

CANADIAN
ISOTOPE
INNOVATIONS

Supplying Molybdenum-99 to Global Markets

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Chief Operating Officer

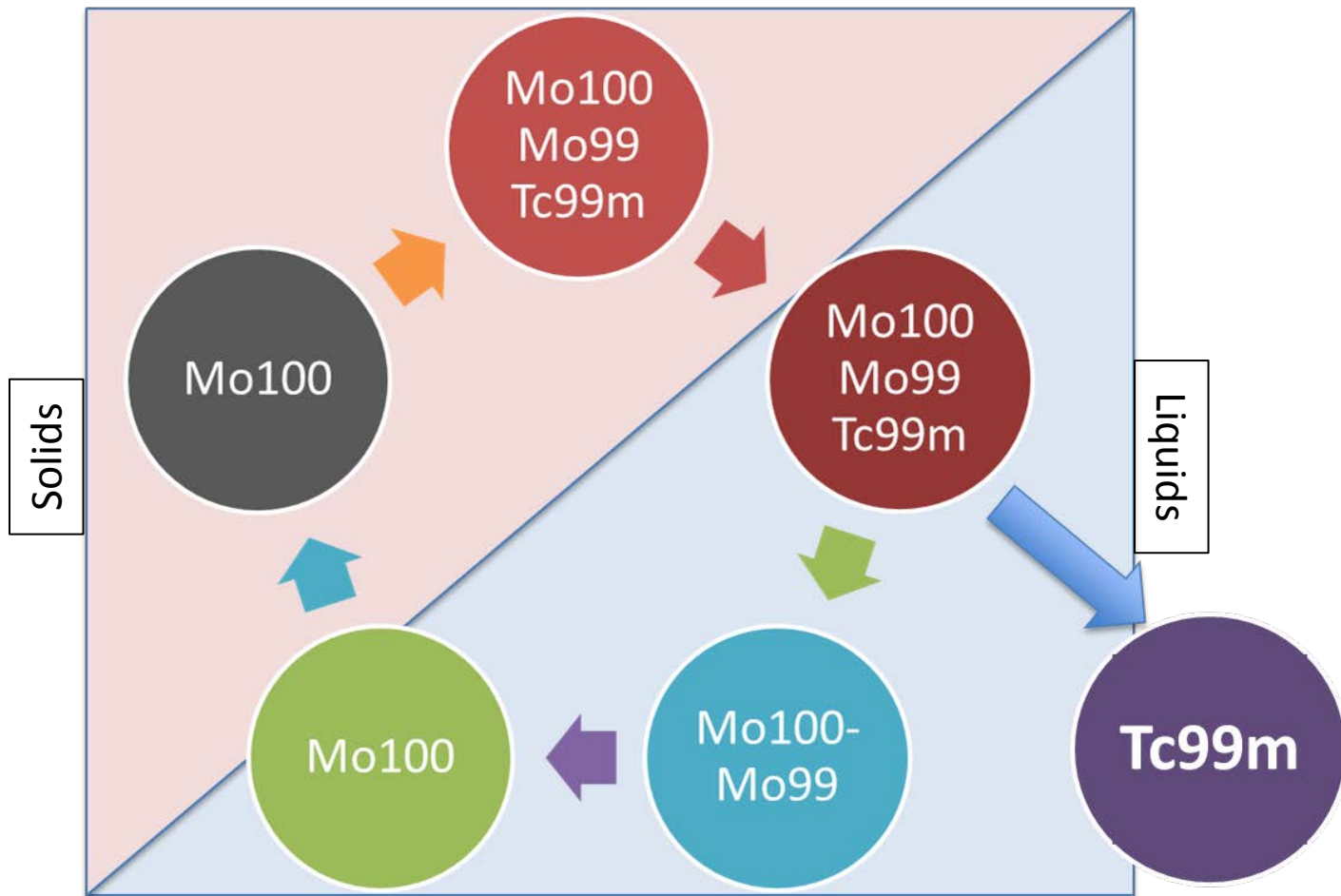
IAEA -Vienna - July 18th, 2017

CIIC GOALS

Leverage our expertise and unique understanding of customer needs to provide safe, reliable and innovative products, at competitive pricing



Linear Accelerator Mo99 Supply



Reactor Mo99 Supply Crises

Nuclear reactor woes delay medical tests

Radioactive isotopes needed for heart and cancer imaging in scant supply

Below: [Discuss](#) [Related](#)

