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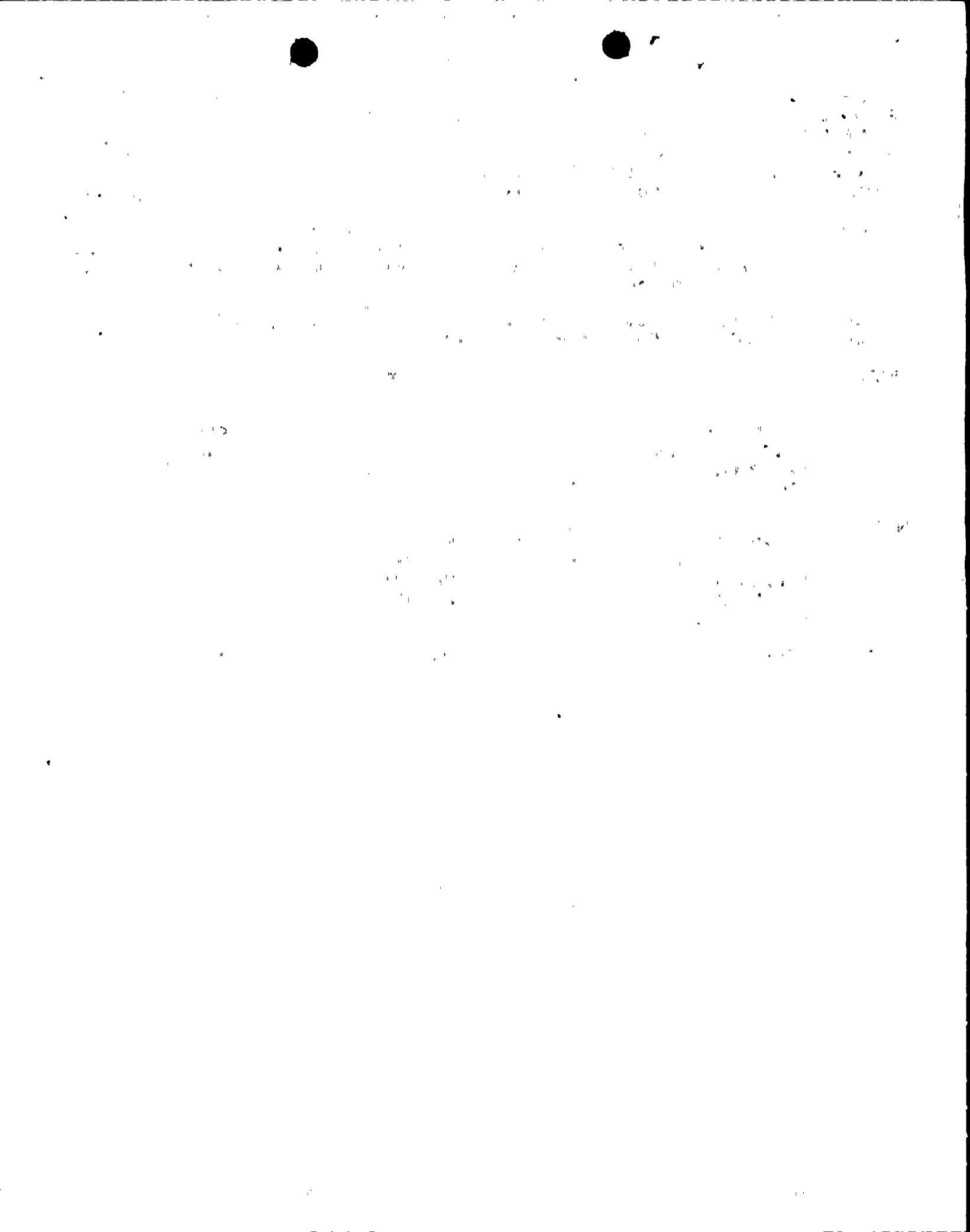
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 FACIL: 50-388 Susquehanna Steam Electric Station, Unit 2, Pennsylv      05000388  
 AUTH. NAME      AUTHOR AFFILIATION  
 KEISER, H. W.      Pennsylvania Power & Light Co.  
 RECIP. NAME      RECIPIENT AFFILIATION  
 BUTLER, W. R.      Project Directorate I-2

SUBJECT: Responds to request for addl info re Unit 2 single loop operation. Limited break spectrum analysis performed to confirm two-loop limiting break remained applicable for single loop operation.

