N-244 MUC-NS#100

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THE UNIVERSITY OF CHICAGO

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Date November 12, 1943

To E. Fermi
From N. Sugarman

Department - Physics
Department - Chemistry Section C-III

In Re:

Following are the preliminary data obtained by Mr. Donald Engelkemeir on the heat generated per fission at the Argonne pile. The two values reported are 213 MEV/fission observed on the first egg, and 182 MEV/fission observed on the second egg. We have given the raw data so that the precision of the chemical operations can be noted. It is our belief that the discrepancy between the two values observed is far out of the range of the chemical error.

The number of fission per c/m of 125d Ba on a given shelf (~30% geometry, corrections for variations in geometry made by means of an arbitrary standard) was determined in previous work at the pile on the fission yield of the 12.5d Ba.

fissions/c/m of Ba = 1.607×10^6

Egg #1

Four series of determinations of four samples each were made of the c/m of Ba per g. of U. The average value for each series is given below:

#1	1.93×10^5	c/m of Ba/g.U
#2	1.91×10^5	
#3	1.96×10^5	
#4	2.06×10^5	
ave. =	1.96×10^5	c/m of Ba/g.U

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BY AUTHORITY OF: TID 116
BY: H. Stokes

fissions/g.U = $1.96 \times 1.607 \times 10^{11} = 3.15 \times 10^{11}$

calories liberated in 1 min. iradiation = 8050 cal.
wt. of egg = 3147 g.

$$\text{MEV/g.U} = \frac{8050 \times 2.634 \times 10^{13}}{3147} = 6.72 \times 10^{13}$$

$$\text{MEV/fission} = \frac{6.72 \times 10^{13}}{3.15 \times 10^{11}} = 213$$

Egg #2

Six samples were taken for this egg. One determination was rejected.

#1	3.62×10^5	c/m of Ba/g.U
#2	3.64×10^5	- rejected
#3	3.66×10^5	
#4	3.61×10^5	
#5	3.58×10^5	
#6	3.58×10^5	
ave =	3.59×10^5	c/mof Ba/g.U

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E. Fermi
November 18, 1943

fissions/g.U = $3.59 \times 1.607 \times 10^{11} = 5.77 \times 10^{11}$

calories liberated in $\frac{1}{8}$ min. irradiation = 12,640 cal.

wt. of egg = 3169 g.

after removing thermocouple solder

$$\text{MEV/g.U} = \frac{12{,}640 \times 2.634 \times 10^{13}}{3169} = 1.050 \times 10^{14}$$

$$\text{MEV/fission} = \frac{1.050 \times 10^{14}}{5.77 \times 10^{11}} = 182.$$

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