

September 8, 2000

Mr. James A. Hutton  
Director-Licensing  
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SUBJECT: PEACH BOTTOM ATOMIC POWER STATION, UNIT NOS. 2 AND 3 - ISSUANCE  
OF AMENDMENT RE: REVISED EXCESS FLOW CHECK VALVE  
SURVEILLANCE REQUIREMENTS (TAC NOS. MA9078 AND MA9079)

Dear Mr. Hutton:

The Commission has issued the enclosed Amendments Nos. 235 and 239 to Facility Operating License Nos. DPR-44 and DPR-56 for the Peach Bottom Atomic Power Station (PBAPS), Unit Nos. 2 and 3. These amendments consist of changes to the Technical Specifications (TSs) in response to your application dated May 31, 2000, as supplemented August 18, 2000.

These amendments revise the PBAPS Units 2 and 3 TSs Surveillance Requirement (SR) 3.6.1.3.11 to allow a representative sample of reactor instrumentation line excess flow check valves (EFCVs) to be tested every 24 months, instead of testing each EFCV every 24 months.

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,  
*/RA/*

John P. Boska, Project Manager, Section 2  
Project Directorate I  
Division of Licensing Project Management  
Office of Nuclear Reactor Regulation

Docket Nos. 50-277 and 50-278

Enclosures: 1. Amendment No. 235 to DPR-44  
2. Amendment No. 239 to DPR-56  
3. Safety Evaluation

cc w/encls: See next page

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Units 2 and 3

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SUBJECT:  
PEACH BOTTOM ATOMIC POWER  
STATION, UNIT NOS. 2 AND 3 -  
ISSUANCE OF AMENDMENT RE:  
REVISED EXCESS FLOW CHECK VALVE  
SURVEILLANCE REQUIREMENTS (TAC  
NOS. MA9078 AND MA9079)

Dear Mr. Hutton:

The Commission has issued the enclosed Amendments Nos. 235 and 239 to Facility Operating License Nos. DPR-44 and DPR-56 for the Peach Bottom Atomic Power Station (PBAPS), Unit Nos. 2 and 3. These amendments consist of changes to the Technical Specifications (TSs) in response to your application dated May 31, 2000, as supplemented August 18, 2000.

These amendments revise the PBAPS Units 2 and 3 TSs Surveillance Requirement (SR) 3.6.1.3.11 to allow a representative sample of reactor instrumentation line excess flow check valves (EFCVs) to be tested every 24 months, instead of testing each EFCV every 24 months.

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DPR-44  
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### 3. Safety Evaluation

cc w/encls: See next page

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DATE			8/30/00	7/27/00		

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PECO ENERGY COMPANY

PSEG NUCLEAR LLC

DELMARVA POWER AND LIGHT COMPANY

ATLANTIC CITY ELECTRIC COMPANY

DOCKET NO. 50-277

PEACH BOTTOM ATOMIC POWER STATION, UNIT 2

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 235  
License No. DPR-44

1. The Nuclear Regulatory Commission (the Commission) has found that:
  - A. The application for amendment by PECO Energy Company, et al. (the licensee) dated May 31, 2000, as supplemented August 18, 2000, 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-44 is hereby amended to read as follows:

-2-

(2) Technical Specifications

The Technical Specifications contained in Appendices A and B, as revised through Amendment No. 235 , 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 and shall be implemented within 30 days.

FOR  
THE NUCLEAR REGULATORY  
COMMISSION

*/RA/*

James  
W. Clifford, Chief, Section 2  
Project  
Directorate I  
Division of Licensing Project Management  
Office  
of Nuclear Reactor Regulation

Attachment: Changes to the Technical  
Specifications

Date of Issuance:

ATTACHMENT TO LICENSE AMENDMENT NO. 235

FACILITY OPERATING LICENSE NO. DP R-44

DOCKET NO. 50-277

Replace the following pages of the Appendix A Technical Specifications with the attached revised pages. The revised pages are identified by amendment number and contain marginal lines indicating the areas of change.

