# Control of Toxic Air Pollutants in North Carolina

DENR, Division of Air Quality

ERC Meeting – September 28, 2011

# Topics Covered

- History of the NC Air Toxics program and the federal program
- Importance of the state program
- Differences between the state and federal programs
- Examples of how sources have complied with the state program
- Comparison of NC, SC and VA's state air toxics programs
- Remaining issues

# Acronyms

- HAPS – hazardous air pollutants as defined by the federal program
- TAPS – toxic air pollutants as defined by the state program
- MACT – Maximum Achievable Control Technology
- GACT – Generally Available Control Technology
- AAL – Acceptable Ambient Level defined by the state program

# NC Air Toxics Program

- Purpose:
  - Air toxics program is risk-based approach to protect NC citizens from adverse health effects resulting from exposure to toxic air pollutants
- Authority:
  - 1989 – *Executive Order*: Ambient Air Standards for Toxic Pollutants; S.L. 1989-168
- History:
  - Mid-1980's – increasing public environmental awareness
  - 1986 – NC Academy of Sciences Study
  - 1990 – NC Administrative Code Title 15A
  - 1993 – Applicability trigger changed to "last MACT"
  - 1995 – Industry questions efficacy of toxics program
  - 1996-97 – Working group formed to study toxics program issues

# History of Federal Program

- Pre-1990 – risk only approach on a pollutant basis. In 20 years, EPA regulated only 7 pollutants.
- 1990 Clean Air Act Amendments (CAAA)
  - Technology First, Then Risk
  - Required EPA to develop regulations with Maximum Achievable Control Technology (MACT) emission standards for industrial categories
  - Residual Risk assessment to follow 8 years after initial MACT standards were finalized.
  - EPA has issued 114 MACT standards since the 1990 CAAA, and proposed 4 more

# Why Does NC Regulate Toxic Air Pollutants?

- Toxic air pollutants are harmful to human health
- 38 million pounds of toxic air pollutants emitted annually
- Intent of state toxic program is to protect communities near facilities from exposure to levels of toxic air pollutants that can cause adverse health effects
- 75 % of toxic air pollution is regulated by NC under the state and federal rules

# What are the advantages?

- Benefits businesses by helping to counter allegations of adverse health impacts
- Doesn't prescribe emission source controls -- facility has flexibility to choose
- Manages emissions to levels having low risk to human health without under- or over-controlling
- Helps the state address local and individual complaints
- Provides program for safe combustion of non-hazardous used/recycled oils

# Fast Facts

North Carolina is:

- #2 chemical producer in the Southeast based on 2007 data†[1]
- #4 chemical producer in the US based on 2007 data[1]
- #3 in the Southeast reporting hazardous *air* pollutant releases to Toxics Release Inventory (TRI)[2]
- #4 in US reporting hazardous *air* pollutant releases to TRI[2]
- 6,000 facilities submitted TRI reports for 12,000 hazardous chemicals[2]

Sources:
[1] http://factfinder.census.gov/servlet/IQRTable?_bm=y&-ds_name=EC0200A1&-NAICS2002=325&-_lang=en Accessed May 2011
[2] http://scorecard.goodguide.com/ranking/rank-states.tcl?type=mass&category-total_env&modifier=na&how_many=100 Accessed May 2011

†Southeastern states - Virginia, North Carolina, South Carolina, Georgia, Florida, Alabama, Arkansas, Kentucky, Louisiana, Mississippi, Tennessee and West Virginia.

