



U.S. DEPARTMENT OF
ENERGY

OFFICE OF
SCIENCE

NP Isotope Program and Facilities

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Program Mission

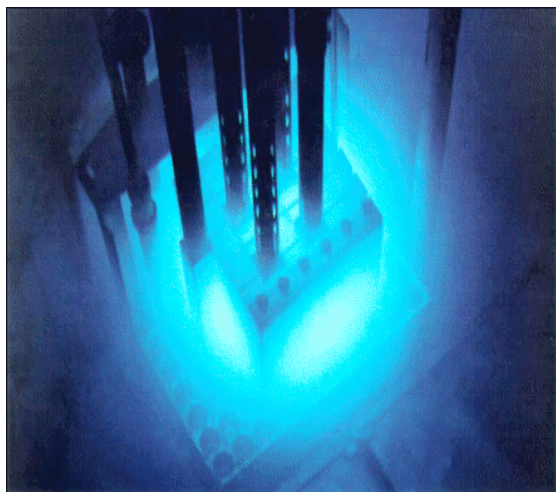
The mission of the DOE Isotope Program is threefold:

- Produce and 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.

History

- The isotope program was created by Congress in the late 1980s to consolidate isotope production activity in DOE
- The program was located in the Office of Nuclear Energy with funding from a revolving fund amounting to one year's sales
- Ironically, most of the production facilities utilized by the program were outside NE
- In FY2009, the program was moved from Office of Nuclear Energy to the Office of Science Nuclear Physics program.
- Better alignment with production labs was achieved – BNL, ORNL, PNNL are Office of Science labs.
- LANL (NNSA) and INL (NE) maintain participation in the program.
- NP had traditionally supported a mix of lab-based and university-based facilities

Present



- The program was re-christened the National Isotope Production and Applications Program
- A clear revision of its focus was adopted
 - Workshop in August 2008
 - NSAC subcommittee reports
- The program will be run from HQ
- Issues of substance will be conducted “Fed to Fed”
- Peer review will be utilized
- Funds to support SBIR are available



NSAC Research Isotope Recommendations

Compelling Research Opportunities using Isotopes

- Invest in new production approaches of alpha-emitting radionuclides, e.g. Ac-225, At-211.
- Invest in coordination of production capabilities and supporting research.
- Produce isotopes of the heavy elements, e.g. Cf, Ra, TRU.
- Focused study and R&D on new or increased production of He-3.
- Re-establish domestic production and supply of stable isotopes.
- Robust investment into education and training.



NSAC Long Range Plan Recommendations

Isotopes for the Nation's Future - A Long Range Plan

- Maintain a dialogue with all interested federal agencies and commercial isotope customers to forecast and match realistic isotope demand and achievable production capabilities.
- Coordinate production capabilities and supporting research to facilitate networking among existing DOE, commercial, and academic facilities.
- Support a sustained research program in the base budget to enhance the capabilities of the isotope program in the production and supply of isotopes generated from reactors, accelerators, and separators.
- Invest in workforce development in a multipronged approach, reaching out to students, post-doctoral fellows, and faculty through professional training, curriculum development, and meeting/workshop participation.



NSAC Long Range Plan Recommendations

- Devise processes for the isotope program to better communicate with users, researchers, customers, students, and the public and to seek advice from experts:
- Encourage the use of isotopes for research through reliable availability at affordable prices.
- Increase the robustness and agility of isotope transportation both nationally and internationally.
- Construct and operate an electromagnetic isotope separator facility
- Construct and operate a variable-energy, high-current, multi-particle accelerator and supporting facilities that have the primary mission of isotope production.



