

REGULATORY INFORMATION DISTRIBUTION SYSTEM (RIDS)

ACCESSION NBR: 8711020335 DOC. DATE: 87/10/27 NOTARIZED: NO DOCKET #
 FACIL: 50-261 H. B. Robinson Plant, Unit 2, Carolina Power & Light C 05000261
 AUTH. NAME AUTHOR AFFILIATION
 SAYRE, D. Carolina Power & Light Co.
 MORGAN, R. E. Carolina Power & Light Co.
 RECIP. NAME RECIPIENT AFFILIATION

SUBJECT: LER 87-025-00: on 870928, during scheduled test of Reactor Protection Logic Train B, technician inadvertently tripped Train A reactor trip breaker. Caused by cognitive personnel error. Technician disciplined & event reviewed. W/871027 ltr.

DISTRIBUTION CODE: IE22D COPIES RECEIVED: LTR 1 ENCL 1 SIZE: 9
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	NRR/DRIS/SIB	1 1	NRR/PMAS/ILRB	1 1
	REG FILE 02	1 1	RES DEPY GI	1 1
	RES TELFORD, J	1 1	RES/DE/EIB	1 1
	RGN2 FILE 01	1 1		
EXTERNAL:	EG&G GROH, M	5 5	H ST LOBBY WARD	1 1
	LPDR	1 1	NRC PDR	1 1
	NSIC HARRIS, J	1 1	NSIC MAYS, G	1 1

NRC Form 366
(9-83)

U.S. NUCLEAR REGULATORY COMMISSION

APPROVED OMB NO. 3150-0104

EXPIRES: 8/31/88

LICENSEE EVENT REPORT (LER)

FACILITY NAME (1) H. B. ROBINSON STEAM ELECTRIC PLANT, UNIT NO. 2										DOCKET NUMBER (2) 0 5 0 0 0 2 6 1				PAGE (3) 1 OF 0 8								
TITLE (4) UNPLANNED REACTOR TRIP DUE TO COGNITIVE PERSONNEL ERROR DURING REACTOR TRIP BREAKER TESTING																						
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 NAMES				DOCKET NUMBER(S)									
0	9	2	8	8	7	8	7	0	2	5	0	0	1	0	2	7	8	7	0 5 0 0 0			
OPERATING MODE (9)			THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more of the following) (11)																			
POWER LEVEL (10)			20.402(b)				20.405(c)				50.73(a)(2)(iv)				73.71(b)							
1 0 0			20.405(a)(1)(i)				50.36(c)(1)				50.73(a)(2)(v)				73.71(c)							
			20.405(a)(1)(ii)				50.36(c)(2)				50.73(a)(2)(vii)				OTHER (Specify in Abstract below and in Text, NRC Form 366A)							
			20.405(a)(1)(iii)				50.73(a)(2)(i)				50.73(a)(2)(viii)(A)											
			20.405(a)(1)(iv)				50.73(a)(2)(ii)				50.73(a)(2)(viii)(B)											
			20.405(a)(1)(v)				50.73(a)(2)(iii)				50.73(a)(2)(ix)											
LICENSEE CONTACT FOR THIS LER (12)																						
NAME Don Sayre, Senior Specialist - Regulatory Compliance										TELEPHONE NUMBER AREA CODE 8 0 3 3 8 3 - 1 2 4 2												
COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT (13)																						
CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPD		CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPD												
SUPPLEMENTAL REPORT EXPECTED (14)												EXPECTED SUBMISSION DATE (15)		MONTH	DAY	YEAR						
<input type="checkbox"/> YES (If yes, complete EXPECTED SUBMISSION DATE)												<input checked="" type="checkbox"/> NO										

ABSTRACT (Limit to 1400 spaces, i.e., approximately fifteen single-space typewritten lines) (16)

