UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

INSERVICE TESTING PROGRAM FOR REQUESTS FOR RELIEF

CONSUMERS POWER COMPANY

PALISADES NUCLEAR PLANT

DOCKET NO. 50-255

1.0 INTRODUCTION

The Code of Federal Regulations, 10 CFR 50.55a, requires that inservice testing (IST) of certain American Society of Mechanical Engineers (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 relief has been requested by the licensee and alternatives authorized or relief granted by the Commission pursuant to Sections (a)(3)(i), (a)(3)(ii), or (g)(6)(i) of 10 CFR 50.55a. In proposing alternatives or 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. NRC guidance contained in Generic Letter (GL) 89-04, "Guidance on Developing Acceptable Inservice Testing Programs," provided alternatives to the Code requirements determined acceptable to the staff. Pursuant to Section (f)(4)(iv), portions of editions or addenda incorporated in 10 CFR 50.55a(b) may be used for IST provided that all related requirements of the respective editions or addenda are met, and subject to Commission approval.

10 CFR 50.55a authorizes the Commission to grant relief from ASME Code requirements upon making the necessary findings. The NRC staff's findings with respect to granting or not granting the relief requested as part of the licensee's IST program are contained in this safety evaluation (SE).

2.0 BACKGROUND

By letter dated June 28, 1991, Consumers Power Company (CPCo) submitted a revised IST program for the Palisades Plant. The submittal superseded previous program revisions, reflected modifications made during the 1990 refueling outage, and indicated that compliance with GL 89-04 guidance had been achieved. The NRC issued an SE in a letter dated July 15, 1992. The SE represented the completion of the review of CPCo's responses to GL 89-04; however, certain additional actions were recommended for relief requests that were approved for an interim period, approved with provisions, or denied. The NRC denied certain requests for relief and directed the licensee to comply with the Code requirements or submit a revised relief request within the first quarter after receiving the SE, except where interim relief had been granted.

In CPCo's letter dated December 29, 1992, actions taken to address the denied relief requests were described and revised relief requests were submitted as appropriate. Table 1 provides a summary of the action items addressed in the December 29, 1992, submittal. The revised relief requests are evaluated in Section 3 below. Further, the remaining actions taken to address recommendations identified in the NRC's SE were described in a letter dated October 4, 1993, which also contained revised relief requests. Table 2 provides a summary of the action items addressed in the October 4, 1993, submittal. The revised relief requests are evaluated in Section 4 below.

The Palisades Plant IST Program was developed to the 1983 Edition, with Summer 1983 Addenda, of Section XI of the ASME Code. The commercial operation date for the Palisades Plant was December 31, 1971. The second 10-year IST interval was extended in accord with the provisions in Section XI of the ASME Code and will expire in May 1995. This SE completes the NRC's review of the IST relief requests for the second 10-year interval and no additional action is required. The NRC will review any impracticalities identified by the licensee for the third 10-year interval upon receipt of CPCo's determination in accordance with 10 CFR 50.55a. The licensee should consider the information included in this SE as it applies to the third 10-year interval and address any issues that affect compliance with the later edition of the code.

3.0 EVALUATION OF RELIEF REQUESTS IN THE DECEMBER 1992 SUBMITTAL

Two revised relief requests that remain outstanding from the December 1992 submittal are evaluated below. Table 1 gives a summary of CPCo's actions described in the December 1992 submittal.

3.1 Pump Relief Request 4

The licensee has requested relief from the requirements of IWP-4500 and Table IWP-3100-2 for measurement and recording of pump bearing vibration amplitude in "peak-to-peak" mils displacement. Alternatively, the licensee proposes to implement the vibration measurement requirements of OM-6 for the following Code Class 2 and 3 pumps:

Auxiliary Feedwater Pumps (P-8A/B/C)
Boric Acid Pumps (P-56A/B)
Charging Pump (P-55A/B/C)
Component Cooling Water Pumps (P-52A/B/C)
Containment Spray Pumps (P-54A/B/C)
High Pressure Safety Injection Pumps (P-66A/B)
Low Pressure Safety Injection Pumps (P-67A/B)
Service Water Pumps (P-7A/B/C)

3.1.1 Licensee's Basis for Relief

The licensee states:

> Relief is requested from the requirements of ASME Section XI, Subsection IWP, Article IWP-4500 and Table IWP-3100.2. Palisades has

reviewed the requirements of Subsection IWP against those in Part 6 of the OMa-1988 Addenda to OM-1987 (Part 6) for pump vibration testing and prefers to implement the more current requirements found in Part 6. CPCo believes that alternate rules in Part 6 provide an acceptable level of quality and safety as is required by 10 CFR 50.55a(a)(3)(i). This is best demonstrated by the NRC's approval of the 1989 Edition of ASME Section XI (ref: 10 CFR 50.55a(b)(2) and 10 CFR 50.55a(b)(2)(viii). The 1989 Edition of ASME Section XI replaced the rules of IWP with those of ANSI [American National Standards Institute]/ASME OM (Part 6).

The vibration requirements of Part 6 will be applied with one exception. An analysis of previous pump test results found that the vibration limits in Table 3a of Part 6 are acceptable for most pumps at Palisades. However, the pumps discussed below were found to regularly exceed the "> 0.325 in/sec" Alert Range Limit when they were known to be operating acceptably. Analysis of this data against a "> 0.325 in/sec" Part 6 Alert Range Limit yields the following results:

P-54A - Five of the last six tests would have been in the alert range.

P-54B - The last six tests would have been in the alert range.

P-54C - The last six tests would have been in the alert range.

P-67A - Four of the last six tests would have been in the alert range.

P-67B - Three of the last six tests would have approached the alert range.

As shown above, application of this alert limit would inappropriately require these pumps be regularly placed on Alert and their test frequency doubled. This additional testing burden would not be warranted based on the pumps' history of acceptable performance at these vibration levels and could lead to pump degradation. Furthermore, no benefit can be expected from this additional testing. Therefore, in accordance with 10 CFR 50.55a (a)(3)(ii), implementation of the "0.325 in/sec" Alert Range Limit for these specific pumps represents an undue hardship without a compensating increase in quality or safety. These pumps cannot meet this requirement because they are tested at low flow rates through a mini[mum] recirc[ulation] line.

This conclusion is supported by the fact that when the containment spray pumps are tested at higher flow rates during cold shutdowns per Tech[nical] Spec[ifications] procedure QO-10, the vibration levels are less than half of the vibration levels recorded when the pumps are tested during mini[mum] recirc[ulation]. Also, vibration levels

NOTE: The licensee also provided test data in the December 29, 1992, submittal.

recorded during special test T-261, LPSI [low pressure safety injection] Pump Performance Test, indicated that vibration levels recorded at design flow rates were less than half the vibration recorded when the pumps are tested during mini[mum] recirc[ulation].

3.1.2 Alternative Testing

The licensee proposes:

CPCo will implement the Part 6 of the OMa-1988 Addenda to the OM-1987 Edition for pump vibration testing with the following exception. The "0.325 in/sec" Alert Limit will be replaced with the limits listed below. Note that the "> 2.5V [reference] to 6V [reference] Alert Range will be maintained. In addition, the "> 0.70 in/sec" Required Action Limit will be replaced with the limits listed below.

	Alert Limit	Required Action Limit
Containment Spray Pump (P-54A)	> 0.74 in/sec	> 1.20 in/sec
Containment Spray Pump (P-54B)	> 1.00 in/sec	> 1.50 in/sec
Containment Spray Pump (P-54C)	> 0.85 in/sec	> 1.30 in/sec
Low Pressure Injection Pump (P-67A)	> 0.70 in/sec	> 1.00 in/sec
Low Pressure Injection Pump (P-67B)	> 0.70 in/sec	> 1.00 in/sec

3.1.3 Evaluation

For the auxiliary feedwater pumps, boric acid pumps, charging pumps, component cooling water pumps, high pressure safety injection pumps, and service water pumps, the licensee's proposed alternative is in accordance with OM-6. Based on the incorporation of the 1989 Edition of Section XI in 10 CFR 50.55a(b), the licensee may implement the requirements of OM-6 pursuant to 10 CFR 50.55a (f)(4)(iv) provided all related requirements are met. For pumps that operate above 600 rpm, measurement of pump vibration in units of velocity rather than in units of displacement provides a better indication of anti-friction bearing wear and other types of pump degradation; hence, this method can result in more timely repairs. Related requirements for vibration measurement in OM-6 include paragraphs 4.6.1, 4.6.4, and 6.1.

For the containment spray pumps and the low pressure injection pumps, the basis for relief does not indicate the basis for consideration that these pumps could continue to perform acceptably, for extended periods at higher flow rates, with the proposed limits for "alert" and "required action." The licensee notes that the testing of these pumps is performed using minimum recirculation test loops. The lower flow rates may be the reason that vibration levels are high during testing; however, the licensee proposes no additional monitoring of vibration for IST during the higher flow tests. At the lower flow rates, vibration velocity peaks above 0.3 in./sec indicate the pump would be operating in a "rough" range. Above 0.7 in./sec, the pump would be operating in a "danger" or "very rough" range considered to be indicative of a problem. The licensee notes that previous test data indicates that each of these pumps would be operating in the "alert" range of OM-6 (> 2.5 V_r to 6 V_r or > 0.325 in./sec); however, the licensee has provided no discussion on

the cause for the high vibration levels being experienced for these pumps other than the lower flow conditions. Increasing the limit for "alert" action might be justified for an interim period (based on the test data included in the submittal) in order to determine the cause of the higher than normal vibration. However, there is no basis for increasing the limit for "required action" to values above those considered acceptable for pump operation without additional information, such as certification from the pump vendor, an analysis indicating that the pump is not degrading by testing at the lower flow rates, etc. Therefore, the proposed alternative for these pumps is unacceptable without additional justification that the pumps are operating in acceptable condition. The vibration monitoring for the containment spray pumps and the low pressure injection pumps must be in accordance with the requirements of IWP or OM-6.

