

LIMITING CONDITIONS FOR OPERATION

SURVEILLANCE REQUIREMENTS

3.4 STANDBY LIQUID CONTROL SYSTEM

Applicability:

Applies to the operating status of the Standby Liquid Control System.

Objective:

To assure the availability of a system with the capability to shutdown the reactor and maintain the shutdown condition without the use of control rods.

Specification:

A. Normal System Availability

During periods when fuel is in the reactor and prior to startup from a Cold Condition, the Standby Liquid Control System shall be operable, except as specified in 3.4.B below. This system need not be operable when the reactor is in the Cold Condition and all control rods are fully inserted and Specification 3.3.A is met.

4.4 STANDBY LIQUID CONTROL SYSTEM

Applicability:

Applies to the surveillance requirements of the Standby Liquid Control System.

Objective:

To verify the operability of the Standby Liquid Control System.

Specification:

A. Normal System Availability

The operability of the Standby Liquid Control System shall be shown by the performance of the following tests:

1. At least once per month each pump loop shall be tested for operability by recirculating demineralized water to the test tank.
2. At least once during each operating cycle:
 - a. Check that the settings of the system relief valves are $1450 < P < 1680$ psig and the valves will reset at $P \geq 1300$ psig.
 - b. Manually initiate the system, except explosive valves, and pump boron solution from the Standby Liquid Control Storage Tank through the recirculation path. Minimum pump flow rate of 38.2 gpm against a system head of 1300 psig shall be verified. After pumping boron solution the system will be flushed with demineralized water.
 - c. Manually initiate one of the Standby Liquid Control System Pumps and

3.4 BASES (cont'd.)

The volume versus concentration requirement of the solution is such that, should evaporation occur from any point within the curve, a low level alarm will annunciate before the temperature versus concentration requirements are exceeded.

The quantity of stored boron includes an additional margin (25 percent) beyond the amount needed to shutdown the reactor to allow for possible imperfect mixing of the chemical solution in the reactor water.

A minimum quantity of 2840 gallons of solution having a 16.0 percent sodium pentaborate concentration, or the equivalent as shown in Figure 3.4.1, is required to meet this shutdown requirement.

