

VIRGINIA ELECTRIC AND POWER COMPANY  
RICHMOND, VIRGINIA 23261

July 28, 2017

10 CFR 50 Appendix H

U.S. Nuclear Regulatory Commission  
Attention: Document Control Desk  
Washington, DC 20555-0001

Serial No.: 17-243  
NRA/GDM: R1  
Docket Nos.: 50-280/281  
License Nos.: DPR-32/37

**VIRGINIA ELECTRIC AND POWER COMPANY (DOMINION ENERGY VIRGINIA)**  
**SURRY POWER STATION UNITS 1 AND 2**  
**REVISED REACTOR VESSEL MATERIALS SURVEILLANCE CAPSULE**  
**WITHDRAWAL SCHEDULES**

By letter dated October 26, 2009, Serial No. 09-507, (ADAMS Accession No. ML092990570), as supplemented by letters dated September 13, 2010, Serial No. 09-507A, (ML102570804) and January 3, 2011, Serial No. 10-271, (ML110040077), Dominion Energy Virginia requested NRC review and approval of proposed reactor vessel material surveillance capsule withdrawal schedules for Surry Power Station (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 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 for surveillance capsule withdrawal and testing. The NRC approved the revised schedules in its Safety Evaluation Report dated January 31, 2011 (ML103000386). The revised schedules were included in the Surry Updated Final Safety Analysis Report (UFSAR) Tables 4.1-12 and 4.1-13, *Surveillance Capsule Withdrawal Schedule for Surry Unit 1* and *Surveillance Capsule Withdrawal Schedule for Surry Unit 2*, respectively.

By letter dated June 3, 2014, Serial No. 14-262, (ML14160A607), Dominion Energy Virginia submitted a license amendment request (LAR) for Surry Units 1 and 2 to revise and clarify the TS Figures 3.1-1 and 3.1-2 Reactor Coolant System (RCS) pressure-temperature (P-T) limits curves, *Surry Units 1 and 2 Reactor Coolant System Heatup Limitations* and *Surry Units 1 and 2 Reactor Coolant System Cooldown Limitations*, respectively. In a request for additional information (RAI) associated with its review of the LAR, the NRC noted that reactor vessel (RV) nozzles, penetrations, and other discontinuities may exhibit significantly higher stresses than those for the RV beltline shell region. Consequently, these higher stresses can potentially result in more restrictive pressure-temperature (P-T) limits, even if the nil-ductility transition Reference Temperature ( $RT_{NDT}$ ) for these components is not as high as that of RV beltline shell materials that have simpler geometries. Therefore, the NRC asked Dominion Energy Virginia to describe how the P-T limit curves and the methodology used to develop those curves considered RV materials, consistent with the requirements of 10 CFR Part 50, Appendix G.

ADD  
NRR

By letter dated February 4, 2015, Serial No. 15-023, (ML15041A720), we advised the NRC that the twelve inlet and outlet nozzles on the Surry Units 1 and 2 RVs were located outside the axial extent of the current fluence model and that fluence calculations for the nozzles would be performed to determine whether the projected neutron fluence would remain below the  $1 \times 10^{17}$  n/cm<sup>2</sup> (E > 1 MeV) threshold at the 1/4T flaw location at the end of the renewed licensed operating period for Surry Units 1 and 2 on May 25, 2032 and January 29, 2033, respectively. By letter dated October 26, 2015, Serial No. 15-023B, (ML15302A340), we informed the NRC that the detailed fluence calculations had been completed for the Surry Units 1 and 2 RV nozzles, and the calculations demonstrated that the neutron fluence will remain below the  $1 \times 10^{17}$  n/cm<sup>2</sup> (E > 1 MeV) threshold.

