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

RELATED TO THE INSERVICE TESTING PROGRAM AND REQUESTS FOR RELIEF

SOUTHERN CALIFORNIA EDISON COMPANY, ET AL.

SAN ONOFRE NUCLEAR GENERATING STATION, UNIT NOS. 2 AND 3

DOCKET NOS. 50-361 AND 50-362

1.0 INTRODUCTION

The Code of Federal Regulations (CFR), Section 50.55a(g) of 10 CFR Part 50, requires inservice examinations and tests of pumps and valves to be performed in accordance with the requirements of the applicable ASME Section XI Code edition and addenda. If the licensee has determined that performance of certain Code requirements is impractical for its facility, the licensee shall notify the Commission and submit, as specified in 10 CFR 50.4, information to support the determination.

The licensee's inservice testing (IST) program was reviewed by the NRC staff and a Safety Evaluation (SE) was issued to the licensee on September 24, 1990, along with a Technical Evaluation Report prepared by EG&G Idaho, Inc. The SE identified a number of items of the licensee's IST program which can be found in Enclosure 2, Appendix C of the September 24, 1990, letter. The licensee was requested to address these items within time periods specified in the SE. The licensee responded to all the items in four separate submittals dated April 12, June 18, July 2, and July 31, 1991. This SE addresses all the item responses from the licensee and any new or revised relief requests issued by the licensee as a result of the staff's evaluation.

2.0 EVALUATION

2.1 Technical Evaluation Report (TER) Items

Item 1:

Pump relief request PRR-01 was denied by the staff and withdrawn by the licensee in their April 12, 1991, submittal. No further action on this item is required.

Item 2:

The licensee indicated in their IST program that the pump vibration measurements may not be in conformance with the Code requirements of IWP-4310. The licensee was instructed to provide a relief request for the applicable pumps for not measuring vibration near the pump bearings. The licensee submitted a revised version of pump relief request PRR-03 in their June 18, 1991, submittal. The original relief request had been approved in the September 24, 1990, SE, but had only addressed relief for performing bearing

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temperature measurement per IWP-3100 for specific pumps. Pump relief request PRR-11 was submitted on June 18, 1991, to request relief from performing bearing temperature measurements for all pumps in the IST program. For certain pumps, PRR-03 and PRR-11 are requesting the same relief. The following are evaluations of revised pump relief request PRR-03 and pump relief request PRR-11:

Pump Relief Request PRR-03: The licensee has requested relief from the bearing vibration measurement requirements of ASME Section XI, paragraph IWP-4510 for the pumps listed below. The licensee also requests relief from the bearing temperature requirements of IWP-4310 and the requirement to observe lubricant level specified in IWP-3100.

Diesel Fuel Oil Transfer Pumps:	2P093, 2P094, 2P095, 2P096 3P093, 3P094, 3P095, 3P096
Salt Water Cooling Pumps:	2P112, 2P113, 2P114, 2P307 3P112, 3P113, 3P114, 3P307

Licensee's Basis for Requesting Relief: These are submerged, vertical shaft, centrifugal pumps. The pump bearings are inaccessible. It is, therefore, not possible to measure bearing vibration or temperature. Being submerged, the pump fluid (diesel fuel and salt water) provides lubrication and cooling for the pump bearings.

Alternate Testing: Vibration of the pumps motor thrust bearing will be measured and trended on a quarterly basis to provide indirect indication of pump degradation.

Evaluation: These are vertical line shaft pumps submerged in the pumped fluid. Instrumentation is not installed to allow bearing vibration or temperature measurements on the pump body. Also, since these pumps are submerged and inaccessible, portable instrumentation cannot be used during testing. Therefore, taking these measurements is impractical. System redesign would be necessary to allow measurement of pump bearing vibration and would be costly and burdensome to the licensee. Measuring vibration at the motor thrust bearing can provide some indication of pump degradation.

Relief from measuring the pump bearing temperature is unnecessary because Section XI, Paragraph IWP-4310, only requires temperature measurements of those centrifugal bearings that are located outside the main flow path. The bearings of the specified pumps are located in the flow path and cooled and lubricated by the pumped fluid. Since the pumped fluid is the lubricant in these pumps, there is no means to observe lubricant level. Therefore, this Code requirement is impractical. However, operation of the pumps assures bearing lubrication.