AP Associated Press


updated 12/7/2007 5:51:10 PM ET

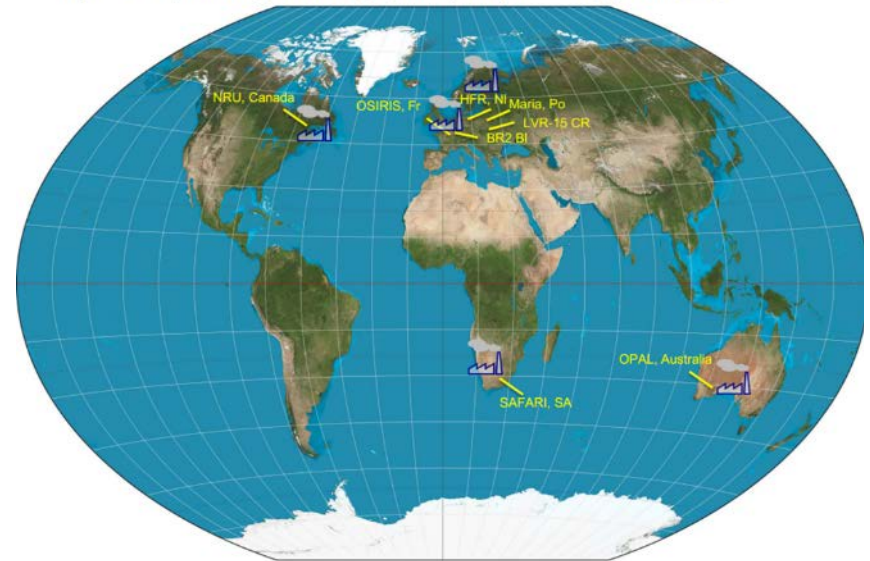
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New York — Thousands of patients are facing delays in crucial medical tests because of a shortage of a radioactive substance used in those examinations — all because of the shutdown of one nuclear reactor in Canada.

The substance is used in at least 15 million medical scans a



Major Mo-99 producing reactors (in yellow) and processing plants 



**NRU reactor has ceased routine Mo99 production*

Mo99 Supply – Is Problem Solved?

NO

Mo99 – Is Problem Solved?

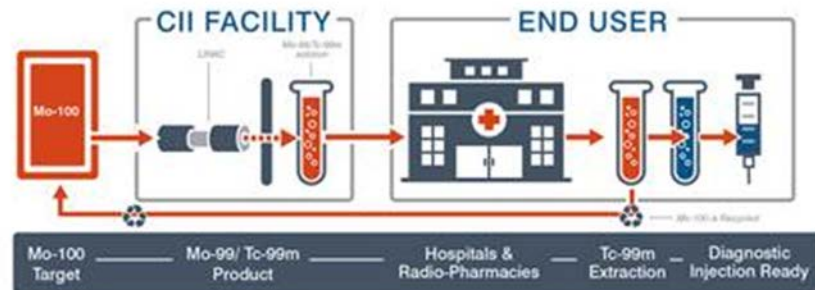
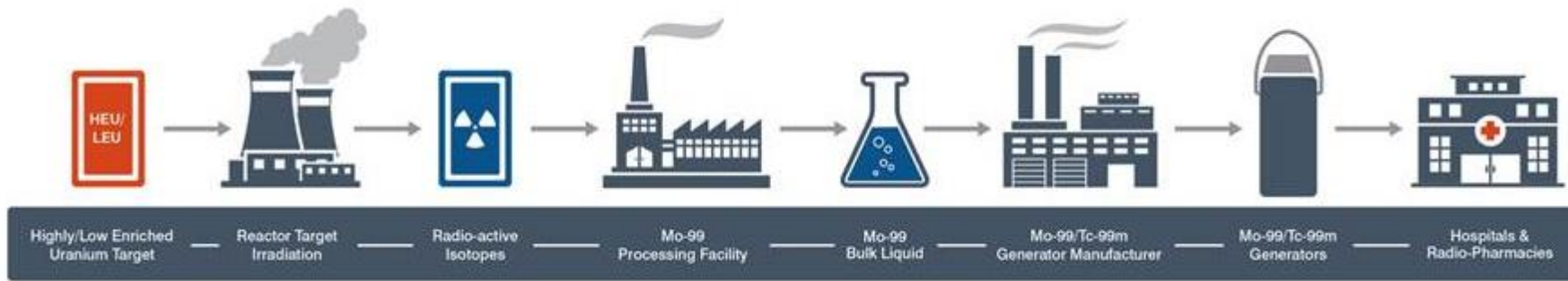
What did MAPLE project teach us about putting all our eggs in one basket??

