

# PAMS Re-Engineering

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Kevin A. Cavender  
EPA/OAR/OAQPS

## Outline

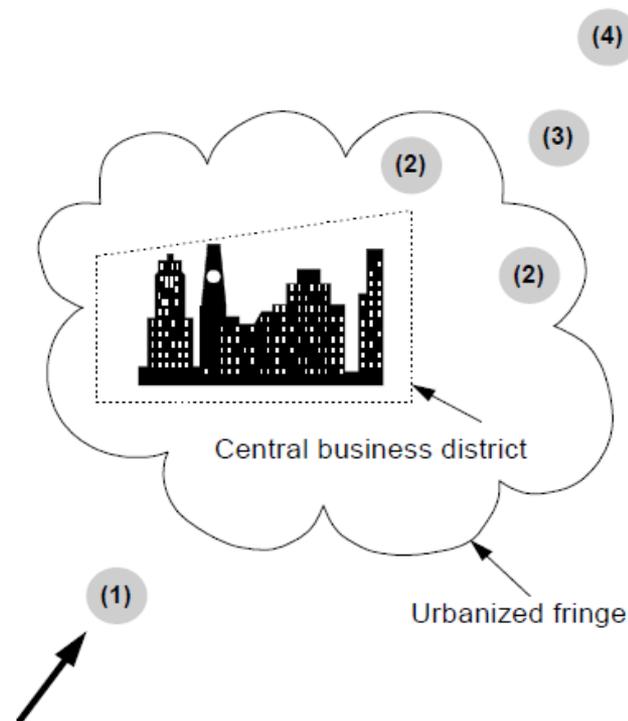
- Program Objectives
- Network Design
- VOC Measurements
- Carbonyl Measurements
- Nitrogen Measurements
- Pollutant Profile Measurements
- Meteorological Measurements
- Data Analysis

# Re-examine Objectives

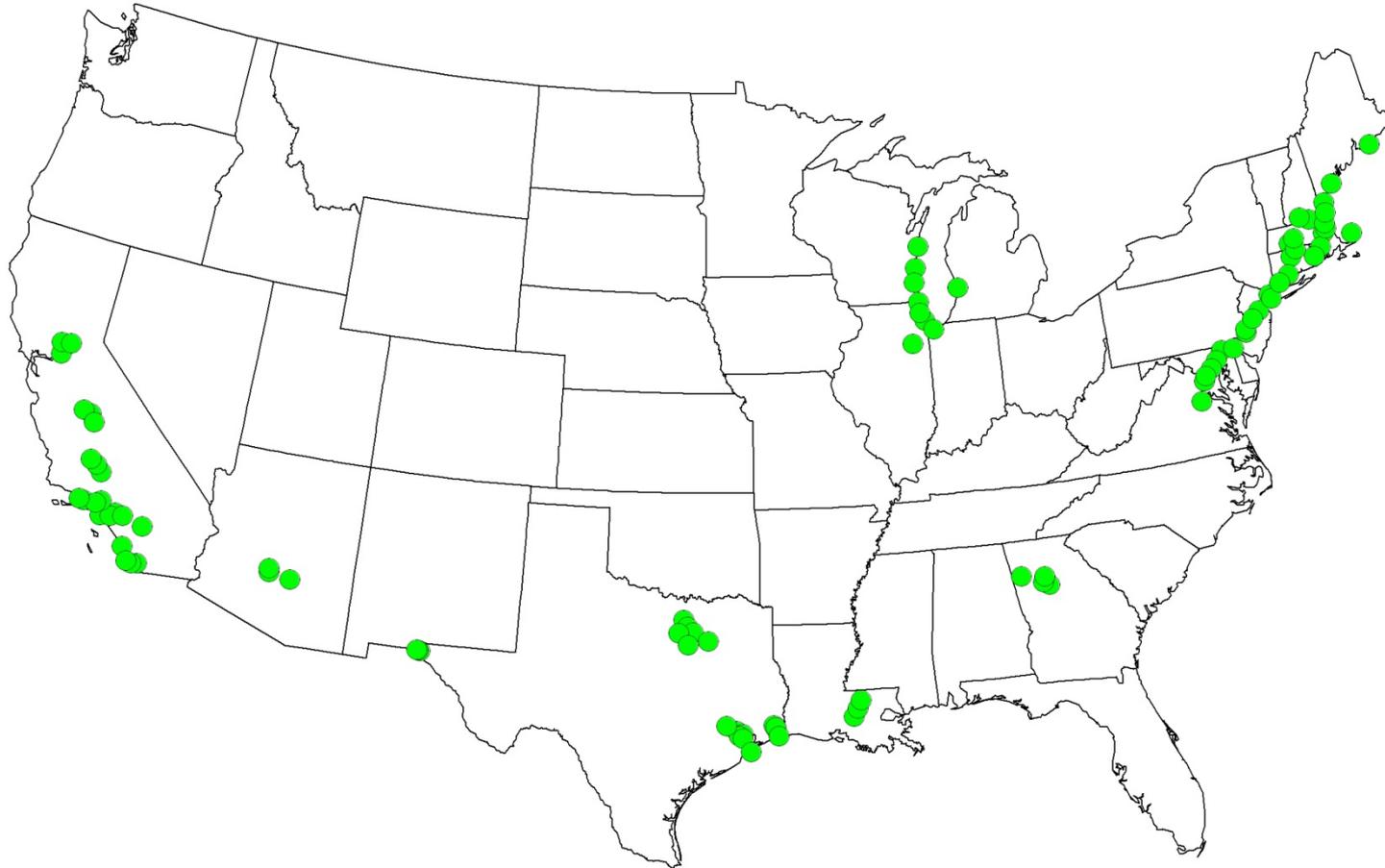
- Existing objectives
  - Build database of speciated VOCs for evaluation of control strategies and local modeling efforts
  - Provide data for model evaluation
  - Support emission inventory improvements
  - Track trends and progress
- Charge Questions
  - How should EPA prioritize the current PAMS objectives? What current objectives, if any, should be deemphasized or eliminated?
  - What additional objectives should EPA consider for the PAMS program at this time?

