In general, the Membrane Interface Probe (MIP) system has the ability to detect concentrations of Volatile Organic Constituents in the soil down to concentrations of roughly 200-500 ppb, depending on the compound and the detector used for the analysis. The results obtained from the MIP system are only semi-quantitative as each chemical has a different transfer rate across the MIP membrane and each compound reacts differently in different sub-surface mediums.

THIS TRANSFER RATE SIMPLISTICALLY RELATES TO:
the volatility of the compound
the solubility of the compound
it's concentration in the surrounding lithology
the permeability of the material in contact with the probe
the gas flow in the MIP system
the status of the membrane

One of the options available for MIP analysis is to use two detectors in series to extend the number of compounds that can potentially be identified in the subsurface soil/water zones. By combining a Photo-Ionization Detector (PID) in series with an Electron Capture Detector (ECD) or a Flame Ionization Detector (FID), the working range of the system can be increased and a greater number of compounds can be detected in the subsurface lithology."

Results using the GC/MS system are semi-quantitative and relate only to the amount of material transferred to the analytical system, therefore a variety of options are available to increase the overall sensitivity of the combined system. Each option can add a degree of complexity to the overall project but has the added benefit of providing a greater degree of detail to the results achieved. Typical "on-column" sensitivities of 2-5ng per compound are common for the GC/MS system employed.

Three common techniques for increasing the sensitivity of the system are the use of SIM for specific compound identification, collecting a larger sample for analysis from the MIP system by varying the speed of the MIP system probe advancement, or using larger collection intervals for the analysis.
Lastly, QA/QC for this type of analysis is inherently limited. There are no expeditious means of performing LCS, sample duplicate, Matrix Spike, and Matrix Spike Duplicate analysis using the GC/MS in conjunction with the MIP system. Each QC sample would have to be pushed through an identical contamination zone with the assumption that all analytes were present in the zone at comparable concentrations and that the transfer rate for compounds was exactly the same for each compound on each push of the probe. If QA/QC samples are critical, then the mobile lab is the next best alternative.