

PICARRO



The World's Leading Instruments for
Carbon and Water Cycle Measurements

WORLD ECONOMIC FORUM



Technology
Pioneer
2012



CERA

Energy Innovation
Pioneer 2012





Inventories
Emission Factors
Measurements

“AS soon as emissions become worth a lot of money, I start losing faith in self-reported numbers regardless of who signs off on them.”

**....Pieter Tans, Senior Scientist
NOAA Earth Systems Research Lab**

“It’s like going on a diet without weighing yourself. We’re counting the calories, believing the bottom-up calculations are right and not making any effort to test by getting on the scale.”

....Ray Weiss, Professor, Scripps

Bloomberg Markets, January 11, 2011

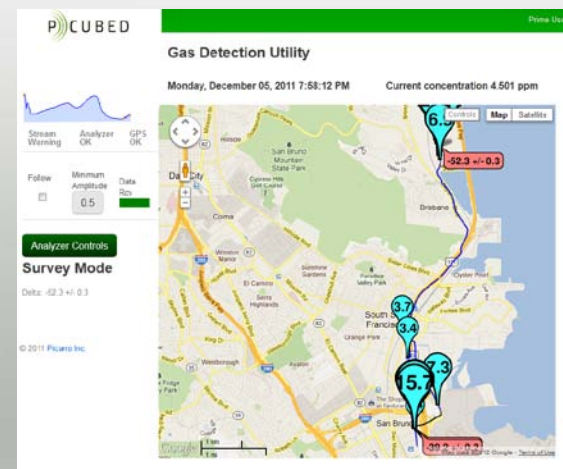




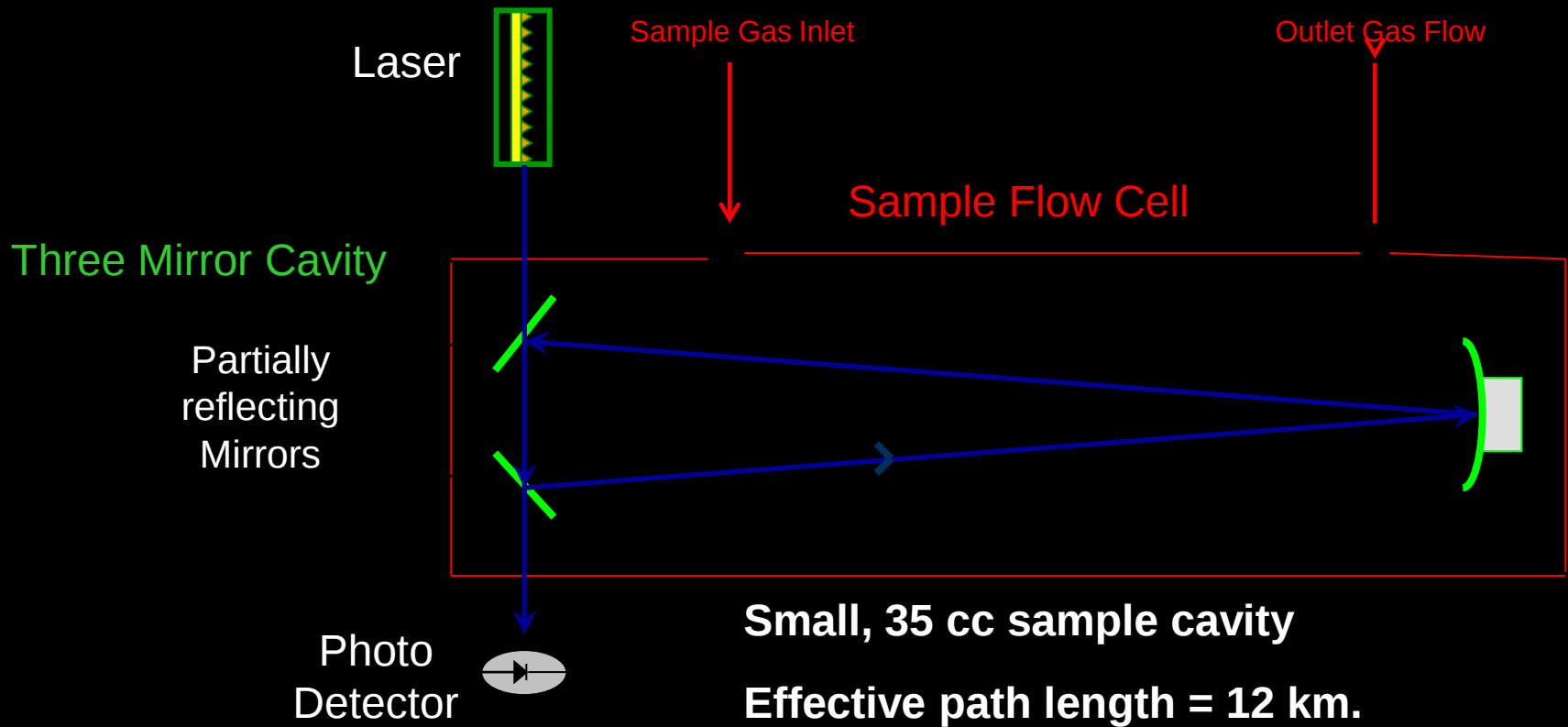
PICARRO + SCIENCE = INFORMATION

PICUBED

Picarro Processing Platform



Cavity Ring Down Spectroscopy

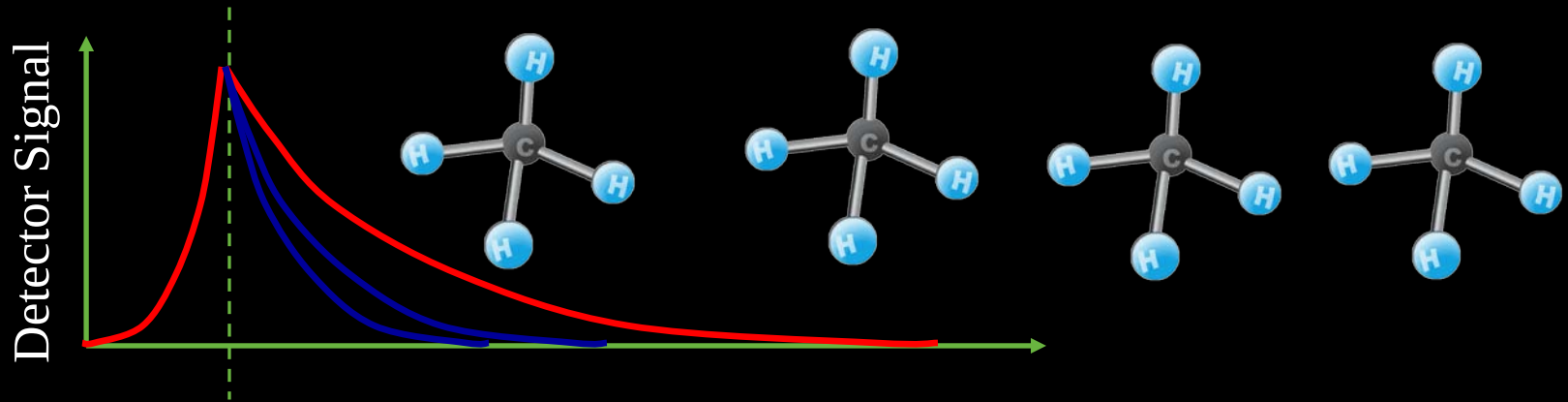


Cavity Ring Down Spectroscopy

Shut off Laser

Fill Cavity

Make Ringdown Measurement



- Passive measurement.
- Laser is off during measurement.
- Small, 35 cc sample cavity
- Effective path length =12 km.



1 Part per Billion
← - - - +/- 12 INCHES - - - →
in
1 Second



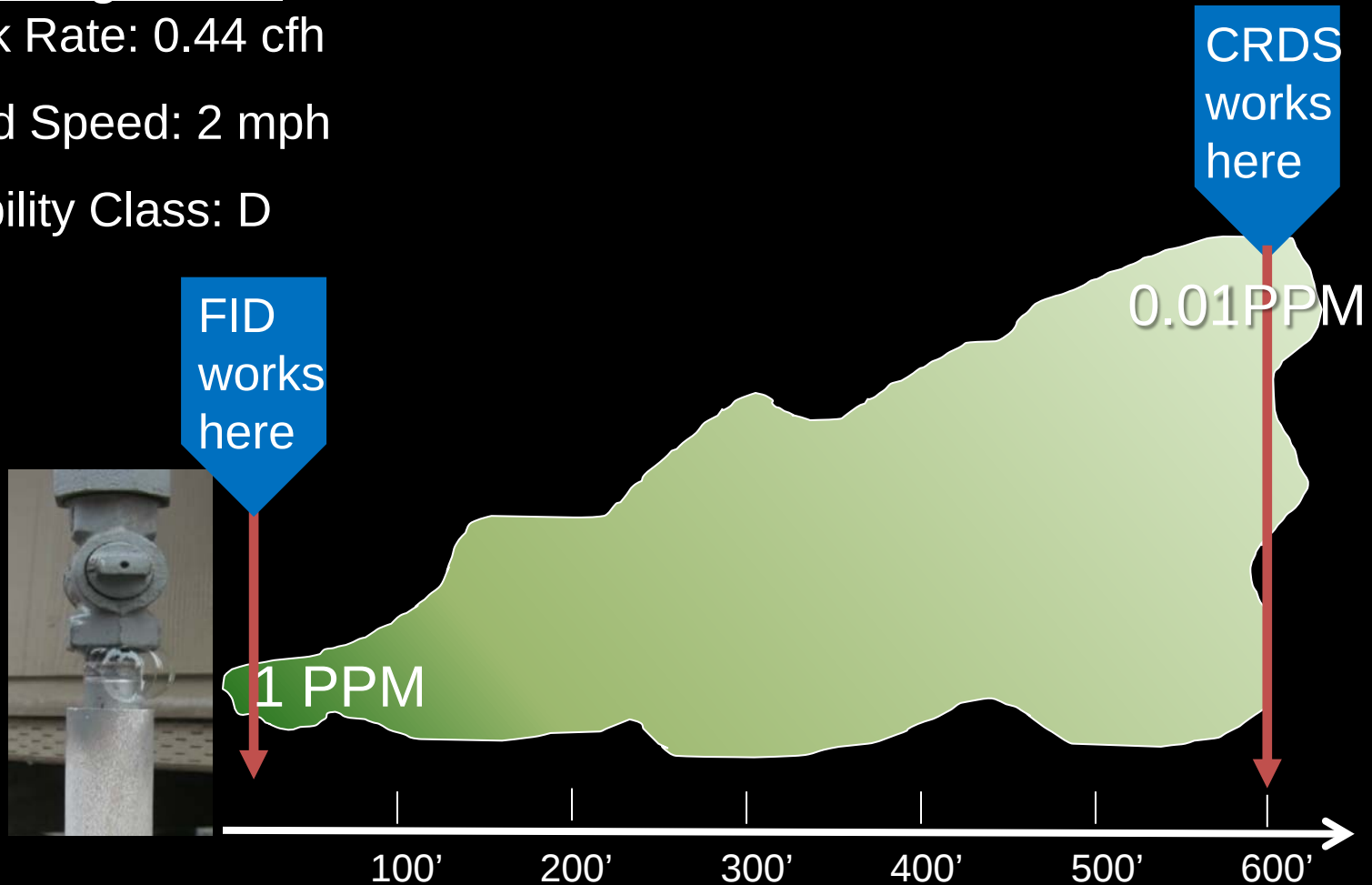
How far away can one measure?

