Houston/Galveston Citizen Air Monitoring Project (**HGCAMP**)

Tools for Citizen Air Sampling

Doug Lipka - EPA

Purpose of Project

- To assist citizens efforts to learn more about the quality of air in the Houston area.
- To calibrate various air sampling devices.

Role of EPA in Air Quality

- Overall responsibility for Clean Air Act
- Permit new construction or modification until States delegated
  - TX delegated title V authority
- Work with States on violations of State Implementation Plans (enforcement)
- Provide financial assistance to State and local air pollution control programs

Role of TNRCC in Air Quality

- Conduct monitoring of ambient air
- Develop air pollution control strategies and regulations
- Issue new construction or modification permits
- Conduct inspections of air emission sources
- Take enforcement action against violations of regulations
- Respond to citizen complaints

Role of HCPC in Air Quality

- Investigate citizen complaints
- Conduct inspections of air emission sources
- Take enforcement action against violations of regulations
- Review TNRCC permits
- Provide local government recommendations on regulations

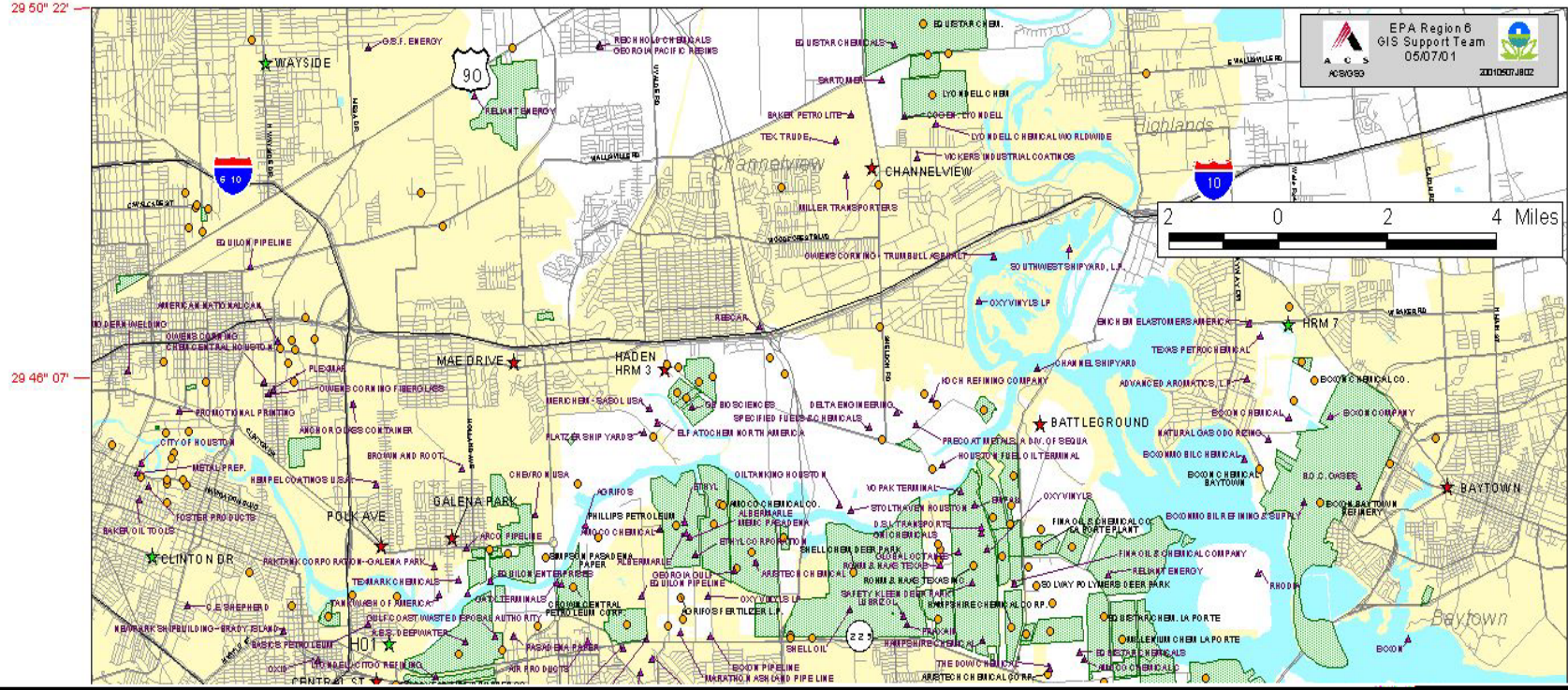
Role of City of Houston

- Mayor's Office of Environmental Policy (MOEP)
  - Leadership role in the development of the Regional State Implementation Plan (SIP)
  - Implementation of the City of Houston Emissions Reductions Plan
- Bureau of Air Policy (Health and Human Services Dept.)
  - Coordinated departmental efforts with MOEP
- Bureau of Air Quality (BAQC)
  - Monitors air quality (daily information provided)
  - Enforcement role/Investigates air pollution complaints
  - Comments on permits to TNRCC
- City of Houston Departments
  - Coordinates environmental initiatives with Mayor's Office of Economic Development

