VIRGINIA ELECTRIC AND POWER COMPANY
RICHMOND, VIRGINIA 23261

January 19, 2001

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

Serial No. 00-663
NL&OS/GSS/ETS R0
Docket Nos. 50-338
50-339
License Nos. NPF-4
NPF-7

Gentlemen:

**VIRGINIA ELECTRIC AND POWER COMPANY**
**NORTH ANNA POWER STATION UNITS 1 AND 2**
**PROPOSED TECHNICAL SPECIFICATIONS CHANGES**
**ELIMINATION OF SEISMIC EFFECTS FROM CONTROL ROD DROP TIMES**
**REQUEST FOR ADDITIONAL INFORMATION**

In a June 22, 2000 letter (Serial No. 00-307), Virginia Electric and Power Company (Dominion) requested amendments to the Facility Operating Licenses NPF-4 and NPF-7 for North Anna Power Station Units 1 and 2, respectively. The proposed changes would add a risk-informed License Condition. The License Condition will eliminate the consideration of the effects of a concurrent seismic event on the rod control cluster assembly drop time for the non-LOCA accident analyses. In a November 20, 2000 telephone conference call and subsequently in a December 22, 2000 letter, additional information was requested regarding the analysis used to develop the seismic allowance currently applied to the rod control cluster assemblies and historical rod control cluster assembly drop times. The attachment to this letter provides the requested information.

If you have any further questions or require additional information, please contact us.

Very truly yours,

W. R. Matthews
Vice President - Nuclear Operations

Attachment

A001

Commitments made in this letter: None

cc: U.S. Nuclear Regulatory Commission
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Mr. M. J. Morgan
NRC Senior Resident Inspector
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Commissioner
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COMMONWEALTH OF VIRGINIA )
)
COUNTY OF HENRICO )

The foregoing document was acknowledged before me, in and for the County and Commonwealth aforesaid, today by William R. Matthews, who is Vice President - Nuclear Operations, 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 19th day of January, 2001.

My Commission Expires: 3-31-04.

Maggie McClure
Notary Public

(SEAL)

**Attachment**

**Request for Additional Information**
**Elimination of Seismic Effects from Control Rod Drop Times**

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

## DROP Code Description

The seismic effect on control rod drop time is calculated using the Westinghouse proprietary DROP code. DROP calculates the RCCA acceleration, velocity and drop time based on a force balance on the RCCA. The seismic drag force is added to normal (at 0 g) drag force to determine the drop time effect. The normal drag force is empirically determined based on measured drop time data at the plant.

Mitsubishi Heavy Industries of Japan performed full-scale shaker testing on entire 14X14 drivelines comprised of the Control Rod Drive Mechanism (CRDM), control rod, guide tube and fuel assembly for both sinusoidal and random acceleration time history inputs. The CRDM seismic support system was also included in the test setup and seismic input was applied at three different elevations. The test results indicated that the drop times did in fact increase as the applied excitation increased. The 14X14 data became available to Westinghouse on a proprietary basis in the mid-1970's. Based on these data, an empirical correlation of drag force versus seismic acceleration was developed and applied in the Westinghouse DROP code.

The most recent Japanese data for 17x17 drivelines demonstrated similar results to the original 14x14 tests. The more recent tests, performed at Japan's Nuclear Power Engineering Test Center under Mitsubishi sponsorship, are described in the Reference given below. These results showed only modest increases (< 20%) in measured drop time for peak accelerations exceeding 1.0 g horizontal and 0.35 g vertical.

The acceptance test criterion currently applied at North Anna was derived from the DROP code by determining the measured drop time at 0 g which would result in a time equal to the 2.7 second value of the Technical Specification / Safety Analysis when the seismic component is applied The seismic allowance is thus deterministically applied to the largest acceptable measured drop time. The calculated effect is lower (in terms of absolute drop time increase) for shorter measured drop times.

Reference: S. Kawakami, H. Akiyama, H. Shihata, M. Watabe, T. Ichikawa and K. Fujita, "Control Rod Behaviour in Earthquakes," Nuclear Engineering International, April 1990.