

DUKE POWER COMPANY
OCONEE UNIT 3

Report No.: AO-287/74-2

Report Date: September 27, 1974

Occurrence Date: September 13, 1974

Facility: Oconee Unit 3, Seneca, South Carolina

Identification of Occurrence: High pressurizer oxygen concentration

Conditions Prior to Occurrence: Operation at various reactor power levels to 15 percent full power

Description of Occurrence:

On September 9, 1974, the analysis of a sample taken from the pressurizer of Oconee Unit 3 indicated an oxygen concentration in excess of 0.1 ppm. The pressurizer spray flow was increased from one gallon per minute to approximately 190 gallons per minute in an effort to dilute the oxygenated pressurizer water by interchange from the reactor coolant loops. Although there are no means for direct measurement of pressurizer flow, additional banks of pressurizer heaters were energized and system pressure held constant, indicating that increased spray flow had been achieved.

It was determined that the oxygen concentration was in excess of 0.1 ppm on September 10 and 11, and the increased pressurizer flow was continued. On September 11, 1974, the reactor was manually tripped because of a steam leak around a turbine bypass valve. In the process of recovery from the trip, the pressurizer spray flow apparently was returned to the normal flow rate.

Further samples indicating an out-of-specification oxygen concentration were taken on September 12 and 13, 1974. At 0935 on September 13, 1974, it was realized that the limit on oxygen concentration in Technical Specification 3.1.5 had been exceeded in the pressurizer and a reactor shutdown commenced at 1015. At 1025, increased spray flow to the Unit 3 pressurizer was commenced and at 1040 continuous venting was commenced. Chemistry samples showed the oxygen concentration to be below 0.1 ppm at 1130. The reactor power reduction was terminated at 1146.

Designation of Apparent Cause of Occurrence:

Whenever the pressurizer oxygen concentration is greater than 0.1 ppm, the appropriate corrective action is to increase pressurizer spray flow and/or implement continuous venting of the pressurizer gas space to the letdown storage tank. The spray was increased; however, it cannot be established whether continuous venting was in effect from September 9 through September

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11, 1974. This was the probable cause for the oxygen concentration remaining out of specification.

Technical Specification 4.1 specifies that the primary coolant oxygen concentration be determined five times weekly. This surveillance requirement was met by sampling the reactor coolant system letdown flow, assuming this would be a representative sample. Therefore, a contributing cause of this occurrence was a misunderstanding on the part of chemistry and operations personnel that pressurizer chemistry surveillance was not a required part of the overall reactor coolant system chemistry surveillance program.

Analysis of Occurrence:

Technical Specification 3.1.5 imposes limitations on the oxygen, chloride and fluoride concentrations to ensure that the integrity of the reactor coolant system is protected against stress corrosion.

In order for this type of corrosion to occur, both oxygen and chloride or fluoride ions must be present in quantities which would exceed the technical specification limits. Throughout the period September 9-13, 1974, chloride and fluoride concentrations were below 0.05 ppm, half of the concentration permitted by the technical specifications. It is therefore concluded that the chemical environment within the pressurizer during the period oxygen concentration exceeded specifications would not have resulted in stress corrosion, and therefore, the safe operation of the unit was not affected.

Corrective Action:

The oxygen concentration in the pressurizer was restored within the limits of Technical Specification 3.1.5 on September 13, 1974 by spraying down and venting the pressurizer gas space.

To prevent recurrence of similar incidents, the following corrective actions have been or will be taken:

1. The Chemistry Training Manual has been revised to include the pressurizer as a part of the reactor coolant system chemistry surveillance program.
2. The Chemistry Management Manual was updated on September 24, 1974 to include the pressurizer in reactor coolant system surveillance.
3. The chemistry status board now shows the pressurizer as being a sampling point required by the Technical Specifications.
4. The events and corrective action taken with regard to this incident have been reviewed by operations and chemistry personnel.
5. The Chemistry Management Manual will be revised to specify appropriate action to be taken by chemistry personnel upon discovery of out-of-specification conditions or conditions which could result in the chemistry becoming out of specification. This revision will be completed prior to October 3, 1974.