3.1.4 Conclusion

Based on the incorporation of the 1989 Edition of Section XI in 10 CFR 50.55a(b), the licensee may implement the requirements of OM-6 pursuant to 10 CFR 50.55a(f)(4)(iv) provided all related requirements are met and subject to Commission approval. The NRC has determined that licensees may implement the vibration monitoring requirements of OM-6. Related requirements for vibration measurement in OM-6 include paragraphs 4.6.1, 4.6.4, and 6.1. NOTE: The updated 10-year interval program that becomes effective May 1995 will be developed to the requirements of OM-6 and this will no longer require Commission approval.

The proposed limits for the containment spray pumps and the low pressure injection pumps have not been justified and are therefore not authorized for implementation pursuant to 10 CFR 50.55a(a)(3)(ii) as requested. The licensee must continue to meet the code requirements for vibration monitoring of these pumps. If the licensee believes that additional information may support approval of increasing the "alert" limit (while maintaining the code required action limit), or may provide a basis for considering these pumps acceptable for continued operation at higher levels, a relief request for the third 10-year interval program should be submitted. The licensee may consider assigning IST limits for the higher flow test as part of a proposed alternative which could verify that the pumps would operate at design basis conditions with lower vibration levels. Other potential actions that CPCo could pursue include (1) the use of spectral analysis (including a review of previous spectral data, if available), (2) consulting services with expertise in vibration of machinery, or (3) consultation with the pump manufacturer(s) to determine and correct the cause of the high vibration or to provide assurance that the levels are not indicative of degradation and that operation will not damage the pumps during the period of time necessary to mitigate the consequences of an accident.

3.2 Valve Relief Request 12

The licensee requests relief from the requirements of IWV-3413 for stroke time measurements of valves CV-0944 and CV-0977B. These valves close to perform a safety function to isolate the component cooling water to radioactive waste

evaporators upon receipt of a safety injection signal (SIS). The valves also have a "fail-safe" function to close.

3.2.1 Licensee's Basis for Relief

The licensee states:

> CV-0944 and CV-0977B are normally open valves which close on SIS. There are no position switches to locally or remotely stroke the CV's.... These valves can only be actuated via an SIS since there is no means of manually positioning these valves. The SIS is tested once each quarter during performance of Technical Specification Surveillance Procedure QO-1, "Safety Injection Signal." Stroke time coordination of these valves would impose a hardship during QO-1 for the following reasons:
>
> 1. QO-1 is manpower intensive and involves blocking or bypassing several automatic actuations and must, therefore, be performed in as little time as possible because it places the plant in an abnormal operating condition.
>
> 2. The SIS signal is initiated from the Control Room; however, position indication for CV-0944 and CV-0977B is located at remote panel C-105. Coordination between control room activities and C-105 would be difficult since a dedicated operator would need to be positioned at C-105 with a stopwatch. Starting the stopwatch would be manual based on a verbal signal from the control room, resulting in an additional reaction time error over and above that introduced by the control room operator. As a result, obtaining a consistent stroke time basis suitable for meaningful trending would be near impossible. The information obtained would be of limited use due to the anticipated wide range of scatter of the data.
>
> The portion of the component cooling water system isolated by these two valves is a closed loop. Therefore, it would require failure of both of these valves to close in order to maintain cooling water flow to the radioactive waste evaporators. Such an occurrence would constitute a multiple active failure which is not required to be considered in the plant's safety analysis.
>
> Based on the above stated reasons and in accordance with 10 CFR 50.55a (a)(3)(ii), relief is requested from the stroke timing requirements of IWV-3413 since compliance with the code requirements would result in hardship without a compensating increase in the level of quality and safety.

3.2.2 Alternative Testing

The licensee proposes:

> CV-0944 and CV-0977B will be stroke tested each quarter during performance of QO-1. QO-1 will verify that CV-0944 and CV-0977B have traveled to their safety position without measuring stroke time. QO-1 will also verify the fail-safe capability of CV-0944 and CV-0977B on a quarterly basis.

3.2.3 Evaluation

The previous revision of this relief request was denied in the July 15, 1992, SE. The relief request has been revised to include additional information on the difficulty of performing testing in accordance with code requirements. These valves are 10-inch, air-operated, butterfly valves which receive an engineered safeguards signal to close to isolate non-essential cooling loads, including the radioactive waste evaporators.

Position indication is available at a remote panel, but control of the valves is not available at the same panel. The SIS is initiated from the control room. This design arrangement is not conducive to measuring stroke time due to the difficulty in communicating the initiation of the SIS to the individual monitoring the position indicating lights at the remote panel. Therefore, measuring stroke time using conventional methods presents a hardship or unusual difficulty without a compensating increase in the level of quality and safety. The code requirement for stroke-time testing of power-operated valves is intended to monitor for degrading conditions by monitoring for increases in the stroke time that could indicate changes in the valve internals or valve actuator and control system. Imposing the code requirements would necessitate modifications to the system to enable testing. The quarterly stroke testing, with verification that the valves travel to their safety-related position and that the valves will fail safe, verifies that these valves are capable of fulfilling their safety function. The testing will indicate a problem with these valves and corrective actions can then be taken. Additionally, the testing occurs frequently enough that a problem would be identified in a reasonable period of time. However, the licensee should consider placing these valves in a preventative maintenance program to monitor for degradation mechanisms and include information in the updated IST program that describes such plans.

3.2.4 Conclusion

Based on the hardship or unusual difficulty in performing stroke-time testing in accordance with the code and considering that imposition of the code requirements would not provide a compensating increase in the level of quality and safety, approval of the alternative testing is authorized pursuant to 10 CFR 50.55a(a)(3)(ii).

4.0 EVALUATION OF RELIEF REQUESTS IN THE OCTOBER 1993 SUBMITTAL

Table 2 summarizes CPCo's response to the remaining action items included in the NRC's SE. Several revised relief requests are evaluated below that reflect NRC's recommendations from the previous SE. Five new relief requests which had not been previously evaluated were submitted: VRR-20, VRR-21, PRR-5, PRR-6, and PRR-7. These new relief requests are also evaluated below.

4.1 Valve Relief Request 15

The relief request was developed to address Technical Evaluation Report (TER) Action Item 5.3. The request relates to the administrative requirements of the ASME Performance Test Code (PTC) 25.3-1976 which is referenced in IWV-3512 of the 1983 Edition of Section XI as the test requirements for safety and relief valve setpoint testing.

4.1.1 Licensee's Basis for Relief

The licensee states:

> Relief from the administrative personnel qualification requirements is requested based on the fact that the proposed alternative provides an equivalent level of quality and safety as implementation of the code requirements. The administrative control requirements contained in PTC 25.3-1976 were written to provide guidance on the administration of a safety relief valve test program and to provide qualification requirements for industrial facilities where other controls for testing were not in place.

4.1.2 Alternative Testing

The licensee proposes the following as an alternative:

> Consumers Power has in place a program for control of plant testing and qualification of personnel which is compliant with all NRC regulations, 10 CFR 50, Appendix B, ASME Section XI, ANSI N45.2.6, and ANSI N18.7. Imposition of a separate set of administrative controls and personnel qualification requirements would be redundant and place an unnecessary burden on plant resources, since the in place programs and procedures adequately provide for test control and personnel qualification.

4.1.3 Evaluation

Two items in the administrative requirements of the PTC which ensure that the testing is adequately documented and that the instrumentation used for the testing is calibrated are adequately controlled by the requirements in 10 CFR Part 50, Appendix B. However, in addition to these two items, two other items that are not specifically addressed in the listed documents are not justified by the licensee's basis for relief: (1) The PTC specifies that a test supervisor who has obtained an academic degree in a branch of engineering from a recognized school of engineering, and who has at least 2 years of practical

experience in fluid-flow measurement, may be considered qualified to supervise the test. The licensee has not discussed the comparison of the specific requirements to the personnel qualification requirements of the listed documents; (2) The PTC specifies that no adjustment to the valve shall be made during the test and that following any deviation of the test conditions, stable conditions be reached before readings are taken. The licensee has not indicated how these requirements are controlled during test performance. Therefore, approval cannot be authorized as requested. The requirements for safety and relief valve testing that will apply for the updated 10-year program constitute an entire part of the ASME Operations and Maintenance (OM) Standards, specifically Part 1-1987, "Requirements for Inservice Performance Testing of Nuclear Power Plant Pressure Relief Devices."

