

Recent Developments in Perma-Fix Medical's Tc-99m Production

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Reported in 2014

- Developed a Micro-Porous Composite Material (MPCM) with a capacity of up to 700 mg Mo/g resin
- Selectively retains Mo and releases Tc
- Conducted ~ 1 Ci prototypical generator tests at MURR, POLATOM

MPCM at a glance

- MPCM was prepared using phase inversion technique
- The surface area of MPCM is very high - 15 m²/g with a pore volume of 0.012 cc/g
- MPCM is amorphous in nature
- Temperatures up to 100 °C do not adversely affect the adsorption capacity of MPCM
- MPCM resin is found to be resistant to extreme pH conditions
- The structure of MPCM has been demonstrated to maintain its integrity when exposed to 50,000 Krad Co-60 gamma radiation
- MPCM has the capacity to absorb up to 700 mg/g Mo

Since Presenting in 2014

- Awarded \$2.8 MM grant from EU
- Conducted prototypical generator tests at approximately 2 Ci, 4 Ci, and ~6 Ci with natural Mo, and ~6 Ci with 98% enriched ^{98}Mo
- All tests successfully loaded ^{99}Mo onto the MPCM in a column
- All test demonstrated 80+% $^{99\text{m}}\text{Tc}$ yield
- Elutions accomplished with pumps or evacuated vials
- No detectable degradation to the resin or eluate

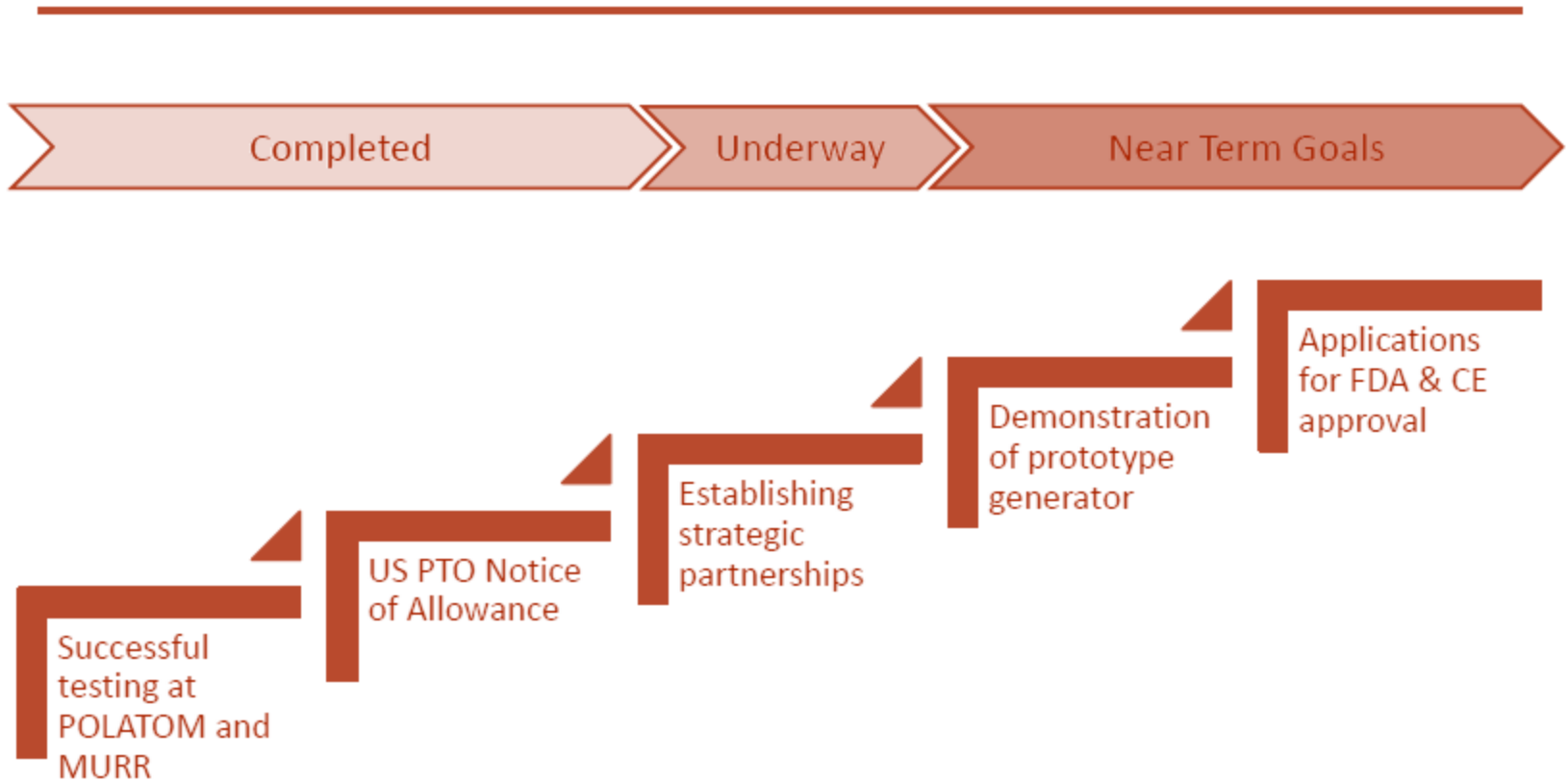
~6 Ci ^{99}Mo Prototype Generator

- Enriched ^{98}Mo target irradiated
- First elution recovered 75+% Tc-99m
- Eluate met radiochemical (% pertechnetate) and radionuclidic purity requirements
- Kit tagging efficiencies currently under study
 - MIBI, MAG3, and Certec

Final Design Goal

- 1-10 Ci (n, γ) ^{99}Mo generator comparable in size to fission ^{99}Mo generator
- Column Bed Volume: 2.5 – 16 mL
- Elution process similar to conventional HEU/LEU generator
- Eluate solution compatible with all kits
- Elution elapsed time < 10 minutes
- Competitive price
- 1.5 - 4.0 Ci ^{99}Mo /g MPCM in column
- Natural Mo and enriched ^{98}Mo can be used as targets













Key Milestones



Timeline

- Currently
 - Additional hot tests
 - Extensive testing of eluents
 - Extensive testing of compounding kit efficiencies
- 2016
 - Start FDA application process
- 4Q 2017-1Q 2018
 - Start production of ^{99}Mo generators

Summary Value Proposition

Winner	Perma-Fix	Uranium
Reliable global supply chain		
Environmentally friendly		
Eliminates proliferation risk		
Flexibility in multiple reactor types		
Non government subsidized		
Cost effective		

Questions?

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