

INTERIM REPORT

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LO-87-79-129

February 28, 1980

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Report No. RE-A-79-149

USNRC-P-394

SEISMIC ANALYSIS OF THE LOFT FP<sup>3</sup>TE  
COOLED ENCLOSURE BOX

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LOFT TECHNICAL REPORT  
LOFT PROGRAM

FORM EG&G 229  
(Rev. 10-79)

TITLE SEISMIC ANALYSIS OF THE LOFT FP <sup>3</sup> TE COOLED ENCLOSURE BOX					REPORT NO. LO-87-79-129
					RE-A-79-149
AUTHOR D. P. Finicle				Charge Number	
PERFORMING ORGANIZATION Applied Mechanics Branch				DATE RELEASED BY LOFT CDCS February 28, 1980	
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ABSTRACT

The FP<sup>3</sup>TE cooled enclosure box, which is located on the top level of the MTA Dolley, has been analyzed for SSE seismic loading. The enclosure box is a factory item that houses some instrumentation. A static equivalent seismic analysis in accordance with RDT F9-2, Ref. 1, was performed on the supports for the box. Per B. Boring of LOFT, only the foundation bolts and the box bottom needed to be analyzed.

The analysis showed the design shown on Ref. 2 and Ref. 3, was not structurally adequate. The 1/2-inch bolts that attach the enclosure box to the MTA overstressed the 14 gauge bottom of the box. By placing a 16-inch x 16-inch .25-inch thick steel plate on the inside of the enclosure and bolting through this plate, the configuration is structurally adequate. The stress level in the base plate and the bolts is low.

DISPOSITION OF RECOMMENDATIONS

For Disposition of Recommendations see R-5411.

NRC Research and Technical  
Assistance Report

## REFERENCES

1. RDT F9-2, "Seismic Requirements for Design of Nuclear Power Plants and Nuclear Test Facilities", January 1974.
2. EG&G Drawing, "FP<sup>3</sup>TE Cooled Enclosure Box", Drawing No. 210239, November 7, 1979.
3. EG&G Drawing, "FP<sup>3</sup>TE Cooled Enclosure Installation", Drawing No. 210240, November 15, 1979.

APPENDIX A

SEISMIC ANALYSIS CALCULATIONS

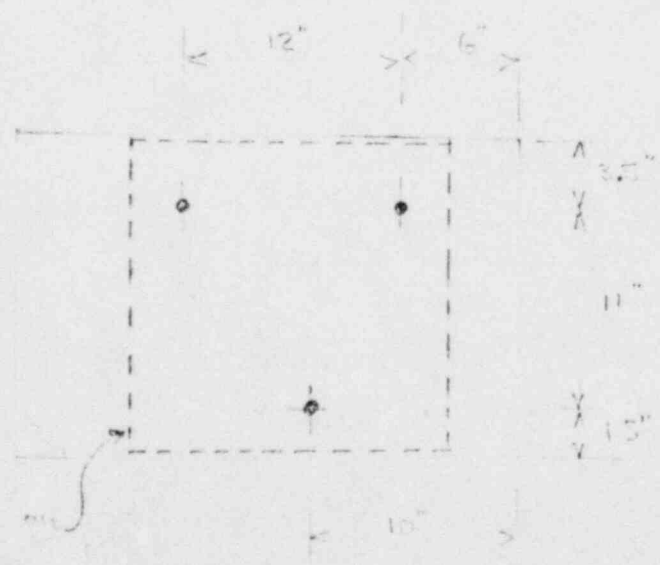
**CALCULATION WORK SHEET**

Page 1 of        Pages  
 Subject Stress Analysis of FPTE Cover Enclosure Date         
 Prepared By D. Field Checked        Work Request       

The FPTE Enclosure box is a welded box made up of steel plate. The thickness is a design item and is assumed adequate, per P. J. Bond. The stress analysis, as required, will be done only on the webplate.

The box is attached to the MTA with 4 lugs  $\frac{1}{2}$ "-13UNC-2B-304SS arranged as shown below

- 1) A-36 STEEL
- 2) 10" dia. 3" thick 12" } from 4" size
- 3) 11 gauge



Explained on  
Pg 3



### CALCULATION WORK SHEET

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 Subject \_\_\_\_\_ Date \_\_\_\_\_  
 Prepared By D. P. [unclear] Checked \_\_\_\_\_ Work Request \_\_\_\_\_

A static equivalent dynamic analysis is performed in the PBT PA-2 with the following data:

12 times the peak of the spectra will be used as the acceleration.

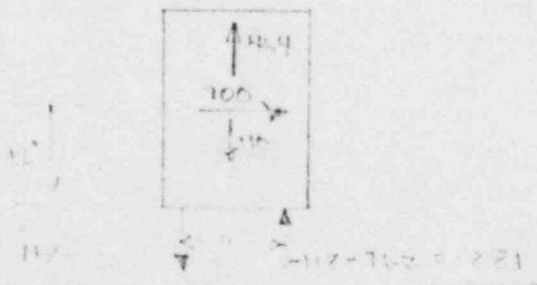
At the 300 cps the constants = 70 + 40 = 110 per H. Kline

using 5% Damping for SEA =  $\omega = 17.4/\text{sec}$

$$F_{max} = 12 \left( \frac{W}{g} \right) \omega^2 = \frac{110}{32.2} (17) 12 = 700\# = \text{Functional}$$

per PBT PA-2 ref 1.

$$F_{PBT} = \frac{5}{8} (700) = 437\#$$



Max. Reaction Force = 221#

Stress in  $\frac{1}{2}$   $\Phi$  pins  $A = .148 \text{ in}^2$

$$S_s = \frac{221}{.148} = 1493 \text{ psi}$$

**CALCULATION WORK SHEET**

Page \_\_\_\_\_ of \_\_\_\_\_ Pages  
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 Prepared By \_\_\_\_\_ Checked \_\_\_\_\_ Work Request \_\_\_\_\_

*Washer for use in the test fixture. Dimensions are as follows:*

*check size for 14 gauge steel*

*The 1/2" hole is centered on the 1" diameter of the hole of the hole. 1/2" and 3/8" from the edge.*

*14 gauge. t = .075"*

*from book, the yield strength is 36,000 psi*

$$V_u = \sigma_y \left( \frac{1}{2} \pi t^2 \right) = 36000 \left( \frac{1}{2} \pi (.075)^2 \right) = 2114.781 \text{ lbs}$$

*Check Tearout*

*O.D. of washer = 1.75"*

$$V = \frac{1}{2} (\pi \times 36000) \times (1.0625 \times .075) = 4500 \text{ lbs}$$

*The configuration as originally drawn is not structurally adequate.*

*Mr. H. Kline, a .25" R will be placed in the bottom of the hole to reinforce it. The area over which the reinforcement plate covers is shown in dotted lines on page 1.*

*The collapse load on the .25" R will be*

$$V_u = \sigma_y \left( \frac{1}{2} \pi t^2 \right) = 36000 \left( \frac{1}{2} \pi (.25)^2 \right) = 2827.433 \text{ lbs}$$





### CALCULATION WORK SHEET

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F.S. on Collapse =  $\frac{3081}{221} = 4.0$

The 25" is structurally adequate