ENCLOSURE 1

INSERVICE TESTING PROGRAM

REVISION 11

SAN ONOFRE NUCLEAR GENERATING STATION

UNIT 3

July 1991

ENCLOSURE 1

INSERVICE TESTING PROGRAM
SAN ONOFRE - UNIT 3

PUMP RELIEF REQUEST NO. 5
(WITHDRAWN)

INSERVICE TESTING PROGRAM
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VALVE RELIEF REQUEST NO. 2

System: Safety Injection

Components: Safety Injection System Check Valves:
24-001-C-724 - RW Tank T005 to Spray Pump P012 Suction Header,
24-002-C-724 - RW Tank T005 to Spray Pump P013 Suction Header.

Class: 2

Function: These valves prevent back-flow from the High Pressure Safety Injection Suction Header, Low Pressure Safety Injection Suction Header and Spray Pump Suction header to the Refueling Water Storage Tanks (RWST's).

Test Requirement:

IWV-3411, exercise these valves open and closed every three months.

Basis for Relief:

INTRODUCTION

The source of flow to these valves is borated water from RWST's. The pumps that produce flow through these valves are the High Pressure Safety Injection (HPSI), Low Pressure Safety Injection (LPSI) and Containment Spray pumps. They discharge into the Reactor Coolant System (RCS) or containment building spray headers.

These safety injection system check valves prevent post accident recirculation flow from escaping the normal flow path into the RWST. Plant conditions can be grouped into three test situations with respect to these valves; (1) RCS Pressurized and at normal operating temperature, (2) RCS depressurized and cooled down, and, (3) RCS open during refueling. These conditions are discussed below:

(1) RCS PRESSURIZED AND AT NORMAL OPERATING TEMPERATURE

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

a. The HPSI (shutoff head 1500 psi) and LPSI (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.

b. 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).

c. 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:

a. **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.

b. **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.

c. **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.

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d. **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 rate limits. The borated water in the RWST is normally at an ambient temperature of ≈ 65° and the cooled down RCS is nominally at ≈ 135°.

e. **CONCLUSION:** The Code required testing of the RWST outlet check valves while the plant is in Cold Shutdown could only be performed after significant redesign of the system, such as the addition of an instrumented full flow test line.

(3) RCS OPEN DURING REFUELING

a. **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 a 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.

b. **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 Spray Pump 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 ≈ 65° and the cooled down RCS is nominally at ≈ 135°.

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Injection of the borated RWST water would result in a cool-down rate in violation of the Technical Specifications (See Figure 3.4-5, RCS Maximum Allowable Cool-Down Rates) for the reactor vessel.

CONCLUSION

From the above discussion, it can be seen that no allowable flow path exits 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.

TEST SCHEDULE

Disassembly and inspection of both of these valves each refueling outage requires the associated system piping to be drained. This generates a significant amount of liquid radioactive waste. In addition, considerable radiation exposure can be received by personnel performing the partial disassembly, hand stroking and inspection. As a consequence, there is a clear advantage in reducing the number of partial disassembly and hand stroking tests required in each refueling.

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).

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VALVE RELIEF REQUEST NO. 2
Continued

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.

We will 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.

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VALVE RELIEF REQUEST NO. 3

System: Safety Injection

Components: Safety Injection System Check Valves:
24-003-C-724 - Outlet Check Valve - Containment Emergency Sump,
24-004-C-724 - Outlet Check Valve - Containment Emergency Sump.

Category: C

Class: 2

Function: These valves open to provide recirculation flow from the containment sump to the suction piping of the HPSI, LPSI and Containment Spray pumps.

Test Requirement:

IWV-3411, exercise these valves every three months.

Basis for Relief:

Test Methodology

NORMAL PLANT OPERATION

The only source of water to the inlet of the containment sump outlet check valves is the containment building sump. During normal plant operation this sump is required to be kept dry and the isolation valves shut. This system lineup precludes either full-stroke or partial stroke of these check valves using flow in this mode.

COLD SHUTDOWN AND REFUELING MODES

In cold shutdown or reactor refueling modes, part stroke exercising of these valves is possible with flow from the containment sump, however, the sump is not maintained at a cleanliness level consistent with the internals of the Safety Injection or Reactor Coolant system piping. The cleanup of the containment sump to cleanliness level consistent with the internals of the Safety Injection or Reactor Coolant system would be labor intensive.

