



Dave Morey
Vice President
Farley Project

Southern Nuclear Operating Company
the southern electric system

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U. S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, DC 20555

Joseph M. Farley Nuclear Plant Unit 2
Pump and Valve Inservice Testing Program
Proposed Revisions to Relief Requests for the Containment Spray System

Southern Nuclear Operating Company (SNC) herein submits revisions to the attached relief requests for the inservice testing of the Farley Nuclear Plant (FNP) Unit 2 containment spray system pumps and valves. The current relief requests contain statements referencing a proposed design modification which would install a test line to support full flow testing of the containment spray header check valves, refueling water storage tank (RWST) to containment spray pump suction line check valve, and containment spray pumps. SNC has reevaluated this design modification and has determined that the marginal increase in testing capability associated with this change does not justify the expense and burden of implementing the modification. Therefore, the modification has been canceled.

The following factors were considered in the reevaluation of this modification:

- Safety - The safety/risk significance of this issue was evaluated using the FNP probabilistic risk assessment results. Containment spray system failure has no impact on the frequency of core damage and only a minor impact on containment failure at FNP. In order to have a failure of containment, FNP would have to experience a large break loss of coolant accident followed by the loss of all four containment cooling fans and both trains of containment spray. Even in this highly unlikely event (less than 2×10^{-6} probability), containment failure would not occur until 36 hours into the event and would result in minimal release of radioactivity to the atmosphere. Therefore, the reduction in overall safety at FNP resulting from the reduced testing capabilities associated with canceling this modification is negligible.
- Cost - The total design change cost is estimated to be \$330,000 while the savings that would be produced by implementing the modification would be less than \$3000 per year. Therefore,

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the net overall savings over the lifetime of the plant produced by canceling this modification is in excess of \$200,000.

- Reliability - The reliability of these components is high based on the actual inspection and test results of the current FNP Unit 2 inservice testing program and preventative maintenance program. Additional assurance is provided by the satisfactory results of the full flow testing that is performed each refueling on the same type components in FNP Unit 1. These components are not in a problem location nor subjected to severe service conditions. Implementing the modification would increase the number of system penetrations and welds, and therefore possibly reduce the overall system's reliability. A search of the NPRDS database showed an extremely low failure rate for the same type check valves as used in the FNP containment spray system.
- Test Options - A review of the current test practices, testing options, and potential design modifications showed that continuing the current test program is the most beneficial to Farley Nuclear Plant based upon an overall evaluation of safety, cost, and reliability. SNC will continue to investigate future upgrades in technology that could provide additional capabilities for detecting component degradation in a cost-effective manner.

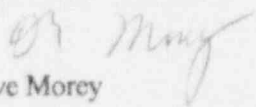
All of the attached relief requests are in compliance with the applicable ASME Section XI requirements and the positions delineated by the NRC in Attachment 1 of Generic Letter (GL) 89-04. Disassembly and inspection of the RWST to containment spray pump suction line check valve is performed in accordance with NRC GL 89-04 Position 2. This position provides guidance which is to be considered when extending inspection frequency beyond each refueling outage. This guidance was considered and a disassembly and inspection frequency of every third refueling outage is justified.

Attachment 1 contains the marked up versions of the current relief requests. Attachment 2 contains the revised relief requests.

This licensing action is estimated to save over \$100,000 over the lifetime of the plant while having a marginal impact on safety. Therefore, this issue should be given priority as a Cost Beneficial Licensing Action (CBLA).

If you have any questions, please advise.

Respectfully submitted,


Dave Morey

EPB/elt.q2e13rv1.doc

Attachments

cc: Mr. S. D. Ebnetter
Mr. B. L. Siegel
Mr. T. M. Ross

ATTACHMENT 1

Marked-Up Versions of Current Relief Requests

PUMP RELIEF REQUEST

PR-3 (Version 1)

Intentionally Left Blank
(Unit 1 Relief Request Not Applicable to Unit 2)

Note: This relief request is applicable until Unit 2 modification which facilitates full flow
testing of containment spray pumps at refueling outages is completed.