Remove

Insert

3.6-15

3.6-15

B 3.6-28

B 3 6-28

PECO ENERGY COMPANY

PSEG NUCLEAR LLC

DELMARVA POWER AND LIGHT COMPAN  
Y

ATLANTIC CITY ELECTRIC COMPANY

DOCKET NO. 50-278

PEACH BOTTOM ATOMIC POWER STATION, UNIT 3

AMENDMENT TO FACILITY OPERATING  
LICENSE

Amendment No. 239

License No. DPR-56

1. The Nuclear Regulatory Commission (the Commission) has found that:
  - A. The application for amendment by PECO Energy Company, et al. (the licensee) dated May 31, 2000, as supplemented August 18, 2000, 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. 239, 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 and shall be implemented within 30 days.

FOR  
THE NUCLEAR REGULATORY  
COMMISSION

*/RA/*

James  
W. Clifford, Chief, Section 2  
Project  
Directorate I  
Division of Licensing Project Management  
Office  
of Nuclear Reactor Regulation

Attachment: Changes to the Technical  
Specifications

Date of Issuance:

ATTACHMENT TO LICENSE AMENDMENT NO. 239

FACILITY OPERATING LICENSE NO. DP R-56

DOCKET NO. 50-278

Replace the following pages of the Appendix A Technical Specifications with the attached revised pages. The revised pages are identified by amendment number and contain marginal lines indicating the areas of change.

	<u>Remove</u>	<u>Insert</u>
	3.6-15	
3.6-15		
	B 3.6-28	
B 3.6-28		

SAFETY EVALUATION BY THE OFFICE OF  
F NUCLEAR REACTOR REGULATION

RELATED TO AMENDMENT NOS. 235 A  
ND 239 TO FACILITY OPERATING

LICENSE NOS. DPR-44 and DPR-56

PECO ENERGY COMPANY

PSEG NUCLEAR LLC

DELMARVA POWER AND LIGHT COMPA  
NY

ATLANTIC CITY ELECTRIC COMPANY

PEACH BOTTOM ATOMIC POWER STATI  
ON, UNIT NOS. 2 AND 3

DOCKET NOS. 50-277 AND 50-278

1.0 INTRODUCTION

By letter dated May 31, 2000, as supplemented by letter dated August 18, 2000, the PECO Energy Company (the licensee) submitted a request for changes to the Peach Bottom Atomic Power Station (PBAPS), Unit Nos. 2 and 3, Technical Specifications (TSs). The requested changes would relax the surveillance frequency to allow a representative sample of reactor instrumentation line excess flow check valves (EFCVs) to be tested every 24 months, instead of testing each EFCV every 24 months. The licensee's intent is to test approximately 20% of the EFCVs each 24 months such that each EFCV will be tested at least once every 10 years (nominal). The licensee states that its basis for the request is a high degree of reliability associated with

the EFCVs and the low consequences from an EFCV failure. The analysis to support this conclusion was based on the Boiling Water Reactor (BWR) Owners Group (BWROG) Topical Report B21-00658-01, "Excess Flow Check Valve Testing Relaxation," by General Electric (GE) Nuclear Energy (Reference 1). The August 18, 2000, letter provided clarifying information that did not change the initial proposed no significant hazards consideration determination or expand the scope of the original Federal Register notice.

2.0 BACKGROUND

EFCVs in reactor instrumentation lines are used in BWR containments to limit the release of fluid from the reactor coolant system in the event of an instrument line break. EFCVs are used in lines that include reactor vessel level and pressure instruments, main steam line flow instruments, recirculation pump suction pressure instruments, and reactor core isolation cooling steam line flow instruments. EFCVs are not required to close in response to a containment isolation signal and are not postulated to operate under post-LOCA conditions. The Topical Report states that EFCVs are not needed to mitigate the consequences of an accident because an instrument line break outside of containment coincident with a design basis LOCA would be of a sufficiently low probability to be outside of the design basis.

The Nuclear Regulatory Commission (NRC) staff reviewed the Topical Report for generic applicability to BWRs and issued a safety evaluation on March 14, 2000 (Reference 2). The Topical Report was found acceptable as a reference for relaxation of EFCV surveillance testing. It was noted that EFCV performance criteria must be established, so that the plant's

corrective action program can provide meaningful feedback for appropriate corrective action in the event of failure during a surveillance test.

