Enclosure 2

UNITED STATES
NUCLEAR REGULATORY COMMISSION
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SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

CONCERNING THE INSERVICE TESTING PROGRAM AND REQUESTS FOR RELIEF

OMAHA PUBLIC POWER DISTRICT

FORT CALHOUN STATION

DOCKET NO. 50-285

1.0 INTRODUCTION

The Code of Federal Regulations, 10 CFR 50.55a(g), requires that inservice testing (IST) of certain ASME Code 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 the 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, the 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 and safety; or (3) conformance is impractical for its facility. The regulations, 10 CFR 50.55a(a)(3)(i), (a)(3)(ii), and (g)(6)(i), authorize the Commission to grant relief from these requirements upon making the necessary findings.

This safety evaluation (SE) concerns relief requests and additional documentation for the Fort Calhoun IST program, submitted in letters dated October 8, 1990, and April 4, 1991. The relief requests addressed in this SE are: E1, E5, E7, E8, E10, E15, E19, E30, E35, E38, E43, and E44 for valves; and E1, E2, E3, E5, E6, and E7 for pumps.

Other relief requests contained in these submittals are not evaluated for the following reasons:

(1) Valve relief requests G1, G2, E32, and E45 are granted because they meet the positions in Generic Letter 89-04, Attachment 1.

(2) The following relief requests were evaluated in a previously issued SE, dated December 22, 1988: valve relief requests E3, E6, E13, E14, E18, and E26; pump relief request E4; and parts of pump relief request E3 (the parts concerning component cooling water pumps AC-3A, B, and C; low-pressure safety injection pumps SI-1A and B; high-pressure safety injection pumps SI-2A, B, and C; containment spray pumps SI-3A, B, and C; and boric acid pumps CH-4A and B).

(3) Pump relief request E8 was deleted in your submittal dated April 4. 1991.

This IST program, which is based on the requirements of Section XI of the ASME Code 1980 Edition through the Winter of 1980 Addenda, covers the second 10-year inspection interval, from September 2, 1983, to September 2, 1993.

2.0 DESCRIPTION AND EVALUATION OF RELIEF REQUESTS

2.1 IST PROGRAM FOR VALVES

2.1.1 Valve Relief Request E1

The licensee requested relief from exercising valves SI-100 and SI-113, high pressure safety injection (HPSI) pump suction check valves, in accordance with the requirements of ASME Code Section XI, Paragraphs IWV-3521 and IWV-3522, and proposed to partial-stroke test quarterly and full-stroke test during refueling outages.

2.1.1.1 Licensee's Basis for Requesting Relief

These valves cannot be fully exercised during plant operation or during cold shutdowns, since to do so would require a flow path to the reactor coolant system (RCS). Such a flow path cannot be used during power operation because the HPSI pumps do not develop sufficient discharge pressure to overcome RCS pressure. This same flow path cannot be used during cold shutdowns because there is insufficient volume in the RCS to accommodate the flow required, and a low temperature overpressure condition of the RCS could result.

The valves will be partial-stroke tested using the minimum recirculation flow path quarterly during normal operations and full-stroke tested during refueling outages.

This method of partial-stroke testing quarterly and full-stroke testing during refueling outages is in accordance with the guidance set forth in NRC GL 89-04, Attachment 1, Position 1.

2.1.1.2 Evaluation

The only flow path for exercising these check valves is into the RCS. The HPSI pumps produce insufficient outlet pressure to establish flow into the RCS at normal operating pressures. Performing this test during cold shutdowns could result in a low temperature overpressurization of the RCS. These valves can be full-stroke exercised during refueling outages.

These valves could only be full-stroke exercised at the Code-required frequency after significant system design changes, such as the addition of a full-flow test loop for each injection line. These changes would be burdensome for the licensee because of the costs involved. Additionally, any such changes could result in reduced reliability. Under the circumstances, the proposal to partial-stroke exercise quarterly and full-stroke exercise each refueling outage provides an adequate assessment of operational readiness and a reasonable alternative to the Code.

Based on the determination that compliance with the Code exercising frequency requirement is impractical and burdensome, and considering the proposal, relief may be granted as requested pursuant to 10 CFR 50.55a(g)(6)(i).

2.1.2 Valve Relief Request E5

The licensee requested relief from exercising valves SI-139 and SI-140, safety injection and refueling water tank discharge check valves (SIRWT), in accordance with the requirements of ASME Code Section XI, Paragraphs IWV-3521 and IWV-3522, and proposed to partial-flow test quarterly and to verify the full-stroke capability of these valves by sample disassembly and inspection every other refueling outage.

2.1.2.1 Licensee's Basis for Requesting Relief

These check valves function to prevent backflow to the SIRWT. These check valves are located in the lines leading from the SIRWT to the suctions of the containment spray (CS) pumps, the low pressure safety injection (LPSI) pumps and the HPSI pumps. The check valves under certain accident conditions must open sufficiently to provide design basis flow to all of these pumps. Because of this requirement, the system design full-stroke testing of these check valves quarterly or during cold shutdowns cannot be performed. During power operation, the HPSI and LPSI pumps cannot overcome the RCS pressure; and during cold shutdowns, running the HPSI pumps could create a low-temperature overpressurization condition in the RCS. The CS system cannot be used because the containment would be sprayed down. Additionally, it is not possible to achieve the maximum design accident flow of the check valves during full-flow testing.

The check valves, SI-139 and SI-140, will be partial-stroke tested using the minimum recirculation flow path quarterly during normal operations. One check valve, on an alternating basis, will be disassembled and inspected every other refueling outage. This sample disassembly of these check valves is in accordance with the NRC guidelines established in GL 89-04, Attachment 1, Position 2. This method ensures that each check valve is disassembled and inspected at least once every 6 years.

2.1.2.2 Evaluation

These valves are located in the lines leading from the SIRWT to the suctions of CS, LPSI, and HPSI pumps and, under certain accident conditions, must open sufficiently to provide design basis flow to all of these pumps. The valves also prevent backflow to the SIRWT. During power operation, no full-flow path exists for the pumps because the HPSI and LPSI pumps cannot overcome RCS pressure and the CS system cannot be permitted to spray the containment except under accident conditions. There is no full-flow path available during cold shutdowns because operating the HPSI pumps could create a low temperature overpressurization condition in the RCS. Exercising these valves with partial flow during the quarterly pump tests is the only testing that can be accomplished other than testing during refueling outages.

The licensee did not address backflow testing these check valves, which function to prevent backflow to the SIRWT. The justification should be provided to the staff for review if backflow testing cannot be performed.

With regard to verifying the full-stroke open capability of these check valves using sample disassembly and inspection, Position 2 of GL 89-04 on alternatives to full-flow testing of check valves states that extension of the valve disassembly and inspection interval to one valve every other refueling outage should only be considered in cases of extreme hardship where the extension is supported by actual in-plant data from previous testing. Further, the minutes on the public meetings on GL 89-04 regarding Position 2 stipulate that a partial-stroke exercise test using flow is expected to be performed after disassembly and inspection is completed, before the valve is returned to service. This post-inspection testing provides a degree of confidence that the disassembled valve has been reassembled properly and that the disk moves freely.