# What are the economic benefits?

- **Health** –
  - Studies performed by the National Institute of Environmental Health Science and American Cancer Society show that a reduction in toxic pollutant exposure contributes to a reduction in health problems, thereby reducing the number of visits to a doctor and/or to an emergency room.
- **Property** –
  - Reduction in corrosive toxic air pollution decreases property deterioration
- **Environment** –
  - Fewer crops are contaminated or ruined by toxic air pollutants
  - Fewer people are exposed to contaminated food, which reduces people having adverse health effects
  - Fewer vistas and natural areas are irreparably damaged
  - Fewer buildings and monuments are degraded

# Basic Differences between State and Federal Programs

- State program
  - Evaluation of pollutant concentration leaving the facility and potentially impacting nearby community
  - Evaluation required when
    - The final federal rule impacting the facility has been issued
    - Modification at a facility causes net increase in emissions of a toxic air pollutant
- Federal Program
  - Primarily technology driven
  - Required to meet technology limit if have a process unit in operation at a facility covered by a federal rule

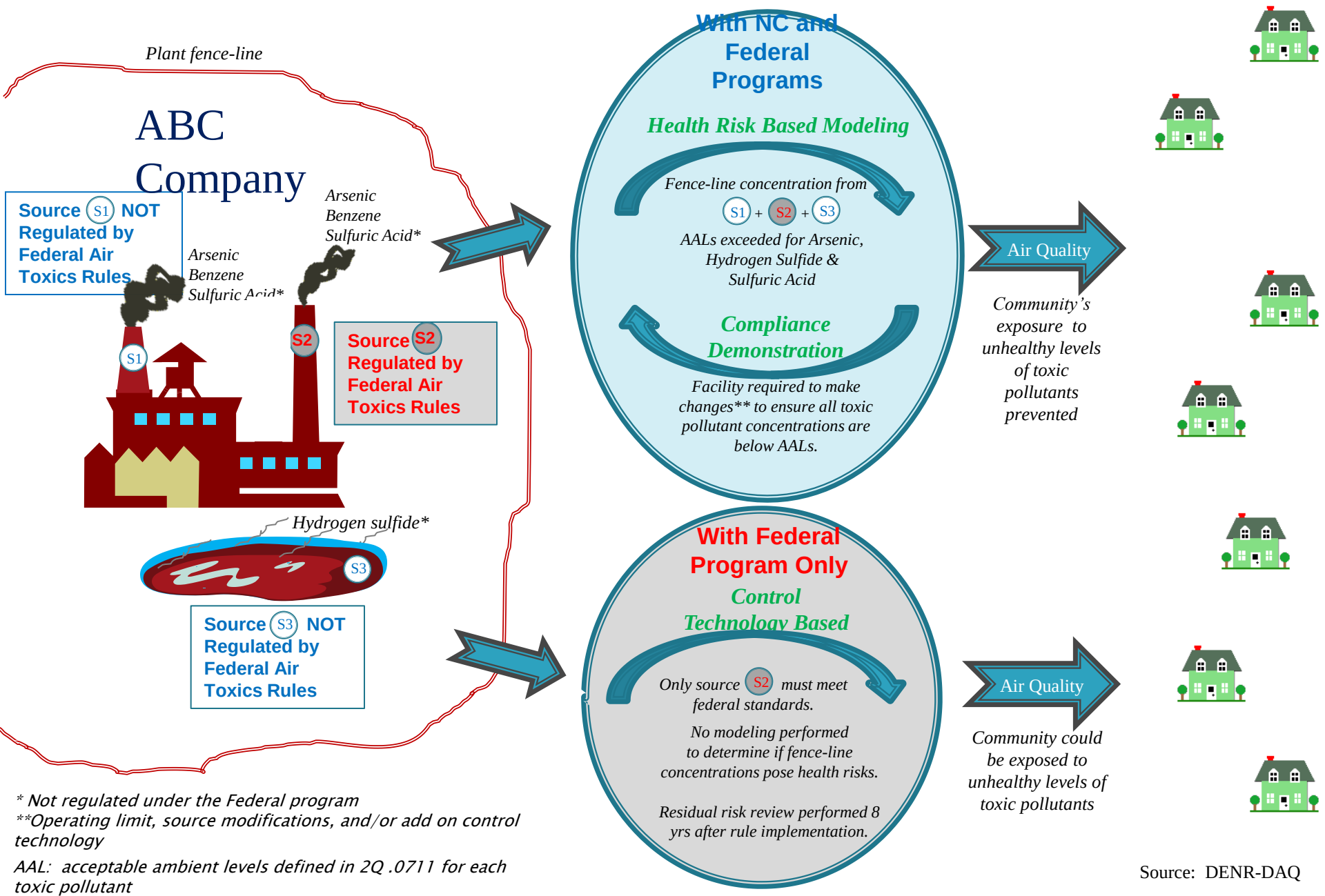
# NC Air Toxics Program vs. Federal Air Toxics Programs

