EPA Enforcement Initiative and Citizen Empowerment

October 2016
CIBO Annual Meeting

Woodstock, VT

ERM

AGENDA

- EPA Enforcement Vision
  - Next Generation Compliance
- Next Generation Monitoring
  - Regulatory
  - Citizen Monitoring

Fence-Line Monitoring Practice Leads

DISCLAIMER! For real expert advice:

Midwest - *Rick Osa*
Technical Director
Rick.Osa@erm.com
847-258-8958

West Coast – *Larry Hottenstein*
Partner
Larry.Hottenstein@erm.com
949-623-4685

East Coast – *Andrew Woerner*
Partner
Andrew.Woerner@erm.com
484-913-0455

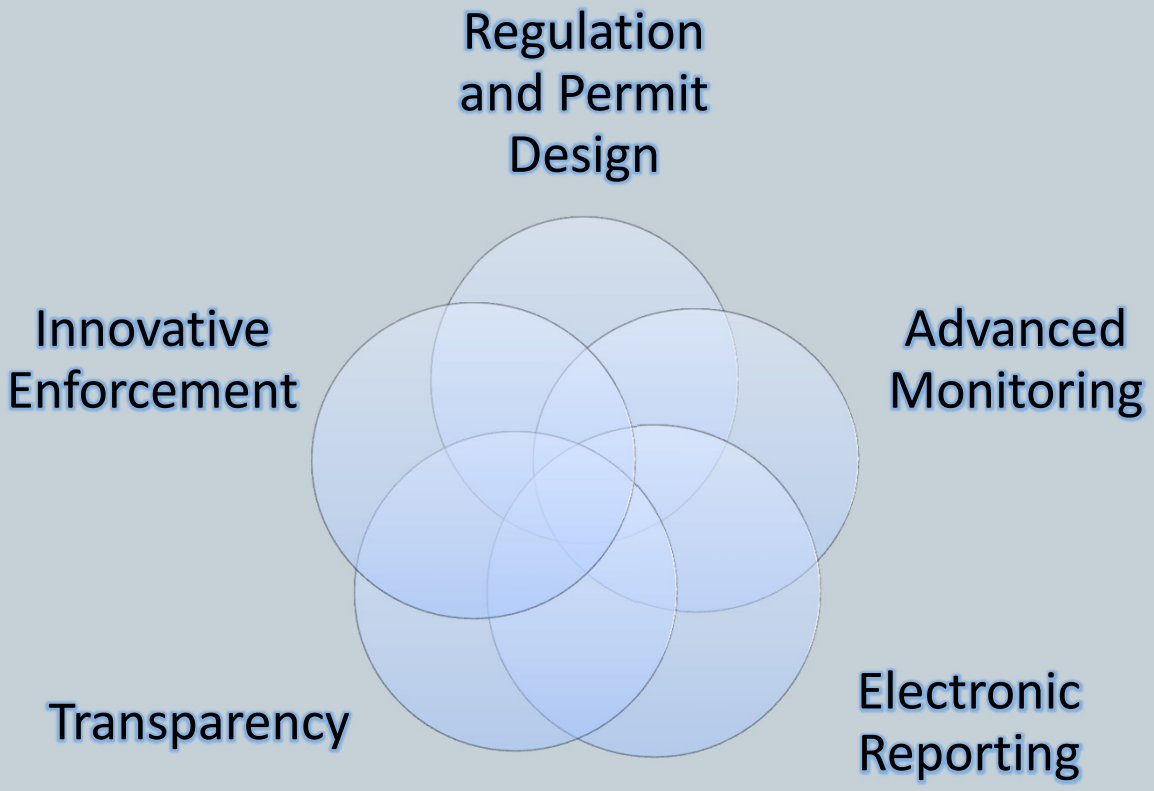
USEPA's Next Generation Compliance

Courtesy of Charmagne Ackerman, USEPA Region 5

EPA Enforcement Goals

- Tough civil and criminal enforcement for violations that threaten communities and the environment
- Vigorous enforcement program for the future - Next Generation Compliance
- Strong EPA/state/tribal environmental protection

Next Generation Compliance – What is it?



Advanced Monitoring Technologies

- Real-time monitoring – knowing about pollution as it's happening
- Facility feedback loops – preventing pollution before it happens
- Fenceline monitoring
- Community monitoring
- Remote sensing

Monitoring buoy in Charles River collects and transmits data to a public website

New Technologies Will Revolutionize Environmental Monitoring

Current Technology

- Expensive
- Big footprint to house and requires power drop
- May require expertise to use
- May require lab analysis
- Collected by government, industry, researchers per established QA

New Technology

- Low cost
- Small footprint or mobile
- "Easy-to-use"
- Real time
- Collected by communities and individuals w/ less QA?