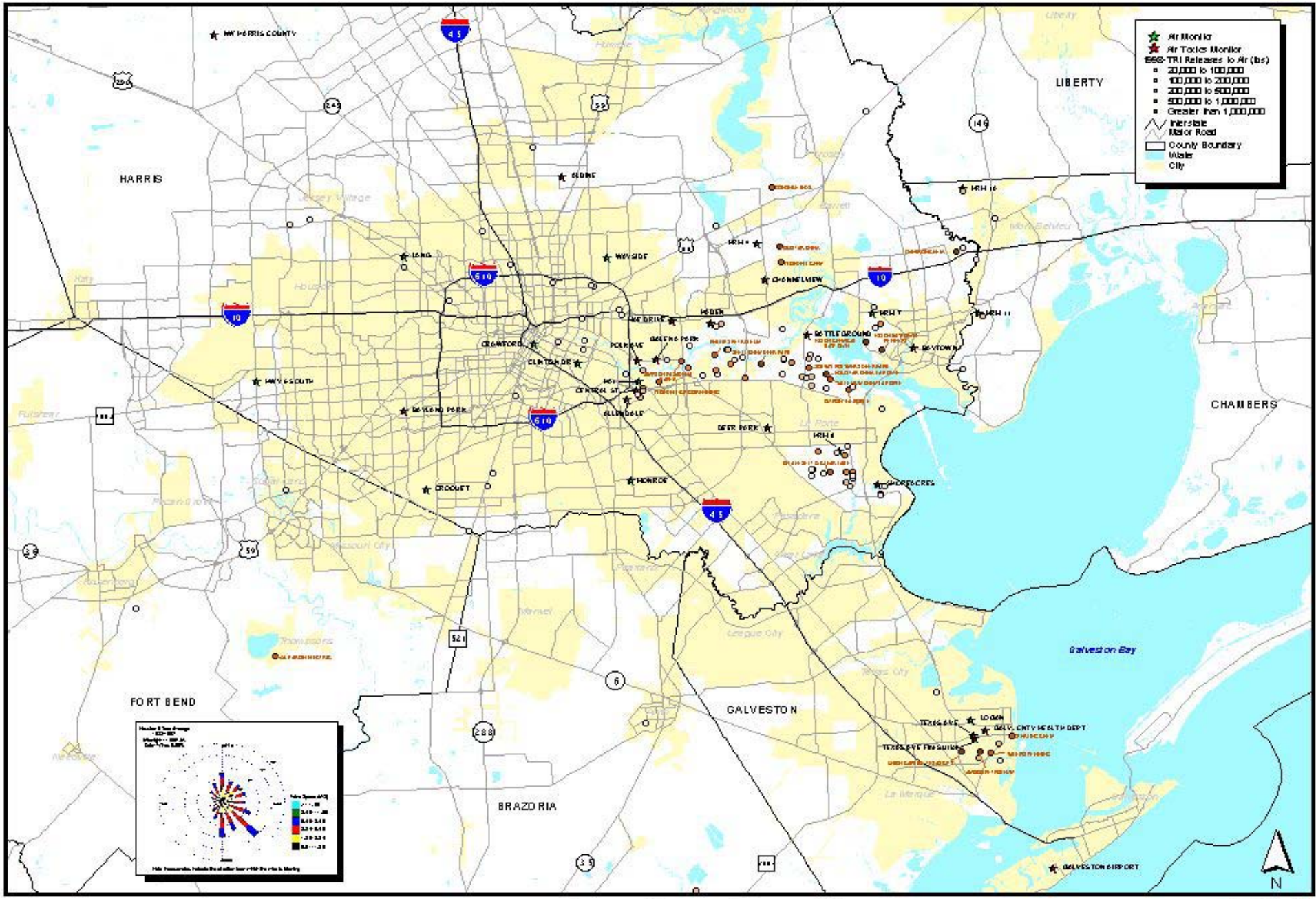
Houston Maps

- Air monitors and emission sites in east Houston
- Air monitor sites in Harris county

Air Monitors and Emissions Sites in East Houston



Air Monitor Sites in the Harris County Area



Sources: AIRS, TRI98, 1992 Census Bureau, TIGER/Line Files, ESRI data

Background

- EPA, Region 6, became involved with citizen Air monitoring in Calcasieu, LA.
- Within the past year, several Houston area citizen groups requested assistance in air sample analysis.
- TNRCC, HCPC, and EPA met several times last year to discuss assistance.
- Discussion with Region 9 EPA about their citizen Air monitoring project.

