Docket No. 50-336
B17517

Attachment 3

Millstone Nuclear Power Station, Unit No. 2
Proposed Revision to Technical Specifications
Engineered Safety Features Pump Testing
Marked Up Pages

January 1999

4.5.2 Each ECCS subsystem shall be demonstrated OPERABLE:

a. At least once per 31 days on a STAGGERED TEST BASIS by:

1. Verifying that each high-pressure safety injection pump:

a) Starts automatically on a test signal.

b) Develons a differential pressure of ≥ ~~1231 psi~~ 1193 psid on recirculation flow.

c) Operates for at least 15 minutes.

2. Verifying that each low-pressure safety injection pump:

a) Starts automatically on a test signal.

b) Develops a differential pressure of ≥ ~~157 psi~~ 163 psid on recirculation flow.

c) Operates for at least 15 minutes.

3. Verifying that each charging pump:

a) Starts automatically on a test signal.

b) Operates for at least 15 minutes.

4. Verifying that each boric acid pump (when required OPERABLE per Specification 3.5.2 c):

a) Starts automatically on a test signal.

b) Develops a discharge pressure of ≥ 98 psig on recirculation flow.

c) Operates for at least 15 minutes.

5. Verifying that upon a sump recirculation actuation signal, the containment sump isolation valves open.

6. Cycling each testable, automatically operated valve through at least one complete cycle.

7. Verifying the correct position for each manual valve not locked, sealed or otherwise secured in position.

8. Verifying the correct position for each remote or automatically operated valve.

9. Verifying that each ECCS subsystem is aligned to receive electrical power from separate OPERABLE emergency busses.

CONTAINMENT SPRAY AND COOLING SYSTEMS

LIMITING CONDITION FOR OPERATION

3.6.2.1 Two containment spray trains and two containment cooling trains, with each cooling train consisting of two containment air recirculation and cooling units, shall be OPERABLE.

APPLICABILITY: MODES 1, 2 and 3*.

ACTION:

Inoperable Equipment	Required Action
a. One containment spray train	a.1 Restore the inoperable containment spray train to OPERABLE status within 7 days or be in HOT SHUTDOWN within the next 12 hours.
b. One containment cooling train	b.1 Restore the inoperable containment cooling train to OPERABLE status within 7 days or be in HOT SHUTDOWN within the next 12 hours.
c. One containment spray train AND One containment cooling train	c.1 Restore the inoperable containment spray train or the inoperable containment cooling train to OPERABLE status within 48 hours or be in HOT SHUTDOWN within the next 12 hours.
d. Two containment cooling trains	d.1 Restore at least one inoperable containment cooling train to OPERABLE status within 48 hours or be in HOT SHUTDOWN within the next 12 hours.
e. All other combinations	e.1 Enter LCO 3.0.3 immediately.

SURVEILLANCE REQUIREMENTS

4.6.2.1.1 Each containment spray train shall be demonstrated OPERABLE:

a. At least once per 31 days on a STAGGERED TEST BASIS by:

1. Starting each spray pump from the control room,

2. Verifying, that on recirculation flow, each spray pump develops a ~~discharge~~ differential pressure of $\geq$ ~~254 psig~~ 232 psid,

*The Containment Spray System is not required to be OPERABLE in MODE 3 if pressurizer pressure is < 1750 psia.

PLANT SYSTEMS

AUXILIARY FEEDWATER PUMPS

LIMITING CONDITIONS FOR OPERATION

3.7.1.2 At least three steam generator auxiliary feedwater pumps shall be OPERABLE with:

a. Two feedwater pumps capable of being powered from separate OPERABLE emergency busses, and

b. One feedwater pump capable of being powered from an OPERABLE steam supply system.

APPLICABILITY: MODES 1, 2, and 3.

ACTION:

a. With one auxiliary feedwater pump inoperable, restore the required auxiliary feedwater pumps to OPERABLE status within 72 hours or be in at least HOT STANDBY within the next 6 hours and in HOT SHUTDOWN within the following 6 hours.

b. With two auxiliary feedwater pumps inoperable be in at least HOT STANDBY within 6 hours and in HOT SHUTDOWN within the following 6 hours.

c. With three auxiliary feedwater pumps inoperable, immediately initiate corrective action to restore at least one auxiliary feedwater pump to OPERABLE status as soon as possible. Entry into an OPERATIONAL MODE or other specified condition under the provisions of Specification 3.0.4 shall not be made with three auxiliary feedwater pumps inoperable.

SURVEILLANCE REQUIREMENTS

4.7.1.2 Each auxiliary feedwater pump shall be demonstrated OPERABLE:

a. At least once per 31 days by:

1. Starting each pump from the control room,

2. Verifying that:

a) Each motor driven pump develops a ~~discharge~~ pressure of ≥ ~~1070 psig~~ 1144 psid on recirculation flow, and

b) The steam turbine driven pump develops a ~~discharge~~ differential pressure of ≥ ~~1080 psig~~ 1134 psid, corrected to rated pump speed, on recirculation flow when the secondary steam supply pressure is greater than 800 psig. The provisions of Specification 4.0.4 are not applicable for entry into Mode 3.

