LIMITING CONDITIONS FOR OPERATION AND SURVEILLANCE REQUIREMENTS

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BASES

3/4.4 MAIN COOLANT SYSTEM

3/4.4.1 MAIN COOLANT LOOPS

COOLANT CIRCULATION - STARTUP AND POWER OPERATION

LIMITING CONDITION FOR OPERATION

3.4.1.1.1 All main coolant loops shall be in operation with all loop isolation valves, open with power removed per Specification 4.5.2.b.3.

APPLICABILITY: MODES 1 and 2

ACTION:

a. With the requirements of the above Specification not satisfied, be in at least HOT STANDBY within 1 hour.

SURVEILLANCE REQUIREMENTS

4.4.1.1.1.1 The above required main coolant loops shall be verified to be in operation and circulating main coolant at least once per 12 hours.

MAIN COOLANT SYSTEM

COOLANT CIRCULATION - HOT STANDBY

LIMTING CONDITION FOR OPERATION

3.4.1.1.2 a. All main coolant loops shall be OPERABLE with all loop isolation valves, open with power removed per Specification 4.5.2.b.3.

b. At least one main coolant loop shall be in operation.*

APPLICABILITY: MODE 3

ACTION:

a. With less than the above required main coolant loops OPERABLE, restore the required loops to OPERABLE status within 72 hours or be in HOT SHUTDOWN within the next 12 hours.

b. With no main coolant loop in operation, suspend all operations involving a reduction in boron concentration of the Main Coolant System and immediately initiate corrective action to return the required coolant loop to operation.

c. With the reactor vessel and connecting pressurizer system isolated from the heat removal system by closing the loop isolation valve(s), leak testing may be performed provided that the coolant temperature in the reactor vessel does not increase at a rate exceeding 50° per hour, the maximum temperature increase during the test period does not exceed 100°F, and pressurizer pressure does not exceed 2485 psig.

SURVEILLANCE REQUIREMENTS

4.4.1.1.2.1 At least the above required main coolant pumps, if not in operation, shall be determined to be OPERABLE once per 7 days by verifying correct breaker alignments and indicated power availability.

4.4.1.1.2.2 At least one Main Coolant loop shall be verified to be in operation and circulating main coolant at least once per 12 hours.

*All main coolant pumps may be de-engergized provided (1) no operations are permitted that would cause dilution of the main coolant system boron concentration, and (2) core outlet temperature is maintained at least 10°F below saturation temperature.

SURVEILLANCE REQUIREMENTS

4.4.1.1.2.3 Determine that the steam generators associated with the main coolant loops required to be in operation are capable of decay heat removal by verifying at least once per 24 hours that:

a. The Main Coolant System is closed and pressurized to $\geq$100 psi above saturation pressure.

b. The Main Coolant System loop cold and hot leg stop valves are fully open, with the bypass valve closed.

c. The steam generator water level is above the top of the tube bundle.

d. An inventory of over 85,000 gallons of primary grade feedwater is available.

e. A boiler feed pump is OPERABLE.

MAIN COOLANT SYSTEM

COOLANT CIRCULATION - SHUTDOWN

LIMTING CONDITION FOR OPERATION

3.4.1.1.3 a. At least two of the coolant loops listed below shall be OPERABLE:**

1. Main Coolant Loop 1 and its associated steam generator and main coolant pump,
2. Main Coolant Loop 2 and its associated steam generator and main coolant pump,
3. Main Coolant Loop 3 and its associated steam generator and main coolant pump,
4. Main Coolant Loop 4 and its associated steam generator and main coolant pump,
5. Shutdown Cooling System, (Shutdown Cooling Pump and Cooler)
6. Shutdown Cooling System, (Low Pressure Surge Tank Cooling Pump and Cooler)

b. At least one of the above coolant loops shall be in operation.*

APPLICABILITY: MODES 4** and 5

ACTION:

a. With less than the above required loops OPERABLE, immediately initiate corrective action to return the required loops to OPERABLE status as soon as possible; be in COLD SHUTDOWN within 20 hours.

b. With no coolant loop in operation, suspend all operations involving a reduction in boron concentration of the Main Coolant System and immediately initiate corrective action to return the required coolant loop to operation.

