

July 14, 2000

Mr. James A. Hutton
Director - Licensing, MC 62A-1
PECO Energy Company
Nuclear Group Headquarters
Correspondence Control Desk
P.O. Box 195
Wayne, PA 19087-0195

SUBJECT: REQUEST BY PECO ENERGY COMPANY TO MODIFY THE PEACH BOTTOM
ATOMIC POWER STATION, UNITS 2 AND 3, REACTOR VESSEL
SURVEILLANCE CAPSULE WITHDRAWAL SCHEDULES (TAC NOS. MA8901
AND MA8902)

Dear Mr. Hutton:

By letter dated April 26, 2000, PECO Energy Company (PECO) submitted a request for NRC review and approval of a proposed revision of the Peach Bottom Atomic Power Station (PBAPS) Units 2 and 3 reactor pressure vessel surveillance capsule withdrawal schedules. The proposed changes would change the date of withdrawal of the next (second) surveillance capsule for each unit as stated in the PBAPS Updated Final Safety Analysis Report (UFSAR) from 15 to 18 effective full-power years (EFPY) of operation to 20 EFPY.

The staff has completed its evaluation of the PECO submittal. The information provided by PECO is sufficient for the staff to determine that the proposed changes to the surveillance capsule withdrawal schedules are acceptable and that PECO should proceed to make the proposed changes to the PBAPS Units 2 and 3 surveillance programs as documented in the PBAPS UFSAR. The safety evaluation which addresses the technical basis for the staff's finding is enclosed. This completes our efforts for TAC Nos. MA8901 and MA8902.

Sincerely,

/RA by J. Zimmerman for/

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

Docket Nos. 50-277 and 50-278

Enclosure: Safety Evaluation

cc w/encl: See next page

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SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

REQUEST TO AMEND FACILITY'S REACTOR PRESSURE VESSEL

SURVEILLANCE CAPSULE WITHDRAWAL SCHEDULE

PEACH BOTTOM ATOMIC POWER STATION, UNITS 2 AND 3

PECO ENERGY COMPANY

DOCKET NOS. 50-277 and 50-278

1.0 INTRODUCTION

By letter dated April 26, 2000, PECO Energy Company (PECO) submitted a request for Nuclear Regulatory Commission (NRC) review and approval of a proposed revision of the Peach Bottom Atomic Power Station (PBAPS), Units 2 and 3, reactor pressure vessel surveillance capsule withdrawal schedules (Reference 1). The proposed changes would modify the date of withdrawal of the next (second) surveillance capsule for each unit as stated in the PBAPS Updated Final Safety Analysis Report (UFSAR) from 15 to 18 effective full-power years (EFPY) of operation to 20 EFPY. PECO's submittal was made in accordance with the provision of Title 10 of the Code of Federal Regulations (CFR), Part 50, Appendix H, which specifies that withdrawal schedules must be submitted with a technical justification, as specified in 10 CFR 50.4, and must be approved prior to implementation.

2.0 REGULATORY REQUIREMENTS AND STAFF POSITIONS

Nuclear power plant licensees are required by Title 10 of the Code of Federal Regulations, Part 50, Appendix H (10 CFR Part 50, Appendix H), to implement reactor pressure vessel (RPV) surveillance programs to "monitor changes in the fracture toughness properties of ferritic materials in the reactor vessel beltline region...which result from exposure of these materials to neutron irradiation and the thermal environment." Regarding RPV surveillance program design and specimen testing, 10 CFR Part 50, Appendix H, incorporates by reference the editions of the American Society for Testing and Materials (ASTM) Standard Practice E 185, "Conducting Surveillance Tests for Light-Water Cooled Nuclear Power Reactor Vessels," through the 1982 edition. Under 10 CFR Part 50, Appendix H, the licensee's RPV surveillance program design and withdrawal schedule is required to meet the requirements of the edition of ASTM E 185 that is current on the issue date of the American Society of Mechanical Engineers (ASME) Code to which the RPV was purchased, although later editions may be used, up to and including the 1982 edition. The test procedures and reporting requirements must, however, meet the requirements of the 1982 edition of ASTM E185 to the extent practical for the configuration of the specimens in the capsules.

Enclosure

As referenced in Appendix K, Exhibit VII of the PBAPS UFSAR, the edition of ASTM E 185 to which the PBAPS Units 2 and 3 RPV surveillance programs are reconciled is the 1970 edition (ASTM E 185-70). Paragraph 4.6 of the ASTM E 185-70 addresses the withdrawal schedule as follows, “[i]t is recommended that sets of specimens be withdrawn at three or more separate times. One of the data points obtained shall correspond to the neutron exposure of the reactor vessel at no greater than 30 percent of its design life. One other data point obtained shall correspond to the neutron exposure of the reactor vessel near the end of its design life.”

3.0 LICENSEE'S DETERMINATION

In its April 26, 2000, submittal, PECO stated that the reason for requesting this surveillance capsule withdrawal schedule change was to support the Boiling Water Reactor Vessel and Internals Project (BWRVIP) initiative to develop an integrated surveillance program (ISP) for BWRs, which the BWRVIP submitted for NRC staff review and approval in December 1999 (Reference 2). PECO noted that to take full advantage of this program, a deferral of the withdrawal of the next PBAPS Units 2 and 3 surveillance capsules was needed. This deferral would allow the withdrawal dates for the PBAPS capsules, if eventually used in the ISP, to be established so that they provided the most meaningful data for the ISP. Alternatively, if it is determined that PBAPS capsules will not be used in the ISP, then deferral of the withdrawal of the next PBAPS capsules would avoid unnecessary expenditure of licensee resources.

