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CLINTON LABORATORIES

CENTRAL FILES NUMBER

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PROJECT

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FILE #2

Date JANUARY 30, 1943

Subject LETTER TO A. H. COMPTON INCLUDING LETTER OF C. H. GREENEWALT OF JAN. 28, 1943

By MARTIN D. WHITAKER

To A. H. COMPTON

Before reading this document, sign and date below

Name	Date	Name	Date

CLASSIFICATION CANCELLED
SEP 16 1963
For the Atomic Energy Commission
RAYMOND A. CARPENTER Ca
for the
Chief, Declassification Branch

[redacted]

MDW-#2

This document consists of 1 page and 0 figures.
Copy 2 of 2 copies, Series A

January 30, 1943

A. H. Compton

M. D. Whitaker

[redacted]

43-1-12

I am enclosing a copy of a letter received from Mr. Greenewalt in which he asks for certain information concerning the Pile to be built at Site "X". He wants this information for the du Pont files so that they can, at any time, show the basis used for the design and construction of this Pile.

I hope it will be possible for the Laboratory to prepare a letter for your signature covering the requests made in Mr. Greenewalt's letter. In addition to the information asked in this letter, there should be included in the Laboratory analysis of this problem the diffusion length of the graphite and the purity of the metal which has been assumed for the calculation. As a matter of fact, since the main problem here is one of deciding on Pile size, it seems to me that we must specify just what graphite is to be in the Pile before we can get this essential data on the Pile size. I understand from your recent telephone conversation that this Pile at "X" is to be constructed from the following graphites:

1. 225 tons of AGOT graphite from the present West Stands Pile.
2. 357 tons of National Graphite, still to be delivered.
3. 100 tons of Speer Graphite.

If my understanding is correct, then, the only unknown in the graphite picture is whether or not all of the 357 tons still to be shipped from the National Carbon Company will be of the AGOT grade.

The Pile size should be calculated with the expectation that the structure specified will have an excess k of the order of .8 to 1%.

It has been assumed in Mr. Greenewalt's letter that the Pile to be constructed at Site "X" will have a uniform size rod throughout the Pile and that the air ducts through the Pile will be of uniform size. May I point out the possibility of economizing on metal by putting somewhat heavier rods in the center of the Pile than in the outer regions of the Pile. This arrangement would complicate to a certain extent the unloading of the activated material from the Pile. Your reaction to this possible modification should, perhaps, be put on the records. A somewhat less impressive economy might be achieved by having smaller sized ducts in the outer portion of the Pile. This would complicate the construction of the Pile to a certain extent.

Sincerely yours,

Martin D. Whitaker

This document contains information affecting the national defense of the United States within the meaning of the Espionage Act, U. S. C. 50:31 and 32. Its transmission or the revelation of its contents in any manner to an unauthorized person is prohibited.

CLASSIFICATION CANCELLED
DATE SEP 16 1963
For the Atomic Energy Commission
RAYMOND A. CARPENTER

MDW/er

This document consists of 2 pages and 0 figures. Copy 1 of 1 copy, Series B

MUC*MDW#4

[redacted]

January 28, 1943

Mr. M. D. Whitaker (2)
Metallurgical Laboratory
University of Chicago
Chicago, Illinois

Dear Mr. Whitaker:

Will you kindly obtain for us the following information pertaining to the Site X pile: (a) pile dimensions, (b) reflector dimensions, (c) metal requirements, and (d) number of channels. Your calculations should be based on the following assumptions:

1. An 8" lattice spacing.

2. 1.1" Diameter rods (finished and uncoated dimensions). Rods to be 4" long without spacers and with the ends chamfered. Assume (a) the rods extending through pile and through reflectors on the discharge side, and (b) rods extending through pile only.

3. The rods will rest in a square channel in the graphite 1.75" on the side (or the equivalent cross-section).

4. The maximum metal surface temperature at any point in the pile will be (a) 100°C., (b) 200°C., and (c) 300°C.

5. The metal is to be coated, probably with one of the following four materials: zinc; a flash coat of zinc with a terneplate (90% Pb, 10% Sn) top coat; speculum metal (65% Cu, 32% Sn, 3% Ni); aluminum. We are at present unable to select the final coating which will be applied and we would suggest that you assume that the coating thickness will be such as to reduce the multiplication factor by 0.5%. Will you please advise us how thick the coatings will be for each of the four coatings indicated above for a 0.5% reduction in K.

6. We are proposing to use air as the cooling medium. Two cases have been considered corresponding to maximum metal temperatures in the pile of 100°C. and 200°C. These would result, respectively, in air pressures on the inlet side of the pile of 3.5 lb./sq.in. below atmospheric and 10" of water below atmospheric. The pressure on the discharge side of the pile will be substantially atmospheric in both cases.

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7. Please indicate also the number and type of control rods to be used in controlling the pile and their preferred location in the pile.

We understand from Coryell's data that a substantial percentage of the fission activity will be released in the air used as the cooling medium. As we understand it, a certain percentage of this fission activity will deposit in the pile, in the fans, and in the stack. We would appreciate your estimates of (a) the total amount of fission activity released into the cooling air for 50 kw. and 1,000 kw. power outputs in the pile, (b) the percentage of this fission activity which will be deposited in the pile and in the fans and stack, and (c) the amount of fission activity which will be released at the top of the stack. Please also estimate for us the shielding which will be required for the fans and stack and the radiation intensity at the base of a 100 ft. stack calculated in R units per day. For the above computations assume that the metal will not be coated. Shielding may be calculated on the assumption that the concrete will contain 10% water.

Very truly yours,

C. H. Greenewalt
Technical Director

CHG:NBS
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