That it is imperative to
[1] diversify technologies,
and
[2] decentralize supply chains

Supply Issues in Fission Mo99 Production

- Full cost recovery and implication to radiopharmacy budgets (↑ about 140%, 2009-16)
- Reactor age and reliability (many repair shutdowns)
- Centralization of production locations
- Minimal technology diversification (fission)
- Processing capacity is fairly stagnant
- Long shipping distances with product loss and transport reliability issues
- Environmental concerns (nuclear waste, effluents)
- Security concerns (reactor and safety, HEU transport and storage, nuclear proliferation)

Simplifying the Mo99 Supply Chain



Simplifying the Mo99 Supply Chain



Advantages of Linac Mo99 Supply

- Use existing, proven technologies for irradiation and processing
- On-Off operations allow for great control in batch production of different isotopes and full flexibility to customize supply to client needs
- Scalable, from regional single linac installs to globally distributed, multi-location facilities
- Offers geographical proximity to clients >> lower product decay loss
- Capital, equipment and construction costs are lower >> Irradiation + processing facility ~\$100m
- Don't need uranium >> zero security costs
- Minimal radioactive waste >> low security, storage and remediation costs
- Licensing is easier and costs are lower than for reactors
- A fully integrated supply chain allows for excellent costs control

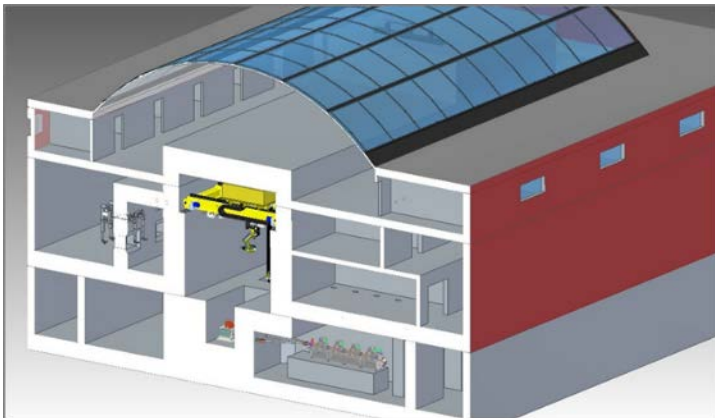
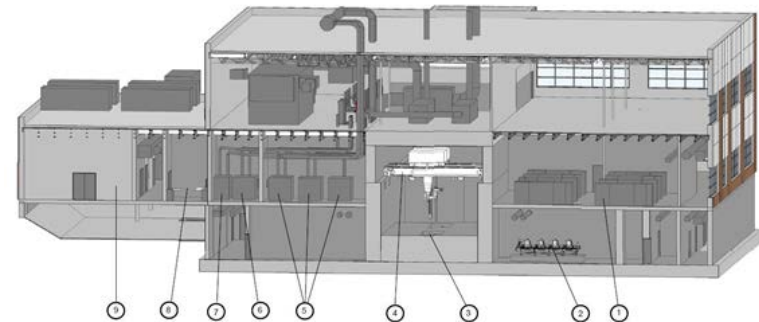


CII - Proposed Facility in Saskatoon, CA



- 1 MODULATORS / KLYSTRONS
- 2 LINEAR ACCELERATOR (LINAC)
- 3 TARGET STATIONS
- 4 MANIPULATOR CRANE
- 5 PROCESS HOT CELLS
- 6 DISPENSING HOT CELL
- 7 STERILIZATION HOT CELL
- 8 PACKAGING
- 9 SHIPPING / RECEIVING

CANADIAN ISOTOPE INNOVATIONS CORP.
ISOTOPE PRODUCTION AND PROCESSING PLANT (IPPP)
SECTIONAL VIEW



- 80,000 sqft² (7,400 m²), first-of-a-kind production and processing facility
- CNSC licensed and cGMP certified
- Capacity to supply at least 26% of North America's demand

CIIC, So Far.....