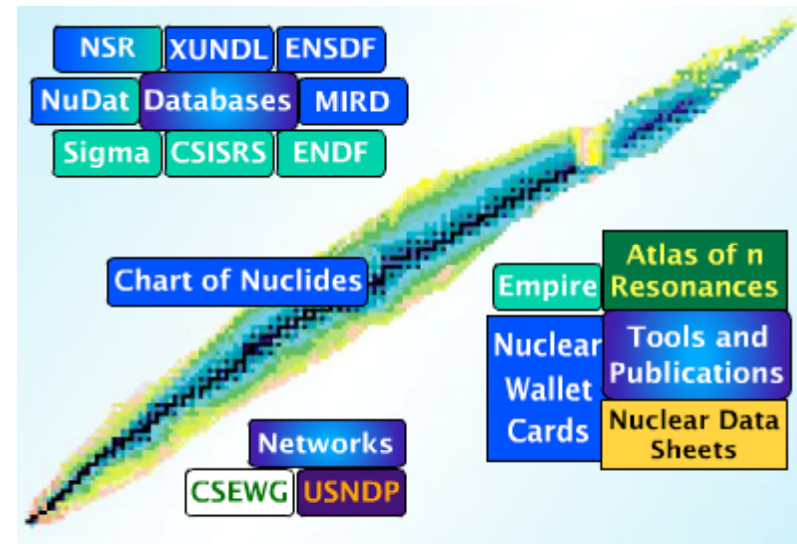
- As part of the move, NIDC was set up. NIDC is responsible for five activities:
 - Identify and provide expert support for IPA activity
 - Manage the Isotope Business Office at ORNL
 - Oversee production scheduling
 - Oversee shipping and distribution
 - Communications
 - Website
 - Newsletter
 - IPA booth
 - Customer interactions





Expert resources

- Examples of the engagement of expert resources
 - Identify participants for peer review activity
 - accelerator production on new products for the portfolio
 - Engage experts on reactor production on new products for the portfolio
 - Engage experts on enrichment technology for re-instituted program
 - Identify experts to advise on issues related to QC and QA
 - Calibration
 - Assessing production
 - Drug Manufacturing Files
 - Good Manufacturing Practice
 - ISO 9000





Production Planning



- **Align production capability and demand**
 - Assess capabilities of sites
 - Review operating schedule vs. delivery dates
 - Determine most cost effective option
 - Work with customer to determine specifications for material
 - Monitor operating schedule
 - Revise any production plan if necessary



Historical Isotope Production Sites in the DOE Isotope Program

Richland:

Sr-90 – Y-90 gen for cancer therapy

Idaho – ATR:

Co-60 – Sterilization of surgical equipment and blood

Brookhaven – BLIP:

Ge-68 – Calibration sources for PET equipment; Antibody labeling
Sr-82 – Rb-82 gen used in cardiac imaging
Cu-67 – Antibody label for targeted cancer therapy

Oak Ridge – HFIR:

Se-75 – Industrial NDA; Protein studies
Cf-252 – Industrial source
W-188 – Cancer therapy

Stable Isotopes Inventory:

Top 10 stable isotopes sold over the last 5 years:

Ca-48, Ga-69, Rb-87, Cl-37, Pt-195, Nd-146, Sm-149, Ru-99, Zr-96

Inventory:

