Department of the Environment

COMAR 26.11.38 Control of NOx Emissions from Coal-Fired Electric Generating Units

Air Quality Control Advisory Council
September 8, 2014

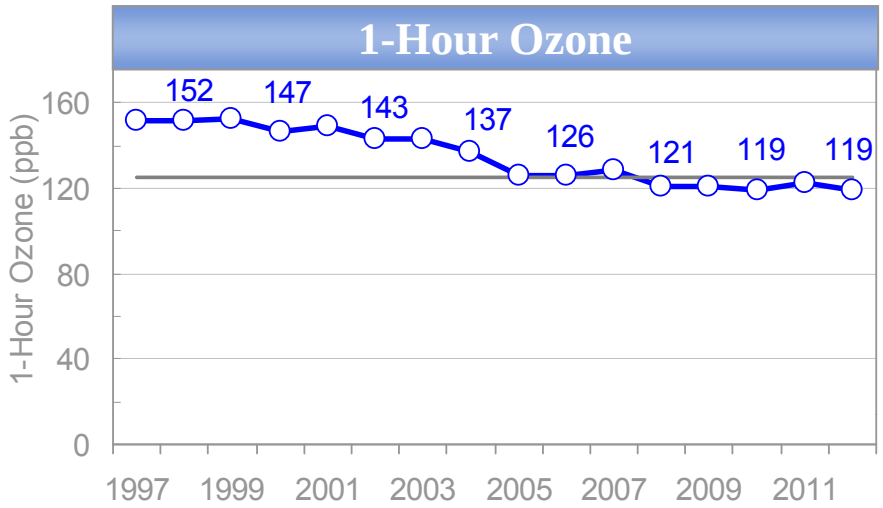
Topics Covered

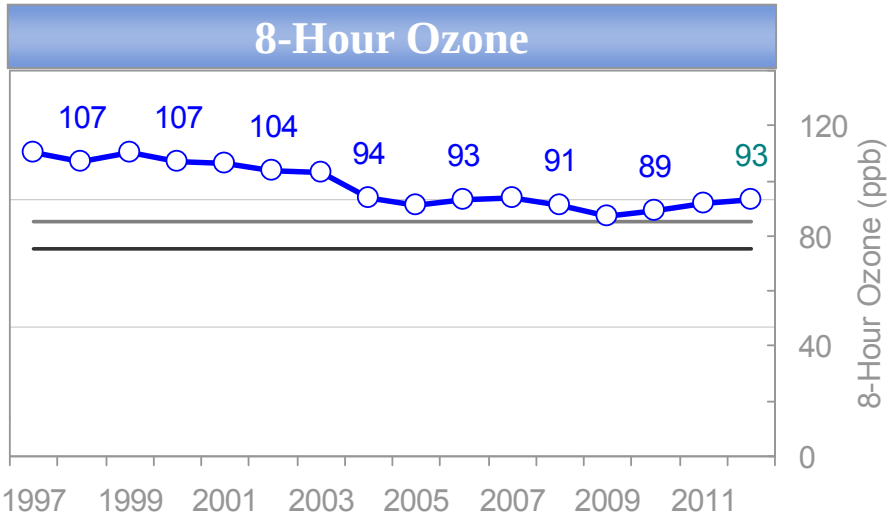
- Background and the good news
- A brief history of power plant controls in Maryland
- New challenges and issues
  - New requirements for power plants
- Overview of 2014 NOx power plant regulations
- Next Steps and Schedule

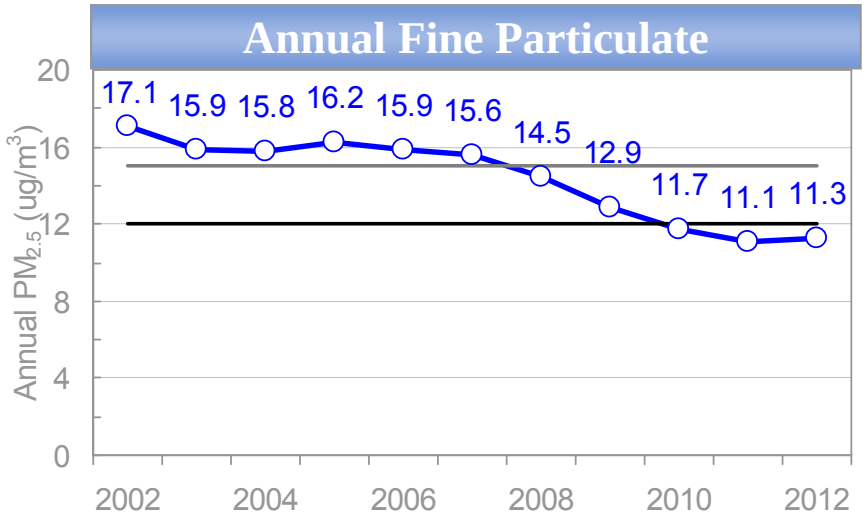
Maryland's Air Quality

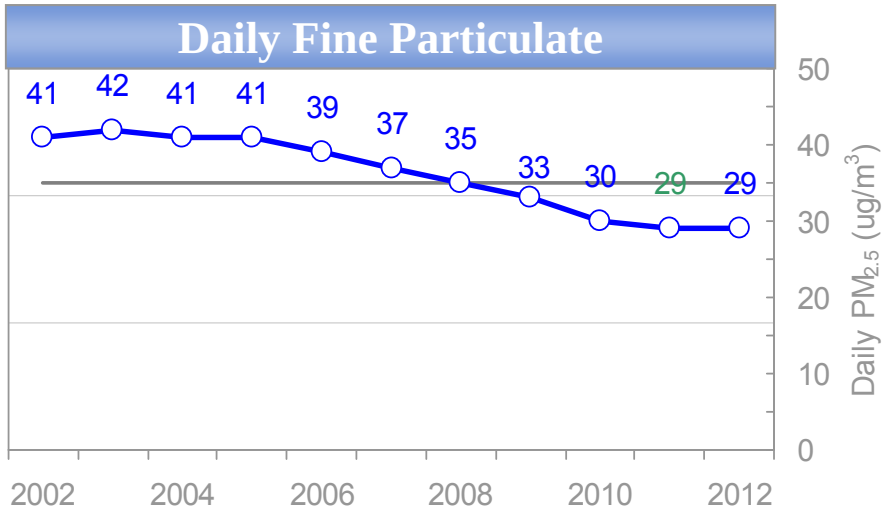
- Ground level ozone has improved dramatically but we still monitor levels above the health based standard
- Fine particle levels are currently below attainment levels
  - New and future ozone and fine particle standards will continue to push Maryland to seek more emission reductions
- Maryland is the fourth most vulnerable state to sea level rise
  - One of the major impacts from climate change
- Mercury and other air toxics continue to be a major issue
- Contribution of air pollution sources to nitrogen deposition in the Chesapeake Bay is a major issue

Progress in Cleaning Maryland's Air





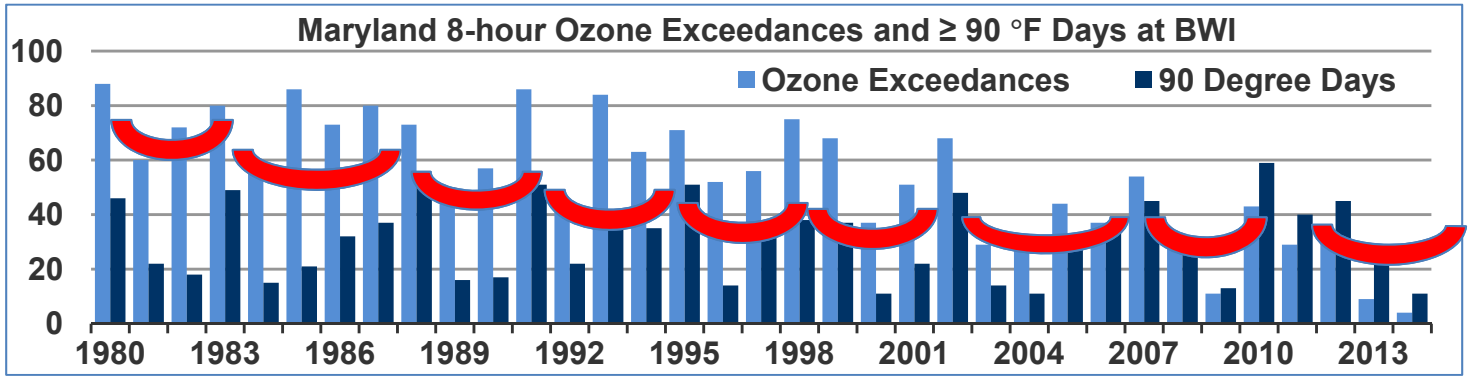




MARYLAND

Ozone in the Summer of 2014

- Lowest ozone levels recorded in the last 30 years
- Yes … it was also one of the coolest summers we've ever seen
  - As of today, 2014 will have had the 3rd fewest number of 90 degree days since 1980
- The ozone was so low in Maryland that we believe that the data for our worst monitor … the Edgewood monitor … the highest reading monitor east of the Mississippi … may be meeting the standard
- Cool weather is not the only reason we've seen such low ozone
  - Recent changes in emissions from upwind power plants is also a major factor
    - Remember … on most days when Maryland exceeds the ozone standard … measured, "incoming" ozone is already above the current 75 ppb standard
  - Reductions in Maryland from programs like the Healthy Air Act and the Clean Cars program have also been critical
- Unfortunately, our research also shows us that ozone weather cycles in 3 to 4 year periods from "cool and friendly" to "hot and unfriendly"
  - 2014 was probably at the friendliest part of the current cycle



Regulating Power Plants

… haven't we been here before?

