OTC Committee Meeting

April 4, 2013

Washington, D.C
Hall of States

Ali Mirzakhalili, P.E.
Stationary and Area Source Committee Update





OZONE TRANSPORT COMMISSION

Outline

- Update on Committee efforts
- Update on completing 2012 Fall Meeting Charge
- Moving Forward- Next steps for the SAS Committee

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Charge to the Committee

- Largest contributor Analysis
  - Using most recent data available, identify the largest individuals and groupings of emitters of NOx and VOC within the OTR and outside the OTR that contribute at least 1% of the 2008 ozone NAAQS of 75 ppb.
  - Using above mentioned data and other data, identify emission sources with the highest short-term emissions of NOx and VOC.
  - Review available data to evaluate real world achievable NOx emission rates across load ranges to adjust long and short term expectations for emission reductions. Develop individual state EGU NOx emission rates achievable, considering reasonable available controls.

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Charge to the Committee… continued

- Distributed and Emergency Generator Inventory
  - Obtain information from system operators (PJM, ISO-NE, NYISO) concerning the location, operation and emissions of all units that participate or plan to participate with the system operator.
  - Analyze the collected data to understand the air quality impact of the operation of the distributed and emergency generators and make recommendations for potential control strategies to the Commission.

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Committee Focus

Responding to the Charge:

•Research and data collection – Develop workplans

•Organize new workgroups - partnerships

•Economic analysis

Stakeholder outreach

Revisiting and updating adopted measures

Analyzing EPA proposals

Discussing adoption and implementation issues

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Largest Contributor Analysis

- EGU Workgroup evaluating available data (mainly CAMD data) for EGUs to determine real world emission rates, adjust short term & long term expected emission reductions to produce potential state by state EGU NOx budget

- Preliminary analysis for top 25 EGU NOx emitters in OTC modeling domain for 2011 and 2012 ozone season provided to Workgroup

- Additional detailed data on 2011 and 2012 EGU NOx emissions being prepared for analysis

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Top 25 NOx Emitters 2011 OS

OTC Modeling Domain – 2 Data by Tom McNevin, Ph.D. NJDEP (3/11/13)

State	Facility Name	Facility ID	Unit ID	SO2 (tons)	Avg. NOx Rate	NOx (tons)
IN	Rockport	6166	MB2	15215.217	0.243	5,339
PA	Keystone	3136	2	12003.958	0.363	5,044
PA	Keystone	3136	1	11465.644	0.372	4,855
PA	Hatfield's Ferry Power Station	3179	1	240.25	0.492	4,288
PA	Conemaugh	3118	2	1741.005	0.317	4,086
PA	Hatfield's Ferry Power Station	3179	2	211.755	0.475	3,984
PA	Conemaugh	3118	1	1581.72	0.341	3,890
PA	Brunner Island	3140	3	3941.335	0.376	3,834
IN	Rockport	6166	MB1	10408.895	0.237	3,616
OH	W H Zimmer Generating Station	6019	1	7574.883	0.219	3,559
PA	Montour	3149	1	4217.97	0.332	3,298
PA	Montour	3149	2	4088.761	0.316	3,132
PA	Hatfield's Ferry Power Station	3179	3	272.927	0.432	2,848
MI	Monroe	1733	2	10698.832	0.285	2,811
GA	Harllee Branch	709	4	13145.319	0.408	2,806
WV	Fort Martin Power Station	3943	1	1001.621	0.351	2,660
NY	Lafarge Building Materials, Inc.	880044	41000			2,647
KY	Paradise	1378	3	1413.673	0.387	2,431
NY	Somerset Operating Company (Kintigh)	6082	1	4574.54	0.297	2,347
OH	Avon Lake Power Plant	2836	12	15158.146	0.400	2,328
OH	Eastlake	2837	5	14532.978	0.262	2,323
MS	Watson Electric Generating Plant	2049	5	9992.412	0.383	2,285
GA	Harllee Branch	709	3	10508.479	0.409	2,254
NC	Marshall	2727	4	664.951	0.230	2,222
WV	Fort Martin Power Station	3943	2	913.69	0.304	2,217

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TOP 25 NOx Emitters 2012 OS

OTC Modeling Domain -2
Data by Tom McNevin, Ph.D.
NJDEP
(3/11/13)

State	Facility Name	Facility ID	Unit ID	SO2 (tons)	Avg. NOx Rate	NOx (tons)
IN	Rockport	6166	MB1	13080.843	0.221	5,001
PA	Keystone	3136	1	8325.276	0.365	4,661
IN	Rockport	6166	MB2	10779.121	0.224	4,215
PA	Conemaugh	3118	1	1476.726	0.320	3,909
PA	Montour	3149	2	3832.866	0.414	3,794
PA	Conemaugh	3118	2	1542.654	0.300	3,789
PA	Keystone	3136	2	5821.209	0.343	3,774
PA	Hatfield's Ferry Power Station	3179	3	646.229	0.509	3,677
PA	Hatfield's Ferry Power Station	3179	1	511.008	0.486	3,601
PA	Hatfield's Ferry Power Station	3179	2	537.327	0.520	3,589
PA	Montour	3149	1	3524.199	0.402	3,543
FL	St. Johns River Power	207	1	2986.416	0.426	3,316
FL	St. Johns River Power	207	2	3249.023	0.334	2,911
WV	Fort Martin Power Station	3943	1	961.538	0.319	2,730
AL	E C Gaston	26	5	4615.664	0.203	2,656
WV	Harrison Power Station	3944	3	2624.735	0.308	2,628
PA	Brunner Island	3140	3	2868.012	0.346	2,601
WV	Harrison Power Station	3944	1	2174.755	0.313	2,569
MI	Monroe	1733	2	11776.072	0.259	2,536
MI	Monroe	1733	1	12493.547	0.247	2,517
OH	Killen Station	6031	2	1654.736	0.351	2,426
NC	Marshall	2727	4	671.558	0.305	2,412
OH	Eastlake	2837	5	17403.936	0.378	2,335
TN	Cumberland	3399	2	2745.974	0.125	2,215
PA	Cheswick	8226	1	1063.787	0.330	2,142

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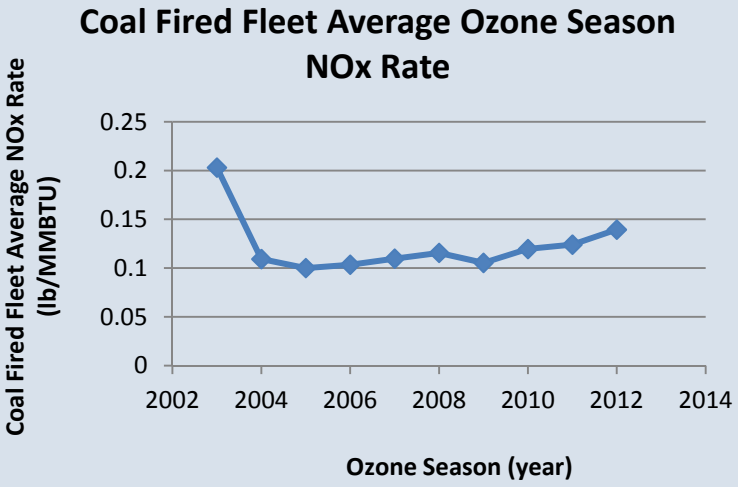
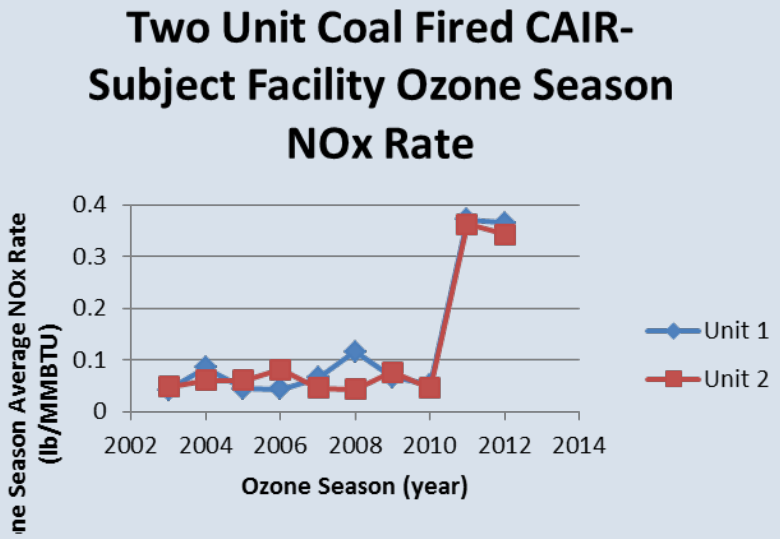
Largest Contributor Analysis

The top graph indicates some EGUs are getting dirtier, not cleaner.

The bottom graph highlights two units that are not running their installed SCR. Sources like this have been identified in AL, FL, GA, IL, IN, KY, MD, MI, NC, OH, PA, SC, TN, TX, VA, and WV.

In 2012, approximately 35% of the coal-fired units with post-combustion NOx controls had average ozone season NOx emission rates at least 50% higher than the year when that unit had its lowest ozone season NOx emissions rate in the period 2003 through 2012.





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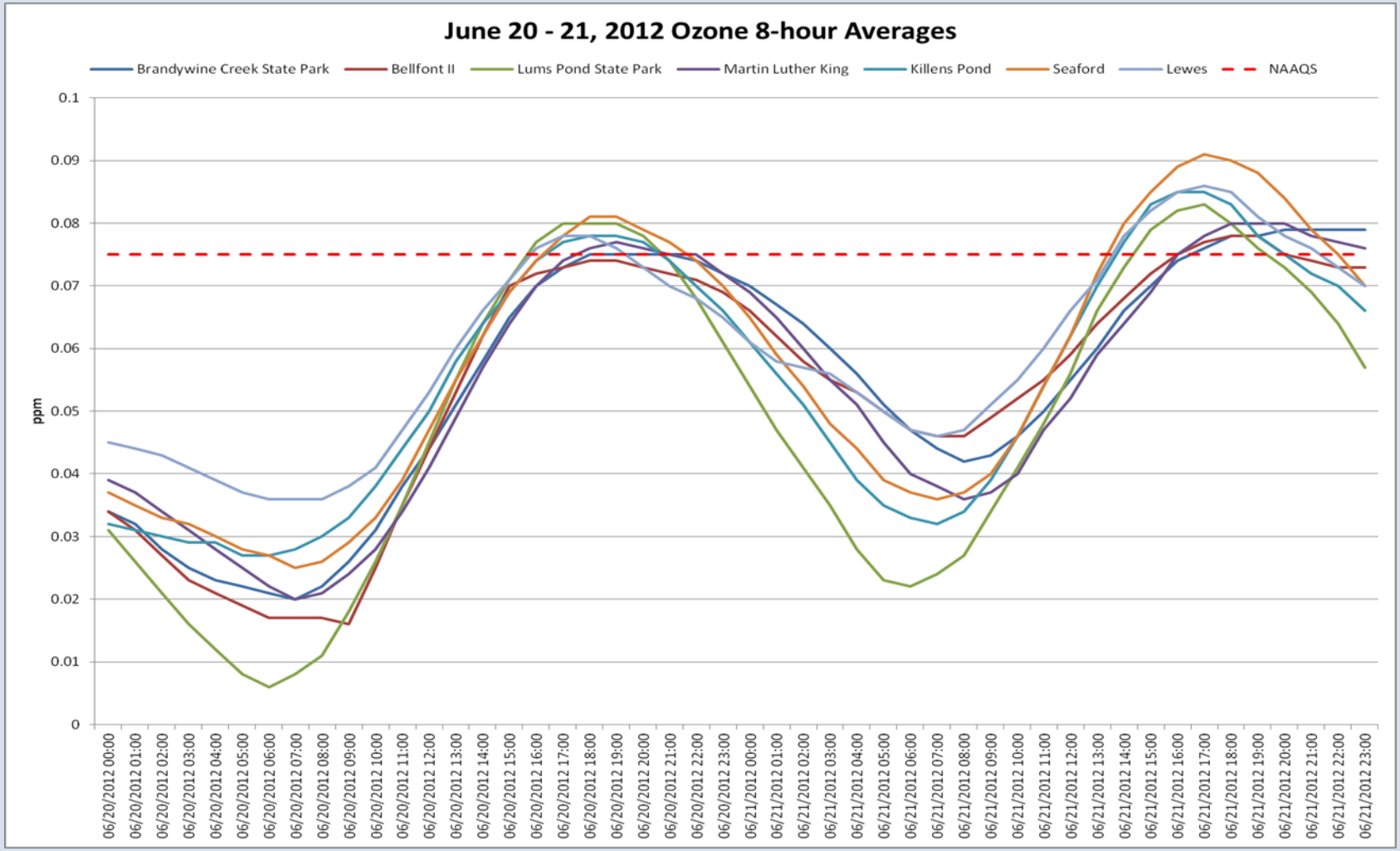
Largest Contributor – DE Analysis



