

NEWS BRIEFS

'Star Wars' Accelerator Put to Medical Use

Researchers at Washington University, St. Louis and Science Research Laboratory, Inc., a Somerville, Massachusetts research and development company, have developed a type of linear accelerator for medical use. Called a tandem cascade accelerator, the device may significantly lower the acquisition and operating costs of PET technology and make PET scanning more affordable.

A working prototype of the new accelerator was installed in May at Washington University's Mallinckrodt Institute of Radiology in a building adjacent to the site of a proposed multidisciplinary neuroimaging center. The instrument will be used to make radioisotopes for PET brain imaging studies and for clinical PET scanning at the Washington University Medical Center.

Made of aluminum and weighing a mere ton, as opposed to the 30-ton, \$1.5 million cyclotron, the tandem cascade accelerator requires only several inches of shielding, compared to the several feet needed to shield a cyclotron; it uses about ten times less electrical power than a cyclotron. Accelerator Applications, Inc., a Science Research spin-off, is manufacturing and marketing the device for a quoted price of \$750,000.

Lower power and shielding requirements are inherent to tandem acceleration schemes in which a negatively charged hydrogen or deuterium atom is accelerated through an electrostatic field, stripped of excess electrons after passing through a carbon foil, and accelerated again as a positively charged particle. Electromagnetic fields, which squander much of a cyclotron's power in the form of heat, are not needed in the linear accelerator.

Science Research took the old idea of tandem acceleration and combined it with a new type of high-voltage power supply and ion source and targetry tech-

nology originally developed as components of anti-missile, directed-energy weapons for the Strategic Defense Initiative (SDI). The medical applications work was funded by the SDI Office of Technology Applications with support from the National Institutes of Health.

Researchers at Science Research, led by Ruth Shefer, PhD, collaborated with Michael J. Welch, PhD, director of the division of radiation sciences at Washington University's Mallinckrodt Institute of Radiology. ■

Cost of Animal-Remains Disposal Reducible

Scientists at Albany Medical College, New York, say they can reduce the cost of animal-remains disposal from about \$140 per Kg to under 50 cents per Kg, using an alkali digestion process to liquefy remains.

According to Gordon I. Kaye, PhD, one of the scientist-inventors, as much as three-quarters of biomedical waste consists of laboratory animal carcasses containing concentrations of radionuclides that would be classified as de minimis if they were in aqueous solution. With that in mind, he and colleague Peter B. Weber, PhD, designed a hydrolysis reaction to convert solid animal carcasses into an aqueous solution that can be disposed of via drains. With the use of concentrated sodium hydroxide heated under pressure, the reaction breaks down animal tissues. Proteins, carbohydrates and lipids are dissolved completely in 12-16 hours.

RNA and DNA viruses also are destroyed. The remaining inorganic portion of bones can be crushed to a powder about 3% of animals' original weight and containing less than 1% of radioactivity. The scientists reported these results at the April meeting of the Host State Technical Consulting Committee of the DOE National Low-Level Waste Management Program in Charlotte, North Carolina.

Weber and Kaye have formed WR², Inc., Troy, New York, to market their

system. With WR² equipment, the inventors predict that labs which routinely ship 25 Kg of carcass weekly to waste sites can reduce the cost per Kg to about 50 cents by using the WR² system, amortizing system equipment costs (about \$100,000) in six months. A pilot plant is under construction at Albany Medical College; commercial units will be available in September. ■

Curtiss Leaves NRC

James R. Curtiss, commissioner of the Nuclear Regulatory Commission, stepped down at the end of his term on June 30, 1993, and will not seek reappointment.

"I enjoyed the job and am pleased with the agency's many accomplishments during my tenure," he said. "It has been a singular pleasure to work with my commission colleagues and the fine and dedicated agency staff."

Among his reasons for stepping down from his post Curtiss cited his desire to spend more time with his two young children and his interest in seeking new and challenging opportunities after over a decade of service in the federal government. At the time of his interview prior to the end of his term, Curtiss had no specific plans and said "It would not be appropriate for me to have any at this point".

When he made his announcement on May 4, Curtiss pledged that in the remainder of his tenure he would "press for completion of several important initiatives that are of great interest to me, including finalizing implementation guidelines for the maintenance rule, setting the license-renewal initiative on course, and offering suggestions on how we might achieve greater progress with the low-level waste disposal program."

