

June 9, 2000

Mr. S. E. Scace - Director  
Nuclear Oversight and Regulatory Affairs  
c/o Mr. David A. Smith  
Northeast Nuclear Energy Company  
P. O. Box 128  
Waterford, CT 06385

SUBJECT: COMPLETION OF LICENSING ACTIVITY ON NORTHEAST NUCLEAR ENERGY  
COMPANY RESPONSE TO GENERIC LETTER 96-05, MILLSTONE NUCLEAR  
POWER STATION, UNIT 3 (TAC NO. M97069)

Dear Mr. Scace:

On September 18, 1996, the 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.

On November 15, 1996, Northeast Nuclear Energy Company (licensee) submitted a 60-day response to GL 96-05 notifying the NRC that it would implement the requested MOV periodic verification program at Millstone Nuclear Power Station, Unit 3. On March 17, 1997, the licensee submitted a 180-day response to GL 96-05 providing a summary description of the MOV periodic verification program planned to be implemented at Millstone Unit 3. In a letter dated August 13, 1997, the licensee informed the NRC of several revised commitments in response to GL 96-05. On May 28, 1999, the licensee updated its commitment to GL 96-05, and provided a response to a request for additional information regarding GL 96-05 forwarded by the NRC staff on March 18, 1999. On March 14, 2000, the licensee committed to maintain its GL 96-05 program consistent with the three phases of the Joint Owners Group (JOG) Program on MOV Periodic Verification. On May 25, 2000, the licensee updated its schedule for implementing the MOV risk ranking methodology.

The NRR staff reviewed the licensee's submittals and applicable NRC inspection reports for the MOV program at Millstone Unit 3. The staff finds that the licensee has established an acceptable program to periodically verify the design-basis capability of the safety-related MOVs at Millstone Unit 3 through its commitment to all three phases of the JOG Program on MOV Periodic Verification and the additional actions described in its submittals. As discussed in the attached safety evaluation (SE), the staff concludes that the licensee is adequately addressing the actions requested in GL 96-05. The staff may conduct inspections at Millstone, Unit 3 to verify the

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implementation of the MOV periodic verification program is in accordance with the licensee's commitments that includes those identified in the enclosed SE; the staff's SE dated October 30, 1997, on the JOG Program on MOV Periodic Verification as well as the staff's SE dated April 14, 1998, on the Westinghouse Owners Group methodology for ranking MOVs by their safety significance.

If you have any questions please contact me at 301-415-1484.

Sincerely,

*/RA/*

Victor Nerses, Sr. Project Manager, Section 2  
Project Directorate I  
Division of Licensing Project Management  
Office of Nuclear Reactor Regulation

Docket No. 50-423

Enclosure: Safety Evaluation

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,"

MILLSTONE NUCLEAR POWER STATION, UNIT NO. 3

DOCKET NO. 50-423

## 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 Northeast Nuclear Energy Company (licensee) to periodically verify the design-basis capability of safety-related MOVs at the Millstone Nuclear Power Station, Unit No. 3 (Millstone 3).

## 2.0 REGULATORY REQUIREMENTS

NRC's 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 Section XI of the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code.

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 to 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 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 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 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's 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 conforming 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.

#### 4.0 MILLSTONE, UNIT 3 GL 96-05 PROGRAM

On November 15, 1996, the licensee submitted a 60-day response to GL 96-05 notifying the NRC that it would implement the requested MOV periodic verification program at Millstone Unit 3. On March 17, 1997, the licensee submitted a 180-day response to GL 96-05 providing a summary description of the MOV periodic verification program. In a letter dated August 13, 1997, the licensee informed the NRC of its revision of several commitments previously submitted in response to GL 96-05. On May 28, 1999, the licensee updated its commitment to GL 96-05, and provided a response to a request for additional information regarding GL 96-05 forwarded by the NRC staff on March 18, 1999. In a telephone conference with the NRC staff on August 2, 1999, the licensee clarified several aspects of its GL 96-05 program. In a letter dated March 14, 2000, the licensee committed to maintain its GL 96-05 program consistent with the three phases of the JOG Program on MOV Periodic Verification. On May 25, 2000, the licensee revised its schedule for implementing the MOV risk ranking methodology.

In its letter dated March 17, 1997, the licensee described its MOV periodic verification program, including scope, testing, and implementation of the JOG program at Millstone Unit 3. 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 13, 1997, the licensee revised several GL 96-05 commitments to (1) establish plans to determine degradation rates for operating requirements and actuator output; (2) validate the KEIGATE Program methodology; and (3) commence dynamic testing under the JOG program. The licensee stated that it planned to complete these commitments during the current extended outage prior to entry into Mode 4.

