SNUPPS

Standardized Nuclear Unit
Power Plant System

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Executive Director

October 20, 1982

SLNRC 82- 040 FILE: 5790
SUBJ: NUREG 0737 Item II.D.1

Mr. Harold Denton, Director
Nuclear Reactor Regulation
U. S. Nuclear Regulatory Commission
Washington, D. C. 20555

Docket Nos.: STN 50-482 and 50-483

Reference:
1. NRC (Eisenhut) letter to all licensees of operating plants and applicants for operating licenses and holders of construction permits dated September 29, 1981, Revised Schedule for Completion of TMI Action Plan Item II.D.1, Relief and Safety Valve Testing (Generic Letter No. 81-36).
2. SLNRC 82-017 from SNUPPS, NUREG 0737 Item II.D.1, dated 3/26/82.
3. SLNRC 82-023 from SNUPPS, NUREG 0737 Item II.D.1, dated 4/29/82
4. SLNRC 82-030 from SNUPPS, NUREG 0737 Item II.D.1, dated 7/1/82.
5. OG-77, "Review of Pressurizer Safety Valve Performance as observed in the EPRI Safety and Relief Valve Test Program", WCAP-10105, dated 7/27/82.

Dear Mr. Denton:

In accordance with the initial recommendations of NUREG 0578, Section 2.1.2 as later clarified by NUREG 0737, Item II.D.1 and the USNRC letter (Reference 1) and extended by Reference 2, each Pressurized Water Reactor (PWR) Utility is to submit a plant specific report for safety and relief valve qualification. Plant specific information on the Garrett relief valve qualification was provided in Reference 3, which completed the SNUPPS documentation on the relief valve qualification. SNUPPS stated in Reference 4 that an action plan for the plant specific report on safety valve qualification was not necessary and that the plant specific report was scheduled for submittal by 9/30/82, consistent with the Reference 2 submittal date of 12/31/82. An evaluation of the EPRI safety valve test program performed by Westinghouse was submitted by Reference 5. This evaluation encompasses the SNUPPS design which employs the Crosby 6M6 safety valve with a loop seal. SNUPPS plants are 4 loop plants with a rating of 3425 MW_t.

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The following are the significant conclusions drawn from the evaluation:

1. Delayed valve opening was evaluated for the limiting Condition II (loss of load) and Condition IV (locked rotor) events. For the Condition II event, safety valve functioning is not required if the reactor trips on high pressurizer pressure. If reactor trip does not occur until the second trip signal (over temperature ΔT), a valve opening delay of approximately 2 seconds would still limit reactor coolant system pressure to within 110 percent of design pressure. For the Condition IV event, the reactor coolant system pressure remains within 120 percent of design pressure in the event of no safety valve opening, assuming reactor trip.

   It should be noted that the valve opening pressures observed in the EPRI tests are in excess of those expected for the actual SNUPPS design. The EPRI test facility pressurization rate was approximately 300 psi/sec compared to an expected maximum value of 144 psi/sec for SNUPPS. Also, the test facility pressurized the system at a fairly constant rate which neglects the effect of reactor trip. These effects tend to cause higher peak pressures as a result of delayed valve opening than would occur in an actual PWR.

2. The pressure pulses in the valve inlet piping due to acoustic water hammer appear to be strongly dependent on the length of water in the loop seal. For the range of water column lengths evaluated in Reference 5, which bounds the SNUPPS design of 5.5 feet, the pipe stress is less than the ASME Service Level C limit. This is consistent with the categorization of relief valve discharges as upset transients and safety valve discharges as emergency transients.

3. Valve chatter was observed in one of the thirteen Crosby 6M6 loop seal tests (on valve closing). The valve performed stably during tests with blowdown values less than that observed for the one test resulting in chatter; however, chatter is apparently not directly initiated by flow through the valves, but is influenced by the valve opening characteristics. Ring settings that lengthen valve opening time were observed to have a positive effect in preventing chatter. In addition, the fact that maintenance was not performed on the valves between tests may have had a bearing on the results. With appropriate ring adjustments the Crosby 6M6 valve provides acceptable performance over the range of fluid conditions tested.

4. Steam flow rates for the Crosby 6M6 valves were in excess of the rated value (420,000 lb/hr) for all tests.

In conclusion, the above evaluation of results of the EPRI safety and relief valve test program demonstrate acceptable operability of the SNUPPS safety valves for their intended application. Therefore, this submittal in combination with Reference 3 submittal completes the SNUPPS documentation of a plant specific report for safety and relief valve qualification. As stated in Reference 1, the SNUPPS plant specific evaluation of safety and relief valve discharge piping and support will be submitted to the NRC by December 31, 1982.

Very truly yours,

[signature] for

Nicholas A. Petrick

JOC/nld

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