

June 22, 2000

Mr. Michael B. Sellman
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Wisconsin Electric Power Company
231 West Michigan Street
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SUBJECT: POINT BEACH NUCLEAR PLANT, UNITS 1 AND 2 - CLOSEOUT OF LICENSING ACTION FOR GENERIC LETTER 96-05, "PERIODIC VERIFICATION OF DESIGN-BASIS CAPABILITY OF SAFETY RELATED MOTOR-OPERATED VALVES" (TAC NOS. M97087 AND M97088)

Dear Mr. Sellman:

On September 18, 1996, the 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 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.

In letters dated November 18, 1996, and March 17, 1997, Wisconsin Electric Power Company provided its response to the recommendations of GL 96-05 and described its long-term MOV periodic verification program for the Point Beach, Units 1 and 2. In Inspection Report 50-266 and 301/99012, dated July 14, 1999, the NRC staff documented a review of the GL 96-05 program being established at Point Beach. On October 25, 1999, and February 15, 2000, the licensee provided additional information regarding its MOV program at Point Beach, including its participation in the industry-wide Joint Owners Group (JOG) Program on MOV Periodic Verification.

The NRC has reviewed the licensee's submittals and applicable NRC inspection reports for the MOV program at Point Beach. The staff finds that the licensee has established an acceptable program to verify periodically the design-basis capability of the safety-related MOVs at Point Beach, including the licensee's participation in 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

M. Sellman

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requested in GL 96-05 at Point Beach. The staff may conduct additional inspections at Point Beach to verify the implementation of the MOV periodic verification program is in accordance with the licensee's commitments and applicable NRC safety evaluations.

If you have any questions regarding this matter, please contact me at (301) 415-1355.

Sincerely,

/RA/

Beth A. Wetzel, Senior Project Manager, Section 1
Project Directorate III
Division of Licensing Project Management
Office of Nuclear Reactor Regulation

Docket Nos. 50-266 and 50-301

Enclosure: Safety Evaluation

cc w/encl: See next page

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Point Beach Nuclear Plant, Units 1 and 2

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November 1999

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"

POINT BEACH NUCLEAR PLANT, UNITS 1 AND 2

DOCKET NOS. 50-266 AND 301

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, 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 testing (IST) 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 Wisconsin Electric Power Company (WEPCo or the licensee) to verify periodically the design-basis capability of safety-related MOVs at the Point Beach Nuclear 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,

ENCLOSURE

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

The NRC staff issued seven supplements to GL 89-10 that provided additional guidance and information on MOV program scope, design-basis reviews, switch settings, testing, periodic verification, trending, and schedule extensions. GL 89-10 and its supplements provided only limited guidance regarding MOV periodic verification and the measures appropriate to assure preservation of design-basis capability. Consequently, the staff determined that additional guidance on the periodic verification of MOV design-basis capability should be prepared.

On September 18, 1996, the NRC staff issued GL 96-05, "Periodic Verification of Design-Basis Capability of Safety-Related Motor-Operated Valves," requesting each licensee establish a program, or ensure the effectiveness of its current program, to verify on a periodic basis that safety-related MOVs continue to be capable of performing their safety functions within the current licensing bases of the facility. In GL 96-05, the NRC staff summarized several industry and regulatory activities and programs related to maintaining long-term capability of safety-related MOVs. For example, GL 96-05 discussed nonmandatory 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 that 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 on the JOG Program on MOV Periodic Verification, dated October 30, 1997, 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 (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 with plants 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 the 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 POINT BEACH GL 96-05 PROGRAM

In a letter dated November 18, 1996, WEPCo committed to perform the action requested in GL 96-05 at the Point Beach, Units 1 and 2, to establish an MOV program, or conduct a review to ensure the effectiveness of the 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 basis of the facility. In a letter dated March 17, 1997, the licensee summarized its MOV program at Point Beach to address the recommendations of GL 96-05. In Inspection Report (IR) 50-266 and 301/99012, dated July 14, 1999, the NRC staff documented a review of the GL 96-05 program being established at Point Beach. On October 25 1999, and February 15, 2000, the licensee provided additional information regarding its MOV program at Point Beach, including its participation in the industry-wide JOG Program on MOV Periodic Verification.

