UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO THE INSERVICE TESTING PROGRAM AND REQUESTS FOR RELIEF

PACIFIC GAS AND ELECTRIC COMPANY

DIABLO CANYON NUCLEAR POWER PLANTS, UNITS 1 AND 2

DOCKET NOS. 50-275 AND 50-323

1.0 INTRODUCTION

The Code of Federal Regulations, 10 CFR 50.55a, requires that inservice testing (IST) of ASME Class 1, 2, and 3 pumps and valves be performed in accordance with Section XI of the ASME Boiler and Pressure Vessel Code and applicable addenda, except where specific written relief has been requested by a licensee and granted by the Commission pursuant to 10 CFR 50.55a(a)(3)(i), (a)(3)(ii), or (g)(6)(i). In requesting relief, a licensee must demonstrate that: (1) the proposed alternatives provide an acceptable level of quality and safety; (2) compliance would result in hardship or unusual difficulty without a compensating increase in the level of quality or safety; or (3) conformance is impractical. The Regulations, 10 CFR 50.55a(a)(3)(i), (a)(3)(ii), and (g)(6)(i), authorize the Commission to grant relief from ASME Section XI requirements upon making the necessary findings.

By letter dated February 27, 1991, as supplemented by letters dated May 3, 1991, December 11, 1991, and May 1, 1992, the Diablo Canyon licensee, the Pacific Gas and Electric Company (PG&E), submitted Revision 8 (Unit 1) and Revision 5 (Unit 2) to the Diablo Canyon IST Program Plan for review by the NRC staff. The revised IST Program Plan included several new and revised relief requests from the requirements of Section XI of the ASME Boiler and Pressure Vessel Code. These were designated relief requests 9, 13, 14, 18, 21, 22, and 23.

Generic Letter (GL) 89-04, "Guidance on Developing Acceptable Inservice Testing Programs," was issued on April 3, 1989. This GL identified acceptable alternatives to ASME Code requirements for certain aspects of inservice testing.

The PG&E relief requests 18, 21, and 22 conform to a position in GL 89-04, Attachment 1. Therefore, they have been reviewed by the staff but are not further discussed in this safety evaluation (SE), since they are approved per the generic letter. This SE addresses valve relief requests nos. 9, 13, 14, and 23 in Revisions 8 (Unit 1) and 5 (Unit 2) of the Diablo Canyon IST Program Plan. The NRC staff's findings with respect to other reliefs previously requested by PG&E as part of the Diablo Canyon IST Program Plan are contained

in NRC staff SEs issued on December 22, 1988 and August 21, 1991. The Diablo Canyon IST program is based on the requirements of Section XI of the ASME Code, 1977 Edition through the Summer of 1978 Addenda, and covers the first ten-year inspection intervals, from May 7, 1985, to May 6, 1995, for Unit 1 and March 13, 1986, to March 12, 1996, for Unit 2.

2.0 DESCRIPTION AND EVALUATION OF RELIEF REQUESTS

2.1 Valve Relief Request No. 23

The licensee requested relief from the valve exercising requirements of ASME Section XI, IWV-3522, for auxiliary feedwater pump steam supply check valves MS-5166 and MS-5167. The licensee proposed to verify valve closure capability by disassembly and inspection on a rotational frequency, one valve each refueling outage.

2.1.1 Licensee's Basis for Requesting Relief

Valve relief request no. 23 was added for disassembly inspections of auxiliary feedwater pump steam supply check valves MS-5166 and MS-5167 to verify the valves' closure capability. The valves were identified to have a safety function in the closed (reverse-flow) position as a result of an inservice testing review. The valves will be disassembled and internally inspected on a rotational frequency, one valve each refueling outage, to verify their capability to close following actuation. If any degradation is detected that could interfere with the valve's operability, the valve on the opposite train will also be disassembled and internally inspected during the same outage. The valves will be part-stroke tested after reassembly following refueling outage visual inspections. Previous testing to verify the valves' opening capability will be continued; it consists of part-stroke quarterly testing and full-stroke cold shutdown testing, in accordance with cold shutdown testing statement no. 2.

