

DUKE POWER COMPANY

P.O. BOX 33189
CHARLOTTE, N.C. 28242

HAL B. TUCKER
VICE PRESIDENT
NUCLEAR PRODUCTION

TELEPHONE
(704) 373-4531

October 25, 1989

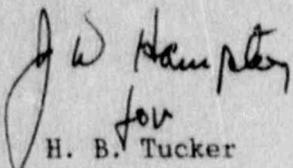
U. S. Nuclear Regulatory Commission
Attn: Document Control Desk
Washington, D.C. 20555

Subject: Catawba Nuclear Station, Unit 2
Docket No. 50-414
Special Report

Gentlemen:

Pursuant to Technical Specifications 6.9.2 and 4.8.1.1.3, please find attached a Special Report concerning a Unit 2 Diesel Generator 2A invalid failure on September 21, 1989.

Very truly yours,


for
H. B. Tucker

MHH-2/lcs

Attachment

xc: Mr. S. D. Ebner
Regional Administrator, RII
U. S. Nuclear Regulatory Commission
101 Marietta Street, NW, Suite 2900
Atlanta, Georgia 30323

Dr. K. Jabbour
Office of Nuclear Regulatory Regulation
U. S. Nuclear Regulatory Commission
Washington, D.C. 20555

Mr. W. T. Orders
NRC Resident Inspector
Catawba Nuclear Station

8911030049 891025
FDR ADOCK 05000414
S PDC

JE22
11

SPECIAL REPORT

CATAWBA NUCLEAR STATION

DIESEL GENERATOR 2A INVALID FAILURE DUE TO

HI LUBE OIL TEMPERATURE SENSOR FAILURE

An invalid failure of Diesel Generator (D/G) 2A occurred on September 21, 1989, at 2235 hours, while Unit 2 was at 100% power. D/G 2A was on a monthly test schedule at the time of this invalid failure. There have been no valid failures in the last 20 valid tests and 2 valid failures in the last 100 tests on D/G 2A.

On September 20, 1989, at 0300 hours, D/G 2A was declared inoperable due to Train A of the Nuclear Service Water (RN) System being taken out of service for maintenance. Following the RN work, on September 21 at approximately 2200 hours, D/G 2A was started for Operations (OPS) Performance Test (PT). The D/G ran for approximately 30 minutes when the following annunciators were received: "TRIP LOW PRESSURE LUBE OIL," "TRIP VIBRATION," "TRIP LOW PRESSURE TURBO OIL," "TRIP HIGH TEMP BEARINGS," and "TRIP HIGH TEMP LUBE OIL OUTLET." The engine continued to run for several minutes, then tripped. OPS initiated Work Request (W/R) 444000PS for Instrumentation and Electrical (IAE) to investigate and repair the cause of the trip. IAE began troubleshooting the problem. The tubing line to the bearing temperature sensors was pressurized and observed not to be losing pressure, eliminating this as being a problem. IAE then requested OPS to start the D/G again in order that the behavior of the control system could be observed. The engine was started and the pressure gauges mounted on the pneumatic tubing lines were monitored. When the engine was loaded, it was noticed that the pressures for Vibration, Lo Turbo Oil Pressure, and Lo Lube Oil Pressure were slowly decreasing. All of these sensors were checked and no leakage was observed. The High Lube Oil Temperature sensor was checked and it was discovered to be venting slightly. The Operators dropped the load from the

D/G and it was noticed that the pressures increased and the venting stopped. The D/G was loaded once more and the venting began. As the loading was increased, the oil temperature increased and the setpoint of the switch was being reached. The D/G was shutdown, and IAE removed the High Temperature Lube Oil Sensor, 2LDY75270.

The calibration of the sensor was checked on the bench and observed to be less than the required value. The setpoint was found to be 185° F. The required tolerance is 200 +/-3° F. This particular sensor and all of the other Calcon manufactured sensors had been removed earlier that day for their periodic calibration and inspection per W/R 10245SWR. The "As Left" value at that time was 199.8° F. Further checks on the bench showed that the temperature sensor was subject to drifting when repeatability was checked. Apparently, the sensor's setpoint had drifted to the point that it had slightly started to vent when the engine's oil temperature was increased by the loading of the engine. The subject sensor is a Calcon Model #A3500-W3. The sensor was replaced with a new one from stock and OPS once more ran their PT, this time with satisfactory results.

Because the pressure for the gauges on the Vibration, Lo Lube Oil, and Lo Turbo Lube Oil sensing lines dropped when the Hi Lube oil temperature sensor began venting, it was determined that the in-line check valves to these sensors were apparently leaking in the reverse direction. The 3 check valves for these sensors were replaced under W/R 444000PS.

During testing when the invalid failure occurred, the slow drop in pressure of the pneumatic tubing lines went undetected until the annunciators, which are set at a decreasing pressure of 45 psi, came in. The engine finally tripped when the setpoint of the P3 pressure sensor, which is 40 psi decreasing, was reached. This explains the long time delay from when the engine was loaded to when it tripped. Had an emergency start occurred, the engine would not have tripped due to the Hi Lube oil temperature being a non-emergency trip sensor.

There have been several problems in the past with the Calcon model #A3500-W3 temperature sensor (Delaval P/N F-573-330). On December 18, 1988, an invalid failure occurred that was attributed to this part (Special Report dated January 17, 1989) used in the Hi Jacket Water Temperature application. Also, a Duke Power Problem Investigation Report was written on 5/13/87 addressing problems with this sensor. IMO Delaval issued a Part 21 notification (Report #145) on April 29, 1988 addressing quality concerns with this part and other Calcon manufactured parts. Action was taken at that time to send all parts of the specified model number in stock back to Delaval for examination. In addition, per Delaval's notification, all installed parts that were functioning properly were considered to have already demonstrated their reliability. None of the Calcon model #A3500-W3 sensors are used in the emergency trip circuitry. During 1EOC5 and 2EOC4 outages, the D/G pneumatic non-emergency trip functions will be replaced with an electronic system per Nuclear Station Modification (NSMs) CN-11149 (Unit 1) and CN-20528 (Unit 2). Since the pneumatic emergency trip functions were replaced during 1EOC3 and 2EOC2 outages, no failures caused by the new systems have resulted. The faulty sensor discovered in this incident will be sent to Cooper Industries' Enterprise Engine Division for examination to determine if any generic problems exist.

D/G 2A was logged out of service from 9-20-89 at 0300 hours to 9-23-89 at 0605 hours, for a total of 75 hours and 5 minutes. As mentioned earlier, the majority of this time was for A Train RN work in progress before the D/G problem occurred. Unit 2 shutdown did not begin after 72 hours due to all associated work to return the D/G to service, had been completed. A few extra hours were required to clear paperwork.