If part stroke exercising were conducted by filling the sump with water and flow testing these valves, this would potentially contaminate the safety injection systems, the refueling water storage tank, and/or the reactor coolant system with low quality water. This contamination of the systems would cause accelerated corrosion and degradation. Extensive flushing and cleanup following such testing would therefore be required.

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VALVE RELIEF REQUEST NO. 3
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CONCLUSION

Code required testing could only be performed after significant system modifications involving considerable costs. These system modifications would involve additional containment penetrations and long runs of large diameter piping with associated supports and isolation valves. 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 practical way to full-stroke these check valves using flow with the existing system design.

TEST SCHEDULE

Disassembly and inspection of these valves each refueling outage requires the associated system piping to be drained. This generates a significant amount of liquid radioactive waste. In addition, considerable radiation exposure can be received by personnel performing the partial disassembly, hand stroking and inspection. As a consequence, there is a clear advantage in reducing the number of these tests required in each refueling.

Alternate Testing:

The valves will be partially disassembled, inspected and manually full stroked at each refueling outage 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.

A method of partial flow testing will be developed and used following the partial disassembly and prior to returning the valve(s) to service. Additionally, we will 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.

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VALVE RELIEF REQUEST NO. 11

System: Safety Injection

Components: Safety Injection System Check 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.

Category: A and C

Class: 1

Function: These valves open to allow a flow of water from the Safety Injection Tanks into the Safety Injection Header of each Primary loop.

Test Requirement:

IWV-3411, exercise these valves every three months.

Basis for Relief:

DURING NORMAL OPERATION

These check valves cannot be stroked during normal operation without violating the Technical Specification requirements for safety injection tank pressure and level bands. In addition, these valves cannot be full-stroked using flow except under actual loss of coolant accident conditions, i.e. no full flow path available.

a. The SIT pressure is ≈ 600 psi and cannot overcome RCS system pressure (nominal operating pressure ≈ 2000 psi). As a result, no flow through these check valves is possible during normal operation.

b. A quarterly test at power using flow (if it were possible) would not be performed because it would inject borated water into the RCS. If injection were possible during operation, the result would be an immediate, uncontrolled and complete reactor shutdown (as a result of the borated water).

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VALVE RELIEF REQUEST NO. 11
Continued

DURING COLD SHUTDOWN OPERATION

During cold shutdown a full-stroke using flow cannot be accomplished because it could lead to a low-temperature over-pressurization of the RCS due to the lack of expansion volume necessary to accommodate the large quantity of water which must be discharged into the RCS. Further, this flow path is not equipped with the flow rate instrumentation necessary to verify a full-stroke of these check valves.

CONCLUSION

Code required testing can only be performed after significant system modifications, such as installation of an instrumented test loop for full-stroke testing these valves using flow. The high costs of the necessary design changes involved would not be justified by the improvement of the valve testing. Further, the addition of valves and piping to the system could result in reduced plant reliability. 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 full-stroke these valves with the existing system design using flow.

TEST SCHEDULE

Because of its effect on the operability of the associated equipment, performing a test by partial disassembly and hand stroking requires considerable manipulation of plant conditions and imposes significant restrictions on the structure of a refueling outage. Because of the need for draining systems in order to disassemble the valves, performance of these tests generates a significant amount of radioactive liquid waste. Considerable radiation exposure can be received by personnel performing the tests. As a consequence, there is a clear advantage in reducing the number of these tests required in each refueling.

Alternate Testing:

Partial stroke test these check valves on a cold shutdown interval.

At refueling intervals, test these valves by partial disassembly and hand stroking. The valve internals shall be visually inspected for worn or corroded parts, and the valve disks shall be manually exercised.

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VALVE RELIEF REQUEST NO. 11
Continued

It shall be verified that the valve is capable of full-stroking and that the internals of the valve are structurally sound. This testing shall be conducted at each refueling outage on a rotating basis. One valve of this group will be tested each successive refueling outage, until the entire group has been tested.

If the disassembled valve is not capable of being full-stroke exercised or there is binding or failure of the valve internals, the remaining valves in this group shall also be disassembled, inspected, and manually full-stroke exercised during the same outage.

A partial flow test shall be performed on the disassembled valve before it is returned to service.

Additionally, we will 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.

