1. The coupling integrity shall be verified for each withdrawn control rod as follows:
- a. When a rod is withdrawn the first time after each refueling outage or after maintenance, observe discernible response of the nuclear instrumentation and rod position indication for the "full-in" and "full-out" position. However, for initial rods when response is not discernible, subsequent exercising of these rods after the reactor is above the Rod Worth Minimizer low power setpoint shall be performed to verify instrumentation response.
  - b. When the rod is fully withdrawn the first time after each refueling outage or after maintenance observe that the drive does not go to the overtravel position.

## 3.3.B Control Rods (Cont'd.)

2. The control rod drive housing support system shall be in place during reactor power operation or when the reactor coolant system is pressurized above atmospheric pressure with fuel in the reactor vessel, unless all control rods are fully inserted and Specification 3.3.A.1 is met.
- 3.a. DELETED
- b. The Rod Worth Minimizer (RWM) low power setpoint is greater than or equal to 10% of rated power. Whenever the reactor is in the startup or run modes with thermal power less than or equal to the Rod Worth Minimizer (RWM) low power setpoint the Rod Worth Minimizer shall be operable except as follows:
1. With the RWM inoperable after the first 12 control rods are fully withdrawn, operation may continue provided that control rod movement and compliance with the prescribed control rod pattern are verified by a second licensed operator or technically qualified member of the station technical staff.

## 4.3.B Control Rods (Cont'd.)

- c. During each refueling outage and after control rod maintenance, observe that the drive does not go to the overtravel position.
  - d. When repositioning the uncoupled control rod, per Specification 3.3.B.1.a the uncoupled control rod's position shall be verified to have followed the control rod drive by neutron instrumentation (LPRM or TIP). If the control blade cannot be verified to have followed the drive out to its final position, then the rod shall be completely inserted and the control rod directional control valves disarmed electrically.
2. The control rod drive housing support system shall be inspected after reassembly and the results of the Inspection recorded.

## 3.a. DELETED

- b.1. Prior to the start of control rod withdrawal towards criticality and prior to attaining the Rod Worth Minimizer low power setpoint during rod insertion at shutdown, the Rod Worth Minimizer (RWM) shall be demonstrated to be operable by the following checks:
- a. The RWM computer on line diagnostic test shall be successfully performed.
  - b. Prior to the start of control rod withdrawal only, proper annunciation of the selection error of at least one out-of-sequence control rod in a fully inserted group shall be verified.



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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION  
RELATED TO AMENDMENT NO. 166 TO FACILITY OPERATING LICENSE NO. 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 NO. 3

DOCKET NO. 50-278

1.0 INTRODUCTION

By letter dated June 14, 1991, the Philadelphia Electric Company, Public Service Electric & Gas Company, Delmarva Power and Light Company and Atlantic City Electric Company (the licensees) submitted a request for a temporary change to the Peach Bottom Atomic Power Station, Unit No. 3, Technical Specifications (TS). The requested change would permit operation of the facility with control rod 38-23 uncoupled for the remainder of operating Cycle 8. The change to TS 3.3.B.1 would not require that the compensatory measures of the action statement be initiated for control rod 38-23 because it is not coupled. Also, repositioning of the control rod to its proposed step 46 position would be allowed when the reactor power was above 10% of rated power. The surveillance requirements of TS 4.3.B.1 would include additional monitoring during the repositioning evolution. In this regard neutron monitoring by means of either the Local Power Range Monitor (LPRM) or Transversing Incore Probe (TIP) Systems would be used to verify the control rod movement.

The control rod 38-23 was identified as being uncoupled during an attempt to withdraw it to the fully withdrawn position during the weekly control rod drive (CRD) exercise required by TS 4.3.A.2.a. The uncoupling was detected by noting that from rod position 48 the rod could be moved into the overtravel position. The overtravel feature provides a positive check as only uncoupled drives may reach this position. The licensee made several unsuccessful attempts to recouple by giving notch insert signals from position 48 to 46 using normal drive pressure per the "Control Rod Uncoupled Procedure." The licensee also observed that the rod could be inserted to position 00 without difficulty and would withdraw normally and settle to any position from 00 to 46 without incident. Because the control rod to drive coupling cannot be confirmed, the licensee assumed that the rod was uncoupled. TS 3.3.B.1 requires that an uncoupled rod be inserted and the control rod directional control valves be disarmed electrically. Along with CRD 38-23, the three rods symmetric to it were also inserted to preserve operational symmetry.

