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TNX-2

FINAL DETERMINATION  
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L. M. Redman  
JAN 14, 1981

PROJECT \_\_\_\_\_

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COPY # 5: **OSTI**

*H. L. Anderson*

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**JUN 18 1998**  
WITH ATTACHMENTS/ENCL

Date OCTOBER 30, 1943

Subject REPORT SEPTEMBER 22 TO OCTOBER 30, 1943

By H. L. ANDERSON

To A. H. COMPTON

Before reading this document, sign and date below

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J.A. B... OS-6 TSM 12/1/93

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OS-6 *[Handwritten initials]* 12/1/93

October 30, 1943

- TNX

Dr. A. H. Compton  
P. O. Box 5434  
Chicago 80, Illinois

1981

Dear Dr. Compton:

REPORT SEPTEMBER 22 TO OCTOBER 30, 1943

Safety & Control Rods

Round and cross drop safety rods are being constructed by the Wilmington Shops so that the reliability of the design can be gauged by actual test. Liquid safties are being discussed. A control rod is also being constructed. The design is such that either boron or cadmium coating could be used. Boron aluminum flame spray is being experimented with and shows promise. Cadmium will be used if calculations show that heating of graphite by the capture of gamma rays is not excessive. Measurements of the absorption coefficient of these gamma rays in graphite are being carried out at Argonne.

Jacketing

Jacketing of the slugs is still the most uncertain feature of the design. Present trend is toward a double Zn-Sn bonded, double jacketed slug with fusion weld closure on outer jacket with the argon shielded tungsten arc. Such jacketed slugs will be made as soon as possible. W size cans are not yet available in sufficient quantity to permit experimental work to proceed rapidly. Doubts about the design--will the bond stick all over? If it doesn't, there may be a hot spot, the bond may melt and alloy with either Al or U with consequent swelling. To some extent this depends on how closely the tolerances on the extruded cans can be met in practice. If a reliable weld can be made with the thicker jackets, it may be possible to use a single jacketed unbonded slug.

Graphite Piling

My memorandum to Greenwalt of October 14 pointed out some dangers of parallel piling due to the statistics of machining tolerances.

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H. L. Anderson to A. H. Compton

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Wheeler is carrying out more extensive calculations comparing the various piling schemes from this point of view.

Laplacian for Hanford

I have made some calculations on the value of the Laplacian for Hanford from an analysis of the West Stands experiments. West Stands experiment gave  $\Delta = 60 \times 10^{-6} \text{cm}^{-2}$ . The W lattice with the same graphite purged of nitrogen and with the .045" double jacketed, double bonded slugs,  $\Delta = 49 \times 10^{-6} \text{cm}^{-2}$ . Required  $\Delta$  for 1500 tube pile is  $40 \times 10^{-6} \text{cm}^{-2}$  and for 2004 tube pile  $35 \times 10^{-6} \text{cm}^{-2}$ . According to chemical analysis data MUC-GE3-371, use of 1.61 density Gulf Cleves graphite will increase the Laplacian by  $10 \times 10^{-6} \text{cm}^{-2}$ ; 1.70 density Kendall increases the Laplacian by  $18 \times 10^{-6} \text{cm}^{-2}$ . Using Gulf Cleves throughout, this means that  $24 \times 10^{-6} \text{cm}^{-2}$  is available to take care of thimbles, temperature effect, and poisoning. A lower value of the migration length 560 instead of 640 was used in these calculations as giving better agreement with West Stands experiments and present cross-section data. This is not a large safety margin. Trimming .010" off the jackets and using improved pitch in the graphite will help this situation.

Very truly yours,

*H. L. Anderson*

H. L. ANDERSON

- CC:2- E. Fermi
- 3- S. K. Allison
- 4- C. H. Greenevald
- 5- H. L. Anderson

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