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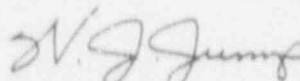
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File No.: G02
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U. S. Nuclear Regulatory Commission
Attention: Document Control Desk
Washington, DC 20555

South Texas Project Electric Generating Station
Unit 2
Docket No. STN 50-499
Supplemental Special Report Regarding
Diesel Generator #23 Valid Failure on November 20, 1990

Pursuant to the South Texas Project Electric Generating Station Technical Specifications 4.8.1.1.3 and 6.9.2, Houston Lighting & Power submits the attached Supplemental Special Report regarding diesel generator #23 valid failure which occurred on November 20, 1990. A Special Report regarding the failure was provided to the NRC on December 20, 1990, reference letter ST-HL-AE-3649.

If you should have any questions on this matter, please contact Mr. C. A. Ayala at (512) 972-8628 or myself at (512) 972-7205.


W. J. Jump
Manager,
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AKK/sgs

Attachment: Supplemental Special Report
Regarding a Diesel Generator
Valid Failure on November 20, 1990

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Houston Lighting & Power Company
South Texas Project Electric Generating Station

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14/NRC/

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DESCRIPTION OF EVENT:

On November 20, 1990, Unit 2 was in Mode 5 during a refueling outage. At approximately 1619 hours, during the performance of a twenty-four hour load test, Standby Diesel Generator (SDG) #23 injector pump 5L separated from the engine. The load test was terminated and SDG #23 was secured. The diesel generator was declared inoperable and a valid failure was declared due to the possible fire hazard from the loss of fuel.

An investigation was conducted to determine the cause of this failure. Injector pump 5L was found to have all four hold down studs failed. The pump for each cylinder is mounted with four hollow studs which are designed to fail if overloaded. This design is intended to protect the SDG cam shaft in case the fuel injector pump or associated components cause overload. The fuel injector pump housing was damaged but disassembly in our shops showed no sign of seizure or malfunction of the pump internals. The fuel injection pump and the damaged studs were replaced and torqued as required. This work was completed on November 21, 1990.

On November 22, 1990, at approximately 0156 hours, during a post maintenance test, injector pump 5R separated from the engine. Similar to the injector pump 5L separation, the four hold down studs for pump 5R had failed. The fuel injection pump housing was damaged but disassembly in our shop showed no sign of seizure or malfunction of the pump internals. The fuel injector pump and the damaged studs were subsequently replaced and torqued as required.

Four injector pumps (5R, 5L, 1R and 3R) had been previously removed on November 18, 1990, to adjust timing. All four hollow studs and hold down nuts for each of the four injector pumps were replaced and torqued as required by procedure. After injector pump 5R failed, an inspection of injector pump fasteners on cylinders 1R and 3R was conducted. One hold down nut on pump 1R and two hold down nuts on 3R were found to have less torque than required by procedures. Therefore, all four hollow studs and hold down nuts on pumps 1R and 3R were replaced again and torqued as required.

On November 24, 1990, a one hour run on SDG #23 was satisfactorily performed. Upon completion of this run, the hold down nuts on each of the four affected pumps were verified and found to be satisfactorily torqued. Subsequently, a twenty-four hour load test was successfully completed on SDG #23. The diesel was declared operable on November 27, 1990 after completion of several other surveillances.

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A magnetic particle examination on November 26, 1990 was conducted on the studs removed from pumps 1R and 3R. No linear indications (i.e. cracks) were found.

On January 30, 1991, Unit 1 was in a refueling outage. At approximately 0355 hours, all four hold down studs for injector pump 2L in Standby Diesel #13 failed during the performance of a twenty-four hour load test. The diesel was emergency stopped to investigate the cause of the failure.

It was noted that on January 26, 1991, seven injector pumps, including injector pump 2L, on SDG #13 were removed to adjust timing. All four hollow studs on each of the seven injectors were replaced upon completion of the timing activities. Further investigation on the installation method of the studs determined that there was some inconsistency in the use of a special tool which is used to install the studs. The special tool was introduced in August 1990 to facilitate the installation of the hollow studs in the injector pumps. The applicable procedures did not provide sufficient guidance on the proper use of the tool. Improper use of the special tool could result in pre-stressing the studs. This was determined to be the most probable cause of the stud failures.

The procedures governing the use of the special installation tool were revised to preclude further use of the special tool. The new installation process was added to the procedures. The new instructions to install the studs uses loctite and finger tightening of the stud. The new installation method was used to replace all the studs in the seven injector pumps on SDG #13. A work document review and walkdown of the diesels in both units was conducted to identify studs that had been installed using the special tool. Thirty-two such studs in Unit 2 were identified and they were replaced using the new installation process. No additional studs required replacement in Unit 1.

Injector pump stud nuts are checked during each refueling outage to verify that they are torqued properly. This surveillance was performed during the refueling outages in Unit 1 & 2 and no problems were noted.

CAUSE OF EVENT:

Based on the January 30 event, it was concluded that the cause of the event was less than adequate procedural instructions requiring the use of an inappropriate special installation tool. The use of this tool resulted in pre-stressing of the studs.

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ANALYSIS OF EVENT:

This event was classified as a valid failure because of the quantity of fuel loss from the damaged injector pump. The continued operation of SDG #23 would have created a possible fire hazard.

The January 30 event was classified as a valid test and will not impact the testing frequency of SDG #13.

CORRECTIVE ACTIONS:

1. The injector pumps 5L and 5R in SDG #23 were replaced along with mounting studs and other parts damaged due to the separation of the pumps from the engine. The work was completed on November 24, 1990. The studs were subsequently replaced using the new installation technique. The work was completed on February 6, 1991.
2. The hollow studs for injector pumps 1R and 3R in SDG #23 were also replaced. The work was completed on November 24, 1990. The studs were subsequently replaced using the new installation technique. The work was completed on February 6, 1991.
3. The four hollow studs and nuts for injector pump 5L were sent to the HL&P lab for failure analysis. Fatigue failure in at least one stud was found as a result of the failure analysis conducted by the lab.
4. The HL&P lab results were sent to Cooper-Bessemer for further design review.
5. The procedures governing the use of the special stud installation tool were revised to delete the use of the tool. The new technique for installing the studs uses loctite and finger tightening of the stud.
6. The studs on Unit 1, SDG #13 injector pumps 2L, 4L, 6L, 7L, 4R, 7R and 8R were replaced using the new installation technique. The work was completed on January 31, 1991.
7. The studs on Unit 2, SDG #21 injector pumps 2R and 4L were replaced using the new installation technique. The work was completed on February 4, 1991.
8. The studs on Unit 2, SDG #22 injector pumps 2L and 7L were replaced using the new installation technique. The work was completed on February 5, 1991.

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CORRECTIVE ACTIONS: (cont'd)

9. Based on the above STPEGS believes the stud failure problem was initiated during the installation of new studs. In a previous letter a commitment was made to replace the fuel injection hold down studs any time a fuel injection pump is removed (letter dated April 18, 1990, ST-HL-AE-3422). STPEGS will only replace the hold down studs if an unusual stress has been placed on them.

ADDITIONAL INFORMATION:

The injector pump is a Bendix model FDX-22 and Cooper-Bessemer Part No. 2-50F-030-001. The parts which failed are Cooper-Bessemer Part No. KSV-18-1B.

Per STPEGS Technical Specification 3.8.1.1, there has been one valid failure in the last 20 valid tests of SDG #23 and the number of valid failures in the last 100 valid tests is less than four, therefore, the testing frequency for SDG #23 remains once per 31 days.