ATTACHMENT 1

PROPOSED TECHNICAL SPECIFICATIONS

3.3 SAFETY INJECTION, RECIRCULATION, and CONTAINMENT SPRAY SYSTEMS

3.3.1 OPERATING STATUS

APPLICABILITY: Applies to the operating status of the Safety Injection, Recirculation, and Containment Spray Systems.

OBJECTIVE: To define those conditions and components that are necessary to ensure availability of the Safety Injection, Recirculation and Containment Spray Systems.

SPECIFICATION: A. In Modes 1, 2, and in Mode 3 when the RCS pressure is greater than or equal to 600 psig, two trains of the Safety Injection, Hot Leg Recirculation, Cold Leg Recirculation, and Secondary Recirculation Systems shall be OPERABLE.

Safety Injection and Recirculation Systems are comprised of:

1. Three RWST ESF Switchover automatic trip channels per train, with the setpoint less than or equal to 20% and greater than or equal to 18% of RWST level.
2. Two safety injection pumps.
3. Two feed water pumps.
4. Two recirculation pumps.
5. The recirculation heat exchanger.
6. Two charging pumps.
7. Two component cooling water pumps.
8. Two saltwater cooling pumps.
9. A minimum of 5400 pounds of anhydrous trisodium phosphate stored in the containment sump in racks provided.
10. Flow paths, valves, and interlocks associated with each train or common to both trains of the systems.

B. In Mode 3 when the RCS pressure is less than 600 psig and in Mode 4, one train of the Hot Leg Recirculation and Cold Leg Recirculation Systems shall be OPERABLE.

C. In Modes 1, 2, 3, and 4, two trains of the Containment Spray System and associated portions of the Recirculation System shall be OPERABLE.

Containment Spray System is comprised of:

1. Two refueling water pumps.

2. Two hydrazine additive pumps.

3. Flow paths, valves, and interlocks associated with each train or common to both trains of the system.

D. Effective leakage from the Recirculation loop outside the containment shall be less than 625 cc/hr as calculated from the following formula.

$$\text{Effective Leakage} = (a_1 \times L_1) + (a_2 \times L_2) + (a_3 \times L_3)$$

where,

L_1 = pump and valve leakage which drains to auxiliary building sump

L_2 = valve leakage in auxiliary building or doghouse

L_3 = valve leakage outside

a_1 = iodine release factor for leakage in auxiliary building sump

a_2 = iodine release factor for leakage in auxiliary building or doghouse

a_3 = iodine release factor for leakage outside the auxiliary building or doghouse

ACTIONS:

A. With one train of the Safety Injection System, Hot Leg Recirculation System, Cold Leg Recirculation System, Secondary Recirculation System, or necessary support systems inoperable when RCS pressure is greater than or equal to 600 psig, restore the inoperable train for each system to OPERABLE status within 72 hours or be in at least HOT STANDBY within the next 6 hours and reduce RCS pressure to less than 600 psig within the following 6 hours.

B. With both trains of the Hot Leg Recirculation or Cold Leg Recirculation Systems, or necessary support systems inoperable when RCS pressure is less than 600 psig, restore at least one train to OPERABLE status within 1 hour or be in COLD SHUTDOWN within the next 20 hours.

C. 1. With one train of Containment Spray System, associated portions of the Recirculation System, or necessary support systems inoperable, restore the inoperable train for each system to OPERABLE status within 72 hours or be in at least HOT STANDBY within the next 6 hours and COLD SHUTDOWN within the following 30 hours.

2. With one containment spray flow limiter valve inoperable, close the valve if either recirculation pump is inoperable. Restore the inoperable valve to OPERABLE status within 72 hours or be in at least HOT STANDBY within the next 6 hours and COLD SHUTDOWN within the following 30 hours.

D. If effective leakage from the recirculating loop outside the containment exceeds 625 cc/hr, make necessary repairs to limit leakage to 625 cc/hr within 72 hours or be in COLD SHUTDOWN within the next 36 hours.

BASIS: The requirements of this specification assure that before the reactor can be made critical, or before the reactor coolant system heatup is initiated, adequate engineered safeguards are OPERABLE.

