

PROPOSED FINE PARTICULATE ATTAINMENT/ NONATTAINMENT DESIGNATION RECOMMENDATIONS

- **This proposal is available on the DEP Website at <http://www.dep.state.pa.us> (choose Subject/Air Quality/RegsPlans/Clean Air Plans/Recommendations)**
- **Send comments to: J. Wick Havens, Chief Division of Air Resource Mgmt, P.O. Box 8468, Harrisburg, PA 17105-8468 or e-mail to: jhavens@state.pa.us**
- **No later than February 6, 2004**

DEP will hold informational meetings to discuss its proposed recommendations at the following times:

Tuesday, January 27, 2004, at 1:00 PM

Southwest Regional Office, Waterfront Room A
400 Waterfront Drive
Pittsburgh, PA 15222

Wednesday, January 28, 2004, at 1:00 PM

PENNDOT Riverfront Office Center
Transportation University – Room 411
1101 S. Front Street
Harrisburg, PA 17104

Thursday, January 29, 2004, at 2:00 PM

Delaware Regional Planning Commission
111 S. Independence Mall East (The Bourse Building)
Philadelphia, PA 19106

BACKGROUND

- **WHAT IS FINE PARTICULATE MATTER ?**
- **WHAT IS THE STANDARD ?**
- **WHAT HAS BEEN DONE ALREADY ?**
- **WHAT IS THE PROCESS ?**
- **WHAT IS TRANSPORT ?**

WHAT IS PM2.5 ?

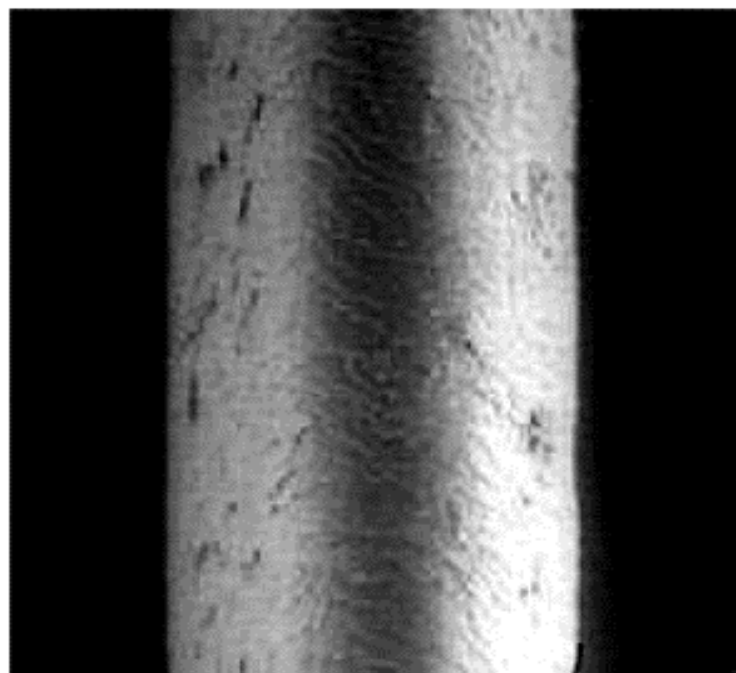
- **Solid and liquid particles smaller than 2.5 micrometers in diameter suspended in the air.**
- **Because of their small size, PM2.5 can penetrate deeply into the lungs.**
- **PM2.5 has been linked to premature death**
- **PM2.5 contributes to serious health problems, such as respiratory and cardiovascular disease.**
- **PM2.5 also contributes to acid rain, reduced visibility, and nutrient imbalances in sensitive waterways, such as the Chesapeake Bay.**

WHAT IS PM2.5 ?

