

## Cancer Therapy

### Unit and Cobalt-60

#### Sources

On an October morning in 1951, the world's first commercial cobalt-60 therapy unit in London, Ontario, Canada was used to treat a cancer patient.

That epochal event, coming just six years after the formation of the fledgling commercial products division of Eldorado Mining and Refining Ltd., marked the beginning of Canada's growth to the status of a world leader in the use of nuclear technology in the medical field.

Today, Atomic Energy of Canada Limited (AECL), a federal Crown corporation, is a major producer of radioisotopes, cancer therapy units and irradiation facilities.

In a cobalt-60 unit, gamma rays emitted from a cobalt-60 source are directed at a tumor. A single such source is capable of providing 31 500 treatments to 1 500 patients over five years.

Continual modifications and improvement on that first cobalt-60 therapy unit have been made over the past three decades.

Annually, over 500 000 patients in 80 countries undergo treatment on one of a range of AECL cancer therapy units of which over 1 700 are in operation around the globe.

The Phoenix, the latest addition to AECL's cobalt-60 therapy program, has the advantage of low initial cost and it is able to integrate with the latest treatment techniques and systems. This machine, with its high quality beam and dose distribution, is easily installed for quick operation. Further, it requires no daily run-up and calibration as do some units. It offers special benefits for therapy in the head and neck region.

AECL maintains a special beam therapy source measurement cell

that enables measurement of radiation source output with less than one degree of beam scatter.

When it was first incorporated in 1952, AECL was handed responsibility for nuclear research in Canada – all of it for peaceful purposes; research that in its industrial application resulted in the development of CANDU, one of the most successful nuclear reactor electrical generating systems on earth.

Cobalt-60, a radioactive isotope produced in the CANDU reactors by the irradiation of cobalt-59, is in ever-increasing demand in a world learning the potential of gamma ray technology.

The Theratron 780-C is the world's most advanced such unit. It is designed and built to provide clinic cost effectiveness and is fully compatible with existing treatment methods. New design features, drawn from studies of other Theratron operations in over 1 000 clinics throughout the world include a 35-centimetre "rotation axis to collimator distance" – the greatest possible clearance for any such unit and a precise 0 degree lock on the source head swivel. And there are many more.

Since launching its cobalt-60 program, AECL has encapsulated more than 100 million curies; its annual production rate has reached 20 million, making it the world's major supplier of radioactive cobalt.

AECL uses only high specific activity pellets, thereby making it possible to produce small diameter (0.5 to 2 cm) sources with radiation outputs much larger than some other sources containing low activity cobalt. Also, the sources are doubly encapsulated and the use of nickel plated pellets prevents dusting and corrosion.



The Theratron 780C, the most advanced cobalt-60 cancer treatment machine in the world.