Amendment Application No. 188 incorporated new requirements to address the operability of Emergency Core Cooling System (ECCS) subsystems, trains, and action requirements for inoperable trains(s), consistent with the guidance provided in the Standard Technical Specifications. When the RCS pressure is greater than or equal to 600 psig in Modes 1, 2 and 3, the ECCS, consisting of the Safety Injection, Normal and Alternate Hot Leg Recirculation, Cold Leg Recirculation, Secondary Recirculation and Containment Spray Systems, is required to be OPERABLE. Operability of redundant trains and components provides protection for single active failures. For example, the RWST ESF Switchover train is inoperable when one of more of the RWST level channels for that train is inoperable.

The 72-hour period provided for performing surveillance testing, preventive and corrective maintenance, is applied to all components for one train. In addition to the ECCS trains the action statements also address, "necessary support systems." Any support system, such as back-up Nitrogen or Component Cooling Water, is required for the ECCS when necessary to support the safety function. This is consistent with the definition of OPERABILITY in Section 1.

When RCS pressure is below 600 psig in Modes 3 and 4, only a single train of the Hot Leg Recirculation and Cold Leg Recirculation Systems and the common ECCS flow paths are required to be operable due to the stable reactivity condition of the reactor and limited core cooling requirements. Note that the Containment Spray System is required to have both trains OPERABLE in Modes 1, 2, 3 and 4, consistent with the Standard Technical Specifications. The Hot Leg Recirculation and Cold Leg Recirculation Systems include components that support containment spray (the recirculation pumps, heat exchanger, valves and flow paths). Note that both trains of those portions of the recirculation system which support containment spray are required through Mode 4. Refueling Water Storage Tank and boron concentration requirements are in Specification 3.3.3.

Secondary recirculation is a means of providing cooling after a Main Steam Line Break which disables the RHR system inside the containment. The flow path takes water from the sump and returns it to the RWST using recirculation and refueling water pumps. The feedwater and safety injection pumps are aligned to supply the secondary side of the steam generators using the feedwater bypass valves.

The containment spray system consists of two redundant trains, which satisfy the single failure criterion. At least one containment spray flow limiter valve must be open during the initial containment spray mode to pass the design flow rate of the Containment Spray System. Since the flow limiting valves require non-safety related instrument air to open, the flow limiting valves are maintained in the open position to assure the valves will be in the correct position for containment spray. For operation during the recirculation phase both valves are closed. Instrument air is not required to close the valves. One of the two valves is permitted to be inoperable for 72 hours but must be placed in the closed position if one of the recirculation pumps is inoperable. When both recirculating water pumps are operable, a spray flow limiter valve can be inoperable in the open position for 72 hours. Both recirculation pumps are needed when one valve is inoperable and open to assure adequate NPSH is available to the recirculation pumps under the higher spray flow conditions.

Below an RCS pressure of 600 psig, the safety injection system may be isolated in accordance with Specification 3.3.2. Additional charging pump technical specification requirements are included in Specification No. 3.2, "Chemical and Volume Control System."

When the reactor is in Modes 1-4, preventive or corrective maintenance or surveillance testing is allowed in accordance with the Action Statement time limits. The specified maintenance times are a maximum, and maintenance work will proceed with diligence to return the equipment to an OPERABLE condition as promptly as possible. OPERABILITY of the specified components shall be based on the verification that the appropriate surveillance tests have been performed.

In the unlikely event that the need for safety injection should occur:

-- functioning of one train will protect the core. Containment sprays alone, however, will maintain containment pressure under design pressure.

-- functioning of one of the two hydrazine additive pumps and associated discharge valve will effect introduction of hydrazine into containment spray water. This provides for absorption of airborne fission products and reduction of the thyroid doses associated with the maximum hypothetical accident to within 10 CFR 100 limits.

-- dissolution of 5400 pounds of anhydrous trisodium phosphate stored in the sump will ensure that the pH of the water in the sump will be greater than 7 within four (4) hours, so as to prevent chloride stress corrosion cracking of systems and components exposed to the circulating sump water.

The switchover from injection to recirculation modes is a two part process, which consists of the automatic termination of the flow from SI/FW pumps including automatic pump trip and automatic closures of MOV's 850 A, B and C followed by manual realignment to recirculation from the containment sump. The automatic trip setpoint is bounded by the minimum water level in the sump to support recirculation for long term post-LOCA cooling and the minimum RWST level to support charging and containment spray during the manual realignment. The setpoint analysis conservatively determined the automatic trip setpoint to be 20% of the RWST level. The automatic trip setpoint is the result of the combination of the worst single active failure considering SIS and SISLOP conditions.