On September 28, 1987, Unit 2 was at 100 percent power when the reactor tripped at 1445 hours due to a cognitive personnel error. A Plant Maintenance Instrumentation & Control Technician performing a scheduled test of the Reactor Protection Logic Train "B" inadvertently tripped the Train "A" reactor trip breaker resulting in a one-out-of-two reactor trip logic. The NRC Senior Resident Inspector for the Plant was notified at 1510 hours. The utility-licensed Shift Foreman notified the NRC at 1618 via the Emergency Notification System pursuant to 10CFR50.72(b)(2)(i). The reactor automatically went to zero percent power and into a safe, stable hot shutdown condition. The trip was cleared, the surveillance test properly completed, and the reactor made critical at 2333 hours, returning on-line at 0047 hours, September 29, 1987. The licensee has disciplined the technician responsible and has reviewed the event to determine whether additional actions are necessary to preclude recurrence. There were no component failures during the event. There are no known prior events similar to this isolated incident. The event is reported pursuant to 10CFR50.73.(a)(2)(i)(A).

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NRC Form 365A
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LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

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APPROVED OMB NO. 3150-0104

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TEXT (If more space is required, use additional NRC Form 365A's) (17)

I. DESCRIPTION OF EVENT

On Monday, September 28, 1987, with Unit 2 at 100 percent power, the reactor¹ tripped at 1445 hours. The trip² was caused by fulfilling the Train "A"³ reactor trip logic (one-out-of-two).

At the time of the reactor trip, two Plant Maintenance Instrumentation & Control (I&C) technicians and a utility-licensed Control Operator (CO) were performing a monthly Maintenance Surveillance Test (MST) procedure, MST-010⁴, as required to satisfy Plant Technical Specification Table 4.1-1, Item No. 27, Logic Channel Testing. The purpose of the test was to ensure the Reactor Protection Logic Trains "A" and "B"⁵ and Safeguard Relay Rack Trains "A" and "B"⁵ functioned properly. This test is performed monthly at any normal operating condition, with reactor power 75 percent or greater.

During implementation of procedure step for returning Train "B" to service, the technician responsible for inserting a key into the Train "B" reactor trip breaker TEST AUTOMATIC SHUNT TRIP test switch⁶ inadvertently inserted the key into the Train "A" reactor trip breaker TEST AUTOMATIC SHUNT TRIP test switch⁶ and turned it to the TEST position. This action caused the Train "A" main breaker⁷ to open. Since the Train "A" bypass breaker⁷ had been racked out earlier in the test following the return of Train "A" to service, the opening of the Train "A" main breaker completed the Train "A" reactor trip logic.

The Train "B" reactor trip breaker,⁷ the Train "B" bypass breaker,⁷ and the turbine⁸ automatically tripped following the initial trip signal, and the feedwater regulating valves⁹ automatically closed when the Reactor Coolant System¹⁰ average temperature decreased to 554 degrees Fahrenheit.

¹ EIIIS Codes: System - AB; Component - RCT; Manufacturer - W120.

² Plant Reactor Trip No. 345.

³ EIIIS Codes: System - JC; Component - not available; Manufacturer - W120.

⁴ Title: REACTOR PROTECTION LOGIC TRAIN "A" AND "B" AT POWER SAFEGUARD RELAY RACK TRAIN "A" AND "B."

⁵ EIIIS Codes: System - B; Component - not available; Manufacturer - W120.

⁶ EIIIS Codes: System - JC; Component - 33; Manufacturer - Not Available.

⁷ EIIIS Codes: System - JC; Component - 52; Manufacturer - W120.

⁸ EIIIS Codes: System - SB; Component - TRB; Manufacturer - W120.

⁹ EIIIS Codes: System - SJ; Component - FCV; Manufacturer - C635.

¹⁰ EIIIS Codes: System - AB; Component - Not Available; Manufacturer - W120.

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

The licensee notified the NRC Senior Resident Inspector for the H. B. Robinson Plant by telephone at 1510 hours. The NRC was notified of the event by the utility-licensed Shift Foreman at 1618 hours via the Emergency Notification System pursuant to 10CFR50.72(b)(i).

The sequence of occurrences leading to the reactor trip are described in Table 1.