The NRC staff considers valve disassembly and inspection to be a maintenance procedure with inherent risks which make its routine use as a substitute for testing undesirable when other testing methods are possible. It may be possible to verify that these valves move to their fully-open and fully-closed positions by use of non-intrusive diagnostic testing techniques during a reduced-flow test at least once each refueling outage.

A determination that the proposed disassembly and inspection program provides a reasonable alternative to the Code requirements cannot be made based on the information provided. An interim period is necessary for the licensee to investigate the options and develop the necessary documentation. Immediate compliance with the Code-required testing could result in plant shutdown and an extended outage.

A check valve inspection program proposed by the licensee provides a reasonable alternative to the Code, in this case, during an interim period of one year or until the next refueling outage, whichever is longer. During this interim period, the licensee should (1) consider non-intrusive methods of testing these valves' open and closure capabilities during a reduced-flow test at least once per refueling outage, (2) show that extension of disassembly and inspection interval from every refueling outage to every other refueling outage is due to extreme hardship where the extension is supported by actual in-plant data from previous testing as indicated in GL 89-04, Position 2, (3) address the practicability of performing a partial-flow test of the reassembled valves before they are returned to service following the disassembly and inspec- tion procedure, (4) perform a backflow test of the valves or provide the justification for not performing this test.

Based on the determination that compliance with the Code is impractical and burdensome, and considering the licensee's proposal, interim relief may be granted pursuant to 10 CFR 50.55a(g)(6)(i) for one year or until the next refueling outage, whichever is longer.

2.1.3 Valve Relief Request E7

The licensee requested relief from exercising valves SI-159 and SI-160, containment recirculation check valves, in accordance with the requirements of ASME Code Section XI, Paragraph IWV-3521 and IWV-3522, and proposed to verify the full-stroke capability of these valves by sample dissassembly and inspection every other refueling outage.

2.1.3.1 Licensee's Basis for Requesting Relief

Thes valves function to prevent backflow to the containment lower level. These valves are backed up by motor operated isolation valves HCV-383-3 and HCV-383-4 which are normally closed, fail-as-is, and open only upon receipt of a containment recirculation actuation signal (RAS). Because of system design, these valves cannot be partial-stroked or full-stroke exercised with flow during power operation, cold shutdown, or refueling outage because the containment sump is normally dry and there is no flow path that is able to be used for testing. Full-stroke exercising these valves requires that the containment sump be filled with water and provided with a source of makeup water in addition to operating the CS pumps, the LPSI pumps, and the HPSI pumps at rated capacity. Thus, system configuration renders flow testing of these valves impractical.

Check valves SI-159 and SI-160 will be alternately disassembled every other refueling outage. This sample disassembly of these check valves is in accordance with the NRC guidelines established in GL 89-04, Attachment 1, Position 2 with the exception of partial-stroking. This method of sample disassembly and inspection will ensure that each check valve is disassembled and inspected at least once every 6 years. Because of the relatively low pressure and temperature seen by these valves and previous disassembly and inspection results showing "like-new" valve condition, this is considered an adequate method of ensuring the operability of these check valves to perform their function during an accident.

2.1.3.2 Evaluation

These check valves are located in the suction piping from the dry containment sump. Full-stroke exercising these valves with flow would require flooding the containment sump, which could result in equipment damage and require extensive cleanup efforts. Further, this testing involves the injection of non-reactor grade water into the reactor coolant system, the safety injection system, and the refueling water tank. This causes chemistry control problems, which could result in increased corrosion rates and reduced plant reliability.

Compliance with the Code requirements could only be achieved after a significant redesign of the system, which would be burdensome for the licensee because of the cost involved.

The licensee has proposed verifying the operability of these check valves using sample disassembly and inspection. The NRC staff positions regarding check valve disassembly and inspection are explained in detail in GL 89-04, "Guidance on Developing Acceptable Inservice Programs." Position 2 of GL 89-04 regarding alternatives to full-flow testing of check valves states that extension of the valve disassembly and inspection interval to one valve every other refueling outage should only be considered in cases of extreme hardship where the extension is supported by actual in-plant data from previous testing. For this request, the basis for extension of valve disassembly and inspection interval to one valve every other refueling outage centers on previous disassembly and inspection results which indicate the valves to be in a "like-new" condition. The licensee should also show, as specified in GL 89-04, Position 2, that the extension is due to extreme hardship.

The minutes of the public meeting on GL 89-04 regarding Position 2, Alternatives to Full-Flow Testing of Check Valves, 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 is completed. This post-inspection testing provides a degree of confidence that the disassembled valve is reassembled properly and that the disk moves freely. The licensee should investigate methods of part-stroke exercising these check valves. One of the options the licensee may consider is a part-stroke exercise test using existing test taps combined with non-intrusive diagnostic testing (such as acoustics) to verify disk movement. It is not evident based on the information provided that part-stroke exercising following valve reassembly is impractical.

The NRC staff considers valve disassembly and inspection to be a maintenance procedure with inherent risks which make its routine use as a substitute for testing undesirable when other testing methods are possible. It may be possible to verify that these valves move to their fully-open and fully-closed positions by use of non-intrusive diagnostic testing techniques during a reduced flow test at least once each refueling outage.

The licensee did not address backflow testing these valves, which function to prevent backflow to the containment lower level. The justification should be provided if this testing cannot be performed.

A determination that the proposed disassembly and inspection program provides a reasonable alternative to the Code requirements cannot be made based on the information provided. An interim period is necessary for the licensee to investigate the options and develop the necessary documentation. Immediate compliance with the Code-required testing could result in plant shutdown and an extended outage.

A check valve inspection program proposed by the licensee provides a reasonable alternative to the Code, in this case, during an interim period of one year or until the next refueling outage, whichever is longer. During this interim period, the licensee should (1) consider non-intrusive methods of testing these valves' open and closure capabilities during a reduced-flow test at least once per refueling outage, (2) show that extension of disassembly and inspection interval from every refueling outage to every other refueling outage is due to extreme hardship where the extension is supported by actual in-plant data from previous testing as indicated in GL 89-04, Position 2, (3) address the practicability of performing a partial-flow test of the reassembled valves before they are returned to service following the disassembly and inspection procedure, and (4) perform a backflow test of the valves or provide the justification for not performing this test.

Based on the determination that compliance with the Code is impractical and burdensome, and considering the licensee's proposal, interim relief may be granted pursuant to 10 CFR 50.55a(g)(6)(i) for one year or until the next refueling outage, whichever is longer.

2.1.4 Valve Relief Request E8

The licensee requested relief from exercising valves FW-161 and FW-162, steam generator normal feedwater inlet check valves, in accordance with the requirements of ASME Code Section XI, Para- graphs IWV-3521 and IWV-3522, and proposed to full-stroke test these valves during refueling outage.

