Canada's Medical Isotope Strategy

NNSA's Mo-99 Topical Meeting
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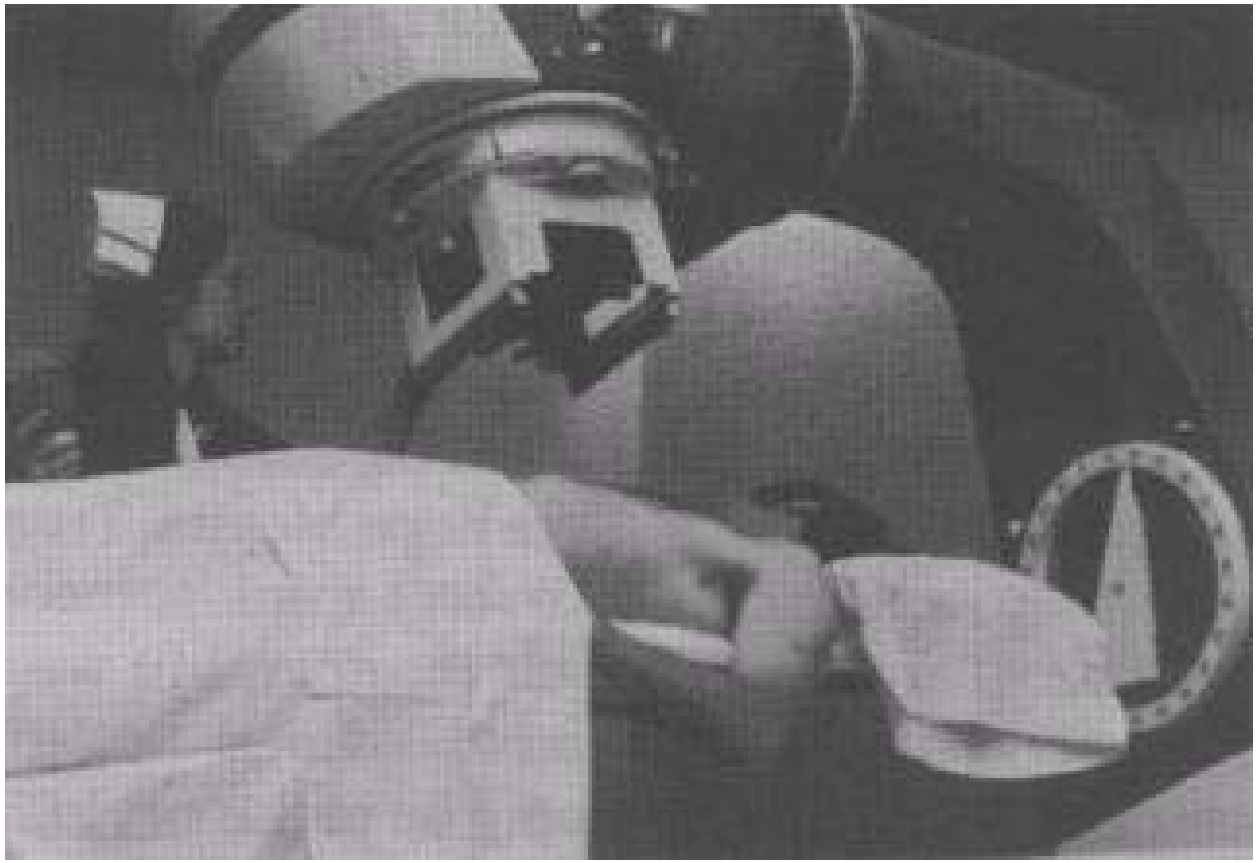
Purpose and Outline

- To provide an overview of the Government of Canada's policies and programs for securing supply of technetium-99m for Canadians

- Outline
  - Context
  - Role of Government
  - Short-Term Action
  - Programs
  - Long-Term Vision

AECL At The Forefront



Cancer therapy unit produced by Atomic Energy of Canada Limited
(installed in the University Hospital, Saskatoon)

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Global Mo99 Suppliers


NRU (Canada)


HFR (Netherlands)


BR-2 (Belgium)


OSIRIS (France)


SAFARI (S. Africa)

Five global reactors:

