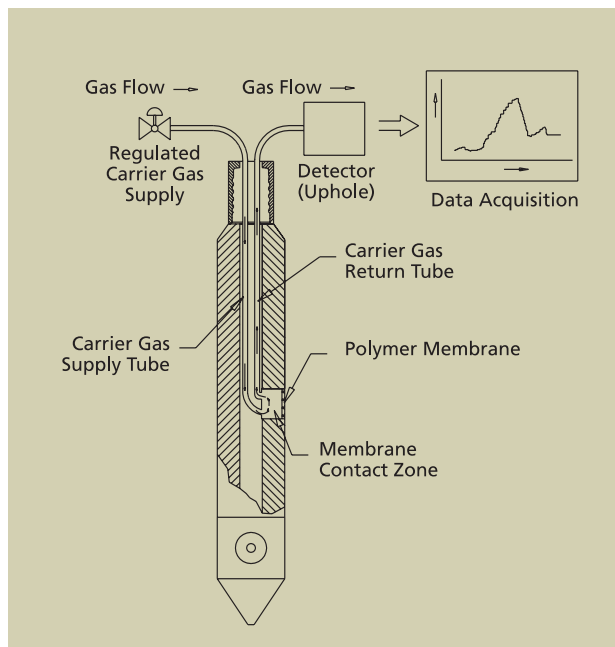


# Membrane Interface Probe

## THE RIGHT ANSWERS, THE FIRST TIME

Modern site investigation methods, such as the US EPA Triad approach, ASTM expedited site characterization, and adaptive site characterization, are faster, are less expensive, and produce better outcomes than conventional site investigations. At Stone Environmental, Inc., we specialize in field services that support these expedited approaches. Our Membrane Interface Probe (MIP), combined with our enhanced Waterloo Profiler system, onsite laboratories, and 3-D data interpolation and visualization, helps consultants solve their clients' problems and save thousands of dollars, compared to what they would pay using standard monitoring wells and fixed labs.

### MIP Field Deployment Configuration



*The MIP volatilizes VOCs in the subsurface, and transports them to a variety of detectors at the surface to measure responses.*

### Rapid Screening for VOCs

The Membrane Interface Probe (MIP) is a rapid screening tool for locating volatile organic compounds (VOCs) in the subsurface. Invented and manufactured by Geoprobe®, the MIP collects real-time, nearly continuous data on the distribution of VOCs as well as an electrical conductivity log that is indicative of gross stratigraphy. The MIP uses a number of detectors (electron capture detector, photoionization detector, and flame ionization detector) at the surface.

The MIP technique is effective in both the saturated and unsaturated zones, and provides concentration data even in clays and silts, which typically make water samples very difficult to collect. The MIP yields a total VOC detector response, and our onsite analytical chemistry expertise allows us to identify the compounds that are present.

An excellent screening tool for use in Triad-type investigations, the MIP can very quickly generate a large body of data, locating source areas and plume cores in three dimensions. It is capable of completing 200 linear feet of exploration per day, and the data are immediately available to the site investigator for decision making.

### How the MIP Works

The MIP heats the soil and groundwater adjacent to its tip, causing volatilization of any VOCs present. The VOCs then diffuse across a permeable membrane in response to a concentration gradient. A carrier gas stream picks up the VOCs and brings them to the surface, where we measure them using a series of detectors (PID, ECD, etc.). An electric dipole arrangement on the tip also measures the electrical conductivity of the soil, providing an indication of stratigraphic changes.

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*The Membrane Interface Probe is a direct push tool for obtaining real-time data on VOC distribution.*



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### **The Benefits of Stone's MIP**

**Real-Time Data.** Contaminant concentration and electrical conductivity data are displayed in the field and can be used to adjust or select the locations of future holes.

**High Productivity.** The MIP is advanced at a rate of 1 foot per minute with continuous data. Completion rates of more than 200 feet per day are possible. High productivity allows for close horizontal spacing of holes.

**High Resolution on Location of VOCs.** VOC data are produced on a nearly continuous basis (every 0.05 feet), providing an extremely detailed picture of the vertical distribution of VOC contamination.

**Continuous Record of Electrical Conductivity.** The MIP provides an indication of stratigraphy in real time.

**Useful in Saturated and Unsaturated Zones.** The MIP measures relative concentrations of VOCs both above and below the water table.

**Provides Concentration Data in Silts and Clays.** The MIP is ideal for areas where the collection of water samples is prohibitively slow.

**Onsite Analyses.** Our onsite labs analyze both total VOCs and specific target compounds through the use of gas chromatography.

**Trained and Experienced Operators.** Our operators are fully trained and highly experienced gas chromatography analysts with chemistry/environmental engineering degrees, and MIP certifications awarded by Geoprobe®.

**Rapid Delineation of Plume Cores and Source Areas.** Delineation of plume cores and identification of source areas through the use of drill rigs, monitoring wells, and fixed labs can take months or years. Using the MIP, plume cores and source areas can be identified in days.

**Waterloo Profiler Follow-Up.** The MIP is a semi-quantitative screening tool and does not provide actual mass per volume concentrations in groundwater. Once the plume anatomy has been defined using the MIP, our Waterloo Profiler can obtain detailed, high-quality data on concentrations of particular analytes.

**3-D Data Interpolation and Visualization.** With the MIP's high rate of data production, it is sometimes quite useful to employ our 3-dimensional data interpolation and visualization software in the field to help decide where to focus further investigation. Our 3-D services include an analysis of uncertainty in the interpolation to assist you in decision making.



**STONE ENVIRONMENTAL INC**

535 Stone Cutters Way  
Montpelier, Vermont  
05602 USA

Phone / 802.229.4541  
Fax / 802.229.5417  
Web Site / [www.stone-env.com](http://www.stone-env.com)