

January 18, 2001

Mr. David A. Christian
Senior Vice President - Nuclear
Virginia Electric and Power Company
5000 Dominion Blvd.
Glen Allen, Virginia 23060

SUBJECT: SURRY POWER STATION UNITS 1 AND 2 - GENERIC LETTER (GL) 96-05,
"PERIODIC VERIFICATION OF DESIGN BASIS CAPABILITY OF SAFETY-
RELATED MOTOR-OPERATED VALVES" (TAC NOS. M97107 AND M97108)

Dear Mr. Christian:

The purpose of this letter is to transmit our safety evaluation of your response to the subject matter for Surry.

On September 18, 1996, the NRC issued GL 96-05, "Periodic Verification of Design-Basis Capability of Safety-Related Motor-Operated Valves," requesting each nuclear power plant licensee to establish a program, or to ensure the effectiveness of its current program, to verify on a periodic basis that safety-related motor-operated valves (MOV) continue to be capable of performing their safety functions within the current licensing bases of the facility.

On November 13, 1996, Virginia Electric and Power Company (VEPCO) submitted a 60-day response to GL 96-05 discussing its plans regarding the requested MOV periodic verification program at Surry Power Station, Units 1 and 2. On March 12, 1997, VEPCO submitted a 180-day response to GL 96-05 providing a summary description of the MOV periodic verification program to be implemented at Surry. In a letter dated May 26, 1999, VEPCO stated that it planned to revise its 180-day response to GL 96-05. VEPCO's letter dated September 17, 1999, superseded the previous 180-day response to GL 96-05 dated March 12, 1997. On February 28 and August 28, 2000, VEPCO responded to a request for additional information regarding GL 96-05 forwarded by the NRC staff on January 6, 2000.

The NRC staff has reviewed VEPCO's submittals and applicable NRC inspection reports for the MOV program at Surry. Based on our understanding of VEPCO's commitment to all three phases of the Joint Owners Group (JOG) Program on MOV Periodic Verification, we find that you have established an acceptable program to verify periodically the design-basis capability of the safety-related MOVs at Surry. As discussed in the safety evaluation (SE), we conclude that you are adequately addressing the actions requested in GL 96-05. The NRC staff may conduct inspections at Surry to verify the implementation of the MOV periodic verification program is in accordance with your commitments; this NRC SE; the NRC SE dated October 30, 1997, on the JOG Program on MOV Periodic Verification; and the NRC SE dated April 14, 1998, on the Westinghouse Owners Group methodology for ranking MOVs by their safety significance.

D. A. Christian

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Our safety evaluation is enclosed. This completes our effort under TAC Nos. M97107 and M97108, and the TACs are closed.

If you have any questions, please call me at (301) 415-1448.

Sincerely,

/RA/

Gordon E. Edison, Senior Project Manager, Section 1
Project Directorate II
Division of Licensing Project Management
Office of Nuclear Reactor Regulation

Enclosure: As stated

Docket Nos. 50-280 and 50-281

cc w/encl: See next page

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SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION
LICENSEE RESPONSE TO GENERIC LETTER 96-05, "PERIODIC VERIFICATION OF
DESIGN-BASIS CAPABILITY OF SAFETY-RELATED MOTOR-OPERATED VALVES"

SURRY POWER STATION, UNITS 1 AND 2

DOCKET NOS. 50-280 AND 50-281

1.0 INTRODUCTION

Many fluid systems at nuclear power plants depend on the successful operation of motor-operated valves (MOVs) in performing their safety functions. Several years ago, MOV operating experience and testing, and research programs sponsored by the nuclear industry and the U. S. Nuclear Regulatory Commission (NRC), revealed weaknesses in a wide range of activities (including design, qualification, testing, and maintenance) associated with the performance of MOVs in nuclear power plants. For example, some engineering analyses used in sizing and setting MOVs did not adequately predict the thrust and torque required to operate valves under their design-basis conditions. In addition, inservice tests of valve stroke time under zero differential-pressure and flow conditions did not ensure that MOVs could perform their safety functions under design-basis conditions.

Upon identification of the weaknesses in MOV performance, significant industry and regulatory activities were initiated to verify the design-basis capability of safety-related MOVs in nuclear power plants. After completion of these activities, nuclear power plant licensees began establishing long-term programs to maintain the design-basis capability of their safety-related MOVs. This safety evaluation (SE) addresses the program developed by Virginia Electric and Power Company (licensee) to verify periodically the design-basis capability of safety-related MOVs at Surry Power Station, Units 1 and 2.

