

# **Petroleum Hydrocarbons in Soil - Canada-Wide Standard (CWS)**

## **What is the Canada-Wide Standard for Petroleum Hydrocarbons (PHC) in Soil?**

PHC consist of a wide range of organic compounds found in or derived from geological sources such as oil, coal and bitumen, including a variety of raw and refined fuels and lubricants. They provide energy to heat our homes and places of work, fuel our transportation systems, power manufacturing processes and tools, and provide a source for numerous synthetic materials.

However, when PHC are released to soil they cause a wide variety of problems related to their toxicity, mobility and persistence.

The CWS for PHC in soil is a remediation standard that sets out the levels to which sites contaminated by PHC must be cleaned up to - if and when they are subject to remediation.

The proposed standard sets out generic target levels, as well as a process for generating site-specific numbers, that are protective of both human and ecological health. The CWS is risk-based, having been founded on the most recent and comprehensive body of science. The standard provides for consistent and effective management of PHC-contaminated sites across Canada.

## **What is the science on Petroleum Hydrocarbons?**

PHC released to the environment are complex mixtures, typically containing thousands of compounds, in varying proportions. The properties of PHC contamination in soils varies with the petroleum source, soil type, the composition, degree of processing (crude, blended or refined), and the extent of weathering caused by exposure to the environment. PHC contamination can cause a number of problems:

- Their chemical reactivity and volatile nature can pose a fire/explosion hazard, especially if vapours enter confined spaces.
- Most constituents are toxic to some degree for human and/or environmental health.
- Lighter hydrocarbons (i.e., those of lower molecular weights) are mobile and can be transported considerable distances in groundwater or air.
- Larger and branched-chain hydrocarbons are persistent in the environment.
- PHC may create aesthetic problems such as offensive odour, taste or appearance.
- Under some conditions, PHC can degrade soil quality by interfering with water retention and flow, and with nutrient supplies for plants.

The differing properties of PHC are related to the *size* of the PHC molecules. In this CWS, PHC are grouped into four size fractions to effectively assess and manage the risks they pose to the environment and human health.

### **Extent of the problem**

Petroleum hydrocarbons are one of the most widespread soil contaminants in Canada. The majority of contaminated sites contain PHC. There are tens of thousands of contaminated sites across Canada.

Currently, management of contaminated sites varies considerably across Canada and generally lacks an adequate scientific basis.

### **Achieving the Standard**

The proposed PHC CWS is unique in that it does not include a timeframe for implementation.

The standard does not itself trigger clean-up of PHC-contaminated sites, but does require a consistent level of clean-up *when* remediation takes place, to ensure protection of human health and the environment. Governments will report on implementation of the standard in 2003 and every five years thereafter.

Science, technology and economics related to PHC management will be reviewed in 2003. Incorporation of new and emerging information will ensure continued improvement in the management of PHC-contaminated sites.

The CWS will be used by industry and governments in their operations and reclamation activities, and by

governments in setting control requirements.

### **How Will PHC-Contaminated Sites be Identified and Addressed?**

Under the PHC CWS the processes of site identification and remedy selection are implementation issues for individual jurisdictions. However, across jurisdictions, the most common factors that make sites priorities include known release, complaints, requirements of a licence or approval, land re-development or transfer, and decommissioning. When one or more of these factors triggers site assessment, the PHC CWS can be used to ensure that effective and consistent remediation occurs.

Further information is available from the CCME's website ([www.ccme.ca](http://www.ccme.ca)).