- **PM2.5 may either be directly emitted (primary PM2.5) or formed in the atmosphere by chemical reaction of precursors (secondary PM2.5)**
- **Primarily composed of sulfates, nitrates, organic carbon, soot and crustal material.**
- **PM2.5 results mainly from the pollutants emitted when fuel is combusted.**

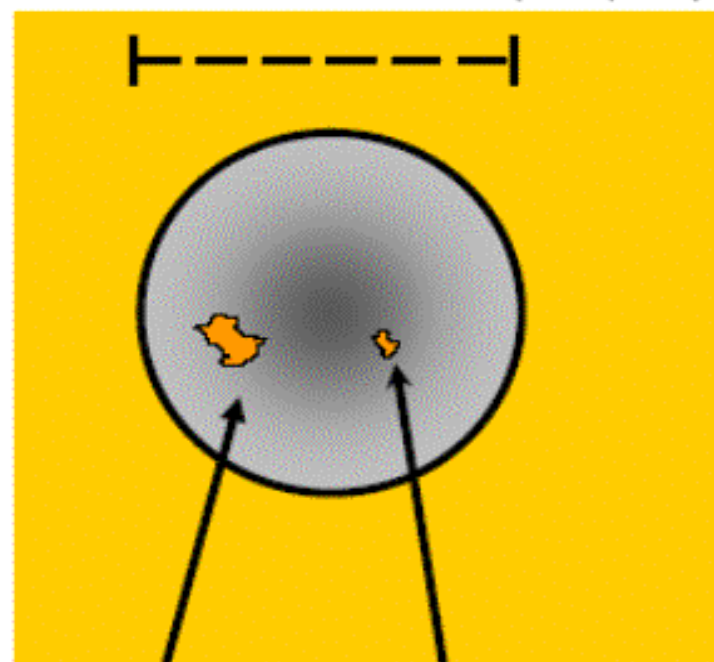
Particulate Matter: What is It?

A complex mixture of extremely small particles and liquid droplets



Human Hair (70 μm diameter)

Hair cross section (70 μm)

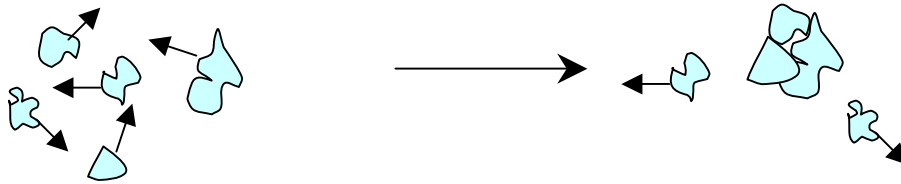


PM₁₀
(10 μm)

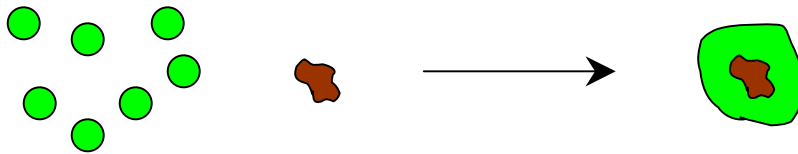
PM_{2.5}
(2.5 μm)

Formation of PM 2.5

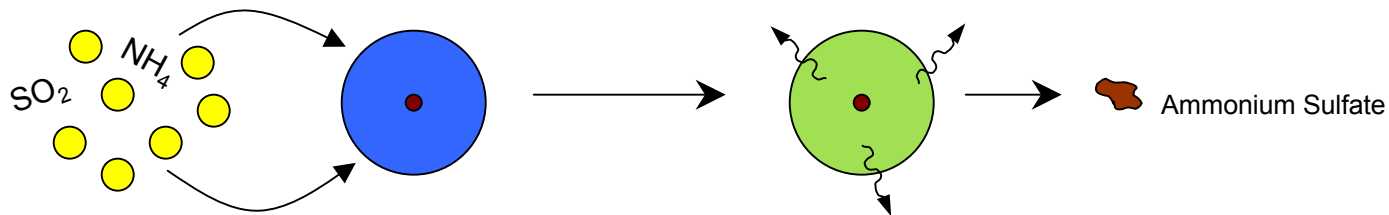
Coagulation: Particles collide with each other and grow.



