PLANT SYSTEMS

SECONDARY WATER CHEMISTRY

LIMITING CONDITION FOR OPERATION

3.xxx The secondary water chemistry shall be maintained within the limits of Table 3.XX.

APPLICABILITY: Modes 1, 2 and 3.

ACTION:

a. With the condenser condensate total cation conductivity exceeding its Steady State Limit but within its Transient Limit, restore the conductivity to within its Steady State Limit within 7 days; or, be in HOT SHUTDOWN within the next 12 hours.

b. With the condenser condensate total cation conductivity exceeding its Transient Limit, restore the conductivity to within the Transient Limit within 96 hours or be in HOT SHUTDOWN within the next 12 hours.

c. With the total cation conductivity of the final feedwater to any steam generator exceeding its Steady State Limit but within its Transient Limit, verify at least once per 24 hours that the pH and maximum total solids in the final feedwater are within the limits of Table 3.XX. and restore the conductivity to within its Steady State Limit within 7 days; or, be in HOT SHUTDOWN within the next 12 hours.

d. With the pH and/or maximum total solids of the final feedwater to any steam generator exceeding its limit(s), restore the out-of-limit parameter(s) to within its limit(s) within 72 hours or be in HOT SHUTDOWN within the next 12 hours.

e. With the total cation conductivity of the final feedwater to any steam generator exceeding its Transient Limit, restore the conductivity to within its limit within 72 hours or be in HOT SHUTDOWN within the next 12 hours.

SURVEILLANCE REQUIREMENTS

4.xxx The secondary water chemistry parameters shall be determined to be within the limits at least once per 24 hours by analyzing the condenser condensate and steam generator final feedwater for total cation conductivity.

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PLANT SYSTEMS

BASES

3/4.xxx SECONDARY WATER CHEMISTRY

Contamination of the steam generator secondary coolant can cause potential tube degradation and impair tube integrity. Generally, the most severe contamination results from condenser inleakage of causticforming impurities that may accumulate on the secondary side of the steam generator, or on the high heat flux surfaces of the steam generator tubes can lead to the potential for intergranular stress corrosion cracking.

Monitoring of the condenser condensate by cation conductivity is an effective means of detecting condenser tube inleakage. The leakage rate can then be determined by comparing the cation concentration in the condensate with the cation concertration in the condenser cooling water. The cation conductivity of the steam generator final feedwater will indicate when blowdown is required to remove the accumulation of caustic forming impurities and the scale forming solids in the steam generator. Monitoring the pH and free hydroxide the final feedwater provides a means to initiate balance of corrective actions needed to restore the operating secondary coolant. Monitoring the total solids in the final feedwater will indicate the potential accumulation of solids and the necessity for blowdown to minimize sludge buildup.

Controlling the secondary water chemistry within the specified limits will control the potential accumulation of corrosive impurities in the steam generator and minimize tube degradation. These limits provide reasonable assurance that the conditions in the steam generator will minimize the potential for tube degradation during all conditions of operation, and postulated accidents. These measures ensure the continued protection of the steam generator tubing which is an essential part of the reactor coolant pressure boundary.

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TABLE 3.xx

SECONDARY WATER CHEMISTRY LIMITS

Water Sample Location	Total Cation Conductivity µmhos/cm2 @ 25°C: Steady State Limits	Total Cation Conductivity µmhos/cm2 @ 25°C: Transient Limits	pH @ 25°C: Limits	Maximum Total Solids: Limits
Condenser Condensate	≤( )	≤ ( )	N.A.	N.A.
Final Feedwater	≤( )	≤ ( )*	( )≤pH≤( )	≤ ( )

* May be increased to (   ) for the first (   ) hours during startup from HOT SHUTDOWN.

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TABLE 1.1

OPERATIONAL MODES

MODE	REACTIVITY CONDITION, K_{eff}	%RATED THERMAL POWER*	AVERAGE COOLANT TEMPERATURE
1. POWER OPERATION	$\geq$ 0.99	> 5%	$\geq$ (305)°F
2. STARTUP	$\geq$ 0.99	$\leq$ 5%	$\geq$ (305)°F
3. HOT STANDBY	< 0.99	0	$\geq$ (305)°F
4. HOT SHUTDOWN	< 0.99	0	(305)°F > T_{avg} > 200°F
5. COLD SHUTDOWN	< 0.99	0	$\leq$ 200°F
6. REFUELING**	$\leq$ 0.95	0	$\leq$ 140°F

*Excluding decay heat.

**Reactor vessel head unbolted or removed and fuel in the vessel.

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