2.1.4.1 Licensee's Basis for Requesting Relief

The check valves function to prevent the loss of inventory of the steam generators in the event of a line break upstream. These check valves cannot be fully-exercised closed quarterly during power operation or during cold shutdown because the only flow path is forward to the steam generator. Valves will be full-stroke exercised closed during each refueling outage.

2.1.4.2 Evaluation

The verification of operability of these valves quarterly during power operation is not practical because it would isolate feedwater to steam generators, resulting in a reactor trip. Verification during cold shutdown is also not practical because the required leak testing equipment and boundary setup details are extensive and could delay plant startup. A delay would be burdensome to the licensee. Based on the determination that compliance with the Code exercising frequency requirements is impractical and burdensome, and considering the proposal, relief may be granted as requested pursuant to 10 CFR 50.55a(g)(6)(i).

2.1.5 Valve Relief Request E10

The licensee requested relief from exercising valves SI-175 and SI-176, containment spray header check valves, in accordance with the requirements of ASME Code Section XI, Paragraphs IWV-3521 and IWV-3522, and proposed to verify full-stroke capability of these valves by sample disassembly every other refueling outage.

2.1.5.1 Licensee's Basis for Requesting Relief

The check valves are located inside containment. These valves cannot be full-stroked or partial-stroked exercised using system flow during any plant operating conditions because the only flow path is into the CS headers and would result in spraying down the containment, causing equipment damage and requiring extensive cleanup.

Check valves SI-175 and SI-176 will be alternately disassembled every other refueling outage. This sample disassembly of these check valves is in accordance with the NRC guidelines established in GL 89-04, Attachment 1, Position 2 with the exception of partial-stroking. This method of sample disassembly and inspection will ensure that each check valve is disassembled and inspected at least once every 6 years. Because of the relatively low pressure and temperature conditions to which these valves are exposed and previous disassembly and inspection results showing "like-new" valve condition, this is considered an adequate method of ensuring the operability of these check valves to perform their function during an accident. These check valves are located on the containment spray headers inside containment and function to prevent backflow from the containment to the shutdown cooling heat exchangers.

2.1.5.2 Evaluation

Using the containment spray pumps to full or part-stroke exercise these valves at any frequency would result in containment spray-down and equipment damage.

The Code-required testing could only be performed after significant system modifications which would be burdensome for the licensee because of the cost involved.

The licensee proposed verifying the operability of these check valves by sample disassembly and inspection. The NRC staff position regarding check valve disassembly and inspection is explained in GL 89-04, "Guidance on Developing Acceptable Inservice Testing Programs." Position 2 of GL 89-04 regarding alternatives to full-flow testing of check valves states that extension of the valve disassembly and inspection interval to one valve every other refueling outage should only be considered in cases of extreme hardship where the extension is supported by actual in-plant data from previous testing. For this relief request, the basis for extension of interval to one valve every other refueling outage focuses on previous disassembly and inspection results that indicate the valves to be in a "like-new" condition. In order to be consistent with GL 89-04, Position 2, the licensee should also show that the extension is due to extreme hardship.

The minutes of the public meeting on GL 89-04 regarding Position 2 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 is completed. This post-inspection testing provides a degree of confidence that the disassembled valve has been reassembled properly and that the disk moves freely. One option the licensee may consider is a part-stroke exercise test using air flow combined with non-intrusive diagnostic testing to verify disk movement following reassembly.

The NRC staff considers valve disassembly and inspection to be a maintenance procedure with inherent risks which make its routine use as a substitute for testing undesirable when other testing methods are possible. It may be possible to verify that these valves move to their fully-open and fully-closed positions by use of non-intrusive diagnostic testing techniques during a reduced flow test at least once each refueling outage.

The licensee did not address back-flow testing these check valves, which function to prevent backflow from the containment to the shutdown cooling heat exchangers. The justification should be provided to the staff for review if this testing cannot be performed.

A determination that the proposed disassembly and inspection program provides a reasonable alternative to the Code requirements cannot be made based on the information provided. An interim period is necessary for the licensee to investigate the options and develop the necessary documentation. Immediate compliance with the Code-required testing could result in plant shutdown and an extended outage.

A check valve inspection program proposed by the licensee provides a reasonable alternative to the Code, in this case, during an interim period of one year or until the next refueling outage, whichever is longer. During this interim period, the licensee should (1) consider non-intrusive methods of testing these valves' open and closure capabilities during a reduced-flow test at least once per refueling outage, (2) show that extension of disassembly and inspection interval from every refueling outage to every other refueling outage is due to extreme hardship where the extension is supported by actual in-plant data from previous testing as indicated in GL 89-04, Position 2, (3) address the practicality of performing a partial-flow test of the reassembled valves before they are returned to service following the disassembly and inspection procedure, and (4) perform a backflow test of the valves or provide the justification for not performing this test.

Based on the determination that compliance with the Code is impractical and burdensome, and considering the licensee's proposal, interim relief may be granted pursuant to 10 CFR 50.55a(g)(6)(i) for one year or until the next refueling outage, whichever is longer.

2.1.6 <u>Valve Relief Request E15</u>

The licensee requested relief from exercising valves CH-198, charging pump discharge to RCS check valve, and CH-203 and -204, loop charging line to RCS check valve, in accordance with the requirements of ASME Code Section XI, Paragraphs IWV-3521 and IWV-3522.

2.1.6.1 Licensee's Basis for Requesting Relief

These check valves cannot be fully tested during plant operations quarterly or during cold shutdowns, since to do so would require a flow path to the RCS. This flow path cannot be utilized during power operation because the HPSI pumps do not develop sufficient discharge pressure to overcome RCS pressure.

These check valves will be partial-stroke exercised in the forward flow direction quarterly during power operation using the charging pumps. The check valves will be full-stroke exercised during refueling outages in the forward flow direction during refueling outages using the charging pumps and the HPSI pumps. This is in accordance with the guidance provided in GL 89-04, Attachment 1, Positions 2 and 3.

2.1.6.2 Evaluation

Full-stroke exercising these valves during power operation is not practical because the only full-flow path is into the RCS and the charging pumps do not develop full design accident flow against reactor pressure. It is impractical to full-stroke exercise these valves during cold shutdown because the RCS does not contain sufficient expansion volume to accommodate the flow required and a low temperature overpressure condition could result. These valves could only be full-stroke exercised quarterly or during cold shutdown if extensive system modifications were performed, such as installing full-flow test loops. Making these system modifications would be costly and burdensome to the licensee.