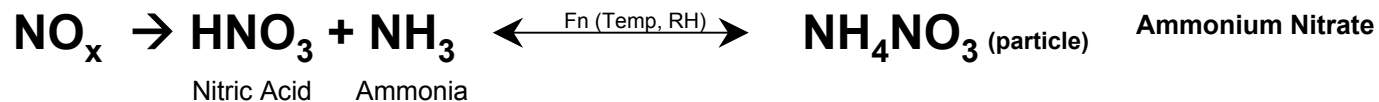
Condensation: Gases condense onto a small solid particle to form a liquid droplet.



Cloud/Fog Processes: Gases dissolve in a water droplet and chemically react. A particle exists when the water evaporates.



Chemical Reaction: Gases react to form particles.



WHAT IS THE STANDARD ?

- **Congress, through the Clean Air Act, requires EPA to set health-based standards.**
- **This was done originally in the 70's but EPA is required to revise them.**
- **Latest revision was in 1997.**
- **Annual standard – 15 ug/m³**
- **24-hour standard – 65 ug/m³**

CHRONOLOGY

- **7/18/97 -- Final NAAQS for O3 & PM published**
- **May 1999 – US Court of Appeals in DC ruled against NAAQS and implementation approach**
- **Feb. 2001 – US Supreme Court**
 - **Upheld NAAQS**
 - **Ruled against EPA implementation approach**
- **March 2002 –US Court of Appeals in DC upheld NAAQS**

WHAT HAS BEEN DONE ALREADY ?

- **Since 1975, States and EPA have adopted numerous controls to reduce the ozone precursors, nitrogen oxides (NO_x) and volatile organic compounds (VOCs)**
- **Controls adopted to meet the ozone standards will also help to meet the PM_{2.5} standard – NO_x and VOC also form PM_{2.5}.**
- **With this new standard PA needs to provide plans demonstrating that nonattainment areas will comply by certain deadlines.**

WHAT IS THE PROCESS ?

- **EPA issues new or revised standards.**
- **States recommend to EPA areas that are worse or better than standards.**
- **EPA considers recommendations but makes a final determination.**
- **States have 3 years from designation to develop plans on how to attain the new standard.**

Schedule to Implement PM2.5 Standard

February 16, 2004	States provide designation recommendations
March 2004	EPA proposes implementation rule
July-August 2004	EPA sends letters to States responding to recommendations (Note: States may submit 2003 PM2.5 data and modify recommendations)
December 2004	EPA finalizes designations
February 2008	Nonattainment area SIPs submitted to EPA (3 years from effective date)
2010 - 2015	Attainment date is 2010 – with possibility of 5 year extension