- Absolutely … this is at least our 5th major round of regulatory action since 1990
  - Acid rain program
  - Nitrogen Oxide (NOx) Reasonably Available Control Technology (RACT) for the earlier standard
  - Ozone Transport Commission (OTC) NOx Budget Program
  - The federal NOx SIP Call
  - The Maryland Healthy Air Act

1996 Acid Rain Provisions of the CAA

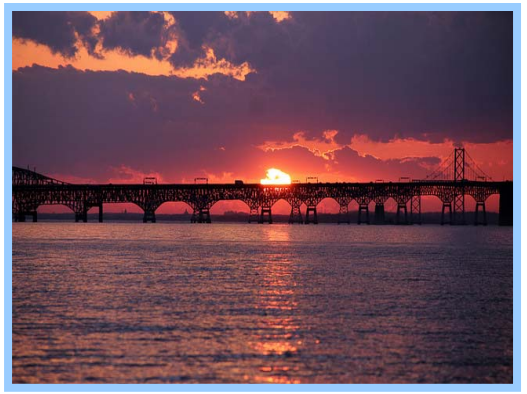
- Established in 1996 under Title IV of Clean Air Act (CAA)
- Cap and trade program to reduce acid rain
- Two phases, 1996 and 2000
  - Sulfur Dioxide (SO2) and NOx
- SO2
  - 9% reduction between 2000 and 2002
  - 41% between 1980 and 2002
- NOx
  - 13% reduction between 2000 and 2002
  - 33% between 1990 and 2002

Reasonably Available Control Technology

- … or RACT
- 1995 and 2006 update
- Drove investment in a host of combustion related modifications
  - Low NOx Burners
  - Separated Overfire Air
  - More
- Did not drive post combustion controls like
  - Selective Catalytic Reduction (SCR) technology
  - Selective Non-Catalytic Reduction (SNCR) technology
- Resulted in small but meaningful NOx reductions in Maryland

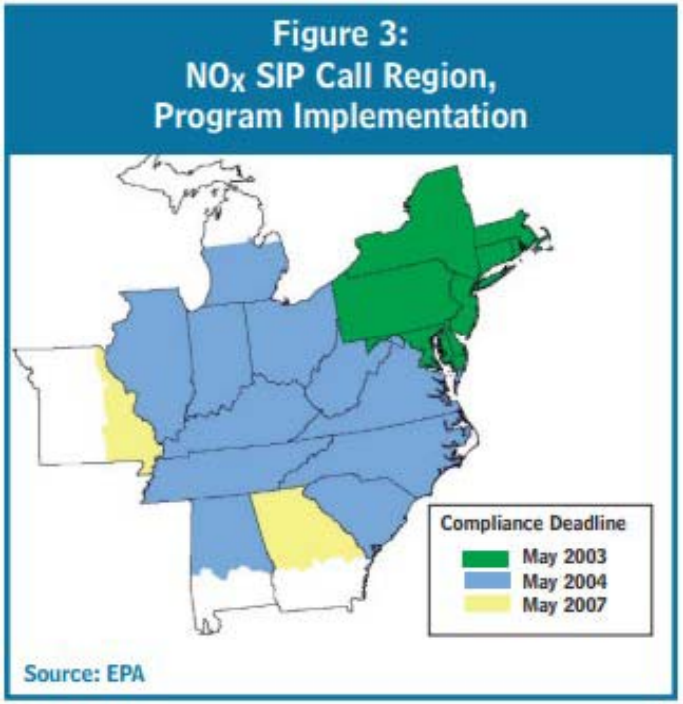
OTC NOx Budget Program

- Regional cap and trade effort between 13 states in the OTC – 1999 to 2002
- Established annual and ozone season caps
  - Market based concepts
    - Allowed banking and trading
- Regional summertime NOx caps for OTC states:
  - 219,000 tons in 1999
  - 143,000 tons in 2003
- Major Issue
  - States upwind of Maryland not included
- Replaced by the NOx SIP Call (a larger NOx Budget Trading Program) in 2003/2004



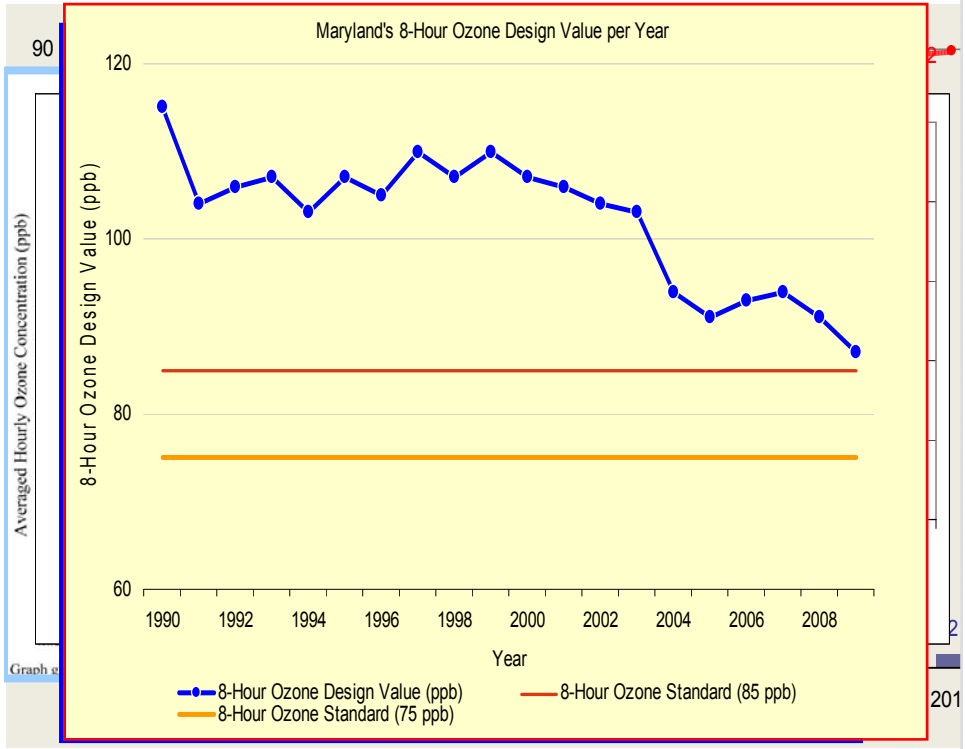
NOx SIP Call

- 20-State cap and trade program to reduce NOx
- 1998 … EPA finalized rule
- Implemented by EPA "calling in" SIPs (State Implementation Plans) for 20 states and requiring NOx reductions
  - Had a model rule that states could opt into
- Patterned after OTC NOx Budget Program
- Designed to reduce regional NOx 28% from 1996 emissions levels by 2007
- A major success story for reducing transport
- Major issue – Allowed unconstrained trading



Why the NOx SIP Call Worked?

Ground Level Ozone Drops Dramatically in the Same Time Frame



The classic ozone transport story

- Incoming ozone levels (as high as 80 ppb) collect in an elevated reservoir over night
- Real world programs like the NOx SIP call have shown that
  - Adding regional controls
  - Results in regional NOx emission reductions …
  - Which lead to reduced ozone in the elevated reservoir …
  - Which lead to lower ozone at ground level and public health protection!

Maryland Healthy Air Act (HAA) of 2006

- Most significant control program ever implemented in Maryland
- Partially a response to the problems with unlimited trading
  - Location does matter for ozone
- To implement the NOx SIP Call some Maryland power plants opted to purchase allowances instead of investing into controls

The Healthy Air Act

- Adopted by the Maryland General Assembly
- Widely applauded by the environmental community
- Environmental community and utilities worked with MDE as partners to design and implement the law
- Almost $2.6 Billion investment for clean air by Maryland utilities
- Helped to dramatically clean the air
  - Fine particle levels dropped dramatically
  - Ozone levels dropped dramatically
  - Mercury emissions dropped dramatically

A Multi-Pollutant Approach

- HAA driven by multiple pollutants
  - HAA required reductions in 4 key pollutants at the States largest power plants
    - Mercury
    - Sulfur dioxide (SO2)
    - Nitrogen oxide (NOx)
    - Greenhouse gases
    - Also drove reductions in direct particulate, hydrogen chloride and other air toxics

So … What Controls Were Installed?

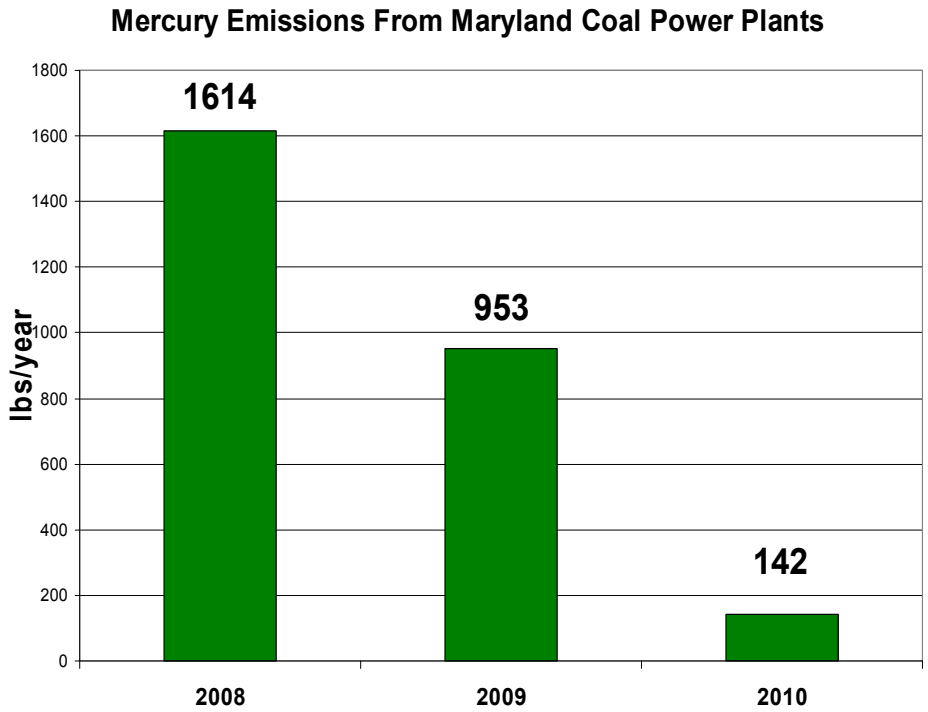
- 6 Flue Gas Desulfurizers (FGDs)
- 2 Baghouses
- 2 Hydrated Limestone injection systems
- 7 SCRs
- 6 SNCRs
- 6 Powdered Activation Carbon injection systems
- These controls were installed on coal units ranging in size from 125-700 MW.
  - All in a 2 to 3 year window

