

***SHINE Medical Technologies  
Presentation to NRC<sup>(1)</sup>:  
Status Update on Medical  
Isotope Facility  
May 11, 2012  
Gregory Piefer, Chief Executive  
Officer***

# ***SHINE Values and Culture***

- ***We share values with the NRC<sup>(1)</sup>:  
Protect the health and safety of  
people and the environment***
- ***SHINE recognizes it is impossible to  
operate business unless safety is  
paramount***
- ***Will work with NRC<sup>(1)</sup> to ensure  
safety while achieving national  
priorities***

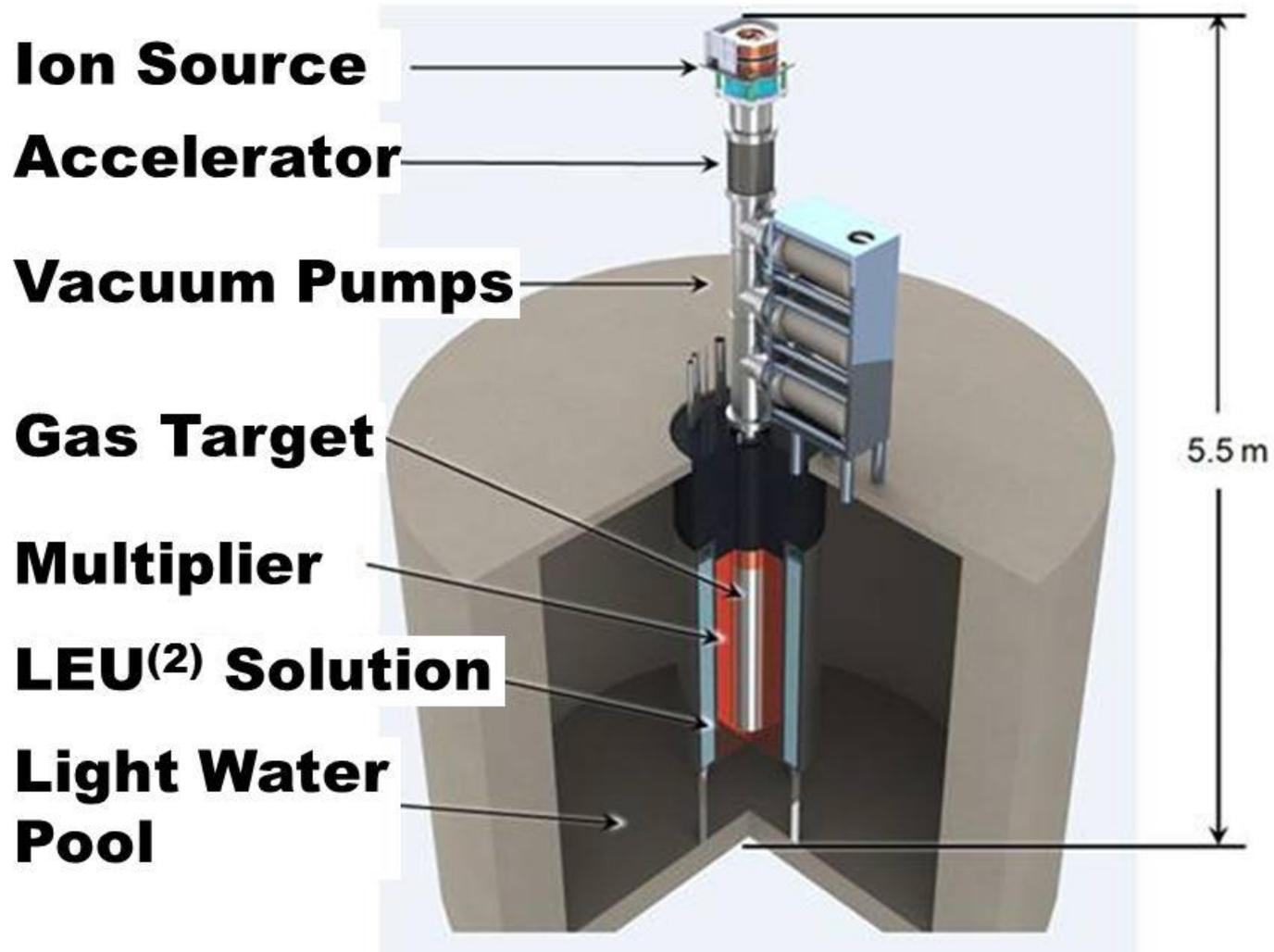
# ***Company Background***

- ***Created in 2010 to pursue the production of medical isotopes***
- ***Motivated by new, eco-friendly, LEU<sup>(2)</sup> based technology and failure of existing supply chain***
- ***Plan to be a world leader in the production of a range of medical isotopes (<sup>99</sup>Mo, <sup>131</sup>I, <sup>133</sup>Xe, others)***

