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LIMITING CONDITIONS FOR OPERATION AND SURVEILLANCE REQUIREMENTS

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CONTAINMENT SYSTEMS

3/4 6.5 ICE CONDENSER

ICE BED

LIMITING CONDITION FOR OPERATION

- 3 6 5.1 The ice bed shall be OPERABLE with:
- a. The stored ice having a boron concentration of ≥ 1800 ppm and ≤ 2500 ppm boron as sodium tetraborate and a pH of 9.0 to 9.5,
 - b. Flow channels through the ice condenser,
 - c. A maximum ice bed temperature of less than or equal to 27°F,
 - d. A total ice weight of at least 2,082,024 pounds at a 95% level of confidence, and
 - e. 1944 ice baskets

APPLICABILITY: MODES 1, 2, 3 and 4.

ACTION:

With the ice bed inoperable, restore the ice bed to OPERABLE status within 48 hours or be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours

SURVEILLANCE REQUIREMENTS

- 4.6 5.1 The ice condenser shall be determined OPERABLE:
- a. At least once per 12 hours by verifying that the maximum ice bed temperature is less than or equal to 27°F.
 - b. At least once per 18 months by verifying, by visual inspection, accumulation of ice on structural members comprising flow channels through the ice bed is ≤ 15 percent blockage of the total flow area for each safety analysis section.

CONTAINMENT SYSTEMS

ICE BED TEMPERATURE MONITORING SYSTEM

LIMITING CONDITION FOR OPERATION

3.6 5 2 This specification is deleted

CONTAINMENT SYSTEMS

ICE CONDENSER DOORS

LIMITING CONDITION FOR OPERATION

3 6 5.3 The ice condenser inlet doors, intermediate deck doors, and top deck doors shall be closed and OPERABLE.

APPLICABILITY: MODES 1, 2, 3 and 4.

ACTION

- a. With one or more ice condenser inlet doors inoperable due to being physically retrained from opening, restore all inlet doors to OPERABLE status within 1 hour or be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours.
- b. With one or more ice condenser doors open or otherwise inoperable for reasons other than action a., POWER OPERATION may continue for up to 14 days provided the ice bed temperature is monitored at least once per 4 hours and the maximum ice bed temperature is maintained less than or equal to 27°F; otherwise, restore the doors to their closed positions or OPERABLE status (as applicable) within 48 hours or be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours.

SURVEILLANCE REQUIREMENTS

4 6.5.3 1 Inlet Doors - Ice condenser inlet doors shall be:

- a. Continuously monitored and determined closed, and
- b. Demonstrated OPERABLE at least once per 18 months by:
 1. Verifying that the torque required to initially open each door is less than or equal to 675 inch pounds.
 2. Verifying that opening of each door is not impaired by ice, frost, debris, or obstruction
 3. Verifying that the torque required to open each door is less than 195 inch-pounds when the door is 40 degrees open. This torque is defined as the "door opening torque" and is equal to the nominal door torque plus a frictional torque component.

CONTAINMENT SYSTEMS

INLET DOOR POSITION MONITORING SYSTEM

LIMITING CONDITION FOR OPERATION

3.6.5.4 This specification is deleted.

CONTAINMENT SYSTEMS

BASES

Frost buildup or loose ice is not to be considered as flow channel blockage, whereas attached ice is considered blockage of a flow channel. Frost is the solid form of water that is loosely adherent, and can be brushed off with the open hand

The frequency of 18 months was based on ice storage tests and the allowance built into the required ice mass over and above the mass assumed in the safety analyses. Operating experience has verified that, with the 18-month interval, the weight requirements are maintained with no significant degradation between surveillances

Verifying the chemical composition of the stored ice ensures that the ice and the resulting melted water will meet the requirement for borated water for accident analysis. This is accomplished by obtaining at least 24 ice samples. Each sample is taken approximately one foot from the top of the ice of each randomly selected ice basket in each ice condenser bay. The SR is modified by a NOTE that allows the boron concentration and pH value obtained from averaging the individual samples' analysis results to satisfy the requirements of the SR. If either the average boron concentration or the average pH value is outside their prescribed limit, then entry into the LCO ACTION is required. Sodium tetraborate has been proven effective in maintaining the boron content for long storage periods, and it also enhances the ability of the solution to remove and retain fission product iodine. The high pH is required to enhance the effectiveness of the ice and the melted ice in removing iodine from the containment atmosphere. This pH range also minimizes the occurrence of chloride and caustic stress corrosion on mechanical systems and components exposed to ECCS and Containment Spray System fluids in their recirculation mode of operation. The frequency of 54 months is intended to be consistent with the expected length of three fuel cycles, and was developed considering these facts

- a. Long-term ice storage tests have determined that the chemical composition of the stored ice is extremely stable;
- b. There are no normal operating mechanisms that decrease the boron concentration of the stored ice, and pH remains within a 9.0-9.5 range when boron concentrations are above approximately 1200 ppm.
- c. Operating experience has demonstrated that meeting the boron concentration and pH requirements has never been a problem, and
- d. Someone would have to enter the containment to take the sample, and, if the unit is at power, that person would receive a radiation dose.

The SR is modified by a NOTE that allows the chemical analysis to be performed on either the liquid or resulting ice of each sodium tetraborate solution prepared. If ice is obtained from off site sources, then chemical analysis data must be obtained for the ice supplied.

3/4 6 5 2 ICE BED TEMPERATURE MONITORING SYSTEM

This specification is deleted

CONTAINMENT SYSTEMS

BASES

3/4.6.5.3 ICE CONDENSER DOORS

The OPERABILITY of the ice condenser doors ensures that these doors will open because of the differential pressure between upper and lower containment resulting from the blowdown of reactor coolant during a LOCA and that the blow-down will be diverted through the ice condenser bays for heat removal and thus containment pressure control. The requirement that the doors be maintained closed during normal operation ensures that excessive sublimation of the ice will not occur because of warm air intrusion from the lower containment.

If an ice condenser inlet door is physically restrained from opening, the system function is degraded, and immediate action must be taken to restore the opening capability of the inlet door. Being physically restrained from opening is defined as those conditions in which an inlet door is physically blocked from opening by installation of a blocking device or by an obstruction from temporary or permanently installed equipment or is otherwise inhibited from opening such as may result from ice, frost, debris, or increased inlet door opening torque beyond the valves specified in Surveillance Requirement 4.6.5.3.1.

Note entry into Limiting Condition for Operation Action Statement 3.6.5.3.b is not required due to personnel standing on or opening an intermediate deck or upper deck door for short durations to perform required surveillances, minor maintenance such as ice removal, or routine tasks such as system walkdowns.

3/4.6.5.4 INLET DOOR POSITION MONITORING SYSTEM

This specification is deleted.

3/4.6.5.5 DIVIDER BARRIER PERSONNEL ACCESS DOORS AND EQUIPMENT HATCHES

The requirements for the divider barrier personnel access doors and equipment hatches being closed and OPERABLE ensure that a minimum bypass steam flow will occur from the lower to the upper containment compartments during a LOCA. This condition ensures a diversion of the steam through the ice condenser bays that is consistent with the LOCA analyses.