Supply 95% of global demand

Approx. 630,000 Ci annually

Distribute to four processors

Coordinate production schedules

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Context

- Vulnerabilities continue
  - Linear supply chains with little redundancy
  - Limited number of producers and processors
  - Aging infrastructure globally
  - Much of the supply comes from HEU sources

The Role of Government

- Promoting health and safety
- Establishing appropriate regulatory frameworks
- Allowing markets to work
- Facilitating international collaboration
- Funding high-risk, early-stage R&D
- Encouraging private-sector investment in innovation
- Supporting and respecting environmental and non-proliferation goals

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Short-term Action

- NRU licensed to cover 2011 - 2016
- Scheduled maintenance outages of NRU each year
- Health care community, and provinces/territories, making more efficient use of available supplies and alternatives
- Health Canada continues to:
  - Notify medical community as required
  - Help encourage advance planning and sharing of best practices
- International High-level Group on the Security of Supply of Medical Radioisotopes (HLG-MR) has helped manage supply fragility
  - Established under auspices of the Nuclear Energy Agency and Chaired by Canada
  - Improved coordination of reactor outage schedules
  - Commitment by producing countries to aim for full-cost recovery pricing
  - The second, two-year mandate is focused on implementation of recommendations from first two years

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Work Toward the Long Term

Expert Panel assessed most viable options for securing a sustainable supply of Tc-99m over the medium to long term.

General Recommendations:

- ***Strive for diversity and redundancy throughout the supply chain***
- ***Leverage multi-use infrastructure***
- ***Continue with international coordination and seek processing standardization within North America***
- ***Highly Enriched Uranium options are only viable in the short to medium term***

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Isotope Supply Initiative

- Via Budget 2010, the Government announced an investment of $48 million to support its isotope strategy:
  - $35 million provided over two years to Natural Resources Canada (NRCan) to support research, development and demonstration (RD&D) of non-reactor based technologies for the production of isotopes;
  - $10 million provided over two years to the Canadian Institutes of Health Research for a clinical trials network to help move research on isotopes and imaging technologies into clinical practice; and
  - $3 million over two years provided to Health Canada to investigate the optimal use of medical isotopes and alternatives.

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Non-reactor-based Isotope Supply Contribution Program (NISP)

- On January 24, 2011, the Government announced the signing of four contribution agreements with respect to two cyclotron and two linear accelerator projects:
  - Canadian Light Source Inc. (CLSI) (linear accelerator);
  - Prairie Isotope Production Enterprise (PIPE) (linear accelerator);
  - Advanced Cyclotron Systems Inc. (ACSI) (cyclotron); and
  - TRIUMF (cyclotron)
- By the end of this two-year funding program (March 2012), the goal is to have a much clearer picture regarding the commercial viability of these alternative technologies

NISP – Why linear accelerators and cyclotrons?

- Advantages
  - Distributed – reduces single-point-of-failure issue
  - Promise to be commercially viable
  - Cyclotrons could be used for multiple purposes
  - Some existing infrastructure and distribution channels
  - Area of Canadian expertise
  - Little radioactive waste

- Risks
  - May not cover needs of more remote centres
  - Still at an R&D stage of development with all of the associated risks
  - Supply and cost of molybdenum-100 uncertain
  - Low priced “reactor moly” will likely continue to be available from foreign producers for some time

NISP – Work Underway

- Across the four projects, work is well underway in the following priority areas:
  - target and converter design and optimization;
  - cooling capacity;
  - target processing and achievable yield;
  - generator design and optimization;
  - Mo-100 costs, availability and recycling;
  - overall process optimization, including yield optimization; and,
  - work to address regulatory requirements.

Long-Term Vision

- Canada as a leader in sustainable supply
  - Commercial production without government support
  - Increased security of supply through diversification

- Canada as a technological leader
  - Through advances in cyclotron and linear accelerator-based technologies for Mo-99/Tc-99m
  - Creating new intellectual property
  - Providing opportunities for smaller countries/markets around the world

- Canada as an environmental leader
  - Through a reduction in waste

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Going Forward

- Winter 2012 – Take stock of progress made with respect to non-reactor-based technologies and clinical trials work to bring other isotopes to market, as considered in the context of the global market