

Cleveland, Ohio
March 9, 1955

MEMORANDUM to the Director

Subject: Performance demonstration of the cyclotron by the G. E. Company
on March 1 to 5, 1955

1. Four separate runs were made and the following outputs were observed:

Run number	Date	Duration, hours	Output micro-amperes	Mean energy Mev
1	3/1/55	4 $\frac{1}{4}$	131.7	21.5
2	3/2/55	10	140.5	19.8
3	3/3/55	12 $\frac{1}{4}$		
4	3/4/55	9 $\frac{1}{2}$		

2. All runs except number 2 went through without interruption. Run number 2 had a 1 hour shut down due to the test set-up failure and a half hour due to septum over heating. These times are already subtracted giving the 10 hours shown above.

3. The current density was measured from run number 1. It was found that 4.32 percent of the beam fell within the $\frac{1}{2}$ x 2 cm area specified. This results in 5.70 μ A in run 1 and 6.06 μ A in runs 2, 3, and 4 falling in the above area compared to the lower limit in the specification of 40 μ A. The difference between runs was due to different average beam currents during runs.

4. Physical inspection of the cyclotron after both run 1 and run 4 show no obvious damage to the cyclotron from running at these levels.

5. Runs 2, 3, and 4 were not run continuously into one run due to filament burn-out. This sets a limit of about 12 hours to any single run made on the machine as it now stands at this current. Filament change cannot safely be made after a run of several hours at these currents without waiting about 12 hours for the radioactivity to decay to a safer level.

6. In Mr. Culler's letter of the first of March 1955, he encloses a description of performance tests. NACA has agreed in general to these tests but not to several specific points written in them. In I.C. for instance, J should be the current falling in a square centimeter and not the maximum density in one square centimeter. Also, we never agreed that as again in I.C., a run interrupted by shutdown to change such things as filaments would be considered a continuous run. This long run was to show that the cyclotron would operate continuously for a single run giving the same

Associate Director

- 2--

March 9, 1955

total current-hours in one square centimeter as originally stated in the specifications. Runs 2, 3, and 4 total $31\frac{3}{4}$ hours compared to the single run of 26.4 hours which would be required.

Royal N. Schweiger

Royal N. Schweiger
Electrical Research Engineer

BP *R.P.*
SLS *B*
RNS:sjt

Cleveland, Ohio
March 11, 1955

MEMORANDUM for the Director

Subject: 60" cyclotron. Information requested on March 10, 1955

1. General Electric's letter of the 15 of November, 1954 neglects the important specification of current density in the cyclotron performance. It also misrepresents many facts regarding other cyclotrons and attempts to tell us what we want and are capable of using.
2. Results of cyclotron performance demonstration of March 1 to 5, 1955. Currents of about 140 microamperes were shown compared to our spec of 200 microamps. Only 6 microamps fell in one square centimeter instead of 40 which is called for in our contract. Since the time must be increased to make up for a lower current density, a 26 hour run would be required. The longest single run G. E. ran was 12 $\frac{1}{4}$ hours which was limited due to the life of the filament in the cyclotron.
3. G. E. has removed several men from the job and does not indicate any further work to increase the cyclotron output.
4. A new set of dees have been built and delivered to the site, however, G. E. has decided not to put them on to try them for better output.
5. Dr. W. Salisbury formerly of Collins Radio, involved in both the Brookhaven and Argonne National Laboratories cyclotrons, made an offer to G. E. for a price to make the NACA cyclotron meet specifications. They refused him. Dr. Salisbury has also contacted the writer with a similar idea for NACA.
6. The G. E. people have indicated that they have many ideas by which they could increase the density and the total current. They have indicated that for financial reasons they have decided to try to stop now rather than risk sizable expenditures on new ideas.

Royal N. Schweiger

Royal N. Schweiger
Electrical Research Engineer

BP
SLS
RMS:sjt

SS/MS

GE CYCLOTRON
Contract NA3-545

	<u>Date</u>	<u>Complete</u>	<u>Amount</u>	<u>Total</u>
Fabricate and Deliver Cyclotron	1/29/48	1/28/50	\$715,000.00	\$715,000.00
Amend. No. 1 - 5% Price Esc.	11/2/48		35,750.00	750,750.00
Amend. No. 2 - 7 $\frac{1}{2}$ % " "	2/9/49		17,875.00	768,625.00
Amend. No. 3 Install cyclotron magnet Frame - Furn. plans and specs. for complete install.	2/18/49		30,818.00	799,443.00
Amend. No. 4 Complete installation	1/28/49		94,624.00	894,067.00-current 209,337.64 total <u>684,729.36</u>

Payments -

No. 1	8/30/49	257,560. ⁸⁸
No. 2	10/12/49	16,666.20
No. 3	11/17/49	161,993.08
No. 4	6/22/50	163,788.21
No. 5	6/15/51	84,720.99

684,729.36

Still Due -

(185,282.83 (Fab. and Deliver)
(24,054.81 (Installation)

209,337.64

Have no unpaid invoices.

\$ 894,067.00

Bar + 7