Day 3

Inspector Discussion Groups
Group Exercises

Break up into groups

**Group 1**: Inspection Horror or Success Stories

**Group 2**: Mentoring New Inspectors

**Group 3**: State/EPA Relationships

**Group 4**: Juggling numerous responsibilities at the same time

Spend 30 min. in discussion groups
Reconvene and discuss
Group 1 (Horror/Success Stories)

Inspection Success Stories

As a senior inspector, describe either successful or horror inspections?

Can your success stories be replicated by other inspectors? If so how?

As a group, identify two areas that inspectors should spend more time evaluating during the inspection in order to have a “successful inspection”.

What training would make you a more successful inspector?
Group 2
Mentoring New Inspectors

- How do you mentor new inspectors? Does everyone in your program mentor new inspectors the same way you do?

- What OJT do you think is the most important for new inspectors?

- Identify two areas that you wish you had received more training on as a new inspector.

- What training would make a new inspector more equipped to conduct inspections?
Group 3
State/EPA Relationships

- Have you participated in a joint inspection with EPA?
- Have you participated in the State Review Framework process?
- What worked well? What did not?
- Examples?
Group 4
Juggling numerous responsibilities

● How do you juggle the numerous responsibilities of your job?

● What training could make you more successful?
Criminal Investigation Program
U. S. EPA and State Enforcement

Compliance Activities
Administrative Enforcement
Civil Enforcement
Criminal Enforcement
Environmental Enforcement In the United States

State/Territorial Civil and Administrative Enforcement Actions

EPA Civil & Administrative

Criminal

Criminal
What Makes a Case Criminal?

It is the decision of the federal, state and/or local prosecutor whether to file a criminal case.
CID Consists of Agents Assigned in Every EPA Region

Agents are sworn federal law enforcement officers

Have arrest authority

Carry firearms

Execute search warrants
Federal Statutes with Criminal Penalties

RCRA
    Haz waste mgmt.
CERCLA
    Superfund
CWA
    Surface waters
    Sewers
FIFRA
SDWA

CAA
    Asbestos
    Stationary sources
EPCRA
TSCA
Misc.
    False Statements
    Conspiracy
    Mail Fraud
    Wire Fraud
Criminal Enforcement

- Knowing or negligent behavior
- Significant and most egregious violators
- Involve lengthy, complex investigations
- Potential for fines and/or incarceration
Factors in Case Selection for Criminal Investigation

- Concealment of misconduct
  - Data falsification
  - Tampering with monitoring equipment
  - Threatening witnesses
- Deliberate misconduct and financial gain
- Ongoing/continuous/repetitive discharges
- Prior criminal or civil actions
• Criminal investigators cannot direct a civil inspection
• Information may be shared by civil and criminal with appropriate conditions (see parallel proceedings notes in later slides)
• More severe penalties
  ● Loss of freedom, i.e. JAIL TIME
“RED FLAGS”

• Conflicting stories - management/workers interviewed separately during warrant
  Motive (Mgmt makes money from event, not workers)

• Unsubstantiated data or no data
  “It was hauled off site”…..MANIFESTS?
  Sample results to back up data
  Bench sheets to back up data
  Lab SOPs to back up data (calibration)
  Requirement to maintain data??
“RED FLAGS”

• Data too good to be true
  What they tell you the data is vs. your observations (i.e. plant effluent)

• Deliberate actions to violate
  Bypass pipe
  Mass accumulation of waste
“RED FLAGS” That May Indicate Criminal Activities

- Conflicting data
  - 2 sets of books
  - 2 sets of reports (better set sent to regulators)

- Claim ignorance about requirements
  yet have prior enforcement history
All environmental laws and requirements are subject to criminal actions

However, violations of other statutes can also be used in a criminal action
False Statements
  Lying to agents
  False submissions
Mail Fraud
Wire Fraud

Conspiracy
Obstruction of
Justice
Evidence
Destruction
RICO
Where Do Criminal Cases Come From??

