Duke Power Company
Catawba Nuclear Generation Department
4800 Concord Road
York, SC 29745

William R. McCollum, Jr.
Vice President
(803)831-3200 Office
(803)831-3426 Fax

DUKE POWER

November 07, 1996

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

Subject: Catawba Nuclear Station
Docket No. 50-414
LER 414/94-002, Rev. 01

Gentlemen:

Attached is Licensee Event Report 414/94-002, Rev. 01, concerning **Reactor Trip Breakers Opened Due To Component Failure.**

This licensee event report has been revised to reflect two changes to the corrective actions which have been implemented. The referenced procedure revisions reflect the addition of the Rod Control System Procedure and deletion of the 1/M Approach to Criticality Procedure. The card testing process was revised to allow testing of the cards in the rod control system.

This event is considered to be of no significance with respect to the health and safety of the public.

Cordially,

W. R. McCollum, Jr.

IE22

Attachment

cc: Mr. S.D. Ebneter
Administrator, Region II
U.S. Nuclear Regulatory Commission
101 Marietta St., NW, Suite 2900
Atlanta, GA 30323

Mr. T. S. Tam
U.S. Nuclear Regulatory Commission
Office of Nuclear Reactor Regulation
Washington, D.C. 20555

Mr. R. J. Freudenberger
NRC Resident Inspector
Catawba Nuclear Station

INPO Records Center
700 Galleria Place
Atlanta, GA 30339-5957

Marsh & McLennan Nuclear
John Hoffman
301 Tresser Blvd.
Stamford, CT 06904

NRC FORM 366 (4-95) U.S. NUCLEAR REGULATORY COMMISSION

APPROVED OMD NO. 3150-0104
EXPIRES: 04/30/98
ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS INFORMATION COLLECTION REQUEST: 50.0 HRS. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE INFORMATION AND RECORDS MANAGEMENT BRANCH (MNBB 7714), 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

LICENSEE EVENT REPORT (LER)

FACILITY NAME (1)	DOCKET NUMBER (2)	PAGE (3)
Catawba Nuclear Station, Unit 2	05000414	1 of 6

TITLE (4)
REACTOR TRIP BREAKERS OPENED DUE TO COMPONENT FAILURE

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(S)
					000					
06	15	94	94	- 002	- 01	11	07	96		05000414

OPERATING MODE (9)	5	THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR (Check one or more of the following) (11)					
POWER LEVEL (10)	0%	20.402(b)	20.405(c)	X 50.73(a)(2)(iv)	73.71(b)		
		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)(x)			

LICENSEE CONTACT FOR THIS LER (12)

NAME	TELEPHONE NUMBER	
	AREA CODE	
D. P. Kimball, Safety Review Group Manager	(803)	831-3743

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	
X6	JD	XIS	W120	Y							

SUPPLEMENTAL REPORT EXPECTED (14)			EXPECTED SUBMISSION DATE (15)	MONTH	DAY	YEAR
	YES (If yes, complete EXPECTED SUBMISSION DATE)	X NO				

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

On June 15, 1994, at 1340 hours, Unit 2 Reactor Trip Breakers (RTBs) were manually opened due to an intermittent component failure of the Rod Control (IRE) System Group "C" Firing Card. Unit 2 was in Mode 5, Cold Shutdown, performing Digital Rod Position Indicator (DRPI) Alignment and Functional test. The Rod Control Bank Selector Switch was selected to Shutdown Bank (SDB) "B" and the Control Room Operator (CRO) began withdrawing rods on SDB "B" with the demand counters indicating that both groups of rods for SDB "B" were withdrawing. When the rods got to the point (6 steps) to receive the first DRPI light-emitting diode (LED), DRPI indicated that rods in group 2 of SDB "B" and group 1 of Control Bank (CB) "D" were six steps withdrawn. The CRO immediately inserted all rods and opened the RTBs. The cause of one group of rods in SDB "B" and CB "D" withdrawing at the same time is attributed to an intermittent component failure in the IRE System Group "C" Firing Card. Corrective Action included replacing the failed Firing Card, testing the remaining Firing Cards in stock, and adding a procedure step to verify that the correct Group Select Lights are illuminated on the IRE System Power Cabinets before rods are withdrawn.

