

VIRGINIA ELECTRIC AND POWER COMPANY
RICHMOND, VIRGINIA 23261

May 15, 2006

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

Serial No. 06-335A
NLOS/GDM R0
Docket Nos. 50-280
50-281
License Nos. DPR-32
DPR-37

VIRGINIA ELECTRIC AND POWER COMPANY
SURRY POWER STATION UNITS 1 AND 2
PROPOSED TECHNICAL SPECIFICATIONS CHANGE REQUEST FOR
REACTOR COOLANT SYSTEM PRESSURE/TEMPERATURE LIMITS, LTOPS
SETPOINT, AND LTOPS ENABLE TEMPERATURE BASIS
RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION

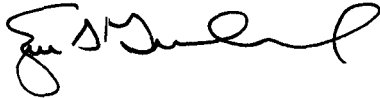
By letter dated April 20, 2006 (Serial No. 06-335), Virginia Electric and Power Company (Dominion) requested amendments, in the form of changes to the Technical Specifications (TS) to Facility Operating License Numbers DPR-32 and DPR-37 for Surry Power Station Units 1 and 2, respectively. The proposed TS change restores the Reactor Coolant System (RCS) Pressure/Temperature (P/T) operating limits, Low Temperature Overpressure Protection System (LTOPS) setpoint, and LTOPS enable temperature (T_{enable}) basis to those that were in place prior to the approval of License Amendments 245/244.

During a conference call between the NRC staff and Dominion held on May 1, 2006, the NRC indicated that additional information was necessary to facilitate the completion of their review. Specifically, the NRC requested information demonstrating that: 1) the most recently completed fluence analyses for Surry Units 1 and 2 were prepared in accordance with Regulatory Guide 1.190, and 2) confirmation that the RCS P/T operating limit curves and LTOPS setpoint provided in the proposed TS change request remain conservative with respect to the more recently performed analyses. Dominion's response is provided in the attachment and concludes that the requested Surry TS RCS P/T operating limits and LTOPS setpoint remain valid and conservative for their period of applicability, corresponding to 28.8 Effective Full Power Years (EFPY) and 29.4 EFPY for Surry Units 1 and 2, respectively.

The additional information provided herein does not affect the significant hazards consideration determination or environmental assessment that were previously provided in support of the proposed TS change request.

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

Very truly yours,



E. S. Grecheck
Vice President – Nuclear Support Services

Attachment

Commitments made in this letter: None

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Serial No. 06-335A
Docket Nos. 280, 281
TS Change Request– Reinstatement of P/T Limits

COMMONWEALTH OF VIRGINIA)
)
COUNTY OF HENRICO)

The foregoing document was acknowledged before me, in and for the County and Commonwealth aforesaid, today by Eugene S. Grecheck, who is the Vice President – Nuclear Support Services of Virginia Electric and Power Company. He has affirmed before me that he is duly authorized to execute and file the forgoing document in behalf of that Company, and that the statements in the document are true and correct to the best of his knowledge, information, and belief.

Acknowledged before me this 15TH day of May, 2006.

My Commission Expires: May 31, 2006.

Vicki L. Hull
Notary Public

(SEAL)

ATTACHMENT

Response to NRC Request for Additional Information

**Proposed Technical Specifications Change Request for Reinstatement of RCS P/T
Limits, LTOPS Setpoint, and LTOPS Enable Temperature Basis**

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

Response to NRC Request for Additional Information

Proposed Technical Specifications Change Request for Reinstatement of RCS P/T Limits, LTOPS Setpoint, and LTOPS Enable Temperature Basis **Surry Power Station Units 1 and 2**

