



**EPA Enforcement Update
and Opportunities for
Collaboration With States**
National Association of Clean Air Agencies
February 26, 2020



Roadmap for This Presentation

The National Compliance Initiative (NCI) for Stationary Sources and Opportunities for Collaboration

- Two Investigations Deploying Ambient Air Monitoring in Communities.
- Recently Reported Fenceline Benzene Data Required by the Refinery MACT.
- The GMAP Comes East This Spring.
- VISR – Field Testing of a Method for Rapid Assessment of Flare Efficiency.
- Field Testing of SOF technology for assessment of Atmospheric Contaminant Plumes.
- Your Feedback/Questions.

National Compliance Initiative (Stationary Sources)

- **Creating Clean Air for Communities (CCAC)**
 - Address Excess VOC Emissions (focusing on nonattainment).
 - Reduce hazardous air pollutant exposure in communities.

Chloroprene Investigation La Place, Louisiana

SPOD Deployment near the Denka
Performance Elastomer (DPE) facility.

Background

- In 2010 EPA revised its cancer risk assessment for chloroprene
- In December 2015, the National Air Toxics Assessment identified the area around the DPE facility as having some of the highest cancer risk in the United States, generating significant concern in the affected community.
- EPA's preliminary risk assessment identified a lifetime average exposure to ambient chloroprene at $0.2\mu\text{g}/\text{m}^3$ as generating a cancer risk of 100 in a million.
- Since 2016, EPA has been monitoring ambient air for chloroprene at six locations in the community.
- In December 2017, pursuant to a state-issued administrative order on consent, DPE completed installation of a regenerative thermal oxidizer, two condensers, and equipment upgrades and controls for vents and fugitive emissions to reduce emissions of chloroprene.
- DPE estimates that the controls reduced emissions by 85%. Since March 2018, air sampling results have shown a substantial reduction in chloroprene emissions from all monitoring locations.
- Although ambient chloroprene concentrations have declined, periodic spikes continue to occur and elevate the average concentration/exposure.

