

# **Validation of Subsoil Hydrocarbon Criteria for Stratified Remediation at Upstream Oil and Gas Facilities in Alberta**

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The concept of stratified remediation for petroleum hydrocarbons (PHCs) refers to the application of alternative remediation standards for varying soil depths at upstream oil and gas facilities in Alberta. The surface soil criteria apply from the soil surface down through the soil profile to a depth of either 1.5 m or 3 m depending on the area of consideration. The subsoil criteria which are less stringent can be used below the 1.5 m or 3 m depth. There is a need to validate the current Alberta Environment subsoil guidelines (Alberta Environment, 2010) by providing empirical evidence that regional deep rooted crops are not affected by critical PHC concentrations in subsoil under drought conditions when the plants are forced to extract moisture from depths below 1.5 m. A soil column study, funded

by the Petroleum Technology Alliance of Canada (PTAC) was established in 2011 to validate these guidelines and to determine the phytotoxic effects of PHC contaminated subsoil on deep rooted crops. The objective of the study is to provide empirical evidence to show that there are no phytotoxic effects on canola and alfalfa grown in fine and coarse textured subsoil contaminated with F2 and F3 hydrocarbons at levels at or above Alberta Tier 1 critical concentrations over four growing seasons in the greenhouse.

Report