

Licensee/Facility:

CAROLINA POWER & LIGHT CO.
 Brunswick
 Southport, North Carolina
 Dockets: 050-00325 050-00324
 [1] GE-4, [2] GE-4

Notification:

MR Number: 2-2005-0006
 Date: 04/13/2005
 Call from Licensee

Subject: Brunswick Automatic Scram

Discussion:

On April 9 at 00:50 an automatic reactor scram occurred on Brunswick Unit 2 due to low reactor water level. The Reactor Core Isolation Cooling (RCIC) system actuated and injected as designed. The High Pressure Coolant Injection (HPCI) system actuated but reactor water level quickly recovered and injection did not occur. Reactor Water Cleanup (RWCU) system and Secondary Containment isolated and Standby Gas Treatment (SBGT) initiated. Primary Containment Isolation System (PCIS) Group 2, 3, 6, and 8 containment isolations were received.

The licensee reported the Reactor Protection System (RPS) actuation and valid system actuations in accordance with 10 CFR 50.72 and initiated an investigation to determine the cause of the reactor water level transient. The plant was at 61% power with reactor water level being maintained by the B RFP. The A RFP had just been placed in standby (idling) and as a result, its minimum flow valve automatically opened as designed. Simultaneously, operators were in the process of manually adjusting the condensate recirculation valve to maintain desired condensate pump discharge pressure. Both of these actions had the effect of reducing condensate booster pumps discharge pressure. The reduction in pressure resulted in the trip of the operating condensate booster pumps which, in turn, caused the B RFP to trip on low suction pressure. Operators attempted to restore reactor level with the A RFP, however, the pump subsequently tripped on low suction pressure.

Immediately following the scram, Operations noticed a disparity between reactor water level indications, supplied from the output of the Digital Feedwater Control System (DFWCS) in the control room and the RPS low level setpoint which receives input from a separate instrument loop. Reactor water level was indicated as 172" to 173" (inches) on the control room level indicators when the scram was received (RPS Scram setpoint is 166"). Licensee review determined that a modification to the DFWCS performed last outage resulted in the observed disparity. A 3 second time constant was added to the DFWCS circuit to reduce unnecessary RFP turbine steam control valve movement. As a result, control room indication lagged actual reactor water level. This means for slow reactor water level changes, there will be no noticeable lag but for rapid changes the lag will be greater. The DFWCS (supplied by Foxboro) changes were incorporated by modification on Unit 2 in Spring 2003 and on Unit 1 in Spring 2004. Additionally, the licensee discovered that the Feedwater and Main Turbine High Water Level Trip Instrumentation (Technical Specification 3.3.2.2), used to protect against a feedwater controller failure abnormal operating occurrence, was affected by the circuit time delay. The licensee declared the Unit 1 feedwater and main turbine high water level trip instrumentation inoperable and entered the technical specification (TS) action statement. Subsequently the licensee removed the time delay feature from the circuit within the TS allowed outage time.

Contact:

MACDONALD, GEORGE T

Org:

R2

Phone No:

(404) 562-4543

Email:

GTM@nrc.gov