# Network Design

- Current design calls for up to 5 sites in each PAMS area
  - Type 1 Upwind
  - Type 2 Max emissions
  - Type 3 Max ozone
  - Type 4 Extreme Downwind
- PAMS Season June-August



# Map of PAMS Areas



## Issues with Current Network Design

- Poor spatial coverage
  - PAMS areas mostly in coastal areas
  - Limits value to model development/testing
- PAMS season is limited to summer months
  - Doesn't provide for extremes in variables
- Options?
  - Add PAMS measurements to urban NCore
  - Lengthen the PAMS season
  - Mobile sites

## Network Design Charge Questions

- What are the advantages and disadvantages of the current design with multiple sites per PAMS area?
  - What changes, if any, should be made in the number and spatial distribution of required sites?
- Should EPA consider requiring PAMS measurements in areas other than areas classified as serious and above for the ozone NAAQS to improve spatial coverage?
- What role, if any, should mobile or temporary sites play in the PAMS program?
- What are the committee's views on the relative merits of revising PAMS to be a very flexible program with relatively few requirements versus a program that is highly specified?
  - If the more flexible model were adopted, what minimum requirements, if any, should be included?

## PAMS Target List

- PAMS measures 58 “target” VOCs
  - Consider adding compounds
    - Biogenics
    - Air toxics
  - Consider dropping compounds
    - Low concentrations/Non-detects
- Charge Questions
  - What criteria should EPA consider when re-evaluating the PAMS target VOC list?
  - Are there specific compounds that EPA should consider adding or subtracting from the target list?

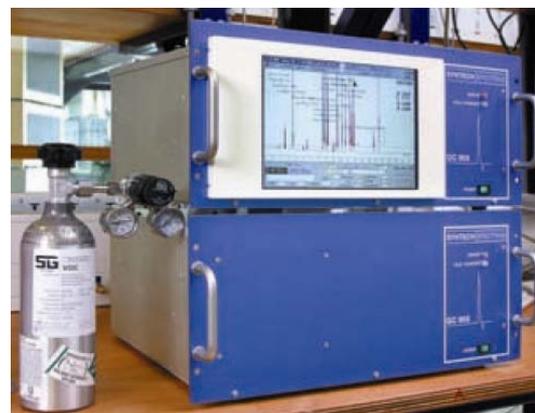


# VOC Measurement Technologies

Canisters

vs

Auto-GCs



- Data averaged over sampling period
- Low capital cost
- Continuing lab costs
- Manually intensive

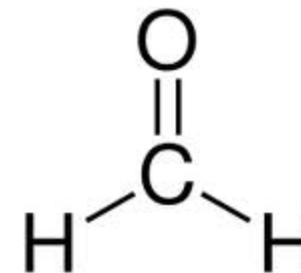
- Hourly data
- Higher capital cost
- Higher skill level required to run and analyze data

