

### *Budget Cuts Limit Operation of Calutrons*

## SUPPLY OF STABLE ISOTOPES FROM OAK RIDGE AFFECTS RADIOPHARMACEUTICAL PRODUCTION

The supply of highly enriched stable isotopes from the Oak Ridge National Laboratory (ORNL) in Tennessee has a direct effect on the production of radionuclides used in medicine. At present, the ORNL Electro-Magnetic Isotope Enrichment Facility (EMIEF) has its calutrons operating at 25% of its previous output level, "a production rate that is much less than the depletion rate," according to Richard C. Reba, MD, director of the Nuclear Medicine Division at the George Washington University Hospital in Washington, DC.

The calutrons (short for California

University cyclotrons) are electromagnetic separators built during World War II to produce large amounts of isotopically pure uranium-235 for the Manhattan Project. When gaseous diffusion became the method of choice for separating uranium isotopes, the Oak Ridge calutrons carved out a niche in physical science and biomedical research by producing enriched stable isotopes.

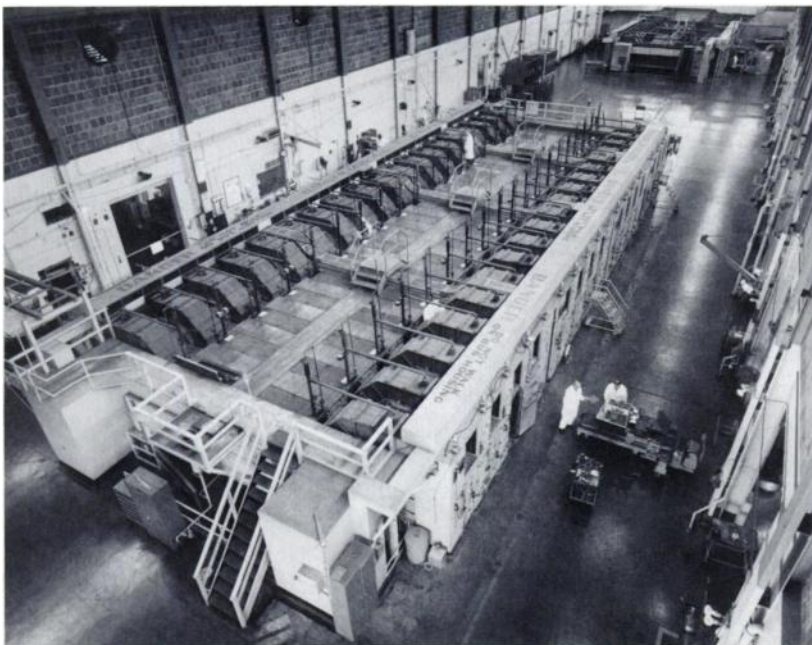
In addition to serving as medical cyclotron targets, these enriched stable isotopes are also used for ion beam research, as target material for studying nuclear reactions, and for analyzing molecular specific activi-

ty, said Keith Evans, PhD, research officer in the Chemistry and Materials Division at Chalk River Nuclear Laboratories in Ontario, Canada. Dr. Evans is also chairman of the Executive Committee of the EMIEF Users Group, formed in 1984 to provide an avenue of communication between the EMIEF administration and the community it serves.

In 1982, the EMIEF had 16 calutrons operating year-round (see *Newsline*, Sept. 1982, p. 1). Today, decreased funding from the US Department of Energy (DOE) permits only eight calutrons to operate for six months a year, reducing production levels by 75%, said Joseph A. Setaro, head of the ORNL Isotopes Section.

"If this trend continues, 69 of the total inventory of 225 isotopes will be unavailable by April of 1986, and this number will increase to 95 in 1987 and 105 by 1988," said Dr. Reba, who is also chairman of the Technical Policy Committee for the EMIEF, formed in 1982 to advise Oak Ridge on policy matters.

The EMIEF operates the only calutrons outside of the Soviet Union and supplies, for example, thallium-203, zinc-68, tellurium-124, iron-58, chromium-50 and cadmium-112—precursors available to radiopharmaceutical companies that produce thallium-201, gallium-67, iodine-123, iron-59, chromium-51, and indium-111, respectively. [The reduced operation of the EMIEF does not affect ORNL production of reactor-produced radionuclides such as yttrium-90 and gadolinium-153.]