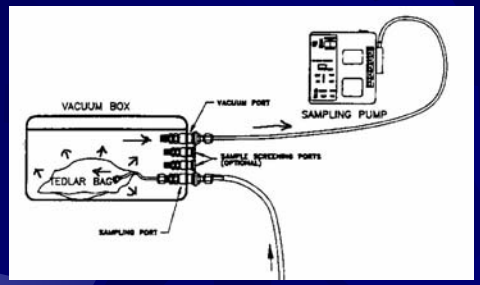
Background (cont)

- Discussions with EPA Offices about interest in Tedlar bag and canister air sampling.
- TNRCC and EPA leadership discussed issues.
- Texas Sunset Commission legislation requiring TNRCC to use standard EPA or TNRCC collection techniques.

Citizen Air Sampling Study – why?

- Battelle Study
  - Concluded that Tedlar bags show different results from canisters for several chemicals, but can be useful.
- EPA ORD recommends using canisters or sorbent tubes.
- Some studies indicate Tedlar bags can be useful for demonstrating Air quality problems, leading to further examination.

Tedlar Bag Samplers



Lung-Type Devices

"Suitcase" Sampler

Citizen Homemade Device

Tedlar® Bag
(EPA approved collection device for stack samples only)

Canister Sampler

(EPA approved for ambient sampling)

EPA Houston Laboratory

Getting Started

- Two Task Groups formed
  - Citizen Air Sampling (“Tools”)
  - Information Exchange
  - Citizen and government co-chairs
- Periodic updates for all participants
- Use of Web sites

Collaborative Effort

- HCPC, TNRCC, City of Houston and EPA will assist in two aspects:
- Citizen ambient air sampling using Tedlar bags and canisters
  - We provide canisters, bags, suitcases, Quality Assurance, training, and analysis.
- Information exchange project
  - How is air quality determined?
  - How can citizens participate?
  - How do air quality levels determine improvement strategies, enforcement, and permitting?
  - How to access existing air quality information?

Citizen Air Monitoring Project

- Focus on evaluation of “Tools for Citizen Air Sampling”
- Work with citizen groups, schools, and individuals in community
- Houston, Harris Co., and Galveston areas covered by project
- Samples collected at each site with either two sampling devices (simultaneous) or one sampling device and one field QC

Citizen Air Monitoring Project (Cont)

- Emphasis on Quality Control (QC)
  - Absolutely necessary to determine usability of data (covered later in program)
- Most samples analyzed by EPA Houston Lab, some by TNRCC
- Program to run through Dec. 31, 2002, but may be extended (TNRCC 6 months?)
- Data made available to citizens after review of the analysis

Results

- Information for Communities and Agencies
  - Chemicals Detected
  - Comparisons to ESLs
  - Toxicological Report
- Efficacy and Efficiency of Devices
- Website
- Possible use for Further Action

Quality Control & Assurance

Ed O'Neill

EPA

What is…

- Quality Control

  An Aggregate of functions actively designed to change the quality outcome of a process

- Quality Assurance

  An evaluation and Reporting of usually the same tests compared to norms

  Linked – interchangeable - QA/QC

Type of Measurements

- Precision
  - Duplicates
  - Replicates
  - % RPD
  - %RSD
- Accuracy
  - Performance testing
  - Second source standards
  - External or reference QC

Safety Considerations

David Brymer

TNRCC

SAFETY

- GENERAL PHILOSOPHY
- MINIMIZING PERSONAL EXPOSURE
- MINIMIZING TRAFFIC RISK
- HOW TO DEAL WITH CONFLICT

SAFETY- General Philosophy

- The primary concern is the safety of each individual and volunteer. No individual is asked or expected to risk or endanger their health in order to collect samples as a volunteer of this project. If at any time a volunteer conducting sampling experiences any health effects, such as a burning sensation on the skin, eyes, nasal passages, or lungs, they are asked to immediately leave the area, seek appropriate professional medical attention, and put their own personal safety as the first priority over any sampling efforts

SAFETY-Personal Exposure

- In many cases it is possible to minimize potential exposure during downwind source sampling. The samplers can be prepared prior to getting out of the vehicle thus minimizing exposure to ambient conditions.
- During sample collection, the individual may choose to walk away from the area if a concentrated plume is present or observe sampling from a vehicle with the air in maximum recirculation mode.

SAFETY-Personal Exposure (cont.)

