EPA
United States
Environmental Protection
Agency

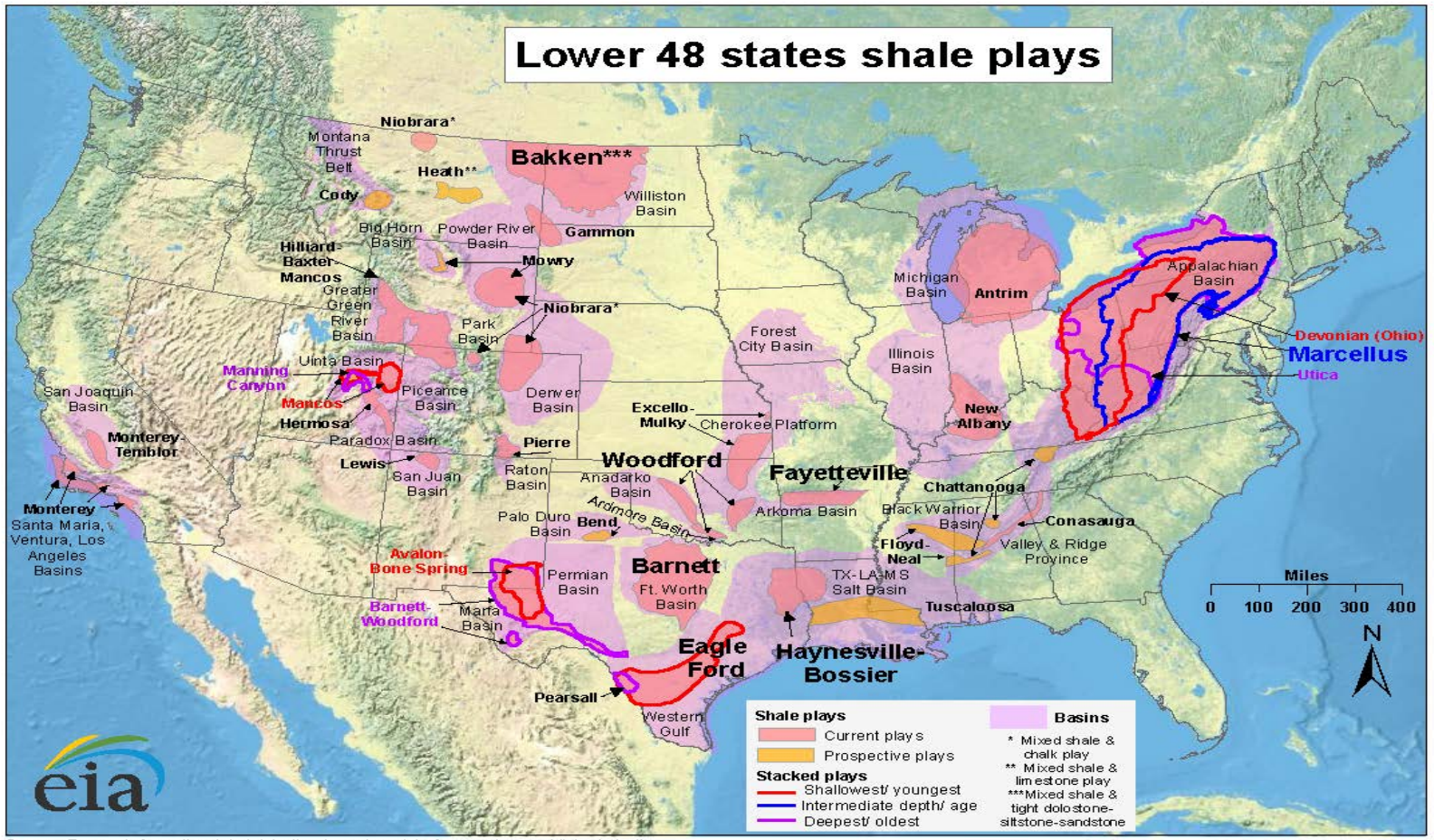
Energy Extraction and Production National Enforcement Initiative

February 2016

Energy Extraction: Expansion

United States Environmental Protection Agency

Advances in hydraulic fracturing and horizontal drilling have opened new areas for oil and gas development. Growth is regional, unevenly distributed across the U.S., and in close proximity to large populations in some areas. Natural gas is an important cleaner burning “bridge fuel” that must be extracted and produced in a manner that protects communities and the environment, and complies with applicable laws.