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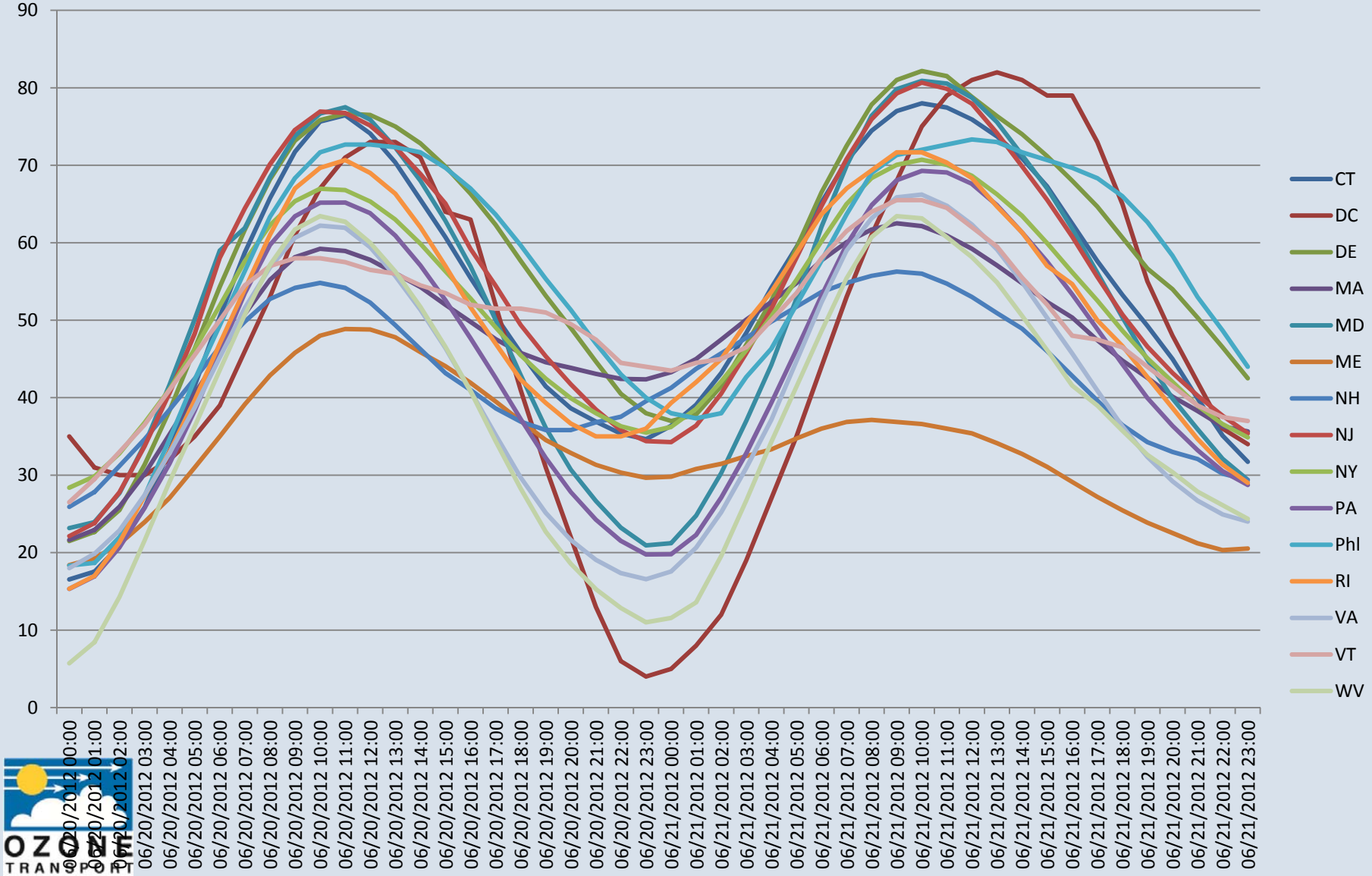
8-hr Ozone averages in ppb June 20-21, 2012
shown as avg by all sites in state (raw data from AirNow)



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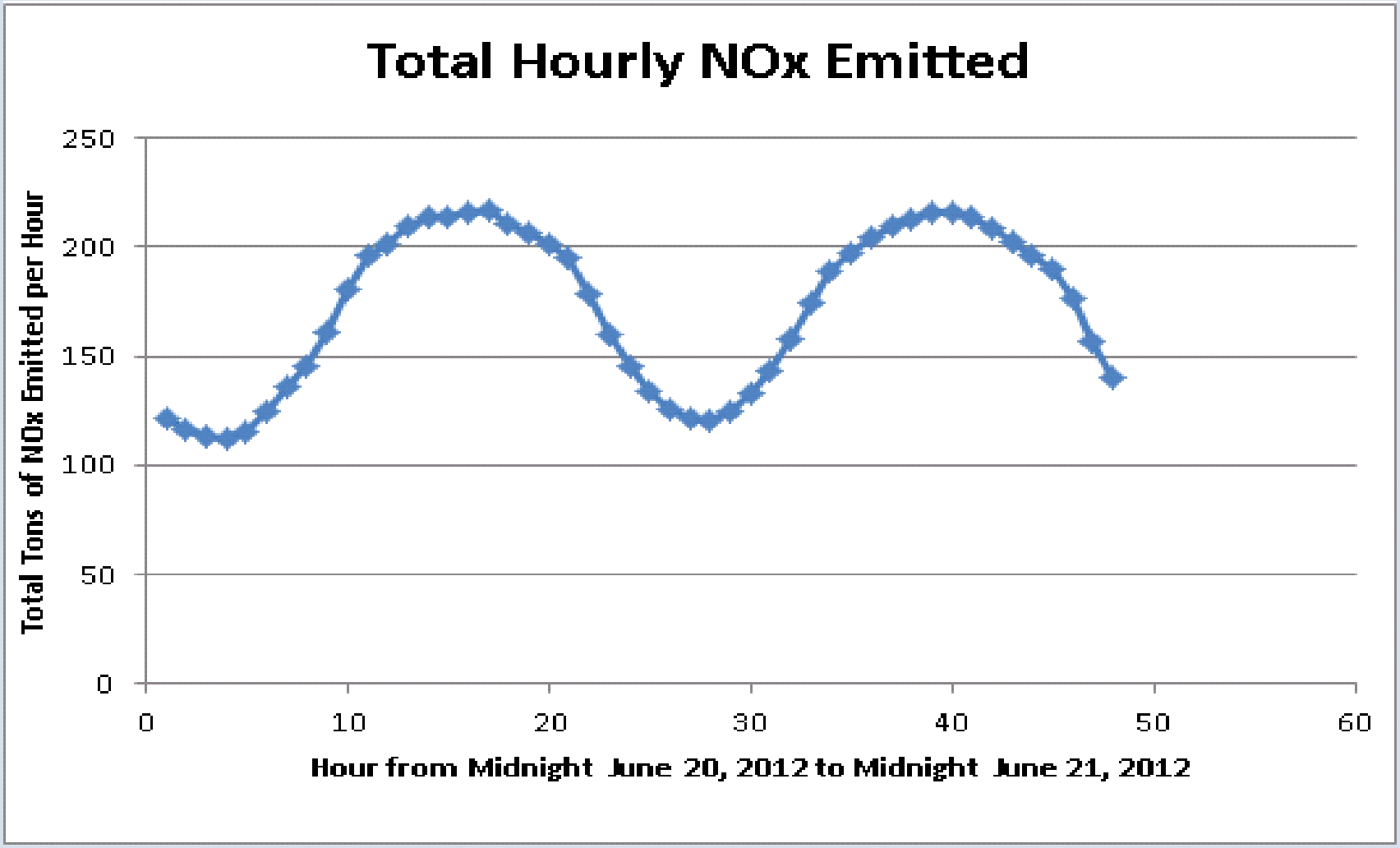
Total Hourly Emissions for the CAIR Ozone Season EGU Fleet



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16th Hour of June 20, 2012 – Generation Mix

Primary Fuel	NOx Emissions (lb)	% of Total NOx	Heat Input (MMBTU)	% Total HI
Wood	940	0.22	4975	0.16
TDF	16	0.00	162	0.01
Resid Oil	16989	3.91	124722	4.02
Process Gas	387	0.09	4147	0.13
Pet Coke	893	0.21	8090	0.26
PNG	62830	14.46	1103000	35.56
Other Oil	1015	0.23	5343	0.17
Other Gas	275	0.06	3755	0.12
Nat Gas	720	0.17	19186	0.62
Diesel Oil	6517	1.50	28111	0.91
Coal	343837	79.15	1799974	58.04