General Electric (GE) Company has analyzed the problem for the licensee and concluded that the most likely cause of control rod uncoupling is that the uncoupling rod was incorrectly installed in one of the spud flow holes instead of the spud center hole. It is postulated that as the rod was withdrawn, the cocked uncoupling rod contacted the top flange of the inner filter. As the rod and index tube continued to move downward, the lock plug springs became fully compressed and forced the uncoupling rod to yield or become jammed in the spud flow hole. The inertia of the index tube may have caused the index tube to uncouple and move downward into the overtravel position. Analysis of possible deformation within the coupling assembly does not point out any adverse scram performance. Although scram loading may cause further damage as discussed in section 2, the ability of the rod to be inserted in a scram action does not appear to be affected.

The proposed TS changes are intended to allow withdrawal of control rod 38-23 to position 46 for the remainder of fuel Cycle 8, which should be completed before October 30, 1991. The three symmetric partner rods could thus also be withdrawn. This will eliminate a power derating of approximately 4% of rated power. The unit refueling outage is currently scheduled to begin on September 7, 1991.

The basis for verification of rod movement during the withdrawal to position 46 would be through the use of neutron monitoring with either LPRM or TIP system.

## 2.0 EVALUATION

Licensee attempts to verify coupling integrity of rod 38-23 were unsuccessful, and, therefore, it must be assumed that the control rod and drive are uncoupled. The primary concern for control rod coupling integrity is its impact on the potential increase in the probability of a control rod drop accident (CRDA) as analyzed in the FSAR. Additionally, control rod coupling integrity ensures that indicated control rod position is indicative of actual control rod position. The uncoupled rod condition also raises an operational concern for equipment damage due to scram loading. The rod could separate from the CRD during the deceleration phase of the scram stroke which could result in increased loads on the affected parts.

The licensee has proposed procedural changes to assure that withdrawal and operation with an uncoupled rod 38-23 will not pose a significant CRDA concern for the remainder of the fuel Cycle 8. The rod will remain inserted and not be withdrawn at reactor power levels less than 10 percent. During the withdrawal sequence above 10 percent, neutron flux information in the vicinity of the rod will be monitored to verify that the control rod blade tracks with the drive movement. This will ensure that the rod is not sticking and separated from the CRD.

An analysis performed by GE for the licensee shows that, for the fuel cycle under consideration, the consequences of a CRDA at power levels above 10 percent of rated thermal power are negligible and that no constraints on control rod sequences are required. Below 10 percent of rated power, the uncoupled control rod will be fully inserted. Above ten percent power, the compensatory actions ensure that the Rod Block Monitor mitigates the consequences of a Rod Withdrawal error.

The licensee's proposed changes provide an additional measure to minimize the possibility of a CRDA by requiring the use of neutron instrumentation (LPRM or TIP) to verify rod position during repositioning of the uncoupled rod. This is addressed in proposed change 4.3.B.1.d.

The GE analysis also addressed the possibility of equipment damage from scram loadings. Mechanism damage could occur during the deceleration phase of the scram stroke. The uncoupled rod would continue to move upward and the velocity limiter would strike the bottom of the fuel support casting. Analysis shows that in this scenario, damage might occur to the velocity limiter or, upon rebound, to the spud and the lock plug. However, there is insufficient energy to dislodge the fuel support and fuel.

GE has provided recommended operating strategies to minimize possible scram load problems. The recommended operation with rod 38-23 withdrawal limited to notch position 46 minimizes the scram loadings on the spud and socket. To minimize the forces on the rod, scram of the rod should not occur under cold depressurized conditions. Scram testing of the rod should be avoided to prevent the potential for mechanical damage. If a scram test is required for the rod during the cycle, it should be conducted from the lowest achievable fully withdrawn position. The weekly tests of rod movement required by the TS will continue, thus assuring rod movement capability.

GE has evaluated the effect of the control rod coupling integrity on scram performance. The scram and insertion performance were not considered to be degraded nor would other reactivity control functions be adversely affected. Since the rod will be operated at a slightly inserted position for full withdrawal, it should have slightly better scram reactivity insertion characteristics. It is, therefore, reasonable to conclude that operation with rod 38-23 fully withdrawn will not lead to any condition adverse to reactor safety.

The TS changes accompanying this mode of operation consist of changes to Sections 3.3.B.1 and 4.3.B.1. The Change to section 3.3.B.1 specifies that, for the remainder of Cycle 8, if coupling cannot be achieved, rod 38-23 may be withdrawn when rated thermal power is greater or equal to 10 percent under certain conditions. These conditions are that no other uncoupled rods are withdrawn and rod 38-23 may not be withdrawn past notch position 46. The change to Section 4.3.B.1 requires the use of neutron instrumentation (LPRM or TIP) to verify that rod 38-23 followed the CDR during repositioning. If the blade cannot be verified to have followed to its final position, then the rod shall be completely inserted and the directional control valves electrically disarmed. These TS changes adequately implement the required changes in rod operation and are acceptable.

