

ATTACHMENT (I)

UNIT 1
MARKED-UP TECHNICAL SPECIFICATION
PAGES

3/4 5-5
B 3/4 5-2

3/4.5 EMERGENCY CORE COOLING SYSTEMS (CCS)

SURVEILLANCE REQUIREMENTS (Continued)

e. At least once per REFUELING INTERVAL by:

1. Verifying the Shutdown Cooling System open-permissive interlock prevents the Shutdown Cooling System suction isolation valves from being opened with a simulated or actual RCS pressure signal of ≥ 309 psia.
2. A visual inspection of the containment sump and verifying that the subsystem suction inlets are not restricted by debris and that the sump components (trash racks, screens, etc.) show no evidence of structural distress or corrosion.
3. Verifying that a minimum total of ^{289.3}~~100~~ cubic feet of solid granular trisodium phosphate dodecahydrate (TSP) is contained within the TSP storage baskets.
4. Verifying that when a representative sample of 4.0 ± 0.1 grams of TSP from a TSP storage basket is submerged, without agitation, in 3.5 ± 0.1 liters of $77 \pm 10^\circ\text{F}$ borated water from the RWT, the pH of the mixed solution is raised to ≥ 6 within 4 hours.

f. At least once per REFUELING INTERVAL, during shutdown, by:

1. Verifying that each automatic valve in the flow path actuates to its correct position on a Safety Injection Actuation test signal.
2. Verifying that each of the following pumps start automatically upon receipt of a Safety Injection Actuation Test Signal:
 - a. High-Pressure Safety Injection Pump.
 - b. Low-Pressure Safety Injection Pump.

Verifying that a sample from the TSP baskets provide adequate pH adjustment of water borated to be representative of the post-LOCA sump condition.

3/4.5 EMERGENCY CORE COOLING SYSTEMS (ECCS)

BASES

pipe downward. In addition, each ECCS subsystem provides long term core cooling capability in the recirculation mode during the accident recovery period.

Portions of the Low Pressure Safety Injection (LPSI) System flowpath are common to both subsystems. This includes the LPSI flow control valve, CV-306, the flow orifice downstream of CV-306, and the four LPSI loop isolation valves. Although the portions of the flowpath are common, the system design is adequate to ensure reliable ECCS operation due to the short period of LPSI System operation following a design basis Loss of Coolant Incident prior to recirculation. The LPSI System design is consistent with the assumptions in the safety analysis.

The trisodium phosphate dodecahydrate (TSP) stored in dissolving baskets located in the containment basement is provided to minimize the possibility of corrosion cracking of certain metal components during operation of the ECCS following a LOCA. The TSP provides this protection by dissolving in the sump water and causing its final pH to be raised to ≥ 7.0 . The ^{borated} requirement to dissolve a representative sample of TSP in a sample of RWT water provides assurance that the stored TSP will dissolve in borated water at the postulated post LOCA temperatures. Insert A

The Surveillance Requirements provided to ensure **OPERABILITY** of each component ensure that as a minimum, the assumptions used in the safety analyses are met and the subsystem **OPERABILITY** is maintained. The surveillance requirement for flow balance testing provides assurance that proper ECCS flows will be maintained in the event of a LOCA. Maintenance of proper flow resistance and pressure drop in the piping system to each injection point is necessary to: (1) prevent total pump flow from exceeding runout conditions when the system is in its minimum resistance configuration, (2) provide the proper flow split between injection points in accordance with the assumptions used in the ECCS-LOCA analyses, and (3) provide an acceptable level of total ECCS flow to all injection points equal to or above that assumed in the ECCS-LOCA analyses. Minimum HPSI flow requirements for temperatures above 365°F are based upon small break LOCA calculations which credit charging pump flow following an SIAS. Surveillance testing includes allowances for instrumentation and system leakage uncertainties. The 470 gpm requirement for minimum HPSI flow from the three lowest flow legs includes instrument uncertainties but not system check valve leakage. The **OPERABILITY** of the charging pumps and the associated flow paths is assured by the Boration System Specification 3/4.1.2. Specification of safety injection pump total developed head ensures pump performance is consistent with safety analysis assumptions.