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Pennsylvania Power & Light Company

Two North Ninth Street • Allentown, PA 18101 • 215 / 770-5151

Harold W. Keiser  
Vice President-Nuclear Operations  
215/770-7502

DEC 15 1987

Director of Nuclear Reactor Regulation  
Attn.: Dr. W.R. Butler, Project Director  
Project Directorate I-2  
Division of Reactor Projects  
U.S. Nuclear Regulatory Commission  
Washington, D.C. 20555

SUSQUEHANNA STEAM ELECTRIC STATION  
RESPONSE TO NRC REQUEST FOR  
ADDITIONAL INFORMATION REGARDING  
UNIT 2 CYCLE 2 SLO  
PLA-2952 FILES R41-2, A17-2, A7-9

Docket No. 50-388

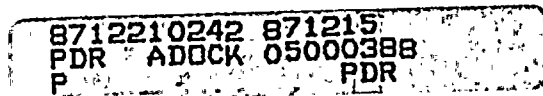
Reference: Letter, "Request for Additional Information", M.C. Thadani to  
H.W. Keiser, dated November 20, 1987.

Dear Dr. Butler:

Attached please find complete responses to the questions in the referenced  
request for additional information. These responses were provided to  
Mr. M.C. Thadani and Mr. G. Thomas of the NRC staff in telecons held on  
November 25, 1987 and December 4, 1987. This submittal closes all outstanding  
questions related to our proposed amendment 52, which was transmitted to you  
on June 30, 1987. Any questions on this letter should be directed to  
Mr. R. Sgarro at (215) 770-7916.

Very truly yours,

H.W. Keiser  
Vice President-Nuclear Operations



Attachment (3 pages)

cc: NRC Document Control Center (original)  
NRC Region I  
Mr. J. Stair, NRC Resident Inspector-SSES  
Mr. M.C. Thadani, NRC Project Manager-Bethesda  
Mr. T.M. Gerusky, Pennsylvania DER

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REQUEST FOR ADDITIONAL INFORMATION

FOR

SUSQUEHANNA UNIT #2 SLO

1. The limiting event which determines operating limit MCPR seems to be recirculation pump seizure accident (0.35  $\Delta$ CPR for the GE 8x8 fuel). Submit the analysis of the recirculation pump seizure accident for the GE fuel. It is stated that PP&L did not take credit for the recirculation pump seizure accident analysis performed by Advanced Nuclear Fuels corporation (ANF). Describe why credit is not taken for this analysis in determining the operating limit MCPR.

Response

ANF performed the  $\Delta$ CPR calculations for the GE 8x8 fuel using the same system transient response shown in XN-NF-86-146. They did not provide the  $\Delta$ CPR value in XN-NF-86-146 because the ANF 9x9 fuel resulted in more pins in boiling transition, even though the  $\Delta$ CPR is smaller. As stated in PLA-2885, PP&L has chosen to increase our MCPR operating limit to assure the MCPR Safety Limit is not exceeded during a Recirculation Pump Seizure accident from SLO conditions instead of taking credit for the radiological consequences evaluation provided on page 12 of XN-NF-86-146. Therefore, ANF transmitted the GE 8x8  $\Delta$ CPR value of 0.35 via separate letter to PP&L.

