MOG Attainment Modeling – Implications for Proposed Transport Rule

Presented by
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On behalf of the
Midwest Ozone Group

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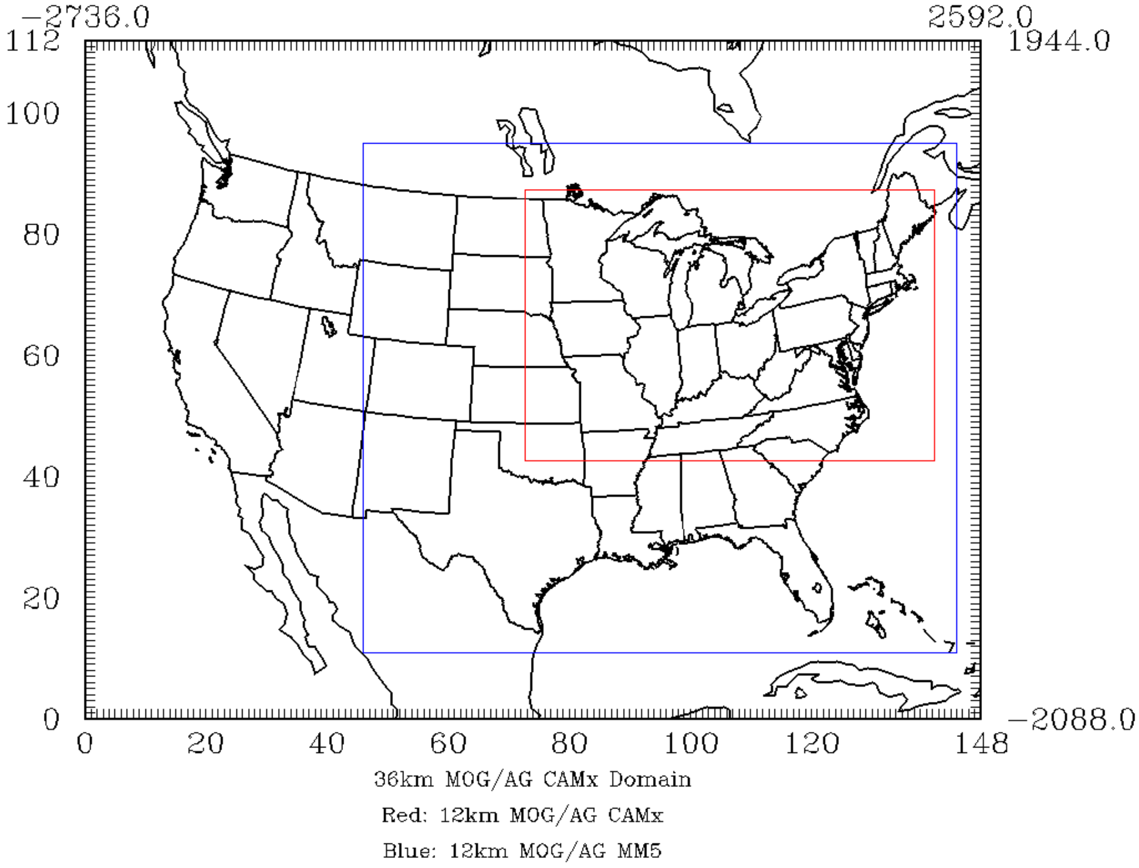
Overview

- Alpine Geophysics running a 2008 modeling platform with SMOKE/CAMx
- 2014/2018 Future Years - Business As Usual (BAU) Cases
- Environ conducted a review of ambient monitoring data
- Work was undertaken at the request of the Midwest Ozone Group and others

