Air Quality Monitoring & Other Technical Updates

- Tim Hanley & Ben Wells – 2020 Network Assessment
- Kevin Cavender – PAMS Update
- Joann Rice - Using FT-IR Spectroscopy for OC/EC in the Chemical Speciation Network (CSN)
- Lew Weinstock - Update on Ethylene Oxide Monitoring Activities

2020 Network Assessments

- Required every five years as described in § 58.10(d)
  - This would be the third one; previous ones in 2010, 2015
- Due to applicable EPA Regional Office by July 1, 2020 along with annual monitoring network plan.
- Ideally:
  - The Network Assessment looks ahead to what the monitoring agency would like to change over multiple years.
  - The Annual Monitoring Network Plan is the actual proposal to change in the coming 18 months.
- To facilitate efficiently assessing ambient air networks, EPA has made an online application available– NetAssess2020!
  - https://sti-r-shiny.shinyapps.io/EPA_Network_Assessment/

Photochemical Assessment Monitoring Stations (PAMS) Start Date Extension

- EPA proposed a 2-year extension to the PAMS start date – to June 1, 2021
  - We received 7 supporting comments and no negative comments
  - Expect to have a final rule completed in the late fall

PAMS Equipment Purchases

- EPA finalized the National Contract for the Markes/Agilent auto-GCs in fall of 2018
  - Those systems were shipped out in the spring of 2019
- Contract for CAS auto-GCs is in progress and expected to be completed this fall/winter
- Contract for ceilometers is being initiated with expectations of completion in Spring/Summer 2020
- EPA has decided to not develop a national contract for the purchase of true NO_2 monitors and will instead send states “targeted” 105 grant money for the purchase of those systems next FY

PAMS Funding

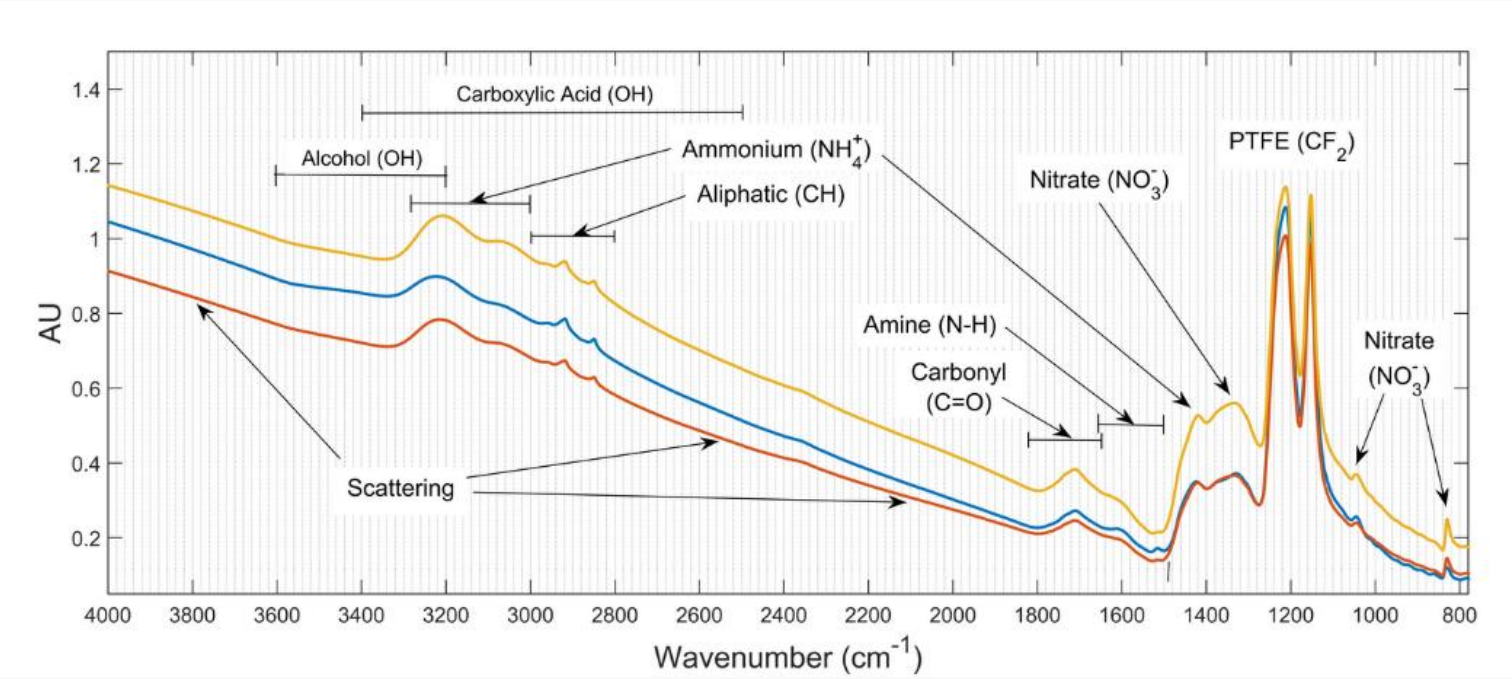
- Funding for PAMS is included in the Section 105 grants
  - Until congressional language allows for the implementation of the proposed reallocation methodology, Section 105 funds will continue to be allocated using the historical allocation methodology
- Regions have the flexibility to adjust State 105 allocations within a Region based on knowledge of minimum monitoring requirements and state monitoring networks
  - Where a state network is larger than minimally required, funding may need to be adjusted to address new or revised minimum monitoring requirements
  - Additionally, states have the flexibility to shift their grant dollars from certain activities to fund CAA-required activities