Modeling a Leak

Leak Rate: 0.44 cfh

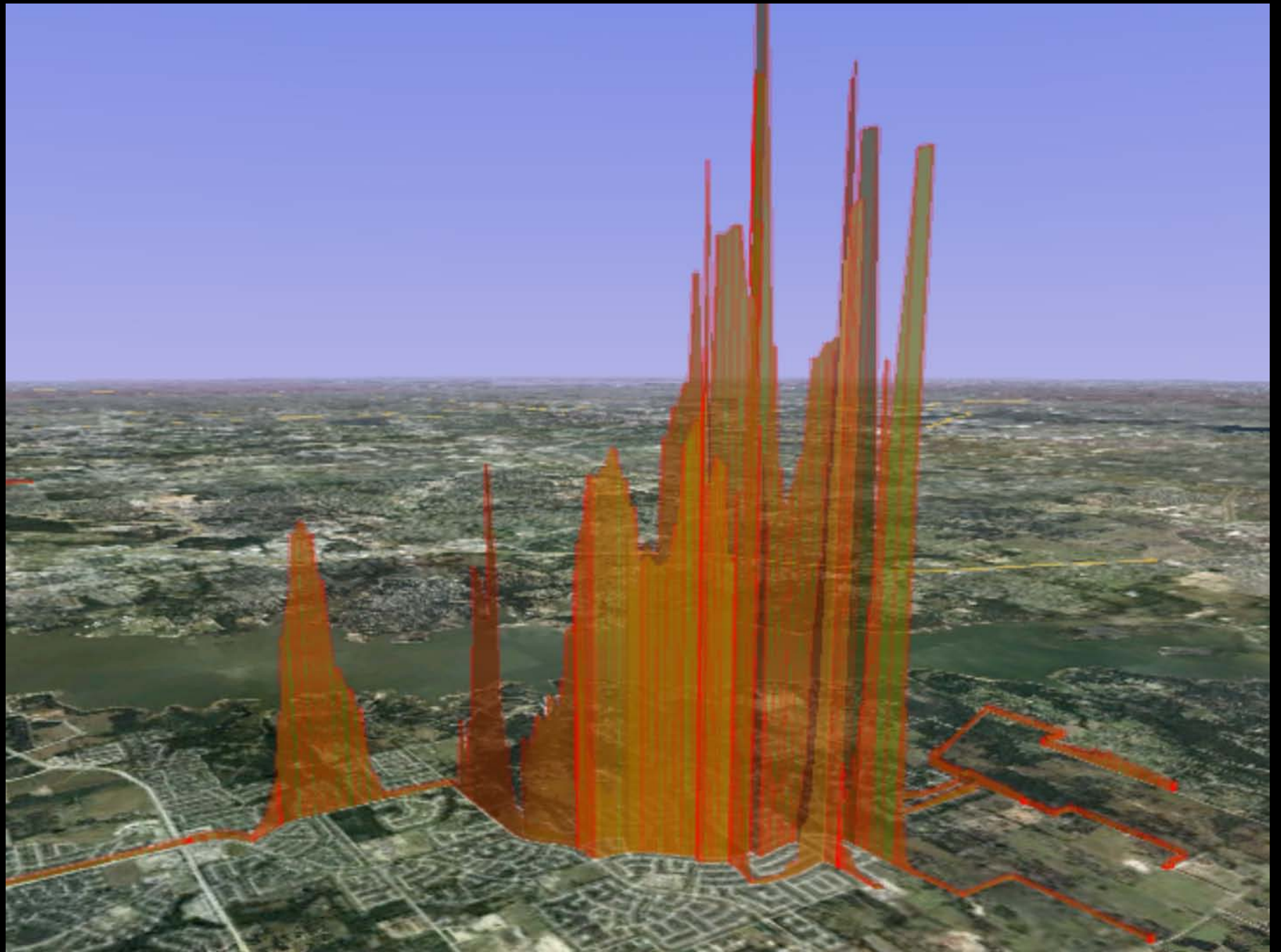
Wind Speed: 2 mph

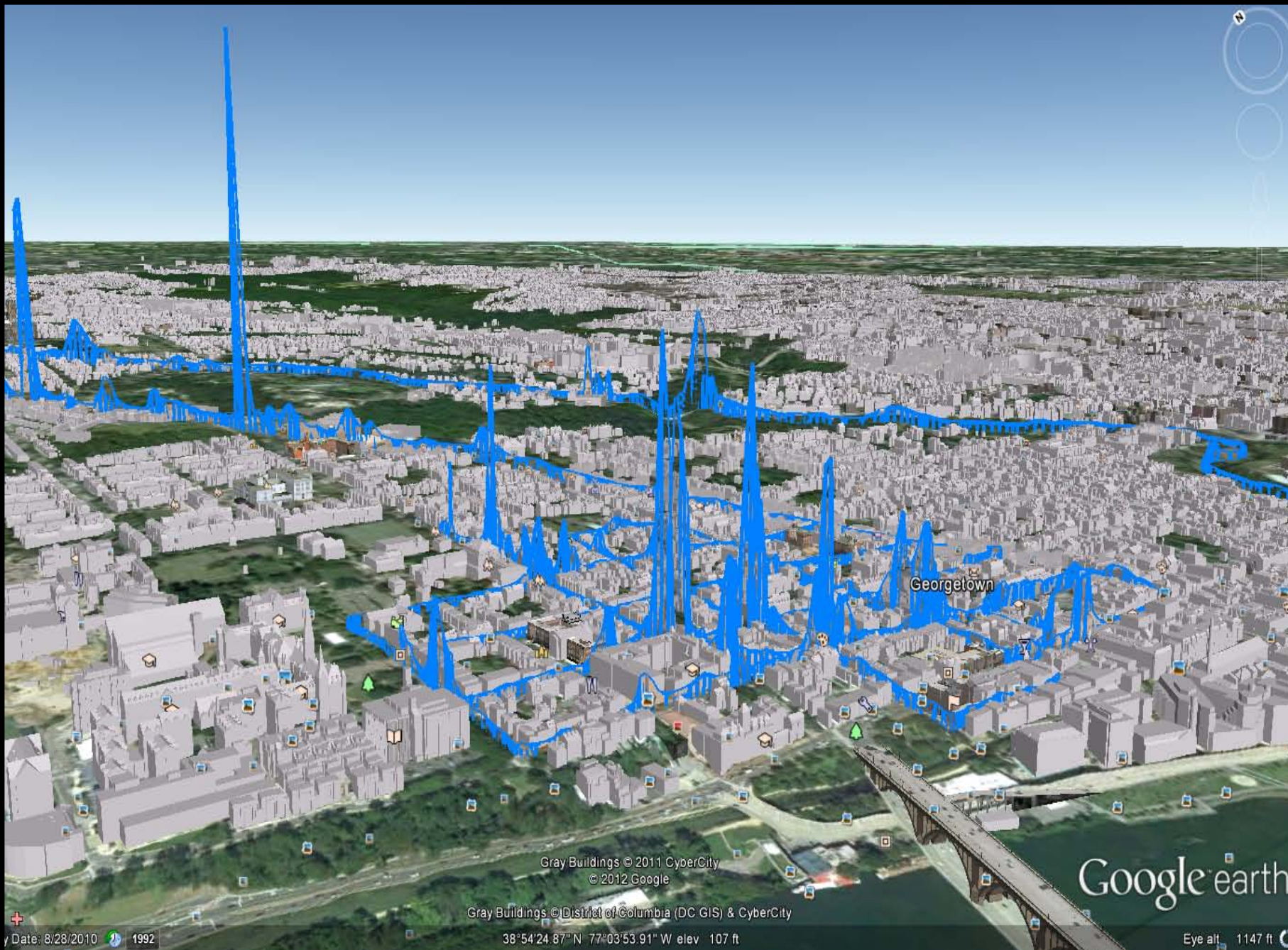
Stability Class: D



Hide & Seek
is Over