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VALVE RELIEF REQUEST NO. 12

System: Safety Injection

Components: Safety Injection System Check Valves:
16-077-C-645 - LPSI Pump P016 Suction Header Check Valve,
16-084-C-645 - LPSI Pump P015 Suction Header Check Valve,
16-199-C-645 - LPSI Pump P016 Suction Header Check Valve,
16-201-C-645 - LPSI Pump P015 Suction Header Check Valve.

Category: C

Class: 2

Function: These valves open to allow a flow of water from the refueling water storage tank (RWST) into the suction piping of the Low Pressure Safety Injection (LPSI) pumps.

Test Requirement:

IWV-3411, exercise these valves every three months.

Basis for Relief:

DURING POWER OPERATION

Full-stroke exercising of the LPSI pump suction check valves with flow requires the passage of the maximum required accident flow rate through the valves. The LPSI suction checks are in the suction lines of the associated LPSI pumps and deliver borated water to these pumps from the RWST's. The pumps in turn discharge to the RCS, Shutdown Cooling heat exchanger and the mini-flow recirculation lines (returning the flow to the RWST's).

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

a. The mini-flow recirculation lines cannot provide enough flow through the LPSI pump suction check valves, as the maximum flow achievable through this path is less than required accident flow. Although this is sufficient for a partial stroke test, flow for a full-stroke is not available.

b. During power operation, the Shutdown Cooling System is isolated and cannot be used as a flow path because it must remain isolated due to interlocks controlled by Technical Specification 3.4.5.2.d

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VALVE RELIEF REQUEST NO. 12
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c. Injecting water into the RCS during power operation is not possible. The LPSI pumps (shutoff head 200 psi) are unable to overcome RCS system pressure (nominal operating pressure ≈ 2000 psi) and therefore there can be no flow into the RCS in this plant mode. If a test at power could be conducted, it would result in injection of borated water into the RCS. The result would be an immediate, uncontrolled and complete reactor shutdown (as a result of the borated water).

COLD SHUTDOWN

During cold shutdown, the Technical Specifications require that the LPSI pumps remain aligned to provide shutdown cooling at all times while the plant is in Cold Shutdown. The LPSI suction check valves are, accordingly, bypassed and cannot be full-stroke tested using flow. Compliance with the Code requirement to perform quarterly testing could only be accomplished after a major modification of the system design. The improvement of the testing in cold shutdown would not justify the high costs involved.

Alternate Testing:

Quarterly, by part-stroke exercising these valves.

A flow path exists during the filling of the refueling canal with the LPSI pumps in plant Mode 6 (refueling). The suction of the LPSI pumps can be aligned to the RWST and the discharge to the LPSI header or shutdown cooling header. Flow could then be directed through the LPSI Suction Header Check Valves at full flow (LPSI Pump Design Flow is 4150 gpm at 400 psid) for a short period of time sufficient to full-stroke these valves with flow. Therefore, the valves will be full stroke exercised using flow at a reactor refueling interval.

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VALVE RELIEF REQUEST NO. 13

System: Containment Spray

Components: Containment Spray System Check Valves:
8-004-C-406 - Containment Isolation Stop Check Valve - Spray Header #1,
8-006-C-406 - Containment Isolation Stop Check Valve - Spray Header #2.

Category: A and C

Class: 2

Function: These valves open to allow a flow of water from the containment spray pump discharge into the containment spray ring headers.

Test Requirement:

IWV-3411, exercise these valves every three months.

Basis for Relief:

FULL FLOW TESTING

These valves are in the line leading from the Containment Spray pump discharge to the riser inside the containment building that leads up to the ring headers and spray nozzles. As a consequence full-stroke exercising these valves through this flow path using the containment spray pumps would result in a containment spray down and consequent potential equipment damage as well as create additional liquid radwaste to be removed from the Containment Building sump.

PARTIAL FLOW TESTING

The riser inside the containment building that leads up to the ring headers and spray nozzles is drained each refueling and refilled prior to returning the plant to service. When the riser is being filled with water, the water can be put in the system upstream of each stop check valve. Therefore, this flow through the Spray Header Containment Isolation Stop Check Valves during the filling of the riser would result in a partial stroke of these valves.

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VALVE RELIEF REQUEST NO. 13
Continued

CONCLUSION

A usable flow path does not exist in any plant mode to allow a full-stroke of the Containment Isolation Stop Check Valves for the Spray Headers using flow. Code required full-stroke testing using flow could only be performed after considerable modification of the system design, such as installation of an instrumented test loop. The high costs of the necessary design changes involved would not be justified by the improvement of the valve testing. Further, the addition of valves, piping, supports and penetrations could result in reduced plant reliability. 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.