Using Fourier Transform Infrared (FT-IR) Spectroscopy to Characterize Organic Carbon and Elemental Carbon (OC/EC) in the Chemical Speciation Network (CSN)

- Why Explore FT-IR?
  - Less expensive
    - Level funding while costs continue to rise.
  - Measurement technique provides more information on chemical composition, organic mass, and sources.
  - Would eliminate need for second CSN sampler and quartz filter at a majority of CSN sites.
    - Can be used on Teflon filers from CSN and FRM networks to predict OC/EC.

FT-IR Advantages

- Simple analytical technique.
- Inexpensive, non-destructive, and fast.
- Provides much more information beyond OC and EC.
- Analysis done on Teflon filter samples.
- No artifact correction needed.



CSN OC and EC calibration development

- Spectra from all CSN samples collected in 2017.
- Sample spectra and quartz filter OC/EC data from all sites used to develop the calibration.
- Samples from all sites split into two types: typical/atypical.
    - Atypical sites have low OC and high EC.
    - Developed a separate calibration for each..
- Maintaining calibration for future implementation:
    - Selected a subset of 18 sites (13%) for calibration - some typical, some atypical sites.
    - Retain quartz filter OC/EC at these sites to evaluate calibration and re-calibration if needed.
- Results show good comparison to quartz filter OC/EC data.
    - Good correlation, low bias, low error, and comparable detection limits.

Progress

- Shown proof of concept for:
  - OC and EC in IMPROVE, CSN and FRM.
  - Organic mass and chemical composition.
  - Source apportionment.
- Developed CSN network-wide OC and EC calibrations to predict OC and EC from Teflon filters.
- Presented initial results at the 2016 NAAMC
  - https://www.epa.gov/sites/production/files/2016-10/documents/nondestructive_method.pdf
- Several papers published so far.

Next Steps/Feedback

- Plan to implement FT-IR for OC/EC with the next CSN contract 2020/2021.
  - IMPROVE on the same timeline.
- Getting feedback from our monitoring partners.
  - Input on process and implementation.
  - What we should consider that we haven't.
  - Any concerns with replacing CSN OC/EC with FT-IR OC/EC and keeping a small subset (13%) of sites to maintain FT-IR calibration?

