



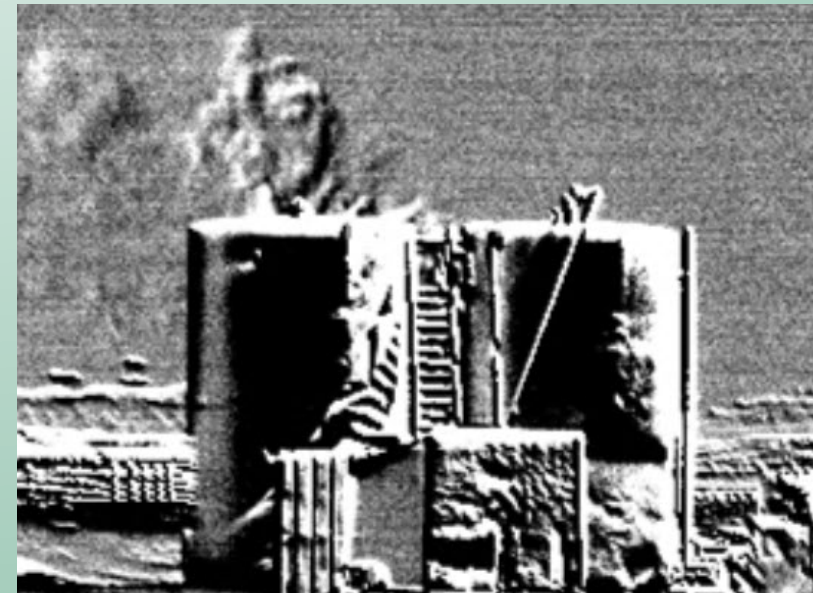
Leak Detection and Repair

METHOD 21 AND OPTICAL GAS IMAGING

Leak Detection and Repair

LT Environmental, Inc.

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Leak Detection and Repair



- ▶ Today we will discuss:
 - ▶ Method 21 Devices
 - ▶ Combining Optical Gas Imaging (OGI) with Method 21
 - ▶ Federal Programs:
 - ▶ Method 21 and Alternative Work Practice
 - ▶ NSPS Subpart OOOO revisions

Leak Detection and Repair

- ▶ EPA Method 21 (40 CFR Part 60, Appendix A-7)
 - ▶ “Determination of Volatile Organic Compound Leaks”
 - ▶ Describes specific devices that can be used:
 - ▶ General requirements:
 - ▶ Intrinsically safe
 - ▶ Constant intake pump
 - ▶ Detect gas

Leak Detection and Repair

Photoionization Detector:



Advantages

- ▶ Lightweight
- ▶ Easy Calibration

▶ Disadvantages

- ▶ VOC only (no methane)
- ▶ May not calibrate to meet all leak definitions

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Flame Ionization Detector:



Advantages

- ▶ Detects methane
- ▶ Can calibrate to multiple leak definitions (500ppm, 10,000ppm, etc..)

Disadvantages:

- ▶ Bulky/Heavy
- ▶ Need UHP Hydrogen
- ▶ Pilot frequently goes out

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Flame Ionization Detector:



MicroFID

- ▶ Smaller, but same advantages/disadvantages

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Infrared Absorption Detector:



Advantages

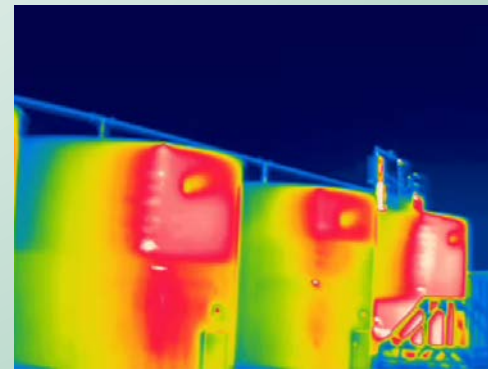
- ▶ Can detect methane
- ▶ Lightweight
- ▶ Calibrates to multiple leak definitions (500ppm or 10,000ppm)

Disadvantages

- ▶ Sensor reads in %LEL not ppm, must convert to ppm
 - ▶ $(\%LEL \times 10,000)$

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Forward Looking Infrared (FLIR)



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Or there's always this.....



