

Cyclotron Isotope Research Center (CIRC)

A Dedicated Facility for Isotope Research, Production

Purpose:

Provide year-round radioisotopes for research and medical applications

Sponsor:

U.S. Department of Energy's Office of Nuclear Energy, Science, & Technology

Project Cost:

\$ 35.87 million over four years for construction, plus a modest increase in operational costs over present isotope program

Schedule:

With a FY03 start, the project should be completed by the end of FY06.

Features:

- 70-million-electron-volt cyclotron with four beam lines and a total beam current of 2,000 microamps
- State-of-the-art laboratories and hot-cell suites for processing radioisotopes
- Separate beam line for commercial/academic use

Partner:

New York State

Users:

Clinical nuclear medicine practitioners and basic researchers from academic institutions and industry (about 100 per year)

Other Advantages:

- Training facility for next generation of nuclear and radiochemists
- Supplemental capacity for production of commercial radioisotopes

Brookhaven National Laboratory proposes to build a new Cyclotron Isotope Research Center (CIRC) dedicated to year-round radioisotope research and production. CIRC would fulfill the urgent national need for a continuous and reliable supply of present and future radioisotopes for biomedical research and other applications, and serve as a training facility for the next generation of nuclear- and radiochemists.

National Need

Radioisotopes are at the heart of nuclear medicine, which offers safe diagnosis and/or treatment of a number of serious, life-threatening diseases, including cancer. Development of new and clinically useful radioisotopes and radiopharmaceuticals is the single most important contributor to the progress and growth of the field of nuclear medicine.

In the U.S. alone, more than 12 million nuclear medicine procedures are carried out annually (about 36,000 per day), and one out of every four hospital patients undergoes a procedure that involves the use of radioisotopes. Diagnostic imaging using techniques such as positron emission tomography (PET) and single photon emission computed tomography (SPECT) has become an indispensable tool in patient management. These techniques work without adverse effects on normal organs and without the debilitating side effects of some of the more common treatments and extended hospital stays.

In April 2000, the U.S. Department of Energy's Nuclear Energy Research Advisory Committee (NERAC) strongly recom-



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mended developing a dedicated, single mission isotope production and processing facility that would be fully operational by 2010.

Why Brookhaven?

- Brookhaven Lab has a 50-year history of radioisotope research and development; specialized facilities for the production and handling of medical isotopes; and experience in incorporating isotopes into biologically

active molecules for the diagnosis and treatment of various diseases.

- The Laboratory is strategically located in the Northeast, near large medical research institutions, universities, and major airports.
- Brookhaven Lab has a world-class brain-imaging center using both PET and magnetic resonance imaging (MRI). Researchers are able to test new isotopes directly in a medical environment.

Brookhaven-Developed Radioisotopes

- Technetium-99m generator, used in 85 percent of all diagnostic nuclear medicine procedures worldwide (about 20 million annually)
- Instant kit for labeling red blood cells with technetium-99m, allowing doctors to see blood movement through the heart and other organs; used in more than 200,000 such procedures each year
- Fluorine-18 fluorodeoxyglucose, the world's most widely used agent for imaging brain function; revolutionized the study of the human brain
- Tin-117m DTPA, the most promising agent for treatment of bone pain and bone metastases in cancer patients