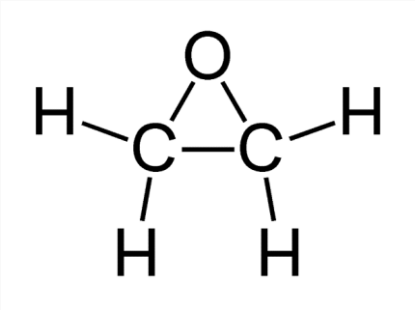
Update on
Ethylene Oxide Monitoring Activities

Quick EtO Introduction

- The 2014 National Air Toxics Assessment indicated that ethylene oxide significantly contributes to elevated risks of cancer in some census tracts across the country – i.e., about 20 areas have risks greater than 100-in-a-million.

- In response, EPA has taken a two-pronged approach to address ethylene oxide emissions, including reviewing Clean Air Act regulations for industrial facilities that emit ethylene oxide and getting additional information to determine whether more immediate emission reduction steps are possible in the higher risk areas.

- Ambient air monitoring has been conducted in a few areas with a significant industrial source of ethylene oxide emissions (Willowbrook, IL; Grand Rapids, MI; and Lakewood, CO). In each of these areas, elevated levels of ethylene oxide were recorded at monitoring sites on days when they were downwind of the industrial facility of interest.
  - Lower, yet measurable levels of ethylene oxide were recorded at monitoring sites on days when they were upwind or on days when the industrial facility of interest was not operating.



Ethylene oxide is a flammable, colorless gas used to make a range of products, including antifreeze, textiles, plastics, detergents and adhesives. EtO also is used to sterilize equipment and plastic devices that cannot be sterilized by steam, such as medical equipment. The Clean Air Act lists EtO as a Hazardous Air Pollutant. U.S. EPA recently updated its risk value for ethylene oxide and is working with industry, and state, local and tribal air agencies to address this chemical

Primer on EtO Monitoring Challenges

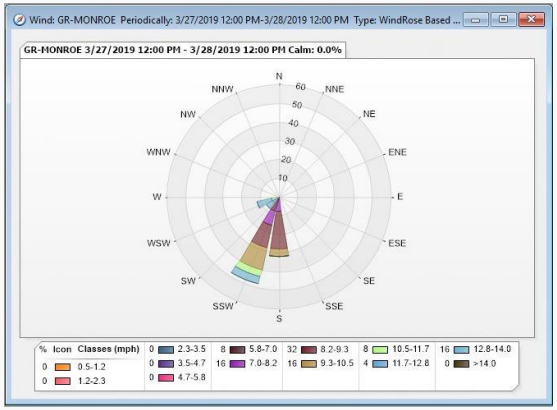
- The only *currently* viable method for analyzing ambient EtO samples is the TO-15, Summa canister method.
  - Measurements are typically averaged over a period of time such as 24 hours.
  - Logistics are cumbersome due to time delay and expense in shipping canisters back and forth to a lab and waiting for the ~2-3 week data validation cycle
  - Method has sensitivity challenges; currently the MDL is in the 0.06 – 0.08 ug/m3 range. This equates to a long-term cancer risk of 300 to 400 in 10^6.
- Relatively little current research has been done on issues such as EtO persistence in the atmosphere as well as the role of other sources beyond known NEI emitters (e.g., commercial sterilizers, chemical facilities).
- This situation leads to very challenging communication issues when measurable concentrations occur.