- Disgruntled employees
- Citizen complaints
- Fed/state EPA civil personnel
- Other Law Enforcement agencies
- Other regulatory agencies
- Fire Departments
**LEADS**

The sooner the information is received, the better the case will be...
Investigative Techniques

Interviews
Document review
Search warrants
Computer forensics
Surveillance
Consensual calls

Informants
Covert / overt sampling
Undercover operations
Fingerprints
Video installation
Handwriting exemplars
Prosecution of a Criminal Case

By the United States Attorney in the district where the offense occurred

State/County Prosecution
Attorney General
District Attorney
Corporate, Individuals, or Both

- Corporations
  - Fines
  - Gov’t contract debarment
  - Probation
  - Based upon the actions of upper level mgmt

- Individuals
  - Fines, imprisonment and/or probation
  - Based on participation, supervision, or lack of supervision
Communication is the Key

When civil & criminal programs both have interest in investigating/ addressing same or related violations by the same or related parties, reps. of each program should meet to determine how to achieve the most appropriate relief without one action interfering with the other, e.g., whether the civil investigation (or litigation) should be suspended pending resolution of the criminal case.
Some Do’s and Don’ts

• Any information obtained during a properly conducted inspection may be shared with the criminal program.

• Inspectors must never promise or state to a subject that evidence obtained by the inspector, including statements made by persons at the site of the inspection, cannot or will not be used in a criminal proceeding, or that the violations that are suspected can or will be addressed by civil enforcement only.
Do’s & Don’ts

Civil inspectors must never use the threat of criminal investigation to obtain consent or any other benefit in connection with an inspection or a civil enforcement matter.

Criminal investigators should not (and will not) “direct” inspectors as to where to conduct inspections.
Role of the Inspector

- Identify potential criminal activity during the normal course of a civil inspection
- Report information to the criminal investigator upon completion of the inspection
- Continue with normal duties unless otherwise assigned
2017 Federal Environmental Criminal Enforcement Results

- 115 Environmental Criminal Cases Opened
- 101 Criminal Defendants Charged
- $88 Million of Court Ordered Environmental Projects
- 73 Years of Incarceration
Illinois Construction Co. Owner Jail Term

- Owner sentenced in federal court for violating the CAA to serve an 8-month sentence followed by 3 years supervised release, and $3,000 fine.

- Activities at 7-acre site purchased to demolish and salvage buildings.

- Owner used untrained workers who failed to use proper removal/disposal methods for asbestos.
Asbestos Case

• Demolition of a Chattanooga textile mill
• 2012: Men convicted of conspiring to violate the CAA in demolition without properly removing asbestos.
• Violations: failure to wet material containing asbestos, & failure to containerize/dispose of material.
• Prosecutors said 2 men fraudulently filed a false 10-day notice vastly underestimating asbestos amount.
Owner of Colorado Aircraft Painting Company Sentenced for Unlawfully Treating Hazardous Waste

- Colorado Department of Public Health & Environment (PHE) directed Gold Metal Paint Co (GMP) to dispose waste, & clean tank & close drain to UST.
- Instead GMP told workers to clean tank without PPE.
- GMP treated hazardous waste by pouring it on the floor and letting it evaporate. Then they drilled open the trench drain so that the waste could again flow into the UST.
- GMP owner pled guilty to illegally treating hazardous waste
- Gold Metal Paint Co. owner sentenced to serve 6 months home confinement, pay $10,000 fine, and 2 years probation.
Law Enforcement Contacts

• Your EPA Region Criminal Investigations Division?

• Contacts for state law enforcement Who are yours?
QUESTIONS
Field Technology for Inspectors

Infrared Cameras and Geospatial Technology
Leak Detection Monitoring
Leak Detection Monitoring

1000’s of valves and connections that must be monitored for leaks. 90 to 99% of valves and connections are not leaking. Costly, monotonous, time consuming.

