

VIRGINIA ELECTRIC AND POWER COMPANY
RICHMOND, VIRGINIA 23261

January 25, 2016

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

Serial No.: 15-022A
NAPS/JHL: R0
Docket Nos.: 50-338/339
License Nos.: NPF-4/7

VIRGINIA ELECTRIC AND POWER COMPANY
NORTH ANNA POWER STATION UNITS 1 AND 2
REACTOR COOLANT SYSTEM FLUENCE MODEL RESULTS

In a letter dated August 27, 2014 (Serial No. 14-424), Virginia Electric and Power Company (Dominion) submitted a license amendment request to revise the North Anna Power Station Units 1 and 2 Technical Specifications (TS). TS Figures 3.4.3-1 and 3.4.3-2, North Anna Units 1 and 2 Reactor Coolant System Heatup Limitations and North Anna Units 1 and 2 Reactor Coolant System Cooldown Limitations, respectively, were being revised for clarification and to be fully representative of the allowable operating conditions during Reactor Coolant System (RCS) startup and cooldown evolutions. Specifically, the revisions to TS Figures 3.4.3-1 and 3.4.3-2 were to extend the temperature axes to reflect temperatures up to RCS full power operation, extend the pressure axes to less than 0 psig to bound RCS conditions to support vacuum-assist fill of the RCS loops, and to add information regarding the reactor boltup temperature.

In a letter dated February 16, 2015 (Serial No. 15-022), Dominion responded to a request for additional information (RAI) to support the proposed amendment. In the RAI response, a commitment was made to review the revision of the fluence model. If the revised fluence model indicates the neutron fluence exposure of the inlet and outlet nozzles would be greater than 1×10^{17} n/cm² (E > 1 MeV) at the end of the licensed operating period, Dominion will advise the NRC accordingly and provide a schedule for submittal of revised pressure-temperature (P-T) limit curves for North Anna Units 1 and 2, if necessary.

On July 27, 2015, the NRC issued Amendment Nos. 275 and 257 to the Renewed Facility Operating Licenses for North Anna Units 1 and 2. The NRC staff Safety Evaluation indicates that the differences in Effective Full Power Years (EFPY) for the current operating period in comparison to the corresponding approved pressure-temperature (P-T) limits provide an adequate margin so that if the revised neutron fluence model indicates that the neutron fluence exposure of the inlet and outlet nozzles is greater than 1×10^{17} n/cm² at the end of extended operation, the licensee will notify the NRC accordingly and provide a schedule for revised P-T limits curves for North Anna Units 1 and 2, if necessary.

This letter provides notification that the revised RCS fluence model has been reviewed and the results are provided in Attachment 1.

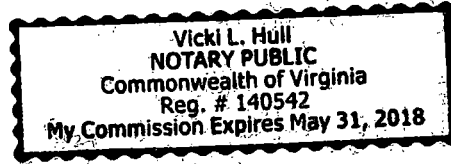
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Should you have any questions or require additional information, please contact Mr. Jay Leberstien at (540) 894-2574.

Respectfully,



Mark D. Sartain
Vice President – Nuclear Engineering



COMMONWEALTH OF VIRGINIA
COUNTY OF HENRICO

The foregoing document was acknowledged before me, in and for the County and Commonwealth aforesaid, today by Mr. Mark D. Sartain, who is Vice President – Nuclear Engineering, of Virginia Electric and Power Company. He has affirmed before me that he is duly authorized to execute and file the foregoing document in behalf of that company, and that the statements in the document are true to the best of his knowledge and belief.

Acknowledged before me this 25TH day of JANUARY, 2016.

My Commission Expires: 5-31-18



Vicki L. Hull
Notary Public

Commitments contained in this letter:

1. Develop new limit curves for the Unit 1 and Unit 2 #1 inlet nozzles no later than December 26, 2031 to determine if the existing P-T curves are conservative through the end of the licensed operating period.
2. Notify the NRC of the assessment results of the new Unit 1 and Unit 2 #1 limit curves for the inlet nozzles no later than March 31, 2032.
3. If the existing P-T curves require revision, a license amendment request will be submitted to the NRC for new P-T curves by January 31, 2032.