The limit of 625 cc/hr for the recirculation loop leakage ensures that the combined 0-2 hr EAB thyroid dose due to recirculating loop leakage and containment leakage will not exceed the limits of 10 CFR 100. The formula for determining the leakage incorporates consideration of the significance of leakage in different plant areas. The iodine release factor adjusts actual pump or valve leakage to account for the fraction of the iodine in the leakage which would actually be released to the atmosphere. The iodine release factors in the auxiliary building sump, the auxiliary building or doghouse, and outside are 0.05, 0.5, and 1.0, respectively.

<u>REFERENCES</u>:

(1) Updated Safety Analysis Report, Chapters 6 and 15.

(2) Event Specific Single Failure Response Evaluation, SONGS 1, M-39419, Rev.3.

(3) Single Failure Analysis, SONGS 1, M-41383, Rev. 1.

ATTACHMENT 2

EXISTING TECHNICAL SPECIFICATIONS

3.3 SAFETY INJECTION AND CONTAINMENT SPRAY SYSTEMS

3.3.1 OPERATING STATUS

APPLICABILITY: Applies to the operating status of the Safety Injection and Containment Spray Systems.

OBJECTIVE: To define those conditions necessary to ensure availability of the Safety Injection and Containment Spray Systems.

SPECIFICATION: A. The reactor shall not be made or maintained critical unless the following conditions are met. In addition, the reactor coolant system temperature shall not be increased above 200•F unless the containment spray system, the refueling water storage tank and the associated valves and interlocks are operable.

(1) Safety Injection Systems

a. Refueling tank water storage and boron concentration comply with Specification 3.3.3.

b. ESF Switchover automatic trip channel is OPERABLE with the setpoint less than or equal to 20% and greater than or equal to 18% of RWST level.

c. Two safety injection pumps are OPERABLE.

d. Two feed water pumps are OPERABLE.

e. Two recirculation pumps are OPERABLE, except as indicated in item D below.

f. The recirculation heat exchanger is OPERABLE.

g. Two charging pumps are OPERABLE.

h. Two component cooling water pumps are OPERABLE.

i. Two saltwater cooling pumps are OPERABLE. The reactor may be maintained critical with one saltwater cooling pump provided the auxiliary saltwater cooling pump or two screen wash pumps are available as backup. Return the inoperable pump to operable status within 72 hours or be in HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the next 30 hours. The backup pump(s) shall be demonstrated operable by test within 1 hour of declaring the saltwater cooling pump inoperable.

j. A minimum of 5400 pounds of anhydrous trisodium phosphate is stored in the containment sump in racks provided.

(2) Containment Spray System

a. Two refueling water pumps are OPERABLE.

b. Two hydrazine additive pumps are OPERABLE.

c. Hydrazine tank level and hydrazine concentration comply with Specification 3.3.4.

(3) Valves and interlocks associated with each of the above systems are OPERABLE.

(4) Effective leakage from the recirculation loop outside the containment shall be less than 625 cc/hr as calculated from the following formula.

Effective Leakage = $a_1 \times L_1 + a_2 \times L_2 + a_3 \times L_3$

where,

L_1 = pump and valve leakage which drains to auxiliary building sump

L_2 = valve leakage in auxiliary building or doghouse

L_3 = valve leakage outside

a_1 = iodine release factor for leakage in auxiliary building sump

a_2 = iodine release factor for leakage in auxiliary building or doghouse

a_3 = iodine release factor for leakage outside the auxiliary building or doghouse

If effective leakage from the recirculating loop outside the containment exceeds 625 cc/hr, make necessary repairs to limit leakage to 625 cc/hr. within 72 hours or be in COLD SHUTDOWN within the next 36 hours.

B. During critical operation or when the reactor coolant system temperature is above 200°F, as appropriate per Item A above, maintenance shall be allowed on any one of the following items at any one time:

(1) One motor-operated valve at a time (MOV 1100B or 1100D) in the recirculation loop upstream of the charging pump suction header for a period of time not longer than 72 consecutive hours.

(2) One refueling water pump and/or its associated discharge valve at a time, for a period not longer than 72 consecutive hours.

(3) One hydrazine pump and/or its associated discharge valve (SV600 or 601) at a time, for a period of time not longer than 72 consecutive hours.

(4) One charging pump for a period of time not longer than 72 consecutive hours.

(5) One of the two required component cooling water pumps for a period of time not longer than 72 consecutive hours.

