



OVER 20 YEARS OF SUCCESSFUL COLLABORATION

Twenty-five years ago, the innovative management team at Atomic Energy of Canada Ltd. (AECL) recognized the potential of cyclotron-produced radioisotopes for medical science advancement. From that vision emerged the remarkably successful alliance between TRIUMF and AECL. Since the 1950s, AECL has been producing isotopes using nuclear reactors. In 1978, AECL's Commercial Products Division approached TRIUMF about using its 500 MeV cyclotron to produce other radioisotopes. The result was the flourishing collaborative research and production site located at TRIUMF on the University of British Columbia's campus. Since its inception it has created benefits for both medical science and economic growth. In 1979 AECL's Commercial Products Division was renamed the Radiochemical Company, and 3 years later began exporting cyclotron-produced isotopes from the TRIUMF site. Two smaller cyclotrons were subsequently purchased and used exclusively by the AECL for the commercial production of isotopes. One of these was designed and commissioned by TRIUMF staff. In 1991, AECL privatized its operations under the name Nordion International Inc., which was later acquired by MDS Inc., a Canadian-based international health and life sciences company, and renamed MDS Nordion Inc.

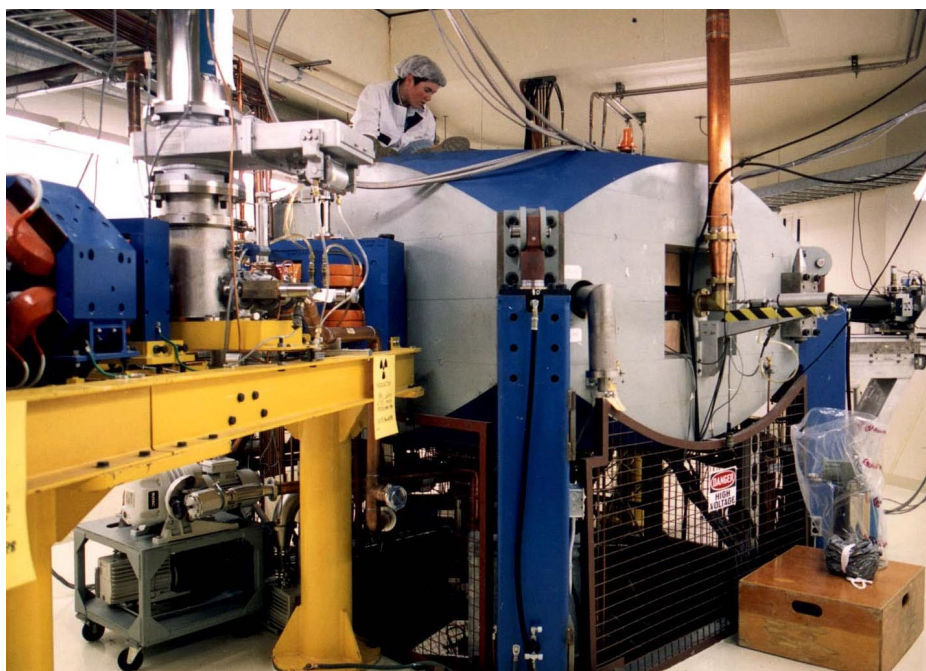
MDS Nordion's headquarters are in Kanata, Ontario. In addition to the TRIUMF site, it has operations running in Belgium (reactor and cyclotron isotope production, radiopharmaceuticals), Laval, Quebec (research, training and testing of cobalt-60 irradiators), Germany (brachytherapy systems and radiography cameras), Sweden (development of computer products and software, and accessories for radiation therapy), as well as offices in Japan and Hong Kong which serve the Pacific Rim. Total corporate annual sales are approximately \$350 million, over 95% of which are exported to some 80 different countries.

WORLDWIDE, IT IS ESTIMATED THAT UP TO 20 MILLION NUCLEAR MEDICINE IMAGING AND THERAPEUTIC PROCEDURES ARE PERFORMED EACH YEAR.