PLANT SYSTEMS

3/4.7.3 REACTOR BUILDING CLOSED COOLING WATER SYSTEM

LIMITING CONDITION FOR OPERATION

3.7.3.1 Two independent reactor building closed cooling water loops shall be OPERABLE.

APPLICABILITY: MODES 1, 2, 3 and 4.

ACTION:

With one reactor building closed cooling water loop inoperable, restore the inoperable loop to OPERABLE status within 48 hours or be in COLD SHUTDOWN within the next 36 hours.

SURVEILLANCE REQUIREMENTS

4.7.3.1 Each reactor building closed cooling water loop shall be demonstrated OPERABLE:

a. At least once per 31 days on a STAGGERED TEST BASIS by:

1. Starting (unless already operating) each pump from the control room,

2. Verifying that each pump develops at least 93% of the ~~discharge~~ differential pressure for the applicable flow rate as determined from the manufacturer's Pump Performance Curve.

3. Verifying that each pump operates for at least 15 minutes,

4. Verifying that each loop is aligned to receive electrical power from separate OPERABLE emergency busses.

5. Verifying correct position of all valves servicing safety related equipment that are not locked, sealed or otherwise secured in position, and

6. Exercising all automatically operated valves servicing safety related equipment and testable during plant operation.

b. At least once per 18 months by exercising all power operated valves through one complete cycle of full travel.

~~4/22/94~~

PLANT SYSTEMS

3/4.7.4 SERVICE WATER SYSTEM

LIMITING CONDITION FOR OPERATION

3.7.4.1 Two independent service water loops shall be OPERABLE.

APPLICABILITY: MODES 1, 2, 3 and 4.

ACTION:

With one service water loop inoperable, restore the inoperable loop to OPERABLE status within 48 hours or be in COLD SHUTDOWN within the next 36 hours.

SURVEILLANCE REQUIREMENTS

4.7.4.1 Each service water loop shall be demonstrated OPERABLE:

a. At least once per 31 days on a STAGGERED TEST BASIS by:

1. Starting (unless already operating) each pump from the control room,

2. Verifying that each pump develops at least 93% of the ~~discharge~~ differential pressure for the applicable flow rate as determined from the manufacturer's Pump Performance Curve.

3. Verifying that each pump operates for at least 15 minutes,

4. Verifying that each loop is aligned to receive electrical power from separate OPERABLE emergency busses.

5. Verifying correct position of all valves servicing safety related equipment that are not locked, sealed or otherwise secured in position, and

6. Exercising all automatically operated valves servicing safety related equipment and testable during plant operation.

b. At least once per 18 months* by exercising all power operated valves through one complete cycle of full travel.

*Except that the surveillance requirement due no later than May 5, 1994, may be deferred until the next refueling outage, but no later than September 30, 1994, whichever is earlier.

3/4.5.1 SAFETY INJECTION TANKS (continued)

within 6 hours and pressurizer pressure reduced to < 1750 psia within 12 hours. The allowed completion times are reasonable, based on operating experience, to reach the required plant condition from full power conditions in an orderly manner and without challenging plant systems.

If more than one SIT is inoperable, the unit is in a condition outside the accident analyses. Therefore, LCO 3.0.3 must be entered immediately.

3/4.5.2 and 3/4.5.3 ECCS SUBSYSTEMS

The OPERABILITY of two separate and independent ECCS subsystems ensures that sufficient emergency core cooling capability will be available in the event of a LOCA assuming the loss of one subsystem through any single failure consideration. Either subsystem operating in conjunction with the safety injection tanks is capable of supplying sufficient core cooling to limit the peak cladding temperatures within acceptable limits for all postulated break sizes ranging from the double ended break of the largest RCS cold leg pipe downward.

The ECCS leak rate surveillance requirements assure that the leakage rates assumed for the system outside containment during the recirculation phase will not be exceeded.

The Surveillance Requirements provided to ensure OPERABILITY of each component ensures that at a minimum, the assumptions used in the accident analyses are met and that subsystem OPERABILITY is maintained. The purpose of the HPSI and LPSI pumps differential pressure test on recirculation ensures that the pump(s) have not degraded to a point where the accident analysis would be adversely impacted. ~~The actual inputs into the safety analysis for HPSI and LPSI pumps differential pressure (discharge-suction) when running on recirculation are 1209 and 150 psi, respectively. The acceptance criteria in the Technical Specifications were adjusted upward to account for instrument uncertainties and drift.~~

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The acceptance criteria for the HPSI pumps Technical Specification Surveillance Requirement (SR 4.5.2.a.1.b), a minimum pump recirculation flow test, was developed assuming a 5% degraded pump using the manufacturer curves. The associated accident analyses assume a HPSI flow that represents 5% degradation. Early delivery of HPSI pump flow, at high head conditions similar to those established when the pump is on recirculation flow, is an important assumption in the accident analyses. Flow measurement instrument inaccuracy has been accounted for in the design basis hydraulic analysis. Pressure measurement instrument inaccuracy will be accounted for in the acceptance criteria contained in the surveillance procedure for SR 4.5.2.a.1.b. Pressure measurement instrument inaccuracy is not reflected in the Technical Specification acceptance criteria.

