

June 12, 1997

Mr. Wendell G. Fiock
BWROG Project Manager
General Electric Company
175 Curtner Avenue, M/C 182
San Jose, CA 95125

SUBJECT: JOINT OWNERS GROUP PROGRAM ON MOTOR-OPERATED VALVE
PERIODIC VERIFICATION (TAC NOs. M98172 and M98173)

Dear Mr. Fiock:

In response to Generic Letter (GL) 96-05, "Periodic Verification of Design-Basis Capability of Safety-Related Motor-Operated Valves," the Boiling Water Reactor (BWR) Owners Group, the Westinghouse Owners Group, and Combustion Engineering (CE) Owners Group are jointly sponsoring an industry-wide program for the periodic verification of the design-basis capability of safety-related motor-operated valves (MOVs). This program is referred to as the Joint Owners Group (JOG) Program on MOV Periodic Verification.

On March 3, 1997, the Westinghouse Owners Group submitted to the NRC for review and comment its Topical Report MPR-1807 (Revision 0, February 1997), "Joint BWR and Westinghouse Owners Group Program on Motor-Operated Valve (MOV) Periodic Verification." On March 7, 1997, the BWR Owners Group submitted its Licensing Topical Report NEDC-32719 (March 1997), "BWR Owners' Group Program on Motor-Operated Valve (MOV) Periodic Verification." The technical content of these topical reports is identical. Also, we have been informed that the CE Owners Group is a full participant in the JOG program.

Enclosed for your consideration are our comments on your topical report on the JOG Program on MOV Periodic Verification. A similar letter is also being sent to the Westinghouse Owners Group. You might want to coordinate your responses with the other participating owners groups. If you have any questions regarding our comments, you may contact Thomas G. Scarbrough, at 301-415-2794.

Sincerely,
original signed by:
David B. Matthews, Chief
Generic Issues and Environmental
Projects Branch
Division of Reactor Program Management
Office of Nuclear Reactor Regulation

Project No. 691

Enclosure: NRC Staff Comments on
JOG Program on MOV Periodic Verification

cc w/enclosure: See next page.

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Project No. 691
Boiling Water Reactor Owners Group

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NRC STAFF COMMENTS ON
JOG PROGRAM ON MOV PERIODIC VERIFICATION

JOG Programmatic Issues

1. The final MOV periodic verification test criteria of the JOG Program on MOV Periodic Verification will not be established until completion of the JOG dynamic test program and the evaluation of the test data by JOG. At this stage, the NRC staff is not able to approve the final criteria until reviewing the JOG program evaluation of the test data and justification for establishing the final criteria. Following the JOG dynamic test program, the NRC staff requests that JOG submit for NRC review and approval a revision to the topical report describing the final test criteria and the justification for those criteria. The JOG should discuss more specifically its plans for using static and dynamic test data to determine the final test criteria.
2. Licensees implementing the JOG program as part of their response to Generic Letter (GL) 96-05, "Periodic Verification of the Design-Basis Capability of Safety-Related Motor-Operated Valves," will be expected to address any conditions or limitations in the NRC evaluation and conclusions on the JOG program provided in the NRC Safety Evaluation, and its supplement to be prepared following submission of the revised topical report that will include the results of the JOG dynamic test program.
3. The topical report does not address the procedures for identification of valve performance issues that might reveal operability concerns with MOVs in nuclear power plants. The topical report should discuss the process for satisfying the requirements of 10 CFR Part 21. Further, the topical report should also emphasize that licensees implementing the JOG program are responsible for addressing the information provided as a result of the JOG program during and following the JOG dynamic test program.
4. The JOG program does not include consideration of 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." Licensees choosing to implement the OMN-1 code case are required to submit a request for relief from IST requirements for application of the code case, pursuant to 10 CFR 50.55a(a)(3).
5. The Westinghouse Owners Group and BWR Owners' Group each submitted a topical report describing the JOG Program on MOV Periodic Verification. These topical reports are currently identical in content. The Owners' Groups will be expected to ensure that the description of the JOG program remains the same for each participant.