2.0 REGULATORY REQUIREMENTS

The NRC regulations require that MOVs important to safety be treated in a manner that provides assurance of their intended performance. Criterion 1 to Appendix A, "General Design Criteria for Nuclear Power Plants," to Part 50 of Title 10 of the *Code of Federal Regulations* (10 CFR Part 50) states, in part, that structures, systems, and components important to safety shall be designed, fabricated, erected, and tested to quality standards commensurate with the importance of the safety functions to be performed. The quality assurance program to be applied to safety-related components is described in Appendix B, "Quality Assurance Criteria for Nuclear Power Plants and Fuel Reprocessing Plants," to

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10 CFR Part 50. In Section 50.55a of 10 CFR Part 50, the NRC requires licensees to establish inservice testing (IST) programs in accordance with the American Society of Mechanical Engineers (ASME) *Boiler and Pressure Vessel Code*, and more recently the ASME *Code for Operation and Maintenance of Nuclear Power Plants*.

In response to concerns regarding MOV performance, the NRC staff issued Generic Letter (GL) 89-10 (June 28, 1989), "Safety-Related Motor-Operated Valve Testing and Surveillance," which requested that nuclear power plant licensees and construction permit holders ensure the capability of MOVs in safety-related systems to perform their intended functions by reviewing MOV design bases, verifying MOV switch settings initially and periodically, testing MOVs under design-basis conditions where practicable, improving evaluations of MOV failures and necessary corrective action, and trending MOV problems. The staff requested that licensees complete the GL 89-10 program within approximately three refueling outages or 5 years from the issuance of the generic letter. Permit holders were requested to complete the GL 89-10 program before plant startup or in accordance with the above schedule, whichever was later.

The NRC staff issued seven supplements to GL 89-10 that provided additional guidance and information on MOV program scope, design-basis reviews, switch settings, testing, periodic verification, trending, and schedule extensions. GL 89-10 and its supplements provided only limited guidance regarding MOV periodic verification and the measures appropriate to assure preservation of design-basis capability. Consequently, the staff determined that additional guidance on the periodic verification of MOV design-basis capability should be prepared. On September 18, 1996, the NRC staff issued GL 96-05, "Periodic Verification of Design-Basis Capability of Safety-Related Motor-Operated Valves," requesting each licensee establish a program, or ensure the effectiveness of its current program, to verify on a periodic basis that safety-related MOVs continue to be capable of performing their safety functions within the current licensing bases of the facility. In GL 96-05, the NRC staff summarized several industry and regulatory activities and programs related to maintaining long-term capability of safety-related MOVs. For example, GL 96-05 discussed non-mandatory ASME Code Case OMN-1, "Alternative Rules for Preservice and Inservice Testing of Certain Electric Motor Operated Valve Assemblies in LWR Power Plants, OM Code 1995 Edition; Subsection ISTC," which allows the replacement of ASME Code requirements for MOV quarterly stroke-time testing with exercising of safety-related MOVs at least once per operating cycle and periodic MOV diagnostic testing on a frequency to be determined on the basis of margin and degradation rate. In GL 96-05, the NRC staff stated that the method in OMN-1 meets the intent of the generic letter with certain limitations. The NRC staff also noted in GL 96-05 that licensees remain bound by the requirements in their code of record regarding MOV stroke-time testing, as supplemented by relief requests approved by the NRC staff.

In GL 96-05, licensees were requested to submit the following information to the NRC:

- a. within 60 days from the date of GL 96-05, a written response indicating whether or not the licensee would implement the requested actions; and
- b. within 180 days from the date of GL 96-05, or upon notification to the NRC of completion of GL 89-10 (whichever is later), a written summary description of the licensee's MOV periodic verification program.

The NRC staff is preparing an SE on the response of each licensee to GL 96-05. The NRC staff intends to rely to a significant extent on an industry initiative to identify valve age-related degradation which could adversely affect the design-basis capability of safety-related MOVs (described in Section 3.0) where a licensee commits to implement that industry program. The NRC staff will conduct inspections to verify the implementation of GL 96-05 programs at nuclear power plants as necessary.