In its submittal dated March 17, 1997, the licensee described its MOV program at Point Beach as consisting of a combination of static and dynamic diagnostic testing and periodic maintenance activities. The licensee divided its MOVs into 40 groups based on valve and

actuator type, manufacturer, model, and differential pressure testing. The licensee uses static and dynamic MOV testing, probabilistic safety assessment evaluation, MOV margin, and plant experience with known valve degradation to develop the periodic verification schedule. The licensee reported that most MOVs are diagnostically tested under static conditions at least every 5 years. MOVs that are normally operated under high differential pressure or are located in a harsh environment are diagnostically tested under differential-pressure conditions at least every 5 years. The licensee performs as-found MOV tests with the results compared to previous as-left data to determine if degradation has occurred. The licensee typically rebuilds MOVs located in high temperature environments on a 5-year schedule, MOVs cycled during quarterly testing on a 10-year schedule, and MOVs cycled infrequently on a 15-year schedule. The licensee also noted that, in response to IR 95007, dated July 13, 1995, it had committed (1) to diagnostically test 26 MOVs under dynamic conditions to evaluate its assumptions regarding valve age-related degradation; (2) to review NRC and industry valve performance degradation information and, specifically, the Electric Power Research Institute (EPRI) MOV Performance Prediction Program; and (3) to collect and trend static and dynamic MOV periodic test results to validate its valve factor study, rate of loading assumptions, and MOV performance prediction methodology.

In IR 99012, the NRC staff reported that the licensee plans to conduct periodic static and dynamic testing of the GL 96-05 MOVs at Point Beach to monitor their continued design-basis capability. The static diagnostic testing frequency of each safety-related MOV is once every 5 years. The licensee plans to dynamically test a sample of MOVs on a rotating basis every 5 years to establish a degradation rate for valve performance. The licensee might exempt some high-margin MOVs with operating requirements sufficient to bound potential valve age-related degradation from dynamic testing and will monitor those MOVs through static diagnostic tests. The test schedule will provide MOV performance information over the first 5-year interval with a maximum interval of 10 years. The staff found that the licensee was continuing its effort to establish periodic test methods for identifying the degradation of valve operating requirements and actuator output, but that additional effort was needed. During the inspection, the staff noted that the licensee had a large backlog of condition reports related to MOV performance. Three significant uncertainties in the licensee's GL 96-05 program identified in IR 99012 were: (1) the establishment of a dynamic diagnostic test plan to provide information on potential valve age-related degradation, (2) the establishment of a plan to trend qualitative and quantitative information on MOV performance and to periodically assess that information, and (3) resolution of the backlog of condition reports on MOV performance.

In its submittal dated October 25, 1999, the licensee provided an update on the progress made at Point Beach to implement GL 96-05, to resolve questions and concerns raised in IR 99012, and to provide its plan and schedule for program implementation. With respect to the commitment in its March 17, 1997, letter to dynamically test 26 MOVs, the licensee noted that the commitment was made prior to its participation in the JOG Program on MOV Periodic Verification. The licensee is now participating in the JOG program and will adopt the criteria for categorizing MOVs based upon safety significance and valve margin, and selecting them for testing. The licensee will adjust its MOV dynamic test program to incorporate the guidance provided in the JOG topical report. In light of its participation in the JOG program, the licensee revised its commitment to state that it would dynamically test nine MOVs by July 15, 2000. The licensee also clarified that it would apply the static testing program to non-safety-related MOVs, where appropriate, to enhance the performance of MOVs important to plant operation, although a specific test frequency had not been established. With respect to its commitment regarding

industry experience, the licensee continues to regularly receive and evaluate industry MOV information. The licensee also reviewed the EPRI MOV Performance Prediction Program and incorporated that information into the Point Beach MOV program. With respect to its commitment to develop a specific age-related degradation margin, the licensee noted that its process is being upgraded to include criteria for adjusting valve factors and rate of loading assumptions in addition to a degradation factor for stem lubrication. The licensee indicated that full implementation of its MOV periodic verification program would be accomplished by July 15, 2000.

