



Westinghouse
Electric Corporation

Energy Systems

Box 355
Pittsburgh Pennsylvania 15230-0355

Mr. Jerome A. Ranalli, Manager
Nuclear Fuel
Public Service Electric & Gas Company
P.O. Box 236
Mail Code N50
Hancocks Bridge, NJ 08038

December 18, 1992
ET-NSL-OPL-II-92-593

Public Service Electric & Gas Company
Salem Units 1 and 2
Clarification of Reduced Safety Injection Evaluations

Reference: 1) PSE-91-038, dated February 28, 1992

Dear Mr. Ranalli:

The referenced letter provided a safety evaluation supporting a change to the requirements in the Salem Units 1 and 2 Technical Specifications for ECCS (Emergency Core Cooling System) pump performance. Section 3.1.1 of that evaluation contains the statement, "The result of this evaluation shows that the minimum safety injection flows assumed in previous SI reduction evaluations are more conservative for RCS pressures greater than 875 psia." Per a PSE&G request, the following provides clarification of this statement.

Since April of 1990, there have been a number of Salem evaluations performed for reductions in minimum Safety Injection (SI) flows. The affected transients include Steamline Break Mass and Energy Outside Containment (SLB M&E OC) performed for equipment qualification, Steamline Break Mass and Energy Inside Containment (SLB M&E IC) performed for determination of the containment pressure and temperature response, and Steamline Break Core Response (SLB CR) performed to determine the margin to DNB (Departure from Nucleate Boiling).

In May of 1990, Westinghouse evaluated the Salem Unit 1 licensing basis analyses for a reduction in safety injection flow. Those minimum SI flows are shown as Case 1 in the attached Table 1. That evaluation concluded that past operation of Salem Unit 1 with degraded Charging/SI pumps was supported by the licensing basis non-LOCA analyses. Later in May of 1990, it was determined that the pump data supplied to Westinghouse should have been based on an orifice reduction factor, K, of 19.4 instead of 17.7. Since the impact of this change is to raise the calculated SI flow, no evaluation of increased minimum SI flow was required.

9305070245 921218
PDR ADOCK 05000272
P PDR

Pat Jim Stone

DF03

Mr. J. A. Ranalli
Page 2
December 18, 1992

In August of 1990, an evaluation was performed to support startup and continued operation of Salem Unit 2 with revised ECCS performance. In October of 1990, an evaluation was performed which determined that past operation of Salem Unit 2 with degraded Charging/SI pumps was supported by the licensing basis analyses. Those minimum SI flows are shown as Case 2 in the attached Table 1.

This evaluation assumed the most limiting SI flow rates available at that time and concluded that since those SI flow rates were less than 1% below the flow rates assumed in the May and September 1990 evaluations performed for Salem Unit 1, the previous evaluation results and conclusions remained valid.

The most recent evaluation was performed in February of 1991 to evaluate the newest SI flows for both Salem units in support of wider Tech Spec ECCS surveillance test ranges for the Charging/SI pumps. Those minimum SI flows are shown as Case 3 in the attached Table 1. With respect to minimum SI flows for Steamline Break analyses, the newest SI flow rates are bounded by the flow rates assumed in the previous evaluations mentioned above for pressures greater than 875 psia. Therefore, SLB analyses results which do not go below 875 psia will remain bounding with respect to minimum SI flows.

The limiting SLB M&E OC analysis case does not go below 890 psia. Therefore, the SI flow rates assumed in the evaluations performed previously, which concluded that the licensing-basis analyses support Salem Unit 1 and 2 operation with degraded Charging/SI pumps, bound (are more limiting than) the newest SI flow rates.

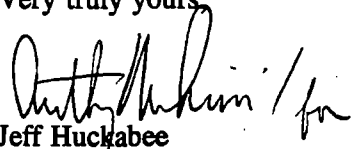
For SLB CR, while the transient results in pressures below 875 psia, it was determined that there is a negligible change to the heat flux, pressure, and core boron concentration from what was previously evaluated and found to be acceptable. Therefore, it was concluded that the licensing-basis statepoints are unchanged and the Tech Spec relaxation would have no impact on the SLB CR analysis results.

The SLB M&E IC case which was limiting with respect to minimum RCS pressure was a split break which reached a minimum pressure above 875 psia. In addition, the peak containment temperatures result from small breaks at 102% power and none of these cases reached pressures below 875 psia. Therefore, the licensing basis cases bound the newest SI flows for SLB M&E IC.

In summary, it was determined that the minimum SI flow rates assumed in the evaluation documented in the referenced letter are bounded by those previously evaluated.

If there are any questions, please contact the undersigned.

Very truly yours,


Jeff Huckabee
Special Sales Representative
Power Systems Field Sales

AMS/lg

cc: T. K. Ross
R. S. Kent
J. A. Rowey
H. G. Berrick

TABLE 1 - CHARGING/SI FLOWS ASSUMED IN SALEM REDUCED-ECCS EVALUATIONS

RCS Pressure (psig)	CASE 1 Injected Flow (gal/min)	CASE 2 Injected Flow (gal/min)	CASE 3 Injected Flow (gal/min)
0	409.4	400.7	374.6
100	398.7	390.7	366.2
200	388.3	380.9	357.8
300	378.0	371.2	349.4
400	367.2	360.6	340.2
500	355.2	349.2	330.6
600	343.2	337.9	320.8
700	331.3	326.5	310.9
800	319.4	315.2	300.8
900	305.9	302.2	289.9
1000	291.6	288.6	278.8
1100	277.2	274.9	267.6
1200	262.5	261.0	256.2
1300	246.1	245.5	244.5
1400	229.5	229.7	232.5
1500	212.6	213.8	220.4
1600	194.5	196.5	207.1
1700	176.1	178.9	192.0
1800	157.4	161.1	176.4
1900	138.4	142.9	160.3
2000	119.3	124.4	143.7
2100	101.2	106.5	126.4
2200	82.8	88.7	92.8
2300	55.7	69.4	
2400	14.7	32.9	
2500	0.0	0.0	

CASE 1 - MAY 1990, SALEM UNIT 1 JUSTIFICATION FOR PAST OPERATION

CASE 2 - OCTOBER 1990, SALEM UNIT 2 JUSTIFICATION FOR PAST OPERATION

CASE 3 - FEBRUARY 1991, SALEM UNITS 1 AND 2 SI TECH SPEC EVALUATION

To accommodate the LOFTRAN code, only ten of the ECCS flow vs. pressure values are actually input into the analyses. The Table 1 Case 3 values become larger than the Case 1/2 values at about 1325 psig. However, the analyses do not assume ECCS flow vs. pressure values between 1325 and 875 psig. Therefore, with respect to the analysis inputs against which the February 1991 evaluation is based, the ECCS flow is unaffected until 875 psig.

It is conservative to assume the evaluation is affected at the higher pressure, since the events analyzed would be impacted as soon as the results decreased below that pressure. Therefore, ECCS values between 875 psig and 1325 psig were evaluated. That evaluation concluded that, since the maximum difference between Case 1/2 and 3 (which occurs at about 900 psig) was less than 5%, the difference was considered insignificant with respect to impact on the previous analyses/evaluations.