

December 5, 1989

PRELIMINARY NOTIFICATION OF EVENT OR UNUSUAL OCCURRENCE -- PNO-IV-89-66A

This preliminary notification constitutes EARLY notice of events of POSSIBLE safety or public interest significance. The information is as initially received without verification or evaluation, and is basically all that is known by the Region IV staff on this date.

FACILITY: Houston Lighting & Power Company
South Texas Project, Unit 2
Bay City, Texas
DOCKET: 50-499

Licensee Emergency Classification:
☐ Notification of Unusual Event
☐ Alert
☐ Site Area Emergency
☐ General Emergency
☒ Not Applicable

SUBJECT: DAMAGE TO EMERGENCY DIESEL NO. 22 DURING A 24-HOUR LOAD TEST - UPDATE

At 9:57 a.m. (CST) on November 28, 1989, No. 22 diesel generator, manufactured by Cooper Bessemer for South Texas Project, Unit 2 (STP-2), failed after approximately 10 hours of a scheduled 24-hour load test. The diesel had performed normally for the first 9 hours. The hourly, recorded operating parameters did not indicate any out-of-specification readings. See PNO-IV-89-66 dated November 28, 1989.

STP-2 diesel generator No. 22 had approximately 640 hours of operation before the failure. Fifty of those 640 hours occurred after a November 1988 high lube oil temperature event prompted inspection of the engine. The inspection indicated no thermal distress to the connecting rod bearings or scuffing of the cylinder liners. Three connecting rod bearings (Nos. 2, 3, and 7) were replaced at that time but for reasons not associated with the high lube oil temperature event. The No. 4 connecting rod bearing involved in the November 28, 1989, event was not one of the bearings replaced in November 1988.

Representatives from Cooper Bessemer arrived onsite the morning of November 29, 1989, to assist the licensee in investigating the cause of the failure. In addition to Cooper Bessemer, representatives from Reynolds-French of Oklahoma and from Southwest Research are onsite to assist the licensee in the investigation and recovery efforts. Visual inspection of the No. 4 connecting rod assembly indicated an area that may have undergone fatigue failure. Pertinent parts of the assembly were examined at the licensee's Houston laboratories. Inspection of the engine block, crankshaft, and undamaged rod assemblies were conducted onsite.

Metallurgical examination of the failed No. 4 connecting rod assembly confirmed the fatigue failure detected during the visual inspection of the assembly. The metallurgical examination indicated that the fatigue failure, which occurred in an area of the master connecting rod located between the articulated rod pin and the crankshaft rod journal, initiated at the end of an oil passage that had been tapped and plugged. Records at Cooper Bessemer, the diesel vendor, described the tapping and plugging of the oil passage as a repair made to correct an overbored oil passage during manufacture of the No. 4 connecting rod assembly.

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Cooper Bessemer advised Houston Lighting & Power Company (HL&P) that its records indicate that the failed No. 4A connecting rod assembly was the only one supplied to a nuclear utility that was reworked by tapping and plugging an overbored oil passage. HL&P inspection of two spare connecting rods disclosed that both connecting rod assemblies had overbored oil passages. One assembly had the passage bored completely through with the hole radiused. The other assembly had the passage bored approximately 3/4 of the way through. Neither overbored passage had been tapped or plugged as was the case with the failed No. 4 connecting rod assembly. HL&P has requested advice from Cooper Bessemer regarding the effect of the overboring on the strength of the connecting rod assembly.

HL&P is continuing its investigation of the failed diesel engine to determine any other factors that may have contributed to the engine's failure. Inspection of the remaining nine connecting rod assemblies indicated no abnormal conditions. Inspections of the engine block and crankshaft have indicated no other apparent causes for the failure. Cooper Bessemer representatives and other consulting experts have advised the licensee that the No. 22 diesel engine can be repaired without replacing the engine block or removing the crankshaft. The licensee estimates that the engine could be repaired and tested by December 28, 1989, if the fatigue failure of the No. 4 connecting rod assembly is confirmed as the root cause of the engine failure.

The region is monitoring the licensee's investigative and recovery actions and evaluating the diesel failure. The region has requested the licensee to provide laboratory results regarding the failed connecting rod material mechanical and chemical properties as soon as possible. Preliminary results indicate that required quenching and tempering heat treatments had not been performed. NRR technical experts will be onsite today to review the licensee's progress.

Neither the licensee nor the NRC plans to issue a press release at this time.

The state of Texas has been informed.

Region IV received notification of this occurrence by telephone from the senior resident inspector at 10:10 a.m. on November 28, 1989. Region IV has informed EDO/NRR/PA.

This information has been confirmed with a licensee representative.

CONTACT: E. Holler, FTS 728-8287

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