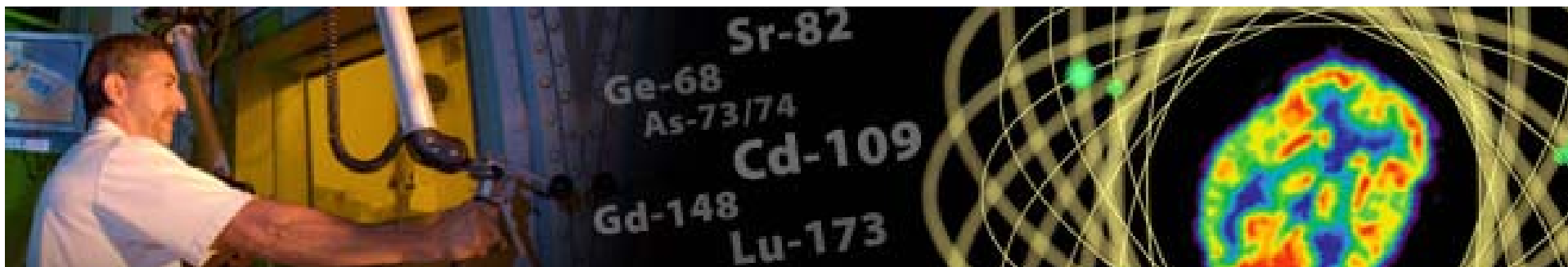


Welcome and Objectives



1st Workshop on Isotope Federal Supply and Demand
January 11-12, 2012

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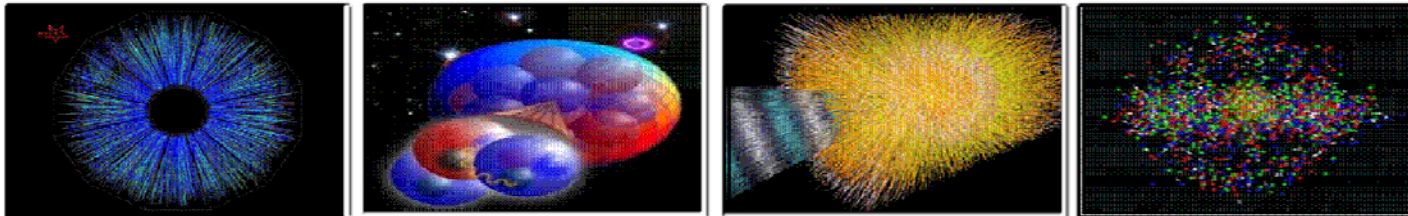


Nuclear Physics Program Mission

Mission: To discover, explore and understand all forms of nuclear matter; to understand how the fundamental particles, quarks and gluons, fit together and interact to create different types of matter in the universe, including those no longer found naturally

Priorities:

- To understand how quarks and gluons assemble into the various forms of matter and to search for yet undiscovered forms of matter
- To understand how protons and neutrons combine to form atomic nuclei and how these nuclei have emerged during the 13.7 billion years since the origin of the cosmos
- To understand the fundamental properties of the neutron and develop a better understanding of the neutrino
- To conceive, plan, design, construct, and operate national scientific user facilities; to develop new detector and accelerator technologies
- To provide stewardship of isotope production and related technologies to advance important applications, research and tools for the nation
- To foster integration of the research with the work of other organizations in DOE





Isotope Program Mission

The mission of the DOE Isotope Program is threefold:

- Produce and/or distribute radioactive and stable isotopes that are in short supply, associated byproducts, surplus materials and related isotope services.
- Maintain the infrastructure required to produce and supply isotope products and related services.
- Conduct R&D on new and improved isotope production and processing techniques which can make available new isotopes for research and applications.



*Isotope Production
Facility (LANL)*

**252 customer orders in FY2010
>415 shipments in FY2010**



*Brookhaven Linac
Isotope Producer*

History

Public Law 101-101 (1990), as modified by Public Law 103-316 (1995) created the Isotope Production and Distribution Program Fund (called a revolving fund) and allow prices charged to be based on costs of production, market value, U.S. research needs and other factors

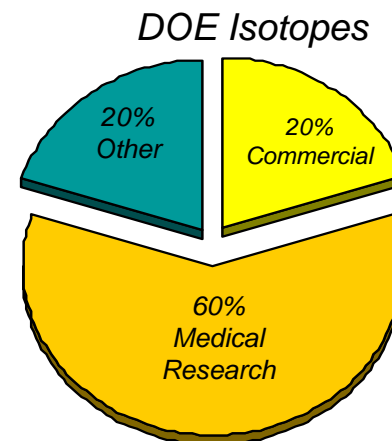
Prices for commercial isotopes are based on full cost. Prices for research isotopes are based on direct cost and may be partially subsidized

