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SUBJECT: Forwards Westinghouse justification for use of W-3 correlation w/1.3 design limit DBNR at pressure below 1,000 psia for steamline break analysis. Approach taken in 840412 ltr no longer required.

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generator ... Electric ...

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June 28, 1984

Director of Nuclear Reactor Regulation
Attention: Mr. Dennis M. Crutchfield, Chief
Operating Reactors Branch No. 5
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Subject: Justification for W-3 Correlation Below 1000 PSIA
R. E. Ginna Nuclear Power Plant
Docket No. 50-244

Dear Mr. Crutchfield:

Reference (a) provided clarification to responses to NRC Staff questions submitted by our Reference (b). Reference (a) provided justification that the DNB design basis was met for Ginna steamline break analysis. That justification used the approach of demonstrating that the minimum W-3 DNBR calculated for the transient exceeded a reference value which itself included considerable margin to the design basis limit of 1.3. That approach was taken in order to resolve NRC concerns about the validity of the W-3 correlation at pressures below 1000 psia.

In Reference (c) the NRC informed us that the Commission did not consider the reference value cited in Reference (a) to be proprietary. The NRC further stated that in not less than 30 days (from June 1) Reference (a) would be placed in the Public Documents Room, unless sufficient reason for withdrawing the document is provided.

A001

DATE June 28, 1984
TO Mr. Dennis M. Crutchfield

The enclosure to this letter provides the Westinghouse justification for the use of the W-3 correlation with a 1.3 design limit DNBR at pressures below 1000 psia. In light of the additional information provided, it is the Westinghouse position that the approach taken in Reference (a) is no longer required. We propose that the information provided in the enclosure be used as justification of the Ginna steamline break analysis. Please note that the information in the enclosure has already been provided to the NRC in support of the Trojan Bit concentration reduction study. Pending resolution of this issue, we request that the information contained in Reference (a) be withheld from the Public Document Room.

Very truly yours,

Roger W. Kober

Roger W. Kober

References

(a) Letter from R. W. Kober (Rochester Gas and Electric) to D. M. Crutchfield (NRC), "Responses to NRC Staff Questions," April 12, 1984.

(b) Letter from R. W. Kober (Rochester Gas and Electric) to D. M. Crutchfield (NRC), "Responses to NRC Staff Questions," March 19, 1984.

(c) Letter from D. M. Crutchfield (NRC), "Responses to NRC Staff Questions' Request for Withholding of Information - Use of Westinghouse Optimized Fuel," June 1, 1984.

Enclosure 1

Justification of 1.3 Design Limit DNBR for the W-3 Correlation at Pressures Below 1000 PSIA

Reference 1 describes the results of applying the W-3 correlation over its original pressure range, 1000 to 2300 psia. The mean measured-to-predicted critical heat flux rato and sample standard deviation from that analysis are shown in Table 1.

Reference 2 contains the results of an analysis of low pressure (700 - 1000 psia) data using the W-3 correlation. Those data were taken from the same sources as those used in the development of the W-3 correlation. As shown in the attached figure (taken from Reference 2) no anomalous behavior is observed for the low pressure data.

The W-3 correlation statistics have been recalculated for the extended database. The revised statistics are essentially unchanged from the original values (Table 1). The limit DNBR was also recalculated using the method of Owen (Reference 3). As shown in Table 1, the revised correlation statistics demonstrate that there is a 95% probability with 95% confidence that DNB will not occur if the minimum DNBR is maintained in excess of 1.31. Again, this value is essentially unchanged from the limit DNBR associated with the original database.

This evaluation demonstrates that extending the pressure range of the W-3 correlation database by a significant amount has a negligible effect on the correlation statistics. Therefore, continued use of the 1.3 limit DNBR for the Ginna steambreak analysisis justified.

