

QUESTION 13

You are the project health physicist at an industrial site that used uranium ore in an extraction process. Several buildings and the surrounding grounds are lightly contaminated with natural U (U-nat). These buildings and the grounds must be remediated and surveyed for unrestricted release. On a small portion of Building B-7 there is a maximum reading on an alpha scintillation probe of 100 cpm with the detector in a fixed position.

GIVEN

- The surface activity derived concentration guideline level (DCGL) for U-nat is 500 dpm per 100 cm², assuming that no more than 10% of the activity is removable.
- The response of your alpha scintillation probe for U-nat is 20%.
- The surface area of your alpha scintillation probe is 50 cm².
- The surface emission abundance of alphas from a concrete block is 50%.
- The alpha scintillation probe has a background of 2 cpm.

POINTS**STATE ALL ASSUMPTIONS**

- 10** A. What are two (2) critical factors one must consider in evaluating equipment or property to determine whether it meets the release criteria for license termination or unrestricted release of equipment or property? **Number your responses. Only the first two will be graded.**
- 15** B. Explain what a DCGL is and how is it determined. Does the predicted land use or reuse of structures affect the DCGL determination? **Justify your answer.**
- 35** C. What is the activity associated with this location at Building B-7? . **Show all work.** Can you release Building B-7 without further decontamination? **Justify your answer.**
- 20** D. In scanning surface soils for gross gamma activity explain four factors that must be considered in converting field instrument readings to a specific DCGL. **Number your responses. Only the first four will be graded.**
- 20** E. Describe 5 pathways by which radioactivity in soil can contribute to human dose. **Number your responses. Only the first five will be graded.** What are two (2) parameters that are important to know when conducting a dose assessment? Explain why each is important. **Number your responses. Only the first two will be graded. Justify your answer.**