3.0 JOINT OWNERS GROUP PROGRAM ON MOV PERIODIC VERIFICATION

In response to GL 96-05, the Boiling Water Reactor Owners Group (BWROG), Westinghouse Owners Group (WOG), and Combustion Engineering Owners Group (CEOG) jointly developed an MOV periodic verification program to obtain benefits from the sharing of information between licensees. The Joint Owners Group (JOG) program on MOV periodic verification is described by BWROG in its Licensing Topical Report NEDC-32719, "BWR Owners' Group Program on Motor-Operated Valve (MOV) Periodic Verification," and described by WOG and CEOG in their separately submitted Topical Report MPR-1807, "Joint BWR, Westinghouse and Combustion Engineering Owners' Group Program on Motor-Operated Valve (MOV) Periodic Verification." The stated objectives of the JOG program on MOV periodic verification are (1) to provide an approach for licensees to use immediately in their GL 96-05 programs; (2) to develop a basis for addressing the potential age-related increase in required thrust or torque under dynamic conditions; and (3) to use the developed basis to confirm, or if necessary to modify, the applied approach. The specific elements of the JOG program are (1) providing an "interim" MOV periodic verification program for applicable licensees to use in response to GL 96-05; (2) conducting a dynamic testing program over the next 5 years to identify potential age-related increases in required thrust or torque to operate gate, globe, and butterfly valves under dynamic conditions; and (3) evaluating the information from the dynamic testing program to confirm or modify the interim program assumptions.

The JOG interim MOV periodic verification program includes (1) continuation of MOV stroke-time testing required by the ASME Code IST program; and (2) performance of MOV static diagnostic testing on a frequency based on functional capability (age-related degradation margin over and above margin for GL 89-10 evaluated parameters) and safety significance. In implementing the interim MOV static diagnostic test program, licensees will rank MOVs within the scope of the JOG program according to their safety significance. The JOG program specifies that licensees need to justify their approach for risk ranking MOVs. In Topical Report NEDC 32264, "Application of Probabilistic Safety Assessment to Generic Letter 89-10 Implementation," BWROG described a methodology to rank MOVs in GL 89-10 programs with respect to their relative importance to core-damage frequency and other considerations to be added by an expert panel. In an SE dated May 20, 1996, the NRC staff accepted the BWROG methodology for risk ranking MOVs in boiling water reactor nuclear plants with certain conditions and limitations. In the NRC SE (dated October 30, 1997) on the JOG program on MOV periodic verification, the NRC staff indicated its view that the BWROG methodology for MOV risk ranking is appropriate for use in response to GL 96-05. With respect to Westinghouse-designed pressurized water reactor nuclear plants, WOG prepared Engineering Report V-EC-1658, "Risk Ranking Approach for Motor-Operated Valves in Response to Generic Letter 96-05." On April 14, 1998, the NRC staff issued an SE accepting with certain conditions and limitations the WOG approach for ranking MOVs based on their risk significance. Licensees not applicable to the BWROG or WOG methodologies need to justify their MOV risk-ranking approach individually.

The objectives of the JOG dynamic test program are to determine degradation trends in dynamic thrust and torque, and to use dynamic test results to adjust the test frequency and method specified in the interim program if warranted. The JOG dynamic testing program includes (1) identification of conditions and features which could potentially lead to MOV degradation; (2) definition and assignment of valves for dynamic testing; (3) testing valves three times over a 5-year interval with at least a 1-year interval between valve-specific tests according to a standard test specification; (4) evaluation of results of each test; and (5) evaluation of collective test results.

In the last phase of its program, JOG will evaluate the test results to validate the assumptions in the interim program to establish a long-term MOV periodic verification program to be implemented by licensees. A feedback mechanism will be established to ensure timely sharing of MOV test results among licensees and to prompt individual licensees to adjust their own MOV periodic verification program, as appropriate.

Following consideration of NRC staff comments, BWROG submitted Licensing Topical Report NEDC-32719 (Revision 2) describing the JOG program on July 30, 1997. Similarly, CEOG and WOG submitted Topical Report MPR-1807 (Revision 2) describing the JOG program on August 6 and 12, 1997, respectively. On October 30, 1997, the NRC staff issued an SE accepting the JOG program with certain conditions and limitations as an acceptable industry-wide response to GL 96-05 for valve age-related degradation. On October 19, 1999, the Babcock & Wilcox Owners Group (B&WOG) forwarded Topical Report MPR-1807 (Revision 2) to the NRC, and stated that B&WOG is now participating in the JOG program on MOV periodic verification. In a letter dated May 15, 2000, the NRC staff informed B&WOG that Topical Report MPR-1807 is acceptable for referencing in B&WOG licensing applications to the extent specified and under the limitations delineated in the report and the associated NRC SE dated October 30, 1997.