ENCLOSURE

JOG Program Scope

6. Licensees are responsible for identifying any valves which are outside the scope of applicability of the JOG overall program or the JOG dynamic test program such as valve manufacturer, size, type, or service conditions.
7. The discussion of gate valves in Section 3 of the topical report needs to be clarified. For example, the topical report does not discuss disk-to-guide friction or potential anomalies that can affect gate valve performance. The first and second bullets following the first full paragraph on Page 3-2 imply that the listed valves will perform in a similar manner although some of these valves have not undergone testing programs. On Page 3-3, in the second bullet from the top of the page, the topical report does not discuss the secondary flow in the WKM valve that can affect performance. On Page 3-3 in the fourth bullet, the topical report states that the JOG program applies to Deloro 50, Monel, and 400 stainless steel, although these materials have not been subject to programs to study age-related effects on valve performance. Review and revision of the gate valve discussion in Section 3 is needed to address these issues.
8. The discussion of globe valves in Section 3 of the topical report needs to be clarified with respect to unbalanced disk globe valves. For example, in the last full sentence on Page 3-3, the topical report states that unbalanced disk globe valves are insensitive to friction, although disk flow load pressing the disk against the surface of the cylindrical guide can affect the magnitude of the required thrust. At the top of Page 3-4, the topical report states that unbalanced globe valves can be addressed using only static tests, although the globe valve model developed by the Electric Power Research Institute has not been validated above 150 °F and globe valve performance above this temperature is not well known.
9. The topical report allows licensees to apply adjustments to either the actuator output thrust or required thrust. These differing approaches in applying uncertainties in thrust and torque setup calculations can result in different amounts of margin if applied to the same MOV. Where justified, licensees may retain their approach for MOV setup provided MOVs are properly evaluated for operability. However, because of the small margins allowed by the JOG interim periodic test program, the staff will expect licensees to account for uncertainties, as appropriate, regarding the output or required thrust (or torque) when establishing test frequencies under the JOG program.

JOG Interim Program

10. Licensees must ensure that each MOV in the JOG program will have adequate margin to remain operable until the next scheduled test, regardless of its risk categorization or safety significance.

11. In addition to the general test frequency established in the JOG program, licensees must consider the operating history of the specific valve, and its application and environment, in determining whether the test frequency is appropriate.
12. The NRC staff reviewed and approved, with certain conditions, the use of BWR Owners' Group Topical Report NEDC-32264, "Application of Probabilistic Safety Assessment to Generic Letter 89-10," for the prioritization of safety-related MOVs for testing in response to GL 89-10, "Safety-Related Motor-Operated Valve Testing and Surveillance." The staff references NEDC-32264 in GL 96-05. Licensees that did not participate in the development of NEDC-32264 will be expected to justify their risk categorization methodology as part of their implementation of the JOG program. The topical report provides limited guidance in this regard on Page 4-2, but does not discuss the potential for common mode failure of MOVs.
13. As an editorial comment, the topical report should reference the Supplement (dated February 20, 1997) to the NRC Safety Evaluation on the EPRI MOV Performance Prediction Program.
14. On Page 4-6, the topical report discusses the use of the EPRI MOV Performance Prediction Methodology (PPM) in evaluating the amount of available margin in categorizing the MOVs. The topical report should be revised to indicate that licensees should evaluate the results of the EPRI PPM before determining whether an MOV has high, medium or low margin. For example, the statement might not apply to those valves having test-determined valve factors or to valve designs that require compensating factors in the models such as the Aloyco, WKM, Westinghouse, Anchor/Darling double-disc, and other designs not tested in the EPRI program. The statement might also not apply to limit-switch controlled valves or to valves with Class 2 Warnings (galling), as defined by the EPRI PPM.
15. As an editorial comment, the last bullet on Page 4-6 should include the provision that the MOV is maintained in good working order.

JOG Dynamic Testing Program

16. The topical report describes the JOG receipt evaluation of test data from participating licensees as part of the JOG dynamic testing program. The JOG receipt evaluation involves comparing the test results with previous tests and assessing any observed trends with similar valves and the JOG program criteria. The interim periodic test program allows margins less than 5% to account for age-related degradation. The JOG receipt evaluation appears to allow a 10% increase in thrust requirements. For the NRC staff to review the JOG test criteria, the topical report should be revised to clarify the 10% review criterion, including the relationship to required thrust and actuator output adjustments.

