

VIRGINIA ELECTRIC AND POWER COMPANY

RICHMOND, VIRGINIA 23261

October 4, 1993

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

Serial No. 93-412  
NL&P/MAE: R3  
Docket Nos. 50-338  
50-339  
50-280  
50-281  
License Nos. NPF-4  
NPF-7  
DPR-32  
DPR-37

Gentlemen:

**VIRGINIA ELECTRIC AND POWER COMPANY**  
**NORTH ANNA POWER STATION UNITS 1 AND 2**  
**SURRY POWER STATION UNITS 1 AND 2**  
**GL 89-10 SUPPLEMENT 5 RESPONSE**  
**INACCURACY OF MOV DIAGNOSTIC EQUIPMENT**

The Virginia Electric and Power Company (Virginia Power) Motor Operated Valve (MOV) Program was implemented to address the requirements of IEB 85-03, "Motor-Operated Valve Common Mode Failures During Plant Transients Due To Improper Switch Settings." The scope of affected systems was increased by Generic Letter (GL) 89-10, "Safety-Related Motor-Operated Valve Testing and Surveillance" and committed to by our letter dated December 26, 1989 (Serial No. 89-530). GL 89-10 requires the testing, inspection, and maintenance of safety-related MOVs as well as position-changeable MOVs.

Supplement 5 to GL 89-10 was issued June 28, 1993. The supplement requires identification of the MOV diagnostic equipment used to confirm the proper size or to establish settings within the scope of GL 89-10. The supplement also requires reporting whether actions have been or are planned to be taken to address concerns regarding accuracy of MOV diagnostic equipment. The three diagnostic equipment manufacturers discussed in Supplement 5 are ABB-Impell, ITI-MOVATS and Liberty Technologies.

Virginia Power used ITI-MOVATS (MOVATS) diagnostic equipment until mid 1991. Almost all of the rising stem MOVs at Surry and North Anna had their torque switches set using MOVATS. After a technical/economic evaluation, Virginia Power elected to replace the MOVATS equipment with Valve Operation Test and Evaluation System (VOTES) test equipment manufactured by Liberty Technologies. By the time MOVATS issued information on the inaccuracy of the equipment in March, 1992, Virginia Power was no longer using the equipment. Valves that had their torque switches set using MOVATS equipment have already been or are scheduled to be reset using the

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VOTES equipment in order to complete the requirements of GL 89-10. An evaluation has been performed on these valves to assure that the current settings are adequate for operability.

Since 1991 Virginia Power has used VOTES diagnostic equipment to establish the relationship between torque switch setting and stem thrust for rising stem MOVs within the scope of GL 89-10. The diagnostic testing methodology was modified in October 1992 to correct equipment inaccuracies documented in the supplement. Valve torque switches that were set using the VOTES equipment prior to October 1992, will be evaluated to determine if they are acceptable as set or whether retesting and resetting of the torque switch is required. These evaluations and any required retesting and resetting of the torque switches have been completed for North Anna Unit 1 and are scheduled to be completed during the Unit 2 refueling outage currently in progress. Evaluations and any required retesting and resetting of the torque switches for Surry Units 1 and 2 are to be completed during the refueling outages currently scheduled for February 1994 and November 1994 respectively. The methodology used to evaluate the impact of the Liberty Technologies 10 CFR Part 21 disclosure is summarized in Attachment 1.

Virginia Power has not used ABB-Impell diagnostic equipment.

Although not discussed in the supplement, Virginia Power has also initiated the following action in response to the changes in actuator torque switch repeatability reported by Limitorque Corporation in its Maintenance Update 92-2. The torque switch setting is procedurally controlled in either the maintenance procedure or the setpoint procedure. The repeatability error of the torque switch identified by Limitorque has been accounted for in the determination of overall accuracy and applied to the minimum and maximum thrust band.

If you have any questions or require additional information regarding the approach Virginia Power has taken in regard to the diagnostic equipment accuracies discussed in the supplement, please contact us.

Very truly yours,



W. L. Stewart  
Senior Vice President - Nuclear

Attachment

cc: U.S. Nuclear Regulatory Commission  
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NRC Senior Resident Inspector  
North Anna Power Station

Mr. M. W. Branch  
NRC Senior Resident Inspector  
Surry Power Station

## ATTACHMENT I

### LIBERTY TECHNOLOGIES 10 CFR PART 21 EVALUATION METHODOLOGY SUMMARY SURRY AND NORTH ANNA POWER STATIONS

The summary which follows describes the methodology used to evaluate the impact of Liberty Technologies October 1992 10 CFR Part 21 disclosure on the potential for their test equipment to underestimate the true thrust generated in a MOV.

#### Action Summary

1. Apply revised constants for stem material (E/nu ratios, where E is Young's Modulus and nu is Poisson's Ratio)
2. Apply revised effective diameters if calibrated on the threaded portion of the stem.
3. Apply torque correction factor if calibrated on the threaded portion of the stem.

#### Scope

1. Valves that used VOTES to set the torque switch and were calibrated on the unthreaded portion of the stem are reviewed for the effect of a change in the E/nu ratio.
2. Valves that used VOTES to set the torque switch and were calibrated on the threaded portion of the stem are reviewed for the effect of a change in the E/nu ratio, a change in the effective diameter, and inclusion of the torque correction factor.

#### Approach

1. Review drawings or contact the manufacturer to determine the stem geometry (pitch, lead, major diameter, minor diameter).
2. Calculate effective diameters and torque correction factors.
3. Calculate a revised maximum thrust.
4. MOV is considered to be acceptable if:
  - a. The adjusted maximum thrust was below the actuator rating, and
  - b. The adjusted maximum thrust was below the valve allowable, and
  - c. The adjusted thrust was below the calculated motor output capability.

Note: The evaluation considered undervoltage motor capabilities as required.

5. In selected cases, the maximum adjusted thrust delivered, as determined by VOTES, was compared to the thrust output estimated by motor current/power/torque at control switch trip, and torque switch setting/spring pack displacement.

### Results

Based on the approach described above, MOVs were divided into two groups, those that were reviewed and found acceptable with no reset required, and those that required retesting and possible resetting of the torque switch.

For those MOVs that required a retest and possible resetting of the torque switch, an as found test was recommended with the calibrator on the solid portion of the stem. Based on this more accurate information of thrust delivered, decisions were made regarding the need for subsequent valve and, or actuator inspections.