

New Jersey Department of
Environmental Protection's Air
Monitoring Network
&
Select Special Projects

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Presented to VOC modeling workshop,
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Air Monitoring Data

- Currently air monitoring data exists in a variety of formats, e.g., Excel, ACCESS
- Each class of analytes has its own spreadsheet
- The NJDEP will be consolidating all air monitoring data into one Oracle Database.

Websites

- <http://www.nj.gov/dep/airmon/index.html>
 - NJDEP air monitoring website
- <http://www.nj.gov/dep/airmon/2007net.pdf>
overview of monitoring network
 - Current and Proposed Air Monitoring Sites
 - Start Dates
 - List of Analytes
- <http://www.nj.gov/dep/airmon/reports.htm>
 - air quality reports- from 1997 but not completely inclusive
- <http://www.nj.gov/dep/aqpp/risk.html>
 - risk screening worksheet

For Data Requests

- Contact: Charlie Pietarinen, Bureau Chief, Bureau of Air Monitoring, NJDEP
- Charles.Pietarinen@dep.state.nj.us
Office: 609-633-7648
P.O. Box 0418, Trenton, NJ 08625.
- Request should include: site, analytes/dates of interest, intended purpose.
- Requests will be processed on a case by case basis, variable turnaround time.

Can Also Access DEP data on AQS

- <http://www.epa.gov/air/data/geosel.html>

A Screening Model for Predicting Concentrations of Volatile Organic Chemical in Shower Stall Air

- Simple Equilibrium Model
- Predicts maximum possible concentration for modeled bathroom
- Requires contaminant concentration in influent water