There are no test connections or taps installed that would allow seat leakage testing and reverse flow seating verification for auxiliary feedwater steam supply check valves MS-5166 and MS-5167. The check valves are located approximately two feet downstream from motor-operated isolation valve (MOV) FCC-37 or FCC-38 with no piping penetration between the MOV and the check valve. Upstream of the MOV, the piping ties directly into the main steam line with no other method of isolation.

Compliance with code requirements is impractical because the valves are not equipped with mechanical exercisers, position indicators or differential pressure instrumentation. At this time, the licensee cannot conclusively determine that non-intrusive diagnostic techniques would effectively demonstrate valve closure capability. Imposing the code requirements on the licensee would create a burden in that system modifications would have to be made to incorporate a method for verifying valve closure capability. Therefore, valve closure capability after full stroking cannot be verified.

2.1.2 Evaluation

Design features, such as mechanical exercisers, position indicators, differential pressure instrumentation, test connections, or taps that could verify the valves' closure capability are not installed. It would be burdensome to require the licensee to perform a system modification to correct the problem because of the expense involved. Further, the use of non-intrusive testing as a viable alternative has not been demonstrated for these valves. The licensee is effectively limited to disassembly and inspection to verify the valves' closure capability at this time. Although a valve should not be disassembled to test its functional capability if there is a viable alternative, disassembly and inspection of one of these valves followed by at least a part-stroke exercising with flow each refueling outage on a rotating basis should provide a reasonable assurance of operational readiness.

The NRC staff positions regarding check valve disassembly and inspection are explained in detail in GL 89-04. The minutes of the public meetings on GL 89-04 regarding Position 2, Alternatives to Full-Flow Testing of Check Valves, further stipulate that a partial-stroke exercise test using flow is expected to be performed before the valve is returned to service after disassembly and inspection.

A full-stroke exercise using flow should be performed if possible. The NRC staff considers valve disassembly and inspection to be a maintenance procedure with inherent risks which makes its routine use as a substitute for testing undesirable when other testing methods are possible. Non-intrusive diagnostic techniques such as acoustics or radiography can be used to demonstrate that these valves close promptly when subjected to reverse flow conditions.

Based on the determination that compliance with the Code requirements is impractical and burdensome, and considering that the licensee's proposed alternative should provide a reasonable assurance of operational readiness, relief is granted as requested from the Code requirements pursuant to 10 CFR 50.55a(g)(6)(i) provided the valves are disassembled and inspected in accordance with the positions of GL 89-04 and provided that the licensee actively investigates the use of non-intrusive diagnostic techniques to demonstrate that these valves will close promptly upon cessation or reversal of flow. This relief request should be revised or deleted if a better method is developed to verify the closure capability of these valves.

2.2 Valve Relief Requests Nos. 9, 13, and 14

The licensee requested relief from the valve exercising requirements of ASME Section XI, IWV-3522, for refueling water storage tank (RWST) suction check valves, 8924, 8977, and 8981.

2.2.1 Licensee's Basis for Requesting Relief

Valve relief request nos. 9, 13, and 14 were revised to allow disassembly inspections of RWST check valves 8924, 8977 and 8981, respectively, to verify the valves' closure capability. The valves were identified to have a safety

function in the closed (reverse-flow) position to limit potential post-LOCA recirculation leakage to the RWST, as described in PG&E letter DCL-90-181, dated July 16, 1990 (LER 1-84-044). Valve 8981 will be disassembled, internally inspected, and manually full-stroke exercised each refueling outage to verify its capability to both open and close. Valves 8924 and 8977 will be disassembled, inspected, and manually full-stroke exercised on a rotational basis, one valve each refueling outage, to verify their capability to open and close. If any degradation is detected in one of the 8924 or 8977 valves that interferes with the valve's operability, then the other valve in this group will also be disassembled, internally inspected, and manually full-stroke exercised during the same outage. Valves 8924 and 8977 are combined in the same disassembly inspection group because of their similarities in safety function, design (same manufacturer, size, model number, and material of construction), and service conditions (normally closed, located in section of piping not normally in service, horizontal orientation, located in auxiliary building with same external environmental conditions, and similar design rated accident flows). There are no known differences in valves 8924 and 8977 degradation mechanisms. The three valves will also be full-flow tested to the open position after reassembly following refueling outage visual inspections. In addition, valve 8924 is part-stroke exercised during cold shutdowns, and 8977 is part-stroke tested quarterly.

