



Southern Nuclear Operating Company

the southern electric system

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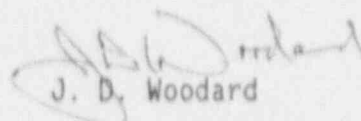
Joseph M. Farley Nuclear Plant
Annual Diesel Generator Reliability Data Report

Gentlemen:

Attachment 1 is the Annual Diesel Generator Reliability Data Report which is submitted in accordance with Technical Specification 6.9.1.12. This report provides the number of tests (valid or invalid) and the number of failures for each diesel generator at Farley Nuclear Plant for 1991. Attachment 2 provides the information identified in Regulatory Position C.3.b of Regulatory Guide 1.108, Revision 1, 1977, for each failure.

In August of 1991, Southern Nuclear assembled a Diesel Generator Task Force to assess diesel performance. The Task Force has reviewed diesel operating records, maintenance problems, and procurement problems in an effort to improve diesel reliability and availability. A number of corrective actions have been taken to date to improve performance and several more actions are still in progress. In the attached report it is noted that as of September 1991, there were six failures in the last 100 valid tests. As of February 21, 1992, the failure rate associated with the 1-2A, 1B, and 2B diesels was two failures in the last 100 valid tests.

Respectfully submitted,


J. D. Woodard

JDW/DRC:map 2079

Attachments

cc: Mr. S. D. Ebner
Mr. S. T. Hoffman
Mr. G. F. Maxwell

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ATTACHMENT 1

ANNUAL DIESEL GENERATOR RELIABILITY DATA REPORT FOR 1991

ANNUAL DIESEL GENERATOR RELIABILITY DATA REPORT FOR 1991

Diesel Generator	1-2A	1B	2B	1C	2C	Total
Valid Successful Tests	58	49	50	37	37	231
Invalid Tests	30	19	15	10	10	84
Valid Failures	2	3	2	0	0	7
Invalid Failures	0	0	0	0	0	0

This diesel generator (DG) reliability data report for the year 1991 is submitted in accordance with Technical Specification 6.9.1.12. The table above shows the number of tests (valid or invalid) and the number of failures for each of the five DGs at Farley Nuclear Plant.

ATTACHMENT 2

INFORMATION IDENTIFIED IN REGULATORY POSITION C.3.B OF
REGULATORY GUIDE 1.108, REVISION 1, 1977

1B DG FAILURE ON 04-19-91

At 0448 on 04-19-91, the 1B DG was started per FNP-1-STP-80.1 and FNP-1-SOP-38.0. The output breaker was closed at 0450 and the DG was then loaded to 1 MW. Shortly thereafter, the Plant Operator (PO) observed load oscillations at the Emergency Power Board (EPB) and attempted to stabilize voltage without success. The load began to decrease until it dropped to zero, at which point the PO opened the output breaker. The Diesel Building Systems Operator (SO) reported to the PO that the low fuel oil pressure annunciator had alarmed and fuel oil pressure indicated zero. Based on the SO's report and since the voltage and the frequency never came up to 4160 Volts and 60 Hertz after the output breaker was opened, the PO tripped the DG at 0455.

Initially an electrical problem was suspected, however, electrical checks were performed and no problem was found. Mechanical Maintenance then investigated the fuel oil system. The fuel oil day tank foot valve was checked, and no problem was found. Per a vendor recommendation, the fuel oil pump and orifice plate were replaced. The diesel was restarted and tested satisfactorily.

The diesel was returned to service on 4-21-91. The 4-19-91 failure was the third failure in the last 100 valid tests. The surveillance test interval was changed to once per 7 days.

(See the NOTE after the 1B DG Failure on 05-24-91 description)

1-2A DG FAILURE ON 05-17-91

At 1014 on 05-17-91, the 1-2A diesel generator tripped on low lube oil pressure during normal surveillance. Low lube oil pressure was caused by a high differential pressure across the lube oil strainer. The strainer differential pressure rapidly increased after the diesel generator start. The SO attempted to swap the on service lube oil strainer, but the swap was not made before the diesel tripped. The rapid increase in differential pressure was caused by water in the oil due to a lube oil heat exchanger tube leak found subsequent to the diesel generator trip. This leak also caused rising lube oil level in the lube oil sump.

The leak was repaired and the heat exchanger pressure tested satisfactorily. Pre-trip oil sample analysis results were reviewed and no indications were found that a heat exchanger tube leak problem was developing. Based on normal oil level checks prior to the event, it is believed that the tube leak developed during this event.

The 1-2A DG was returned to service on 5-19-91. The 5-17-91 failure was the fourth failure in the last 100 valid tests. The surveillance schedule remained at once per 7 days.

