

June 29, 2000

Mr. Thomas F. Plunkett
President - Nuclear Division
Florida Power and Light Company
P.O. Box 14000
Juno Beach, Florida 33408-0420

SUBJECT: SAFETY EVALUATION OF LICENSEE RESPONSE TO GENERIC LETTER
96-05, TURKEY POINT PLANT, UNIT NOS. 3 AND 4
(TAC NOS. M97112 AND M97113)

Dear Mr. Plunkett:

On September 18, 1996, the U.S. Nuclear Regulatory Commission (NRC) issued Generic Letter (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 (MOVs) continue to be capable of performing their safety functions within the current licensing bases of the facility.

By letters dated November 6, 1996, and March 11, 1997, Florida Power and Light Company (the licensee) provided its response to the recommendations of GL 96-05 and described its long-term MOV periodic verification program for the Turkey Point Plant, Units 3 and 4. In Inspection Report 50-250 and 251/98-13 (dated March 8, 1999), the NRC staff documented a review of the GL 96-05 program being established at Turkey Point. By letter dated June 18, 1999, the licensee notified the NRC staff that it had committed to participate in the industry-wide Joint Owners Group (JOG) Program on MOV Periodic Verification. The licensee stated that it would notify the NRC of any significant deviations from the final JOG program within 6 months of receipt of the final JOG report.

The NRC staff has reviewed the licensee's submittals and applicable NRC inspection reports for the MOV program at Turkey Point. The staff finds that the licensee has established an acceptable program to verify periodically the design-basis capability of the safety-related MOVs at Turkey Point through its commitments to the JOG Program on MOV Periodic Verification, and the additional actions described in its submittals. As discussed in the enclosed safety evaluation (SE), the staff concludes that the licensee is adequately addressing the actions requested in GL 96-05. The NRC staff may conduct additional inspections at Turkey Point to verify 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 Westinghouse Owners Group methodology for ranking MOVs by their safety significance.

T. Plunkett

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This completes our action on TAC Nos. M97112 and M97113. If you have any comments, please contact me at (301) 415-1496.

Sincerely,

/RA/

Kahtan N. Jabbour, Senior Project Manager, Section 2
Project Directorate II
Division of Licensing Project Management
Office of Nuclear Reactor Regulation

Docket Nos. 50-250 and 50-251

Enclosure: Safety Evaluation

cc w/ encl: See next page

T. Plunkett

- 2 -

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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"
TURKEY POINT PLANT, UNITS 3 AND 4
DOCKET NUMBERS 50-250 AND 251

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 Florida Power and Light Company (FPL/licensee) to verify periodically the design-basis capability of safety-related MOVs at the Turkey Point Plant, Units 3 and 4.

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 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*.

Enclosure

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 actions, 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 to 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 was 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 February 27, 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 test 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 to BWROG, CEOG and WOG 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 TURKEY POINT GL 96-05 PROGRAM

In letters dated November 6, 1996, and March 11, 1997, FPL provided its response to the recommendations of GL 96-05 and described its long-term MOV periodic verification program for Turkey Point. In Inspection Report (IR) 50-250 and 251/98-13 (dated March 8, 1999), the NRC staff documented a review of the GL 96-05 program being established at Turkey Point. On June 18, 1999, the licensee notified the NRC by letter that it was committing to participate in the industry-wide JOG Program on MOV Periodic Verification. The licensee stated that it would notify the NRC of any significant deviations from the final JOG program within 6 months of receipt of the final JOG report.

In its submittal dated March 11, 1997, the licensee stated that it had reviewed the effectiveness of its MOV periodic verification program at Turkey Point in response to GL 96-05. As a result of its review, the licensee enhanced the MOV program at Turkey Point to incorporate guidance and information provided in GL 96-05 and industry experience. The resulting MOV program at Turkey Point includes a preventive maintenance program, and a mixture of static and dynamic (in situ) diagnostic testing, to ensure that potential age-related degradations are identified. The licensee reported that considerations of risk significance, available margin, and environmental effects were included in the evaluation of MOV periodic verification activities. The licensee also indicated that industry experience and initiatives, such as the JOG Program on MOV Periodic Verification, would be monitored to ensure that the Turkey Point MOV program incorporated industry experience and lessons learned from that experience. As described in the March 11, 1997, submittal, and further reported in IR 98-13, the MOV periodic verification program at Turkey Point includes (1) stem lubrication every cycle for all MOVs; (2) static diagnostic testing every cycle for MOVs in severe environments and every three cycles for MOVs in non-severe environments; (3) actuator inspection and refurbishment every outage for MOVs in severe environments and every three cycles for MOVs in non-severe environments; (4) dynamic testing every three cycles for high and medium risk-significant MOVs with low margin (less than 20%); (5) trending of MOV performance; and (6) performance of additional MOV testing as appropriate. As reported in IR 98-13, the licensee has initiated its MOV static and dynamic diagnostic test program, including participation in the JOG program.

