VIRGINIA ELECTRIC AND POWER COMPANY
RICHMOND, VIRGINIA 23261

February 28, 2000

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

Serial No. 00-013
NL&P/MAE: R1
Docket Nos. 50-280/-281
50-338/-339
License Nos. DPR-32/-37
NPF-4/-7

Gentlemen:

**VIRGINIA ELECTRIC AND POWER COMPANY**
**SURRY POWER STATION UNITS 1 AND 2**
**NORTH ANNA POWER STATION UNITS 1 AND 2**
**RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION**
**GENERIC LETTER 96-05 (TAC NOS. M97107, M97108, M97073, AND M97074)**

Virginia Electric and Power Company (Virginia Power) resubmitted the 180 day response to Generic Letter (GL) 96-05, entitled "Periodic Verification of Design-Basis Capability of Safety-Related Motor-Operated Valves" in a letter dated September 17, 1999 (Serial No. 99-002A). The NRC requested additional information based on that submittal in a letter dated January 6, 2000. The response to the request for additional information is attached and is reflective of our current program.

If you have any questions, please contact us.

Very truly yours,

David A. Christian
Vice President – Nuclear Operations

Attachment

Commitments made by this letter:

1. Virginia Power will provide the NRC with a date for final implementation of the JOG interim program and risk ranking by September 1, 2000.

A073

cc: Regional Administrator
U.S. Nuclear Regulatory Commission
Region II
Atlanta Federal Center
61 Forsyth St., SW, Suite 23 T85
Atlanta, Georgia 30303-3415

Mr. R. A. Musser
NRC Senior Resident Inspector
Surry Power Station

Mr. M. J. Morgan
NRC Senior Resident Inspector
North Anna Power Station

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 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 28th day of February, 2000.

My Commission Expires: 3/31/2000.

Maggie McClure
Notary Public

(SEAL)

# VIRGINIA POWER
# MOV PERIODIC VERIFICATION PROGRAM
# RESPONSE TO A REQUEST FOR ADDITIONAL INFORMATION

## 1. NRC Request

The Joint Owners Group (JOG) program focuses on the potential age-related increase in the thrust or torque required to operate valves under their design-basis conditions. In the NRC Safety Evaluation (SE) of the JOG program, dated October 30, 1997, the NRC specified that licensees are responsible for addressing the thrust or torque delivered by the motor operated valve (MOV) motor actuator and its potential degradation. Describe the plan at Surry and North Anna for ensuring adequate ac and dc MOV motor actuator output capability, including consideration of guidance in Limitorque Technical Update 98-01 and its Supplement 1. Clarify if there are any dc-powered MOVs in the Surry or North Anna Generic Letter 96-05 programs. Briefly discuss the MOV parameters that are trended in order to detect degradation of MOV performance.

### Virginia Power Response

Ensuring adequate motor actuator output capability will be accomplished through the performance of maintenance tasks and engineering practices. The approach will be to minimize the degradation in stem/stem nut coefficient of friction (COF), ensure efficient actuator gearcase operation, and compensate for lubrication degradation in the minimum required calculated thrust or torque.

Both stations employ a frequent stem/stem nut lubrication preventive maintenance (PM) program. The lubrication PM is currently performed every refueling outage or eighteen months (dependent upon whether the PM is performed on an outage or non-outage basis). Degradation in the stem/stem nut COF due to lubricant aging is minimized by the frequent performance of the lubrication PM which ensures fresh lubricant is applied. Virginia Power is currently considering extension of the stem/stem nut PM frequency to five years or three refueling cycles. Any revision to the PM frequency will be determined by consideration of individual MOV design margin and will be supported by actual test data.

Both stations also employ an actuator gearcase grease inspection PM that is performed every refueling outage or eighteen months (dependent upon whether the PM is performed on an outage or non-outage basis). The PM requires multiple actuator grease samples be taken to determine the overall quality of the grease. Actuators that fail specific criteria for the inspection are scheduled for a complete grease replacement that typically requires an actuator overhaul. The performance of the actuator grease

inspection PM alerts the station to a potential degraded grease condition and identifies necessary corrective actions.

Currently, to account for stem lubricant degradation and rate of loading (ROL), the programs at both stations add 25% margin to the minimum required thrust in the calculation of their diagnostic testing thrust setpoints and design margins. The 25% margin is in addition to torque switch repeatability factors, spring pack relaxation factors, and test equipment accuracy.

However, the MOV programs at both stations are in the process of refining the current methodology to separately account for stem lubrication degradation and ROL. The revised methodology will replace the use of the 25% margin addition with separate stem lubrication degradation factors and updated rate of loading (ROL) factors.

Both the current and revised methodologies account for changes in COF and ROL while ensuring the minimum required thrust or torque is maintained. Additionally, the MOV programs at both stations are required to perform periodic diagnostic testing to measure COF. The intent of this testing is to verify no negative trends are developing in the COF and ensure current lubrication PM effectiveness. The three described elements, as well as the periodic diagnostic testing, provide assurance of adequate motor actuator output.