## VOC Charge Questions

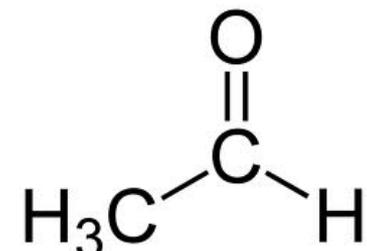
- What are the advantages and disadvantages of manual canister sampling versus field deployed auto-GCs?
- Are the new commercially available auto-GCs appropriate for use at PAMS sites?
  - What additional evaluations are necessary to determine the suitability of auto-GC's for use in the PAMS network?
- What role, if any, should TNMH monitors play in the PAMS program?

## Carbonyls

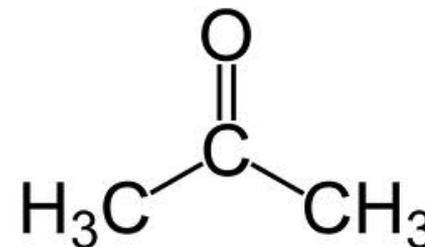
- Carbonyl sampling was removed from the PAMS requirements in all areas except those in severe and above non-attainment areas due to concerns about data quality
- Carbonyl data is important to ozone model evaluation
- Important air toxics
- We will be evaluating sampling and analysis method to determine if carbonyl sampling methods have been/can be improved



Formaldehyde



Acetaldehyde



Acetone

## Carbonyl Charge Questions

- Should carbonyls be required at all VOC speciation sites?
- What issues have been addressed, and what issues still need to be addressed with the current TO-11A method for carbonyl sampling?
- What other methods should be considered as an alternative to the manual TO-11A method for carbonyl sampling?

# Nitrogen Measurements

- $\text{NO}_2$  plays a major role in ozone formation
- Standard  $\text{NO}_x$  measurement technology is known to have positive interferences from other non- $\text{NO}_x$  species ( $\text{HNO}_3$ , PAN, mPAN, etc.)
  - $\text{NO}_2$  measurement =  $\text{NO}_{\text{what}}$
- $\text{NO}_y$  measurements don't give a  $\text{NO}_2$  reading at all!
- New technologies are coming out that will provide a better  $\text{NO}_2$  measurement
  - Direct  $\text{NO}_2$  measurements
  - “true  $\text{NO}_2$ ” photolytic converters
- Can we get  $\text{NO}/\text{true } \text{NO}_2/\text{NO}_y$  all in one box?

## Nitrogen Charge Questions

- Are direct measurement  $\text{NO}_2$  or photolytic  $\text{NO}_2$  analyzers suitable for deployment in the PAMS network?
- What additional evaluations are necessary to determine the suitability for use in the PAMS network?

# Pollutant Profile Measurements

- Characterizing background ozone concentrations, and delineating contributions from local and regional sources and long range transport, has evolved into important assessment needs to support both the standards setting risk assessment process and subsequent implementation.
- A number of options exist to obtain ozone and nitrogen oxide profile information, including:
  - Surface based sondes,
  - Optical remote sensing,
  - Aircraft platforms, and
  - Satellites.
- Charge Question: What observational approaches (surface based sondes and optical remote sensing, aircraft platforms, satellites) are best suited to assist such assessments? What routinely collected surface measurements and in what locations would complement vertical profile and total column observations?

# Upper Air Meteorology Measurements

- Current requirements state that one representative upper air site is required in each PAMS area
  - Details on what upper air data is to be collected is not defined!
    - Mixing height
    - Wind direction and speed?
- Most upper air systems used in PAMS are radar profilers with RASS temperature profilers
  - The systems at PAMS sites are old and VERY expensive
- Inexpensive ceilometers can provide continuous mixing height data
- Can NOAA profilers meet PAMS data needs?



# Meteorology Charge Questions

- Is it necessary to collect upper air wind speed and wind direction data at PAMS sites?
- How should NOAA data be incorporated into the PAMS program?

# Data Analysis

- 25% of PAMS allocation is targeted for data analysis
  - Program is often criticized that the data does not get “used”
- Charge Questions
  - How can PAMS data best be used? What specific data analyses should be conducted?
  - How should any recommended data analyses be implemented? Should these analyses be conducted at the state, regional, or national level?
  - Should more or less of the PAMS funding be allocated to data analysis?