The licensee proposed to partial-stroke exercise open quarterly and to full-stroke exercise open during refueling outages; however, it did not include a justification in the IST program for not backflow testing these valves. These valves appear to have a safety function to close in the event of a charging line rupture outside containment. The staff, in a letter dated November 22, 1991, requested that the licensee provide a justification for not verifying the reverse flow closure capability of these valves. In a letter dated January 3, 1992, the licensee responded that a break in the charging system piping outside of containment during normal operation or a Safe Shutdown Earthquake is considered an incredible event. A conference call was also held in early January 1992 to discuss this issue. The licensee's Updated Safety Analysis Report (USAR), Appendix M, "Postulated High Energy Line Rupture Outside the Containment," evaluates rupture of a charging line outside containment. The licensee should determine if any credit is taken for closure of the check valves for this postulated pipe failure.

Based on the determination that the Code-required testing is impractical and burdensome, and considering the proposal, relief may be granted pursuant to 10 CFR 50.55a(g)(6)(i) from the exercising requirements of Section XI as requested, provided the licensee either backflow tests these valves quarterly or documents the justification for not performing this test.

2.1.7 Valve Relief Request E19

The licensee requested relief from exercising valves SI-207, SI-208, SI-211, SI-212, SI-215, SI-216, SI-219, and SI-220, safety injection tank (SIT) check valves, in accordance with the requirements of ASME Code Section XI, Paragraphs IWV-3521 and IWV-3522.

2.1.7.1 Licensee's Basis for Requesting Relief

These valves cannot be exercised during power operation because a flow path does not exist because of the higher RCS pressure. The SIT pressure is less than RCS pressure during power operation. Also, these check valves cannot be exercised during cold shutdowns because the RCS does not contain sufficient volume to accept the flow required and a low temperature overpressure condition of the RCS could result.

The check valves will be full-stroke tested in the forward flow direction during refueling outages. Test parameters such as SIT level decrease vs. time, SIT pressure, valve differential pressure, flow rate, etc., are used to determine a flow coefficient. The minimum flow coefficient was determined using the safety analysis data stated in the USAR. Comparing this minimum flow coefficient as acceptance criteria to the flow coefficient determined by testing, the ability of the valve to perform its safety function can be determined. This method of testing the check valves is in keeping with guidance provided in GL 89-04, Attachment 1, Position 1. Additionally, valves SI-208, 212, 216 and 220 will be partial-stroke tested at cold shutdown frequency in the forward flow direction using shutdown cooling flow.

2.1.7.2 Evaluation

Full-stroke exercising these valves during power operation is not practical because the RCS is at a higher pressure than the SIT. During cold shutdowns, the RCS lacks adequate expansion volume to accommodate required flow and a low temperature overpressure condition could result. These valves could only be full-stroke exercised quarterly or during cold shutdown if extensive system modifications were performed, such as installing full-flow test loops. Making such modifications would be costly and burdensome to the licensee. Since the licensee is full-stroke exercising valves SI-194, -197, -200, and -203, shutdown cooling injection check valves, during cold shutdowns, the valves SI-208, -212, -216, and -220 can be partial-stroke exercised at the same frequency because they are located in the same flow path.

The licensee proposed to full-stroke test open these valves during refueling outages and partial-stroke test open valves SI-208, -212, -216, and -220 during cold shutdowns. The proposal appears to be a reasonable alternative to the exercising requirements of the Code.

Since the method of exercising these valves depends upon a combination of test and analyses, the staff is undertaking an indepth review of the licensee's methodology and will provide the results in a separate safety evaluation.

Based on the determination that the Code-required testing is impractical and burdensome, and considering the proposal, interim relief may be granted pursuant to 10 CFR 50.55a(g)(6)(i) from the exercising requirements of Section XI as requested, pending completion of the staff's detailed evaluation of the licensee's exercising methodology. The IST program identifies that these PIVs are leak tested each cold-shutdown. The program should identify this as a verification of valve closure and document a cold-shutdown justification for this function.

2.1.8 Valve Relief Request E30

The licensee requested relief from exercising valves HCV-438A-D, IA-HCV-438B-C, and IA-HCV-438D-C, RCP cooler isolation valves and instrument air supply check valves, in accordance with the requirements of ASME Code Section XI, Paragraphs IWV-3411, IWV-3412, IWV-3521, and IWV-3522, and proposed to full-stroke exercise these valves during cold shutdowns when the RCS is depressurized, RCS temperature is less than 130°F, and RCPs are secured.

2.1.8.1 Licensee's Basis for Requesting Relief

These valves serve to isolate containment penetrations M-18 and M-19, RCP seal cooling water. Exercising these valves would isolate cooling water flow to the RC Pumps which could damage the pumps if they are operating. RC pump failure during power operation could result in a plant shutdown; therefore, it is not practical to exercise these valves quarterly during power operations. During some cold shutdowns, reactor coolant temperature may be held above 130°F and plant conditions may not allow further cooldown nor stopping all RC pumps. Exercising these valves during Cold Shutdowns when RC temperature is greater than 130°F or when any RC pump is running could result in RC pump damage; therefore, it is not practical to exercise these valves when those plant conditions exist. These valves cannot be partial-stroked because they are either fully opened or fully closed.

The IA accumulator check valves cannot be exercised quarterly during power operation as exercising these check valves will cause cycling of the process valves. These valves will be full-stroke exercised during cold shutdowns when the RCS is depressurized, RCPs are secured, and RCS temperature is less than 130°F.

2.1.8.2 Evaluation

Exercising these valves during power operation would isolate cooling water flow to the RC pump and result in RC pump damage.

During cold shutdown conditions when the RCS is not depressurized and the RCS temperature is above 130°F, the RC pumps can be running and be damaged if the valves are cycled. The RCP cooler isolation valves, because of design, can only be full-stroke (not part-stroke) exercised. Exercising the instrument air accumulator check valves will cycle the RCP cooler isolation valves; therefore, it would not be practical to cycle these valves during power operation or when the RCP is running during cold shutdown at RCS temperature above 130°F. Imposition of the Code requirements to test these valves quarterly would require significant systems modifications which would be burdensome to the licensee.

Based on the determination that the Code-required testing is impractical and burdensome, and considering the proposal, relief may be granted from the exercising frequency requirements of Section XI as requested pursuant to 10 CFR 50.55a(g)(6)(i).

2.1.9 Valve Relief Request £35

The licensee requested relief from exercising valves HCV-1041B and HCV-1042B, main steam stop check valves, in accordance with the requirements of Section XI, Paragraph IWV-3522, and proposed verifying valve operability by sample disassembly and inspection every other refueling outage.

2.1.9.1 Licensee's Basis for Requesting Relief

These check valves are swing type check valves which are installed to provide a positive isolation of the steam generator. If main steam header pressure is greater than the steam generator pressure, the check valves prevent reverse flow into a faulted steam generator. These check valves cannot be exercised quarterly during power operation because doing so would cause steam to be isolated to the main steam header causing the turbine to trip and resulting in a reactor trip.

The check valves HCV-1041B and HCV-1042B will be disassembled and inspected during refueling outage. This sample disassembly of these check valves is in accordance with the NRC guidelines established in GL 89-04, Attachment 1, Position 2. This method of sample disassembly and inspection ensures that each check valve is disassembled and inspected at least once every 6 years.