PUMP RELIEF REQUEST

PR-3 (Version 2)

System: Containment Spray

Pump: P001A-A, P001B-B

Class: 2

Function: To reduce containment pressure and airborne fission product removal from the post-LOCA containment atmosphere.

Test Requirement: IWP-3100 requires that each measured test quantity be compared to the reference value of the same quantity. Any deviation determined shall be compared to the limits given in Table IWP-3100-2.

Basis for Relief: Section IWP-3100 requires quarterly pump testing to be performed by varying the system resistance until the measured differential pressure or measured flow rate equals the corresponding reference value, or by using a fixed resistance test flow path. Testing the containment spray pumps by varying the system resistance is not a practical method, because to do so would inject a large quantity of water into the containment atmosphere. Use of the fixed resistance two-inch recirculation line back to the refueling water storage tank restricts the test flow rate of these 3000-gpm pumps to approximately 150-gpm. Consequently, flow-rate measurements using the recirculation flow path would not provide any useful information to monitor pump operability or degradation.

Alternate Testing: In addition to quarterly pump test measurements of differential pressure and vibration, pump flow rate, differential pressure, and vibration measurements will be performed at refueling when spool pieces are installed and pump full-flow can be directed to the refueling cavity.

Note: This relief request is applicable after Unit 2 modification which facilitates full flow testing of containment spray pumps at refueling outages is completed.

WITHDRAWN(Unit 2 modification of the containment spray system was canceled)

PUMP RELIEF REQUEST

PR-19 (Version 4)

System: Residual Heat Removal, Auxiliary Feedwater (TDAFW)

Pump: P001A-A, P001B-B, P002

Class: 2, 3

Test Requirement: IWP-3100 requires that each measured test quantity be compared to the reference value of the same quantity. Any deviation determined shall be compared to the limits given in Table IWP-3100-2 as specified by IWP-3210.

Basis for Relief: Section IWP-3100 requires quarterly pump testing to be performed by varying the system resistance until either the measured differential pressure or the measured flow rate equals the corresponding reference value, or by using a fixed resistance test flow path. The test flow paths used to test these pumps do not contain flow control provisions sufficiently accurate to repeat an exact reference condition.

Alternate Testing: Pump testing will be performed at conditions as close to the reference conditions as can be reasonably achieved and the test data compared with a curve of reference values that has been confirmed to represent a pump in good operating condition. Alert and Action Ranges will be consistent with Table IWP-3100-2. Reference vibration levels will be established for discrete portions of the curve, as necessary.

Note: ~~This relief request is applicable until the Unit 2 modification which supports full flow containment spray pump testing is implemented.~~

PUMP RELIEF REQUEST

PR-19 (Version 2)

System: ~~Residual Heat Removal, Auxiliary Feedwater (TDAFW), Containment Spray~~

Pump: ~~P001A-A, P001B-B, P002, P001A-A, P001B-B~~

Class: ~~2, 3, 2~~

Test Requirement: ~~IWP-3100 requires that each measured test quantity be compared to the reference value of the same quantity. Any deviation determined shall be compared to the limits given in Table IWP-3100-2 as specified by IWP-3210.~~

Basis for Relief: ~~Section IWP-3100 requires quarterly pump testing to be performed by varying the system resistance until either the measured differential pressure or the measured flow rate equals the corresponding reference value, or by using a fixed resistance test flow path. The test flow paths used to test these pumps do not contain flow control provisions sufficiently accurate to repeat an exact reference condition.~~

Alternate Testing: ~~Pump testing will be performed at conditions as close to the reference conditions as can be reasonably achieved and the test data compared with a curve of reference values that has been confirmed to represent a pump in good operating condition. Alert and Action Ranges will be consistent with Table IWP-3100-2. Reference vibration levels will be established for discrete portions of the curve, as necessary.~~

