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News Release: Tech Note

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Technical Communication:

FAQ: Use of the Heated Trunkline

The recent release of the heated trunkline from Geoprobe® Systems has brought MIP logging to the next level. We have seen improved data quality of the membrane Interface Probe (MIP) with better contaminant bottom definition, quicker contaminant response and cleanup.

Heated Trunkline Improvements:

- More accurate contaminant definition
- Quicker cleanup times – less downtime
- Eliminates condensation forming in the trunkline
- Reduces the amount of time needed at depth intervals
- Increase daily footage production
- Perform MIP logging year round with greater ease

The set temperature of the heated trunkline (100°C) moves contaminant through the trunkline quicker reducing the dispersion typically seen with heavier VOCs which produce the classic slurred contaminant signal. The MIP logs overlaid in Figure 1 were advanced within 3' of one another in an area of high concentration gasoline.

HTL Responses	PEEK Responses
28' - 13,500,000µV	28' - 17,500,000µV
33' - 300,000µV	33' - 2,350,000µV
40' - <70,000µV	40' - 350,000µV

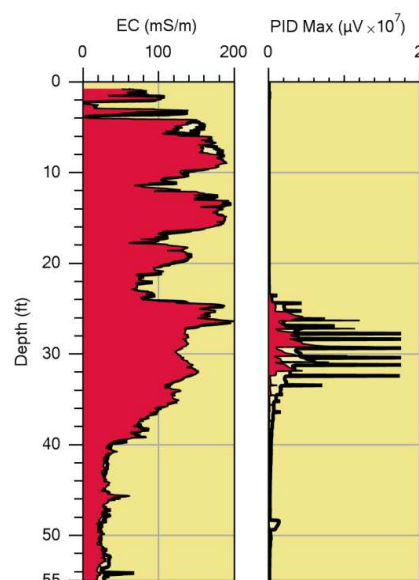
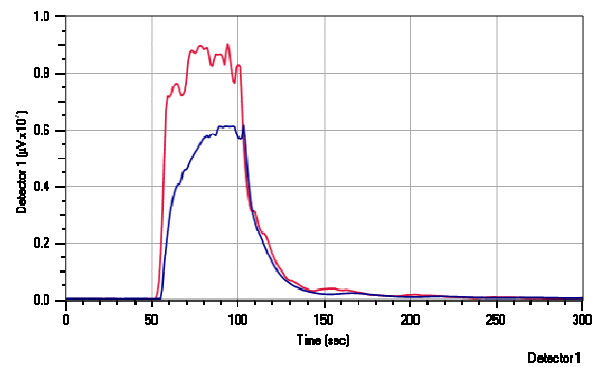


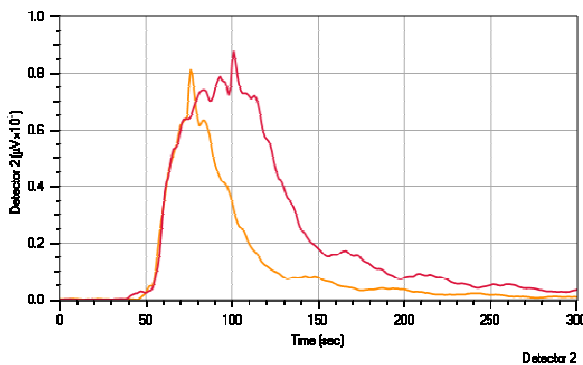
Figure 1: Heated vs. PEEK Trunkline

The heated trunkline produces a much clearer picture of the true thickness of VOC contamination, especially in source zones. Close to pre-log baseline levels can be seen within 10 feet of encountering free product gasoline levels. The heat of the trunkline post log reduces downtime waiting for a stable baseline. Fifteen minutes of probe and trunkline bake out time produces detector baselines that previously could have taken over an hour produce.

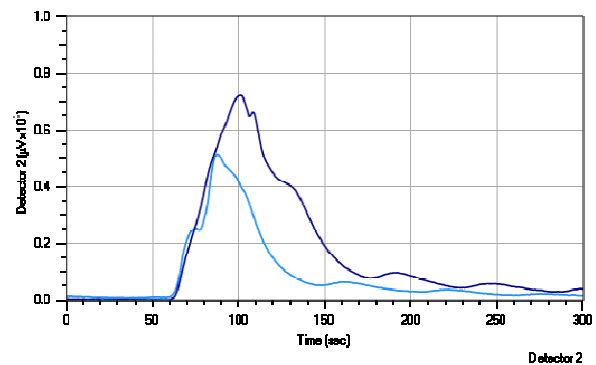
When logging with the trunkline at 100°C, compounds will reach their maximum response height for a given concentration quicker and maintain this signal longer than the unheated PEEK trunklines. This can be seen both in response tests with the typical 45 second residence time (Figure 2) and in the subsurface when watching the real time detector signal responses.



**Figure 2: Benzene 500ppm
Heated TL (red) vs. PEEK TL (blue)**



**Figure 3: PCE 5ppm Heated TL
Residence Time: Red- 45sec.
Orange-20sec.**



**Figure 4: PCE 5ppm PEEK TL
Residence Time: Dark Blue- 45sec.
Light Blue-20sec.**

The quicker contaminant travel through the trunkline allows us be able to recommend that with the heated trunkline we can reduce our residence time from 45 seconds to 20 seconds without losing much resolution (Figures 3 & 4). This means that instead of advancing the probe one foot every minute we can now advance 1 foot every 30 seconds.

Many operators have had difficulties running MIP in colder climates due to condensation forming in the return gas line from the water vapors that diffuse through the membrane. As these water vapors reach the colder temperatures at the surface they condense and can form blockages that can shut down the operation (Figure 5). With temperatures maintained at 100°C this problem has been eliminated. There is no more need to wait for spring to do a job or to worry about covering every exposed inch of trunkline for fear of this occurring. The heated trunkline can keep you logging with ease throughout the winter months.



Figure 5: Condensation in trunkline

Heated Trunkline Specifications and Operating Conditions:

- Stainless steel gas line construction
- 150' Trunkline & 8' Transfer Line
- 100°C Operating Temperature of Trunkline, Transfer Line & Gas Chromatograph
- 8 PSI typical 150' Trunkline Pressure
- PEEK tubing curls connect Trunkline to Probe
- Requires its own controller
- 2KW to operate trunkline and transfer line
- Estimated minimum trunkline life expectancy 10,000'*
- Excess trunkline must be loose and allow for airflow



Figure 6: Heated Trunkline Controller, 8 ft. Transfer Line, 150 ft. Heated Trunkline

*The life expectancy of the trunkline is dependent on operator handling and average log footages