4.0 SURRY GL 96-05 PROGRAM

On November 13, 1996, Virginia Electric and Power Company submitted a 60-day response to GL 96-05 discussing its plans regarding the requested MOV periodic verification program at Surry Power Station, Units 1 and 2. On March 12, 1997, the licensee submitted a 180-day response to GL 96-05 providing a summary description of the MOV periodic verification program to be implemented at Surry. In a letter dated May 26, 1999, the licensee stated that it planned to revise its 180-day response to GL 96-05. The licensee's letter dated September 17, 1999, superseded the previous 180-day response to GL 96-05 dated March 12, 1997. On February 28 and August 28, 2000, the licensee responded to a request for additional information regarding GL 96-05 forwarded by the NRC staff on January 6, 2000.

In its letter dated September 17, 1999, the licensee stated that the MOV periodic verification program at Surry consists of dynamic diagnostic testing, static diagnostic testing, and preventive maintenance. In that letter, the licensee committed to implement the JOG program on MOV periodic verification in accordance with Topical Report MPR-1807, Revision 2. In addition, the licensee described the scope of its MOV periodic verification program, existing and planned testing, preventive maintenance, capability margin, post maintenance testing, corrective action, and implementation of the JOG program at Surry. For example, the licensee indicated that the interim MOV static diagnostic test program at Surry would apply MOV risk insights to prioritize periodic test activities in accordance with an expert panel review and the

methodology described in WOG Engineering Report V-EC-1658, Revision 2. Until the JOG program is implemented at Surry, the licensee stated that the static diagnostic test interval would be three refueling outages or 5 years, whichever is longer. In its letter dated February 28, 2000, the licensee stated that MOVs with test intervals longer than 5 years would be grouped with MOVs that have shorter test intervals to share information on MOV performance. In its letter dated September 17, 1999, the licensee stated that dynamic testing of selected MOVs would be performed as part of its implementation of the JOG program. The licensee stated that adjustments would be made to its GL 96-05 program based on the test results and recommendations from the JOG testing program. In its letter dated August 28, 2000, the licensee reported that the date for final implementation of the JOG interim program and its MOV risk ranking is June 29, 2001. In a telephone conference with the NRC staff on May 15, 2000, the licensee clarified certain aspects of its MOV program.

5.0 NRC STAFF EVALUATION

The NRC staff has reviewed the information provided in the licensee's submittals describing the program to verify periodically the design-basis capability of safety-related MOVs at Surry in response to GL 96-05. NRC Inspection Reports (IRs) 50-280 & 281/94-18 and 96-03 provided the results of inspections to evaluate the licensee's program to verify the design-basis capability of safety-related MOVs in response to GL 89-10. In IR 96-03, the staff closed the review of the GL 89-10 program at Surry based on the actions taken and planned to verify the design-basis capability of safety-related MOVs as noted in IR 96-03 and the licensee's letter dated May 6, 1996. The staff's evaluation of the licensee's response to GL 96-05 is described below.

5.1 MOV Program Scope

In GL 96-05, the NRC staff indicated that all safety-related MOVs covered by the GL 89-10 program should be considered in the development of the MOV periodic verification program. The staff noted that the program should consider safety-related MOVs that are assumed to be capable of returning to their safety position when placed in a position that prevents their safety system (or train) from performing its safety function; and the system (or train) is not declared inoperable when the MOVs are in their non-safety position.

In IR 96-03, the NRC staff reviewed the scope of the licensee's MOV program in response to GL 89-10 at Surry and found that the scope was consistent with the generic letter. In its letter dated September 17, 1999, the licensee stated that the MOV periodic verification program at Surry addresses MOVs that were included in the scope of GL 89-10. In its response to GL 96-05, the licensee did not take exception to the recommendation in the generic letter regarding the consideration of the capability of MOVs placed in their non-safety position.

The NRC staff considers the licensee to have made adequate commitments regarding the scope of its MOV program.

5.2 MOV Assumptions and Methodologies

Licensees maintain their assumptions and methodologies used in the development of MOV programs consistent with the plant configuration throughout the life of the plant (a concept commonly described as a "living program"). For example, the design basis of safety-related MOVs is maintained up to date, including consideration of any plant modifications or power uprate conditions.

In IR 96-03, the NRC staff reviewed the licensee's justification for the assumptions and methodologies used in the MOV program in response to GL 89-10 at Surry. With certain long-term items discussed in the following section, the staff determined that the licensee had adequately justified the assumptions and methodologies used in its MOV program. The staff considers the licensee to have adequate processes in place to maintain the assumptions and methodologies used in its MOV program, including the design basis of its safety-related MOVs.