The Code proposed alternative of measuring vibration at the motor thrust bearing along with the measurement of hydraulic parameters provides reasonable assurance of operational readiness. Based on the determination

that compliance with the Code requirements is impractical, considering the burden on the licensee if the Code requirements were imposed, and the licensee's proposed alternate testing, relief is granted pursuant to 10 CFR 50.55a(g)(6)(i) from the Section XI requirements to measure bearing temperature, to observe lubricant level, and to measure vibration at specified locations, as requested.

Pump Relief Request PRR-11: The licensee is requesting relief from the pump bearing temperature requirements of Section XI, Paragraph IWP-4310, for all pumps in the IST program. The licensee is proposing to use vibration velocity measurements in lieu of bearing temperature measurements.

Licensee's Basis for Requesting Relief: It is unlikely that bearing failure would be detected by a yearly test. The Code does not require continuous monitoring of bearing temperature and this parameter is only indicative of impending pump bearing failure when it is continuously monitored. Annual bearing temperature measurement is required by the Code, but if a bearing is failing, temperature increases rapidly until bearing failure. Furthermore, this temperature increase is only seen for those bearings outside of the pumped fluid flow path (bearings in separate housings) and does not, therefore, afford reliable detection of bearing degradation for bearings submerged in and cooled by the pumped fluid.

Alternate Testing: In lieu of measuring the bearing temperature for pumps in the inservice testing program, substitute additional vibration monitoring. In addition to the Code required unfiltered displacement vibration measurements, measure vibration in units of velocity during each inservice test. Record these measurements and use them as a substitute for bearing temperature measurements.

The acceptance criteria for the vibration measurements shall be those provided in OM-6, with addenda through May 31, 1989.

Evaluation: Bearing temperature measurements, for pumps without installed bearing temperature measurement instrumentation, must be taken at or near the bearing housing. Experience with degraded bearings indicates that the temperature at the bearing housing would not increase significantly until immediately before a bearing failure. Therefore, the likelihood of detecting an impending bearing failure with a single annual bearing temperature measurement is very small. This measurement does not significantly improve the ability to detect pump mechanical degradation. Measurement of pump vibration velocity provides more information about pump mechanical condition than could be obtained by measuring pump vibration displacement and the temperature of the bearing housing, as required by the Code.

Based on the determination that the proposed alternative would provide an acceptable level of quality and safety, relief is granted as requested pursuant to 10 CFR 50.55a(g)(6)(i).

Item 3:

The licensee indicated in their IST program that the inlet pressure is calculated for the diesel fuel oil transfer pumps and the salt water cooling pumps. The Code states that the inlet pressure should be measured. The licensee was instructed to measure the inlet pressure or submit a relief request. Pump relief request PRR-10 was submitted by the licensee in their June 18, 1991, submittal.

Pump Relief Request PRR-10: The licensee has requested relief from the inlet pressure measurement requirements of Section XI, Paragraph IWP-3100, for the pumps listed below. The licensee has proposed to calculate the inlet pressure as a function of fluid level above pump inlet.

Diesel Fuel Oil Transfer Pumps:	2P093, 2P094, 2P095, 2P096 3P093, 3P094, 3P095, 3P096
Salt Water Cooling Pumps:	2P112, 2P113, 2P114, 2P307 3P112, 3P113, 3P114, 3P307

Licensee's Basis for Requesting Relief: The inlet pressure is determined by the variation normally occurring in tank level/sea level.

These are submerged, vertical shaft, centrifugal pumps. The pump inlet pressure is a result of the head imposed by:

(1) the pumped fluid in the diesel fuel storage tanks in the cases of the diesel fuel transfer pumps, and

(2) the level of sea water in the inlet bay in the case of the salt water cooling pumps.

Measuring inlet pressure to the pumps is not practical in these cases due to the nature and location of the pump inlets. The pumps' suctions are located in the bottom of the tank/inlet bay. The suctions proper consist of openings with screens across them at the pump impeller inlet.

