

## SECTION 8.2

### SUBSURFACE SOIL SAMPLING

#### 1.0 Purpose

To describe the procedure for collecting samples of subsurface soil.

#### 2.0 Responsibilities

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

#### 3.0 Procedure

##### 3.1 Equipment

- ✓ Drilling equipment: drilling rig, portable motorized auger, manual auger.
- ✓ Subsurface sampling apparatus: split-spoon sampler, shelly tube sampler, downhole sampler - ORISE design.
- ✓ Plastic bags, approximately 10 cm diameter x 30 cm long.
- ✓ Trowel or spatula.
- ✓ Cardboard "ice cream" containers (1 quart size) or geology sample bags.
- ✓ Twist-ties.
- ✓ Masking tape.
- ✓ Large rubber bands.
- ✓ Record forms, and/or logbook.
- ✓ Labels and security seals.
- ✓ Indelible pen.
- ✓ Equipment cleaning supplies, as appropriate (see Section 4.5).

### 3.2 Sample Collection

3.2.1 When direct radiation measurements are required (surface and borehole logging) they are to be performed prior to sample collection in order to identify the presence of gross radionuclide contamination requiring special handling or cleanup (see Sections 4 and 10).

3.2.2 When a borehole fills with water and a water sample is desired refer to the subsurface water sampling procedure in Section 8.4.

**NOTE:** Special considerations, such as those described for surface sampling, may require deviations from this procedure. These will be described in the site-specific survey plan as the need arises.

### 3.3 Systematic Subsurface Sampling (Option 1)

Procedures applicable to shallow boreholes, generally no greater than 2 to 3 m maximum depth.

3.3.1 Assemble suitable auger (i.e. standard bucket auger or mud, sand, etc. augers) to extensions with “T” handle. Ensure depth demarcation are noted on the auger and extension handles.

3.3.2 Advance auger to each desired depth. Extract the auger to remove soil as the borehole is advanced. Direct monitoring should be performed and if contamination is suspected, decontaminate the auger between each sampling interval.

3.3.3 At the desired depth, remove the sample from the auger and transfer the sample to a container (plastic bag, plastic jar, etc.) and seal the container in a manner sufficient to ensure moisture leakage and/or cross-contamination does not occur.

3.3.4 Label and secure the sample container in accordance with Section 8.15 and the chain-of-custody procedures in Section 8.16. Record pertinent information on the Chain-of-Custody Form, (Figure B-16, or equivalent).

3.3.5 Record sample identification, location, depth, and other pertinent data on the appropriate record forms (Figures B-11, B-14, B-15, or equivalent), map, drawing, and/or site logbook.

3.3.6 Clean sampling tools, as necessary, before proceeding with further sample collection, in accordance with instructions in Section 4.5.

### 3.4 Systematic Subsurface Sampling (Option 2)

Procedure applicable to depths of approximately 3 m when boreholes or trenches have been dug and remain uncollapsed or do not contain water.

**NOTE:** If borehole logging is to be done it should be completed before sampling begins (see Section 7.2). If multiple samples are collected from a borehole, sampling is to be initiated at the deepest location and proceeds at subsequent depths toward the surface. Prior to collecting samples, dress the borehole wall at each sampling location in order to remove any soil that was potentially transferred from other depths.

3.4.1 Place a plastic bag liner into the downhole sampler and secure with a large rubber band.

3.4.2 Lower the sampling tool to the desired depth in the borehole or trench.

3.4.3 Scrape the inside borehole or trench wall with the toothed edge of the tool until approximately 1 kg of sample is collected.

3.4.4 Transfer the plastic bag and sample into container sufficient to ensure moisture leakage and/or cross-contamination does not occur.

3.4.5 Repeat steps 3.3.4 through 3.3.6 of this section.

### 3.5 Systematic Subsurface Sampling (Option 3)

Procedures applicable to depths exceeding 3 m and in boreholes where walls do not remain intact or that fill with water.

3.5.1 Drill the borehole to the desired sampling depth using an auger.

3.5.2 Drive a split-spoon or shelby tube collector beyond the augered depth. The driving distance should be 30 to 60 cm.

3.5.3 Withdraw the collecting device and remove the collected core. Remove and appropriately discard the top 1 to 2 inches of the core as this material may represent soil that had collapsed into the borehole from other depths.

3.5.4 Place the core, or a portion of the core, into a container sufficient to ensure moisture leakage and/or cross-contamination does not occur. (The core may be split into multiple segments, representing different sampling depths.)

3.5.5 Repeat steps 3.3.4 to 3.3.6 of this Section.

### 3.6 Biased Subsurface Sampling

Procedures applicable when a surface sample has been collected and radiation levels are still elevated sufficiently above background as to require further investigation at the location.

3.6.1 Using a shovel, post hole diggers, manual auger, drill rig, etc. collect 1 kg of the next 15 cm of soil and place into a container sufficient to ensure moisture leakage and/or cross-contamination does not occur. Care must be taken and sampling methods selected to ensure that soil that may have collapsed into hole from the surface is removed and not included in the subsurface sample.

3.6.2 Repeat steps 3.3.4 through 3.3.6 of this Section.

3.6.3 Monitor the sample hole to determine activity level. If the activity level is still elevated, repeat items 3.6.1 through 3.6.3. If the activity level has dropped to background, record the measurement and monitor the area, including personnel and equipment, to determine the extent of decontamination that may be necessary.

**NOTE:** Contact the site coordinator if the exposure rate measurement exceeds the capacity of the instrumentation available on site.