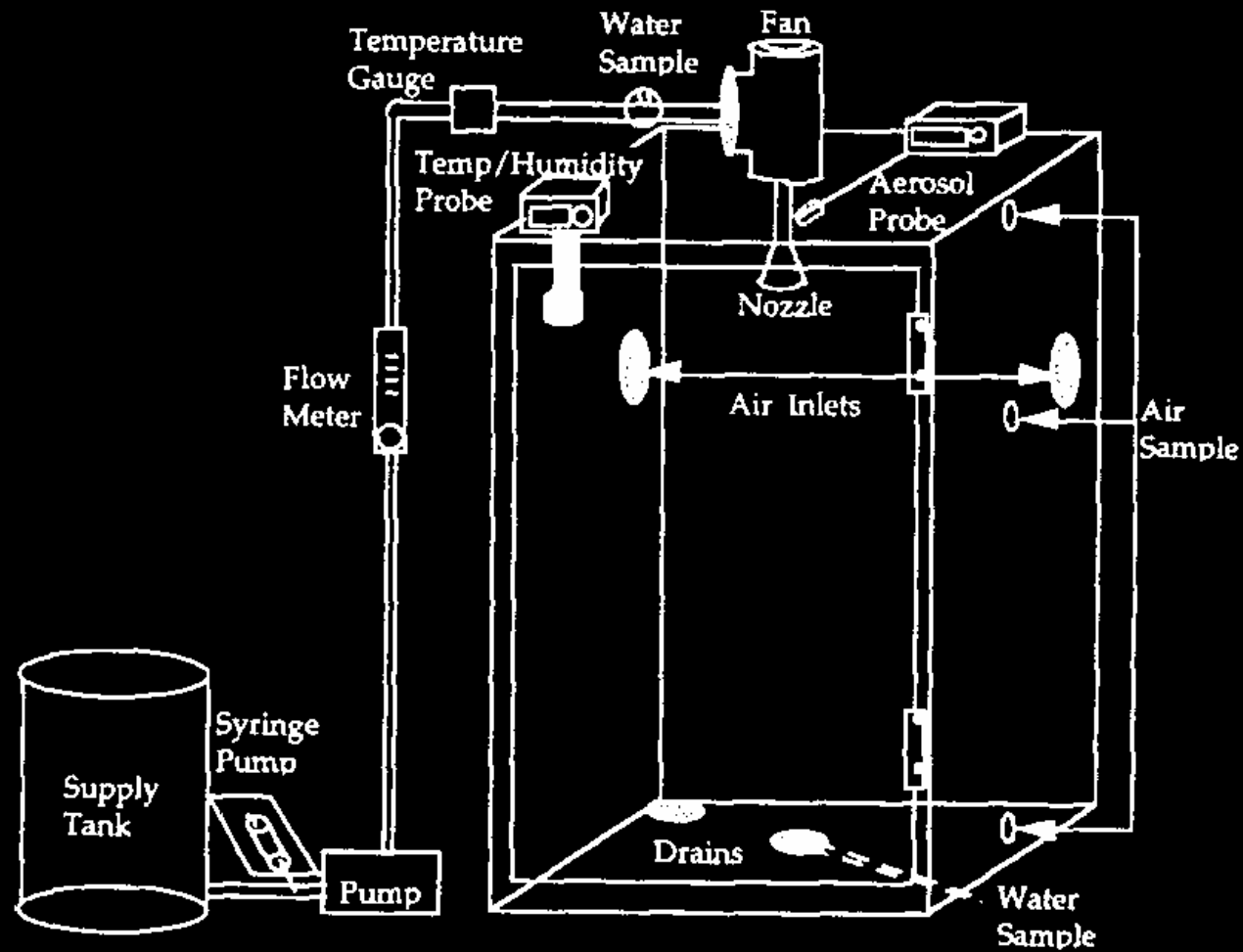


Fig. 1. Configuration of the shower chamber.

Keating et al. (1997)

Experimental Shower Stall Conditions

- Shower stall volume: approx. 1.5 m³
- Shower duration: 8-23 min
- Shower water volume: 0.034-0.19 m³
- Shower water temperature: 19-46°C
- Shower stall air exchange rate: 0-379L/min

Screening Model Shower Stall Standard Conditions

- Shower stall volume = 1.5 m³
- Shower duration = 10 min
- Shower water volume = 0.1 m³
- Shower water temperature = 40°C
- No air exchange

CHLOROFORM

Air concentrations from model
(mg/m³)

| <i>Concentration in influent water (mg/L)</i> | <i>Experimental max. air conc. (mg/m³)</i> | <i>Adjusted conditions</i> | <i>Standard conditions</i> |
|---|---|--------------------------------|--------------------------------|
| 57 ^a | 630 ^a | 506 | 3090 |
| 58.7 ^a | 780 ^a | 529 | 3183 |
| 55.6 ^a | 430 ^a | 498 | 3014 |
| 0.582 ^b | 16 ^b | 13 | 32 |
| 0.555 ^b | 7.7 ^b | 7 | 30 |
| 0.677 ^b | 24.9 ^b | 31 | 37 |

^aKeating et al. (1997)

^bGiardino and Andleman (1996)

TRICHLOROETHENE

Air concentrations from model
(mg/m^3)

| <i>Influent water conc. (mg/L)^a</i> | <i>Experimental max. air conc. (mg/m^3)^a</i> | <i>Adjusted conditions</i> | <i>Standard conditions</i> |
|---|--|--------------------------------|--------------------------------|
| 0.959 | 14.3 | 14 | 58 |
| 0.493 | 42.8 | 36 | 30 |
| 0.922 | 41.9 | 27 | 56 |
| 0.589 | 13.7 | 8 | 36 |
| 0.519 | 54.9 | 41 | 31 |
| 0.875 | 33 | 27 | 53 |

^a Giardino and Andelman (1996)

Ratio of Predicted to Measured Concentrations in Shower Stall Air Under Standard Conditions

| | |
|----------------------|--------|
| <i>Average Ratio</i> | 7.2 |
| <i>Std. Dev.</i> | 5.8 |
| <i>Ratio Range</i> | 0.6-26 |