Democratization of Environmental Monitoring

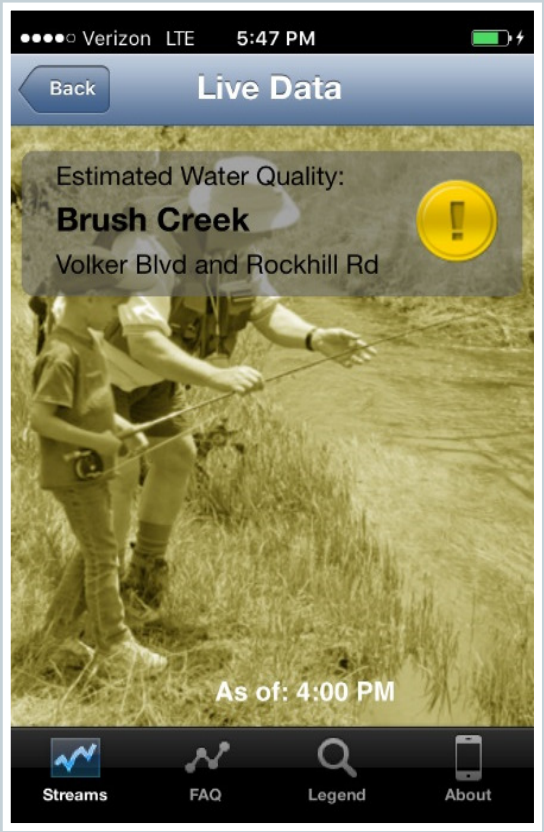
Airbeam (Inserted by ERM)

- With over 1,000 **AirBeams** in use worldwide and more than 100 million data points, the **AirCasting platform** is now one of the largest open-source databases of community-collected air quality measurements ever created. Community based organizations, educators, academics, regulators, and citizen scientists around the world use the AirBeam to measure, map, stream, and crowdsource PM2.5 measurements. The collective effort of thousands of individual AirCasters made this historic milestone possible.

Next Generation is Here Today

Transformative power of:

- New monitoring technologies
- Revolution in information technologies
- Transparency
- Building compliance drivers into programs from the start



Fenceline Monitoring

ERM

Refinery Sector Risk Rule (RSR)

40 CFR 63 Subpart CC - §63.658 Fenceline Monitoring Provisions - Basic Elements

- Select and Set Up Monitoring Locations
- Develop Site-Specific Monitoring Plan
- Install and Operate Dedicated Meteorological Station
- Deploy/Replace Tubes
- Perform Analysis
- Perform Calculations
- Compare to Action Level
- Take Corrective Actions As Necessary
- Report Concentrations for Public Availability

Regulation/Method – Corrective Actions

Benzene Action Level:
12-mo. rolling average $\Delta C = 9\ \mu g/m^3$ (~2.8 ppb)

If 12-month average $\Delta C > 9\ \mu g/m^3$

- 5 days to initiate root cause analysis
- < 45 days to complete root cause analysis and corrective action analysis after exceedance (May include leak detection, increased sampling)

If ΔC value $> 9\ \mu g/m^3$ for the next sampling period following completion of root cause analysis and corrective action activities….

- 60 days to develop a Corrective Action Plan for submittal to EPA
- EPA has 90 days to approve / disapprove plan