Recent Chloroprene Monitoring Results

DENKA Air Monitoring Summary Sheet May 25, 2016 - January 18, 2020

| DATE | Units | 238 Chad Baker | Acorn and Hwy 44 | East St. John the Baptist High | Fifth Ward Elementary | Levee | Ochsner Hospital |
|--|---------|---|------------------|--------------------------------|-----------------------|--------|------------------|
| 11/01/19 | (µg/m3) | ND | ND | ND | 0.0345 | 0.214 | ND |
| 11/01/19 (collocated) | (µg/m3) | -- | -- | -- | -- | 0.211 | -- |
| 11/07/19 | (µg/m3) | 0.226 | ND | ND | 0.095 | 0.167 | ND |
| 11/07/19 (collocated) | (µg/m3) | -- | -- | -- | 0.102 | -- | -- |
| 11/13/19 | (µg/m3) | ND | ND | ND | 0.00435 | 0.0736 | ND |
| 11/13/19 (collocated) | (µg/m3) | -- | -- | -- | -- | 0.0783 | -- |
| 11/19/19 | (µg/m3) | ND | 12.6 | ND | 0.511 | 14.4 | 0.667 |
| 11/19/19 (collocated) | (µg/m3) | -- | 12.6 | -- | -- | -- | -- |
| 11/25/19 | (µg/m3) | 4.06 | 2.55 | 4.82 | 0.791 | 0.805 | 9.21 |
| 11/25/19 (collocated) | (µg/m3) | -- | 2.48 | -- | -- | -- | -- |
| 12/01/19 | (µg/m3) | ND | 0.0102 | ND | ND | 0.457 | 1.810 |
| 12/01/19 (collocated) | (µg/m3) | -- | 0.0116 | -- | -- | -- | -- |
| 12/07/19 | (µg/m3) | ND | 0.287 | ND | 0.0268 | 0.374 | ND |
| 12/07/19 (collocated) | (µg/m3) | -- | -- | -- | -- | 0.399 | -- |
| 12/13/19 | (µg/m3) | 0.812 | 0.202 | ND | 2.640 | ND | ND |
| 12/13/19 (collocated) | (µg/m3) | -- | -- | -- | 2.420 | -- | -- |
| 12/19/19 | (µg/m3) | 0.464 | ND | ND | 0.214 | 1.65 | ND |
| 12/19/19 (collocated) | (µg/m3) | -- | -- | -- | -- | 1.65 | -- |
| 12/25/19 | (µg/m3) | 0.820 | 0.0199 | 0.297 | 0.306 | 0.624 | 0.0232 |
| 12/25/19 (collocated) | (µg/m3) | -- | -- | -- | 0.300 | -- | -- |
| 12/31/19 | (µg/m3) | ND | 0.0475 | ND | ND | 1.730 | ND |
| 12/31/19 (collocated) | (µg/m3) | -- | 0.0490 | -- | -- | -- | -- |
| 01/06/20 | (µg/m3) | 0.0490 | 0.0472 | 0.00580 | 0.289 | ND | 0.301 |
| 01/06/20 (collocated) | (µg/m3) | -- | -- | -- | 0.257 | -- | -- |
| 01/12/20 | (µg/m3) | 0.704 | 1.83 | ND | 1.15 | 0.537 | ND |
| 01/12/20 (collocated) | (µg/m3) | -- | -- | -- | -- | 0.595 | -- |
| 01/18/20 | (µg/m3) | 22.6 | ND | 0.943 | 0.0874 | ND | 0.200 |
| 01/18/20 (collocated) | (µg/m3) | 24.1 | -- | -- | -- | -- | -- |
| NOTES | | EXPLANATION | | | | | |
| *11-27-18 sample was skipped due to ERG not getting the canisters to Weston in time. | | | | | | | |
| 1-6 sampling schedule started 03/01/19 | | | | | | | |
| --- | | No sample received in lab | | | | | |
| Invalid | | Sample was invalid | | | | | |
| ND | | Concentration not detected | | | | | |
| <i>Italicized</i> | | <i>Concentration below method detection limit</i> | | | | | |

The Challenge:

How Best to Reduce Emissions and Ambient Concentrations of Chloroprene.

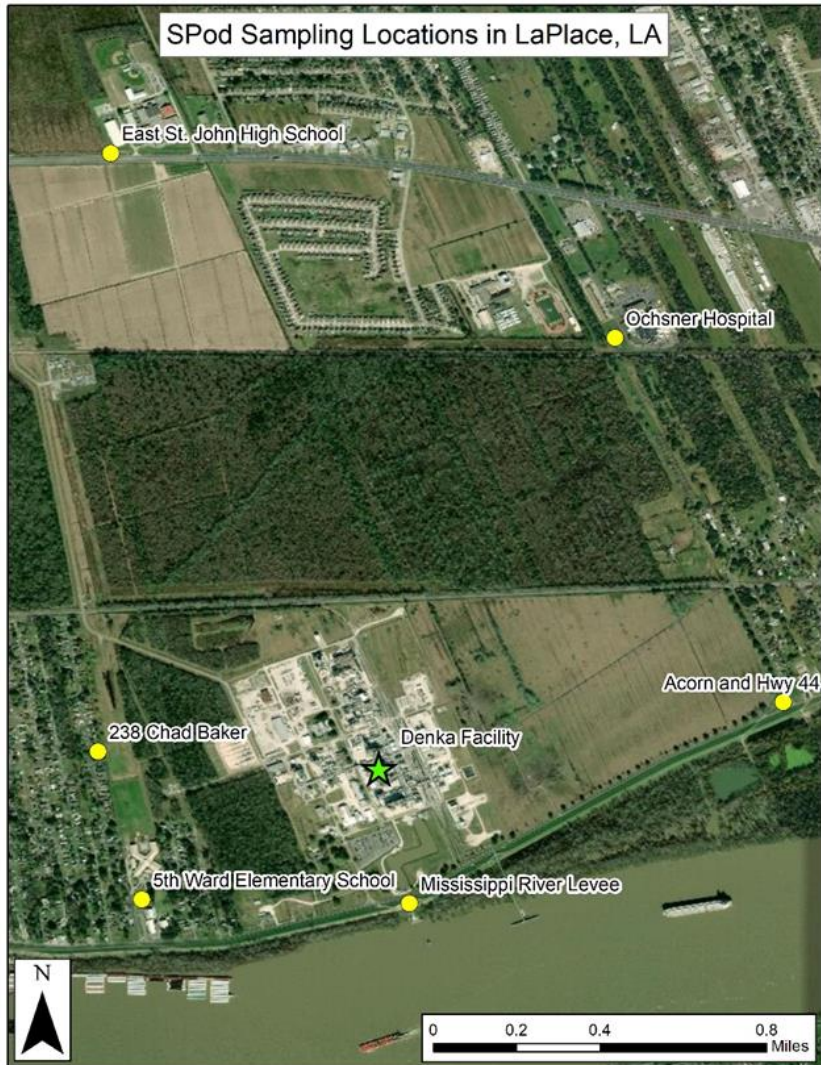
The Response:

