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 RECIP. NAME: RECIPIENT AFFILIATION

DOCKET #
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SUBJECT: Special rept: on 870902, General Motors emergency diesel generator failed to start. Caused by 12 cylinder engine actuator friction clutch assembly out of adjustment. Clutch assembly adjusted. W/871019 ltr.

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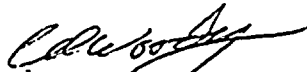
U. S. Nuclear Regulatory Commission
Attn: Document Control Desk
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Gentlemen:

Re: St. Lucie Unit 2
Docket No. 50-389
Date of Event: September 2, 1987
Special Report on Diesel Generator Failure

The attached Special Report is being transmitted pursuant to the requirements of Technical Specification 4.8.1.1.3 and 6.9.1 to provide notification of the 2A Emergency Diesel Generator failure.

Very truly yours,


C. O. Woody
Group Vice President
Nuclear Energy

COW/GRM/gp

Attachment

cc: Dr. J. Nelson Grace, Regional Administrator, Region II, USNRC
Senior Resident Inspector, USNRC, St. Lucie Plant

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SPECIAL REPORT

DIESEL GENERATOR FAILURE

At 0920 hours on September 2, 1987, St. Lucie Unit 2 Emergency Diesel Generator (EDG) 2A was started for a surveillance run. An alarm was received which indicated that one of the engines in the 2A EDG had failed to start. The input signal to this alarm is a high temperature differential between the 16 and the 12 cylinder engines' turbo exhaust temperatures indicating that the engine with the hottest exhaust is picking up more load than the other engine. The two EDG's installed in St. Lucie Unit 2 are General Motors EMD 645-E4 units, each consisting of a 16 cylinder and a 12 cylinder engine mounted in tandem and driving a single generator. At the time the 2A EDG was started, a plant operator observed locally that the lever for the 12 cylinder engine fuel racks did not move. The lever indicator for the fuel rack is graduated from 62 to 196, with the 196 position being in the idle position and 62 being the fully racked in position. As observed by the operator during the initial start, the lever was at the 196 position until approximately one minute after starting when the lever position was noted to be approximately at the 130 position. It was also observed by the operator that the temperature differential between the engines' turbo exhaust was approximately 280 degrees F. The 12 cylinder engine temperature was 150 degrees F and the 16 cylinder engine was at 430 degrees F. When the 12 cylinder engine started, the 12 cylinder engine temperature rose, and the alarm cleared. At 0922, the 2A EDG was stopped. The reactor control operator noted the starting time to be 12 seconds, this exceeded the Technical Specification required time of 10 seconds or less.

At 0938, the 2A EDG was re-started to allow operations personnel to assess and evaluate its performance. The start time was 7.76 seconds and no apparent problem with the fuel racks was noted. The 2A EDG was then stopped to allow cooldown in preparation for the performance of the required surveillance run:

At 1245, the 2A EDG was re-started for the surveillance run. The start time was noted to be 8.52 seconds. At 1350, the 2A EDG was stopped and the surveillance run was deemed satisfactory.

Although the subsequent re-starts of the 2A EDG indicated that the 2A EDG started and accelerated to at least 900 rpm and reached the required voltage and frequency in less than 10 seconds, the initial start was determined to be a valid diesel failure. This determination was based on the following: (1) the excessive starting time, (2) the indication that the lever for the 12 cylinder engine fuel racks did not move in until approximately one minute after starting, and (3) the observed high temperature differential between the 16 and the 12 cylinder engines' turbo exhaust temperatures. The last EDG failure was in July 9, 1986. This is the first failure of a St. Lucie Unit 2 Emergency Diesel Generator within the last 100 valid starts. The surveillance frequency remains as once per 31 days, which is in conformance with regulatory position C.2.d of Regulatory Guide 1.108, Revision 1, August 1977.

On September 22, 1987, the EDG task team supported by electrical maintenance, mechanical maintenance and operations personnel performed tests and inspections on the 2A EDG to determine the root cause of the failure. A structure tree was developed and from it a recommended test/inspection was generated. The test revealed that the 12 cylinder engine actuator friction clutch assembly was out of adjustment by 0.5 inch-pounds. (The recommended range of adjustment is 4.5 to 5.5 inch-pounds) The as found torque was 4.0 inch-pounds. The friction clutch was readjusted to 4.5 inch-pounds and then the actuator was restored to normal. The 2A EDG was returned to operations for surveillance testing, experienced a normal start sequence and started in 6.99 seconds. The engines loaded normally. The EDG task team concluded that it is possible that the slippage in this assembly could produce intermittent problems with the start sequence. A periodic check of the friction clutch adjustment has been added to the EDG maintenance program. Another potential item of concern was the governor air booster assembly. The air booster assembly will be sent to Woodward Governor for testing and evaluation for wear/degradation, and a report will be provided to the St. Lucie Plant on their findings. This will be done during the upcoming St. Lucie Unit 2 refueling outage in October 1987.

