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August 26, 1988
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US Nuclear Regulatory Commission
Attn: Document Control Desk
Washington, D C 20555

Dear Sir:

Three Mile Island Nuclear Station, Unit 1 (TMI-1)
Operating License No. DPR-50
Docket No. 50-289
Modification to Borated Water Storage Tank
Low Low Level Alarm Setpoint

GPU Nuclear Corporation recently undertook a review of the switchover sequence from drawdown of the Borated Water Storage Tank for ECCS injection to recirculation from the reactor building sump following a large break loss of coolant accident. This review was precipitated by a preliminary safety concern, which postulated the following:

"Following a LBLOCA, the drawdown of the BWST for ECCS injection will require operator actions to switch the suction of the RB spray, LPI and HPI pumps from the BWST to the RB sump for recirculation mode. Plant limits and precautions (OP-1101-1) states that the transfer of suction for these pumps must occur within 0.2 minutes of the BWST low low level alarm (3 ft.). This procedure involves opening valves DH-V-6A/B, closing valves DH-V-5A/B, and closing valves BS-V-2A/B. The formation of vortices may result from the inability of the operators to perform the transfer within the time frame allocated because of the high flow rates during a LBLOCA. Vortices in the pump suction may result in air binding of these pumps. The loss of LPI pumps would result in the inability to cool the core."

Based on Outage 6R instrument calibration data, the BWST low low level alarm setpoint was determined to be 3.4 ft. (or 40.8 in.) above the bottom of the BWST. A review of historical surveillance data established this level to be typical. A simplified hydraulic calculation was performed which concluded that the Building Spray pumps would have had sufficient NPSH to assure proper pump operation. In addition, the potential for significant air entrainment to the pump suction was considered low based on engineering judgment of pipe line configuration and fluid velocity.

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With respect to adequacy of the 12 second operator response time, FSAR Section 6.1.2.1 specifies that with all engineered safeguards pumps operating, and assuming the maximum break size, the injection mode of operation lasts a minimum of about 25 minutes. Since operator action associated with the low low level alarm is not required until 25 minutes into the event or later, the 12 second response time following an alarm was judged not to compromise the integrity of the system.

Thus, the Building Spray pumps were considered operable. The Building Spray pumps are most limiting in terms of margin on NPSH; therefore, the LPI pumps also were considered operable.

While a safety concern was determined not to exist based on past plant configuration, GPUN opted to raise the BWST low low level alarm setpoint and accelerate switchover so as to preclude air entrainment/vortexing potential. The BWST low low level alarm setpoint has been raised to 76 inches above the tank bottom. The development of the new setpoint increased the assumed operator response time from 12 seconds to 30 seconds.

The Safety Evaluation supporting the setpoint change addressed the performance of the ECCS pumps during BWST drawdown and during sump recirculation. One of the fundamental effects of earlier switchover from the BWST to RB sump is that less inventory will be transferred from the BWST to the RB sump. Assuming a saturated sump, i.e., the reactor building total pressure equals the saturation pressure of the sump water, flow to the Building Spray pumps must be throttled from the design flow of 1500 gpm to an indicated flow of between 1400 gpm and 1300 gpm during recirculation to assure that adequate NPSH is preserved. This includes consideration of instrument error.

This method for demonstrating adequate NPSH is in accordance with TMI-1 licensing history. GPUN identified at the time of initial plant licensing that adequate NPSH could not be demonstrated using Reg. Guide 1.1 assumptions; however, using saturated sump assumptions, the adequacy of the system configuration could be clearly demonstrated. GPUN also identified in FSAR Section 6.4.2 that in the event that available NPSH was considered insufficient while operating in the recirculation mode, the operator could throttle building spray flow.

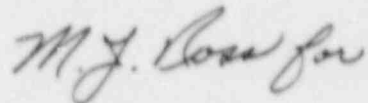
The Safety Evaluation supporting the setpoint change also concluded that the dose consequences associated with throttling building spray flow would not exceed previously licensed values.

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The BWST low low level alarm setpoint was raised prior to restart from Outage 7R, and all necessary procedure changes associated with throttling Building Spray flow during recirculation have been made.

This letter is provided for information only. No NRC response is anticipated.

Sincerely,



H. D. Hukill
Vice President & Director, TMI-1

HDH/SMK:FK

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