In its letter dated May 28, 1999, the licensee committed to continue its participation in the JOG MOV Periodic Verification Program as a member of WOG and to implement the program elements described in the Topical Report MPR-1807 (Revision 2) with two exceptions (discussed in Section 5.4 of this SE). In the telephone conference on August 2, 1999, the NRC staff discussed these exceptions with the licensee. In its letter dated March 14, 2000, the licensee withdrew one of the exceptions. Also, during the telephone conference, the staff stated that the KEIGATE Program was not an approved methodology for sizing and setting MOVs. The licensee agreed and indicated that in its letter dated February 11, 1999, (although related to Unit 2's GL 96-05 response) it stated the Millstone MOV program, meaning it included Unit 3, was implementing the Electric Power Research Institute (EPRI) MOV Performance Prediction Methodology (PPM) in lieu of the KEIGATE Program methodology to size and set up certain actuators.

## 5.0 NRC STAFF EVALUATION

The NRC staff has reviewed the information provided in the licensee's submittals describing the program to periodically verify the design-basis capability of safety-related MOVs at Millstone Unit 3 in response to GL 96-05. NRC Inspection Reports 50-423/98-82 and 98-208 (IRs 98-82 and 98-208) 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. The staff closed the review of the GL 89-10 program at Millstone Unit 3 through IRs 98-82 and 98-208 based on verification of the design-basis capability of safety-related MOVs at Millstone Unit 3 and several specific actions planned by the licensee. 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 also 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 its letter dated November 15, 1996, the licensee committed to implement the requested MOV periodic verification program at Millstone Unit 3 in response to GL 96-05 and did not take exception to the scope of the generic letter. In IR 98-82, the NRC staff noted that the reactor coolant system loop isolation and bypass valves were deleted from the scope of the licensee's MOV program in response to GL 89-10 at Millstone Unit 3, and found that the deletions were consistent with GL 89-10 and its supplements because the MOVs are normally de-energized and their respective breakers are locked open during normal operation. The staff considers the licensee to have made adequate commitments regarding the scope of its MOV program.

### 5.2 MOV Assumptions and Methodologies

Licenses maintain their assumptions and methodologies used in the development of its 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 IRs 98-82 and 98-208, 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 Millstone Unit 3. The staff determined that the licensee had adequately justified the assumptions and methodologies used in its MOV program with certain long-term aspects discussed in the following section. The licensee's letter dated May 28, 1999, indicated ongoing activities, such as review of motor actuator output, to update its MOV program assumptions and methodologies. 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

A letter from the licensee dated April 25, 1998, and IR 98-208 discussed several items of the licensee's MOV program to be addressed over the long term. In its letter dated May 28, 1999, the licensee reported on the status of several of those long-term GL 89-10 aspects. For example, the licensee stated that it (1) tested valves 3MSS\*MOV74C & D under blowdown conditions; (2) planned design changes to increase the setup margins for valves 3SIH\*MV8802A/B and 3SIL\*MV8804A/B for Refueling Outage (RFO) 6; (3) revised its dynamic test evaluation forms to ensure that the load sensitive behavior and stem friction coefficient statistical analyses are updated when dynamic testing is performed; (4) developed Specific Position Training requirements and incorporated these into its Training Qualification Record format; (5) contracted with EPRI to determine appropriate friction coefficients based on separate effects testing for stainless on stainless surfaces that are above 100 °F; and (6) scheduled dynamic tests for butterfly valves 3SWP\*MOV102A/B/C/D to validate bearing coefficient assumptions for RFO 6 with another test planned in RFO 8 (late 2002). The licensee also stated that it plans to implement the results of friction and blowdown testing into the thrust calculations and modify any needed MOV switch settings. Also in GL 89-10, the NRC 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 at Millstone Unit 3 in response to GL 95-07, "Pressure Locking and Thermal Binding of Safety-Related Power-Operated Gate Valves," in an SE dated January 13, 1998.

IR 98-82 provided the results of the inspection to evaluate the Millstone Unit 3 MOV tracking and trending program. During the inspection, the staff concluded that MOV Program PI-16, "MOV Periodic Testing, Periodic Verification, and Tracking and Trending Program," included appropriate guidance for the development of a detailed tracking and trending program for qualitative and quantitative parameters (such as unseating thrust/torque, running load, and motor current) to be monitored in assessing MOV performance. In its submittal dated May 28, 1999, the licensee provided information on its trending of performance parameters to evaluate motor actuator capabilities. Motor current and stem factor are examples of MOV parameters that are trended.

With the licensee's ongoing MOV activities and trending program, no outstanding issues regarding the licensee's GL 89-10 program remain at Millstone Unit 3.