Work is contracted out to lowest bidder.
Leak Detection Monitoring
IR Cameras

Hydrocarbons absorb and emit infrared energy at specific wavelengths within the IR spectrum.

Camera sees IR energy, but has a filter to allow only IR energy in the 3.3 – 3.5 μm wavelength band to be detected.

Hydrocarbons that absorb IR energy in that range will be detected and imaged.
Chemicals Detectable by IR Camera

Benzene
Butane
Ethane
Ethanol
Ethylbenzene
Heptane
Hexane
Methane
Methanol
Octane
Pentane
Propane
Propylene
Toluene
Xylene
IR Camera Used for LDAR
IR Camera Used for LDAR

- **Expected Benefits**
  - *In theory* – ability to survey equipment faster
  - Cheaper/less labor intensive

- **Actual Implementation**
  - Camera is not as sensitive
  - Image can be manipulated – leaks can disappear or be seen more easily with certain camera settings
  - Image affected by background, environmental conditions
  - Daily calibration & recordkeeping of everything monitored
  - Camera is not intrinsically safe
  - Camera is very expensive

Alternative work practice requires annual Method
IR Camera as an Inspection Tool

• Might not be the best replacement for traditional LDAR, but the camera is good for seeing:
  • Leak sources that were not previously identified/monitored
  • Surveying for large plumes (e.g. safety before entering an area)
  • Emission sources that can’t be easily reached or detected by traditional means
Examples From Real Inspections

• Compressor distance piece at a natural gas compressor station

  Distance piece is designed to prevent lubricating oil from leaking into the compressor cylinder.
  Distance piece also acts as a process gas leakage control.

  Compressed gas was leaking passed the packing rings and over into the oil sump.
Examples From Inspections

Storage vessel bleeder vents must be closed at all times unless the tank roof is being
Examples From Inspections

Refinery Flare
Excess steam = incomplete combustion of hydrocarbons
Examples From Inspections

Marine tank vessel loading operations
Tank Levels

Differences in temperature due to heat capacity of fluids
Drums
Temperature Readings

- Fruit processing plant waste dumped in a pit
- Exposure to air and decomposition caused it to heat up
- IR camera used to see elevated temperatures
Any Questions?
Digital Opacity Compliance System
Second Generation
EPA Alternative Method 082, Moving Opacity Technology Forward the 301 Study for Large Stacks

Virtual Technology LLC
Evolution of DOCS II (2006-2016)

Evolution of DOCSII...The Road to SaaS

DOCS
DOCS II
DOCS II Web
DOCS II SaaS
DOCS III SaaS
Evolution of DOCS II

- 2000 to 2005 – Several research projects contracted by DOD & Universities
  - EPA Technology Transfer Network, Emission Technology Center Publishes PRE-008 - Determination of Visible Emissions Opacity from Stationary Sources Using Computer-based Photographic Analysis Systems

- 2005 to 2009 – Research continued by DOD
  - 2007 - ASTM Workgroup formed due to EPA consensus standard direction
  - 2009 - ASTM D7520-09 approved and published

- 2012 February – EPA Office of Air Quality Planning and Standards published US EPA Alternate Method 082 (ALT 082) in the Federal Register as a **Broadly Applicable Standard**, citing ALT 082 certified Digital Camera Opacity Techniques (DCOTs) can be used “in lieu” of Method 9, for all subparts of 40 CFR 60, 61 and 63
  - Federal Permit changes not required
  - Match ASTM D7520
  - Stationary, Mobile, Fugitive

**US EPA ALT 082 Broadly Applicable Standard**
Evolution of DOCS II Continued

• 2012 October – ASTM D7520-13 Update Approved by ASTM
  • Allows use of any Digital Image Device: High Definition Digital Recorders (Digital Video), (Cell Phones), all Sony CCD based Cameras (98% of Digital Cameras)
  • Allows certification of optical and digital zoom

• 2012 to Present – Fugitive Dust Applicability
  • Original research performed June 05’- June 11’
  • Full NIST Long Path Trans. certification completed January 2012
  • ASTM Research Report submitted to committee July 2012
  • Applicable to fugitives per 40 CFR 60 Subpart ooo October 2012

• 2013 – 301 Testing began to eliminate 7’ ASTM stack exit limit
  • EPA desired “comparison with current compliance method”
  • Results ALT 082 is the same as Method 9 observers on stack exits greater than 7’.