# ***Technology Overview***

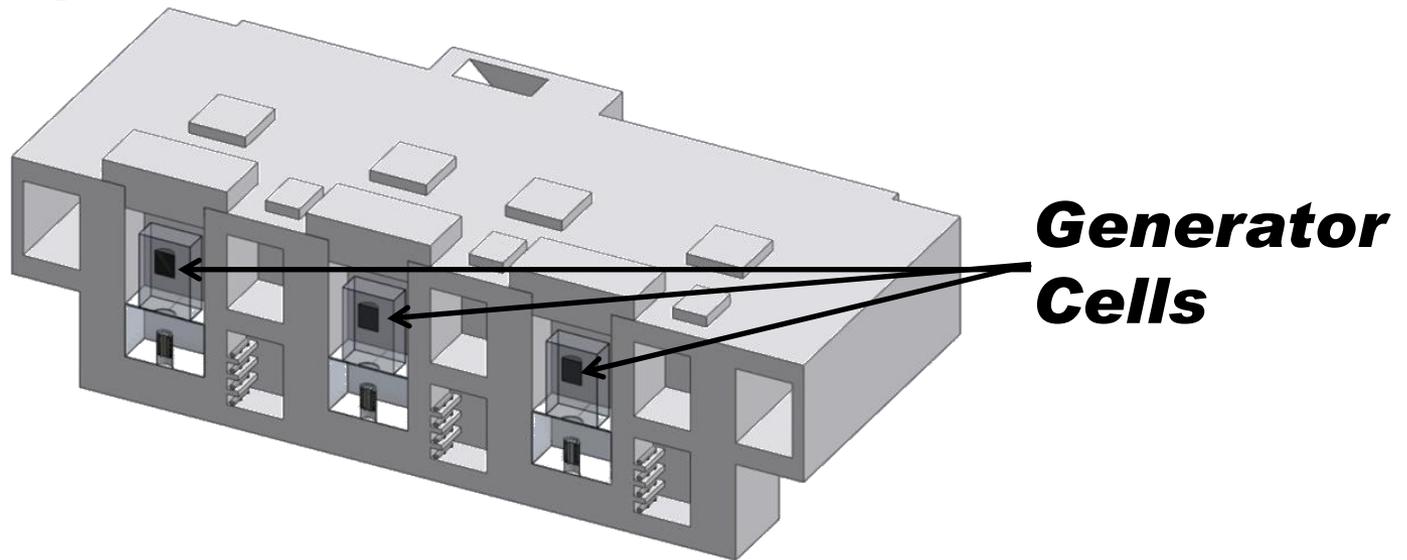
- ***Neutrons are produced by particle accelerator and pass into aqueous LEU<sup>(2)</sup> solution***
- ***Neutrons induce subcritical fission in <sup>235</sup>U present in solution***
- ***Fission creates medical isotopes***
- ***After irradiation, isotopes of interest are isolated in chemical separation process***

# ***Isotope Generation System***



# ***Generator Basic Specifications***

- ***Capacity: 10% U.S. need for  $^{99}\text{Mo}$***
- ***Fission thermal power: ~ 100 kW each***
- ***Facility will house multiple units***



# ***Project Status***

- ***Technology proof-of-concept done***
- ***Team with extensive nuclear experience in place, growing***
- ***Facility preliminary design started***
- ***ER<sup>(4)</sup> submittal late 2012***
- ***PSAR<sup>(3)</sup> submittal late 2012***



# **Challenges**

- ***Regulatory structure for licensing is not mature, could lead to delays in approval***
- ***National objectives call for rapid deployment of domestic supply***
  - ***Short period of time before shortages will recur (2016 shutdown of NRU<sup>(5)</sup>)***
  - ***Shortages will lead to patient suffering, continued reliance on HEU<sup>(6)</sup>***

# ***National Support Helpful So Far***

- ***NNSA program has accelerated efforts to establish domestic supply, eliminate HEU***
- ***NRC staff recognized need for supplemental guidance, released in draft form***
- ***Inter-agency working groups have communicated the urgency and provided cross-agency integration***

# ***Continued Support Needed to Achieve National Priorities***

- ***Elevate priority of medical isotope license actions in order to:***
  - ***Prevent loss of healthcare tools which benefit millions of Americans annually***
  - ***Support HEU<sup>(6)</sup> minimization***
  - ***Establish domestic supply***
- ***Ensure NRC staff has resources required for expeditious, complete review***

# ***Our Perspective***

- ***SHINE isotope facility is of the scale of small research reactors***
- ***Facility inventory smaller than many campus reactors***
- ***Environmental impacts are insignificant compared to power reactors***

***Thank You!***

***Questions?***

***Gregory Piefer***

***CEO-SHINE Medical Technologies***



# ***Acronyms***

***1: NRC—Nuclear Regulatory Commission***

***2: LEU—Low Enriched Uranium***

***3: PSAR—Preliminary Safety Analysis Report***

***4: ER—Environmental Report***

***5: NRU—National Research Universal reactor at Chalk River, Canada***

***6: HEU—Highly Enriched Uranium***