MAINE YANKEE ATOMIC POWER COMPANY •

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Director of Nuclear Reactor Regulation
United States Nuclear Regulatory Commission
Washington, D. C. 20555

Attention: Mr. Robert A. Clark, Chief
Operating Reactors Branch #3
Division of Licensing

References: (a) License No. DPR-36 (Docket No. 50-309)
(b) YAEC Letter to USNRC , dated April 8, 1982, MN-82-78
(c) YAEC-1296P, DNBR Limit Methodology and Application to Maine Yankee Plant

Subject: YAEC DNBR Limit Methodology and Application to the Maine Yankee Plant

Dear Sir:

As a result of their review of the YAEC-1 Critical Heat Flux (CHF) correlation, the staff requested information on the relationship between the COBRA IIIC and COBRA IV thermal-hydraulic models.

The DNBR limit for the YAEC-1 CHF correlation was developed with COBRA IV. A limited number of data points were also run with COBRA IIIC to confirm the adequacy of the correlation with either code. The COBRA IIIC code is used in the setpoint methodology to determine coefficient settings for the Reactor Protection System.

A comparison of the DNBRs developed from COBRA IIIC and COBRA IV for a limited number of data points is provided (Table 1). The comparison covers four of the five Test Sections (T.S.) with five Subchannel Locations (S.L.) each. The Measured-to-Predicted (M/P) value, equal to 1.00/predicted MDNBR, is consistent for each case. COBRA IIIC produces comparable or slightly (1-2%) lower DNBRs than COBRA IV, using the same modeling options in each code. These modeling options are the same as those used to develop the correlations and are used in the setpoint methodology.

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In all but one case (T.S. 60,SL 42) COBRA IIIC predicts the same or lower DNBRs than COBRA IV. This one case represents a high pressure (2415 psia), low temperature (533°F), and low quality condition (0.5%). This combination of parameters is well beyond the limits imposed by the Reactor Protection System. High pressure coupled with low temperature can only produce a DNB condition at heat fluxes associated with core power levels well above the high power level trip setpoint.

The comparison demonstrates that operating limits established with COBRA IIIC are generally conservative relative to COBRA IV and that within the range of heat fluxes that can occur with the plant operating within power level and distribution limits, COBRA IIIC is always conservative with respect to COBRA IV. Therefore, use of the YAEC-1 correlation with either COBRA IIIC or COBRA IV using the DNBR limit developed from COBRA IV is justified.

We trust that you find this information satisfactory. However, if you have further questions, feel free to contact us.

Very truly yours,

MAINE YANKEE ATOMIC POWER COMPANY

John H Garrity

John H. Garrity, Senior Director
Nuclear Engineering and Licensing

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Attachment (1 page)

cc: Mr. Ronald C. Haynes
Mr. Paul A. Swetland

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TABLE 1

COBRA III VS. COBRA IV

M/P VALUES = $1/MDNBR_{predicted}$

T.S. 36.1	COBRA III	COBRA IV
S.L. 42	1.060	1.049
43	1.014	1.012
44	1.034	1.029
45	1.142	1.134
70	1.164	1.152
T.S. 38		
S.L. 12	1.017	1.006
13	1.008	0.999
14	1.005	0.993
15	1.001	0.997
16	1.006	1.005
T.S. 58		
S.L. 2	1.202	1.185
3	1.130	1.120
4	1.053	1.042
5	1.075	1.068
6	1.112	1.103
T.S. 60		
S.L. 37	1.215	1.203
39	1.368	1.350
40	1.299	1.280
41	1.307	1.299
42	1.366	1.372