References

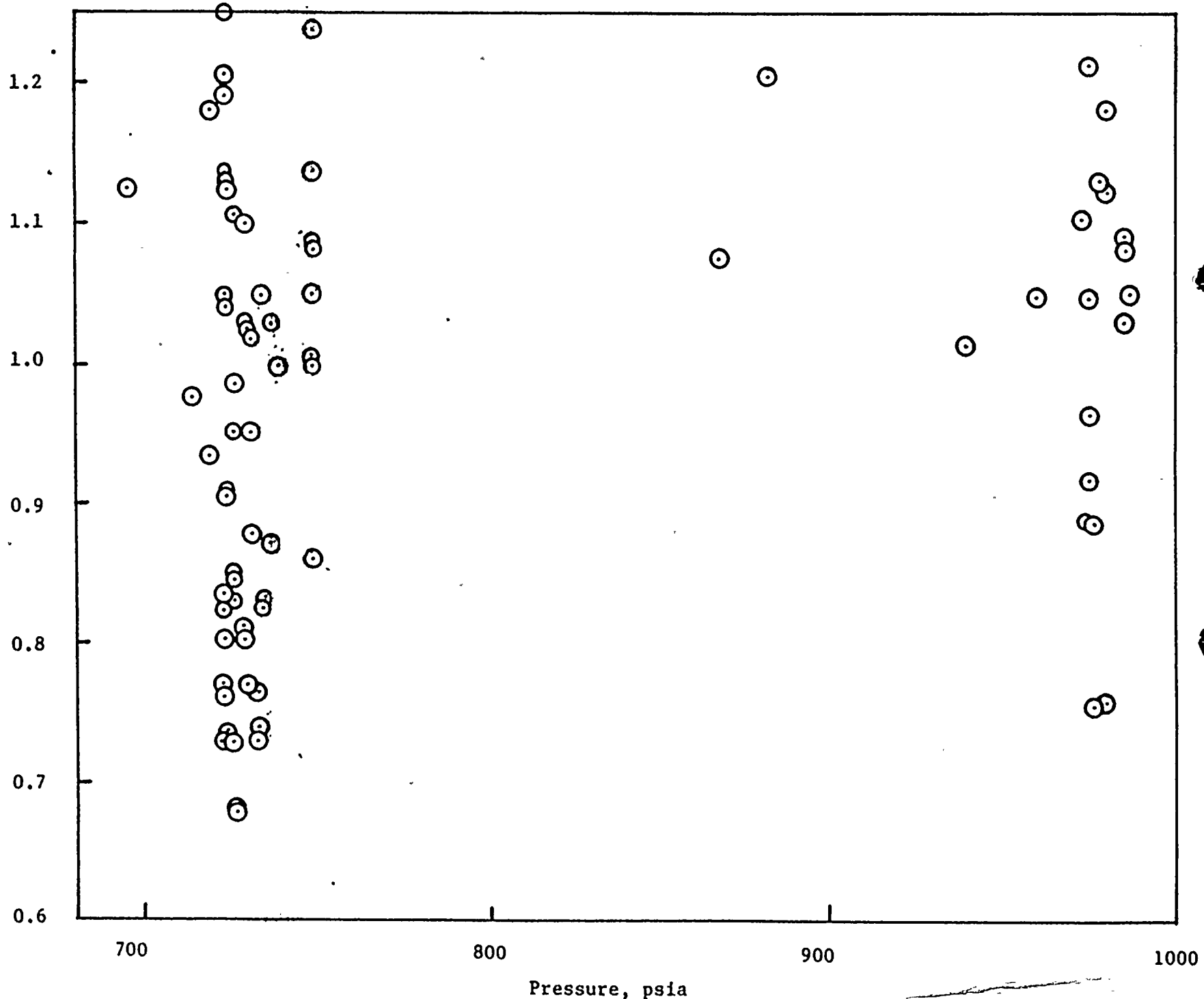
1) Tong, L. S. , "Prediction of Departure from Nucleate Boiling for Axially Non-Uniform Heat Flux Distribution," J. Nuclear Energy, Vol. 21, pp 241-248 (1967).

2) Prairie Island FSAR Amendment 20, p. 14.2-30, Docket #50-282, August 4, 1972.

3) Owen, D. B., "Factors for One-Sided Tolerance Limits and for Variable Sampling Plans," SCR-607, March 1963.

TABLE 1 - W-3 CHF CORRELATION STATISTICS

Pressure Range (psia)	Number of Data Points	$\overline{M/P}$	Sample Standard Deviation	Limit DNBR
1000 - 2300	809	0.996	0.132	1.30
700 - 2300	885	1.001	0.137	1.31



(Predicted/Measured) DNB Heat Flux vs Pressure Figure 14.2-11