5.3 GL 89-10 Long-Term Items

When evaluating the GL 89-10 program at Surry, the NRC staff discussed in IR 96-03 several items of the licensee's MOV program to be addressed over the long term. The items involved (1) capability margin of the pressurizer power-operated relief valve (PORV) block valves; (2) verification of the torque required to operate Pratt butterfly valves; (3) verification of the setup of Posi-Seal butterfly valves; and (4) evaluation of potential overthrust or overtorque conditions of motor actuators. In IR 98-05, the staff evaluated the licensee's actions to address these open items. For example, the licensee had (1) modified the control circuitry to increase the capability of the pressurizer PORV block valves and performed follow-up diagnostic testing; (2) performed a dynamic diagnostic test of a 96-inch Pratt butterfly valve to support its sizing methodology; (3) performed static diagnostic tests of several Posi-Seal butterfly valves with action taken to address the higher-than-anticipated unseating torque measurements; and (4) revised its procedure for evaluating potential overthrust and torque conditions consistent with Limitorque guidance. The NRC staff considered these items to be satisfactorily resolved. Also in GL 89-10, the staff identified pressure locking and thermal binding as potential performance concerns for safety-related MOVs. The NRC staff completed the review of the licensee's actions in response to GL 95-07, "Pressure Locking and Thermal Binding of Safety-Related Power-Operated Gate Valves," in an SE dated December 22, 1999.

In IR 94-18, the NRC staff discussed qualitative and quantitative aspects of the licensee's program for trending MOV performance at Surry. The staff found that the licensee was identifying MOV failures, taking appropriate corrective action, and trending MOV problems. As part of the licensee's program, the MOV coordinator at Surry prepares a quarterly report that lists the status of the MOV testing efforts and failures that occurred during the period. The quarterly report also describes the root cause of the MOV failures and tracks failures by type since 1991. Further, as noted in its letter dated February 28, 2000, the licensee monitors rate of loading and degradation in stem/stem nut coefficient of friction during the performance of periodic MOV diagnostic tests to verify that negative trends are not developing and to ensure the effectiveness of stem lubrication frequencies.

With the licensee's ongoing MOV activities and trending program, no outstanding issues regarding the licensee's GL 89-10 program remain at Surry.

5.4 JOG Program on MOV Periodic Verification

In its letter dated September 17, 1999, the licensee committed to implement the JOG program on MOV periodic verification as described in Topical Report MPR-1807 (Revision 2). In an SE dated October 30, 1997, the NRC staff accepted the JOG program as an industry-wide response to GL 96-05 with certain conditions and limitations. The JOG program consists of the following three phases: (1) the JOG interim static diagnostic test program; (2) the JOG 5-year dynamic test program; and (3) the JOG long-term periodic test program. The staff considers the licensee's commitment in response to GL 96-05 to include implementation of all three phases of the JOG program at Surry. The conditions and limitations discussed in the NRC SE dated October 30, 1997, apply to the JOG program at Surry. The staff considers the commitments by the licensee to implement all three phases of the JOG program at Surry to be an acceptable response to GL 96-05 for valve age-related degradation.

In its letter dated September 17, 1999, the licensee noted that the interim MOV static diagnostic testing under the JOG program would be performed on a test frequency based on the safety significance and capability margin of each GL 96-05 MOV. The licensee stated that the Surry MOV risk-ranking approach would be consistent with the MOV risk-ranking methodology presented in WOG Engineering Report V-EC-1658 (Revision 2). An expert panel will review the results of the Surry analysis and provide input into the final determination for risk ranking the MOVs. In its report, WOG provided an example list of risk-significant MOVs for consideration by each licensee when applying the owners group methodology. The conditions and limitations specified in the NRC SE dated April 14, 1998, apply to the Surry MOV risk-ranking approach. Based on the licensee's summary, the staff considers the methodology for risk-ranking MOVs at Surry to be acceptable.

In its letter dated August 28, 2000, the licensee reported that the date for final implementation of the JOG interim program and its MOV risk ranking is June 29, 2001. Until the JOG program is implemented at Surry, the licensee stated that the static MOV diagnostic test interval would be three refueling outages or 5 years, whichever is longer. With the short time until full implementation, the staff considers the schedule for implementing the JOG interim program at Surry and the licensee's testing plan until then to be acceptable.