Note: ~~This relief request is applicable until the Unit 2 modification which supports full flow containment spray pump testing is implemented.~~

WITHDRAWN(Unit 2 modification of the containment spray system was canceled)

RELIEF REQUEST

Q2E13-RV-1 (Version 1)

System: Containment Spray

Valve: QV002A, QV002B

Category: C

Class: 2

Function: Containment spray system inside containment isolation check valves

ASME Section XI
Quarterly Test
Requirements: Verify forward-flow operability quarterly. (IWV-3521)

Basis for Relief: The only way to verify full forward-flow operability during normal operating or cold shutdown would be by using the pumps and injecting a large quantity of water into the containment. Spraying the containment would result in extensive damage to safety-related equipment located inside the containment.

Partial exercising using air as a test medium is not possible during normal operation because Technical Specifications require primary containment integrity in operating modes 1 - 4 and attachment of test connections would violate containment integrity.

Alternate Testing: One of these valves will be disassembled and manually full stroke tested at each refueling on a staggered test basis. The valve internals will be verified as structurally sound (no loose or corroded parts) and the disk manually exercised to verify full stroke capability. If the disassembled valve is not capable of being full-stroke exercised or there is binding or failure of valve internals, the remaining valve must also be disassembled, inspected, and manually full-stroke exercised during the same outage.

The disassembled valves will be part stroked with air flow after reassembly. Flow indication will be through installed instrumentation, observed pressure changes, level changes or through the use of ultrasonic (or similar) flow measuring devices.

Additionally, these valves will be partially exercised using air as a test medium during cold shutdown. If multiple shutdowns occur, testing frequency is not to exceed quarterly.

Note: This relief request is applicable until the Unit 2 modification which supports full flow containment spray pump testing is implemented.

RELIEF REQUEST

Q2E13-RV-1 (Version 2)

System: Containment Spray

Valve: QV002A, QV002B, QV014

Category: C

Class: 2

Function: Containment spray system inside containment isolation check valves (QV002A, B) and RWST to containment spray pump suction line check valve (QV014).

ASME Section XI

Quarterly Test

Requirements: Verify forward flow operability. (IWV-3521)

Basis for Relief: The only way to verify full forward flow operability during normal operation or cold shutdown would be by using the pumps and injecting a large quantity of water into the containment. Spraying the containment would result in extensive damage to safety-related equipment located inside the containment.

Partial exercising using air as a test medium is not possible during normal operation because Technical Specifications require primary containment integrity in operating modes 1-4 and attachment of test connections would violate containment integrity.

Alternate Testing: The system has been modified such that spool pieces can be installed downstream of these check valves. During refueling, these spool pieces will be installed and a full forward flow test performed by pumping water through these full flow test lines to the containment refueling cavity. Because of the time involved in installing the spool pieces and the large quantity of water necessary, this test can only be performed at refueling.

Additionally, QV014 will be partial forward flow verified during quarterly pump testing, and valves QV002A(B) will be partially exercised using air as a test medium during cold shutdown. If multiple shutdowns occur, testing frequency for valves QV002A(B) is not to exceed quarterly.

Note: This relief request is not applicable until Unit 2 modification which supports full flow testing of the containment spray pumps is completed.