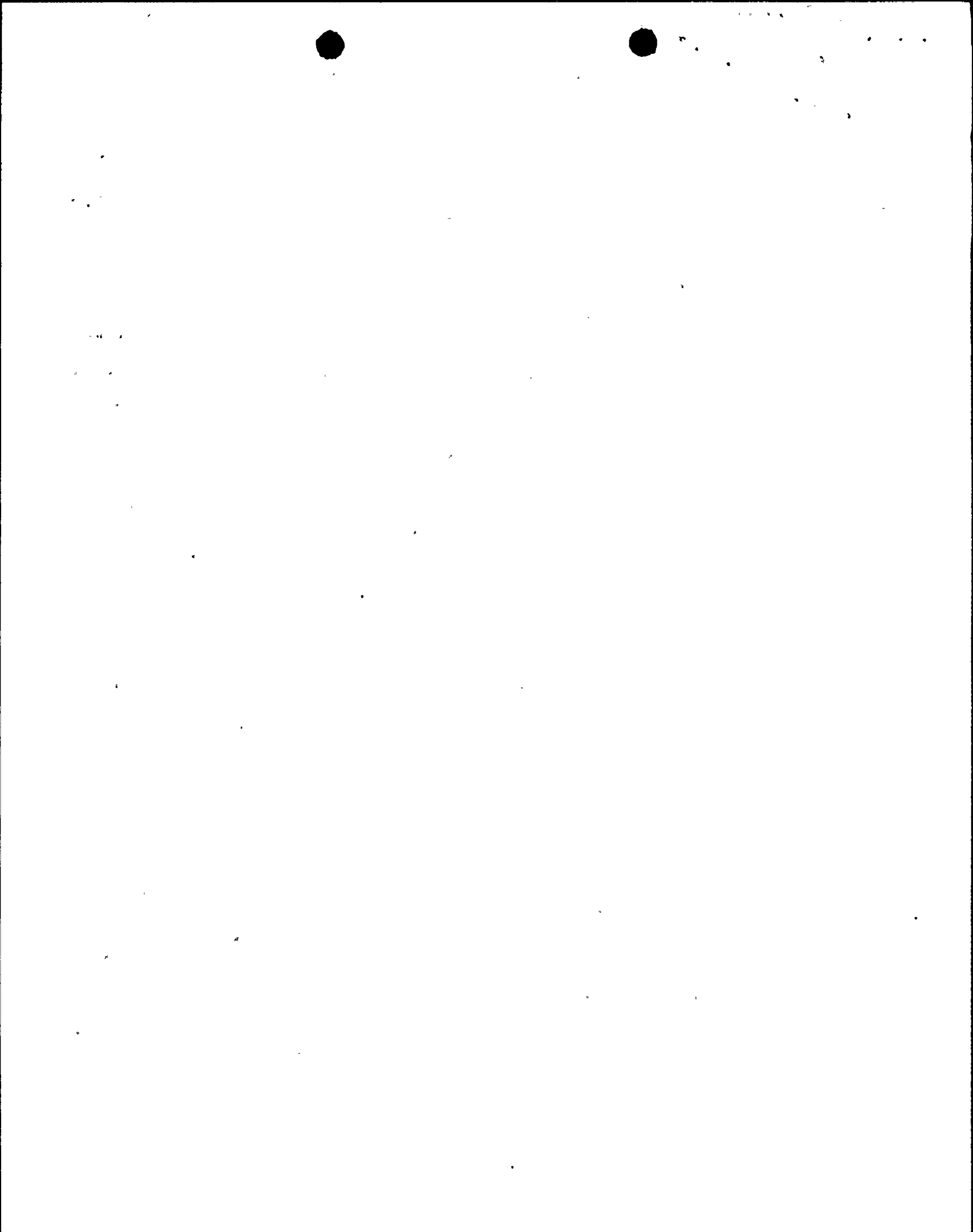
2. In the Susquehanna Unit 2, Cycle 2 single loop operation analysis performed by Exxon, (XN-NF-86-146, November 1986), peak calculated pressure for different transients is not given. Submit the calculated peak pressure for the transients analyzed for SLO.

Response

<u>Event</u>	<u>Peak Vessel Pressure (psia)</u>
Idle Loop Startup	1029.8
Recirculation Pump Trip	1010.9
Recirculation Pump Seizure	1010.9

3. In the Susquehanna Unit 2, Cycle 2 LOCA analysis for SLO performed by EXXON (XN-NF-86-125 November 1986), the following statement is given in the introduction section, "A previous analysis for single loop operation by the NSSS vendor made simplifying conservative assumptions. These conservative assumptions resulted in a reduction in the MAPLHGR limit for single loop operation. The analysis reported herein was made without such simplifying assumptions".