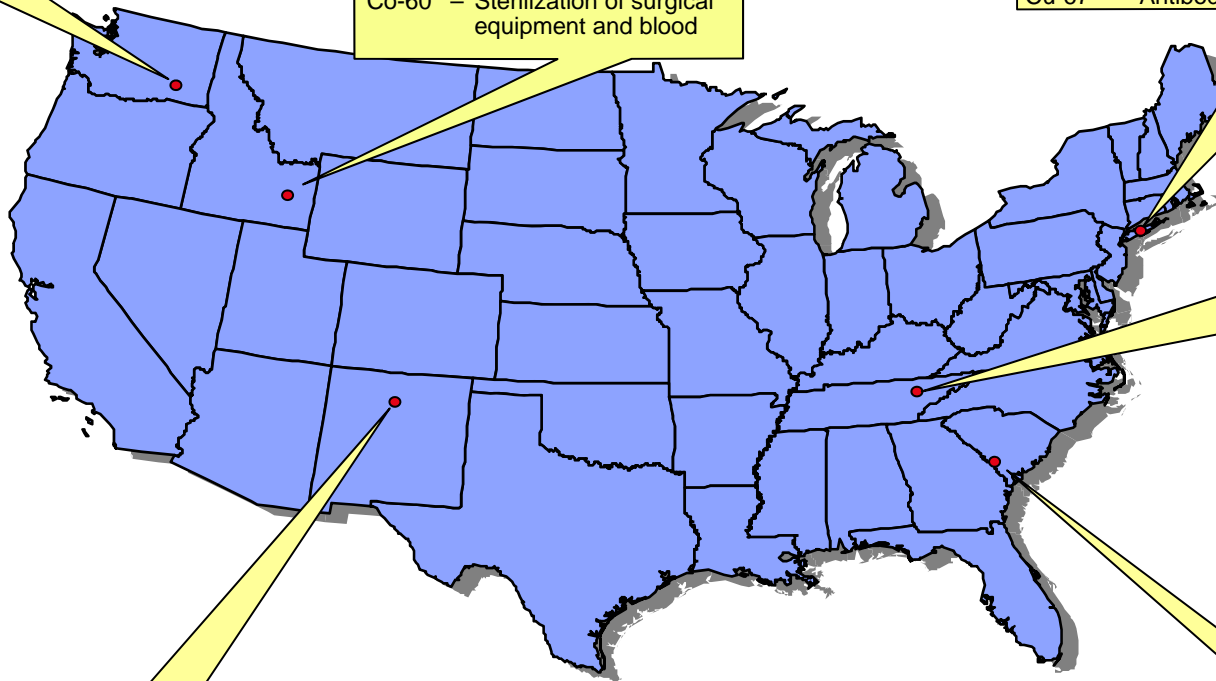
Ac-225 – Cancer therapy

Los Alamos – LANSCE/IPF:

Ge-68 – Calibration sources for PET equipment; Antibody labeling
Sr-82 – Rb-82 gen used in cardiac imaging
As-73 – Biomedical tracer