The JOG program is intended to address most gate, globe and butterfly valves used in safety-related applications in the nuclear power plants of participating licensees. JOG indicates that each licensee is responsible for addressing any MOVs outside the scope of applicability of the JOG program. The NRC staff recognizes that JOG has selected a broad range of MOVs and conditions for the dynamic testing program, and that significant information will be obtained on the performance and potential degradation of safety-related MOVs during the interim static diagnostic test program and the JOG dynamic test program. As the test results are evaluated, JOG might include or exclude additional MOVs with respect to the scope of its program. Although the test information from the MOVs in the JOG dynamic test program might not be adequate to establish a long-term periodic verification program for each MOV outside the scope of the JOG program, sufficient information should be obtained from the JOG dynamic test program to identify any immediate safety concern for potential valve age-related degradation during the interim period of the JOG program. Therefore, the NRC staff considers it acceptable

for the licensee to apply its interim static diagnostic test program to GL 96-05 MOVs that currently might be outside the scope of the JOG program with the feedback of information from the JOG dynamic test program to those MOVs. In the NRC SE dated October 30, 1997, the NRC staff specifies that licensees implementing the JOG program must determine any MOVs outside the scope of the JOG program (including service conditions) and justify a separate program for periodic verification of the design-basis capability (including static and dynamic operating requirements) of those MOVs. In its letter dated September 17, 1999, the licensee states that the need to dynamically test valves outside the scope of the JOG dynamic test program at Surry will be addressed at the completion of the JOG program when adequate statistical data are available from the industry.

5.5 Motor Actuator Output

The 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 SE dated October 30, 1997, on the JOG program, the NRC staff specifies that licensees are responsible for addressing the thrust or torque delivered by the MOV motor actuator and its potential degradation. Although JOG does not plan to evaluate degradation of motor actuator output, significant information on the output of motor actuators will be obtained through the interim MOV static diagnostic test program and the JOG dynamic test program. Several parameters obtained during MOV static and dynamic diagnostic testing help identify motor actuator output degradation when opening and closing the valve including, as applicable, capability margin, thrust and torque at control switch trip, stem friction coefficient, load sensitive behavior, and motor current.

In its letter dated February 28, 2000, the licensee stated that its MOV periodic verification program at Surry is intended to address potential degradation that can result in a decrease in output capability of motor actuators. The licensee's program relies on preventive maintenance, periodic diagnostic testing, and margin to confirm the capability of the motor actuator to provide the required torque. Stem lubrication and actuator gearcase grease inspection are examples of preventive maintenance items that are periodically performed to ensure adequate motor actuator capability. Periodic diagnostic test results are used to monitor potential degradation of stem/stem nut coefficient of friction, and rate of loading effects. The licensee incorporates margin for rate of loading, stem lubrication degradation, torque switch repeatability, spring pack relaxation, and test equipment accuracy into the calculations to ensure adequate capability of its MOV motor actuators.

In Technical Update 98-01 and its Supplement 1, Limitorque Corporation provided updated guidance for predicting the torque output of its ac-powered MOV motor actuators. In its letter dated February 28, 2000, the licensee reported that it had evaluated the updated Limitorque guidance. The licensee stated that it has always used the recommended application factor of 0.9 and pullout efficiency in its MOV calculations at Surry. The licensee evaluates the output capability of its ac-powered MOVs using electrical standard methods and has assessed those results against available industry test data. The licensee stated that it used derated motor performance values in capability calculations for 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. The licensee reported that no MOV operability concerns were identified. The licensee stated that there are no dc-powered MOV motor actuators in the GL 96-05 program at Surry.

The NRC staff considers the licensee to be establishing sufficient means to monitor MOV motor actuator output and its potential degradation.

6.0 CONCLUSION

The NRC staff finds that the licensee has established an acceptable program to verify periodically the design-basis capability of the safety-related MOVs at Surry through its commitment to all three phases of the JOG program on MOV periodic verification, and the additional actions described in its submittals. Therefore, the staff concludes that the licensee is adequately addressing the actions requested in GL 96-05. The staff may conduct inspections at Surry to verify that the implementation of the MOV periodic verification program is in accordance with the licensee's commitments; this NRC SE; the NRC SE dated October 30, 1997, on the JOG program on MOV periodic verification; and the NRC SE dated April 14, 1998, on the WOG methodology for ranking MOVs by their safety significance.

Principal Contributor: T. Scarbrough

Date: January 18, 2001