| NC Air Toxics Program | Federal Air Toxics Programs |
|---|---|
| 97 Toxic Air Pollutants (TAPs) – 21 TAPs are not HAPs | 187 Listed Hazardous Air Pollutants (HAPs)[1] |
| Based on preventing exposures at a facility's property boundary to toxic air pollutants. | Primarily based on reducing emissions by source category to the lowest levels observed nationally. |
| Based on facility-wide emissions – pollutant by pollutant. | Focuses on specific categories of emission sources (e.g., pharmaceuticals, pulp and paper, chromium electroplating, etc.). Some emission sources at a facility may not be covered. |

[1] Hazardous air pollutants regulated under Section 112 of the CAA

| NC Air Toxics Program | Federal Air Toxics Programs |
|---|---|
| Trigger – Last MACT or modification that resulted in increase of a given toxic air pollutant. | Trigger – If a process unit is covered by a MACT, the facility must show compliance within 3 years of final federal standard. |
| Offers flexible solutions for compliance . Facilities may choose which emission sources to address, what compliance measures are needed. | Specific control equipment or techniques may be dictated for all affected sources. Compliance alternatives may be few, expensive. |
| Designed to supplement and complement the federal programs. If federal rules provide sufficient protection from exposures, no further state controls are required. If federal rules fall short, state rules provide a backstop. | Federal programs not intended to comprehensively address all air toxics emissions. Were designed in anticipation that state and local air toxics programs would address local issues and federal program limitations. |

