Small-Scale Reactor for the Production of Medical Isotopes

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Key Benefits

- **Technology would exceed US supply demands allowing for commercial sales worldwide**
- **Critical isotope used in cancer treatment & medical diagnostics**
- **Technology would eliminate US reliance on foreign sources for essential medical isotopes**
- **LEU fuel (compared to HEU) minimizes nuclear proliferation risk**
- **Operational at low power and passively safe**
- **No backup power supply or shutdown cooling requirements**
- **Drawing upon proven technology with minimal research effort required**
- **Commercially available control system results in ease of operation**

Commercial Markets & Applications

- **Radiopharmaceutical companies and distributors**
- **Medical & healthcare facilities**
- **Medical diagnostics & cancer treatments**

Commercialization Readiness

- **Design is created by commercially available components**
- **Proven to work based on Sandia's Cintichem –based process which used HEU instead of LEU– our LEU reactor is ready to construct!**
- **US government is looking for investors to develop a technology which reduces our dependence on foreign sources for isotope production NOW. *We have this capability!***

Immediate & Critical Need

Currently there is a **severe worldwide shortage of medical isotopes–** specifically Molybdenum-99.

⇒ Essential in **cancer treatment**, diagnostics, and medical imaging (MRI, CT scans, X-rays, etc.)

United States is *completely* dependent on foreign sources for Mo-99.

⇒ No domestic or back up supply

Current reactors are more than 50 years old which makes them:

⇒ Significantly higher risk for unplanned outages & more frequent maintenance

⇒ Commercial production of radioisotopes is not their primary mission

In 2009 the United States Congress announced an initiative for The Medical Isotope Production Act as an effort to establish a domestic supply of Mo-99 using low enriched uranium (LEU) as opposed to the standard highly enriched uranium (HEU) fuel.

⇒ The bill would provide $160M over a 5 year period. The bill (HR3276) passed the House with a 400-17 vote in late 2009.

Technology & Design Elements

The critical elements of this technology lie within the unique reactor design as well as the dedication to medical isotope production.

⇒ Simple, small, **passively safe** ~2MW reactor which would be LEU-fueled utilizing proven technology: oxide pins for targets and fuel.

⇒ The **low enriched uranium (LEU)** "small-size" reactor that is dedicated to the production of Molybdenum-99 (Mo-99) is the only serious and long-lasting solution.

⇒ Our reactor still has research capabilities but will be devoted primarily to commercial production– unlike other reactors!

⇒ **LEU has the smallest proliferation risk of all reactor fuels**

⇒ All of the elements in this reactor are the same which is essential in **standardization and ease-of-use**.

⇒ Safe design **minimizes worker exposure** to radiation and possible release during transport

Financial Impacts

Current U.S. demand for Mo-99 is equal to world demand at approximately 6,000 curies (Ci) per 6 day week.

Pre-shortage rates of Mo-99:

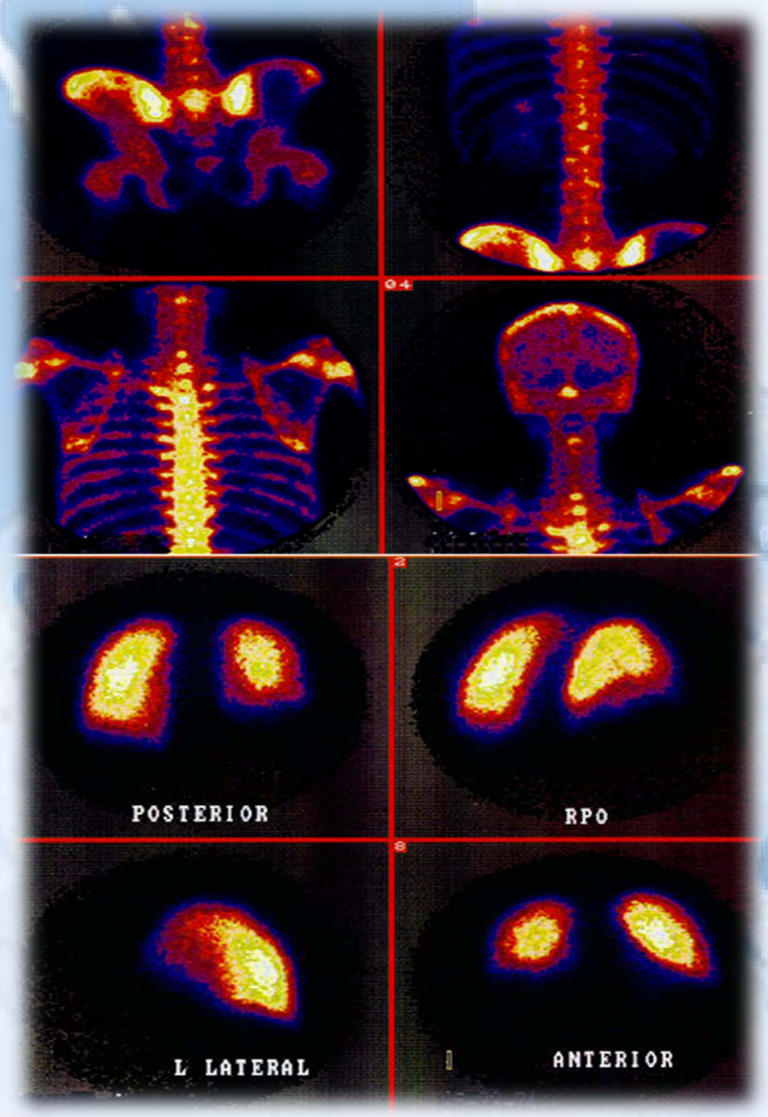
⇒ Demand growth at 5-10% per year

⇒ Revenue from US demand alone (pre-shortage) could yield approximately **$150 million per year**

Current rates of Mo-99 due to shortage:

⇒Revenue at current rate could yield approximately **$468 million per year**

With this technology, we could produce enough Mo-99 to satisfy US demand and have a surplus available to meet world demand need. Additional isotopes other than Mo-99 are produced as a result of this process and would also be commercially valuable.



Intellectual Property

Our patent pending technology provides several integral elements to resolve the current Mo-99 production crisis.

National Nuclear Security Administration

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