Alternate Testing: Calculate inlet pressure using a measurement of the level of fluid over the pump inlet; accounting for the fluid specific gravity, use accepted engineering practices to determine inlet pressure from standard references. Document the calculation for each test in the test records.

Evaluation: These pumps are not equipped with suction pressure instrumentation, therefore, direct suction pressure measurements cannot be

taken either prior to pump start or during operation. System modifications would be required to enable direct measurement of suction pressure. These modifications would be a hardship for the licensee due to the costs involved.

During testing, these pumps take suction from reservoirs that are vented to atmosphere, therefore, the pressure at the pump suction is determined by the height of liquid above the pump suction. The primary purpose of the pump suction pressure measurement is to be able to obtain a value for the differential pressure across the pump and to ensure consistent initial test conditions. Maintaining a minimum level in the suction reservoir would also provide assurance that the required suction head is available. Blockage in the pump suction piping would be indicated by pump cavitation and a reduction in pump discharge pressure and flow rate. Calculation of pump suction pressure using a measurement of the level of fluid over the pump inlet and accounting for specific gravity affects should be adequate to monitor pump condition and detect degradation and as such, would provide reasonable assurance of operational readiness provided the suction pressure calculation methods meet the accuracy requirements of the Code.

Based on the determination that requiring the installation of suction pressure instrumentation would result in hardship without a compensating increase in the level of quality and safety, relief is granted pursuant to 10 CFR 50.55a(a)(3)(ii) provided the licensee's suction pressure calculation methods are within the accuracy that would result from using instruments meeting the Code accuracy requirements.

Item 4:

PRR-05 requested relief from the requirements of IWV-3100 with regards to flow-rate measurement for the following pumps: low pressure safety injection, containment spray, auxiliary feedwater, and diesel fuel oil. The staff granted relief for the low pressure safety injection pumps and containment spray pumps provided the licensee follows the guidance in Generic Letter (GL) 89-04, "Guidance on Developing Acceptable Inservice Testing Programs," Position 9, "Pump Flow Testing Using Minimum Flow Return Line With or Without Flow Measuring Devices." Interim relief was granted for the auxiliary feedwater and diesel fuel oil pumps to allow time for the licensee to investigate methods to determine pump flow rates.

The licensee withdrew the relief request in their July 31, 1991, submittal and stated that the pumps would be tested in conformance with GL 89-04, Position 9. Testing of these pumps will be performed with the mini-flow lines quarterly and full or substantial flow testing will be performed on the applicable pumps at the following schedule:

Low Pressure Safety Injection Pumps: During Cold Shutdown when the shutdown cooling system is in operation.

Containment Spray Pumps: During refueling, when filling the refueling cavity.

Diesel Fuel Transfer Pumps: During quarterly testing because the flow instruments have recently been installed.

Auxiliary Feedwater Pumps: During Cold Shutdown using the emergency flow path (Mode 3 for the steam driven auxiliary feed pump).

With the licensee's action, the item is resolved and no further action by the staff is required.

Item 5:

Pump relief request PRR-08 was denied by the staff and withdrawn by the licensee in their April 12, 1991, submittal. No further action on this item is required.

Item 6:

This item addresses three valve relief requests, VRR-03, VRR-11, and VRR-13, in which the licensee has proposed to verify the full-stroke open capability of the check valves using sample disassembly and inspection. The following is a summary of the licensee's response to each of the three relief request evaluations made by the staff.

Relief requests VRR-03 and VRR-13 addressed the safety injection system containment emergency sump outlet check valves, 24-003-C-724 and 24-004-C-724, and the containment spray system isolation stop check valves, 8-004-C-406 and 8-006-C-406. These relief requests were granted on an interim basis by the staff allowing the licensee to use disassembly and inspection to verify the full-stroke capability of the check valves without performing a part-stroke exercise test with flow after reassembly. The licensee was requested to investigate methods to part-stroke exercise the check valves and actively pursue the use of non-intrusive diagnostic testing techniques to demonstrate that these valves move to their fully open position. The licensee revised the relief requests in their July 31, 1991, submittal and agreed to develop a method to part-stroke the check valves after reassembly and to investigate the use of non-intrusive diagnostic tech- ques to verify the check valves swing fully open, but did not provide any information on how or when these procedures would be accomplished. Interim relief was granted for one year or until the next refueling outage, whichever is later. The licensee needs to provide information that supports a specific implementation schedule and the basis for that schedule, before the staff can extend the time period for the interim relief.

