Progress Energy

Serial: RNP-RA/06-0120

DEC 21 2006

United States Nuclear Regulatory Commission
Attn: Document Control Desk
Washington, DC 20555-0001

H. B. ROBINSON STEAM ELECTRIC PLANT, UNIT NO. 2
DOCKET NO. 50-261/LICENSE NO. DPR-23

LICENSEE EVENT REPORT NO. 2006-001-00
MANUAL REACTOR TRIP DUE TO FAILURE OF A TURBINE
GOVERNOR VALVE ELECTRO-HYDRAULIC CONTROL CARD

Ladies and Gentlemen:

The attached Licensee Event Report is submitted in accordance with the requirements of 10 CFR 50.73. Should you have any questions regarding this matter, please contact Mr. C. T. Baucom, Supervisor – Licensing/Regulatory Programs, at (843) 857-1253.

Sincerely,

Ernest J. Kapopoulos, Jr.
Plant General Manager
H. B. Robinson Steam Electric Plant, Unit No. 2

CTB/grs

Attachment

c: Dr. W. D. Travers, NRC, Region II
Mr. C. P. Patel, NRC, NRR
NRC Resident Inspector, HBRSEP

Progress Energy Carolinas, Inc.
Robinson Nuclear Plant
3581 West Entrance Road
Hartsville, SC 29550

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NRC FORM 366 (6-2004) U.S. NUCLEAR REGULATORY COMMISSION

LICENSEE EVENT REPORT (LER)

(See reverse for required number of digits/characters for each block)

APPROVED BY OMB NO. 3150-0104 EXPIRES 6-30-2007

Estimated burden per response to comply with this mandatory collection request: 50 hours. Reported lessons learned are incorporated into the licensing process and fed back to industry. Send comments regarding burden estimate to the Records and FOIA/Privacy Service Branch (T-5 F52), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by internet e-mail to infocollects@nrc.gov, and to the Desk Officer, Office of Information and Regulatory Affairs, NEOB-10202 (3150-0104), Office of Management and Budget, Washington, DC 20503. If a means used to impose an information collection does not display a currently valid OMB control number, the NRC may not conduct or sponsor, and a person is not required to respond to, the information collection.

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4. TITLE

Manual Reactor Trip Due to Failure of a Turbine Governor Valve Electro-Hydraulic Control Card

5. EVENT DATE			6. LER NUMBER			7. REPORT DATE			8. OTHER FACILITIES INVOLVED	
MONTH	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REV NO	MONTH	DAY	YEAR	FACILITY NAME	DOCKET NUMBER
										05000
10	25	2006	2006	- 001 -	00	12	21	2006	FACILITY NAME	DOCKET NUMBER
										05000

9. OPERATING MODE

1

10. POWER LEVEL

100%

11. THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check all that apply)

- ☐ 20.2201(b)
- ☐ 20.2201(d)
- ☐ 20.2203(a)(1)
- ☐ 20.2203(a)(2)(i)
- ☐ 20.2203(a)(2)(ii)
- ☐ 20.2203(a)(2)(iii)
- ☐ 20.2203(a)(2)(iv)
- ☐ 20.2203(a)(2)(v)
- ☐ 20.2203(a)(2)(vi)
- ☐ 20.2203(a)(3)(i)
- ☐ 20.2203(a)(3)(ii)
- ☐ 20.2203(a)(4)
- ☐ 50.36(c)(1)(i)(A)
- ☐ 50.36(c)(1)(ii)(A)
- ☐ 50.36(c)(2)
- ☐ 50.46(a)(3)(ii)
- ☐ 50.73(a)(2)(i)(A)
- ☐ 50.73(a)(2)(i)(B)
- ☐ 50.73(a)(2)(i)(C)
- ☐ 50.73(a)(2)(ii)(A)
- ☐ 50.73(a)(2)(ii)(B)
- ☐ 50.73(a)(2)(iii)
- ☒ 50.73(a)(2)(iv)(A)
- ☐ 50.73(a)(2)(v)(A)
- ☐ 50.73(a)(2)(v)(B)
- ☐ 50.73(a)(2)(v)(C)
- ☐ 50.73(a)(2)(v)(D)
- ☐ 50.73(a)(2)(vii)
- ☐ 50.73(a)(2)(viii)(A)
- ☐ 50.73(a)(2)(viii)(B)
- ☐ 50.73(a)(2)(ix)(A)
- ☐ 50.73(a)(2)(x)
- ☐ 73.71(a)(4)
- ☐ 73.71(a)(5)
- ☐ OTHER Specify in Abstract below or in NRC Form 366A