4.1.3 Conclusion

The alternative is not adequately justified, though noncompliance with the administrative portion of the PTC should not have an adverse impact on the operability of the valves if the testing was performed with essentially equivalent controls. The licensee should review the most current set point tests for each of the installed safety and relief valves and ensure that the test supervisor had an engineering degree, or essentially equivalent qualifications, and that the test procedures had controls to account for any changes or deviations in the test conditions. If any discrepancies are identified that indicate that the PTC requirements, or equivalent, were not met, the potential impact on the set point of the installed valves should be assessed for continued operability and the applicable valves should be scheduled for tests during the next refueling outage using the requirements of Part 1-1987 of the ASME OM Standards that will become effective for Palisades in May 1995. The results of the review and any actions taken should be documented and available for review by the NRC during inspections of the IST program.

4.2 Valve Relief Request 4

This relief request was revised to address TER action item 5.9. Relief from the requirements of Section XI, IWV-3521, to full-stroke exercise check valves every three months, with certain exceptions, is requested for the high pressure safety injection to the primary coolant system check valves. The valves close to prevent back leakage into the high pressure safety injection system and open to allow flow to the primary coolant system.

4.2.1 Licensee's Basis for Relief

The licensee states:

> Relief is requested on the basis that compliance with the code requirement is impractical. These check valves cannot be full-stroke exercised during normal power operation since the test path required to stroke open the check valves requires injecting highly borated water into the Primary Coolant System (PCS) which would result in a reactivity change power reduction and possibly a pressure/temperature transient. This test flowpath is not available during normal

operations since the PCS is at a greater pressure than the HPSI pump discharge. Testing at any plant condition other than cold shutdown will result in thermal shock to the injection nozzles. Full-stroke testing is not possible during cold shutdown periods, except when the reactor vessel head is removed, due to Technical Specification 3.3 pump operability limitations below 260°F (Low Temperature Overpressurization - 10 CFR Part 50, Appendix G). Closure of these valves is verified quarterly during the performance of surveillance test QO-32.

4.2.2 Alternative Testing

The licensee proposes:

The HPSI check valves shall be tested as follows:

1. During cold shutdowns each valve shall be part-stroke tested per Inservice Test Procedure QO-8B, "ESS [engineered safeguards system] Check Valve Operability Test and High Pressure Safety Injection Flow Indicator Verification (Cold Shutdown)."

2. During refueling outages (reactor vessel head removed), these check valves shall be full-stroke tested per Inservice Test Procedure RO-65, "HPSI/RHPSI Check Valve Test."

3. Valve closure is verified on a quarterly basis during the performance of surveillance test QO-32, "Closure Verification of HPSI Train 1 and 2 and LPSI Check Valves."

4.2.3 Evaluation

Interim relief was granted for this relief request in the July 1992 SE. The evaluation noted that partial-stroke exercising the valves quarterly may be possible using the test line to the primary system drain tank, as discussed in paragraph 6.1.3.1.2 of the safety analysis report. The revised relief request did not discuss use of the test line, but added discussion concerning thermally shocking the injection nozzles. Therefore, it is assumed that the licensee evaluated the use of the test line and determined that such a test would also result in allowing cold water to flow through the nozzles. If the safety analysis report is incorrect, it should be revised to reflect actual plant conditions.

It is impractical to test these valves with design accident flow rate during power operations without causing a primary coolant system boration and reactivity change with an accompanying power transient. In addition, the basis for relief indicates that the injection nozzles could be thermally shocked if the testing is performed during power operations. During cold shutdown conditions, the testing is prohibited by limitations on the operation of a high pressure pump to prevent low temperature overpressurization. If the staff imposed the code requirements, the licensee would be required to test quarterly or during cold shutdowns, which could not be accomplished without removing the reactor vessel head or damaging the injection nozzles.

Otherwise, plant modifications installing full-flow test loops would be required. These alternatives would be burdensome to the licensee considering that the proposed testing schedule can provide reasonable assurance of the valves operational readiness. In addition, the later edition of the code allow owners to determine the practicality of deferring check valve testing to full-stroke exercising during refueling outages (reference Subsection IWV of the 1989 Edition of Section XI).

4.2.4 Conclusion

Relief is granted to defer partial-stroke exercising to cold shutdowns and full-stroke exercising to refueling outages for the high pressure safety injection pressure isolation check valves. The granting of relief is authorized pursuant to 10 CFR 50.55a(f)(6)(i) based on the impracticality of performing testing in accordance with the ASME Code requirements. Consideration has been given to the burden on the licensee if the code requirements were imposed.

4.3 Valve Relief Request 5

This relief request was revised to address TER action item 5.10 which identified that the licensee's justification for relief discussed only the valve's safety function to open. The request is applicable to the redundant high pressure safety injection (HPSI) check valves which prevent back leakage of primary water into HPSI train 2 and provide a flow path for HPSI train 2 water into the primary system. Deferral of testing to part-stroke exercising during cold shutdowns and full-stroke exercising during refueling outages is proposed.

4.3.1 Licensee's Basis for Relief

The licensee states:

> Relief is requested from exercise testing these valves in both the open and closed directions based on the fact that the code requirements are impractical. Full-stroke testing during normal operation is impractical because the discharge pressure of the pump is insufficient to overcome PCS [primary coolant system] pressure at normal operating conditions. Part-stroke testing during normal operations is not prudent due to the risk of damage to the valve seats resulting from the thermal stresses set up when injecting cold water across a hot valve seat. Full-stroke testing during a normal cold shutdown is prohibited by the Technical Specifications Section 3.3 pump operability limitations below 260°F due to the risk of overpressurization of the PCS. Full-stroke testing can only be performed during a reactor refueling when the reactor vessel head is removed providing an adequate surge volume for the pumps.

4.3.2 Alternative Testing

The licensee proposes:

The HPSI Train 2 check valves shall be tested as follows:

1. During cold shutdowns, each valve shall be part-stroke tested per Inservice Test Procedure QO-08, "ESS [engineered safeguards system] Check Valve Operability Test and High Pressure Safety Injection Flow Indicator Verification (Cold Shutdown)."

2. During refueling outages (reactor vessel head removed or equivalent), these check valves shall be full-stroke and closure tested per Inservice Test Procedure RO-65, "HPSI Train 1 and 2, and HLI [hot leg injection] Check Valve Test."

3. Valve closure is verified on a quarterly basis during the performance of surveillance test QO-32, "Closure Verification of HPSI Train 1 and 2 and LPSI [low pressure safety injection] Check Valves."

4.3.3 Evaluation

Interim relief was granted for this relief request in the July 1992 SE. The evaluation noted that partial-stroke exercising the valves quarterly may be possible using the test line to the primary system drain tank, as discussed in paragraph 6.1.3.1.2 of the safety analysis report. The revised relief request did not discuss use of the test line, but added discussion concerning possible damage to valve seats from thermal stresses. Therefore, it is assumed that the licensee evaluated the use of the test line and determined that such a test would damage the valve seats. If the safety analysis report is incorrect, it should be revised to reflect actual plant conditions. Also, the TER recommended that the licensee review the category for these valves, particularly whether the valves are required to be leak tight (Category A/C). The valves are listed as Class 1, Category C, valves. Therefore, it is assumed that the licensee determined that these valves do not perform a leak-tight function, but rather, close to prevent diversion of flow back into HPSI Train 2.

These valves cannot be full-stroke exercised during normal power operation because the only full-flow path is into the primary system and the HPSI pump operating pressure is less than normal primary system operating pressure. At reduced primary system pressures, partial-stroke exercising is possible, but not practical because of the potential for thermal and power transients induced by injecting relatively cold borated water into the primary system. Additionally, full-stroke exercising the valves during cold shutdowns is impractical due to the low temperature overpressurization concerns. At these conditions, HPSI pumps are required to be inoperable when the reactor head is installed and the primary system cold leg temperature is less than 260°F in accordance with plant Technical Specification 3.3. The part-stroke exercising during cold shutdown, full-stroke exercising during refueling outages, and

quarterly closure verification provide adequate assurance of the operational readiness of the valves. If the staff imposed the code requirements, the licensee would be required to full-stroke exercise quarterly or during cold shutdowns, which could not be accomplished without removing the reactor vessel head or damaging the valve seats. Otherwise, plant modifications installing full-flow test loops would be required. These alternatives would be burdensome to the licensee considering that the proposed testing schedule can provide reasonable assurance of the valves operational readiness. In addition, the later edition of the code allows owners to determine the practicality of deferring check valve testing to full-stroke exercising during refueling outages (reference Subsection IWV of the 1989 Edition of Section XI).

4.3.4 Conclusion

Relief is granted to defer partial-stroke exercising to cold shutdowns and full-stroke exercising to refueling outages for the redundant high pressure safety injection check valves. The granting of relief is authorized pursuant to 10 CFR 50.55a(f)(6)(i) based on the impracticality of performing testing in accordance with the ASME Code requirements. Consideration has been given to the burden on the licensee if the code requirements were imposed.

4.4 Valve Relief Request 6

This relief request was revised to address TER action items 5.11 and 5.12. The relief was determined to be approved in accordance with GL 89-04, Position 2, provided the licensee further justify the extended schedule for disassembly and inspection beyond one valve of the group of two check valves each refueling outage, with a minimum of each valve being inspected at least once every 6 years. The relief request indicates that the valves have not been full-stroke exercised since initial installation. The initial disassembly and inspection of both valves has been scheduled for the 1994 (now 1995) refueling outage which involves a complete core offload. The justification for the extension of the inspection frequency to only during refueling outages which involve core offloads is based on the design of the piping system. The valves are in redundant lines that run from the containment sump to the suction of the engineered safeguards pumps. The valves close to prevent back flow of water from the refueling water tank to the sump and open to allow flow from the sump to the suction of the pumps. The piping is designed to provide a water-seal barrier under post-accident conditions for containment integrity — that is, the valves are in pipes within pipes. The valves are of the split-body type, double-disc swing check valves. To date, a method to properly support both the inner and outer pipes in a manner that will prevent damage while allowing disassembly of the valves has not been developed and implemented (existing pipe hanger locations are not adequate to support the piping/valve during valve disassembly). However, the licensee believes that the efforts involved in performing the disassembly and inspection of the check valves during refueling outages when the core is not completely offloaded could challenge shutdown cooling, thereby increasing the shutdown risk.

