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October 27, 1995

U. S. Nuclear Regulatory Commission
Washington, DC 20555

ATTENTION: Document Control Desk

SUBJECT: Calvert Cliffs Nuclear Power Plant
Unit Nos. 1 & 2; Docket Nos. 50-317 & 50-318
Revision to Reactor Vessel Surveillance Capsule Withdrawal Schedule

- REFERENCE:
- (a) ASTM E185-82, "Conducting Surveillance Tests for Light-Water Cooled Nuclear Power Reactor Vessels"
 - (b) Letter from R. E. Denton (BGE) to Document Control Desk (NRC), dated November 29, 1993, "Request for Approval to Use Plant-Specific Data for Reactor Vessel Fracture Toughness Analysis"
 - (c) Letter from M. L. Boyle (NRC) to R E Denton (BGE), dated July 29, 1994, "Request for Approval to Use Plant-Specific Data for Reactor Vessel Fracture Toughness Analysis, Calvert Cliffs Nuclear Power Plant, Unit No. 1"

Pursuant to Appendix H of 10 CFR Part 50, Baltimore Gas and Electric Company hereby submits for approval a revision to its schedule for withdrawal of reactor vessel material surveillance capsules for Calvert Cliffs Units 1 and 2. The proposed withdrawal schedule is based on ASTM [American Society for Testing and Materials] E185-82 recommendations (Reference a), and reflects updated fluence information from the surveillance capsules removed in 1992 and 1993 from Unit 1 and Unit 2, respectively. The details of the proposed revision are contained in the attachment to this letter. The attachment also includes a withdrawal schedule for the Calvert Cliffs Unit 1 supplemental surveillance program described in References (b) and (c).

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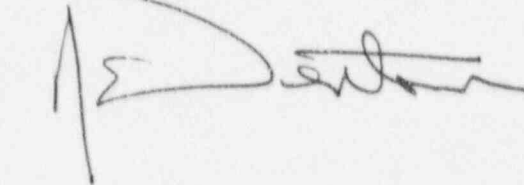
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Should you have questions regarding this matter, we will be pleased to discuss them with you.

Very truly yours,

A handwritten signature in black ink, appearing to be "D. A. Brune", written over a horizontal line.

RED/GT/dlm

Attachment: Proposed Revision to the Schedule for Withdrawal of Reactor Vessel Material
Surveillance Capsule for Calvert Cliffs Units 1 & 2

cc: D. A. Brune, Esquire
J. E. Silberg, Esquire
L. B. Marsh, NRC
D. G. McDonald, Jr., NRC
T. T. Martin, NRC
Resident Inspector, NRC
R. I. McLean, DNR
J. H. Walter, PSC

ATTACHMENT

PROPOSED REVISION TO THE SCHEDULE FOR WITHDRAWAL OF
REACTOR VESSEL MATERIAL SURVEILLANCE CAPSULE FOR
CALVERT CLIFFS UNITS 1 & 2

Baltimore Gas and Electric Company
Docket Nos. 50-317 and 50-318
October 27, 1995

**PROPOSED REVISION TO THE SCHEDULE FOR WITHDRAWAL OF
REACTOR VESSEL MATERIAL SURVEILLANCE CAPSULE FOR
CALVERT CLIFFS UNITS 1 & 2**

I. BACKGROUND

Appendix H of 10 CFR Part 50 describes reactor vessel material surveillance program requirements. Paragraph (II)(B)(3) of this Appendix states that a proposed material withdrawal schedule must be submitted with a technical justification and approved prior to implementation.

Table (1) shows the currently approved withdrawal schedule for Calvert Cliffs Units 1 and 2 reactor vessel surveillance capsules (References 1 and 2). The capsules located at the 263° and 97° locations have already been withdrawn from both units, and the capsule analysis results were submitted to the NRC in References (3) through (6).

II. PROPOSED WITHDRAWAL SCHEDULE

Tables (2) and (3) provide the proposed revisions to the reactor vessel surveillance capsule withdrawal schedules for Units 1 and 2, respectively. The revised schedules are based on American Society for Testing and Materials (ASTM) E185-82 recommendations (Reference 7), and reflect updated fluence information from the surveillance capsules removed in 1992 and 1993 from Unit 1 and Unit 2, respectively. The proposed schedules are slightly modified versions of the withdrawal schedule suggested in the latest surveillance capsule reports (References 5 and 6).

