

# **NUTS AND BOLTS OF AIR POLLUTION**

**CAPCA  
Fall 2004 Meeting**

**October 20<sup>th</sup> -- 1:00 PM to 5:00 PM**

# AGENDA

- Introduction, history, and some background on air pollution issues
- How to get a permit?
- Legal issues related to getting and keeping a permit
- Air pollution control technology
- Source testing/evaluation/modeling
- Panel Discussion
  - Dealing with a permitting issue

# Why? Who? Goals?

- Why? -- We all need a foundation of understanding
- Who? -- Everyone, we cannot remember everything
- Goals? --
  - Understanding the basics for business
  - Understanding the impact on our environment

# HOW DID WE GET HERE? WHAT IS AIR POLLUTION?

- There always has been air pollution!!!
  - Great Smoky Mountains
  - Biogenic sources
  - Volcanoes
  - Your personal contribution
- Air pollution is a relative things --
  - Pleasant vs. Unpleasant odors
  - Haze
  - Chemicals and related health effects
  - Reduction in upper atmospheric ozone

# WHERE DID IT COME FROM?

- Industrialization
  - Steam engine
  - Cars and other modes of transportation
  - Larger facilities/increased manufacturing
  - Increases in use of energy
  
- Lifestyle Changes
  - More leisure activities involving energy and chemicals

# FIRST HINTS OF PROBLEMS

- London
  - Wood burning and the conversion to coal
- Donora Incident
  - 1948 -- Allegheny County, PA
  - Sulfuric acid discharge caused several deaths over three day period

# AND SECOND AND THIRD AND... HINTS OF PROBLEMS

- London Incident
  - 1952 (several thousands impacted)
- Los Angeles Basin
  - Word “SMOG” invented
- Bhopal
  - Invented SARA in the US

# IMPACTS TO DATE

- Ozone layer changes by chloro-fluorocarbons
- Impact on lakes by acid rain from “acid gas” releases
- Damage to materials from ozone and “acid gas” materials
- Possible damage to human and other life forms from local events and chronic exposures (residual toxicity)

# ENTER THE WORLD OF REGULATION (Pre - 1940's)

- Early regulations were most “Smoke” oriented
- The US Government set up a lab in Cincinnati in the 1930's to evaluate workplace and environmental chemical impacts -- Public Health Service
- Several states, NY being prominent, set up similar efforts in the 1930's

# ENTER THE WORLD OF REGULATION ('60's)

- Dramatic growth in the understanding the environment and “our role” in environmental damage
  - Rachael Carson’s book published
- 1963 Act required government bodies to get air permits passed
- 1965 Act required mobile sources to be less polluting passed
- 1967 Act began to set ambient air quality standards

# ENTER THE WORLD OF REGULATION ('40's and '50's)

- One of the first regulatory body was in Allegheny County, PA (around Pittsburgh) as a direct result
- This was followed by the growth of more state and local “air” programs
- 1955 Federal Act -- Gave thrust to local and state governments to control air pollution
- Note -- Tremendous growth in urban/suburban sprawl, chemical industry, and industry in general occurred during this period

