
Practical Pointers

High Energy Contaminant: An Mo-99/Tc-99m Fission Generator

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Because low-level radioactive waste disposal has become a problem in recent years, nuclear medicine departments have instituted in-house waste disposal procedures. All radioactive materials are allowed to decay through 10 half-lives to background, monitored with a survey meter, recorded, and disposed of in ordinary trash.

The radioactive species Mo-99 has a half-life of 67 hr (2.79 days). Thus a generator should be kept in storage at least 28 days before disposal. However, because Mo-99 is a high-energy isotope, the generators are held in storage at our facility for an additional 30 days to insure background readings of ≤ 0.1 mR. The "moly" column is then removed from the generator, checked in the dose calibrator for residual activity, and monitored with a survey meter. If the moly column reads background, it is disposed.

During routine disposal of an Mo-99/Tc-99m fission generator column, stored for a period of 65 days, a dose calibrator reading showed 65 μ Ci of activity present. Normal calculated residual activity should have been 0.2 μ Ci. In addition, a survey meter reading at the surface of the column was 10 mR. The column was immediately placed in a leaded environment and the manufacturer

notified. The column was shipped back to the manufacturer, according to DOT specifications for radioactive materials, for analysis and identification of the contaminant.

Analysis showed the contaminant to be niobium-95, a byproduct of the molybdenum fission process. It has a half-life of 35 days and a gamma photon of 765 keV. According to the manufacturer's technical services department, the species does not enter into the eluate and would pose no radiation health problems to patients receiving Tc-99m from the generator.

Strict quality control procedures for radioactive waste disposal—eg., monitoring with a survey meter, checking for residual activity in a dose calibrator, and accurate record keeping—should be performed on all waste to avoid any environmental problems.

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