III. JUSTIFICATION

A. Change in the Capsule Withdrawal Interval

The current surveillance capsule withdrawal schedule is based on years of operation. The proposed surveillance capsule withdrawal schedule is based on target fluence values rather than years of operation. These target fluence values are projections based on the most recent fluence analyses and are tied to meaningful fluence values (e.g., 1/4T end of license fluence, vessel wall end of license fluence). Removing surveillance capsules based on target fluence values is useful in that it provides material property information and dosimetry results at meaningful fluence values as suggested in ASTM E185-82, "Conducting Surveillance Tests for Light-Water Cooled Nuclear Power Reactor Vessels" (Reference 7). In addition to target fluence values, the proposed withdrawal schedules include the outage cycle and the calendar year in which the capsule target fluence is most closely attained. This assists Baltimore Gas and Electric Company (BGE) engineers and planners in the execution of surveillance capsule withdrawal and analysis.

B. Change in the Order of Capsule Removal for Unit 1

In accordance with the current Unit 1 capsule withdrawal schedule, the 284° capsule is scheduled to be removed next. However, the most recent fluence analyses show that the lead factor for this capsule is low, and it will not be able to attain enough fluence by the end of the current license to meet any of the pertinent target fluences. Therefore, in the

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revised withdrawal schedule for Unit 1, it is proposed that the 83° capsule be withdrawn instead. The 83° capsule has a higher lead factor than the 284° capsule and can reach a pertinent target fluence by the year 2004. The two capsules contain identical dosimetry, temperature monitors, and surveillance materials.

C. Standby Surveillance Capsules

Removal and testing of five surveillance capsules from each unit provides sufficient material property changes and fluence information as suggested in ASTM E185-82 (Reference 7). It is prudent to include standby capsules to meet future needs (e.g., life extension, radical fuel management changes). The proposed surveillance capsule withdrawal schedules include a standby capsule for each unit.

D. Unit 1 Supplemental Surveillance Capsule Withdrawal

Table 4 provides BGE's proposed withdrawal schedule for the supplemental surveillance capsule placed in the Unit 1 reactor vessel at the 263° location, following the withdrawal of the original capsule. The supplemental surveillance program provides additional surveillance data for Unit 1 axial weld seams 2-203-A, B, C. When removed in the year 2000, the capsule will be sectioned into two, with one-half removed for testing. The second half will be reconstituted for reinstallation in the 263° location and will be removed for final analysis in 2012. Data from this program will be used to verify the embrittlement observed at low to intermediate fluence levels from the McGuire Unit 1 surveillance program. This will support the application of the McGuire Unit 1 surveillance data to predict the embrittlement of Unit 1 weld seams 2-203-A, B, C as discussed in (References 8 and 9).

IV. REFERENCES

- (1) Letter from D. G. McDonald, Jr. (NRC) to G. C. Creel (BGE), dated December 23, 1992, "Clarification of Previous Reactor Vessel Surveillance Program Actions and Withdrawal Schedule Change for Unit 2 Reactor Vessel Material Specimens, Calvert Cliffs Nuclear Power Plant Unit No. 1 (TAC No. M85113) and Unit No. 2 (TAC No. M84440)"
- (2) Letter from D. G. McDonald, Jr. (NRC) to G. C. Creel (BGE), dated March 11, 1992, "Withdrawal Schedule Change for Reactor Vessel Material Specimens, Calvert Cliffs Nuclear Power Plant, Unit No. 1 (TAC No. M82686)"
- (3) Letter from R. F. Ash (BGE) to R. A. Clark (NRC), dated February 4, 1981, transmitting "Perrin, J. S., et al., Calvert Cliffs Unit No. 1 Nuclear Plant Reactor Pressure Vessel Surveillance Program: Capsule 263, Battelle Report, December 1980"

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CALVERT CLIFFS UNITS 1 & 2

- (4) Letter from J. A. Tiernan (BGE) to A. C. Thadani (NRC), dated April 28, 1986, transmitting "Surveillance Capsule Report No. SwRI-7524, Reactor Vessel Material Surveillance Program for Calvert Cliffs Unit 2 Analysis of 263° Capsule, September 1985"
- (5) Letter from R. E. Denton (BGE) to NRC Document Control Desk, dated, June 22, 1993, transmitting "Lowe, A L, Jr., et al., Analysis of Capsule 97° Baltimore Gas and Electric Company Calvert Cliffs Nuclear Power Plant Unit No. 1, B&W Nuclear Service Company, BAW-2160, June 1993"
- (6) Letter from R. E. Denton (BGE) to NRC Document Control Desk, dated March 18, 1994, transmitting "Lowe, A L, Jr., et al., Analysis of Capsule 97° Baltimore Gas and Electric Company Calvert Cliffs Nuclear Power Plant Unit No. 2, B&W Nuclear Service Company, BAW-2199, February 1994"
- (7) ASTM E185-82, "Standard Practice for Conducting Surveillance Tests for Light-Water Cooled Nuclear Power Reactor Vessels," American Society for Testing and Materials, Philadelphia, PA
- (8) Letter from R. E. Denton (BGE) to Document Control Desk (NRC), dated November 29, 1993, "Request for Approval to Use Plant-Specific Data for Reactor Vessel Fracture Toughness Analysis"
- (9) Letter from M. L. Boyle (NRC) to R E Denton (BGE), dated July 29, 1994, "Request for Approval to Use Plant-Specific Data for Reactor Vessel Fracture Toughness Analysis, Calvert Cliffs Nuclear Power Plant, Unit No. 1"