TEST SCHEDULE

Disassembly and inspection of both of these valves each refueling outage requires additional draining of the associated system piping over and above draining the riser as previously discussed. This generates a significant amount of liquid radioactive waste. In addition, considerable radiation exposure can be received by personnel performing the partial disassembly, hand stroking and inspection. As a consequence, there is a clear advantage in reducing the number of partial disassembly and hand stroking tests required in each refueling.

Alternate Testing:

At each refueling outage, (1) perform a partial stroke test (open) of each valve using system flow, and, (2) 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.

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VALVE RELIEF REQUEST NO. 13
Continued

Following reassembly and prior to return to service, the valve will be tested by partial stroking using system flow. Additionally, we will 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.

INSERVICE TESTING PROGRAM
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VALVE RELIEF REQUEST NO. 16

System: All Systems

Components: All Power Operated Valves

Category: A and B

Class: 1, 2, and 3

Function: N/A

Test Requirement:

IWV-3413(c): If an increase in stroke time of 25 % or more from the previous test for valves with stroke times greater than 10 sec. or 50 % or more for valves with stroke times less than or equal to 10 sec. is observed, the test frequency shall be increased to once each month until corrective action is taken, at which time the original test frequency shall be resumed.

Basis for Relief:

It has been observed through surveillance testing and corrective action that the repeatability of valve stroke times for valves with short stroke times is sporadic and independent of degradation.

For valves with rapid stroke times, compliance with the stroke time trending and corrective action requirements of the Code is impractical because much of the difference in stroke times from test to test comes from inconsistencies in the operator or timing device. Therefore, compliance with the Code requirements would often result in costly maintenance when no degradation has actually occurred. An alternative acceptable to the NRC staff regarding stroke time measurements for rapid-acting valves is explained in detail in Generic Letter 89-04, Attachment 1, Position 6.

Alternate Testing:

Valves with stroke times of 2 seconds or less are referred to by the NRC as "rapid-acting valves." An increase in stroke time of 50 % or more for a rapid-acting valve (stroke time of 2 seconds or less) shall not result in a test frequency increase to once each month. However, if a valve stroke time does exceed its maximum stroke time value, it shall be declared inoperable.

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VALVE RELIEF REQUEST NO. 18

System: Main Steam

Components: Main Steam System Check Valves:
4-003-D-620 - Steam Supply - S/G E088 to AFP Turbine K007 Check Valve,
4-005-D-620 - Steam Supply - S/G E089 to AFP Turbine K007 Check Valve.

Category: C

Class: 3

Function:

These valves are in the main steam supply to the turbine-driven auxiliary feedwater pump. In the event of a main steam line break, these valves provide reverse flow check to isolate the affected steam generator.

Test Requirement: IWV-3411, exercise the valves every three months.

Basis for Relief:

The AFP Steam Supply check valves are in the steam supply lines from the main steam system to the inlet of the steam driven AFP turbine trip and throttle valves.

DURING PLANT OPERATION

During normal plant operation, main steam pressure tends to open these valves. No pressure source exists to reverse this pressure in the steam line where these valves are located and allow detection of valve closure or valve leakage. Consequently, with the present system design, verifying the closure of the AFP Steam Supply check valves by leak testing or with reverse flow, while the plant is operating, is not practical. Although a temporary external pressure source could be hooked up to the down stream piping and applying reverse pressure to these check valves, the required valve lineup would cause the associated auxiliary feedwater pump to be inoperable during the test.

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VALVE RELIEF REQUEST NO. 18
Continued

DURING COLD SHUTDOWN OR REFUELING MODES

Regardless of plant mode, there is no positive means of verifying that the valve disc travels to the closed position. System connections, such as vents and drains (and appropriate line isolation valves) are not present in the system to allow verification that a pressure differential exists across the AFP Steam Supply check valves when they are in the closed position.

CONCLUSION

Testing of these valves could only be accomplished after significant redesign of the system, such as installation of additional isolation valves and appropriate vents and drains in the high pressure steam piping. The high costs of the necessary design changes involved would not be justified by the improvement of the valve testing. Further, the addition of valves, supports and necessary piping modifications could result in reduced plant reliability. 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 test these check valves closed with the existing system design using reverse flow or pressure.

