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 AUTH. NAME AUTHOR AFFILIATION
 SAGER, D.A. Florida Power & Light Co.
 RECIP. NAME RECIPIENT AFFILIATION

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SUBJECT: Special rept: on 911021 & 22, 1B EDG failed during 24 hr
 surveillance runs. First failure caused by broken shaft due
 to fatigue at high stress location. New shaft, of modified
 design, installed. 24 hr run performed satisfactorily 911027.

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

Gentlemen:

Re: St. Lucie Unit 1
Docket No. 50-335
Special Report
Date of Events: October 21 and 22, 1991
Emergency Diesel Generator Failures

The attached Special Report is being transmitted pursuant to the requirement of St. Lucie Unit 1 Technical Specifications 4.8.1.2.2 and 6.9.2. This report provides notification of two failures associated with the 1B Emergency Diesel Generator during the 24 hour surveillance runs.

Should there be any questions on this information, please contact us.

Very truly yours,

D.A. Sager
By A.G. Boring
D. A. Sager
Plant Vice President

DAS/JWH/kw

Attachment

cc: Stewart D. Ebnetter, Regional Administrator, Region II, USNRC
Senior Resident Inspector, USNRC, St. Lucie Plant

DAS/PSL #550-91

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Special Report

1B Emergency Diesel Generator Failures

First Failure

St. Lucie Unit 1 was in Mode 5 and beginning a refueling outage. At 0357 on October 21, 1991, the 1B Emergency Diesel Generator (EDG) was started for its 24 hour surveillance run. The EDG automatically tripped at 0928 on high discharge water temperature. The radiator fan idler pulley shaft was found to be sheared.

Analysis showed that the broken shaft was caused by fatigue at a high stress location. A new shaft, of a modified design, was installed. The new shaft is made of a different material and has reduced stress risers at the shaft diameter steps to increase shaft fatigue resistance.

This surveillance run was a failure of a valid test. RG 1.108 §2.a.3 requires a test to be performed at least once per eighteen months to demonstrate full-load-carrying capacity for an interval of not less than 24 hours. The EDG ran five and one-half hours before tripping.

Second Failure

The 1B EDG was restarted at 2035 on October 22, 1991. The radiator fan belts were found to be flapping excessively. Plant management decided to shutdown the EDG to determine the cause of the excessive flapping. The EDG was stopped at 0931 on October 23.

Cracks were found on the fan drive belt bearing support frame. Evaluation of the structure revealed a natural frequency at the third harmonic of the EDG rotational speed. The presence of excitation forces near the natural frequency of the structure explains the reduced life of the idler shaft and supporting frame. The excitation is produced by the torsional oscillation from the 12 cylinder EDG.

To increase the service life of the fan components and associated support structure, the cracks were repaired and stiffener plates were installed. These actions were performed on both the 1A and 1B EDGs. Future plans are to install vibration isolators on the 1A and 1B EDG power takeoff shafts. These isolators greatly reduce the amplitude of torsional vibrations being transmitted to the fan assembly frame and have proven to be beneficial on St. Lucie Unit 2 EDGs. This long-term corrective action will be evaluated for implementation during the next refueling outage.

The surveillance run started on October 22 was also a failure of a valid test. RG 1.108 § 2.e.7 states that tests performed to verify correction of the problem should be considered valid tests and successes or failures, as appropriate.

Failure Summary

These failures were the first and second failures of the 1B EDG since implementation of the RG 1.108-based Technical Specifications. To date, twenty valid tests have been performed. The current surveillance interval is once per seven days per Technical Specification 4.8.1.1.

The 24 hour run was performed satisfactorily from 2001 on October 27 to 2011 October 28, 1991.