12. LICENSEE CONTACT FOR THIS LER

FACILITY NAME	TELEPHONE NUMBER (Include Area Code)
C. T. Baucom	843-857-1253

13. COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT

CAUSE	SYSTEM	COMPONENT	MANU-FACTURER	REPORTABLE TO EPIX	CAUSE	SYSTEM	COMPONENT	MANU-FACTURER	REPORTABLE TO EPIX
X	JJ	CBD	WESTING-HOUSE	Y					

14. SUPPLEMENTAL REPORT EXPECTED

☐ YES (If yes, complete 15. EXPECTED SUBMISSION DATE). ☒ NO

15. EXPECTED SUBMISSION DATE	MONTH	DAY	YEAR

ABSTRACT (Limit to 1400 spaces, i.e., approximately 15 single-spaced typewritten lines)

At 0247 hours on October 25, 2006, with H. B. Robinson Steam Electric Plant (HBRSEP), Unit No. 2, in Mode 1 at 100% power, control room operators responded to alarms received for steam flow greater than feed flow on all three steam generators. Turbine first stage pressure indicated 0 psig. Three of the four turbine governor valves indicated closed, the fourth indicated an intermediate position. The control rods began automatically inserting, as expected. The net megawatt recorder indicated that electrical generation had rapidly reduced from 742 to 0 megawatts. The control room operators diagnosed the event as a 100% load rejection and initiated a manual reactor trip at 0248 hours, 68.8 seconds following the start of the event.

The root cause of this event was failure of a turbine governor valve electro-hydraulic control system card. A pressurizer power operated relief valve lifted and reseated during the event. The condition described in this Licensee Event Report is reportable in accordance with 10 CFR 50.73(a)(2)(iv)(A), any event or condition that resulted in manual or automatic actuation of any of the systems listed in 10 CFR 50.73(a)(2)(iv)(B).

LICENSEE EVENT REPORT (LER)

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NARRATIVE

I. DESCRIPTION OF EVENT

At 0247 hours on October 25, 2006, with H. B. Robinson Steam Electric Plant (HBRSEP), Unit No. 2, in Mode 1 at 100% power, control room operators responded to alarms received for steam flow greater than feed flow on all three steam generators [EIIS System:Component AB:SG]. Turbine first stage pressure [EIIS System:Component TA:PI] indicated 0 psig. Three of the four turbine governor valves [EIIS System:Component TA:FCV] indicated closed, the fourth indicated an intermediate position. The control rods [EIIS System AA] began automatically inserting, as expected, due to the difference between reactor coolant average temperature and reference temperature, which is based on turbine first stage pressure. The reactor operator placed the rod control system in manual based on a misdiagnosis that a turbine first stage pressure channel had failed, since indicated pressure was 0 psig. The net megawatt recorder indicated that electrical generation had rapidly reduced from 742 to 0 megawatts. The control room operators diagnosed the event as a 100% load rejection and initiated a manual reactor trip at 0248 hours, 68.8 seconds following the start of the event.

A pressurizer power operated relief valve (PORV) [EIIS System:Component AB:RV] lifted and reseated during the event. As a result of lifting, the pressurizer PORV has a current leakage rate of approximately 0.03 gpm. This leakage is being monitored in accordance with site procedures. The auxiliary feedwater system (AFW) [EIIS System BA] also initiated during the event, as expected, due to the low steam generator level that resulted from rapid closure of the turbine governor valves.

II. CAUSE OF EVENT

Investigation of this event was conducted using the Corrective Action Program and documented in Significant Nuclear Condition Report (NCR) 210311. This investigation found that the root cause of this event was a component failure in one of the five logic cards in the turbine governor valve electro-hydraulic control (EHC) system [EIIS System JJ].