The acceptance criteria for the LPSI pumps Technical Specification Surveillance Requirement (SR 4.5.2.a.2.b) was developed assuming a 10% degraded pump from the actual pump curves. The associated accident analyses assume a LPSI flow that represents 10% degradation. For the limiting large break loss of coolant accident (LBLOCA) analysis case, the analysis does not credit LPSI flow following the safety injection actuation signal until after a time delay which simulates the time for the emergency diesel generators to start and load. After this delay, the Reactor Coolant System (RCS) has depressurized well below the shutoff head of the LPSI pumps. At this low RCS pressure, the operating point of the pumps is significantly greater than minimum recirculation flow. For boron precipitation control following a loss of coolant accident, the LPSI pump is credited with providing hot leg injection flow. The operating point for the LPSI pumps during hot leg injection is also greater than minimum recirculation flow. Flow measurement instrument inaccuracy has been accounted for in the design basis hydraulic analysis. Pressure measurement instrument inaccuracy will be applied and controlled by the surveillance procedures when verifying pump performance in the flow ranges credited in the accident analyses. No correction for pressure measurement instrument inaccuracy will be applied to minimum recirculation flow type test data since this portion of the curve is not credited in the accident analyses. Pressure measurement instrumentation inaccuracy is not reflected in either Technical Specification SR 4.5.2.a.2.b, or in the associated surveillance procedure.

3/4.6.2 DEPRESSURIZATION AND COOLING SYSTEMS

3/4.6.2.1 CONTAINMENT SPRAY AND COOLING SYSTEMS

The OPERABILITY of the containment spray system ensures that containment depressurization and cooling capability will be available in the event of a LOCA. The pressure reduction and resultant lower containment leakage rate are consistent with the assumptions used in the accident analyses. The leak rate surveillance requirements assure that the leakage assumed for the system outside containment during the recirculation phase will not be exceeded.

The OPERABILITY of the containment cooling system ensures that 1) the containment air temperature will be maintained within limits during normal operation, and 2) adequate heat removal capacity is available when operated in conjunction with the containment spray system during post-LOCA conditions.

To be OPERABLE, the two trains of the containment spray system shall be capable of taking a suction from the refueling water storage tank on a containment spray actuation signal and automatically transferring suction to the containment sump on a sump recirculation actuation signal. Each containment spray train flow path from the containment sump shall be via an OPERABLE shutdown cooling heat exchanger.

The containment cooling system consists of two containment cooling trains. Each containment cooling train has two containment air recirculation and cooling units. For the purpose of applying the appropriate action statement, the loss of a single containment air recirculation and cooling unit will make the respective containment cooling train inoperable.

Either the containment spray system or the containment cooling system has sufficient heat removal capability to handle any design basis accident. However, the containment spray system is more effective in dealing with the superheated steam from a main steam break inside containment. Therefore, at least one train of containment spray is always required to be OPERABLE, when pressurizer pressure is $\geq$ 1750 psia.

INSERT B

3/4.6.3 CONTAINMENT ISOLATION VALVES

The Technical Requirements Manual contains the list of containment isolation valves (except the containment air lock and equipment hatch). Any changes to this list will be reviewed under 10CFR50.59 and approved by the Plant Operations Review Committee (PORC).

The OPERABILITY of the containment isolation valves ensures that the containment atmosphere will be isolated from the outside environment in the event of a release of radioactive material to the containment atmosphere or pressurization of the containment. Containment isolation within

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The Technical Specification Surveillance Requirements provided to ensure OPERABILITY of each component ensures that at a minimum, the assumptions used in the accident analysis are met and that subsystem OPERABILITY is maintained. The purpose of the containment spray pumps differential pressure test on recirculation, Surveillance Requirement 4.6.2.1.1.a.2, ensures that the pumps have not degraded to a point where the accident analysis would be adversely impacted. The surveillance requirement acceptance criteria for the containment spray pumps was developed assuming a 5% degraded pump from the actual pump curves. Flow and pressure measurement instrument inaccuracies have been accounted for in the design basis hydraulic analysis. It is not necessary to account for either flow or pressure measure instrument inaccuracy in the acceptance criteria contained in the surveillance procedure. Flow and pressure measurement instrument inaccuracies are already reflected in the Technical Specification acceptance criteria.

3/4.7.1.2 AUXILIARY FEEDWATER PUMPS

The OPERABILITY of the auxiliary feedwater pumps ensures that the Reactor Coolant System can be cooled down to less than 300°F from normal operating conditions in the event of a total loss of off-site power.

Any single motor driven or steam driven pump has the required capacity to provide sufficient feedwater flow to remove reactor decay heat and reduce the RCS temperature to 300°F where the shutdown cooling system may be placed into operation for continued cooldown.

3/4.7.1.3 CONDENSATE STORAGE TANK INSERT C

The OPERABILITY of the condensate storage tank with the minimum water volume ensures that sufficient water is available for cooldown of the Reactor Coolant System to less than 300°F in the event of a total loss of off-site power. The minimum water volume is sufficient to maintain the RCS at HOT STANDBY conditions for 10 hours with steam discharge to atmosphere.

