

**VIRGINIA ELECTRIC AND POWER COMPANY**  
**RICHMOND, VIRGINIA 23261**

January 4, 2002

United States Nuclear Regulatory Commission  
Attention: Document Control Desk  
Washington, DC 20555-0001

Serial No.: 01-685  
LR/MWH R0  
Docket Nos.: 50-280/281  
50-338/339  
License Nos.: DPR-32/37  
NPF-4/7

Gentlemen:

**VIRGINIA ELECTRIC AND POWER COMPANY (DOMINION)**  
**SURRY AND NORTH ANNA POWER STATIONS UNITS 1 AND 2**  
**REQUEST FOR ADDITIONAL INFORMATION**  
**LICENSE RENEWAL APPLICATIONS**

In an October 22, 2001 letter, the NRC requested additional information regarding the license renewal applications (LRAs) for Surry and North Anna Power Stations. The attachment to this letter contains the responses to the Requests for Additional Information (RAIs) associated with Sections 3.6, 4.7.3, and B2.1.3 of the LRA.

A response to the RAI associated with Section 3.6-1 is not provided herein, but will be provided by separate correspondence at a later date.

Should you have any questions regarding this submittal, please contact Mr. J. E. Wroniewicz at (804) 273-2186.

Very truly yours,



David A. Christian  
Senior Vice President – Nuclear Operations and Chief Nuclear Officer

Attachment

Commitments made in this letter: None

A086

cc:

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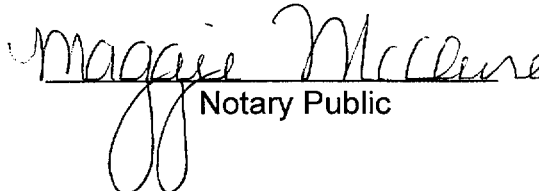
SN: 01-685  
Docket Nos.: 50-280/281  
50-338/339  
Subject: License Renewal RAI

COMMONWEALTH OF VIRGINIA     )  
                                              )  
COUNTY OF HENRICO            )

The foregoing document was acknowledged before me, in and for the County and Commonwealth aforesaid, today by David A. Christian who is Senior Vice President and Chief Nuclear Officer 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 4th day of January, 2002.

My Commission Expires: March 31, 2004.

  
Notary Public

(SEAL)

**Attachment**

**License Renewal – Response to RAI  
Serial No. 01-685**

**Response to Request for Additional Information  
Dated October 22, 2001  
Surry and North Anna Power Stations, Units 1 and 2  
License Renewal Applications  
Sections 3.6, 4.7.3, and B2.1.3**

**Virginia Electric and Power Company  
(Dominion)**

### **Section 3.6, "Aging Management of Electrical and Instrumentation and Controls"**

#### **RAI 3.6-2:**

Under "Preventive Actions" in the non-EQ cable monitoring activity the applicant states that "periodic actions will be taken to prevent inaccessible non-EQ medium-voltage cables from being exposed to significant moisture . . . ." In the same non-EQ cable monitoring activity under "Acceptance Criteria" the applicant states that "[t]he acceptance criterion with respect to wetted conditions is the absence of long-term submergence of cables." The term "significant moisture" used in the preventive actions has been understood in past LRAs to mean periodic exposures to moisture that last more than a few days (i.e., cable in standing water). Periodic exposures to moisture of less than a few days (i.e., normal rain and drain) are not significant. Please revise your definition of significant moisture in the context of its use in the non-EQ cable monitoring AMA to mean "periodic exposure to moisture that last more than a few days," or provide a technical justification to the contrary. In addition, verify that this same definition applies to the terminology "long-term submergence" used in the acceptance criteria of the non-EQ cable monitoring activity. Finally, if a cable is determined to be exposed to significant moisture, ensure that the engineering evaluation includes cable testing to demonstrate that the cable is capable of performing its intended function.

#### **Dominion Response:**

The Non-EQ Cable Monitoring Aging Management Activity, documented in response to RAI 3.6.2-1 monitors for submergence of non-EQ medium-voltage cables that are within the scope of license renewal and meet the susceptibility criteria for water tree formation.

The only cables at either North Anna or Surry that meet the susceptibility criteria are the North Anna service water pump motor feed cables. The service water pump motor feed cables, operated at 4.16 KV, have ethylene propylene rubber (EPR) insulation rated for 8 kV. Following installation of the present feed cables, modifications have been made to the manholes containing the service water feed cables to minimize the ingress of surface and ground water. Subsequent inspections after completion of the manhole modifications show that water intrusion has been effectively eliminated.

In the Non-EQ Cable Monitoring Aging Management Activity documented in response to RAI 3.6.2-1, the acceptance criterion is established for the absence of exposure of cable to significant moisture. It is further stated that cable found to be submerged in standing water for more than a few days will require an engineering evaluation and appropriate corrective action. The acceptance criteria of the Non-EQ Cable Monitoring Aging Management Activity do not include the terminology "long-term submergence".

Table 4-3 of SAND 96-0344, Aging Management Guideline for Commercial Nuclear Power Plants - Electrical Cables and Terminations, provides the expected insulation life of an insulated cable submerged in 90 degree C water during (ICEA) Insulated Cable Engineers Association E-60 testing for various insulation types. This Table 4-3 shows



that EPR has a 47-month time to failure. The manholes are visually inspected at a frequency that is well within the 47-month timeframe to determine if the cables have been exposed to significant moisture. If cables are found submerged, regardless of the potential duration, corrective actions will be implemented through the Corrective Action System in accordance with 10CFR50, Appendix B. An engineering evaluation will be performed as part of the corrective action. Such an evaluation would consider the performance of testing to determine cable insulation condition.

