



# Delaware Electric Utilities Multi-Pollutant Regulation Development

Meeting #1

January 30, 2006

# [ *Agenda* ]

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- Goal and Reasons for Regulation
- Purpose of Committee & Invited Committee Members
- Pollutants Covered
- Affected Units
- Control Technologies (NO<sub>x</sub>, SO<sub>x</sub>, Hg)
- Repowering Option
- Related Initiatives (CAIR/CAMR, RGGI)
- Regulatory Development Timeline
- Discussion Issues and Next Meeting

# ***Goal of Regulation***

To require a significant reduction in air emissions from Delaware's coal and residual oil fired power plants.

# ***Reasons For Regulation***

- Reducing emissions from Delaware's power plants will benefit public health, safety, and welfare.
  - Coal fired power plants are Delaware's largest emitters (1<sup>st</sup> and 2<sup>nd</sup>) on the Toxics Release Inventory (TRI).
  - Power plant emissions contribute to Delaware's non-attainment with the ozone air quality standard.

# ***Reasons For Regulation*** (cont'd)

- Power plant emissions contribute to Delaware's non-attainment with the fine particulate matter air quality standard.
  - Preliminary modeling indicates that Delaware will be close to attainment of the current PM<sub>2.5</sub> standard by the 2010 attainment date.
  - The current standard is not protective of public health, and the EPA has proposed a new standard which at least New Castle and Sussex Delaware is monitoring non-attainment.
  - We should take action now to preclude a new non-attainment designation, and to prevent continued negative health impacts.

## ***Reasons For Regulation*** (cont'd)

- Currently there are four fish advisories in the Delaware Bay where mercury is a contaminant of concern.
- As much as 25% of the nitrogen entering Chesapeake Bay and Delaware's inland bays is attributable to deposition from the air.
- Power plant emissions contribute to acid rain, which causes materials damage and harms aquatic life.

## ***Reasons For Regulation*** (cont'd)

- In addition to the negative health impacts, both NO<sub>x</sub> and SO<sub>x</sub> are significant contributors to Delaware's regional haze problem.
- Studies have shown that's communities close to coal-fired power plants have a higher incidence of respiratory illness, including asthma, than areas more removed from these pollution sources.

# ***Reasons For Regulation*** *(cont'd)*

- Federal actions do not reduce emissions from Delaware power plants.
  - The EPA has finalized the Clean Air Interstate Rule (CAIR) and the Clean Air Mercury Rule (CAMR) as a means to address emissions from power plants.
  - EPA modeling predicts no Delaware units installing SCR or scrubbers by 2010.

## ***Reasons For Regulation*** (cont'd)

- EPA modeling predicts no Delaware units installing mercury controls as a result of CAMR.
- “zero-out-modeling” shows that the Delaware emissions alone can cause exceedances of the federal ozone air quality standards in Delaware and the surrounding states.

## ***Reasons For Regulation*** (cont'd)

- The American Lung Association (ALA) grades each county in the nation on air quality annually in its State of the Air report, with a grade of “A” being best, and a grade of “F” being worst .
- In this years (2005) report all three Delaware counties received a grade of “F” relative to its ozone air quality, and a grade of “F” in New Castle and “D” in Kent and Sussex for PM<sub>2.5</sub> air quality.
- The ALA report is consistent with Delaware’s ambient monitoring data.

# ***Reasons For Regulation*** (cont'd)

- **Ozone RFP - Requirement #1**: Reductions needed to meet CAA Reasonable Further Progress (RFP) requirements:
  - Delaware must reduce “grown” 2002 base year VOC and/or NOx emissions by 15%: (i.e., about 50.3 TPD “VOC Equivalent”)
  - Preliminary assessment indicates we are on track to meet these requirements:
    - Provided Regs. we are working on are finalized (e.g., multi-P, lightering, etc.)
    - Note that we need local reductions from EGU’s to meet this requirement, and CAIR does not get these reductions.