The following five EHC system logic cards were replaced:

1. Digital-to-Analog (D/A) Converter
2. Up-Down Counter
3. High-Thresold Logic (HTL) Gate 6
4. Input Expander
5. HTL Gate 1

Technical representatives from Westinghouse and Data Techniques (a Westinghouse vendor) tested the removed logic cards. Three of the five cards were found to have anomalies. A weak transistor on the up-down counter card may have caused the counter to count incorrectly and could have caused the condition experienced. The vendor recommended that this card be replaced with a new style card. The D/A converter card was found to be slightly out of calibration. The vendor determined that the small offset would not have an effect on the system. The HTL Gate 6 card had an intermittent failure of a single-gate circuit which is not believed to have contributed to this event.

III. ANALYSIS OF EVENT

The condition described in this Licensee Event Report is reportable in accordance with 10 CFR 50.73(a)(2)(iv)(A), any event or condition that resulted in manual or automatic actuation of any of the systems listed in 10 CFR 50.73(a)(2)(iv)(B).

The health and safety of the public and plant personnel were not impacted by this event. The required safety functions were maintained and the operating parameters of the plant remained within required safety limits. The steam generator PORVs and a pressurizer PORV lifted as designed to relieve system pressure. Based on a review of plant data, if the control room operators had taken no action, the automatic trip logic would have been satisfied and would have tripped the unit within 1 to 2 seconds of the manual trip. Given this short duration, no additional safety significance would have resulted if the manual trip had not been initiated. The plant responded as designed and the operating crew manually tripped the reactor in response to the conditions they observed. The AFW system initiated during the event, as expected, due to the low steam generator level that resulted from rapid closure of the turbine governor valves.

During the event the reactor operator placed the rod control system in manual based on a misdiagnosis that a turbine first stage pressure channel had failed. Turbine first stage pressure channel failure indications were present during the initial stages of the event and some of the indications for a first stage pressure channel failure and a 100% load rejection are common. Once the load rejection was properly diagnosed, the crew took the appropriate and conservative actions to place the plant in a safe condition. The Updated Final Safety Analysis Report, Section 15.2.2, Loss of External Load, includes the assumption that the rod control system is in manual at the start of the event. Additionally, the investigation of this event included simulator modeling to understand the impact on plant parameters due to having the rod control system in manual. This modeling found the impact to be minimal, and further found that the pressurizer PORV would have lifted if the rod control system had been left in automatic. Therefore, placing the rod control system in manual did not significantly affect the event.

IV. CORRECTIVE ACTIONS

Immediate Corrective Actions:

The five logic cards in the EHC system were replaced. Operators have reviewed information and received simulator training on the proper response to turbine governor valve failures with regard to placing the rod control system in manual.

Planned Corrective Actions:

In accordance with vendor recommendations, the EHC system up-down counter card will be replaced with a new style card (1B51049-101) during the next refueling outage, which is currently scheduled to begin in April 2007.

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NARRATIVE

V. ADDITIONAL INFORMATION

Failed Component Information:

The failed EHC system card was a Westinghouse up-down counter card, Part Number 2822A82.

Previous Similar Events:

Licensee Event Report 1998-003-00

On April 25, 1998, at approximately 1334 hours, steam generator (SG) level deviation alarms were received on all three SGs. Control room operators observed that turbine first stage pressure was rapidly decreasing and reactor control rods were automatically inserting. The control board operator placed the rod control system in manual based on a misdiagnosis that a turbine first stage pressure transmitter had failed low. Reactor coolant system (RCS) pressure increased to approximately 2335 psig resulting in opening of a pressurizer PORV.

The initiating event was the inadvertent closing of the turbine governor valves, which reduced steam flow and resulted in an increase in steam generator pressure. The increased steam generator pressure resulted in shrinkage of the steam generator levels below the reactor trip setpoint. Troubleshooting of the EHC system, which controls the turbine governor valves, was performed by maintenance personnel assisted by a vendor technical representative. Various failure modes of the EHC system were investigated. Of the EHC system failures investigated, only changes to the impulse channel (which monitors turbine first stage pressure) corresponding to a pressure spike of approximately 35 psig, were found to duplicate the turbine governor valve response recorded during the event. No equipment failures were identified that would have resulted in the initiation of the event and the root cause of the event could not be definitively determined.