

Isotope Workshop

Working Group 3 : Radioisotopes for Applications

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- **Goal:** The goal of the workshop is to bring together for the first time representatives of the stakeholders (producers and users of isotopes) from a variety of disciplines in an attempt to identify their needs, the challenges towards meeting those needs, and options towards increasing the availability of important isotopes.
 1. **Who uses isotopes and why?**
 2. **Who produces them and where?**
 3. **What is the status of the supply and what is missing?**
 4. **What are the needs today and in the future?**
 5. **What are the options for increasing availability and associated technical hurdles?**
(Can present facilities handle the anticipated demand ?
 6. **Other issues???**

The deliverable will be a report which articulates the Nation's needs for isotopes across the various disciplines, the challenges in meeting those needs and options for improving the capabilities for meeting the demands.

First step towards development of comprehensive and prioritized strategic plan
NSAC will use this input (and others) to develop a long range plan

Who uses isotopes and why?

- National Security
 - Defense programs
 - Stockpile stewardship
 - Homeland Security
- Industrial Applications
 - Petroleum
 - Tracers
 - Radiography
 - Nuclear Power
- Research
- Agriculture
- Medical
 - Diagnostic
 - Therapeutic
- Occupational Health
- Environmental
- Reference Materials

What is the status of the supply and what is missing?

- Coordination/efficient use of existing resources
- No commercial alternative to unique DOE infrastructure
- Implicit vulnerabilities with dependence on foreign supply
 - Transportation
 - Political
 - Security
- Single/no supplier
- Reliability/quality
- Availability: technical, economic

Medical Applications

- Mo-99 Availability
 - Support reliable supply of Mo-99
 - Encourage development of new LEU sources
- Alpha Emitters Availability
 - Need to assure sufficient supply of developing isotopes such as At-211 & Ac-225
 - Th-229 could be extracted from existing supplies of U-233
- Coordinate public & private sector accelerators to increase production
- Encourage technology development & training
- Develop long term infrastructure to assure research development & commercial availability of isotopes

Industrial

- Short-term critical supply issues
- Recognition of strategic isotopes used by industry dependent on government support (e.g., Cf-252, Am-241)
- Reliability – multiple sourcing necessary; current dependence on Russia
- Need US reactor for target irradiations
 - Lack of infrastructure, costs non-competitive
- Cradle-to-grave husbandry is vital
- Vision and long-term strategic plan

National Security Applications

Nuclides	Use	Producer	Status of Supply	Missing	Current/ Future Demand	Impact	Special Considerations	Options for increased availability
Cf-252	Calibration standard	DOE-NE/DP	1	Processing facilities.	1	1	ANSI standard for certifying radiation detection instruments.	Reinstate irradiation and processing
Pu-236	Isotope dilution spikes/nuclear forensics	DOE-DP	1 for highly enriched	High purity required	1	1	High purity required	Reestablish mass separator capability for radioactive and stable isotopes.
Th-228	Calibration standard	DOE-DP	1	No current efforts for separation	1	1	ANSI standard for certifying radiation detection instruments.	

Definitions:

Supply / Demand

1. Demand $>$ supply
2. Demand = supply
3. Demand $<$ supply

Impact: economic / multiple industries / multiple populations

1. Massive
2. Moderate
3. Minimal

What are the options for increasing availability and associated technical hurdles?

- Improve Coordination/Efficiency Of Existing Resources
 - Academic, Commercial, Government
 - International Cooperation
- Access Untapped Capacity
 - Accelerator
 - Reactor
- Evaluate Options For...
 - Existing Vs. Upgraded Vs. New Facilities
 - Dedicated Vs. Multipurpose Facilities
- Utilize Public/Private Partnerships

Challenges

- Identify/socialize **strategic importance** of specific isotopes: eg. Cf-252, Am-241, He-3, Mo-99, Cs-137
- Cradle-to-grave plan for infrastructure/operations
- Short/Long-term plan for infrastructure/operations
- Lack of T&E programs
- Technological development

Other Issues

- Urge formation of NSAC Subcommittee to address a broader range of radioisotope production & applications
 - Increase recognition of isotope science and applications
 - Ensure comprehensive membership
 - Increase NSAC recognition of needs of the isotope community
- Stress the Impact of radioisotopes on strategic, economic, societal, public health, populations effected
- Develop new models for Public-Private Partnerships
- Incorporate stakeholders into DOE infrastructure for prioritization

Some Unanswered Questions

- What should the role of government be to support isotope science and applications?
- What process or infrastructure should be used to establish priorities?
- How can we ensure this workshop activity and subsequent report result in positive outcomes?