Relief request VRR-11 addressed the following valves:

12-040-A-551 - Safety Injection Tank T008 Outlet Check Valve
12-041-A-551 - Safety Injection Tank T007 Outlet Check Valve
12-042-A-551 - Safety Injection Tank T009 Outlet Check Valve
12-043-A-551 - Safety Injection Tank T010 Outlet Check Valve

The relief request was granted provided the licensee performs a partial flow test of the reassembled valves before they are returned to service and part-stroke exercises all these valves during cold shutdowns. Also, the staff requested that non-intrusive test techniques be investigated by the licensee to demonstrate that these check valves move to their fully open position. The licensee revised the relief request in their July 31, 1991, submittal and agreed to perform all of these activities. Since the licensee's alternative testing now incorporates the conditions specified in the staff's September 24, 1990, SE, the relief request is granted without provision, pursuant to 10 CFR 50.55a(g)(6)(i), for the reasons set forth in TER Section 4.2.1.1.2.

Item 7:

This item addresses two valve relief requests, VRR-18 and VRR-20. The licensee requested to verify closure capability by valve disassembly and inspection of the turbine driven auxiliary feedwater pump steam supply check valves, 4-003-D-620 and 4-005-D-620, and the main feedwater supply check valves, 20-036-C-609 and 20-129-C-609. The staff granted relief to both relief requests provided the licensee part-stroke exercises the valves to the open position with flow after reassembly. In addition, the licensee was requested to actively pursue the use of non-intrusive diagnostic techniques to demonstrate that these valves close when subject to reverse flow conditions. The licensee revised their relief request in their July 31, 1991, submittal agreeing to the provisions, and also will perform a partial-stroke test to the open position using system flow quarterly for the auxiliary feedwater pump steam supply check valves and during cold shutdowns for the main feedwater supply check valves. Since the licensee's alternative testing now incorporates the conditions specified in the staff's September 24, 1990, SE, the relief request is granted without provision, pursuant to 10 CFR 50.55a(g)(6)(i), for the reasons set forth in TER Sections 4.5.1.1.2 and 4.6.1.1.2.

Item 8:

The staff noted that the reactor coolant system solenoid operated vent valves, HV-0296A, HV-0296B, HV-0297A, HV-0297B, HV-0298, and HV-0299 should be included in the IST program and tested to code requirements. The licensee indicated in their April 12, 1991, submittal that this item has been resolved. This action satisfactorily addresses the staff's original concern.

Item 9:

This item addressed relief request VRR-16 which concerned all power operated valves in the IST program, specifically, corrective action for rapid-acting valves. The relief request was granted provided the licensee followed the direction of GL 89-04, Position 6: Stroke Time Measurements for Rapid Acting

Valves. The licensee revised this relief request in their July 31, 1991, submittal to reflect the GL 89-04, Position 6. Since the licensee's alternative testing now incorporates the conditions specified in the staff's September 24, 1990, SE, the relief request is granted without provision, pursuant to 10 CFR 50.55a(g)(6)(i), for the reasons set forth in TER Section 4.1.2.1.2

Item 10:

This item addressed two check valve relief requests, VRR-02 and VRR-12, that were denied for dissassembly and inspection and granted for partial-stroke testing quarterly provided the licensee full-stroke exercises the valves during refueling outages.

VRR-12 originally requested relief to perform disassembly and inspection in lieu of the Code requirements on the low pressure safety injection pump suction header check valves, 16-077-C-645, 16-084-C-645, 16-199-C-645, and 16-201-C-645. The staff denied the relief request because insufficient basis had been provided to justify why the valves could not be full-stroke exercised during refueling outages. The licensee revised their relief request in their July 31, 1991, submittal and incorporated full flow testing of the valves during refueling outages. The licensee also satisfied the provisional relief by stating in the relief request that the valves will be part-stroke exercised quarterly. Since the licensee's alternate testing now incorporates the conditions specified in the staff's September 24, 1990, SE, the relief request is granted without provision, pursuant to 10 CFR 50.55a(g)(6)(i), for the reasons set forth in TER Section 4.2.2.2.2. This may be reviewed during a future on-site IST inspection.