Describe in detail which simplifying assumptions ANF decided to delete and the basis for their deletions. Also describe which assumptions ANF used in the SLO LOCA analysis.



### Response

GE assumed that boiling transition occurs immediately (i.e., 0.1 seconds). ANF performed the SLO LOCA analysis with their approved methodology (Reference XN-NF-80-19(P)(A), Volume 2, 2A, 2B, 2C) and have determined that for all postulated LOCAs boiling transition does not occur immediately.

4. Only a limited break spectrum analysis was performed to confirm that the two-loop limiting break remained applicable for SLO. Justify the use of a limited break spectrum analysis instead of the complete break spectrum analysis.

### Response

Section 4.1 of XN-NF-86-125 provides an evaluation of the entire LOCA break spectrum from SLO conditions. As stated in XN-NF-86-125, the SLO LOCA calculations for the largest suction and discharge break do not result in early CHF in the hot channel. Therefore, the heat-up response is similar to the two loop LOCA analysis. The calculated Peak Cladding Temperature (PCT) is lower for the SLO LOCA since the initial MCPR is higher for SLO calculation. The higher initial MCPR for SLO was chosen since the recirculation pump seizure accident  $\Delta$ CPR is higher than the two loop  $\Delta$ CPR.

Since early CHF does not occur for the largest break, early CHF will not occur for the smaller breaks. Since the initial SLO hot channel MCPR is higher than the two loop hot channel MCPR, the calculated SLO peak cladding temperatures will be lower than the two loop PCTs for all break sizes.

5. In the report XN-NF-86-125, Section 3.2, Appendix-K spray heat transfer coefficients are used for the spray cooling period. Justify the use of these heat transfer coefficients since they are not approved for 9x9 fuel being used in SSES #2, Cycle 2.

### Response

The Appendix-K spray heat transfer coefficients were used in the reload licensing submittal for Susquehanna Unit 2 Cycle 2 (Reference XN-NF-86-65). This submittal was approved by the NRC in a letter from E. G. Adensam (NRC) to H. W. Keiser (PP&L), "Issuance of Amendment No. 31 to Facility Operating License No. NPF-22-Susquehanna Steam Electric Station, Unit 2", dated October 3, 1986.

6. In XN-NF-86-146 SSES Unit #2, Cycle 2 ANF SLO analysis, core flow measurement uncertainty during SLO is not addressed. It is stated that the procedure established by GE to correct for the back flow through the inactive jet pumps is also applicable for a core with ANF fuel. Describe in detail the applicability for ANF fuel.

Response

Section 5.0 of XN-NF-86-146 states that the core flow uncertainty was increased for the SLO Safety Limit MCPDR analysis.

The procedure established by GE to correct for the back flow through the inactive jet pumps is required to maintain the appropriate flow biased rod block and scram setpoints. The correction procedure is developed from the differences in the core flow to recirculation drive flow relationship between single loop and two loop operation. Since the ANF fuel is hydraulically compatible to the GE fuel, as shown the Unit 2 Cycle 2 reload submittal (Reference XN-NF-86-60 which is an enclosure to PLA-2661 dated June 19, 1986), the drive flow correction developed by GE is also applicable to ANF fuel.

7. The Rod Withdrawal Error (RWE) transient is not analyzed for ANF fuel. Describe in detail the insignificance of this transient for SLO operation.

Response

As stated in the response to Question #6, the setpoints are corrected to maintain the appropriate flow biased rod block and scram setpoints. Since the Rod Withdrawal Error (RWE) transient is affected by the Rod Block Monitor setpoint which is the same in SLO and two loop operation and is not affected by the actual drive flow, the single loop operation RWE  $\Delta$ CPRs are the same as the two loop operation  $\Delta$ CPRs for the same power/core flow conditions.

ajr/msk220a