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REACTOR VESSEL MATERIAL SURVEILLANCE CAPSULE FOR
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Table (1)

**Current
Capsule Withdrawal Schedule**

<u>YEARS</u>	<u>Capsule Azimuthal Position</u>	
	<u>UNIT 1</u>	<u>UNIT 2</u>
5	263°	263°
14	97°	97°
23	284°	284°
30	104°	104°
35	277°	277°
40	83°	83°

Table (2)

**Proposed Unit 1 Reactor Vessel Surveillance Program
Capsule Removal Schedule**

Capsule Azimuthal Position	Target Fast Neutron Fluence (x 10 ¹⁹ n/cm ²)	Target Fluence Expected at End of Cycle	Projected End of Cycle Date
263°	0.62 ^a	3	1979
97°	2.64 ^b	10	1992
83°	3.47 ^c	16	2004
104°	3.14 ^d	21	2014
277°	4.31 ^d	21	2014
284°	STANDBY		

Notes:

- (a) Actual capsule fluence [Perrin, J S, et al., "Calvert Cliffs Unit No. 1 Nuclear Plant Reactor Pressure Vessel Surveillance Program: Capsule 263," Battelle Columbus Laboratories, December 1980]
- (b) Actual capsule fluence; corresponds to the projected fluence at the vessel 1/4 thickness location for plant life extension (48 EFPY) [Lowe, A L, J., et al., "Analysis of Capsule 97° Baltimore Gas and Electric Company Calvert Cliffs Nuclear Power Plant Unit No. 1," B&W Nuclear Service Company, BAW-2160, June 1993]
- (c) Capsule fluence that corresponds to the projected fluence at the vessel inner wall location at end of license (32 EFPY)
- (d) Capsule fluence at end of license

**PROPOSED REVISION TO THE SCHEDULE FOR WITHDRAWAL OF
REACTOR VESSEL MATERIAL SURVEILLANCE CAPSULE FOR
CALVERT CLIFFS UNITS 1 & 2**

Table (3)

**Proposed Unit 2 Reactor Vessel Surveillance Program
Capsule Removal Schedule**

<u>Capsule Azimuthal Position</u>	<u>Target Fast Neutron Fluence (x 10¹⁹ n/cm²)</u>	<u>Target Fluence Expected at End of Cycle</u>	<u>Projected End of Cycle Date</u>
263°	0.806 ^a	4	1982
97°	1.85 ^b	9	1985
284°	2.04 ^c	13	2001
104°	3.02 ^d	17	2009
277°	3.88 ^e	17	2009
83°	STANDBY		

Notes:

- (a) Actual capsule fluence [Norris, E. B., "Reactor Vessel Material Surveillance Program for Calvert Cliffs Unit 2 Analysis of 263° Capsule," Southwest Research Institute, SwRI-7524, September 1985]
- (b) Actual capsule fluence [Lowe, A L, Jr., et al., "Analysis of Capsule 97° Baltimore Gas and Electric Company Calvert Cliffs Nuclear Power Plant Unit No. 2," B&W Nuclear Service Company, BAW-2199, February 1994]
- (c) Capsule fluence that corresponds to the projected fluence at the vessel 1/4 thickness location at end of license (32 EFPY)
- (d) Capsule fluence that corresponds to the projected fluence at the vessel 1/4 thickness location for plant life extension (48 EFPY)
- (e) Capsule fluence that corresponds to the projected fluence at the vessel inner wall location at end of license (32 EFPY)

Table (4)

**Unit 1 Supplemental Reactor Vessel Surveillance Program
Capsule Removal Schedule**

<u>Capsule Identification</u>	<u>Target Fast Neutron Fluence (x 10¹⁹ n/cm²)</u>	<u>Target Fluence Expected at End of Cycle</u>	<u>Projected End of Cycle Date</u>
S1	1.00	14	2000
S2	1.93	20	2012