

EMERGENCY CORE COOLING SYSTEMS

SURVEILLANCE REQUIREMENTS (Continued)

- g. By verifying the correct position of each electrical and/or mechanical position stop for the following ECCS throttle valves:
1. Within 4 hours following completion of each valve stroking operation or maintenance on the valve when the ECCS subsystems are required to be OPERABLE.
  2. At least once per 18 months.

LPSI System  
Valve Number

- |                           |   |
|---------------------------|---|
|                           | H |
| 1. SIB-UV 615, SIA-UV 306 |   |
| 2. SIB-UV 625, SIB-UV 307 |   |
| 3. SIA-UV 635             | H |
| 4. SIA-UV 645             |   |

Hot Leg Injection  
Valve Number

1. SIC-HV 321
2. SID-HV 331

TYPO'S

- h. By performing a flow balance test, during shutdown, following completion of modifications to the ECCS subsystems that alter the subsystem flow characteristics and verifying the following flow rates:

HPSI System - Single Pump

The sum of the injection line flow rates, excluding the highest flow rate, is greater than or equal to 816 gpm.

LPSI System - Single Pump

1. Injection Loop 1, total flow equal to  $4800 \pm 200$  gpm
2. Injection Legs 1A and 1B when tested individually, with the other leg isolated, shall be within 200 gpm of each other.
3. Injection Loop 2, total flow equal to  $4800 \pm 200$  gpm
4. Injection Legs 2A and 2B when tested individually, with the other leg isolated, shall be within 200 gpm of each other.

Simultaneous Hot Leg and Cold Leg Injection - Single Pump

- ~~1. Hot Leg, flow equal to  $545 \pm 20$  gpm~~
- ~~2. Cold Leg, flow equal to  $545 \pm 20$  gpm~~
1. The hot leg flow rate is greater than or equal to 525 GPM;
2. The sum of the cold leg flow rates is greater than or equal to 525 gpm; and
3. The total pump flow rate does not exceed 1200 GPM



...

...

...

...

...

...

...

EMERGENCY CORE COOLING SYSTEMSBASESECCS SUBSYSTEMS (Continued)

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. The 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.

The term "minimum bypass recirculation flow," as used in Specification 4.5.2e.3. and 4.5.2f., refers to that flow directed back to the RWT from the ECCS pumps for pump protection. Testing of the ECCS pumps under the condition of minimum bypass recirculation flow in Specification 4.5.2f. verifies that the performance of the ECCS pumps supports the safety analysis minimum RCS pressure assumption at zero delivery to the RCS.

*In specification 4.5.2h the specified flows include instrument uncertainties.*

3/4.5.4 REFUELING WATER TANK

The OPERABILITY of the refueling water tank (RWT) as part of the ECCS ensures that a sufficient supply of borated water is available for injection by the ECCS in the event of a LOCA. The limits on RWT minimum volume and boron concentration ensure that (1) sufficient water plus 10% margin is available to permit 20 minutes of engineered safety features pump operation, and (2) the reactor will remain subcritical in the cold condition following mixing of the RWT and the RCS water volumes with all control rods inserted except for the most reactive control assembly. These assumptions are consistent with the LOCA analyses.

\* The following test conditions, which apply during flow balance tests, ensure that the ECCS subsystems are adequately tested.

1. The pressurizer pressure is at atmospheric pressure.
2. The miniflow bypass recirculation lines are aligned for injection.
3. For LPSI system, (add/subtract) 6.4 gpm (to/from) the 4800 gpm requirement for every foot by which the difference of RWT water level above the RWT RAS setpoint level (exceeds/is less than) the difference of RCS water level above the cold leg centerline.



(1)

CONTROLLED BY USER

EMERGENCY CORE COOLING SYSTEMS

SURVEILLANCE REQUIREMENTS (Continued)

- g. By verifying the correct position of each electrical and/or mechanical position stop for the following ECCS throttle valves:
  1. Within 4 hours following completion of each valve stroking operation or maintenance on the valve when the ECCS subsystems are required to be OPERABLE.
  2. At least once per 18 months.

<u>LPSI System</u>		<u>Hot Leg Injection</u>
<u>Valve Number</u>		<u>Valve Number</u>
1. SIB-UV 615, SIA-UV 306	H	1. SIC-HV 321
2. SIB-UV 625, SIB-UV 307		2. SID-HV 331
3. SIA-UV 635		
4. SIA-UV 645	H	

←  TYPOS

- h. By performing a flow balance test, during shutdown, following completion of modifications to the ECCS subsystems that alter the subsystem flow characteristics and verifying the following flow rates:-

HPSI System - Single Pump

The sum of the injection line flow rates, excluding the highest flow rate, is greater than or equal to 816 gpm.

LPSI System - Single Pump

1. Injection Loop 1, total flow equal to 4800 ± 200 gpm
2. Injection Legs 1A and 1B when tested individually, with the other leg isolated, shall be within 200 gpm of each other.
3. Injection Loop 2, total flow equal to 4800 ± 200 gpm
4. Injection Legs 2A and 2B when tested individually, with the other leg isolated, shall be within 200 gpm of each other.

Simultaneous Hot Leg and Cold Leg Injection - Single Pump

- ~~1. Hot Leg, flow equal to 545 ± 20 gpm~~
- ~~2. Cold Leg, flow equal to 545 ± 20 gpm~~
1. The hot leg flow rate is greater than or equal to 525 gpm;
2. The sum of the cold leg flow rates is greater than or equal to 525 gpm; and
3. The total pump flow rate does not exceed 1200 gpm



EMERGENCY CORE COOLING SYSTEMSBASESECCS SUBSYSTEMS (Continued)

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. The 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.