3/4.7.1.4 ACTIVITY

The limitations on secondary system specific activity ensure that the resultant off-site radiation dose will be limited to a small fraction

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The Technical Specification Surveillance Requirements provided to ensure OPERABILITY of each component ensures that at a minimum, the assumptions used in the accident analysis are met and that subsystem OPERABILITY is maintained. The purpose of the auxiliary feedwater pumps differential pressure tests on recirculation, Surveillance Requirements 4.7.1.2.a.2.a and 4.7.1.2.a.2.b, is to ensure that the pumps have not degraded to a point where the accident analysis would be adversely impacted. The surveillance requirement acceptance criteria for the auxiliary feedwater pumps was developed assuming a 5% degraded pump from the actual pump curves. The surveillance requirement acceptance criteria for the turbine driven auxiliary feedwater pump can be adjusted to account for the affect on pump performance of variations in pump speed. Flow and pressure measurement instrument inaccuracies have not been accounted for in the design basis hydraulic analysis for the motor driven auxiliary feedwater pumps. Flow, pressure, and speed measurement instrument inaccuracies have not been accounted for in the design basis hydraulic analysis for the turbine driven auxiliary feedwater pump. Corrections for flow, pressure, and speed (turbine driven pump only) measurement instrument inaccuracies will be applied to test data taken when verifying pump performance in the flow ranges credited in the accident analyses. No corrections for flow, pressure, and speed (turbine driven pump only) measurement instrument inaccuracies will be applied to minimum recirculation flow type test data since this portion of the curve is not credited in the accident analyses. Corrections for flow, pressure, and speed (turbine driven pump only) measurement instrument inaccuracies are not reflected in the Technical Specification acceptance criteria.

a feedwater isolation signal since the steam line break accident analysis credits them in prevention of feed line volume flashing in some cases. Since the block valves are not credited with isolation, they are not required to operate as fast as the isolation valves although equal response times for all valves are specified. Feedwater pumps are assumed to trip immediately with an MSI signal.

3/4.7.2 STEAM GENERATOR PRESSURE/TEMPERATURE LIMITATION

The limitation on steam generator pressure and temperature ensures that the pressure induced stresses in the steam generators do not exceed the maximum allowable fracture toughness stress limits. The limitations of 70°F and 200-psig are based on a steam generator RT_{NDT} of 50°F and are sufficient to prevent brittle fracture.

3/4.7.3 REACTOR BUILDING CLOSED COOLING WATER SYSTEM

The OPERABILITY of the reactor building closed cooling water system ensures that sufficient cooling capacity is available for continued operation of vital components and Engineered Safety Feature equipment during normal and accident conditions. The redundant cooling capacity of this system, assuming a single failure, is consistent with the assumptions used in the accident analyses.

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The Technical Specification Surveillance Requirements provided to ensure OPERABILITY of each component ensures that at a minimum, the assumptions used in the accident analysis are met and that subsystem OPERABILITY is maintained. The purpose of the reactor building closed cooling water pumps differential pressure test, Surveillance Requirement 4.7.3.1.a.2, a substantial flow test, is to ensure that the pumps have not degraded to a point where the accident analysis would be adversely impacted. The surveillance requirement acceptance criteria for the reactor building closed cooling water pumps was developed assuming a 7% degraded pump from the actual pump curves. Flow measurement instrument inaccuracy for the reactor building closed cooling water pumps has been accounted for in the design basis hydraulic analysis. Pressure measurement instrument inaccuracy for the reactor building closed cooling water pumps is accounted for in the acceptance criteria contained in the surveillance procedure.

PLANT SYSTEMS

BASES

3/4.7.4 SERVICE WATER SYSTEM

The OPERABILITY of the service water system ensures that sufficient cooling capacity is available for continued operation of vital components and Engineered Safety Feature equipment during normal and accident conditions. The redundant cooling capacity of this system, assuming a single failure, is consistent with the assumptions used in the accident analyses.

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3/4.7.5 FLOOD LEVEL

The service water pump motors are normally protected against water damage to an elevation of 22 feet. If the water level is exceeding plant grade level or if a severe storm is approaching the plant site, one service water pump motor will be protected against flooding to a minimum elevation of 28 feet to ensure that this pump will continue to be capable of removing decay heat from the reactor. In order to ensure operator accessibility to the intake structure action to provide pump motor protection will be initiated when the water level reaches plant grade level.

3/4.7.6 CONTROL ROOM EMERGENCY VENTILATION SYSTEM

The OPERABILITY of the control room emergency ventilation system ensures that 1) the ambient air temperature does not exceed the allowable temperature for continuous duty rating for the equipment and instrumentation cooled by this system and 2) the control room will remain habitable for operations personnel during and following all credible accident conditions. The OPERABILITY of this system in conjunction with control room design provisions is based on limiting the radiation exposure to personnel occupying the control room to 5 rem or less whole body, or its equivalent. This limitation is consistent with the requirements of General Design Criteria 10 of Appendix "A", 10 CFR 50.

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The Technical Specification Surveillance Requirements provided to ensure OPERABILITY of each component ensures that at a minimum, the assumptions used in the accident analysis are met and that subsystem OPERABILITY is maintained. The purpose of the service water pumps differential pressure test, Surveillance Requirement 4.7.4.1.a.2, a substantial flow test, is to ensure that the pumps have not degraded to a point where the accident analysis would be adversely impacted. The surveillance requirement acceptance criteria for the service water pumps was developed assuming a 7% degraded pump from the actual pump curves. Flow and pressure measurement instrument inaccuracies for the service water pumps have been accounted for in the design basis hydraulic analysis. It is not necessary to account for flow and pressure measurement instrument inaccuracies in the acceptance criteria contained in the surveillance procedure.