TEST SCHEDULE

Disassembly and inspection of both of these valves each refueling outage requires the associated system piping to be opened up. This is a significant effort requiring substantial manpower and refueling outage time. As a consequence, there is a clear advantage in reducing the number of partial disassembly and hand stroking tests required in each refueling.

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).

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VALVE RELIEF REQUEST NO. 18
Continued

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.

We are actively pursuing the use of non-intrusive diagnostic techniques such as acoustics or radiography to demonstrate that these valves close when subjected to reverse flow conditions. If another method is developed to verify the reverse flow closure capability of these check valves, this relief request will be revised or withdrawn.

INSERVICE TESTING PROGRAM
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VALVE RELIEF REQUEST NO. 20

System: Condensate and Feedwater

Components: Condensate and Feedwater System Check Valves:
20-036-C-609 - Main Feed Check at Steam Generator E089,
20-129-C-609 - Main Feed Check at Steam Generator E088.

Category: C

Class: 2

Function:

These check valves are in the main feedwater supply to the steam generators. During a loss of feedwater accident, these check valves will close isolating the main feedwater piping from auxiliary feedwater flow.

Test Requirement:

IWV-3411, exercise these valves every three months.

Basis for Relief:

INTRODUCTION

The Main Feed check valves at the Steam Generators prevent reverse flow from exiting the steam generators in the event of a feed line break between the steam generator feedwater inlet nozzle and the first power operated isolation valve inside containment.

DURING POWER OPERATION

These check valves pass full feedwater flow into each steam generator during power operation. The check valves remain fully open and cannot be closed without disrupting the feedwater flow into the associated steam generator. If the Check valve were closed for test, the resulting reduction of feedwater flow would cause control of the steam generator level to be lost, resulting in a plant trip.

DURING COLD SHUTDOWN AND REFUELING

Flow is not present during cold shutdown, however, there are no test connections installed in this system to enable leak testing of these valves to verify closure. No instrumentation is installed in this system which could enable closure verification of these valves by measuring reverse differential pressure across the valves nor are these valves equipped with position indication.

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VALVE RELIEF REQUEST NO. 20
Continued

CONCLUSION

Compliance with the Code requirements could only be achieved after a significant redesign of the system. The high costs of the necessary design changes involved would not be justified by the improvement of the valve testing. Further, the addition of valves, supports and necessary piping modifications could result in reduced plant reliability. 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 close-stroke these valves with the existing system design using flow.

TEST SCHEDULE

Because of its effect on the operability of the associated equipment, performing these tests requires considerable manipulation of plant conditions and imposes significant restrictions on the structure of a refueling outage. As a consequence, there is a clear advantage in reducing the number of these tests required in each refueling.

Alternate Testing:

At cold shutdown intervals, perform a full 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.

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VALVE RELIEF REQUEST NO. 20
Continued

We are actively pursuing the use of non-intrusive diagnostic techniques such as acoustics or radiography to demonstrate that these valves close when subjected to reverse flow conditions. If another method is developed to verify the reverse flow closure capability of these check valves, this relief request will be revised or withdrawn.

ENCLOSURE 1

INSERVICE TESTING PROGRAM
SAN ONOFRE - UNIT 3

VALVE RELIEF REQUEST NO. 23

System: All Systems

Components: All Power Operated Valves

Category: B

Class: 1, 2 and 3

Function: N. A.

Test Requirement:

IWV-3413(c): if an increase in stroke time of 25 % or more from the previous test for valves with stroke times greater than 10 sec. or 50 % or more for valves with stroke times less than or equal to 10 sec. is observed, the test frequency shall be increased to once each month until corrective action is taken, at which time the original test frequency shall be resumed.

Basis for Relief:

Comparison with the previous test often causes a needless and inappropriate entry into the increased frequency of testing. A one-time test result of low value can often occur immediately after valve maintenance in which, for example, the stem is lubricated. The next test after a normal 92 day interval, can result in a return to the normal valve stroke time. If the difference between these two times is more than that allowed <25 % (or < 50 %), the valve will be put in the increased frequency of testing and require corrective action. This happens frequently and causes valves to be the subject of corrective action even when they are functioning properly and normally.