Gray Buildings © 2011 CyberCity
© 2012 Google

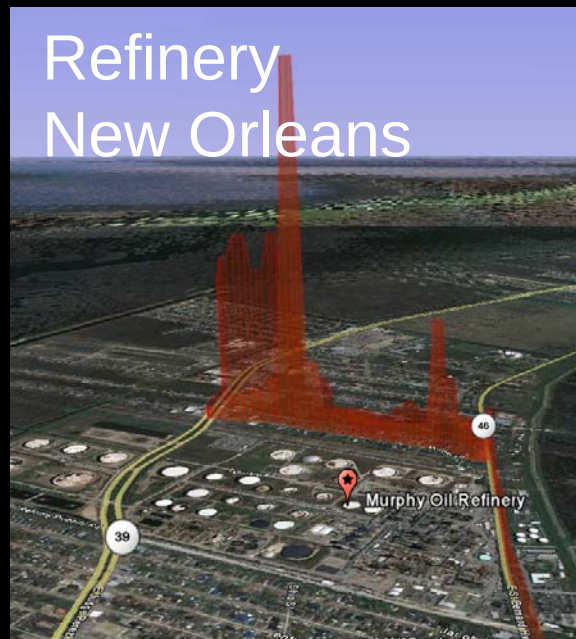
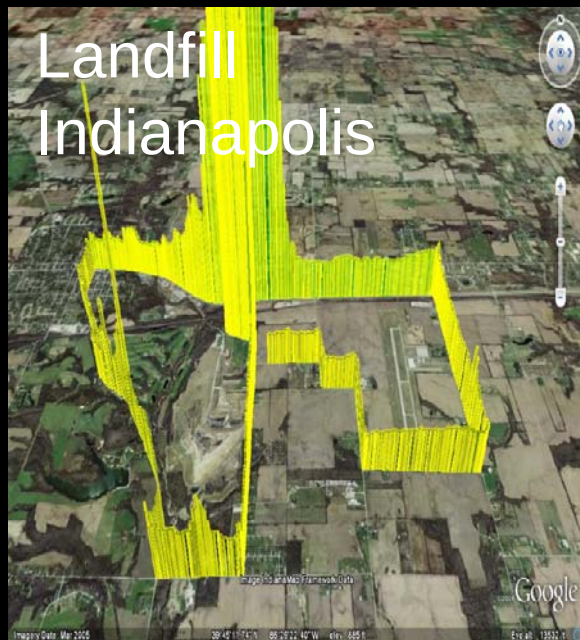
Gray Buildings © District of Columbia (DC GIS) & CyberCity