Recent Ambient Monitoring Projects for EtO – Grand Rapids, MI

https://www.michigan.gov/egle/0,9429,7-135-3310_70314_89277---,00.html

Two 1-day duration studies (Phase I and II)
November 2018 & March 2019

Phase II Results

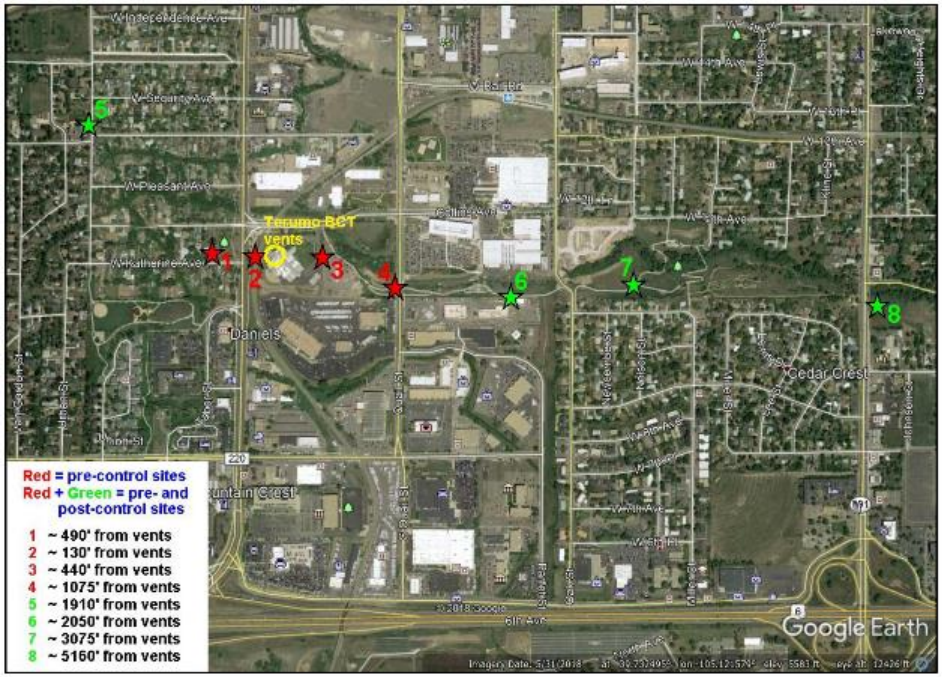


- The highest concentration of ethylene oxide (2.08 µg/m^3) was measured at a parking lot directly across the street from Viant, Location #2. Given the wind direction, out of the south-southwest/south at speeds of 0-10 mph on the sampling day, the discharge from the air vent at Viant was in direct line with this sample location.
- The Phase II sampling results appear to support a background level of around 0.18 µg/m^3 in the Grand Rapids area. This suggested background level can be seen at both Locations #10 and #11.

