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 FILE: 0290
SUBJ: RSB Review

RECEIVED SEP 22 1981 U.S. NUCLEAR REGULATORY COMMISSION

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,

N A Petrick

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):

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

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

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

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

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Define the following ratios:

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

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

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

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

Consider two plants:

① = representative 4-loop plant in WCAP-7769

② = SNUPPS

$$\alpha_1 = \frac{W_{svr_1}}{W_{svc_1}} = 0.86 \qquad (1)$$

$$\alpha_2 = \frac{W_{svr_2}}{W_{svc_2}} \qquad (2)$$

$$\beta_1 = \frac{W_{src_1}}{W_{psur_1}} = 1\ 056 \qquad (3)$$

$$\beta_2 = \frac{W_{svr_2}}{W_{psur_2}} = 1.050 \qquad (4)$$

from (1) and (2)

$$\alpha_2 = \alpha_1 \left(\frac{W_{svr_2}}{W_{svr_1}}\right)\left(\frac{W_{src_1}}{W_{svc_2}}\right)$$

assume that

$$\frac{W_{svr_2}}{W_{svr_1}} = 1$$

then

$$\alpha_2 = \alpha_1 \left(\frac{W_{svc_1}}{W_{svc_2}}\right)$$

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

$$\frac{W_{svr_2}}{W_{svr_1}} = \frac{W_{psur_2}}{W_{psur_1}} = \frac{41.15}{41.0}$$

therefore

$$\alpha_2 = \alpha_1 \left(\frac{W_{svc_1}}{W_{svc_2}}\right)\left(\frac{W_{psur_2}}{W_{psur_1}}\right)$$

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

$$\alpha_2 = 0.865$$