SUPPLEMENT 1

TDI OWNERS GROUP

VOGTLE ELECTRIC GENERATING PLANT - UNIT 1

REVISION 1

Exhaust Manifold Piping
(Large Bore Scope Only)

Component Part No. 02-380A

Performed By:

Duke Power Company
Management and Technical Services
October 31, 1985

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I. INTRODUCTION

The purpose of this supplement is to summarize the evaluation performed to justify eliminating the recommended modifications as stated in the original report.

The exhaust manifold piping contains a sliding span of pipe with a slip joint at each end. These slip joints allow movement along the pipe axis. As stated in the original calculation (Reference No. 1), in a linear elastic analysis using simplified boundary conditions, this type of component is unstable. Therefore, the original report recommended replacing one slip joint at the end of the sliding spans with a slip-on flange in order to analyze the manifold using normal linear elastic analysis methods. The present exhaust manifold was not shown to be deficient in the original analysis.

II. METHODOLOGY

The effects of dead weight loads and thermal movements on the sliding span of pipe were evaluated using conventional techniques (Reference No. 2). To account for the seismic loading, several bounding cases were evaluated. These cases were developed using the sections of pipe connecting to each end of the sliding span. Each section was analyzed with and without the weight of sliding span lumped at the end (see Figures 1 and 2).

It is expected that friction from the seals in the slip joints will provide sufficient force (approximately 142 lb.) to move the sliding span along with the adjoining pipe during a seismic event while allowing relative thermal movements. The seismic displacements and rotations at the slip joint are negligible (displacements approximately .1 inches, rotations approximately .015 radians). Even if the friction force is inadequate to keep the sliding span moving with the adjoining pipe sections, restraining devices are provided to prevent separation of exhaust piping. The gap associated with the slip joint at both normal operating and ambient temperatures is much larger than the total relative movements of the adjacent piping. Therefore, no significant impact between the sliding span and adjacent piping will occur.

III. RESULTS AND CONCLUSIONS

Based on this evaluation (Reference No. 2), the exhaust manifold piping has been found to be acceptable without modification. All stress levels remain well below code allowables (maximum stress ratio of approximately 0.4). Nozzle loads are not significantly increased from those approved in the original calculation. Relative movements at the slip joints are very small and the restraining devices are adequate to prevent any lock up or separation of the exhaust piping.

The exhaust manifold piping as designed and installed by Transamerica Delaval, Inc. is adequate to perform its intended design function.

FIGURE 1
EXHAUST MANIFOLD PIPING

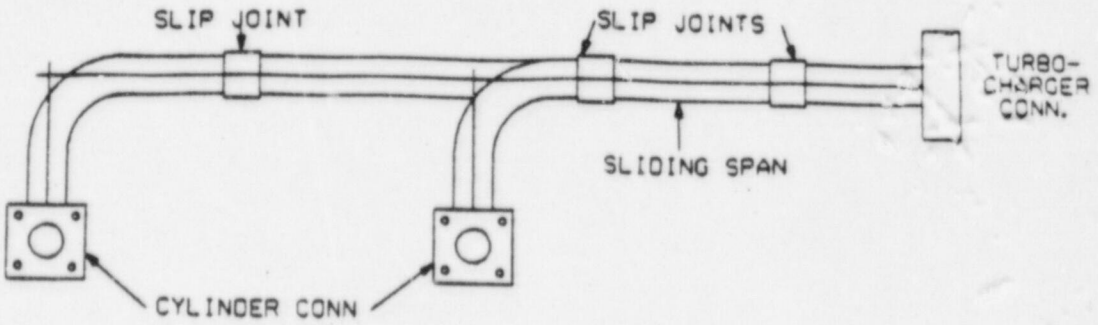
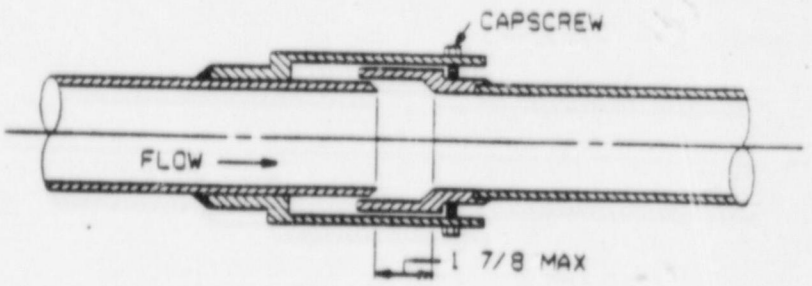


FIGURE 2
SLIP JOINT CONFIGURATION



IV. REFERENCES

1. "Supporting Calculations for the Evaluation of Comanche Peak Diesel Generator Large Diameter Piping and Supports," Impell Report No. 02-0630-1230, Rev. 0, August, 1984. Calculation No. CP-EM-001.

2. "Qualification of the Diesel Generator Exhaust Manifold Assembly," Duke Power Company, Calculation No. CNC-1206.02-50-0001, Rev. 0.

3. "Supporting Calculations for the Evaluation of Catawba Generator Skid Mounted Large Diameter Piping and Supports," Impell Report No. 02-0630-1251, Rev. 0, September, 1984. Calculation No. CA-EM-001.

4. "Supporting Calculations for the Evaluation of Vogtle Generator Skid Mounted Large Diameter Piping and Supports," Impell Report No. 02-0630-1301, Rev. 0, December, 1984. Calculation No. VO-EM-001. 1