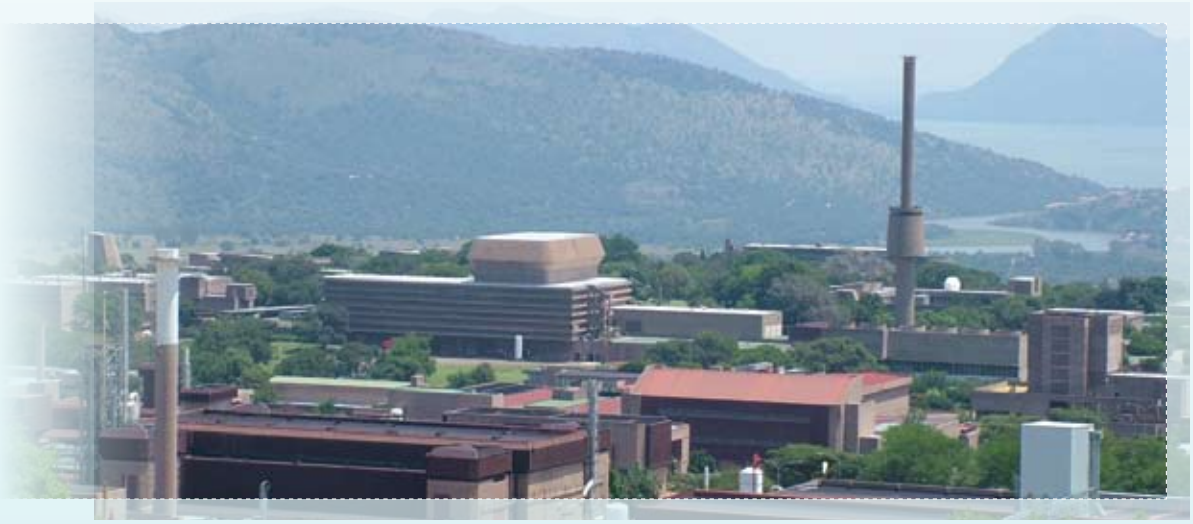
World leader in the production and supply of medical isotopes



NTP Radioisotopes (Pty) Ltd
a subsidiary of Necsa Ltd

The South African nuclear industry dates back to the mid-1940s, when the Atomic Energy Board (AEB) was established to oversee the development of the nation's uranium mining and trade industry.

South Africa's nuclear experience truly began under the auspices of the United States "Atoms for Peace" programme when in 1957 it signed a bilateral 50-year nuclear collaboration with the United States that resulted in South Africa's acquisition of the 20MW SAFARI-1 nuclear research reactor and an assured supply of highly enriched uranium (HEU) fuel. Subsequently a uranium enrichment programme, a fuel programme and a clandestine weapons programme were established.

In 1991 South Africa signed the Nuclear Non-proliferation Treaty (NPT) and in1993 opened its nuclear weapons past to international inspections, becoming the first and only country to abandon its weapons programme voluntarily.

South Africa has emerged a champion of both global nuclear non-proliferation and access to the peaceful application of nuclear energy through its nuclear custodian, the South African Nuclear Energy Corporation, Necsa.

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NTP Radioisotopes (Pty) Ltd

Molybdenum-99 from South Africa

NTP Radioisotopes (Pty) Ltd, a subsidiary of Necsa, champions the cause for radiation-based medical supplies and services.

While precious metals are highly sought after, there is an even greater demand worldwide for another valuable commodity - the commercially produced radioactive isotope Molybdenum-99 (Mo-99). The isotope is used in over 100 000 nuclear medical procedures globally every day.

The nuclear medicine industry has a limited and fragile supply chain of the much-needed isotopes used for the diagnosis and treatment of many diseases. Indeed there are only four countries in the world capable of making this rare product in commercial quantities and NTP Radioisotopes in South Africa is the acknowledged world leader in terms of quantity produced, reliability and quality. This ISO9001:2008, USFDA approved company, which has been in operation since 1992, initially as a business division of Necsa and since 2003, as a registered limited liability company, developed the expertise and markets for Mo-99.

The demand for nuclear medicine is growing because of its ability to help in the diagnosis of cancer, heart disease and other illnesses. The 50 million or so patients who have medical scans using nuclear techniques every year derive immense benefits from the modality because of its ability to help doctors make early and accurate diagnoses.

