

LICENSEE EVENT REPORT (LER)

FACILITY NAME (1) Catawba Nuclear Station, Unit 2 DOCKET NUMBER (2) 0 5 0 0 0 4 1 1 4 PAGE (3) 1 OF 0 4

TITLE (4) Essential Switchgear Incoming Breaker Fails To Trip During Testing Due To Open Sliding Link In Control Circuit

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)										
1	2	2	9	8	8	0	1	1	0	0	0	4	0	1	1	4	1	0	4		
N/A												0	5	0	0	0	0	0	0	0	0

OPERATING MODE (9) 5 THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §. (Check one or more of the following) (11)

20.402(b)	20.406(c)	50.73(a)(2)(iv)	73.71(b)
20.406(a)(1)(i)	50.38(e)(1)	50.73(a)(2)(v)	73.71(e)
20.406(a)(1)(ii)	50.38(e)(2)	50.73(a)(2)(vi)	OTHER (Specify in Abstract below and in Text, NRC Form 366A)
20.406(a)(1)(iii)	X 50.73(a)(2)(i)	50.73(a)(2)(vii)(A)	
20.406(a)(1)(iv)	50.73(a)(2)(ii)	50.73(a)(2)(vii)(B)	
20.406(a)(1)(v)	50.73(a)(2)(iii)	50.73(a)(2)(x)	

LICENSEE CONTACT FOR THIS LER (12)

NAME Julio G. Torre, Associate Engineer - Licensing TELEPHONE NUMBER 710 4 317 13 1-18 1 0 1 2 1 9

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

CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPRDS	CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPRDS

SUPPLEMENTAL REPORT EXPECTED (14)

YES (If yes, complete EXPECTED SUBMISSION DATE) NO

EXPECTED SUBMISSION DATE (15) MONTH DAY YEAR

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

During Engineered Safeguards Features Actuation Periodic Testing on December 29, 1987, the incoming breaker to 4160 Volt Essential Switchgear 2ETB failed to trip when expected. Concurrent Blackout and Safety Injection (S/I) signals had been simulated which required the alternate incoming breaker to 2ETB to open. The associated Diesel Generator (D/G) started and the Load Sequencer performed as expected by connecting the S/I loads to 2ETB. The failure of the incoming breaker to trip during the sequencer actuated load shed required the D/G to be paralleled with the offsite power system. Subsequent investigation found a sliding link open in the alternate incoming breaker's control circuit which prevented the breaker from tripping on an S/I signal. The sliding link was closed and testing was successfully completed. The D/G paralleled properly during this incident and offsite power voltages remained normal. The Unit was in Mode 5, Cold Shutdown, at the time of this incident. This event was determined to be reportable on March 3, 1988.

The activity which opened and did not reclose the sliding link could not be identified. An alternate train of essential power and offsite power was maintained operable as required by Technical Specifications.

The health and safety of the public were unaffected by this event.

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

BACKGROUND:

Technical Specification 3.8.1.1.a requires two physically independent circuits between the offsite power system and the Onsite Essential Auxiliary Power (EIS:EA) System.

PT/2/A/4200/09, Engineered Safeguards Features Actuation Periodic Test, Enclosure 13.4, verifies Train B response to concurrent actuation of Blackout (B/O) and Loss of Coolant Accident (LOCA) logic. Upon actuation of both B/O and LOCA logic, the 4160 Volt Emergency bus is energized, the connected equipment is load shed, the Diesel Generator (EIS:DG) (D/G) is automatically started and produces specified voltage and frequency within 11 seconds, the D/G Load Sequencer connects required loads to the B Train essential bus, and the D/G is verified to power the required loads for ≥ 5 minutes. Technical Specifications 4.8.1.1.2.g.6.a and b require that these capabilities be demonstrated at least once per eighteen months.

The 4160V Essential Auxiliary Power System is composed of two redundant switchgear buses, 2ETA and 2ETB. Switchgear 2ETB may be aligned so that breaker (EIS:BRK) 2ETB3 connects bus 2ETB to 22/4.16 KV Transformer (EIS:XFMR) 2ATC or breaker 2ETB4 connects bus 2ETB to 22/4.6KV Transformer SATB.

DESCRIPTION OF INCIDENT:

On December 23, 1987, the Unit 2 end of cycle 1 refueling outage began. Duke Power Performance personnel began PT/2/A/4200/09, Enclosure 13.4, Engineered Safeguard Features (ESF) Actuation Periodic Test, for Train B Blackout and LOCA, on the morning of December 29, 1987. To support Transmission Department breaker testing prior to the beginning of the outage, Operations had aligned 4160V essential bus 2ETB to its alternate source, 22/4.16KV Transformer SATB. This was done by removing the breaker from cubicle 2ETB3 and placing it in cubicle 2ETB4 and reclosing the breaker.

As directed by the periodic test, a degraded bus condition was simulated on 2ETB. Subsequently, Safety Injection, Containment Spray, and Containment Isolation were simulated per the periodic test. At 0859:54:129 hours, a High Containment Pressure Safety Injection Reactor Trip signal was generated, which actuated Load Sequencer 2B. The incoming breaker (2ETB4) to 2ETB did not trip as expected, and D/G 2B was connected to 2ETB and paralleled to the offsite power system. The Load Sequencer then connected the required Emergency Core Cooling System (ECCS) and related loads to the Train B essential bus as expected.

At 0901:40 hours, the initiated ESF signals were reset, and Load Sequencer 2B was reset at 0904:40:605 hours. The ECCS and other actuated equipment were then secured.