Results

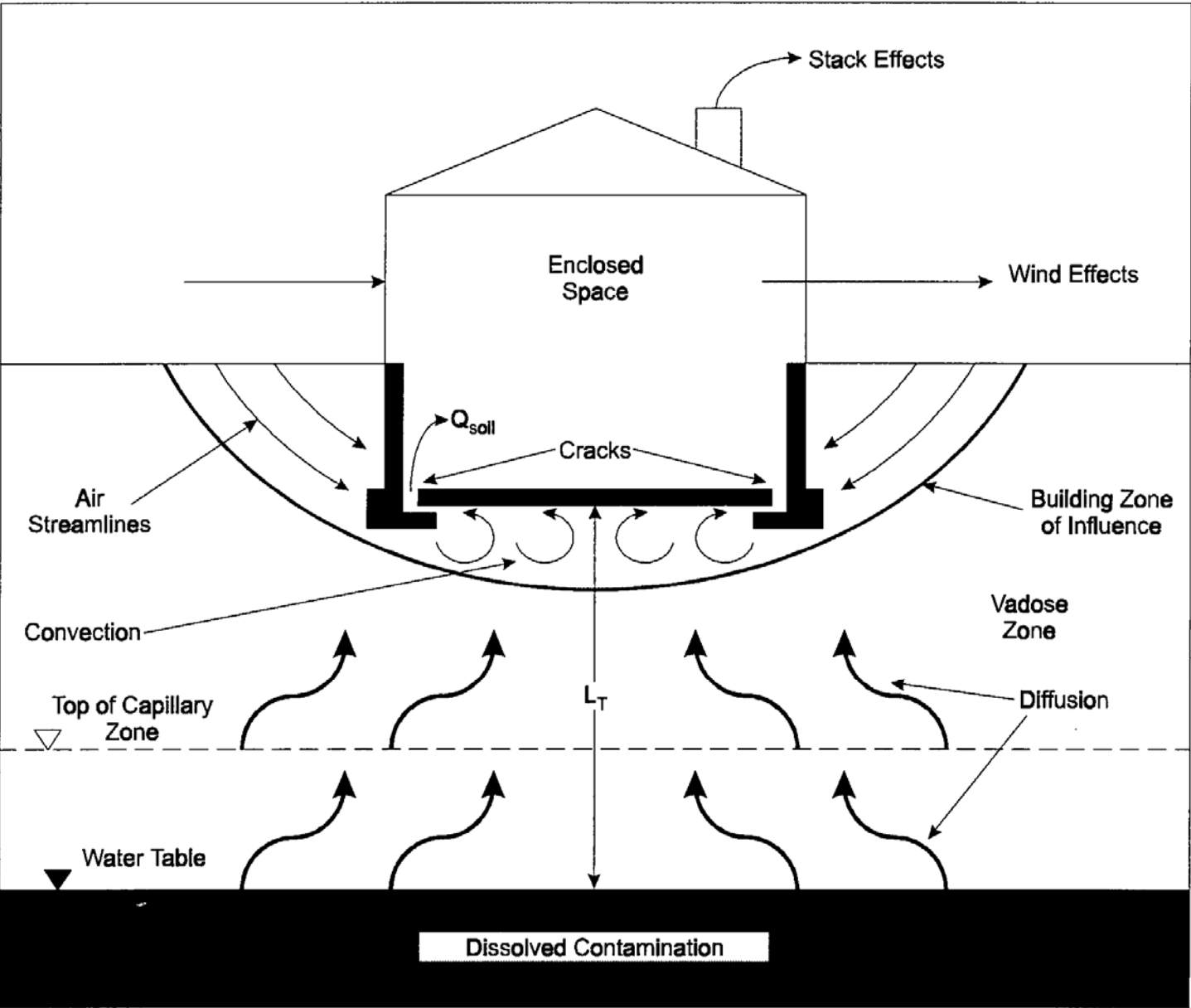
- Predicted values (adjusted water temperature, air exchange and water flow rates) were 1 to 3 times the experimental peak concentrations
- At times, shower water criteria are lower than MCLs or other criteria based on ingestion.
- Project completed
- Contact Dr. Paul Sanders @ (609) 292-9998 or paul.sanders@dep.state.nj.us

Investigation of Indoor Air Sources of VOC Contamination

- Purpose: Determine background levels of VOCs in indoor air to separate indoor sources from groundwater contributions.
- Process: Indoor air concentrations measured in 100 homes in suburban and rural areas in NJ.
- Of 57 target compounds, 23 not detected in any home.
- Often measured: gasoline constituents, solvents from consumer products, disinfection by-products, PERC, acetone, 2-butanone, freons
- Investigator: Dr. Clifford Weisel / project completed

Investigation of Indoor Air Quality in Structures Located Above VOC-Contaminated Groundwater

- Evaluate soil vapor intrusion into buildings through field measurements of groundwater, soil and indoor air (Stafford Township Sept 2002 to Jan 2004) no hits in Egg Harbor and Mt Holly
- Compare to existing guidance,
- Site-specific mathematical modeling of vapor intrusion
- Evaluate factors affecting hydrocarbon vapor biodegradation
- Investigator- Golder Associates / project completed