# Example Illustrating State and Federal Air Toxics Programs




* Not regulated under the Federal program

**Operating limit, source modifications, and/or add on control technology

AAL: acceptable ambient levels defined in 2Q .0711 for each toxic pollutant

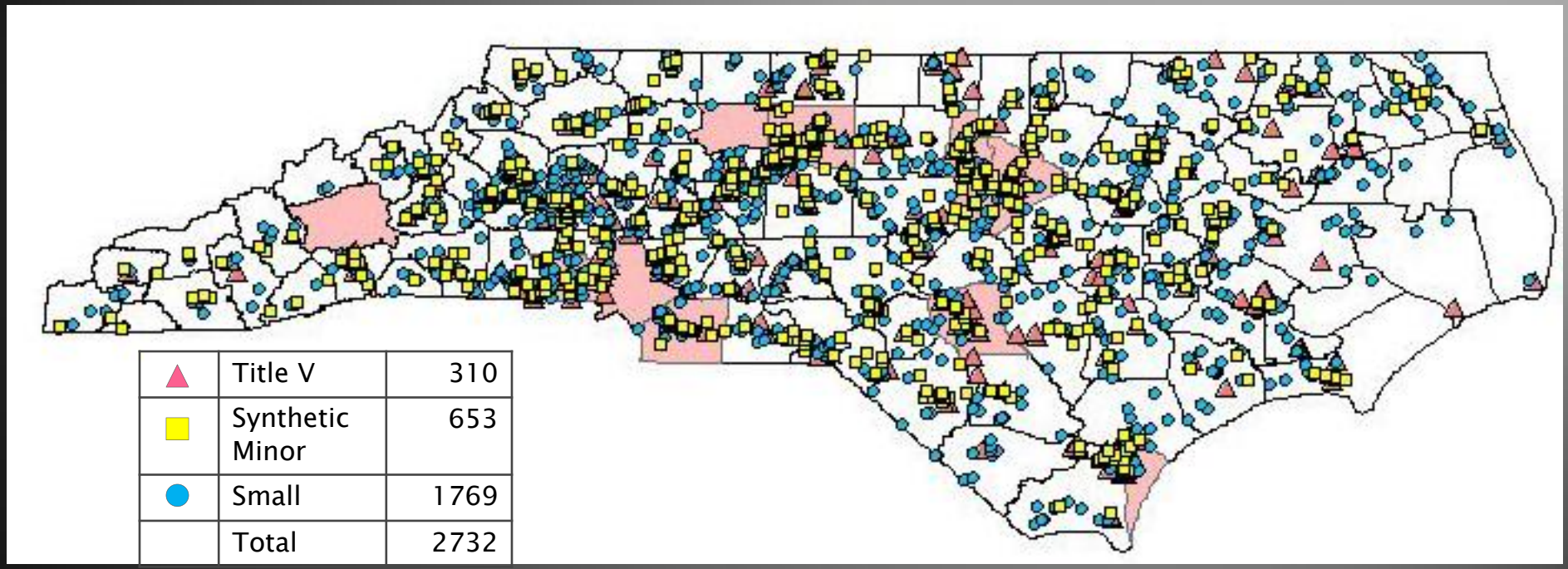
Source: DENR-DAQ

# Federal and State Statistics

- There are over 2,700 permitted facilities subject to federal and/or state air rules.
  - 10% are subject to federal toxic air pollutant rules
  - 30% are subject to state toxic air pollutant rules
  - 10% are subject to both state and federal toxic air pollutant rules
  - 50% of facilities are not subject to federal or state *toxic air pollutant* rules

| Class | Number of Facilities | Number of Facilities Subject to State Toxic Air Rules | Number of Facilities Subject to State and Federal Toxic Rules |
|---|---|---|---|
| Title V | 310 | 79 | 117 |
| Synthetic Minor | 653 | 270 | 55 |
| Small | 1769 | 435 | 85 |
| Total | 2732 | 784 | 257 |

# Permitted Facilities



| | | |
|---|---|---|
| ▲ | Title V | 310 |
| ■ | Synthetic Minor | 653 |
| ● | Small | 1769 |
| | Total | 2732 |

Top 10 largest county populations (200,000 to 920,000 people)

# What have facilities done to meet the state air toxics rules?

- Many control decisions at a facility are not solely focused on air toxics
- Some examples of what sources have done to comply include:
  - Switch Fuels
  - Increase stack height
  - Take a permit limit to restrict emissions
  - Install a control device to capture emissions
  - Reformulate solvent to lower TAP option

# 2007-2010
# Treatment of Combustion Sources

- Sept. 2004 – Original Boiler MACT promulgated
- July 2007 – US District Court of Appeals mandated the vacatur and remand of the Industrial Boiler MACT Rule
- Sept 2007 – The Air Quality Committee (AQC) of the Environmental Management Commission (EMC) requested a "menu of options" for addressing toxic air emissions from combustion sources
- Oct 2008 – Public hearings on toxics changes
- May 2009 – The EMC approves changes to the combustion source exemption in the NC air toxics rules
- July 2010 – The combustion source exemption changes became effective