Using a reference or average value of valve stroke time for comparison of test data versus the previous stroke time is a reasonable alternative to Code requirements. While still being in compliance with the Code, a continual increase in valve stroke time over a long period could result in significant valve degradation without the test frequency being increased or corrective action being taken. This is because the test data is compared only to the previous stroke time and each incremental increase in stroke time could be less than that specified in Paragraph IWV-3417(a). Comparing test results to a reasonably derived reference, or, an average stroke time, insures that such an oversight could not occur, while at the same time eliminating unnecessary corrective action.

INSERVICE TESTING PROGRAM
SAN ONOFRE - UNIT 3

VALVE RELIEF REQUEST NO. 23
Continued

The reference value of stroke time used for comparison of test data should be established when the valve is known to be in good operating condition.

Alternate Testing:

Instead of the previous stroke time, use a **REFERENCE STROKE TIME**.

If an increase in stroke time of 25 % or more from the **REFERENCE STROKE TIME** for valves with stroke times greater than 10 sec. (or 50 % or more for valves with stroke times less than or equal to 10 sec.) is observed, the test frequency shall be increased to once each month until corrective action is taken, at which time the original test frequency shall be resumed.

REFERENCE STROKE TIME is the average stroke time since the last maintenance that could have affected stroke time (or last three strokes, whichever is greater). The **REFERENCE STROKE TIME** value if used for comparison of test data shall be established when the valve is known to be in good operating condition.

INSERVICE TESTING PROGRAM
SAN ONOFRE - UNIT 3

VALVE RELIEF REQUEST NO. 24

System: All Systems

Components: All Valves Tested at Cold Shutdown Intervals

Category: All

Class: 1, 2 and 3

Function: N. A.

Test Requirement:

Code section IWV-3412(a) requires that valves that cannot be exercised during plant operation shall be specifically identified by the Owner and shall be full-stroke exercised during cold shutdowns. Full stroke exercising during cold shutdowns for all valves not full-stroke exercised during plant operations shall be on a frequency determined by the intervals between shutdowns as follows: for intervals of 3 months or longer, exercise during each shutdown; for intervals of less than 3 months, full stroke exercise is not required unless 3 months have passed since last shutdown exercise.

Basis for Relief:

If a plant cold shutdown is of such short duration that all of the cold shutdown testing cannot be completed as required, then the plant startup can be delayed for this testing. This has not been required of other plants with approved Inservice Testing Programs.

Requiring completion of all required valve testing prior to plant restart would be a hardship because it could result in costly extensions of cold shutdowns.

Alternate Testing:

Valve testing at cold shutdown shall commence not later than 48 hours after cold shutdown and continue until required testing is completed or plant is ready to return to service. Completion of all required valve testing is not a requisite to plant startup. Valve testing which is not completed during a cold shutdown will be performed during subsequent cold shutdowns starting from the last test performed at the previous cold shutdown, to meet the Code specified testing requirements. No valve need be tested more often that once every 92 days. For planned cold shutdowns where ample time is available exception to the 48 hours may be taken, if testing of all the "Cold Shutdown" valves identified in the IST Program will be completed before return to power operation.

ENCLOSURE 1

INSERVICE TESTING PROGRAM
SAN ONOFRE - UNIT 3

VALVE RELIEF REQUEST NO. 25

System: Main Steam

Components: Atmospheric Dump Valves (ADV's)
3HV8419
3HV8421

Category: B

Class: 2

Function:

Close on Main Steam Isolation Signal (MSIS). Time to close is 19.6 sec. Open remotely and manually. There is no response time associated with opening the ADV in any accident analysis (except for 30 minute operator response time).

Test Requirement:

Full stroke exercise quarterly in accordance with the ASME Code, Section XI, IWV-3411.

Basis for Relief:

NORMAL SYSTEM LINEUP

The ADV's 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 MSIS actuated position, and there is generally no need to perform a full closed stroke test of the ADV's.

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 % 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.

INSERVICE TESTING PROGRAM
SAN ONOFRE - UNIT 3

VALVE RELIEF REQUEST NO. 25
Continued

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 %. The ADV's 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 % 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.

