ATTACHMENT 1

Proposed Technical Specification Changes

Surry Power Station
Units 1 and 2

4.5 SPRAY SYSTEMS TESTS

Applicability

Applied to the testing of the Spray Systems.

Objective

To verify that the Spray Systems will respond promptly and perform their design function, if required.

Specification

A. Test and Frequencies

1.* The containment spray pumps shall be flow tested at a reduced flow rate at least once per month.

2a.* The inside containment recirculation spray pumps shall be dry tested at least once per quarter, and

b. Each refueling outage a flow test shall be performed.

3.* The recirculation spray pumps outside the containment shall be flow tested by determining the shut off head of the pump once per month.

4. The weight loaded check valves within the containment in the various subsystems shall be tested by pressurizing the pump discharge lines with air at least once each refueling period. Verification of seating the check valves shall be accomplished by applying a vacuum upstream of the valves.

5.* All motor operated valves in the containment spray and recirculation spray flow path shall be tested by stroking them at least once per month.

6. The containment spray nozzles and containment recirculation spray nozzles shall be demonstrated operable at least once per five years coinciding with the closest refueling outage, by performing an air or smoke flow test and verifying each spray nozzle is unobstructed.

7.* The spray nozzles in the refueling water storage tank shall be checked for proper functioning at least monthly.

8. A visual inspection of the containment sump including the inside recirculation pump wells and the engineered safeguards system suction inlets shall be performed at least once each refueling period and/or after major maintenance activities in the containment.

* During periods of extended reactor shutdown the monthly testing requirement may be waived after the first month of shutdown provided the component is tested prior to reactor startup.

B. <u>Acceptance Criteria</u>

1a. A dry-test of an inside containment recirculation spray pump shall be considered satisfactory if the motor and pump shaft rotates, starts on signal, and the ammeter readings for the motor are comparable to a reference value, established after pump overhaul.

b. A flow-test of the inside recirculation spray pump shall be considered satisfactory if the pump meets the acceptance criteria of ASME Section XI, Article IWP.

2. A flow-test of a containment spray pump shall be considered satisfactory if the pump meets the acceptance criteria of ASME Section XI, Article IWP. A check will be made to determine that no particulate material from the refueling water storage tank clogs the test spray nozzles

located in the refueling water storage tank.

3. The test of each of the weight loaded check valves shall be considered satisfactory if air flows through the check valve, and if sealing is achieved.

4. A test of a motor operated valve shall be considered satisfactory if its limit switch operates a light on the main control board demonstrating that the valve has stroked.

5. The test of the containment spray nozzles and recirculation spray nozzle shall be considered satisfactory if flow through each nozzle can be verified.

6. The test of the spray nozzles in the refueling water storage tank shall be considered satisfactory if the monitored flow rate to the nozzles, when compared to the previously established flow rate obtained with the new nozzles, indicates no appreciable reduction in flow rate.

7. The test of the outside recirculation spray pump shall be considered satisfactory if the pump starts and the measured shutoff head of the pump is that specified on the head curve within instrument accuracy.

8. The inspection should verify that the containment sump including the inside recirculation pump wells and the engineered safeguards system suction inlets are free of debris that could degrade system operation. The inspection should also verify that the sump components (trash racks, screens, etc.) are properly installed and show no sign of structural distress or excessive corrosion.

<u>Basis</u>

The flow testing of each containment spray pump is performed by opening the normally closed valve in the containment spray pump recirculation line returning water to the refueling water storage tank. The containment spray pump is operated and a quantity of water recirculated to the refueling water storage tank. The discharge to the tank is divided into two fractions, one for the major portion of the recirculation flow and the other to pass a small quantity of water through test nozzles which are identical with those used in the containment spray headers. The purpose of the recirculation through the test nozzles is to assure that there is no particulate material in the refueling water storage tank small enough to pass through pump suction strainers and large enough to clog spray nozzles.