WITHDRAWN

(Unit 2 modification of the containment spray system was canceled)

RELIEF REQUEST

Q2E13-RV-3 (Version 1)

System:	Containment Spray
Valve:	QV007A, QV007B
Category:	C
Class:	2
Function:	Spray additive tank to eductor line check valves.
ASME Section XI Test Requirements:	Verify full forward-flow operability quarterly or at cold shutdown. (IWV-3521)
Basis for Relief:	The only way to verify forward-flow operability is by measuring for design flowrate through the line while operating the containment spray pumps under design flow conditions. There are no system design provisions for performing full-flow pump testing. Quarterly pump testing is through a small 2-inch line from the pump discharge back to the RWST. With this test configuration, there is no flow through the valves, and testing for flow through the check valves is not possible without opening additional valves which will introduce sodium hydroxide into the RWST (ECCS water supply).
Alternate Testing:	<p>Valves will be partial flow tested quarterly during flushing in preparation for quarterly containment spray pump testing.</p> <p>One of these valves will be disassembled and manually full stroke tested at each refueling on a staggered test basis. The valve internals will be verified as structurally sound (no loose corroded parts) and the disk manually exercised to verify full stroke capability. If the disassembled valve is not capable of being full-stroke exercised or there is binding or failure of valve internals, the remaining valve must also be disassembled, inspected, and manually full-stroke exercised during the same outage.</p> <p>The disassembled valves will be part stroked with flow after reassembly. Flow indication will be through installed instrumentation, observed pressure changes, level changes or through the use of ultrasonic (or similar) flow measuring devices.</p>

Note:—This relief request is applicable until the Unit 2 modification which supports full flow containment spray pump testing is implemented.

RELIEF REQUEST
Q2E13-RV-3 (Version 2)

System: Containment Spray

Valve: QV007A, QV007B

Category: C

Class: 2

Function: Spray additive tank to eductor line check valves.

ASME Section XI

Test Requirements: Verify full forward flow operability quarterly or at cold shutdown. (IWV-3521)

Basis for Relief: The only way to verify forward flow operability is by measuring for design flowrate through the line while operating the containment spray pumps under design flow conditions. There are no system design provisions for performing full flow pump testing, except when spool pieces are installed and full flow pump testing is performed at refueling. The suction source for these valves during full flow testing would have to be the 2" supply line from RWST which could be insufficient and result in unstable flow through the check valves and undue wear or damage.

Quarterly pump testing is through a small 2-inch line from the pump discharge back to the RWST. With this test configuration, there is no flow through the valves, and testing for flow through the check valves is not possible without opening additional valves which will introduce sodium hydroxide into the RWST (ECCS water supply).

Alternate Testing: Valves will be partial flow tested quarterly during flushing in preparation for quarterly containment spray pump testing. Additionally, one of these valves will be disassembled and manually full stroke tested at each refueling on a staggered test basis. The valve internals will be verified as structurally sound (no loose or corroded parts) and the disk manually exercised to verify full stroke capability. If the disassembled valve is not capable of being full stroke exercised or there is binding or failure of valve internals, the remaining valve must also be disassembled, inspected, and manually full stroke exercised during the same outage. The disassembled valves will be part stroked with flow after reassembly. Flow indication will be through installed instrumentation, observed pressure changes, level changes or through the use of ultrasonic (or similar) flow measuring devices.

Note: This relief request is applicable after the Unit 2 modification which supports full flow testing of the containment spray pumps is completed.

WITHDRAWN

(Unit 2 modification of the containment spray system was canceled)

RELIEF REQUEST
Q2E13-RV-4 (Version 4)

System: Containment Spray

Valve: QV014

Category: C

Class: 2

Function: RWST to containment spray pump suction line check valve.

ASME Section XI
Quarterly Test
Requirements: Verify forward-flow operability. (IWV-3521)

Basis for Relief: The only way to verify forward-flow operability using flow would be by using the pumps and injecting a large quantity of water into the containment. Spraying the containment would result in extensive damage to safety-related equipment located inside the containment.

There are no valves between QV014 and the RWST to shut off flow during valve disassembly. The valve has been disassembled, inspected and manually full-stroke exercised ~~five~~three times since 1985 by freeze plugging the 12-inch line just upstream of the valve. This has been done at refueling outages with the RWST drained to minimum level. In each case the valve was found to be in excellent condition, with no visible signs of degradation. The disassembly and inspection interval has been extended based on the hardship involved in performing a freeze seal; excellent inspection results; low failure rates in the industry for this type valve; and the valve's good location, environment, and service conditions.

