

DUKE POWER COMPANY
OCONEE UNIT 1

Report No.: A0-269/74-12

Report Date: August 22, 1974

Occurrence Date: August 6, 1974

Facility: Oconee Unit 1, Seneca, South Carolina

Identification of Occurrence: Low Boric Acid Concentration in 1B Core Flood Tank

Conditions Prior to Occurrence: Unit 1 at 100 percent full power

Description of Occurrence:

On August 6, 1974, the results of a routine chemical analysis of Core Flood Tank 1B at Oconee Unit 1 indicated a boron concentration of 1659 ppm. Oconee Technical Specification 3.3.3(b) requires the boron concentration to be above 1800 ppm whenever the reactor coolant system temperature is above 250°F or pressure is above 800 psig. Reactor shutdown commenced, and another chemistry sample was taken which confirmed the initial sample. Concentrated boric acid from the Boric Acid Mix Tank (BAMT) was pumped to Core Flood Tank 1B. The reactor shutdown was terminated and power escalation resumed after a sample indicated 1847 ppm boron in Core Flood Tank 1B.

Analysis of Occurrence:

The boron concentration of the Core Flood Tanks is measured weekly and after any makeup addition. Additions to, or removal from, the contents of the Core Flood Tanks are apparent from level and pressure changes of the tank. Chemical analyses of 15 samples from July 6 to August 2, 1974 have consistently shown the boron concentration of Core Flood Tank 1B to be between 2096 and 2135 ppm. Several additions of borated water, from the High Pressure Injection System and the Boric Acid Mix Tank, were made during this time period and results after the analysis were consistent with the addition. Chemical analysis of other sources of borated water throughout the station also compared favorably with expected values during this time.

The sample taken on August 2, 1974 showed a concentration of 2096 ppm boron. Between the August 2 sample and the out-of-specification sample taken on August 6, 1974 only 20 gallons of borated water had been added to Core Flood Tank 1B, and that had been from the BAMT with a concentration of 13,856 ppm boron. It is not possible for this volume of addition to have reduced the boron concentration from 2096 to 1659 ppm as the chemical analysis showed.

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The chemical analysis was performed with three separate samples with similar results. Samples performed on standards and other known sources of borated water throughout the station also indicated the results were correct. The addition from the BAMT to Core Flood Tank 1B to bring the concentration back into specification on August 6 also agreed with predicted concentration.

There is no known mechanism which could have caused the dilution of the contents which occurred between August 2 and August 6, 1974. Simple in-leakage is not considered sufficient to cause the dilution without producing a Core Flood Tank level alarm.

The bases of Technical Specification 3.3 states that both Core Flood Tanks are required to be operable as a single tank has insufficient capacity inventory to reflood the core. A Core Flood Tank is considered operable if it contains 1040 ± 30 cubic feet of borated water with at least 1800 ppm boron at a pressure of 600 ± 25 psig. Both Core Flood Tanks were at the proper capacity, and pressure and the composite boron concentration were 1885 ppm. Sufficient margin was present to flood the core and maintain it in a shutdown condition. It is therefore concluded that the health and safety of the public was not affected.

Corrective Action:

In order to investigate the mechanism by which the dilution of the boron concentration in Core Flood Tank 1B has occurred, daily analysis of the boron concentration and its isotopic activity will be performed for a two-week period. Accurate records will be kept of the source, volume, and boron concentration of all makeup additions. This information will be reviewed and a supplemental report submitted.