Outdoor air <1.8
Median indoor air(lit) = 6
DEP Indoor Screening
Level = 1.8

Building "A"

50.5- MTBE Concentrations
 $\mu\text{g}/\text{m}^3$ = Air/Vapor;
 ug/L = Groundwater

50.5

P= 0.6 Pa
137

<1850

M. Sand
foc = 0.0003 to 0.006

1,665,000

18,026

5,920,000

28/10/02

Bsmt/1st fl = 2.7
Subslab/bsmt=130
DV/bsmt=43,000
GW/bsmt=88,000

590,000

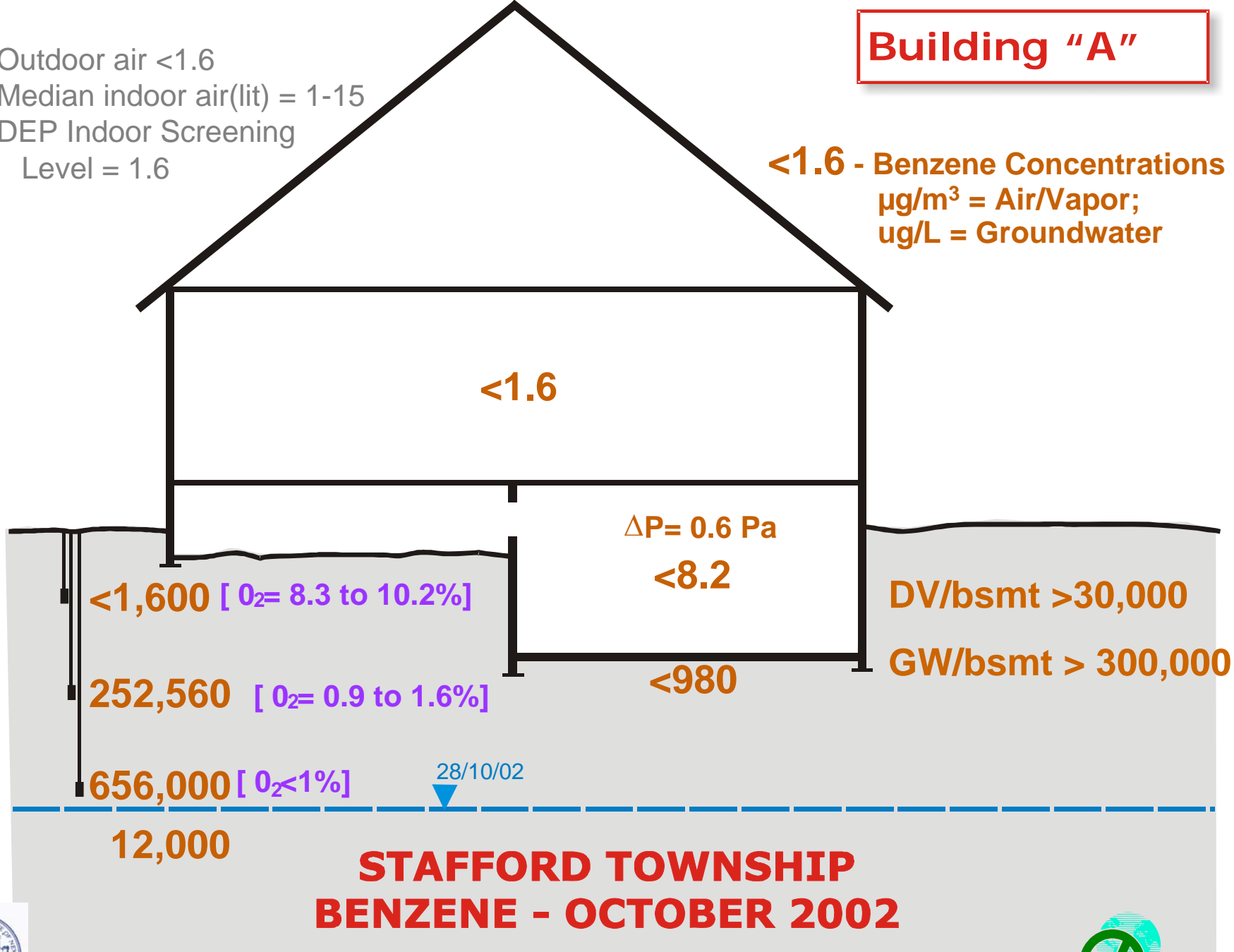
**STAFFORD TOWNSHIP
MTBE - OCTOBER 2002**