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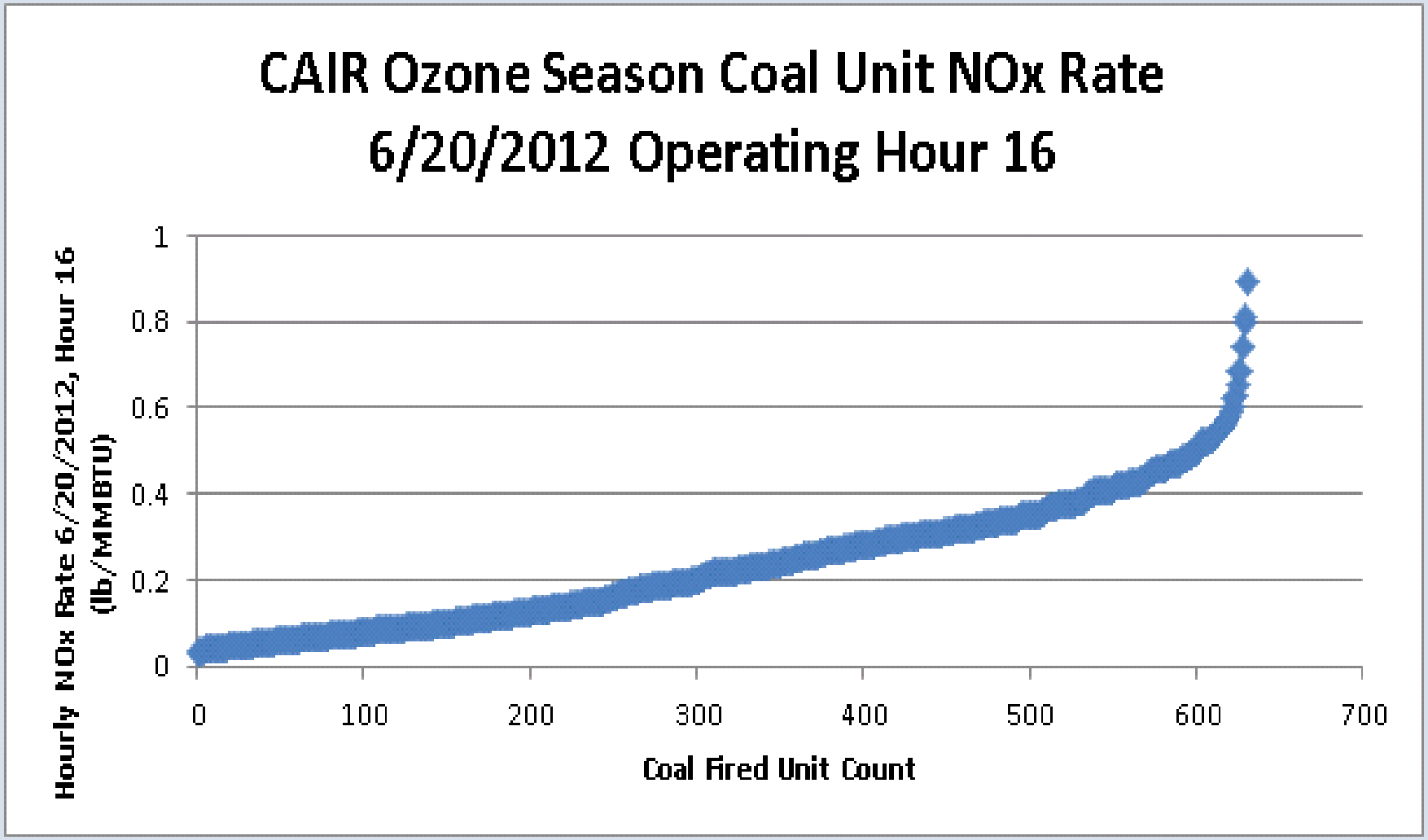

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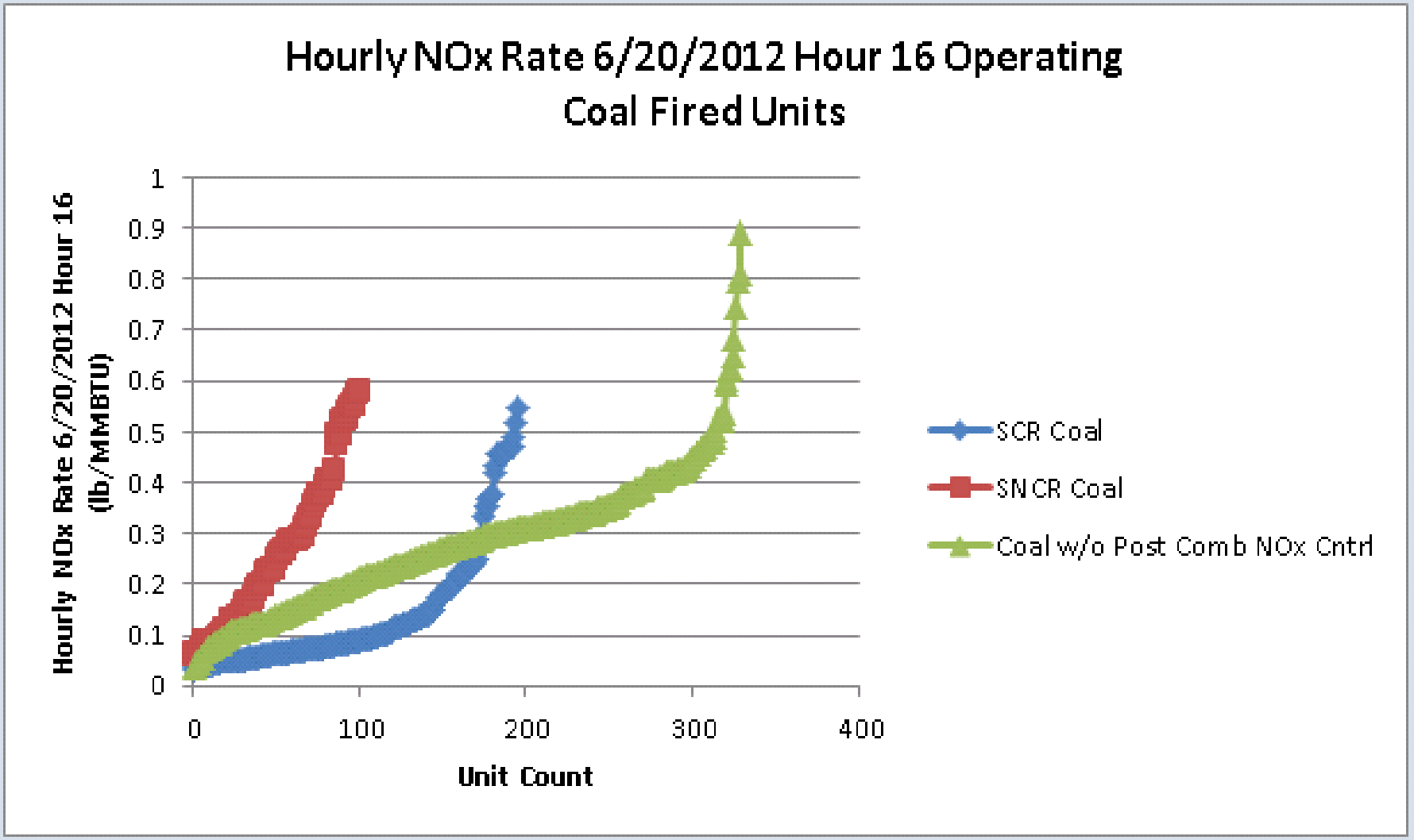

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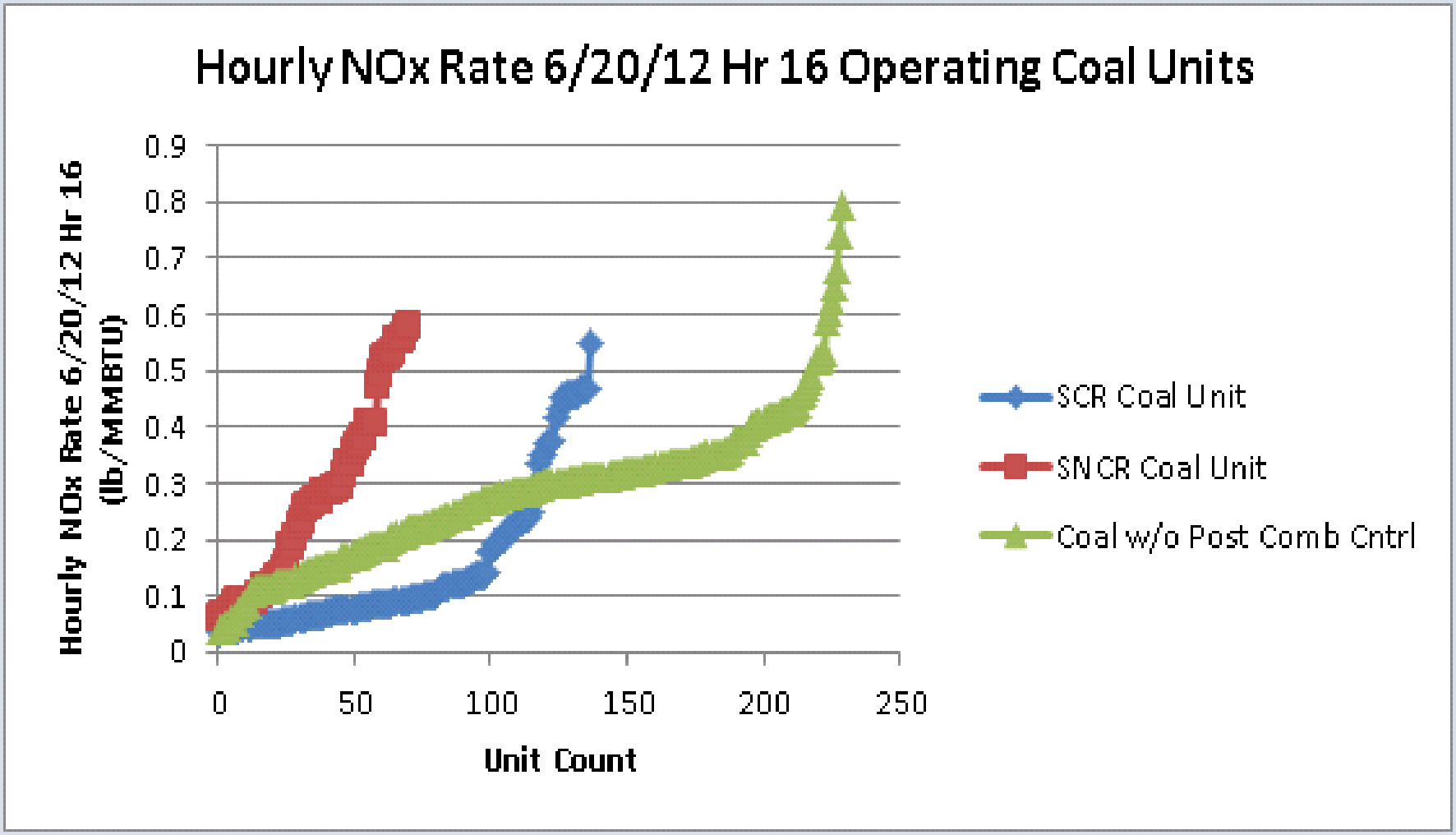
CT, DE, IL, IN, KY, MD, MI, NJ, NY, OH, PA, TN, VA, and WV



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Startup and Shutdown Events May Be Significant

	06/20/12 hr 16	06/21/12 hr 3	06/21/12 hr 15
	(Peak NOx Hour)	(Low-NOx Hour)	(High 6/21 NOx Hour)
Unit Type	**(Units Operating/Units Off)**	**(Units Operating/Units Off)**	**(Units Operating/Units Off)**
Steam	533/160	499/194	529/164
Combined Cycle	228/18	197/49	226/20
Combustion Turbine	405/481	26/860	400/486

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Largest Contributor Analysis

- OTC SAS Committee is working with MARAMA to get the Emissions Modeling Framework (EMF) and the Control Strategy Tool (CoST) housed and set up for inventory analyses
  - EMF is a tool to manage emission inventories.
  - EMF supports the management and quality assurances of emission inventories and emission related data.
  - CoST models emission reductions and engineering costs for control strategies applied to point, area, and mobile sources.
- EMF will be modified to perform tasks useful to regional planning and state inventory staff – including growing inventories and estimating emissions for short timeframes (seasonal, daily or hourly)
- State staff will be trained to use both EMF and CoST
- OTC and MARAMA are preparing a work plan and timeline for the completion of this analysis

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Distributed and Emergency Generator Inventory

- Workgroup has requested information (location, operations, emissions of Demand Response units) from the system operators, however, this information is not provided due to confidentiality agreements or not collected by the ISOs.

- Workgroup plans to request the same information from the curtailment providers associated with the system operators

- Reviewing the RICE NESHAP and its effects of DR units

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PJM Response

Addressing the specific information that you requested, it is either information that we do not collect or information that we do collect but cannot provide because it is confidential information of one or more PJM Members which PJM is required to maintain as confidential per section 18.17 of PJM's Operating Agreement.