Compliance with code requirements is impractical because there are no test connections or taps installed that will allow seat leakage testing and reverse flow seating verification for these check valves. The valves are not equipped with mechanical exercisers, position indicators, or differential pressure instrumentation to verify valve closure. At this time, the licensee cannot conclusively determine that non-intrusive diagnostic techniques would effectively demonstrate valve closure capability. Therefore, valve closure capability after full stroking cannot be verified.

2.2.2 Evaluation

Design features that can verify the closure capability of RWST check valves 8924, 8977, and 8981 are not installed. Because of the expense involved, it would be burdensome to require the licensee to perform a system modification to correct this problem. Further, the use of non-intrusive testing as a viable alternative has not been demonstrated for these valves. The licensee is effectively limited to disassembly and inspection to verify the valves' closure capability at this time. Although a valve should not be disassembled to test its functional capability if there is a viable alternative, disassembly and inspection of these valves in accordance with positions of GL 89-04 should provide a reasonable assurance of operational readiness.

The NRC staff positions regarding check valve disassembly and inspection are explained in detail in GL 89-04. The minutes of the public meetings on GL 89-04 regarding Position 2, Alternatives to Full-Flow Testing of Check Valves, further stipulate that a partial-stroke exercise test using flow is expected to be performed before the valve is returned to service after disassembly and inspection. A full-stroke exercise using flow should be performed if possible. The NRC staff considers valve disassembly and inspection to be a

maintenance procedure with inherent risks which makes its routine use as a substitute for testing undesirable when other testing methods are possible. Non-intrusive diagnostic techniques such as acoustics or radiography can be used to demonstrate that these valves close promptly when subjected to reverse flow conditions.

Based on the determination that compliance with the Code requirements is impractical and burdensome, and considering that the licensee's proposed alternative should provide a reasonable assurance of operational readiness, relief is granted as requested from Code IWV-3522 exercising requirements pursuant to 10 CFR 50.55a(g)(6)(i), provided the valves are disassembled and inspected in accordance with the positions of GL 89-04 and provided that the licensee actively investigates the use of non-intrusive diagnostic techniques to demonstrate that these valves will close promptly upon cessation or reversal of flow. This relief should be revised or deleted if a better method is developed to verify the closure capability of these valves.

The portions of the relief requests nos. 9, 13, and 14 pertaining to verifying the capability of the valves to open were granted in the SE dated December 22, 1988.

The licensee should refer to NRC Information Notice 91-56, "Potential Radioactive Leakage to Tank Vented to Atmosphere," for additional information on the safety function of the RWST outlet check valves. The licensee should review the safety function of these valves to ensure that they are appropriately categorized with respect to possible leak rate testing requirements and revise the IST program as appropriate.

3.0 CONCLUSION

The valve relief requests nos. 9, 13, 14, and 23, addressed in submittals dated February 27, 1991, May 3, 1991, December 11, 1991, and May 1, 1992 are acceptable for implementation provided that the provisions described in the evaluation sections are implemented within one year of the receipt of this SE. The staff has determined that granting relief, pursuant to 10 CFR 50.55a(g)(6)(i), is authorized by law and will not endanger life or property, or the common defense and security and is otherwise in the public interest. In making this determination the staff has considered the alternate testing being implemented and the impracticality of performing the required testing considering the burden if the requirements were imposed. The granting of relief is based upon the fulfillment of any commitments made by the licensee in its basis for each relief request and the proposed alternative testing.

Principal Contributor: K. Dempsey

Date: June 15, 1992

This completes our review of the Diablo Canyon IST program and closes TAC Nos. M79825 and M79826. If you have any questions regarding this matter, please contact me.

Sincerely,

Original signed by
Harry Rood, Senior Project Manager
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