MDS Nordion's Vancouver operation on the TRIUMF site currently employs 50 full-time permanent staff and 22 contract staff. These 22 contract staff are TRIUMF employees, supported by Nordion on a full-time, cost-recovery basis and they are responsible for the operation of Nordion's two compact commercial cyclotrons. To date, the cumulative sales of MDS Nordion in Vancouver have exceeded \$200 million. The licensing agreements between TRIUMF and MDS Nordion have resulted in royalties of several million dollars that TRIUMF has utilized as supplementary funding for further research, as well as related technological activities that support the transfer of TRIUMF technologies to Canadian industry.

Nordion's operation at TRIUMF is unique in Canada. In fact, it is one of only a few sites worldwide that produces cyclotron-based isotopes. According to the U.S. Institute of Medicine, there are over 36,000 diagnostic medical procedures employing radioisotopes performed in the United States each day. About 100 million laboratory tests using radioisotopes are performed there each year.

MDS Nordion produces



The TR30 cyclotron, owned and operated by MDS Nordion, for the production of radioisotopes.



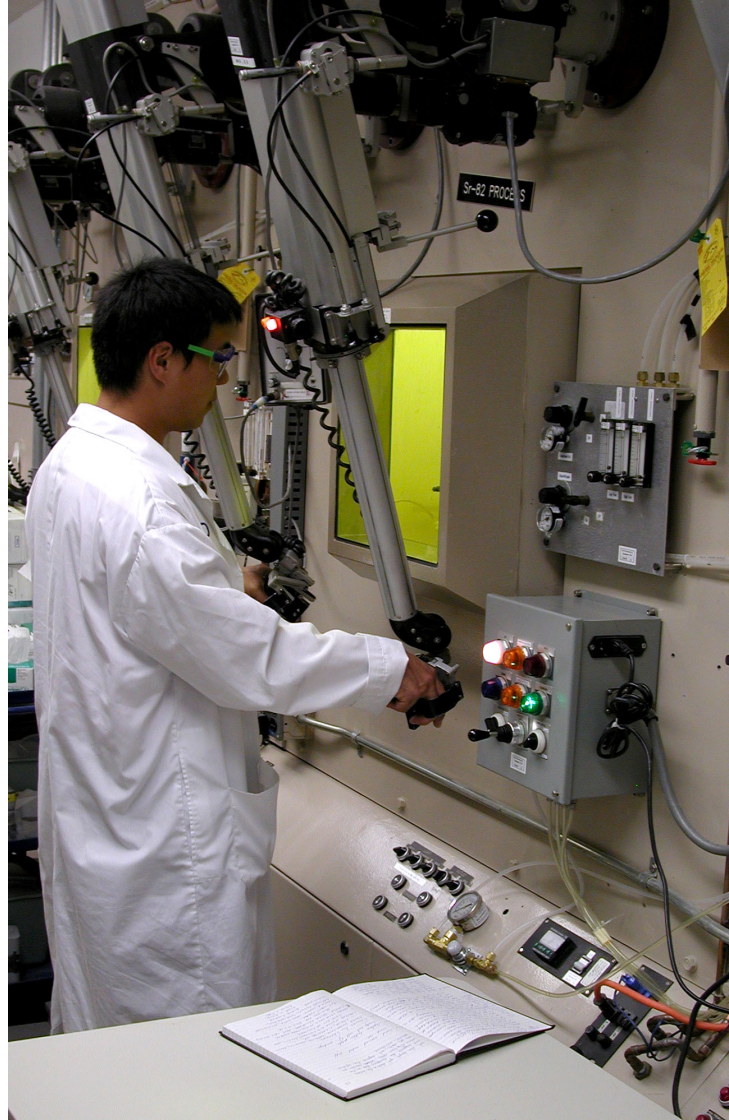
the following radioisotopes under license from TRIUMF for sale worldwide:

- *palladium-103*, used for prostate cancer therapy;
- *strontium-82*, used for high resolution heart imaging to detect coronary artery disease and for diagnosing bone lesions;
- *thallium-201*, widely used as a heart imaging agent;
- *indium-111*, used in blood cell labeling, as a heart imaging agent and to locate tumours;
- *gallium-67*, used to detect such conditions as Hodgkin's disease;
- *cobalt-57*, used as a marker to estimate organ size/location, and for diagnosis of anaemia related to vitamin B12 deficiency;
- *iodine-123*, used traditionally for thyroid imaging, also currently made into a radiopharmaceutical for neurological diagnosis of Parkinson's disease, schizophrenia and Alzheimer's disease, in oncology for cancer imaging (e.g. breast cancer), and in cardiology for imaging cardiac tissue.

