Calvert Cliffs Nuclear Power Plant

1650 Calvert Cliffs Parkway
Lusby, Maryland 20657

March 5, 2008

U. S. Nuclear Regulatory Commission
Washington, DC 20555

ATTENTION: Document Control Desk

SUBJECT: Calvert Cliffs Nuclear Power Plant
Unit No. 1; Docket No. 50-317
Revision to Reactor Vessel Surveillance Capsule Withdrawal Schedule

REFERENCE: (a) Letter from Mr. A. W. Dromerick (NRC) to Mr. C. H. Cruse (CCNPP), dated November 8, 2000, "Safety Evaluation of Request to Revise Reactor Pressure Vessel Surveillance Program Schedule for Calvert Cliffs Nuclear Power Plant, Unit Nos. 1 and 2 (TAC Nos. MA9370 and MA9371)"

Pursuant to Appendix H of 10 CFR Part 50, Calvert Cliffs Nuclear Power Plant, Inc. hereby submits for approval a revision to its schedule for withdrawal of reactor vessel material surveillance capsule at the 104° location for Calvert Cliffs Unit 1.

As is the case with the currently approved withdrawal schedule (Reference a), the proposed withdrawal schedule satisfies the requirements of ASTM [American Society for Testing and Materials] E185-70, the version that was current at the time the reactor vessels were designed. In addition, to the extent practicable, both the proposed and the currently approved withdrawal schedules comply with ASTM E185-82. The details of the proposed revision are contained in Attachment (1) to this letter.

SCHEDULE

Based on the current reactor vessel surveillance capsule withdrawal schedule, the Calvert Cliffs Unit 1 capsule located at the 104° location is required to be withdrawn during the 2008 refueling outage (March 2008). Therefore, we request that you complete the review of our application as expeditiously as possible.

Should you have questions regarding this matter, please contact Mr. Jay S. Gaines at (410) 495-5219.

Very truly yours,

Mark D. Flaherty
Manager -- Engineering Services

MDF/PSF/bjd

Attachment: (1) Proposed Revision to the Schedule for Withdrawal of Reactor Vessel Material Surveillance Capsule for Calvert Cliffs Unit 1

cc: D. V. Pickett, NRC
S. J. Collins, NRC
Resident Inspector, NRC
R. I. McLean, DNR

ATTACHMENT (1)

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

Calvert Cliffs Nuclear Power Plant, Inc.
March 5, 2008

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

I. BACKGROUND

Appendix H of 10 CFR Part 50 describes reactor vessel material surveillance program requirements. Paragraph (III)(B)(3) of this Appendix states that a proposed material withdrawal schedule must be submitted with a technical justification per 10 CFR 50.4, and approved prior to implementation.

As is the case with the currently approved withdrawal schedule, the proposed withdrawal schedule satisfies the requirements of American Society for Testing and Materials (ASTM) E185-70, the version that was current at the time the reactor vessel surveillance program was designed. In addition, to the extent practicable, both the proposed and the currently approved withdrawal schedules comply with ASTM E185-82.

Table (1) shows the currently approved withdrawal schedule for Calvert Cliffs Unit 1 reactor vessel surveillance capsules (Updated Final Safety Analysis Report Table 4-13A). This withdrawal schedule was approved in 2000 (Reference 1).

II. PROPOSED REVISION TO THE WITHDRAWAL SCHEDULE

Table (2) provides the proposed revision to the reactor vessel surveillance capsule withdrawal schedule for Unit 1. The revised schedule is based on ASTM E185-82 recommendations, and reflects updated fluence information from the surveillance capsule removed in 1992 with appropriate adjustment made for fuels loaded in subsequent cycles. As shown below in Section III, the proposed withdrawal schedule satisfies the requirements of ASTM E185-70, the version that was current at the time the reactor vessels were designed. Therefore, the withdrawal schedule satisfies the requirements of Appendix H to 10 CFR Part 50.

III. JUSTIFICATION

The Calvert Cliffs Unit 1 reactor vessel was designed to the 1965 through winter 1967 Addenda, edition of the American Society of Mechanical Engineers Code. American Society for Testing and Materials E185-70 was the current standard when the surveillance program was designed. As stated in the Calvert Cliffs Updated Final Safety Analysis Report, the reactor vessel surveillance program meets the requirements of ASTM E185-70.

