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September 11, 1981

Mr. R. C. Haynes
Director, Region I
U. S. Nuclear Regulatory Commission
631 Park Avenue
King of Prussia, PA 19406

SUSQUEHANNA STEAM ELECTRIC STATION
FINAL REPORT OF A DEFICIENCY RELATING
TO DIESEL GENERATOR EXHAUST ' .ES
ERs 100450/100508 FILES 840-4/821-10
PLA-926

References: PLA-656 (4/16/81)
NRC letter, R. M. Stark to N. W. Curtis (8/17/81)

Dear Mr. Haynes:

This letter serves to provide the Commission with the final report of a deficiency involving the original design of the diesel generator exhaust lines for the Susquehanna Steam Electric Station. The deficiency was the subject of correspondence identified as PLA-656 which provided an interim report and explained the need for additional evaluation of the exhaust piping's ASME classification.

The referenced NRC letter (R. M. Stark to N. W. Curtis dated 8/17/81) provides NRC concurrence for using Revision 1 to ASME Code Case 1481-1 (N-19) "Elevated Temperature Design of Section III, Division 1, Class 2 and 3 Components".

The attachment to this letter contains the final report on the deficiency as required under the provisions of 10 CFR 50.55(e).

We trust the Commission will find this information to be satisfactory.

Very truly yours,

N. W. Curtis
Vice President-Engineering & Construction-Nuclear

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Attachment

cc: Mr. Victor Stello
Director-Office of Inspection & Enforcement
U. S. Nuclear Regulatory Commission
Washington, D.C. 20555

Mr. G. McDonald, Director (1)
Office of Management Information & Program Control
U. S. Nuclear Regulatory Commission
Washington, D.C. 20555

Mr. Gary Rhoads
U. S. Nuclear Regulatory Commission
P.O. Box 52
Shickshinny, PA 18655

ATTACHMENT TO PLA-926

SUBJECT:

Deficiency in the Original Design of the SSES Diesel Generator Exhaust Lines

DESCRIPTION OF DEFICIENCY & CAUSE:

The Emergency Diesel Generator exhaust system was deficient in its original design. This design was approved, released for construction and the exhaust lines were then installed according to the approved original design. The design for the exhaust lines was determined to be deficient with respect to the criteria established in the Final Safety Analysis Report and with the exhaust system requirements for the diesels procured for SSES.

FSAR Subsection 9.5.8.3, Rev. 1 dated 8/78 stated that each diesel engine, at full load, exhausts 48,000 cfm at a temperature of approximately 950°F. This data has been confirmed through information from Cooper Bessemer.

The criteria used by Bechtel for the design of the diesel exhaust system was based on 700°F design exhaust temperature. In May of 1980 Bechtel reanalyzed the original diesel exhaust system design for a 1000°F exhaust temperature and found that the thermal loads combined with other pipe loads would produce excessive thermal movement of the expansion joints and excessive stresses of the equipment installed in the system. The original design of the diesel exhaust system was determined to be inadequate.

ANALYSIS OF SAFETY IMPLICATIONS:

The failure of the exhaust system within each of the individual diesel rooms could create an abnormal environmental condition. This condition may cause failure of diesels to continue to operate, especially when the diesel generator is being used for safe shutdown of the plant or during other modes of operation of the plant. Preliminary calculations indicate that the room ambient temperature could reach between 266°F and 380°F. This depends on the partial/or thorough mixing and partial/complete heat transfer between supply air and exhaust gases.

From Bechtel's analysis, the failure of an expansion joint within the diesel room could cause the exhaust gases to enter and heat up the generator room environment and possibly cause generator failure by high temperature.

A Cooper Bessemer representative has indicated that the diesel generator unit could malfunction if a high temperature (160° - 170°F) environment existed within the diesel room.

The original design did not conform to the criteria and bases established in the Safety Analysis Report. The original design was, however, approved and released for construction/installation. If this design were to have remained uncorrected, it could have adversely effected the safe operation of the Susquehanna Steam Electric Station at anytime through the lifetime of the plant. PP&L has, therefore, concluded that the condition is reportable under the provisions of 10 CFR 50.55(e).

ATTACHMENT TO PLA-926

CORRECTIVE ACTION:

In July of 1980, Bechtel issued Design Change Request (DCR) #231 to correct the above deficiency. A third exhaust expansion joint was added (two exhaust expansion joints were provided in the original design) to each of the exhaust lines to absorb the excessive thermal movement and meet excessive nozzle loads. The diesel exhaust piping is now considered adequate for its design function. Upon incorporation of the approved ASME Code Case 1481-1 (N-19) dated March 1, 1976 into the FSAR, full compliance with commitments will exist and no further action will be necessary.