NORTHEAST UTILITIES

THE CONNECTICUT LIGHT AND POWER COMPANY
WESTERN MASSACHUSETTS ELECTRIC COMPANY
HOLYOKE WATER POWER COMPANY
NORTHEAST UTILITIES SERVICE COMPANY
NORTHEAST NUCLEAR ENERGY COMPANY

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March 22, 1985

Docket No. 50-423
B11490

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

Reference: B. J. Youngblood to W. G. Counsil, Safety Evaluation Report (SER) Related to the Operation of Millstone Nuclear Power Station, Unit No. 3 (NUREG-1031), dated July, 1984.

Dear Mr. Youngblood:

Millstone Nuclear Power Station, Unit No. 3
Responses to SER Confirmatory Item

Enclosed is Northeast Nuclear Energy Company's response to SER Confirmatory Item 15 concerning thermal-hydraulic analysis to support N-1 loop operation. This response should fully resolve the Staff's concern regarding this item.

If you have any questions, please contact our licensing representative directly.

Very truly yours,

NORTHEAST NUCLEAR ENERGY COMPANY
et. al.

BY NORTHEAST NUCLEAR ENERGY COMPANY
Their Agent

W. G. Counsil
Senior Vice President

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STATE OF CONNECTICUT)
) ss. Berlin
COUNTY OF HARTFORD)

Then personally appeared before me W. G. Counsil, who being duly sworn, did state that he is Senior Vice President of Northeast Nuclear Energy Company, an Applicant herein, that he is authorized to execute and file the foregoing information in the name and on behalf of the Applicants herein and that the statements contained in said information are true and correct to the best of his knowledge and belief.

Lorraine J. D'Amico
Notary Public

My Commission Expires March 31, 1988

Millstone Unit No. 3
Confirmatory Items
Core Performance Branch

SER 15 - Thermal-Hydraulic Analyses to Support N-1 Loop Operation

In a letter dated April 9, 1984, the applicant expressed the intent to operate in the N-1 mode. However, the applicant has not yet provided core thermal-hydraulic analyses taking into account the effect of partial loop operation on core inlet flow distribution and minimum DNBR or Technical Specifications including the appropriate provisions to ensure that this type of operation is within acceptable limits.

Resolution of this issue will be included in a supplement to this SER.

Response (3/85)

The core inlet flow distribution criteria used in the THINC analyses (DNBR evaluation) are based on 1/7 scale hydraulic reactor model tests (References 1 and 2). THINC analyses using this data have indicated that a conservative design basis is to consider a five percent (5%) reduction in the flow of the hot assembly. Studies made with the improved THINC model (Reference 3) show that it is appropriate to use the 5% reduction in inlet flow to the hot assembly for one loop out of service based on the experimental data in Reference 1 and 2.

The inlet flow distributions (from Ref. 2) for three and four loops in operation have been provided for comparison.

References

1. G. Hestroni, "Hydraulic Tests of the San Onofre Reactor Model," WCAP-3269-8, June, 1964.

2. G. Hestroni, "Studies of the Connecticut Yankee Hydraulic Model," WCAP-2761, June, 1965.

3. L. E. Hochreiter, "Application of the THINC IV Program to PWR Design," WCAP-8054, October, 1973 (proprietary), and WCAP-8195 October, 1973 (non-proprietary).

CONN. YANKEE MODEL TEST - RUN 81 - 4 LOOPS (EQUAL) 29.10 GPM/ASSY

•••••••••• NORMALIZED FLOW DISTRIBUTION ••••••••••

1142 1140

					1.01	0.91	0.90						
				1.34	0.96	0.91	0.93	1.10	0.99	1.01			
			0.95	0.96	0.99	0.89	0.99	1.02	1.02	0.96	0.97		
		0.99	1.10	1.03	0.92	0.99	1.07	1.05	1.07	1.04	0.95	1.11	
	1.00	1.01	1.01	0.92	1.05	0.98	1.14	1.10	1.11	1.00	1.07	1.04	0.89
	0.99	1.00	0.93	0.89	1.02	1.09	1.19	1.01	0.94	1.10	1.03	1.01	1.08
0.93	1.36	0.96	0.95	1.05	1.01	0.96	1.06	1.00	1.00	0.93	1.00	1.02	0.96	0.78
0.94	0.92	0.89	0.99	0.86	1.04	1.12	1.07	1.11	0.98	0.95	0.95	0.94	0.84	0.97
1.29	1.05	1.01	0.95	0.99	0.90	1.02	1.13	1.00	0.96	1.10	1.01	0.95	0.96	0.95
	0.99	1.02	0.99	1.04	0.95	0.97	0.95	1.07	1.09	0.91	1.08	0.96	1.00	
	1.01	1.05	1.04	0.98	1.00	0.98	1.05	0.88	1.09	0.95	0.93	1.02	0.84	
		0.94	0.99	0.90	1.04	0.95	1.03	0.98	1.00	1.18	1.10	0.81	
			0.99	1.00	0.99	0.99	0.99	0.98	1.00	1.07	0.97		
				0.91	0.99	0.96	1.07	0.95	1.07	0.96			
						0.87	1.03	0.93					

1150 1140 1142 1137 1135 1150

Normalized flow distribution with four loops operating without the dummy instrumentation tubes.

CONN. YANKEE MODEL TEST - RUN 71 - 3 LOOPS (1, 3, and 4 EQUAL) 23.91 GPM/ASSY

NORMALIZED FLOW DISTRIBUTION

1255 1251 1250 1247 1255 1250

					1.02	0.91	0.91						
				1.04	0.97	0.93	0.94	1.09	1.00	1.02			
			0.98	0.97	1.00	0.90	0.98	1.02	1.03	0.98	0.98		
		1.00	1.06	0.99	0.92	0.99	1.06	1.05	1.07	1.02	0.95	1.11	
	1.00	0.97	0.97	0.92	1.04	0.98	1.10	1.08	1.10	1.00	1.03	0.98	0.90
	0.97	1.07	0.98	0.89	1.00	1.08	1.13	0.98	0.94	1.08	0.98	1.01	0.92
0.94	0.98	0.98	1.00	1.04	1.04	0.97	1.08	0.98	1.03	0.94	1.01	1.01	0.93	0.80
0.92	0.93	0.87	1.00	0.88	1.04	1.05	1.06	1.10	1.01	1.01	0.99	0.94	0.97	0.99
1.27	1.00	0.97	0.95	0.98	0.88	1.01	1.08	0.99	1.02	1.13	1.05	0.98	0.97	0.99
	1.01	1.04	1.01	1.02	0.92	0.95	0.94	1.08	1.08	0.92	1.12	0.98	1.00	
	1.02	1.06	1.03	0.96	0.98	1.00	1.04	0.97	1.04	0.95	0.95	1.03	0.89	
		0.97	1.00	0.93	0.98	0.94	1.02	1.01	1.02	1.19	1.13	0.88	
			1.03	1.00	0.98	0.98	1.14	0.97	1.02	1.09	0.98		
				0.93	1.00	0.98	1.09	1.00	1.08	1.01			
						0.92	1.04	0.95					

Normalized flow distribution with three loops operating (equal flows), without dummy instrumentation tubes.