



UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
WASHINGTON, D. C. 20555

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION  
RELATED TO TECHNICAL SPECIFICATION 3.1.5 "STANDBY LIQUID CONTROL SYSTEM"

FACILITY OPERATING LICENSE NO. NPF-29

ENTERGY OPERATIONS, INC.

GRAND GULF NUCLEAR STATION, UNIT 1

DOCKET NO. 50-416

During August 1988, the licensee conducted a Safety System Functional Assessment of the standby liquid control system (SLCS). As identified in the NRC staff's Inspection Report 50-416/88-25 dated December 5, 1988, three of the major items of concern were:

- (1) Lack of insulation and heat tracing on the SLCS pump suction and discharge piping,
- (2) Technical availability of minimum Technical Specification sodium pentaborate volume and level requirements, and
- (3) Inadequate response to IE Information Notice No. 86-48 "Inadequate Testing of boron Solution Concentration in the Standby Liquid Control System."

The licensee's corrective action for these items was to propose changes to the Technical Specifications (TS).

The present TS for the standby liquid control system are non-conservative since: (1) sodium pentaborate concentrations up to 28%, with a saturation temperature of 112°F, are allowed whereas the unheated SLCS discharge piping is at containment ambient temperature of 70° to 80°F; and (2) the specified minimum volume of 4530 gallons is too small for poison concentrations less than 14.4% (a minimum volume of 4808 gallons is required for the minimum allowable concentration of 13.6%).

However, continued operation is justified until a revised TS is issued because SLCS conditions are maintained within acceptable limits by administrative procedures. The surveillance procedure for adding sodium pentaborate to the storage tank requires the total weight of sodium pentaborate to be between 5900 and 6000 pounds. The total weight of 5900 pounds is greater than 14.4% by weight and the total weight of 6000 pounds corresponds to 17% by weight at the tank low level alarm point. The 17% solution has a saturation temperature of 75° F. Since the surveillance procedure requests the total weight to be kept to less than 6000 pounds, it is not likely that a concentration greater than 17% would be achieved.

The licensee's initially proposed TS submitted by letter dated June 19, 1989, were acceptable to the staff except in two areas; the allowable temperature range for the solution was not specified, and the requirement to determine operability of the heat tracing circuits had been deleted. By letter dated March 29, 1990, the staff requested additional information in these two areas.

By letter dated May 31, 1990, the licensee partially responded to these areas by specifying the temperature range and requiring one of the redundant heat tracing circuits to be operable. However, the licensee proposed new Action statements to allow the heat tracing to be inoperable for an unspecified time provided the suction piping temperature remained above 75°F and to allow sodium pentaborate concentrations up to 32% for 72 hours provided the temperature in the tank stayed above the saturation temperature. This May 31, 1990, proposal was discussed in a November 6, 1990, meeting with the licensee and staff's conclusions regarding this proposal were provided in the staff's summary of the meeting issued November 30, 1990. The licensee's reason for requesting concentrations greater than 15.2% was to allow time for mixing the solution after adding sodium pentaborate. The staff's concern with allowing concentrations above 15.2% for any length of time was that although the short section of suction pipe and the solution in the tank may be kept above 75°F by resetting the controls on the heat tracing and tank heater, the long sections of discharge piping in the containment (which does not have heat tracing) would be at containment ambient temperature. Therefore, for operation with storage tank concentrations greater than 15.5%, the sodium pentaborate may not remain in solution in the pipe if injection was required.

The licensee submitted a revised proposal by letter dated December 7, 1990. This proposal would have retained an allowed outage time of 72 hours for concentrations which exceeded the specified upper limit of 15.2%. In addition, only one of the two heat tracing circuits would have been required to be operable. The staff has completed its review of this proposal. In its review, the staff has considered the TS for the other three domestic BWR-6 reactors and the IE Information Notice No. 86-48, "Inadequate Testing of Boron Solution Concentration in the Standby Liquid Control System". Two of these other BWR-6 reactors require heat tracing to be operable and none of the three allow concentrations after mixing which would have saturation temperatures above the specified minimum solution and piping temperature. The IE Information Notice No. 86-48 indicates that with adequate tank level measurements, adequate mixing with the air sparger and adequate sampling procedures the solution can be accurately diluted or strengthened and maintained within the TS requirements. The plants considered in the information notice were LaSalle, Clinton and Peay.

The staff concludes that the relaxation of the specification as proposed in the December 7, 1990, proposal has not been justified. Accordingly, the staff concludes that the proposed new Action statement 3.1.5.a.3 and the associated new Figure 3.1.5-1 which would allow concentrations greater than 15.2% for times up to 72 hours and proposed surveillance requirement 4.1.5.3 which would allow one division of heat tracing to be continually inoperable are not acceptable. The staff further concludes that the present non-conservative specification should be corrected on a more timely basis. As indicated above, the proposal submitted June 19, 1989, would be acceptable provided the allowable temperature range is specified and provided the heat tracing is required to be operable.

Dated: January 29, 1991

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