DUKE POWER COMPANY
POWER BUILDING
422 SOUTH CHURCH STREET, CHARLOTTE, N. C. 28242

WILLIAM O. PARKER, JR.
VICE PRESIDENT
STEAM PRODUCTION

TELEPHONE: AREA 704
373-4083

April 8, 1982

Mr. James P. O'Reilly, Regional Administrator
U. S. Nuclear Regulatory Commission
Region II
101 Marietta Street, Suite 3100
Atlanta, Georgia 30303

Re: McGuire Nuclear Station Unit 1
Docket No. 50-369

Dear Mr. O'Reilly:

Please find attached Reportable Occurrence Report RO-369/82-23. This report concerns T.S.3.1.1.2, "The shutdown margin shall be greater than or equal to 1.0% Delta k/k". This incident was considered to be of no significance with respect to the health and safety of the public.

Very truly yours,

William O. Parker, Jr.

PBN/jfw
Attachment

cc: Director
Office of Management and Program Analysis
U. S. Nuclear Regulatory Commission
Washington, D. C. 20555

Records Center
Institute of Nuclear Power Operations
1820 Water Place
Atlanta, Georgia 30339

Mr. P. R. Bemis
Senior Resident Inspector
McGuire Nuclear Station

DUKE POWER COMPANY
McGUIRE NUCLEAR STATION
REPORTABLE OCCURRENCE REPORT NO. 82-23

REPORT DATE: April 8, 1982

FACILITY: McGuire Unit 1, Cornelius, NC

IDENTIFICATION: Reactor Coolant System (NC) Approached Shutdown Margin

DISCUSSION: During filling and venting of the NC System on March 12, the boron concentration approached the required shutdown margin, 1030 ppm, for cold shutdown, Mode 5. Fill sources were the Recycle Holdup Tank B, 18,700 gallons at 1075 ppm boron, and the boric acid blender, approximately 20,000 gallons at an unknown boron concentration. After filling, a Chemical and Volume Control System sample indicated the NC System boron concentration was 1025 ppm. Immediately the system was declared below the shutdown margin, and approximately 600 gallons of boric acid from Boric Acid Storage Tank A were added to the system. After sufficient recirculation time, a sample was taken and the NC system boron concentration declared above the shutdown margin.

This incident resulted from a Procedural Deficiency, due to the practice of operating the blender without concentration verification during large scale additions to the NC system. In this instance, blending at a concentration less conservative than the shutdown margin, as identified in Section 3.1.1.2 of Technical Specifications, resulted in diluting the NC system boron concentration.

EVALUATION: After the boric acid flow indication in the Control Room appeared faulty, the Chemical and Volume Control System (NV) boric acid flow element (Barton Turbine Rotometer, model 7101) was removed and inspected during the scheduled maintenance outage on March 11. The turbine blades were found to be missing due to an unknown reason; however, this same phenomenon had been experienced previously. The flow element was replaced and the system returned to service on March 11, the same day the NC fill through NV began. The new flow element indicated a higher flow than the previous element; therefore, settings for boration were partially based on previous operating experience and the Boration and Dilution Tables. Blending at a lower than expected boron concentration resulted in a fill source of approximately 20,000 gallons of low concentration makeup, less than 1030 ppm boron.

Daily samples indicated the NC system boron concentration was less than expected; however, the Volume Control Tank (VCT) concentration indicated blender output was sufficient to meet the shutdown requirement. The VCT boron concentration apparently had been increased at the blender prior to the daily sample being taken. Filling of the NC system was completed shortly after the samples were taken and little makeup was required during venting. After the NC pumps were operated, the system concentration was determined to be 1025 ppm boron.

The shutdown margin specification may or may not have been violated, based on the experimental error of ±11 ppm as per the procedure, "Chemistry Procedure for the Determination of Boron in Aqueous Boric Acid Solutions". However, sample data does indicate the shutdown margin was approached and a margin above the requirement was not maintained.

SAFETY ANALYSIS: With T_{AVE} less than 200°F, a 1% delta K/K shutdown margin provides adequate protection to prevent inadvertant criticality with one inoperable control rod. Based on the calculated shutdown margin and the chemical analyses, the boron concentration approached the shutdown margin after the NC pumps had operated during venting. If the boron concentration did drop slightly below the 1% shutdowm margin with all control rods operable, the reactor would remain sub-critical due to a conservative safety margin.

The health and safety of the public were not compromised by this event.

CORRECTIVE ACTION: Immediate boration of the NC system was implemented when the sample indicated a boron concentration less than the shutdown margin. A sufficient volume of boric acid was added to restore the boron concentration well above the required shutdown limit.

Procedure changes will be incorporated to require verification of blender outlet concentration during large scale NC system makeup.

Westinghouse has identified a potential problem with the turbine rotometer blades both at McGuire and at least one other Westinghouse plant. Presently they are evaluating the problem to identify the cause(s) and corrective action(s). Corrective measures to prevent the boric acid flow element deteriation will be determined utilizing the results of the Westinghouse evaluation.