The surveillance requirement for the Shutdown Cooling (SDC) System open-permissive interlock provides assurance that the SDC suction isolation valves are prevented from being remotely opened when the RCS pressure is at or above the SDC System design suction pressure of 350 psia. The suction

INSERT A

Testing must be performed to ensure the solubility and buffering ability of the TSP after exposure to the containment environment. A representative sample of 3.43 ± 0.05 grams of TSP from one of the baskets in containment is submerged in 1 ± 0.01 liters of water at a boron concentration of 3106 ± 50 ppm and at a standard temperature of $120 \pm 5^\circ\text{F}$. Without agitation, let the solution stand for four hours. The liquid is then decanted and mixed, the temperature adjusted to $77 \pm 2^\circ\text{F}$ and the pH measured. At this point, the pH must be ≥ 6.0 . The representative sample weight is based on the minimum required TSP amount of 14,371 pounds mass, which, at a manufactured density, corresponds to the minimum volume of 289.3 cubic feet, and a maximum possible sump amount following a LOCA of 4,503,500 pounds mass, normalized to buffer a 1 ± 0.01 liter sample. The boron concentration of the test water is representative of the maximum possible concentration corresponding to the maximum possible sump volume following a LOCA. Agitation of the test solution is prohibited since an adequate standard for the agitation intensity cannot be specified. The test time of four hours is necessary to allow time for the dissolved TSP to naturally diffuse through the sample solution. In the containment sump following a LOCA, rapid mixing would occur, significantly decreasing the actual amount of time before the required pH is achieved. This would ensure compliance with the Standard Review Plan requirement of a $\text{pH} \geq 7.0$ by the onset of recirculation following a LOCA.

ATTACHMENT (2)

UNIT 2
MARKED-UP TECHNICAL SPECIFICATION
PAGES

3/4 5-5
B 3/4 5-2

3/4.5 EMERGENCY CORE COOLING SYSTEMS (ECCS)

SURVEILLANCE REQUIREMENTS (Continued)

e. At least once per REFUELING INTERVAL by:

1. Verify the Shutdown Cooling System open-permissive interlock prevents the Shutdown Cooling System suction isolation valves from being opened with a simulated or actual R pressure signal of ≥ 309 psia.
2. A visual inspection of the containment sump and verifying that the subsystem suction inlets are not restricted by debris and that the sump components (trash racks, screens, etc.) show no evidence of structural distress or corrosion.
3. Verifying that a minimum total of ^{289.3} 100 cubic feet of solid granular trisodium phosphate dodecahydrate (TSP) is contained within the TSP storage baskets.
4. Verifying that when a representative sample of 4.0 ± 0.1 grams of TSP from a TSP storage basket is submerged, without agitation, in 3.5 ± 0.1 liters of $77 \pm 10^\circ\text{F}$ borated water from the RWT, the pH of the mixed solution is raised to ≥ 6 within 4 hours.

f. At least once per REFUELING INTERVAL, during shutdown, by:

1. Verifying that each automatic valve in the flow path actuates to its correct position on a Safety Injection Actuation test signal.
2. Verifying that each of the following pumps start automatically upon receipt of a Safety Injection Actuation Test Signal:
 - a. High-Pressure Safety Injection Pump.
 - b. Low-Pressure Safety Injection Pump.

Verifying that a sample from the TSP baskets provides adequate pH adjustment of water borated to be representative of the post-LOCA sump condition.