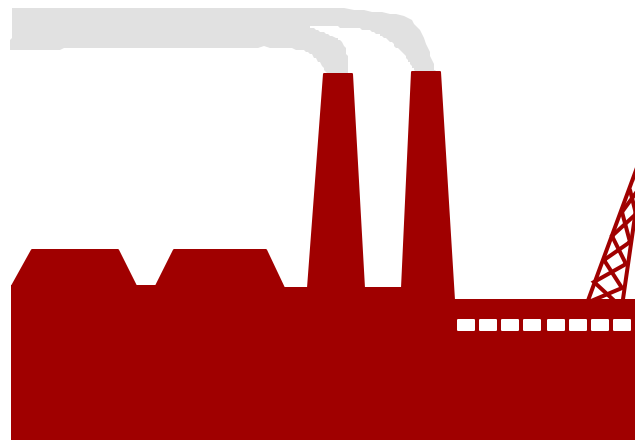
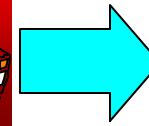
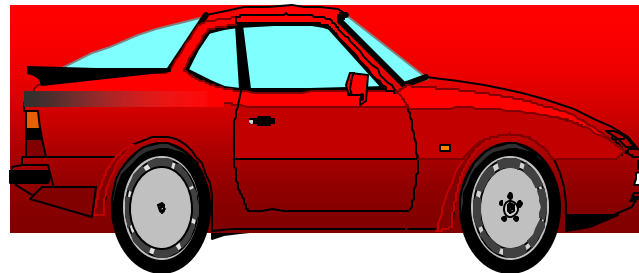
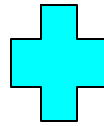
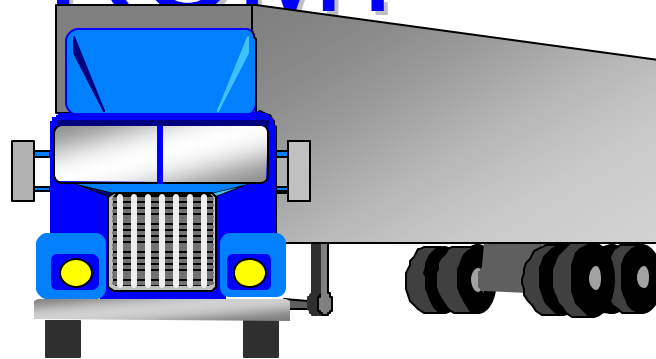
# ENTER THE WORLD OF REGULATION ('60's)

- 1969 -- Clean Air Act
  - Put federal government “really” into understanding and regulating air pollution in the US
  - Created what we know as USEPA

# WE CAN CLEAN UP THE AIR IN THE UNITED STATES ('70'S)

- First “Earth Day” celebrated in April 1970
- 1977 Amendments to the Clean Air Act
  - NAAQS set (Hydrocarbons?)
  - PSD and NSR entered lexicon
  - State programs created SIP's
  - Non-attainment became a reality

# WHERE DID IT ALL COME FROM?








Background

- Sulfur Dioxide
- Oxides of Nitrogen
- Particulates
- Carbon Monoxide
- Ozone
- plus NESHAPS

# WHAT DOES THIS REALLY REPRESENT?

- Products of combustion – by-products of these processes
- SMOG problems
- Health Issues related to people and the flora/fauna
- Some materials impact
- A few NESHAPS until much more recent (1990) additions of HAPs (and state air toxics)

 Sulfur Dioxide  
 Oxides of Nitrogen  
 Particulates  
 Carbon Monoxide  
 Ozone  
plus  
NESHAPS

# WHAT HAPPENED NEXT?

- A regulatory process was created
  - Set NAAQS for several materials
  - Permit-based process for “large sources”
  - Modified mobile sources with various control schemes
  - Evaluated impacts, then tried to drive modifications
  - Moved states into the air pollution arena as the primary permitting and enforcement arm -- EPA is lead and R&D operation

# NAAQS's?

- Particular Matter

  - PM<sub>2.5</sub>

  - PM<sub>10</sub>

  - TSP

- CO

- SO<sub>2</sub>

- NO<sub>x</sub>

- Ozone

- Pb

# NESHAPS?

## □ Original Listing

- Asbestos
- Beryllium
- Mercury
- Vinyl Chloride
- Benzene
- Inorganic Arsenic
- Coke Oven Emissions
- Radionuclides

## □ Current Listing

- 188 chemicals from the EPCRA listing
- Includes all the stuff to in the earlier regulations

# WHAT HAPPENED IN 1977?

- Modified Clean Air Act
  - First of several major modifications
  - Added SIP details
  - Required five year NAAQS reviews
  - Demanded change in NOx standard
  - Added public access to air pollution process
  - Formalized BACT/LAER/RACT/PSD/NSR
  - Added many technical revisions

# MORE MODIFICATIONS?

## Modified in

- 1971
- 1973
- 1974
- 1978
- 1980
- 1981
- 1982
- 1983
- 1988
- 1991
- 1994
- 1996

