

Question 440.30N

With regard to the information in Appendix 5.4.A "Cold Shutdown Capability" identify the most limiting single failure with regard to cooldown capability and verify that the statement of Table 5.4.A-1 that the auxiliary feedwater storage tank (AFST) "capacity of 500,000 gallons is adequate to support 4 hours at hot standby conditions followed by 10 hours cooldown to RHR cut in condition with a margin for contingencies" considers this failure.

Response*insert*

The most limiting failure regarding cooldown time is the loss of "A" train AC power, which results in the loss of two steam generator PORVs. The AFST usable capacity of 525,000 gallons is adequate to support 4 hours at hot standby, a 14-hour cooldown, followed by depressurization to RHR conditions with a margin for contingencies. A maximum of 377,000 gallons of water would be added to the effective steam generators during this period.

The AFST sizing considers possible level instrument error, water delivered to a faulted steam generator, water lost through the turbine lube oil cooler, various small system water losses (i.e., flange or pump seal leakage), and a margin against vortex formation. The minimum usable volume in the AFST above the suction nozzles is 445,000 gallons.

INSERT

The most limiting failure regarding cooldown time is a Main Feedwater Line Break (MFLB) with a failure of an Auxiliary Feedwater flow control valve. The flow control valve failure in the open position maximizes the water added to the steam generator with the MFLB. The amount of water needed for energy removal and cooldown would be <376,000 gallons with a total time to RHR cut-in of <21 hours. A cooldown of 25°F/hr can be accomplished with the remaining three steam generators. The corresponding miscellaneous losses at 21 hours is 95,000 gallons to define a total AFST water volume of <471,000 gallons. The AFST usable capacity of 525,000 is adequate to support this limiting condition.

ATTACHMENT 4

PROPOSED CHANGE TO
TECHNICAL SPECIFICATION 3.7.1.3

PLANT SYSTEMS

ATTACHMENT 4
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AUXILIARY FEEDWATER STORAGE TANK

LIMITING CONDITION FOR OPERATION

3.7.1.3 The auxiliary feedwater storage tank (AFST) shall be OPERABLE with a contained water volume of at least ~~510,000~~ 485,000 gallons of water.

APPLICABILITY: MODES 1, 2, and 3.

ACTION:

With the AFST inoperable, within 4 hours restore the AFST to OPERABLE status or be in at least HOT STANDBY within the next 6 hours and in HOT SHUTDOWN within the following 6 hours.

SURVEILLANCE REQUIREMENTS

4.7.1.3 The AFST shall be demonstrated OPERABLE at least once per 12 hours by verifying the contained water volume is within its limits.

BASES3/4.7.1.2 AUXILIARY FEEDWATER SYSTEM

The OPERABILITY of the Auxiliary Feedwater System ensures that the Reactor Coolant System can be cooled down to less than 350°F from normal operating conditions in the event of a total loss-of-offsite power.

Each auxiliary feedwater pump is capable of delivering a total feedwater flow of 540 gpm at a pressure of 1324 psig to the entrance of the steam generators. This capacity is sufficient to ensure that adequate feedwater flow is available to remove decay heat and reduce the Reactor Coolant System temperature to less than 350°F when the Residual Heat Removal System may be placed into operation. The AFW pumps are tested using the test line back to the AFST and the AFW isolation valves closed to prevent injection of cold water into the steam generators. The SIPEGS isolation valves are active valves required to open on an AFW actuation signal. Specification 4.7.1.2.1 requires these valves to be verified in the correct position.

3/4.7.1.3 AUXILIARY FEEDWATER STORAGE TANK (AFST)

The OPERABILITY of the auxiliary feedwater storage tank with the minimum water volume ensures that sufficient water is available to maintain the RCS at HOT STANDBY conditions for 4 hours with steam discharge to the atmosphere concurrent with total loss-of-offsite power, followed by a cooldown to 350°F at 25°F per hour. The contained water volume limit includes an allowance for water not usable because of tank discharge line location or other physical characteristics.

3/4.7.1.4 SPECIFIC ACTIVITY

main feedwater line and failure of the AFW flow control valve

The limitations on Secondary Coolant System specific activity ensure that the resultant offsite radiation dose will be limited to a small fraction of 10 CFR Part 100 dose guideline values in the event of a steam line rupture. This dose also includes the effects of a coincident 1 gpm primary-to-secondary tube leak in the steam generator of the affected steam line. These values are consistent with the assumptions used in the safety analyses.

3/4.7.1.5 MAIN STEAM LINE ISOLATION VALVES

The OPERABILITY of the main steam line isolation valves ensures that no more than one steam generator will blow down in the event of a steam line rupture. This restriction is required to: (1) minimize the positive reactivity effects of the Reactor Coolant System cooldown associated with the blowdown, and (2) limit the pressure rise within containment in the event the steam line rupture occurs within containment. The OPERABILITY of the main steam isolation valves within the closure times of the Surveillance Requirements are consistent with the assumptions used in the safety analyses.