

March 19, 2002

Mr. L. W. Myers  
Senior Vice President  
FirstEnergy Nuclear Operating Company  
Beaver Valley Power Station  
Post Office Box 4  
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SUBJECT: BEAVER VALLEY POWER STATION, UNIT 2 - CHANGES TO THE REACTOR  
PRESSURE VESSEL SURVEILLANCE CAPSULE WITHDRAWAL SCHEDULE  
(TAC NO. MB2974)

Dear Mr. Myers:

By letter dated September 13, 2001, FirstEnergy Nuclear Operating Company submitted the test report from the analysis of the third reactor pressure vessel surveillance capsule, capsule W, for Beaver Valley Power Station, Unit 2 (BVPS-2). Included in this submittal, was a request for Nuclear Regulatory Commission (NRC) approval of a revision to the capsule withdrawal schedule for BVPS-2. Your request was made in accordance with the provision of Title 10 of the *Code of Federal Regulations* (10 CFR), Part 50, Appendix H, paragraph III.B.3, which specifies that "[a] proposed withdrawal schedule must be submitted with a technical justification as specified in [10 CFR 50.4]. The proposed schedule must be approved prior to implementation."

The NRC staff has evaluated your request and concluded that the proposed revision to the BVPS-2 reactor pressure vessel surveillance capsule withdrawal schedule conforms to the requirements of the 1982 Edition of the American Society for Testing and Materials Standard E 185, and 10 CFR Part 50, Appendix H. Thus, the proposed revision is acceptable for BVPS-2. Our safety evaluation is enclosed.

Sincerely,

/RA/

Daniel S. Collins, Project Manager, Section 1  
Project Directorate I  
Division of Licensing Project Management  
Office of Nuclear Reactor Regulation

Docket No. 50-412

Enclosure: Safety Evaluation

cc w/encl: See next page

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SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION  
REQUEST TO REVISE REACTOR PRESSURE VESSEL SURVEILLANCE CAPSULE  
WITHDRAWAL SCHEDULE  
PENNSYLVANIA POWER COMPANY  
OHIO EDISON COMPANY  
THE CLEVELAND ELECTRIC ILLUMINATING COMPANY  
THE TOLEDO EDISON COMPANY  
FIRSTENERGY NUCLEAR OPERATING COMPANY  
BEAVER VALLEY POWER STATION, UNIT 2  
DOCKET NO. 50-412

## 1.0 INTRODUCTION

By letter dated September 13, 2001, FirstEnergy Nuclear Operating Company (FENOC), the licensee for Beaver Valley Power Station, Unit No 2 (BVPS-2), submitted the test report from the analysis of the third reactor pressure vessel surveillance capsule, capsule W, for BVPS-2. Included in this submittal, was a request for Nuclear Regulatory Commission (NRC) approval of a revision to the capsule withdrawal schedule for BVPS-2. The request was made pursuant to Title 10 of the *Code of Federal Regulations* (10 CFR), Part 50, Appendix H, "Reactor Vessel Material Surveillance Program Requirements," paragraph III.B.3, which specifies that "[a] proposed withdrawal schedule must be submitted with a technical justification as specified in [10 CFR 50.4]. The proposed schedule must be approved prior to implementation."

## 2.0 BACKGROUND

Appendix H to 10 CFR Part 50 requires that licensees 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." Section III of Appendix H states that the design of the surveillance program and the withdrawal schedule must meet the requirements of the edition of American Society for Testing and Materials (ASTM) E 185 that is current on the issue date of the American Society of Mechanical Engineers (ASME) Code to which the reactor vessel was purchased. Later editions of ASTM E 185 may be used in establishing a facility's withdrawal schedule, but are limited to only those editions through 1982. As required by 10 CFR Part 50, Appendix H, Section III, any changes to the withdrawal schedule must first be approved by the NRC. Section IV of Appendix H requires that each capsule withdrawal and the test results must be the subject of a summary technical report to be submitted to the NRC. Additionally, as discussed in NRC Administrative Letter 97-04, "NRC Staff Approval for

Changes to 10 CFR Part 50, Appendix H, Reactor Vessel Surveillance Specimen Withdrawal Schedules,” dated September 30, 1997, changes to RPV surveillance capsule withdrawal schedules that do not conform to ASTM E 185 require approval by the license amendment process, whereas changes that do conform to the ASTM standard require only staff verification of such conformance.<sup>1</sup>

For RPVs predicted to exhibit between 100 °F and 200 °F of Charpy 30-ft-lb transition temperature shift at the RPV inside surface, the surveillance capsule withdrawal schedule criteria from ASTM E 185-82 recommends that sets of specimens be withdrawn at four or more separate times during plant life. It specifically recommends that the last withdrawal capsule should be withdrawn at a fluence consistent with the end-of-lifetime (EOL) fluence, or not less than once or more than twice the peak EOL vessel fluence. Additionally, ASTM E 185-82 recommends that the second to the last withdrawal capsule should be at 15 effective full-power years (EFPY) of RPV operation or at the time when the accumulated neutron fluence of the capsule corresponds to the approximate EOL fluence at the reactor vessel inner wall location, whichever comes first.