Curtiss was appointed NRC commissioner on October 20, 1988, by former President Ronald Reagan. ■

FDA Approves New Bone Metastasis Therapy

The FDA has approved a new medica-

NEWS BRIEFS

tion designed to ease the pain of metastatic cancer to bone. The product, Metastron, is a ^{89}Sr chloride injection developed by Medi-Physics. The radiopharmaceutical provides pain relief for an average of six months and is administered in one outpatient injection.

Ralph G. Robinson, MD, professor and interim chairman, department of diagnostic radiology at the University of Kansas Medical Center, believes the new compound is worthwhile therapy for those who need it. "There is no reason for advanced cancer patients with bone metastasis to suffer," he said. "Metastron provides an excellent alternative that will not only reduce pain but improve quality of life."

Robinson stresses that although palliative, the new compound should not be considered a pain medication. "This radiopharmaceutical is not like aspirin or codeine," he said. "It is a form of systemic radiation therapy that also provides pain relief."

According to a study published in the May 1993 issue of the *International Journal of Radiation Oncology, Biology, Physics*, no significant differences in survival or pain relief at the index site were observed in 126 patients studied. However, the same study reports that a quality-of-life analysis demonstrated overall superiority of ^{89}Sr with pain relief and a statistically significant improvement in physical activity.

Strontium-89 is not the first bone-seeking radiopharmaceutical to be used in systemic radiotherapy: phosphorus-32 was previously evaluated for the alleviation of pain. Although ^{32}P is shown to reduce pain in 50% to 70% of patients, it also caused a 20% to 30% occurrence of severe hematologic toxicity. Strontium-89's lack of toxicity is primarily due to its handling as a calcium imitator without the leukocyte or marrow incorporation prominent with ^{32}P .

Available in other countries for seven

years, Metastron has been used to relieve pain in more than 6,000 patients worldwide. ■

Pennsylvania Medical Center Fined for Alleged QM Violations

The Nuclear Regulatory Commission (NRC) fined Mercy Catholic Medical Center \$12,500 after routine inspections at two of its facilities exposed 17 alleged radiation safety violations. The facilities, Fitzgerald Mercy Hospital in Darby, Pennsylvania, and Misericordia Hospital in Philadelphia, were charged with failing to meet NRC requirements for a quality management (QM) program.

The NRC guidelines for QM programs are designed to ensure that nuclear medicine is administered as prescribed by physicians who are identified as "authorized users" and administer treatment under Mercy's NRC license. Hospital QM programs must include written policies and procedures which ensure that prescriptions are prepared before treatment administration.

Among specific allegations against the Mercy facilities are that 1) a patient received a dose of iodine-131 in September 1992 without a prescription prepared by an authorized user, and 2) a patient who had implantation of cesium-137 in November 1992 did not have an appropriate prescription. Moreover, seven patients who had brachytherapy between February 1992 to February 1993 did not have adequate instruction prior to treatment. None of the allegations resulted in a misadministration.

Other violations cited were the failure to: limit radiation levels in unrestricted areas, perform adequate radiation surveys of adjoining areas when radiopharmaceutical therapy or brachytherapy was performed, calibrate instruments appropriately, test sealed sources for leakage at proper intervals, and supply dosimeters to nurses caring for patients undergoing radioactive iodine therapy.

According to Thomas T. Martin,

regional administrator of NRC Region I, the alleged violations collectively represent lack of management attention to and oversight of licensed activities at the facilities.

Mercy Catholic Medical Center has paid the fine, although company officials emphasize that the violations primarily relate to documentation and recordkeeping issues. The fine was 150% more than usual because NRC officials believed that Mercy had the opportunity to identify the violations before NRC did. ■

Supercollider Killed in the House

On June 24, the House voted overwhelmingly to halt construction on the \$11 billion superconducting supercollider.

The Texas proton-smasher seemingly was a victim in the wake of approval for the more expensive space station, which passed by a very thin margin. Although the supercollider provides several thousand jobs in Texas and Louisiana, its constituency is much smaller than that of the space station, which could possibly provide tens of thousands more jobs in several states.

Halting the supercollider was part of an amendment to the energy and water appropriations bill that passed by a vote of 280 to 150. The House also voted to kill the project last year, but the 232 to 181 margin was far narrower. Had President Bush not put pressure on Republican senators to vote in favor of the project in the Senate, the supercollider would have met an earlier demise.

Since that time, several Republican senators have reversed their decision from last year and President Clinton has not lobbied fervently in the supercollider's favor.

The Waxahachie, Texas-based proton-smasher is the largest physics project in the world. Department of Energy scientists hoped advances in superconductivity would have numerous other benefits, including improvements in magnetic resonance imaging. ■