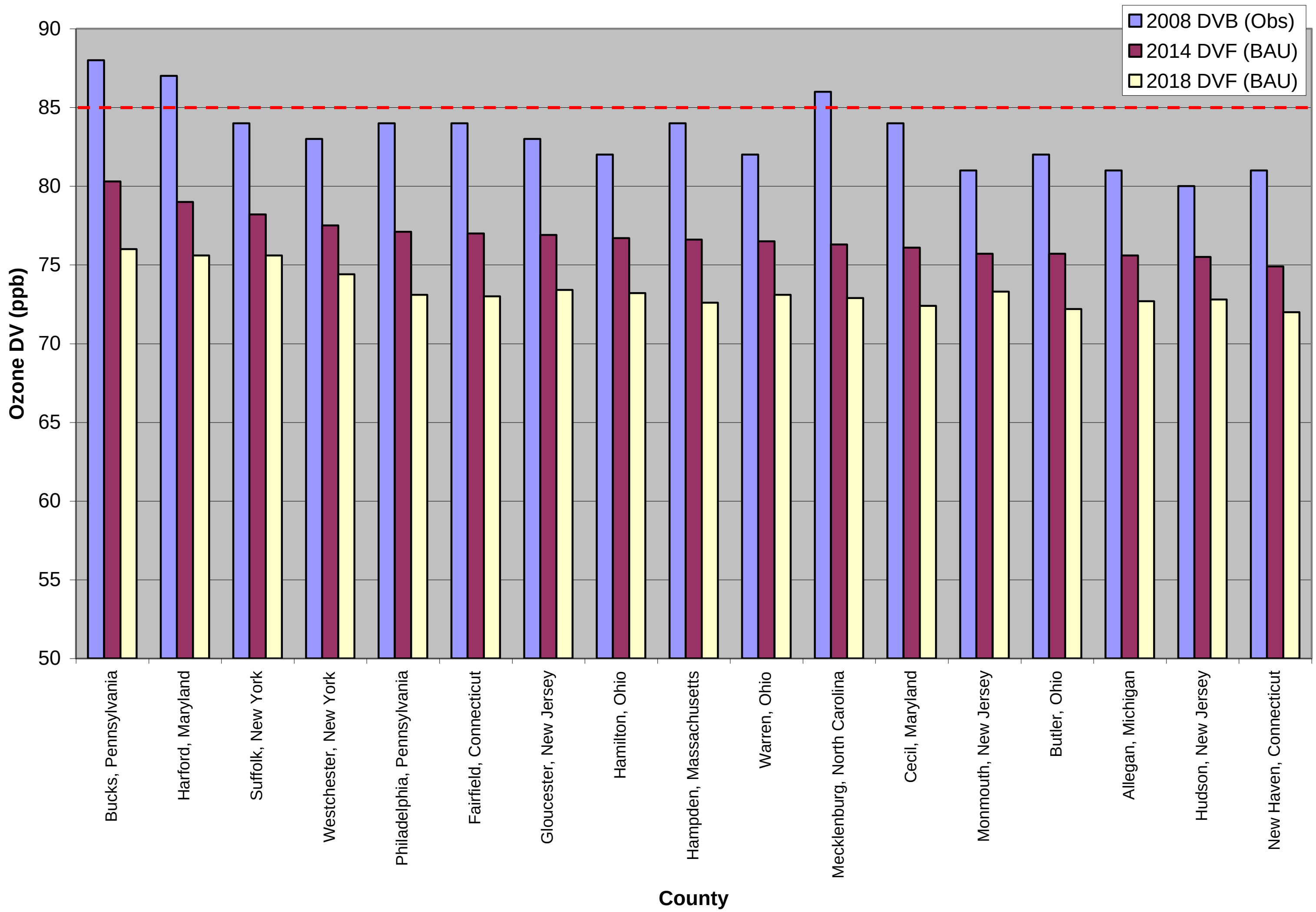
Modeled 12km Domain



Ozone

- Transport rule addresses 1997 standard of 85 ppb based upon a review of 2005 monitoring data
- ENVIRON's analysis of 2008 monitoring data shows many assumed non-attainment areas are in attainment (Attachment 1)
- Alpine's analysis shows that all but three monitor locations within 12km modeling domain are attainment by 2008 with use of most current design values (2007-2009)(Attachment 2)
- Alpine's modeling show that all monitor locations within 12km modeling domain are attainment by 2014 and remain in attainment in 2018