*All main coolant pumps and decay heat removal pumps may be de-energized provided (1) no operations are permitted that would cause dilution of the main coolant system boron concentration, and (2) core outlet temperature is maintained at least 10°F below saturation temperature.

**All main coolant loops shall be OPERABLE with all loop isolation valves, open with power removed per Specification 4.5.2.b.3 when in Mode 4.

LIMITING CONDITIONS FOR OPERATION (Continued)

c. With the reactor vessel and connecting pressurizer system isolated from the heat removal system by closing the loop isolation valve(s), leak testing may be performed provided that the coolant temperature in the reactor vessel does not increase at a rate exceeding 50° per hour, the maximum temperature increase during the test period does not exceed 100°F, and pressurizer pressure does not exceed 2485 psig.

SURVEILLANCE REQUIREMENTS

4.4.1.1.3.1 The required residual heat removal loop(s) shall be determined OPERABLE per Specification 4.0.5.

4.4.1.1.3.2 The required main coolant pump(s), if not in operation, shall be determined to be OPERABLE once per 7 days by verifying correct breaker alignments and indicated power availability.

4.4.1.1.3.3 Determine that the steam generator(s) associated with the main coolant loop(s) required to be in operation are capable of decay heat removal by verifying at least once per 24 hours that:

a. The Main Coolant System is closed and pressurized to 100 psi above saturation pressure.

b. The Main Coolant System loop cold and hot leg stop valves are fully open, with the bypass valve closed.

c. The steam generator water level is above the top of the tube bundle.

d. An inventory of over 85,000 gallons of primary grade feedwater is available.

e. A boiler feed pump is OPERABLE.

4.4.1.1.3.4 At least one coolant loop shall be verified to be in operation and circulating main coolant at least once per 12 hours.

4.4.1.1.3.5 Verify that the Shutdown Cooling System isolation valves are locked closed within one hour prior to increasing Main Coolant System pressure above 300 PSIG.

4.4.1.1.3.6 At least once per 18 months, during shutdown, demonstrate main coolant loop isolation valve operability by cycling each valve through at least one complete cycle of full travel from the control room.

REFUELING OPERATIONS

RESIDUAL HEAT REMOVAL AND COOLANT CIRCULATION

ALL WATER LEVELS

LIMITING CONDITION FOR OPERATION

3.9.8.1 At least one residual heat removal (RHR) loop, either the Shutdown Cooling Pump and Cooler or the Low Pressure Surge Tank Pump and Cooler, shall be in operation.

APPLICABILITY: MODE 6

ACTION:

a. With less than one residual heat removal loop not in operation, except as provided in b. below, suspend all operations involving an increase in the reactor decay heat load or a reduction in boron concentration of the Main Coolant System. Close all containment penetrations providing direct access from the containment atmosphere to the outside atmosphere within 4 hours.

b. The residual heat removal loop may be removed from operation for up to 6 hours in any 24 hour period during the performance of CORE ALTERATIONS, or during changeover to the backup pump and cooler.

c. The provisions of Specification 3.0.3 are not applicable.

SURVEILLANCE REQUIREMENTS

4.9.8 At least one residual heat removal loop shall be determined to be in operation and circulating main coolant at a flow rate of 950 gpm at least once per 24 hours.

LOW WATER LEVEL

LIMITING CONDITION FOR OPERATION

3.9.8.2 Two Residual Heat Removal (RHR) loops shall be OPERABLE.

APPLICABILITY: MODE 6 when the water level above the top of the irradiated fuel assemblies seated within the reactor pressure vessel is less than 32 feet.

ACTION:

a. With less than the required RHR loops OPERABLE, immediately initiate corrective action to return the required RHR loops to OPERABLE status as soon as possible.

b. The provisions of Specification 3.0.3 are not applicable.

SURVEILLANCE REQUIREMENTS

4.9.8.2 The required Residual Heat Removal loops shall be determined OPERABLE per Specification 4.0.5.

3/4.4.1 MAIN COOLANT LOOPS

The plant is designed to operate with all main coolant loops in operation, and maintain DNBR above 1.30 during all normal operations and anticipated transients.

In MODE 3, a single main coolant loop provides sufficient heat removal capability for removing decay heat; however, single failure considerations require that two loops be OPERABLE. Safety Injection System considerations require four loops to be OPERABLE.