Attachment

1. Revised RCS Fluence Model Results

cc: U.S. Nuclear Regulatory Commission - Region II
Marquis One Tower
245 Peachtree Center Avenue, NE Suite 1200
Atlanta, GA 30303-1257

Dr. V. Sreenivas
NRC Project Manager – North Anna
U.S. Nuclear Regulatory Commission
One White Flint North
Mail Stop 08 G-9A
11555 Rockville Pike
Rockville, MD 20852-2738

Ms. Karen Cotton-Gross
NRC Project Manager – Surry
U.S. Nuclear Regulatory Commission
One White Flint North
Mail Stop 08 G-9A
11555 Rockville Pike
Rockville, MD 20852-2738

NRC Senior Resident Inspector
North Anna Power Station

Attachment

Revised RCS Fluence Model Results

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

REVISED RCS FLUENCE MODEL RESULTS

On July 27, 2015, the NRC issued Amendment Nos. 275 and 257 to the Renewed Facility Operating Licenses for North Anna Power Station (NAPS) Units 1 and 2. The NRC staff Safety Evaluation indicates that the differences in Effective Full Power Years (EFPY) for the current operating period in comparison to the corresponding approved pressure-temperature (P-T) limits provide an adequate margin so that if the revised neutron fluence model indicates that the neutron fluence exposure of the inlet and outlet nozzles is greater than 1×10^{17} n/cm² at the end of extended operation, the licensee will notify the NRC accordingly and provide a schedule for revised P-T limits curves for North Anna Units 1 and 2, if necessary.

The results of the revised RCS fluence model are summarized below.

Westinghouse Electric Company revised the fluence model to extend the axial region above the fuel to be able to calculate the fluence in the nozzle region. Initial calculations projected the fluence at the lowest extent of the inlet and outlet nozzle forgings to vessel shell welds. The projected fluence at this location, about 5 inches below where a postulated flaw would be assumed in the nozzle region, was found to be below the 1×10^{17} n/cm² threshold for 8 of the 12 nozzles. Additional calculations were performed at the location where a postulated flaw is assumed to determine the magnitude of the fluence with respect to the 1×10^{17} n/cm² threshold for the other 4 nozzles.

Westinghouse Electric Company determined the magnitude of the fluence for these 4 nozzles at 60 and 80 years of plant operation and the time (in EFPY) when the fluence at each of the postulated flaw locations reaches 1×10^{17} n/cm² ($E > 1.0$ MeV). The results of the fluence modeling have been documented by Westinghouse Electric Company in WCAP-18015-NP, Revision 0, Extended Beltline Pressure Vessel Fluence Evaluations Applicable to North Anna 1 & 2.

WCAP-18015-NP indicates that the 1/4T location for 2 of the 12 nozzles will reach the 1×10^{17} n/cm² fluence threshold of concern prior to 54 EFPY.

- For Unit 1, the 1/4 T Flaw in Inlet Nozzle 1 is projected to reach 1×10^{17} n/cm² at approximately 48.5 EFPY, which corresponds to December 26, 2034. The license renewal operating period NAPS Unit 1 runs through April 1, 2038.
- For Unit 2, the 1/4 T Flaw in Inlet Nozzle 1 is projected to reach 1×10^{17} n/cm² at approximately 49.1 EFPY, which corresponds to October 15, 2036. The license renewal operating period NAPS Unit 2 runs through August 21, 2040.

Thus, the fluence at the postulated 1/4T flaw location in the NAPS Unit 1 and Unit 2 #1 inlet nozzles are projected to exceed the 1×10^{17} n/cm² threshold prior to reaching the end of the licensed operating period.

While the fluence is projected to exceed the 1×10^{17} n/cm² threshold for the #1 inlet nozzles prior to the end of licensed operating period this does not necessarily indicate that the existing heatup and cooldown curves will become non-conservative prior to reaching the end of the licensed operating period. However, new limit curves will need to be constructed for the Unit 1 and Unit 2 #1 inlet nozzles and compared to the approved Technical Specification limit curves for the other vessel materials to determine if the existing P-T curves are adequate through the end of the licensed operating period.

The assessment of the #1 inlet nozzles must be completed under a schedule that provides sufficient time to amend the existing heatup and cooldown curves, if required. Below is the schedule for revising the P-T curves, if necessary.

1. Develop new limit curves for the Unit 1 and Unit 2 #1 inlet nozzles no later than December 26, 2031 to determine if the existing P-T curves are conservative through the end of the licensed operating period.
2. Notify the NRC of the assessment results of the new Unit 1 and Unit 2 #1 limit curves for the inlet nozzles no later than March 31, 2032. This will validate if the existing heatup and cooldown curves are conservative or if they will require revision prior to end of the licensed operating period.
3. If the existing P-T curves require revision, a license amendment request will be submitted to the NRC for new P-T curves by January 31, 2032. A submittal date of January 31, 2032 bounds the projected time for exceeding the Unit 1 1×10^{17} n/cm² fluence threshold projected to occur at 48.5 EFPY.