Ozone/Precursor Transport
A Downwind State's Perspective

NACAA Spring Membership Meeting

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Overview

- CAA requirements and reality check
- Impacts on Delaware
- EPA's 1/22/2015 Framework for Addressing Transport
- Comparison of the CAA and the EPA Framework
- Modeling is a Tool, but not a Precision Instrument
- Meteorology is a Variable, not a Constant
- Issues
- Necessary elements

New or revised National Air Quality Standards

- Within two years after NAAQS promulgation: With input from the states and tribes, EPA must identify or "designate" areas as meeting (attainment areas) or not meeting (nonattainment areas), the standards. Designations are based on the most recent set of air monitoring data.

- Within three years after NAAQS promulgation: All states must submit plans, known as state implementation plans (SIPs)

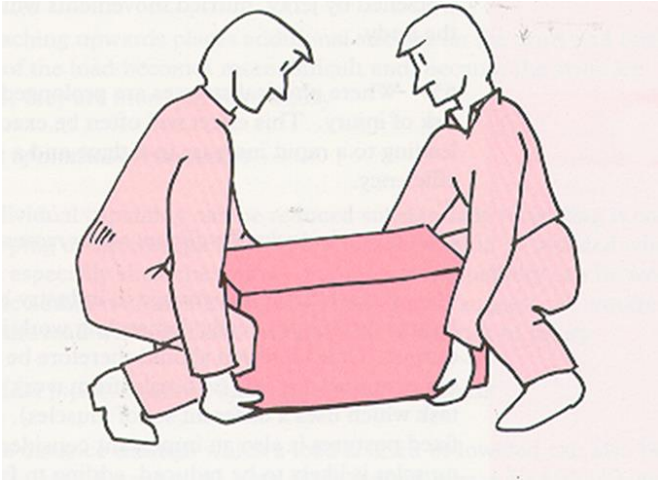
- Within 18-36 months after designations: Due dates for nonattainment area SIPs are based on the area designation date and vary by pollutant and area classification. Each nonattainment area SIP must outline the strategies and emissions control measures that show how the area will improve air quality and meet the NAAQS.

The Good Neighbor Requirement

- Every State must adopt a SIP that provides for implementation, maintenance, and enforcement of the NAAQS (CAA 110(a)(1)).
- The SIP is due within 3 years after the promulgation of a NAAQS. The CAA explicitly allows the EPA do prescribe a shorter period, but not a longer period (CAA 110(a)(1)).
- The required content of the SIP is spelled out in 110(a)(2)(A) – (M).
- The SIP must contain adequate provisions prohibiting emissions of air pollutant in amounts which will contribute significantly to nonattainment in, or interfere with maintenance by, any other State (110(a)(2)(D)(i)(I)).

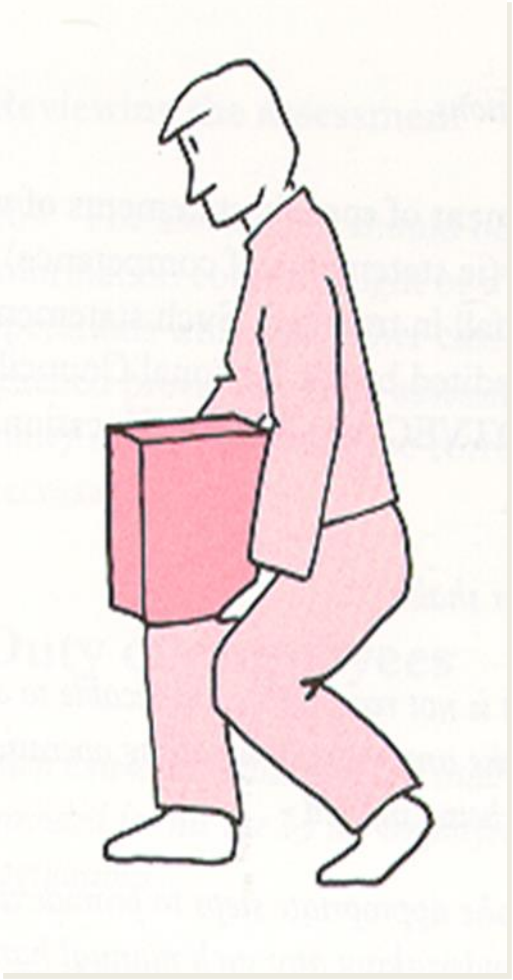
How CAA is Supposed to Work

- Non-attainment areas adopt measures to reduce emissions,
- Contributing areas reduce their emissions at the same time (good neighbor help),
- Non-attainment area attains the standard.