In MODES 4 and 5, a single main coolant loop or RHR loop provides sufficient heat removal capability for removing decay heat; but single failure considerations require that at least two loops be OPERABLE. Thus, if the main coolant loops are not OPERABLE, this specification requires two RHR loops to be OPERABLE. Safety Injection System considerations require four loops to be OPERABLE in Mode 4.

The operation of one Main Coolant Pump or one RHR pump provides adequate flow to ensure mixing, prevent stratification and produce gradual reactivity changes during boron concentration reduction in the Main Coolant System. The reactivity change rate associated with boron reduction will, therefore, be within the capability of operator recognition and control.

The requirement to maintain the boron concentration of an isolated loop greater than or equal to the boron concentration of the operating loops ensures that no reactivity addition to the core could occur during startup of an isolated loop. Verification of the boron concentration in an isolated loop prior to opening the stop valves provides a reassurance of the adequacy of the boron concentration in the isolated loop. Startup of an isolated loop will inject cool water from the loop into the core. The reactivity transient resulting from this cool water injection is minimized by delaying isolated loop startup until its temperature is within 30°F of the operating loops. Making the reactor subcritical prior to loop startup prevents any power spike which could result from this cool water induced reactivity transient.

The prohibition on starting a main coolant pump without a bubble in the pressurizer or with a SG/MCS temperature difference of 100°F requirement is necessary to prevent exceeding the isothermal Appendix G curve limits under the most restrictive MC flow initiation transient if the PORV or SCS relief valves fail.

3/4.4.2 and 3/4.4.3 SAFETY VALVES

The pressurizer code safety valves operate to prevent the Main Coolant System from being pressurized above its Safety Limits of 2735 psig. Each safety valve is designed to relieve 92,000 lbs per hour of saturated steam at the valve set point. The relief capacity of a single safety valve is adequate to relieve any overpressure condition which could occur during shutdown. In the event that no safety valves are OPERABLE, an operating Shutdown Cooling System connected to the Main Coolant System provides overpressure relief capability and will prevent Main Coolant System overpressurization during shutdown.

3/4.9.6 SHIELD TANK CAVITY MANIPULATOR CRANE OPERABILITY

The OPERABILITY requirements for the manipulator cranes ensure that: 1) the manipulator crane and universal handling tool will be used for movement of control rods and fuel assemblies, 2) each crane and tool has sufficient load capacity to lift a control rod or fuel assembly, and 3) the core internals and pressure vessel are protected from excessive lifting force in the event they are inadvertently engaged during lifting operations.

3/4.9.7 CRANE TRAVEL - SPENT FUEL PIT

The restriction on movement of loads in excess of the nominal weight of a fuel assembly over fuel assemblies in the spent fuel pit ensures that in the event this load is dropped (1) the activity release will be limited to that contained in a single fuel assembly, and (2) any possible distortion of the fuel in the storage tanks will not result in a critical array. This assumption is consistent with the activity release assumed in the accident analysis.

Handling of the present fuel pit building roof hatches for infrequent transfers of spent fuel racks by administrative control will assure safe handling of the roof hatches. The restriction of movement of the spent fuel storage racks and spent fuel inspection stand over spent fuel ensures that a rack or stand cannot be dropped on spent fuel. Dropping of a rack or stand from a maximum height will not result in loss of integrity of the fuel pit floor. Handling of the fuel handling equipment for infrequent maintenance by administrative control will ensure the safe handling of any fuel handling components. Handling of fuel casks over the spent fuel pit is not permitted until such time as NRC has reviewed and approved the spent fuel cask drop evaluation.

3/4.9.8 RESIDUAL HEAT REMOVAL AND COOLANT CIRCULATION

The requirement that at least one residual heat removal (RHR) loop be in operation ensures that (1) sufficient cooling capacity is available to remove decay heat and maintain the water in the reactor pressure vessel below 140°F as required during the REFUELING MODE, and (2) sufficient coolant circulation is maintained through the reactor core to minimize the effect of a boron dilution incident and prevent boron stratification.

The requirement to have two RHR loops OPERABLE when there is less than 32 feet of water above the core ensures that a single failure of the operating RHR loop will not result in a complete loss of residual heat removal capability. With the reactor vessel head removed and 32 feet of water above the core a large heat sink is available for core cooling. Thus, in the event of a failure of the operating RHR loop, adequate time is provided to initiate emergency procedures to cool the core.