Monitor for spikes and conduct root cause analysis.

Monitoring Using the SPod Platform

- The SPod or Sensor Pod is a commercially available solar-powered sensor system comprised of existing proven technology:
 - Meteorological (MET) station to continuously measure wind speeds and directions;
 - Photoionization detector (PID) to continuously measure total VOC concentrations;
 - Canister sampling; and
 - Data processing.





Monitoring Sites near Denka Facility

| Site | Distance (m) | Distance (km) | Distance (miles) |
|---------------------------|--------------|---------------|------------------|
| 238 Chad Baker | 943.20 | 0.94 | 0.59 |
| Acorn and Hwy 44 | 1375.78 | 1.38 | 0.85 |
| East St. John High School | 2529.70 | 2.53 | 1.57 |
| Fifth Ward Elem. School | 941.59 | 0.94 | 0.59 |
| Levee | 530.34 | 0.53 | 0.33 |
| Ochsner Hospital | 1832.73 | 1.83 | 1.14 |

SPOD Deployment Plan

- Initial phase -- SPODs continuously measure total VOC and take periodic canister samples for chloroprene to develop a rough correlation.
- Operational phase – At selected total VOC reading, system will take canister samples for chloroprene.
- Chloroprene values of a set amount (e.g. $5\mu/m^3$) will require a root-cause analysis by the facility.
- The object is to identify events/practices that result in elevated ambient chloroprene.

TCE Investigation

(Diffusion Tube Monitoring – Location Confidential)

The TCE Passive Monitoring Effort

- Following grab (canister) sample(s) indicating potentially significant ambient levels of trichloroethylene (TCE) in a community near a battery manufacturing facility, EPA's National Enforcement Investigation Center (NEIC) conducted a campaign to determine ambient air emissions
- NEIC deployed 34 passive samplers, i.e., thermal desorption tubes (TD tubes) at 16 locations.
- The tubes were deployed for two weeks (Nov/Dec 2019)
- Data will help inform any follow-on action.
- This is an example of a low cost investigation that should help answer an important question.



Refinery MACT
Fence Line Benzene Monitoring
Results

Overview

- Fenceline Monitoring Requirements
- Goals of this Rule
- What do the Data Show
- How Can EPA Assist State Investigations



Rule Overview

- Petroleum Refinery MACT standard (40 CFR part 63 subpart CC) required...
 - All petroleum refineries to monitor benzene emissions along fence line
 - Report measurement results back to the EPA
 - Raw sampler data
 - Bi-weekly ΔC (highest – lowest concentration)
 - Annual average ΔC
 - Perform root cause analysis and corrective action if rolling annual average ΔC exceeded the benzene action level of $9 \mu\text{g}/\text{m}^3$.