Due to the physical arrangement of the recirculation spray pumps inside the containment, it is impractical to flow-test them other than on a refueling outage frequency. Flow testing of these pumps requires the physical modification of the pump discharge piping and the erection of a temporary dike to contain recirculated water. The length of time required to setup for the test, perform the test, and then reconfigure the system for normal operation is prohibitive to performing the flow-test on even the cold shutdown frequency. Therefore, the flow-test of the inside containment recirculation spray pumps will be performed on a refueling outage frequency.

The inside containment recirculation spray pumps are capable of being operated dry for approximately 60 seconds without significantly overheating and/or degrading the pump bearings. During this dry pump check, it can be determined that the pump shafts are turning by rotation sensors which indicate in the Main Control Room. In addition, motor current will be compared with an established reference value to ascertain that no degradation of pump operation has occurred. The inside recirculation spray pumps are removed and inspected periodically to verify the mechanical condition of the pumps.

The recirculation spray pumps outside the containment have the capability of being dry-run and flow tested. The test of an outside recirculation spray pump is performed by closing the containment sump suction line valve and the isolation valve between the pump discharge and the containment penetration. This allows the pump casing to be filled with water and the pump to recirculate water through a test line from the pump discharge to the pump casing.

With system flush conducted to remove particulate matter prior to the installation of spray nozzles and with corrosion resistant nozzles and piping, it is not considered credible that a significant number of nozzles would plug during the life of the unit to reduce the effectiveness of the subsystems; therefore, provisions to air test the nozzles every five years coinciding with the closest refueling outage is sufficient to indicate that plugging of the nozzles has not occurred.

The spray nozzles in the refueling water storage tank provide means to ensure that there is no particulate matter in the refueling water storage tank and the Containment Spray Subsystems which could plug or cause deterioration of the spray nozzles. The nozzles in the tank are identical to those used on the containment spray headers.

The monthly flow test of the containment spray pumps and recirculation to the refueling water storage tank will indicate any plugging of the nozzles by a reduction of flow through the nozzles.

Performing the containment sump, pump well and system suction inlets inspections will reduce the potential for system degradation due to sump debris associated with refueling activities as well as reduce wear on the inside recirculation spray pumps during dry testing. Ensuring proper installation and structural integrity of the trash racks and sump screens will prevent ingress of debris generated during the DBA and will allow long term recirculation mode cooling.

<u>References</u>

FSAR Section 6.3.1 Containment Spray Pumps
FSAR Section 6.3.1 Recirculation Spray Pumps

2. The test will be considered satisfactory if control board indication and/or visual observations indicate that all the appropriate components have received the safety injection signal in the proper sequence. That is, the appropriate pump breakers shall have opened and closed, and all valves, required to establish a safety injection flow path to the Reactor Coolant System and to isolate other systems from this flow path, shall have completed their stroke.

3. Verify by visual inspection that each low head safety injection pump suction inlet from the containment sump is free of debris that could degrade system operation. Perform each refueling outage and/or after major maintenance activities in the containment.

B. Component Tests

Pumps

1. The low head safety injection pumps and charging pumps shall be operated at intervals not greater than one month. During periods of extended reactor shutdown the monthly testing requirement may be waived provided the component is tested prior to reactor startup.

2. Acceptable levels of performance for the low head safety injection pumps shall be that the pumps start, reach their required developed head on recirculation flow and the control board indications and/or visual observations indicated that the pumps are operating properly.

3. In addition to the Safety Injection System, the charging pumps form an integral part of the Chemical and Volume Control System (CVCS), and are operated on a routine basis as part of this system. If these pumps have performed their design function as part of the routine operation of the CVCS, their level of performance will be deemed acceptable as related to the Specification.

ATTACHMENT 2

Updated Proposed Technical Specification Changes

Surry Power Station
Units 1 and 2

4.5 SPRAY SYSTEMS TESTS

Applicability

Applies to the testing of the Spray Systems.

Objective

To verify that the Spray Systems will respond promptly and perform their design function, if required.