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NYISO Response

At this time the NYISO does not require its market participants to provide the specific information you have requested in order for resources to participate in the NYISO's demand response programs. The NYISO does not require that distributed generation be explicitly enrolled as such in order to participate, nor does the NYISO require specific generator unit output data be provided to demonstrate performance in the NYISO's demand response programs. As a result, the NYISO does not have a comprehensive set of information that it can provide to you at this time.

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ISO-NE Response

ISO-NE cannot provide resource-specific data in response to the OTC's request. In some instances, the ISO may have information that is available to us as a system operator, but that information is the property of the asset owners and we are restricted in our ability to share it. In other instances the requested information is not collected by the ISO as part of its normal procedures.

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ISO – NE Response

Registration Data* - RTEG Fuel Mix

Dispatch Zone/Fuel Type	# of Generators	MW By Fuel Type	Percentage by Fuel Type
Distillate Fuel Oil. Including Diesel, No. 1	558	39.6	35.40%
Distillate Fuel Oil. Including Diesel, No. 2	693	681.0	60.48%
Distillate Fuel Oil. Including Diesel, No. 3	3	2.9	0.26%
Distillate Fuel Oil. Including Diesel, No. 4	2	0.7	0.06%
Gaseous Propane	2	0.1	0.01%
Gasoline	16	0.9	0.08%
Jet Fuel	3	6.3	0.56%
Liquefied Propane, No. 3	2	0.6	0.05%
Natural Gas	157	34.5	3.07%
Other	1	0.03	0.00%
Other Biomass Gas. Includes digester gas, methane, and other biomass gasses.	7	0.37	0.03%
Grand Total	**1444**	**1125.909**	100.00%

*These data are self reported by participants and not verified by ISO-NE

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Why are Engine Emissions a Concern?

- Pollutants emitted from stationary engines are known or suspected of causing cancer and other serious health effects:
  - Aggravation of respiratory and cardiovascular disease
  - Changes in lung function and increased respiratory symptoms
  - Premature deaths in people with heart or lung disease
  - Benzene and 1,3-butadiene are known human carcinogens
  - Noncancer health effects from air toxics may include neurological, cardiovascular, liver, kidney effects, also effects on immune and reproductive systems
- NOx and VOC can react in the presence of sunlight to form ozone

March 6, 2013 US EPA Webinar Presentation

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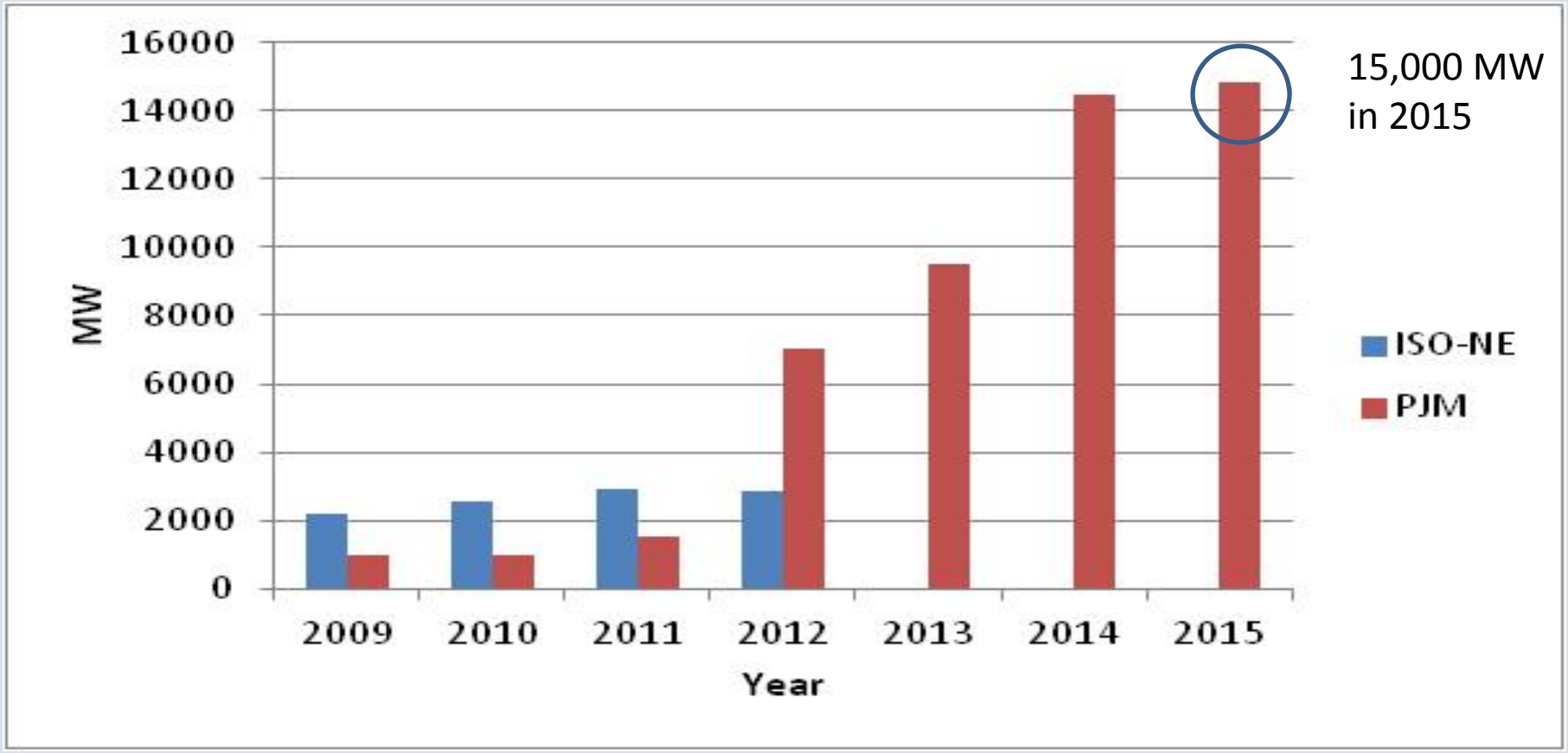
Demand resources growing in New England and PJM



Data from ISO New England and PJM website

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Estimating the resulting emissions using the PJM Auction

- Assume 50% of 15,000 MW bid into PJM DG market will be provided by emergency generators = 7,500 MW
- Allocate the generation to PJM states based on state electrical generation
- Use Bluestein Emission Factors to calculate state emissions
- Zero out emission in states that forbid the use of emergency generators to provide DG

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Julie McDill, MARAMA – August 2012

2015 Emissions Diesel Generators provide 50% of Emergency DSM

	ELECTRIC GENERATION	PERCENT OF PJM TOTAL	EMERGENCY DSM 2015	Estimated Emissions							
				Without current restriction on use of Emergency Generators for emergency DSM		With current restriction on use of Emergency Generators for emergency DSM		Without current restriction on use of Emergency Generators for emergency DSM		With current restriction on use of Emergency Generators for emergency DSM	
				NOX Annual	NOX Daily	NOX Annual	NOX Daily	PM2.5 Annual	PM2.5 Daily	PM2.5 Annual	PM2.5 Daily
	MW	%	MW	Tons/Yr	Tons/Day	Tons/Yr	Tons/Day	Tons/Yr	Tons/Day	Tons/Yr	Tons/Day
TOTAL PJM GENERATION	**185,600**	**100%**	**7,500**								
DELAWARE	3,626	2%	147	160	10	-	-	5.7	0.3	-	-
MARYLAND	13,488	7%	545	594	36	594	36	21.3	1.3	21.3	1.3
NEW JERSEY	20,808	11%	841	917	55	-	-	32.8	2.0	-	-
OHIO	35,404	19%	1,431	1,559	94	1,559	94	55.8	3.3	55.8	3.3
PENNSYLVANIA	34,619	19%	1,399	1,525	91	-	-	54.6	3.3	-	-
VIRGINIA	24,644	13%	996	1,085	65	1,085	65	38.8	2.3	38.8	2.3
WEST VIRGINIA	17,274	9%	698	761	46	761	46	27.2	1.6	27.2	1.6
TOTAL EMISSIONS				**8,175**	**490.5**	**3999.8**	**240.0**	**293**	**17.6**	**143.1**	**8.6**

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Julie McDill, MARAMA – August 2012

NOx emissions from Emergency Generators compared with Point Source Emission

			Point Sources	Emergency Engines	
All Counties	NOX	TPY	373,126	10,893	3%
	NOX	TPD	1,022	654	64%
	PM2.5	TPY	76,409	390	1%
	PM2.5	TPD	209	23	11%
Ozone 8Hr Nonattainment	NOX	TPY	172,262	7,392	4%
	NOX	TPD	472	444	94%
PM Daily Nonattainment	NOX	TPY	161,920	5,368	3%
	NOX	TPD	444	322	73%
	PM2.5	TPY	31,564	192	1%
	PM2.5	TPD	86	12	14%
PM Annual Nonattainment	NOX	TPY	166,970	6,030	4%
	NOX	TPD	457	362	79%
	PM2.5	TPY	32,072	216	1%
	PM2.5	TPD	88	13	15%

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Julie McDill, MARAMA – August 2012

Impacts of Diesel Generators on NAAQS – DE Analysis

AERMOD screening modeling analysis

- EPA recommended approach for modeling of 1-hour NO2 and SO2 NAAQS
- 2006-2011 New Castle County Airport Meteorology
- HAPs modeled for highest-2nd-high (H2H) concentrations
- Converted HAPs and diesel PM hourly concentrations to annual based on screening approach

CALGRID screening modeling analysis

- For confirmation of AERMOD modeled hourly NO2 impacts

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Emissions inventory of diesel generators – DE Analysis

More than 300 permitted units of capacity > 450 kW

190 units in densely populated Wilmington and Newark area

Modeling inputs needed

- emissions, stack parameters, locations
- Emissions (NOx, SO2, diesel PM, benzene, toluene, xylene, and formaldehyde) are estimated based upon the generator size, age, and fuel type
- Coordinates and stack parameters from permits