Recent Ambient Monitoring Projects for EtO – Lakewood, CO

https://www.colorado.gov/pacific/cdphe/ethylene-oxide

Two 7-day duration studies
August & October 2018

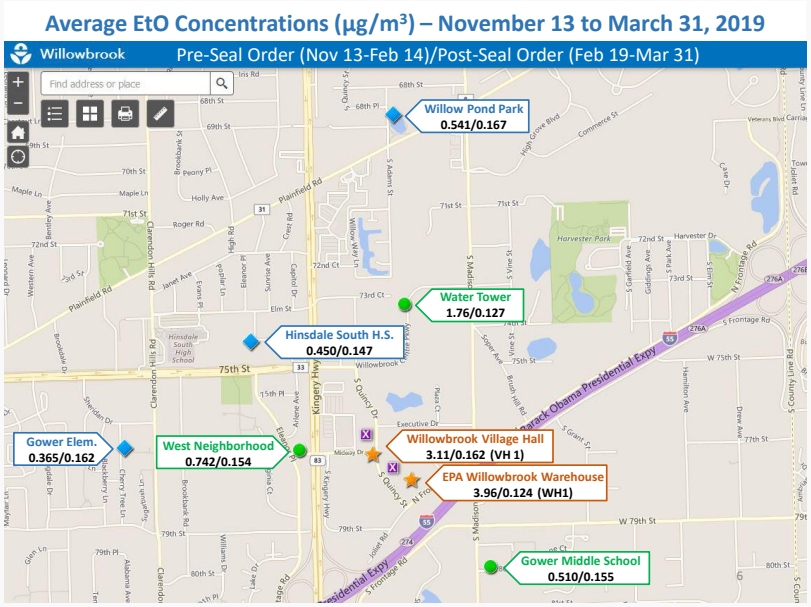


- For the pre-control monitoring, site #3 on the east side of the Terumo BCT facility had the highest pre-control average concentration over the 7 days of sampling at 3.092 µg/m3, followed closely by Site #2 on the west side at 2.996 µg/m3.
- For the post-control monitoring, Site #3 also had the highest post-control average concentration over the 7 days of sampling at 0.993 µg/m3, followed by Site #2 at 0.774 µg/m3.
- Mean background levels were approximately 0.253 µg/m^3.

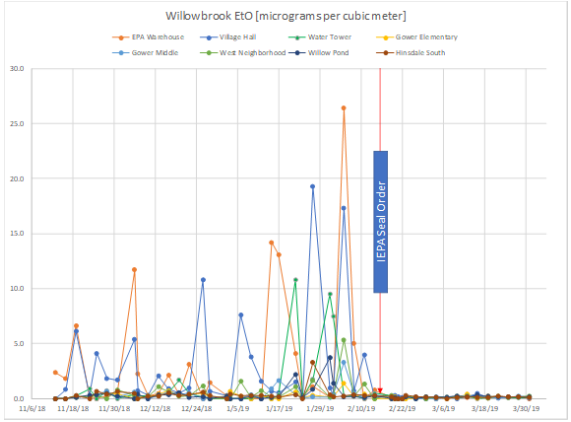
Recent Ambient Monitoring Projects for EtO – Willowbrook, IL

https://www.epa.gov/il/sterigenics-willowbrook-facility

4 1/2 Month study – November 13, 2018 – March 31, 2019



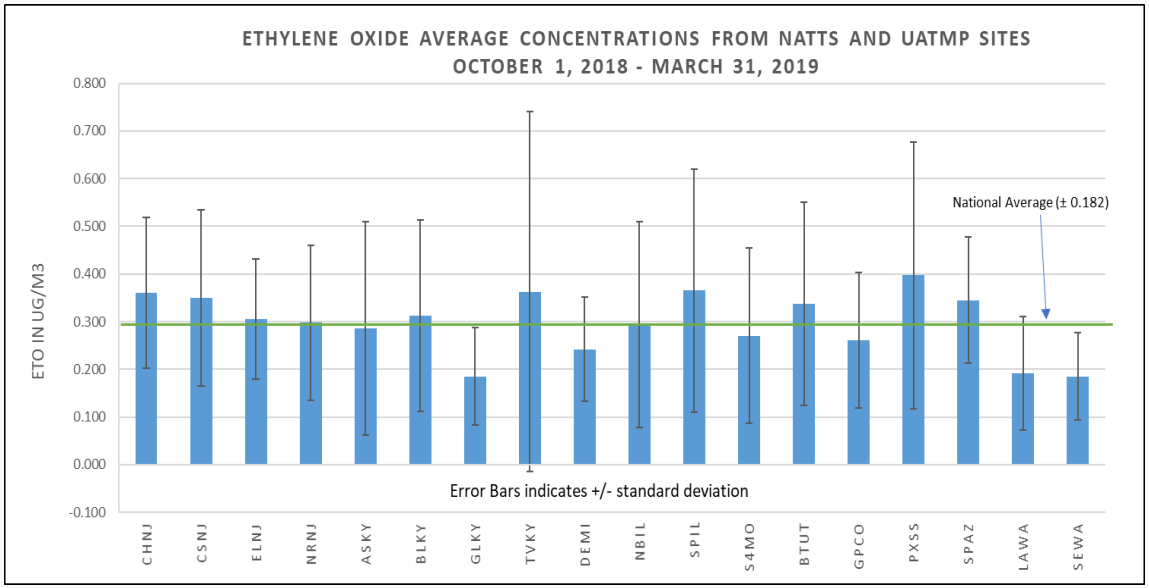
Sampling showed significant day-to-day variability (pre-seal order)



- EPA conducted 24-hour sampling at eight sites near a commercial sterilization facility (Sterigenics). Site averages when the facility was operating (32 sample days) ranged from 0.37 to 3.96 µg/m3. Highest 24-hour averages exceeded 10 µg/m3 on several occasions.
- The 6-week average background concentration after the facility was sealed by the IEPA was 0.15 µg/m3.