- Samplers should be aware of the types and uses of personal protective equipment (that they may choose to obtain on their own and utilize):
  - Protective clothing, some citizens have noted that long-sleeved shirts and pans can be helpful in limiting skin exposure,
  - Dust masks, can provide some protection for particulate matter,
  - Supplied air respirators or breathing packs, and
  - Cartridge-style respirators fitted with appropriate cartridges

SAFETY-Personal Exposure (cont.)

- Dust masks or tight fitting cartridge respirators do not remove all types of potential air pollutants. The correct cartridge type must be used for a specific chemical class (e.g. Hydrocarbon or acid fumes)
- Any type of tight fitting respirator, dust mask, or heavy supplied air system can place an increased burden on the cardiovascular system. Anyone using such a device should be fit tested and properly evaluated by medical personnel prior to wearing this type of protection equipment.

SAFETY- MINIMIZING TRAFFIC RISK

- In general, do not block, interfere, or hinder traffic in any way. Be cognizant of traffic before stepping out of your vehicle.
- For this type of short duration sampling, when pulling over onto a shoulder or within 15 feet off a roadway activate your vehicles flashers. Traffic cones are optional.
- If you park in an approved parking place or pull more than 15 feet of a roadway, the use of flashers is not required.

SAFETY- Conflict Avoidance

- Try to sample in well-lit areas and/or in groups. Have a cell phone on your person, car keys readily accessible if possible and do not hesitate to leave the area if you feel threatened.
- If approached by plant personnel or authorities, help avoid conflict by communicating in a pleasant, non-aggressive, helpful manner. Identify yourself, present your credentials if asked, and explain in a factual manner what you are doing.
- Some professionals say that setting firm rules, in a polite manner, can help. Example, I would like to answer your questions but I can’t do this unless you calm down.

SAMPLE SITE SELECTION-LIMITATIONS

- Within Harris or Galveston Counties
- Public Property
- Representative of Ambient Air (no indoor air, small spills such as gasoline, or direct auto exhaust)
- Variety of Conditions

WHEN TO TAKE SAMPLES

- Whenever you want. A wide variety of samples is desirable (upwind or downwind of suspected sources, cooler temperatures and very hot temperatures). NOTE: some compounds can be present at levels of interest even if there is no odor.
- Sampling during periods of mist or rain is undesirable and usually results in few compounds being detected.
- Light winds during early morning hours sometimes results in higher VOC concentrations from fugitive or mobile sources.
- Stronger, steady winds often are conducive for sampling elevated sources.

SAMPLE SITE SELECTION- Practical Considerations

- Do not handle any volatile organic compounds (e.g. gasoline, nail polish or remover, paint, glues, varnishes, solvents, markers, printer cartridges, liquid paper, etc.) prior to or during sampling without very thoroughly washing your hands.
- Do not allow water to enter the sampler (not a good idea to sample during rain anyway)

SAMPLE SITE SELECTION- Practical Considerations (2)

- Get downwind of a suspected source or find an area with VOC odors (not burned match or rotten egg odors).
- Try to sample upwind of any roadways (unless you are trying to characterize auto emissions).
- Try to sample at least 30 feet away from large trees or buildings

SAMPLE SITE SELECTION- Practical Considerations (3)

- Make sure you are on public property. Residences (with prior written approval if not the samplers personal property), schools, public recreational areas, and road right of ways are potential sampling sites.
- In most cases, road right-of-way can be identified as the area between the shoulder and telephone/power poles, sidewalks, utility markings, and street signs if the road has a curb and a gutter. Legal advertisement signs and fences are usually not on public property.

SAMPLE SITE SELECTION- Practical Considerations (4)

- If the road has a drainage (bar) ditch instead of gutters, the ditch (including both sloped sides) is generally in the road right-of-way.
- If you are told you are on private property then it is recommended that you leave.
- A good resource is Mike Schaefer with Tx Dept. of Transportation at 713-802-5711.

Quality Control & Assurance

- Continued, Ed O'Neill

EPA

Why is QC Important?

- Absolutely necessary to determine usability of data
- Affected by many aspects of project
  - Field operations
  - Sample collection
  - Transport of sample
  - Storage of sample
  - Analysis

Types of Quality Control for Project

- Standardized collection procedures through Standard Operating Plans (SOPs)
  - Proper handling of collection devices (canisters and bags)
  - Consideration for weather, wind direction, nearby exhaust
  - Both samples must be at same time and location
  - Bags are one time use and then dispose
  - Sample when analytes are present (releases)
- Field and Laboratory blanks (provided by lab)
- Field and Laboratory spikes (provided by lab)
- Duplicates

Why Two Entities?

- Evaluation requires comparison
  - Different entities
- Precision
  - Same entities
- Laboratory Studies
  - Supplement field data
  - Fill in the gaps