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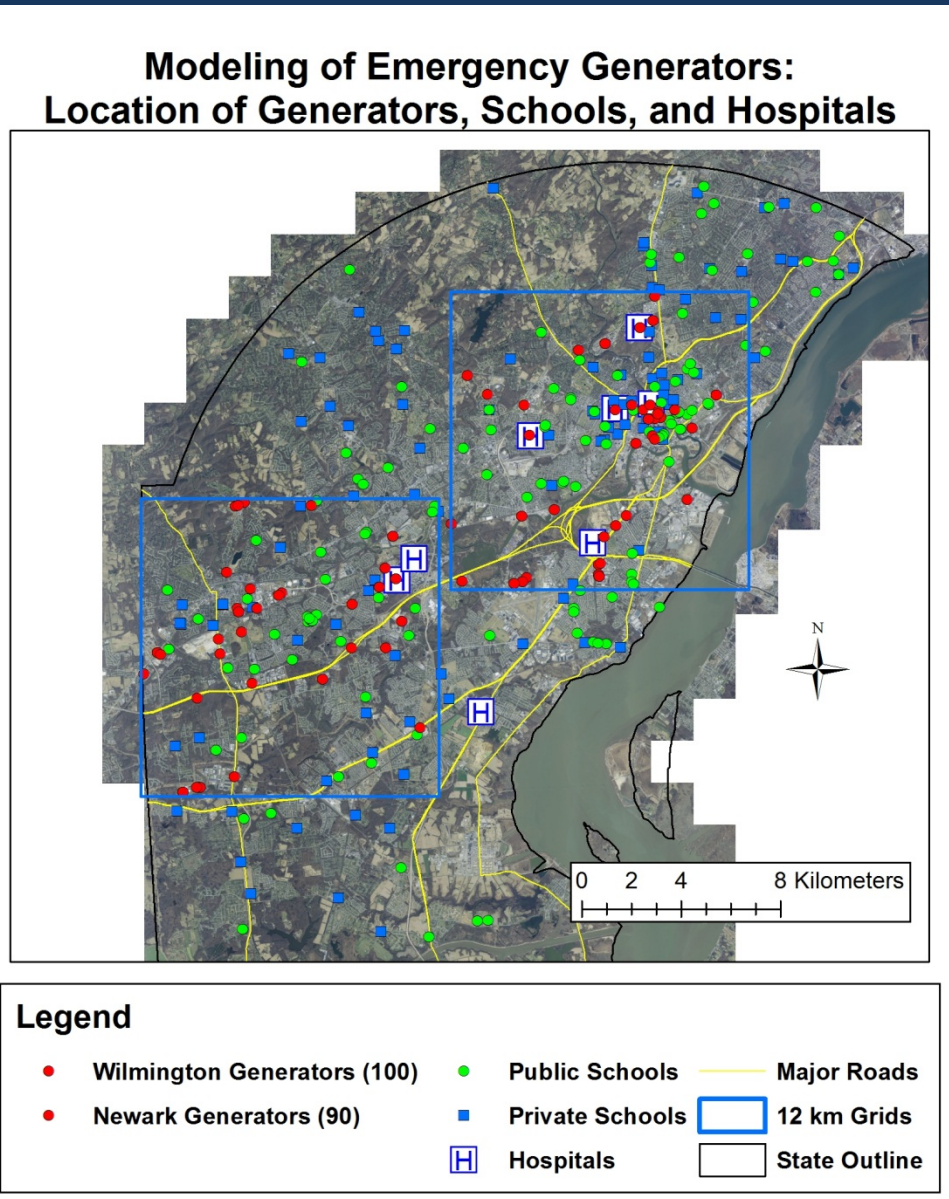
Permitted Diesel Generators in Wilmington and Newark Area



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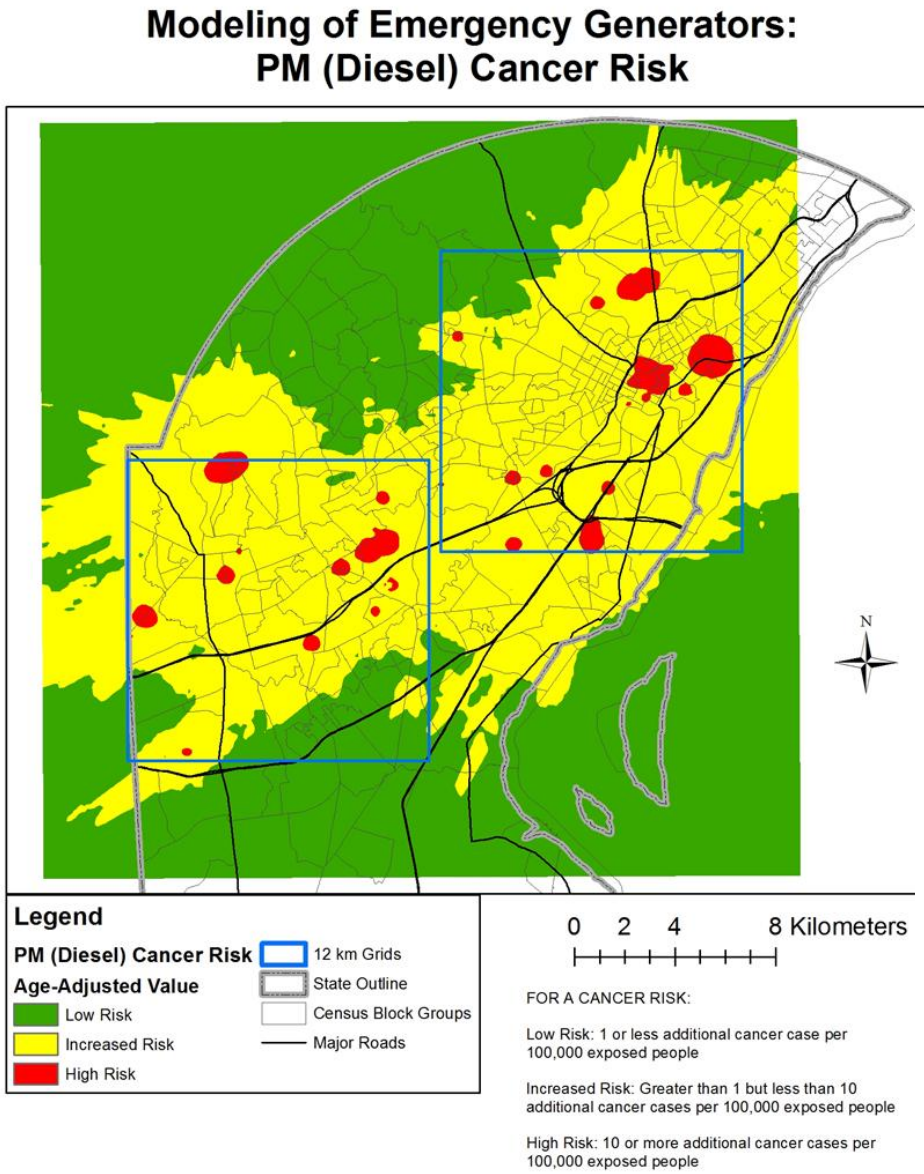
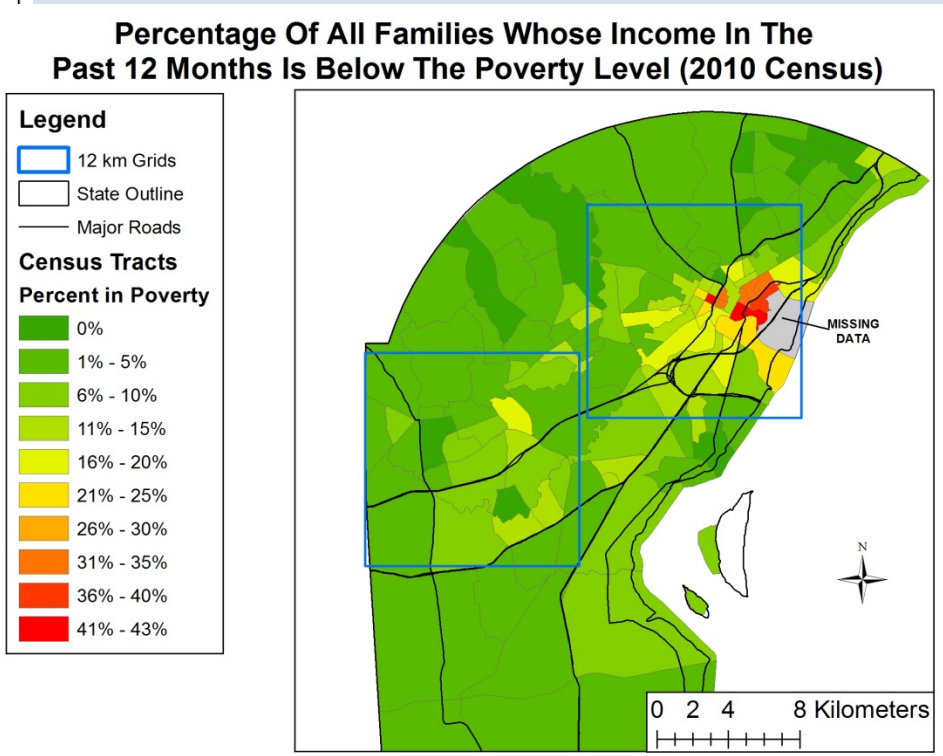
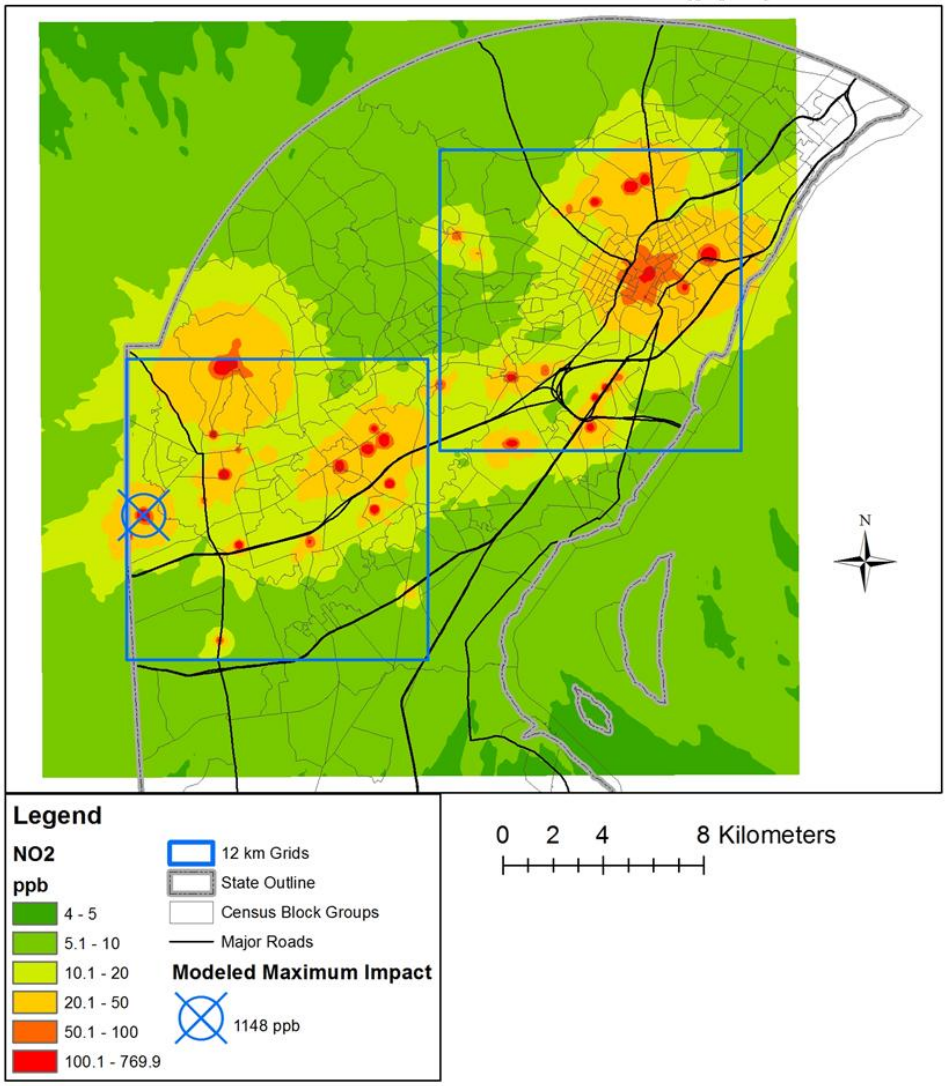
Additional cancer risk from diesel PM emissions resulting from emergency generation – DE Analysis





AERMOD Modeled H8H-1hour NO2 Concentrations for 12:00 -6:00 PM of Summer Months – DE Analysis