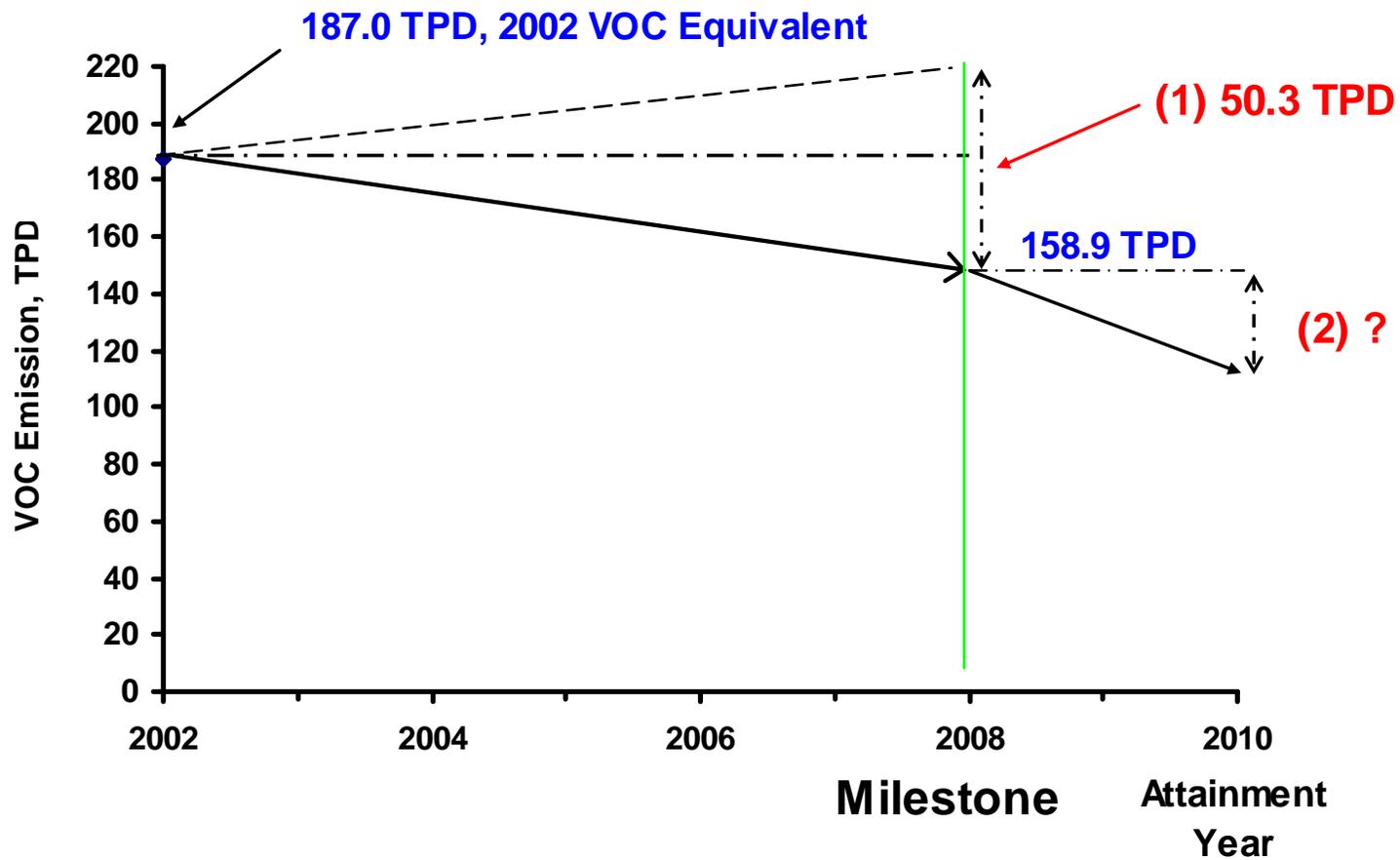
# ***Reasons For Regulation*** (cont'd)

