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U. S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, DC 20555

Subject: Catawba Nuclear Station, Unit 1
Docket No. 50-413
Special Report
Invalid Failure of Diesel Generator 1B

Pursuant to Technical Specification 4.8.1.1.3 and 6.9.2, find attached a Special Report concerning the Unit 1 Diesel Generator B (D/G 1B) invalid failure that occurred on February 18, 1992.

Very truly yours,

M. S. Tuckman

CRL/1BDGSR33.92

Attachment

xc: S. D. Ebneter
Regional Administrator, Region II

W. T. Orders
Senior Resident Inspector

R. E. Martin, ONRR

A033

SPECIAL REPORT

CATAWBA NUCLEAR STATION

DIESEL GENERATOR 1B INVALID FAILURE DURING
OPERABILITY TESTING OF ENGINE

An invalid failure (start #973) of Diesel Generator (D/G) 1B occurred on February 18, 1992 at 0922 hours. The invalid failure occurred during the Operations Periodic Test (PT), PT/1/A/4350/02A. D/G 1B was on a monthly operability test schedule at the time of this invalid failure. There has been 0 valid failures in the past 20 valid starts and 0 valid failures in the past 100 valid starts for D/G 1B. D/G 1B remains on a monthly operability test schedule as a result of this failure. The D/G was unavailable for 23 hours and 17 minutes as a result of this invalid failure.

The start, warm-up and loading of D/G 1B during the performance of the operability PT were normal in all respects. Approximately 20 minutes into the full load run, the diesel generator shutdown due to high jacket water temperature. The operator noted that the high jacket water temperature annunciator flashed on, and then immediately off, before any operator action to acknowledge the condition could be taken. The high temperature lube oil annunciator also came on, but not until after the diesel generator had tripped.

Instrumentation and Electrical (IAE) personnel inspected and tested the pneumatic shutdown sensors in search of a possible fault that would have caused the engine to shutdown. The jacket water shutdown sensors were found to operate as designed.

A work request was written to inspect the crankcase area for any abnormal appearance or indication of an over temperature condition. The inspection found no abnormal appearances evident on the pistons, rods, liners, rod bearings or main bearings and no water leaks were observed.

Prior to performing the Operations PT, performance technicians had equipment set up on the D/G in preparation for the D/G Engine Cooling Water/Nuclear Service Water (KD/RN) heat exchanger heat balance. The temperature tracking data from the heat balance test equipment was reviewed. The data indicated that, although the thermostatic control valve had functioned, it did not start to open at the expected temperature. The late start allowed the temperature to spike and shutdown the diesel generator even though the system overall temperature had started trending down. This explained why the high temperature jacket water annunciator flashed on and then immediately cleared as reported by the operator.

A work request was written to disassemble and inspect the thermostatic control valve. The thermostatic control valve actuating assembly was removed intact from the valve body. Discussions with AMOT, the valve manufacturer, produced a technique to exercise the whole assembly before further valve disassembly. The valve operated as specified by the manufacturer during this test.

The slide valve seat and o-ring sealing surfaces were examined and found to be smooth, with no bruises or abrasions. The o-ring seat surface felt tacky rather than having its normal slippery feel.

Next, the slide valve o-ring was examined. Previous inspections of this o-ring found it to be slippery. The last time the o-ring was examined it showed some signs of wear and minor aging, but the wear was not considered excessive. This inspection, the o-ring felt tacky, seemed soft, and aging was readily apparent.

System water chemistry records were checked to determine if any chemicals that might adversely affect the o-ring were present. It was determined that the chemicals used, or mixed, in the system would not adversely effect the o-ring. Additional sampling showed that no chlorides were present.

When the o-ring was replaced, it was discovered that the old o-ring was larger in diameter than the one replacing it. The o-ring is the only thing that the sliding sleeve comes in contact with, except for the seat at each end of its travel. The sleeve o-rings purpose is to prevent leakage around the valve sleeve. Leakage around the valve sleeve would cause additional and possibly excess cooling.

It is believed that the slightly oversized o-ring, in conjunction with the tacky o-ring surface, created increased drag forces that required additional capacity from the power element assembly to start the valve moving. This was borne out in the data retrieved from the temperature tracking system.

The failed o-ring was sent to the Applied Science Center Metallurgy Lab to study the o-ring. This testing is not complete at this time. The report findings will be available on request at a later time.

The thermostatic control valve was reassembled with a new o-ring, and the system was refilled with demineralized water, chemically treated, and brought back to the normal standby temperature. The D/G then successfully completed several test runs and then the Operations PT. The temperatures were maintained automatically and satisfactorily by the thermostatic control valve. The diesel generator was then declared operable.

Additional work requests were written to inspect and replace the thermostatic control valve slide o-rings on D/Gs 2A, 2B, and 1A at the earliest opportunity.