Regulatory Schedule and Jobs

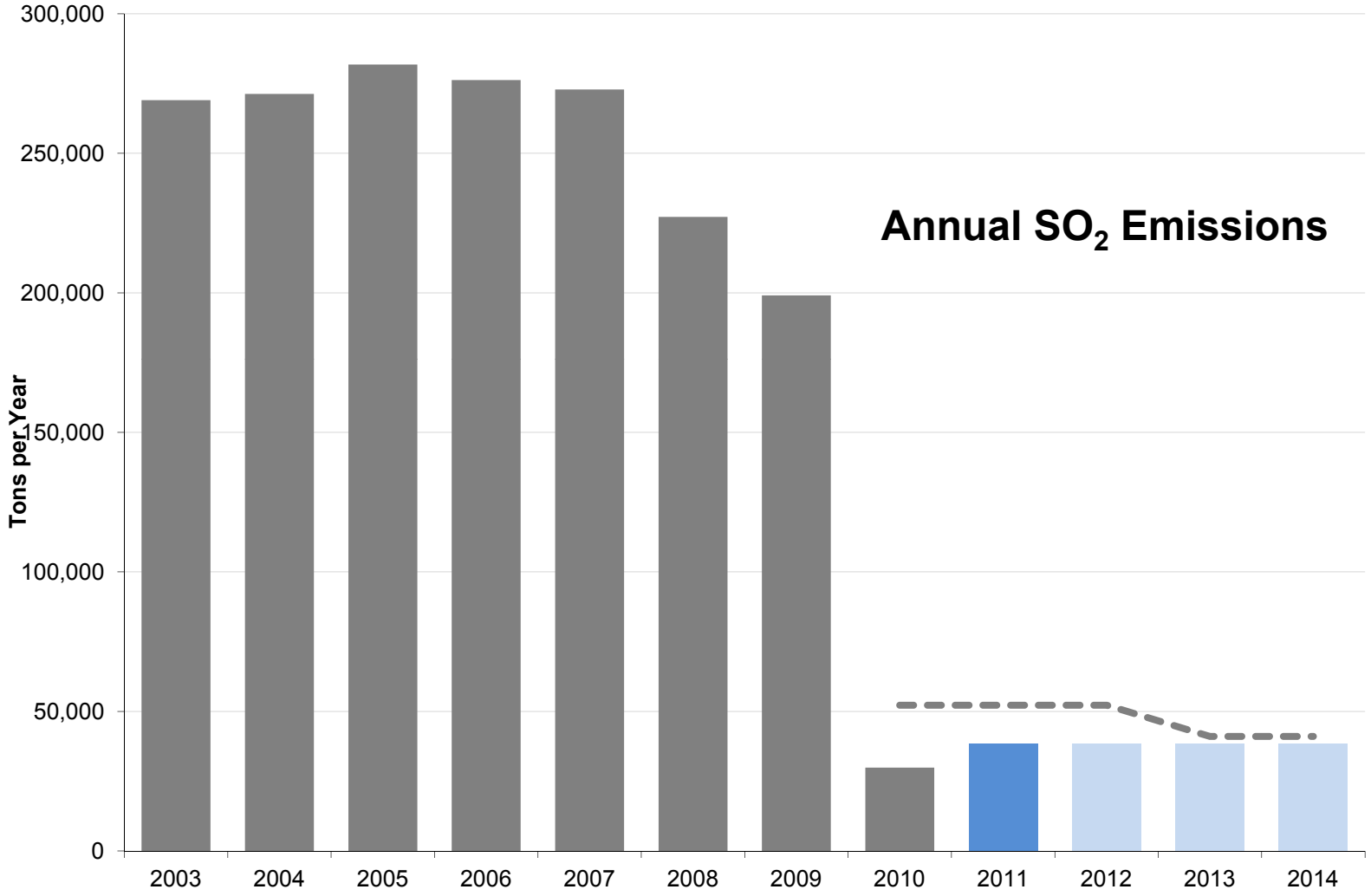
- State regulations adopted on July 7, 2007
  - NOx reductions required by May 2009 (less than 2 years)
  - SO2 and Hg reductions by January 2010 (about 2.5 years)
- Required extensive effort by MD generators
  - Also required significant effort by MDE, the MD Public Service Commission, the MD DNR and others
  - All deadlines met, no extensions needed
- Jobs resulting from HAA implementation
  - About 90 permanent jobs
  - Over 3000 jobs during peak construction period

The Results – Mercury & Other Air Toxics

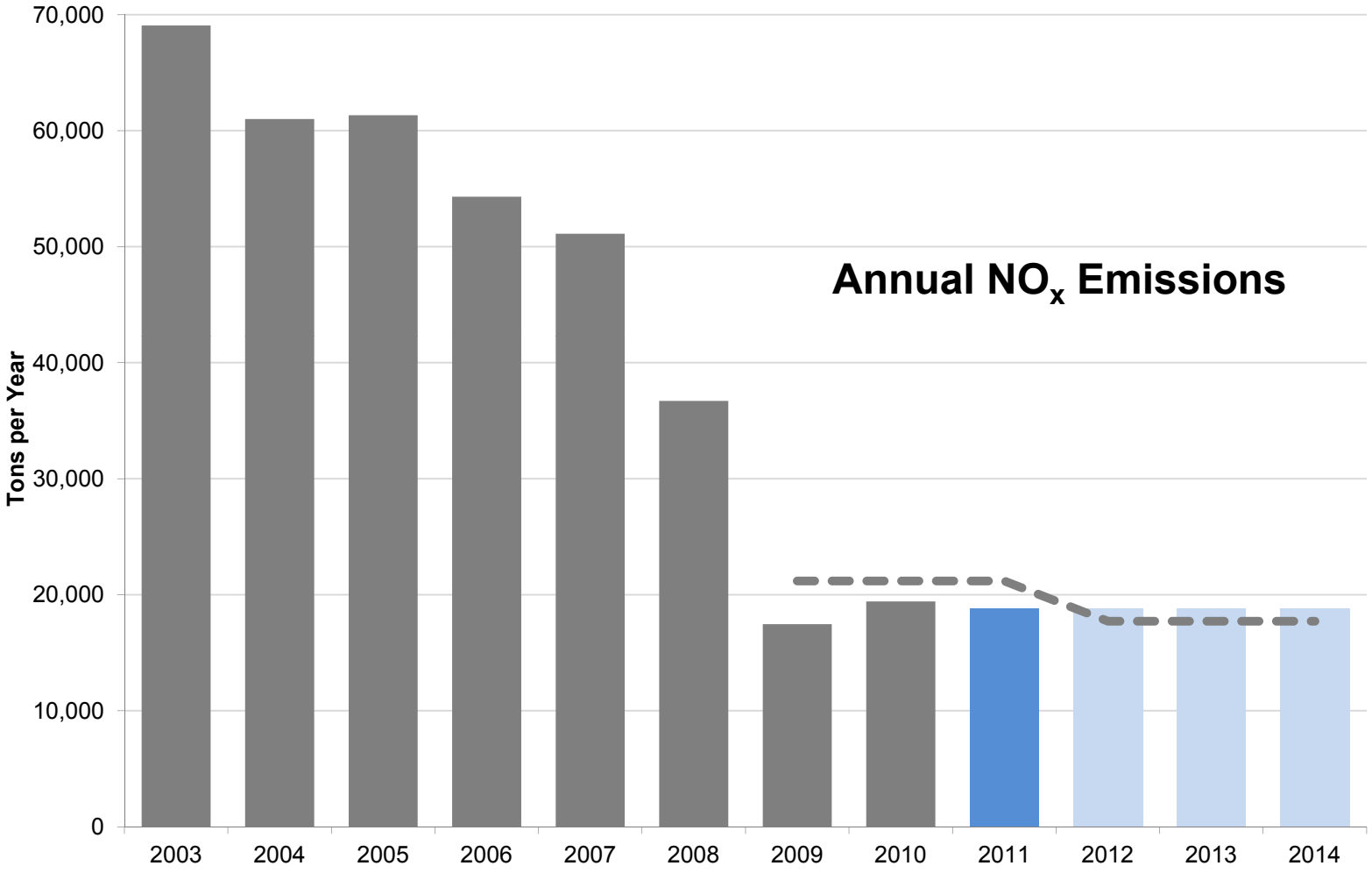
- Mercury
  - Exceeded 2012 90% reduction requirement in 2010
- Hydrogen Chloride (HCl) reduced 83%
- Direct particulate matter reduced 60%



The Results – SO2



The Results – NOx



What Did Maryland Generators Think?

- Constellation Energy
  - "We recently completed the installation of a major air quality control system, including scrubbers, a baghouse, and other equipment at one of our major coal facilities in Maryland," said Paul Allen, senior vice president and chief environmental officer of Constellation Energy.

"These systems work effectively and result in dramatically lower emissions of mercury, sulfur dioxide, particulate matter, and acid gases. We know from experience that constructing this technology can be done in a reasonable time frame, especially with good advance planning; and there is meaningful job creation associated with the projects."

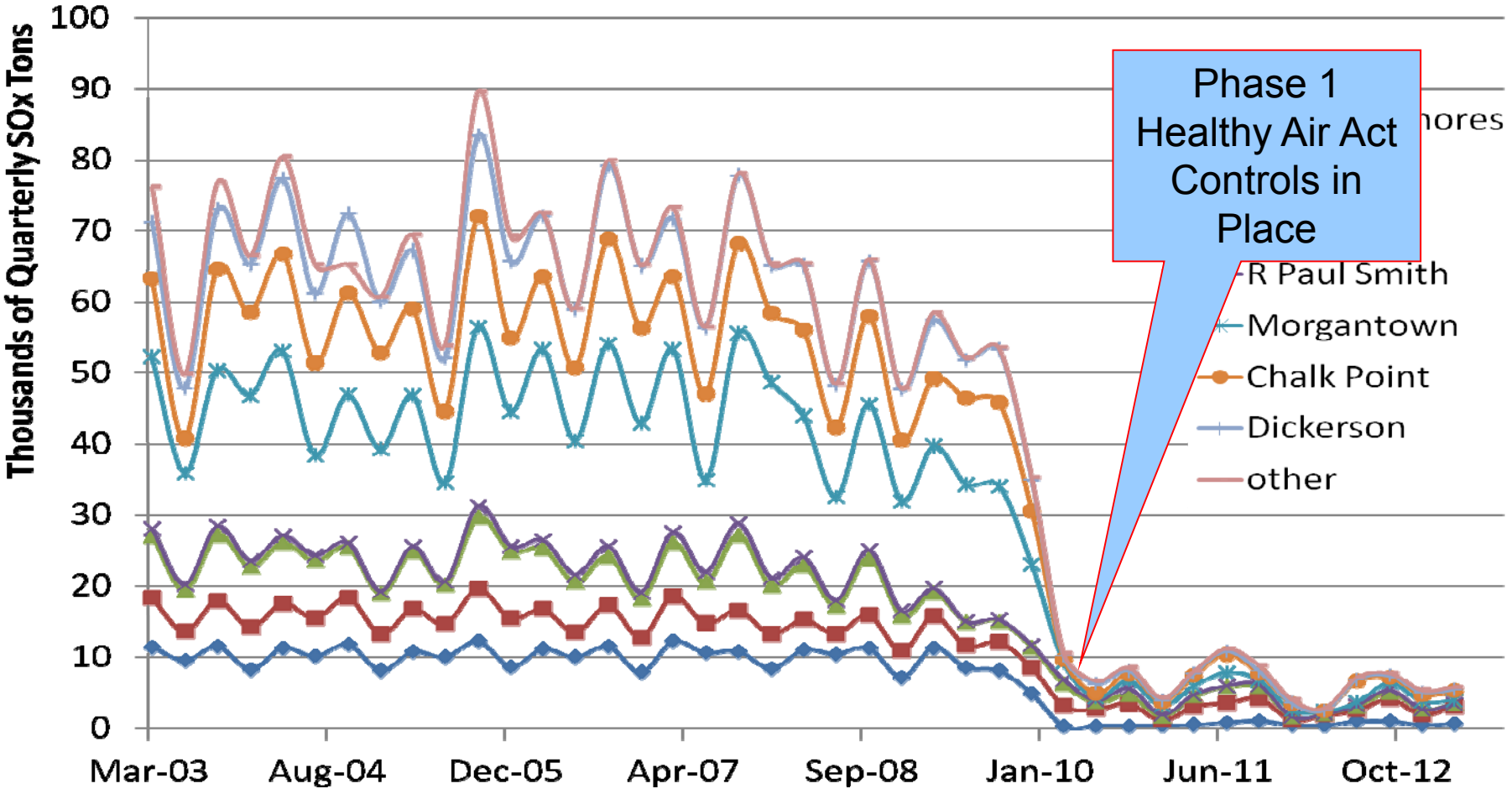
- March 16, 2011 press release

Others on Maryland's Healthy Air Act

- The National Wildlife Federation
  - Maryland's Healthy Air Act would save 96 lives each year in 2010 compared to 27 lives saved under existing federal air rules
  - The Healthy Air Act's curbs on air pollution will save 17,350 workdays each year in 2010, compared to 4,925 workdays saved under federal air rules.