In early 2009, a critical global shortage of Mo-99, used in devices for nuclear medicine scans, occurred due to the unscheduled closure of the large NRU research reactor in Canada and another in Europe. NTP has increased production by 20% to help maintain the supply of Mo-99 to users nationally and internationally.

Currently NTP is the world's largest supplier of the strategically critical Mo-99 medical isotope and is playing the leading role in supporting the practice of nuclear medicine globally during the crisis, which is likely to persist beyond 2010.

What are radioisotopes?

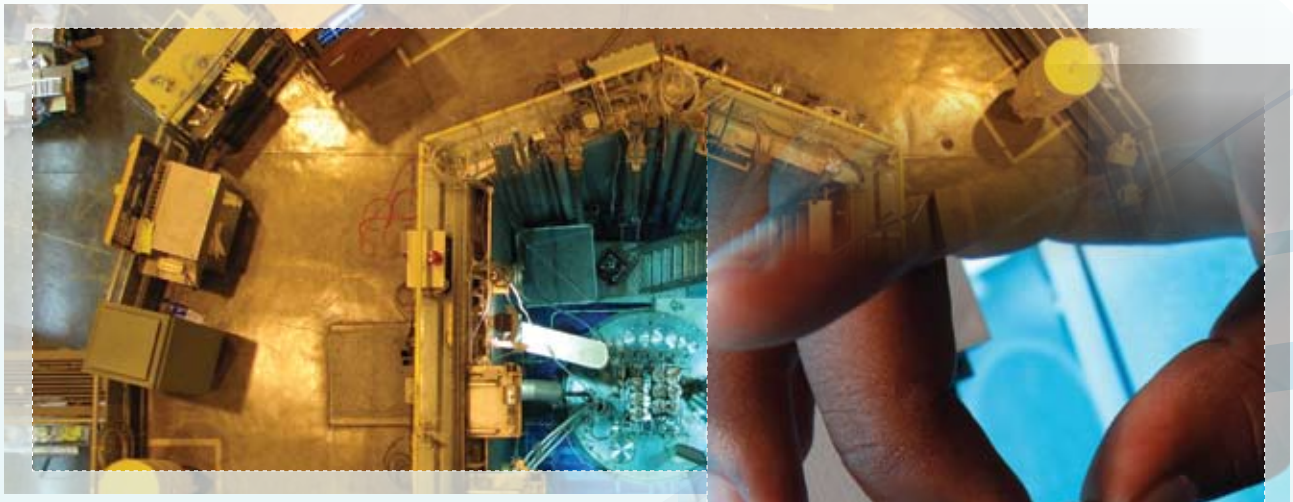
Radioisotopes, naturally or artificially created, are varieties of the same chemical element, all having an unstable nucleus that decays, emitting alpha, beta, or gamma rays (radiation) until such time as stability is reached. Isotopes are made by bombarding uranium targets in a nuclear reactor or a particle accelerator with intense beams of neutrons. Some of these radioisotopes can then be used as tracer agents in humans to allow for organ imaging and therefore diagnosis of diseases.

What are the advantages of medical isotopes?

Molybdenum-99, with a half life of 66 hours, is used as a parent radioisotope in Technetium-99m generators to produce the isotope Technetium-99m (Tc-99m) with a half life of 6 hours. This is mixed with a specific organ-seeking chemical compound, and injected into patients, making it is possible for doctors to examine the way in which an organ of concern is functioning (physiology) rather than just its shape (morphology) as is done with X-rays or CT and MRI scans. The difference is that nuclear medicine uses a radiation source on the inside of the body, where both bone and soft tissue can be imaged, rather than outside the body, as is the case with X-rays and other medical diagnostic scanning modalities.

Further medical isotopes produced by NTP Radioisotopes are used for the treatment of conditions such as thyroid disease and lymphoma.

Approximately 60 countries on five continents are served with a range of radiation-based products



NTP Radioisotopes will soon produce the first Mo-99 using a fully converted LEU production process

The production environment

NTP Radioisotopes produces Mo-99 in a highly sophisticated environment, using materials irradiated in its SAFARI-1 nuclear reactor at its Pelindaba facility. The 20 MW Oak Ridge-type reactor is much smaller than the power reactors used for producing electricity. Now in its 46th year of faultless operation, the reactor achieves a world record average of 305 operating days, at full capacity, per annum.

