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December 11, 1990

U. S. Nuclear Regulatory Commission
ATTN: DOCUMENT CONTROL DESK
Washington, DC 20555

Re: 10CFR 50.59 changes
License R-74, Docket 50-159

Dear Sirs:

We are upgrading our console instrumentation in order to eliminate the remaining vacuum-tube equipment. As part of this upgrade we expect to replace our existing chart recorders with a hybrid multiple-point recorder. Most aspects of this change are not changes in the facility as described in the Safety Analysis Report and would not be reportable under 50.59. One point on the recorder, Core Inlet Temperature, will be reportable under 50.59 because the sensor type will be changed from a resistance temperature detector to a thermocouple.

The point in question, core inlet temperature, is described in the SAR (page 2-46) as providing an alarm at 125 degrees F. and a scram at 130 degrees F. This alarm and scram are not addressed in Technical Specifications. The SAR indicates in Section 2.6.4 (page 2-57) that calculations of heating in the shielding and thermal column were performed for a pool water temperature of 130 degrees F. and for 1.5 MW power. Section 2.3.1 (page 2-25) indicates pool water temperature will be maintained <130 degrees F. at the core cooling water inlet. The 130 degree operating limit is based on demineralizer resin temperature limits and the difficulty in maintaining the laboratory temperature and humidity with high pool temperatures. The Safeguards Evaluation section of the SAR, Chapter 6, does not address pool temperature.

The alarm and scram will remain in effect with the replacement recorder, and the replacement of the RTD with a thermocouple will be duly reported as a 50.59 change. During a NRC seminar held in conjunction with the October 1990 TRTR meeting we became aware that the commission had concerns about instrumentation upgrading that involved digital data logging or digital devices in reactor safety systems. Although we believed the proposed change was only a minor 50.59 reported change due to a change in the sensor used for core inlet temperature, we discussed the proposed change with our project manager, who in turned discussed it with others.

After the discussion with our project manager we determined that, although his opinion was that the recorder replacement would not be an unreviewed safety question, it would be prudent to present the commission with our safety analysis for the change before the change takes place. We would prefer to know ahead of time if NRC takes exception to our analysis that the change can

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be done under 50.59. The following is our analysis, and we request that NRC respond to this analysis of the proposed change.

The existing alarm and scram originate in microswitches operated by cams on the pen drive train of a potentiometric chart recorder. The cams are on the shaft that drives the slidewire used (in a null-balance circuit) to balance the bridge in which the RTD is located. Pen displacement positions a pointer on the recorder as well as the pen which records the trace. The recorder is rated for a 5 second response time, but large amounts of pen travel are not required to go from permissible operating temperatures to the trip point. Because the reactor core is cooled by natural circulation flow, and because the pool heats at a maximum rate of 23 degrees F per hour of full-power operation, rapid changes in core inlet temperature will not occur. The recorder will run upscale, causing a scram, if the RTD sensor fails open, but would not cause a scram if the sensor shorts. The recorder could fail to respond and cause a scram on almost all instrument failures except for the sensor failing open. Failure of electrical power to the recorder, the vacuum-tube amplifier, the balancing motor, or the exciting voltage for the bridge could cause failure of the recorder in the "as is" condition. A number of mechanical failures in the potentiometer/pen drive train could also cause "as is" failures.

The replacement recorder will be a hybrid digital/analog device which scans all inputs at least once per second, causing actuation of the internal relays that operate alarms and scrams. Point scanning for such alarms is independent of the recording and trending functions of the recorder. The temperature indication (by thermocouple) can be made to provide the scram on high temperature or sensor failure. Although the replacement recorder is more complicated than the 1960-model device being replaced it is no less reliable. In addition, the replacement recorder has power-up and continuous diagnostic routines that will alert the operator to equipment failures.

Since Technical Specifications and Safety Analysis do not address the core inlet temperature instrument or scram capability it does not appear to have great safety significance. The replacement (or even complete elimination) of the core inlet instrument will not increase the probability of occurrence or consequence of any accident considered in the SAR. We therefore conclude that no unreviewed safety question exists for this replacement.

Very truly yours,

R. J. Cashwell
Reactor Director

cc: Reactor Safety Committee
NRC Region III