Source: Energy Information Administration based on data from various published studies.
Updated: May 9, 2011

National Enforcement Initiative

- In March 2010, EPA announced a new **enforcement initiative** for energy extraction.
- Initiative renewed for FY 14-16 cycle.
- Requested comment on whether to renew for the FY 17-19 cycle.
- Focus is **onshore natural gas extraction and production**.

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Approaches

- Target efforts based on potential non-compliance.
- Increased field presence.
- Utilize advanced air monitoring technologies to facilitate compliance evaluations.
- Encourage corporate-wide assessments and corrective actions where appropriate.
- Promote Best Management Practices.

Air Pollution Focus

- Air emissions from shale gas exploration and production threaten ambient air quality.
  - Air emissions can be released during all stages of production.
  - Primary pollutants of concern are volatile organic compounds (VOCs, e.g., propane, butane, xylene, benzene, toluene).
  - Ozone non-attainment areas – e.g., Denver, Western PA.
  - Between 2000 and 2013 approx. 9.4 million people lived within one mile of a hydraulically fractured well.
  - Approx. 487,000 active natural gas wells

Science First:
What is Actually Happening

Available Tools Influence Enforcement Approach: IR Cameras

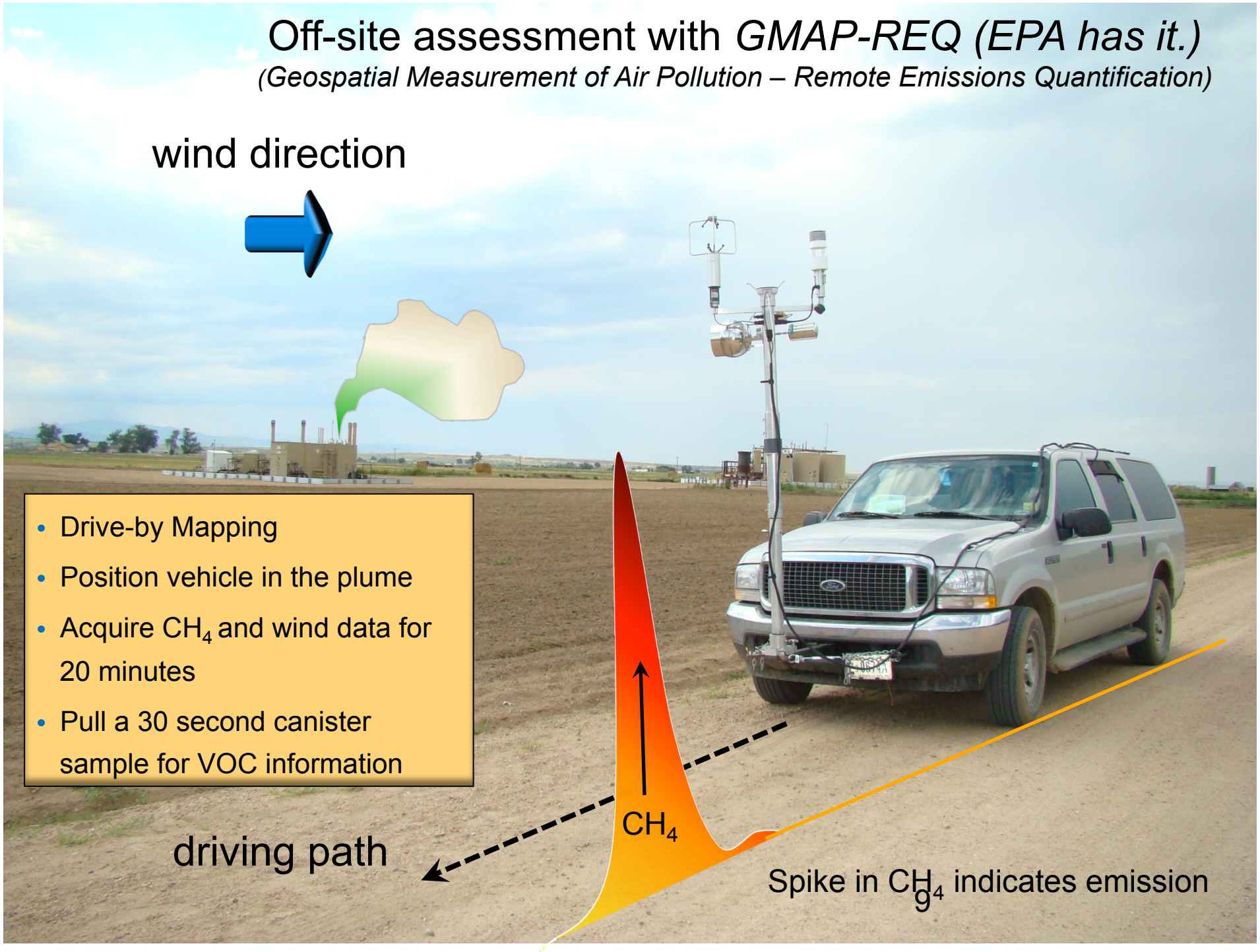
- Enables inspectors, citizens, judges and operators to see the emissions.
- Great for finding leaks in difficult to monitor sources or unexpected areas.
- Devices have been provided or made available to all EPA Regional Offices.
- Increasing numbers of states and operators also using IR cameras.

