LETTER TO THE EDITOR

An Overlooked Source of High Radiation Background in Counting Areas

In preparation for low-level counting procedures, a higher than usual radiation background was found in our counting room (approximately three times the normal reading). Careful monitoring with a G.M. counter and wipe-test of every surface in the room indicated no contamination. Monitoring surrounding areas in which contamination was unexpected e.g., rest rooms, locker rooms, and ceilings, resulted in readings of 10–20 times normal background (but still an order of magnitude lower than the 2 mR/hr limit for unrestricted areas). At this point a NaI(Tl) probe attached to a multichannel analyzer was placed near the area of highest reading, and after an extended counting period, a spectrum of iodine-131 was obtained. We suspected that the presence of I-131 was related to thyroid therapy with 200 mCi of I-131 two days earlier. The dose was administered in a special lead-lined room on the sixth floor of the hospital and the patient did not leave the room for six days. The Section of Nuclear Medicine is on the second floor of the hospital.

By using a portable collimated NaI(Tl) probe with the spectrometric window set for I-131, it was discovered that the most radioactive detectable area was the drain pipe in one of the rest rooms. Sequential counting of this pipe over a period of 12 days demonstrated exponential clearance of the I-131 activity from the pipe, with an effective half-life of 2.3 days. The "biological" half-life of the emitter in the pipe was therefore 3.3 days. The implication is that the I-131 was adhering to the walls of the pipe and was being slowly removed by flow of water in the pipe.

This contamination appears to have been due to radioactive urine from the therapy patient. While no unacceptable radiation levels were found anywhere, the contamination generated practical problems for the low-level counting of biological samples. We therefore recommend that when choosing a room for a high-dose thyroid therapy patient, the distance factor alone is not sufficient, and one must also ascertain that water flow from the toilet in the patient's room is not routed through pipes in, or directly adjacent to, areas where a low and constant background is needed. In addition, the drainage pipes do not act as simple conduits; they can trap radioactivity in unexpected amounts. Encouraging frequent flushing might help to reduce the "biological" half-life.

STEPHEN M. KARESH
DAN G. PAVEL
KEN MARKWELL
University of Illinois at
the Medical Center
Chicago, Illinois