NOTE: MST-010 involves three personnel: a CO at the RTGB Unit 2 Control Room and two I&C technicians, one at the Reactor Protection Cabinets¹¹ in the Safeguards Relay Rack Room and one at the Generator Breakers¹² & Reactor Trip Switchgear¹³ in the Rod Drive Motor-Generator (MG) Set Room, a high noise area during normal Plant operations. The three are in communication via sound-powered headsets. The MST normally requires six to seven hours to accomplish. The technician at the Generator Breakers & Reactor Trip Switchgear did not have a copy of the procedure at the work location but was being read the instructions over the headset by the technician at the Reactor Protection Cabinets. These personnel had accomplished the procedure up through the step which returned Train "A" to service earlier in the day. They had returned to their respective positions and locations following a brief lunch break to return Train "B" to service and complete MST-010.

¹¹ EIIS Codes: System - JC; Component - CAB; Manufacturer - W120.

¹² EIIS Codes: System - JC; Component - BKR; Manufacturer - W120.

¹³ EIIS Codes: System - JC; Component - SWGR; Manufacturer - W120.

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TABLE 1

SEQUENCE OF OCCURRENCE - REACTOR TRIP NO. 345

1. The technician at the Switchgear informs the CO to reset (close) "B" trip breaker in preparation for the test. (The Train "B" bypass breaker is racked in and closed.)
2. The CO closes "B" trip breaker.
3. The technician at the Switchgear inadvertently inserts the key into the "RTA BLOCK AUTO SHUNT TRIP" test switch, turns it to the "BLOCK" position, and holds it in that position.
4. The technician at the Switchgear inadvertently inserts the key into the "RTA TEST AUTO SHUNT TRIP" test switch, turns it to the "TEST" position momentarily and mistakenly verifies that "A" trip breaker does not trip, while still holding the key in the "BLOCK" position.
5. The technician at the Protection Cabinets informs the CO that a certain Annunciator will be received when the next step is performed, while the technician at the Switchgear still holds the key in the "BLOCK" position on "A" trip breaker.
6. The technician at the Cabinets trips "B" trip breaker as evidenced by the test light, using the Function Selector Switch on a prescribed Position and depressing the test button to trip the breaker, while the technician at the Switchgear still holds the key in the "BLOCK" position on "A" trip breaker.
7. The technician at the Switchgear releases the "RTA BLOCK AUTO SHUNT TRIP" test switch and removes the key.
8. The technician at the Switchgear has the CO reset (close) "B" trip breaker since this breaker had opened on the signal from the "TEST" switch for Train "A".
9. The CO receives a "CLOSED" indication on the RTGB for the "B" trip breaker.
10. The technician at the Switchgear inadvertently inserts the key into the "RTA TEST AUTO SHUNT TRIP" test switch and turns it to the "TEST" position.
11. The reactor tripped on a one-out-of-two Train "A" logic at 1445 hours, went to zero percent power and into a safe, stable, hot shutdown condition (547 degree Fahrenheit 2235 psi). The trip condition was cleared, the MST-010 logic channel testing properly completed, and the reactor returned to critical at 2333 hours, going on-line at 0047 hours Tuesday, September 29, 1987, approximately 10 hours and two minutes later, and increasing in power at three percent per hour.

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

II. CAUSE OF EVENT

The reactor trip was caused by a cognitive personnel error¹⁴ on the part of the I&C technician at the Reactor Trip Switchgear. This technician inserted the key into the "RTA TEST AUTO SHUNT TRIP" test switch instead of the correct, corresponding test switch for Train "B."

III. ANALYSIS OF EVENT

The general design features of the Reactor Protection System logic include testing by exercising the reactor trip breakers to demonstrate system integrity. Bypass breakers are provided for this purpose. During normal operation, these bypass breakers are open. Administrative controls are used to minimize the amount of time these breakers are closed and to prevent simultaneous closure of both bypass breakers.

Although test switches for redundant channels are conveniently grouped on a single panel to facilitate testing, physical and electrical isolation of redundant protection channels is maintained by the inclusion of the interposing relay which is actuated by the logic test switches. Overall, the Reactor Protection System is comprised of identifiable channels which are physically, electrically, and functionally separated and isolated from one another.