Photoionization Detectors

- Hand held detectors
  - Sensitive to 1 ppb
  - Measured concentrations are real-time
  - General VOCs, or benzene or butadiene-specific
- Alert inspectors to presence of…
  - Emissions from storage tanks, wastewater, etc
  - Equipment leaks
- For LDAR, PIDs can detect process equipment leaks tens of feet away for further identification using FLIR cameras

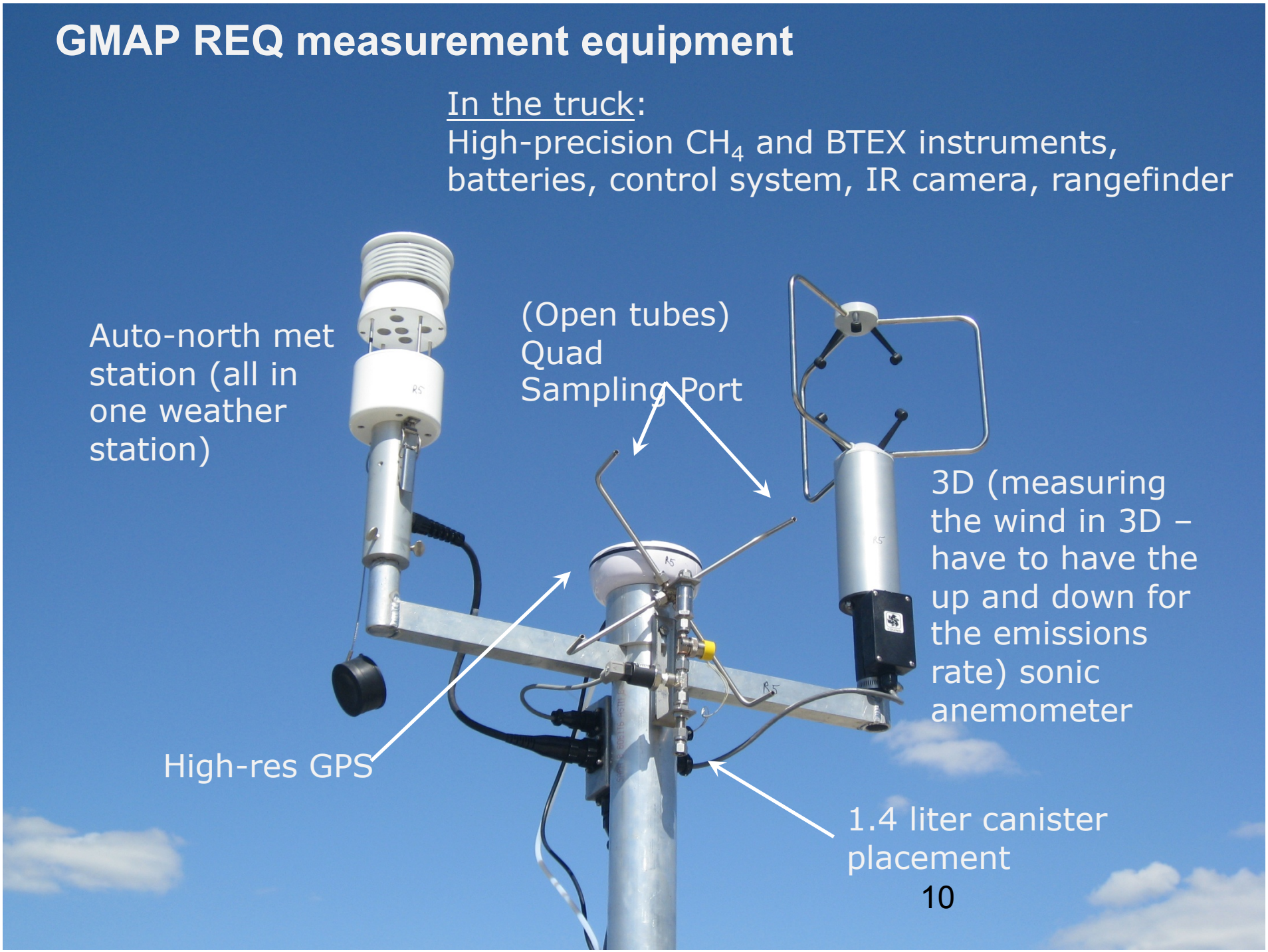
Off-site assessment with *GMAP-REQ (EPA has it.)*

