

Leak Detection and Quantification of Fugitive Methane Emissions at Natural Gas Facilities

An EPA Best Management Practice

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Reducing Emissions, Increasing Efficiency, Maximizing Profits



Measurement Methods

- For leaks up to 10 cfm – Hi Flow Sampler
10.5 cfm @ \$9/Mcf = \$49,669
- For leaks 10 – 240 cfm – Vent-Bag Method
50 cfm @ \$9/Mcf = \$236,520
100 cfm @ \$9/Mcf = \$473,040
- For leaks >180 cfm – Anemometer
 - Used only on vertical open ended line
 - Much more subjective, requires experience.



Hi Flow Sampler Applications



Advantages:

- Total Leak Capture
- Measures Leak Rate Directly
- Can Measure 30 components per hour
- Repair Decision Based on Leak Rate & Repair Costs

Hi Flow Sampler Technology

- Captures Entire Leak
 - Measures Flow Rate (F) and Concentration (sample)
 - Subtracts the background (back) Concentration
 - Leak Rate = $F \times (\text{sample} - \text{back})$





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How Much Was That Leak?

Leaking Valve Actuator. Leak measured at 6.74 scfm or \$31,882/yr. Estimated to have been leaking at current leak rate for last three years or more. Successfully repaired next day and reduced to zero emissions.

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**Entire Survey Paid
For in recovered
gas, Including
investment of new
Hi Flow Sampler**

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How Much Was That Leak?

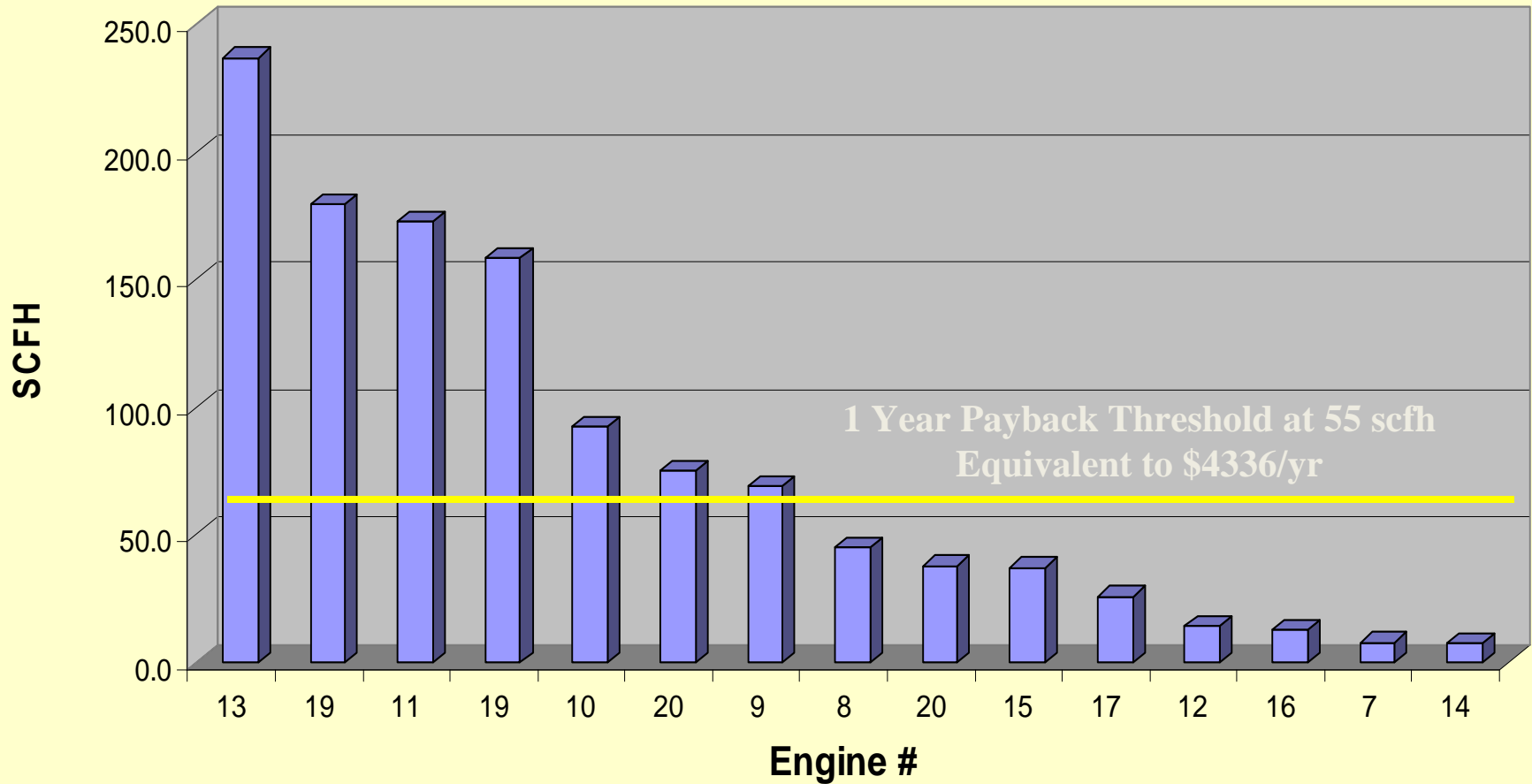
Leaking Actuator on Methanol Injector Pump. Leak Rate at 3.5 cfm or \$16,556/yr. Estimated repair <\$500.