Specification

A. Each containment spray subsystem shall be demonstrated operable:

1. By verifying, that on recirculation flow, each containment spray pump performs satisfactorily when tested in accordance with Specification 4.0.3.

2. By verifying that each motor-operated valve in the containment spray flow path performs satisfactorily when tested in accordance with Specification 4.0.3.

3. At least once per 5 years, coincident with the closest refueling outage, by performing an air or smoke flow test and verifying each spray nozzle is unobstructed.

4. Coincident with the containment spray pump test described in Specification 4.5.A.1, by verifying that no particulate material clogs the test spray nozzles in the refueling water storage tank.

B. Each recirculation spray subsystem shall be demonstrated operable:

1. By verifying each recirculation spray pump performs satisfactorily when tested in accordance with Specification 4.0.3.

2. By verifying that each motor-operated valve in the recirculation spray flow paths performs satisfactorily when tested in accordance with Specification 4.0.3.

3. At least once per 5 years, coincident with the closest refueling outage, by performing on air or smoke flow test and verifying each spray nozzle is unobstructed.

C. Each weight-loaded check valve in the containment spray and outside containment recirculation spray subsystems shall be demonstrated operable at least once per 18 months, during shutdown, by cycling the valve one complete cycle of full travel and verifying that each valve opens when the discharge line of the pump is pressurized with air and seats when a vacuum is applied.

D. A visual inspection of the containment sump and the inside containment recirculation spray pump wells and the engineered safeguards suction inlets shall be performed at least once each refueling period and/or after major maintenance activities in the containment. The inspection should verify that the containment sump and pump wells are free of debris that could degrade system operation and that the sump components (i.e., trash racks, screens) are properly installed and show no sign of structural distress or excessive corrosion.

Basis

The flow testing of each containment spray pump is performed by opening the normally closed valve in the containment spray pump recirculation line returning water to the refueling water storage tank. The containment spray pump is operated and a quantity of water recirculated to the refueling water storage tank. The discharge to the tank is divided into two fractions; one for the major portion of the recirculation flow and the other to pass a small quantity of water through test nozzles which are identical with those used in the containment spray headers. The purpose of the recirculation through the test nozzles is to assure that there are no particulate material in the refueling water storage tank small enough to pass through pump suction strainers and large enough to clog spray nozzles.

Due to the physical arrangement of the recirculation spray pumps inside the containment, it is impractical to flow-test them other than on a refueling outage frequency. Flow testing of these pumps requires the physical modification of the pump discharge piping and the erection of a temporary dike to contain recirculated water. The length of time required to setup for the test, perform the test, and then reconfigure the system for normal operation is prohibitive to performing the flow-test on even the cold shutdown frequency. Therefore, the flow-test of the inside containment recirculation spray pumps will be performed on a refueling outage frequency.

The inside containment recirculation spray pumps are capable of being operated dry for approximately 60 seconds without significantly overheating and/or degrading the pump bearings. During this dry pump check, it can be determined that the pump shafts are turning by rotation sensors which indicate in the Main Control Room. In addition, motor current will be compared with an established reference value to ascertain that no degradation of pump operation has occurred. The inside recirculation spray pumps are removed and inspected periodically to verify the mechanical condition of the pumps.

The recirculation spray pumps outside the containment have the capability of being dry-run and flow tested. The test of an outside recirculation spray pump is performed by closing the containment sump suction line valve and the isolation valve between the pump discharge and the containment penetration. This allows the pump casing to be filled with water and the pump to recirculate water through a test line from the pump discharge to the pump casing.

With a system flush conducted to remove particulate matter prior to the installation of spray nozzles and with corrosion resistant nozzles and piping, it is not considered credible that a significant number of nozzles would plug during the life of the unit to reduce the effectiveness of the subsystems; therefore provisions to air-test the nozzles every 5 years, coinciding with the closest refueling outage, is sufficient to indicate that plugging of the nozzles has not occurred.