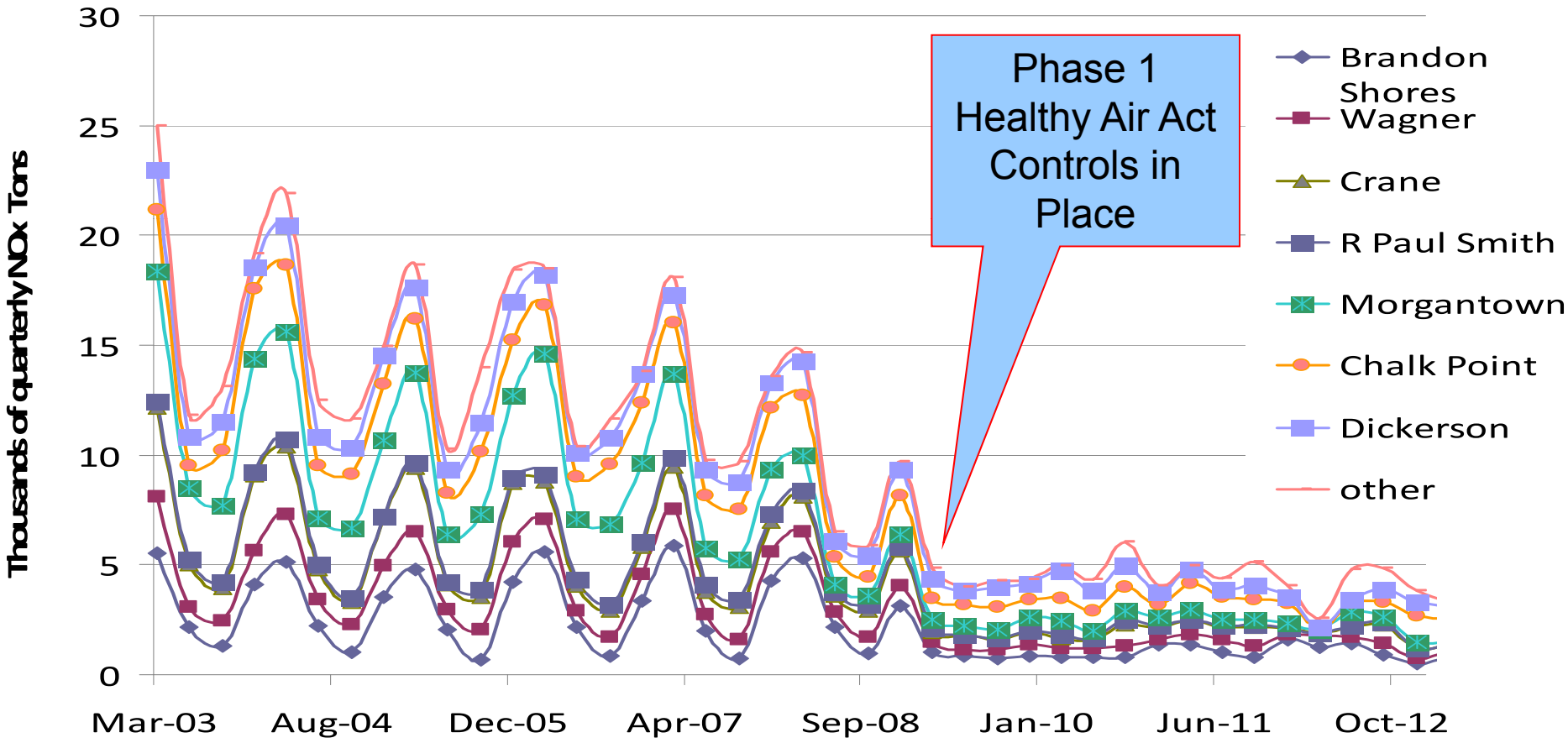
SO2 Emission Trends

Quarterly SO2 Emissions by Plant



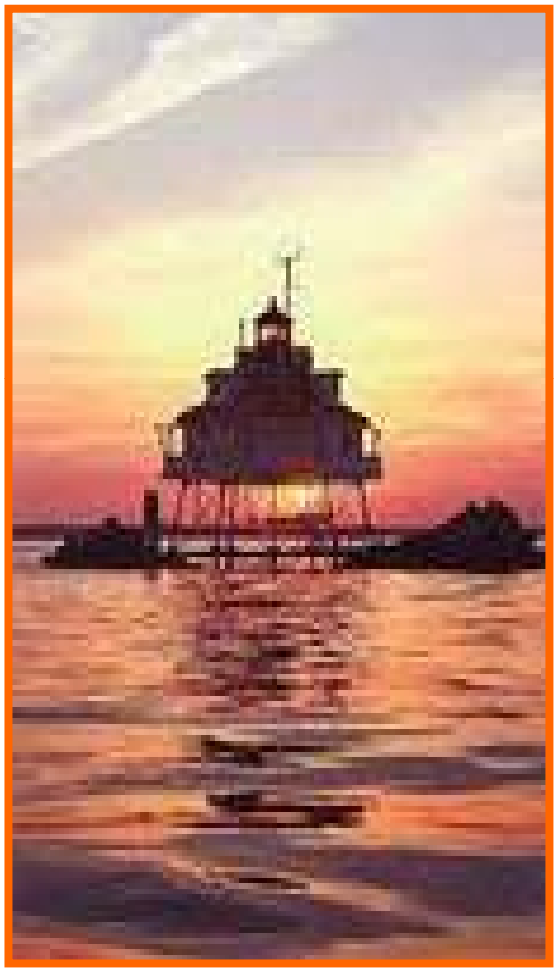
NOx Emission Trends

Quarterly NOx Emissions by Plant



Summary

- Maryland has already implemented aggressive pollution controls on Maryland power plants
- The controls generated very deep reductions …
  - For each Company
    - Not each plant
  - For the year and for the summer ozone season
    - Not for each day
- These controls have been very effective and did what they were supposed to do
  - Maryland is measuring attainment for fine particulates
  - Ozone levels have dropped dramatically
- The new ozone standard and the new SO2 standard now require us to refocus on
  - Plant-by-plant controls and
  - Peak day emissions



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The New Challenges

The New Ozone Standard

- Finalized by EPA in 2008
  - 75 ppb as an 8-hour standard
- Delayed in 2010
  - EPA announced plans to adopt an even more stringent standard (in the 60 to 70 ppb range)
    - This range was consistent with EPA's science advisors
- 2011 - Decision to not move ahead with more stringent standard announced
- June 2012 – EPA designates 3 areas in Maryland as "nonattainment"
  - Other areas across the Country also designated nonattainment

The New SO2 Standard

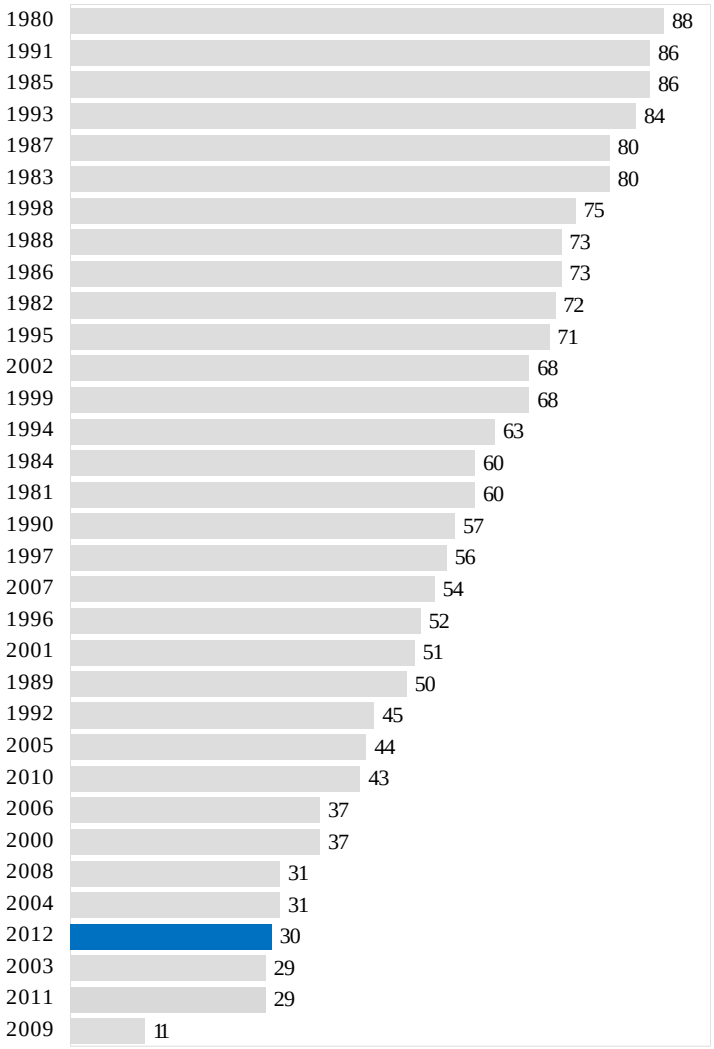
- Finalized by EPA in 2010
  - 75 ppb as a 1-hour standard
- August 2013 – EPA only designated areas of the country that were monitoring nonattainment
- Rest of country, including all of Maryland, has not been designated:
- Today's AQCAC meeting will focus on the new NOx reduction requirements to address the new ozone standard.
- MDE will be bringing a draft regulation to AQCAC to address the new SO2 standard in late 2014

