DUKE POWER COMPANY
OCONEE UNIT 1

Report No.: AO-269/74-14

Report Date: October 18, 1974

Occurrence Date: October 5, 1974

Facility: Oconee Unit 1, Seneca, South Carolina

Identification of Occurrence: Failure of Pressure Switch 1PS-364

Conditions Prior to Occurrence: Unit at 75 Percent of Full Power

Description of Occurrence:

At 1350 October 5, 1974, a 4 gpm reactor coolant leak was detected on Oconee Unit 1. A reactor shutdown commenced immediately after discovery. During the shutdown, at 1441, the Channel A Engineered Safeguards (ES) and Reactor Protective Systems (RPS) tripped indicating low reactor coolant system pressure. The reactor was subcritical by 1547, however, personnel entry to the Reactor Building was not possible until 0600 October 6, 1974. Pressure Switch 1PS-364, interlock for valve 1LP-2, was found leaking and was isolated. Channel A ES and RPS pressure transmitter 1PT-21P was found to be damaged due to steam from 1PS-364.

Designation of Apparent Cause of Occurrence:

The reactor coolant leakage from pressure switch 1PS-364 was the result of a defective diaphragm. This was the first failure of this type of valve at Oconee. The valve is proof tested to 4500 psi.

The failure of pressure transmitter 1PT-21P was due to electronic component failure induced by heat from the steam being impinged on it.

Analysis of Occurrence:

Pressure switch 1PS-364 creates an electrical interlock to the operation of valve 1LP-2, decay heat removal from the reactor coolant system, which prevents opening with reactor coolant pressure greater than 410 psi. This will prevent inadvertent overpressurization of the low pressure injection piping. The failure of the pressure switch resulted in the proper action of preventing the opening of valve 1LP-2.

Valve 1LP-1 serves as a redundant isolation valve to prevent overpressurization of the low pressure injection system. This valve is interlocked using a pressure signal from the integrated control syste which prevents operation with reactor coolant pressure in excess of 200 psi. Valve 1LP-1 was not affected by this incident.

Pressure transmitter 1PT-21P supplies pressure information to Channel A ES and RPS. The failure of this transmitter gave a "zero" pressure indication to ES and RPS Channel A and resulted in a channel trip. The pressure switch failed in a conservative manner by giving a channel trip.

The maximum level of contamination in the Reactor Building was 2.1×10^{-7} μCi/ml of ^{131}I. Personnel radiation exposure was minimized during this incident. All entries into the Reactor Building were controlled by health physics personnel. No activity was released to the environment. It is concluded that the health and safety of the public was not affected.

Corrective Action:

Pressure switch 1PS-364 was isolated and removed. The piping was capped because a spare pressure switch was not in stock. The breakers for valve 1LP-2 and redundant valve 1LP-1 were red tagged to prevent inadvertent actuation.

Pressure transmitter 1PT-21P was replaced with a new transmitter and was properly calibrated.

Failure Data:

Pressure switch 1PT-364 is a Custom Component, Type 6045GX4 (200-400 psi range, 4500 psi proof pressure, 35 psi deadband).

Pressure transmitter 1PT-21P is a Motorola Type 56 PH.