

VIRGINIA ELECTRIC AND POWER COMPANY  
RICHMOND, VIRGINIA 23261

January 3, 2011

10 CFR 50 Appendix H

U.S. Nuclear Regulatory Commission  
Attention: Document Control Desk  
Washington, DC 20555

Serial No. 10-721  
NL&OS/GDM R2'  
Docket Nos. 50-280/281  
License Nos. DPR-32/37

**VIRGINIA ELECTRIC AND POWER COMPANY (DOMINION)**  
**SURRY POWER STATION UNITS 1 AND 2**  
**REVISED REACTOR VESSEL MATERIALS SURVEILLANCE CAPSULE**  
**WITHDRAWAL SCHEDULES**  
**RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION**

By letter dated October 26, 2009 (Serial No. 09-507), Dominion requested NRC review and approval of the proposed reactor vessel material surveillance capsule withdrawal schedules for Surry Units 1 and 2 in accordance with 10 CFR 50, Appendix H, Section III.B.3. The proposed schedules were developed to accommodate the 60-year license period for Surry Power Station Units 1 and 2 and to satisfy the requirements and guidance of ASTM E-185-82, "Standard Practice for Conducting Surveillance Tests for Light-Water Cooled Nuclear Power Reactor Vessels," dated July 1, 1982.

Subsequently, the NRC requested additional information in support of their review of Dominion's October 26, 2009 submittal. Dominion's response to the NRC's request is provided in the attachment.

If you have any further questions regarding this submittal, please contact Mr. Gary D. Miller at (804) 273-2771.

Sincerely,

  
J. Alan Price  
Vice President – Nuclear Engineering

Commitments made in this letter: None.

Attachment:

- Response to NRC Request for Additional Information, Revised Reactor Vessel Surveillance Capsule Withdrawal Schedules

cc: U.S. Nuclear Regulatory Commission  
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**Attachment**

**Response to NRC Request for Additional Information**  
**Revised Reactor Vessel Surveillance Capsule Withdrawal Schedules**

**Virginia Electric and Power Company  
(Dominion)  
Surry Power Station Units 1 and 2**

**Response to NRC Request for Additional Information**  
**Surveillance Capsule Withdrawal Schedule**

**Surry Power Station Units 1 and 2**

**NRC Question No. 1**

*After comparing the 10-16-09 submittal to an earlier submittal, ML0223902830, they also show capsule V at Unit 1 withdrawn in 1986 (6.0 EFPY) at fluence of  $1.94 \times 10^{19}$ . The EFPY seems wrong, they only gained 3 EFPY between 1978 and 1986?*

**Dominion Response**

The Effective Full Power Years (EFPY) values in question listed in Table 4.1-12 were historical values from previously submitted reports. As part of performing fluence analyses for license renewal, revised EFPY values were calculated based on the most recent compilation of historical fuel management data. The EFPY value for each removed capsule is presented below. To date, four (4) capsules (T, W, V, and X) have been removed from Surry Unit 1, and four capsules (X, W, V, and Y) have been removed from Surry Unit 2.

| SPS Unit 1             |      |                                 |
|------------------------|------|---------------------------------|
| Capsule Identification | EFPY | Capsule Fluence                 |
| T                      | 1.1  | $2.81\text{E}18 \text{ n/cm}^2$ |
| W                      | 3.5  | $4.31\text{E}18 \text{ n/cm}^2$ |
| V                      | 8.2  | $1.94\text{E}19 \text{ n/cm}^2$ |
| X                      | 16.3 | $1.60\text{E}19 \text{ n/cm}^2$ |

| SPS Unit 2             |      |                                 |
|------------------------|------|---------------------------------|
| Capsule Identification | EFPY | Capsule Fluence                 |
| X                      | 1.2  | $2.97\text{E}18 \text{ n/cm}^2$ |
| W                      | 3.8  | $6.36\text{E}18 \text{ n/cm}^2$ |
| V                      | 8.7  | $1.89\text{E}19 \text{ n/cm}^2$ |
| Y                      | 20.8 | $2.73\text{E}19 \text{ n/cm}^2$ |

The EFPYs noted above and the capsule fluence value for Surry Unit 2 Capsule Y differ from the values in Tables 4.1-12 and 4.1-13 included in Dominion's October 26, 2009 letter (Serial No. 09-507) as these were projected estimated values prior to the removal and analysis of the surveillance capsules. The projected EFPY values have been updated, and the Unit 2 Capsule Y fluence value has been changed to reflect the actual value at the time of removal and analysis. These changes are reflected in the respective tables and are attached.

### **NRC Question No. 2**

*In addition, the earlier submittal shows capsule X at Unit 1 as being withdrawn in 1997, 15.8 EFPY, but with a fluence of  $2.42 \times 10^{19}$  instead of 15.8 EFPY and fluence of  $1.60 \times 10^{19}$  that is shown in Oct. 26, 2009 submittal.*

### **Dominion Response**

Per BAW-2324, "Analysis of Capsule X, Virginia Power Surry Unit No. 1, Reactor Vessel Material Surveillance Program," dated April 1998, the fluence on Capsule X at Unit 1 (when withdrawn and tested) was  $1.599\text{E}19 \text{ n/cm}^2$ , which rounds to  $1.60\text{E}19 \text{ n/cm}^2$ . The UFSAR and earlier correspondence included the projected fluence value of  $2.42\text{E}19 \text{ n/cm}^2$  prior to the withdrawal and testing of Capsule X.