Valve relief request VRR-02 involves the safety injection system refueling water storage tank check valves. This relief request is similar to VRR-12, however, the licensee revised relief request VRR-02 in their July 31, 1991, submittal and provided further justification to perform disassembly and inspection of the valves on a refueling outage frequency. The following is an evaluation of revised relief request VRR-02.

Valve Relief Request VRR-02: The licensee has requested relief from the exercising frequency and method requirements of Section XI, Paragraph IWV-3522, for the safety injection and containment spray pumps combined suction check valves from the refueling water tank, 24-001-C-724 and 24-002-C-724. The licensee has proposed verifying the full-stroke capability of these valves with disassembly and inspection on a sampling basis during refueling outages.

Licensee's Basis for Requesting Relief:

(1) RCS Pressurized and at Normal Operating Temperature

These valves cannot be full-stroked using flow during power operation, for the following reasons:

The HSPI (shutoff head 1500 psi) and LSPI (shutoff head 200 psi) pumps are unable to overcome RCS system pressure (nominal operating pressure = 2000 psi). There is no full flow recirculation to the RWST from either pump.

As a result, only pump recirculation through the miniflow line is produced using these pumps while the RCS is pressurized. Although this is sufficient for a partial stroke test, flow for a full-stroke test is not available.

A quarterly test at power, using the only available flow path, would either inject borated water into the RCS or spray down the containment building, or both. If injection were possible during operation, the test would not be performed because the result would be an immediate, uncontrolled and complete reactor shutdown (as a result of the borated water) and/or flooding and resultant degradation of the components and systems located in the containment building (as a result of the containment building spray down).

The containment spray pumps cannot be utilized to full-stroke these valves using flow, as the only full flow path during plant operation is through the containment spray header and nozzles.

(2) RCS Depressurized and Cooled Down

These valves cannot be full-stroked using flow during cold shutdown for the following reasons:

Testing with all pumps in a loop: Sufficient flow to full-stroke the RWST outlet check valves is not achievable in this condition. Return flow from the HPSI and LPSI pump discharge lines is very limited, consisting of mini-flow recirculation lines and RCS vent lines.

Testing with the containment spray pump: The Containment Spray (CS) Pumps have a 6" recirculation line to the RWST's, but these pumps by themselves cannot develop full-stroke flow for the RWST outlet check valves.

Testing with the LPSI pump: Stroking the RWST outlet check valves with flow from the LPSI pumps is prohibited by the Technical Specifications in cold shutdown because the LPSI pumps must be aligned to take suction from the RCS to provide shutdown cooling during this mode of operation. The LPSI pumps cannot, therefore, take a suction through the RWST outlet check valves.

Testing with the HPSI pump: The equivalent of the combined CS, LPSI, and HPSI flowrate cannot be developed with the HPSI pump alone. The HPSI pumps cannot be used to exercise these valves during cold shutdown because of the risk of exceeding cooldown ambient temperature of approximately 65° and the cooled down RCS is nominally at approximately 135°.

(3) RCS Open During Refueling

Flow path: The RWST outlet check valves are in the 24" supply line to the suction headers of the HPSI, LPSI and containment spray pumps. To full-stroke the RWST outlet check valves using flow during refueling with the reactor vessel head removed, would require that the system achieve a test flow of approximately 6500 gpm (full accident flow). There is one check valve for each of the two trains of pumps. Full flow from the RWST through the check valves of interest is only achieved with all of the pumps in one train running at the same time (one HPSI pump, one LPSI pump and one spray pump).

A large flow could be achieved in the refueling mode during refueling cavity fill. The HPSI, LPSI and containment spray pumps could take suction from the RWST and discharge to the RCS. With the reactor pressure vessel head removed, flow would first fill and then overflow the reactor pressure vessel into the refueling cavity.