At the time of the event, the Train "A" main reactor trip breaker was racked in and closed with the Train "A" bypass breaker open and racked out. The Train "B" main reactor trip breaker was initially open, as discussed in Table 1, and was closed when returned to service, with the Train "B" bypass breaker yet to be opened and racked out. Figure 1 provides a diagram of the reactor trip logic channels.

The event has been reviewed by the Plant Nuclear Safety Committee (PNSC). The Committee has determined that the inadvertent reactor trip was an unnecessary challenge to the Reactor Protection System. The System, however, performed as designed and the PNSC identified no safety concerns related to the event which were of impact to Plant start-up or operation.

The Reactor Protection System performed as designed and automatically tripped the reactor. Safety systems required to achieve and maintain a safe, stable hot shutdown condition performed satisfactorily. At no time throughout the event was there a threat to the health and safety of the public. Automatic reactor trip actions included the Train "B" reactor trip breaker and bypass breaker opening, the turbine tripping (with all valves going shut), and the feedwater regulating valves closing when the RCS Tavg decreased to 554 degrees Fahrenheit. No automatic Safeguards System actions were required during the event.¹⁵

¹⁴ Cause Code: A; unintentional human error.

¹⁵ Safeguards System automatic actions: Safety Injection pumps; Residual Heat Removal pumps; Service Water pumps and booster pumps; Containment fans; Auxiliary Feedwater pumps; Emergency diesel generators; Isolation Valve Seal Water; Control Room ventilation isolation; Containment Spray pumps; and Main Steam isolation valves.

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This event is reported pursuant to the requirements of 10CFR50.73(a)(2)(i)(A).

IV. CORRECTIVE ACTIONS

The I&C technician responsible for the personnel error has been disciplined.

The reactor trip was cleared, MST-010 properly completely, and the reactor trip breakers reset, with the bypass breakers racked out.

The PNSC reviewed the event prior to reactor start-up and recommended that Plant Maintenance evaluate the need for procedural enhancements to MST-010 to preclude a similar personnel error.

The reactor was returned to power operation.

The Plant Trip Reduction and Assessment Program (TRAP) Committee reviewed the event and recommended that Plant Maintenance evaluate the human factors involved in the event and determine any necessary revision to the design or procedure for Reactor Protection System logic testing to preclude a similar personnel error. As a result, Plant Maintenance has:

1. Replaced the test switch labels with identification plates color coded to correspond to the appropriate Reactor Protection Trains.
2. Initiated revision of MST-010 into individual procedures governing smaller portions of work now covered by the one procedure, such as a separate procedure for the logic testing of each Train ("A" and "B") of the Reactor Protection System and of the Safeguards System.

An individual knowledgeable in human factors evaluation has examined the work locations and activities involved in the performance of MSTs with a high potential for causing an inadvertent reactor trip due to personnel error. As a result, appropriate enhancements are to be incorporated into MST-010.

V. ADDITIONAL INFORMATION

A. FAILED COMPONENT IDENTIFICATION

There were no failed components associated with this event.

The following component identification details are provided for information:

The BLOCK and TEST AUTO SHUNT TRIP test switches for the reactor trip breakers were manufactured by GEMCO; Series 408 selector switches, two-position, lock right, spring return to right, with one normally closed contact block; Part No. 408S-2-3-4-1-1-2-A3; installed in October 1984 under Plant Modification No. M-799, Revision 0, REACTOR TRIP BREAKER AUTO SHUNT TRIP, to satisfy a commitment to NRC Generic Letter 83-28, Paragraphs 4.2 and 4.5.

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U.S. NUCLEAR REGULATORY COMMISSION

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B. PREVIOUS SIMILAR EVENTS

There are no known prior LERs of similar events with regard to surveillance testing of the reactor trip system. Personnel error resulting in an inadvertent reactor trip during the performance of an MST has not previously occurred in over 12 months. The reduced risk of a personnel error causing a reactor trip is due to an extensive review and evaluation program accomplished by the licensee in 1986. The event was reported in LER 86-013-00 for an inadvertent reactor trip due to a personnel error while performing MST-014, STEAM GENERATOR PRESSURE PROTECTION CHANNEL TESTING.