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Attachment 4

Millstone Nuclear Power Station, Unit No. 2
Proposed Revision to Technical Specifications
Engineered Safety Features Pump Testing
Retyped Pages

January 1999

4.5.2 Each ECCS subsystem shall be demonstrated OPERABLE:

a. At least once per 31 days on a STAGGERED TEST BASIS by:

1. Verifying that each high-pressure safety injection pump:

a) Starts automatically on a test signal.

b) Develops a differential pressure of $\geq$ 1193 psid on recirculation flow.

c) Operates for at least 15 minutes.

2. Verifying that each low-pressure safety injection pump:

a) Starts automatically on a test signal.

b) Develops a differential pressure of $\geq$ 163 psid on recirculation flow.

c) Operates for at least 15 minutes.

3. Verifying that each charging pump:

a) Starts automatically on a test signal.

b) Operates for at least 15 minutes.

4. Verifying that each boric acid pump (when required OPERABLE per Specification 3.5.2.d):

a) Starts automatically on a test signal.

b) Develops a discharge pressure of $\geq$ 98 psig on recirculation flow.

c) Operates for at least 15 minutes.

5. Verifying that upon a sump recirculation actuation signal, the containment sump isolation valves open.

6. Cycling each testable, automatically operated valve through at least one complete cycle.

7. Verifying the correct position for each manual valve not locked, sealed or otherwise secured in position.

8. Verifying the correct position for each remote or automatically operated valve.

9. Verifying that each ECCS subsystem is aligned to receive electrical power from separate OPERABLE emergency busses.

3/4.6.2 DEPRESSURIZATION AND COOLING SYSTEMS

CONTAINMENT SPRAY AND COOLING SYSTEMS

LIMITING CONDITION FOR OPERATION

3.6.2.1 Two containment spray trains and two containment cooling trains, with each cooling train consisting of two containment air recirculation and cooling units, shall be OPERABLE.

APPLICABILITY: MODES 1, 2 and 3*.

ACTION:

Inoperable Equipment	Required Action
a. One containment spray train	a.1 Restore the inoperable containment spray train to OPERABLE status within 7 days or be in HOT SHUTDOWN within the next 12 hours.
b. One containment cooling train	b.1 Restore the inoperable containment cooling train to OPERABLE status within 7 days or be in HOT SHUTDOWN within the next 12 hours.
c. One containment spray train AND One containment cooling train	c.1 Restore the inoperable containment spray train or the inoperable containment cooling train to OPERABLE status within 48 hours or be in HOT SHUTDOWN within the next 12 hours.
d. Two containment cooling trains	d.1 Restore at least one inoperable containment cooling train to OPERABLE status within 48 hours or be in HOT SHUTDOWN within the next 12 hours.
e. All other combinations	e.1 Enter LCO 3.0.3 immediately.

SURVEILLANCE REQUIREMENTS

4.6.2.1.1 Each containment spray train shall be demonstrated OPERABLE:

a. At least once per 31 days on a STAGGERED TEST BASIS by:

1. Starting each spray pump from the control room,

2. Verifying, that on recirculation flow, each spray pump develops a differential pressure of $\geq$ 232 psid,

*The Containment Spray System is not required to be OPERABLE in MODE 3 if pressurizer pressure is < 1750 psia.

AUXILIARY FEEDWATER PUMPS

LIMITING CONDITION FOR OPERATION

3.7.1.2 At least three steam generator auxiliary feedwater pumps shall be OPERABLE with:

a. Two feedwater pumps capable of being powered from separate OPERABLE emergency busses, and

b. One feedwater pump capable of being powered from an OPERABLE steam supply system.

APPLICABILITY: MODES 1, 2 and 3.

ACTION:

a. With one auxiliary feedwater pump inoperable, restore the required auxiliary feedwater pumps to OPERABLE status within 72 hours or be in at least HOT STANDBY within the next 6 hours and in HOT SHUTDOWN within the following 6 hours.

b. With two auxiliary feedwater pumps inoperable be in at least HOT STANDBY within 6 hours and in HOT SHUTDOWN within the following 6 hours.

c. With three auxiliary feedwater pumps inoperable, immediately initiate corrective action to restore at least one auxiliary feedwater pump to OPERABLE status as soon as possible. Entry into an OPERATIONAL MODE or other specified condition under the provisions of Specification 3.0.4 shall not be made with three auxiliary feedwater pumps inoperable.

SURVEILLANCE REQUIREMENTS

4.7.1.2 Each auxiliary feedwater pump shall be demonstrated OPERABLE:

a. At least once per 31 days by:

1. Starting each pump from the control room,

2. Verifying that:

a) Each motor driven pump develops a differential pressure of $\geq$ 1144 psid on recirculation flow, and

b) The steam turbine driven pump develops a differential pressure of $\geq$ 1134 psid, corrected to rated pump speed, on recirculation flow when the secondary steam supply pressure is greater than 800 psig. The provisions of Specification 4.0.4 are not applicable for entry into Mode 3.

3/4.7.3 REACTOR BUILDING CLOSED COOLING WATER SYSTEM

LIMITING CONDITION FOR OPERATION

3.7.3.1 Two independent reactor building closed cooling water loops shall be OPERABLE.

APPLICABILITY: MODES 1, 2, 3 and 4.