(Geospatial Measurement of Air Pollution – Remote Emissions Quantification)



GMAP REQ measurement equipment

In the truck:
High-precision CH_4 and BTEX instruments, batteries, control system, IR camera, rangefinder




Google earth
Imagery Date: 10/7/2012
40°08'43.08" N 104°52'10.56" W elev 4984 ft
Eye alt 5281 ft

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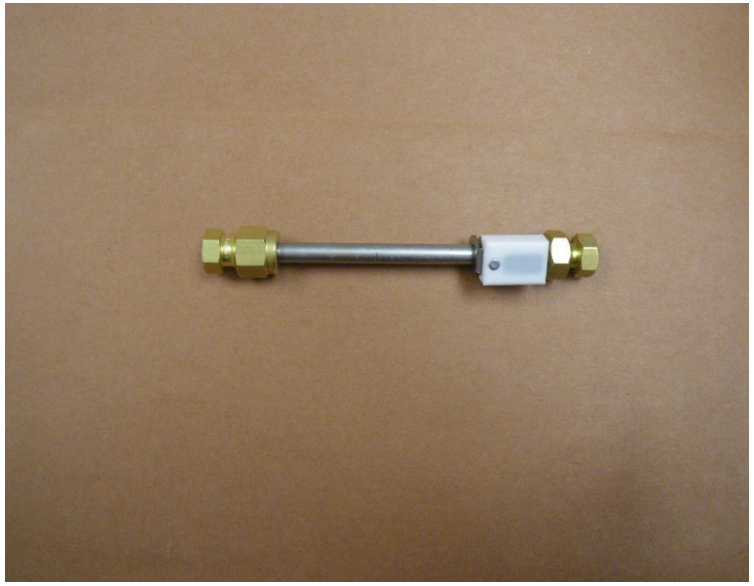
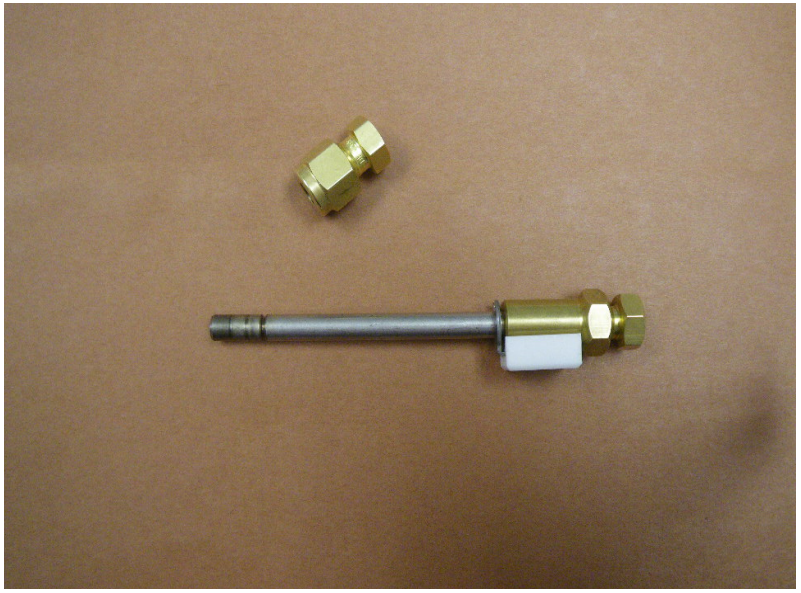
Diffusion Tube