MOG Modeled Results (8-hr Ozone)



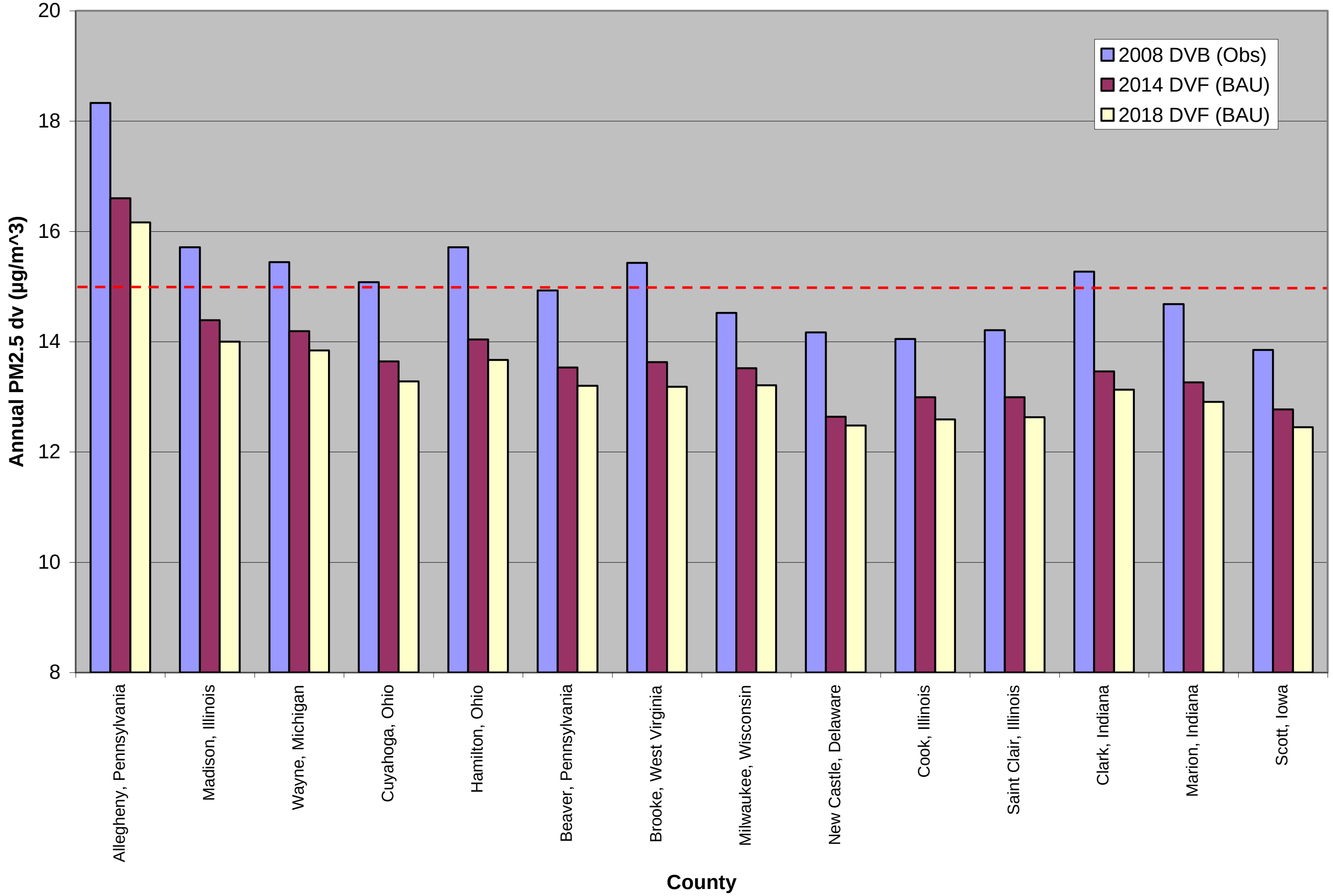
Annual PM 2.5

- Alpine's modeling shows that all but nine counties in the 12km modeling domain are in attainment of the annual PM2.5 NAAQS in 2008