2.1.9.2 Evaluation

It is impractical to verify the operability of these valves during power operations because exercising the valve closed would isolate the main steam piping, resulting in a reactor trip. Verifying valve closure during cold shutdowns is also not practical because the testing setup is detailed and time consuming and could delay plant startup which would be burdensome to the licensee.

The licensee has proposed verifying the operability of these check valves using disassembly and inspection. The NRC staff positions regarding check valve disassembly and inspection are explained in detail in GL 89-04, "Guidance on Developing Acceptable Inservice Programs." Position 2 of GL 89-04 regarding alternative to full-flow testing of check valves states that extension of the valve disassembly and inspection interval to one valve every other refueling outage (or every 6 years) should only be considered in cases of extreme hardship where the extension is supported by actual in-plant data from previous testing. The licensee's basis does not include the necessary information to comply with this GL 89-04 position.

The minutes of the public meeting on GL 89-04 state that the use of disassembly and inspection to verify the reverse-flow closure capability of check valves may be found to be acceptable only where reverse-flow closure cannot practically be verified by flow or pressure measurements. The licensee has not adequately demonstrated the impracticality of performing a backflow test on these valves during refueling outages. Therefore, the licensee should develop a method to verify the reverse-flow closure of these valves at refueling outages other than by sample disassembly and inspection or explain why these valves cannot be reverse-flow tested.

The minutes of the public meeting on GL 89-04 also state that partial-stroke exercise testing with flow is expected to be performed after valve disassembly and inspection is completed but before returning the valve to service. This post-inspection testing provides a degree of confidence that the disassembled valve has been reassembled properly and that the disk moves freely.

Immediate compliance with the Code-required testing could result in plant shutdown and an extended outage. The licensee needs an interim period to develop a method and procedures for performing the required backflow testing. In the interim period, the use of sample disassembly and inspection should provide a reasonable assurance of these valves to perform their safety function in the closed direction provided the disassembly is performed in accordance with GL 89-04, Attachment 1, Position 2, and the NRC staff positions as stated in the minutes of the public meetings on GL 89-04.

Based on the determination that the immediate imposition of Code-required testing is impractical and burdensome, and considering the proposal, interim relief may be granted pursuant to 10 CFR 50.55a(g)(6)(i) for a period of one year or until the next refueling outage, whichever is longer. During this time, the licensee should follow GL 89-04, Attachment 1, Position 2, and explain why these valves cannot be reverse-flow tested or develop a method to verify reverse flow closure of these valves other than by sample disassembly and inspection.

2.1.10 Valve Relief Request E38

The licensee requested relief from exercising PCV-1849A and B, instrument air containment isolation valves, in accordance with the requirements of ASME Code Section XI, Paragraph IWV-3411 and IWV-3412, and proposed to full-stroke exercise the valves during cold shutdown when the RCS is depressurized, the RCPs are secured, and the RCS temperature is less than 130°F.

2.1.10.1 Licensee's Basis for Requesting Relief

These valves serve to isolate instrument air (IA) pressure to containment systems. Stroke testing cannot be performed quarterly during power operations or cold shutdown with RCS temperature greater than 130°F and RCS not depressurized. The valves cannot be partial-stroked because they are either fully opened or fully closed.

The closing of these valves could:

(1) cause fluctuations in the level and pressure control of the pressurizer,

(2) result in damage to RCP seals,

(3) disrupt RCS letdown to CVCS,

(4) damage nuclear detector instrumentation,

(5) damage the CVCS ion exchange resins,

(6) cause level fluctuations in the SIT level, and

(7) cause loss of the steam generator blowdown.

These valves will be stroke-timed in the closed direction during refueling outages when the RCS temperature is less than 130°F with RCPs off and RCS depressurized. The surveillance test will be revised to reflect the change in frequency from refueling outage to cold shutdown when RCS is depressurized, RCPs are secured, and RCS temperature is less than 130°F. This procedure change has been initiated and is expected to be issued prior to the 1991 refueling outage.

2.1.10.2 Evaluation

Exercising these valves during power operation or when in cold shutdowns with RCS temperature greater than 130°F and not depressurized would cause transients and cause damage to major components. Because of design, the valves can only be full-stroke exercised. It would not be practical to exercise the valves other than when RCS is depressurized, RCPs are secured, and RCS temperature is less than 130°F. Imposition of the Code requirements to test these valves quarterly would require significant systems modifications which would be burdensome to the licensee.

Based on the determination that the Code-required testing is impractical and burdensome, and considering the proposal, relief may be granted from exercising frequency requirements of Section XI as requested pursuant to 10 CFR 50.55a(g)(6)(i).

2.1.11 Valve Relief Request E43

The licensee requested relief from exercising valve, CH-166, volume control tank (VCT) outlet check valve, in accordance with the requirements of ASME Code Section XI, Paragraph IWV-3521, and proposed to full-stroke exercise the valves during refueling outages.

2.1.11.1 Licensee's Basis for Requesting Relief

This check valve serves to prevent a divergent path from the boric acid injection system to the VCT. A divergent path may reduce the concentration of boric acid required to be injected into the RCS.

This valve cannot be fully exercised closed quarterly during power operation or cold shutdown. The only flow path through this valve is into the RCS and would result in injecting highly concentrated boric acid into the RCS. Injecting concentrated boric acid into the RCS during cold shutdown could delay reactor startup because of the requirement to establish the proper boron concentration prior to the reactor startup. The check valves cannot be partial-stroke during power operation or cold shutdowns for the same reasons.

The valve will be full-stroke exercised in the reverse direction during refueling outages.

2.1.11.2 Evaluation

This check valve has a safety function to close to prevent a divergent path which may reduce the amount of boric acid injected into the RCS to less than acceptable levels. Exercising the valve, partially or fully, involves injecting concentrated boric acid into the RCS. Injection of concentrated boric acid during power operation could cause a plant trip. During cold shutdown, overboration of RCS may result and delay the return to power.

Based on the determination that compliance with the Code exercising frequency requirement is impractical, that the licensee's proposed alternatives would provide a reasonable assurance of operational readiness, and considering the burden on the licensee if this Code requirement is imposed, relief may be granted as requested pursuant to 10 CFR 50.55a(g)(6)(i).

2.1.12 Valve Relief Request E44

The licensee requested relief from exercising valves, SI-135, SI-143, and SI-149, containment spray pump discharge check valves, in accordance with the requirements of ASME Code Section XI, Paragraph IWV-3521 and IWV-3522, and proposed to full-stroke exercise the valves during cold shutdowns when the CS pumps are able to be aligned to the shutdown cooling heat exchangers (at less than 120°F primary coolant temperature) in accordance with the Technical Specifications.

2.1.12.1 Licensee's Basis for Requesting Relief

These valves cannot be fully exercised quarterly during power operation because the only full-flow path is into the CS headers and would result in spraying down the equipment in containment, possibly causing equipment damage and requiring extensive cleanup. Also, these valves cannot be partial-stroke exercised during the quarterly CS pump tests because the minimum flow lines branch off upstream of these valves.

