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# Standard Practice for Sampling Surface Soil for Radionuclides[1]

This standard is issued under the fixed designation C 998; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon (ε) indicates an editorial change since the last revision or reapproval.

## 1. Scope

1.1 This practice covers the sampling of surface soil for the purpose of obtaining a sample representative of a particular area for subsequent chemical analysis of selected radionuclides. This practice describes one acceptable approach to collect soil samples for radiochemical analysis.

1.2 *This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.*

## 2. Referenced Documents

2.1 *ASTM Standards:*

D 420 Guide to Site Characterization for Engineering, Design, and Construction Purposes[2]

D 1129 Terminology Relating to Water[3]

## 3. Terminology

3.1 *Definitions:*

3.1.1 *sampling*—obtaining a representative portion of the material concerned (see Terminology D 1129).

## 4. Summary of Practice

4.1 Guidance is provided for the collection of soil samples to a depth of 50 mm. Ten core samples are collected in a specified pattern and composited to obtain sufficient sample so as to be representative of the area.

## 5. Significance and Use

5.1 Soil provides a source material for the determination of selected radionuclides and serves as an integrator of the deposition of airborne materials. Soil sampling should not be used as the primary measurement system to demonstrate compliance with applicable radionuclides in air standards. This should be done by air sampling or by measuring emission rates. Soil sampling does serve as a secondary system, and in many cases, is the only available avenue if insufficient air sampling occurred at the time of an incident. For many insoluble radionuclides, the primary exposure pathway to the general population is by inhalation. The resuspension of transuranic elements has received considerable attention **(1, 2)**[4] and their measurement in soil is one means of establishing compliance with the U.S. Environmental Protection Agency (EPA) guidelines on exposure to transuranic elements. Soil sampling can provide useful information for other purposes, such as plant uptake studies, total inventory of various radionuclides in soil due to atmospheric nuclear tests, and the accumulation of radionuclides as a function of time. A soil sampling and analysis program as part of a preoperational environmental monitoring program serves to establish baseline concentrations. Consideration was given to these criteria in preparing this practice.

5.2 Soil collected by this practice and subsequent analysis is used to monitor radionuclide deposition of emissions from nuclear facilities. The critical factors necessary to provide this information are sampling location, time of sampling, frequency of sampling, sample size, and maintenance of the integrity of the sample prior to analysis. Since the soil is considered to be a heterogeneous medium, multipoint sampling is necessary. The samples must represent the conditions existing in the area for which data are desired.

## 6. Apparatus

6.1 *Sampling Instrument*[5]—In order to standardize the sample collection, it is suggested that the coring tool be that instrument used by golf courses to place the hole in the putting green. This instrument is commercially available at reasonable cost, has approximately a 0.105-m diameter barrel, and can take samples down to 0.3 m. An illustration of the sampling instrument and its use is provided in Fig. 1.

6.2 *Sample Container*, such as metal cans with lids, plastic bags, etc.

6.3 *Meter Stick*.

[1] This practice is under the jurisdiction of ASTM Committee C26 on Nuclear Fuel Cycle and is the direct responsibility of Subcommittee C26.05 on Test Methods.

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[2] *Annual Book of ASTM Standards*, Vol 04.08.

[3] *Annual Book of ASTM Standards*, Vol 11.01.

[4] The boldface numbers in parentheses refer to the list of references at the end of this practice.

[5] Model 28200 Scalloped Style of the Standard Manufacturing Company of Cedar Falls, IA, or its equivalent, has been found satisfactory for this purpose.