- **Ozone RFP - Requirement #2**: DE and upwind states must reduce emissions sufficient to attain ozone NAAQS by 2010:
  - Both EPA and preliminary OTC Modeling indicates more than the minimum RFP reductions are needed to attain.
  - SIP quality Modeling results that determine how much more VOC/NO<sub>x</sub> reductions are needed for the Philadelphia CMSA to attain in 2010 are becoming available now.
  - AQMS is working to make reductions where feasible, and is working with OTC and NESCAUM, and mid-western states through the OTC to identify and develop regional control measures.
  - Also, further VOC/NO<sub>x</sub> reductions will be needed beyond 2010 to offset growth and maintain the ozone NAAQS

## Delaware State Total

(1) 15% VOC-equivalent Emission Reduction by 2008, 50.3 TPD;

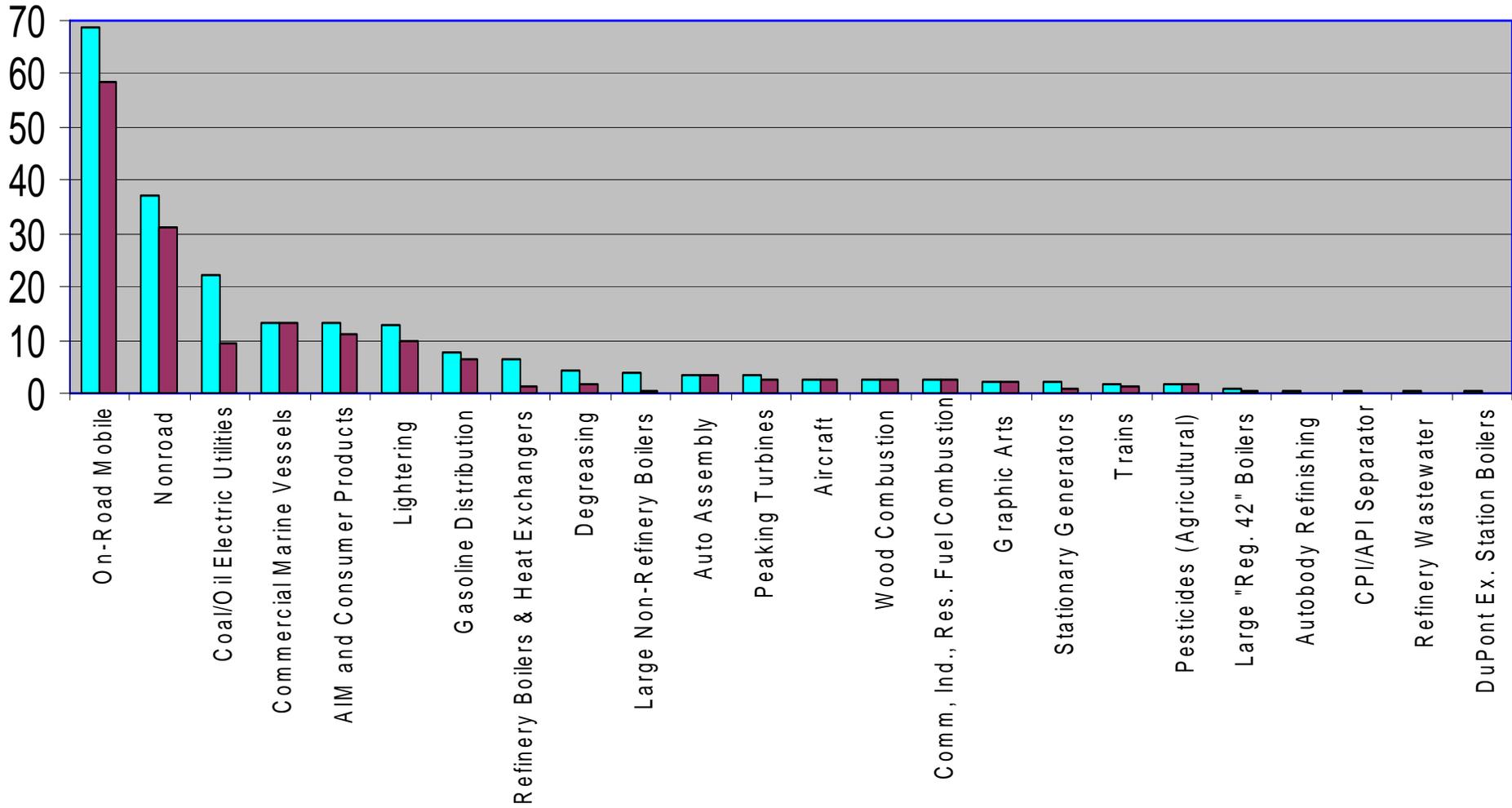
(2) Additional reduction to be Needed for Attainment in 2010: ?