The industry TS Task Force has also proposed a change to BWR/4 Standard Technical Specifications (STS) to incorporate this EFCV testing relaxation. The NRC staff is reviewing the proposed change, STS Change Traveler TSTF-334, Revision 0, dated June 2, 1999.

PBAPS TS Surveillance Requirement (SR) 3.6.1.3.11 currently requires verification of the actuation (closing) capability of each reactor instrumentation line EFCV every 24 months. This is typical for BWR TSs. The proposed change would relax the SR frequency by allowing a "representative sample" of EFCVs to be tested every 24 months. The licensee's intent is to test approximately 20% of the EFCVs every 24 months such that each EFCV will be tested at least once every 10 years (nominal). The proposed change is similar in principle to existing performance-based testing programs, such as inservice testing of snubbers and testing of containment isolation valves under Option B of Appendix J to 10 CFR Part 50.

Licensees make changes to their TS Bases sections without the need for prior NRC review or approval. Nevertheless, the licensee also included in its submittal, for information, a revised Basis for TS 3.6.1.3.11.

### 3.0 EVALUATION

#### 3.1 Systems Review

Topical Report B21-00658-01 provides detailed information about EFCV surveillance testing at 12 BWR plants. Testing history indicates that there is a low failure rate in EFCV surveillance testing (see Section 3.2.1, below). Although the

Topical Report did not include data for PBAPS, there have been no failures in the previous 7 years of testing 134 valves (68 at Unit 2 and 66 at Unit 3). Thus, EFCVs have been very reliable performers throughout the industry, in general, and especially at PBAPS.

The licensee has stated that its existing Maintenance Rule (10 CFR 50.65) Program would provide appropriate actions to respond to EFCV failures which are identified during surveillance testing. The surveillance test procedures provide acceptance criteria which are used to evaluate EFCV performance.

In order to ensure there is no significant degradation in EFCV performance due to aging effects, the licensee has stated, in the supplemental letter dated August 18, 2000, that the PBAPS Maintenance Rule program will be used to monitor EFCV performance. For each PBAPS unit, the performance criteria will be less than or equal to 2 failures on a 24-month rolling average. This is acceptable to the staff as a monitoring method to ensure that significant increases in the failure rates of EFCVs will be evaluated and corrected.

#### 3.1.1 Technical Specification Level of Detail

The proposed TS states that "a representative sample" of EFCVs will be tested every 24 months. The "representative sample" is not defined in the TS itself. The proposed Bases say that the licensee will test approximately an equal number of EFCVs each refueling outage, such that each EFCV is tested at least once every 10 years (nominal).

The term "representative sample," with an accompanying explanation in the TS Bases, is identical to current usage in the STS, NUREG-1433, Revision 1. Specifically, NUREG-1433 uses the term

"representative" in TS SR 3.8.6.3 in reference to battery cell testing, and "representative sample" in SR 3.1.4.2 for verification of control rod scram times. Therefore, the application of a "representative sample" for the EFCV testing SR, with its accompanying definition in the Bases, is consistent with the STS usage.

The licensee's proposal to test each EFCV at least once every 10 years (nominal) is acceptable because of the very low EFCV failure rates as demonstrated by industry data in the Topical Report and by plant-specific data at PBAPS. Changes to this interval are subject to appropriate controls under TS 5.5.10, the TS Bases Control Program. TS 5.5.10 applies a process similar to 10 CFR Part 50.59. Based on the low safety significance of the failure of an EFCV to actuate, the level of detail in the TS itself is appropriate.

### 3.2 Risk, Environmental and Radiological Review

In Topical Report B21-00658-01, the licensee provided: (1) an estimate of the steam release frequency (into the reactor building) due to a break in an instrument line concurrent with an EFCV failure to close, and (2) an assessment of the radiological consequence of such release.

At PBAPS, the instrument lines connected to the reactor coolant pressure boundary include a ¼-inch flow restriction orifice located inside the primary containment (upstream of the EFCVs) to limit reactor water leakage in the event of an instrument line rupture. This design feature is described in the PBAPS Updated Final Safety Analysis Report (UFSAR), Section 5.2.3.5. The staff expects that the licensee will confirm the presence of the restriction orifice before reducing the EFCV testing on these lines. As discussed below, in Section 3.2.2, previous evaluation of such an

instrument line rupture in the PBAPS UFSAR, Section 5.2.3.5, which the EFCVs are designed to mitigate, did not credit the isolation of the line by the EFCVs. Thus, a failure of an EFCV is bounded by the previous evaluation of an instrument line rupture. This analysis also showed that the resulting offsite doses would be well below the guidelines of 10 CFR Part 100.