As a result of the revised projected fluence calculations performed for the RV nozzles, Dominion Energy Virginia is proposing a revision to Surry UFSAR Tables 4.1-12 and 4.1-13 to reflect the latest projected fluence calculations in the estimated capsule fluence values. The proposed revision would also implement the following changes: 1) revise the withdrawal schedule for Unit 1 Capsule Z from 2025 to 2027 and Unit 2 Capsule U from 2027 to 2032; 2) eliminate intermediate capsule relocations for standby Capsule S (Unit 1) and standby Capsule Z (Unit 2); and 3) add projected fluence values for the standby capsules beyond end of life [(Unit 1, Capsules U, S, and Y) and (Unit 2, Capsules T and Z)]. The first proposed change is to ensure the revised estimated standby capsule fluence values coincide with the nearest respective unit refueling outage for withdrawal. The second and third proposed changes are for asset optimization by designating standby capsule withdrawal options focused on 80, 100 and 120 years of operation. The revised surveillance capsule withdrawal schedules satisfy the requirements and guidance of ASTM E-185-82 and 10 CFR 50, Appendix H, "Reactor Vessel Material Surveillance Program Requirements."

Therefore, pursuant to the requirements of 10 CFR 50, Appendix H, Section III.B.3, Dominion Energy Virginia requests NRC approval of the proposed changes to the surveillance capsule withdrawal schedules included in the draft revised UFSAR Tables 4.1-12 and 4.1-13 provided in the attachment. Upon receipt of NRC approval, the Surry UFSAR will be updated to include the revised UFSAR tables.

Should you have any questions or require additional information, please contact Mr. Gary D. Miller at (804) 273-2771.

Sincerely,



Mark D. Sartain  
Vice President – Nuclear Engineering and Fleet Support

Commitment made in this letter:

1. Upon receipt of NRC approval, the Surry UFSAR will be updated to include the revised UFSAR tables.

Attachment:

Revised Reactor Vessel Materials Surveillance Capsule Withdrawal Schedules, Surry Units 1 and 2

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

**Revised Reactor Vessel Materials Surveillance Capsule Withdrawal Schedules**  
**Surry Power Station Units 1 and 2**

**VIRGINIA ELECTRIC AND POWER COMPANY**  
**(DOMINION ENERGY VIRGINIA)**

Table 4.1-12

SURVEILLANCE CAPSULE WITHDRAWAL SCHEDULE<sup>a</sup> FOR SURRY UNIT 1

Capsule Identification	Capsule Location	Estimated Withdrawal EFPY/Year	Insert EFPY/Year	Estimated Capsule Fluence (x 10 <sup>19</sup> ) <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°	44.0/2027	NA	6.35
U	45°	13.3/1994	NA	0.95
U	65°	NA	13.3/1994	NA
U <sup>d</sup>	65°	NA	NA	4.59 (48.0 EFPY) 6.82 (68.0 EFPY)
S <sup>d</sup>	295°	NA	NA	5.42 (48.0 EFPY) 7.65 (68.0 EFPY)
Y	305°	15.8/1997	NA	1.52
Y	165°	NA	15.8/1997	NA
Y <sup>d</sup>	165°	NA	NA	6.24 (48.0 EFPY) 7.82 (58.0 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. Future projected capsule fluence values are related to asset management objectives.

Table 4.1-13  
SURVEILLANCE CAPSULE WITHDRAWAL SCHEDULE<sup>a</sup> FOR SURRY UNIT 2

Capsule Identification	Capsule Location	Estimated Withdrawal EFPY/Year	Insert EFPY/Year	Estimated Capsule Fluence (x 10 <sup>19</sup> ) <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°	49.0/2032	NA	7.26
T	55°	19.7/2002	NA	1.82
T	165°	NA	19.7/2002	NA
T <sup>d</sup>	165°	NA	NA	6.65 (48.0 EFPY) 9.06 (60.0 EFPY)
Z	305°	13.7/1994	NA	1.34
Z	245°	NA	13.7/1994	NA
Z <sup>d</sup>	245°	NA	NA	5.39 (48.0 EFPY) 8.21 (68.0 EFPY)
S	45°	NA	NA	1.07
W1	285°	15.0/1996	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. Capsules T and Z are available to satisfy potential fluence monitoring requirements during the 20-year license renewal period. Future projected capsule fluence values are related to asset management objectives.
- e. Master Integrated Reactor Vessel Materials Surveillance Program capsule.