

## SECTION 8.7

### DETERMINATION OF REMOVABLE ACTIVITY

#### 1.0 Purpose

To provide guidelines for measuring removable alpha and beta radioactivity on equipment and building surfaces.

#### 2.0 Responsibilities

- The site coordinator is responsible for assuring this procedure is implemented.
- Survey team personnel are responsible for following this procedure.

#### 3.0 Procedure

##### 3.1 Equipment

- ✓ Filter papers (Whatman 50 or equivalent), 47 mm diameter, numbered.
- ✓ Glassine or paper envelopes.
- ✓ Record forms and/or log book.
- ✓ Counting equipment.

##### 3.2 Gross Alpha and Gross Beta Smear Sample Collection

**NOTE:** Direct measurements should be completed before a smear sample is taken.

3.2.1 Grasp the smear (filter) paper by the edge, between the thumb and index finger.

3.2.2 Applying moderate pressure with two or three fingers, wipe the numbered side of the paper over approximately 100 cm<sup>2</sup> of the surface.

3.2.3 Place the filter in an envelope.

3.2.4. Record the smear number, site, date, location of the smear, and name of sample collector on the envelope.

- 3.2.5 Label and secure the sample in accordance with Section 8.15 and the chain-of-custody procedure in Section 8.16. Record pertinent information on the Chain-of-Custody Form, (Figures B-9, B-12, or equivalent).
- 3.2.6 If the initial direct measurement was elevated, the smear should be monitored to determine whether contaminated material was transferred to the smear. If an activity level greater than 250 cpm is detected, the smear envelope should be marked as such.

**NOTE:** Smears having activity levels greater than 2500 cpm should be counted using field instrumentation and should be sealed in an appropriate container and marked to minimize potential for cross-contamination.

### 3.3 Low-Energy Beta Smear Sample Collection

- 3.3.1 If the survey objective is to determine if low-energy beta-emitters such as C-14 or H-3 are present, an additional smear may be collected.
- 3.3.2. Pre-fill the appropriate number of scintillation vials with deionized water to approximately one-half volume.
- 3.3.3 Moisten the numbered side of a smear with deionized water from a scintillation vial.
- 3.3.4 Perform steps 3.2.1 and 3.2.2.
- 3.3.5 Fold the smear in half with the numbered side facing out.
- 3.3.6 Place the smear inside the scintillation vial, replace cap and continue with steps 3.2.5 and 3.2.6 of this section.

**NOTE:** A field blank should be prepared by placing an unused smear into a scintillation vial containing the deionized water used to moisten the smears.

### 3.4 Field Sample Measurement

- 3.4.1 If the survey objective is to determine if radon or thoron daughter products or other short half-life radionuclides are present, the smears should be counted within 1-2 hours before significant decay of short-lived radionuclides has occurred.
- 3.4.2 If necessary, smears can be counted in the field using portable instrumentation (see Section 7).

- 3.4.3 Record count and counting time data on the appropriate record form (Figure B-9, B-12, or equivalent).
- 3.4.4 Determine the net count rate (N) by subtracting the background count (determined by counting a blank or unused smear) from the gross count rate.

$$N \text{ cpm} = \frac{\text{Gross Count} - \text{background count}}{\text{Time}}$$

- 3.4.5 Substitute the value for N in the surface activity equation in Sections 7.3 and 7.4 for calculating the removable activity. Note whether the detector is monitoring for alpha, beta, or alpha plus beta. The value for geometry (G) will be 1, provided a 100 cm<sup>2</sup> area was wiped.