During a teleconference on May 1, 2006, the NRC staff indicated that additional information was required regarding the reactor vessel neutron fluence analyses that support the Surry Technical Specifications (TS) change request submitted by Dominion letter dated April 20, 2006 (Reference 1). Specifically, the NRC noted that the reactor vessel neutron fluence analysis originally performed in support of Surry TS Amendments 207/207 (References 2 and 3) did not apply the latest neutron cross-section library of the Evaluated Nuclear Data file, currently ENDF/B-VI. As noted in Regulatory Guide 1.190, *Calculational and Dosimetry Methods for Determining Pressure Vessel Neutron Fluence*, the updated ENDF/B-VI cross-section data have been demonstrated to provide a more accurate determination of the flux attenuation through iron and are strongly recommended for use by licensees when performing reactor vessel neutron fluence analysis. The reactor vessel fluence analyses cited in Reference 2 were performed by Westinghouse circa 1987, and utilized the ENDF/B-IV cross section library; however, the data has been updated since that time. Neither Regulatory Guide 1.190, nor its predecessor Draft Regulatory Guide-1053, had been issued when the previous fluence analyses were performed.

To address this issue, Dominion proposed to submit relevant information discussing new reactor vessel fluence analyses for Surry that were recently performed by AREVA NP (formerly Framatome ANP). As discussed in this letter, the new reactor vessel fluence analyses used the current ENDF/B-VI cross-section library. The fluence analyses results used in conjunction with the current reactor vessel material properties for Surry demonstrate that the applicable 1/4-T and 3/4-T RT_{NDT} values, which form the basis for the TS Reactor Coolant System (RCS) Pressure/Temperature (P/T) limits originally approved in Amendments 207/207 and are requested for reinstatement in Reference 1, remain valid and conservative.

Reactor Vessel Neutron Fluence Analysis Methodology

In support of Surry's reactor vessel integrity program, Dominion has recently procured revised 60-year reactor vessel neutron fluence analyses for Surry Units 1 and 2 from AREVA. These neutron fluence projections are valid for cumulative core exposures of 48 Effective Full Power Years (EFPY) for both Surry Units 1 and 2. Future operating cycles are assumed to be equilibrium fuel cycles with a capacity factor of 95%. The revised 60-year fluence analyses consider the effects of certain core design changes planned for future operating cycles for Surry Units 1 and 2. These core design changes, and the impacts on Surry's Pressurized Thermal Shock assessment per 10 CFR 50.61, will be the subject of a forthcoming Dominion letter to the NRC.

The revised 60-year fluence analyses for Surry Units 1 and 2 were performed in accordance with NRC-approved methodology as described in Framatome Topical Report BAW-2241P, Revision 1, "Fluence and Uncertainty Methodologies" (Reference 4). The NRC's safety evaluation for Topical Report BAW-2241P, Revision 1, concluded that the methodology is acceptable for referencing in licensing applications for determining the reactor vessel fluence of Westinghouse, CE, and B&W designed reactors (Reference 5). In the NRC's safety evaluation dated April 5, 2000, the NRC noted the following limitations for use of Topical Report BAW-2241P, Revision 1:

- 1. The FTI dosimetry C/M data-base includes an extensive set of PWR core/internals/vessel configurations. However, the dosimetry set is not complete and there are certain designs that are not included in the data-base (e.g., cores including partial-length fuel assembly designs). FTI has indicated (Response-9 of Reference-17) that in the case where the BAW-2241P, Revision 1, methodology is applied to a plant including a feature not included in the FTI data-base, an additional evaluation will be performed. This will include an evaluation of the effect on the dosimetry measurements, calculation-to-measurement ratios and the analytical uncertainties. FTI has stated that the fluence calculational uncertainty will be increased if this evaluation indicates that the uncertainties given in BAW-2241P, Revision 1, are not adequate.*
- 2. Should there be changes in the input cross section of this methodology, the licensee will evaluate the changes for their impact and, if necessary, will modify the methodology accordingly.*
- 3. The licensee will provide the staff with a record of future modifications of the methodology.*

The revised 60-year reactor vessel neutron fluence analyses performed by AREVA for Surry Units 1 and 2 meet these conditions as described below:

1. Surry Units 1 and 2 are included in the Framatome dosimetry database, as shown on Table E-6 of Topical Report BAW-2241P, Revision 1. Therefore, Condition No. 1 is met.
2. The cross section library utilized in Topical Report BAW-2241P, Revision 1, is shown below:

"BUGLE-93: Coupled 47 Neutron, 20 Gamma-Ray Group Cross Section Library Derived from ENDF/B-VI for LWR Shielding and Pressure Vessel Dosimetry Applications," Radiation Shielding Information Center (RSIC), Oak Ridge National Laboratory (ORNL), DLC-175, April 1994.

