June 30, 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, ST. LUCIE PLANT, UNIT NOS. 1 AND 2 (TAC NOS. M97104 AND M97105)

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 October 28, 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 St. Lucie Plant, Units 1 and 2. In Inspection Report 50-335 and 389/98-12 (dated February 19, 1999), the NRC staff documented a review of the GL 96-05 program being established at St. Lucie. On June 30, 1999, the licensee provided additional information regarding its MOV program at St. Lucie, including its participation 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 St. Lucie. The staff finds that the licensee has established an acceptable program to verify periodically the design-basis capability of the safety-related MOVs at St. Lucie 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, the staff concludes that the licensee is adequately addressing the actions requested in GL 96-05. The staff may conduct additional inspections at St. Lucie to verify the implementation of the MOV periodic verification program is in accordance with the licensee's commitments and applicable NRC safety evaluations.

This completes our action on TAC Nos. M97104 and M97105. 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. 50-335 and 50-389

Enclosure: Safety Evaluation

cc w/ encl: See next page

This completes our action on TAC Nos. M97104 and M97105. 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. 50-335 and 50-389

Enclosure: Safety Evaluation

cc w/ encl: See next page

DISTRIBUTION:
PUBLIC (Public)
PDII Reading (Hardcopy)
RidsNrrDlpmLpdii2
BClayton (Hardcopy)
RidsNrrPmKJabbour
RidsOgcRp
RidsAcrsAcnwMailCenter
RidsRgn2MailCenter
TScarbrough (RidsNrrDeEmeb)

Accession Number ML003728144

OFFICE	PDII-2/PM		PDII-2/LA		PDII-2/SC	
NAME	KJabbour		BClayton		RCorreia	
DATE	06/29/00		06/22/00		0 6/29/00	

OFFICIAL RECORD COPY

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"
ST. LUCIE PLANT, UNITS 1 AND 2
DOCKET NUMBERS 50-335 AND 389

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 St. Lucie Plant, 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 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 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-design pressurized water reactor (PWR) 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 ST. LUCIE GL 96-05 PROGRAM

In letters dated October 28, 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 St. Lucie. In Inspection Report (IR) 50-335 and 389/98-12 (dated February 19, 1999), the NRC staff documented a review of the GL 96-05 program being established at St. Lucie. On June 30, 1999, the licensee provided additional information regarding its MOV program at St. Lucie, including its participation in the industry-wide JOG Program on MOV Periodic Verification.

In its letter dated October 28, 1996, the licensee stated that the actions requested in GL 96-05 would be implemented at St. Lucie. In its submittal dated March 11, 1997, the licensee reported that it had reviewed the effectiveness of its MOV periodic verification program and had enhanced the program to incorporate guidance and information provided in GL 96-05 and by industry experience. The licensee stated that the resulting MOV periodic verification program included 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 indicated that industry experience and initiatives, such as the JOG program, would be monitored to ensure that the St. Lucie MOV program incorporated industry experience and lessons learned from that experience. As listed in the licensee's submittal dated March 11, 1997, and further described in IR 98-12, the MOV periodic verification program at St. Lucie includes (1) static and dynamic MOV diagnostic testing; (2) actuator inspection and refurbishment (if required) every outage for MOVs in severe environments and every other outage for MOVs in non-severe environments; (3) valve stem cleaning and lubrication every outage for each GL 96-05 MOV; (4) establishment of a goal of 10% margin to account for age-related degradation of MOV performance; (5) trending of MOV performance through review of test results and operating problems; and (6) performance of additional MOV testing as appropriate.

In its submittal dated June 30, 1999, the licensee provided additional information on the MOV program in response to GL 96-05 at St. Lucie. For example, the licensee stated that its GL 96-05 program uses design margin and field set-up margin/periodic testing to cover the

effects of potential actuator output degradation and valve degradation resulting in increased thrust requirements. The licensee noted that a design stem friction coefficient of 0.20 is used for GL 96-05 MOVs. Where an MOV is sized with less than a 0.20 stem friction coefficient, the licensee establishes additional margin provided by increased periodic testing or maintenance. The licensee selects valve factors for its GL 96-05 MOVs to bound dynamic test results from each valve group or applies the Electric Power Research Institute MOV Performance Prediction Methodology.