Google earth

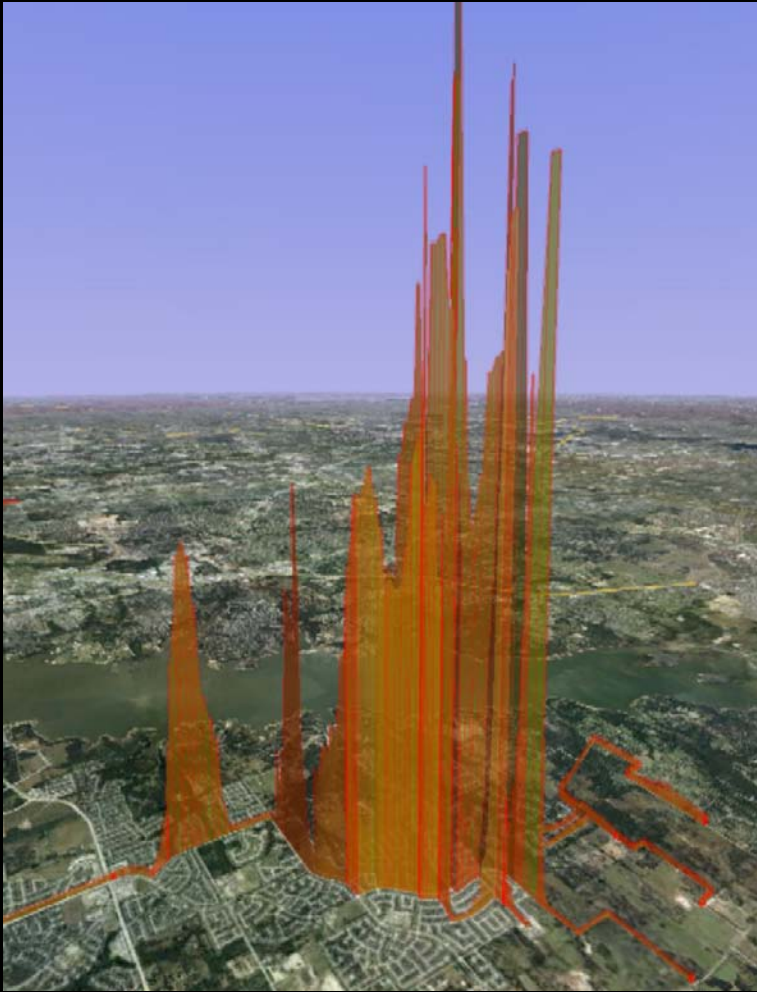
Date: 8/28/2010 1992

38°54'24.87" N 77°03'53.91" W elev 107 ft

Eye alt 1147 ft



Technology for Emissions Monitoring



32 pixels $\rightarrow$ 32 Picarros



Plume Camera

Technology for Emissions Monitoring

PICUBED

Thu Apr 26 2012 14:44:49
CH4: 1.965 ppm Wind: 3.15 m/s



GPS

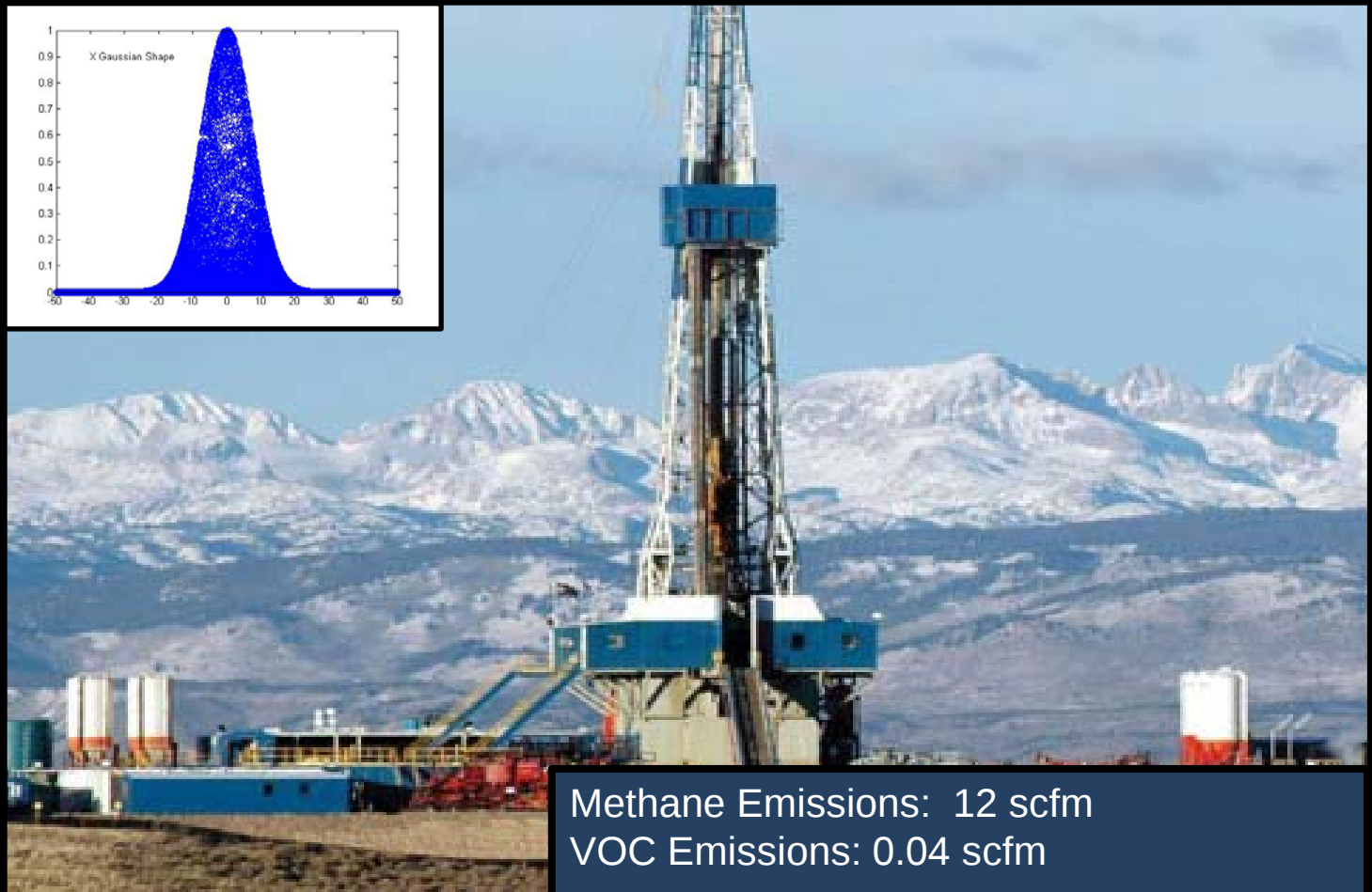
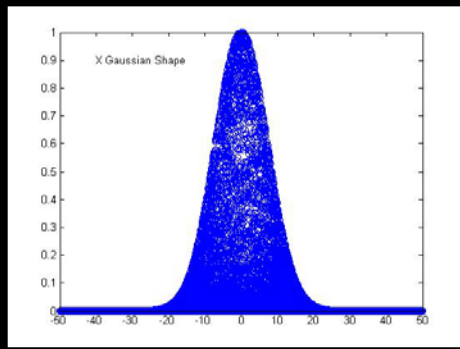
Survey Mode