**TABLE 4.1-12**  
**Surveillance Capsule Withdrawal Schedule<sup>a</sup> for Surry Unit 1**

| Capsule Ident. | Capsule Location | Withdrawal EFPY/Year | Insert EFPY/Year | Est. Capsule Fluence ( $\times 10^{19}$ ) <sup>b</sup> |
|----------------|------------------|----------------------|------------------|--|
| T <sup>c</sup> | 285°             | 1.1/1974             | NA               | 0.281  |
| W <sup>c</sup> | 55°              | 3.5/1978             | NA               | 0.431  |
| V <sup>c</sup> | 165°             | 8.2/1986             | NA               | 1.94   |
| X              | 65°              | 13.3/1994            | NA               | 1.28   |
| X              | 165°             | NA                   | 13.3/1994        | NA   |
| X <sup>c</sup> | 165°             | 16.3/1997            | NA               | 1.60   |
| Z              | 245°             | 13.3/1994            | NA               | 2.11   |
| Z              | 285°             | NA                   | 13.3/1994        | NA   |
| Z <sup>c</sup> | 285°             | 43.2/2025            | NA               | 6.31   |
| U              | 45°              | 13.3/1994            | NA               | 0.95   |
| U              | 65°              | NA                   | 13.3/1994        | NA   |
| U <sup>d</sup> | 65°              | NA                   | NA               | 4.58 (48.0 EFPY)                                       |
| S              | 295°             | 43.2/2025            | NA               | 5.02   |
| S              | 285°             | NA                   | 43.2/2025        | NA   |
| S <sup>d</sup> | 285°             | NA                   | NA               | 6.05 (48.0 EFPY)                                       |
| Y              | 305°             | 15.8/1997            | NA               | 1.52   |
| Y              | 165°             | NA                   | 15.8/1997        | NA   |
| Y <sup>d</sup> | 165°             | NA                   | NA               | 6.34 (48.0 EFPY)                                       |

- a. Withdrawal schedule meets requirements of ASTM E 185-82, *Standard Practice for Conducting Surveillance Tests for Light-Water Cooled Nuclear Power Reactor Vessels*, dated July 1, 1982.
- b. 48.0 EFPY corresponds to the estimated cumulative core burnup at the end of the 60-year license period. Fluence values for withdrawn capsules are obtained from capsule test reports.
- c. These capsules are required to satisfy the requirements of ASTM E 185-82 during the license period.
- d. Standby Capsules S, U, and Y are available to satisfy potential fluence monitoring requirements during the 20-year license renewal period.

**TABLE 4.1-13**  
**Surveillance Capsule Withdrawal Schedule<sup>a</sup> for Surry Unit 2**

| Capsule Ident.  | Capsule Location | Withdrawal EFPY/Year | Insert EFPY/Year | Est. Capsule Fluence ( $\times 10^{19}$ ) <sup>b</sup> |
|-----------------|------------------|----------------------|------------------|--|
| X <sup>c</sup>  | 285°             | 1.2/1975             | NA               | 0.297  |
| W <sup>c</sup>  | 245°             | 3.8/1979             | NA               | 0.636  |
| V <sup>c</sup>  | 165°             | 8.7/1986             | NA               | 1.89   |
| Y               | 295°             | 14.3/1995            | NA               | 1.97   |
| Y               | 165°             | NA                   | 14.3/1995        | NA   |
| Y <sup>c</sup>  | 165°             | 20.8/2002            | NA               | 2.73   |
| U               | 65°              | 27.9/2009            | NA               | 3.49   |
| U               | 285°             | NA                   | 27.9/2009        | NA   |
| U <sup>c</sup>  | 285°             | 45.0/2027            | NA               | 5.95   |
| T               | 55°              | 19.7/2002            | NA               | 1.82   |
| T               | 165°             | NA                   | 19.7/2002        | NA   |
| T <sup>d</sup>  | 165°             | NA                   | NA               | 5.88 (48.0 EFPY)                                       |
| Z               | 305°             | 13.7/1994            | NA               | 1.34   |
| Z               | 245°             | NA                   | 13.7/1994        | NA   |
| Z               | 245°             | 45.0/2027            | NA               | 4.48   |
| Z               | 285°             | NA                   | 45.0/2027        | NA   |
| Z <sup>d</sup>  | 285°             | NA                   | NA               | 5.09 (48.0 EFPY)                                       |
| S               | 45°              | 15.0/1996            | NA               | 1.07   |
| W1              | 285°             | NA                   | 10.9/1991        | NA   |
| W1 <sup>e</sup> | 285°             | 16.4/1997            | NA               | 0.690  |

a. Withdrawal schedule meets requirements of ASTM E 185-82, *Standard Practice for Conducting Surveillance Tests for Light-Water Cooled Nuclear Power Reactor Vessels*, dated July 1, 1982.

b. 48.0 EFPY corresponds to the estimated cumulative core burnup at the end of the 60-year license period. Fluence values for withdrawn capsules are obtained from capsule test reports.

c. These capsules are required to satisfy the requirements of ASTM E 185-82 during the license period.

d. Standby capsules T and Z are available to satisfy potential fluence monitoring requirements during the 20-year license renewal period.

e. Master Integrated Reactor Vessel Materials Surveillance Program capsule