The operational impact of an EFCV failing to close during the rupture of an instrument line that is connected to the reactor pressure vessel (RPV) boundary is based on the environmental effects of a steam release in the vicinity of the instrument racks. The environmental impact of the failure of instrument lines connected to the RPV pressure boundary is the released steam into the reactor building. However, the Topical Report stated that the magnitude of release through an instrument line would be within the pressure control capacity of reactor building ventilation systems and that the integrity and functional performance of secondary containment following an instrument line break would be met. This capability of the ventilation systems for PBAPS was confirmed by the licensee. The separation of equipment in the reactor building is also expected to minimize the operational impact of an instrument line break on other equipment due to jet impingement. A manually operated stop valve is installed in each line outside primary containment as close as practicable to the primary containment penetration. Isolation of a ruptured instrument line outside containment may be possible, depending on the location of the rupture. However, the dose analysis in PBAPS UFSAR, Section 5.2.3.5, does not credit termination of the leak until after the reactor is in cold shutdown.

#### 3.2.1 Estimation of Release Frequency

To estimate the release frequency initiated by an instrument line break, the licensee

considered two factors: (1) the instrument line break frequency downstream of the EFCV, and (2) the probability of the EFCV failing to close. The Topical Report calculated an instrument line break frequency based on the WASH-1400 small pipe break failure rate of  $6.1E-12$  per hour/per foot of line. The Topical Report assumed 100 feet for each instrument line which resulted in a frequency of  $5.34E-06$  breaks per year for a single instrument line.

The Topical Report provided an EFCV composite failure rate based on BWR plant data. The data represented 12,424.5 valve years of operation with a total of 11 failures noted. Based on the reported industry data, the EFCV composite failure rate was  $1.67E-07$ /hour. This failure rate is referenced as an "upper limit failure rate" in the Topical Report.

The Topical Report composite 24-month surveillance release frequency (release frequency equals a break in an instrument line concurrent with a EFCV failure to close) for one instrument line was found to be  $7.81E-09$  release/year. Increasing the surveillance interval to 10 years as proposed by the Topical Report increased the composite release frequency for one instrument line to  $3.91E-08$  release/year.

The Topical Report total plant release frequency is estimated based on the number of instrument lines (EFCVs) installed at the plant. Assuming 68 installed EFCVs, the 24-month total plant composite release frequency is  $5.31E-07$  release/year and  $2.66E-06$  release/year for a 10-year surveillance interval.

However, in the review of the Topical Report the staff noted the BWROG assumed the EFCV failure rate was constant over time. Additionally, the staff questioned the use of an instrument line break frequency based on WASH-1400 and not on more current data. The BWROG

response to a staff request for additional information included a updated instrument line failure frequency of  $35.2E-06$  failures/year based on the Electric Power Research Institute's (EPRI) Technical Report No. 100380, "Pipe Failures in U.S. Commercial Nuclear Power Plants", July 1992. This value is 6.6 times greater than the WASH-1400 data. The BWROG response also assumed that the EFCV failures were five times the actual observed number (55 vs 11) listed in the Topical Report.

Incorporating just the EPRI instrument line failure frequency into the Topical Report results in a revised 24-month total plant composite release frequency of  $3.50E-06$  and a 10-year frequency of  $1.75E-05$  (based on 68 EFCVs). The 10-year composite release frequency shows an increase of  $1.40E-05$  over the 24-month value.

With an assumed observed number of failures increased to 55, the Topical Report EFCV failure rate estimate is  $6.30E-07$ /hour. Incorporating the revised EPRI pipe failure data, the Topical Report composite single instrument line release frequency becomes  $1.94E-07$  release/year for 24 months and  $9.71E-07$  release/year for a 10-year surveillance interval. The Topical Report total plant composite release frequencies assuming 68 installed EFCVs then becomes  $1.32E-05$  release/year and  $6.60E-05$  release/year for the 24-month and 10-year surveillance intervals respectively. The 10-year release frequency shows an increase of  $5.28E-05$  over the 24-month value. The additional impact of an increase in instrument line failure frequency and a five-fold increase in EFCV failures shows that the Topical Report release frequency remains low with limited impact on release frequencies.

