Radiation Biology, Protection and Applications

(PHYS-450)

EXERCISES

Week 14

Problem 1:

Ingestion of ^{137}Cs eating reindeer meat

In reindeer meat, a concentration of 500 Bq/kg of ^{137}Cs has been measured. What committed effective dose does a person receive on eating 250 grams of this meat?

Problem 2:

Inhalation of ^{131}I

The measured concentration of ^{131}I in a laboratory is 55 Bq/m³. What committed effective dose a person receives during 15 minutes light activity in this laboratory?

Hint: During light work, a reference person inhales 20 liters (0.02 m^3) of air per minute. This corresponds to 60 mins. · 0.02 m^3/min. = 1.2 m^3 per hour. The volume of air inhaled in 15 mins. is then V = 1.2 m^3/h · 0.25 h = 0.3 m^3.

Problem 3:

Inhalation of ^{7}Be due to BeO from atmosphere

Due to cosmic ray interactions with nitrogen (^{14}N) in the upper atmosphere, each cubic meter of air on the Earth has a concentration of 1 mBq/m^3 of radionuclide ^{7}Be in the form of BeO (beryllium oxide). What is the annual committed effective dose a person receives through this source?

Hint: The inhalation volume of air daily V_d =23 m^3/day or V_y=8400 m^3/year.