POST 2002 DE Control Measures	NOX	SOX	VOC	Primary PM
<b>Stationary Sources</b> Power Plant Multi-Pollutant Refinery Large Boiler/Heater Peaking Units Petroleum Refineries Crude Oil Lightering State-wide Coal, Residual oil, and Distillate oil Sulfur Limits RACT on all major primary PM sources	X X X     	X    X   	   X X   	      X
<b>Mobile Source Rules</b> Federal Non-Road Federal On-Road Diesel Federal Recreational Marine Gasoline/Diesel Engines Federal Commercial/military Marine diesel engines Federal Locomotive Rule Federal Aircraft emission standards Federal Marine vessels, residual oil Rule Delaware Anti-Idling Regulation OBD in Sussex Federal Ultra-Low Sulfur Fuels	X X X X X X X X X X X	X X X X X X X X X X X	X X X X X X X X X X	          
<b>Areas Sources</b> Delaware Small Stationary Generators (DG) Regulation Federal Small Spark Ignition (Gasoline) Engines Rules AIM (next round) Consumer Products (next round) Stage II and ORVR Cutback Asphalt Printing & Graphic Arts Others.....	X X       	X X       	   X X X X X	       

# 95% of DE 2002 VOC Equivalent Emissions (TPD)

2002 Emissions 2009 Emissions



# ***Purpose of Committee***

- The review committee is to aid in the development of the regulatory requirements and associated language.
- The committee is made up of:
  - State Agencies
  - Power plant owners and operators
  - Persons with environmental interests
  - persons impacted by the emissions from power plants

# *Invited Committee Members*

- State Agencies:
  - DNREC
  - DHSS
  - Public Service Commission
  - Delaware Economic Development Office
- Impacted Utilities:
  - Conectiv Energy
  - NRG Energy, Inc.
  - City of Dover
- Environmental Groups:
  - Green Delaware
  - American Lung Assoc.
  - Mid-Atlantic Environmental Law Center
  - Environmentalists for Truth
  - Sierra Club
  - Audubon Society
- Citizens & Legislature
  - William (Bill) Zak
  - Hon. George H. Bunting, Jr.
  - Center for Inland Bays

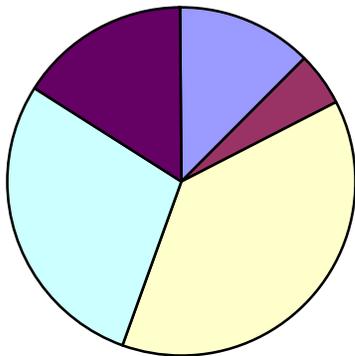
# ***Pollutants Covered***

## Multi-P Approach:

- Nitrogen Oxides (NO<sub>x</sub>). One of the key air pollutants that cause Delaware's ground level ozone problem, and an associated larger regional ozone problem that covers much of the eastern United States.
- Sulfur Oxides (SO<sub>x</sub>). Both NO<sub>x</sub> and SO<sub>x</sub> are significant contributors to Delaware's fine particulate matter problem, the associated larger regional fine particulate matter problem and the regional haze problem.
- Mercury (Hg). Hg is a toxic heavy metal, which, when ingested, can cause serious neurological damage, particularly to developing fetuses, infants, and children.