How Transport Has Worked

- Non-attainment areas adopt measures to reduce emissions,
- Neighbors continue to grow their emissions and occupy the void,
- Non-attainment areas fail to attain,
- Non-attainment areas get bumped-up to a higher classification and adopt more measures,
- Neighbors are glad they are not part of that,
- Cycle is repeated.



Impact in Delaware

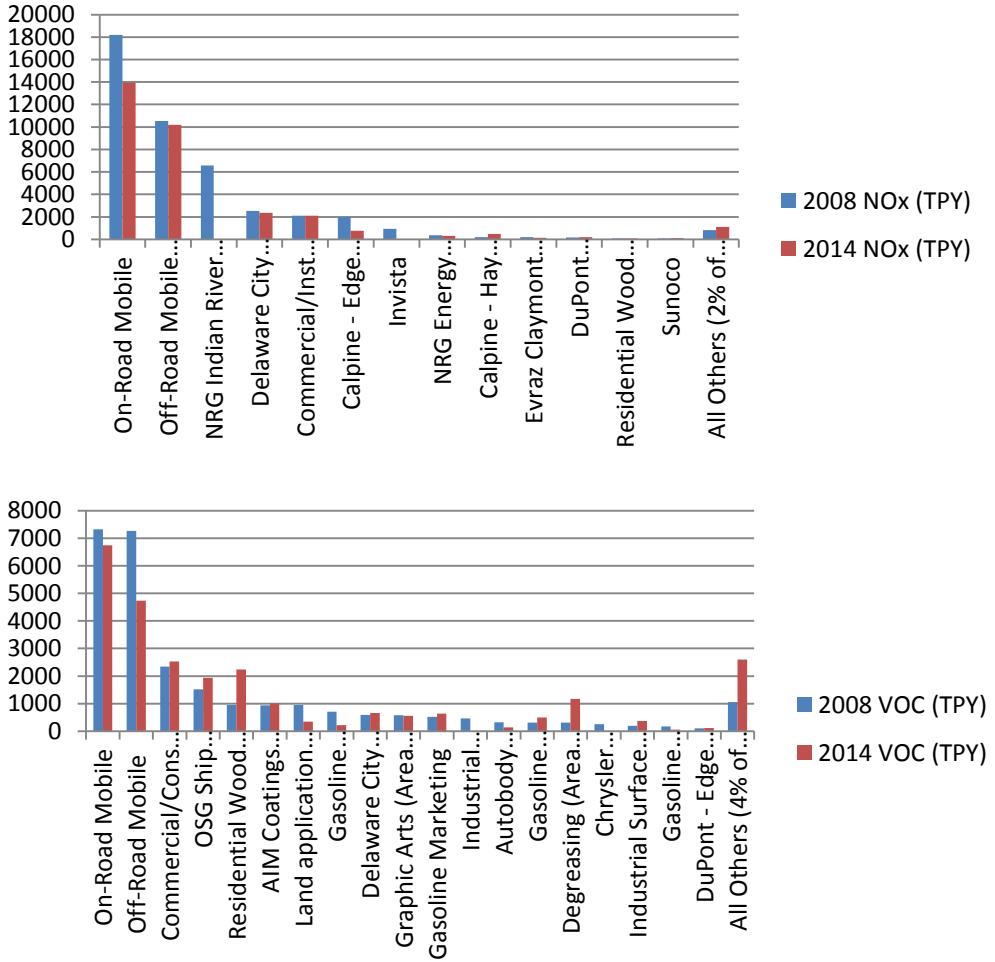
- Delaware's major source threshold 25 tons VOC and NOx (anti-backsliding),
- Overall reduction in Delaware since 1990 was a 68% reduction in VOC and a 67% reduction in NOx emission levels.
- The next ton of ozone precursor reduction in Delaware is estimated to cost above $5,300.
- The next ton NOx reduced from an EGU in Delaware will cost approximately $8,800.