Cooldown Limits: The only discharge path that exists for this flow is into the core through the safety injection headers to the cold legs and/or the 6" recirculation line from the containment pump spray discharge to the RWST (this 6" line alone has insufficient capacity for a full-stroke of the RWST outlet check valves using flow). The borated water in the RWST is normally at an ambient temperature of approximately 65° and the cooled down RCS is normally at approximately 135°.

Injection of the borated RWST water would result in a cool-down rate in violation of the Technical Specifications for the reactor vessel.

From the above discussion, it can be seen that no allowable flow path exists in any plant mode for a full-stroke of the RWST outlet check valves using flow. Testing of these valves could only be accomplished after significant redesign of the system, such as installation of a fully instrumented full flow test loop. NRC Generic Letter 89-04, Attachment 1, Position 2, identifies partial disassembly and inspection as an acceptable alternative for stroking a valve when it is impractical to use flow. In this case, there is no way to stroke these valves with the existing system design using flow.

Alternate Testing: Quarterly, perform a partial stroke test (open) of each valve using system flow. At each refueling outage, test the valves by partial disassembly, inspection and manual stroking on a rotating basis (one valve per refueling).

During partial disassembly the valve internals will be visually inspected for worn or corroded parts, and the valve disk will be manually exercised. If it is found that the full stroke capability of the disassembled valve is in question, the other valve will be similarly disassembled and

inspected and manually full stroked during the same outage. Following reassembly and prior to return to service, the valve will be tested by partial stroking using system flow.

The licensee agreed to actively pursue the use of non-intrusive diagnostic techniques to demonstrate that these valves swing fully open during partial flow testing. When another method is developed to verify the full-stroke capability of these check valves, this relief request will be revised or withdrawn.

Evaluation: These valves cannot be full-stroke exercised during power operation due to the inability of the high and low pressure safety injection pumps to overcome RCS pressure. A quarterly partial stroke test can be performed using the minimum flow line of these pumps. The containment spray pumps cannot be utilized at any time to exercise these valves as the only full flow path is through the containment spray nozzles which, if used, would require considerable manpower for cleanup and could result in equipment damage.

These valves cannot be full-stroke exercised during cold shutdown using the low pressure safety injection pumps because they must be aligned to take suction from the RCS to provide shutdown cooling. The high pressure injection pumps cannot be used to exercise these valves during cold shutdown because of concerns regarding low temperature overpressurization of the RCS and exceeding cooldown rate limits.

These valves cannot be full-stroke exercised during refueling outage because there is insufficient capacity to accommodate the full accident flow in either the cold legs and/or the recirculation line from the containment spray pump discharge to the refueling water storage tank. Also, the resulting cooldown rate would violate current Technical Specification limits. In either of these three plant modes, the Code required testing could only be performed after significant redesign of the system, such as the addition of an instrumented full flow test line, which would be burdensome for the licensee due to the costs involved.

The licensee has proposed verifying the full-stroke open capability of these check valves by sample disassembly and inspection. The NRC staff's position regarding check valve disassembly and inspection are explained in detail in Generic Letter No. 89-04. The minutes on the public meetings on Generic Letter No. 89-04 regarding Position 2, "Alternatives to Full Flow Testing of Check Valves," further stipulate that a partial stroke exercise test using flow is expected to be performed after disassembly and inspection is completed but before the valve is returned to service. The licensee's proposed alternate testing is consistent with the above staff position and, therefore, provides reasonable assurance of operational readiness.

Based on the determination that the Code required testing is impractical, and considering the acceptability of the proposed alternate testing and the burden on the licensee if the Code requirements were imposed, relief is granted pursuant to 10 CFR 50.55a(g)(6)(i) as requested.

Item 11:

In relief request VRR-19, the license requested relief from the frequency requirements of IWV-3416 for the containment normal purge supply valves HV-9948 and HV-9949, and the containment normal purge exhaust valves HV-9950 and HV-9951. Because of the valve availability requirements, the licensee's proposed alternate testing to full-stroke exercise these valves when the system is placed in service during cold shutdown and refueling is not a deviation from Code requirements and relief is not required. The licensee withdrew the relief request in their April 12, 1991, submittal. No further action is required on this item.

