

COMMERCIAL SCALE PRODUCTION OF LEU BASED MOLYBDENUM 99 IN SOUTH AFRICA

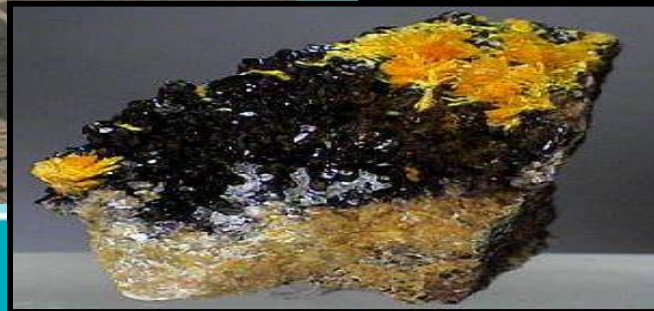
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Necsa CEO

12 April 2010

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- Radioisotopes production by Necsa's subsidiary NTP Radioisotopes (Pty) Ltd
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4th Largest Reserves of Uranium in the World are in South Africa



Establishment of the Atomic Energy Board

The Atomic Energy Board established in 1946 (following World War II) to perform nuclear research & to be South Africa's national nuclear authority.

Pelindaba site acquired in 1959.

Four point nuclear industry development programme.

- Development & refinement of the SA's nuclear raw materials.
- Promotion of nuclear power.
- Development and utilisation of nuclear technology in industry, medicine, geology and agriculture.
- Basic research in support of above

Safari-1 Research Reactor



Oak Ridge type reactor, part of “Atoms for Peace”

Discontinued Strategic Programmes



Uranium Enrichment



Fuel Fabrication



Weapons Programme

Radiochemical Facility



Decision to use state of the art facilities to make radioisotopes

NTP Radioisotopes (Pty) Ltd

- Currently world's largest producer of medical radioisotopes
- Over 10 million people worldwide benefit from medical procedures made possible from the supply of Necsa's Mo-99
- Entirely Low Enriched Uranium process by mid 2010.
- At present, the NRU reactor in Canada, which produced up to 40% of global Mo-99, is in a shutdown owing to a reactor coolant leak

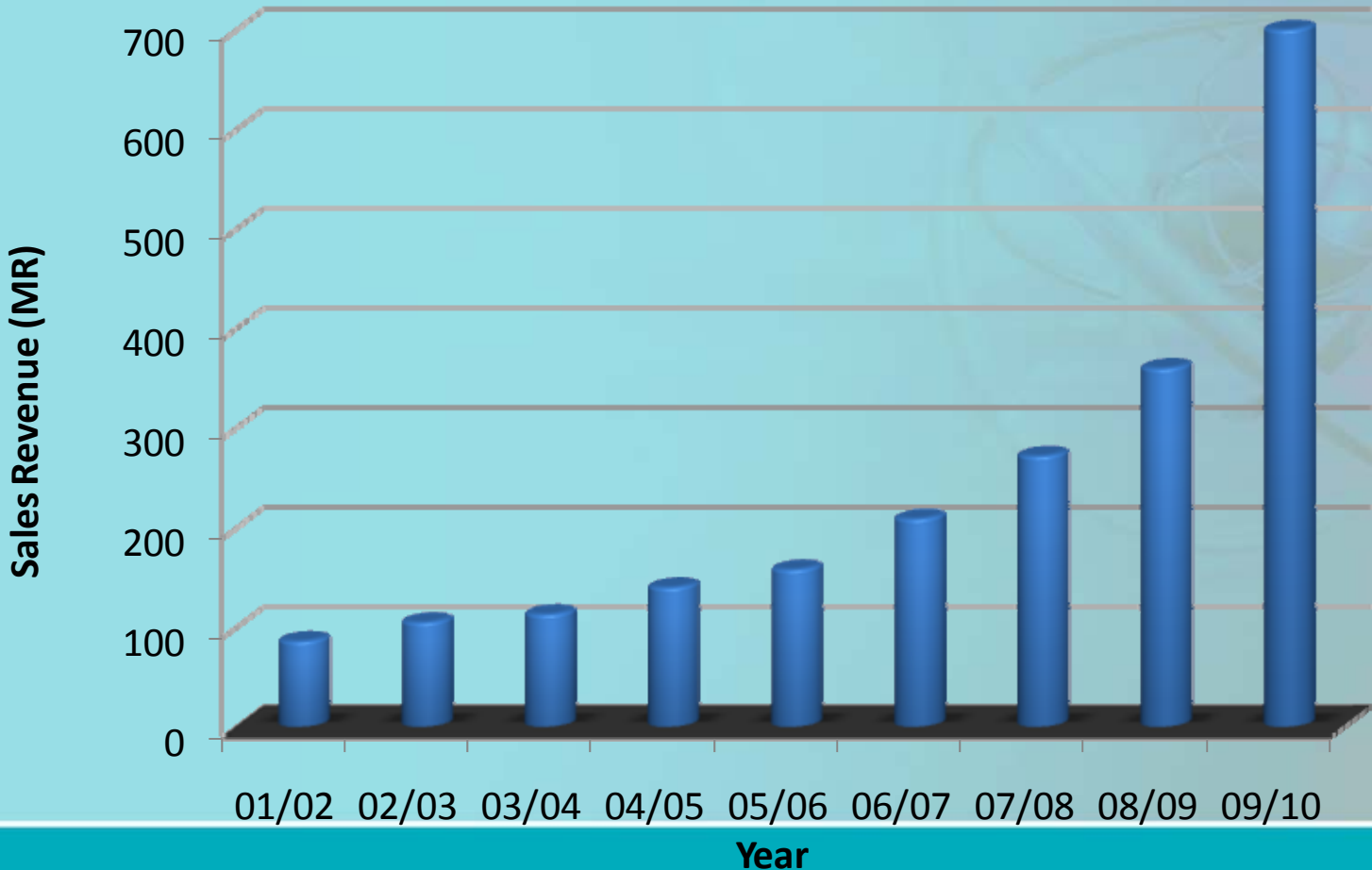
The Radioisotopes Business is about Logistics



