

QUESTION 1

You are a health physicist at a Tritium production facility. You have received a regulatory information bulletin concerning a tritium uptake at a similar facility. In response to this bulletin, you initiate a special round of airborne monitoring and urine sampling for tritium.

GIVEN

Tritium Data:

ALI: 80,000 μCi

$T_{1/2}$: 12.3 years

Biological Data for Reference Man:

Volume of free water within the whole body: 43 l

Mass of Soft Tissues within the whole body: 65 kg

Daily water loss for Reference Man: 3 l/d

Daily urine loss for Reference Man: 1.4 l/d

POINTS

- 20 A. Describe two airborne monitoring techniques that you would consider using to measure airborne tritium concentrations. Give one advantage and one disadvantage for each discussed technique. **Number your responses. Only the first two techniques will be graded.**
- 20 B. A positive spot urine sample result of 500 dpm/ml is reported for a researcher who entered the reactor facility only once, 60 days prior to submitting the sample. Assuming reference man metabolism, estimate the initial tritium uptake. **Show all work.**
- 10 C. An individual has a single intake 1600 μCi of tritium. This individual also has 100 mrem of whole body external exposure for the year. **What is the individual's total effective dose equivalent for the year? What is the target organ?**