The spray nozzles in the refueling water storage tank provide means to ensure that there is no particulate matter in the refueling water storage tank and the containment spray subsystems which could plug or cause deterioration of the spray nozzles. The nozzles in the tank are identical to those used on the containment spray headers. The flow test of the containment spray pumps and recirculation to the refueling water storage will indicate any plugging of the nozzles by a reduction of flow through the nozzles.

Performing the containment sump and pump well inspections will reduce the potential for system degradation due to sump debris associated with refueling activities or major maintenance activities as well as reduce wear on the inside containment recirculation spray pumps during dry testing. Ensuring proper installation and structural integrity of the trash racks and sump screens will prevent ingress of debris generated during the DBA and will allow long term containment cooling and recirculation mode cooling of the core.

References

FSAR Section 6.3.1, Containment Spray Pumps
FSAR Section 6.3.1, Recirculation Spray Pumps

(Pages TS 4.5-5 and TS 4.5-6 have been deleted)

c. Verifying, by visual inspection, that each low head safety injection pump suction inlet from the containment sump is free of debris that could degrade system operation. Perform each refueling outage and/or after major maintenance activities in the containment.

Basis

Complete system tests cannot be performed when the reactor is operating because a safety injection signal causes containment isolation. The method of assuring operability of these systems is therefore to combine system tests to be performed during refueling shutdowns, with more frequent component tests, which can be performed during reactor operation.

The system tests demonstrate proper automatic operation of the Safety Injection System. A test signal is applied to initiate automatic operation action and verification is made that the components receive the safety injection signal in the proper sequence. The test may be performed with the pumps blocked from starting. The test demonstrates the operation of the valves, pump circuit breakers, and automatic circuitry.

During reactor operation, the instrumentation which is depended on to initiate safety injection is checked periodically, and the initiating circuits are tested in accordance with Specification 4.1. In addition, the active components (pumps and valves) are to be periodically tested to check the operation of the starting circuits and to verify that the pumps are in satisfactory running order. The test interval is determined in accordance with ASME Section XI. The accumulators are a passive safeguard. In accordance with Specification 4.1, the water volume and pressure in the accumulators are checked periodically.

References

FSAR Section 6.2, Safety Injection System

ATTACHMENT 3

Discussion of Proposed Changes

Surry Power Station
Units 1 and 2

Discussion of Proposed Changes

The proposed changes in Attachment 1 will require quarterly dry testing of the Inside Containment Recirculation Pumps and flow testing each refueling outage. Requirements are being added to inspect the containment sump and trash screens every refueling outage and/or after major maintenance activities in the containment. Pump testing is specifed and controlled by the Inservice Testing Program with appropriate relief requests and justification.

Technical Specification Section 4.5

Due to the physical arrangement of the recirculation spray pumps inside the containment, it is impractical to flow-test them other than on a refueling outage frequency. Flow testing of these pumps requires the physical modification of the pump discharge piping and the erection of a temporary dike to contain recirculated water. The length of time required to setup for the test, perform the test, and then reconfigure the system for normal operation is prohibitive to performing the flow-test on even the cold shutdown frequency. Therefore, a Relief Request has been submitted with our Inservice Inspection Program Plan for Pumps to allow the flow-test of the inside containment recirculation spray pumps be performed on a refueling outage frequency. We have previously committed to full flow-test the pumps each refueling by our letter to the NRC, Serial No. 88-020, dated January 29, 1988.

The acceptance criteria for flow testing of the Inside Containment Recirculation Spray pumps is the ASME Section XI, Acticle IWP requirements. For consistency, the acceptance criteria for the Containment Spray pumps are being changed to ASME Section XI, Article IWP requirements.

The Inside Containment Recirculation Spray pumps are capable of being operated dry for approximately 60 seconds without significantly over-heating and degrading the pump bearings. During this dry pump check, it can be determined that the pump shafts are turning by rotation sensors which indicate in the Main Control Room. In addition, motor current will be compared with an established reference value to ascertain that no degradation of pump operation has occurred. In addition, the inside recirculation spray pumps will be overhauled once every five years. These measures, taken together, are considered sufficient to ensure and confirm overall pump integrity and operability.