New Challenges – New Regulatory Approaches

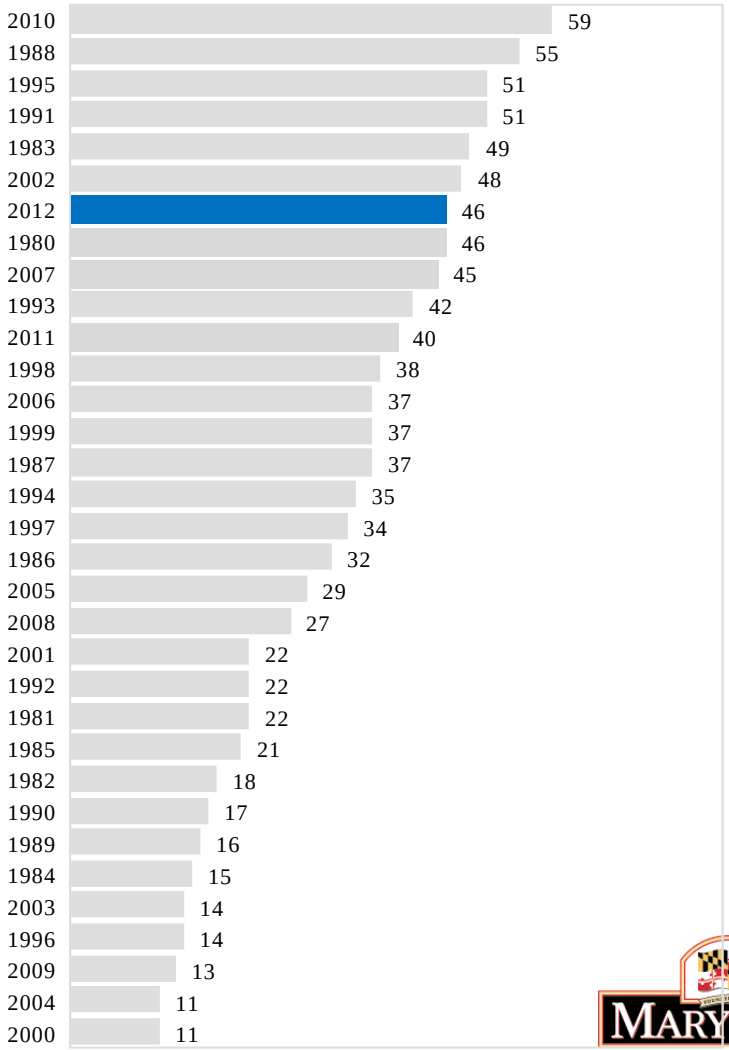
- HAA and other NOx and SO2 control programs have served their purpose
- The air is significantly cleaner
- New standards for ozone and SO2 present significant new challenges that will require additional and different types of control programs for Maryland's power sector
- The new SO2 and ozone standards will require limits that are designed to reduce **emissions on the days when we see the highest emissions**
  - For the EGU (Electricity Generating Unit) sector this is a large challenge as …
    - These are generally the hottest days of the summer when electricity demand is at it's peak

Fewer Bad Days When It's Hot

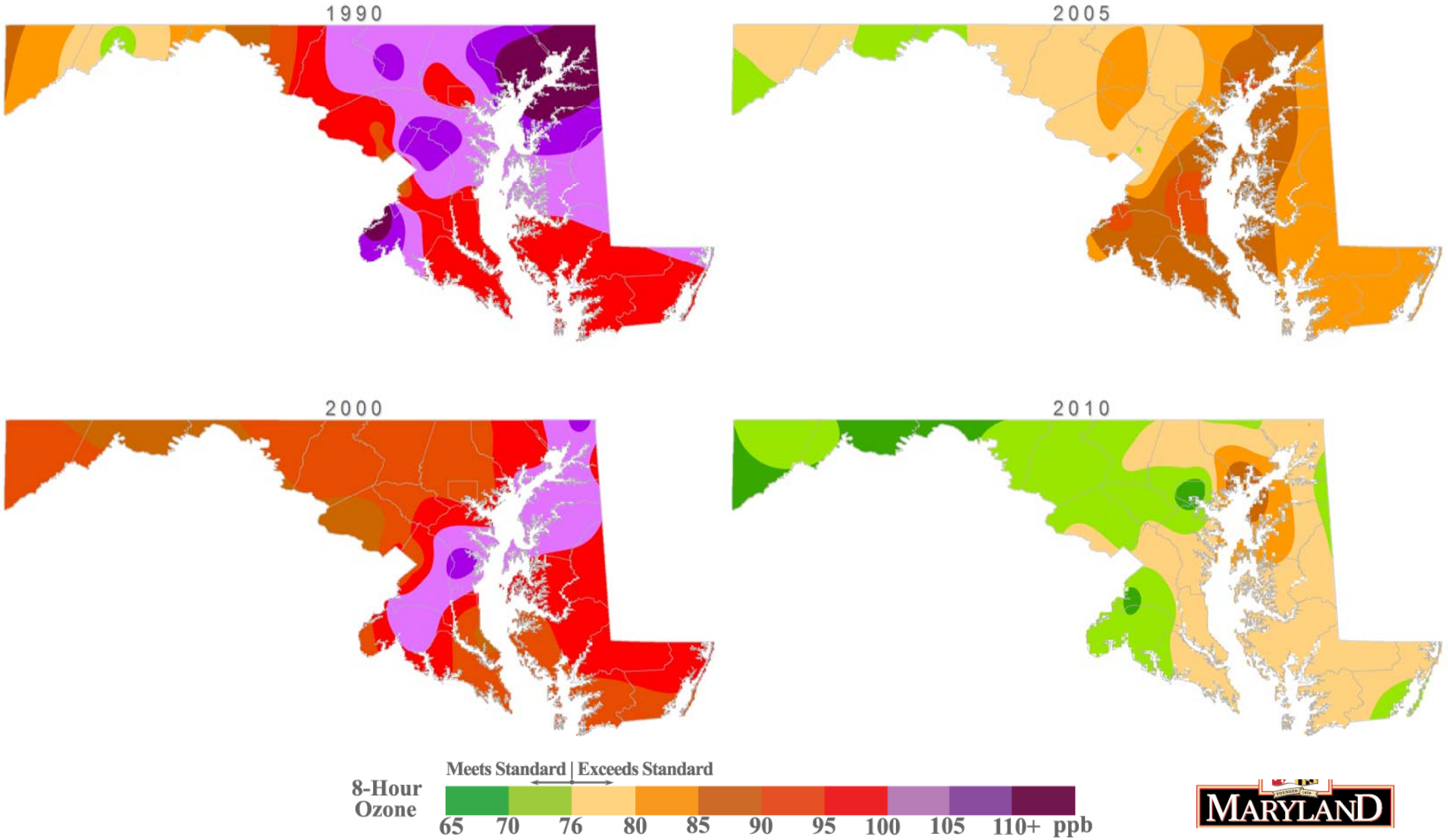
Number of Maryland's Ozone Exceedance Days