Why Benzene & Fenceline Monitoring?

- Benzene is found in nearly all refining processes
 - Can lead to negative health effects and increased risk of cancer
- Better manage fugitive emissions from petroleum refineries
 - Reduce public exposure
- Provide a reference point for EPA modeling, risk assessments and emission inventories

Data Are Posted on EPA's Website

- 135 Refineries Covered.
- Approximately 10% reported an annual average ΔC benzene concentration above $9 \mu\text{g}/\text{m}^3$.
- Some concentrations may have exceeded diffusion tubes upper measurement limits.
- EPA had begun evaluating some of the refineries' root cause analysis and corrective actions.

**The GMAP is Heading
East This Spring**

Off-site assessment with *GMAP-REQ*.

(Geospatial Measurement of Air Pollution – Remote Emissions Quantification)

wind direction



- Drive-by Mapping
- Can be used to assess VOC (BTEX), H₂S, methane, NO_x and SO₂.



driving path



Spike in CH₄ indicates emission

GMAP – Benzene Concentrations



GMAP Currently Being Booked for Investigations

- EPA Regional office are reaching out to States to discuss possible deployment opportunities.
- If you cannot connect with the person in the Regional Office planning GMAP activities, call me and I will find your contact (no guarantees on availability of the GMAP, but we want to know if you are interested.)

Video Imaging Spectro- Radiometry (VISR)

VISR A DEVICE AND METHOD

- The term “VISR” is used for both
 - The Method – Video Imaging Spectro-**Radiometry**
 - The Device – Video Imaging Spectro-**Radiometer**
- VISR is designed to instantaneously assess flare combustion efficiency from a considerable distance.

VISR FUNDAMENTALS

- VISR is a multi-spectral imager similar to optical gas imaging cameras.
- The device “reads” and records the infrared radiation emitted from the hot gases and calculates the relative concentrations of combustion product in the flame -- carbon dioxide and unburned hydrocarbon.
- With this data the device calculates flare combustion efficiency in real time (every second).

VISR IS FIELD READY



- Can be mounted on the back of a pickup truck.
- Powered by a small generator.
- 30-minute setup time.
- 1,000-foot range.
- Regions 4 and 5 have used VISR in the field.
- **OECA currently has a contract vehicle for additional deployments.**

SOLAR OCCULTATION FLUX

- SOF used in Europe since ~1994 as lower-cost alternative to DIAL
- Is recognized as a “Reference Method” in EU
- Vendor is “Fluxsense” from Sweden, now also in the U.S.
- Fluxsense is a subcontractor with ERG. Contract has funds for SOF work
- The SOF is a combination of five real-time instruments that are combined to speciate emissions and calculate the mass emission rates from a single tank to a whole facility.
- U.S. experience: Houston Ship Channel, California refineries, Suncoke Indiana Harbor Consent Decree

HOW SOF WORKS

- FTIR with solar tracker uses sun as IR source for alkanes, ethene
- Sky DOAS uses sky radiance for NO₂, SO₂, formaldehyde
- Ground-level extractive DOAS and FTIR for expanded list of analytes including BTEX
- Triggered SUMMAs for TO-15 analysis by ERG
- Wind field LIDAR for pollutant flow rate
- GPS for geo-tagging of plume locations
- Drives around sources for upwind-downwind measurement
- Uses Tracer Correlation for measurement bias analysis
- Umbrella QAPP, site-specific planning

SOF INVESTIGATIONS

- OECA has contracted with Fluxsense to see if SOF measurements can help expedite excess emissions cases.
- Ideal sources are those associated with hydrocarbon production, storage, and contaminated wastewater treatment.
- Ideal time-frame is March – October when sun is highest.
- **\$\$ is available for investigations.**

QUESTIONS/COMMENTS?