Stop Survey

Start Capture

Analyzer Controls

© 2012 Picarro Inc.



Methane Emissions: 12 scfm
VOC Emissions: 0.04 scfm

Sources

- 147 Refineries
- 450 Pulp Paper Mills
- 3,100 Landfills
- 3,500 Large Waste Water Plants
- 15,500 Large CAFOS
- 3M Miles Natural Gas Pipelines
- 1,200 Natural Gas Compressor Stations
- Zillion's Fracking Locations

Stakeholders & Customers

- Voters, Home Owners, Schools
- Real Estate, Insurance, Law Firms
- Disenfranchised Communities
- NGO's – big and small
- Elected Officials
- Federal, State & Municipal Agencies
- Service Firms
- Polluters

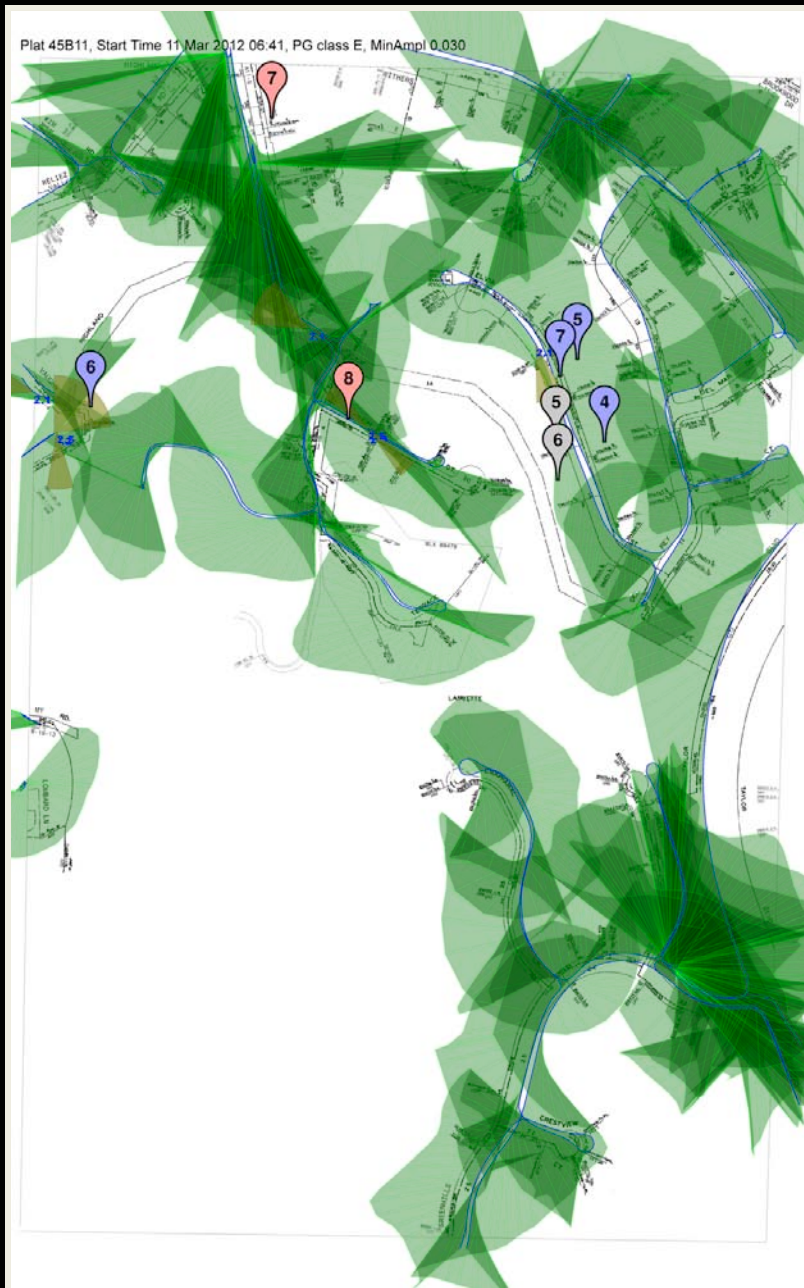
Natural Gas Leaks Kill Trees



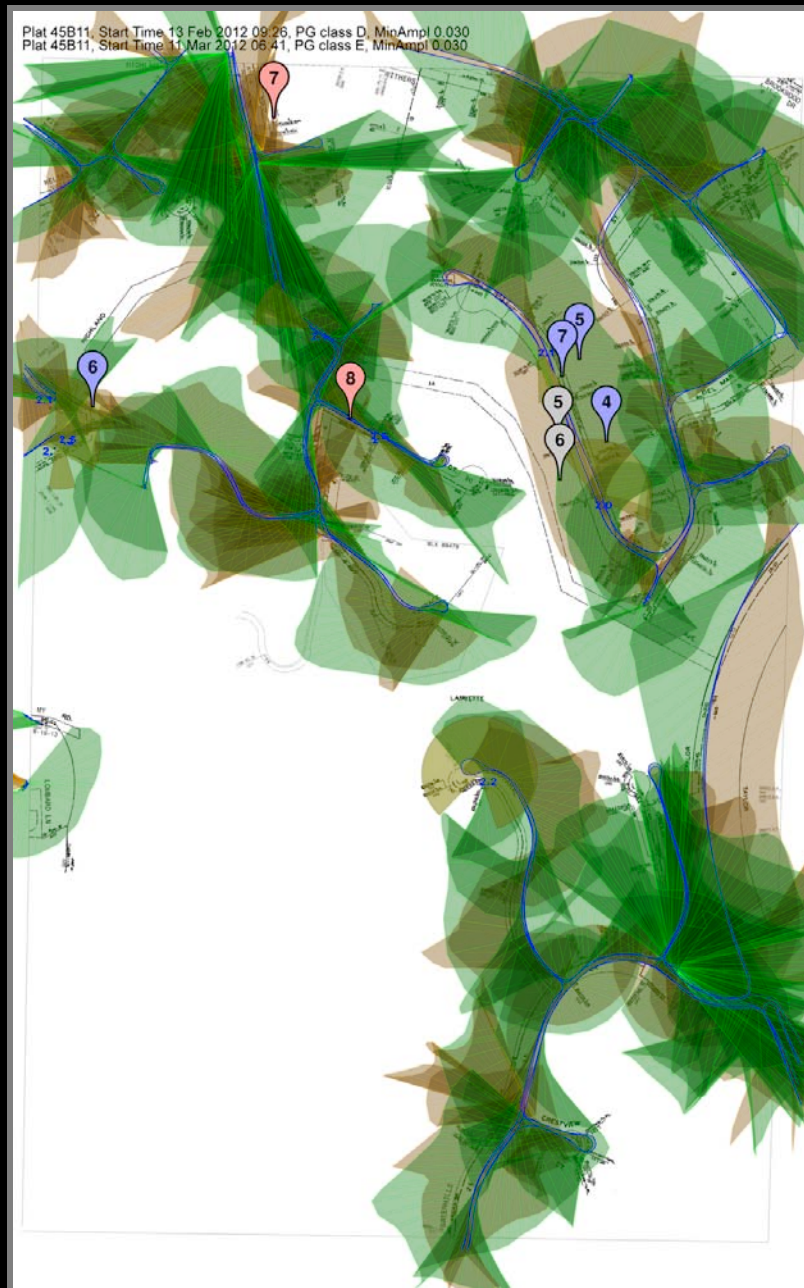
Natural Gas Leaks Can Kill People



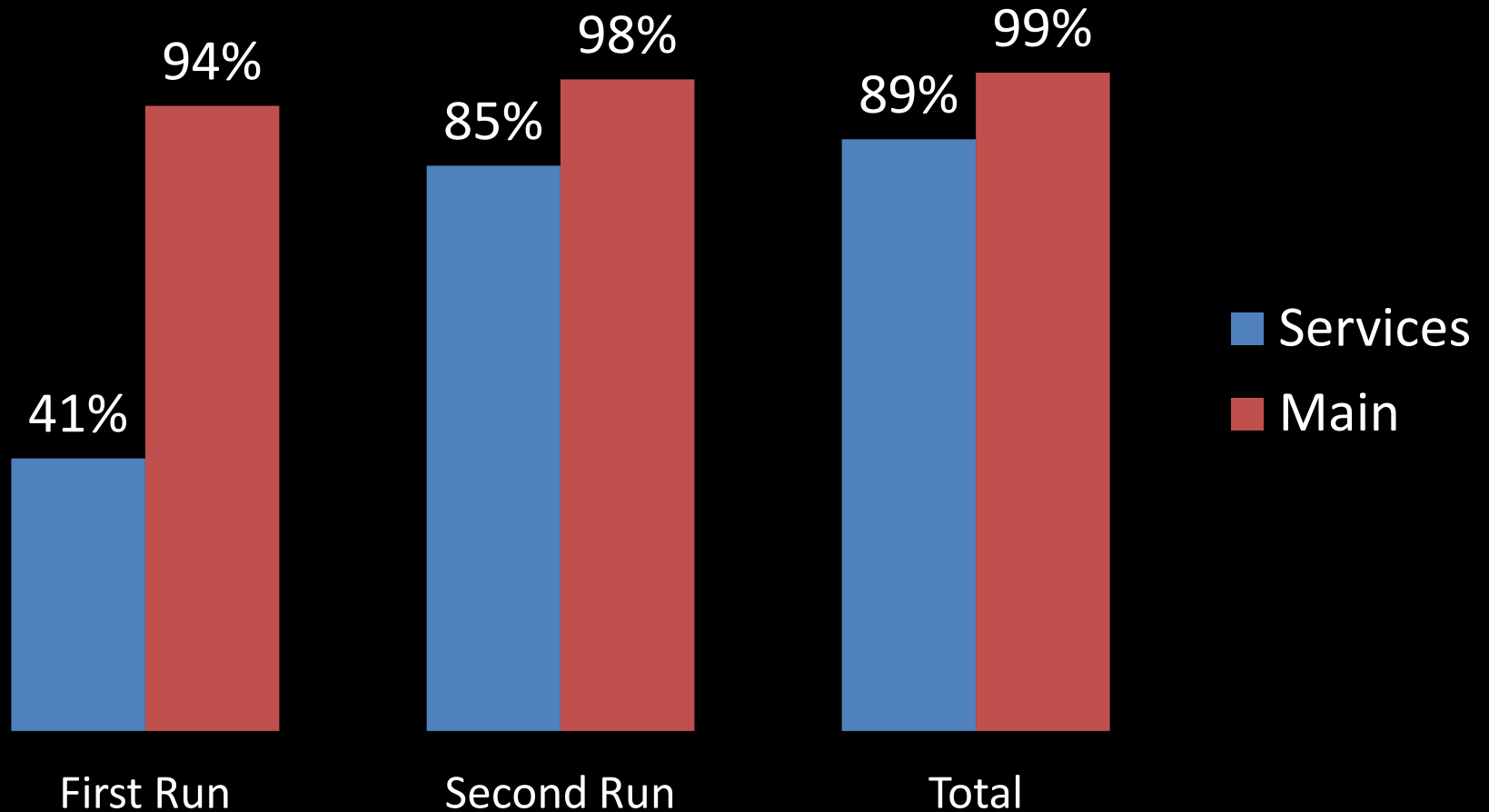
Plat 45B11, Start Time 11 Mar 2012 06:41, PG class E, MinAmpI 0.030