About Rod Packing Leakage

- Under best conditions leak rate can be expected at a minimum of 11.5 scfh
- Leakage can be reduced through proper monitoring and a cost effective schedule for replacing packing rings & piston rods.
- Step one is to monitor and record baseline packing leakage and piston rod wear.
- Establish a replacement threshold

Rod Packing Leak Rates at Oklahoma Compressor Station



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Leak Survey Methods

Leak Detection Tools

- Remote Methane Leak Detector (RMLD)
- Soap solution
- Flame Ionization
- Heath Detecto-Pak Infrared
- Catalytic oxidation/thermal conductivity
- Flir Gas Imaging Camera
- Ultrasonic
- Visual



..., Maximizing Profits



RMLD

Remote Methane Leak Detector



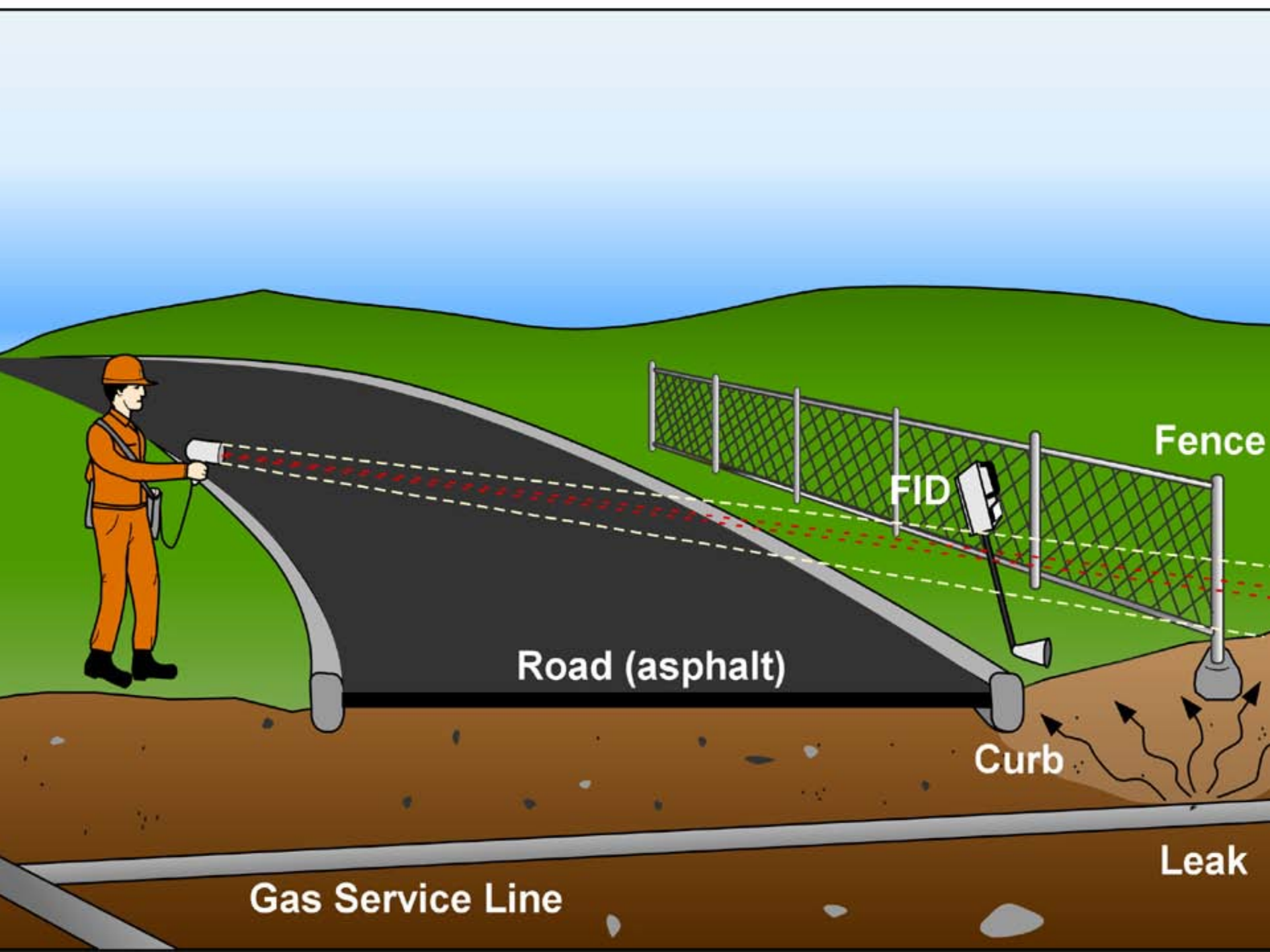
RMILD

Remote Methane Leak Detector



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Fence

FID

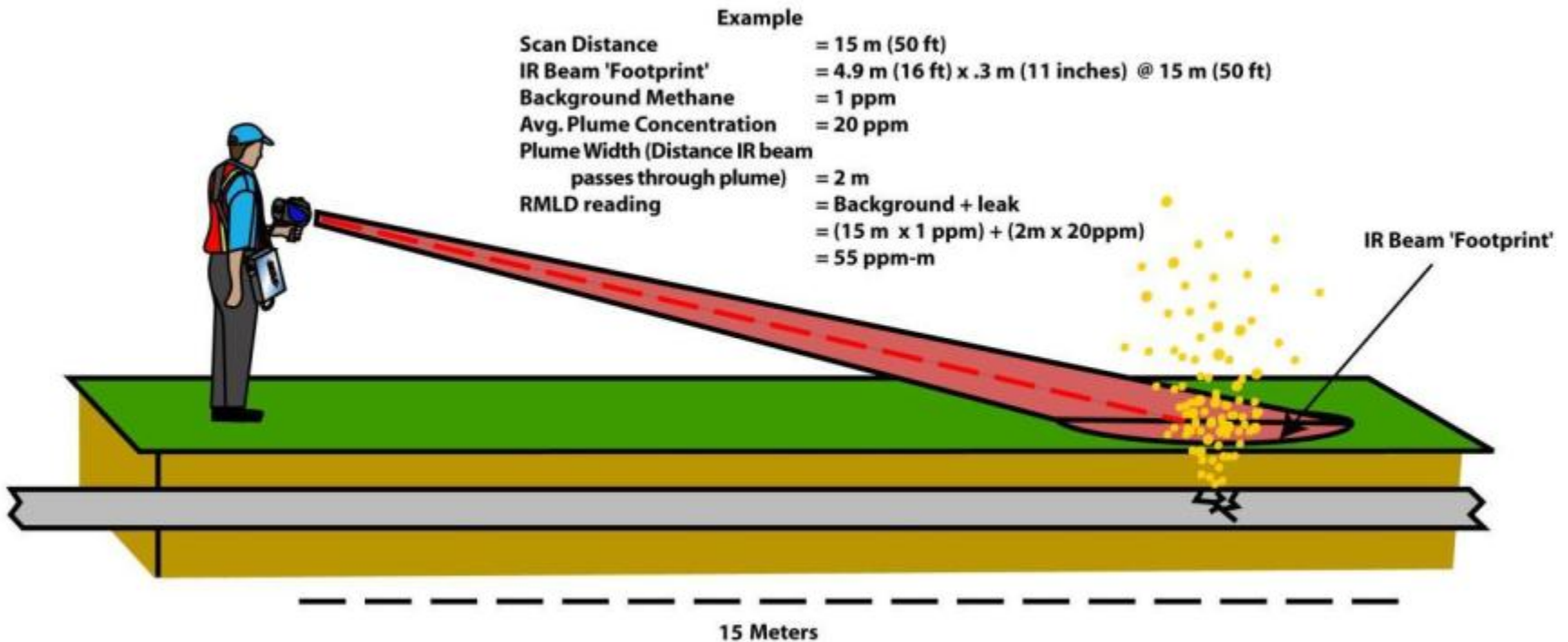
Road (asphalt)

Curb

Leak

Gas Service Line

How Does the RMLD Measure Gas?





Pump Driven CGI



Ultrasonic

Questions?



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