Alternate Testing: The valve will be disassembled and manually full-stroke exercised once every three refueling outages using the freeze plug method described above. The valve internals will be verified as structurally sound (no loose or corroded parts) and the disk manually exercised to verify full stroke capability.

The disassembled valve will be part stroked with flow after reassembly. Flow indication will be through installed instrumentation, observed pressure changes, level changes or through the use of ultrasonic (or similar) flow measuring devices.

Additionally, this check valve is partially exercised quarterly during containment spray pump surveillance testing when flow is recirculated to the RWST.

Note: This relief request is applicable until the Unit 2 modification which supports full flow testing of the containment spray pumps is implemented.

RELIEF REQUEST

Q2E13-RV-4 (Version 2)

DELETED

(See relief request Q2E13-RV-1)

Note: This relief request is applicable until the Unit 2 modification which supports full flow testing of the containment spray pumps is implemented.

WITHDRAWN

(Unit 2 modification of the containment spray system was canceled)

ATTACHMENT 2

Revised Relief Requests

FNP-2-M-067

PUMP RELIEF REQUEST

PR-3

Intentionally Left Blank
(Unit 1 Relief Request Not Applicable to Unit 2)

FNP-2-M-067

PUMP RELIEF REQUEST

PR-3 (Version 2)

WITHDRAWN

(Unit 2 modification of the containment spray system was canceled)

PUMP RELIEF REQUEST

PR-19

System:	Residual Heat Removal, Auxiliary Feedwater (TDAFW)
Pump:	P001A-A, P001B-B, P002
Class:	2, 3
Test Requirement:	IWP-3100 requires that each measured test quantity be compared to the reference value of the same quantity. Any deviation determined shall be compared to the limits given in Table IWP-3100-2 as specified by IWP-3210.
Basis for Relief:	Section IWP-3100 requires quarterly pump testing to be performed by varying the system resistance until either the measured differential pressure or the measured flow rate equals the corresponding reference value, or by using a fixed resistance test flow path. The test flow paths used to test these pumps do not contain flow control provisions sufficiently accurate to repeat an exact reference condition.
Alternate Testing:	Pump testing will be performed at conditions as close to the reference conditions as can be reasonably achieved and the test data compared with a curve of reference values that has been confirmed to represent a pump in good operating condition. Alert and Action Ranges will be consistent with Table IWP-3100-2. Reference vibration levels will be established for discrete portions of the curve, as necessary.

PUMP RELIEF REQUEST

PR-19 (Version 2)

WITHDRAWN

(Unit 2 modification of the containment spray system was canceled)

RELIEF REQUEST

Q2E13-RV-1

System:	Containment Spray
Valve:	QV002A, QV002B
Category:	C
Class:	2
Function:	Containment spray system inside containment isolation check valves
ASME Section XI Quarterly Test Requirements:	Verify forward-flow operability quarterly. (IWV-3521)
Basis for Relief:	<p>The only way to verify full forward-flow operability during normal operating or cold shutdown would be by using the pumps and injecting a large quantity of water into the containment. Spraying the containment would result in extensive damage to safety-related equipment located inside the containment.</p> <p>Partial exercising using air as a test medium is not possible during normal operation because Technical Specifications require primary containment integrity in operating modes 1 - 4 and attachment of test connections would violate containment integrity.</p>
Alternate Testing:	<p>One of these valves will be disassembled and manually full stroke tested at each refueling on a staggered test basis. The valve internals will be verified as structurally sound (no loose or corroded parts) and the disk manually exercised to verify full stroke capability. If the disassembled valve is not capable of being full-stroke exercised or there is binding or failure of valve internals, the remaining valve must also be disassembled, inspected, and manually full-stroke exercised during the same outage.</p> <p>The disassembled valves will be part stroked with air flow after reassembly. Flow indication will be through installed instrumentation, observed pressure changes, level changes or through the use of ultrasonic (or similar) flow measuring devices.</p> <p>Additionally, these valves will be partially exercised using air as a test medium during cold shutdown. If multiple shutdowns occur, testing frequency is not to exceed quarterly.</p>