In its June 30, 1999, submittal, the licensee stated that static re-verification of GL 96-05 MOVs at St. Lucie will be performed consistent with the guidelines provided by the JOG Program on MOV Periodic Verification in Topical Report MPR-1807 (Revision 2). The licensee indicated that periodic static testing of its GL 96-05 MOVs will be conducted on a frequency which meets or exceeds the guidelines in MPR-1807. The licensee noted that periodic dynamic testing is being performed for all gate valve, balanced globe valve, and butterfly valve groups within the scope of GL 96-05 at St. Lucie, which have been determined to be testable under design differential-pressure conditions or reduced differential-pressure conditions that can be extrapolated to design conditions. The licensee defined a prototype population within each valve group for continued dynamic testing. The licensee also noted that dynamic testing of several safety-related MOVs not identified as prototypes is being conducted in support of the JOG data collection effort. The licensee stated that prototype valves will be dynamically tested on a three-outage frequency, unless test results indicate more frequent testing is warranted or sufficient data are available to justify otherwise. The licensee stated that, as a participant in the JOG program, St. Lucie will continue to meet or exceed the technical provisions of the program as documented in JOG Topical Report MPR-1807 (Revision 2). The licensee will review JOG feedback notices and the final JOG program, and will notify the NRC if any significant deviations exist between the JOG program and the MOV program at St. Lucie within 6 months of receipt of an applicable feedback notice or the final JOG report.

5.0 NRC STAFF EVALUATION

The NRC staff has reviewed the information provided in the licensee's submittals and IR 98-12 describing the program at St. Lucie to verify periodically the design-basis capability of safety-related MOVs in response to GL 96-05. The staff also reviewed IR 98-06 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 at St. Lucie. 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 the entire scope of MOVs in the GL 89-10 program at St. Lucie was included in the GL 96-05 program. IR 98-12 reported that the licensee evaluated all safety-related MOVs at St. Lucie for inclusion in the GL 96-05 program. The licensee considered the guidance provided in GL 96-05 regarding MOVs 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. The licensee reviewed applicable surveillance procedures to ensure that all appropriate MOVs had been included within the GL 96-05 program at St. Lucie.

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

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 basis of safety-related MOVs are maintained up to date, including consideration of any plant modifications, power uprate conditions, or pressure setpoint tolerance changes for safety valves.

As documented in IR 98-12, the NRC staff found the licensee to be maintaining its MOV calculations at St. Lucie 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 St. Lucie in IR 98-06, 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 reported in IR 98-12, the staff verified that the licensee was addressing the long-term GL 89-10 planned actions at St. Lucie.

In GL 89-10, the NRC staff recommended that MOV performance be trended on a long-term basis. In IR 98-12, the staff documented a review of the licensee's procedures for trending MOV performance at St. Lucie. In its submittal dated June 30, 1999, the licensee provided additional information on its quantitative and qualitative process for monitoring and evaluating MOV parameters to identify degradation trends. For example, the licensee trends as-left static test data for all GL 96-05 MOVs, as-found static test data for a reduced population of MOVs, and dynamic test data for prototype MOVs. The static test parameters being monitored include control switch trip (CST) torque and thrust, stem coefficient of friction, and running load for gate and globe valves; and CST torque, seating coefficients, and running load for butterfly valves. The dynamic test parameters being monitored include valve factor and rate of loading for gate and globe valves; and bearing coefficient and required hydrodynamic torque for butterfly valves. The licensee applies test information to other applicable MOVs in its GL 96-05 program. The licensee tracks and documents age-related degradation margin, static and dynamic test results, and maintenance and modification activities for GL 96-05 MOVs at St. Lucie in a report prepared following each refueling outage. The licensee reviews trends observed from monitoring MOV parameters to ensure that no MOV will degrade to an inoperable status over the course of the next maintenance cycle.

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

5.4 JOG Program on MOV Periodic Verification

On June 30, 1999, the licensee stated that, as a participant in the JOG program, St. Lucie will continue to meet or exceed the technical provisions of the program as documented 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 St. Lucie. The conditions and limitations discussed in the NRC SE dated October 30, 1997, apply to the JOG program at St. Lucie. The staff considers the licensee's described MOV program including its application of the JOG program at St. Lucie to be an acceptable response to GL 96-05 for valve age-related degradation. The licensee's commitment to meet or exceed the JOG program in its letter dated June 18, 1999, resolves the uncertainties described in IR 98-12 regarding MOV margins and grouping, and dynamic testing schedules, to establish applicable degradation rates for GL 96-05 MOVs at St. Lucie.

In 1994, the licensee ranked the safety-related MOVs at St. Lucie according to their safety significance using probabilistic and deterministic insights. Since then, the nuclear industry has developed generic methodologies for risk ranking MOVs installed in nuclear power plants designed by Westinghouse and General Electric. The industry has not developed a generic MOV risk-ranking methodology for PWR nuclear plants designed by Combustion Engineering (CE), such as St. Lucie. In its submittal dated June 30, 1999, the licensee provided additional information regarding the risk ranking of MOVs at St. Lucie. In particular, the licensee compared its 1994 MOV risk-ranking methodology with the WOG methodology for Westinghouse-design PWR nuclear plants to obtain further insights on MOV risk ranking. Based on that comparison, the licensee considered its MOV risk-ranking methodology at St. Lucie to be adequate. Nevertheless, the licensee is updating the MOV risk ranking at St. Lucie to apply the WOG methodology similar to its use at the licensee's Turkey Point Plant. In addition, the updated MOV risk-ranking methodology at St. Lucie will include an expert panel review consisting of operations, maintenance, and engineering personnel. The St. Lucie licensee stated that it will participate with licensees of other CE-design plants to perform a comparison of the MOV risk rankings. Based on the licensee's plans, the NRC staff considers the licensee's approach for updating its risk ranking of MOVs at St. Lucie to be acceptable. The limitations and conditions specified in the NRC SE dated April 14, 1998, are applicable to the licensee's use of the WOG MOV risk-ranking methodology at St. Lucie, where appropriate. The additional information provided in the licensee's submittal dated June 30, 1999, resolves the uncertainties indicated in IR 98-12 regarding the MOV risk ranking at St. Lucie.