# 2002 Base Year Emissions - NO<sub>x</sub>

NOX - tons per year

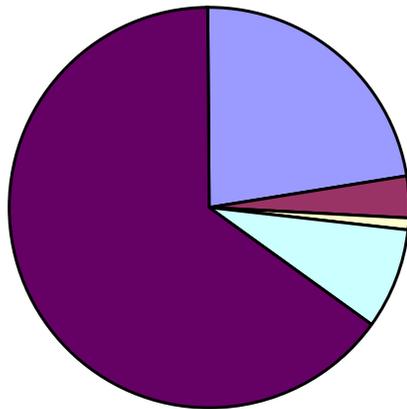


■ Point (less EGUs) ■ Area ■ On-road ■ Off-road ■ EGU's

- Delaware's power plants are among the largest NO<sub>x</sub> emitting sources in the state.
- In 2002 they accounted for about 55% of the total stationary source NO<sub>x</sub> emissions, and about 16% of Delaware's overall NO<sub>x</sub> inventory.

# 2002 Base Year Emissions - SO<sub>x</sub>

SOX - tons per year

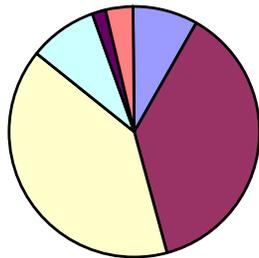


■ Point (less EGUs) ■ Area ■ On-road ■ Off-road ■ EGU's

- Delaware's power plants are the largest SO<sub>x</sub> emitting sources in the state.
- They account for about 74% of the total stationary source SO<sub>x</sub> emissions, and about 65% of Delaware's overall SO<sub>x</sub> inventory.

# 2004 TRI Emissions – Hg

Mercury - pounds per year



Based on the 2004 TRI data, with the shutdown of occidental chemical, **77%** of all of the mercury (HG) emissions in Delaware come from Delaware's six coal fired power plants.

# ***Affected Units***

Applicability:

- Criteria 1: Coal and Residual oil fired electric utility units
- Criteria 2: Nameplate capacity equal to or greater than 25 megawatts

<b>Unit (year built)</b>	<b>Age</b>	<b>Fuel</b>	<b>NO<sub>x</sub> Controls – Current Emission Rate</b>	<b>SO<sub>x</sub> Controls – Current Emission Rate</b>	<b>Mercury Controls – Current Emission Rate</b>
<b>Indian River 1 (1957)</b>	48	Coal	First generation low NO <sub>x</sub> burners & overfire air – <b>0.38 lb/mmbtu</b>	Uncontrolled – <b>2.2 lb/mmbtu</b>	Uncontrolled
<b>Indian River 2 (1959)</b>	46	Coal	First generation low NO <sub>x</sub> burners & overfire air – <b>0.33 lb/mmbtu</b>	Uncontrolled – <b>2.1 lb/mmbtu</b>	Uncontrolled
<b>Indian River 3 (1970)</b>	35	Coal	First generation low NO <sub>x</sub> burners, overfire air, & selective non-catalytic reduction – <b>0.28 lb/mmbtu</b>	Uncontrolled – <b>2.2 lb/mmbtu</b>	Uncontrolled
<b>Indian River 4 (1980)</b>	25	Coal	First generation low NO <sub>x</sub> burners, overfire air, & selective non-catalytic reduction – <b>0.30 lb/mmbtu</b>	Uncontrolled - <b>1.0 lb/mmbtu</b>	Uncontrolled
<b>EdgeMoor 3 (1954)</b>	51	Coal	Selective non-catalytic reduction – <b>0.17 lb/mmbtu</b>	Uncontrolled – <b>1.01 lb/mmbtu</b>	Uncontrolled
<b>EdgeMoor 4 (1966)</b>	39	Coal	First generation low NO <sub>x</sub> burners & gas reburn – <b>0.18mmbtu</b>	Uncontrolled – <b>1.04 lb/mmbtu</b>	Uncontrolled
<b>EdgeMoor 5 (1973)</b>	32	Residual Oil	First generation low NO <sub>x</sub> burners – <b>0.35 lb/mmbtu</b>	Uncontrolled – <b>0.60 lb/mmbtu</b>	NA
<b>Mckee Run 3 (1975)</b>	30	Residual Oil	Burner modifications & Fan Boost Overfire Air – <b>0.35 lb/mmbtu</b>	Uncontrolled – <b>0.73 lb/mmbtu</b>	NA

# ***Control Technologies***

- Highly effective emission reduction technologies commercially available to attain significant reductions in NO<sub>x</sub>, SO<sub>x</sub> and Hg emission rates exist.
- Some of the technologies that may be candidates for use as part of an overall NO<sub>x</sub>/SO<sub>x</sub>/Hg reduction strategy for retrofit to existing boilers are summarized on the following charts.

