DUKE POWER COMPANY
OCONEE UNIT 1

Report No.: AO-269/74-6

Report Date: March 28, 1974

Occurrence Date: March 20, 1974

Facility: Oconee Unit 1

Identification of Occurrence: Improper boration to compensate for transient xenon

Conditions Prior to Occurrence: Operation at 90 percent full power. Xenon reactivity was within ± 10 percent of the 100 percent equilibrium value. The control rod configuration was within the withdrawal limits required by the Technical Specifications.

Description of Occurrence:

At 0630, March 20, 1974, Oconee Unit 1 was at 78 percent full power following a series of power reductions from 70 percent power and then power increases from 25 percent full power. The xenon concentration was within ± 10 percent of the 100 percent equilibrium value at 0830; control rod group 7 was approximately 13 percent withdrawn. Since the boron concentration had not been changed in the last 12 hours to compensate for transient xenon reactivity effects, the power level was increased to 90 percent full power. However, the power history had been incorrectly assessed; xenon was still burning out and the control rods were moving into the core to compensate for the positive reactivity addition due to xenon burnout. Continued control rod insertion would have resulted in the violation of the control rod withdrawal limit specified in Technical Specification 3.5.2.5-c. At 0915, boron was added to the reactor coolant system to keep the control rods within the insertion limits. Shortly after boration had occurred, a review of the situation revealed that xenon had not been at equilibrium, and the addition of boron was contrary to Technical Specification 3.5.2.5-d. The power level was immediately reduced to below 80 percent full power. Regulatory Operations, Region II, was notified of the occurrence at 1300, March 20, 1974.

Designation of Occurrence:

The principal cause of the occurrence was misevaluation of transient xenon reactivity changes following a series of changes in power level. A contributing cause to the occurrence was misunderstanding of the intent of Technical Specification 3.5.2.5-d, which prohibits changes in boron concentration above 80 percent full power to compensate for transient xenon but allows boration to compensate for reactivity effects other than transient xenon at any time.

Analysis of Occurrence:

The provision disallowing boron concentration changes above 80 percent full power to compensate for transient xenon was added to the Oconee Technical Specifications to assure that the control rod withdrawal limits would limit the core power peaking. Otherwise, boration could be used to maintain the control rods within the withdrawal limits even during peak xenon conditions. In addition to rod position, limitations are also placed on quadrant tilt and imbalance to preclude exceeding the interim acceptance criteria in the event of a loss-of-coolant accident. At the time of the occurrence, all power distribution parameters (quadrant tilt, rod position, and imbalance) were within their limits. Furthermore, power was reduced below 80 percent in less than an hour following boration. For these reasons, it is concluded that the potential consequences of the occurrence could not have affected the health and safety of the public.

Corrective Action:

On December 31, 1973, certain changes to Technical Specifications 3.5.2.4 and 3.5.2.5 were requested. This request for change was subsequently supplemented on March 8, 1974. Included in this request for change is a modification of 3.5.2.5-d, which clarifies both requirements and intent of limitations on transient xenon reactivity. This change is expected to be issued by the Directorate of Licensing in the very near future, and should preclude recurrence of similar incidents. In the interim, discussions between Oconee Operations supervisory staff, General Office staff, and Regulatory Operations, Region II, have clarified the intent and requirements of this specification to preclude recurrence of similar incidents. This incident will be reviewed with Operations personnel.