(6) One of the two saltwater cooling pumps with the auxiliary saltwater cooling pump or screen wash pumps available as backup for a period of time not longer than 72 consecutive hours. The backup pump(s) shall be demonstrated operable by test within 1 hour of declaring the saltwater pump inoperable.

(7) One train of ESF switchover automatic trip for a period of time not to exceed 72 consecutive hours.

(8) One motor-operated valve at a time (MOV-1100C or MOV-1100E) in the VCT outlet line to the charging pump suction for a period of time not longer than 72 consecutive hours.

C. Prior to initiating maintenance on any of the components, the duplicate (redundant) component shall be tested to demonstrate availability.

D. In the event of a failure of a recirculating pump, plant operation may continue provided operability of the remaining pump and its associated motive and control power are satisfactorily demonstrated on a daily basis, including verification that the containment spray bypass valves (CV517 and 518) are closed.

<u>BASIS</u>: The requirements of Specification A assure that before the reactor can be made critical, or before the reactor coolant system heatup is initiated, adequate engineered safeguards are OPERABLE. The limit of 625 cc/hr for the recirculation loop leakage ensures that the combined 0-2 hr EAB thyroid dose due to recirculating loop leakage and containment leakage will not exceed the limits of 10 CFR 100. The formula for determining the leakage incorporates consideration of the significance of leakage in different plant areas. The iodine release factor adjusts actual pump or valve leakage to account for the fraction of the iodine in the leakage which would actually be released to the atmosphere. The iodine release factors in the auxiliary building sump, the auxiliary building or doghouse, and outside are 0.05, 0.5, and 1.0, respectively.

When the reactor is critical or the reactor coolant system temperature is above 200•F, maintenance is allowed per Specifications B and C providing requirements in Specification C are met which assure OPERABILITY of the redundant component. The specified maintenance times are a maximum, and maintenance work will proceed with diligence to return the equipment to an operable condition as promptly as possible. OPERABILITY of the specified components shall be based on the results of Specification No. 4.2.

The allowable maintenance periods are based upon the repair of certain specific items. Based on the demonstration that equipment redundant to that removed from service is OPERABLE, it is reasonable to maintain the reactor at power over this short period of time.

In the unlikely event that the need for safety injection should occur:

-- functioning of one train will protect the core.[1][2][3][4] Containment sprays alone, however, will maintain containment pressure under design pressure.[3]

-- functioning of one of the two hydrazine additive pumps and associated discharge valve will effect introduction of hydrazine into containment spray water. This provides for absorption of airborne fission products and reduction of the thyroid doses associated with the maximum hypothetical accident to within 10 CFR 100 limits.

-- dissolution of 5400 pounds of anhydrous trisodium phosphate stored in the sump will ensure that the pH of the water in the sump will be greater than 7 within four (4) hours, so as to prevent chloride stress corrosion cracking of systems and components exposed to the circulating sump water.

In the event of inoperability of a recirculation pump, plant operation may continue since either pump is sufficient and a daily OPERABILITY demonstration of the remaining pump and its associated motive and control power provides assurance that it will be OPERABLE if required.

The switchover from injection to recirculation modes is a two part process, which consists of the automatic termination of the flow from SI/FW pumps including automatic pump trip and automatic closures of MOV's 850 A, B and C followed by manual realignment to recirculation from the containment sump. The automatic trip setpoint is bounded by the minimum water level in the sump to support recirculation for long term post-LOCA cooling and the minimum RWST level to support charging and containment spray during the manual realignment. The setpoint analysis conservatively determined the automatic trip setpoint to be 20% of the RWST level. The automatic trip setpoint is the result of the combination of the worst single active failure considering SIS and SISLOP conditions.

REFERENCES:

(1) Final Engineering Report and Safety Analysis, Paragraph 10.1.

(2) Final Engineering Report and Safety Analysis, Paragraph 5.1.

(3) "San Onofre Nuclear Generating Station," report forwarded by letter dated December 29, 1971, from Jack B. Moore to Director, Division of Reactor Licensing, USAEC, subject: Emergency Core Cooling System Performance, San Onofre Nuclear Generating Station, Unit 1.

(4) USAEC Safety Evaluation of ECCS Performance Analysis for San Onofre Unit 1, forwarded by letter dated March 6, 1974, from Mr. Donald J. Skovholt to Mr. Jack B. Moore.

(5) Supplement No. 1 to the Final Engineering Report and Safety Analysis, Section 5, Question 3c.