- Key experienced, committed personnel in place
- Pilot production sites available: Canadian Light Source, Fedoruk Centre
- US and Canadian customers engaged, progress at various stages
- Technologies are validated and key processes are complete or advanced development stages
- Regulator engagement: Health Canada, and FDA Consultant
- Front-end engineering of integrated state-of-the art production facility completed
- Investor engagements ongoing



CIIC's Next-Gen LSA Generator

- Solvent extraction technology is our primary approach
- Extensive internal and customer engagements to ensure technology is the best fit for NM field
- All consumables are supplied, and generator is field-serviced and maintained
- Multi-center testing of generator for regulatory and market validation purposes planned, in both Canada and the US



CIIC's Next-Gen LSA Generator

- New practice model – generator at client site, Mo99 solution is shipped and is client loaded
- Small relative size
- Able to cater to high activity customers (up to 19Ci/unit)
- Fast speed of Tc99m extraction
- Compliant with regulatory and cGMP specifications
- All consumables will be CIIC supplied to maintain quality and client convenience
- All docking and extraction steps will be aseptic



CIIC's Linac Business Streams

- Integrated full cycle customer relationship – Mo99, generator supply, service and maintenance, and recycling
- Irradiation services and Mo99 supply – as solid or liquid
- Generator provision for other LSA Mo99 sources (e.g. n,g)
- Turn-key package including Linacs, and technology support
- Other isotopes and services around other isotopes



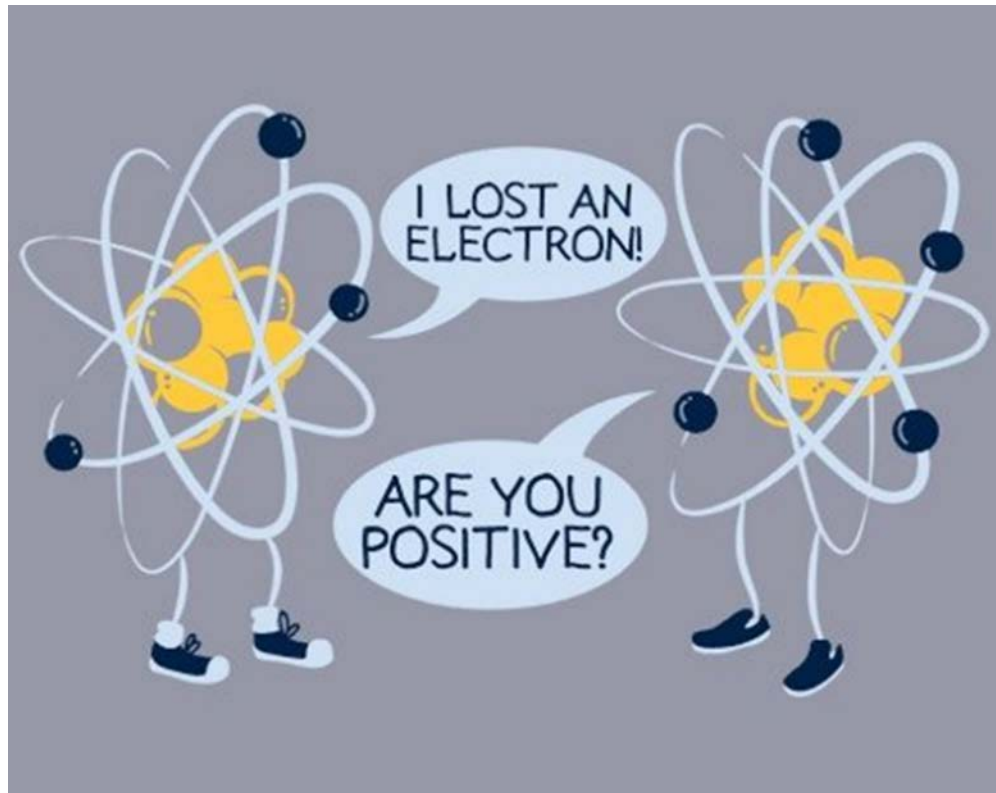
Risks to Business Plan

- Assured supply of enriched molybdenum-100
- Successful development of next-gen CIIC generator
- Health Canada and FDA approvals – success and timelines
- Market acceptance of alternative non-fission Mo99 sources
- CIIC's private investment fundraising for business plan execution
 - Unbalanced competition, including as a result of global government subsidies



CII - Strengths for Global Supply

- **Innovative, customer-responsive technology**
 - **Technology diversification**
 - **Facility siting decentralization**
- **Commitment to security and environmental consciousness**
 - **Fully integrated processes with excellent costs control**
 - **Accessible and scalable technologies**



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