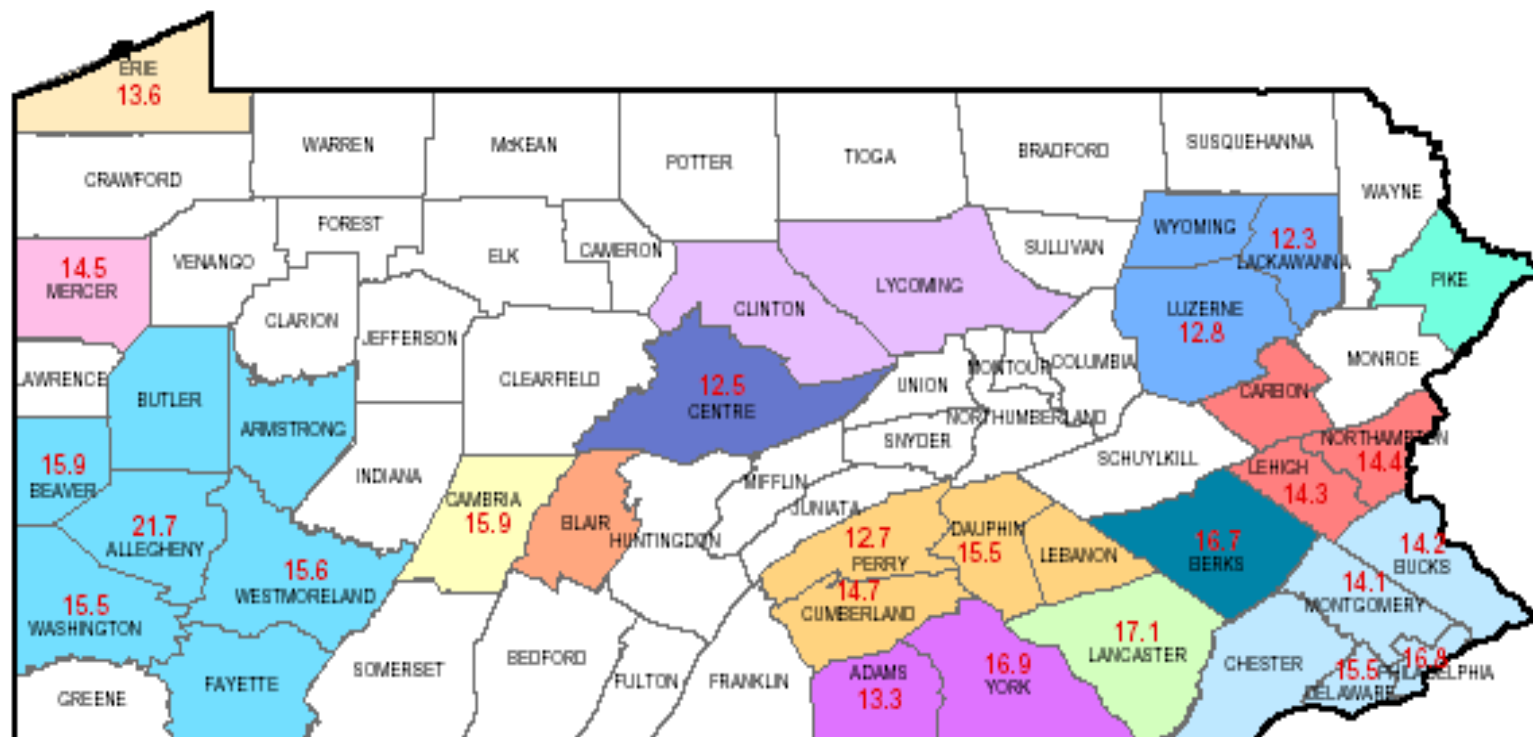
WHAT IS TRANSPORT ?

- As PM_{2.5} and its precursors, SO₂, NO_x, VOC and NH₃, are carried downwind, they react to form PM_{2.5} over time.
- This process can go on for several days and cause poor air quality hundreds of miles from where the pollutants originated.
- PA receives very poor air quality as a result of this transport. We also send poor air quality to our downwind neighbors.

TRANSPORT AND MULTI-STATE CONTROLS

- National legislation to control NO_x and SO₂ is being considered by Congress
- EPA has developed the Interstate Air Quality Rule - requires NO_x and SO₂ reductions in 29 states in the eastern ½ of the US and Washington, DC
- National multi-pollutant legislation or implementation of the Interstate Air Quality Rule will enable many areas of PA to achieve the PM_{2.5} standard.

Figure 1 - Pennsylvania 2000 - 2002 PM 2.5 Annual Design Values Per County
 Based on Statistical Areas from 2000 Census Data (Report Dated June 10, 2003)



Metropolitan Statistical Areas

- | | | |
|------------------------------------|--|--|
| ■ Allentown-Bethlehem-Easton_PA-NJ | ■ Lancaster_PA | ■ Scranton-Wilkes-Barre_PA |
| ■ Altoona_PA | ■ New_York-Northern_New_Jersey-Long_Island_NY-NJ-CT-PA | ■ State_College_PA |
| ■ Erie_PA | ■ Philadelphia-Wilmington-Atlantic_City_PA-NJ-DE-MD | ■ Williamsport-Lock_Haven_PA |
| ■ Harrisburg-Carlisle-Lebanon_PA | ■ Pittsburgh_PA | ■ York-Hanover-Gettysburg_PA |
| ■ Johnstown_PA | ■ Reading_PA | ■ Youngstown-Warren-East_Liverpool_OH-PA |

Figure 2: Statistical Areas

Based on 2000 Census Data (Report Dated June 10, 2003)