In its submittal dated February 15, 2000, the licensee provided additional information on the MOV program at Point Beach following a telephone conference with the NRC staff on January 12, 2000. For example, the licensee stated that MOV age-related degradation is managed by assessing valve family performance based on a combination of static and dynamic tests, valve internal inspections, and the combined experience of participants in the JOG program. The licensee intends to dynamically test a representative valve with the least capability margin from each valve family to identify age-related degradation. The licensee stated that motor-operated gate and globe valves that are capable of achieving a valve factor of 0.95 and 1.5, respectively, are considered to bound the potential age-related degradation and will not be dynamically tested. Alternative methods will be used to verify the ability of a family of valves to perform their function where dynamic testing cannot be conducted, such as comparison to valves within the JOG program or use of the EPRI MOV performance prediction methodology. The licensee has established margins for MOV settings that include industry-accepted valve factors, undervoltage actuator capability, diagnostic test equipment uncertainties, and limit switch and torque switch setpoint tolerances. The licensee stated that, as the JOG program evolves, the MOV program at Point Beach will be adjusted to meet the provisions of the JOG program. The licensee stated that its current approach in terms of the scope of MOV testing exceeds the requirements of the JOG program. As age-related degradation is identified by the utilities participating in the JOG program, the licensee will evaluate that information and take appropriate action.

5.0 NRC STAFF EVALUATION

The NRC staff has reviewed the information provided in the licensee's submittals and IR 99012 describing the program at Point Beach to verify periodically the design-basis capability of safety-related MOVs in response to GL 96-05. The staff also reviewed IR 95007, dated July 13, 1995, which provided the results of an inspection at Point Beach 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 submittals dated November 18, 1996, and March 17, 1997, the licensee did not take exception to the scope of the MOV program recommended in GL 96-05. As reported in IR 99012, the MOV program at Point Beach includes 126 safety-related MOVs and 54 non-safety-related MOVs. As part of that inspection, the NRC staff found that the scope of the MOV program is consistent with the recommendations of GL 96-05. The staff considers the licensee to have made adequate commitments regarding the scope of its MOV program at Point Beach.

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 or power uprate conditions.

As noted in IR 99012, the licensee reconfirmed its intent to maintain a "living" MOV program at Point Beach and was in the process of updating the program and calculations in response to new information. For example, the licensee was updating plant procedures to address 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 IR 95007, the NRC staff closed its review of the MOV program implemented at Point Beach in response to GL 89-10 based on the licensee's actions to verify the design-basis capability of its safety-related MOVs. In that report, the staff noted several long-term actions planned by the licensee. As reported in IR 99012, the staff reviewed the status of the long-term GL 89-10 planned actions at Point Beach. During this recent inspection, the staff found that the licensee had completed (1) revision of a plant procedure to include guidance on evaluating MOV capability to achieve unwedging thrust requirements; (2) revision of a plant procedure to specify that dynamic tests must be conducted under differential-pressure conditions of at least 60 percent of the MOV design basis to allow reliable extrapolation of the test results; (3) revision of a plant procedure for design-basis review of each MOV family to include diagnostic equipment inaccuracy and torque switch repeatability in the MOV switch setting requirements; (4) application of test results to increase the valve factor specified for MOVs 1(2)CC-719 and 1(2)SI-871A(B); (5) increase of the valve factor applied for globe valves to 1.1 in a plant calculation to be consistent with industry information; and (6) improvement of the calibration of MOV load-cell diagnostic equipment through the use of instrumented valve stems and initiation of plans to obtain additional MOV advanced diagnostic equipment.