- Alpine's modeling show that all but one monitor location (Allegheny, PA) in the 12km modeling domain shows attainment of the annual PM-2.5 NAAQS by 2014 <u>without new controls</u> and that continues to be the case in 2018

- EPA's technical support document describes Allegheny, PA as "heavily influenced" by local sources

MOG Modeled Results (Annual PM2.5)



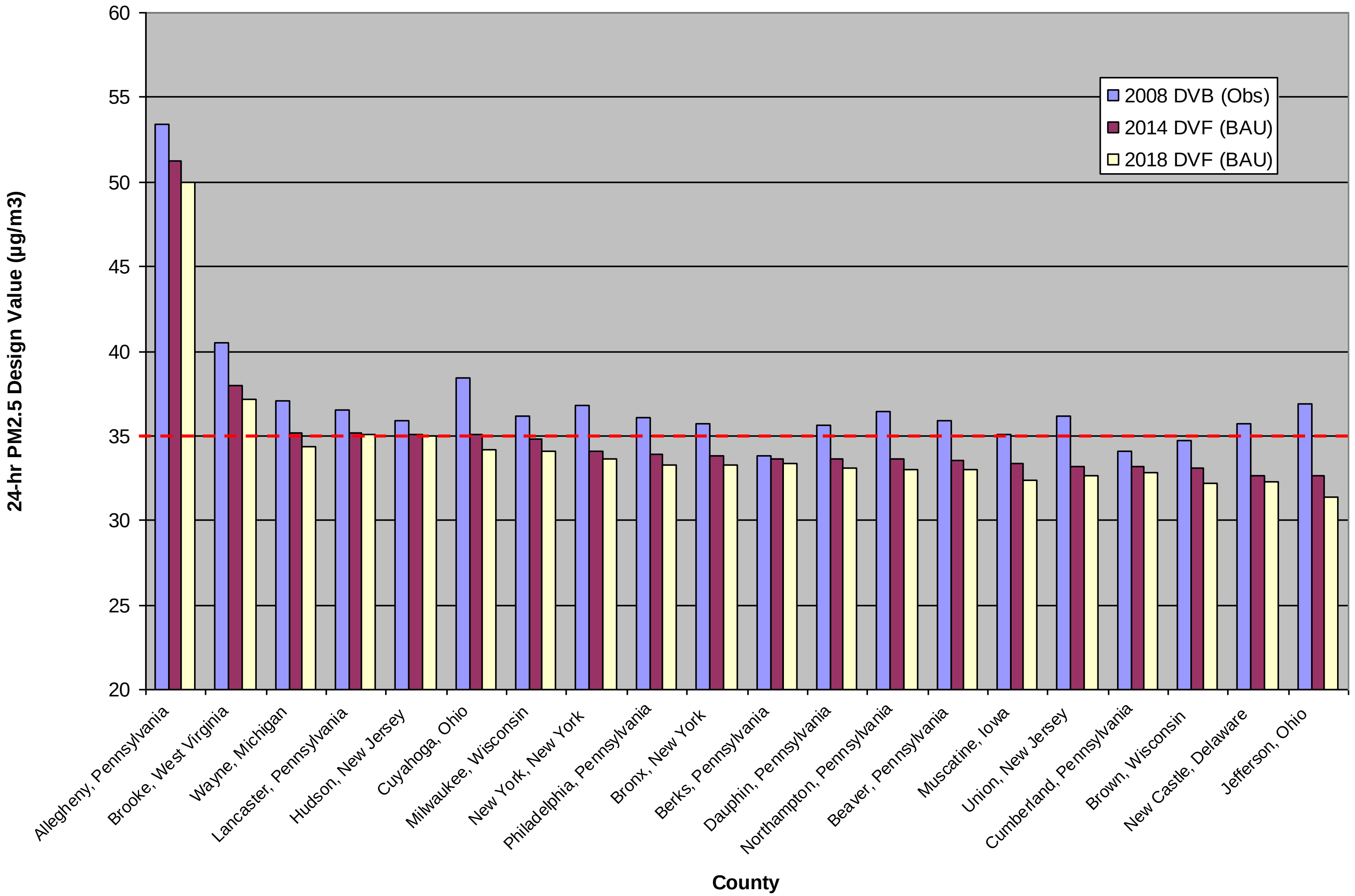
24-hr PM 2.5

- Alpine's modeling shows that 21 counties in the 12km modeling domain are in nonattainment of the 24-hr PM2.5 NAAQS in 2008