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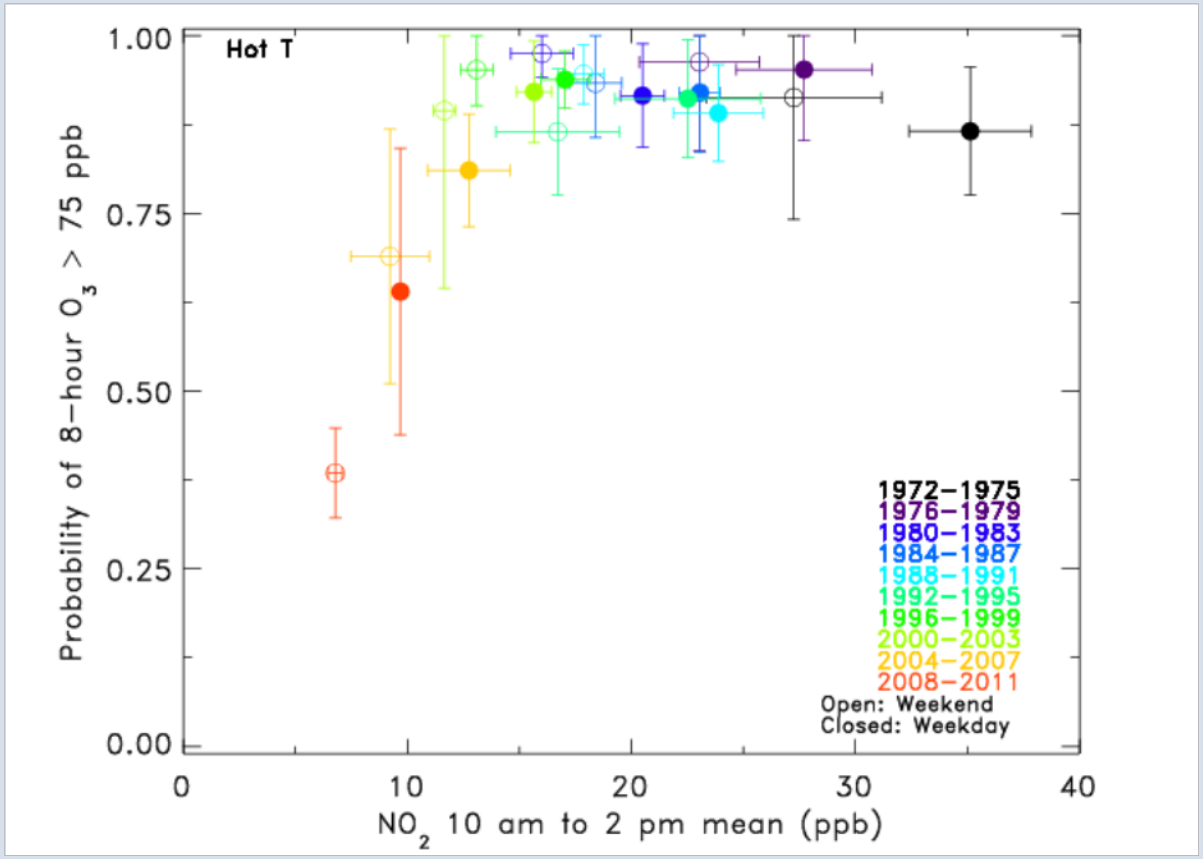
As Measured NOx Levels Have Gone Down … … *So Have Ambient Ozone Levels*



Observations show: NOx reductions worked, but response is nonlinear; we had to get over the hump.

From Hosley, Salawitch, Canty, et al. in preparation, 2012; Preliminary Data. Do not cite!

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Other SAS Committee Updates

Consumer Products Rule

- OTC SAS committee is seeking Air Directors approval to provide a technical update to the Consumer Product model rule, creating the category of dual purpose air freshener/ disinfectant at the request of stakeholders and to be consistent with CARB regulations.

Vapor Recovery

- The workgroup is focusing on enhancements to Stage I measures and considering other potential emissions not addressed through the Stage II transition

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Other SAS Committee Updates

Cutback Asphalt

- Workgroup is preparing recommendations on ways states can improve their current regulations, with focus on consistent standards for cutback and emulsified asphalt and appropriate test methods based on detection levels

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Other SAS Committee Updates

AIM Coating

- Compliance issues with abuse of exemptions in the rule.

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Next Steps for the Committee

- Continue to work with MARAMA to establish the EMF and CoST inventory tools, and move forward with training staff on the use of these tools

- Continue to evaluate EGU NOx real world emission data to create a state specific NOx budget

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Next Steps for the Committee

- Continue to collect data from demand response units, as well as move forward in evaluating the air quality impact of these units, and prepare control strategy recommendation for the Commission

- A programmatic review of the existing model rules for potential updates due to improved control technologies, better data/information resources, etc. Included in the review process should be an assessment of the potential to expand the applicability (such as for smaller size units) and an assessment of incremental cost effectiveness of potential further reductions. Update any support documentation.

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Ongoing Committee Work

- Coordinate with Modeling Committee by providing emissions input, and emission reduction estimates;
- Develop economic analysis tools;
- Continue to track rule adoption efforts and provide technical support and a forum for collaboration;
- Continue evaluation of and comments on EPA proposals;
- Prepare for OTC meetings.

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Questions?

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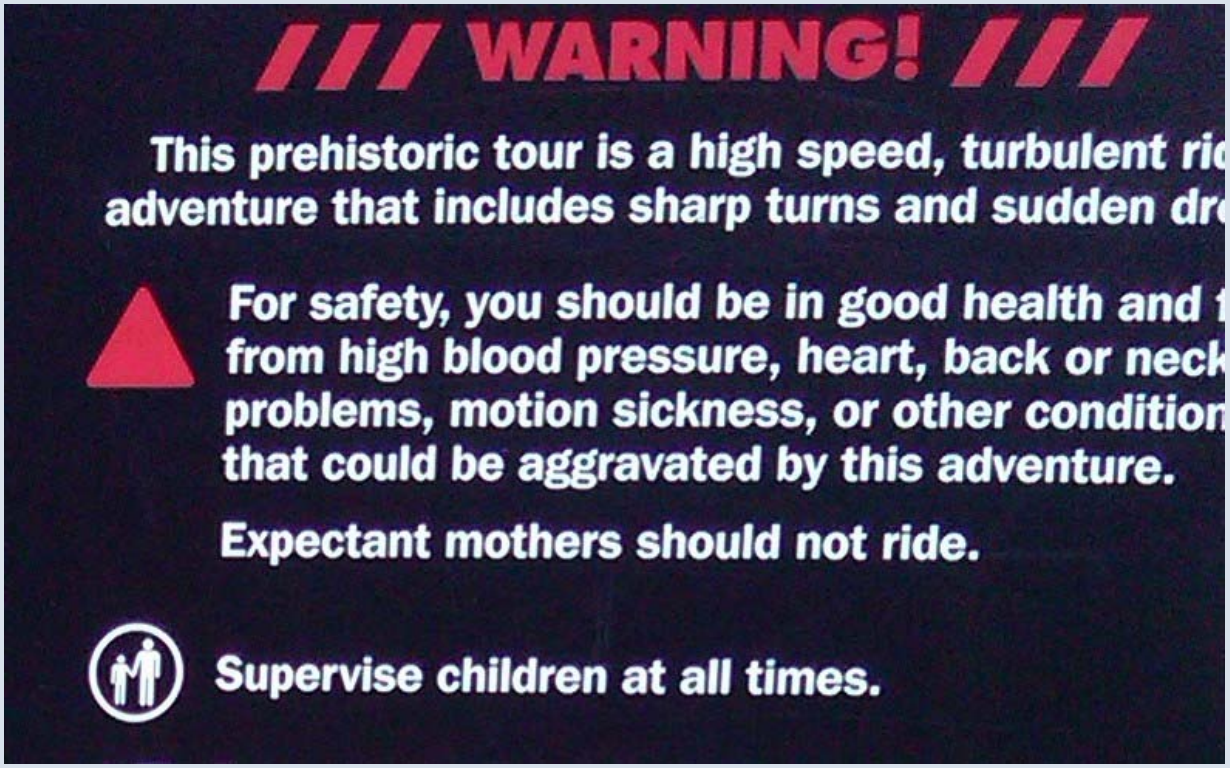

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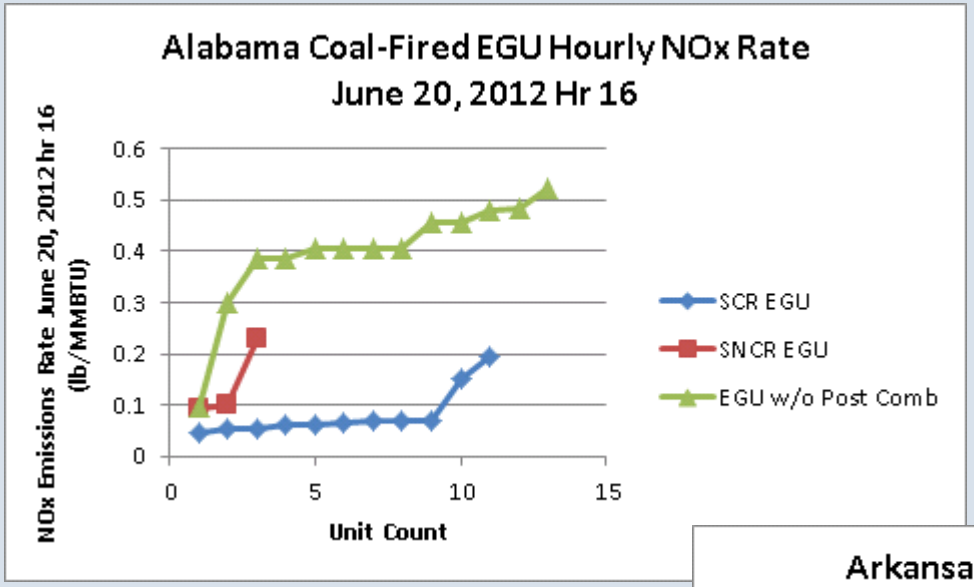
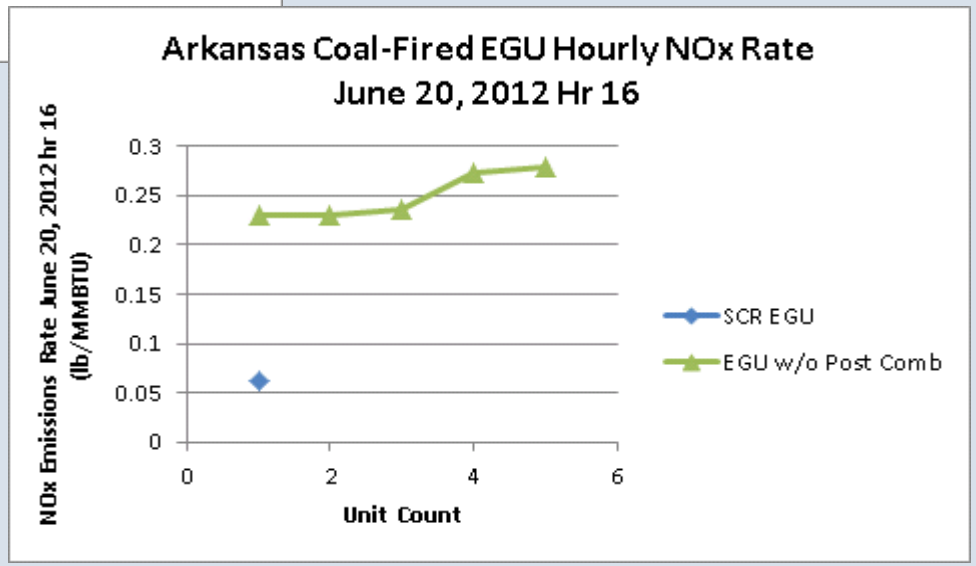
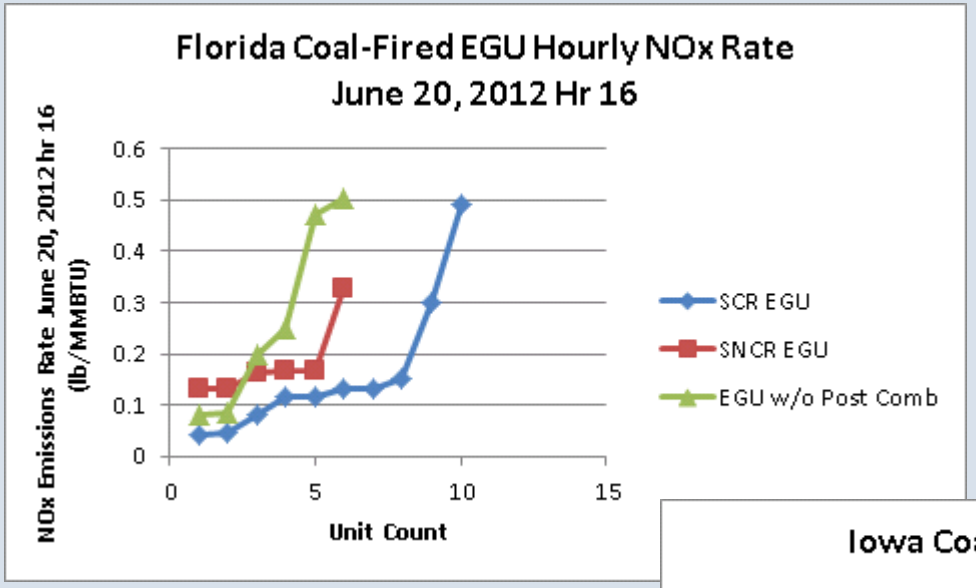
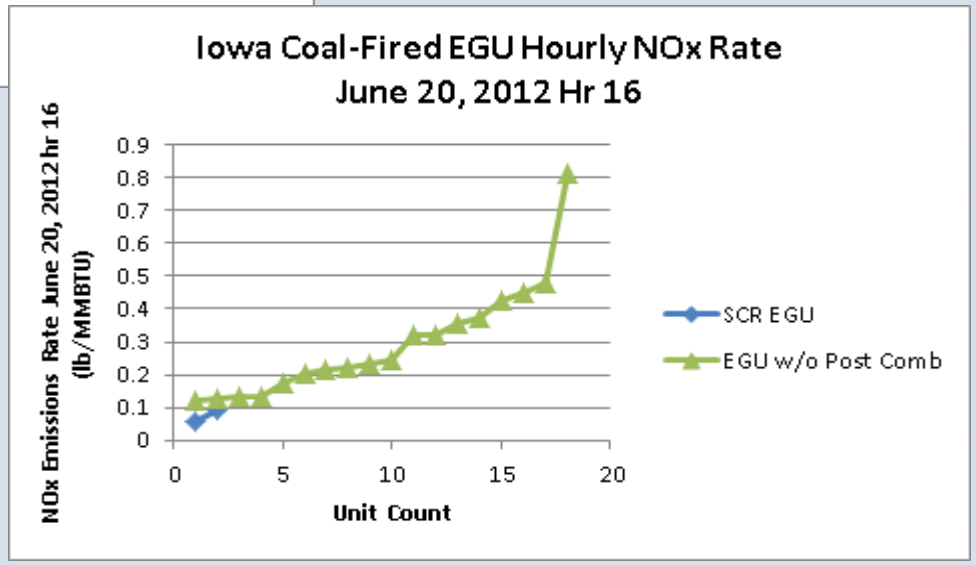
Bonus Slides – A' La Andy