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 March 11, 1997, the licensee stated that potential degradations that might result in a decrease in MOV motor actuator capability will be continuously monitored to ensure that MOVs are capable of performing their safety functions within the current licensing basis. The licensee indicated that this will be accomplished by the St. Lucie preventive maintenance program using a combination of static and dynamic testing with trending of the data and feedback to both preventive maintenance and testing programs. In IR 98-12, the NRC staff found that the licensee had specified parameters to be monitored to identify potential degradation trends in MOV performance. These parameters include motor current, stem friction coefficient, and load sensitive behavior. In its submittal dated June 30, 1999, the licensee provided additional information regarding its monitoring and evaluation of MOV parameters, such that motor actuator degradation trends can be identified and appropriate corrective action taken. For example, the licensee trends as-left static test data for all GL 96-05 MOVs, as-found static test data for a reduced population of MOVs, and dynamic test data for prototype MOVs. The licensee applies this test information to other applicable MOVs in its GL 96-05 program. The licensee reviews the results of the MOV parameters to ensure that no MOV will degrade to an inoperable status over the course of the next maintenance cycle. The additional information provided in the licensee's submittal dated June 30, 1999, resolves the uncertainties indicated in IR 98-12 regarding the monitoring of MOV actuator output capability at St. Lucie.

In Technical Update 98-01 and its Supplement 1, Limitorque Corporation provided updated guidance for predicting the torque output of its motor actuators. In IR 98-12, the NRC staff described the licensee's actions at St. Lucie in response to the new information on ac-powered MOV output capability. In particular, the licensee evaluated the operability of each safety-related MOV at St. Lucie in light of the new information. The licensee took action to address certain MOVs that were determined to not have been capable of performing their design functions. The licensee also identified several MOVs that needed modification to return their capability margin to the 10% goal, and also determined specific MOV calculations and

evaluations needing revision. The licensee established a schedule to complete the MOV modifications and document revisions to address the new information on MOV motor actuator output.

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 98-12, the licensee is aware of the ongoing industry evaluation of dc-powered MOV actuator output capability. The licensee established 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 St. Lucie through the licensee's MOV program, including 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 30, 1999, also resolves the uncertainties specified in IR 98-12 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 St. Lucie. The staff may conduct additional inspections at St. Lucie 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 (as applied by the licensee for this CE-design plant) the NRC SE dated April 14, 1998, on the WOG methodology for ranking MOVs by their safety significance.

Principal contributor: Thomas Scarbrough, NRR

Date: June 30, 2000

Mr. T. F. Plunkett
Florida Power and Light Company

ST. LUCIE PLANT

cc:
Senior Resident Inspector
St. Lucie Plant
U.S. Nuclear Regulatory Commission
P.O. Box 6090
Jensen Beach, Florida 34957

Joe Myers, Director
Division of Emergency Preparedness
Department of Community Affairs
2740 Centerview Drive
Tallahassee, Florida 32399-2100

M. S. Ross, Attorney
Florida Power & Light Company
P.O. Box 14000
Juno Beach, FL 33408-0420

Mr. Douglas Anderson
County Administrator
St. Lucie County
2300 Virginia Avenue
Fort Pierce, Florida 34982

Mr. William A. Passetti, Chief
Department of Health
Bureau of Radiation Control
2020 Capital Circle, SE, Bin #C21
Tallahassee, Florida 32399-1741

Mr. Rajiv S. Kundalkar
Vice President
St. Lucie Nuclear Plant
6351 South Ocean Drive
Jensen Beach, Florida 34957

Mr. R. G. West
Plant General Manager
St. Lucie Nuclear Plant
6351 South Ocean Drive
Jensen Beach, Florida 34957

E. J. Weinkam
Licensing Manager
St. Lucie Nuclear Plant
6351 South Ocean Drive
Jensen Beach, Florida 34957

Mr. John Gianfrancesco
Manager, Administrative Support
and Special Projects
P.O. Box 14000
Juno Beach, FL 33408-0420

Mr. J. A. Stall
Vice President - Nuclear Engineering
Florida Power & Light Company
P.O. Box 14000
Juno Beach, FL 33408-0420

Mr. J. Kammel
Radiological Emergency
Planning Administrator
Department of Public Safety
6000 SE. Tower Drive
Stuart, Florida 34997