Consistent with this proposed Technical Specification change and discussions with the NRC, our Inservice Testing Program Plan for Pumps, as submitted in letter Serial No. 88-024A, dated September 30, 1988, includes Relief Requests which support the quarterly dry check of the inside recirculation spray pumps.

A proposed Specification is added which will require a visual inspection of the containment sump including the inside containment recirculation spray pump wells and the engineered safeguards system suction inlets be performed at least once each refueling period and/or after major maintenance activities in the containment. The inspection should verify that the containment sump and pump wells are free of debris that could degrade containment spray system operation and that the sump components (i.e., trash racks, screens) are properly installed and show no sign of structural distress or excessive corrosion.

Technical Specification Section 4.11

A proposed Specification is added which will require a visual inspection of the low head safety injection pump suction inlets from the containment sump be performed at least once each refueling period and/or after major maintenance activities in the containment. The inspection should verify that the pump suction inlets are free of debris that could degrade pump performance and thereby reduce the effectiveness of the low head safety injection system.

This inspection will be performed coincident with the visual inspection of the containment sump specified in Specification 4.5.

Similar changes to Section 4.5 and 4.11 are included in Attachment 2 to supplement our April 11, 1988, Technical Specification submittal on pump and valve testing requirements.

SUMMARY

Although the frequency for dry rotation testing of the inside containment recirculation pump has decreased from monthly to quarterly, assurance of system integrity and operability is maintained because:

1) quarterly dry rotation checks reduces the potential for degradation of the pump bearings, while maintaining a high level of assurance of the pump's ability to perform its intended function;

2) Additionally, each inside recirculation spray pump will be overhauled once every five years as part of routine maintenance to provide further assurance of continued pump operability;

3) each pump is verified fully operable each refueling outage by a full flow recirculation test;

4) following major maintenance activities performed in containment during refueling outages, the containment sump and inside containment recirculation spray pump wells are visually inspected to ensure they are free of debris.

10 CFR 50.92 Significant Hazards Considerations

These proposed changes to the Technical Specifications have been reviewed and it has been determined that a Significant Hazards Consideration does not exist, in that:

1) The implementation of these proposed changes do not significantly increase the probability of occurrence or the consequences of an accident or malfunction of equipment important to safety and previously evaluated in the Updated Final Safety Analysis Report (UFSAR). The changes continue to require functional testing for operability in accordance with ASME Section XI as modified by our IST Program Relief Request. Although, the frequency for dry testing the Inside Recirculation Spray Pumps has been reduced to quarterly, performing the dynamic flow testing of the pumps each refueling outage provides empirical data to directly evaluate pump performance and operability. In addition, the proposed reduction in dry pump testing, in combination with planned maintenance to overhaul the pumps every five years, reduces the potential for any significant pump bearing degradation. Likewise, the proposed change to formally require visual inspection of containment sumps every refueling outage specifically reduces the potential for foreign debris in the sumps which could lead to pump and/or associated system performance degradation. Therefore, a significant increase in the probability or consequences of an accident has not been created by these proposed changes.

2) The implementation of these proposed changes do not create a possibility for an accident or a malfunction of a different type than any evaluated previously in the UFSAR. Pump testing continues in accordance with ASME Section XI requirements and current NRC approved practices. In as much as the proposed changes only define surveillance testing requirements, they do not create new or different kinds of accidents. Additionally, the proposed change for sump visual inspections is specifically made to preclude the possibility of system degradation associated with foreign debris which may result in a malfunction different than that previously evaluated.

3) The implementation of these proposed changes do not significantly reduce the margin of safety as defined in the basis of any Technical Specification. Testing and operability requirements are established in accordance with ASME Section XI and the Technical Specifications. No assumptions used in the UFSAR Chapter 14 accident analysis are affected by these proposed changes.

Based on this review, we conclude that the proposed change does not involve a significant hazards consideration.