The term "minimum bypass recirculation flow," as used in Specification 4.5.2e.3. and 4.5.2f., refers to that flow directed back to the RWT from the ECCS pumps for pump protection. Testing of the ECCS pumps under the condition of minimum bypass recirculation flow in Specification 4.5.2f. verifies that the performance of the ECCS pumps supports the safety analysis minimum RCS pressure assumption at zero delivery to the RCS.

*In specification 4.5.2h the specific flows include instrument uncertainties.*

3/4.5.4 REFUELING WATER TANK

The OPERABILITY of the refueling water tank (RWT) as part of the ECCS ensures that a sufficient supply of borated water is available for injection by the ECCS in the event of a LOCA. The limits on RWT minimum volume and boron concentration ensure that (1) sufficient water plus 10% margin is available to permit 20 minutes of engineered safety features pump operation, and (2) the reactor will remain subcritical in the cold condition following mixing of the RWT and the RCS water volumes with all control rods inserted except for the most reactive control assembly. These assumptions are consistent with the LOCA analyses.

\* The following test conditions, which apply during flow balance tests, ensure that the ECCS subsystems are adequately tested.

1. The pressurizer pressure is at atmospheric pressure.
2. The miniflow bypass recirculation lines are aligned for injection.
3. For LPSI system, (add/subtract) 6.4 gpm (to/from) the 4800 gpm requirement for every foot by which the difference of RWT water level above the RWT RAS setpoint level (exceeds/is less than) the difference of RCS water level above the cold leg centerline.



(15)

CONTROLLED BY USER

EMERGENCY CORE COOLING SYSTEMS

SURVEILLANCE REQUIREMENTS (Continued)

g. By verifying the correct position of each electrical and/or mechanical position stop for the following ECCS throttle valves:

1. Within 4 hours following completion of each valve stroking operation or maintenance on the valve when the ECCS subsystems are required to be OPERABLE.
2. At least once per 18 months.

LPSI System  
Valve Number

Hot Leg Injection  
Valve Number

1. SIB-UV 615, SIA-UV 306
2. SIB-UV 625, SIB-UV 307
3. SIA-UV 635
4. SIA-UV 645

1. SIC-HV 321
2. SID-HV 331

← TYPO'S

h. By performing a flow balance test, during shutdown, following completion of modifications to the ECCS subsystems that alter the subsystem flow characteristics and verifying the following flow rates:

HPSI System - Single Pump

The sum of the injection line flow rates, excluding the highest flow rate, is greater than or equal to 816 gpm.

LPSI System - Single Pump

1. Injection Loop 1, total flow equal to  $4800 \pm 200$  gpm
2. Injection Legs 1A and 1B when tested individually, with the other leg isolated, shall be within 200 gpm of each other.
3. Injection Loop 2, total flow equal to  $4800 \pm 200$  gpm
4. Injection Legs 2A and 2B when tested individually, with the other leg isolated, shall be within 200 gpm of each other.

Simultaneous Hot Leg and Cold Leg Injection - Single Pump

- ~~1. Hot Leg, flow equal to  $545 \pm 20$  gpm~~
- ~~2. Cold Leg, flow equal to  $545 \pm 20$  gpm~~
1. The hot leg flow rate is greater than or equal to 525 GPM;
2. The sum of the cold leg flow rates is greater than or equal to 525 GPM; and
3. The total pump flow rate does not exceed 1200 GPM



.....

.....

.....

.....

.....

.....

.....

.....

EMERGENCY CORE COOLING SYSTEMSBASESECCS SUBSYSTEMS (Continued)

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. The 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.

*In specification 4.5.2h the specified flows include instrument uncertainties.*

The term "minimum bypass recirculation flow," as used in Specification 4.5.2e.3. and 4.5.2f., refers to that flow directed back to the RWT from the ECCS pumps for pump protection. Testing of the ECCS pumps under the condition of minimum bypass recirculation flow in Specification 4.5.2f. verifies that the performance of the ECCS pumps supports the safety analysis minimum RCS pressure assumption at zero delivery to the RCS.

3/4.5.4 REFUELING WATER TANK

The OPERABILITY of the refueling water tank (RWT) as part of the ECCS ensures that a sufficient supply of borated water is available for injection by the ECCS in the event of a LOCA. The limits on RWT minimum volume and boron concentration ensure that (1) sufficient water plus 10% margin is available to permit 20 minutes of engineered safety features pump operation, and (2) the reactor will remain subcritical in the cold condition following mixing of the RWT and the RCS water volumes with all control rods inserted except for the most reactive control assembly. These assumptions are consistent with the LOCA analyses.

\*The following test conditions, which apply during flow balance tests, ensure that the ECCS subsystems are adequately tested.

1. The pressurizer pressure is at atmospheric pressure.
2. The miniflow bypass recirculation lines are aligned for injection.
3. For LPSI system, (add/subtract) 6.4 gpm (to/from) the 4800 gpm requirement for every foot by which the difference of RWT water level above the RWT RAS setpoint level (exceeds/is less than) the difference of RCS water level above the cold leg centerline.



Handwritten scribbles and faint lines in the top right corner, possibly remnants of a signature or date.

Faint, illegible handwritten text or markings in the middle-left section of the page.