ACTION:

With one reactor building closed cooling water loop inoperable, restore the inoperable loop to OPERABLE status within 48 hours or be in COLD SHUTDOWN within the next 36 hours.

SURVEILLANCE REQUIREMENTS

4.7.3.1 Each reactor building closed cooling water loop shall be demonstrated OPERABLE:

a. At least once per 31 days on a STAGGERED TEST BASIS by:

1. Starting (unless already operating) each pump from the control room,

Verifying that each pump develops at least 93% of the differential pressure for the applicable flow rate as determined from the manufacturer's Pump Performance Curve.

3. Verifying that each pump operates for at least 15 minutes,

4. Verifying that each loop is aligned to receive electrical power from separate OPERABLE emergency busses.

5. Verifying correct position of all valves servicing safety related equipment that are not locked, sealed or otherwise secured in position, and

6. Exercising all automatically operated valves servicing safety related equipment and testable during plant operation.

b. At least once per 18 months by exercising all power operated valves through one complete cycle of full travel.

3/4.7.4 SERVICE WATER SYSTEM

LIMITING CONDITION FOR OPERATION

3.7.4.1 Two independent service water loops shall be OPERABLE.

APPLICABILITY: MODES 1, 2, 3 and 4.

ACTION:

With one service water loop inoperable, restore the inoperable loop to OPERABLE status within 48 hours or be in COLD SHUTDOWN within the next 36 hours.

SURVEILLANCE REQUIREMENTS

4.7.4.1 Each service water loop shall be demonstrated OPERABLE:

a. At least once per 31 days on a STAGGERED TEST BASIS by:

1. Starting (unless already operating) each pump from the control room,

2. Verifying that each pump develops at least 93% of the differential pressure for the applicable flow rate as determined from the manufacturer's Pump Performance Curve.

3. Verifying that each pump operates for at least 15 minutes,

4. Verifying that each loop is aligned to receive electrical power from separate OPERABLE emergency busses.

5. Verifying correct position of all valves servicing safety related equipment that are not locked, sealed or otherwise secured in position, and

6. Exercising all automatically operated valves servicing safety related equipment and testable during plant operation.

b. At least once per 18 months* by exercising all power operated valves through one complete cycle of full travel.

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*Except that the surveillance requirement due no later than May 5, 1994, may be deferred until the next refueling outage, but no later than September 30, 1994, whichever is earlier.

3/4.5.1 SAFETY INJECTION TANKS (continued)

within 6 hours and pressurizer pressure reduced to < 1750 psia within 12 hours. The allowed completion times are reasonable, based on operating experience, to reach the required plant condition from full power conditions in an orderly manner and without challenging plant systems.

If more than one SIT is inoperable, the unit is in a condition outside the accident analyses. Therefore, LCO 3.0.3 must be entered immediately.

3/4.5.2 and 3/4.5.3 ECCS SUBSYSTEMS

The OPERABILITY of two separate and independent ECCS subsystems ensures that sufficient emergency core cooling capability will be available in the event of a LOCA assuming the loss of one subsystem through any single failure consideration. Either subsystem operating in conjunction with the safety injection tanks is capable of supplying sufficient core cooling to limit the peak cladding temperatures within acceptable limits for all postulated break sizes ranging from the double ended break of the largest RCS cold leg pipe downward.

The ECCS leak rate surveillance requirements assure that the leakage rates assumed for the system outside containment during the recirculation phase will not be exceeded.

The Surveillance Requirements provided to ensure OPERABILITY of each component ensures that at a minimum, the assumptions used in the accident analyses are met and that subsystem OPERABILITY is maintained. The purpose of the HPSI and LPSI pumps differential pressure test on recirculation ensures that the pump(s) have not degraded to a point where the accident analysis would be adversely impacted.

The acceptance criteria for the HPSI pumps Technical Specification Surveillance Requirement (SR 4.5.2.a.1.b), a minimum pump recirculation flow test, was developed assuming a 5% degraded pump using the manufacturer curves. The associated accident analyses assume a HPSI flow that represents 5% degradation. Early delivery of HPSI pump flow, at high head conditions similar to those established when the pump is on recirculation flow, is an important assumption in the accident analyses. Flow measurement instrument inaccuracy has been accounted for in the design basis hydraulic analysis. Pressure measurement instrument inaccuracy will be accounted for in the acceptance criteria contained in the surveillance procedure for SR 4.5.2.a.1.b. Pressure measurement instrument inaccuracy is not reflected in the Technical Specification acceptance criteria.