1B DG FAILURE ON 05-17-91

At 2018 on 5-17-91, the 1B DG alarmed on low fuel oil pressure. When the fuel oil pressure was read locally, both pressure indicators (PIs) 637 and 638 read zero. The fuel oil strainer was shifted but this action did not restore fuel oil pressure. The diesel was then manually primed and the fuel oil pressure returned to normal. The diesel was shut down and inspected. Investigation indicated the fuel oil suction line had become air-bound, and priming the diesel while it was operating had corrected the problem. The diesel was restarted with normal pressures indicated. The STP was completed satisfactorily.

The 1B DG was returned to service on 5-17-91. Prior to the 5-17-91 test on the 1B DG, there had been 4 failures of the large DGs in the last 100 valid tests. If the 5-17-91 test had been successful, the failure rate would have dropped to 3 in the last 100 valid tests. Since the 5-17-91 test was a failure, the failure rate remained at 4 in the last 100 valid tests.

(See the NOTE after the 1B DG Failure on 05-24-91 description)

1B DG FAILURE ON 05-24-91

At 0825 on 05-24-91, after starting for normal surveillance, the diesel generator was secured due to low fuel oil pressure. The low fuel oil pressure was caused by a leak in the fuel oil line at the day tank which allowed air to enter the system.

Per MWR 220387, Mechanical Maintenance found the day tank foot valve in satisfactory condition, however, a pressure test of the fuel pump suction piping indicated a leak through cut threads on the foot valve pipe fitting at the top of the day tank. Investigation revealed the threads were probably damaged during preventive maintenance on the foot valve on 12-17-90 during removal or reinstallation of the foot valve pipe.

The foot valve pipe inside the day tank, and the foot valve, were replaced. The 1B DG was returned to service on 5-25-91. The 5-24-91 failure was the fifth failure in the last 100 valid tests. The surveillance schedule remained at once per 7 days.

NOTE: In retrospect, it is now believed that the unloading of the diesel, the failure of the voltage to increase, and the low fuel oil pressure observed in the 4-19-91, 5-17-91 and 5-24-91 1B DG failures were all caused by fuel depletion. The fuel depletion was due to air binding of the fuel pump caused by air being drawn through cut threads on the foot valve pipe fitting at the top of the day tank. The problem was corrected when the foot valve pipe inside the day tank, and the foot valve, were replaced on 05-24-91. The day tank foot valve inspection PMs for all 5 DGs have been revised to require a pressure test of the fuel oil suction piping after the foot valve inspection.

1-2A DG FAILURE ON 08-13-91

At 1807 on 08-13-91, after starting the diesel for routine surveillance, the diesel was shut down due to a body-to-bonnet leak on the Robert Shaw intercooler thermostatic bypass valve. The body-to-bonnet leak was repaired when the thermostatic bypass valve was disassembled for the replacement of its poppet valve assembly and load spring and reassembled with new gaskets on 8-19-91.

The 1-2A DG was returned to service on 8-21-91. The length of this outage was due to the length of time required to obtain a replacement valve. This was the fourth failure in the last 100 valid tests. The surveillance test interval remained at once per 7 days.

2B DG FAILURE ON 09-02-91

At 1030 on 9-2-91, after starting the 2B DG for normal surveillance, closing the output breaker and increasing the load, the DG was unloaded due to oscillations of 500 kW. The DG was run unloaded while maintenance checked the EGA controller and the governor. It was reloaded after 30 minutes and the load increased steadily to 1 MW, but smoke began coming from the turbo charger area. The DG was then unloaded and secured.

An investigation of the DG was conducted which resulted in adjustment of the EGA controller by maintenance personnel and the governor by the vendor. The DG was restarted on a dual header start and was loaded satisfactorily. The smoke appeared to be the result of the DG being freshly painted and an oil build up in the exhaust header caused by running the DG unloaded for 30 minutes.

The 2B DG was returned to service on 9-2-91. The 9-2-91 failure was the fifth failure in the last 100 valid tests. The surveillance schedule remained at once per 7 days.

2B DG FAILURE ON 09-17-91

At 0055 on 09-17-91, during the 24 hour load run, with the DG paralleled to the grid, voltage control of the DG was lost which caused a loss of reactive load control. The diesel generator was rapidly removed from operation. The loss of voltage control was found to be a failure of a control transformer (T54) in the feedback circuit of the voltage regulator. The defective component was replaced and has been sent to the manufacturer for diagnostic testing.

There has only been one other failure of a T54 transformer at FNP. This occurred in 1985 (MWR 116762) on the 1B DG.

The 2B DG was returned to service on 9-17-91. The 9-17-91 failure was the sixth failure in the last 100 valid tests. The surveillance schedule remained at once per 7 days.