• 2015- EPA opinion “Any Creditable Evidence” rule of Clean Air Act, makes applicable to all sources types “a picture says a thousand words”.

• 2015- FerroAlloy NESAP defines DCOT as BACT, and mandates for Process Fugitive Emis.
• 2016 – ASTM D7520-16 Approved no limits on Applicability. Stationary, Mobile, Fugitive
• 2017 – FerroAlloy NESHAP final reconsideration ruling DCOT is BACT for Opacity.

DOCS II is the only ASTM D7520-16 & ALT 082 certified DCOT
World Bank Requires, <20% Opacity Guarantee for Payment
ASTM D7520-16, used for World Bank Opacity Measurement
Leading Organizations in Conservation, Compliance, Sustainability, Training, Regulatory Policy and Enforcement, Local and International, all Agree

Digital Image Based Monitoring is the Way to GO

Digital Image Based Analysis, The “Best” Solution
DOCS II Procedure

Capture

Transfer images automatically or manually

Send for Analysis

Receive Validated Digital Report
How DOCS II Works

• An image or images of the emission source are captured by a certified Camera Operator using a certified camera.
• The images are uploaded to the “Cloud” where they are acquired by a Certified Analyst who identifies the Regions of Interest (marked according to explicit rules and training).
• DOCS II then applies algorithms to the Regions of Interest and calculates the opacity of each image and the average, based on the selected rule, e.g. 6 min. avg., 3 min. avg.
• DOCS II generates a draft VEE report.
• Source owner accepts and/or rejects the draft VEE report.
• DOCS II generates final VEE report and archive record.

Simple, Fast, Reliable, Repeatable
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DOCS II Compared to Humans

- Less variation than Method 9 against NIST traceable transmissometer
  - Average deviation count for students at CARB certification is 23
  - Typical deviation count for DOCS II on same certification run is 15
  - Over 95% of DOCS II readings were zero or 1 deviation count
- Average deviation under ideal conditions (high contrast)
  - DOCS II +5%
  - Method 9 +10%
- Average deviation under difficult conditions (low contrast)
  - DOCS II +10%
  - Method 9 +15%
- Flexible applicability
  - Clouds, Rain, Snow, Trees, & Buildings
  - Day or Night
  - Close & Far (Limited only by camera zoom)

Simple, Fast, Reliable, Repeatable
Method 9 vs. EPA ALT 082 aka ASTM D7520

EPA Method 9
- reading, certification
  - EPA Required Content Training
  - 50 plume certification
  - $\pm$7.5\% overall and $\leq$ 15\% within each set of 25.
- Cert. duration 6 months
- Operational conditions
  - Unlimited backgrounds
  - Unlimited weather conditions
- Paper Non-Validated Record

EPA ALT 082
- System certification
- 6 sets of (25) White and (25) Black against various backgrounds
- 4 independent Analyst use System to derive Opacity of each image
- All (4) Analyst must pass all (6) sets, $\pm$7.5\% overall and $\leq$ 15\% within each set of 25
- Cert. duration 3 $\frac{1}{2}$ years
- Camera Operator training
  - EPA Required Content Training
  - Camera Operator Training
  - Submit 1 acceptable set of images for analysis every 3 months
- Operational conditions
  - Unlimited backgrounds
  - Unlimited weather conditions
- Digital Validated Record
User drags the emission points from facility onto map.
- Emission Points all start Blue
- User touches each Emission point as they see emissions
- Emission points toggle color Green on Red off
- Clock displays survey time and remaining time
- End of Survey sum totals all on/off events by source and compares to limit
- Generates Survey report listing emission units, visible emission time
- User prompted to record picture of exceeding emission units.
EPA ALT 082, Distance only limited by Optical Zoom Capability
Gas Turbine Stack Opacity and PM Sources

