



**PROTOCOL FOR THE CONTAMINATED SITES REGULATION
UNDER THE ENVIRONMENT ACT**

**PROTOCOL NO. 11:
Sampling Procedures for Land Treatment Facilities**

Prepared pursuant to Part 6 – Administration, Section 21,
Contaminated Sites Regulation, OIC 2002/171

SAMPLING PROCEDURES FOR LAND TREATMENT FACILITIES

1.0 Introduction

Land treatment facilities are used to remediate soil contaminated with petroleum hydrocarbons. When soil is removed from a land treatment facility, it must be clean enough to be used as fill or cover at other sites. Some contaminants cannot be remediated in a land treatment facility, and not all contaminants remediate at the same rate. For these reasons, it is important to correctly characterize the contaminants in the soil when it is placed in the facility, to monitor the progress of its remediation, and to ensure that remediation was successful before the soil is removed.

Section 21(1) of the *Contaminated Sites Regulation*, OIC 2002/171 authorizes the Minister to approve or adopt protocols for sampling soil, sediment, water, snow and other environmental media. In accordance with Section 21(1), this protocol has been designed to ensure that standardized and consistent approaches to sampling procedures are used when sampling soil at land treatment facilities.

2.0 Initial Characterization

If available site assessment data is not sufficient to characterize contaminated material destined for a land treatment facility at a rate of one sample for every 50 m³ of material, the material should be sampled as it is excavated to meet that sample density. If field testing results or knowledge of site characteristics or spill conditions suggest that the material may be special waste, the required sample density is one sample for every 10 m³ of material. If any of the material is confirmed to be special waste, the land treatment facility receiving the material must hold a special waste permit, or the material must be removed from the facility according to the requirements of the land treatment facility permit.

3.0 Interim Sampling

After contaminated material has been sampled, excavated, and placed in a land treatment facility, there may be a need to analyze samples of the soil to help gauge the rate of soil remediation. Provided that this interim sampling and analysis is not required by a permit or other legal obligation, any sample density may be used, keeping in mind that a greater number of samples will allow for greater confidence in the accuracy of the results.

Interim sampling is to be used only to estimate the rate of remediation; it may not be sufficiently rigorous to be considered confirmatory sampling as described below. In the event that interim sampling conducted at a sample density lower than that normally required to demonstrate regulatory compliance shows that the soil has been sufficiently remediated to meet the criteria specified in Table 1, the proponent must still conduct proper confirmatory sampling as described below in order to demonstrate compliance with the *Contaminated Sites Regulation*.

In most cases where soil has been transferred to a land treatment facility, prior analytical testing will have been completed to determine the initial or interim level of contamination in the soil. This information can be used, in conjunction with knowledge of the remediation activities being carried out at the facility (tillage, nutrient/water addition, etc.), and of the climate conditions during the period of remediation, to predict the approximate duration of treatment that will be necessary to reduce the contaminant levels to meet the criteria specified in Table 1.

4.0 Confirmatory Sampling

If previous analytical results, duration and type of remediation activities, and site conditions indicate that a given stockpile has likely remediated sufficiently so that the soil will meet the criteria specified in Table 1,

the proponent should conduct confirmatory sampling, taking one representative sample for every 50 m³ if the material is destined for a site with agricultural land use, or one representative sample for every 100 m³ if the land use at the destination is not agricultural. Representative samples are formed by combining a number of grab samples from throughout the volume of soil to be represented. The material may not be removed from the facility until the contaminant levels are below the criteria specified in Table 1.

Table 1. Criteria for removal of material from a land treatment facility.[†]

Hydrocarbon Fraction:	VPH	LEPH	HEPH
Standard:	200	1000	1000

When confirmatory samples indicate that the appropriate criteria have been met, the land treatment facility operator must submit the results to the Environmental Programs Branch for approval before the material may be removed from the facility.

5.0 Decommissioning

When a land treatment facility is decommissioned, the site must be shown not to be contaminated. In the case of a facility with an artificial liner, this requires sampling the native soil below the liner; if a natural liner is used, the liner soil itself is sampled.

Samples should be taken such that one sample represents 100 m³ of soil. The site should be divided into a grid with squares no larger than 26 x 26 m. In each grid square, 5 grab samples taken from a depth of no more than 15 cm should be combined to form a single sample representative of the soil in that grid square. The five samples should be arranged roughly in a quincunx pattern (as shown in Figure 1) to maximize coverage. These dimensions of 26 m x 26 m x 15 cm make for a soil volume of approximately 100 m³ per grid square.

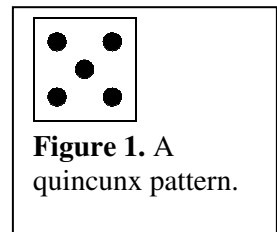


Figure 1. A quincunx pattern.

6.0 Effective Date

The effective date of this protocol shall be **November 19, 2007** and it shall remain in effect until replaced or rescinded by the Environmental Programs Branch.

7.0 Additional Information

For more information on contaminated sites or this protocol, please contact:

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Approved: S. Jensen Date: Nov. 19/07
 Manager, Standards and Approvals Section
 Environmental Programs Branch
 Department of Environment

[†] Note that the Yukon is considering adopting the Canada-Wide Standard for Petroleum Hydrocarbons in Soil. For information on applying the Canada-Wide Standard, please contact the Environmental Programs Branch.