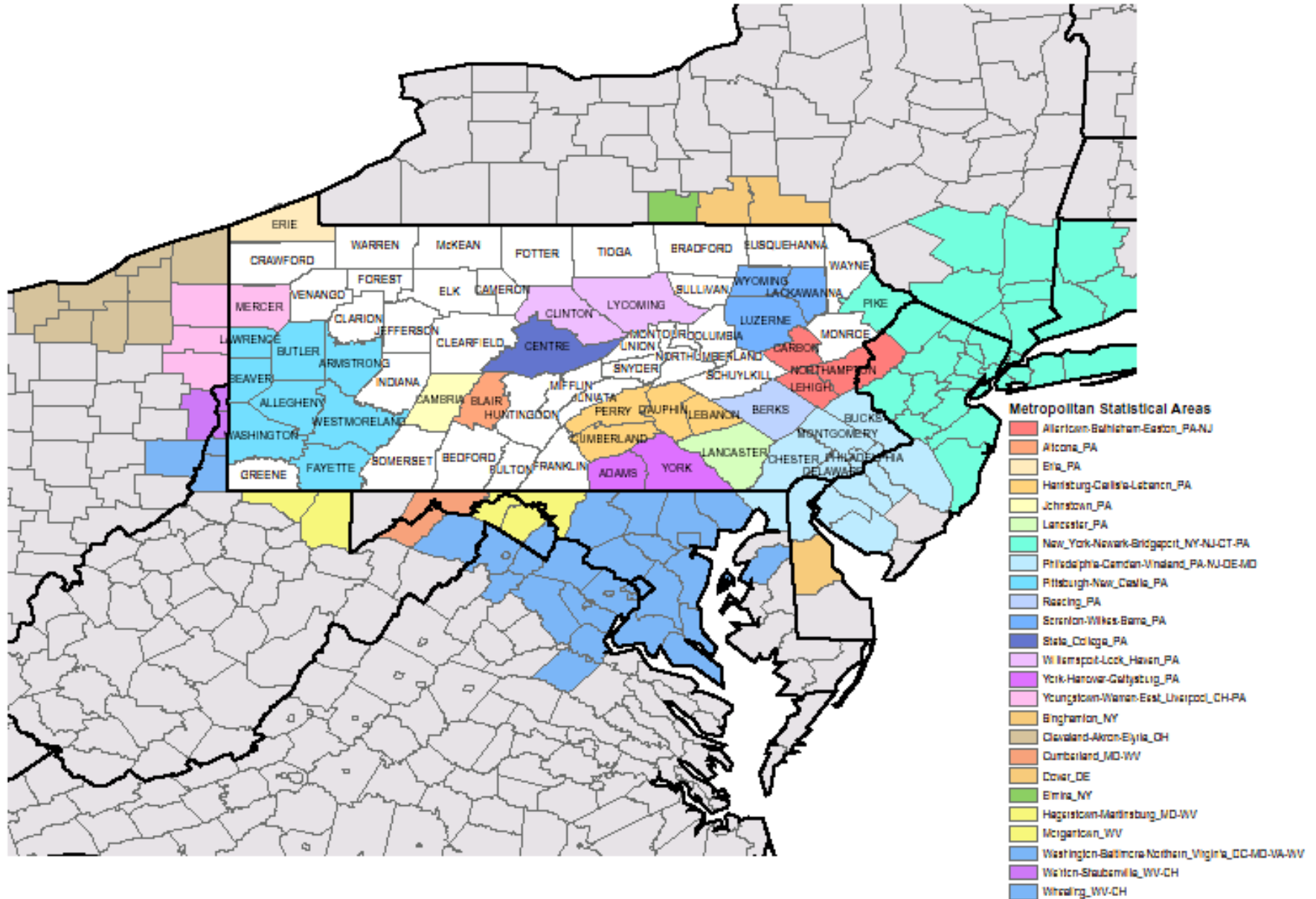