The acceptance criteria for the LPSI pumps Technical Specification Surveillance Requirement (SR 4.5.2.a.2.b) was developed assuming a 10% degraded pump from the actual pump curves. The associated accident analyses assume a LPSI flow that represents 10% degradation. For the limiting large

break loss of coolant accident (LBLOCA) analysis case, the analysis does not credit LPSI flow following the safety injection actuation signal until after a time delay which simulates the time for the emergency diesel generators to start and load. After this delay, the Reactor Coolant System (RCS) has depressurized well below the shutoff head of the LPSI pumps. At this low RCS pressure, the operating point of the pumps is significantly greater than minimum recirculation flow. For boron precipitation control following a loss of coolant accident, the LPSI pump is credited with providing hot leg injection flow. The operating point for the LPSI pumps during hot leg injection is also greater than minimum recirculation flow. Flow measurement instrument inaccuracy has been accounted for in the design basis hydraulic analysis. Pressure measurement instrument inaccuracy will be applied and controlled by the surveillance procedures when verifying pump performance in the flow ranges credited in the accident analyses. No correction for pressure measurement instrument inaccuracy will be applied to minimum recirculation flow type test data since this portion of the curve is not credited in the accident analyses. Pressure measurement instrumentation inaccuracy is not reflected in either Technical Specification SR 4.5.2.a.2.b, or in the associated surveillance procedure.

The purpose of the ECCS throttle valve surveillance requirements is to provide 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.

Verification of the correct position for the mechanical and/or electrical valve stops can be performed by either of the following methods:

1. Visuallly verify the valve opens to the designated throttled position; or

2. Manually position the valve to the designated throttled position and verify that the valve does not move when the applicable valve control switch is placed to "OPEN."

In MODE 4 the automatic safety injection signal generated by low pressurizer pressure and high containment pressure and the automatic sump recirculation actuation signal generation by low refueling water storage tank level are not required to be OPERABLE. Automatic actuation in MODE 4 is not required because adequate time is available for plant operators to evaluate plant conditions and respond by manually operating engineered safety features components. Since the manual actuation (trip pushbuttons) portion of the safety injection and sump recirculation actuation signal generation is required to be OPERABLE in MODE 4, the plant operators can use the manual trip pushbuttons to rapidly position all components to the required accident

3/4.6.2 DEPRESSURIZATION AND COOLING SYSTEMS

3/4.6.2.1 CONTAINMENT SPRAY AND COOLING SYSTEMS

The OPERABILITY of the containment spray system ensures that containment depressurization and cooling capability will be available in the event of a LOCA. The pressure reduction and resultant lower containment leakage rate are consistent with the assumptions used in the accident analyses. The leak rate surveillance requirements assure that the leakage assumed for the system outside containment during the recirculation phase will not be exceeded.

The OPERABILITY of the containment cooling system ensures that 1) the containment air temperature will be maintained within limits during normal operation, and 2) adequate heat removal capacity is available when operated in conjunction with the containment spray system during post-LOCA conditions.

To be OPERABLE, the two trains of the containment spray system shall be capable of taking a suction from the refueling water storage tank on a containment spray actuation signal and automatically transferring suction to the containment sump on a sump recirculation actuation signal. Each containment spray train flow path from the containment sump shall be via an OPERABLE shutdown cooling heat exchanger.

The containment cooling system consists of two containment cooling trains. Each containment cooling train has two containment air recirculation and cooling units. For the purpose of applying the appropriate action statement, the loss of a single containment air recirculation and cooling unit will make the respective containment cooling train inoperable.

Either the containment spray system or the containment cooling system has sufficient heat removal capability to handle any design basis accident. However, the containment spray system is more effective in dealing with the superheated steam from a main steam break inside containment. Therefore, at least one train of containment spray is always required to be OPERABLE, when pressurizer pressure is $\geq$ 1750 psia.

The Technical Specification Surveillance Requirements provided to ensure OPERABILITY of each component ensures that at a minimum, the assumptions used in the accident analysis are met and the subsystem OPERABILITY is maintained. The purpose of the containment spray pumps differential pressure test on recirculation, Surveillance Requirement 4.6.1.1.a.2, ensures that the pumps have not degraded to a point where the accident analysis would be adversely impacted. The surveillance requirement acceptance criteria for the containment spray pumps was developed assuming a 5% degraded pump from the actual pump curves. Flow and pressure measurement instrument inaccuracies have been accounted for in the design basis hydraulic analysis. It is not necessary to account for either flow or pressure measure instrument inaccuracy in the acceptance criteria contained in the surveillance procedure. Flow and pressure measurement instrument inaccuracies are already reflected in the Technical Specification acceptance criteria.

3/4.7.1.2 AUXILIARY FEEDWATER PUMPS

The OPERABILITY of the auxiliary feedwater pumps ensures that the Reactor Coolant System can be cooled down to less than 300°F from normal operating conditions in the event of a total loss of off-site power.

Any single motor driven or steam driven pump has the required capacity to provide sufficient feedwater flow to remove reactor decay heat and reduce the RCS temperature to 300°F where the shutdown cooling system may be placed into operation for continued cooldown.

The Technical Specification Surveillance Requirements provided to ensure OPERABILITY of each component ensures that at a minimum, the assumptions used in the accident analysis are met and that subsystem OPERABILITY is maintained. The purpose of the auxiliary feedwater pumps differential pressure tests on recirculation, Surveillance Requirements 4.7.1.2.a.2.a and 4.7.1.2.a.2.b, is to ensure that the pumps have not degraded to a point where the accident analysis would be adversely impacted. The surveillance requirement acceptance criteria for the auxiliary feedwater pumps was developed assuming a 5% degraded pump from the actual pump curves. The surveillance requirement acceptance criteria for the turbine driven auxiliary feedwater pump can be adjusted to account for the affect on pump performance of variations in pump speed. Flow and pressure measurement instrument inaccuracies have not been accounted for in the design basis hydraulic analysis for the motor driven auxiliary feedwater pumps. Flow, pressure, and speed measurement instrument inaccuracies have not been accounted for in the design basis hydraulic analysis for the turbine driven auxiliary feedwater pump. Corrections for flow, pressure, and speed (turbine driven pump only) measurement instrument inaccuracies will be applied to test data taken when verifying pump performance in the flow ranges credited in the accident analyses. No corrections for flow, pressure, and speed (turbine driven pump only) measurement instrument inaccuracies will be applied to minimum recirculation flow type test data since this portion of the curve is not credited in the accident analyses. Corrections for flow, pressure, and speed (turbine driven pump only) measurement instrument inaccuracies are not reflected in the Technical Specification acceptance criteria.