Building "A"

Outdoor air <1.6
Median indoor air(lit) = 1-15
DEP Indoor Screening
Level = 1.6

<1.6 - Benzene Concentrations
 $\mu\text{g}/\text{m}^3$ = Air/Vapor;
 ug/L = Groundwater



STAFFORD TOWNSHIP BENZENE - OCTOBER 2002



Stafford Summary

- Coordinated sampling of GW, soil vapor and indoor air helps see the whole picture, but is resource-intensive
- BTEX chemicals did not clearly impact indoor air quality even when present at parts-per-million levels in underlying groundwater
- MTBE did appear in indoor air when underlying groundwater concentrations were above 500 ppm
- Tracer compounds such as 2,2,4-trimethylpentane may be useful for separating indoor vs. subsurface sources of BTEX chemicals

Camden Waterfront South Air Toxics Pilot Project

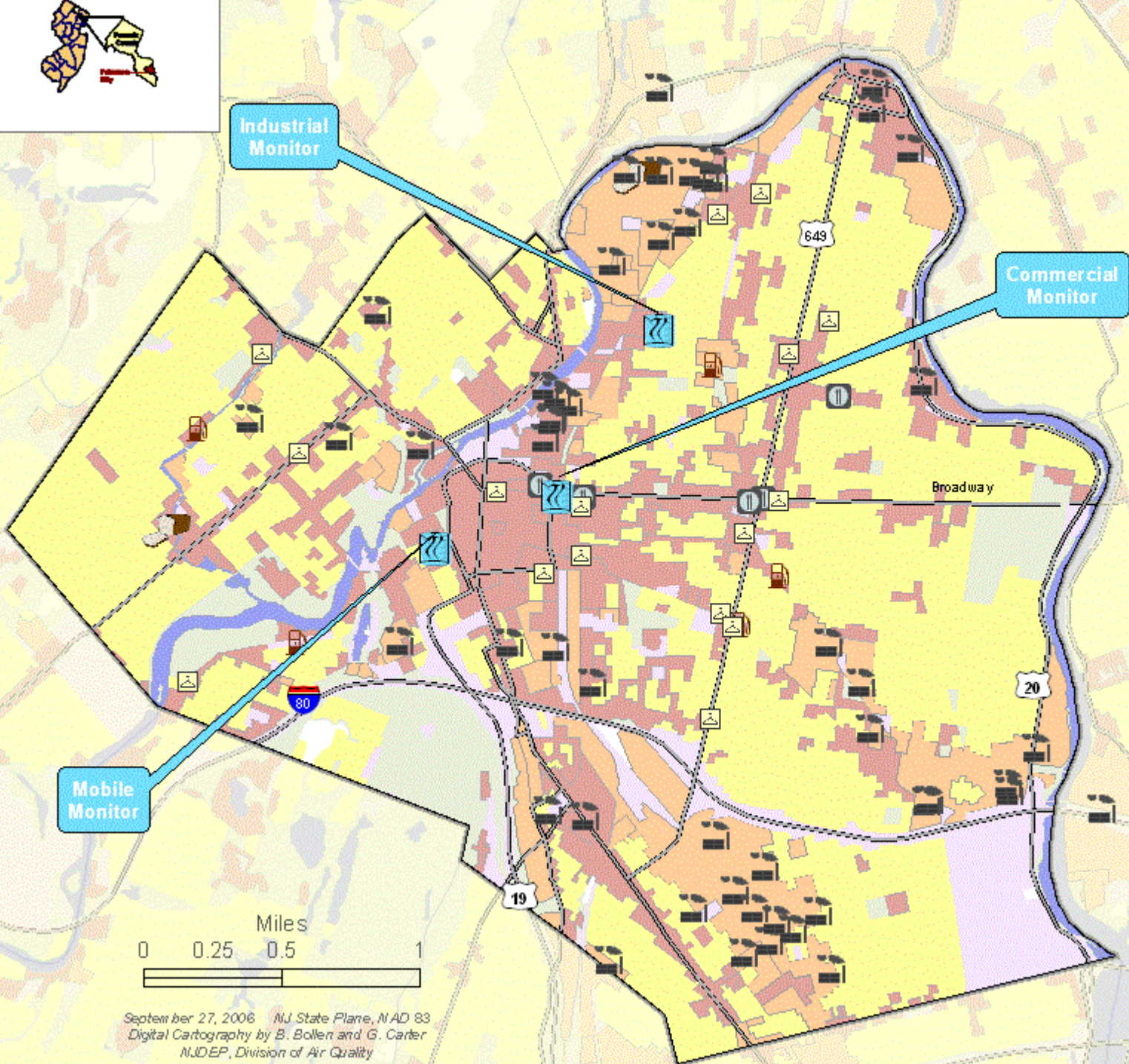
- Assess exposures to select VOCs, metals and PM₁₀
- Industrial Source Complex (ISC) Model
- Neighborhood scale modeling
- Importance of microinventory
- limited monitoring PM_{2.5} & bucket brigade
- Project completed
- <http://www.state.nj.us/dep/ej/camden/index.html>