Since the 1950s, nuclear medicine has become an increasingly important and utilized part of patient care. The procedures are generally safe and painless. Only very small amounts of the radioisotope or radiopharmaceutical are needed to diagnose and treat disease. When introduced into the body these substances are attracted to specific bones, tissues or organs. Because these substances are radioactive they decay emitting radiation that can be detected using special types of cameras that show the distribution of the isotope in the body. Both reactor- and cyclotron-produced radioisotopes emit gamma rays but only the cyclotron produced ones also emit the positrons that are essential for PET scans. The images so obtained provide physicians with critical information on how the body is functioning. This in turn helps them to diagnose disease, determine the best course of treatment, and monitor the progress of the treatment. Current studies at TRIUMF are showing the promise of using radioisotopes to treat cancerous growths, resulting in significantly less trauma to the patient than caused

IN THE UNITED STATES ONE OUT OF EVERY THREE MEDICAL PATIENTS UNDERGOES AT LEAST ONE NUCLEAR MEDICINE TEST.

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A MDS Nordion technologist preparing radioisotopes at TRIUMF for shipment

by the traditional methods.

MDS Nordion is the only Canadian supplier of many of these crucial radioisotopes. Through its licensing agreements with TRIUMF, Nordion has first rights to the cutting-edge isotope technology originating from TRIUMF research. This ensures timely dissemination of the technology, while delivering the maximum benefit to the Canadian economy.

The demand for radioisotopes has grown each year as diagnostic techniques and screening capabilities have increased. To help satisfy the growing demand, Nordion is investing \$20 million to build a new commercial cyclotron facility at its TRIUMF site. This new facility will increase MDS Nordion's radioisotope production capacity in Vancouver in order to help meet the



ever-growing demand for iodine-123 and palladium-103. The new cyclotron will bring with it an extension to the current building that houses the Vancouver MDS Nordion team. Construction began in 2001 and production is expected to begin in January, 2003. In addition to meeting global demands for medical isotopes, the new facility will create additional opportunities for high quality employment. By the year 2006, it is projected that there will be 53 employees and 31 contract employees, all of them in highly skilled positions.

MDS Nordion is now working at full capacity to ensure that the demand for high-priority isotopes is met. The new cyclotron will be capable of meeting additional demands for these and other existing products. The increase in production and export will also assist TRIUMF and Nordion in continuing their research and development of new cyclotron-

THERE ARE CURRENTLY OVER 100 DIFFERENT MEDICAL IMAGING PROCEDURES IN USE.

produced isotopes, which will further advance the Canadian nuclear medicine industry. The improved radioisotope production capability of Nordion at the TRIUMF site is estimated to provide products for 1,000,000 nuclear medicine procedures around the world each year.

The synergistic benefits flowing from the long-term relationship between the TRIUMF universities and MDS Nordion are manifold and well recognized by Nordion's customers. TRIUMF has provided and continues to provide leading-edge research skills to MDS Nordion. At the same time, MDS Nordion has introduced the concept of the marketplace to TRIUMF staff, as well as the potential social and economic benefits that can flow from the practical application of scientific skills and knowledge.

The success of the TRIUMF-Nordion partnership has not been based on any one strategy or set of strate-



State of the Nordion facility addition as of May, 2002

gies. It started with a sharing of knowledge and has succeeded because of the level of mutual trust and respect the two parties have established. Both parties recognise that, while working together, each must respect the fact that they are two discrete entities and must remain independent; that the synergy from the relationship lies in the strength of the other's difference; and that the collaboration is a joint effort, where either success or failure affects both parties equally. Further developments are under way, with TRIUMF working on new types of targets, new calibration sources, and cyclotron improvements, and with Nordion expanding its radioisotope product line. These developments are aimed at making still further advances into the cost-effective production and delivery of short-lived radioisotopes to the health care system.

Looking back, the TRIUMF-Nordion co-operation of the past 25 years has been a major Canadian success story. As a result of this success, Canada is now one of the world's major suppliers of cyclotron-produced radioisotopes, and the future holds even greater promise.

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