- Alpine's modeling for 2014 shows that all monitor locations (except for Allegheny County, PA and Brooke County, WV) within 12km modeling domain become attainment of 24-hr PM-2.5 NAAQS <u>without new controls</u> and that continues to be the case in 2018

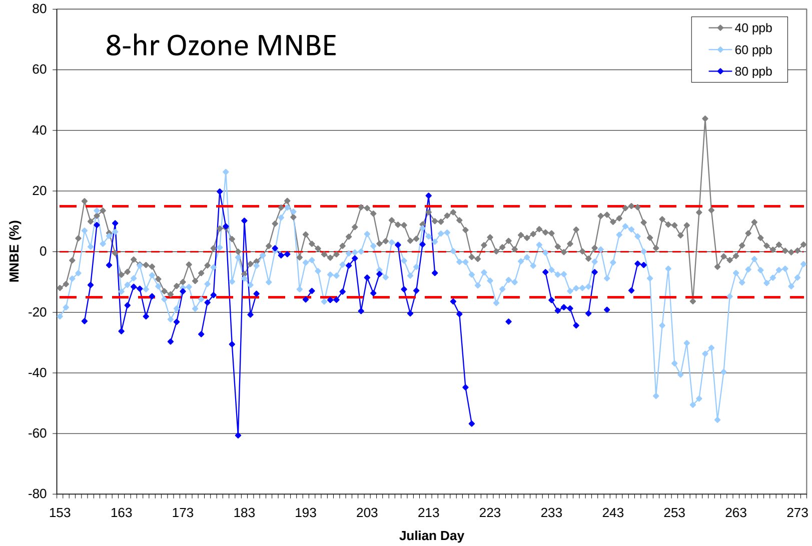
- Both Allegheny and Brooke appear to be influenced by local sources

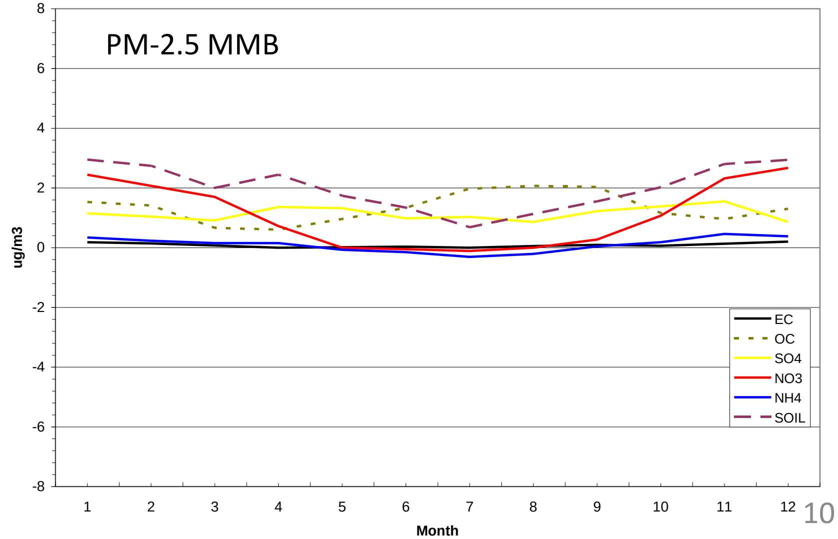
MOG Modeled Results (24-hr PM2.5)



Model Performance

- The CAMx operational evaluation for 8-hr ozone concentrations does not suggest presence of bias or compensating errors
- Systematic over prediction of PM species
  - Organic carbon traditionally under estimated
- The current 2008 36/12km CAMx modeling appears suited for policy exploration