The valves will be full-stroke exercised during cold shutdowns when the CS pumps are able to be aligned to the shutdown cooling heat exchangers (at less than 120°F primary coolant temperature) in accordance with the Technical Specifications.

2.1.12.2 Evaluation

These valves cannot be full-stroke exercised during power operation because the only full-flow path allowed by Technical Specification is into the CS headers, and a flow into the CS headers would spray down and damage the equipment in containment. These valves can be full-stroke exercised at shutdown conditions at RCS temperature less than 120°F, when Technical Specifications allow adjustment of CS pumps for shutdown cooling service.

The licensee did not address the feasibility of partial-stroke exercising these valves during the quarterly pump tests by using the downstream taps. The justification should be documented in the IST program if this quarterly testing cannot be performed.

Based on the determination that compliance with the Code exercising frequency requirement is impractical, that the licensee's proposed alternative would provide a reasonable assurance of operational readiness, and considering the burden on the licensee if this Code requirement is imposed, relief may be granted as requested pursuant to 10 CFR 50.55a(g)(6)(i) provided the licensee either partial-stroke exercises these valves quarterly using the downstream taps or documents the justification for not performing this test.

2.2 IST Program for Pumps

2.2.1 Pump Relief Request E1

The licensee requested relief from measurement of pump bearing temperature requirements of ASME Code Section XI, Paragraphs IWP-3100, IWP-3300, IWP-3500, and IWP-4310 for the following pumps:

- auxiliary feedwater pumps FW-6, FW-10
- component cooling water pumps AC-3A, B, C
- raw water pumps AC-10A, B, C, D
- low pressure safety injection pumps SI-1A, B
- high pressure safety injection pumps SI-2A, B, C
- containment spray pumps SI-3A, B, C
- charging pumps CH-1A, B, C
- boric acid pumps CH-4A, B
- D/G fuel oil transfer pumps FO-4A-1, 2, FO-4B-1, 2

2.2.1.1 [illegible]'s Basis for Requesting Relief

The referenc[illegible]on of the Code requires bearing temperature to be recorded annu[illegible]y. [illegible]data has shown that the bearing temperature changes due to deg[illegible]ly occur after major degradation has occurred at the pump. Pric[illegible]ion, measurements would provide a warning of any impending malfur[illegible] been demonstrated by experience that bearing temperature rise [illegible]nutes prior to bearing failure. Therefore, the detection of poss[illegible]ng failure by the yearly temperature measurement is extremely unlikely. Some pumps require at least one hour of operation to achieve stable bearing temperatures. The small probability of detecting bearing failure by temperature measurement does not justify the additional pump operating time to obtain the measurements.

This is in agreement with present changes that are being implemented in Subsection IWP of the Code. Deletion of bearing temperature measurement from the Code has been approved and will be included in future Editions/Addenda. Reference ASME/ANSI OMa-1988, Part 6.

2.2.1.2 Evaluation

The temperature at the bearing most often would not increase significantly until just before a bearing failure. Therefore, the likelihood of detecting an impending bearing failure with a single annual bearing temperature measurement is very small. The quarterly pump vibration measurements provide more information about the degradation of the bearing than the annual bearing temperature measurement.

Relief may be granted as requested pursuant to 10 CFR 50.55a(a)(?)(i), since the alternative testing provides an acceptable level of quality and safety.

2.2.2 Pump Relief Request E2

The licensee requested relief from the observation of proper lubrication level or pressure requirements of ASME Code Section XI, Paragraph IWP-3100 and IWP-3300 and proposed to fulfill pump lubrication requirements through plant maintenance procedures rather than Section XI test requirements. The following is the list of applicable pumps:

- auxiliary feedwater pumps FW-6, FW-10
- component cooling water pumps AC-3A, B, C
- raw water pumps AC-10A, B, C, D
- low pressure safety injection pumps SI-1A, B
- high pressure safety injection pumps SI-2A, B, C
- containment spray pumps SI-3A, B, C
- charging pumps CH-1A, B, C
- boric acid pumps CH-4A, B
- D/G fuel oil transfer pumps FO-4A-1, 2, FO-4B-1, 2

2.2.2.1 Licensee's Basis for Requesting Relief

The observation of lubrication level or pressure is a maintenance function, not a performance degradation monitoring function. Pump lubrication requirements are determined by the pump manufacturer and plant operation.

Pump lubrication requirements are fulfilled through plant maintenance procedures rather than Section XI test requirements. This is in agreement with present changes that are being implemented in Subsection IWP of the Code. Deletion of observing lubricant level or pressure from the Code has been approved and will be included in future Editions/Addenda. Reference ASME/ANSI OMa-1988, Part 6.

2.2.2.2 Evaluation

Compliance with lubrication requirements using the plant maintenance procedures instead of the IST program is not inconsistent with ASME/ANSI OMa-1988 Part 6 (OM-6) and should provide acceptable level of quality and safety relative to this relief request. The acceptability of using the guidelines of OM-6 for pump testing is addressed by ASME Code Case N-465. This Code Case is referenced in NRC Regulatory Guide 1.147 and has been determined to be suitable for use by the Commission staff per 10 CFR 50.55a.

The licensee's proposed alternative will provide an acceptable level of quality and safety; therefore, relief may be granted from the requirements of Section XI pursuant to 10 CFR 50.55a(a)(3)(i), as requested.

2.2.3 Pump Relief Request E3

The licensee requested relief from the requirement of Section XI, Paragraph IWP-3100, IWP-3300, and IWP-4240 to measure inlet and differential pressures for the following pumps: raw water pumps AC-10A, B, C, D; charging pumps CH-1A, B, C; and diesel generator fuel oil transfer pumps FO-4A-1, 2, FO-4B-1, 2. The licensee pro- posed to calculate the pump inlet and differential pressures for the raw water pumps and proposed to measure discharge pressure only for the charging pumps and the diesel generator fuel oil transfer pumps.

Component cooling water pumps (AC-3A, B, C), LPSI pumps (SI-1A, B), HPSI pumps (SI-2A, B, C), CS pumps (SI-3A, B, C), and boric acid pumps (CH-4A, B) were evaluated in a previously issued SE, dated December 22, 1988, and are, therefore, not included in this SE.

2.2.3.1 Licensee's Basis for Requesting Relief

Raw Water Pump

System design does not include instrumentation for direct measurement of inlet and differential pressure.

The pump inlet pressure will be calculated based on the river level and the elevation of the pump suction bells. The pump differential pressure will then be calculated based on the measured discharge pressure and the calculated inlet pressure. Since (1) the river provides the required positive pressure at the suction of the pumps, (2) the river level does not change when a pump is started, and (3) at least one pump is usually in service, the calculated inlet pressure prior to starting a pump is the same as with a pump running.