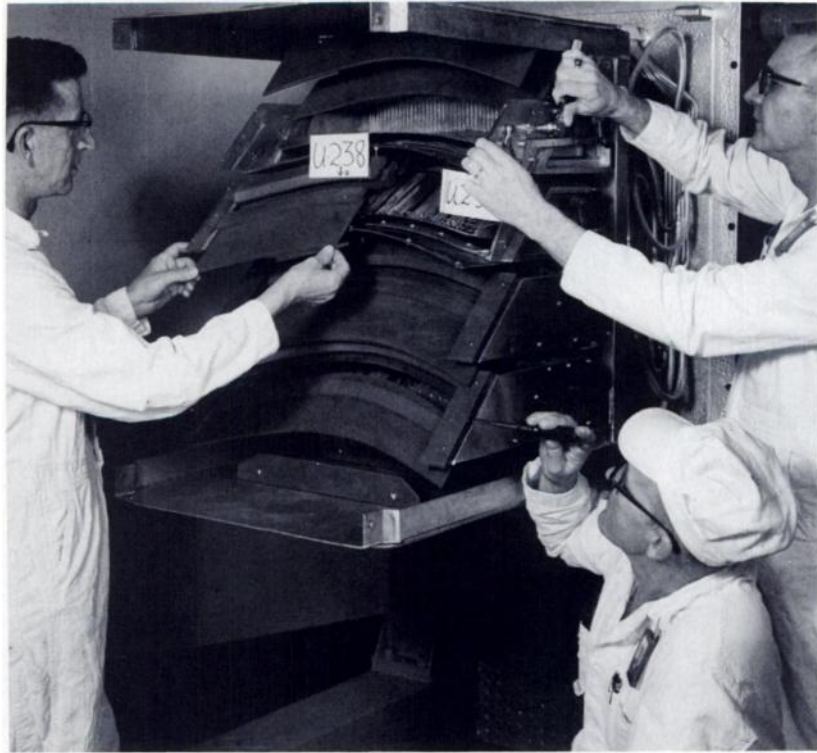
*These banks of electromagnetic separators (calutrons), operated by the Oak Ridge National Laboratory's Y-12 Plant, serve as the western world's principal source of electromagnetically enriched stable isotopes, used as targets in nuclear reactors or cyclotrons for transformation into radiochemically pure, high-specific-activity radionuclides.* (Courtesy of ORNL)

Dr. Reba has suggested that other methods of isotope enrichment might need to be explored. Medical applications are a high priority, however, with the DOE and ORNL management, he noted. [The next meeting of the EMIEF Technical Policy Committee will be held in July 1986, and Dr. Reba has invited *Newsline* readers to contact him about the agenda at: Nuclear Medicine Div., George Washington University Hospital, 901 23rd St. NW, Washington, DC 20037 (202)676-3458.]

### Not Priced for Replacement

Since ORNL is a government facility, it is not permitted to sell its products at a profit. To sell enriched stable isotopes at cost, however, means that they are sold at fixed prices based on the cost of production with no mechanism to account for the higher costs of replacement, said Mr. Setaro. "If we have an inventory of an isotope that lasts from 1965 to 1985, for example, we have to sell that isotope at the 1965 cost of production, which may be \$.50/mg, although the cost to produce that isotope in 1985 may be \$5.00/mg," he explained.

Although the scientific and medical community may not feel the effects of a shortage in enriched stable isotopes for another two or three years, some farsighted scientists are working now to avert a potential crisis. One of the EMIEF Users Group's objectives is to provide a means of incorporating the priorities of users into the EMIEF production schedule, said Richard W. Hoff, PhD, a research chemist at the Lawrence Livermore National Laboratory in California, and the first chairman of the EMIEF Users Group Executive Committee. (In addition to Drs. Evans and Hoff, the committee's members include: Martin Finlan, PhD, Amersham International, United Kingdom; Helmut Folger, Gesellschaft für Schwerionenforschung, Federal Republic of Germany; Richard F. Casten, PhD,



*During World War II, the Oak Ridge calutrons separated fissile uranium-235 from uranium-238. The uranium isotopes were retrieved in graphite receivers.*

(Courtesy of ORNL)

Brookhaven National Laboratory, Upton, NY; and John A. Harvey, PhD, Oak Ridge National Laboratory.

The EMIEF Users Group held its annual meeting on October 3, 1985, in Oak Ridge, during which Morteza Janghorbani, MD, of the Boston University School of Medicine, discussed the applications of enriched stable isotopes in medicine, and Drs. Casten and Folger spoke on the use of these isotopes in heavy ion accelerator applications.

"Right now we're in the process of collecting information from the nuclear medicine industrial community on forecasted five-year requirements for enriched stable isotopes," said Dr. Hoff. The group is also supporting efforts to obtain increased funding for the EMIEF from the DOE.

The next meeting of the EMIEF Users Group is scheduled for October 1986. [For more information, con-

tact: James Terry, PhD, EMIEF Users Group Liaison, Oak Ridge National Laboratory, Bldg. 4500N, Mail Stop I-205, Oak Ridge, TN 37831 (615)574-4169.]

ORNL is also actively seeking information from users. When Mr. Setaro became head of the Isotopes Section in June of 1985, he appointed Joe Ratledge to a newly created market planning position. Mr. Ratledge travels to scientific meetings to inquire about the needs of stable isotope and radionuclide users, and plans to attend nuclear medicine meetings this year.

The laboratory also publishes *Isotope News*, a quarterly newsletter free of charge, to keep the community informed about ORNL isotope production. [To subscribe, contact Joseph A. Setaro, Isotopes Section Head, Operations Div., Oak Ridge National Laboratory, PO Box X, Oak Ridge, TN 37831 (615)574-5903.] ■