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ACCESSION NBR:8911160298 DOC.DATE: 89/11/07 NOTARIZED: NO DOCKET #
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SUBJECT: Special rept:on 891016,momentary loss of pressure control & excursion caused by failure to recognize sys reactions.

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NOV. 07 1989

Robinson File No: 13510H

Serial: RNPD/89-3661

United States Nuclear Regulatory Commission
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H. B. ROBINSON STEAM ELECTRIC PLANT, UNIT NO. 2
DOCKET NO. 50-261
LICENSE NO. DPR-23
SPECIAL REPORT - OPERATION OF OVERPRESSURE PROTECTION SYSTEM

Gentlemen:

In accordance with Technical Specifications 3.1.2.1.e and 6.9.3.1.e, Carolina Power and Light Company (CP&L) submits the following report of the operation of the Overpressure Protection System at H. B. Robinson, Unit No. 2. As an aid to understanding the system alignment and sequence of events, a Residual Heat Removal System flow diagram is provided as Attachment I.

Event Description

On October 16, 1989, H. B. Robinson Unit 2 (HBR2) was in cold shutdown with the Residual Heat Removal (RHR) System in service for decay heat removal. The Reactor Coolant System (RCS) was water-solid with pressure and temperature at approximately 350 psig and 160°F, respectively. Reactor Coolant Pump (RCP) "C" and RHR Pump "A" were in operation, and the Low Temperature Overpressure Protection (LTOPP) System was in service. The LTOPP System normally utilizes both pressurizer power operated relief valves (PORV), PCV-455C and PCV-456, however, PCV-455C had been removed from service at 0145 hours on October 14 due to a leaking valve operator diaphragm. Following the morning shift turnover and pre-shift briefing, instructions were given to increase RCS temperature to between 180°F and 185°F.

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Prior to the LTOPP actuation, HCV-142, RHR System to normal letdown line isolation valve, was approximately 40% open to provide letdown purification and primary system pressure control via PCV-145, low pressure letdown pressure control valve. PCV-145, which is not shown on Attachment I, is part of the Chemical and Volume Control System (CVCS) and is located downstream of HCV-142. To help maintain RCS temperature, HCV-758, RHR heat exchanger outlet flow control valve, was in the closed position; it had previously been determined that HCV-758 was leaking by and full closure was required to limit flow through the heat exchangers and, thereby, maintain the desired RCS temperature. Based on the condition of HCV-758, plant operators had begun using the RHR heat exchanger outlet isolation valves, RHR-759A and RHR-759B, to control flow through the heat exchangers and adjust RCS temperature. As such, RHR-759A was closed prior to the event. It should also be noted that RHR-764, HCV-758 bypass valve, was closed as part of the normal RHR System alignment for decay heat removal.

At 0830 hours, in an attempt to initiate the required increase in RCS temperature, RHR-759B was closed. Within a very short time (approximately 30 seconds), the LTOPP System automatically actuated to open PCV-456 and relieve RCS pressure. Closure of RHR-759B had isolated the RHR letdown line and PCV-145, which resulted in the momentary loss of pressure control and the resultant RCS pressure excursion. Upon recognition of this situation, RHR-759B was immediately reopened which re-established normal RCS pressure control. After RCS pressure decreased below the LTOPP setpoint, PCV-456 automatically closed, and RCS pressure was stabilized at approximately 340 psig. A review of computer data from the event showed that the maximum indicated RCS wide range pressure reached 418 psig, while the maximum indicated pressurizer pressure reached 404 psig. All systems and components functioned as designed and no apparent discrepancies were noted. Also, the unavailability of PCV-455C had no apparent adverse effect on the performance of the LTOPP System. This valve was returned to service at 1323 hours on October 16.

Root Cause and Corrective Action

The cause of this event was the failure to recognize the overall consequences and system reactions which were to result from the closure of RHR-759B. The full range of possible effects were not established and evaluated prior to valve closure. A contributing factor was the degraded condition of HCV-758 which caused operating personnel to employ circuitous methods for controlling or adjusting RCS temperature.

To ensure that the appropriate causal factors have been identified, this event will be reviewed within the plant's Corrective Action Program. This will include the use of INPO's Human Performance Evaluation System (HPES) to establish the elements of human performance which contributed to the occurrence of this event.

Also, this event will be reviewed with licensed operators to enhance their understanding of the system alignment and sequence of events which resulted in the LTOPP actuation. This review will also emphasize the importance of fully understanding possible consequences prior to performing equipment or component manipulations.

Finally, a project has been initiated to evaluate methods for maintaining proper operation of HCV-758. The intent of this project is to ensure that this valve functions as intended, and that system operation is consistent with the needs and expectations of operating personnel.

If you should have any questions regarding this event, please contact Mr. J. D. Kloosterman at (803) 383-1491.

Very truly yours,

R. E. Morgan
General Manager
Robinson Nuclear Project Department

CTB:lht

Attachment

cc: Mr. S. D. Ebneter
Mr. L. W. Garner
INPO

ATTACHMENT I
RESIDUAL HEAT REMOVAL SYSTEM FLOW DIAGRAM