Conclusion

- The ozone objectives of the proposed transport rule can be achieved within the 12km modeling domain with no new controls no later than 2014

- The annual PM objectives of the proposed transport rule can be achieved within the 12km modeling domain with no new controls no later than 2014 with the possible exception of local controls at the Allegheny PA location

- The 24-hr PM objectives of the proposed transport rule can be achieved within the 12km modeling domain with no new controls no later than 2014 with the possible exception of local controls at the Allegheny PA and Brooke WV locations

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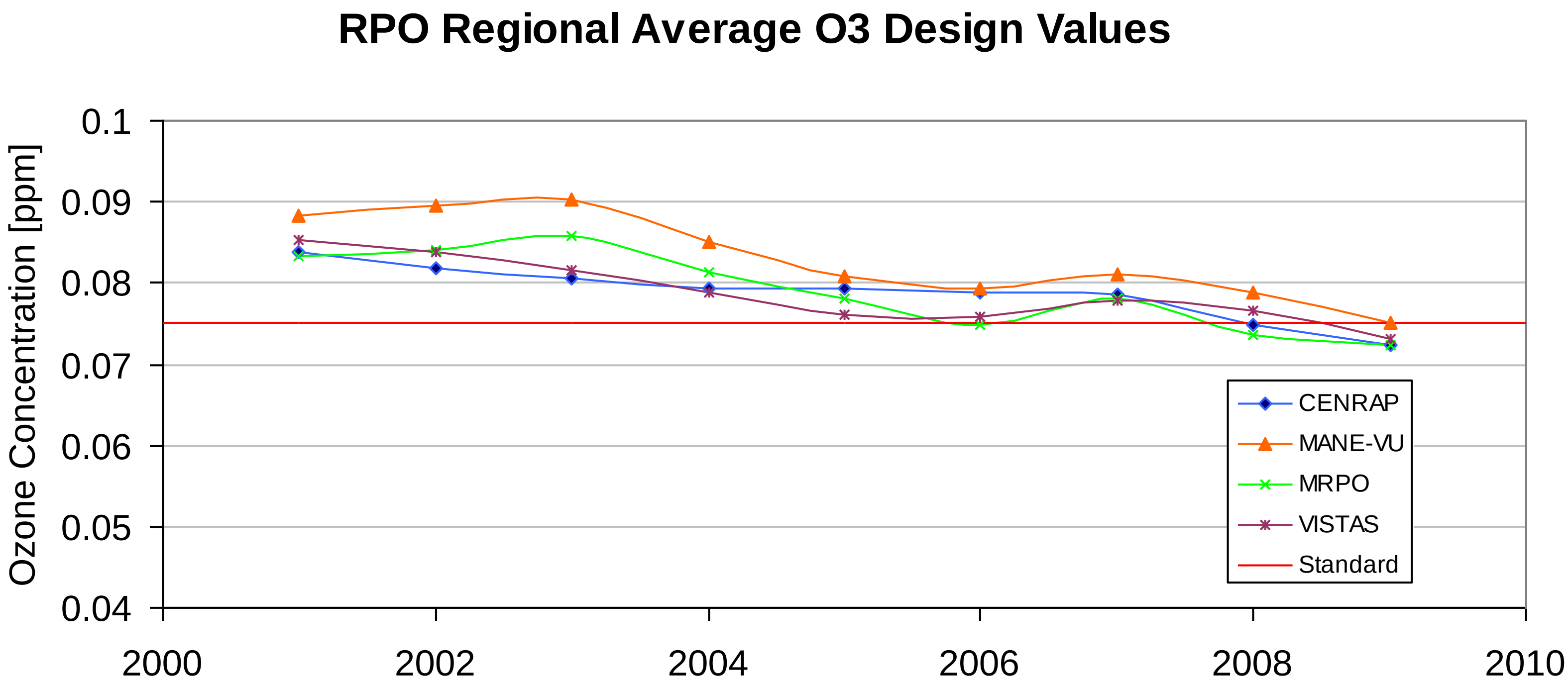
Attachment 1