Item 12:

This item addressed relief request VRR-23 concerning stroke time measurement of all power operated valves in the IST program. The licensee proposed that measured stroke times be compared to the average stroke time, or the last three stroke times, whichever is greater. Relief from the stroke time trending and corrective action requirements of IWV-3417(a) was granted provided the reference value of the stroke time used for comparison of test data is established when the valve is known to be in good operating condition. The licensee revised the relief request in their July 31, 1991, submittal to incorporate the provision cited in the staff's evaluation. Since the licensee's alternate testing now incorporates the conditions specified in the staff's September 24, 1990, SE, the relief request is granted without provision, pursuant to 10 CFR 50.55a(a)(3)(i), for the reasons set forth in TER Section 4.1.3.1.2.

Item 13:

The staff noted in this item that no emergency diesel generator air start valves were included in the licensee's IST program. The licensee was requested to evaluate whether the diesel generators had valves in their emergency diesel air start systems that perform an active safety function and incorporate these valves, if any existed, into their IST program. The licensee responded in their April 12, 1991, submittal that this item had been resolved. However, the licensee provided no detailed information on their evaluation. This item may be investigated in a future on-site IST inspection.

Item 14:

This item, paragraph 14 of TER Appendix C, addressed the reactor coolant system check valve 3-152-A-551 cold shutdown justification. The licensee stated in their IST program that the valve would be exercised at cold shutdowns if sufficient volume is available in the pressurizer. The staff stated that if

the valve testing could not b done every cold shutdown, a relief request should be submitted. If the testing is to be performed every cold shutdown, then the words "sufficient volume available in the pressurizer" should be deleted from the cold shutdown justification. The licensee stated in their April 12, 1991, submittal that the program changes had been made to resolve this item. This action satisfactorily addresses the staff's original concern.

Item 15:

This item, paragraph 15 of TER Appendix C, addressed the main steam valves HV-8204 and HV-8205. The staff's finding was that the licensee provided no justification which demonstrates the impracticability of testing these valves, therefore, these valves should be tested quarterly as required by the Code. The licensee stated in their April 12, 1991, submittal that the cold shutdown justification demonstrating the impracticability of quarterly full-stroke testing of the main steam valves has been incorporated into their program. In the licensee's June 18, 1991, submittal, the licensee provided the following justification:

> Full-stroke exercising of each MSIV while the plant is at power (each valve is individually stroked) will cause a loss of 50 percent of our heat removal from the primary coolant system. This would result in a reactor trip on asymmetric reactor core power and actuation of the steam and pressurizer (primary) relief valves. Accordingly, full-stroke testing of these valves while at power is not practical. Therefore, testing will continue to be conducted at cold shutdown.

The staff has reviewed the cold shutdown justification for the main steam valves and found it to be acceptable.

Item 16:

This item, paragraph 16 of TER Appendix C, addressed the cold shutdown justification for the safety injection valves listed below:

3-156-A-551	3-157-A-550	3-158-A-550	4-012-C-358	4-015-C-358
4-016-C-358	4-017-C-553	3-018-A-551	3-019-A-551	3-020-A-551
3-021-A-551	3-155-C-551			

The licensee stated in their IST program that the valves would be exercised at cold shutdowns if sufficient volume is available in the pressurizer. The staff stated that if the valve testing could not be done every cold shutdown, a relief request should be submitted. If the testing is to be performed every cold shutdown, then the words "sufficient volume available in the pressurizer" should be deleted from the cold shutdown justification. The licensee stated in their April 12, 1991, submittal that the program changes had been made to resolve this item. This action satisfactorily addresses the staff's original concern.

Item 17:

This item, paragraph 17 of TER Appendix C, addressed the main steam atmospheric dump valves (ADV) HV-8419 and HV-8421. The licensee provided technical justification indicating that these valves cannot be exercised during power operation since this would result in a low steam generator pressure indication which would shut the main steam isolation valves and cause a plant shutdown. The piping and instrument diagrams show the existence of manual isolation valves which would allow the ADV's to be tested without loss of steam generator pressure. The licensee was directed to either test these valves quarterly or justify why testing per the code requirements is impractical. The licensee submitted relief request VRR-25 in their July 31, 1991, submittal to request relief from testing the ADV's quarterly. The following is an evaluation of the relief request.