**More  
Modifications  
to Come!!!**

# THE BIG CHANGE -- 1990

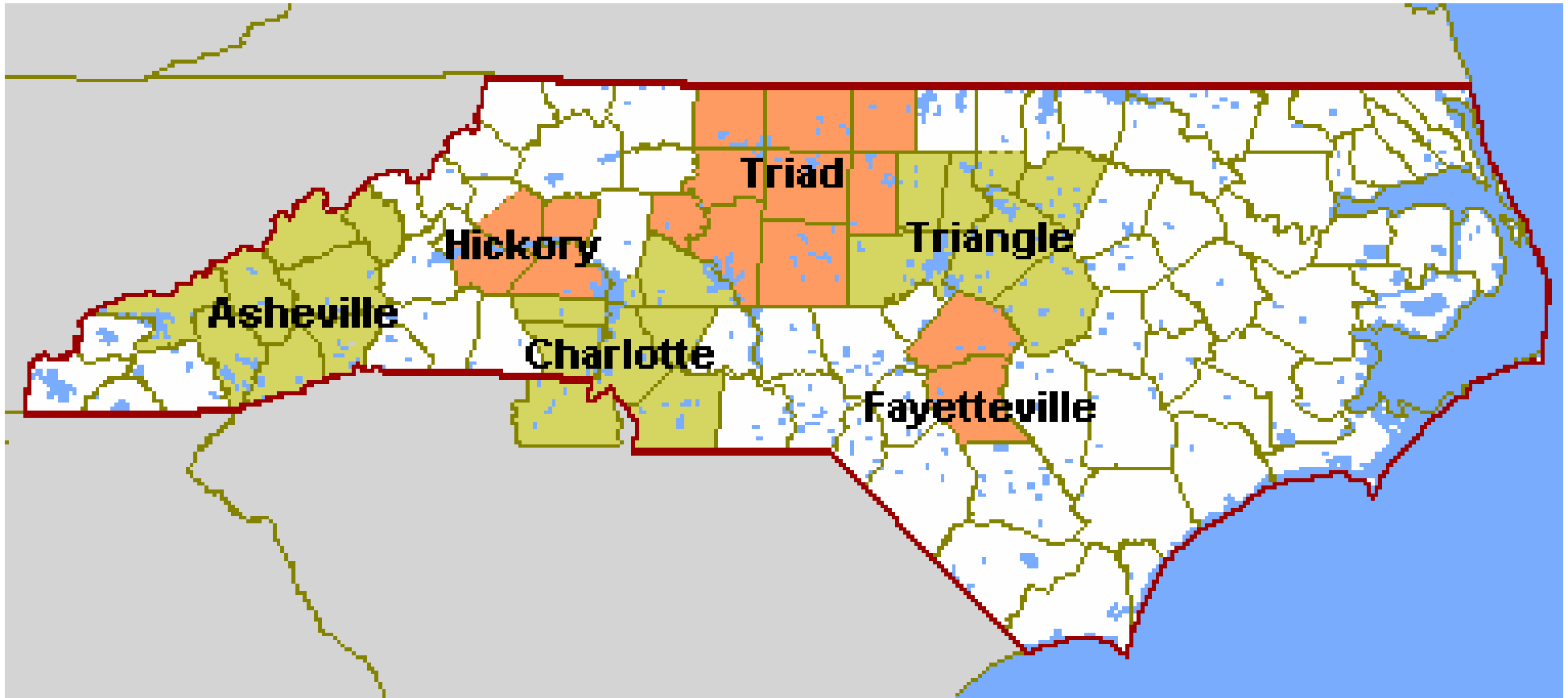
- Redefined attainment status
- More control for acid rain
- Introduced the terms “Hazardous Air Pollutant” and “Maximum Achievable Control Technology”
- Increased permitting requirements through the federally enforceable permitting process
- CFC control/elimination
- Increased penalties

# WHAT ARE HAPS AND TAPS

- HAPS are hazardous air pollutants
  - Regulated as NESHAPS
  - Come from a list of 188 chemicals in 1990 Clean Air Act
  - If you discharge more than 10 tons/yr of one or more than 25 tons/yr of three or more you are a major HAP source
- TAPs are toxic air pollutants
  - (not all 50 states have TAPs)
  - List developed/regulated by state
  - Health oriented

# WHERE AM I NOW?

- Emissions of what materials
- Amount of emissions
  - Minor
  - Major
  - PSD
- Control level required – NSPS, MACT, etc.
- Community impacts (112r)
- Under TAPS, health impacts
- More reporting required



# OZONE MONITORING

Nuts & Bolts -- History and  
Background

**Charlotte Local Network**

Select an ozone monitor from the list below to obtain specific details about that location.