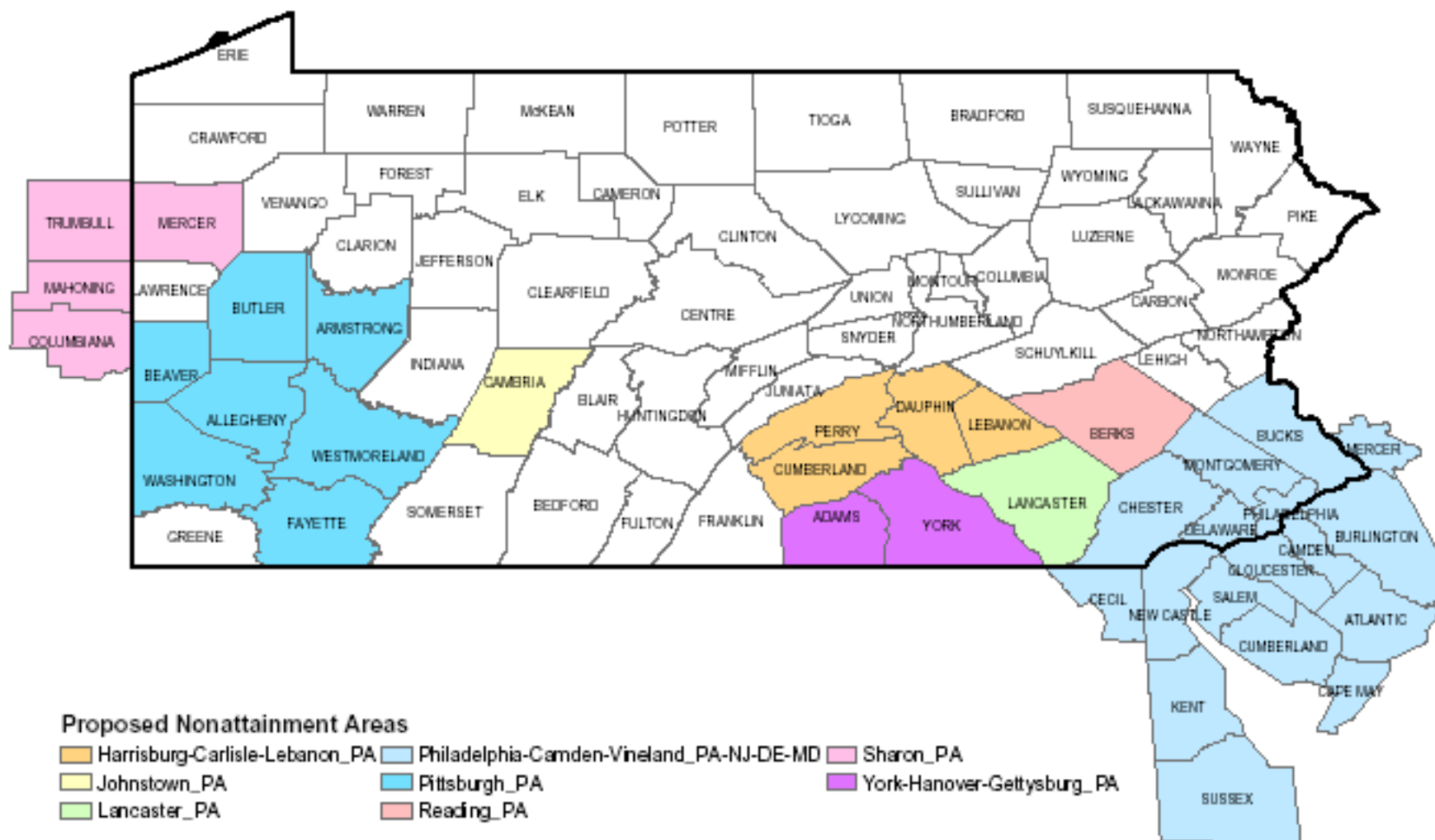