The staff has reviewed the licensee's proposed Technical Specification changes for operation of control rod 38-23 for the remainder of Cycle 8 at Peach Bottom, Unit 3, and the safety evaluation prepared by General Electric. Based on this review, we conclude that the proposed changes satisfy staff positions and requirements in these areas. Operation with control rod 38-23 withdrawn under the guidance of the proposed procedures and Technical Specifications is acceptable.

### 3.0 EXIGENT CIRCUMSTANCES

The Commission's regulation, 10 CFR 50.91, provides special exceptions for issuance of amendments when the usual 30-day public notice period cannot be met. One type of special exception is an exigency. An exigency is a case in which the staff and the licensee need to act quickly and time does not permit the Commission to publish a Federal Register notice allowing 30 days for prior public comment, and the Commission also determines that the amendment involves no significant hazards considerations. In this instance, Peach Bottom, Unit 3 is operating in a four percent derated condition during a period of extremely high electrical demand.

The Unit 3 derate is a result of the current Technical Specification requirement to insert the uncoupled rod into the core and the requirement to fully insert three symmetric control rods to prevent flux tilting in the core. The result of operating with four control rods inserted is a reduction of maximum output power of approximately four percent. The high electrical demand during the summer months requires maximum grid generating capability. The cost of replacement power to the licensee during the summer months is also extremely high. The licensee applied for this amendment change and requested that it be processed in an exigent manner.

The staff finds that the licensee did not deliberately or negligently cause the exigent situation to come into being. Failure of the Commission to act on the licensee's request would result in loss of generating capability to the grid during a period of high demand and a very high cost to the licensee for replacement power.

### 4.0 FINAL NO SIGNIFICANT HAZARD CONSIDERATION DETERMINATION

The Commission has provided standards for determining whether a significant hazards consideration exists (10 CFR 50.92(c)). A proposed amendment to an operating license for a facility involves no significant hazards consideration if operation of the facility in accordance with proposed the amendment would not: (1) involve a significant increase in the probability or consequences of an accident previously evaluated; (2) create the possibility of a new or different kind of accident from any accident previously evaluated; or (3) involve a significant reduction in a margin of safety.

The licensee has analyzed the proposed amendment to determine if a significant hazard consideration exists:

The proposed amendment to Technical Specifications Sections 3.3.B.1 and 4.3.B.1 for Peach Bottom Unit 3;

- (1) does not involve a significant increase in the probability or consequences of an accident previously evaluated. This amendment incorporates compensatory actions in the Technical Specifications to assure that even with an uncoupled rod, the rod position is known, that no other uncoupled rods are withdrawn and that scram performance remains intact.
- (2) does not create the possibility of a new or different kind of accident from any previously evaluated. The compensatory measures included in the Technical Specification changes assure that no new or different kind of accident is possible.
- (3) does not involve a significant reduction in the margin of safety as the limiting event is the [control rod drop accident] CRDA and all fuel limits stipulated in that analysis will be met when the compensatory measures included in the Technical Specification changes are implemented.

Based on the above considerations, including the staff's safety evaluation, the staff concludes that the amendment meets the standards set forth in 10 CFR 50.92 for a no significant hazards determination. Therefore, the staff has made a final determination that the proposed amendment involves no significant hazards consideration.

#### 5.0 STATE CONSULTATION

In accordance with the Commission's regulations, the Pennsylvania State official was notified of the proposed issuance of the amendment. The State official had no comments.

#### 6.0 ENVIRONMENTAL CONSIDERATION

The amendment changes a requirement with respect to installation or use of a facility component located within the restricted area as defined in 10 CFR Part 20. The NRC staff has determined that the amendment involves 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 amendment involves no significant hazards consideration, and there has been no public comment on such finding. Accordingly, the amendment meets 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 or environmental assessment need be prepared in connection with the issuance of the amendment.

## 7.0 CONCLUSION

The Commission has concluded, based on the considerations discussed above, that because the requested changes do not involve a significant increase in the probability or consequences of an accident previously evaluated, do not create the possibility of an accident of a type different from any evaluated previously, and do not involve a significant reduction in a margin of safety, the amendments do not involve a significant hazards consideration that: (1) there is reasonable assurance that the health and safety of the public will not be endangered by operation in the proposed manner, (2) such activities will be conducted in compliance with the Commission's regulations, and (3) the issuance of the amendment will not be inimical to the common defense and security or to the health and safety of the public.

Principal Contributors: J. Shea  
P. Milano

Date: July 10, 1991