In its submittal dated June 18, 1999, the licensee committed to participate in the JOG Program on MOV Periodic Verification such that the data associated with all tested MOV groups are available to validate the MOV periodic verification program at Turkey Point. The licensee noted that MOV testing provisions and schedules for Turkey Point are defined by the JOG program. In support of its MOV periodic verification program, the licensee stated that the GL 96-05

program being implemented at Turkey Point uses design margin in lieu of field set-up margin to address the effects of potential thrust or torque degradation. For example, the design thrust values for gate valves and globe valves in GL 96-05 MOVs at Turkey Point include 20% and 10% margin, respectively, to account for age-related degradations in packing load, corrosion, and valve factor. The licensee noted that these margin values exceed the criteria for high-margin MOVs recommended in the JOG program.

As a participant in the JOG program, the licensee stated in its submittal dated June 18, 1999, that it will continue to meet or exceed the technical provisions of the JOG program as documented in Revision 2 of JOG Topical Report MPR-1807. The licensee believes that the JOG program results will validate the valve aging assumptions at Turkey Point with regard to degradation rates for the potential increase in valve thrust or torque operating requirements for its GL 96-05 MOVs. The licensee is currently performing dynamic testing of several safety-related MOVs in support of the JOG data collection effort. The licensee noted that a target population of approximately 10% of those MOVs practical and useful to test will be dynamically tested over a three-cycle period for each Turkey Point unit. The licensee stated that dynamic testing for the target population is currently scheduled for completion by the end of Cycle 19 (October 2001 for Unit 3 and October 2000 for Unit 4).

5.0 NRC STAFF EVALUATION

The NRC staff has reviewed the information provided in the licensee's submittals and IR 98-13 describing the program at Turkey Point to verify periodically the design-basis capability of safety-related MOVs in response to GL 96-05. The staff also reviewed IR 97-08 which provided the results of an inspection to evaluate the licensee's program to verify the design-basis capability of safety-related MOVs in response to GL 89-10. The NRC 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 nonsafety position.

In its submittal dated March 11, 1997, the licensee stated that all MOVs within the scope of GL 89-10 at Turkey Point (111 MOVs) are included in the MOV periodic verification program under GL 96-05. As noted in IR 98-13, the licensee has directed that any MOVs not capable of returning to their safety position be declared inoperable when moved to their nonsafety 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 the assumptions and methodologies used in the development of their MOV programs for the life of the plant (a concept commonly described as a "living program"). For example, the design bases of safety-related MOVs are maintained up to date, including consideration of any plant modifications or power uprate conditions.

As documented in IR 98-13, the NRC staff has found the licensee to be maintaining its MOV calculations up to date with respect to new information on MOV capability. For example, the licensee revised its MOV calculation guidelines to incorporate the recent guidance from the

actuator manufacturer on MOV motor actuator output. The NRC 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

In closing its review of the GL 89-10 program at Turkey Point in IR 97-08, the NRC staff noted several long-term planned actions by the licensee to address weaknesses in the MOV program involving assumptions applied in MOV calculations, in evaluation of stem friction coefficients, and in extrapolating dynamic test data. As noted in IR 98-13, the staff verified that the licensee was addressing the long-term GL 89-10 planned actions.

In GL 89-10, the NRC staff recommended that MOV performance be trended on a long-term basis. As documented in IR 98-13, the MOV periodic verification program at Turkey Point trends quantitative and qualitative parameters such as MOV trouble and breakdown work orders, stem coefficient of friction, actuator inspection results, and grease condition. In its submittal dated June 18, 1999, the licensee provided additional details regarding its trending of MOV performance. For example, the licensee will trend valve factor, load sensitive behavior, and stem coefficient of friction to ensure that no MOV will experience an inability to perform its intended safety function during any period between scheduled maintenance tests. In particular, the licensee will calculate the valve factors for dynamically tested MOVs and compare those valve factors to design-basis values prior to returning the MOVs to service. The licensee will also compare calculated valve factors to previous test data to identify any degradation trends so as to provide assurance that the MOV design parameters will not be exceeded before the next planned maintenance test. The licensee will apply any identified degradation trends to other applicable valves. Similarly, the licensee will review load sensitive behavior observed for dynamically tested MOVs and apply that information in the MOV program. With respect to the stem friction coefficient, the licensee will compare measured values to previously recorded values for consistency. The plant procedures at Turkey Point specify that a condition report be prepared if an observed stem friction coefficient is abnormally high or exceeds the design value. As with load sensitive behavior, the licensee will apply stem friction coefficient information in the Turkey Point MOV program.