Number of 90 Degree Days at BWI

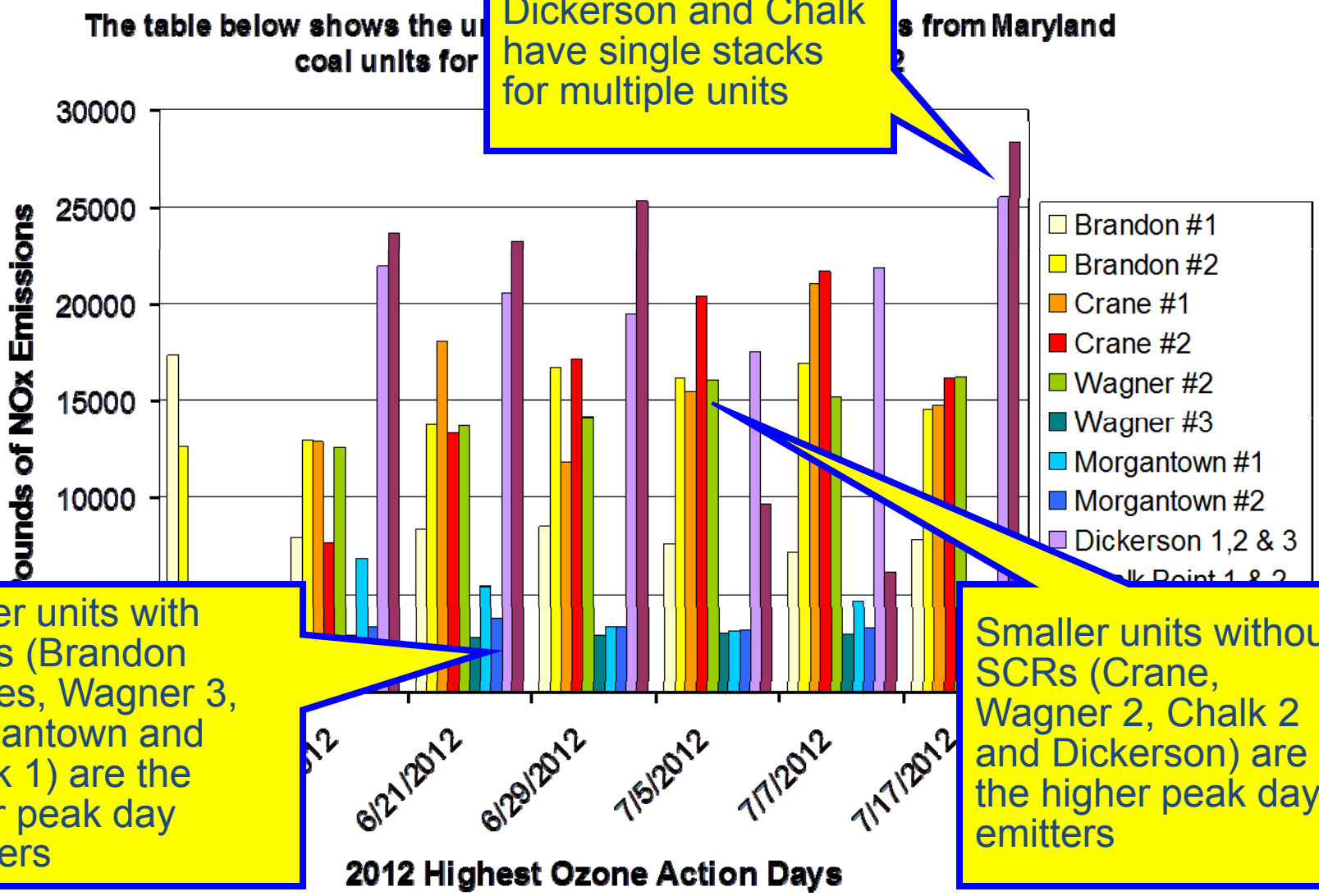


Smaller Problem Areas



NOx Emissions on Peak Ozone Days

Daily NOx Emissions By Unit



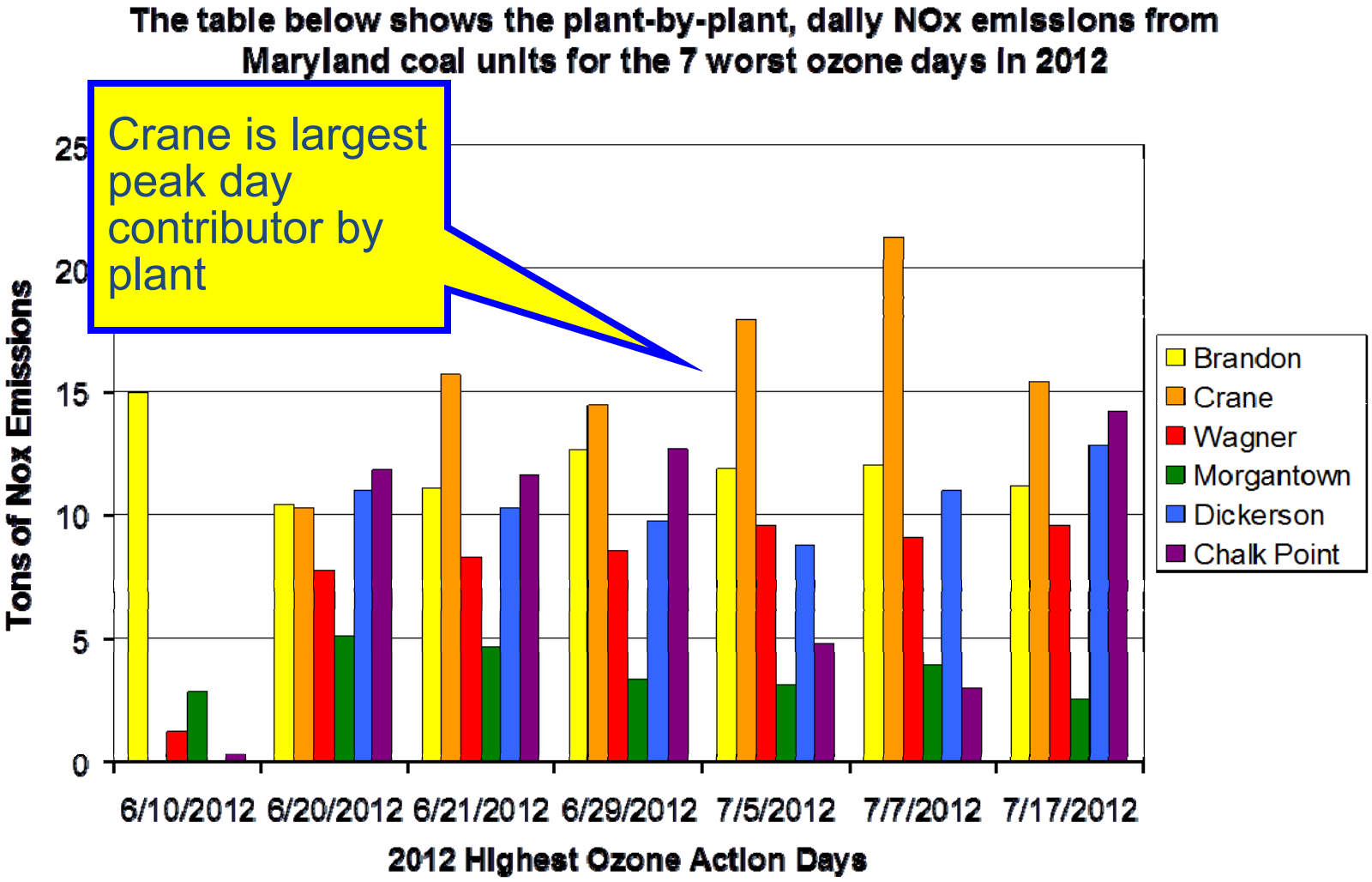
Dickerson and Chalk have single stacks for multiple units

Larger units with SCRs (Brandon Shores, Wagner 3, Morgantown and Chalk 1) are the lower peak day emitters

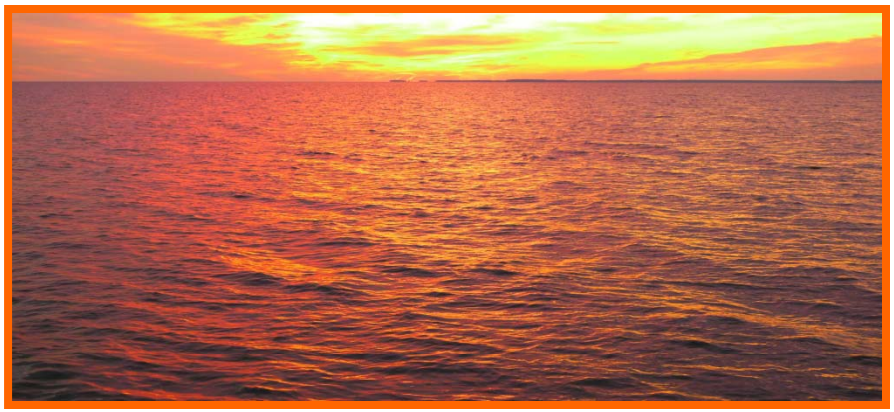
Smaller units without SCRs (Crane, Wagner 2, Chalk 2 and Dickerson) are the higher peak day emitters

NOx Emissions on Peak Ozone Days

Daily NOx Emissions By Plant

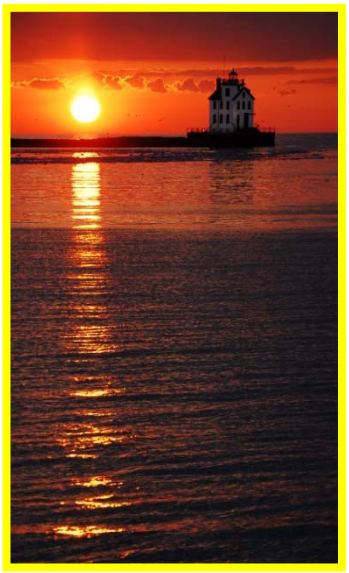


So why are these smaller units not better controlled?



Issues With NOx Emissions

- The new 75 ppb ozone standard requires deeper reductions and shines a spot light on peak day NOx emissions
- Healthy Air Act has driven dramatic improvements, but:
  - It allowed sources to invest in units that could achieve the greatest reductions for least cost
  - It uses annual and "ozone season" caps that have not forced units to always run emissions controls when they are needed
    - Linked to lower capacity factors at many units
- Some units also appear to not always be running their control equipment at a high level of efficiency to insure maximize emission reductions



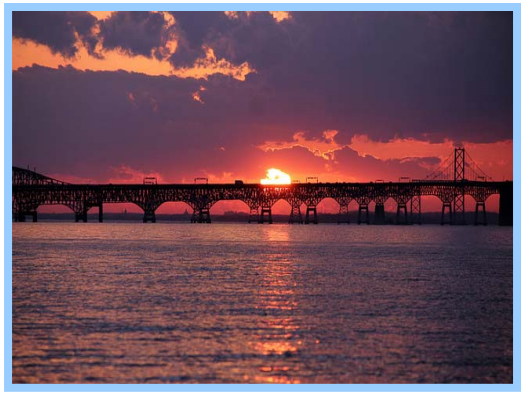
So what is the Clean Air Act driver for this regulation?

NOx Reduction Requirements

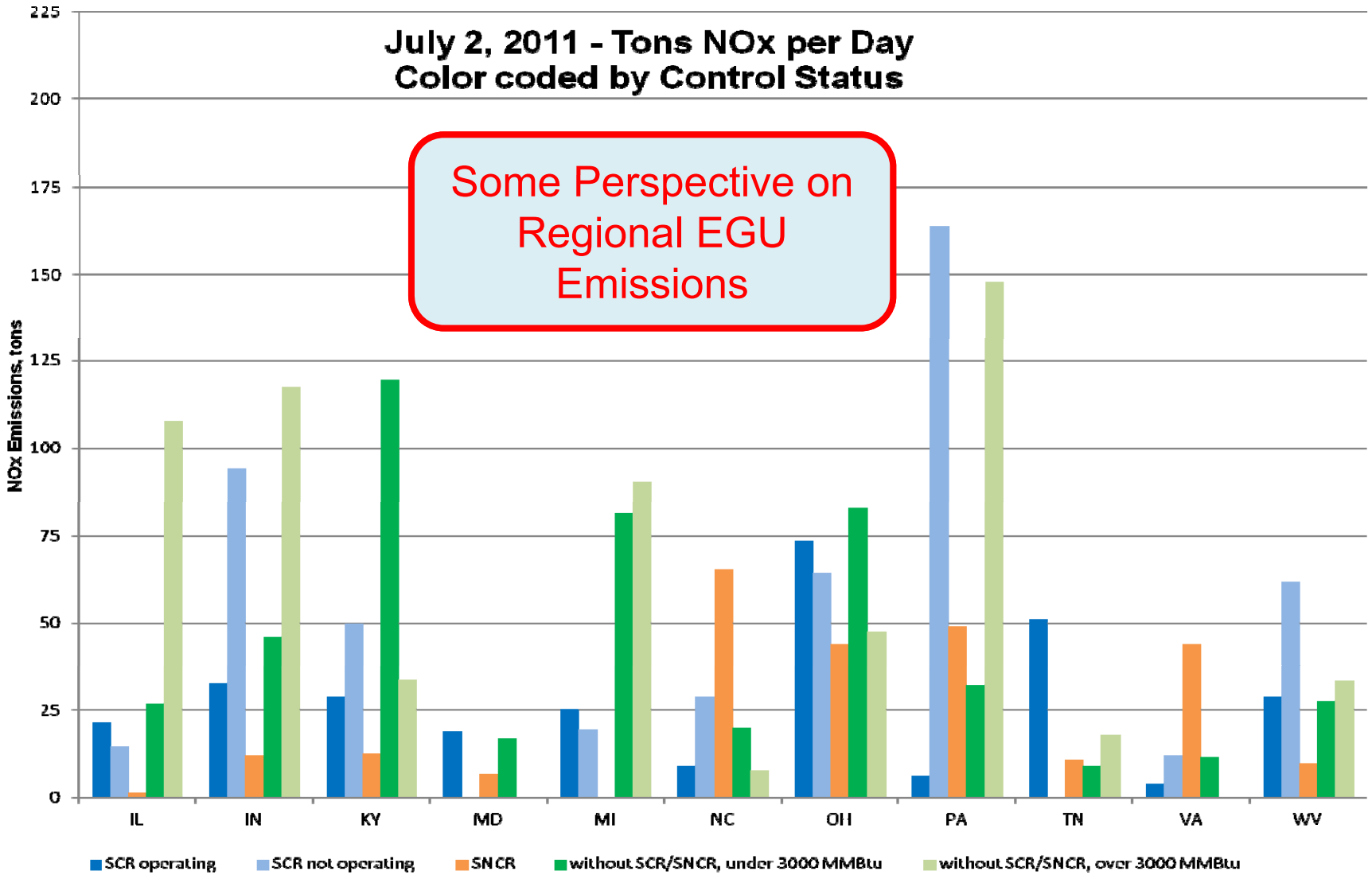
- In 2014, MDE is required to update NOx RACT (Reasonably Available Control Technology) requirements in the Maryland SIP (State Implementation Plan)
- In 2015, MDE is required to submit a new "Attainment Plan" to address the State's problems with ozone
  - This requirement calls for clean air by 2018
- This regulation will be part of both of these Clean Air Act mandated requirements

What About Pollution from Upwind States?