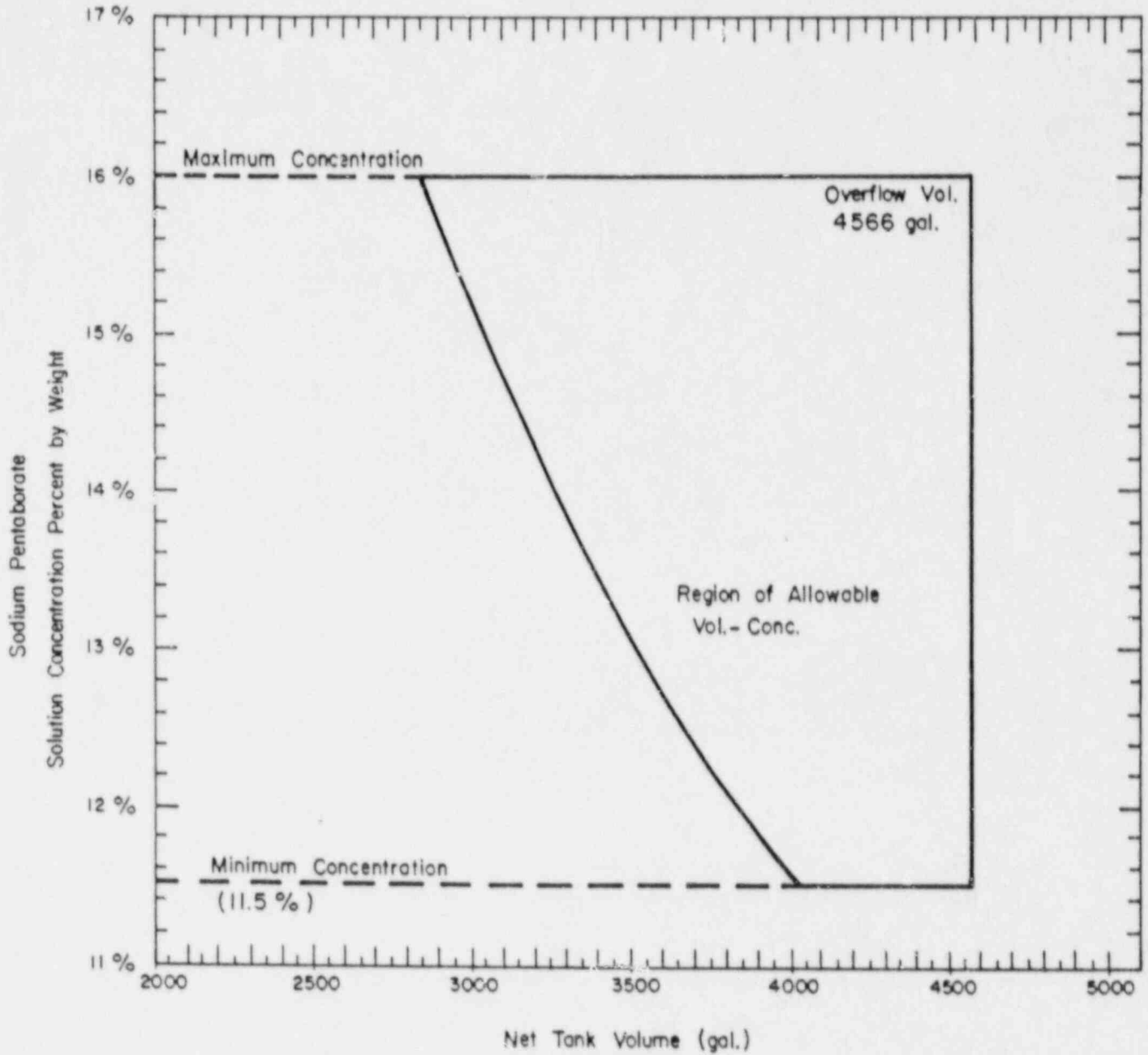
The NRC's final rule on Anticipated Transients Without Scram (ATWS), 10CFR50.62, requires that the Standby Liquid Control System (SLCS) be modified to provide a minimum flow capacity and boron content equivalent in control capacity to 86 gpm of 13 weight percent sodium pentaborate solution for a 251 inch I.D. vessel. For Cooper Nuclear Station, with a 218 inch I.D. vessel, the equivalent minimum flow rate is 66 gpm at 13 weight percent sodium pentaborate. This equivalence is met with both SLCS pumps supplying their minimum flow rate of 38.2 gpm with a solution concentration of at least 11.5 weight percent of sodium pentaborate. Because ATWS is a very low probability event and is considered to be beyond the design basis for CNS, the surveillance and limiting condition for operation requirements need not be more stringent than the original SLCS design basis requirements. The SLCS changes made as a result of the ATWS rule do not invalidate the original system design basis.

4.4 BASES

STANDBY LIQUID CONTROL SYSTEM

Experience with pump operability indicates that the monthly test, in combination with the tests during each operating cycle, is sufficient to maintain pump performance. The only practical time to fully test the liquid control system is during a refueling outage. Various components of the system are individually tested periodically, thus making unnecessary more frequent testing of the entire system.

The bases for the surveillance requirements are given in subsection III.9.6 of the Final Safety Analysis Report, and the details of the various tests are discussed in subsection III.9.5. The solution temperature and volume are checked at a frequency to assure a high reliability of operation of the system should it ever be required.



NEBRASKA PUBLIC POWER DISTRICT
 COOPER NUCLEAR STATION

Sodium Pentaborate
 Solution Volume-Concentration
 Requirements

FIGURE 3.4.1