
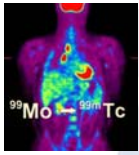



## MURR's Support of a Reliable, Domestic Supply of <sup>99</sup>Mo

J. David Robertson  
Associate Director for Research & Education  
University of Missouri Research Reactor

---

---

---

---

---

---

---

---

---

---

---

## University of Missouri Research Reactor

- A 10 MW reactor that operates 24 hours a day, 6.5 days a week, 52 weeks a year
- 170 full time employees
- Every week MURR supplies the active ingredients for FDA approved Quadramet® (<sup>153</sup>Sm) TheraSpheres® (<sup>90</sup>Y) and Lutathera® (<sup>177</sup>Lu)




---

---

---

---

---

---

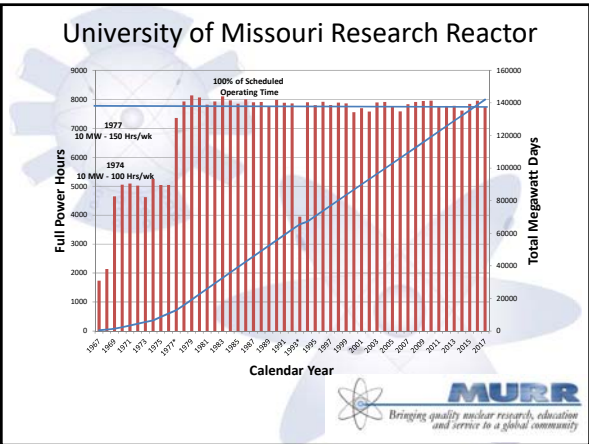
---

---

---

---

---




---

---

---

---

---

---

---

---

---

---

---

## MURR FDA Compliant Quality Programs

- Registered with the FDA as:
  - ✓ API Manufacturer
  - ✓ Analysis Lab
- Drug Master Files with FDA  
*MURR has filed 2 DMFs and 2 more in process*
- Weekly supply of isotopes for:
  - ✓ Existing treatments
  - ✓ New Drug clinical trials
  - ✓ Global Distribution




---

---

---

---

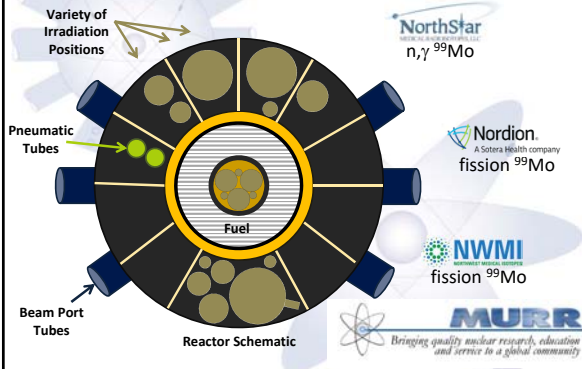
---

---

---

---

## <sup>99</sup>Mo Production at MURR




---

---

---

---

---

---

---

---

## <sup>98</sup>Mo(n,γ)<sup>99</sup>Mo for NorthStar

- Weekly production of <sup>99</sup>Mo
  - ✓ High density metal moly targets
  - ✓ Target processing and dissolution
- Filed DMF with FDA
- <sup>n,γ</sup><sup>99</sup>Mo used in NorthStar's RadioGenix™ generating system




---

---

---

---

---

---

---

---

### NorthStar Fill Line at MURR



---

---

---

---

---

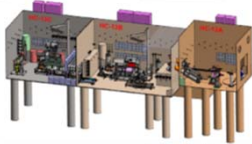
---

---

---

### Fission <sup>99</sup>Mo for Nordion

- <sup>99</sup>Mo will be produced by irradiation of LEU targets at MURR followed by selective gaseous extraction
- Significant milestones in 2017
  - ✓ Full-scale target assembly flow testing completed
  - ✓ Demonstrated high extraction yields from fission targets
  - ✓ Part 1 License Amendment Application submitted to NRC
  - ✓ Hot cells designed and under fabrication



---

---

---

---

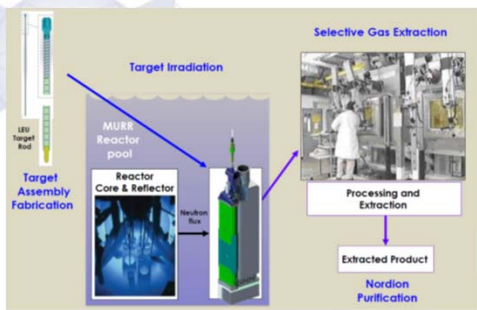
---

---

---

---

### Fission <sup>99</sup>Mo from Selective Gas Extraction



---

---

---

---

---

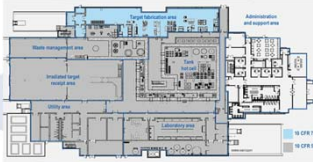
---

---

---

## Fission <sup>99</sup>Mo for Northwest Medical Isotopes

- Use network of university of reactors to irradiate LEU targets
  - Same target design used for all reactors
  - MURR and Oregon State University
- Single radioisotope production facility
  - Located in Columbia, MO
  - Processing includes target fabrication, <sup>99</sup>Mo production and uranium recycle
  - Awaiting final approval of NRC Construction Permit Application



---

---

---

---

---

---

---

---

## MURR's Support of a Reliable, Domestic Supply of <sup>99</sup>Mo

J. David Robertson  
RobertsonJo@Missouri.edu

Questions?



---

---

---

---

---

---

---

---