Delaware Emission Controls and Costs

Regulation (7 DE Admin. Code)	Pollutant	Estimated Cost Effectiveness
1112 (NOx RACT)	NOx	$400 - $12,300 per ton
1124 (VOC RACT)	VOC	$3,000 - $29,000 per ton
1126 (Vehicle I/M)	VOC, NOx	$1,000 - $5,000 per ton
1136 (Vehicle I/M)	VOC, NOx	$1,000 - $5,000 per ton
1125 (non-attainment NSR)	VOC, NOx	$39,700 to $150,000 per ton
1142, Section 2.0 (NOx emissions from Petroleum Refineries)	NOx	$10,000 - $150,000 per ton
1141, Section 1.0 (AIM)	VOC	$6,400 per ton
1141, Section 2.0 (Consumer Products)	VOC	$800 per ton
1144 (Stationary Generators)	NOx	$23,000 - $90,000
1146 (EGU Multi-Pollutant Regulation)	NOx	$1,200 - $5000 per ton
1148 (Combustion Turbines)	NOx	$63,000 - $78,000 per ton

There is Nothing Left that Delaware Can Do

- Delaware has controlled every non-trivial VOC and NOx emitting source and source category in the State
- Delaware demonstrated this in a detailed CAA 110 Infrastructure SIP

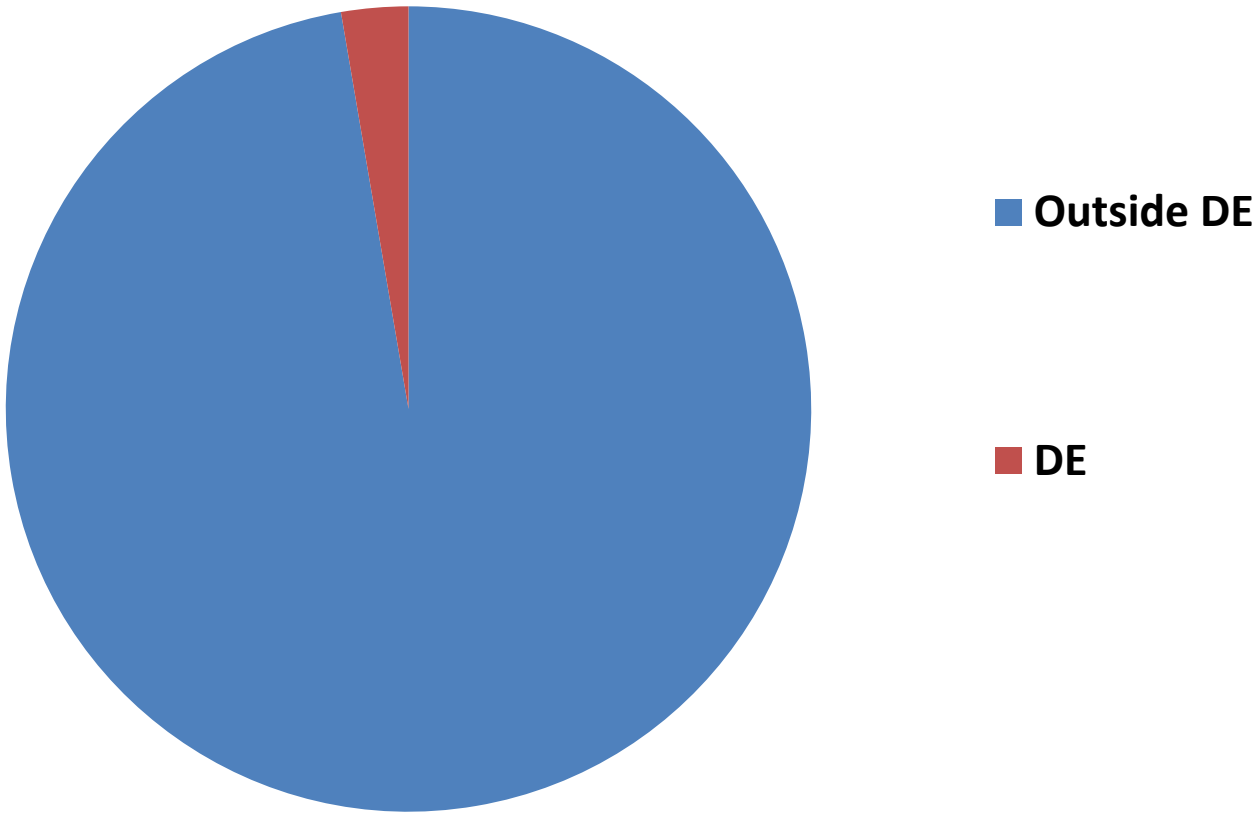


Impact in Delaware

- Delaware's highest Impact to its Seaford monitor in Sussex County (stand-alone non-attainment) = 0.66 ppb [1].
- Indiana's impact on the same monitor = 2.14 ppb.
- Kentucky's impact = 2.69 ppb.
- Ohio's impact = 3.50 ppb.
- Maryland's Impact = 14.32 ppb.
- Pennsylvania's impact = 3.96 ppb.
- Texas's Impact = 1.28 ppb.
- Virginia's Impact = 4.61 ppb.
- West Virginia's impact = 3.01 ppb