3/4.5 EMERGENCY CORE COOLING SYSTEMS (ECCS)

BASES

Portions of the Low Pressure Safety Injection (LPSI) System flowpath are common to both subsystems. This includes the LPSI flow control valve, CV-306, the flow orifice downstream of CV-306, and the four LPSI loop isolation valves. Although the portions of the flowpath are common, the system design is adequate to ensure reliable ECCS operation due to the short period of LPSI System operation following a design basis Loss of Coolant Incident prior to recirculation. The LPSI System design is consistent with the assumptions in the safety analysis.

The trisodium phosphate dodecahydrate (TSP) stored in dissolving baskets located in the containment basement is provided to minimize the possibility of corrosion cracking of certain metal components during operation of the ECCS following a LOCA. The TSP provides this protection by dissolving in the sump water and causing its final pH to be raised to ≥ 7.0 . The ^{borated} requirement to dissolve a representative sample of TSP in a sample of RWT water provides assurance that the stored TSP will dissolve in borated water at the postulated post LOCA temperatures. Insert A

The Surveillance Requirements provided to ensure **OPERABILITY** of each component ensure that at a minimum, the assumptions used in the safety analyses are met and the subsystem **OPERABILITY** is maintained. The surveillance requirement for flow balance testing provides assurance that proper ECCS flows will be maintained in the event of a LOCA. Maintenance of proper flow resistance and pressure drop in the piping system to each injection point is necessary to: (1) prevent total pump flow from exceeding runout conditions when the system is in its minimum resistance configuration, (2) provide the proper flow split between injection points in accordance with the assumptions used in the ECCS-LOCA analyses, and (3) provide an acceptable level of total ECCS flow to all injection points equal to or above that assumed in the ECCS-LOCA analyses. Minimum HPSI flow requirements for temperatures above 305°F are based upon small break LOCA calculations which credit charging pump flow following a SIAS. Surveillance testing includes allowances for instrumentation and system leakage uncertainties. The 470 gpm requirement for minimum HPSI flow from the three lowest flow legs includes instrument uncertainties but not system check valve leakage. The **OPERABILITY** of the charging pumps and the associated flow paths is assured by the Boration System Specifications 3/4.1.2. Specification of safety injection pump total developed head ensures pump performance is consistent with safety analysis assumptions.

The surveillance requirement for the Shutdown Cooling (SDC) System open-permissive interlock provides assurance that the SDC suction isolation valves are prevented from being remotely opened when the RCS pressure is at or above the SDC System design suction pressure of 350 psia. The suction piping to the LPSI pumps is the SDC System component with the limiting design pressure rating. The interlock provides assurance that double isolation of the SDC System from the RCS is preserved whenever RCS pressure is at or above the SDC System design pressure. The 309 psia value

INSERT A

Testing must be performed to ensure the solubility and buffering ability of the TSP after exposure to the containment environment. A representative sample of 3.43 ± 0.05 grams of TSP from one of the baskets in containment is submerged in 1 ± 0.01 liters of water at a boron concentration of 3106 ± 50 ppm and at a standard temperature of $120 \pm 5^\circ\text{F}$. Without agitation, let the solution stand for four hours. The liquid is then decanted and mixed, the temperature adjusted to $77 \pm 2^\circ\text{F}$ and the pH measured. At this point, the pH must be ≥ 6.0 . The representative sample weight is based on the minimum required TSP amount of 14,371 pounds mass, which, at a manufactured density, corresponds to the minimum volume of 289.3 cubic feet, and a maximum possible sump amount following a LOCA of 4,503,500 pounds mass, normalized to buffer a 1 ± 0.01 liter sample. The boron concentration of the test water is representative of the maximum possible concentration corresponding to the maximum possible sump volume following a LOCA. Agitation of the test solution is prohibited since an adequate standard for the agitation intensity cannot be specified. The test time of four hours is necessary to allow time for the dissolved TSP to naturally diffuse through the sample solution. In the containment sump following a LOCA, rapid mixing would occur, significantly decreasing the actual amount of time before the required pH is achieved. This would ensure compliance with the Standard Review Plan requirement of a $\text{pH} \geq 7.0$ by the onset of recirculation following a LOCA.