With regard to the impact of the surveillance capsule deferral on RPV integrity, PECO found that the capsule deferral would not challenge their ability to operate the RPV safely. PECO noted that the results from the first surveillance capsules for each unit were consistent with the predictions from the methodology in Regulatory Guide 1.99, Revision 2 (RG 1.99, Rev. 2) and were conservatively bounded when the margin term was included (Reference 3). Hence, the irradiation embrittlement of the RPV, as measured by the observed shift in the Charpy impact testing procedure, was adequately covered by use of the RG 1.99, Revision 2, methodology. In addition, PECO noted that PBAPS Units 2 and 3 operational practices would not be challenged as a result of the deferral since existing technical specifications pressure-temperature (P-T) limit curves were established based on non-beltline material properties and, hence, are effective to 32 EFPY. PECO's submittal also stated that a significant increase in shift would be required to make the beltline materials limiting, even at 32 EFPY.

4.0 STAFF EVALUATION

The NRC staff reviewed the information supplied by the licensee and the regulatory requirements stated in Section 2.0 above. The staff's examination of the licensee's request is based on several factors. These factors included both regulatory and technical concerns. The staff concluded that the licensee's request to defer PBAPS Units 2 and 3 capsule withdrawals from 15 or 18 EFPY to 20 EFPY met all appropriate regulatory requirements. The staff reached this conclusion because compliance with the ASTM E 185-70, as required for PBAPS Units 2 and 3 by 10 CFR Part 50, Appendix H, is non-prescriptive with regard to withdrawal of the second surveillance capsule. As noted in Section 2.0, the only specific withdrawal requirements in E 185-70 are that one capsule (data point) be obtained at no more than 30 percent of the vessel design life and another at near end of design life exposure levels. Therefore, the staff concludes that withdrawal of the second capsule for each unit at 20 EFPY, as proposed by the licensee, satisfies the requirements of 10 CFR Part 50, Appendix H, because these regulations are non-prescriptive with regard to withdrawal of the second surveillance capsule and additional

capsules will remain after the withdrawal of the second surveillance capsules to allow for subsequent withdrawal and testing.

Regarding the licensee's technical justification for the deferral request, the staff's review focused on two points. The first was confirming that the deferral of these capsules would not adversely effect the licensee's ability to ensure that the PBAPS units could continue to be operated in a safe manner through the period of the deferral. The second was confirming that, since this request was nominally in support of the ISP submitted by the BWRVIP, the deferrals were consistent with, or not detrimental to, the objectives of the proposed ISP.

For the first point, the staff confirmed that since the licensee had already pulled and tested one surveillance capsule from each unit, information has been obtained to support the licensee's fluence analysis and RPV P-T limit curve determination. The results of the Charpy testing of each unit's first capsule showed that the plate and weld materials were behaving consistent with the predictions from the methodology in RG 1.99, Rev. 2, embrittlement models. The results of the testing of each unit's second capsule would have to demonstrate very large, atypical shifts to cause the plant-specific surveillance data (per Position 1.1 of RG 1.99, Rev. 2) to be conservatively used in lieu of the embrittlement models. Furthermore, each unit's current P-T limit curves are based on non-beltline materials (the material properties of which are not projected to change with time) and these materials bound the P-T limit curves based on beltline materials (which accumulate irradiation damage and degrade with time) out to 32 EFPY. In addition, the P-T limits based on the non-beltline materials are even more bounding when compared to the P-T limits based on the limiting beltline material over the period of the deferral from approximately 18 to 20 EFPY. For all of these reasons, the staff concludes that the licensee can continue to safely operate PBAPS Units 2 and 3 to 20 EFPY with the current P-T limit curves and without testing the second surveillance capsule from each unit before that time.

Finally, the staff confirmed that the licensee's deferral request was consistent with, and not detrimental to, the objectives of the proposed BWRVIP ISP. The BWRVIP submitted their proposed ISP in December 1999, and included a preliminary compilation of surveillance capsule withdrawal dates based upon the dates currently in plant-specific surveillance programs. The staff noted that the proposed BWRVIP ISP would defer withdrawal of the PBAPS Unit 3 capsules indefinitely and that deferral of the second PBAPS Unit 2 capsule from 18 to 20 EFPY was consistent with the objectives of the ISP. Therefore, the staff concluded that, regarding this point, the licensee's deferral request was acceptable because the licensee's proposal would not detrimentally effect the BWRVIP ISP.

5.0 CONCLUSION

The NRC staff has concluded that deferral of the withdrawal of the second PBAPS Unit 2 and Unit 3 surveillance capsules from approximately 18 EFPY to 20 EFPY is acceptable because, (1) the change meets all appropriate regulatory requirements, (2) the plant-specific data from the second surveillance capsule is not needed to derive the appropriate P-T limits for the period of deferral (non-beltline material is limiting) and (3) the BWRVIP ISP is not adversely affected. The licensee should proceed to modify PBAPS surveillance program, as documented in the PBAPS UFSAR, to reflect this change.

6.0 REFERENCES

- [1] J. A. Hutton [PECO] to U.S. Nuclear Regulatory Commission, Document Control Desk, "Peach Bottom Atomic Power Station, Units 2 and 3, Revision to the Specimen Capsule Withdrawal Schedule," April 26, 2000.
- [2] C. Terry [BWRVIP] to U.S. Nuclear Regulatory Commission, Document Control Desk, "Project No. 704 - BWR Vessel and Internals Project, BWR Integrated Surveillance Program Plan (BWRVIP-78)," December 22, 1999.
- [3] U.S. Nuclear Regulatory Commission Regulatory Guide 1.99, Revision 2, "Radiation Embrittlement of Reactor Vessel Materials," May 1988.

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Date: July 14, 2000

Peach Bottom Atomic Power Station,
Units 2 and 3

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