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AUTH.NAME AUTHOR AFFILIATION
CURTIS,N.W. Pennsylvania Power & Light Co.
RECIP.NAME RECIPIENT AFFILIATION
YOUNGBLOOD,B.J. Licensing Branch 1

SUBJECT: Forwards response to SER Outstanding Issue 36,advising that calculation of fission products will not reach isolation valves if MSIV-loop control sys operated for 30-s w/inboard isolation valves open.

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May 15, 1981

Mr. B. J. Youngblood, Chief
Licensing Branch No. 1
U. S. Nuclear Regulatory Commission
Washington, D.C. 20555

Docket Nos. 50-387
50-388

SUSQUEHANNA STEAM ELECTRIC STATION
SER OUTSTANDING ISSUE 36
ER 100450 File 841-2
PLA-788

Dear Mr. Youngblood:

In response to SER Outstanding Issue 36, the attached calculation assures that the fission products will not reach the inboard isolation valves if the MSIV-LCS is operated for 30 seconds with the inboard isolation valves open.

This calculation completes our action on SER Outstanding Issue 36.

Very truly yours,

N. W. Curtis/s

N. W. Curtis
Vice President - Engineering and Construction-Nuclear

cc: R. M. Stark - NRC

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Per NRC request, the following calculations show that fission product is about half way down the main steam line between the RPV and inboard MSIV. This is relative to the LCS operation, coupled with an inboard MSIV failed open, before it automatically shuts off in about 30 seconds.

Steam Line Data:

Steam line length from

RPV nozzle to inboard MSIV = 89 ft (shortest of 4 steam lines, Ref. Bechtel's FCI-P49-951 to 953)

Steam line size = 26-inch (Ref. 761E250RE)

Sch 80, pipe nominal ID = 23.358" (Ref. 731E224)
Area = 2.975 ft^2
Volume = 265 ft^3

Mass of steam @ 50 psia = 31.1 lbm. (saturated)

LCS Data:

Process line equivalent length ~ 150 ft (Ref. Bechtel's drawing SK-M-5288 to 5291)

Line size = 2"

Calculate mass of steam released in 30 seconds through the 2-inch blowdown line.

$$\Delta P = 3.36 \times 10^{-6} \frac{f l w^2 v}{d^5} \text{ (crane pg 3-2)}$$

ΔP = 35 psid
f = .023
L = 150 ft
v = 8.5 ft^3/lb vg @ 50 psia
d^5 = 13.74 Sch 160 pipe

$$\Delta P = \frac{3.36 \times 10^{-6} \times .023 \times 150 \times W^2 \times 8.5}{13.74}$$

$$W = \sqrt{\frac{35 \times 13.74}{3.36 \times 10^{-6} \times .023 \times 150 \times 8.5}} \text{ lbs/hr}$$

= 0.61 lbs/sec.

Mass release in 30 sec = 18.3 lbs vs. 31.1 lbs initially in the steam line.

Note: The intial mass of 31.1 lbm does not take into account steam mass between inboard and outboard MSIV's.