In response to the NRC staff finding in IR 99012 that the licensee had not completed its review of valve factor and load sensitive behavior assumptions, the licensee established a scheduled plan for developing and implementing the periodic MOV dynamic test program at Point Beach in its submittal dated October 25, 1999. The licensee will evaluate valve factor, stem factor, and load-sensitive behavior following completion of the first round of its MOV dynamic tests. The licensee also noted that, based on its review of the EPRI MOV performance prediction methodology and applicable NRC SE, it applies a valve factor of 1.1 for both guide-based and seat-based globe valves in the MOV program at Point Beach. The licensee reported that a

plant procedure provides screening criteria for valve factors, stem factors, and load sensitive behavior, and specifically delineates the method by which out-of-tolerance values will be dispositioned. The licensee indicated that full implementation of its MOV periodic verification program at Point Beach would be accomplished by July 15, 2000.

In GL 89-10, the NRC recommended that MOV performance be trended on a long-term basis. In IR 95007, the NRC staff reported that the licensee had adequate plans to perform MOV trending at Point Beach. In response to the NRC staff finding in IR 99012 that the licensee had not completed its plans for tracking and trending MOV performance, the licensee is preparing a procedure to define the type of information that is to be periodically reviewed and trended as described in its submittal dated October 25, 1999. For example, the procedure will include trending of quantitative and qualitative MOV parameters, such as valve factor, stem factor, rate of loading, failure history, and the backlog of outstanding corrective actions. The licensee indicated that the first trend report would be completed in early 2000. The licensee also reviewed its backlog of condition reports related to MOV performance, addressed the most significant backlogged MOV condition reports, and enhanced its method for tracking open MOV condition reports. The staff considers the licensee's ongoing actions to be adequate to address the uncertainties in IR 99012 regarding the establishment of a plan to trend qualitative and quantitative information on MOV performance, the assessment of that information, and the backlog of condition reports on MOV performance.

With the licensee's ongoing actions to implement its MOV trending program, no outstanding issues regarding the licensee's GL 89-10 program remain at Point Beach.

5.4 Valve Operating Requirements

In its submittal dated March 17, 1997, the licensee described the plans to use static and dynamic MOV testing, probabilistic safety assessment aspects, MOV margin, and plant experience with known valve degradation to perform MOV periodic verification at Point Beach. As described in IR 99012, the licensee plans to conduct static diagnostic testing of each safety-related MOV once every 5 years, and dynamic testing of a sample of MOVs on a rotating basis every 5 years to establish a degradation rate for valve performance. The licensee might exempt some high-margin MOVs with operating requirements sufficient to bound potential valve age-related degradation from dynamic testing, and will monitor those MOVs through static diagnostic tests. The test schedule will provide MOV performance information over the first 5-year interval with a maximum interval of 10 years. In IR 99012, the staff noted that the licensee had not completed its plans to provide for the identification of potential age-related degradation for GL 96-05 MOVs at Point Beach.

As stated in its submittal dated October 25, 1999, the licensee is now a participant in the JOG Program on MOV Periodic Verification, and will adopt the JOG criteria for categorizing MOVs based upon safety significance and valve margin at Point Beach. The licensee will adjust its MOV dynamic test program to incorporate the guidance provided in the JOG topical report. As described in its submittal dated February 15, 2000, the licensee will manage potential age-related MOV degradation at Point Beach by assessing valve family performance based on a combination of static and dynamic tests, valve internal inspections, and the combined experience of the participants in the JOG program. In its program, the licensee intends to dynamically test a representative valve with the least margin from each family to identify age-related degradation. The licensee has evaluated its dynamic test results from its