BACKGROUND

The Rod Control [EIIS:JD] (IRE) System provides for reactor [EIIS:RCT] power modulation by manual or automatic control of full length control rod [EIIS:ROD] banks in a preselected sequence and for manual operation of individual banks.

The Rod Control System consists of 9 banks of Rod Control Cluster Assemblies (RCCAs), five Shutdown Banks, and four Control Banks. Shutdown Banks A and B have 2 groups of rods. Shutdown Bank C, D, and E have only 1 group of rods. Control Banks A,B,C and D all have 2 groups of rods.

The Rod Control System has five Power Cabinets [EIIS:CAB] that convert all input power to DC current pulses for operation of Control Rod Drive Mechanisms (CRDMs), receives and decodes control demands from the logic cabinet, and transmits alarm [EIIS:ALM] signals back to the logic cabinet. Power Cabinet 1BD controls Group 1 of Shutdown Bank "B", Control Bank "B", and Control Bank "D". The Rod Control System Power Cabinets have 3 indicator lights [EIIS:IL] on the front of the cabinet which indicate the group of rods that have been selected to be withdrawn.

The purpose of the Digital Rod Position Indication (DRPI) [EIIS:AA] (EDA) System is to measure the position of each control rod and display this position on a column of light-emitting-diodes (LEDs) for each rod in the Control Room. Coils [EIIS:CL] are mounted axially along pressure housings, which electro-magnetically sense the positions of the rods. For each rod, detector [EIIS:DET] coils provide input to two separate channels [EIIS:CHA] (Data A and Data B), so that one channel can continue to function if the other fails.

EVENT DESCRIPTION

June 15, 1994

Unit 2 was in Mode 5, Cold Shutdown, Reactor Coolant [EIIS:AB] (NC) System temperature at 108 degrees Fahrenheit, NC pressure at 350 psig, and NC Boron concentration at 2201 ppm.

01

1130 hours A tailgate meeting was held with Instrument and Electrical (IAE), Engineering, and Operations (OPS) to discuss the procedure for DRPI Alignment and Functional Test (IP/0/B/3250/10), impact on Technical Specifications (T/S), test termination criteria, expected alarms and things to watch for during the test.

1200 hours IAE and OPS began the DRPI test. The Control Room Operator (CRO) selected Shutdown Bank "A" on the Rod Control Bank Selector Switch and began withdrawing rods in Shutdown Bank "A".

1325 hours IAE and OPS successfully completed testing on Shutdown Bank "A".

1330 hours IAE and OPS began Shutdown Bank "B" Test.

1333 hours CRO selected Shutdown Bank "B" on the Rod Control Bank Selector Switch.

1334 hours CRO began withdrawing rods for Shutdown Bank "B" and the demand counters [EIIS:CTR] for Shutdown Bank "B" started counting as though group 1 and group 2 for Shutdown Bank "B" were withdrawing. CRO noticed that when the rods got to the point (6 steps) to receive the first DRPI LED, DRPI indicated that group 2 of Shutdown Bank "B" and group 1 of Control Bank "D" were six steps withdrawn. The demand counter for Control Bank "D" group 1 was indicating zero and the Rod Bottom LED for Shutdown Bank "B" group 1 was illuminated. The CRO immediately inserted all rods.

1335 hours CRO verified the Source Range and Boron Dilution Mitigation System (BDMS) had not changed since the testing had begun on Shutdown Bank "B".

1338 hours CRO discussed opening the Reactor Trip Breakers due to DRPI System being potentially inoperable.

1340 hours CRO opened the Reactor Trip Breakers.