Irradiated material is manipulated and processed in a row of shielded hot cells to extract the desired quantities and types of radioisotopes. In effect, these are miniature chemical factories more or less capable of creating the entire periodic table of radioisotopes.

Once purified, the resulting material is sent on its way in liquid form in specially designed, suitably shielded, internationally licensed transport containers, which are designed and built by NTP Radioisotopes and subjected to rigorous nuclear industry and air transport testing and certification.

The operations are fully ISO-compliant and adhere to the best safety, medical and environmental standards in the world.

World first in the use of LEU

Since its inception, SAFARI-1 has been fuelled using highly enriched uranium (HEU) and after South Africa signed the Nuclear Non-proliferation Treaty, the remaining weapons' grade uranium inventory has been used for fuelling and for Mo-99 irradiation target plates. Since 25 June 2009, the SAFARI-1 reactor has been run continuously on a fully low enriched (LEU) fuel with a U_{235} content of less than 20% – conforming with International Safeguards requirements.

South Africa and NTP Radioisotopes will soon achieve another world-first when the change-over to LEU target plates, scheduled to take place in 2010, is complete and NTP Radioisotopes produces the first commercial-scale Mo-99 using a fully converted LEU production process.

Global footprint

NTP Radioisotope's Mo-99 is currently used in at least 30% of all nuclear scans done in the world using reactor-produced isotopes. The company routinely serves customers with its range of isotope products in approximately 60 countries on five continents. Its principal product remains Mo-99.

Delivering a useful product

The challenge, in addition to mastering the complex technology needed to make these isotopes, is to transport them reliably, safely and as quickly as possible to wherever they are needed in the world, since the nature of isotopes is that they decay away from the very moment they are produced. Mo-99 has a half-life of only 66 hours (which means that 20% of the product is lost every day that it is not used) and is exported from Pelindaba, situated in the interior of South Africa, to many countries on different continents every day, often with the need to trans-ship en route.

Mo-99 is one of the most valuable commodities in the world and sales of this isotope will soon be worth about one billion Rand per year for NTP Radioisotopes, with commensurate spin-offs for South African foreign exchange, employment and the fiscus.

NTP holds a world-leading position with regard to reliability in terms of delivery and quality of radioisotopes and strives continually to minimise any risks to the regular, routine supply of Mo-99 to its customers throughout the world.

Driving efficiency

NTP Radioisotopes is actively driving a campaign to increase the efficient use of Mo-99. By ensuring that what is produced is consumed as efficiently by its customers as possible and that wastage is eliminated, the company aims to ensure that more of this precious commodity is available for medical diagnoses and treatments.

The company is represented internationally by Managing Director, Don Robertson, on the High Level Group (HLG) of the Organisation for Economic Co-operation and Development's Nuclear Energy Steering Committee where it is also providing leadership and advice aimed at alleviating the impact of the Mo-99 shortage.

NTP Radioisotopes is actively driving the efficient use of Mo-99

NTP Radioisotopes (Pty) Ltd – the Company

The company is a subsidiary of Necsa and emanates from the latter's commercialisation programme, launched in the late 1980s and its subsequent renewed focus on national strategic objectives.

NTP Radioisotopes is a company with over 250 staff members, and is fully ISO 9001:2008 compliant. It is also approved by all the world's major medical regulatory bodies, including the USFDA, the Australian TGA and the European Pharmacopoeia, and boasts the best safety and environmental standards and accomplishments in the world in its field.

Safety at the facility is paramount and regular training is offered to maintain the company's track-record of more than 1 million continuous disabling injury free hours of operations.

The company's social responsibility ethic is extremely strong – evidenced in its commitment to putting back into the local community through the building of a science laboratory for the Ennis School and on-going support for the school.

The NTP subsidiary family comprises AEC Amersham (Pty) Ltd and Pharmatopes (Pty) Ltd (100 per cent owned), NTP Logistics (Pty) Ltd (51 per cent owned), Cyclotope (Pty) Ltd (100 per cent owned) and Gammatec NDT Supplies, an international distributor of radioactive materials used in gamma radiography (55 percent owned).

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