Common Sources of Liquid Fuel GT Opacity:
- Acid mist: $\text{H}_2\text{SO}_4$, etc..
  - $< 5$ ppm $\text{H}_2\text{SO}_4$ for 20% opacity
- $\text{SO}_3$ (Blue plume)
  - $\sim 10$ ppm $\text{SO}_3$
- $\text{NO}_2$ (Yellow plume)
  - $\sim 15$ ppm $\text{NO}_2$
- Solid PMs
  - Carbon soot
  - Ash
- Other vapors
- UHCs reactions with $\text{NO}_x$ & $\text{SO}_x$ (?)
  - Greatly increase $\text{NO}_2$
  - Maybe $\text{SO}_3$
- Mitigations:
  - Stack temperature ($\text{SO}_x$, $\text{H}_2\text{SO}_4$)
  - Fuel composition
  - Oxidation catalyst
  - Carbon soot catalyst
  - ESP, Electrostatic Precipitator
  - FGD, Flue Gas Desulfurization
- Measurement:
  - Digital Opacity Meter, EPA 082
  - Human, EPA 9
Automated
Visible Emissions Monitoring and
Electronic Reporting
of
Visible Emission Surveys  (Method 22)
Opacity Observations  (Method 9)
Stack/Flare Watch  (custom)

Shawn Dolan
sdolan50@msn.com
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Future Now: PM Speciation

- Measuring PM Concentration via Light Scatter & Energy Emittance
Sony CCD Based Cameras “see” an wider spectrum than does the human eye, like birds “see” more UV.

Foundational Physics Principles Universally apply to plumes, e.g. as particle size decreases energy emittance and frequency increase.
All Consumer Cameras Record UV, VL, IR, Spectrums

Opacity, blended with UV/ VL/IR light generates expected energy profile
Software as Service: Cloud Computing Category:
BA02  Asset management, BA15 Engineering, BA29 Tracking and monitoring tools

$4995/yr (1 Required, Per 10 Trained VEE Users)
DOCS II Digital Opacity Compliance System Setup
Price is for 1 Certified Account per year, allowing 10 Trained VEE Users. Provides set up of organization specific Air emission sources, permits, limits, frequencies, processes and alerts reference set of VEE requirements for the organization.

$2499/ea (1 Required for each Trained VEE User)
DOCS II Digital Opacity Compliance System Train
Price is for 1 Visible Emission Evaluation Data Collection Certification required once for all DOCS II Trained VEE User Accounts with in a Certified Account

$99/ea (Opacity Analysis of User VEE data)
DOCS II Digital Opacity Compliance System VEE
Price is for 1 Visible Emission Evaluation Record Set. Web based Opacity determinations from Certified Account, Trained VEE User, input of required VE dataset: acquisition location, source images.

$49/yr (Storage for ~100 VEE records)
DOCS II Digital Opacity Compliance System Storage
Price is per GB of Visible Emission Evaluation Record Set Storage per year. Secure virtual storage and easy retrieval of VEE records, VEE record ~ 7MB

$2499/ea (1 Required for each Trained VEE User)
DOCS II Digital Opacity Compliance System Train
Price is for 1 Visible Emission Evaluation Data Collection Certification required once for all DOCS II Trained VEE User Accounts with in a Certified Account

$499/ea (Litigation Detail Report/VEE)
DOCS II Digital Opacity Compliance System LDR
Price is for 1 Visible Emission Evaluation Certification Detail report, includes: DOCS II certification package, NIST trace to smoke generator certification, Analyst certification history, Source comparative analysis within Certified Account

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“This is to inform you that you are hereby required to reduce your visible emissions to 20% opacity...”