DUKE POWER COMPANY
P.O. BOX 33189
CHARLOTTE, N.C. 28242

HAL B. TUCKER
VICE PRESIDENT
NUCLEAR PRODUCTION

TELEPHONE
(704) 373-4531

85 FEB 19 P1:24

February 14, 1985

Dr. J. Nelson Grace, Regional Administrator
U. S. Nuclear Regulatory Commission
Region II
101 Marietta Street, NW, Suite 2900
Atlanta, Georgia 30323

Re: Oconee Nuclear Station
Docket No. 50-269

Dear Dr. Grace:

Please find attached a report concerning the response time failure of a Control Rod Drive (CRD) DC breaker during a Channel D Reactor Protective System (RPS) on-line testing on January 14, 1985. The breaker, which should have opened within 80 milliseconds, did not open for 168 milliseconds. This report is submitted per our commitment to inform NRC of unacceptable performance of CRD breakers.

Very truly yours,

H. B. Tucker

Hal B. Tucker

MAH:slb

Attachment

cc: American Nuclear Insurers
c/o Dottie Sherman, ANI Library
The Exchange, Suite 245
270 Farmington Avenue
Farmington, CT 06032

Ms. Helen Nicolaras
Office of Nuclear Reactor Regulation
U. S. Nuclear Regulatory Commission
Washington, D. C. 20555

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

M&M Nuclear Consultants
1221 Avenue of the Americas
New York, New York 10020

INPO Records Center
Suite 1500
1100 Circle 75 Parkway
Atlanta, Georgia 30339

Mr. J. C. Bryant
NRC Resident Inspector
Oconee Nuclear Station

OFFICIAL COPY

IE 27

Duke Power Company
Oconee Nuclear Station
Special Report
Response Time Failure of Control Rod Drive
DC Breaker

Introduction:

On January 14, 1985 at 1532 hours with Unit 1 operating at 100% full power a Control Rod Drive (CRD) DC Breaker failed a Channel D Reactor Protective System (RPS) on-line test. The breaker which should have opened within 80 milliseconds (msec), did not open for 168 milliseconds. The immediate corrective action was to replace the slow front frame from the affected CRD DC breaker with a spare front frame which had been tested and had preventive maintenance performed on it. All Unit 1 CRD breakers were tested and they all passed the on-line test.

The apparent causes of the failure were a sticking trip shaft bearing and a high trip latch operating torque. There were no releases of radioactivity and the health and safety of the public were not affected.

Description of Occurrence:

On January 14, 1985 at 1332 hours a CRD DC breaker (#CB-3) failed a monthly Unit 1 Channel D on-line functional test. On-line test of the CRD DC breaker #CB-3 showed a response time of 168 msec which was greater than 80 msec delay time for CRD breaker assumed in the safety analyses' calculation of overall RPS delay times. The slow front frame of the failed CRD breaker was replaced with a spare front frame which had been tested and had preventive maintenance performed on it. At 1728 hours, CRD breaker #CB-3 was retested and tripped in 28 msec. At this time, all Unit 1 CRD breakers were on-line tested and all tripped in less than the required 80 msec time limit.

Cause of Occurrence:

The slow front frame from CRD breaker #CB-3 was bench tested and indicated a trip response time of 30 msec. This indicated similar results seen in past slow front frames which were found to have sticking trip latch roller bearings. Inspection of the breaker showed only one abnormality. The trip latch operating torque measured 2 inch pounds which was greater than the 1.5 inch pound limit. Apparently the combination of a sticking roller latch bearing and the excessive trip latch operating torque caused the slow trip time. The slow front frame was cleaned and successfully bench tested.

In the event that an actual reactor trip had been called during this period of time, and the CRD DC breaker #CB-3 had delayed in tripping, all safety rod groups 1, 2, 3 and 4 and regulating rod groups 5, 6 7 would have dropped immediately as designed. This would have been caused by the interruption of power to the CRD mechanisms by the other CRD AC and DC breakers and the silicon control rectifiers (SCRs). Insertion of these rod groups would have shut down the reactor.

IE27
H1

The SCRs function independently of the CRD breakers and act to interrupt power to and trip regulating rod groups 5, 6 and 7 upon receipt of a trip signal. Thus, the SCRs would have provided a diverse and independent means of shutting down the reactor.

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

Corrective Action:

The immediate corrective action taken was to replace Unit 1 CRD DC breaker #CB-3 front frame with a spare front frame. The CRD DC breaker #CB-3 was then retested and met trip time requirement of 80 msec. All Unit 1 CRD breakers were retested and all had response time within the acceptable limit. The faulty front frame from Unit 1 CRD DC breaker #CB-3 was inspected and successfully tested.

The immediate and supplemental corrective actions ensured that all other CRD breakers on Unit 1 were operable and would have tripped within the acceptance criteria if a trip signal had been received.

The subject breaker is an old General Electric (GE) Type AK 2 breaker. On the GE Type AK 2 breaker, the trip latch roller is part of the front frame.

Similar failures of CRD breakers have previously occurred and reported to NRC by Reportable Occurrence Report RO-269/83-20, dated December 30, 1983 and Special Reports dated August 17, 1984 and January 16, 1985.

Presently a program is being implemented to replace the front frame of all GE Type AK 2 breakers in an attempt to correct these recurring problems. These new front frame assemblies are being installed as a result of the Salem ATWS event. Finally, in an amended response to Generic Letter 83-28, Items 4.1 and 4.2 submitted to NRC on August 10, 1984, Duke's activities regarding reactor trip system reliability, preventive maintenance, and surveillance program have been documented.