By restricting the disassembly to refueling outages when the core is offloaded and shutdown cooling is out of service, the shutdown risk is minimized while still assuring that the disassembly and inspection is performed nominally once every five years (assuming that both valves are inspected each core offload). The valves are verified capable of closing during cold shutdowns by monitoring for changes in sump level during performance of Technical Specification Surveillance Procedure QO-02, "Recirculation Actuation System and Containment Sump Check Valves." For the third 10-year interval and following the actual performance of the initial disassembly and inspection, the licensee should document the time, dose, and resources expended to complete the effort and include the information in the IST program as additional basis for the extension. Also, the condition of the valves must be assessed for added assurance that the extended inspection interval is acceptable.

4.5 Valve Relief Request 7

This relief request was revised to address TER action item 5.13. The check valves in the discharge lines from the refueling water tank (1) open to supply suction to the safety injection pumps and the containment spray pumps, and (2) close to prevent back flow of containment sump water into the tank when operating the safety injection system in the recirculation mode during post-accident conditions. The valves are indicated as Category C; however, they were the subject of NRC Information Notice 91-56, "Potential Radioactive Leakage to Tank Vented to Atmosphere," and may be subject to leakage testing (reference NRC SE dated January 9, 1995, on this issue). If the valves have a leak-tight function, they should be Category A/C for IST. The licensee's response to Item 5.13 states that while these valves do provide an isolation function during recirculation, there is no leakage limit specified in the FSAR or plant Technical Specifications. However, offsite dose limits are part of the plant's licensing basis and may relate to the leak tightness of these valves. The licensee should make any necessary changes to the IST program developed for the third 10-year interval.

Relief was previously granted (reference July 1992 SE) for full-stroke exercising the valves to verify both the opening and closing capability, but not leak tightness, provided the licensee justify the extended disassembly and inspection interval to core offloads. The previous revision of the relief request stated that the valves could not be disassembled at times other than a full core offload when fuel pool cooling loads are low because the valves could not be isolated from the refueling water tank. The TER noted that no explanation for not draining the tank and performing disassembly and inspection each refueling outage was given. The licensee states in the revised relief request that "[i]t is not prudent to disassemble these valves at time[s] other than at a full core offload when fuel pool cooling loads are low, because appropriate isolation does not exist between these valves and the shutdown cooling system." Therefore, the justification has changed and is now based on an isolation function that the valves are required to perform during shutdown cooling. The interval described in the revised relief request is that the valves will be disassembled "nominally once per 10 years when there is a full core offload and when fuel pool cooling loads are acceptable." Valve Relief Request 6 (see Section 4.4 above) discusses core offloads as nominally once every five years. It is not clear what conditions are

different for these valves that relate to "when fuel pool cooling loads are acceptable." Additionally, the licensee's response to Item 5.13 states that "these valves shall be disassembled and inspected during outages requiring full core offload and when shutdown cooling can be removed from service." The schedule should be clarified in the updated third 10-year interval program with the apparent disassembly and inspection interval inconsistencies between VRR-6 and VRR-7 corrected. Therefore, the designated schedule will be further reviewed as part of the updated program.

4.6 Valve Relief Request 10

This relief request was revised to address TER action item 5.16. The power-operated valves in the service water system supplying cooling water to the emergency diesel generator are not designed to enable stroke-time testing. Interim relief was granted in the previous SE issued July 15, 1992, to allow time for the licensee to evaluate methods to monitor the valves for degrading conditions. The licensee attempted to measure the time from diesel start to achieving required flow, but the data proved to be inconsistent and not useful for assessing degradation of the valves.

4.6.1 Licensee's Basis for Relief

The licensee states:

> Relief is requested on the basis that the proposed alternatives provide an acceptable level of quality and safety. Plant configuration will not allow stroke timing of these valves. The control circuitry for [the valves] does not include control switches or indicating lights. A modification to install this equipment would be required to allow testing in accordance with the ASME Code. Such installations would introduce new equipment subject to failure, thus reducing the reliability of the diesel generator cooling system.

4.6.2 Alternative Testing

The licensee proposes:

> These valves shall be demonstrated as operable once per month in conjunction with diesel generator tests MO-7A-1 and MO-7A-2. This test removes the air supply from [the valve] actuators allowing them to travel to the open position (Fail-Safe Position). Thus, testing in accordance with [these tests] qualifies as an acceptable "Fail-Safe Test." [These valves] do not have position indicating systems. Proper valve position can be determined by cooling system flow rate. Once per 5 years, [the valve] actuators are inspected for proper operation in accordance with Predetermined Periodic Activity Control Sheet SWS044. Any actuator degradation, such as diaphragm, packing, or solenoid air leaks will be discovered and repaired during this activity.

4.6.3 Evaluation

The code requirement for stroke-time testing of power-operated valves is intended to monitor for degrading conditions through increases in the stroke time that could indicate changes in the valve internals or valve actuator and control system. Stroke timing of these valves is impractical because of design limitations. Imposing the code requirements would be burdensome to the licensee, requiring modifications to the system to enable testing. Demonstrating monthly that cooling water is supplied to the emergency diesel generators verifies that these valves adequately stroke to the position to fulfill their safety function. The lack of cooling water delivered to the diesels would indicate a problem with these valves and corrective actions could be taken. Additionally, the testing occurs frequently enough that a problem would be identified in a reasonable period of time. Preventative maintenance once every 5 years will provide an extra level of monitoring the valves for degrading conditions that might not be obvious through testing.

4.6.4 Conclusion

Relief is granted for the test methods used in monitoring the power-operated valves supplying service water to the emergency diesel generators. The relief is granted pursuant to 10 CFR 50.55a(f)(6)(i) based on the impracticality of performing testing in accordance with the code requirements. The burden of imposing the code requirements on the licensee has been considered and the proposed alternative testing has been determined to provide adequate assurance of the operational readiness of the valves.

4.7 Valve Relief Request 19

This relief request was revised to address TER action item 5.25. Interim approval was given for containment air cooler service water check valves to allow time for the licensee to review the safety function(s) of the valves and determine the appropriate test requirements based on the function(s). In the previous revision, the licensee proposed to disassemble and inspect the valves in accordance with the Position 2 of GL 89-04. The revised relief request clarifies that the valves have a safety function to open only. The code requires check valves to be exercised once every 3 months, except where exercising is impractical during power operations, in which case the valves may be exercised during cold shutdowns.

4.7.1 Licensee's Basis for Relief

The licensee states:

> Relief is requested from the above required test frequency since compliance with the Code requirement would result in [a] hardship or unusual difficulty without a compensating increase in the level of quality and safety. During plant operations, including normal cold shutdowns, it is not possible to align the service water system in an accident configuration and verify the maximum accident required flow rate is achieved through each containment air cooler discharge check

valve. Such alignment would require isolating critical loads that would be isolated automatically during certain accident conditions.

4.7.2 Alternative Testing

The licensee proposes:

> These check valves are in continuous service during normal operations. Palisades shall perform IST of these valves in accordance with Technical Specification Surveillance Procedure QO-05 on a quarterly basis for a period of one year for the purpose of establishing an appropriate full flow testing methodology. Thereafter, [the test] will continue to be performed or, if determined appropriate by the QO-05 test data, a new quarterly test procedure will be developed. The results of these tests will be compared with previously performed special test procedures to confirm the ability to achieve required accident flow through the Containment Air Coolers.
>
> Review of operating history indicates a method may exist to perform Code required full flow testing for the subject check valves. This review also indicated that the required flow rates usually occur only during winter months, when heat loads on the system are at a minimum. This test shall be performed for a period of not less than one year, beginning no later than the third quarter of 1993. Full flow testing shall require each valve to pass a minimum of 1275 gpm [gallons per minute] during one or more QO-05 inservice tests performed under a normal operations system alignment. This is considered acceptable because, under accident conditions, the noncritical service water header would be isolated. This isolation would result in increased flows to containment.

4.7.3 Evaluation

It is not clear whether the testing will continue to be performed quarterly with a minimum flow rate of 1275 gpm, or whether 1275 gpm represents the accident flow rate. If the testing is performed each quarter, approval of an alternative test frequency is not necessary for complying with the code requirements. Additionally, if the testing is performed at a flow rate that is comparable to design flow rate, the code requirement for full-stroke exercising is accomplished. However, it is not clear that the flow rate will be at or above design accident flow rate during each quarterly test. If not, the exercising is considered a partial stroke. While there appears to be some ambiguity regarding compliance with the code, it appears that the testing, as described, meets the code requirements. For the updated third 10-year interval IST program, the licensee should review the testing and determine if, in fact, compliance with code requirements is not achieved. If so, efforts should be made to prepare a clear and concise explanation of the requirements that are not met and how the alternative testing will be performed to account for the deviations from the code. This issue is considered closed for the second 10-year interval.