[1] http://epa.gov/airtransport/O3TransportAQModelingTSD.pdf

Transport is the Problem



EPA's 1/22/2015 Framework for Addressing Transport

A good neighbor SIP is due no later than 3 years after promulgation of the NAAQS, and must contain adequate provisions prohibiting emissions which will contribute significantly to nonattainment or maintenance.

EPA Framework For Addressing Transport:

- Identify downwind air quality problems based on modeled future air quality concentrations for a year aligned with attainment deadlines for a particular NAAQS.
- Apply a screening threshold of 1 percent of the NAAQS is used to identify contributing upwind states warranting further review and analysis.
- Identify the emissions reductions necessary to prevent an identified upwind state from contributing significantly to those downwind air quality problems and
- Adopt permanent and enforceable measures needed to achieve those emissions reductions.

Comparison of the CAA and the EPA Framework for 2008 Ozone Std.

	CAA Requirement	EPA Framework
Due Date	3 years after promulgation of NAAQS	Soon
Content	Adequate provisions prohibiting emissions which will contribute significantly to nonattainment or maintenance.	Give us what you can
Downwind Areas	Areas designated non–attainment or maintenance that **are** impacted significantly.	Areas projected to be non-attainment/maintenance that **will be** impacted by 1% or more based on **one** future year modeling.
Adequate Provisions	Provisions that result in less than significant impact, or that cover all sources and at least equivalent to impacted state.	Running of existing controls on EGUs.
Averaging Time	Averaging time that is protective of the NAAQS.	Ozone season mass.

Modeling is a Tool, but not a Precision

340071001	New Jersey	Camden	3.308	1.84	-44%
340150002	New Jersey	Gloucester	5.510	2.46	-55%
360850067	New York	Richmond	0.478	1.13	136%
421010004	Pennsylvania	Philadelphia	1.452	1.35	-7%

- The 4 monitors in red letters are the monitors that Delaware significantly impacts (because they are projected to have maintenance problems in 2018).
- Note, for example, Delaware's impact to all CT monitors except for one decreased by about 30%. The one CT monitor where Delaware's impact increased is located in Fairfield County, and DE's impact to the other monitor in Fairfield County decreased by 37%.

330115001	New Hampshire	Hillsborough	0.921	0.19	-79%
340071001	New Jersey	Camden	3.308	1.84	-44%
340110007	New Jersey	Cumberland	5.791	3.21	-45%
340150002	New Jersey	Gloucester	5.510	2.46	-55%
340170006	New Jersey	Hudson	0.678	0.81	19%
340190001	New Jersey	Hunterdon	1.562	0.22	-86%
340210005	New Jersey	Mercer	1.243	1.02	-18%
340230011	New Jersey	Middlesex	1.275	0.88	-31%
340250005	New Jersey	Monmouth	0.359	0.62	73%
340273001	New Jersey	Morris	0.762	0.16	-79%
340290006	New Jersey	Ocean	1.546	0.82	-47%
360270007	New York	Dutchess	0.777	0.23	-70%
360810124	New York	Queens	0.501	0.94	88%
360850067	New York	Richmond	0.478	1.13	136%
361030009	New York	Suffolk	1.622	0.60	-63%
361030002	New York	Suffolk	1.004	0.38	-62%
361030004	New York	Suffolk	0.872	0.56	-36%
420170012	Pennsylvania	Bucks	2.165	1.47	-32%
420450002	Pennsylvania	Delaware	5.066	2.66	-47%
420910013	Pennsylvania	Montgomery	1.834	0.42	-77%
420958000	Pennsylvania	Northampton	0.380	0.88	132%
421010024	Pennsylvania	Philadelphia	1.881	1.35	-28%
421010004	Pennsylvania	Philadelphia	1.452	1.35	-7%
440071010	Rhode Island	Providence	0.684	0.37	-46%
440090007	Rhode Island	Washington	0.710	0.35	-51%
511071005	Virginia	Loudoun	0.988	0.20	-80%
518000004	Virginia	Suffolk City	0.714	0.51	-29%

Below is a comparison between the 1/22/2015 modeling (which is based on a grown 2011 inventory) and the CSAPR 2012 base case modeling (which is based on a grown 2005 inventory).

