

# CATEGORY 1

## REGULATORY INFORMATION DISTRIBUTION SYSTEM (RIDS)

ACCESSION NBR: 9806010213      DOC. DATE: 98/05/26      NOTARIZED: NO      DOCKET #  
 FACIL: 50-261 H.B. Robinson Plant, Unit 2, Carolina Power & Light Co      05000261  
 AUTH. NAME      AUTHOR AFFILIATION  
 CHERNOFF, H.K.      Carolina Power & Light Co.  
 MOYER, J.W.      Carolina Power & Light Co.  
 RECIP. NAME      RECIPIENT AFFILIATION

SUBJECT: LER 98-003-00: on 980425, automatic reactor trip resulted from inadvertent closure of turbine governor valves. Caused by pressure spike sensed in impulse pressure control of turbine control sys. Turbine control sys revised. W/980526 ltr.

DISTRIBUTION CODE: IE22T      COPIES RECEIVED: LTR 1 ENCL 1 SIZE: 6  
 TITLE: 50.73/50.9 Licensee Event Report (LER), Incident Rpt, etc.

**NOTES:**

	RECIPIENT ID CODE/NAME	COPIES LTTR ENCL	RECIPIENT ID CODE/NAME	COPIES LTTR ENCL
	PD2-1 PD	1 1	SHEA, J W	1 1
INTERNAL:	AEOD/SPD/RAB	2 2	AEOD/SPD/RRAB	1 1
	<del>FILE CENTER</del>	1 1	NRR/DE/ECGB	1 1
	NRR/DE/EELB	1 1	NRR/DE/EMEB	1 1
	NRR/DRCH/HHFB	1 1	NRR/DRCH/HICB	1 1
	NRR/DRCH/HOLB	1 1	NRR/DRCH/HQMB	1 1
	NRR/DRPM/PECB	1 1	NRR/DSSA/SPLB	1 1
	NRR/DSSA/SRXB	1 1	RES/DET/EIB	1 1
	RGN2 FILE 01	1 1		
EXTERNAL:	L ST LOBBY WARD	1 1	LITCO BRYCE, J H	1 1
	NOAC POORE, W.	1 1	NOAC QUEENER, DS	1 1
	NRC PDR	1 1	NUDOCS FULL TXT	1 1

**NOTE TO ALL "RIDS" RECIPIENTS:**

PLEASE HELP US TO REDUCE WASTE. TO HAVE YOUR NAME OR ORGANIZATION REMOVED FROM DISTRIBUTION LISTS OR REDUCE THE NUMBER OF COPIES RECEIVED BY YOU OR YOUR ORGANIZATION, CONTACT THE DOCUMENT CONTROL DESK (DCD) ON EXTENSION 415-2083

**FULL TEXT CONVERSION REQUIRED**

**TOTAL NUMBER OF COPIES REQUIRED: LTTR 24 ENCL 24**

C  
A  
T  
E  
G  
O  
R  
Y  
  
1  
  
D  
O  
C  
U  
M  
E  
N  
T



**Carolina Power & Light Company**  
Robinson Nuclear Plant  
3581 West Entrance Road  
Hartsville SC 29550

Robinson File No: 13510C  
Serial: RNP-RA/98-0098

MAY 26 1998


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

H. B. ROBINSON STEAM ELECTRIC PLANT, UNIT NO. 2  
DOCKET NO. 50-261/LICENSE NO. DPR-23  
Licensee Event Report 1998-003  
Reactor Trip Due to Inadvertent Closure of Turbine Governor Valves

Dear Sir or Madam:

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. T. M. Wilkerson, Manager, Regulatory Affairs.

Very truly yours,

  
J. W. Moyer  
Plant General Manager

1/1  
Jerr

Attachment

c: Mr. L. A. Reyes, Regional Administrator, USNRC, Region II  
Mr. J. W. Shea, USNRC Project Manager, HBRSEP  
USNRC Senior Resident Inspector, HBRSEP

9806010213 980526  
PDR ADOCK 05000261  
S PDR

55555

NRC FORM 366 U.S. NUCLEAR REGULATORY COMMISSION  
(04-1998)**LICENSEE EVENT REPORT (LER)**(See reverse for required number of  
digits/characters for each block)

APPROVED BY OMB NO. 3150-0104 EXPIRES 04/30/1998

Estimated burden per response to comply with this mandatory information collection request: 50 hrs. Reported lessons learned are incorporated into the licensing process and fed back to industry. Forward comments regarding burden estimate to the Information and Records Management Branch (T-6 F33), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, and to the Paperwork Reduction Project (3150-0104), Office of Management and Budget, Washington, DC 20503. If 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.