O_3 Trends by Regions



- Average ozone DVs have decreased in all four regions by roughly similar amounts
- Trend slopes range from -1.8 to -1.3 ppb/year
- Trends are not monotonic, possibly reflecting influence of meteorology

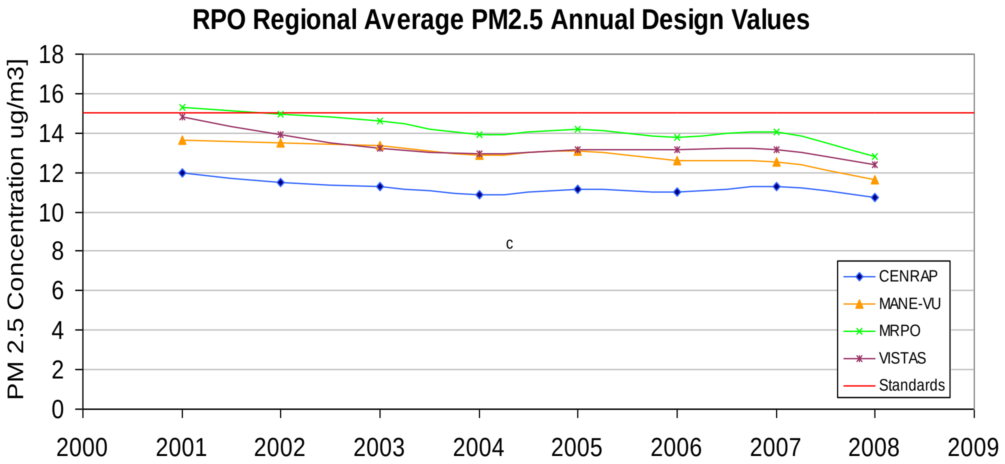
Attachment 2

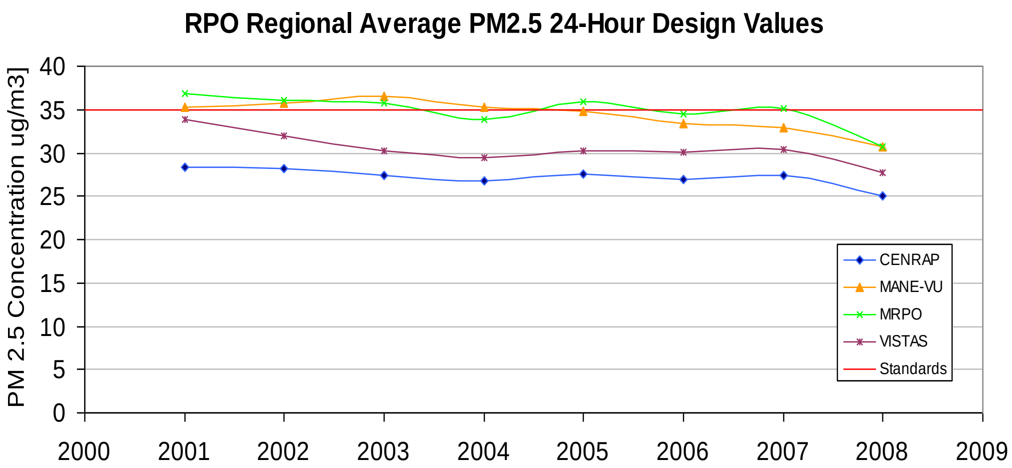
MOG Modeled Results (8-hr Ozone)