# Background

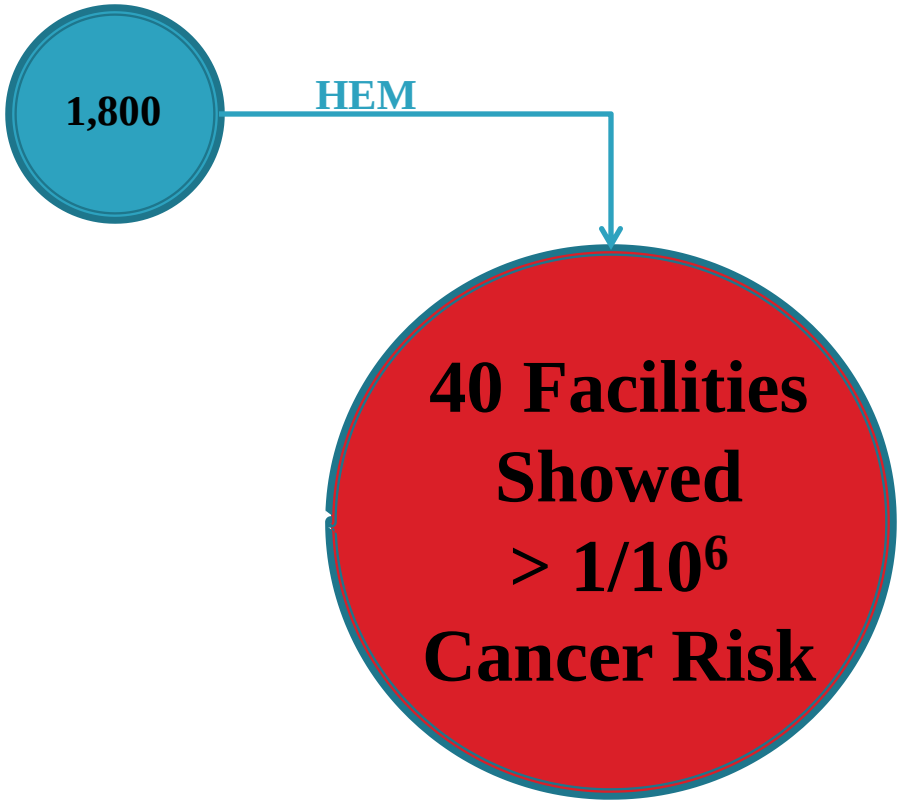
- **Combustion Source TAP Exemption**
  - 15A NCAC 2Q .0701(b) – Within one year of promulgation of the Boiler MACT, NCDAQ will determine whether additional measures are necessary to control state-regulated TAP emissions from combustion sources.
- **Boiler MACT**
  - Promulgated: 69 FR 55217 (Sept. 13, 2004)
  - Vacated: *NRDC v. EPA,* 489 F.3d 1250 (July 8, 2007)

# Risk-Based Approach to Address Existing Boilers

**1,800 Existing Combustion Sources and Electric Utilities**

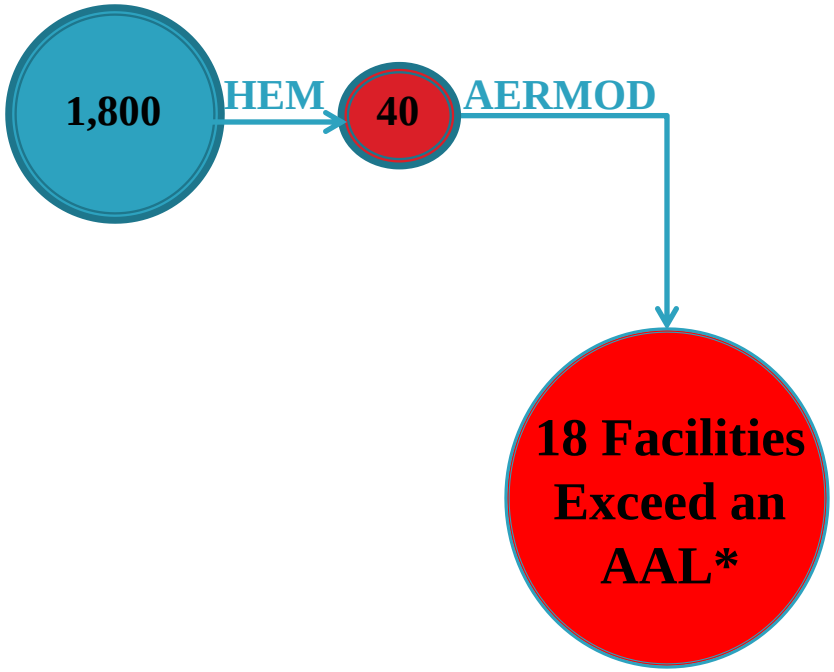
- NCDAQ Toxics Branch assessed inhalation risks from existing combustion sources and electric utilities using US EPA's Human Exposure Model (HEM-3) and actual 2004 emissions data.