Charging Pumps and D/G Fuel Oil Transfer Pumps

The charging pumps and the D/G fuel oil transfer pumps are positive displacement pumps designed to deliver constant capacity irrespective of inlet pressure or differential pressure across the pumps. Discharge pressure and flow rate are better parameters to use for detecting pump degradation than differential pressure and flow rate when testing positive displacement pumps. If discharge pressure is used as a test parameter rather than differential pressure, then inlet pressure is not required to be measured.

Pump discharge pressure will be set at a reference value and flow rate will be measured and compared to a reference flow rate. This is in agreement with present changes that are being implemented in Subsection IWP of the Code. Utilizing discharge pressure rather than differential pressure for detecting pump degradation on positive displacement pumps has been approved and will be included in future Editions/Addenda of the Code. Reference ASME/ANSI OMa-1988, Part 6.

2.2.3.2 Evaluation

Raw Water Pump

The measurement of inlet pressure cannot be made because of a lack of installed inlet pressure instrumentation in the design. Measuring the height of fluid above the pump suction and calculating the inlet pressure is a reasonable alternative to directly measuring pump inlet pressure provided the calculations are within the accuracy that would result from installed instrumentation meeting the Code accuracy requirements. It would be burdensome to require the licensee to perform system modifications in order to measure inlet pressure on these pumps in accordance with the Code requirements because the expense involved would not be justified by the limited amound of additional information provided.

Based on the determination that the Code-required testing is impractical and burdensome, and considering the proposal, relief may be granted from the requirements of Section XI as requested pursuant to 10 CFR 50.55a(g)(6)(i) provided the inlet pressure calculations are within the accuracy that will result from installed instrumentation meeting the Code accuracy requirements.

Charging and D/G Fuel Oil Transfer Pumps

Since these are positive displacement pumps, changes in inlet pressure have no effect on the flow rate or the discharge pressure as long as an adequate pump suction source is available. For this reason, calculating or measuring inlet or differential pressure would not contribute meaningful data to use in monitoring pump degradation. The licensee's proposal to measure discharge pressure instead is an acceptable alternative to the Code.

The licensee's proposed alternative should provide an acceptable level of quality and safety; therefore, relief may be granted from the requirements of Section XI as requested pursuant to 10 CFR 50.55a(a)(3)(i).

2.2.4 Pump Relief Request E5

The licensee requested relief from the instrumentation full-scale range requirements of Section XI, Paragraph IWP-4120 for the raw water pump AC-10A, B, C, D and charging pumps CH-1A, B, C.

2.2.4.1 Licensee's Basis for Requesting Relief

Raw Water Pumps

The raw water (RW) system is designed with two headers supplying cooling water to four component cooling water (CCW) heat exchangers. Each header contains an annubar. Each annubar is associated with an indicator with a range of 0-10,000 GPM. The RW system is always lined up through both headers which results in a fairly even flow distribution through each header. When performing the quarterly pump test, measured flow values may range from 3500 GPM to 7000 GPM. This results in flow values between 1750 GPM and 3500 GPM on each header's flow indicator, potentially below one-third of the flow indicator's full-scale range.

Alternate Testing: None. Testing a RW pump through a single header would require manipulation of several valves. These valve manipulations could result in fluctuations in the CCW temperature as well as the heat loads cooled by the CCW system. It is impractical to alter the valve lineup on balanced RW and CCW systems under these operating conditions and doing so could result in equipment damage.

As a result of further engineering evaluation, it has been determined that the RW pumps have been averaging around 7000 gpm since 1990 and in no case have they been less than 5000 gpm. Taking the worst case (worst case being the 5000 gpm flow), each RW header was receiving approximately 2500 gpm of flow.

The 2500 gpm reading is still within four times the scale. Based on this and the typical flow rate of approximately 3500 gpm per header, which is within the ASME required three times range, the licensee is confident that any RW pump degradation will be detected.

The licensee is presently evaluating alternative methods of RW system flow measurement. This evaluation is expected to be completed by the end of the present 10-year interval ending September 25, 1993. The licensee will inform the NRC of any changes to be made to the facility as a result of this evaluation in the IST Program 3rd ten-year interval submittal.

Charging Pumps

The charging portion of the chemical and volume control system is designed for simultaneous flow of all three charging pumps. Therefore, the reference flow rate for a single pump is less than one-third of the flow indicator's full-scale range.

Alternative Testing: None. The use of wider range instrumentation in this application should prevent instrument damage or inaccuracies due to overranging when three pumps are in service. Utilizing the existing instrumentation whose range is greater than three times reference flow values should provide sufficiently accurate data to utilize in the pump monitoring program to assess pump degradation.

Testing a charging pump quarterly in accordance with the ISI Program Plan Revision 5, requires that flow be measured using an instrument designed for the simultaneous flow of all three charging pumps. The flow of a single charging pump is less than one-third of the flow indicator's full scale range. The existing range is required to ensure accurate indication during an accident and is designed to prevent overranging of the instrument. The licensee is presently using the output of the plant computer as a more accurate determination of the indicated flow.

The licensee plans to install additional flow instrumentation to monitor the charging flow on the low end of the scale (i.e., flow < 40 gpm). This instrumentation would ensure that the range requirements as stated in IWP-4120 of ASME Section XI are satisfied. It is expected that this modification plan will be evaluated for acceptability by the end of the current ten-year interval ending September 25, 1993. The licensee will inform the NRC of any changes to be made to the facility as a result of this evaluation in the IST program 3rd ten-year interval submittal.

2.2.4.2 Evaluation

The licensee proposed to use existing instrumentation whose range is greater than three times reference flow value instead of the Code-required range of less than or equal to three times reference value.

The licensee has not demonstrated that instrumentation meeting the Code requirements is not readily available or that compliance with the Code accuracy requirements would be excessively burdensome. The availability, procurement, and installation of instrumentation that meets the Code accuracy requirements should be investigated.

An interim period is necessary to give the licensee time to complete their investigation, procure the necessary instrumentation, and make any necessary system design changes. Imposition of immediate compliance could result in an extended outage which would be a hardship for the licensee because of the costs involved. The licensee is currently evaluating alternative methods of flow measurements for the raw water pumps and the charging pumps, including a plan which would install additional flow instrumentation that meets the Section XI requirements. This evaluation is expected to be completed by September 25, 1993. The measurement of flow using the existing instruments combined with other inservice testing performed on the pumps (such as vibration monitoring) should provide reasonable assurance of pumps' operational readiness in the interim period.

Based on the determination that immediate compliance with the Code is impractical, and considering the licensee's proposal, interim relief may be granted pursuant to 10 CFR 50.55a(g)(6)(i) until September 25, 1993, to use the currently installed flow rate instrumentation for pump testing while the licensee investigates acceptable alternatives. This relief request should be withdrawn if acceptable instrumentation is installed.