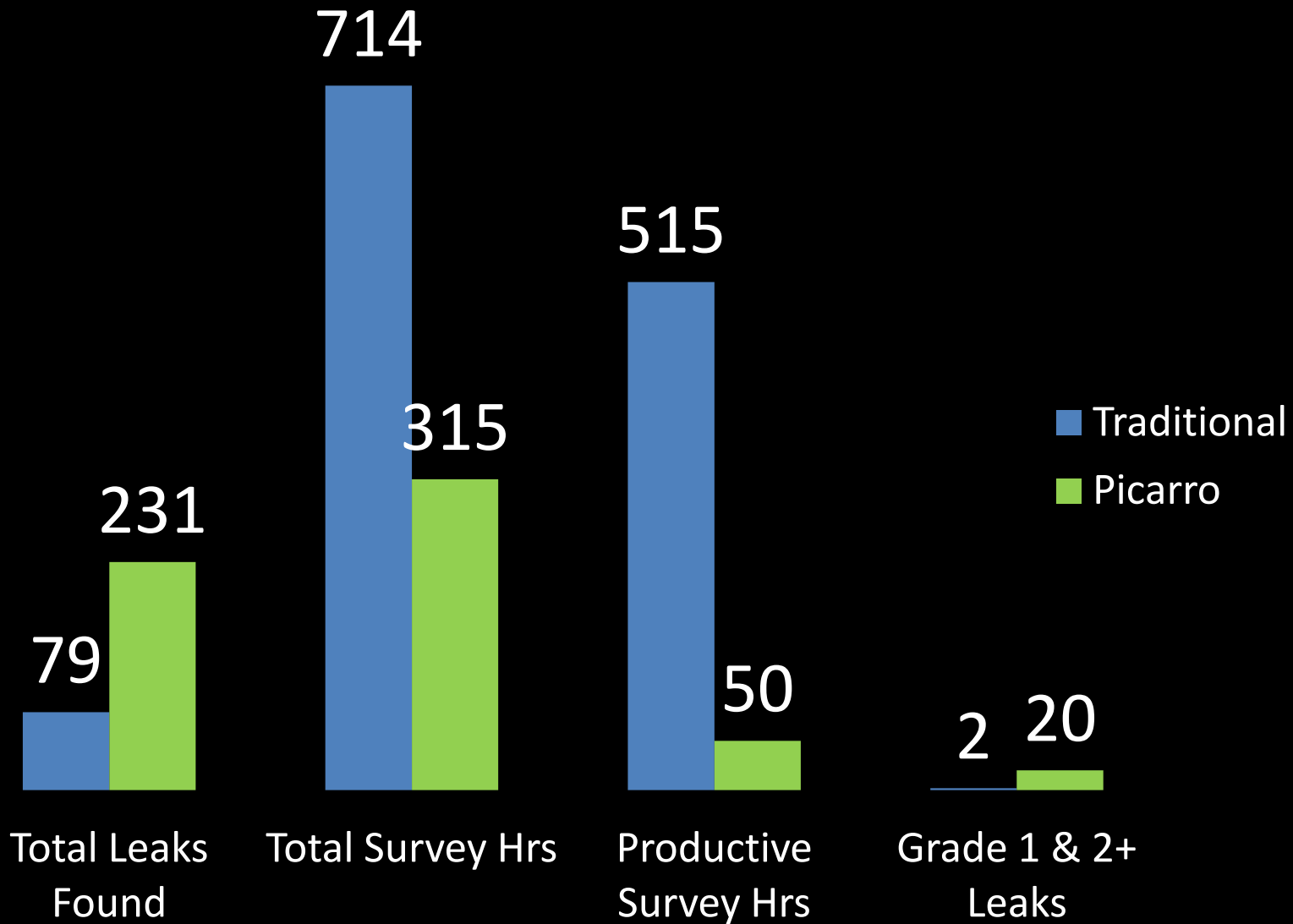
Plat 45B11, Start Time 13 Feb 2012 09:26, PG class D, MinAmpI 0.030
Plat 45B11, Start Time 11 Mar 2012 06:41, PG class E, MinAmpI 0.030



Survey Coverage



Side by Side Scorecard



A close-up, black and white photograph of a person's face, partially obscured by their hands. The person's eyes are closed, and their hands are pressed against their face, with fingers spread, suggesting a gesture of despair, shame, or hiding. The lighting is dramatic, with strong highlights on the skin and deep shadows in the recesses of the hands and face. The background is dark and indistinct.

Hide & Seek
is Over

TRANSPARENCY IS
THE NEW GAME