17. The interim test frequency allows some MOVs to be tested at intervals longer than 5 years. The MOVs with tentative test schedules beyond 5 years should be grouped with similar MOVs that will be tested on a more frequent basis. Test data should be evaluated before exceeding 5 years, such that applicable MOVs will be tested within 5 years if the test results do not support longer test intervals. The topical report should be revised to include this guidance.
18. On Page 5-1, the topical report discusses the information that can be obtained from dynamic testing. The topical report should indicate that the information is most applicable for the particular differential pressure and fluid conditions and becomes less reliable with extrapolation. Therefore, the JOG program should ensure that sufficient test data are collected to encompass a broad range of valves and service conditions such that licensees will not need to extrapolate the JOG program results. Also, on Page 5-1, the topical report should caution licensees that the transfer of information on unwedging thrust from one valve to another might be unreliable because of specific valve characteristics. Also, on Page 5-1, the first bullet should include a reference to disc-to-seat and disc-to-guide friction (or valve factor).
19. In the first full paragraph on Page 5-2, the topical report discusses the dynamic test program matrix. The JOG program should attempt to have the interval between tests to be as long as possible within the parameters of the program to provide a better opportunity to observe age-related degradation.
20. On Page 5-2, the topical report discusses the use of the results from the dynamic test under GL 89-10 as part of the JOG dynamic test program. The topical report should discuss the collection of information on duty cycles and service conditions for these MOVs to be able to evaluate the effect of service wear over that time interval.

Actuator Output Thrust and Torque

21. On Page 3-7, the topical report states that the actuator is outside the scope of the JOG program. The JOG Program focuses on the potential age-related increase in the thrust and torque required to operate the valves. The topical report in Section 4 discusses the information that can be obtained from static testing. Industry testing has revealed that information from static testing provides an indication of actuator output at that specific time for that specific MOV, but that extrapolation of that information to other MOVs and times is less reliable. To assist licensees in addressing potential degradation in actuator output thrust and torque as part of their long-term MOV programs, the JOG should include an evaluation of potential degradation in actuator output thrust and torque as part of its dynamic test program. This evaluation should address the effects of aging on rate-of-loading and stem friction coefficient under dynamic conditions.

DP Test Group (Appendix C)

22. In Table C-3, the topical report should indicate the testing of the unbalanced globe valves.
23. Table C-3 indicates that globe valve testing will only be conducted under cold conditions. With the uncertainties surrounding globe valve performance under hot conditions, the JOG program should include dynamic testing of balanced and unbalanced disk globe valves under both cold and hot conditions.
24. The tables in Appendix C should be finalized.
25. As an editorial comment, the word "unbalanced" on Line 4 of Page C-1 should be "balanced."

In-Plant Test Specification (Appendix D)

26. On Page 2 of Appendix D, Section 3.2 should require that the valve internals not be exposed to air because this could reduce the thrust requirements.
27. On Page 3 of Appendix D, the word "maximum" in the third line of Section 4.3 should be deleted.
28. On Page 3 of Appendix D, the phrase "the packing load" in Line 9 of Section 4.3 should be changed to "the sum of the absolute values of the packing load and the stem rejection load," in order to provide more assurance of a reliable thrust measurement.
29. On Page 5 of Appendix D, Section 4.6 should include identification of the disk wedge angle, where applicable.
30. On Page 6 of Appendix D, the first bullet should note the importance of clearly identifying a point of flow isolation. Pressure instrumentation alone might not reliably predict the point of flow isolation. Further, the friction coefficient determined when the disk is sliding on the seating surface is the most reliable for extrapolation and trending with respect to other valves.
31. On Pages 6 and 7 of Appendix D, the closing and opening valve factor equations are provided. Discuss the basis for use of these equations rather than more up-to-date equations.
32. On Pages 7 and 8 of Appendix D, the topical report should indicate whether the seat diameter "d" is based on seat or guide measurements for globe valves.
33. On Page 10 of Appendix D, Section 4.7 should include provisions for documenting the number of IST and operational strokes that the MOV has experienced between JOG-specified tests.

34. On Page 10 of Appendix D, Section 4.7 should require that actual diagnostic electronic data be provided to JOG in addition to paper data traces for more detailed evaluation.