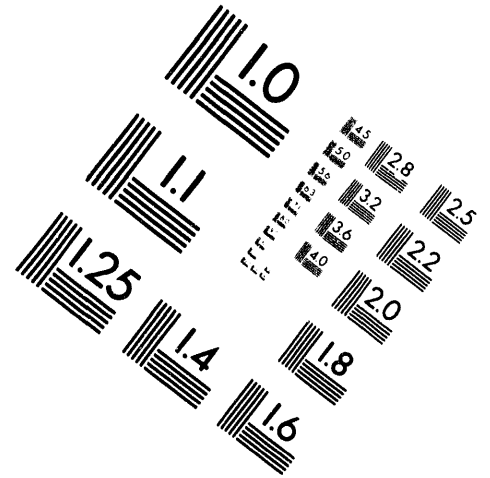
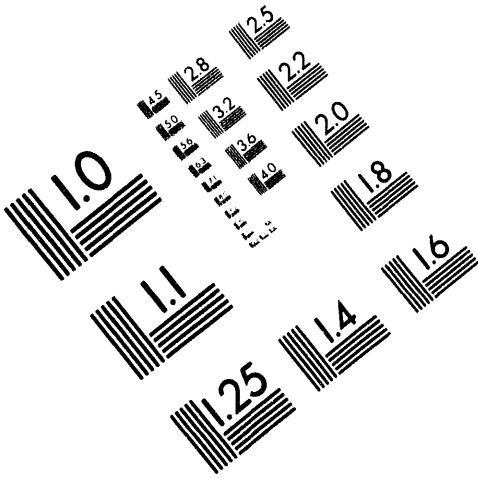




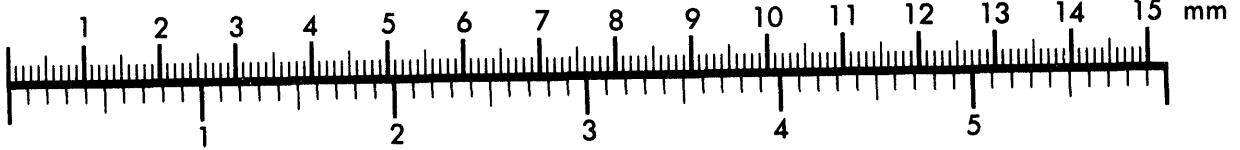
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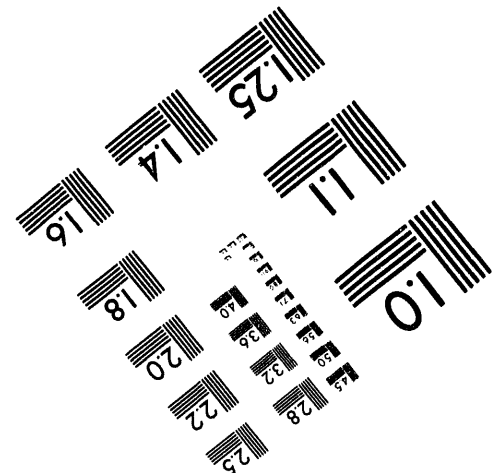
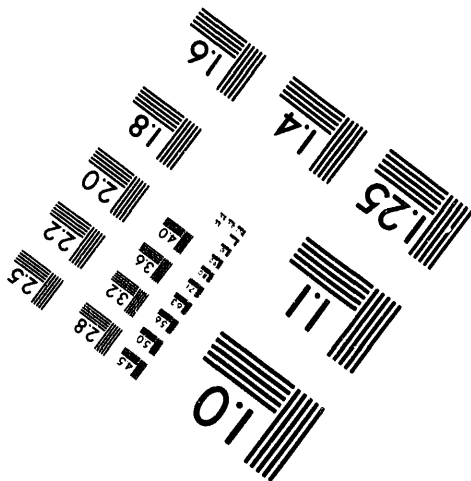
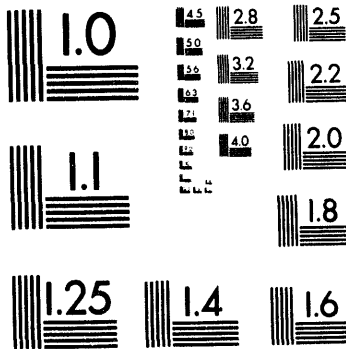
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Author: W. E. Jordan

July 12, 1946

100 AREAS

July 2 through July 8
 (For Technical Progress Letter No. 105)



Physics

D File

The D Pile was shut down for a period of about 25 hours on July 2. During the discharge of a tube in Row 46, ten active pieces became lodged on the I beam under the discharge elevator. Two lead, six perforated aluminum, and two regular metal pieces were involved. Time consumed in removing these pieces made it necessary to omit from discharging 14 of the 50 tubes scheduled for discharge in order to operate without the addition of temporary poison columns after the shutdown. It was necessary to operate at not more than 10 MW below rated level for about two hours because of graphite temperatures. During the remainder of the period the pile operated at rated level.