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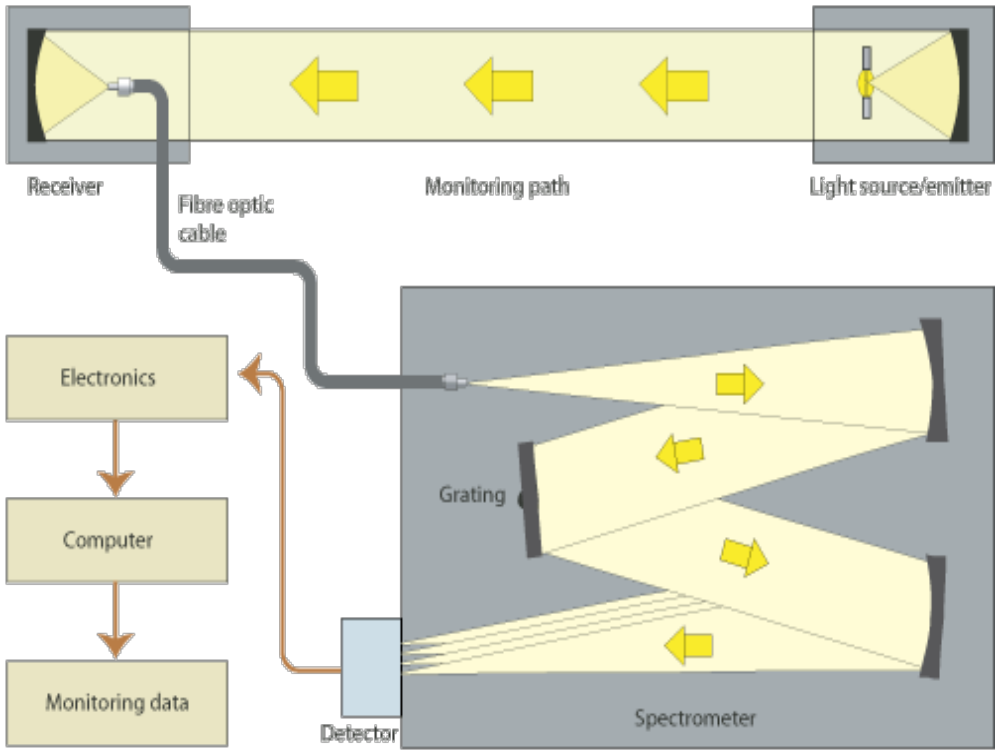

Apply Law and Common Sense

CAA Legal Authorities

- NSPS, especially Subpart OOOO
- NESHAP/MACT
- NSR/PSD
- SIP
- FIP
- Permit Requirements
- Section 303 – Imminent and Substantial Endangerment
- Section 112(r) – General Duty Clause

A Recent Enforcement Settlement – Region 8

- Entered in June 2015.
- Resolved claims that the company failed to adequately design, size, operate, and maintain vapor control systems on its controlled condensate storage tanks -- emissions of VOCs.
- Covers all of the company's ***controlled*** condensate storage tanks in the Denver 8-hour ozone marginal nonattainment area that have vapor control systems operating pursuant to the Colorado SIP.
  - More than 3,400 tank batteries, which are multiple storage tanks located together.
- The company will spend an estimated $60 million on system upgrades, monitoring, and inspections.
- $4.5 million to fund environmental mitigation projects.
- $4 million on Supplemental Environmental Projects.
- $4.95 million civil penalty.

Recent Enforcement Settlement – Region 8

- **Injunctive Relief**
  - Engineering evaluations to ensure vapor control systems are properly designed/controlled.
  - Company must make necessary modifications to ensure systems are properly designed/controlled following the engineering evaluations.
  - Infrared camera inspections to ensure the vapor control systems are controlling emissions as expected.
  - Inspection/preventative maintenance program.
  - Third-party auditor will review the engineering evaluations and will also perform infrared camera inspections.
  - Evaluation of the pressure relief valves and thief hatches on each condensate storage tank and address any evidence of VOC emissions.
  - Install pressure monitors with continuous data reporting on a cross-section of the tank systems.