The DOE Isotope Program is new to the Office of Science

The Fiscal Year (FY) 2009 President's Request Budget proposed to transfer the Isotope Production Program from the Department of Energy (DOE) [Office of Nuclear Energy](#) to the Office of Science's [Office of Nuclear Physics](#)

Transfer was completed with Congressional Appropriation in FY 2009

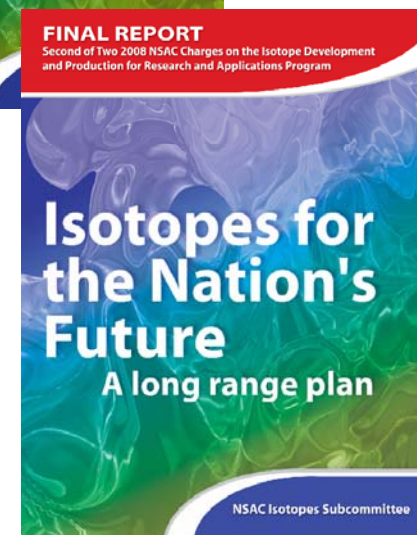
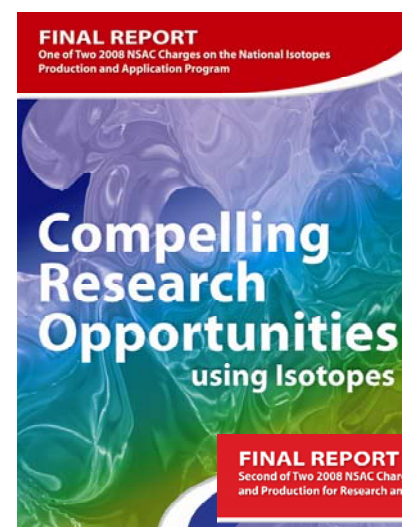
Majority of isotopes produced are for medical community



Re-organizing the Isotope Program

The changes to the program have been substantial since transferred to Office of Science

- Created Research and Development Program for new and improved isotope production techniques
- Introduced peer review into mode of operations
- Restructured the federal organization of the program
Created the National Isotope Development Center
- Charged NSAC to set priorities for research opportunities and to develop a long-term strategic plan for isotope production and development
- Increased portfolio of isotope production sites
- Increased availability of research isotopes and made more affordable
- Improved communication with stakeholders





First Federal Workshop on Isotope Supply and Demand

Over 20 government institutions represented

~ 90 isotopes identified by agencies – key to mission/availability

- Armed Forces Radiobiology
Research Institute
- Central Intelligence Agency
- Defense Threat Reduction Agency
- Department of Agriculture
- DOE/Office of Environmental
Management
- DOE/Office of Intelligence
- DOE/New Brunswick Laboratory
- DOE/Nuclear Energy
- DOE/National Nuclear Security
Administration
- DOE/Office of Science
- DOE/Savannah River Operations
Office
- Department of Health and Human
Services
- Department of Homeland Security
- Department of Transportation
- Environmental Protection Agency
- Federal Bureau of Investigation
- National Aeronautics and Space
Administration
- National Institutes of Health
- National Institute of Science and
Technology
- National Science Foundation
- Office of the Assistant Secretary of
Defense
- White House National Security Staff