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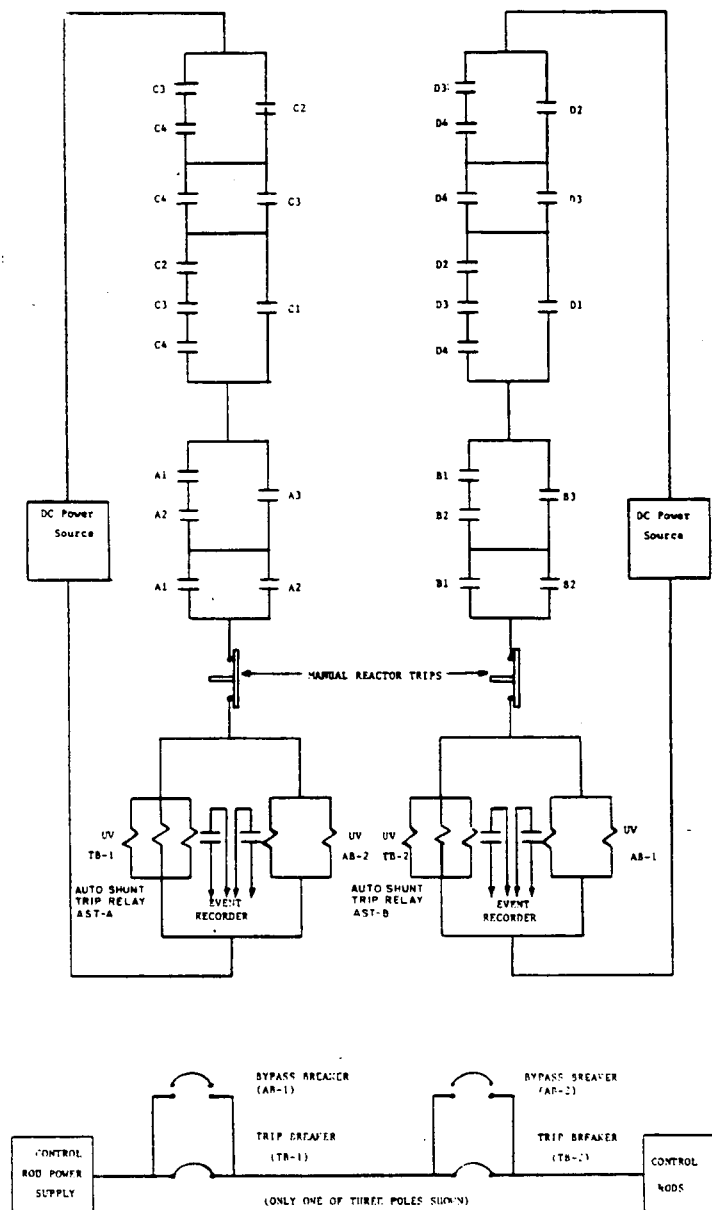
REACTOR TRIP LOGIC CHANNELS
DIAGRAM

Figure 1



Carolina Power & Light Company

ROBINSON NUCLEAR PROJECT DEPARTMENT
POST OFFICE BOX 790
HARTSVILLE, SOUTH CAROLINA 29550

OCT 27 1987

Robinson File No: 13510C

Serial: RNP/87-4918
(10 CFR 50.73)

United States Nuclear Regulatory Commission
Attn: Document Control Desk
Washington, D. C. 20555

H. B. ROBINSON STEAM ELECTRIC PLANT, UNIT NO. 2
DOCKET NO. 50-261
LICENSE NO. DPR-23
LICENSEE EVENT REPORT 87-025-00

Gentlemen:

The enclosed Licensee Event Report (LER) is submitted in accordance with the Licensee Event Report System of 10 CFR 50.73. The format of the LER follows the recommendations of NUREG-1022 and Supplements No. 1 and 2.

Very truly yours,

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

DAS:jch

Enclosure

cc: Dr. J. Nelson Grace
Mr. R. Latta
INPO

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