It's Not All About Enforcement

It's Also About Communication

Oil and Gas Compliance Alert

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Office of Enforcement and Compliance Assurance

Compliance Alert

September 2015

EPA Observes Air Emissions from Controlled Storage Vessels at Onshore Oil and Natural Gas Production Facilities

Purpose

The U.S. Environmental Protection Agency (EPA) is publishing this Compliance Alert because EPA and state investigations have identified Clean Air Act compliance concerns regarding significant emissions from storage vessels, such as tanks or containers, at onshore oil and natural gas production facilities. The Alert discusses certain engineering and maintenance practices causing the compliance concerns and potential emissions-reducing solutions. While this Alert provides information intended to help operators and state regulators identify and address compliance concerns, the Alert's engineering and maintenance practices do not equate to or guarantee compliance with federal and state regulations.

Compliance Concerns

This Alert aims to help operators assess whether their vapor control systems are properly designed, sized, operated, and maintained such that emissions from storage vessels may be controlled in compliance with applicable federal and state regulations. For purposes of this Alert, a "vapor control system" includes a closed-top storage vessel, all vent lines leading from the storage vessel, fittings and connectors in the vent lines, any liquid knock-out vessels in the vent lines, any pressure relief devices (PRDs) on the vessel or vent lines, and the control device used to combust gas or route gas into the sales line.

At onshore oil and natural gas production facilities, oil and natural gas is extracted from sub-surface formations through a wellhead and then flows into a separator at varying pressures. The separator divides material from the wellhead into various constituents, such as oil, water, hydrocarbon liquids and natural gas or comingled liquids and natural gas, depending on the characteristics of the well. The separator has a valve that opens to "dump" the pressurized liquid into a storage vessel. While some storage vessels are designed to operate at pressures greater than atmospheric pressure, most storage vessels currently used for oil and natural gas production are atmospheric storage vessels, which are only designed to operate at or below atmospheric pressure.

Storage vessels at an oil and gas production facility.

EPA and state inspectors have observed emissions from storage vessel PRDs, such as closed thief hatches and pressure relief valves. Inadequately designed, sized, operated, and/or maintained vapor control systems may not effectively capture and control emissions.

Storage vessel emissions at onshore oil and natural gas production facilities are regulated because they contain: (1) large quantities of volatile organic compounds (VOCs) that contribute to the formation of ground-level ozone; (2) hazardous air pollutants (HAPs) such as ben-

- EPA and state investigations identified CAA compliance concerns regarding significant emissions from storage vessels, such as tanks or containers, at onshore oil and natural gas production facilities.
- The Alert discusses certain engineering and maintenance practices that may address compliance concerns and reduce emissions.
- To read the Alert, go to: http://www2.epa.gov/enforcement/compliance-alert-epa-observes-emissions-controlled-storage-vessels-onshore-oil-and.
- Wide distribution:
  - Interstate Oil and Gas Compact Commission (IOGCC); and
  - Academics, NGOs, Vendors, and Researchers.
- Positive feedback:
  - ExxonMobil;
  - TCEQ;
  - ND Dept of Health;
  - OSHA; and
  - National Oil and Gas Emissions Committee.

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Emerging Issues

Unconventional Oil & Gas Pigging/Venting Operations

Background: Shale Gas Gathering Pipelines

- In comparison to traditional or conventional rural natural gas gathering pipelines, unconventional shale gas gathering lines are generally:
  - Larger in diameter
  - Operating at higher pressure
  - Transporting "wet" gas

  } **Greater potential for VOC emissions**

- Potential concern for safety of people near operations and the environment.

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Unconventional Oil & Gas Pigging/Venting Operations

- Numerous gas compressor and pig launcher/receiving stations.
- Venting of high and low pressure pipelines.
- We are investigating how best to fully estimate all emissions from these operations.
- Numerous citizen complaints raise level of concern.

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Unconventional Oil & Gas Pigging/Venting Operations

- NSPS Subpart OOOO does not address pigging emissions from gathering or transmission lines.
- Magnitude and Frequency of these operations can be significant.
- Operations may trigger CAA permitting requirements.
- Some States (e.g., Texas) have specific regulatory requirements.
- Sharing information with PHMSA/DOT/OSHA/ CDC.