GL 89-10 program and identified a strong correlation between similar valves within a family at Point Beach. The licensee considers motor-operated gate and globe valves that can achieve a valve factor of 0.95 and 1.5, respectively, to be capable of bounding potential age-related degradation, and will not dynamically test those MOVs. Alternative methods will be used to verify the ability of a family of valves to perform their function where testing cannot be conducted, such as comparison to valves within the JOG program or use of the EPRI MOV Performance Prediction Methodology. As the JOG program evolves, the licensee will adjust the MOV program at Point Beach to meet the provisions of the JOG program. As age-related degradation is identified by the utilities participating in the JOG program, the licensee will evaluate that information and take appropriate action. The NRC staff notes that the conditions and limitations discussed in the NRC SE dated October 30, 1997, which accepted the JOG program as an industry-wide response to GL 96-05, apply to the JOG program as implemented at Point Beach. Further, where the licensee applies the WOG MOV risk-ranking methodology, the limitations and conditions specified in the NRC SE dated April 14, 1998, are applicable to Point Beach. The staff considers the licensee's described MOV program, including its application of the JOG program at Point Beach, to be an acceptable response to GL 96-05 for valve age-related degradation. The staff considers the licensee's application of the JOG program at Point Beach to address the uncertainties raised in IR 99012 regarding the establishment of a dynamic diagnostic test plan to provide information on potential valve age-related degradation.

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

As discussed in IR 99012, the licensee monitors MOV motor actuator output through periodic static diagnostic testing of each GL 96-05 MOV at Point Beach. The licensee's static diagnostic test frequency for each GL 96-05 MOV of once every 5 years might be adjusted based on participation in the JOG program. In addition to static testing, the licensee will obtain information on MOV motor actuator output during periodic dynamic diagnostic tests of a sample

of GL 96-05 MOVs. The parameters to be monitored include thrust, motor current, stem friction coefficient, rate of loading, and stroke time, as appropriate. In addition to testing, plant procedures at Point Beach specify periodic preventive maintenance activities of GL 96-05 MOVs to help ensure their continued reliable output capability. The licensee's letter dated March 17, 1997, summarized the MOV preventive maintenance program to provide rebuilding of MOVs located in high temperature environments every 5 years, MOVs cycled during quarterly testing every 10 years, and MOVs infrequently cycled every 15 years. The licensee also reviews information from the NRC and industry on valve performance degradation. For example, although the JOG program focuses on potential age-related degradation of valve operating requirements, significant information on the output of motor actuators will be obtained through the JOG dynamic test program.

In Technical Update 98-01 and its Supplement 1, Limatorque Corporation provided updated guidance for predicting the torque output of its motor actuators. As indicated in IR 99012, the licensee responded to the updated guidance on ac-powered MOV motor actuator output by revising the MOV calculation procedure at Point Beach. The licensee applied a methodology developed by the Commonwealth Edison Company (ComEd) to predict MOV motor actuator output in revising its MOV calculations. The licensee will address any modifications to the ComEd methodology resulting from the updated Limatorque guidance. The licensee did not identify any MOV operability concerns during the evaluation of the new information.

In Technical Update 98-01, Limatorque noted that a future technical update will be issued to address the application of dc-powered MOVs. As indicated in IR 99012, there are 10 dc-powered MOVs in the GL 96-05 program at Point Beach. The licensee applied "pullout" efficiency and the application factor recommended by Limatorque for those dc-powered MOVs. The licensee is following the industry effort on this issue and will address any additional guidance when issued.

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 Point Beach, including the licensee's participation in the JOG Program on MOV Periodic Verification and the additional actions described in its submittals. The additional information provided in the licensee's submittals dated October 25, 1999, and February 15, 2000, also resolves the uncertainties specified in IR 99012 regarding (1) the establishment of a dynamic diagnostic test plan to provide information on potential valve age-related degradation; (2) the establishment of a plan to trend qualitative and quantitative information on MOV performance and to periodically assess that information; and (3) the backlog of condition reports on MOV performance. The staff concludes that the licensee is adequately addressing the actions requested in GL 96-05 at

Point Beach. The staff may conduct additional inspections at Point Beach to verify that implementation of the MOV periodic verification program is in accordance with (1) the licensee's commitments, (2) this NRC SE, and (3) the NRC SE dated October 30, 1997, on the JOG Program on MOV Periodic Verification; and, if the licensee applies the WOG methodology for ranking MOVs by their safety significance at Point Beach, the NRC SE dated April 14, 1998.

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