The RPV surveillance program for BVPS-2 was established in accordance with 10 CFR Part 50, Appendix H, and was designed to meet the requirements of ASTM E 185-73. As part of BVPS-2’s current reactor vessel radiation surveillance program, capsule W, the third capsule removed, was withdrawn during the eighth refueling outage at 9.77 EFPY of exposure. Pursuant to 10 CFR Part 50, Appendix H, Section IV, FENOC’s September 13, 2001, submittal includes the report, “Analysis of Capsule W from FirstEnergy Nuclear Operating Company Beaver Valley Unit 2 Reactor Vessel Radiation Surveillance Program,” WCAP-15675, Revision 0, dated August 2001, which provides a technical summary of the results of mechanical property tests for capsule W and includes the data required by ASTM E185-82. Table 7-1 of WCAP-15675 provides updates to the capsule lead factors and fluence information contained in Table 5.3-6 of the BVPS-2 Updated Final Safety Analysis Report (UFSAR), as well as a proposed revision to the capsule removal schedule. Specifically, FENOC proposes to change the withdrawal date for the fourth BVPS-2 surveillance capsule from 13 EFPY to 14 EFPY.

The proposed schedule in Table 7-1 of WCAP-15675 differs from the licensee’s current commitment in the BVPS-2 UFSAR, Table 5.3-6. Accordingly, the licensee requested NRC approval of the proposed change. The licensee stated in the submittal that the proposed revision to the surveillance capsule removal schedule conforms to the requirements of ASTM E 185-82.

### 3.0 EVALUATION

The estimated peak EOL fluence for the BVPS-2 RPV is  $3.625 \times 10^{19}$  n/cm<sup>2</sup>. Currently, the licensee for BVPS-2 has withdrawn three capsules. The first capsule was removed from the vessel at 1.24 EFPY with an accumulated neutron fluence of  $6.08 \times 10^{18}$  n/cm<sup>2</sup>. The second capsule was removed from the vessel at 5.98 EFPY with an accumulated neutron fluence of  $2.63 \times 10^{19}$  n/cm<sup>2</sup>. The third capsule was removed from the vessel at 9.77 EFPY at a fluence of  $3.625 \times 10^{19}$  n/cm<sup>2</sup>. All capsules were subsequently tested. Each of these capsule withdrawals

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<sup>1</sup>see also Cleveland Electric Illuminating Company, et al. (Perry Nuclear Power Plant, Unit 1), CLI-96-13, 44 NRC 315, 328 (1996).

met the withdrawal schedule requirements of ASTM E 185-82. The recommendation of ASTM E 185-82, as stated above, for the fourth capsule (BVPS-2 capsule X) is that the last withdrawal capsule should be at EOL or not less than once or more than twice the peak EOL vessel fluence.

The NRC staff has evaluated the requested revision to the licensee's capsule withdrawal schedule for BVPS-2 as provided in Table 7-1 of WCAP-15675. The new calculated fluences, reported in WCAP-15675 Table 7-1, provide the basis for the change in removal time from 13 to 14 EFPY for capsule X.

The NRC staff independently verified that the proposed revision to the capsule withdrawal schedule for the BVPS-2 RPV surveillance program, as specified in WCAP-15675, Table 7-1, is in accordance with the recommendations of ASTM E 185-82. The NRC staff has independently verified that the proposed withdrawal schedule for the surveillance program complies with the requirements of 10 CFR Part 50, Appendix H.

Because the proposed change to the RPV capsule removal schedule for BVPS-2 conforms to the requirements of ASTM E 185-82, and 10 CFR Part 50, Appendix H, the NRC staff finds the proposed change acceptable. Consistent with the guidance contained in NRC Administrative Letter 97-04, a license amendment is not required in order for the NRC staff to approve this change.

#### 4.0 CONCLUSION

Based on the NRC staff's review of WCAP-15675 and Table 7-1, the NRC staff has found that the requested revision to the licensee's capsule withdrawal schedule satisfies the requirements of ASTM E 185-82. Therefore, the NRC staff approves the revision to the capsule withdrawal schedule and its incorporation into Table 5.3-6 of the BVPS-2 UFSAR.

Principal Contributors: T. Bloomer  
D. Collins

Date: March 19, 2002