REACTIVITY CONTROL SYSTEMS

BORATED WATER SOURCES - SHUTDOWN

LIMITING CONDITIONS FOR OPERATION

3.1.2.7 As a minimum, one of the following borated water sources shall be OPERABLE:

a. One boric acid storage tank with:

1. A minimum contained volume of 12,544 gallons,

2. Between 7,000 and 7,700 ppm of boron, and

3. A minimum solution temperature of 65°F.

b. The refueling water storage tank with:

1. A minimum contained volume of 101,432 gallons,

2. Between 2,000 and 2,500 ppm of boron, and

3. A minimum solution temperature of 37°F.

APPLICABILITY: MODES 5 and 6.

ACTION:

With no borated water sources OPERABLE, suspend all operations involving CORE ALTERATIONS or positive reactivity changes until at least one borated water source is restored to OPERABLE status.

SURVEILLANCE REQUIREMENTS

4.1.2.7 The above-required borated water source shall be demonstrated OPERABLE:

a. At least once per 7 days by:

1. Verifying the boron concentration of the water,

2. Verifying the water level of the tank, and

3. Verifying the boric acid storage tank solution temperature when it is the source of borated water and the outside ambient air temperature is <37°F.

REACTIVITY CONTROL SYSTEMS

BASES

3/4.1.2 BORATION SYSTEMS (Continued)

With the RCS temperature below 200°F, one injection system is acceptable without single failure consideration on the basis of the stable reactivity condition of the reactor and the additional restrictions prohibiting CORE ALTERATIONS and positive reactivity change in the event the single injection system becomes inoperable.

The boron inventory in the RWST or BAT is sufficient (a) to compensate for an inadvertent positive reactivity addition to the Reactor Coolant System of approximately 1 percent $\Delta k/k$ while in MODE 5 at 200°F; and (b) to maintain a constant RCS reactivity while the temperature is decreased from 200°F to 80°F. In MODE 6, the BAT inventory is sufficient to increase the boron concentration to compensate for an inadvertent positive reactivity addition of appoximately 1 percent $\Delta k/k$ while in the refueling mode. These conditions require 8494 usable gallons of 7000-ppm borated water from the boric acid storage tanks or 23,432 usable gallons of 2000-ppm borated water from the refueling water storage tank.

The required boric acid storage tank volume of 8494 gallons has been increased to a value greater than the minimum level indicating range (4050 gallons), to 12,544 gallons. The required RWST volume of 23,432 gallons must be increased to account for nonusable volume due to tank geometry, letdown and vortexing considerations (78,000 gallons), to 101,432 gallons.

3/4.1.3 MOVABLE CONTROL ASSEMBLIES

The specifications of this section ensure that (1) acceptable power distribution limits are mantained, (2) the minimum SHUTDOWN MARGIN is maintained, and (3) limit the potential effects of a rod ejection accident. OPERABILITY of the control rod position indicators is required to determine control rod positions and thereby ensure compliance with the control rod alignment and insertion limits.

The ACTION statements which permit limited variations from the basic requirements are accompanied by additional restrictions which ensure that the original criteria are met. Misalignment of a rod requires measurement of peaking factors or a restriction of THERMAL POWER; either of these restrictions provides assurance of fuel rod integrity during continued operation. The reactivity worth of a misaligned rod is limited for the remainder of the fuel cycle to prevent exceeding the assumptions used in the accident analysis for a rod ejection accident.

The maximum rod drop time restriction is consistent with the assumed rod drop time used in the accident analyses. Measurement with $T_{avg} \geq 550°F$ and with all reactor coolant pumps operating ensures that the measured drop times will be representative of insertion times experienced during a reactor trip at operating conditions.

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