**FACILITY NAME (1)**

H. B. ROBINSON STEAM ELECTRIC PLANT, UNIT NO. 2

**DOCKET NUMBER (2)**

05000261

**PAGE (3)**

1 OF 5

**TITLE (4)**

Reactor Trip Due to Inadvertent Closure of Turbine Governor Valves

EVENT DATE (5)			LER NUMBER (6)			REPORT DATE (7)			OTHER FACILITIES INVOLVED (8)	
MONTH	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	MONTH	DAY	YEAR	FACILITY NAME	DOCKET NUMBER
04	25	1998	1998	- 03 --	00	05	26	1998	FACILITY NAME	DOCKET NUMBER
										05000
									FACILITY NAME	DOCKET NUMBER
										05000

OPERATING MODE (9)	1	THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR 5: (Check one or more) (11)			
POWER LEVEL (10)	100	20.2201(b)	20.2203(a)(2)(v)	50.73(a)(2)(i)	50.73(a)(2)(viii)
		20.2203(a)(1)	20.2203(a)(3)(i)	50.73(a)(2)(ii)	50.73(a)(2)(x)
		20.2203(a)(2)(i)	20.2203(a)(3)(ii)	50.73(a)(2)(iii)	73.71
		20.2203(a)(2)(iii)	20.2203(a)(4)	X 50.73(a)(2)(iv)	OTHER
		20.2203(a)(2)(iii)	50.36(c)(1)	50.73(a)(2)(v)	Specify in Abstract below
		20.2203(a)(2)(iv)	50.36(c)(2)	50.73(a)(2)(vii)	or in NRC Form 366A

**LICENSEE CONTACT FOR THIS LER (12)****NAME**

H. K. Chernoff, Supervisor, Licensing/Regulatory Programs

**TELEPHONE NUMBER (Include Area Code)**

(843) 857-1544

**COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT (13)**

CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO EPIX	CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO EPIX

**SUPPLEMENTAL REPORT EXPECTED (14)**

YES (If yes, complete EXPECTED SUBMISSION DATE).	NO	EXPECTED	MONTH	DAY	YEAR
	X				

**ABSTRACT (Limit to 1400 spaces, i.e., approximately 15 single-spaced typewritten lines) (16)**

On April 25, 1998, at approximately 1334, an automatic reactor trip resulted from an inadvertent closure of the turbine governor valves. Closure of these valves resulted in an increased steam generator (SG) pressure and subsequent shrink in level below the reactor trip setpoint. The most probable cause was attributed to a pressure spike sensed in the impulse pressure control of the turbine control system. During the approximately 7 seconds between receipt of alarms, and reactor trip, the control board operator placed the reactor control rods in manual based on a diagnosis that the event was due to a failed turbine first stage pressure transmitter. The diagnosis of the event was incorrect. However, the action did not significantly affect the event.

Subsequent to this event operation of the turbine control system was revised to reduce the vulnerability to turbine first stage pressure transients. In addition the impulse pressure transmitter was replaced, and additional instruments to monitor the turbine control system were temporarily installed.

This report is submitted in accordance with 10 CFR 50.73(a)(2)(iv) as an event or condition that resulted in a manual or automatic actuation of an engineered safety system, including the reactor protection system.

NRC FORM 366A  
(04-1998)LICENSEE EVENT REPORT (LER)  
TEXT CONTINUATION

FACILITY NAME (1)	DOCKET	LER NUMBER (6)			PAGE (3)	
H. B. ROBINSON STEAM ELECTRIC PLANT, UNIT NO. 2	05000261	YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	2	OF 5
		1998	-- 03	-- 00		

TEXT (If more space is required, use additional copies of NRC Form 366A) (17)

I. DESCRIPTION OF EVENT

On April 25, 1998, at approximately 1334, steam generator (SG) level deviation alarms (EIS System Code IB, Component Code: LA) were received on three SGs (EIS System Code AB, Component Code SG). Control room operators observed that turbine generator (EIS System Code EL Component Code TRB) first stage pressure was rapidly decreasing and reactor control rods (EIS System Code AA) were automatically inserting. The control board operator placed the control rods in manual based on the belief that the turbine generator first stage pressure transmitter had failed low. Reactor coolant system (RCS) (EIS System Code AB) pressure increased to approximately 2335 psig resulting in opening a pressurizer power operated relief valve (PORV)(EIS System Code AB, Component Code RV). Approximately 7 seconds after receipt of the SG level deviation alarms, an automatic reactor trip was actuated on a low-low level in the 'A' SG. Auxiliary feedwater (EIS System Code BA) initiated approximately 1 second after the reactor trip. The PORV automatically closed approximately 3 seconds after the reactor trip.

II. CAUSE OF EVENT

The initiating event was the inadvertent closing of the turbine generator governor valves (EIS System Code EL, Component Code SCV) 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 electro-hydraulic control (EHC) system (EIS System Code JJ), which controls the turbine governor valves, was performed by H.B. Robinson Steam Electric Plant (HBRSEP), Unit No. 2, maintenance personnel assisted by a vendor technical representative. Various failures modes of the EHC system were investigated. Of the EH 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.

