Isotope Production and Distribution Program Fund

Program Overview and Benefits

The Department of Energy's Isotope Program produces and sells radioactive and stable isotopes, byproducts, surplus materials, and related isotope services world-wide and operates under a revolving fund established by the 1990 Energy and Water Appropriations Act (Public Law 101–101), as modified by Public Law 103–316. The combination of an annual direct appropriation and collections from isotope sales are deposited in the Isotope Production and Distribution Program Fund; both are needed to maintain the Isotope Program's viability. This revolving fund allows continuous and smooth operations of isotope production, sales, and distribution independent of the federal budget cycle and fluctuating sales revenue. An independent cost review of the fund's revenues and expenses is conducted annually.

The annual appropriation is requested as Isotope Development and Production for Research and Applications in the Office of Science Nuclear Physics program. Appropriated funds are used to maintain mission-readiness of facilities by supporting the core scientists and engineers needed to carry out the Isotope Program and the maintenance of isotope facilities to assure reliable production. In addition, the appropriation provides support for R&D activities associated with the development of new production and processing techniques for isotopes, operations support for the production of research isotopes, and support for the training of new personnel in isotope production. Each site's production expenses for processing and distributing isotopes are offset by revenue generated from sales. About 80 percent of the resources in the revolving fund are used for operations, maintenance, isotope production, and R&D for new isotope production techniques, with roughly 20 percent available for process improvements, unanticipated changes in volume, and purchases of small capital equipment, such as assay equipment and shipping containers needed to ensure on-time deliveries.

The Department has supplied isotopes and related services since the Atomic Energy Act of 1954 specified the role of the U.S. government in isotope distribution. Substantial national and international scientific, medical, and research infrastructure has relied upon the use of isotopes and is strongly dependent on the Department's products and services. Isotopes are now used for hundreds of applications that benefit society every day such as diagnostic medical imaging, cancer therapy, smoke detectors, neutron detectors for homeland security applications, explosives detection, oil exploration, and tracers for climate-related research. For example, radioisotopes are used in the diagnosis or treatment of about one third of all patients admitted to hospitals[a]. Each year, nearly 18 million nuclear medicine imaging and therapeutic procedures are performed on patients at the approximately 5,000 nuclear medicine centers in the United States[b]. Such nuclear procedures are among the safest and most effective diagnostic tests available and enhance patient care by avoiding exploratory surgery and other invasive procedures. In FY 2012, the Isotope Program organized the first Federal workshop to assess stakeholder requirements in order to optimize the utilization of resources and assure the greatest availability of isotopes.

Isotopes are primarily produced and processed at three facilities stewarded by the Isotope Program: the Isotope Production Facility (IPF) at Los Alamos National Laboratory, the Brookhaven Linac Isotope Producer (BLIP) at Brookhaven National Laboratory, and processing facilities at Oak Ridge National Laboratory (ORNL). IPF and BLIP provide accelerator production capabilities, while the High Flux Isotope Reactor (HFIR) at ORNL provides reactor production capability. HFIR has the highest neutron flux available for isotope production in the U.S. In addition, production and distribution activities are supported at the Advanced Test Reactor at the Idaho National Laboratory and by the Pacific Northwest National Laboratory. The Isotope Program is broadening production capability by including university accelerator and reactor facilities which can provide cost-effective and unique production capabilities, including at the University of Washington, Washington University, the University of California at Davis, and the Missouri University Research Reactor.

[a] http://www.nrc.gov/reading-rm/doc-collections/fact-sheets/med-use-radactiv-mat-fs.html

[b] http://interactive.snm.org/docs/whatisnucmed2.pdf

The resources available in the revolving fund in FY 2012 totaled $46.7 million. This consists of $19.1 million from FY 2012 appropriations and collections of $27.6 million. Collections in FY 2012 included sales of californium-252, selenium-75, and strontium-82. Californium-252 has a variety of industrial and medical applications, selenium-75 is used as a radiography source, and strontium-82 has gained world-wide acceptance for use in heart imaging. In FY 2012, the Isotope Program served about 150 customers including major pharmaceutical companies, industrial users, and approximately 100 researchers at hospitals, national laboratories, other Federal agencies, universities, and private companies, with the sale of approximately 190 different radioactive and stable isotopes. Among the isotopes produced, seven are high-volume and moderately priced isotopes; the remaining are low-volume research isotopes, which are more expensive to produce. The Isotope Pricing Policy was revised and issued in FY 2012 to provide clear guidelines on pricing practices. Commercial isotopes are priced to recover full cost or the market price (whichever is higher).

For FY 2014, the Department foresees more than moderate growth in isotope demand.

Program Accomplishments

New isotope production capabilities are being established at Duke University, Texas A&M University, Washington University, University of Wisconsin, and Oak Ridge National Laboratory as a result of grants awarded in FY 2012 under an Isotope Production solicitation. Capabilities will be established to produce astatine-211 (an alpha emitter under investigation for cancer therapy applications); copper-64 (medical therapeutic and diagnostic applications); yttrium-86, zirconium-89, copper-62, and iodine-124 (medical diagnostic applications); and curium-248 (physics research applications). Each award has a duration of either one or two years and all work will be completed in FY 2014.