Valve Relief Request VRR-25: The licensee has requested relief from the testing frequency requirements of IWV-3411 for the atmospheric dump valves, 2HV8419, 2HV8421, 3HV8419, and 3HV8421. The licensee has proposed to partial stroke the valves on a quarterly basis and full-stroke the valves on a cold shutdown basis.

Licensee's Basis for Requesting Relief:

Normal System Lineup: The ADVs are rarely opened during power operation and are only used during plant heat up and cool downs when the condenser is not available. Therefore, the valves are normally in their main steam isolation signal actuated position, and there is generally no need to perform a full closed stroke test of the ADVs.

Quarterly Full Stroke: Fully opening an ADV without isolation of the steam flow path at power risks plant upset and trip as this allows a large steam release, approximately 5 percent of 3410 MW thermal, and a resultant pressure transient when the ADV is tripped closed. The pressure transient can result in RCS temperature excursions and resulting Engineered Safety Feature (ESF) initiation with the associated reactor plant trip.

There is a maintenance block valve upstream of each ADV. This valve could be closed to block steam flow to allow the ADV to be fully opened for test without releasing steam. However, an isolated ADV is unavailable to perform its function with the block valve closed necessitating entry into the action requirements of Technical Specification 3.7.1.6, and aggravating the unavailability of the ADV's from a plant reliability point of view.

Partial Stroke Testing With Pressure Applied: A partial stroke of an ADV can be performed, while the ADV is experiencing full system pressure, by opening the valve to approximately 25 percent. The ADVs are designed with integral pilot valves that assist in opening the ADV when it is under pressure. The pilot valve equalizes pressure across the ADV (partially) during the open stroke.

Partial stroke exercising with main steam pressure applied followed by closing the ADV in a similar manner as would a MSIS actuation, demonstrates the ADV and its pilot valves' ability to open and close under actual operating conditions.

Conclusion: This proposed alternative testing method would be analogous to actual design conditions for ADV operation and can be performed with minimal impact to plant operations. The pilot valve stroke length is the first 5 percent of the stem travel. The proposed partial stroke test fully exercises the pilot valve and piston ring, and partially exercises the main plug.

The pilot valve serves no function when the ADV is not under system pressure. The depressurized stroke test is an artificiality that does not demonstrate the ability of the ADV to function under design conditions.

Alternate Testing: Perform a partial stroke test of the ADV under actual operating conditions (without isolation of the main steam pressure) on a quarterly basis.

Full-stroke the valve on a cold shutdown basis.

Evaluation: The ADVs cannot be tested at full power with the manual isolation valves open because of steam flow loss when the valve is opening and a possible plant trip due to a pressure transient when the valve is closed. The licensee's proposed testing includes part-stroke exercising the valves quarterly during power operation and full-stroke exercising the valves at cold shutdowns. The quarterly part-stroke test verifies the valve operability of the pilot assist mechanisms and the cold shutdown exercise test verifies the valves' full-stroke capability. Because the revised relief request proposes a testing frequency that meets Code requirements, this relief request is not required. The licensee should make this a cold shutdown justification and incorporate it into their IST program.

2.2 Additional Relief Request: Relief request VRR-24 was granted by the staff in the September 24, 1990, SE. The licensee made minor editorial changes in this relief request which was included in their July 31, 1991, submittal. The editorial changes do not affect the SE and further evaluation on this relief request is not required.

3.0 CONCLUSION

Based on the review of your IST program relief requests, the staff concludes that the relief requests as evaluated and modified by their SER 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 relief, pursuant to 10 CFR 50.55a(a)(3)(i), (a)(3)(ii), or (g)(6)(i), is authorized by law and will not endanger life or property or the common defense and security and is otherwise in the public interest. In making this determination, the staff has considered the alternate testing being implemented, compliance resulting in a hardship without a compensating increase in safety, and the impracticality of performing the required test, considering the burden if the requirements were imposed.

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