4.8 Valve Relief Request 13

The relief request was revised to address TER action items 5.26 and 5.27. VRR-20 originally applied to chemical volume and control system (CVCS) check valve CK-CVC2116. The previous VRR-13 applied to component cooling water system check valves CK-CC-401 and 402. The revised VRR-13 applies to CVCS check valves CK-CVC2114, 2116, and 2118. These valves close to isolate the primary system from the charging system when the charging system is not operating. Testing in accordance with the requirements of IWV-3521 and 3522 of Section XI of the ASME Code are impractical due to limitations of the design. Therefore, the licensee proposes to use disassembly and inspection as an acceptable alternative in accordance with Position 2 of GL 89-04 to verify that the valves will stroke to prevent reverse flow. GL 89-04 approves the alternative provided the guidance delineated in Position 2 is followed, including documentation of compliance in the IST program. This request is therefore acceptable per GL 89-04 for the second 10-year interval which ends in May 1995 and will not be further evaluated at this time.

4.9 Valve Relief Request 24

This relief request was revised to address TER action item 5.29. Interim relief was granted to allow time for the licensee to evaluate methods of testing check valve CK-CD407 which closes to prevent inadvertent drainage of the condensate storage tank. The revised relief request indicates that it is impractical to perform verification of the valve's capability to close due to limitations in the design configuration and that the alternative given in Position 2 of GL 89-04 will be used (disassembly and inspection). GL 89-04 approves the alternative provided the guidance delineated in Position 2 is followed, including documentation of compliance in the IST program. This request is therefore acceptable per GL 89-04 for the second 10-year interval which ends in May 1995 and will not be further evaluated at this time.

4.10 Valve Relief Request 18

This relief request was revised to address TER action item 5.30. Interim approval was given to allow time for the licensee to review the testing and revise the request, if necessary, to include additional justification for the proposed alternative testing. The applicable valves are auxiliary feedwater control valves that regulate flow to the steam generators upon receipt of an auxiliary feedwater actuation signal and close to isolate a depressurized steam generator during a main steam line break. Relief from the requirements to stroke time these power-operated valves is requested.

4.10.1 Licensee's Basis for Relief

The licensee states:

> Relief is requested on the basis that the proposed alternative will provide an acceptable level of quality and safety. System configuration will not allow stroke time testing in accordance with the Code. Valves actuation and position indicating functions are

performed by flow regulators instead of control switches and indicating lights.

4.10.2 Alternative Testing

The licensee proposes:

> Each valve shall be exercised to the position required to pass accident required flow rates (without recording stroke times) during the performance of Technical Specification Surveillance procedure QO-21, "Auxiliary Feedwater System Valves, Inservice Test Procedure." Isolation capability shall verified during the performance of QO-21 by exercising each valve to the closed position (without recording stroke times) and recording flow rates equal to 0 gpm. Valve, including actuation and position indicating system, degradation has been detected by failure to meet acceptance criteria of QO-21. Degradation is indicated by flow controller setpoint drift or change.
>
> The ability to pass flow (without recording stroke times) as required by QO-21 shall constitute an acceptance open stroke test. The ability to isolate flow (without recording stroke times) as required by QO-21 shall constitute an acceptable closure stroke test. The ability to move to the open position as required by QO-21 shall constitute an acceptable "Fail Safe Test." Movement to the open position involves removal of actuator air supply. This accurately simulates the "Fail Safe Position." Each valve including its position indication and actuating system shall meet the flow control requirements of QO-21. Indication of required flow rates as documented in QO-21, constitutes an acceptable "Position Indication Test." Flow is direct indication of valve position.

4.10.3 Evaluation

IWV-1200, "Valves Exempt from Testing," exempts valves that have no specific function in shutting down a reactor or in mitigating the consequences of an accident and used only for system control (such as pressure regulating valves). Even though the subject valves are flow regulating valves, they have a fail-safe function to open and an isolation function as well. Therefore, the requirements for valve position indication verification and power-operated valve exercising apply.

The design of these valves does not enable testing because the actuation and position indication are performed by flow regulators rather than control switches and indicating lights. Therefore, compliance with the code requirements is impractical and an alternative method of monitoring these valves is necessary. If the code requirements were imposed, a burden on the licensee would ensue, necessitating modifications to the actuation and position indication features of the valves. The alternatives proposed by the licensee, in consideration of the impracticality of meeting the code requirements, will provide adequate assurance of the operational readiness of the subject valves. It is assumed that the alternative testing frequency is

in accordance with the code requirements since the relief request did not address the test frequency.

4.10.4 Conclusion

Relief from the power-operated valves testing requirements, specifically involving the measurement of stroke times, is granted for the subject valves. The relief is granted pursuant to 10 CFR 50.55a(f)(6)(i) based on the impracticality of performing testing in accordance with the code requirements. Consideration has been given to the burden on the licensee that would result if such requirements were imposed.

4.11 Valve Relief Request 20

The relief request applies to valve CV-0915, component cooling water (CCW) surge tank three-way-vent valve to CCW room or vent gas collection header. Relief from the stroke timing requirements of the code is requested.

4.11.1 Licensee's Basis for Relief

The licensee states:

> CV-0915 is normally venting from the CCW surge tank to the vent gas collection header. In the case of a leak between one of [the] CCW cooling loads and the CCW system resulting in radioactive contamination of the CCW system, this valve moves to vent gas to the CCW room. This action [prevents] uncontrolled radioactive release to the outside environment. These actions are initiated by a high radiation signal from [radiation detector] RIA-0915. There are no hand switches associated with the control circuitry. Therefore, it is not possible to accurately time valve strokes.

4.11.2 Alternative Testing

The licensee proposes:

> CV-0915 shall be stroke tested once each quarter through the performance of the Health Physics Procedure HP 6.8, "Process Monitor Operational Check - Quarterly," without stroke timing the valves. Verification of valve motion will be performed at the lights in the main control room. Testing per HP 6.8... verifies the subject valve will travel to its desired position. This is considered adequate for the following reasons:
>
> • The valve is tested in the mode in which it would be called upon to mitigate an accident.
>
> • A limiting value of stroke time will be established at 10 seconds. If CV-0915 fails to operate within this time constraint, then corrective action shall be taken. If CV-0915 does not move to the desired position, then it shall be declared inoperable.

4.11.3 Evaluation

IWV-1200, "Valves Exempt from Testing," exempts valves that have no specific function in shutting down a reactor or in mitigating the consequences of an accident and used only for operating convenience (such as manual vent valves). Even though the subject valve is a vent valve, it has a safety function to open automatically on a high radiation signal from radiation detector RIA-0915. Therefore, the requirements for valve position indication verification and power-operated valve exercising apply.

The design of the valve does not enable testing because the actuation signal cannot be controlled by a manual handswitch to reposition the valve. Therefore, compliance with the code requirements is impractical and an alternative method of monitoring these valves is necessary. If the code requirements were imposed, a burden on the licensee would ensue, necessitating modifications to the actuation and control circuitry of the valve. The alternatives proposed by the licensee, in consideration of the impracticality of meeting the code requirements, will provide adequate assurance of the operational readiness of the subject valve.

4.11.4 Conclusion

Relief from the power-operated valves testing requirements, specifically involving the measurement of stroke times, is granted for the subject valve. The relief is granted pursuant to 10 CFR 50.55a(f)(6)(i) based on the impracticality of performing testing in accordance with the code requirements and in consideration of the burden on the licensee that would result if such requirements were imposed.

4.12 Valve Relief Request 21

For the service water system cooling water flow to the CCW heat exchangers control valves (CV-0821/2/3/6), relief from the stroke timing and test frequency requirements is requested. Valves CV-0823 and CCV-0826 open while valves CV-0821 and CV-0822 close on a refueling water tank low level associated with a recirculation actuation signal.

4.12.1 Licensee's Basis for Relief

The licensee states:

> Relief is requested from the stroke time measurement and test frequency requirements for the above valves on the basis that compliance with the code requirement is impractical. The function of these valves, as provided above, is to vary service water flow through the component cooling water heat exchangers and thus regulate CCW temperature by throttling on the discharge flow. The position of the valves at any particular time is set based on the temperature of the water source (Lake Michigan). Repositioning valves CV-0823 and CV-0826 to the full-closed position or CV-0821 and CV-0822 to the full-open position in order to accomplish a full-stroke test would result in significant changes to the temperature of cooling water supplied to

components served by the CCW heat exchangers, particularly during times of high heat loads when the primary coolant pumps are operating. In addition, such rapid fluctuations in cooling flow during times of high heat loads would result in undesirable thermal stresses in the CCW heat exchangers.

It has been determined that by cycling these valves from the as-found (throttled position) to their safety position during cold shutdown will acceptably minimize the adverse affects of cycling cooling water flow.

Because stroke testing will be initiated from the throttled position, it is not practical to full-stroke the valves, achievement of meaningful stroke time data is not possible. Therefore, relief is also requested from the increased test frequency requirements of IWV-3417(a). Therefore, the stroke time will be measured to verify that it falls within the 45-second limiting stroke time requirement.