OZONE TRANSPORT COMMISSION





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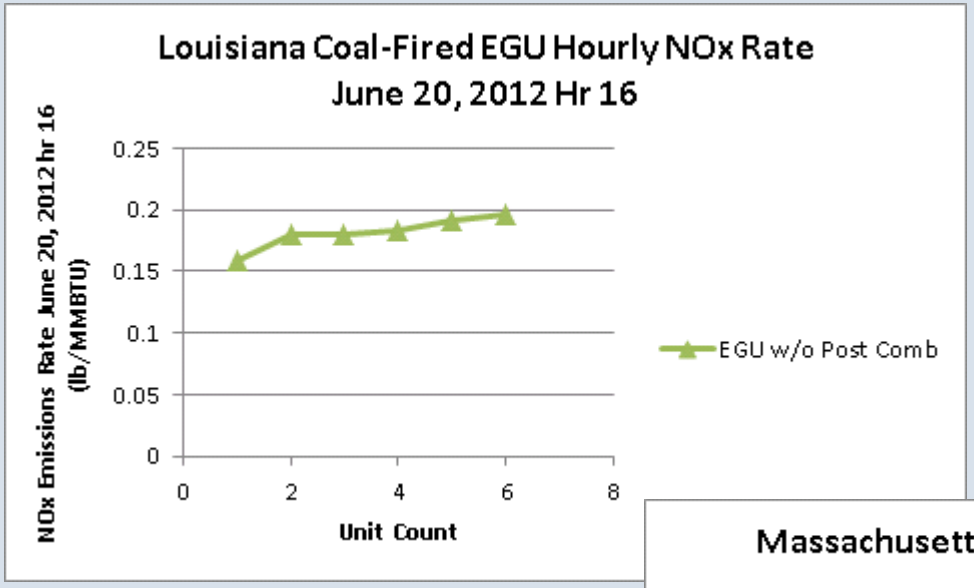

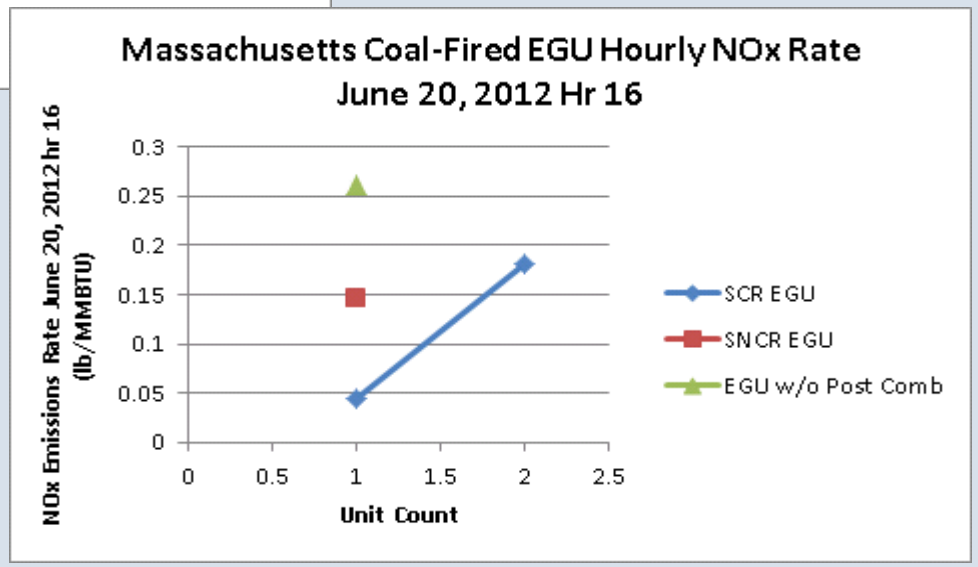

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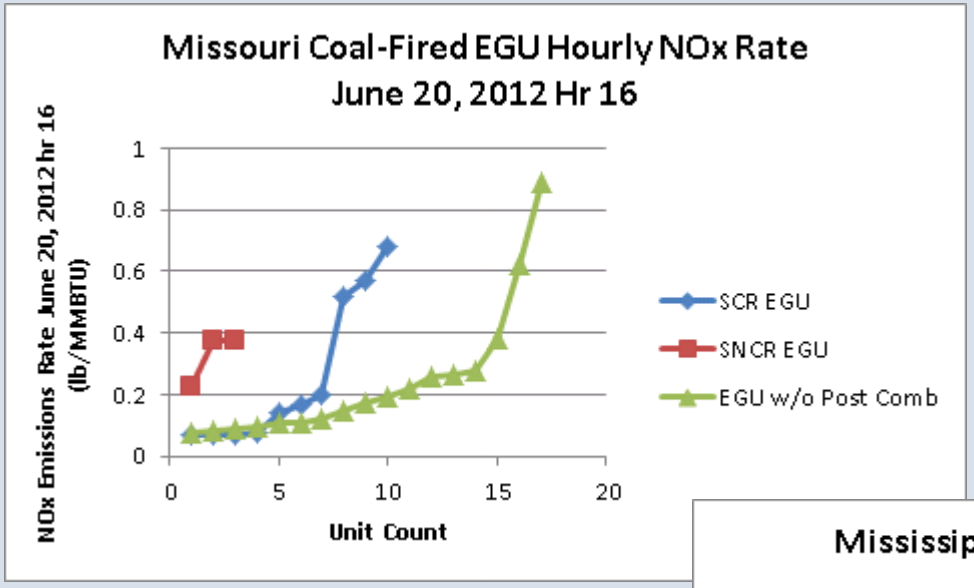

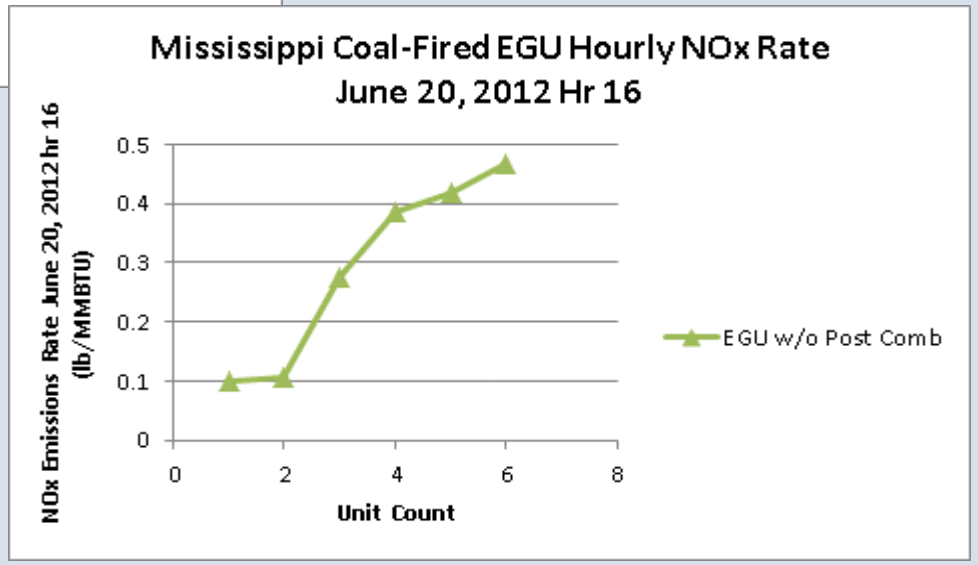

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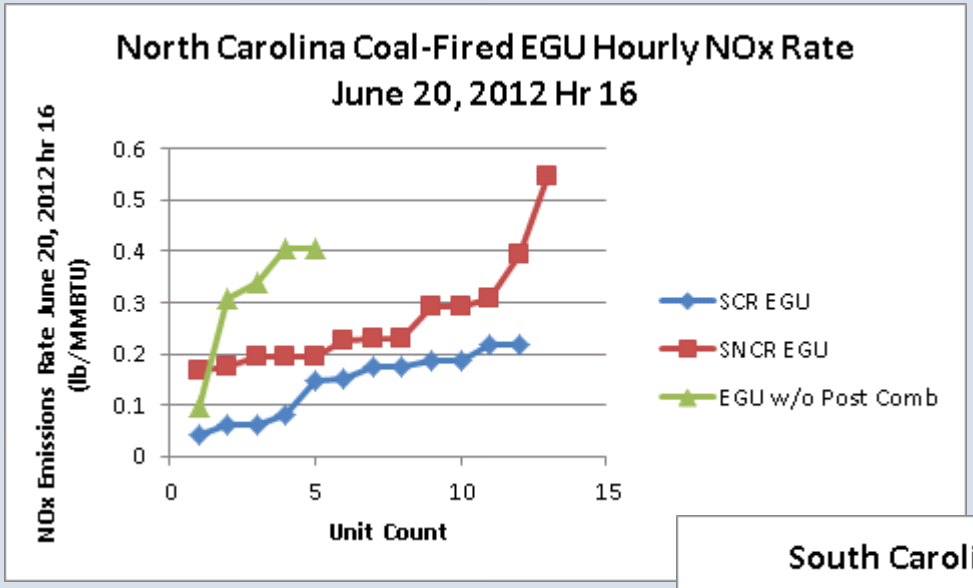