Work Request 6140 PRF was originated immediately following the test to investigate/repair the failure of 2ETB4 to trip as required. Later that day, Duke Power Instrumentation and Electrical (IAE) personnel found sliding link T-15 in cabinet 2EATC17 open, affecting 2ETB4's control circuit. The link was closed

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

and the circuit was retested satisfactorily. Periodic testing was subsequently completed.

A Problem Investigation Report (PIR) was initiated by IAE personnel on December 31, 1987, to identify and evaluate the open sliding link. Design Engineering evaluated the open sliding link and on January 15, 1988, identified operability concerns when 2ETB was aligned to SATB. Operations and Duke Power Compliance personnel verified that 2ETB was aligned to SATB from December 17, 1987, to January 18, 1988, and determined that the incident was NRC reportable.

CONCLUSION:

The cause of the open sliding link could not be determined. Performance personnel stated that the link was found open during pre-operational testing in December 1985. That was likely due to construction completion activities. Since the link was reclosed at that time, work activities from December 1985 to December 29, 1987, were reviewed. No work request or station modifications performed appeared to have manipulated the sliding link. This review was performed by the Construction and Maintenance Division, Transmission Department, IAE, Performance, and the Catawba Safety Review Group. Since all pertinent information has been reviewed, the investigation will not be continued by the Safety Review Group.

Design Engineering identified a potential operability concern in the initial PIR response on January 15, 1988. Reportability of the incident was not determined until March 3, 1988. The need to evaluate reportability in a timely manner has been reemphasized to Compliance personnel as a result.

There have been two previous incidents concerning Technical Specification violations due to an undetermined cause (see LER 413/87-27 and 413/86-59). Therefore, this is considered a recurring event.

CORRECTIVE ACTION:

SUBSEQUENT

- (1) Work Request 6140 PRF was initiated to investigate/repair the cause of 2ETB4 not tripping as expected.
- (2) The open sliding link was identified and reclosed under the work request.
- (3) Engineered Safeguards Features Actuation Periodic Testing was completed.

SAFETY ANALYSIS:

The degraded voltage sensing circuitry on 2ETB actuates at 90% nominal voltage. This condition existing for greater than 40 seconds actuates an annunciator and continues a 10 minute timing sequence which will allow Operator response to

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TEXT (if more space is required, use additional NRC Form 365A (3) (17))

investigate the degraded bus condition. If the degraded condition still existed at the end of the 10 minute sequence, the incoming breakers would be tripped and the normal response to a blackout on the bus would be initiated. That function was unaffected by the open sliding link.

A degraded bus condition existing previously for 40 seconds concurrent with a LOCA would attempt to trip the incoming breaker. This would not occur with the T-15 sliding link open and 2ETB aligned to SATB. In this situation, 2ETB voltage would remain degraded with D/G 2B connected. The ECCS and related loads would be supplied with a degraded voltage source. However, had the degraded condition existed for the full 10 minutes, the incoming breaker would have tripped via a control circuit path not blocked by the open sliding link.

An additional level of undervoltage protection on bus 2ETB actuates the load sequencer and isolates the bus at 83.3% nominal voltage. This function was unaffected by the open sliding link.

Therefore, the maximum length of time that loads would have been supplied with a degraded voltage on 2ETB would be 10 minutes with voltage between 90% and 83.3% nominal voltage. The ECCS components are designed to start and come to full speed with 80% voltage applied and run continuously at 90% voltage. Operation of the equipment at voltages between 90% and 83.3% for no longer than 10 minutes would not have produced significant overheating of the equipment. Overheating would be expected to occur during a longer run time, somewhere around an hour.

During the period from December 17, 1987, to January 18, 1988, 2ETB was powered from Transformer SATB through 2ETB4. Unit 2 entered Mode 5, Cold Shutdown, on December 25, 1987, which required one essential power train to be operable while the Unit was in Mode 5 and below. Throughout the period, the Train A Essential Power System and Residual Heat Removal System were maintained operable as required by Technical Specifications, as well as offsite power.

A review to determine if 2ETB had been aligned previously to SATB was inconclusive. The Transmission Department performed 2ETB breaker testing in mid October 1986. However, no records exist to confirm the alignment of the power system. Operations personnel felt that the bus may have been completely deenergized. Regardless, the alternate train of essential power and offsite power was maintained operable as required by Technical Specifications.

This incident is reportable pursuant to 10 CFR 50.73, Section (a)(2)(i)(B).

The health and safety of the public were unaffected by this event.

DUKE POWER COMPANY

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HAL B. TUCKER
VICE PRESIDENT
NUCLEAR PRODUCTION

April 1, 1988

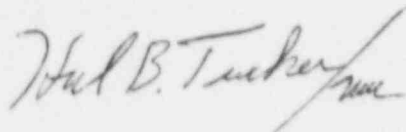
U. S. Nuclear Regulatory Commission
Attention: Document Control Desk
Washington, D. C. 20555

Subject: Catawba Nuclear Station, Unit 2
Docket No. 50-414
LER 414/88-11

Gentlemen:

Pursuant to 10 CFR 50.73 Section (a) (1) and (d), attached is Licensee Event Report 414/88-11 concerning an essential switchgear incoming breaker failure to trip during testing due to an open sliding link in the control circuit. This event was considered to be of no significance with respect to the health and safety of the public.

Very truly yours,



Hal B. Tucker

JGT/10016/sbn

Attachment

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