3/4.7.1.3 CONDENSATE STORAGE TANK

The OPERABILITY of the condensate storage tank with the minimum water volume ensures that sufficient water is available for cooldown of the Reactor Coolant System to less than 300°F in the event of a total loss of off-site power. The minimum water volume is sufficient to maintain the RCS at HOT STANDBY conditions for 10 hours with steam discharge to atmosphere.

3/4.7.1.4 ACTIVITY

The limitations on secondary system specific activity ensure that the resultant off-site radiation dose will be limited to a small fraction

a feedwater isolation signal since the steam line break accident analysis credits them in prevention of feed line volume flashing in some cases. Since the block valves are not credited with isolation, they are not required to operate as fast as the isolation valves although equal response times for all valves are specified. Feedwater pumps are assumed to trip immediately with an MSI signal.

3/4.7.2 STEAM GENERATOR PRESSURE/TEMPERATURE LIMITATION

The limitation on steam generator pressure and temperature ensures that the pressure induced stresses in the steam generators do not exceed the maximum allowable fracture toughness stress limits. The limitations of 70°F and 200-psig are based on a steam generator RT_{NDT} of 50°F and are sufficient to prevent brittle fracture.

3/4.7.3 REACTOR BUILDING CLOSED COOLING WATER SYSTEM

The OPERABILITY of the reactor building closed cooling water system ensures that sufficient cooling capacity is available for continued operation of vital components and Engineered Safety Feature equipment during normal and accident conditions. The redundant cooling capacity of this system, assuming a single failure, is consistent with the assumptions used in the accident analyses.

The Technical Specification Surveillance Requirements provided to ensure OPERABILITY of each component ensures that at a minimum, the assumptions used in the accident analysis are met and that subsystem OPERABILITY is maintained. The purpose of the reactor building closed cooling water pumps differential pressure test, Surveillance Requirement 4.7.3.1.a.2, a substantial flow test, is to ensure that the pumps have not degraded to a point where the accident analysis would be adversely impacted. The surveillance requirement acceptance criteria for the reactor building closed cooling water pumps was developed assuming a 7% degraded pump from the actual pump curves. Flow measurement instrument inaccuracy for the reactor building closed cooling water pumps has been accounted for in the design basis hydraulic analysis. Pressure measurement instrument inaccuracy for the reactor building closed cooling water pumps is accounted for in the acceptance criteria contained in the surveillance procedure.

3/4.7.4 SERVICE WATER SYSTEM

The OPERABILITY of the service water system ensures that sufficient cooling capacity is available for continued operation of vital components and Engineered Safety Feature equipment during normal and accident conditions. The redundant cooling capacity of this system, assuming a single failure, is consistent with the assumptions used in the accident analyses.

The Technical Specification Surveillance Requirements provided to ensure OPERABILITY of each component ensures that at a minimum, the assumptions used in the accident analysis are met and that subsystem OPERABILITY is maintained. The purpose of the service water pumps differential pressure test, Surveillance Requirement 4.7.4.1.a.2, a substantial flow test, is to ensure that the pumps have not degraded to a point where the accident analysis would be adversely impacted. The surveillance requirement acceptance criteria for the service water pumps was developed assuming a 7% degraded pump from the actual pump curves. Flow and pressure measurement instrument inaccuracies for the service water pumps have been accounted for in the design basis hydraulic analysis. It is not necessary to account for flow and pressure measurement instrument inaccuracies in the acceptance criteria contained in the surveillance procedure.

3/4.7.5 FLOOD LEVEL

The service water pump motors are normally protected against water damage to an elevation of 22 feet. If the water level is exceeding plant grade level or if a severe storm is approaching the plant site, one service water pump motor will be protected against flooding to a minimum elevation of 28 feet to ensure that this pump will continue to be capable of removing decay heat from the reactor. In order to ensure operator accessibility to the intake structure action to provide pump motor protection will be initiated when the water level reaches plant grade level.

3/4.7.6 CONTROL ROOM EMERGENCY VENTILATION SYSTEM

The OPERABILITY of the control room emergency ventilation system ensures that 1) the ambient air temperature does not exceed the allowable temperature for continuous duty rating for the equipment and instrumentation cooled by this system and 2) the control room will remain habitable for operations personnel during and following all credible accident conditions. The OPERABILITY of this system in conjunction with control room design provisions is based on limiting the radiation exposure to personnel occupying the control room to 5 rem or less whole body, or its equivalent. This limitation is consistent with the requirements of General Design Criteria 10 of Appendix "A", 10 CFR 50.