Delaware's impact on all Delaware monitors decreased on average by 60% except for Lewes, which increased by 83%.

	New EPA Version 1 2018 Transport Modeling					CSAPR 2012 Base Case Modeling			
County	2009 - 2013 Average DV	2009 - 2013 Maximum DV	Projected 2018 Average DV	Projected 2018 Maximum DV	Projected 2018 DE Emissions Impact (ppb)	2012 Base Case Ozone Average Design Values	2012 Base Case Ozone Maximum Design Values	2012 Base Case DE Emissions Impact (ppb)	% Change between 2012 Base modeling and 2018 Projection Modeling
Kent	74.3	78.0	64.3	67.5	1.8	71.2	71.8	4.4	-60%
New Castle	76.3	80.0	64.9	68.1	0.4	70.3	72.0	1.5	-71%
New Castle	78.0	78.0	68.1	68.1	1.9	73.6	74.2	6.3	-69%
New Castle	77.7	80.0	67.4	69.4	3.0	72.1	72.7	5.3	-44%
New Castle	75.0	75.0	65.1	65.1	2.9	-	-	-	-
Sussex	77.3	81.0	66.3	69.4	0.7	71.2	71.8	1.4	-53%
Sussex	77.7	81.0	68.6	71.5	7.1	74.1	75.2	3.9	83%

The Role of Meteorology

- Comparison of the impact on the Lewes monitor between the two modeling excursions for each of the states that significantly impact Delaware.
- It is sorted with the state that had the largest decrease in impact to the state that had the largest increase in impact.
- Note that the states to the north of DE all had a decrease in impact to the Lewes monitor, the states to the west all had an increase in impact, and the states to the south all had a huge increase in impact.
- Meteorology is a likely reason.

State	2018 Impact on Lewes	2012 Impact on Lewes	% Change (+ indicates more greater impact in 2018)
NY	0.63	9.092	**-93%**
CT	0.1	1.0	**-91%**
NJ	3.27	13.034	**-75%**
MI	0.33	1.171	**-72%**
IL	0.31	0.593	**-48%**
PA	7.58	10.552	**-28%**
OH	2.34	1.853	**26%**
IN	0.73	0.482	**51%**
MO	0.34	0.222	**53%**
VA	4.06	2.468	**65%**
MD/DC	8.3	4.6	**80%**
DE	7.1	3.9	**83%**
WV	1.99	0.637	**212%**
TN	0.25	0.059	**324%**
NC	2.18	0.422	**417%**
KY	1.34	0.185	624%
TX	0.66	0.074	792%

Issues

- 2018 projection includes reductions that are not enforceable in SIPS -- the CAA requires the SIP to include those measures.
- EPA framework is based on modeled projection --- What if EPA modeling was wrong and an area does not attain? This would be known years after an upwind SIPs were approved.
- EPA's framework relies on one year of meteorology which is insufficient to establish contribution.
- EPA's framework relies too heavily on imperfect emissions inventory.
- EPA's framework is not harmonized with the downwind area's attainment needs and contrary to the plain language of CAA.
- The purpose of good neighbor SIP submission is to assure that the state's SIP contains the necessary requirements for the attainment of the new or revised NAAQS **before** the attainment date.
- State obligation is not to let us just barely get into attainment. It must provide room for growth.

Necessary Elements

- Transport SIPs must be harmonized with attainment needs as required by the CAA. EPA must determine each state's contribution to other downwind states at the same time as it makes designation.

- Transport SIPs must be submitted on time or there should be a FIP.

- Upwind obligations cannot be deemed satisfied if large portions of inventory remain poorly controlled.
  - Require RACT on all major NOx and VOC sources.
  - Require BACT on all existing EGUs and large industrial boilers.
  - Require BACT on all sources with high ozone-day emissions.
  - Adopt the regional measures that have been recommended by the OTC (AIM, Consumer Products, etc.)

More Necessary Elements

- Cost kick-out must have a nexus with the cost of controls in downwind areas.
- Coordinated SIPs makes sense – Think Large Planning Areas.
- Federal measures for some categories (e.g. AIM, CP, ICI Boilers, RICE, etc.) will help everyone.

Questions?