Two special samples were charged into the pile. Special Request 19 (mercuric sulfide) was charged into Tube 1666, and Special Request 25-1 (beryllium nitride) was charged into Tube 2P78. Both samples consisted of a single unit and were centered in the tube by means of jacketed lead pieces. The effective poisoning value of the two special columns was estimated at 11 inhours. Observations of the effect of the charges are given below:

Amount in rods at shutdown	51 inhours
Loss by 1.7% discharge	-1 inhour
Loss due to metal quality	-1 inhour
Long term gains in 4 days	4 inhours
Reactivity for no poison change	53 inhours
Observed reactivity	40 inhours
Effectiveness of special columns	13 inhours

MASTER

The agreement is considered good.

Further study of the coefficient test performed on July 1 has led to a slight revision of some of the results. It has not been possible to arrive at a satisfactory interpretation of the data obtained after the return to rated operation, but the following results were derived from the operation at reduced level:

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Overall power coefficient, C_0	0.34 ih/MW
Metal power coefficient, C_M	-0.26 ih/MW
Graphite power coefficient, C_G	0.60 ih/MW
Graphite relaxation period	60 minutes

These results are in only fair agreement with previous coefficient measurements. The direction and rate of coefficient change will be studied further.

F Pile

With the exception of a scheduled shutdown on July 3, the unit was operated throughout the week at 50 MW below rated level.

During the shutdown Tube 2363, which contained special cast pieces, was discharged and reloaded with regular metal.

One section of the graphite recently removed from D experimental hole was shipped on July 8.

The reactivity of the unit has been increasing at the rate of 1 ih per operating day during the past week.

General

Attempts to initiate a self-propagating wave in graphite of high stored energy content (407 Mw-days/CT material containing 84 cal/gm. by the Sykes method) have so far been unsuccessful. Further work is in progress.

The annealing of parallel-cut graphite of 836 Mw-days/CT exposure at successively higher temperatures, holding each temperature for five days, has produced the following recoveries in the thermal conductivity and electrical resistivity effects.

Annealing temperature, °C	100	150	200	400
Percent Recovery in thermal conductivity effect	0	17.6	26.7	36.1
Percent Recovery in electrical resistivity effect	2.6	8.5	11.5	11.5

Water, Corrosion and Engineering

Process Water Control and Pressure Drop Studies

The iron content of the process water averaged 0.034, 0.007 and 0.009 ppm at B, D and F Areas, respectively. These values are about the same as they have been for the past few weeks.

The rates of pressure drop increase for D and F Areas were 0.22 and 0.20 lbs./ (sq.in.)(day), respectively.

Corrosion

The cast material previously charged into Tube 2363 at F was discharged on July 3. This material will be examined for blisters and corrosion. Corrosion Tube 2874 was discharged at D on June 25. Slugs from this tube are now being examined. No unusual corrosion has been noted so far.

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Graphite Expansion

Tube 4674 at D was traversed for vertical bowing on July 2. The maximum displacement observed was 2-3/32 inches, representing an increase of 3/32 inch since the previous traverse on May 21.

Considering the present measured length of the tubes, the present measured available movement of tube and gunbarrel, the initial measured thickness of the graphite, and the maximum variation in gunbarrel length, the increase in graphite thickness appears to be as follows:

<u>B Pile Tube Number</u>	<u>Graphite Growth in 1/32 inch</u>
0756	6 to 12
0278	5 " 11
0791	9 " 15
1476	20 " 26
2552	15 " 21
2574	18 " 24
2595	19 " 25
4066	13 " 19
4574	20 " 26
4091	14 " 20

It will be noted that the "flattened" portion has grown as anticipated, but also that the top layers have been carried out appreciably more than the bottom layers. Calculation based on the measured expansion of graphite exposed in the test holes indicated that expansion along the center tube would be about 33/32 inches as compared to the 19 to 26 thirty-seconds inch observed. The difference possibly may still be accounted for as closing up of the initial clearances between blocks.

Similar data are to be obtained on the front to rear expansion of graphite for the D Pile so that this variable can be followed in the future.

The data presented in Technical Progress Letter #103 two weeks ago on gunbarrel clearances at B Area were further expanded to tie in with the critical measurements of graphite thickness made during construction of the piles. Construction measurements of graphite thickness from front keyway to rear keyway were made at the center, near and far side for each layer containing aluminum process tubes.

Construction measurements of the actual length from Van Stone to Van Stone of 40 tubes in D unit are available, but actual initial measurements at B and F were not taken. However, the measurements reported two weeks ago for the ten unplaced tubes measured showed them to vary between + 5/64 and -7/64 inch of standard, and the distribution of the variations was such as to indicate that there had been no detectable stretching or growth of the tubes.

Construction records of initial gunbarrel length indicate that all were within 1/64 inch of nominal length before refacing. However, it appears that all gunbarrels for D Area and an appreciable number at B and F Areas were refaced. No record was kept of the actual gunbarrels refaced, but the tolerance was that no gunbarrel could be shortened more than 3/32 inches.

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