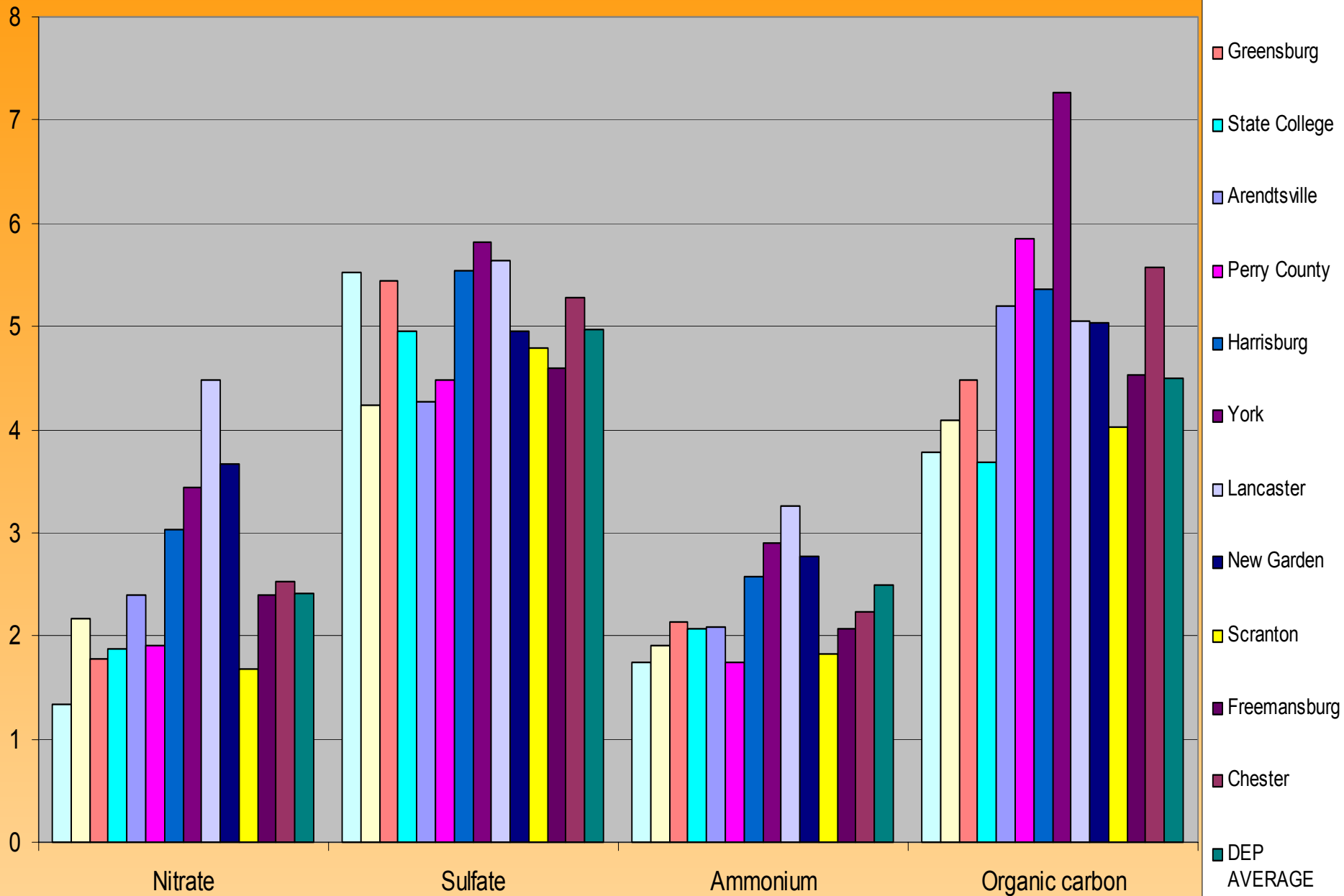
Figure 3 - Proposed PM 2.5 Nonattainment Areas