# Risk-Based Approach to Address Existing Boilers




- **~40 facilities presented a greater than 1 in a million cancer risk.**
  - These 40 facilities were asked to submit AERMOD dispersion modeling showing potential ambient impacts of TAP emissions.

# Risk-Based Approach to Address Existing Boilers




*** What was the most common pollutants of concern?** Arsenic, and to a lesser degree, formaldehyde.

- **18 facilities showed ambient impacts exceeding an Acceptable Ambient Level (AAL).**
  - **These facilities were subject to the Director's Call.** Notification letters sent out between Apr.–Sept. 2009.
  - Each facility given 180 days to submit a permit application requesting operational limits or emissions controls necessary to reduce impacts below the AALs.

# What Result?

- Limit/Remove Fuels from Permit
- Limit TAP Emissions from Non-Combustion Sources
- Increase Stack Heights
- Remove Generators or Boilers
- Limit Hours of Operation for Generators
- Fuel Analysis to Develop Site-Specific Emission Factors
- Three companies given additional time due to SAB Evaluation of Arsenic AAL

# Comparison of NC Air Toxics Program to SC and VA

| | Pollutants Covered | Form of Standards | Applicability Trigger | Compliance Demonstration Options | Exemptions | Ability to Address Issues |
|---|---|---|---|---|---|---|
| **NC** | 97 | 1-hr, 24-hr & annual | Last MACT[1] | Modeling, inhabitability, new toxicity information, site specific risk assessment, economic hardship, technical infeasibility | 28 general exemptions, including existing combustion sources | Unacceptable health risk |
| **SC** | 250 | 24-hr | All facilities in 1991 | Modeling | HAPs covered by a federal rule | Case-by-case |
| **VA** | 187 | 1 hr or annual[2] | All sources that emit one or more toxic air pollutants | Existing Sources: modeling<br>New / Modified sources: case-by-case Best Available Control Technology for toxics and modeling | All sources regulated or exempted under federal rules; Pollutants without TLV, Boilers[3] | Case-by-case |

[1]Exemption for new and modified combustion sources removed through rule change effective July 10, 2010

[2] Based on occupational health standards Threshold Limit Value (TLV)

[3]Boiler or generator that burns only natural gas, #2 fuel oil, #4 fuel oil, #6 fuel oil, propane, or kerosene

# Positive Programmatic Example

- USA Today Article – "The smokestack effect – Toxic air and America's schools", 12/8/08
  - Screening level modeling based on 2005 emission data from more than 20,000 industrial facilities
  - relative ranking 127,800 schools nationwide
  - lists seven North Carolina schools in areas of highest modeled levels of toxic chemicals
  - Monitoring at 95 schools nationwide which showed elevated levels of toxics at 64 schools (***ZERO*** in NC)
- EPA initiated the Schools Monitoring Initiative
  - Selected schools for monitoring using a number of factors
    - computer modeling analysis,
    - USA Today article
    - ***Consultation*** with state and Local air agencies
  - ***ZERO NC Schools were recommended for additional monitoring***
    - Internal review indicated that the nearby toxic air pollution emissions posed no unacceptable health risk to school population
    - State air toxic pollutant regulations were protecting school population from adverse health effects resulting from exposure to toxic air pollutants

# Outstanding Issues/Questions

- Whether the state program duplicates federal program
- Need to understand issue of frequency of toxics modeling requirements
- What are the costs to industry to comply with the NC Air Toxics program and what are public health benefits from the program
- Completion of air toxics study as outlined in Study Bill would be beneficial to get a full understanding of all issues

# Contact Information

- Sheila Holman, Director
- NCDENR, Division of Air Quality
- Sheila.holman@ncdenr.gov
- (919) 715-0971
- www.ncair.org