FNP-2-M-067

RELIEF REQUEST

Q2E13-RV-1 (Version 2)

WITHDRAWN

(Unit 2 modification of the containment spray system was canceled)

RELIEF REQUEST

Q2E13-KV-3

System:	Containment Spray
Valve:	QV007A, QV007B
Category:	C
Class:	2
Function:	Spray additive tank to eductor line check valves.
ASME Section XI Test Requirements:	Verify full forward-flow operability quarterly or at cold shutdown. (IWV-3521)
Basis for Relief:	<p>The only way to verify forward-flow operability is by measuring for design flowrate through the line while operating the containment spray pumps under design flow conditions. There are no system design provisions for performing full-flow pump testing. Quarterly pump testing is through a small 2-inch line from the pump discharge back to the RWST. With this test configuration, there is no flow through the valves, and testing for flow through the check valves is not possible without opening additional valves which will introduce sodium hydroxide into the RWST (ECCS water supply).</p>
Alternate Testing:	<p>Valves will be partial flow tested quarterly during flushing in preparation for quarterly containment spray pump testing.</p> <p>One of these valves will be disassembled and manually full stroke tested at each refueling on a staggered test basis. The valve internals will be verified as structurally sound (no loose corroded parts) and the disk manually exercised to verify full stroke capability. If the disassembled valve is not capable of being full-stroke exercised or there is binding or failure of valve internals, the remaining valve must also be disassembled, inspected, and manually full-stroke exercised during the same outage.</p> <p>The disassembled valves will be part stroked with flow after reassembly. Flow indication will be through installed instrumentation, observed pressure changes, level changes or through the use of ultrasonic (or similar) flow measuring devices.</p>

FNP-2-M-067

RELIEF REQUEST

Q2E13-RV-3 (Version 2)

WITHDRAWN

(Unit 2 modification of the containment spray system was canceled)

RELIEF REQUEST

Q2E13-RV-4

System: Containment Spray

Valve: QV014

Category: C

Class: 2

Function: RWST to containment spray pump suction line check valve.

ASME Section XI
Quarterly Test
Requirements: Verify forward-flow operability. (IWV-3521)

Basis for Relief: The only way to verify forward-flow operability using flow would be by using the pumps and injecting a large quantity of water into the containment. Spraying the containment would result in extensive damage to safety-related equipment located inside the containment.

There are no valves between QV014 and the RWST to shut off flow during valve disassembly. The valve has been disassembled, inspected and manually full-stroke exercised five times since 1985 by freeze plugging the line just upstream of the valve. This has been done at refueling outages with the RWST drained to minimum level. In each case the valve was found to be in excellent condition, with no visible signs of degradation. The disassembly and inspection interval has been extended based on the hardship involved in performing a freeze seal; excellent inspection results; low failure rates in the industry for this type valve; and the valve's good location, environment, and service conditions.

Alternate Testing: The valve will be disassembled and manually full-stroke exercised once every three refueling outages using the freeze plug method described above. The valve internals will be verified as structurally sound (no loose or corroded parts) and the disk manually exercised to verify full stroke capability.

The disassembled valve will be part stroked with flow after reassembly. Flow indication will be through installed instrumentation, observed pressure changes, level changes or through the use of ultrasonic (or similar) flow measuring devices.

Additionally, this check valve is partially exercised quarterly during containment spray pump surveillance testing when flow is recirculated to the RWST.

RELIEF REQUEST

Q2E13-RV-4 (Version 2)

WITHDRAWN

(Unit 2 modification of the containment spray system was canceled)