- Yes – this is a big deal
- Maryland runs a sophisticated air pollution research program
- Our data show that on bad air days 50% to 70% of our ozone problem comes from upwind states
  - A significant equity issue
- On December 9, 2013, Governor O'Malley and 8 other Governors submitted a Clean Air Act Petition to level the playing field on air pollution controls in upwind states
- Maryland is also challenging EPA over other state's air plans that do not include "Good Neighbor" commitments



A Snapshot of Our Work on Transport



EGU NOx Emissions – 11 Eastern States

MDE 2014 NOx Regulations

- We have been working on these regulatory concepts for about 2 years
- We believe we have an approach that addresses many of the concerns raised by stakeholders
  - Many stakeholder and 1-on-1 meetings
- Two Phases - three basic steps
  - Immediate requirements
    - Step 1 - Minimize NOx emissions immediately by using current technologies each day of the summer ozone season
    - Step 2 - Immediately set a maximum "allowable" rate to insure meaningful, consistent emission reductions from existing control technologies
  - 2016 to 2018 requirements
    - Step 3 - Deeper reductions in the 2016 to 2018 time frame
      - While providing affected sources with flexibility to achieve those deeper reductions

Step 1 – Minimize Emissions …

… using existing technologies

- Section .03A(2) – page 2 and 3 of draft regulation
- All units in Maryland have invested in SCR, SNCR or SACR control technology
- Significant, immediate environmental benefits can be achieved by simply running these control technologies:
  - Run the technologies as they were designed to be run …
  - Each day of the summer ozone season
- MDE analysis indicates that this step alone could result in about a 9 ton per day (tpd) NOx reduction
- We believe we will start to see these benefits before the regulations are finalized … reductions in the summer of 2014

Regulatory Language – .03A …

… minimize emissions each day of the ozone season

- This requirement is a stand alone requirement

.03 2015 NO_x Emission Control Requirements.

A. Daily NOx Reduction Requirements During the Ozone Season.

(1) Not later than 45 days after the effective date of this regulation, the owner or operator of an affected electric generating unit shall submit a plan to the Department for approval that demonstrates how each affected electric generating unit will operate installed pollution control technology and combustion controls to meet the requirements of § A(2) of this regulation. The plan shall summarize the data that will be collected to demonstrate compliance with § A(2).

(2) Beginning on May 1, 2015, for each operating day during the ozone season, the owner or operator of an affected electric generating unit shall minimize NOx emissions by operating and optimizing the use of all installed pollution control technology and combustion controls consistent with the technological limitations, manufacturers' specifications, good engineering and maintenance practices, and good air pollution control practices for minimizing emissions (as defined in 40 C.F.R. § 60.11(d)) for such equipment and the unit at all times the unit is in operation while burning any coal.

Complying With .03A(2)

- Two compliance requirements
  - Compliance Requirement #1 – Collect and maintain operational and performance data

.05 Compliance Demonstration Requirements.

A. Procedures for demonstrating compliance with § .03(A) of this chapter.

(1) An affected electric generating unit shall demonstrate, to the Department's satisfaction, compliance with § .03(A)(2) of this chapter, using the information collected and maintained in accordance with § .03(A)(1) of this chapter and any additional documentation available to and maintained by the affected electric generating unit.

.03 2015 NO_x Emission Control Requirements.

A. Daily NOx Reduction Requirements During the Ozone Season.

(1) Not later than 45 days after the effective date of this regulation, the owner or operator of an affected electric generating unit shall submit a plan to the Department for approval that demonstrates how each affected electric generating unit will operate installed pollution control technology and combustion controls to meet the requirements of § A(2) of this regulation. The plan shall summarize the data that will be collected to demonstrate compliance with § A(2).

Complying With .03A(2) (continued)

- Compliance Requirement #2
  - Unit specific reporting

.05 Compliance Demonstration Requirements.
A. Procedures for demonstrating compliance with § .03(A) of this chapter.

(2) An affected electric generating unit shall not be required to submit a unit-specific report consistent with § A(3) of this regulation, or any other information unless otherwise requested by the Department, where the unit emits at levels that are at or below the following rates:

Affected Unit	24-Hour Block Average - NOx Emissions in lbs/MMBtu
Brandon Shores	
Unit 1	0.08
Unit 2	0.08
C.P. Crane	
Unit 1	0.30
Unit 2	0.28
Chalk Point	
Unit 1 only	0.07
Unit 2 only	0.30
Units 1 and 2 combined	0.18
Dickerson	
Unit 1 only	0.24
Unit 2 only	0.24
Unit 3 only	0.24
Two or more Units combined	0.24
H.A. Wagner	
Unit 2	0.25
Unit 3	0.07
Morgantown	
Unit 1	0.07
Unit 2	0.07

The Unit Specific Report

- Required whenever 24-hour rates are exceeded

.05 Compliance Demonstration Requirements.
A. Procedures for demonstrating compliance with § .03(A) of this chapter.

(3) The owner or operator of an affected electric generating unit subject to § .03(A)(2) of this chapter shall submit a unit-specific report for each day the unit exceeds its NOx emission rate of § A(2) of this regulation, which shall include the following information for the entire operating day:

(a) Hours of operation for the unit;
(b) Hourly averages of operating temperature of installed pollution control technology;
(c) Hourly averages of heat input (MMBtu/hr);
(d) Hourly averages of MW output (M W h);
(e) Hourly averages of Ammonia or urea flow rates;
(f) Hourly averages of NOx emissions data (lbs/MMBtu and ppm);
(g) Malfunction data;
(h) The technical and operational reason the rate was exceeded, such as:
(i) operator error;
(ii) technical events beyond the control of the owner or operator (e.g. acts of God, malfunctions); or
(iii) dispatch requirements that mandate unplanned operation (e.g. start-ups and shut-downs, idling and operation at low voltage or low capacity);
(i) A written narrative describing any actions taken to reduce emission rates; and
(j) Other information that the Department determines is necessary to evaluate the data or to ensure that compliance is achieved.

How Were the 24-Hour Rates Calculated?

- 24-Hour Block Average NOx Emission Rates
- Calculated by analyzing 2007 to 2011 NOx 24-hour average emissions data collected by CEMs (Continuous Emission Monitors) – maintained in the EPA Clean Air Market Division's (CAMD) data base
  - Then adjusting those rates, using engineering data and judgment, to reflect the regulations requirement to minimize emissions each day by optimizing existing control technologies (.03A)
    - For example, for units with rates that were not running their SNCR control equipment consistently or efficiently, engineering data indicates that effective use of the SNCR would achieve an additional 15% to 35% reduction, depending on combustion design and controls
      - The 24 hour rates were adjusted appropriately

MDE 2014 NOx Regulations

- Again …
- Two Phases - three basic steps
  - Immediate requirements
    - Step 1 - Minimize NOx emissions immediately by using current technologies each day of the summer ozone season
    - Step 2 - Immediately set a maximum "allowable" rate to ensure meaningful, consistent emission reductions from existing control technologies
  - 2016 to 2018 requirements
    - Step 3 - Deeper reductions in the 2016 to 2018 time frame
      - While providing affected sources with flexibility to achieve those deeper reductions

Step 2 – System Wide Performance

- Also required immediately upon adoption of the regulation
  - Section .03B (page 3 of the draft regulation)
- Establishes an overall NOx emission rate for the companies system to ensure, consistent, summer long emissions benefits
- Because of the technology requirements of Section .03A(2), MDE expects actual system-wide rates to be less then the maximum allowable rates established in Section .03B

The System Wide Rate

- A companies “system” must meet and maintain a 30-day rolling average rate that may not exceed:
  - 0.15 pounds of NOx per each MMBtu of energy generated (0.15 lb/MMBtu)
- The unit-by-unit, day-by-day requirement (.03A) to minimize emissions using existing technologies will need to be met at all times
  - Even if the company could meet the 0.15 lb/MMBtu rate by operating the equipment less efficiently

How Was the System-Wide Rate Calculated?

- A system-wide NOx emission rate of 0.15 lb/MMBtu as a 30-day rolling average
  - Calculated using 2011 to 2014 CAMD CEMs data to calculate 30-day rolling averages for the NRG and Ravens systems
  - These 30-day averages were adjusted to reflect operation of existing SNCR and SCR control technology consistent with the requirement of .03A(2) to minimize emissions by optimizing the performance of control technologies

Regulatory Language: System-Wide NOx Rate

- Regulatory Requirement

.03 2015 NO_x Emission Control Requirements.

B. Ozone Season NOx Reduction Requirements.
(1) The owner or operator of an affected electric generating unit shall not exceed a system-wide NO_x emission rate of 0.15 lbs/MMBtu as a 30-day rolling average during the ozone season.

- Compliance

.05 Compliance Demonstration Requirements.

B. Procedures for demonstrating compliance with NOx emission rates of this chapter.
(1) Compliance with the NOx emission rate limitations in § § .03B(1), .03D(2), .04C(1) and .04C(4) shall be demonstrated with a continuous emission monitoring system that is installed, operated, and certified in accordance with 40 CFR Part 75.
(2) In order to calculate the 30-day rolling average emission rates of this chapter, beginning May 1, 2015 and for each subsequent May 1 of following years, data from the previous twenty-nine operating days of the preceding September shall be used.

