Yukon
Environment

# 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.

In this protocol:

"highly contaminated soil" includes:

a) soil with a total petroleum hydrocarbon concentration of 30,000 ppm or greater; and
b) soil contaminated with a nonaqueous phase liquid.

"nonaqueous phase liquid" means an immiscible liquid composed of organic compounds (which may be lighter or denser than water) at any apparent thickness.

## 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 $m^3$ 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 highly contaminated, the required sample density is one sample for every 10 $m^3$ of material. If any of the material is confirmed to be highly contaminated, the land treatment facility receiving the material must be permitted to receive highly contaminated material, 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 *Schedules 1 and 2* of Yukon's *Contaminated Sites Regulation* (CSR), the proponent

must still conduct proper confirmatory sampling as described below in order to demonstrate compliance with the CSR.

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 Schedules 1 and 2 of the CSR.

## 4.0 Confirmatory Sampling for Soil Removal

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 standards applicable to the proposed receiving site as specified in the CSR, and provided that the soil has been tilled or turned at least once since the time it arrived at the facility (to reduce variation within the piles), the operator can request approval to remove the soil from the LTF.

To support a removal request, the operator must conduct confirmatory sampling, taking one representative sample for every 50 $m^3$ if the material is destined for a site with agricultural land use, or one representative sample for every 100 $m^3$ 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.

Samples shall be analyzed as prescribed in *Protocol 5: Petroleum Hydrocarbon Analytical Methods and Standards*. Where there is reason to believe that contaminants other than petroleum hydrocarbons may be present in the soil, the samples shall be analyzed for those parameters as well.

When confirmatory samples indicate that the contaminant levels in the soil to be removed are below the standards that apply at the proposed receiving location as specified in the CSR, the land treatment facility operator must submit the results to the Standards & Approvals section of the Environmental Programs Branch for approval along with a request identifying the proposed receiving location. The date that the material was last tilled or turned must also be included with your submission. The material may be removed from the facility only after receiving the written approval of the Standards & Approvals section.

At facilities with natural liners, the liner material must be tested after material is removed from a treatment cell. Samples are to be taken as described for decommissioning below, and analyzed for all contaminants known to have been present in the removed material at any point during its course of treatment. That portion of the treatment cell shall not be used again to store or treat contaminated material until the concentrations of all contaminants in the liner material are below the CSR standards for the applicable land use at the LTF site.

## 5.0 Decommissioning

A decommissioning plan must be submitted to the Standards & Approvals section for approval at least two months prior to the planned decommissioning of the facility. The plan must include a schedule for decommissioning, the results of sampling demonstrating the contaminant levels in

all soil being treated in the LTF, details of the proposed disposition of remaining soil and a description of how the site will be restored for future uses.

When a land treatment facility is decommissioned, the site must be shown not to be contaminated before it can be abandoned. 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. The berm material enclosing the facility must also be sampled to demonstrate that it is not contaminated above CSR standards. Sampling should also be conducted on any other area of the site where contamination is suspected due to operation of the facility.

Samples should be taken such that one sample represents 100 $m^3$ of soil. When sampling the base of the LTF, 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 the pattern 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 $m^3$ per grid square.

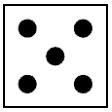

**Figure 1.** Grid sampling pattern for liner or sub-liner sampling.

The berm material surrounding the facility should be sampled at a rate of one sample per 100 $m^3$ of material. Each sample should be comprised of several grab samples (aliquots) taken throughout a volume of berm material representing 100 $m^3$. Other areas of the site where contamination is suspected should also be sampled at a rate of one sample per 100 $m^3$.

If sampling results indicate that contaminants are present at concentrations equal to or greater than applicable CSR standards, remediation of the site will be required. Any contaminated soil generated during remedial activities will need to be transported to another permitted facility.

If groundwater monitoring wells have been installed at the LTF site for groundwater monitoring purposes, these wells must be decommissioned in accordance with Protocol 7: Groundwater Monitoring Well Installation, Sampling and Decommissioning.

Following decommissioning of the LTF, the permittee is required to submit a report to the Standards & Approvals section demonstrating that no contamination remains onsite and that the decommissioning was carried out in accordance with the approved plan.

## 6.0 Effective Date

The effective date of this protocol shall be February 7, 2018 and it shall remain in effect until replaced or rescinded by the Standards & Approvals section.

## 7.0 Additional Information

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


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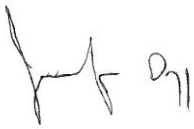
Approved:  Date: February 7, 2018

Manager, Standards and Approvals Section
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