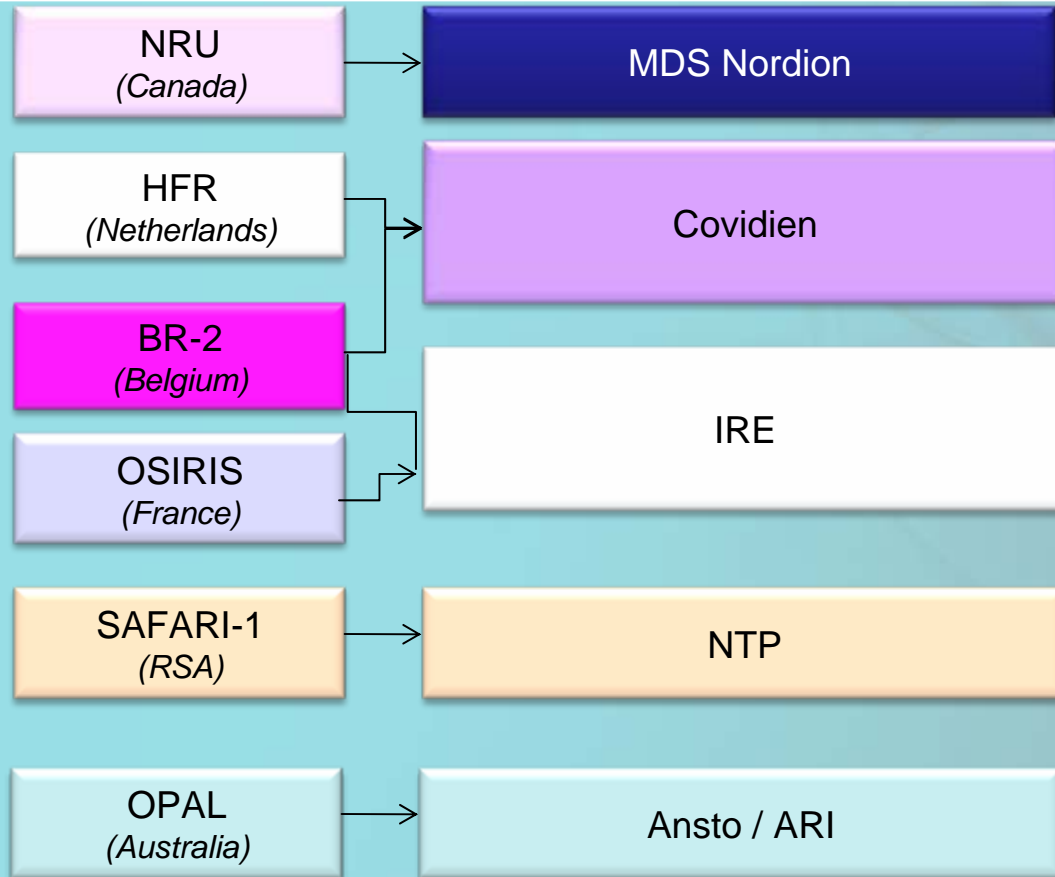
Mo-99 has a half life of 66 hours!