This is the same cross section library that was used in the revised 60-year reactor vessel neutron fluence analyses for Surry Units 1 and 2. Therefore, Condition No. 2 is met.

3. Any modifications to the methodology of Topical Report BAW-2241P, Revision 1, will be, or have been, submitted to the NRC by AREVA NP (previously Framatome ANP). Therefore, Condition No. 3 is met.

Revised Reactor Vessel Neutron Fluence Analyses Results

The revised 60-year fluence analyses performed by AREVA also provide peak reactor vessel fluence results at a cumulative core exposure of 32 EFPY for each Surry unit. The fluence values at 32 EFPY can be considered bounding with respect to the original 40-year operating period for Surry Units 1 and 2. A cumulative core exposure of 32 EFPY exceeds the cumulative core exposure for the TS RCS P/T limits curves, Low Temperature Overpressure Protection System (LTOPS) setpoint, and LTOPS enable temperature (T_{enable}) discussed in Amendments 207/207, which indicate cumulative exposure applicability limits of 28.8 EFPY for Surry Unit 1 and 29.4 EFPY for Surry Unit 2. Therefore, the 32 EFPY fluences represent a conservative point of comparison relative to cumulative core exposure applicability limits of the RCS P/T limits requested in Reference 1.

Results from the revised 60-year fluence analyses are shown below.

Table 1 – Revised RPV Fluence Projections for Surry Unit 1

Surry Unit 1 Location	Material	Neutron Fluence (E > 1.0 MeV)	
		Fluence at 32 EFPY (n/cm²)	Fluence at 48 EFPY (n/cm²)
Vessel Wall Inner Surface (0°)	Intermediate and Lower Plates	3.80E+19	5.66E+19
Lower Shell Longitudinal Weld	SA-1494/8T1554 SA-1526/299L44	6.40E+18	1.04E+19
Intermediate Shell Longitudinal Weld	SA-1494/8T1554	6.78E+18	1.08E+19
Intermediate to Lower Shell Circumferential Weld	SA-1585/72445 SA-1650/72445	3.74E+19	5.61E+19
Nozzle to Intermediate Shell Circumferential Weld	J726/25017	5.27E+18	7.75E+18

Table 2 – Revised RPV Fluence Projections for Surry Unit 2

Surry Unit 2 Location	Material	Neutron Fluence (E > 1.0 MeV)	
		Fluence at 32 EFPY (n/cm ²)	Fluence at 48 EFPY (n/cm ²)
Vessel Wall Inner Surface (0°)	Intermediate and Lower Plates	3.64E+19	5.38E+19
Lower Shell Longitudinal Weld	WF-4/8T1762 WF-8/8T1762	7.62E+18	1.14E+19
Intermediate Shell Longitudinal Weld	SA-1585/72445 WF-4/8T1762	7.63E+18	1.14E+19
Intermediate to Lower Shell Circumferential Weld	R3008/0227	3.62E+19	5.37E+19
Nozzle to Intermediate Shell Circumferential Weld	J737/4275	4.00E+18	6.32E+18

TS RCS P/T Limits

The Surry Units 1 and 2 TS RCS P/T limits and LTOPS setpoints originally approved in Amendments 207/207 were based on a limiting 1/4-thickness (1/4-T) RT_{NDT} of 228.4 °F, and a limiting 3/4-thickness (3/4-T) RT_{NDT} of 189.5 °F. When the RCS P/T limits and LTOPS setpoints were developed, these values of RT_{NDT} were determined to bound all Surry Units 1 and 2 reactor vessel beltline materials at end-of-original 40-year license fluences corresponding to 28.8 EFPY and 29.4 EFPY for Surry Units 1 and 2, respectively.