Employing the updated EPRI instrument line failure rate to the Peach Bottom plant

specific data (zero EFCV failures, 68 valves (Unit 2, the limiting case), and 4.17E+06 hours operating time) the 24-month and 10-year total plant release frequency is estimated at 1.51E-05 release/year and 7.53E-05 release/year respectively. The plant release frequencies are similar to the EPRI adjusted Topical Report total plant composite release frequencies. Additionally, if the composite Topical Report industry failure/operating times for the specific valves installed at Peach Bottom Units 2 and 3 are used, the release frequencies are well within the adjusted release frequencies of the Topical Report. The staff considers the increase in estimated release frequency to be sufficiently low. This is based on the qualitative analysis that an instrument line break with a concurrent failure of an EFCV to close is not a significant contributor to core damage accidents. Based on the above, the estimated increase in the 10-year release frequency is not considered significant. Therefore, the Peach Bottom Units 2 and 3 plant results are consistent with the Topical Report results and staff safety evaluation conclusions, and, are therefore acceptable.

### 3.2.2 Radiological Consequences

The licensee noted that it had previously evaluated the radiological consequences of an unisolable rupture of such an instrument line, as documented in the PBAPS UFSAR, Section 5.2.3.5. This evaluation assumed a continuous discharge of reactor water through an instrument line with a 1/4-inch orifice for the duration of the detection and cooldown sequence. The assumptions for the accident evaluation do not change as a result of the proposed TS change, and the evaluation in PBAPS UFSAR, Section 5.2.3.5, remains acceptable.

## 4.0 SUMMARY

As demonstrated in BWROG Topical

Report B21-00658-01, the impact of an increase in EFCV surveillance test intervals to 10 years results in an instrument line release frequency considered by the staff to be sufficiently low, especially since the consequence of an EFCV failure are bounded by previous licensee analysis and therefore are highly unlikely to lead to core damage. Additionally, the licensee's evaluation results including the plant specific EFCV failure data and release frequency is consistent with the Topical Report composite results. The staff concludes that the release frequency associated with the Peach Bottom station request for relaxation of EFCV surveillance testing is sufficiently low and therefore acceptable.

The consequences of steam release from the failure of the EFCVs is not significant, as shown by the Topical Report and previous licensee analysis. Based on the acceptability of the methods applied to estimate the release frequency, the licensee's relatively low release frequency estimate, the negligible consequence of a release in the reactor building, in conjunction with a highly unlikely impact on core damage, the staff concludes that the impact on risk associated with the licensee's request for relaxation of EFCV surveillance testing is also sufficiently low and is acceptable.

## 5.0 STATE CONSULTATION

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

## 6.0 ENVIRONMENTAL CONSIDERATION

The amendments change a surveillance requirement. The NRC 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 (65 FR 48756). 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 or environmental assessment need be prepared in connection with the issuance of the amendments.

## 7.0 CONCLUSION

The Commission 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, (2) such activities will be conducted in compliance with the Commission's regulations, and (3) the issuance of the amendments will not be inimical to the common defense and security or to the health and safety of the public.

## 8.0 REFERENCES

1. BWR Owners Group Report B21-00658-01, dated November 1998, "Excess Flow Check Valve Testing Relaxation," Prepared by GE Nuclear Energy
2. Letter from NRC to Glenn Warren (BWR Owners Group Chairman) dated March 14, 2000, "Safety Evaluation of General Electric Nuclear Energy Topical Report B21-00658-01, 'Excess Flow Check Valve Testing Relaxation'," (TAC Nos. MA7884 and M84809)

3. Letter from NRC to Eliot Protsch (IES Utilities) dated December 29, 1999, "Duane Arnold Energy Center - Issuance of Amendment Re: Revised Excess Flow Check Valve Surveillance Requirements," (TAC No. MA5421)

Principal Contributors: J. Boska, C. Doutt

Date: September 08, 2000