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SUBJECT: Informs of calibr problems associatied w/reactor vessel head level monitor portion of inadequate core cooling sys. Unacceptable string error found. Testing initiated to restore instrument strings to acceptable tolerance limits.

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November 20, 1987

U. S. Nuclear Regulatory Commission
Attention: Document Control Desk
Washington, D. C. 20555

Subject: Oconee Nuclear Station
Docket Nos. 50-269, -270, -287
Reactor Vessel Level Indication System

Dear Sir:

By letter dated July 2, 1987 Duke Power Company (Duke) submitted an implementation letter regarding the installation, calibration and testing of the Inadequate Core Cooling (ICC) Monitoring System for Oconee Nuclear Station consistent with the design description provided in a letter dated July 1, 1985. The ICC Monitoring System has been developed in response to Item II.F.2 of NUREG-0737 to aid the plant operators in determining conditions which may lead to an ICC event.

The purpose of this letter is to inform the NRC of calibration problems associated with the Reactor Vessel Head Level Monitor (RVHLM) portion of the ICC Monitoring System for Oconee Unit 1. The problems with the RVHLM were identified during the period of October 26, 1987 through November 4, 1987 while Oconee Unit 1 was in refueling shutdown. Oconee Units 2 and 3 were operating at 85% and 100% of full power, respectively, during this period.

During the performance of the instrument calibration procedures on the RVHLM, an unacceptable string error was found. A testing program was initiated to determine the cause of the errors and to restore the instrument strings to an acceptable tolerance limit. A fill verification test indicated proper fill of all six capillary legs. Next, calibration of each transmitter was performed and the results indicated severe nonlinearity, hysteresis and repeatability problems. The first attempts to explain the calibration errors were directed at the Barton 752 transmitters. Wet calibrations proved that the transmitter responses were well within specifications for accuracy, hysteresis and linearity and thus were not considered to be the cause of the calibration errors. The next focus of attention was on the calibration procedure. The procedure used at Oconee requires that field input pressures be applied using a wet rig and a filled calibration tubing to the Decay Heat Line Sensor Bellows. To eliminate the methodology of the procedure as the source of error, a dry sensor calibration test was performed. The test revealed essentially no change in the hysteresis figures.

A second attempt was made at running string checks after the transmitter wet calibration and normalization. The test showed the Train A Hot Leg Level string within the specified tolerance of 1%. Train B Vessel Level transmitter string

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was non-reportable with severe hysteresis. The Train A Vessel Level transmitter string had about a 5% worst case error, and the repeatability and hysteresis figures for the transmitter were acceptable. It appeared that this transmitter could be recalibrated and made operable within tolerance. But when calibration was attempted the very next day, the transmitter again showed unacceptable hysteresis figures.

At this time, a sensitivity experiment was performed to determine the exact nature of the hysteresis problem on the Train A Vessel Level transmitter. The test showed that the system was sensitive to small changes in pressure. To eliminate the possibility of trapped air causing the problems, an elevated calibration was performed. The test results showed a reduction in the hysteresis figures, but the reduction was not enough to conclude that trapped air was a problem. This test also confirmed the results from the fill verification test, which showed that the system had remained properly filled after 18 months of operation.

Studies of the data obtained throughout the testing of the RVHLM did not reveal specific causes for the calibration problems. Most of the testing was performed under pre-startup temperature and pressure conditions, and further testing would have severely impacted Unit startup. The situation was discussed with the resident inspector at Oconee and the NRC Region II management prior to the startup. The Unit 1 startup was allowed to proceed and further testing of the RVHLM were postponed until a future outage of sufficient length. The next scheduled outage of sufficient length is the Unit 1 End-of-Cycle 11 Refueling outage, which is currently scheduled to begin in February of 1989.

Other portions of the ICC Monitoring System including the Subcooling Margin Monitor (SMM), Wide Range Hotleg Level Monitor (HLLM), Core Exit Thermocouples (CETC) and Reactor Coolant Pump Motor Current Monitor were properly calibrated, if needed, and declared operable prior to the Unit 1 startup. These components will provide sufficient information for conditions which may lead to an ICC event. The significance of the RVHLM data is limited to highly unlikely post-LOCA conditions in which the heat transfer occurs by natural circulation of the reactor coolant. It is likely that formation of a void in the RCS under those conditions would be detected by a level drop in the hot legs through the HLLM. Furthermore, data from SMM, CETC, Pump Motor Current Monitor and other plant parameters available to operators would provide sufficient information to detect conditions leading to an ICC event. Therefore, the temporary inoperability of the RVHLM is adequately compensated for by other components of the ICC Monitoring System and available plant parameters.

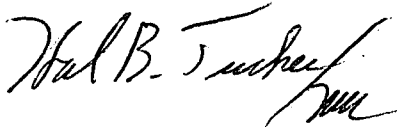
As indicated in Duke's letter of July 2, 1987 the ICC Monitoring System has been installed and functionally tested for all three Oconee Units. However, current Oconee Technical Specifications have no provisions for operability or surveillance requirements of this system. Technical Specification revisions for the ICC Monitoring System are being prepared and will be submitted for NRC review and approval in the near future.

As far as ICC Monitoring Systems for Oconee Units 2 and 3 are concerned, certain anomalies and known failures of the Reactor Vessel Level Instrumentation System (RVLIS) have previously been reported to NRC (See LER 287/87-04 and LER

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270/87-03). Surveillance performances for these systems including checks and calibrations are planned for upcoming refueling outages for Units 2 and 3.

Very truly yours,



Hal B. Tucker

MAH/1009/sbn

Attachment

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