Arrowood

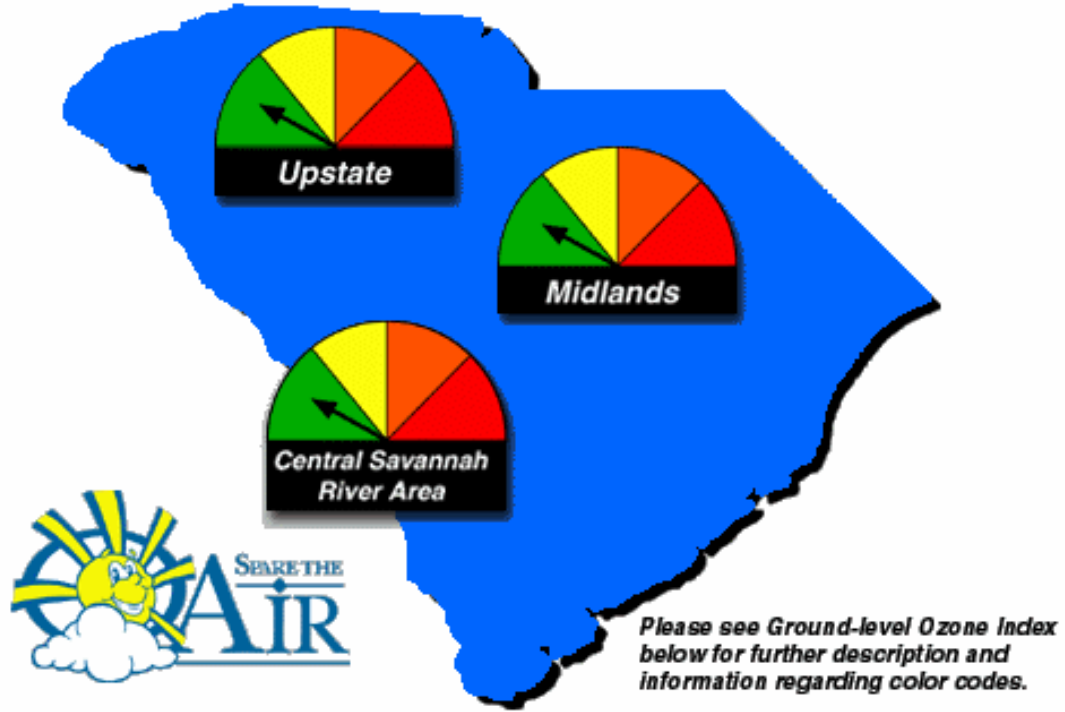
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# OZONE MONITORING

Nuts & Bolts -- History and  
Background



**SC Ozone Forecast Discussion**

# OZONE MONITORING

Nuts & Bolts -- History and Background

View of Shining Rock Wilderness



I WANT TO SEE  
MY  
MOUNTAINS!!!

**BUT IT IS MORE  
THAN OZONE**

Nuts & Bolts -- History and  
Background

# WHAT HAVE WE SEEN?

- Cleaner air -- YES!
- Some improvement but “load” continues to grow
- Focus has been on “end-of-pipe” efforts
- Global action is forthcoming
  - Montreal
  - Kyoto
  - Rio
- Greater general awareness of pollution issues

# WHAT IS NEXT?

- More challenges and concerns and probably (continuing) non-attainment issues
- Lifestyle changes
- More understanding of the global impact
- More to learn and understand
  - Regulatory
  - Science
- Less reliance on “end-of-pipe” controls, more on source control and