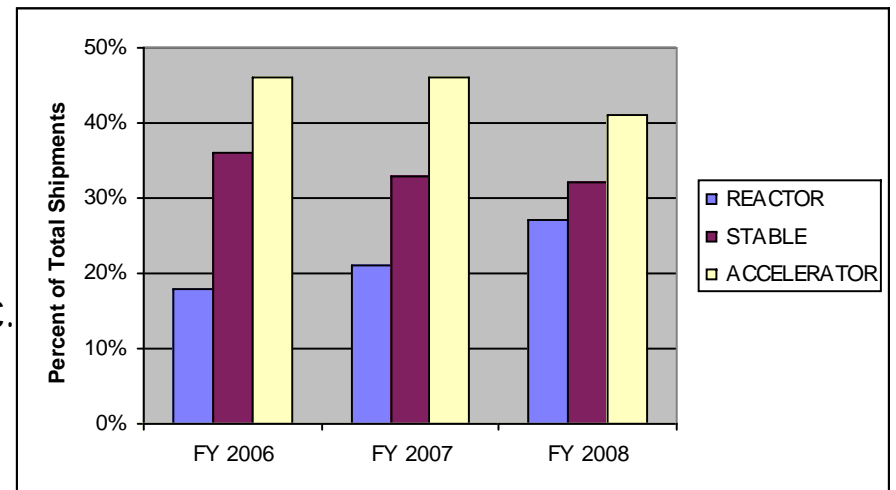
Stable Isotopes

- Not radioactive
- Used in numerous research, national security, commercial, and medical applications
- Many applications require enriched stable isotopes
- Enrichment
 - Techniques include electromagnetic separation and gaseous diffusion
 - Isotope Program does not currently have enrichment capabilities
 - Now funding innovative enrichment methods
 - Enriched stable isotopes in Isotope Program inventory from previous operation of calutrons (electromagnetic separations devices)
 - Russia is the predominant alternate supply of enriched stable isotopes



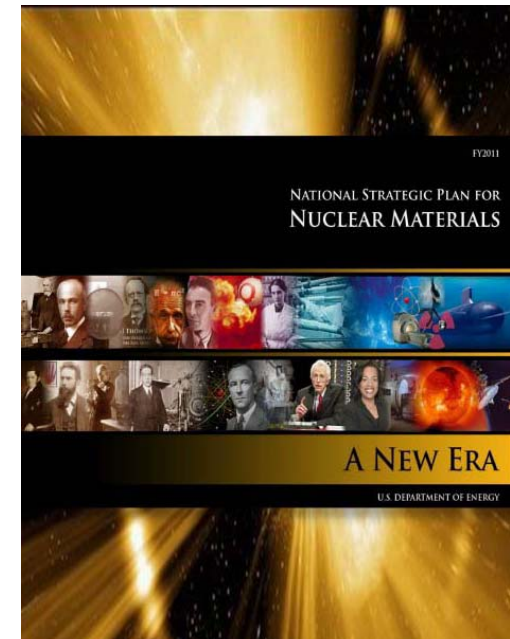
Radioactive Isotopes

- Used in numerous research, national security, commercial, and medical applications
- Can be produced by transforming one isotope into another
 - Typically use an enriched stable isotope “target”
 - Production in
 - Nuclear reactors – bombard target with neutrons
 - Accelerator or cyclotron – bombard target with charged particles (protons, alpha particles, etc.)
- Usefulness of a particular isotope in an application depends upon
 - Half-life (time it takes for half of the atoms to radioactively decay)
 - Type of radioactive decay
 - Emission of gamma rays, beta particles
 - (electrons/positrons), alpha particles (He-4 nuclei), neutrons, etc.
 - Energies of the emissions
 - Chemistry of the element



IP Distribution Services

- The IP provides services to manage the distribution of isotopes that are owned by other programs
 - Most of these are legacy materials owned by other DOE programs because of stockpile stewardship
 - Communication strengthened with NNSA Office of Nuclear Materials Integration
 - SC involved in internal Working Groups
 - IP access to materials before disposed
 - IP access to size of inventories
 - IP participated in National Strategic Plan for Nuclear Materials
 - Provides effective interface for communication and strategic planning



Objectives of Meeting

- **Federal perspective – what is needed to accomplish mission now and future?**
 - Federal only – open communication
 - Can differ from community perspective
 - Agency spreadsheets have identified ~ 90 isotopes – expect list to grow.
 - IP/NNSA will follow up with agencies

- **Collect information to improve strategic planning and forecast of demand**
 - DOE is not and cannot be responsible for all isotopes
 - Help facilitate communication
 - Hearing of demands/supply from respective agencies may improve coordination/communication amongst agencies
 - Mitigate potential shortages in future
 - Changes in utilization of isotope by an agency can create a shortage – example
 - He-3 spike for neutron detection following 9-11 created a shortage that was difficult to predict
 - Interagency communication is requirement



Discussion Points

First day:

- **What isotopes are needed for mission accomplishment?**
 - **How used**
 - **Projected demand**
 - **Description of any supply**

- **Are there any that you have difficulty obtaining?**
 - **Aid in identifying a supply**
 - **Possibility for development of production**

- **Are there mission activities that create new needs for isotopes or significantly change the amounts of an isotope that you need?**
 - **Avoid potential shortage**

Second day:

Round table discussions on isotope needs