4.12.2 Alternative Testing

The licensee proposes:

These valves will be partial-stroke tested on a cold shutdown basis in accordance with QO-6, "Cold Shutdown Valve Test Procedure (Includes Containment Isolation Valves)." The stroke time will be compared against the 45-second limiting stroke time for the purpose of determining operability. Since it will not be possible to measure full-stroke time, the requirements of IWV-3417(a) will not be observed. Performance of QO-06 will satisfy the fail-safe actuator test requirements of the Code. This procedure will also be used to verify proper operation of the remote position indicators at least once every 2 years in accordance with IWV-3300. Testing per QO-06 verifies the subject valve will travel to its desired position. This is considered adequate for the following reason: The valve is tested in the mode in which it would be called upon to mitigate an accident. Verification of stroking within the limiting valve of 45 seconds during [performance of] QO-06 constitutes an acceptable test.

4.12.3 Evaluation

IWV-1200, "Valves Exempt from Testing," exempts valves that have no specific function in shutting down a reactor or in mitigating the consequences of an accident and is used only for system control (such as pressure regulating valves). Even though the subject valves are temperature regulating valves, they have a safety function to open (CV-0823 and CV-0826) and an isolation function (CV-0821 and CV-0822). Therefore, the requirements for valve position indication verification and power-operated valve exercising apply.

While the design of these valves does enable testing, the cooling water transient that could occur during such testing would result in hardship and unusual difficulty. Therefore, if an alternative method of monitoring these valves is available, there would be no compensating increase in the level of

quality and safety in imposing the code requirements, possibly necessitating modifications to the actuation controls of the valves or placing the plant in an unsafe condition solely to perform testing. The proposed alternative to stroke timing these valves and taking corrective action if the stroke time increases 25% above the previous value (IWV-3413 and IWV-3417(a)) will provide adequate assurance of the operational readiness of the subject valves.

4.12.4 Conclusion

The proposed alternative to the power-operated valves testing requirements of IWV-3413 and IWV-3417(a), specifically involving the measurement of stroke times and taking corrective actions if the stroke time increases by 25% over the previous value, is approved for the subject valves. The approval is authorized pursuant to 10 CFR 50.55a(a)(3)(ii) based on the hardship or unusual difficulty of performing the testing in accordance with the code without a compensating increase in the level of quality and safety.

4.13 Pump Relief Request 5

The licensee proposes to eliminate the measurement and recording of pump bearing temperature required by IWP-3100 for the auxiliary feedwater pumps, CCW pumps, boric acid pumps, and HPSI pumps.

4.13.1 Licensee's Basis for Relief

The licensee states:

> For any condition during which feedwater to the steam generators from the main feedwater pumps is interrupted and the reactor is tripped, sufficient feedwater flow is maintained by the auxiliary feedwater pumps to remove decay heat from the primary system and maintain the reactor in a safe condition. On initiation of a safety injection actuation signal, the component cooling water system provides adequate cooling capability for the safety injection and containment spray water when it is recirculated through the shutdown cooling heat exchangers, and for cooling the glands of the safety injection charging, and containment spray pumps. The boric acid pumps supply boric acid solution at the desired concentration to the charging pumps through the [boric acid] blender. Upon a safety injection signal, these pumps line up with the charging pumps to permit direct introduction of concentrated boric acid into the primary coolant system. The high pressure safety injection pumps inject borated water at high pressure into the primary coolant system during emergency conditions.
>
> Bearing temperatures are a poor indicator of degradation. It is unlikely that degraded bearings would be detected during a yearly test. Monitoring of bearing temperatures may be indicative of impending bearing failures when continuously monitored, which is not the case for Palisades.

4.13.2 Alternative Testing

The licensee proposes:

> Lubricant level shall be monitored as required by ASME Section XI to assure operability. Additionally, oil samples from the bearing housings and bearing signatures analysis shall be taken and monitored for degradation on a quarterly basis per the requirements of this procedure and Engineering Manual Procedure EM-30, "Plant Predictive Maintenance and Program." Oil analysis for boric acid pumps P-56A and P-56B will not be performed because [the pump] area is inaccessible when the system is in service. However, bearing signature analysis shall occur on a quarterly basis.
>
> Early bearing wear can be detected long before actual failure of a bearing occurs and long before bearing temperatures would indicate impending failure. Periodic particulate analysis of oil samples taken in accordance with Engineering Manual EM-30, "Plant Predictive Maintenance Program," provides early detection of bearing degradation. Additionally, monitoring the lubricant level can ensure a potentially damaging situation does not develop. Signature analysis also provides early warning of bearing, as well as other types of machine, degradation. Should bearing degradation be recognized to the point that operability of the pumps could come under question, correction action...shall be taken.

4.13.3 Evaluation

OM-6, "Inservice Testing of Pumps in Light-Water Reactor Power Plants," through reference by IWP of the 1989 Edition of Section XI, is incorporated by reference in 10 CFR 50.55a(b). OM-6 has dropped the IWP-3100 requirement to measure the bearing temperature on an annual basis for much the same reasons as stated in the licensee's basis for relief. Bearing temperature increases rapidly until bearing failure occurs. An annual temperature measurement would not likely detect bearing failure unless the bearing was already degraded at the time the measurement was made. Bearing temperatures are indicative of pending failure, however, if monitoring is continuous. For standby pumps, such as the subject pumps, other parameters are relied upon for degradation monitoring (e.g., vibration monitoring, hydraulic parameters). Therefore, the elimination of bearing temperature may be approved as consistent with the requirements of OM-6. The approval is authorized pursuant to 10 CFR 50.55a(f)(4)(iv).

4.13.4 Conclusion

The licensee's proposed elimination of bearing temperature measurement is approved pursuant to 10 CFR 50.55a(f)(4)(iv) which allows the licensee to use portions of a later edition of the code. OM-6 will be used by CPCo for the updated IST program due to begin in May 1995 and this alternative will no longer be necessary.

4.14 Pump Relief Request 6

For the containment spray pumps, low pressure safety injection pumps, and high pressure safety injection pumps, which perform safety functions in shutting down the reactor and mitigating the consequences of an accident, an alternative to the full-range instrument requirement of IWP-4120 (3 times the reference value or less) is needed to allow CPCo to use digital flow meters.

4.14.1 Licensee's Basis for Relief

The licensee states:

> Relief is requested from the requirements of ASME Section XI, Subsection IWP, Article IWP-4120, while testing the above mentioned pumps in order to allow the use of a digital flow meter (FI-0404). Palisades has reviewed the requirements of Subsection IWP against those in Part 6 of the OMa-1988 Addenda to OM-1987 (Part 6) for instrumentation range and prefers to implement the more current requirements found in Part 6. CPCo believes that alternate rules in Part 6 provide an acceptable level of quality and safety as is required by 10 CFR 50.55a(a)(3)(i). This is best demonstrated by the NRC's approval of the 1989 Edition of ASME Section XI {ref: 10 CFR 50.55a(b)(2) and 10 CFR 50.55a(b)(2)(viii)}. The 1989 Edition of ASME Section XI replaced the rules of IWP with those of ASME OM (Part 6). Palisades is seeking relief because Subsection IWP does not address the use of digital instrumentation and because the range of FI-0404 is greater than three times the reference value.

4.14.2 Alternative Testing

The licensee proposes to implement the requirements of Part 6 for the range of digital instrumentation.

4.14.3 Evaluation

Subsection IWP of Section XI does not include requirements for digital instruments used to monitor the flow rate and differential pressure of pumps. OM-6 requires digital instruments to be accurate within ± 2 percent over the calibrated range, which could also be stated as ± *2 percent of reading*. OM-6 requires that the licensee shall select digital instruments such that the reference value does not exceed 70 percent of the calibrated range of the instrument. Because the instrumentation will provide a better accuracy for the measured value, the alternative gives an equivalent level of quality and safety. However, the licensee's proposal is acceptable only if the requirements for accuracy, calibration, and range are met. Section 50.55a, paragraph (f)(4)(iv), specifies that portions of later editions of the code which are incorporated in Section 50.55a(b) may be used for IST provided all related requirements are met and subject to Commission approval.

4.14.4 Conclusion

The alternative is approved pursuant to 10 CFR 50.55a(f)(4)(iv) provided the OM-6 requirements for accuracy, calibration, and range are met. The updated IST program will be in conformance with OM-6 and this alternative will be covered by the implementation of OM-6 in total when the new program is implemented in May 1995.

4.15 Pump Relief Request 7

The jacket water pumps supply cooling water to the emergency diesel generators to ensure supply of a continuous coolant during the time the diesels are required to operate in accident conditions. The licensee has indicated that these pumps are mounted on the diesel generator skids but also has indicated that the pumps are ASME Code Class 3. Discharge pressure and system instrumentation are the only instruments installed for monitoring these pumps. The licensee proposes to determine operability of the pumps by the performance of the monthly diesel surveillance. During the surveillance, the jacket water temperature and pressure will be measured and compared to acceptance criteria to determine system operability. The licensee proposes that this test is adequate to determine the operability of the jacket water cooling system and components.