Based on Statistical Areas from 2000 Census Data (Report Dated June 10, 2003)

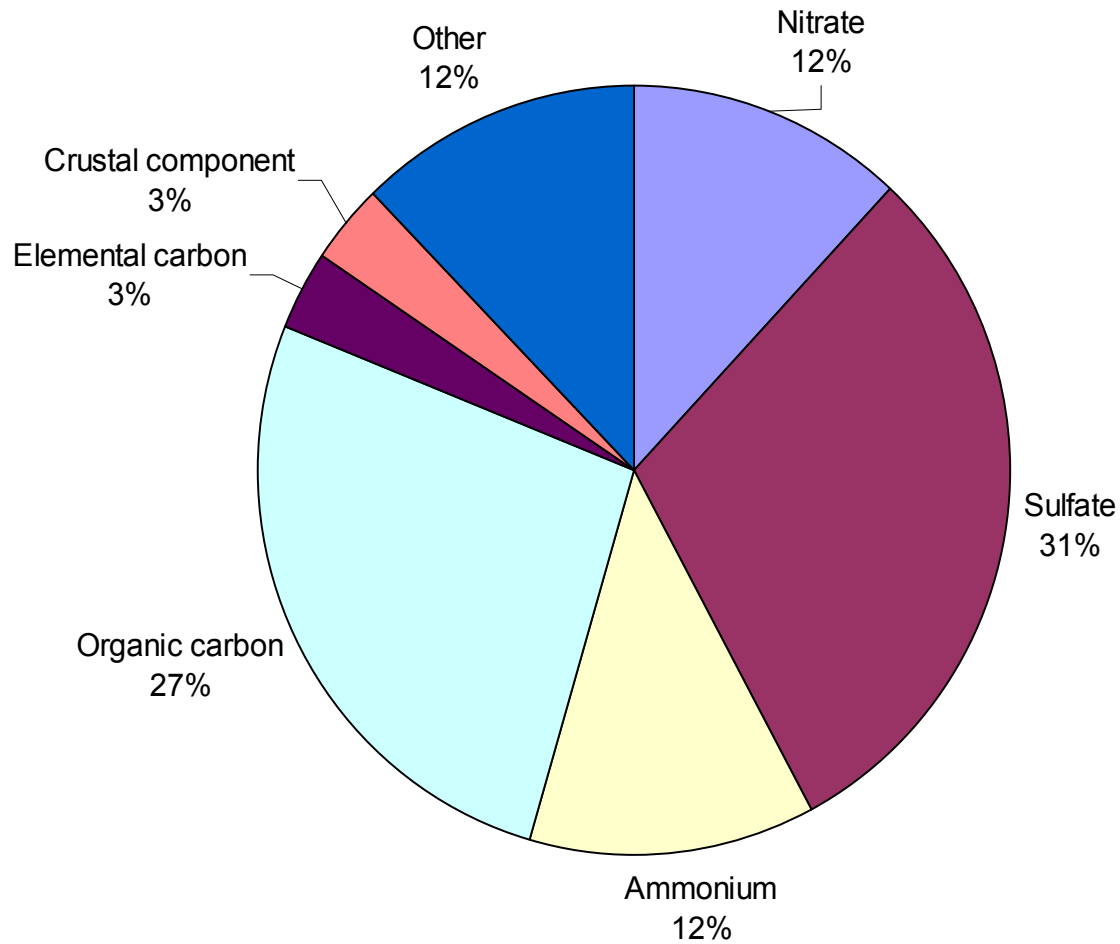


ALL SPECIATION SITES

NO₃, SO₄, NH₄ and Organic Carbon - Cluster Graph (ug/m³)



ALL SPECIATION SITES
No. of Sites 13 POC 5
Date(S): 7/1/2002 - 6/26/2003
Average Percentages - Statewide



Future Emission Reductions

- **Gas Cans** 1/03
- **NOx SIP Call in the Northeast** 5/03
- **NOx SIP Call in the East** 5/04
- **Consumer Products** 1/05
- **Tier II Vehicles** 2004
- **Low sulfur gasoline** 2005
- **Low sulfur diesel fuel** 2006
- **Cleaner diesel engines** 2007
- **Off-Road engine standards** 2007-14

Future Emission Reductions (continued)

- **Architectural and Industrial
Maintenance Coatings** 1/05
- **Small NOx and SIP Phase II** 5/05
- **Vehicle Emission Test & Repair
Program Improvements** 2004