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REMEDIATION SERVICES

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Masters Thesis Abstract

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The Ultraviolet Optical Screening Tool (UVOST) is a direct-push tool that is routinely used to delineate petroleum non-aqueous phase liquids on contaminated sites by measuring the fluorescence of a material through a sapphire window on the side of the probe. This investigation technique offers the advantage of the rapid determination of petroleum hydrocarbons in site investigations.

The purpose of this research is to investigate an alternative use for the UVOST; the ability to delineate the spatial distribution of an organic-rich, unconsolidated, water-covered sediment, contaminated with dioxins, furans, and elevated metals. The hypothesis of this thesis is that the UVOST will produce a “signature” fluorescence pattern for the organic-rich sediment that can then be used to delineate the presence or absence of this sediment. This would allow for simultaneous acquisition of water cover thickness, contaminated sediment layer thickness and uncontaminated sediment surface elevations.

A stabilization lagoon in Pictou County, NS, has been receiving industrial wastewater for the past 50+ years and is slated for remediation. Conventional sampling (i.e. sediment gravity coring) has identified a layer of black effluent influenced sediment contaminated with dioxins and furans overlying an uncontaminated grey estuarine influenced sediment. In this thesis, laboratory and field testing on the black effluent influenced sediment and grey estuarine influenced sediment are presented as a proof of concept to test the hypothesis. The results of this study indicate that the UVOST can be utilized at freshwater aquatic sites to delineate an organic-rich sediment which overlays a clastic sediment layer. The resolution of the acquired data was also shown to provide multiple surface elevations (i.e. water and sediment layers) simultaneously.