API/AFPM Fence-Line Monitoring Pilot Study

Timing: October 2013 through February 2014

Based on Draft Methods 325A and 325B

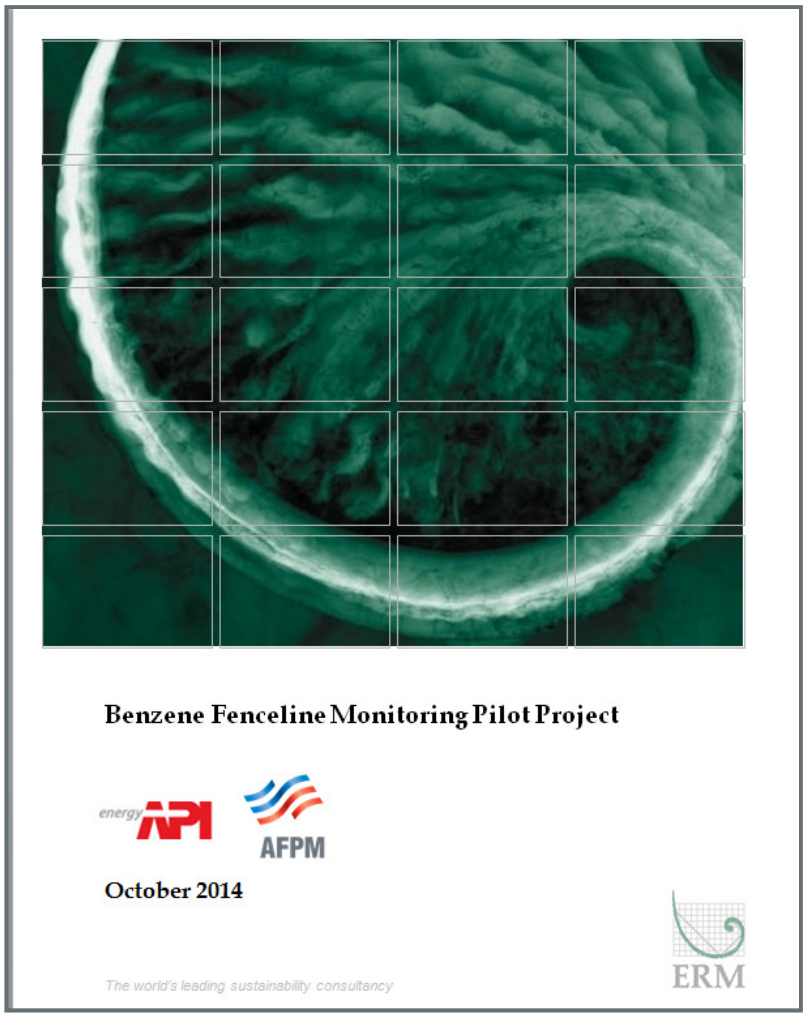
Blinded Study - 12 Refineries

- 6 rural and 6 urban;
- Size ranged from 100 to 5,000 acres

Duration - 12 weeks (6 periods x 2 weeks each period)

Other Data

- Meteorological Data
- Noting any SSM or other non-typical events



RSR Fence-line Monitoring – Compliance Issues?

What does an increase in benzene emissions in the ambient air mean? What is the data demonstrating?

USEPA states -

"The action level proposed was consistent with the emissions projected from fugitive sources compliant with the provisions of the refinery MACT standards . . ."

- Does this mean that staying below the action level means compliance with MACT and going above it means non-compliance?
- "Any Credible Evidence Rule" applies to Title V permitted facilities and Title V compliance certifications - Is this where "any credible evidence" comes into play?

RSR Fence-line Monitoring – Compliance Issues?

- CERCLA/EPCRA has a reportable quantity for benzene of 10 pounds - Does an increase in ambient air emissions mean that you have exceeded the RQ?
- Is an increase in ambient air emissions evidence of a risk to public health?
- At what level will an increase be indicative of a risk to public health?

Next Generation Monitoring

New Day in Monitoring

NAMS/SLAMS, NAAQS Attainment, Permitting

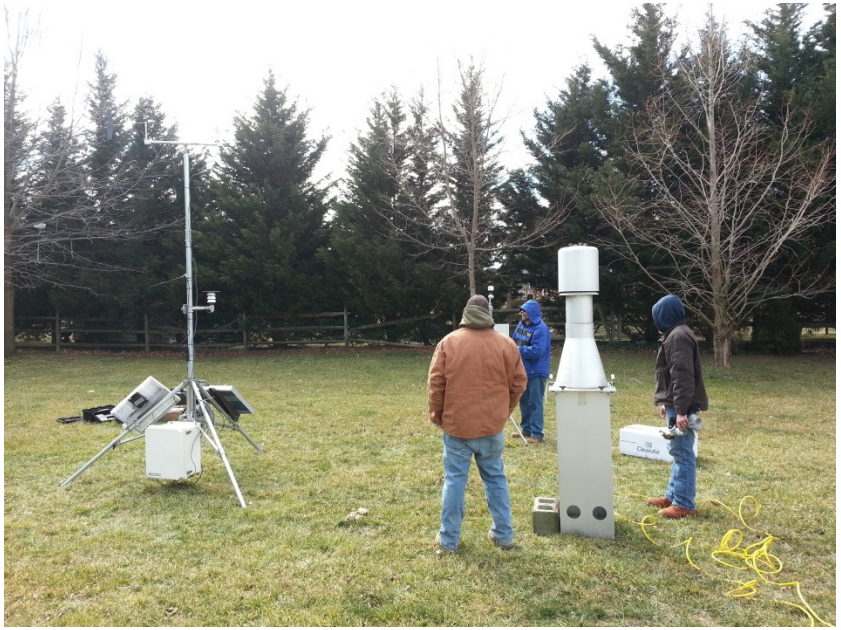
- Criteria Pollutants
- Federal Reference Methods (FRM)
- Federal Equivalent Methods (FEM)

Specific QA/QC Requirements for valid data

Fenceline Monitoring

Special Purpose – Refineries, Battery Plants

- H_2S, SO_2 - continuous
- Lead – 24 hour average



Consent Decrees, Facility Specific

- Real-time monitoring – FTIR, DOAS
- BTEX, 1,3-butadiene, formaldehyde
- Criteria Pollutants + Air Toxics
- Downwind Impact Assessment