Sales to 60 countries...

ISOTOPES SALES PERFORMANCE PAST 9 YEARS



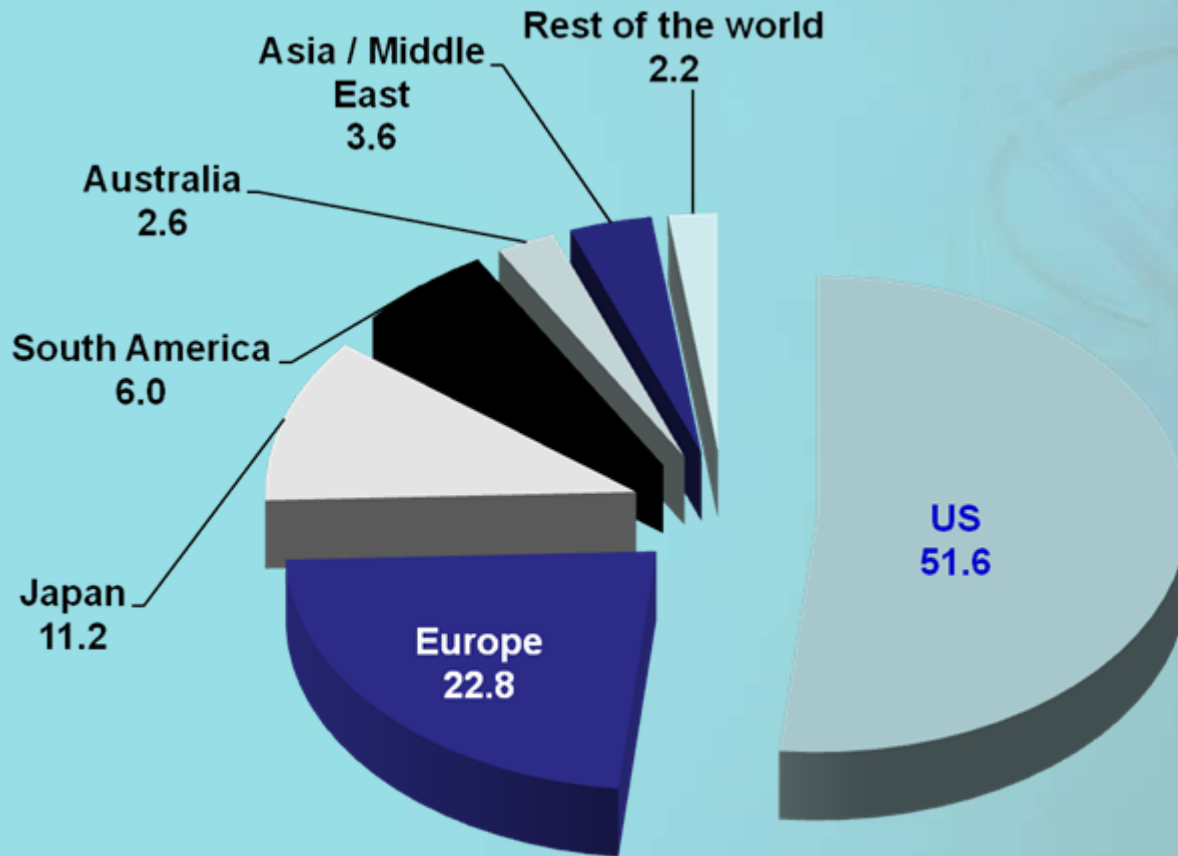
Global Mo-99 Producers and Markets



Reactor

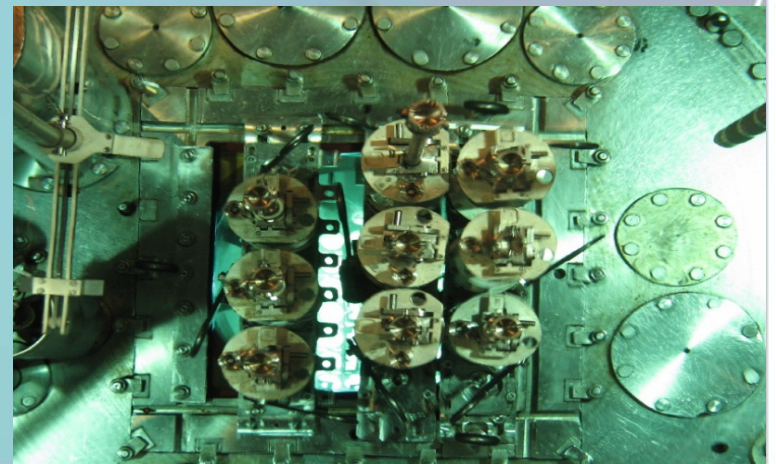
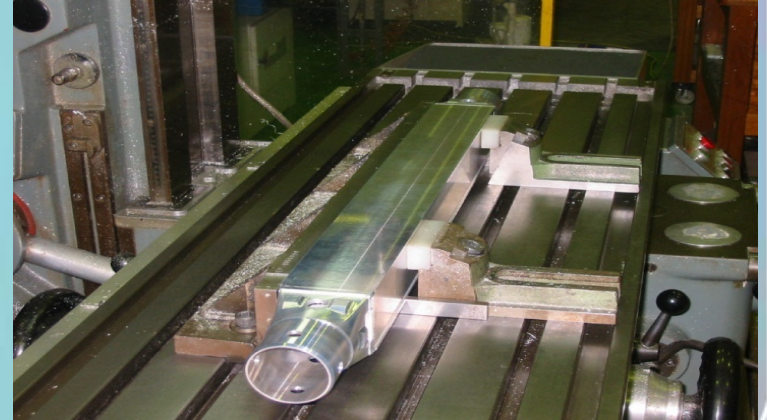
Mo-99
Production

Mo-99 Demand (%) Per Region



SAFARI-1 Fuel Conversion Strategic Consideration

- Full techno-economic study
- Minimise financial and operational risks
- No changes to fuel and core geometry



SAFARI-1 Fuel Conversion Time Line

Year	Event
2001	Technical and Economic Feasibility Study
2005	Government approves conversion of SAFARI-1
2006	First test irradiations of LEU fuel commenced
Aug 2008	Nuclear Regulator approved conversion
Sep 2008	Conversion commenced
Jun 2009	Conversion completed (no changes to fuel and core geometry)

Mo-99 Target Conversion Strategic Consideration

- Minimum changes to target, irradiation, handling & chemical processes
- Retention of production capacity
- No interruption in current production



SAFARI-1 Fuel Conversion Project Status

- Theoretical feasibility studies – completed
- Cold experiments on depleted uranium targets - completed
- Test Irradiation Program in SAFARI - completed
- Process development and tests on irradiated LEU targets –
ongoing
- 1000 6-day Curies per week by July 2010!

Mo-99 Waste Streams

- The largest change to the waste streams are:
 - Doubling of uranium mass
 - Increase in activity of actinides
- No significant change to liquid or other solid waste streams
- No criticality issues
- Increase in the volumes of waste per curie ^{99}Mo produced.

Impact of LEU Conversion

- Maintaining Mo-99 production capacity required significant R&D investment
- Need for enhanced facilities for handling Uranium residue waste streams (more actinides and light elements!)

Significant increase in Mo-99 production costs



Significant increase in Mo-99 price

Necsa/NTP strategy for Radioisotopes Going Forward

- LEU based product (> 3000 6 day Curies per week at capacity)
- New Dedicated Isotopes Production Reactor (DIPR) at Pelindaba by 2017.
- Safari to be refurbished and used as dedicated MTR reactor and as a back-up isotope producer for the DIPR
- All operations fully commercial, profitable and not government subsidised.
- Proven NTP Mo-99 production technology can be deployed globally by means of joint ventures.



Thank You!!!