Leak Detection and Repair

- ▶ Choose the right tool for the job
 - ▶ PID calibrates with isobutylene (VOC)
 - ▶ FID/Infrared Absorption calibrates with Methane (Hydrocarbon)
- ▶ Most regulations are focused in “Hydrocarbon” leaks, which is a major component of natural gas (~70%)

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State Leak Detection Regulations

► Colorado

- *Colorado Regulation 7 XVII.F.6.e. For leaks identified using an approved instrument monitoring method or AVO, owners or operators have the option of either repairing the leak in accordance with the repair schedule set forth in Section XVII.F.7. or conducting follow-up monitoring using EPA Method 21 within five (5) working days of the leak detection. If the follow-up EPA Method 21 monitoring shows that the emission is a leak as defined in Section XVII.F.6., the leak must be repaired and remonitored in accordance with Section XVII.F.7.*



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State Leak Detection Regulations

- ▶ Colorado
 - ▶ Leak definition = 500ppm
 - ▶ “Hydrocarbon”
 - ▶ PID vs FID



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State Leak Detection Regulations

▶ Colorado

- ▶ *XVII.F.7.c. Leaks discovered pursuant to the leak detection methods of Section XVII.F.6. shall not be subject to enforcement by the Division unless the owner or operator fails to perform the required repairs in accordance with Section XVII.F.7.*

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State Leak Detection Regulations

- ▶ Wyoming
 - ▶ Operator must develop LDAR protocol
 - ▶ Best Available Control Technology (BACT) >8 TPY (attainment area) or >4 TPY (non-attainment area)
 - ▶ Method 21, OGI Camera, AVO or a combination thereof
 - ▶ Does not negate other Federal LDAR requirements : Kb, OOOO, KKK

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State Leak Detection Regulations

▶ Utah

- ▶ *ILB.10.a.1 (General Approval Order) A reading of 500 ppm or greater with an analyzer or a TDLAS [tunable diode laser absorption spectroscopy] shall be considered a leak. Any emissions detected with an infrared camera shall be considered a leak unless the owner/operator evaluates the leak with an analyzer meeting U.S. EPA Method 21, 40 CFR Part 60, Appendix A no later than 5 calendar days after detection and the analyzer's reading is less than 500 ppm.*



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State Leak Detection Regulations

- ▶ Utah

- ▶ In conversations with the State; VOC is the gas component of concern
- ▶ A PID analyzer calibrated to 500ppm

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Federal Leak Detection Regulations

- ▶ Optical Gas Imaging
 - ▶ NSPS Subpart A §60.18(g) “Alternative Work Practice”
 - ▶ IR Camera allowed for any NSPS requiring a Method 21 monitor except:
 - ▶ Closed Vent Systems
 - ▶ Equipment designated as “leakless”
 - ▶ Equipment identified as “no detectable emissions” (leak definition 500ppm)

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Federal Leak Detection Regulations

- ▶ Some Oil and Gas regulations that require monitoring:
 - ▶ NSPS Subpart Kb
 - ▶ NSPS Subpart KKK
 - ▶ NSPS Subpart OOOO

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Federal Leak Detection Regulations

- ▶ NSPS Subpart Kb
 - ▶ “Closed Vent” systems for storage tanks (after custody transfer)
 - ▶ Method 21 only

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Federal Leak Detection Regulations

- ▶ NSPS Subpart OOOO
 - ▶ “Closed Vent” system inspections
 - ▶ Method 21 only – Closed Vent
 - ▶ Natural gas processing plant inspections
 - ▶ Method 21 only – 500ppm definition

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Federal Leak Detection Regulations

- ▶ NSPS Subpart KKK (applicable January 20, 1984 – August 23, 2011)
 - ▶ Potential for alternative work practice
 - ▶ Not applicable for facilities constructed after August 23, 2011

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Proposed Changes to Federal Rule

- ▶ NSPS Subpart OOOO Revisions
 - ▶ Proposed changes to existing rule
 - ▶ Published September 18, 2015
 - ▶ EPA soliciting comments through November 17, 2015

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Proposed Changes to Federal Rule

- ▶ Well Sites:
 - ▶ Proposing facility-wide OGI camera inspections
 - ▶ Within 30 days of well completion/modification
 - ▶ Inspections done semi-annually
 - ▶ Alternate proposal would require annual inspections
 - ▶ Soliciting comment on requiring quarterly inspections

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Proposed Changes to Federal Rule

- ▶ Well Sites:
 - ▶ May exclude sites that are wellhead only
 - ▶ May exclude low production sites (<15 bopd)

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Proposed Changes to Federal Rule

- ▶ Compressor Stations:
 - ▶ Proposing facility wide OGI camera inspections
 - ▶ Within 30 days after startup or modification
 - ▶ Inspections done semi-annually

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Proposed Changes to Federal Rule

- ▶ Re-inspections:
 - ▶ Proposing that Method 21 could be used for re-monitoring
 - ▶ Consideration of cost of re-hiring OGI personnel for re-inspection
 - ▶ Repaired if re-monitor shows leak is <500ppm above background

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Proposed Changes to Federal Rule

- ▶ Be informed
- ▶ Submit comments to EPA by November 17, 2015
- ▶ Know your leak detection options



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