# ***NO<sub>x</sub> Control Technology***

<b><u>Technology</u></b>	<b><u>Applicability</u></b>	<b><u>Reduction Potential</u></b>
Selective Non-Catalytic Reduction (SNCR)	Coal, oil, and gas fired	Up to 60%
Selective Catalytic Reduction (SCR)	Coal, oil, and gas fired	Up to 90%

# [ *SO<sub>2</sub> Reduction Technology* ]

<u>Technology</u>	<u>Applicability</u>	<u>Reduction Potential</u>
Furnace or Duct Sorbent Injection	Coal fuel	Up to 60%
Flue Gas Desulfurization	Coal fuel	Up to 90%
Low Sulfur Oil	Oil	About 50%

# ***Hg Reduction Technology***

<u>Technology</u>	<u>Applicability</u>	<u>Reduction Potential</u>
Side Benefit of SO <sub>2</sub> Reduction Technology	Coal Fuel	Up to 50%
Activated Carbon Injection	Coal Fuel	Up to 90%

# ***Repowering Option***

- Principle #1: Emissions controls are technologically and economically available.
- Principle #2: Investing in these aging/inefficient plants may not make the most sense.
  - Repowering would, in addition to cleaning up the air emissions, increase energy efficiency, and provide Delaware citizens with more reliable power.
  - Committee should develop and incorporate incentives to encourage the repowering of these units into the regulation.

# ***Related Initiatives***

- CAIR/CAMR
  - To comply with these federal rules:
    - Mass NO<sub>x</sub>, SO<sub>x</sub>, and Hg emissions must be capped (in addition to any rate based multi-p requirements we establish).
    - Trading?
    - A separate regulation?
  - OTC is assisting DE in evaluating need for tighter NO<sub>x</sub> and SO<sub>x</sub> caps than CAIR based on regional attainment modeling.
- Regional Greenhouse Gas Initiative ( RGGI)
  - Delaware (through DNREC and the Public Service Commission) is participating in the RGGI to reduce greenhouse gas emissions.
  - This will be developed under a separate regulation at a later date.
  - This could result in greenhouse gas controls or offsets being required to reduce or offset carbon dioxide emissions from power plants in Delaware.

# ***Regulatory Development Timeline***

- Compliance Date: January 2008/9
- Regulation Effective Date: September 11, 2006 (based on CAIR).
- CAIR/CAMR SIP due: September 11, 2006.
- Public Hearing: end of July 2006
- Proposal: In July 1<sup>st</sup> 2006 DE Register
- Public Workshop/Information Sessions: June 2006

# ***Discussion Issues***

- Regulatory Emission Limits
  - SCR and Scrubber based
  - Other options
- Trading Options:
  - None
  - Facility-wide bubble
  - Trading under Regional Programs
- Repowering
- Phase-In Schedule

# ***Next Meeting***

At this time we anticipate holding of five committee meetings, one a month, between January and May. The tentative dates and agenda for each meeting are:

- January 30<sup>th</sup>: DNREC will present reasons for Regulation, anticipated benefits, outline preliminary regulatory provisions, and go over the regulatory development timeline.
- **February 23<sup>rd</sup>: Affected power plant owners and operators will have opportunity to present their views on the impacts of regulation on power in DE, and to present alternate regulatory provisions for consideration.**
- March 30<sup>th</sup>: Environmental and impacted persons will have opportunity to present their views on the information discussed in the first two meetings, and to present any additional information they believe pertinent to the development of the regulation.
- April 27<sup>th</sup>: The Department will present draft regulatory language for discussion.
- May 31<sup>st</sup>: The Department will present a second draft of regulatory language for discussion.