ENCLOSURE 2

SUMMARY PUMP RELIEF REQUEST INDEX

PRR No.	Subject
1	(Withdrawn) *No change made by this submittal.*
2	(Withdrawn) *No change made by this submittal.*
3	DGFO Pumps and Salt Water Pumps, Bearing Vibration and Temperature Measurement. *No change made by this submittal.*
4	Monthly Testing Versus Quarterly Testing of all Pumps. *No change made by this submittal.*
5	LPSI, Spray, Diesel Fuel Transfer and AFW Pumps Mini-Flow Testing. *Withdrawn by this submittal.*
6	Instrument Range and Accuracy for AFW, CCW, SWCS and Charging Pumps. *No change made by this submittal.*
7	Measurement of liquid temperature. *No change made by this submittal.*
8	Charging Pump Vibration Measurement. *No change made by this submittal.*
9	(This number has never been used) *No change made by this submittal.*
10	Inlet pressure measurement for DGFO and SWCS Pumps. *No change made by this submittal.*
11	Bearing Temperature Measurement. *No change made by this submittal.*

ENCLOSURE 2

SUMMARY VALVE RELIEF REQUEST INDEX

VRR No.	Subject
1	(Withdrawn) *No change made by this submittal.*
2	Alternate Testing for Safety Injection System Check Valves; 24-001--C-724, RW Tank T005 to Spray Pump P012 Suction Header, and, 24-002-C-724, RW Tank T005 to Spray Pump P013 Suction Header. *Revised by this submittal to address comments in NRC SER.*
3	Alternate Testing for Safety Injection System Check Valves; 24-003--C-724, Outlet Check Valve - Containment Emergency Sump, and, 24-004--C-724, Outlet Check Valve - Containment Emergency Sump. *Revised by this submittal to address comments in NRC SER.*
4	(Withdrawn) *No change made by this submittal.*
5	(Withdrawn) *No change made by this submittal.*
6	(Withdrawn) *No change made by this submittal.*
7	(Withdrawn) *No change made by this submittal.*
8	Alternate Testing for Safety Injection System Check Valves; 10-006--C-675, HPSI Pumps P017 and P018 Suction Check Valve, and, 10-008--C-675, HPSI Pumps P018 and P019 Suction Check Valve. *No change made by this submittal.*
9	(Withdrawn) *No change made by this submittal.*
10	(Withdrawn) *No change made by this submittal.*
11	Alternate Testing for Safety Injection System Check 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, and, 12-043-A-551, Safety Injection Tank T010 Outlet Check Valve. *Revised by this submittal to address comments in NRC SER.*
12	Alternate Testing for Safety Injection System Check Valves; 16-077--C-645, LPSI Pump P016 Suction Header Check Valve, 16-084-C-645, LPSI Pump P015 Suction Check Valve, 16-199-C-645, LPSI Pump P015 Suction Header Check Valve, and, 16-201-C-645, LPSI Pump P015 Suction Header Check Valve. *Revised by this submittal to address comments in NRC SER.*

SUMMARY VALVE RELIEF REQUEST INDEX
Continued

13 Alternate Testing for Containment Spray System Check Valves; 8-004--C-406, Containment Isolation Stop Check Valve - Spray Header #1, 8-006-C-406, Containment Isolation Stop Check Valve - Spray Header #2. *Revised by this submittal to address comments in NRC SER.*

14 Alternate Testing for Chemical and Volume Control System Check Valve 2-122-C-554, Charging Pumps Check Valve to Regen Heat Exchanger E063. *No change made by this submittal.*

15 (Withdrawn) *No change made by this submittal.*

16 Rapid Acting Valves. *Revised by this submittal to address comments in NRC SER.*

17 (Withdrawn) *No change made by this submittal.*

18 Alternate Testing for Main Steam System Check Valves; 4-003-D-620, Steam Supply - S/G E088 to AFP Turbine K007 Check Valve, and, 4-005-D-620, Steam Supply - S/G E089 to AFP Turbine K007 Check Valve. *Revised by this submittal to address comments in NRC SER.*

19 (Withdrawn) *No change made by this submittal.*

20 Alternate Testing for Condensate and Feedwater System Check Valves; 20-036-C-609, Main Feed Check at Steam Generator E089, and, 20-129--C-609, Main Feed Check at Steam Generator E088. *Revised by this submittal to address comments in NRC SER.*

21 (Withdrawn) *No change made by this submittal.*

22 (Withdrawn) *No change made by this submittal.*

23 Use of Average/Reference Stroke time in determining entry into increased frequency testing (ALERT). *Revised by this submittal to address comments in NRC SER.*

24 Determining the portion of Cold Shutdown interval valves to be tested in an outage. *Editorial changes contained in this submittal.*

25 Atmospheric Dump Valve Stroke Testing Frequency. *Added by this submittal to address comments in NRC SER.*