Community Monitoring

Supplement Existing Monitoring Networks

"Assess" Community Exposure

New Sensor Technologies

- Expensive –

  SOF, DIAL

- Low Cost -

  AirBeam, EGG, Dylos, Ormantine

USEPA Air Sensor Guidebook

"…to assist those interested in potentially using lower cost air quality sensor technologies for air quality measurements……"

Commercial Products

Company	Product	Size	Pollutants	Cost
Aethlabs	microAeth AE51	Handheld	Black carbon	Mid cost
2BTech	POM Monitor 106-L	Handheld Shoebox	O_3	Mid cost
Thermo	Aerosol Monitor, personal DataRAM pDR-1500	Shoebox	$PM_{2.5}$, PM_{10}	Mid cost
TSI	DUSTTRAK™ II Aerosol Monitor	Shoebox	PM_1, $PM_{2.5}$, PM_{10}	Mid cost
AreaRAE	Various models	Handheld Shoebox	CO, carbon dioxide (CO_2), hydrogen sulfide (H_2S), nitric oxide (NO), NO_2	Lower cost
Aeroqual	Series 200 to 500	Handheld	O_3, NO_2, CO, CO_2, H_2S, SO_2	Lower cost
Dräger	Various models	Handheld	CO, CO_2, NO, NO_2, SO_2, H_2S	Low cost
Sciencescope	Logbook GLE	Handheld	CO	Low cost
Vernier	LabQuest	Handheld	CO_2	Low cost
Sensaris	Various models	Handheld	O_3, CO, NO_2, CO_2	Low cost
Libelium	Waspmotes Gas sensor board	Handheld	O_3, CO, NO_2, CO_2	Low cost

High cost >$10,000
Mid cost $4,000-$7,000
Lower cost $1,000-$2,000
Low cost <$1,000

Wicked Device Provided Slide on EGG Models

Three models. Each unit ships with a manual, power supply and the egg itself.

Wi-Fi connected

Report data to the cloud

Highly configurable

Over-the-air software updates

Data can be downloaded for analysis

No charge for data storage /access

From *Wicked Device* Presentation on EGG

Comparison to similarly priced units

(particulate only – no similar units exist for other models)

	Air Quality Egg v2	Dylos 1100 Pro	AirBeam
Retail price	$240	$289	$250
Smallest Particle Size	0.5 micron	0.5 micron	0.5 micron
Over the air updates	✓	✗	✗
Internet connection	✓ Wi-Fi	✗	Via your phone
Humidity accuracy	✓ 1% RH	✗	✓ 5% RH
Temperature accuracy	✓ 0.5 Celsius	✗	✓ 1 Celsius
Offline data logging mode	✓	✓ Only mode available	✗
On unit display	✓	✓	✗
Optional GPS	✓	✗	✗
Online graphing and analysis	✓	✗	✓ On phone only

Note: The Sensly was not included. It can only detect particles larger than PM10 and relies on cross sensitivities to detect gasses.

Wicked Device Data Comparison for EGG

Summary:

They are not as accurate as EPA units, but show the same trends and perform well.

Gas sensors not accurate below 5 ppb.

Within 10 parts of reference data.

Best accuracy in class.

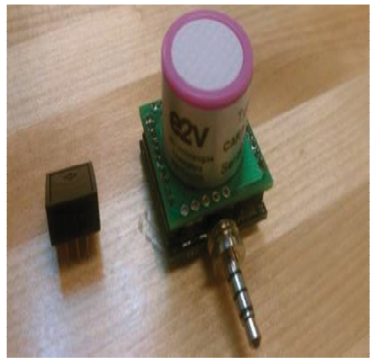
Additional studies needed

Smartphone Application

Sponsor: University of Michigan

Details

- Electronics to interface with smartphones
- Uses audio jack for power and communications
- Application on smartphone processes data, determines location, and communicates data
- Interfacing with gas sensors
- Participating in pilot project in SF Bay Area



Advance Monitoring -Issues

QA/QC – Precision, Accuracy, Response, MDL, Interferences

Real-time Measurements vs. Trends

Source-specific vs. Area-wide

- Background
- Other facilities
- Mobile sources

Public Accessibility – Real-time Web Posting the Cloud?

How will local agency respond to complaints?

Summary

- USEPA's Next Generation Compliance initiative increases risk of enforcement from regulators, citizen suits, toxic tort actions
- No SSM exemption and the "all credible evidence" rule, the risk is even greater (CE removes bar of admission of information other than performance test data to prove compliance or violations)
- The proliferation of fence-line and advanced monitoring can blur the lines on what constitutes "compliance"
- Expect that it will be worse before it gets better as new monitoring techniques and devices become available at low cost

Discussion

Michael Zebell, P.E.
Environmental Resources Management
mike.zebell@erm.com