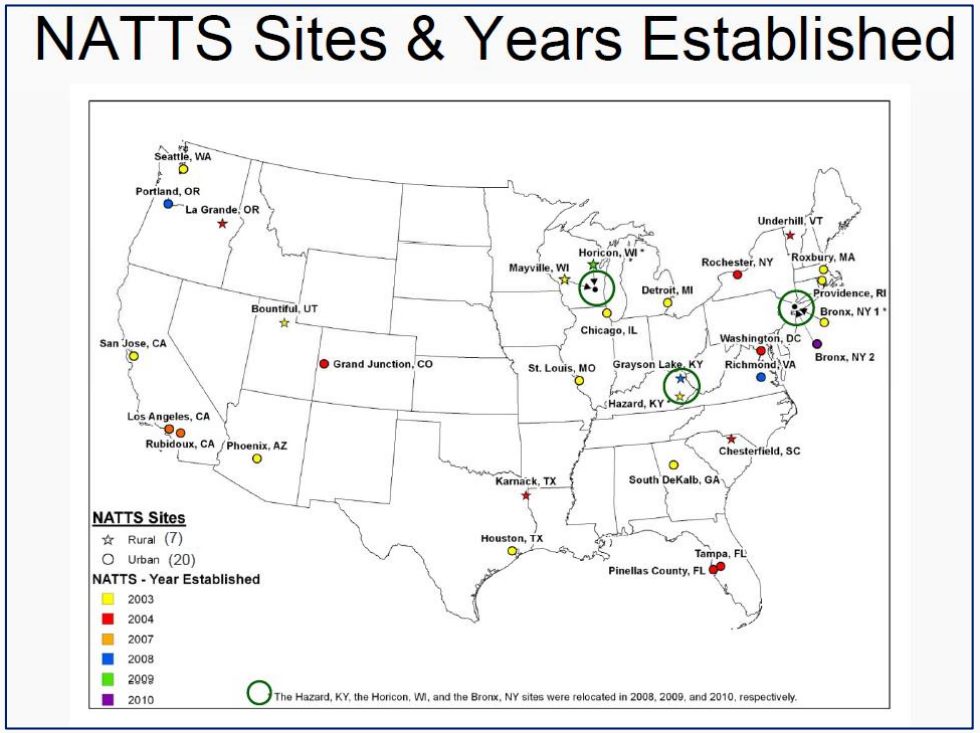
Next EPA Steps in Investigating the Distribution of EtO data Across the U.S.

- EPA has worked with the national air toxics contract lab to analyze EtO concentrations at a subset of the NATTS and UATMP sites for the 4thQ 2018 – 1stQ 2019 period
- Outreach calls have been completed with the affected states and the data are in final QA review prior to AQS posting
- The average concentration for this data set is 0.297 µg/m3
- There is a statistical difference (lower) between a grouping of [GLKY, LAWA, SEWA] and the other sites



Goals of the NATTS EtO enhancement

- Improve understanding of the national distribution of this compound in areas **away** from major EtO sources in different parts of the country
- Provide national or regional context for the results of case by case modeling results on individual facilities
- Support analysis of community-led ambient monitoring programs
- Increase and improve national air toxics analytical capacity for EtO
  - Analysis currently limited to a few commercial labs and Region 4/Athens
- Training programs with all the NATTS labs begin this week



Karnack, TX; Houston, TX, and San Jose, CA discontinued in 2018

QUESTIONS?