With the licensee's ongoing implementation of its MOV trending program, no outstanding issues regarding the licensee's GL 89-10 program remain at Turkey Point.

5.4 JOG Program on MOV Periodic Verification

On June 18, 1999, the licensee notified the NRC that it was committing to participate in the JOG Program on MOV Periodic Verification at Turkey Point. 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 Turkey Point. The conditions and limitations discussed in the NRC SE dated October 30, 1997, apply to the JOG program at Turkey Point. The staff considers the commitments by the licensee to implement the JOG program at Turkey Point to be an acceptable response to GL 96-05 for valve age-related degradation. The licensee's commitment to the JOG program in its letter dated June 18, 1999, resolves the uncertainties described in IR 98-13 regarding MOV margins and grouping, and dynamic testing schedules, to establish applicable degradation rates for GL 96-05 MOVs at Turkey Point.

In its submittal dated June 18, 1999, the licensee states that the MOV risk ranking at Turkey Point had been revised using WOG Topical Report V-EC-1658-A (Revision 2) and its latest Probabilistic Safety Assessment (PSA) model. The licensee reports that some MOVs currently classified as high risk could be reclassified as medium-risk MOVs based on its updated PSA analysis and expert panel review. The licensee is evaluating its revised MOV risk rankings against rankings at other utilities to assess any differences and the appropriateness of implementing the suggested risk reductions. The conditions and limitations discussed in the NRC SE dated April 14, 1998, on the WOG methodology for ranking MOVs by their safety significance apply to the MOV risk ranking performed at Turkey Point. The NRC staff notes that WOG also provided an example list of risk-significant MOVs for consideration by each licensee in applying the owners group methodology. The staff considers the licensee's approach to risk ranking MOVs at Turkey Point to be acceptable. The additional information provided in the licensee's submittal dated June 18, 1999, resolves the uncertainties indicated in IR 98-13 regarding the MOV risk ranking at Turkey Point.

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.

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 submittal dated June 18, 1999, the licensee stated that potential degradation in MOV actuator output at Turkey Point is primarily accommodated by determining MOV actuator output capability based on motor nameplate rating and actuator pullout efficiency. The licensee considers this approach to provide a conservative estimate of actuator output and is expected to account for potential degradation in torque capability that may occur with service life. The

licensee also stated that its preventive maintenance such as periodic actuator inspections, overhauls, and grease monitoring reduce the potential for age-related output degradation. As discussed above, the licensee also monitors stem friction coefficient and load sensitive behavior in ensuring continued MOV actuator output capability. The additional information provided in the licensee's submittal dated June 18, 1999, resolves the uncertainties indicated in IR 98-13 regarding the monitoring of MOV actuator output capability at Turkey Point.

In Technical Update 98-01 and its Supplement 1, Limitorque Corporation provided updated guidance for predicting the torque output of its motor actuators. As reported in IR 98-13, the licensee evaluated the operability of each safety-related MOV at Turkey Point in response to the recent Limitorque guidance on MOV actuator capability. The licensee determined that all of its GL 96-05 MOVs continued to be capable of performing their design functions. However, the licensee identified several MOVs that needed to be reset or modified to return their design capability margin, and also determined specific MOV calculations and evaluations needing revision. As reported in IR 98-13, the licensee plans to complete the MOV setting adjustments and modifications by the end of the refueling outages at Turkey Point in 2000.

In Technical Update 98-01, Limitorque noted that a future technical update will be issued to address the application of dc-powered MOVs. As reported in IR 98-13, the licensee is aware of the ongoing industry evaluation of dc-powered MOV actuator output capability. As part of its response to Technical Update 98-01, the licensee highlighted specific dc-powered MOVs that could be affected by updated actuator output guidance. Licensee personnel also indicated plans to address any new guidance that might be provided for dc-powered MOV motor actuator output.

Any MOV operability concerns that might be identified in the future will be processed in accordance with established regulatory requirements and plant-specific commitments.

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 Turkey Point through its commitment to the JOG Program on MOV Periodic Verification, and the additional actions described in its submittals. The additional information provided in the licensee's submittal dated June 18, 1999, also resolves the uncertainties specified in IR 98-13 regarding (1) MOV capability margins, representative MOVs to be tested for each group, and the dynamic testing schedule to be used to establish appropriate degradation rates; (2) monitoring and evaluation of MOV parameters to identify degradation trends; and (3) ranking of MOVs according to their safety significance. The staff concludes that the licensee is adequately addressing the actions requested in GL 96-05 at Turkey Point. The staff may conduct additional inspections at Turkey Point to verify 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.

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