NRC FORM 366A  
(04-1998)

U.S. NUCLEAR REGULATORY COMMISSION

LICENSEE EVENT REPORT (LER)  
TEXT CONTINUATION

FACILITY NAME (1)	DOCKET	LER NUMBER (6)			PAGE (3)
H. B. ROBINSON STEAM ELECTRIC PLANT, UNIT NO. 2	05000261	YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	3 OF 5
		1998	-- 03	-- 00	

TEXT (If more space is required, use additional copies of NRC Form 366A) (17)

## III. ANALYSIS OF EVENT

This report is submitted in accordance with 10 CFR 50.73(a)(2)(iv) as an event or condition that resulted in a manual or automatic actuation of an engineered safety system, including the reactor protection system.

There was no adverse impact to safety as a result of this event. Although inadvertent closure of the turbine governor valves has not been specifically analyzed, the event is similar to a turbine trip event and is bounded by a loss of external electrical load event (Updated Final Safety Analysis Report Section 15.2.2) The maximum average RCS temperature recorded during this event was 581 degrees F, a maximum recorded pressure of 2335 psig, and a maximum recorded reactor power level of 100 per cent. These parameters are bounded by the analysis performed for the loss of external electrical load event.

A post trip review of the event revealed that one of the four turbine governor valves did not fully close as a result of the EHC system spurious actuation. Due to an inaccurate turbine governor valve position indicator, the EHC system saw one turbine governor valve fully closed even though it remained partly open. The turbine trip signal resulting from the reactor trip, removed EHC fluid pressure and closed the remaining turbine governor valves. Since the turbine trip signal occurred within approximately 7 seconds of the initiating event, this partially open turbine governor valve had little effect on the event.

The control board operator placed the control rods in manual based on an initial diagnosis that the initiating event was due to a failure of the turbine first stage pressure channel. Although the Abnormal Operating Procedure directs placing the control rods to manual for failure of the turbine first stage pressure transmitter, this action should not have been taken coincident with indications of decreasing turbine load. Placing the control rods in manual did not affect the overall transient since an automatic trip occurred within approximately 7 seconds of the initiating event.

NRC FORM 366A  
(4-1998)LICENSEE EVENT REPORT (LER)  
TEXT CONTINUATION

FACILITY NAME (1)	DOCKET	LER NUMBER (6)			PAGE (3)
H. B. ROBINSON STEAM ELECTRIC PLANT, UNIT NO. 2	05000261	YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	4 OF 5
		1998	-- 03 --	00	

TEXT (If more space is required, use additional copies of NRC Form 366A) (17)

IV. CORRECTIVE ACTIONSImmediate Corrective Action

An investigation to determine the cause of the inadvertent closure of the turbine governor valves was performed. Each of the conditions that could result in automatic closure of the turbine governor valves was reviewed. For each of these conditions, the failure methods were compared to governor valve closure times recorded during the event. Based on this investigation, the most probable cause of the event was determined to be the sensing of a pressure spike of approximately 35 psig in the impulse pressure sensing circuitry.

The calibration of the impulse pressure transmitter was found to be out of tolerance low, however this was ruled out as a factor in the event. The impulse pressure transmitter was however replaced.

The internal EHC system circuits were tested with simulated inputs to check internal setpoints and proper function of control modes. No discrepancies were found that would have resulted in the initiation of the event.

The operation of the EHC system with the Impulse circuitry in service during normal operation was reviewed with the vendor technical representative. The vendor recommendation was that the impulse feedback circuitry be used ("IMP IN") primarily during valve testing. Operation at full load with "IMP IN" could result in a reactor trip, if the impulse pressure were to become unresponsive to governor valve position. Based on vendor recommendation, operation of the EHC system was revised to disable the impulse circuitry during operation at full power by selecting "IMP OUT". The vendor technical representative stated that operation with "IMP OUT" selected was consistent with operation at most other utilities.

Planned Corrective Action

This event will be reviewed with licensed operators. Emphasis will be placed on the inappropriate action of placing the reactor control rods in manual. This event review will be completed by July 17, 1998.

NRC FORM 366A  
(04-1998)LICENSEE EVENT REPORT (LER)  
TEXT CONTINUATION

FACILITY NAME (1)	DOCKET	LER NUMBER (6)			PAGE (3)
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	
H. B. ROBINSON STEAM ELECTRIC PLANT, UNIT NO. 2	05000261	1998	-- 03 --	0	5 OF 5

TEXT (If more space is required, use additional copies of NRC Form 366A) (17)

V. ADDITIONAL INFORMATION

Although previous Licensee Event Reports (LERs) were identified in which EHC system failures resulted in the inadvertent closure of the turbine governor valves and a subsequent reactor trip, those events involved different failure modes.