The guidance provided in ASTM E185-82 is consistent with, but more specific than, the guidance provided in earlier editions, including ASTM E185-70 to which the Calvert Cliffs Nuclear Power Plant reactor vessel surveillance program is required to conform. Therefore, compliance with the ASTM E185-82 withdrawal schedule guidance ensures compliance with ASTM E185-70 withdrawal schedule guidance. ASTM E185-82 provides a withdrawal schedule in terms of years of operation but also provides the option to develop a schedule tied to target fluences accumulated in the vessel. As in the case of the currently approved withdrawal schedule, the proposed withdrawal schedule follows the guidance that ties the withdrawal schedule to vessel fluence targets. The target fluence guidance is as follows:

Capsule No.	Fluence Target
1.	When the accumulated neutron fluence of the capsule exceeds $5x10^{18}$ n/cm^2, or when the highest predicted delta RT_{NDT} (nil-ductility reference temperature) of all encapsulated materials is approximately 28°C (50°F), whichever comes first.
2.	At a time when the accumulated neutron fluence of the capsule corresponds to a value midway between the first and the third capsules.
3.	At a time when the accumulated neutron fluence on the capsule corresponds to the approximate end of life (EOL) fluence at the reactor vessel ¼ T location.
4.	At a time when the accumulated neutron fluence on the capsule corresponds to the approximate EOL fluence at the reactor vessel inner wall location.
5.	Not less than once or greater than twice the peak EOL vessel fluence. The capsule may be held without testing following withdrawal.

The proposed change only affects the Capsule 3 (Unit 1 104° capsule) withdrawal schedule. Therefore, the only fluence data presented here is for the vessel ¼ T fluence.

The fluence projection for the extended end-of-life vessel ¼ T fluence was $2.96x10^{19}$ n/cm^2 (2000, Reference 1).

The current fluence projection for the extended end-of-life vessel ¼ T fluence is $3.06x10^{19}$ n/cm^2.

The fluence projection for the 104° capsule in 2008 is $2.96x10^{19}$ n/cm^2.

The fluence projection for the 104° capsule in 2010 is $3.12x10^{19}$ n/cm^2.

Calvert Cliffs Unit 1 first two capsules have been withdrawn and analyzed. The 104° capsule is currently scheduled to be withdrawn during the Spring 2008 refueling outage. However, with the current ¼ T fluence projection, a revised capsule withdrawal schedule is needed to meet the ASTM E185-82 criteria. We propose withdrawing the 104° capsule during the spring 2010 refueling outage. This meets the ASTM E185-82 guidance for choosing the refueling outage nearest to the extended end-of-life for the ¼ T location.

Additional evaluations will be performed to adjust, if necessary, the remaining capsule withdrawal schedules. In accordance with 10 CFR Part 50, Appendix H, approval of any proposed changes will be requested before implementation.

IV. REFERENCE

1. Letter from Mr. A. W. Dromerick (NRC) to Mr. C. H. Cruse (CCNPP), dated November 8, 2000, "Safety Evaluation of Request to Revise Reactor Pressure Vessel Surveillance Program Schedule for Calvert Cliffs Nuclear Power Plant, Unit Nos. 1 and 2 (TAC Nos. MA9370 and MA9371)"

Table (1)

Current Unit 1 Reactor Vessel Surveillance Program
Capsule Removal Schedule (approved 2000)

Capsule Azimuthal Position	Target Fast Neutron Fluence ($\times 10^{19}$ n/cm^2)	Projected End-of-Cycle Date
263°	0.62 [a]	Withdrawn, 1979
97°	2.64 [b]	Withdrawn, 1992
104°	2.96 [c]	2008
83°	5.09 [d]	2018
277°	6.26 [e]	2030
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; [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].

(c) Withdrawal criteria - Capsule fluence that corresponds to the projected fluence at the vessel ¼ T location at end of extended life (2.96×10^{19} n/cm^2).

(d) Withdrawal criteria - Capsule fluence that corresponds to the projected fluence at the vessel inner wall location at end of extended life.

(e) Withdrawal criteria - Not less than once or greater than twice the peak end of extended life vessel fluence at the vessel inner wall (5.09×10^{19}< fluence in n/cm^2 <10.18×10^{19}). Note: This capsule also satisfies the requirement in the Nuclear Regulatory Commission safety evaluation report for Calvert Cliffs license renewal, that one capsule containing dosimetry is to be removed during the final 5 years of the extended license.

Table (2)

Proposed Unit 1 Reactor Vessel Surveillance Program
Capsule Removal Schedule

Capsule Azimuthal Position	Target Fast Neutron Fluence ($\times 10^{19}$ n/cm^2)	Projected End-of-Cycle Date
263°	0.62 [a]	Withdrawn, 1979
97°	2.64 [b]	Withdrawn, 1992
104°	3.06 [c]	2010
83°	5.09 [d]	2018
277°	6.26 [e]	2030
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; [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].

(c) Withdrawal criteria - Capsule fluence that corresponds to the projected fluence at the vessel ¼ T location at end of extended life (3.06×10^{19} n/cm^2).

(d) Withdrawal criteria - Capsule fluence that corresponds to the projected fluence at the vessel inner wall location at end of extended life.

(e) Withdrawal criteria - Not less than once or greater than twice the peak end of extended life vessel fluence at the vessel inner wall (5.09×10^{19}< fluence in n/cm^2 <10.18×10^{19}). Note: This capsule also satisfies the requirement in the Nuclear Regulatory Commission safety evaluation report for Calvert Cliffs license renewal, that one capsule containing dosimetry is to be removed during the final 5 years of the extended license.