4.15.1 Licensee's Basis for Relief

The licensee states:

> Relief is requested from the requirements of ASME Section XI, Subsection IWP, Table 3100-1 parameters, while testing the above mentioned pumps. These pumps are mounted on the diesel generator's skid. These pumps only have discharge pressure and system temperature instrumentation installed. It is our interpretation that the NRC doesn't require skip (sic) mounted components to be tested per Subsection IWP. This is supported by the "Minutes of the Public Meeting on Generic Letter 89-04," published 10/25/89 by the NRC. Question 110 is applicable. This question is worded as follows: "What additional NRC Guidance can be provided on testing skid mounted pumps and valves (i.e., Diesel Generator systems: lube oil pumps/valves, internal engine cooling; RCIC systems - condensate/vacuum pumps with only one source of power, etc.)? Most of these pumps and valves do not have the necessary test instrumentation to support ASME Section XI testing and do not fall within the scope statements of IWP and IWV. Will modifications need to be performed?" Response: "The purpose of IST is to provide assurance of the operability of components and to detect degradation in their performance. Where a particular component is integrated with other components in a system, it may be difficult to perform an individual test of that component. In specific cases for which individual testing is not feasible, an alternate test should be proposed by the licensee. In developing an alternate test, the licensee should attempt to develop quantitative criteria to evaluate the operability and condition of the component."

4.15.2 Alternative Testing

The licensee proposes:

> The diesel jacket water cooling pumps operability will be determined by the performance of the monthly diesel surveillances, MO-7A-1 and MO-7A-2. During these surveillances the jacket water temperature and pressure will be measured and compared to acceptance criteria to determine system operability. This is sufficient to determine the operability of the jacket water cooling system.

4.15.3 Evaluation

The NRC discussed skid-mounted equipment in response to Question 110 in the "Minutes of Public Meetings on Generic Letter 89-04," issued October 25, 1989. When a component is part of an integrated system that supports the functioning of a major component, such as a diesel generator, testing of the major component generally indicates that the support system components are operating properly. In most cases, testing of the individual components in accordance with the ASME Code is not practical because the system was not designed to enable testing. Design requirements to enable IST became part of Section 50.55a in 1976 (note that the commercial operation date for the Palisades plant was December 31, 1971). Therefore, based on the limitations of the design making it impractical to perform IST in accordance with the code requirements, relief may be granted. Imposition of the code requirements would be a burden on the licensee in that plant modifications would be necessary. The proposed alternative to test the diesel jacket water cooling pumps along with the monthly diesel generator surveillance will provide an adequate level of assurance of the operational readiness of the pumps on a monthly basis. Degradation can be detected through a maintenance program.

4.15.4 Conclusion

Relief is granted pursuant to 10 CFR 50.55a(f)(6)(i) based on the impracticality of performing testing in accordance with the code. The burden on the licensee that would ensue if the requirements were imposed has been considered. The alternative testing will provide an acceptable level of assurance of the operational readiness of the pumps.

5.0 CONCLUSION

The staff concludes that the relief requests as evaluated and modified by this SE will provide reasonable assurance of the operational readiness of the pumps and valves to perform their safety-related functions. The staff has determined that granting of the relief requests and approval of proposed alternatives to the code requirements pursuant to 10 CFR 50.55a 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 granting relief pursuant to 10 CFR 50.55a(f)(6)(i) the staff has considered the impracticality of meeting the code requirements and the burden on the licensee if the requirements were imposed.

Principal Contributor: P. Campbell

Date: April 20, 1995

Table 1
NRC Review of Consumers Power Company Response to Action Items, December 29, 1992
Summary of Action Item, Actions Taken, and Remaining Action

Description of Action Item NRC July 15, 1992	Description of Actions Taken December 29, 1992, Response	Current Status and Remaining Action
TER Item 5.6: The NRC staff encourages the use of pump vibration velocity measurements, such as the program contained in ASME Operation and Maintenance Standard (O&M) Part 6. However, in Pump Relief Request 4, the licensee has provided insufficient information to evaluate the request. The licensee is encouraged to revise and resubmit the request or adopt Code Case N-465.	A revised relief request (PRR-4) was included in the submittal.	PRR-4 is evaluated in Section 3.1 of the SE with approval pursuant to 10 CFR 50.55a (f)(4)(iv). For the containment spray pumps and low pressure injection pumps, the proposed alternate limits are not authorized. However, the issue is considered closed for the second 10-year interval and any further action will relate to the third 10-year interval program.
TER Item 5.18: Based on the lack of sufficient justification, it is recommended that relief be denied for the component cooling isolation valves stroke time requirements. The licensee should test these valves in accordance with the code or revise and resubmit the relief request. Additionally, the Basis for Relief section of Valve Relief Request 12 requests relief from the stroke timing requirements specified by ASME Section XI, paragraph IWV-3414. This is an incorrect reference. Paragraph IWV-3413 defines the stroke time testing requirements for power operated valves.	A revised relief request (VRR-12) was included in the submittal.	VRR-12 is evaluated in Section 3.2 of the SE.
TER Item 5.19: The individual listings for the valves identified on Valve Relief Requests 10 and 12, provided in Attachment 5, "Inservice Test Program, Valve Test Table," imply that relief is being requested from the provisions of IWV-3415 concerning Fail Safe Valves. This is not identified in the text of the Relief Requests and has not been evaluated in the TER.	EGAD-EP-01, "Valve Table," was revised to remove the reference to Relief Requests 10 and 12 for fail safe testing of CV-0884, CV-0885, CV-0944, and CV-0977B. Fail-safe testing for these valves will be performed in accordance with the test listed in the valve table. Therefore, a relief request is not needed for fail safe testing of these valves.	The revised valve table was not included in the submittal; however, the actions described in the response adequately address the concerns of the action item. No further action is required.

Description of Action Item NRC July 15, 1992	Description of Actions Taken December 29, 1992, Response	Current Status and Remaining Action
TER Item 5.20: The licensee has not provided justification for not full-stroke exercising the component cooling water check valves, CK-CC401 and 402, with flow or verifying closure capability. The licensee should test these valves in accordance with the Code or revise and resubmit the relief request. Additionally, the Baseline Data section of Valve Relief Request 13 incorrectly classifies the check valves as Category B, which does not agree with the other section of this relief request, or the Attachments. The first sentence of this section is also incomplete as submitted.	The previous Valve Relief Request 13 has been deleted (revised VRR-13 applies to other valves). A full flow test of CK-CC401 and CK-CC402 is now performed at the required frequency during pump testing. Additionally, the licensee has determined that these valves do not have a safety function to close.	The concerns of the action item have been addressed. No further action is required.
TER Item 5.22: It is recommended that relief be denied for the pressurizer PORVs. The licensee has not provided sufficient justification in Valve Relief Request 15 for not specifying maximum limiting stroke times and performing corrective action upon exceeding these limits. The licensee should perform tests in accordance with the Code. Additionally, the licensee has not specified a fail-safe test in Attachment 5. Based on the FSAR, it appears that the valves have a fail-safe function.	A 2-second limiting stroke time and a fail-safe test have been added to the surveillance procedure. Consequently, Relief Request 15 has been deleted. The 2-second limiting stroke time is noted in the Cold Shutdown Testing Basis for the PORV.	The concerns of the action item have been addressed. No further action is required.
TER Item 5.28: It is recommended that generic relief from the requirements of ASME Section XI, Paragraph IWV-3417(b) and 3523 be denied for valves in flowpaths [not] addressed by the Technical Specifications (Valve Relief Request 22). The licensee may request specific relief.	The relief request has been revised to indicate that it applies only to those valves whose flow paths are covered by Chapter 3 of the Palisades Technical Specifications. The revised relief request was provided in the December 12, 1992, submittal.	The concerns of the action item have been addressed. No further action is required. Relief Request 22 was approved in the July 15, 1992, SE with the provision that the licensee indicate that it applies only to those valves in systems addressed by Technical Specifications. The relief request is acceptable as revised.

Description of Action Item NRC July 15, 1992	Description of Actions Taken December 29, 1992, Response	Current Status and Remaining Action
TER Item 5.31: Relief has been recommended for full-stroke exercising the service water pumps' discharge check valves, provided that all the criteria in Generic Letter 89-04 are met. It is recommended that relief from reverse flow testing be denied. The licensee should perform this testing in accordance with the Code requirements. Additionally, the Baseline Data and Acceptance Criteria provided in Valve Relief Request 27 refers to the check valves described in Valve Relief Request 26. This relief request should be revised, as appropriate.	Relief Request 27 indicates that the disassembly and inspection program is in accordance with GL 89-04. The portion which previously requested relief for reverse flow testing has been deleted. The closure capability of the pump discharge check valves will be verified by observing that the pump shaft is not rotating for a standby pump when the other pumps are operational. The revised relief request was provided in the December 12, 1992, submittal. The licensee notes that the discrepancy from Relief Request 26 could not be identified and that the June 28, 1991, IST Program submittal deleted RR 26. However, RR-26 for valves CK-CVC2112 and CK-CVC2114 existed in the June 28, 1991, submittal which indicated that it was a new relief request. The NRC SE indicated that it was approved per GL 89-04, Position 2. In the June 28, 1991, submittal, Attachment 4, Page 57 of 57, Relief Request 27 for the service water valves CK-SW401/2/3 indicated that for the baseline data: "CK-CVC2112 and CK-CVC2114 are original plant equipment." The revised Relief Request 27 indicates for baseline date: "None."	The actions taken for the service water valves addressed the concerns of the action item. In the October 4, 1994, submittal, VRR-27 is revised to state that the SW check valves will be full-flow exercised each refueling outage and part-stroke exercised quarterly during normal plant operations. The testing frequency will be in compliance with the requirements that will apply to the third 10-year interval program and this relief request can be changed to a refueling outage test deferral. Also, VRR-26 was deleted in the October 4, 1994, submittal. The NRC considers both of these issues closed for the second 10-year interval. Any further actions will be taken in the context of the third 10-year interval program.

