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~ November 2012 ~

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Item ID Number 04240 **Not Scanned**

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Report/Article Title Protocol: Sampling Soils for Tetrachlorodibenzodioxins

Journal/Book Title

Year 0000

Month/Day

Color

Number of Images 2

Description Notes Includes figure

PROTOCOL: SAMPLING SOILS FOR TETRACHLORODIBENZODIOXINS*

Sampling protocols for tetrachlorodibenzodioxins (TCDD) have been described by Young et al (1, 2). These methods are predicated on the chemical nature of TCDD and on the methods involved in the contamination of the soil. TCDD is essentially water insoluble. When applied to soil as a liquid, e.g., as a contaminant of a liquid herbicide, it apparently binds tightly to soil particles. These particles can be moved by wind or water, with minimal loss of the TCDD. Thus sampling a site contaminated with aerially applied TCDD, either as a liquid or on particles, it is important that the soil be sampled carefully through a series of depth increments. Figure 1 is the recommended procedure. The removal of a soil increment of 1 x 5 x 10 cm will provide approximately 50 gms of soil. Although this is sufficient for an analysis, it is frequently recommended that two (2) locations be collected (not more than a few meters from each other) and the samples pooled by depth. When an area of approximately one hectare is to be sampled, at least 3 sets of samples should be collected so as to adequately represent the area. Separate analyses should be performed on these samples.

A second method of sampling the soils of an area thought to be contaminated with TCDD is to find the locations where particles of soil would accumulate, as a consequence of wind or water action. Sites that accumulate silt from areas in excess of one (1) hectare and have the silt collected in the out-fall of a pipe or drainage system are ideal. If a crude estimate can be made of the size of area drained and the amount of soil residue accumulated at an out-fall over a set period of time then an increment of that soil may permit an estimate of rate of contamination. Usually a 100 gram sample of soil is collected.

All soil samples collected for TCDD should be done using gloves, porcelain spatulas and amber glass jars with aluminum liners in the caps. The samples should be frozen as soon as convenient and retained frozen until prepared for analysis.

REFERENCES:

1. Young, A.L., C.E. Thalken and W.J. Cairney. 1979. Herbicide Orange site treatment and environmental monitoring. Air Force Technical Report OEHL-TR-79-169. USAF Occupational and Environmental Health Laboratory, Brooks AFB TX 78235. 36 p.
2. Young, A.L., C.E. Thalken and W. E. Ward. 1975. Studies on the ecological impact of repetitive aerial applications of herbicides on the ecosystem of Test Area C-52A, Eglin AFB, Florida. Air Force Technical Report AFATL-TR-75-142. Air Force Armament Laboratory, Eglin AFB FL 32542. 127 p.

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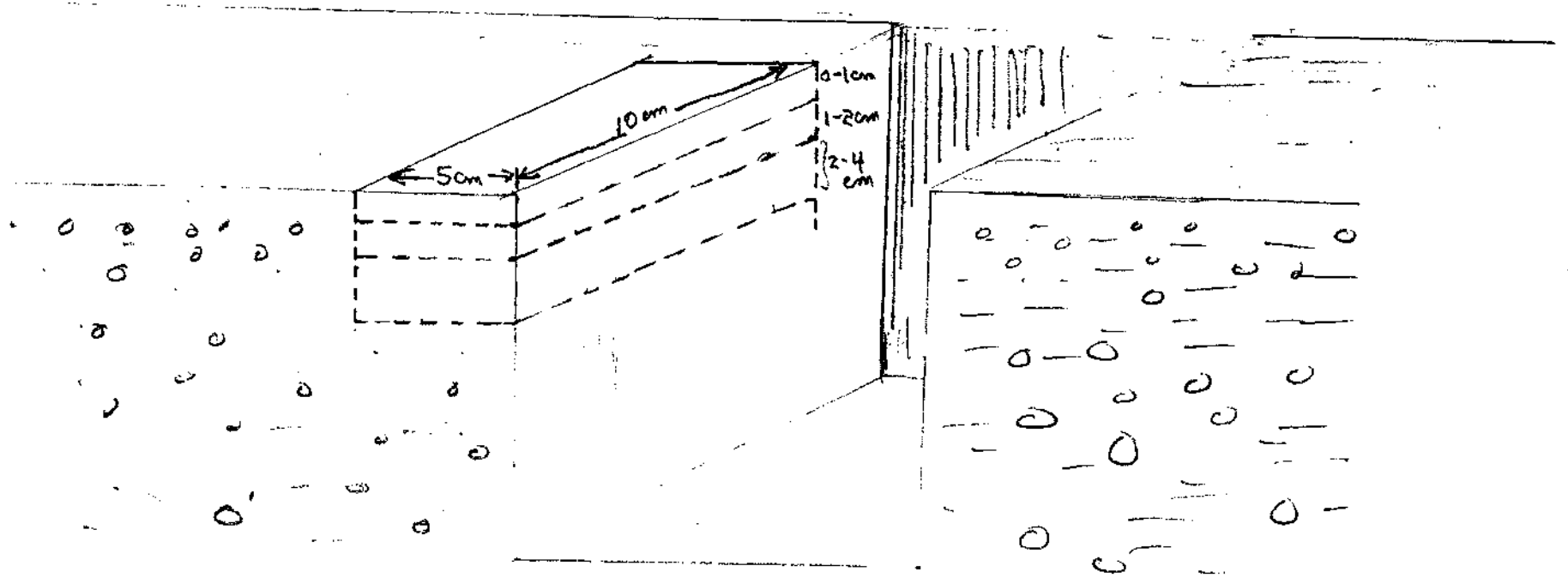


Figure 1. Ditch method of collecting soil increments for analysis of tetrachlorodibenzodioxins. Incremental samples are removed by undercutting the soil from the wall exposed within the ditch.