

UNITED STATES NUCLEAR REGULATORY COMMISSION WASHINGTON, D. C. 20555

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MEMORANDUM FOR:	Jack E. Rosenthal, Chief Reactor Operations Analysis Branch Division of Safety Programs Office for Analysis and Evaluation of Operational Data
FROM:	Sanford L. Israel Reactor Systems Section <u>W</u> and B&W Reactor Operations Analysis Branch Division of Safety Programs Office for Analysis and Evaluation of Operational Data
SUBJECT:	ERRORS IN EFFECTIVE REACTOR TRIP SETTINGS OR MONITORING ASSOCIATED WITH EXCORE

INSTRUMENTATION

Enclosed is a technical review report on errors in effective reactor trip settings or monitoring associated with excore instrumentation. This study was initiated because of licensee event reports from H. B. Robinson and Shearon Harris. Excore instrumentation is used in the reactor protection system for overpower reactor trips, departure from nucleate boiling trips in certain plants (axial offset input) and periodic surveillance of core power and power distributions (axial power input), and flux rate. Calorimetric calculations are used to calibrate the core power function and incore instrumentation is used to calibrate the axial shape function.

The safety significance is that departure from nucleate boiling could occur during certain reactor transients if the calibration errors or deviations in the excore signals from actual reactor power are large. These instruments are also monitored to maintain the plant within licensed power and to maintain the axial power distribution within limits imposed by the LOCA analyses.

A wide range of human errors contributed to the observed errors in the effective trip settings. These included those associated with writing procedures, administrative oversight of the calibration process, and actual technician errors. Most of these types of maintenance errors have been addressed in industry generic communications. Generally, none of the evaluations

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in the LERs reviewed indicated consequences outside of the FSAR analyses. Consequently, no new generic activity appears warranted at this time. It should be noted that several of the LERs illustrated the benefits of monitoring alternate indications of core power to verify that the NIS indications are reasonable.

Original Signed by:

Sanford L. Israel Reactor Systems Section \underline{W} and B&W Reactor Operations Analysis Branch Division of Safety Programs Office for Analysis and Evaluation of Operational Data

Enclosure: As stated

cc w/enclosure: R. Jones, NRR H. Richings, NRR L. Kopp, NRR

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