At revised reactor vessel neutron fluence projections corresponding to 32 EFPY, the limiting 1/4-T RT_{NDT} value is 225.6 °F for Surry Unit 1 Lower Shell Longitudinal Weld SA-1526/299L44, and the limiting 3/4-T RT_{NDT} value is 188.9 °F for Surry Unit 1 Intermediate to Lower Shell Circumferential Welds SA-1585/72445 and SA-1650/72445. Details of the adjusted RT_{NDT} calculations are provided in Tables 3 and 4 below for the limiting reactor vessel materials. Values of initial RT_{NDT}, chemistry factors, and margin terms are consistent with those most recently submitted by Dominion as updates to the NRC's Reactor Vessel Integrity Database for Surry (Reference 6).

Table 3 – Current Reactor Vessel Material Properties for Surry Units 1 and 2

Weld Material	Location	Initial RT _{NDT} (°F)	Chemistry Factor (°F)	Margin (°F)
Surry 1				
SA-1585/72445, SA-1650/72445	Intermediate to Lower Shell Circ. Weld	-5.0	131.4	68.5
SA-1526/299L44	Lower Shell Longitudinal Weld	-7.0	220.6	69.5
Surry 2				
R3008/0227	Intermediate to Lower Shell Circ. Weld	0.0	132.4	48.8

Table 4 – Adjusted RT_{NDT} Values at 32 EFPY for Surry Units 1 and 2

Weld Material	Inner Surface Fluence (x1E19)	1/4-T Location			3/4-T Location		
		Fluence (x1E19)	ΔRT _{NDT} (°F)	RT _{NDT} (°F)	Fluence (x1E19)	ΔRT _{NDT} (°F)	RT _{NDT} (°F)
Surry 1							
SA-1585/72445 SA-1650/72445	3.740	2.282	160.8	224.3	0.849	125.4	188.9
SA-1526/299L44	0.640	0.390	163.1	225.6	0.145	109.4	171.9
Surry 2							
R3008/0227	3.620	2.209	160.9	209.7	0.822	125.2	174.0

When revised fluence projections at 32 EFPY are considered, the limiting 1/4-T and 3/4-T RT_{NDT} values remain less than those values specified in support of the RCS P/T limits and LTOPS setpoints approved in TS Amendments 207/207. Therefore, the requested Surry TS RCS P/T limits, LTOPS setpoint, and LTOPS enabling temperature remain valid and conservative for their period of applicability, corresponding to 28.8 EFPY and 29.4 EFPY for Surry Units 1 and 2, respectively.

References

1. Letter from E. S. Grecheck of Virginia Electric and Power Company to USNRC, "Virginia Electric and Power Company, Surry Power Station Units 1 and 2, Proposed Technical Specifications Change Request for Reinstatement of Previous Reactor Coolant System Pressure/Temperature Limits, LTOPS Setpoint, and LTOPS Enable Temperature Basis," Serial No. 06-335, April 20, 2006.
2. Letter from R. F. Saunders of Virginia Electric and Power Company to USNRC, "Virginia Electric and Power Company, Surry Power Station Units 1 and 2, Request for Exemption - ASME Code Case N-514, Proposed Technical Specifications Change, Revised Pressure/Temperature Limits and LTOPS Setpoint," Serial No. 95-197, June 8, 1995.
3. Letter from USNRC to J. P. O'Hanlon, "Surry Units 1 and 2 - Issuance of Amendments Re: Surry, Units 1 and 2 Reactor Vessel Heatup and Cooldown Curves (TAC NOS. M92537 and M92538)," dated December 28, 1995.
4. Framatome ANP Report BAW-2241P, Revision 1, "Fluence and Uncertainty Methodologies," December 1999.
5. NRC Letter from S. A. Richards to J. J. Kelly (B&WOG), "Acceptance for Referencing of Licensing Topical Report BAW-2241P, Revision 1, Fluence and Uncertainty Methodologies (TAC No. M98962)," dated April 5, 2000.
6. Letter from L. N. Hartz of Virginia Electric and Power Company to USNRC, "Virginia Electric and Power Company, Surry Power Station Unit 2, Evaluation of Surry 2 Capsule Y Data," dated March 27, 2003.