

## Isotope Production and Distribution Program Fund

### Overview

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 Development Appropriations Act (Public Law 101–101), as amended by the 1995 Energy and Water Development Appropriations Act (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 relies 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.<sup>a</sup> 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.<sup>b</sup> 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. The Isotope Program continuously assesses isotope needs to inform program direction; for example, in FY 2013, the Isotope Program organized the second 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 Brookhaven Linac Isotope Producer (BLIP) and associated processing labs at Brookhaven National Laboratory (BNL), the Isotope Production Facility (IPF) and associated processing labs at Los Alamos National Laboratory (LANL), 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 United States. In addition, production and distribution activities are supported at the Advanced Test Reactor at the Idaho National Laboratory and at the Pacific Northwest National Laboratory. The Isotope Program is broadening capability by including university-supported accelerator and reactor facilities used for research, education, and isotope production that 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. Most of these facilities reside in university medical departments.

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

<sup>b</sup> <http://interactive.snm.org/docs/whatisnucmed2.pdf>

A total of \$53.5 million was available in the revolving fund in FY 2013. This consisted of \$18.5 million from FY 2013 appropriations and collections of \$35.0 million to recover the costs of isotope production and isotope services. Collections in FY 2013 included sales of californium-252, helium-3, selenium-75, and strontium-82. Californium-252 has a variety of industrial and medical applications; helium-3 is used in neutron detectors for national security; selenium-75 is used as a radiography source; and strontium-82 has gained world-wide acceptance for use in heart imaging. In FY 2013, the Isotope Program served over 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 over 170 different radioactive and stable isotopes. Among the isotopes produced, seven are high-volume moderately priced isotopes; the remaining are low-volume research isotopes, which are more expensive to produce. Commercial isotopes are priced to recover full cost or the market price, whichever is higher.

#### **Highlights of the FY 2015 Budget Request**

For FY 2015, the Department foresees more than moderate growth in isotope demand. Revolving fund resources are being used to support efforts to increase radioisotope production capabilities and availability, including the re-establishment of a Federal stable isotope enrichment capability as recommended by the Nuclear Science Advisory Committee. The U.S. government has not had an isotope enrichment capability since 1998. Since that time, inventories of some enriched stable isotopes have been depleted, forcing researchers to rely upon uncertain international supplies. A U.S. enrichment capability is needed to assure the supply of enriched stable isotopes to researchers as well as assuring a domestic supply of enriched stable isotopes needed for national security applications.