### 5.4 JOG Program on MOV Periodic Verification

In its letter dated May 28, 1999, the licensee updated its commitment to implement the JOG Program on MOV Periodic Verification as described in Topical Report MPR-1807 (Revision 2) with two exceptions. The licensee's first exception to Topical Report MPR-1807 involves the classification of high margin valves when using the EPRI MOV PPM to size and setup actuators. The licensee used the EPRI MOV PPM for some MOVs as "best available" information. The NRC staff views this to be a clarification of the topical report in lieu of an exception, and considers that this clarification is acceptable in instances where the EPRI MOV PPM provides the "best available" information and plans are in place to resolve the applicability question. In the May 28, 1999, letter the licensee stated that it has an action plan in place to validate the "best available" data assumptions used in Millstone Unit 3 design-basis calculations. In its second exception to the JOG program, the licensee stated that it would initially follow the interim static MOV test frequency established by the JOG program, but might extend the static test intervals based on information obtained from Millstone static MOV testing and the JOG program. The staff discussed its concerns

regarding this exception with the licensee in a telephone conference on August 2, 1999. In its letter dated March 14, 2000, the licensee withdrew this exception.

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. In their letter dated March 14, 2000, the licensee committed to maintain its GL 96-05 program consistent with the three phases of the JOG program on MOV Periodic Verification. The conditions and limitations discussed in the NRC's SE dated October 30, 1997, apply to the JOG program at the Millstone Unit 3. The staff considers the commitments by the licensee to implement all three phases of the JOG program at Millstone Unit 3 to be an acceptable response to GL 96-05 for valve age-related degradation.

In its letter dated March 17, 1997, 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 functional capability of each GL 96-05 MOV. In the May 28, 1999, letter, the licensee indicated that the current MOV ranking method at Millstone Unit 3 is only partially consistent with the WOG methodology. The licensee indicated that its current MOV risk ranking methodology had not included input from an expert panel. The licensee committed in its May 25, 2000, letter, to revise the current method to apply the MOV risk-ranking approach presented in the WOG Engineering Report V-EC-1658-A by November 15, 2000. 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 JOG program at Millstone Unit 3. Based on the licensee's commitment, the staff considers the licensee's approach to updating its risk ranking of MOVs at Millstone Unit 3 to be acceptable.

In its letter dated May 28, 1999, the licensee stated that, in the long term, it might acquire data from the motor control center (MCC) when stroking an MOV under static conditions and confirm the adequacy of motor power analysis by comparing it with simultaneously obtained strain gauge test results. The issues to be evaluated for the use of MCC test data include (1) the correlation between new MCC test data and existing direct MOV data measurements; (2) the relationship between changes in MCC test data and MOV thrust and torque performance; (3) system accuracies and sensitivities to MOV degradation for both outputs and operating performance requirements; and (4) validation of MOV operability using MCC testing. If its test results are successful, the licensee might apply motor power analysis in the performance of future static MOV diagnostic testing.

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's 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's 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 May 28, 1999, the licensee indicated that it plans to ensure adequate actuator output capability for safety-related MOVs at Millstone Unit 3 to perform their design-basis functions by a combination of MOV activities. First, the licensee will monitor stem friction coefficient changes through the use of as-found static and dynamic diagnostic testing. This testing is used to trend MOV performance parameters to allow assurance of acceptable margins. Second, the licensee will monitor actuator gearbox efficiency degradation by torque input and output measurements. Third, the licensee will sample gearbox grease to evaluate the condition of the actuator internals and to determine appropriate actuator overhaul cycles.

In Technical Update 98-01 and its Supplement 1, Limatorque Corporation provided updated guidance for predicting the torque output of its ac-powered motor actuators. In its letter dated May 28, 1999, the licensee reported that it has dynamometer-tested all of the ac motors that were identified in the technical update as possibly not providing their full name-plate rated output torque. These test results were incorporated into the actuator output calculations to estimate actuator output capability in a conservative manner. The SE dated August 30, 1999, described the evaluation of the licensee's submittal in response to GL 96-05 for Millstone Unit 2 and provided additional discussion of the licensee's MOV calculation methodology. The licensee did not identify any significant concerns resulting from the review of MOV output capability at Millstone Unit 3. Any MOV operability concerns that might be identified in the future will be processed in accordance with established regulatory requirements and plant-specific commitments.

In a telephone conference with the NRC staff on August 2, 1999, the licensee indicated that there are no dc-powered MOVs in the GL 96-05 program at Millstone Unit 3.

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 Millstone Unit 3 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 Millstone, Unit 3 to verify the implementation of the MOV periodic verification program is in accordance with the licensee's commitments that included those identified in this SE; the staff's SE dated October 30, 1997, on the JOG Program on MOV Periodic Verification as well as the staff's SE dated April 14, 1998, on the WOG methodology for ranking MOVs by their safety significance.

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