**RAI 3.6-3:**

In both LRAs, Table 3.0-2, regarding the external service environments exposed to borated water leakage, the applicant states that "[t]his environment is not considered for in-scope cables and connectors since cables are insulated, splices are sealed, and terminations are protected by enclosures." With regard to terminations protected by enclosures, operating experience has shown that water and borated water have migrated into enclosures and terminations by following cables or moving through conduits. Are the cables and conduit that penetrate enclosures which you credit for protecting terminations, sealed to prevent the intrusion of borated water into the enclosure? If not, provide the technical basis for concluding that these enclosures will protect the enclosed terminations from borated water leakage.

**Dominion Response:**

Dominion installation practice used at Surry and North Anna is to seal enclosures, and the cables and conduit that penetrate enclosures, to eliminate the possibility of borated water intrusion. Dominion has performed an operating experience review and has determined this to be an effective practice to eliminate this concern.

### **Section 4.7.3, "Leak-Before-Break"**

#### **RAI 4.7.3-1:**

In the NAS LRA, Section 4.7.3, the applicant identifies the leak-before-break (LBB) analysis for primary loop piping as a time-limited aging analysis (TLAA). As part of its analysis, the applicant identified the steam generator primary nozzles to safe-end welds in the primary loop piping that was analyzed for LBB as the only components fabricated with Alloy 82/182-weld material for NAS 1 and 2. The applicant went on to state that primary water chemistry is controlled by the chemistry control program for the primary system (an AMA described in Section B2.2.4 of the LRA) and, therefore, no known active degradation mechanism for primary water stress-corrosion cracking (PWSCC) exists for these welds. The applicant also states that it is participating in the ongoing NRC/industry program on alloy 82/182-weld material and will implement the findings/resolution from this effort.

As a result of this discussion, the staff noted that the applicant can not take credit for its chemistry control program for the primary system to determine that PWSCC is not an applicable aging effect for the welds of concern. The applicant referred the staff to Table 3.1.5 -1 that includes the welds of concern, cracking as an applicable aging effect, and water chemistry control as the AMA. However, the staff does not believe that chemistry control alone can adequately manage this aging on the basis of information currently available to the industry. Upon conclusion of the ongoing NRC/industry program relating to 82/182-weld materials, other aging management is expected to be needed for these welds.

Therefore, the applicant is requested to provide addition information regarding the need to include a summary description (and/or follow-up action) in its FSAR Supplement describing future (or follow-up action items for) aging management activities consistent with 10 CFR 54.21(d).

#### **Dominion Response:**

The following action item will be included in Section A3.5.3, Leak Before Break, of the UFSAR Supplement:

"The steam generator primary nozzles to safe-end welds in the primary loop piping that have been analyzed for LBB are the only components fabricated with Alloy 82/182-weld material for NAPS 1 and 2. Dominion will continue to participate in the ongoing NRC/industry program on Alloy 82/182-weld material and will implement the findings/resolution from this effort, as appropriate."

### **Section B2.1.3, "Tank Inspection Activities"**

#### **RAI B2.1.3-1:**

The scope of this aging management program includes the tanks which are above ground, as well as those that are located below grade. Experience with the implementation of Unresolved Safety Issue (USI) A-46 indicate that for the above grade tanks, their anchorage components require frequent inspections and aging management. For the tanks located below grade, the degradation of exterior surfaces would depend upon the pH level and aggressive chemicals in the surrounding soil. Please provide more information regarding your operating experience for these broad categories of tanks for NAS and SPS.

#### **Dominion Response:**

Periodic tank inspection is a new activity for North Anna and Surry. Since a formal inspection activity has not previously existed, there have been only limited internal and external examinations of selected tanks. The external surfaces of most tanks that are insulated, protected by a missile barrier, or buried have not been previously inspected.

Within the context of a limited inspection history, the operating history for buried piping and tanks has not established a pattern of aging effects leading to failure of buried components at either Surry or North Anna.

For above-grade tanks that do not have insulation or coverings on the external surfaces, condition monitoring of external attachments/anchorages has been performed during the daily process of performing plant walkdowns. For tanks that do have such coverings, inspections of anchorages will occur as part of the new Tank Inspection Activities.

External inspections have been performed during insulation removal from some above-ground tanks, but have not yet been performed for buried tanks. Inspections of buried tanks will be performed as part of the new Tank Inspection Activities. Internal visual inspections of condensate storage tanks, fire protection tanks (Surry only), and underground fuel oil storage tanks have been performed periodically in the past and some deterioration of protective coatings has been found and corrected in accordance with the Corrective Action System. Additional internal tank inspections will be included in the new Tank Inspection Activities at Surry and North Anna to ensure inclusion of the various material and environment combinations. As indicated in the statement of operating experience for Section B2.1.3, prior inspections, although limited in scope, indicate that there has been no significant loss of material from the base metal, including the anchorages.

**RAI B2.1.3-2:**

On the bases of the description provided in the "Summary" section of this AMA, the staff understands that currently you are performing routine maintenance inspection of these tanks, and you will be performing a focused one time inspection of these tanks prior to the start of the extended period of operation. Your future inspections during the extended period of operation will depend upon the findings of this focused inspection. Please confirm and provide additional information.

**Dominion Response:**

It is Dominion's intent to plan future tank inspection activities based on an engineering evaluation of the results of the one-time inspections of tanks that will be performed prior to beginning the period of extended operation as described in Section B4.0 of the License Renewal Applications for Surry and North Anna. The listing of tanks for which representative samples will be included in the one-time inspections is provided in Section B2.1.3 of the license renewal applications for Surry and North Anna. These representative samples will be chosen to encompass the material and environment (both internal and external) combinations for tanks that are within the scope of license renewal.