Limitorque Technical Update 98-01 and Supplement 1

The Limitorque Technical Update 98-01 and Supplement 1 covered several topics related to calculation of motor actuator output and motor torque capability. The response to required actions resulting from the technical update is addressed in categories grouped by mechanical and electrical disciplines.

Electrical

The methodology used by Virginia Power to calculate motor shaft torque at reduced voltage is based on standard electrical engineering principals as determined by IEEE standards and NEMA MG1. The calculated results of the Virginia Power methodology are consistent with the test data provided by the Commonwealth Edison motor study (Commonwealth Edison MOV AC Motor Test Program Report, Part 1, Revision 1, dated April 1995.) No corrective actions are applicable to or necessary for Virginia Power regarding application of the Limitorque revised degraded voltage factor.

Additionally, Limitorque stated there are two types of motors that require a separate configuration review. In particular, actuators with a 25 ft-lb, 3600 rpm motor in a 56 frame and actuators with a 60 ft-lb, 1800 rpm motor in a 56 frame must have their output torque capabilities derated beyond that calculated with the revised degraded voltage factor. Both stations have these types of motors installed on program valves. However, recognizing some discrepancies associated with the Limitorque data provided

for those two types of motors, Virginia Power uses motor performance values that more accurately represent the test data from the Commonwealth Edison study. Therefore, no corrective actions are necessary for Virginia Power regarding the two special cases for reduced motor torque capability.

There are no dc-powered MOVs in the Surry or North Anna Generic Letter 96-05 programs.

Mechanical

According to Limitorque, the maximum available torque developed for SMB-1 actuators with a 66:1 worm gear ratio is 90% of the value determined employing the methods outlined in the Technical Update or the Limitorque Selection Guide from their technical manual. There are no MOVs in the North Anna program and four MOVs in the Surry program with this specific worm gear ratio. An engineering analysis of the Limitorque recommended de-rating for the actuators with the 66:1 worm gear set showed no impairment of design function and required no changes to control switch settings or design modifications.

In the Technical Update, Limitorque stated that the use of run efficiency instead of pullout efficiency in determining actuator capability is no longer allowed. Virginia Power calculations have always employed the pullout efficiency and also use the Limitorque recommended value of 0.9 for the application factor. No corrective actions are necessary for Virginia Power regarding the use of run efficiencies in determining actuator output.

**2. NRC Request**

Your letter dated September 17, 1999, states that the maximum interval between static diagnostic tests, including the grace period, will not exceed 10 years. In the NRC SE dated October 30, 1997, regarding the Westinghouse Owners Group (WOG) Topical Report MPR-1807 describing the JOG program, the NRC staff stated that MOVs tested at frequencies beyond 5 years will need to be grouped with other MOVs that will be tested at frequencies less than 5 years in order to validate assumptions for the longer test intervals. The NRC staff stated that this review must include valve thrust (or torque) requirements and actuator output capability. Please describe how your MOV static diagnostic testing program will satisfy this condition of the NRC Safety Evaluation.

**Virginia Power Response**

As stated in our letter dated September 17, 1999, Virginia Power will implement the JOG interim program for static diagnostic testing. Until the JOG interim program is implemented, the current static diagnostic test frequency of three refueling outages or five years, which ever is longer, will be used. A 25% PM grace period will be used for scheduling purposes.

In accordance with the JOG interim program and the WOG MOV risk ranking methodology, Virginia Power will determine MOV PM frequencies by design margin and risk significance. Design margin will be calculated in accordance with the JOG program and will include consideration for actuator capability degradation. (See the Virginia Power response to NRC Request number 1.) The condition presented in the NRC Safety Evaluation (SE) of the JOG program is clear with respect to grouping MOVs with a test schedule beyond five years with MOVs with a test schedule within five years. Virginia Power intends to group MOVs according to the SE condition and MOVs with a test frequency beyond five years will be grouped with MOVs with a test frequency within five years.

**3. NRC Request**

In a letter dated September 17, 1999, VEPCO stated that it plans to implement (1) the three elements of the JOG program as described in Topical Report MPR-1807 (Revision 2); and (2) the MOV risk-ranking methodology described in WOG Engineering Report V-EC-1658 (Revision 2). Discuss the JOG dynamic test program and the JOG interim periodic test program implementation dates, and when MOV risk ranking will be complete.

**Virginia Power Response**

Virginia Power is participating in the JOG Dynamic Test Program and has had test results from four North Anna valves accepted by the JOG. The JOG interim periodic program has not yet been implemented at Virginia Power. Since the risk ranking is an integral part of the interim program and testing frequency determination, the date for its completion will be provided with the JOG interim program implementation date. Virginia Power will provide the NRC with a date for final implementation of the JOG interim program and risk ranking by September 1, 2000.