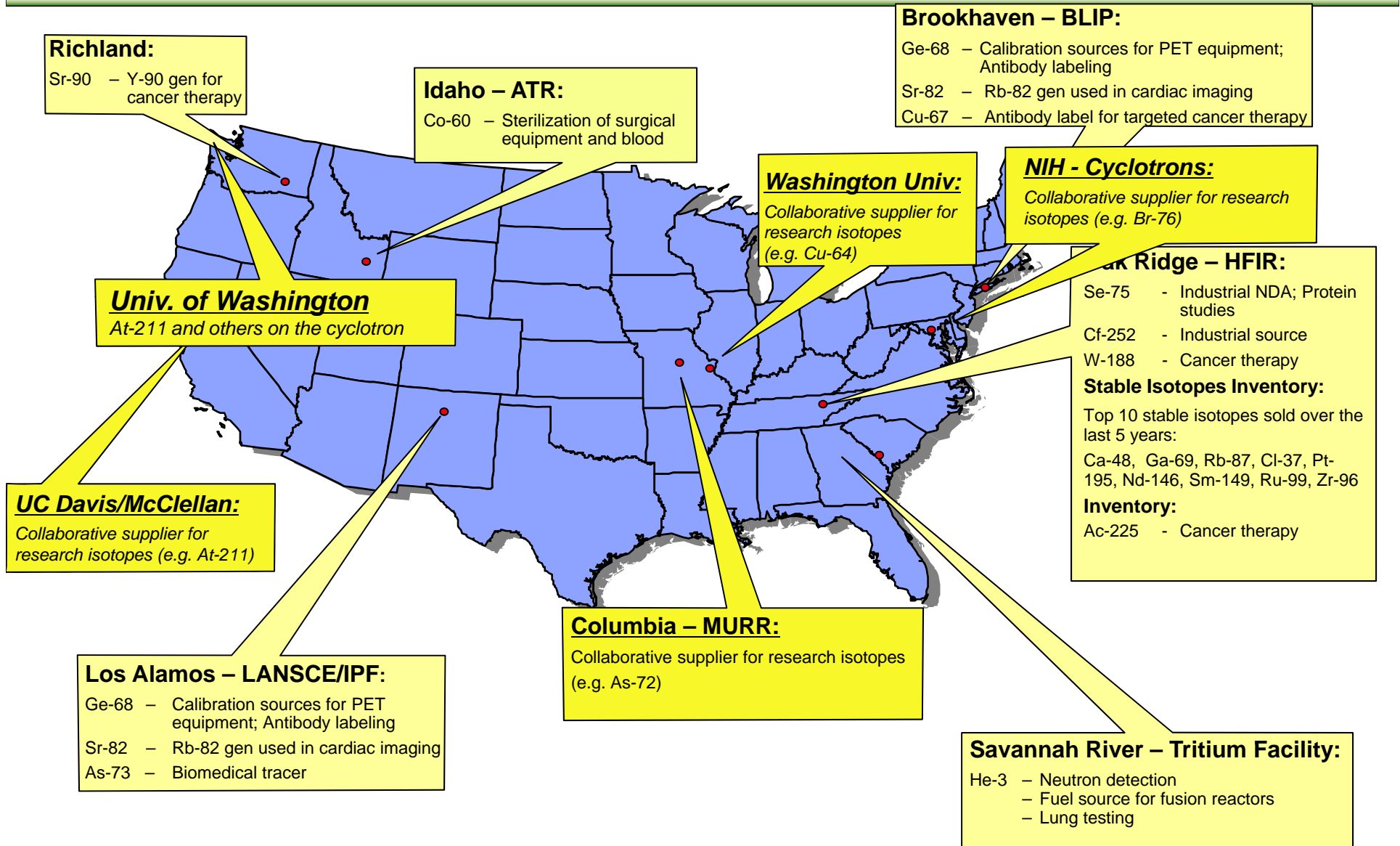
Savannah River – Tritium Facility:

He-3 – Neutron detection
– Fuel source for fusion reactors
– Lung testing





Additional Production Sites Integrated in the Isotope Program



- Provide oversight for the entire program
- Monitor incoming shipments from external production sites
- Track location and movement of shipping containers
 - Type B
- Monitor shipments from production sites to customers
- Interact with freight companies, customs agents, and others to expedite material movement
- Work with shipping container suppliers for new designs
- Organize task group to provide guidance

- **Website will be updated**
 - Searchable by isotope or element
 - Linked to IBO to facilitate inquiry on price and schedule
 - Also provide archive of newsletters and other communications
- **Re-establish Newsletter**
- **Point of Contact for customers**
- **Staff booth at SNM, ACS and other meetings**
- **Act to inform both the stakeholders and DOE mgmt. on developments related to isotope use**



Opportunities for Small Business

- The Isotope program has substantial interactions with industry as a supplier of stable enriched and radioactive isotopes
- Small business can provide support for the program in a variety of areas
 - Stable isotope enrichment
 - Improved electromagnetic enrichment capability
 - Improved centrifugal enrichment capability
 - New technology for isotope enrichment
 - Accelerator production of radioisotopes
 - New accelerator technology
 - Cyclotron
 - LINAC
 - Injector technology



Opportunities for Small Business

- Small business can provide support for the program in these areas:
 - Reactor isotope production
 - New isotopes for industrial and other applications
 - Radiation and Power sources
 - In core neutron irradiations
 - New target materials
 - Alternative neutron sources
 - Radioisotope production
 - Novel target materials
 - Separation chemistry
 - Ion exchange materials
 - Automation
 - Radioisotope Generators



Opportunities for Small Business

- Small business can provide support for the program in these areas:
 - Software to support isotope production
 - Automation
 - Modeling and theory
 - Other applications
 - Isotope Program
 - Shipping and distribution
 - Business office operations
 - Public private partnerships



National Isotope Development Center

- **Contact information**

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Thank you!