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Standardization & Special Projects Branch
Division of Licensing
Office of Nuclear Reactor Regulation
U. S. Nuclear Regulatory Commission
Washington, DC 20555

License: CX-10, Docket 50-13

Reference: Letter to Robert W. Reid, Chief
From A. F. Olsen, May 18, 1981

Gentlemen:

The referenced letter informed the NRC that a calibration test performed on the Log-N-2 channel of the CX-10 revealed a discrepancy between the value of an electronically simulated reactor period and the period indicated on the channel's period meter. In the reference, the NRC was advised that the facility would not be operated until the discrepancy was resolved and that the NRC would be informed of the resolution. The purpose of this letter is to advise the NRC of the resolution of this problem.

Our evaluation of this problem focused on three areas:

1. Determination of whether an unsafe condition had been present or not.
2. Determination of whether or not a violation of the facility's Technical Specifications had occurred.
3. Repair of the channel so that true period and indicated period correspond.

We concluded from our evaluation that no unsafe condition had existed and that no violation of the Technical Specifications had occurred. The channel was repaired so that true period and indicated period corresponded. The evaluation is discussed in detail below.

1.0 Safety Considerations

1.1 Normal Operations

The Log-N-2 period instrument provides a shutdown function only. It is not used by the operator to track the approach to criticality or to monitor the reactor period. This information is provided by the Log N startup channel.

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1.2 Maximum Credible Accident

None of the safety analyses in the Hazards Evaluation Reports prepared for the license or amendment applications assume operation of the period safety channel. Termination of uncontrolled reactivity excursions during the postulated maximum credible accidents depend mainly on internal shutdown mechanisms, i.e., Doppler broadening of the epithermal absorption resonances. The one Hazards Evaluation (Amendment #11) that does assume operation of the external safety system takes credit for scram initiation by one of the two redundant linear safety channels. Even in this case, the period channels are not assumed to function and the effects of the external shutdown system take place only after doppler broadening has already terminated the initial excursion. No credit is taken for the mitigating effects of the period channel activation during any accident analysis because the calculated consequences and effects of the accident would not be changed by a change in the Log-N-2 period channel setting.

2.0 Technical Specifications

The CX-10 facility does not have technical specifications per se. However, Title 10, Code of Federal Regulations, Part 50, §50.36(d)(1) states that if a facility license was issued prior to January 16, 1969, and does not have technical specifications, the entire safety analysis report is considered to be the technical specifications. In the case of CX-10, this would include several documents because numerous license amendments have been applied for and granted since the license was initially issued.

These documents specify the use of four safety channels (two linear safeties and two period safeties) at all times during reactor operation. There is no question that all four safety channels have been operational since each one is tested every day that the reactor is run. Only the settings (scram and setback) of Log-N-2 are in question.

The requirements for the Log-N-2 scram and setback settings specified in the license applications that comprises the Safety Analysis Report are vague. BAW-1245 (application for amendment #5 authorizing operation with the 2.5% enriched fuel) incorporates by reference the safety system described in BAW-1211 (application for amendment #3). BAW-1211 states that Log-N-2 initiates scram and setback signals at pre-set levels which are usually set at 13 and 20 seconds, respectively. There is no apparent license restriction that prohibits these settings from being changed to any particular value.

In view of these considerations, it was concluded that no violation of the technical specifications had occurred.

3.0 Instrument Repair

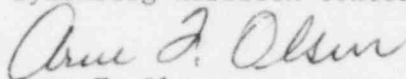
The final step was to repair the instrument so that the true period and the period meter reading matched. This was accomplished so that the meter could be used to confirm the Log-N-2 scram and setback settings during the Log-N-2 channel checks performed each day prior to reactor operation. The repair was accomplished by adjusting the capacitance of

a condenser that differentiates the Log N amplifier output and provides the input signal for the Log-N-2 safety preamplifier. After the repair, proper calibration of the channel was experimentally confirmed both with an electronically simulated period and with a true reactor period utilizing the Lynchburg Pool Reactor (R-47). The channel was also tested for proper scram and setback operation before being restored to service.

All these actions have been reviewed by the Lynchburg Research Center's, Safety Review Committee. The instrument has operated properly since the repair has been completed.

Very truly yours,

BABCOCK & WILCOX
Lynchburg Research Center



Arne F. Olsen
Senior License Administrator

AFO/jhc

cc: Director,
Region II