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SUBJECT: Revised special rept: on 880330, LTOPP relief valve opened.
 Initial submittal to be replaced in entirety by this rept.

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United States Nuclear Regulatory Commission
Attn: Document Control Desk
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REFERENCE: Serial: RNP/87-1670

H. B. ROBINSON STEAM ELECTRIC PLANT, UNIT NO. 2
DOCKET NO. 50-261
LICENSE NO. DPR-23
30-DAY SPECIAL REPORT REVISION - LTOPP ACTUATION

Gentlemen:

Carolina Power and Light Company (CP&L) provides this revised submittal in accordance with Plant Technical Specifications 3.1.2.1.e and 6.9.3.1.e. The original report identified the cause of the event as the failure of the "B" Charging Pump speed controller to maximum speed and a resulting imbalance between charging and letdown flows. Subsequent investigation has attributed the cause of the event to the failure of the pump fluid drive output inboard bearing. This submittal should replace the original in its entirety (Reference).

On March 30, 1987, the Low Temperature OverPressure Protection (LTOPP) relief valve, PCV-456, opened at 400 psig, its design setpoint. This valve is a Pressurizer Power Operated Relief Valve (PORV) designed to lift to relieve a pressure transient in the Reactor Coolant System (RCS). The following narrative describes the event and subsequent actions by CP&L to determine the root cause and to prevent recurrence.

At the time of the event, the Plant was operating on Residual Heat Removal (RHR) and the Pressurizer was water-solid. RCS pressure was at approximately 330 psig. The "A" Charging Pump, one of three, was in service with charging flow at 53 gpm plus seal injection flow, and letdown at 77 gpm. RCS pressure was being controlled with a Pressure Control Valve, PCV-145, in the Letdown System.

The "B" Charging Pump was started with its controller set to minimum speed. The intent was to gradually increase the charging flow capacity to allow for additional letdown flow in order to increase RCS purification. However, the charging flow went to 103 gpm. Alarms for "Pressurizer PORV/Safety Valve Open", "Low Pressure Protection Actuation/Trouble PCV-456", and "Pressurizer Power Relief Line High Temperature" were received on the main control board in the Unit No. 2 Control Room. The alarms were acknowledged and cleared.

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Both the "A" and "B" Charging Pump speed controllers were reduced to minimum speed. Within a few seconds, alarms were again received on the main control board. With both Charging Pumps at minimum speed, the charging flow should have been approximately 48 gpm instead of the 83 gpm indicated.

The "A" Charging Pump was stopped upon discovering that PCV-145 could not respond quickly enough for the charging/letdown flow imbalance. RCS pressure then dropped to approximately 290 psig. PCV-145 was placed under manual control to recover pressure and the RCS was stabilized at 350 psig.

The LTOPP actuation was caused by the flow from the "B" Charging Pump being greater than expected for the pump speed selected by the operator. Subsequent investigation by Plant Maintenance personnel found the output shaft inboard bearing in the pump fluid drive was damaged. The probable cause has been attributed to the lack of lubrication due to wear on the internal lube oil pump.

The bearing is pressed onto the output shaft and rides inside the input shaft with a slip fit. Bearing damage could cause the bearing to bind, resulting in a direct link between the input and output shafts. Thus, the fluid drive's ability to adjust pump speed could be impacted, resulting in the pump going to full speed regardless of the controller. Discussions with the pump manufacturer representative have supported this conclusion.

Following the event, the fluid drives of the "A" and "C" Charging Pumps were inspected by Plant Maintenance personnel and the fluid drive manufacturer representative. No indication of a similar condition was found on either fluid drive. This further supports the conclusion that the "B" Charging Pump fluid drive bearing had failed due to end of life.

Changes have been incorporated into the Plant preventive maintenance program governing pump vibration and gauges have been installed to monitor the fluid drive lube oil pressure of the three Charging Pumps. These actions should alert Plant personnel to indications of bearing problems before damage to the bearing can lead to a similar occurrence.

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Should you have any question, please contact Mr. J. M. Curley, (803) 383-1367.

Very truly yours,



R. E. Morgan
General Manager
H. B. Robinson S. E. Plant

DAS:lko

Enclosure

cc: Dr. J. N. Grace
Mr. L. W. Garner
INPO