Demonstration of Rapid *In Situ* Detection of VOCs by Membrane Introduction Mass Spectrometry

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The Tri-Service Site Characterization and Analysis Penetrometer System (SCAPS) was developed to reduce the time and cost required for site characterization. Direct-push sensors were developed to detect specific classes of contaminants such as petroleum hydrocarbons, explosive compounds, radionuclides, metals, and volatile organic compounds (VOCs). This presentation describes the demonstration of a direct-push sensor that can quantify VOC contamination in the subsurface in real-time. This system consists of a modified Membrane Interface Probe (MIP) developed by Geoprobe Systems, Inc. coupled to a direct sampling ion-trap mass spectrometer (ITMS). The ITMS-MIP system was proven capable of rapidly collecting and analyzing samples from the subsurface, regardless of matrix. Five performance demonstrations with validation of results have been completed to date. Two of the five demonstrations resulted in a strong linear correlation ($r^2 = 0.9$) with validation samples analyzed using EPA Method 8260. While the other three demonstrations revealed that the calibration method used introduced a bias compared to EPA Methods.