County	8-hr Ozone DV (ppb) 2008 DVB (Obs)	2014 DVF (BAU)	2018 DVF (BAU)
Bucks, Pennsylvania	88	80.3	76
Harford, Maryland	87	79	75.6
Suffolk, New York	84	78.2	75.6
Westchester, New York	83	77.5	74.4
Philadelphia, Pennsylvania	84	77.1	73.1
Fairfield, Connecticut	84	77	73
Gloucester, New Jersey	83	76.9	73.4
Hamilton, Ohio	82	76.7	73.2
Hampden, Massachusetts	84	76.6	72.6
Warren, Ohio	82	76.5	73.1
Mecklenburg, North Carolina	86	76.3	72.9
Cecil, Maryland	84	76.1	72.4
Monmouth, New Jersey	81	75.7	73.3
Butler, Ohio	82	75.7	72.2
Allegan, Michigan	81	75.6	72.7
Hudson, New Jersey	80	75.5	72.8
New Haven, Connecticut	81	74.9	72

Attachment 3

$PM_{2.5}$ Trends: Regions





- Average $PM_{2.5}$ DVs have decreased (negative trends) in all four regions
- Trend slopes range from -0.67 to -0.34 ug/m^3 (24-hr DVs)
- Trends are not monotonic, possibly reflecting influence of meteorology

Attachment 4

MOG Modeled Results (Annual PM2.5)

County	Annual PM Design Value (ug/m^3)		
	2008 DVB (Obs)	2014 DVF (BAU)	2018 DVF (BAU)
Allegheny, Pennsylvania	18.3	16.6	16.2
Madison, Illinois	15.7	14.4	14.0
Wayne, Michigan	15.4	14.2	13.8
Cuyahoga, Ohio	15.1	13.6	13.3
Hamilton, Ohio	15.7	14.0	13.7
Beaver, Pennsylvania	14.9	13.5	13.2
Brooke, West Virginia	15.4	13.6	13.2
Milwaukee, Wisconsin	14.5	13.5	13.2
New Castle, Delaware	14.2	12.6	12.5
Cook, Illinois	14.1	13.0	12.6
Saint Clair, Illinois	14.2	13.0	12.6
Clark, Indiana	15.3	13.5	13.1
Marion, Indiana	14.7	13.3	12.9
Scott, Iowa	13.9	12.8	12.5

Attachment 5

MOG Modeled Results (24-hr PM2.5)

County Name	24-hr PM Design Value (ug/m^3) 2008 DVB (Obs)	2014 DVF (BAU)	2018 DVF (BAU)
Allegheny, Pennsylvania	53.4	51.2	50
Brooke, West Virginia	40.5	38	37.2
Wayne, Michigan	37.1	35.2	34.4
Lancaster, Pennsylvania	36.5	35.2	35.1
Hudson, New Jersey	35.9	35.1	35
Cuyahoga, Ohio	38.4	35.1	34.2
Milwaukee, Wisconsin	36.2	34.8	34.1
New York, New York	36.8	34.1	33.6
Philadelphia, Pennsylvania	36.1	33.9	33.3
Bronx, New York	35.7	33.8	33.3
Berks, Pennsylvania	33.8	33.6	33.4
Dauphin, Pennsylvania	35.6	33.6	33.1
Northampton, Pennsylvania	36.4	33.6	33
Beaver, Pennsylvania	35.9	33.5	33
Muscatine, Iowa	35.1	33.4	32.4
Union, New Jersey	36.2	33.2	32.6
Cumberland, Pennsylvania	34.1	33.2	32.8
Brown, Wisconsin	34.7	33.1	32.2
New Castle, Delaware	35.7	32.6	32.3
Jefferson, Ohio	36.9	32.6	31.4

Attachment 6

SO_2 Emission Inventory

LADCO STATES	CAIR Caps 2015	CATR Caps 2014	MOG est. 2014	MOG est. 2018
IL	134,869	151,530	161,663	148,810
IN	178,219	201,412	344,807	330,548
MI	125,024	155,675	186,994	191,382
OH	233,464	178,307	394,031	273,537
WI	61,085	66,683	79,744	79,974

Attachment 7

NOx Emission Inventory

LADCO STATES	CAIR Caps 2015	CATR Caps 2014	MOG est. 2014	MOG est. 2018
IL	63,525	56,040	51,988	48,041
IN	90,779	115,987	113,621	99,325
MI	54,420	64,932	69,424	64,970
OH	90,556	97,313	109,634	93,082
WI	33,966	44,846	34,886	30,206