

C O P Y

OAK RIDGE NATIONAL LABORATORY
 CARBIDE AND CARBON CHEMICALS COMPANY

Post Office Box P
 Oak Ridge, Tenn.

December 1, 1953

Dr. Charles E. Crompton
 Chief, Radioisotopes Branch
 Isotope Division, A.E.C.
 Oak Ridge, Tennessee

Dear Sir:

In accordance with our discussion of November 25, 1953, we have prepared a few comments which further outline our position with regard to the use of the 86-inch cyclotron by offsite groups.

It is our opinion that the 86-inch cyclotron bombardments should be made available to outside users when it can offer a unique service because of its one milliamper proton beam at an energy of 22 Mev, and in those cases where its proximity to the user will substantially reduce decay losses. In other situations we believe that the use of the university cyclotrons should be encouraged.

It is our plan that the division should be reimbursed for the actual cost (including overhead) of such bombardments. These costs are as follows: \$50 per hour for innage time (the length of time the beam is on the target); \$50 service charge for installing and removing the target; and the cost of the target.

At present, the Electronuclear Research Division maintains, in addition to its rather comprehensive nuclear physics program, a small program which is concerned primarily with developing new uses for the cyclotron. At present, this program includes Be 7 production for the Radioisotope Sales Department of ORNL, service irradiations for the ORINS Medical Division for the production of Ga 67, and service irradiations for the ORNL Biology Division. Occasional service irradiations are made for the Physics and Chemistry Divisions. In addition to the time used by the above programs, a few hours can be made available to outside customers, the exact amount being dependent on the needs of our established programs. Because of the variation in available time, the responsibility for the approval and scheduling of bombardments is left with the 86-inch cyclotron staff.

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RSL:JAM:mvj

Very truly yours,

/s/ Robert S. Livingston

Robert S. Livingston

Director

Electronuclear Research Division

C O P Y

[1953, Dec. 7-8]

AEC CYCLOTRON PROGRAM

In March 1949 the Commission approved a staff recommendation for the undertaking of a program for the distribution of cyclotron-produced isotopes within the framework of the AEC's isotope distribution program. Impetus for presentation of this recommendation to the Commission was given by a proposal from the Committee on Nuclear Science, National Research Council.

The program initially was limited to the distribution of a few processed radioisotopes which either cannot be produced by nuclear reactors or could not be prepared to meet activity specifications obligatory for a number of scientific applications. These isotopes were Beryllium 7, Sodium 22, Arsenic 73,74, Iron 59 (free of Fe 55), Zinc 65 (high specific activity) and Iodine 125. Later the program also included procurement of unprocessed targets bombarded in a cyclotron.

Individual institutions which operated cyclotrons were unwilling to make the materials generally available because (1) they had no administrative facilities for handling packaging and sales, (2) they were engaged primarily in research and did not wish to become production units, and (3) prices of the isotopes which reflected full production costs would be exorbitant. However, several institutions expressed willingness to furnish bombardment time if facilities such as those operated by the AEC would process the targets and sell the materials.

Arrangements were therefore concluded with the following groups to buy cyclotron time as needed:

- Radiation Laboratory, University of California \$12,800
- University of Pittsburgh \$18,300
- University of Washington, St. Louis \$840
- Massachusetts Institute of Technology \$900

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of UCRL
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Materials were to be furnished customers at 33 1/3% of cost of production; the AEC furnished the difference between income received and costs.

Several factors have arisen which now make it advisable to review the program at this time.

(1) Commission owned and operated cyclotrons, viz. 86" at ORNL (protons only), 60" at BNL, and 60" at ANL can be used. The beam strengths are such that yields are greater and entire production and processing costs of a few isotopes can be recovered at present prices. Be 7 is made exclusively at ORNL and Na 22 could be so produced.

(2) Acceptable concentration values for human intake of some of the isotopes, viz. Fe 55 in Iron 59, have been raised so that reactor-produced material is satisfactory. Use of higher flux reactors produces materials with higher specific activities, viz. Zn 65.

(3) Although the cyclotron program has been a small one, it represents a sizable net loss which must be borne by other income. A table showing revenues and costs (including ORNL processing and distribution) follows:

FY	Costs	Revenue
1951	\$ 35,933	\$ 10,804
1952	79,312	24,568
1953	104,066*	48,115*

* Note: Of the FY 1953 expenditures, \$33,070 involved radioisotopes produced or service bombardments on the ORNL 86" cyclotron, with costs and income approximately equal. The cost and income on items produced in other cyclotrons were \$70,996 and \$14,944 respectively, or a net deficit of \$56,052. The income for the latter materials recovered only 23% of costs.

(4) Yields of some of the isotopes, viz. As 73,74, are lower than anticipated and processing costs higher, with the result that established prices do not recover 33 1/3% of their overall costs. Therefore, to recover costs it would be necessary (a) to raise prices of these materials, (b) to work out more economical production processes, or (c) to remove these isotopes from the list of available materials.

(5) Only two isotopes, Be 7 and Na 22, have been widely used. Authorizations of these two materials constitute 79% of the program.

Therefore, it would appear that the present cyclotron program could be modified to utilize Commission cyclotrons and to reduce the 66 2/3% or greater subsidy heretofore furnished by the AEC. Use of Commission cyclotrons would not decrease availability or increase prices of materials, yet costs of production could be more nearly recovered. Participating groups in the ANL and BNL programs might obtain special bombardments in the respective cyclotrons, in a manner similar to arrangements now in existence for service irradiations in the nuclear reactors.