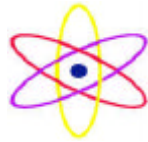
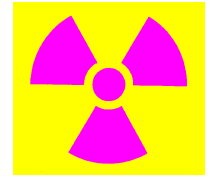
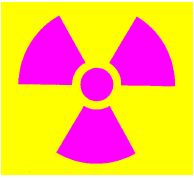


# Radiation Safety Newsletter

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The shutting down of two nuclear reactors has contributed to a technetium shortage worldwide. Radiopharmaceuticals are used in the field of nuclear medicine as tracers in the diagnosis and treatment of many diseases. Technetium-99m (Tc99m) is considered the workhorse of nuclear medicine, as its properties and relative availability allow it to be used in an extensive and ever-growing capacity for diagnostic studies. Technetium-based radiopharmaceutical studies can be used for the brain, myocardium, thyroid, lungs, liver, gallbladder, kidneys, skeleton, blood, tumors, and more.

Its use is so widespread and depended upon for medical decisions that a small decrease in its supply can have a dramatic effect on the modern medical system. According to the LA Times, an average of 55,000 patients nationwide has some diagnostic nuclear medicine study performed each day.

National Research Universal Reactor in Chalk River, Canada, which normally supplies a third of United States Tc99m demand, has been shut down by regulators for mechanical and contamination issues three times in a period of about 2 years. It is currently

shut down indefinitely as experts decide whether it is safe to ever operate again.



*Chalk River Power Plant recently was shut down for repairs, causing a crippling effect to the worldwide radiopharmaceutical supply.*

The Petten nuclear reactor in Holland, which provides half of U.S. demand, has recently shut down for a month for routine maintenance, and it is expected to close for months due to necessary repairs.

To add to the concern, none of the five reactors equipped to produce Tc-99m by highly enriched uranium [HEU], are in the United States, and all are over 45 years old. Moreover, this is a massively expensive process complicated by significant security issues.

Currently there are no published announcements to replace them.

Cindy Couche, Chief Nuclear Medicine Technician at SUNY Upstate had a story to tell with a familiar ring to all those affected by the shortage.

“Our supply of available TC99m over the course of the shortage has been on average 50%, with times of cutbacks to the point where all outpatient scans had to be either cancelled or significantly delayed.”

She added, “We have been able to substitute other radiopharmaceuticals for technetium in a few situations, such as Thallium-201 for some cardiac studies, but currently there is no substitute for certain studies, including some bone scans.”

There are no satisfactory immediate solutions for the Tc99m shortage. Currently, the Nuclear Regulatory Commission has loosened the restrictions placed on some radioactive material transfers so that this time-critical resource can be distributed and delivered in time to places that need it. The FDA is also, according to an FAQ on their website, working closely with producers of Tc99m to help facilitate an increase in production. Whether or not this leads to permanent changes to regulations with respect to the production and transportation of radiopharmaceuticals remains to be seen.

Other than that, the situation calls for long-term and cost-effective solutions for future production. One company in the United States has disclosed its intention to build a facility that would produce Tc99m using a low enriched uranium [LEU] process. It

would eliminate the large infrastructure costs associated with having a nuclear reactor and the federal requirements for security of a similar plant.

Some researchers in private and public sector are evaluating the plausibility of producing Tc99m for large-scale production using a cyclotron, a process used for many of the radionuclides used in research. It is not known how large of an impact this would have on the future production and pricing of RAM used for research.