Urban Community Air Toxics Monitoring
Project, Paterson City, NJ (UCAMPP)
UCAMPP should have been called:

**Identification of Risk Reduction
Strategies for Air Toxics in an
Urban Community Through
Emissions Inventory, Site Visits,
Outreach & Education, Modeling
& Monitoring.**



Location of Monitoring Sites in Relation to Air Emission Sources in The City of Paterson

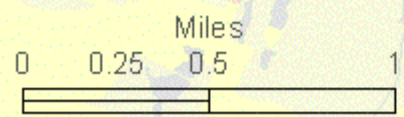


-  Monitor Sites
-  Industry
-  Dry Cleaners
-  Gas Stations
-  Fast Food Restaurants
-  Bakeries
-  Residential
-  Commercial
-  Industrial
-  Other Urban
-  Recreational and Park Lands
-  Passaic River
-  Roads (Major)

Mobile Monitor

Industrial Monitor

Commercial Monitor



Monitoring Study Design

Industrial Site
(School 10)

Commercial Site
(Dept. of Health)

Mobile Site
(School 2)

Background Site
(Chester)

60 VOCs

16 PAHs

4 Carbonyls

meteorology parameters at 1 site

48 Elements

Cr (VI)

OC/EC

24-h sampling period

Every six days over one year

Modeling for UCAMPP

- Importance of Microinventory/ Site Visits- started with >100 sources, narrowed down to about half
- Neighborhood Scale
- CALPUFF using actual meteorological data from 2006 from Paterson
 - Purpose: evaluate modeling effort with monitoring data
 - Characterize concentration gradients and spatial resolution of select air toxics throughout the city of Paterson
- <http://www.state.nj.us/dep/dsr/paterson/>
- Monitoring completed, QA in process
- Contact: Dr. Linda J. Bonanno (609) 984-9480,
linda.bonanno@dep.state.nj.us

Teterboro Airport Air Quality Study, NJ

- VOCs by TO-15
- octane, nonane, decane, undecane, dodecane.
- Carbonyls by TO-11A
- Every six days – NJDEP schedule
- Monitoring from 1/5/06 to 12/31/06
- draft report expected fall '07.
- Contact: Dr. Alex Polissar (609)777-1946
Alexander.Polissar@dep.state.nj.us

- New Jersey Air Deposition Network
 - Multi-site / years / pollutants
 - Contaminants measured included PCBs, PAHs, certain organochlorine pesticides, heavy metals, nutrients, and organic and elemental carbon particles..
 - <http://www.state.nj.us/dep/dsr/njadn/>
 - Contact Mike Aucott for additional information
Michael.Aucott@dep.state.nj.us
(609) 292-7530

Air Toxics and Odor Measurement Within Camden, NJ & a Demonstration of Emission Rate Determination Using OP-FTIR and Path-averaged Summa® Canisters at the Camden Waste Water Treatment Facility (WWTF)

- <http://www.state.nj.us/dep/dsr/camden-air/>
- Demonstration project of new technology, long path FTIR : limited data collection, high detection limits.
- Report completed
- Contact Linda Bonanno, Ph.D.
- Linda.bonanno@dep.state.nj.us
- (609) 984-9480