Table 2
NRC Review of Consumers Power Company Response to Action Items, October 4, 1993
Summary of Action Item, Actions Taken, and Remaining Action

Description of Action Item NRC July 15, 1992	Description of Actions Taken October 4, 1993, Response	Current Status and Remaining Action
TER Item 5.1: The IST valve table identified only containment isolation valve leakage for the valves identified as "Event V" pressure isolation valves listed in Technical Specification Table 4.3.1. Per GL 89-04, Position 4, these valves should be properly designated as pressure isolation valves in the IST program.	The IST valve test table EGAD-EP-01 has been revised to indicate that these are Category A or A/C and are subject to leakage testing as well as containment isolation leakage testing.	No additional action is required.
TER Item 5.2: To conform with GL 89-04, Position 5, the limiting stroke times for power-operated valves should be the lower of either the technical specification or safety analysis limit or a limit based on a multiplier of the reference value of the valve.	The IST valve procedure has been updated to conform with Position 5 of GL 89-04. The limiting stroke time of each of the valves will be the lower of either the technical specification or safety analysis limit or a limit based on a multiplier of the reference value of the valve.	No further action is required.
TER Item 5.3: A relief request should be prepared if the safety and relief valves test supervisor does not meet the requirements of ASME PTC 25.3 and if any other administration requirements of the PTC cannot be met.	Valve Relief Request 15 was prepared and submitted to address this item.	VRR 15 is evaluated in Section 4.1. The issue will no longer be applicable when the updated program takes effect in May 1995.
TER Item 5.4: The inlet pressure for the service water pumps is calculated and the value is used to determine the differential pressure for quarterly IST. The licensee must ensure that the calculation provides results within the code accuracy for instrumentation and that the calculational method is proceduralized.	The calculation for determining the inlet pressure is in service water pump test procedure QO-14. The basis document for QO-14 includes a description of how the calculational method conforms with the code accuracy requirements.	No further action is required.
TER Item 5.5: Approval for deleting the bearing temperature measurement for low pressure safety injection pumps and containment spray pumps was given provided the licensee review the periodic oil samples and the signature analysis program to ensure that the frequency for these programs is adequate to monitor for degradation.	A review was performed indicating that the quarterly frequency adequately monitors the pumps for degradation.	No further action is required.

Description of Action Item NRC July 15, 1992	Description of Actions Taken October 4, 1993, Response	Current Status and Remaining Action
TER Item 5.7: For the safety injection tank discharge check valves covered by VRR-2, the licensee was to investigate the possibility of performing a flow test rather than disassembly and inspection, but continue disassembly and inspection if the flow test was unsuccessful. Interim approval was given to allow time for attempting to perform flow testing during the next refueling outage.	Disassembly and inspection was to be considered the alternative to flow testing based on impracticalities until flow testing could be successfully completed.	Disassembly and inspection is an acceptable alternative when flow testing cannot confirm full-stroke exercising of valves (Position 2 of GL 89-04). The updated 10-year IST program effective May 1995 should reflect the type of testing that will be performed for exercising these valves. The initial testing with flow is planned for the May 1995 refueling outage. Future actions will be covered by the third 10-year interval program.
TER Item 5.8: The IST program contained inconsistencies on the function of the containment spray header check valves.	These valves have a safety function to open. Valve Relief Request 3, which was approved as noted in the July 1992 SE, has been revised to delete the reference to a "closed" safety function for these valves.	No further action is required.
TER Item 5.9: Interim relief was granted for the high pressure safety injection pressure isolation check valves to allow time for the licensee to evaluate partial-stroke exercising quarterly.	Valve Relief Request 4 has been revised to specify part-stroke exercising during cold shutdown and full-stroke exercising during refueling outages.	See Section 4.2 of the SE.
TER Item 5.10: Valve Relief Request (VRR) 5 indicated that relief for both the open and close safety functions of the redundant high pressure safety injection check valves was requested; however, the justification included discussion only for the opening function.	VRR 5 has been revised to discuss both safety functions.	See Section 4.3 of the SE.
TER Items 5.11 and 5.12: VRR-6 was determined to be approved with provisions that the licensee include justification for the extended disassembly and inspection schedule and closure verification testing for the containment sump discharge check valves.	VRR 6 has been revised to address the schedule for disassembly and inspection. Closure testing can be performed during cold shutdown conditions and therefore conforms with the code requirements.	See Section 4.4 of the SE.
TER Item 5.13: VRR 7 was determined to be approved with provisions that the justification include both the open and close function, if applicable, for the refueling water storage tank discharge check valves.	VRR 7 has been revised to include both the open and close safety function of these valves and includes justification for the extension of the schedule for disassembly and inspection, with part-stroke exercising on a quarterly frequency.	See Section 4.5 of the SE.
TER Item 5.14: Relief was granted for the open-stroke testing of the high pressure safety injection pumps discharge check valves, while only interim relief was granted for the close-stroke testing.	VRR 8 has been revised to include only the open-stroke testing. Close-stroke exercising will be performed on a quarterly frequency.	No further action is required.

Description of Action Item NRC July 15, 1992	Description of Actions Taken October 4, 1993, Response	Current Status and Remaining Action
TER Item 5.15: VRR 9 concerned disassembly and inspection of the containment spray pumps discharge check valves. Relief was granted with the provision that at least one valve in the group be inspected each refueling outage to conform with GL 89-04, Position 2.	VRR 9 has been withdrawn. A flow test has been developed such that full-stroke exercising can be performed on a quarterly frequency.	No further action is required.
TER Item 5.16: Interim relief was granted for stroke timing emergency diesel generator jacket cooling water (service water) valves to allow time for the licensee to determine a means for monitoring the valves.	VRR 10 was revised, proposing monitoring the valves by monitoring the start time of the diesel generator during monthly testing.	See Section 4.6 of the SE.
TER Item 5.17: Valve Relief Request 11 incorrectly referenced valves "less than 6 inches" in diameter. It should reference valves "greater than 6 inches" in diameter to conform with GL 89-04, Position 10.	VRR 11 has been revised to delete the reference to the incorrect valve size.	The relief request was approved as noted in the July 1992 SE. No further action is required.
TER Item 5.21: The normal position of check valves CV-CC-401 and 402 is noted as "open" in the IST program, but the system drawing shows the valves as normally closed.	The IST program valve test table has been revised to indicate the normal position as "closed."	No further action is required. The licensee should consider including a review of valve positions in the development of the updated 10-year interval IST program.
TER Item 5.23: Valve Relief Request defines aspects of the check valve disassembly and inspection program but is not applicable to any specified valves. Other relief requests identify the valves in this program. The aspects could be included in the IST program rather than in a relief request.	VRR 17 has been withdrawn. The specifics for compliance with the guidance in Position 2 of GL 89-04 are included in IST Program Valve Procedure EM-09-02.	No further action is required.
TER Item 5.24: Interim approval was given for disassembly and inspection of the auxiliary feedwater check valves CK-FW-703/704/728/729 to allow time for the licensee to review the grouping to ensure conformance with GL 89-04, Position 2.	The previous VRR 18 has been deleted. Full-stroke exercising has been determined to be practical for these valves on a quarterly frequency.	No further action is required.
TER Item 5.25: Interim approval was given for containment air cooler service water check valves to allow time for the licensee to review the function(s) of the valves and determine the appropriate test requirements based on the function(s).	VRR 19 has been revised to establish the test method and acceptance criteria for these valves. The valves have a safety function to open and are not required to close.	See Section 4.7 of the SE.

Description of Action Item NRC July 15, 1992	Description of Actions Taken October 4, 1993, Response	Current Status and Remaining Action
TER Item 5.26: VRR 20 and the IST valve table specify check valve CK-CVC2116 as "Class 2." It appears that the valve is actually a "Class 1" valve. Interim approval was given to investigate full-stroke exercising of the valve rather than disassembly and inspection.	The revision to VRR 13, which replaces VRR 20 for this valve, correctly specifies the valve as "Class 1." The relief request includes justification for disassembly and inspection to verify the valve is capable of closing. Opening capability is verified in accord with the code requirements.	See Section 4.8 of the SE.
TER Item 5.27: VRR 21 and the IST valve table specify check valve CK-CVC2118 as "Class 2." It appears that the valve is actually a "Class 1" valve. Interim approval was given to investigate full-stroke exercising of the valve rather than disassembly and inspection.	The revision to VRR 13, which replaces VRR 21 for this valve, correctly specifies the valve as "Class 1." The relief request includes justification for disassembly and inspection to verify the valve is capable of closing. The valve is not required to open to fulfill its safety function.	See Section 4.8 of the SE.
TER Item 5.29: VRR 24 was approved for an interim period to allow the licensee time to investigate an alternative method, to disassembly and inspection, of verifying that the condensate demineralizer check valve is capable of closing.	VRR 24 has been revised to indicate conformance with GL 89-04, Position 2, including additional justification of the impracticality of other alternatives.	See Section 4.9 of the SE.
TER Item 5.30: The class of the auxiliary feedwater flow control valves in VRR 25 should be reviewed. Interim approval was given to allow the licensee time to revise the request to include justification for each of the specific test requirements listed as applicable to these valves.	VRR 18 (which replaces previous VRR 25) has been revised to correct the code classification and to provide additional justification for the proposed alternative testing.	See Section 4.10 of the SE.