

SNUPPS

Standardized Nuclear Unit  
Power Plant System

5 Choke Cherry Road  
Rockville, Maryland 20850  
(301) 869-8010

Nicholas A. Petrick  
Executive Director

September 17, 1981

SLNRC 81-105  
SUBJ: RSB Review

FILE: 0290

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



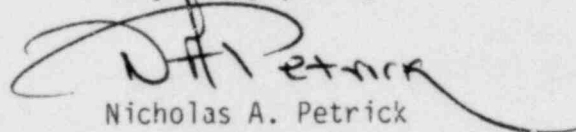
Docket Nos.: STN 50-482, STN 50-483, and STN 50-486

Ref: SLNRC 81-83, dated September 1, 1981, Same subject

Dear Mr. Denton:

The referenced letter provided information required by the NRC's Reactor Systems Branch. Enclosure B to the reference was tables from WCAP-7769 marked-up with SNUPPS parameters. In discussions with the NRC, it was determined that additional information on this subject was required. This information is provided in the enclosure.

Very truly yours,

  
Nicholas A. Petrick

RLS/dck/3b2

Enclosures

cc: J. K. Bryan, UE  
G. L. Koester, KGE  
D. T. McPhee, KCPL  
W. A. Hansen, NRC/Cal  
T. E. Vandel, NRC/WC

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Enclosure to SLNRC 81-105

Required safety valve capacity (peak surge rate into pressurizer following loss of load without trip):

$$= 1,200,000 \text{ lb}_m/\text{hr} = 41.15 \text{ ft}^3/\text{sec}$$

Actual installed safety valve capacity (at 2500 psia + 3% accumulation):

$$= 1,260,000 \text{ lb}_m/\text{hr} = 43.21 \text{ ft}^3/\text{sec}$$

$$\text{Ratio} = \frac{1,260,000}{1,200,000} = 1.050$$

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Define the following ratios:

$$\alpha = \frac{\begin{array}{l} \text{(REQUIRED SAFETY VALVE FLOW TO SHOW "ACCEPTABLE")} \\ \text{(RESULTS FOR TRANSIENTS IN TABLE 2-3)} \end{array}}{\text{(ACTUAL SAFETY VALVE CAPACITY)}}$$

$$\alpha = \frac{w_{svr}}{w_{svc}}$$

$$\beta = \frac{\text{(ACTUAL SAFETY VALVE CAPACITY)}}{\text{(REQUIRED SAFETY VALVE SIZING CAPACITY [PEAK SURGE RATE])}}$$

$$\beta = \frac{w_{svr}}{w_{psur}}$$

Consider two plants:

① = representative 4-loop plant in WCAP-7769

② = SNUPPS

$$\alpha_1 = \frac{w_{svr1}}{w_{svc1}} = 0.86 \quad (1)$$

$$\alpha_2 = \frac{w_{svr2}}{w_{svc2}} \quad (2)$$

$$\beta_1 = \frac{w_{src1}}{w_{psur1}} = 1.056 \quad (3)$$

$$\beta_2 = \frac{w_{svr2}}{w_{psur2}} = 1.050 \quad (4)$$

from (1) and (2)

$$\alpha_2 = \alpha_1 \left( \frac{w_{svr2}}{w_{svr1}} \right) \left( \frac{w_{src1}}{w_{src2}} \right)$$

assume that

$$\frac{w_{svr2}}{w_{svr1}} = 1$$

then

$$\alpha_2 = \alpha_1 \left( \frac{w_{src1}}{w_{src2}} \right)$$

The validity of this assumption is contingent upon the parameters in Table 2-2 being sufficiently close to those for SNUPPS that the expected transient response would be the same.

$$\alpha_2 = (0.86) \frac{43.3}{43.21}$$

$$\alpha_2 = 0.862$$

If it is assumed that the safety valve flow required to show acceptability for the transients in Table 2-3 for SNUPPS is greater than that required to show acceptability in the WCAP-7769 4-loop plant by an amount proportional to the amount by which the peak surge rate for SNUPPS is greater than the peak surge rate for the WCAP-7769 4-loop plant, then

$$\frac{w_{svr2}}{w_{svr1}} = \frac{w_{psur2}}{w_{psur1}} = \frac{41.15}{41.0}$$

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therefore

$$\alpha_2 = \alpha_1 \left( \frac{w_{svc1}}{w_{svc2}} \right) \left( \frac{w_{psur2}}{w_{psur1}} \right)$$

$$\alpha_2 = (0.86) \left( \frac{43.3}{43.21} \right) \left( \frac{41.15}{41.0} \right)$$

$$\alpha_2 = 0.865$$