MDE 2014 NOx Regulations

- Again …
- Two Phases - three basic steps
  - Immediate requirements
    - Step 1 - Minimize NOx emissions immediately by using current technologies each day of the summer ozone season
    - Step 2 - Immediately set a maximum "allowable" rate to insure meaningful, consistent emission reductions from existing control technologies
  - 2016 to 2018 requirements
    - Step 3 - Deeper reductions in the 2016 to 2018 time frame
      - While providing affected sources with flexibility to achieve those deeper reductions

Step 3 – Deeper Reductions

- Section.04 – Page 3 in draft regulation
- To further address the issue associated with smaller, less controlled units that have high peak day emissions
  - Step 3 will require deeper reductions in the 2015 to 2018 time frame to reduce these emissions
- We have received a tremendous amount of feedback on this issue
  - We developed our proposed approach to try and address all of the comments we have received from affected facilities, the environmental advocacy community, elected officials and other interested parties
- Our proposed approach provides significant flexibility to achieve the additional emission reductions
- Also linked to insuring public health protection and the next ozone standard

Step 3 – Deeper Reductions (continued)

- Again, designed to drive deeper NOx reductions from power plants in Maryland
- A flexible approach
- Affected sources will be allowed to choose from 4 basic options to comply
  - Install Selective Catalytic Reduction (SCR) technology that can achieve an ozone season NOx emission rate of 0.07 lbs/MMBtu (on a 30-day rolling average) or less;
  - Retire units without SCR technology;
  - Switch fuel from coal to natural gas; or
  - Establish and comply with a system-wide emission reduction program that guarantees significant new reductions
    - The reductions under this program will need to be equivalent to the reductions that would be achieved if every unit was controlled with an SCR
      - Companies provided flexibility to find the least cost way to achieve that goal

Regulatory Language – Deeper Reductions

Applicability and Notice to the Department

- Make a decision by 2015

.04 Additional NO_x Emission Control Requirements Beginning May 31, 2015 and April 1, 2018.

A. This regulation applies to C.P. Crane units 1 and 2, Chalk Point unit 2, Dickerson units 1, 2, and 3 and H.A. Wagner unit 2.

B. Notification to the Department. Not later than May 31, 2015, the owner or operator of the affected electric generating units subject to this regulation must notify the Department as to which compliance option as specified in § C of this regulation shall be selected by the owner or operator of the affected electric generating unit to comply with this regulation.

Deeper Reductions (continued)

The Four Options

.04 Additional NO_x Emission Control Requirements Beginning May 31, 2015 and April 1, 2018.

C. General Requirements. The owner or operator of the affected electric generating units subject to this regulation shall choose from the following:

(1) Not later than June 1, 2018:

(a) Install and operate a selective catalytic reduction (SCR) control system; and

(b) Meet a NOx emission rate of 0.07 lbs/MMBtu, as determined on a 30-day rolling average during the ozone season;

(2) Not later than June 1, 2018, permanently retire the unit;

(3) Not later than June 1, 2018, switch fuel from coal to natural gas for the unit; or

(4) Not later than April 1, 2016, meet a system-wide NOx emission rate during the ozone season or system-wide daily NOx tonnage cap during the ozone season calculated by assuming SCR controls at C.P. Crane units 1 and 2, Chalk Point unit 2, Dickerson units 1, 2, and 3 and H.A. Wagner unit 2 operated in a manner consistent with the requirements in § § .03A(2) and .04C(1)(b) and actual operations after 2007. *

Deeper Reductions (continued)

The 4th Option - Alternative Emission Reduction Plan

.04 Additional NO_x Emission Control Requirements Beginning May 31, 2015 and April 1, 2018.

D. Where the compliance option of § C(4) is selected, the owner or operator of an affected electric generating unit shall submit no later than May 31, 2015, an alternative emission reduction plan for approval by the Department that ensures compliance with the applicable limit of § C(4). Upon approval by the Department, the provisions of the alternative emission reduction plan shall be enforceable and shall be incorporated into the owner's permit to operate.

§ C(4). Not later than April 1, 2016, meet a system-wide NOx emission rate during the ozone season or system-wide daily NOx tonnage cap during the ozone season calculated by assuming SCR controls at C.P. Crane units 1 and 2, Chalk Point unit 2, Dickerson units 1, 2, and 3 and H.A. Wagner unit 2 operated in a manner consistent with the requirements in § § .03A(2) and .04C(1)(b) and actual operations after 2007.

Other Requirements - HAA

- Requirements to clarify that the Healthy Air Act caps remain in place

.03 2015 NO_x Emission Control Requirements

B. Ozone Season NOx Reduction Requirements.

(2) The owner or operator of an affected electric generating unit subject to the provisions of this regulation shall continue to meet the ozone season NOx reduction requirements in COMAR 26.11.27.

C. Annual NOx Reduction Requirements. The owner or operator of an affected electric generating unit subject to the provisions of this regulation shall continue to meet the annual NOx reduction requirements in COMAR 26.11.27.

Other Requirements – AES Warrior Run

- Inherently clean design of the AES Warrior Run plant (fluidized bed boiler) results in no new reduction requirement
- Existing limits established in the Companies NSPS permit remain in place

.03 2015 NO_x Emission Control Requirements

D. NOx Emission Requirements for Affected Electric Generating Units Equipped with Fluidized Bed Combustors.

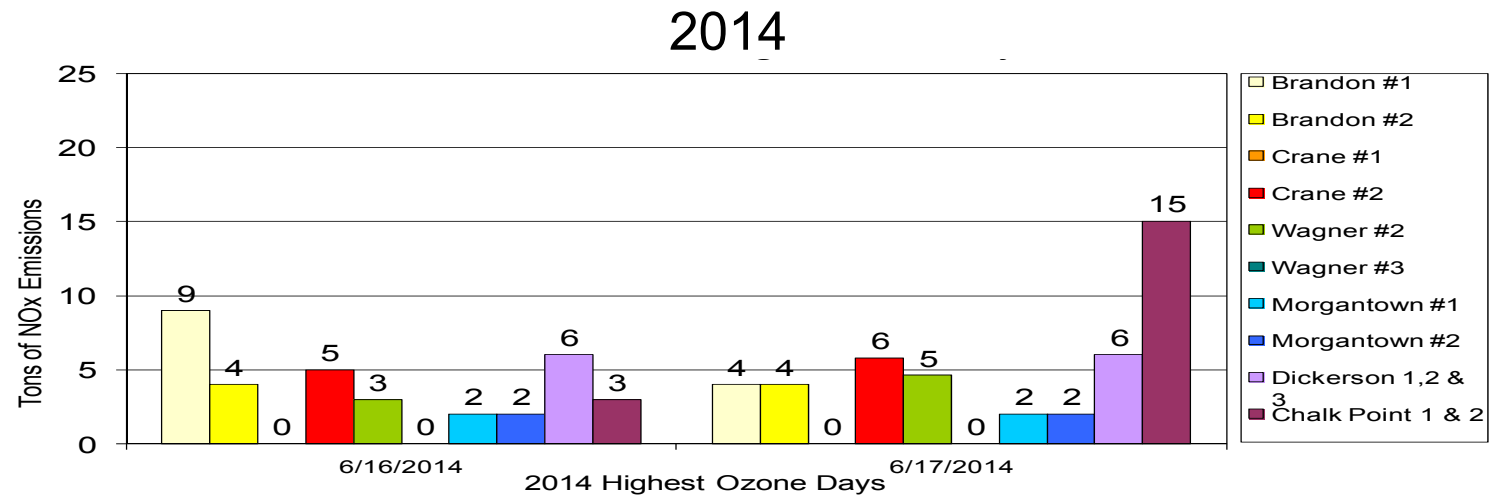
(1) The owner or operator of an affected electric generating unit equipped with a fluidized bed combustor is not subject to the requirements of § § A and B(1) of this regulation.

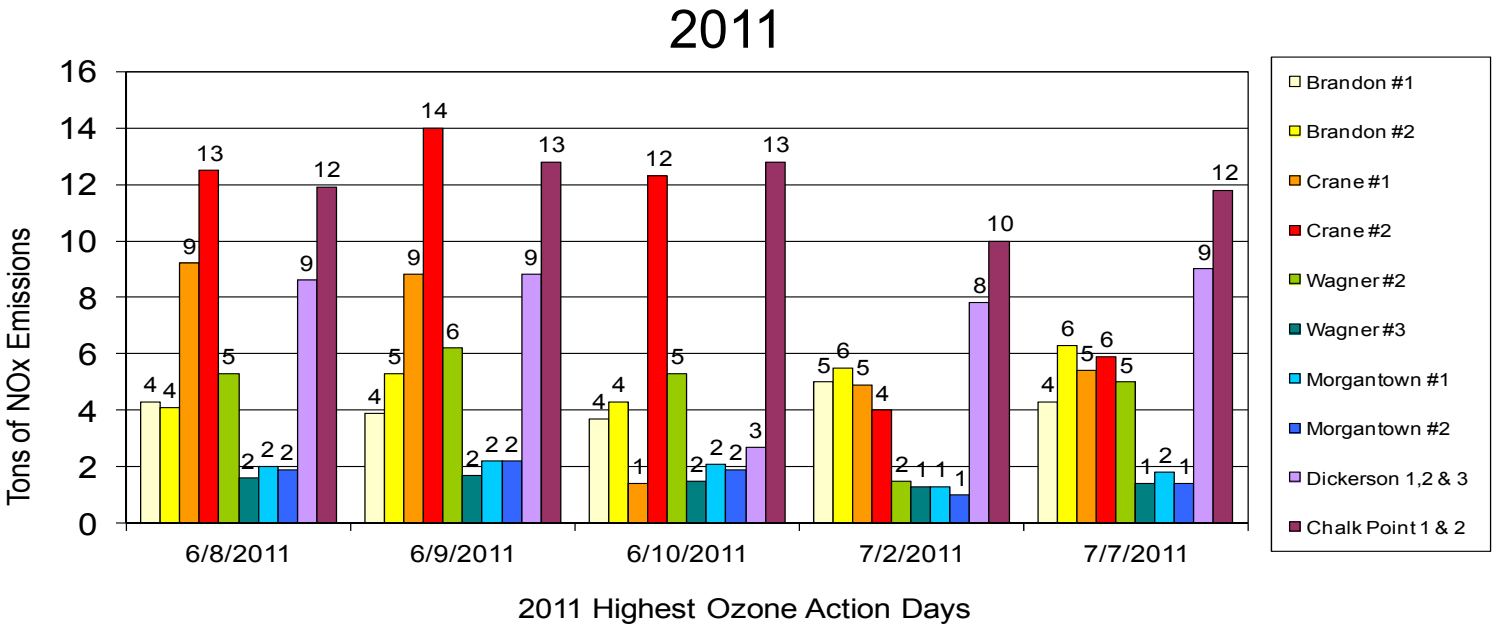
(2) The owner or operator of an affected electric generating unit equipped with a fluidized bed combustor shall not exceed a NO_x emission rate of 0.10 lbs/MMBtu as a 24-hour block average.

2014 Summer Study

- MDE is working with Raven Power and NRG to conduct research on site specific and system-wide NOx control options
  - Started Summer 2014
- Although not in a regulatory format the emission reduction benefits from Step 1 (optimize existing control technology) of the MDE regulatory proposal should be realized this summer
- The summer studies will also provide valuable data to help the affected facilities analyze the available options in Step 3 of the draft regulation

2014 – Are Emissions Lower?





Proposed Regulatory Schedule

- 2012 to 2014
  - Many meetings, calls and other discussions with interested stakeholders
- September 8, 2014
  - Air Quality Control Advisory Council (AQCAC)
- December 2015
  - Proposal in Maryland Register
- February 2015
  - Regulations become effective
- May 2015
  - Reductions begin