2100 hours IAE determined that the cause of one group of rods within Shutdown Bank "B" and Control Bank "D" to withdraw at the same time was attributed to an intermittent component failure of the IRE System Group "C" Firing Card in the 1BD Power Cabinet.

June 17, 1994 IAE replaced the failed Group "C" Firing Card in Cabinet 1BD with a Firing Card that had been tested on the Westinghouse Rod Control Simulator.

June 18, 1994

1530 hours DRPI test successfully completed for all Shutdown and Control Banks.

CONCLUSION

During this event the Control Room Operator responded appropriately by inserting all rods and manually opening the Reactor Trip Breakers. Reactor Trip Breakers were manually opened due to an intermittent component failure of the Rod Control System Group "C" Firing Card which resulted in one group of rods in Shutdown Bank "B" and Control Bank "D" withdrawing at the same time. The failed Firing Card will be tested on a Westinghouse Rod Control Simulator to determine the exact cause of the failure.

Procedures affecting rod movement were revised to verify the correct Group Select Lights are illuminated on the IRE System Power Cabinets before rods are withdrawn. This will prevent withdrawing more than one bank of rods at a time.

Training will be provided to Operators to address the validity of rod position indication when the demand counters do not agree with DRPI and both systems appear operable. The training will make the Operators more aware of the type of problems that can be encountered during rod movement and the

01

actions that can be taken to address the problems.

Failure of the Rod Control System Firing Card is NPRDS reportable.

A review of the Operating Experience Program Database for the past 24 months prior to this event identified five LERs that described a Reactor Trip. Since none of the five reports involved the same equipment, group, or similar cause as this event, this event is considered not to be recurring.

CORRECTIVE ACTION

IMMEDIATE

1) CRO inserted all rods upon discovery of one group of rods within two different banks withdrawing at the same time.

2) CRO verified the Source Range and BDMS System had not changed since the testing on Shutdown Bank "B" had begun.

3) CRO opened the Reactor Trip Breakers.

SUBSEQUENT

1) Replaced the failed Firing Card with a Firing Card that has already been tested on the Westinghouse Rod Control Simulator per Work Order 94045546-01.

2) Revised the DRPI Alignment and Functional Test Procedure (IP/0/B/3250/10), Rod Drop Test Procedure (IP/0/B/3220/01), Control Rod Worth Measurement by Rod Swap Procedure (PT/0/A/4150/11B) and the Rod Control System Procedure (OP/1,2/A/6150/08) to verify the correct Group Select Lights are illuminated on the Rod Control System Power Cabinets before withdrawing rods.

01

3) Revised the DRPI Alignment and Functional Test Procedure (IP/0/B/3250/10) and Rod Drop Test Procedure (IP/0/B/3220/01) to have the CRO insert all rods and open the Reactor Trip Breakers if an unexpected problem occurs during rod withdrawal.

PLANNED

1) Test the Firing Card that failed on a Westinghouse Rod Control Simulator to determine which component failed.

2) Test the remaining Firing Cards in stock prior to placing them in service.

3) Event will be included in Operator Proficiency Training to discuss validity of rod position indication when demand counters do not agree with DRPI and both systems appear operable.

SAFETY ANALYSIS

Unit 2 was in Mode 5, Cold Shutdown, during this event. Reactor Coolant temperature was at 108 degrees Fahrenheit, Reactor Coolant pressure was at 350 pounds per square inch gauge, and Reactor Coolant Boron concentration was at 2201 parts per million (ppm). The minimum Reactor Coolant System Boron concentration required to maintain Keff < 0.99 with the highest worth Rod Control Cluster Assembly bank withdrawn while in Mode 5 was determined to be 1724 ppm Boron. During the entire event no transient, change in Source Range, or change in Boron Dilution Mitigation System occurred. Operations responded correctly by reinserting all rods and manually opening the Reactor Trip Breakers. All systems responded as expected.

The health and safety of the public were not affected by this event.