2.2.5 <u>Pump Relief Request E-6</u>

The licensee requested relief from the requirement of Section XI, Paragraph IWP-3100, to establish fixed reference values for flow and differential pressure for component cooling water pumps AC-3A, B, C and raw water pumps AC-10A, B, C, D. The licensee also requested relief from the inlet pressure measurement requirement of Section XI, Paragraph IWP-3100 for charging pumps CH-1A, B, C and D/G fuel oil transfer pumps FO-4A-1, 2 and FO-4B-1, 2.

2.2.5.1 <u>Licensee's Basis for Requesting Relief</u>

<u>Component Cooling Water and Raw Water Pumps</u>

The design and the operation of these systems prevent varying the system resistance to establish either reference differential pressure or flow-rate values. The plant's conditions may vary significantly from one test to the next which affect the equipment heat loads and the cooling water flow to the various components. Significant system modifications would be necessary to allow repeatable reference differential pressures or flow rates. It is impractical to establish reference differential pressures or flow rates under these operating conditions, and doing so could result in equipment damage.

A set of reference points (i.e., reference pump curves) has been established for these pumps when the pumps were known to be operating properly. Since the pumps are tested quarterly, regardless of plant conditions, the measured flow rate and the calculated differential pressure will be compared to the reference pump curve to ensure that the flow rate deviates no more than theamount allowed by Table IWP-3100-2. As plant conditions change, the calculated differential pressure and measured flow rate will change. However, when these points are plotted on the pump reference curves, the measured flow rates should be within the tolerances allowed by Table IWP-3100-2 at any given differential pressure. When the tolerances are exceeded, pump degradation will be suspected.

Baseline vibration data is developed for all points used in establishing the baseline pump curve. The baseline vibration values are referenced when flow or differential pressure changes significantly on the curve from previous tests.

Charging Pumps and D/G Fuel Oil Transfer Pumps

See Section 2.2.3.2 for the evaluation of licensee's requested relief from the inlet pressure measurement requirement of Section XI, Paragraph IWP-3100 for charging pumps CH-1A,B,C and D/G fuel oil transfer pumps FO-4A-1,2 and FO-4B-1,2.

2.2.5.2 Evaluation

Component Cooling Water Pumps and Raw Water Pumps

The CCW pumps and the RW pumps operate under a variety of flow rate and differential pressure conditions. Significant system redesign and modification would be needed to allow returning to fixed points of operation for testing. This would be very costly and burdensome to the licensee.

The use of pump curves is acceptable if the testing incorporates the following elements which will be subject to NRC inspection:

(1) Curves are developed, or manufacturer's pump curves are validated when the pumps are known to be operating acceptably.

(2) Curves are based on an adequate number of points, with a minimum of three.

(3) Points are beyond the flat portion of the curves in a range which includes or is as close as practicable to design basis flows.

(4) Acceptance criteria based on the curves does not conflict with Technical Specifications or Facility Safety Analysis Report operability criteria, for flow rate and differential pressure, for the affected pumps.

(5) If vibration levels vary significantly over the range of pump conditions, a method for assigning vibration acceptance criteria should be developed for regions of the pump curve.

The licensee should factor these elements into their program and procedures for developing and utilizing the pump curves.

Based on the determination that compliance with the Code requirements is impractical, and considering the burden on the licensee if the Code requirements are imposed, relief may be granted from the Code requirements pursuant to 10 CFR 50.55a(g)(6)(i) for the CCW pumps and the RW pumps.

Charging Pumps and D/G Fuel Oil Transfer Pumps

Since these are positive displacement pumps, changes in inlet pressure have no effect on the flow rate or the discharge pressure as long as an adequate pump suction source is available. For this reason, calculating or measuring inlet or differential pressure would not contribute meaningful data to use in monitoring pump degradation.

The licensee's proposed alternative should provide an acceptable level of quality and safety, therefore, relief may be granted from the requirements of Section XI as requested pursuant to 10 CFR 50.55a(a)(3)(i).

2.2.6 Pump Relief Request E7

For D/G fuel oil transfer pumps, FO-4A-1, 2 and -4B-1, 2, the licensee requested relief from the requirements of Section XI, Paragraph IWP-3500, to run each pump at least 5 minutes under conditions as stable as the system permits before the measurements are made. The licensee proposed to run the pumps for only 2 minutes prior to recording the test measurements.

2.2.6.1 Licensee's Basis for Requesting Relief

The D/G fuel oil transfer pump takes suction from the fuel oil storage tank and pump fuel oil to the 300 gallon wall mounted day tank. The capacity of this pump is 20 gallons per minute. The level switch in the wall mounted day tank are set such that there would be approximately 200 gallons between the low-level switch setting (where the pumps start) and the high-level switch setting (where the pumps trip). Therefore, if the first pump runs 5 minutes, the second pump to be tested would trip before completing its 5 minute run. Defeating the trip logic to keep the pump running could result in overflowing the tank. Draining the tank prior to running the pumps is impractical because there is no permanent piping back to the storage tank.

The D/G fuel oil transfer pumps will be in operation for only 2 minutes prior to recording pump test parameters. Two minutes should be more than adequate time to ensure conditions have stabilized. Within 2 minutes, the gear-driven positive-displacement pump will stabilize.

2.2.6.2 Evaluation

The use of two minutes running time prior to making test parameter measurement is consistent with ASME/ANSI OMa-1988 Part 6 (OM-6) and should provide acceptable level of quality and safety. The acceptability of using the guidelines of OM-6 for pump testing is addressed in AMSE Code Case N-465. This Code Case is identified in NRC RG 1.147 and has been determined to be suitable for use by the Commission staff per 10 CFR 50.55a.

The licensee's proposed alternative should provide an acceptable level of quality and safety; therefore, relief may be granted from the requirements of Section XI pursuant to 10 CFR 50.55a(a)(3)(i), as requested.

3.0 Conclusion

No relief request is denied; however, in certain areas, the licensee did not provide the requisite bases to justify the requests. These areas are addressed in the evaluation sections of this SE. Valve relief requests E15 and E44 and pump relief request E3 are acceptable for implementation provided that the changes and actions described in the evaluation sections are made within one year of receipt of this SE. Actions described in the SE Section 2.2.4 for pump relief request E5 should be completed by September 25, 1993, which is the licensee's expected completion date. For valve relief request E5, E7, E10, and E35, the actions specified in the evaluation sections should be completed within one year or the next refueling outage, whichever is longer. The following relief requests may be granted as requested pursuant to 10 CFR 50.55a: E1, E8, E30, E38, and E43 for valves; and E1, E2, E6, and E7 for pumps. Valve relief request E19 may be granted on an interim basis pending completion of the staff's detailed evaluation of the licensee's exercising methodology.

The staff has determined that granting relief, pursuant to 10 CFR 50.55a(a)(3)(i), (a)(3)(ii), or (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, compliance resulting in a hardship without a compensating increase in safety, and the impracticality of performing the required testing considering the burden if the requirements were imposed. The evaluation section for each relief request identifies the regulation under which the requested relief is granted. 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.

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