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STANLEY,H.G. Pennsylvania Power & Light Co.
RECIP.NAME RECIPIENT AFFILIATION
MARTIN,T.T. Region 1 (Post 820201)

SUBJECT: Special rept:on 920131,vapor cloud noticed coming from crankcase vent.Caused by leak in expansion seal.Expansion seal replaced & procedures revised.

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October 28, 1992

Mr. T. T. Martin
Regional Administrator, Region I
U.S. Nuclear Regulatory Commission
475 Allendale Road
King of Prussia, PA 19406

SUSQUEHANNA STEAM ELECTRIC STATION
FOLLOWUP SPECIAL REPORT - 'E' DIESEL GENERATOR
JACKET WATER LEAK AT EXPANSION SEAL
PLAS-542 FILE R41-2

Docket No. 50-387
License No. NPF-14

Dear Mr. Martin:

All Diesel Generator failures, valid or invalid, are to be reported as required by Regulatory Guide 1.108, Section C.3.b and Technical Specification 4.8.1.1.4. This Followup Special Report describes a condition which was determined to constitute a valid test and failure.

DESCRIPTION OF EVENT

At 1117 hours on January 31, 1992, with Unit 1 in Condition 1 at 97% power and Unit 2 in Condition 1 at 100% power, the 'E' Diesel Generator was being shutdown following completion of a successful operability surveillance run. The operator noticed a vapor cloud coming from the crankcase vent (which vents to the outside of the diesel bay) and pointed this out to mechanical maintenance personnel who were inside the diesel bay supporting the surveillance run. While the diesel was coasting down, a "Jacket Water Stand Pipe Low Level" alarm came in and could not be reset. The jacket water stand pipe level sight glass was observed to be lower than normal. An oil sample was taken from the crankcase sump and was found to contain water. The 'E' Diesel Generator was declared inoperable and Technical Specification ACTIONS 3.8.1.1.b and 3.8.1.1.d were taken.

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CAUSE OF EVENT

The source of water in the crankcase lube oil sump was traced to a leak in an expansion seal located at the No. 6 Left cylinder. Based on metallurgical examination, the root cause of the jacket water leak at the expansion seal was attributed to a thermal and vibrational fatigue failure initiated by mechanical scratching on the seal surface. The scratching is believed to have been introduced during initial manufacturing or installation. The expansion seal failure apparently occurred at or near the end of the surveillance run, since a lube oil sample taken during the run (a routine activity) showed normal results.

Surface perturbations were found on three additional expansion seals on the 'E' Diesel Generator. These discrepancies (punch marks, dents and rust/discolored area) were determined by metallurgical examination to not be related to the No. 6 left seal condition other than they were apparently due to carelessness or mishandling during manufacture or shipping.

SAFETY CONSEQUENCES ASSESSMENT

There were no safety consequences or compromise to public health or safety as a result of this event. The 'E' Diesel Generator is a fifth and spare diesel that can be substituted for any one of the four Susquehanna emergency diesel generators ('A' through 'D'). On 1/31/92, when this event occurred, the 'E' Diesel Generator was substituted in for the 'D' Diesel Generator to allow for removal of that diesel from service to perform preventative maintenance activities. Upon discovery of water in the crankcase lube oil sump, the 'E' Diesel Generator was declared inoperable. Three emergency diesel generators remained OPERABLE at all times, as required by the Susquehanna Safety Analysis, to perform their design function. Diesel Generator 'D' was substituted back in for the 'E' Diesel Generator within the required Tech Spec 72 hour LCO action time. The 'E' Diesel Generator was unavailable for 27 days. However, this unavailable time included additional preventative maintenance activities which were implemented since the Diesel Generator was already out of service for the seal repairs.

CORRECTIVE ACTION

The No. 6 Left expansion seal was replaced. A thorough inspection was performed on all remaining expansion seals on the 'E' Diesel Generator. This inspection identified three additional seals with surface perturbations. These seals were replaced as a precautionary measure.

The procedure for diesel cylinder underside inspections and expansion seal replacement was revised to direct that closer attention to be given to inspection of the expansion seals to identify surface perturbations which could lead to potential fatigue failures of the seal.

The expansion seals of the remaining four emergency diesel generators were inspected for any surface perturbations during their recent maintenance outages. The inspections concluded that all expansion seals currently meet all procedural acceptance criteria and will perform their intended function. The inspections also provided recommendations for additional inspection/replacement of specific expansion seals during future maintenance outage windows. All expansion seals are inspected every 18 months. Preventative maintenance activities will be put into place to perform a metallurgical examination on a removed sample expansion seal from each emergency diesel generator during that diesel generator's 5-year routine inspection, commencing with 15 years of total operation on each machine. Based upon the results found, the frequency for future inspections and recommendations for replacement will be determined.

The 'E' Diesel Generator Start Log indicates that there is one (1) failure in the last 20 valid tests. The 'E' Diesel Generator test interval is one start at least once every 31 days per Technical Specification Table 4.8.1.1.2-1.

H. G. Stanley
Superintendent of Plant - Susquehanna

RRW/mjm

cc: U. S. Nuclear Regulatory Commission
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