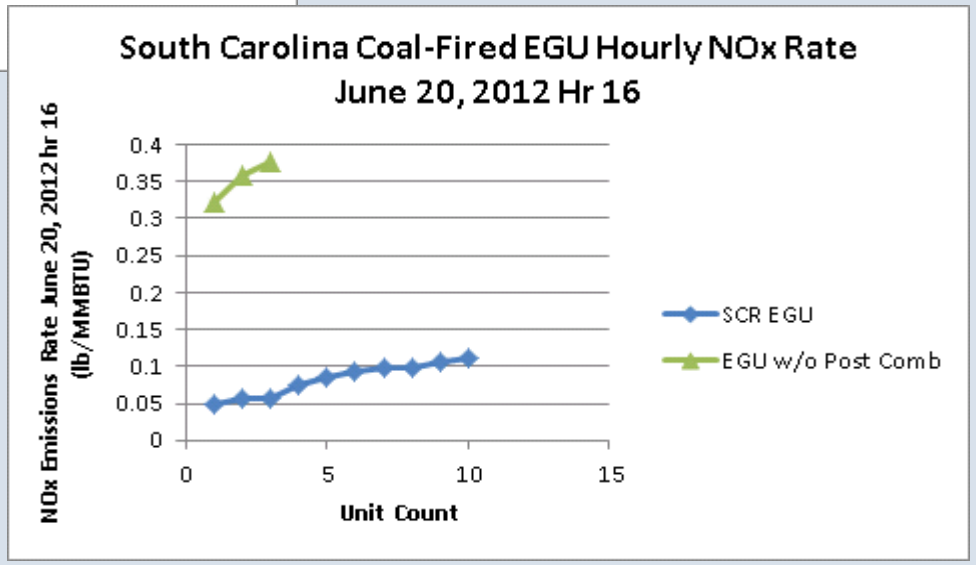

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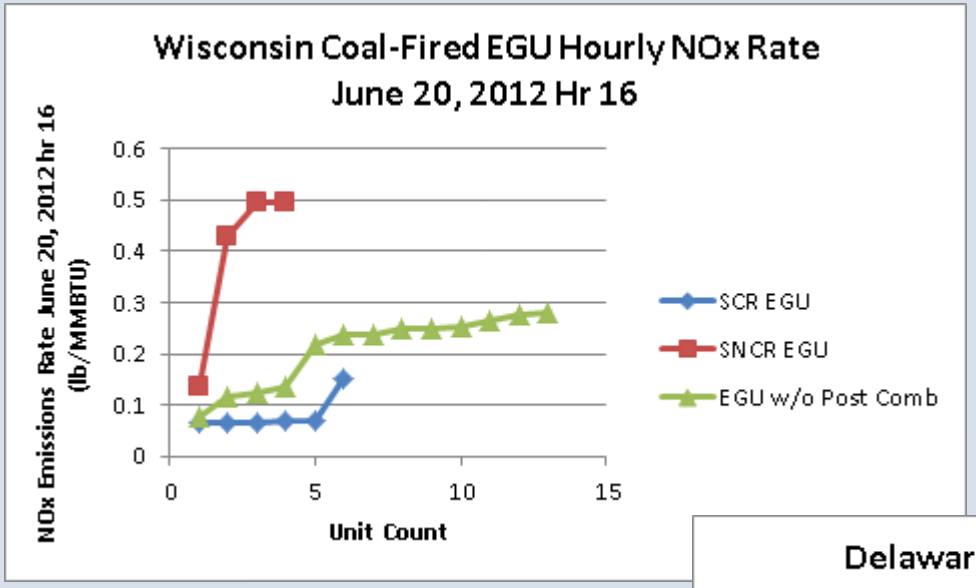

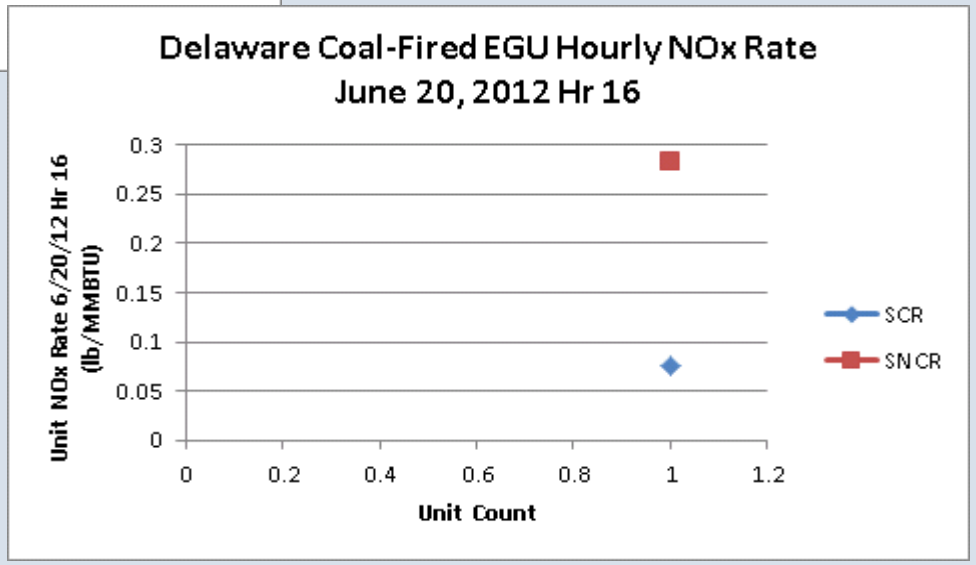

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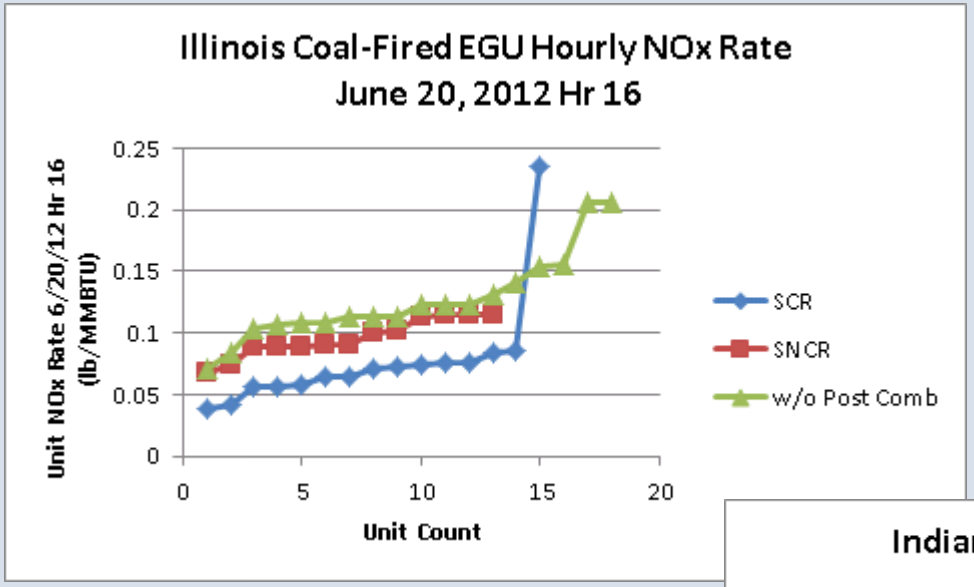

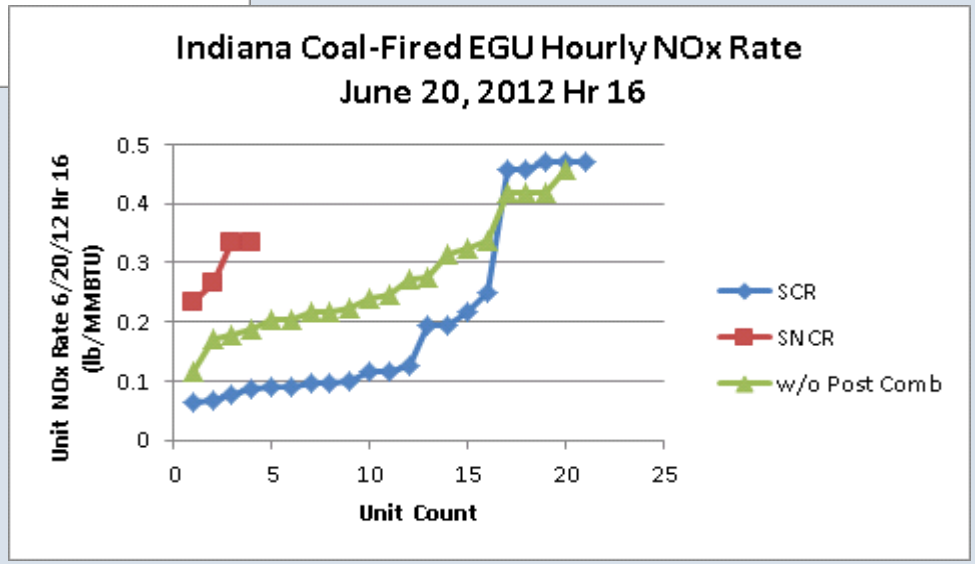

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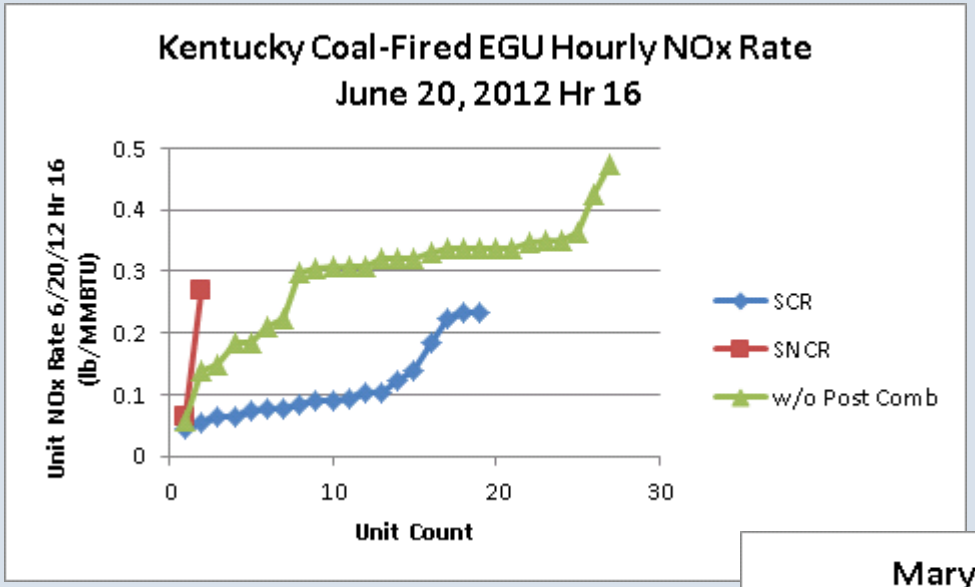

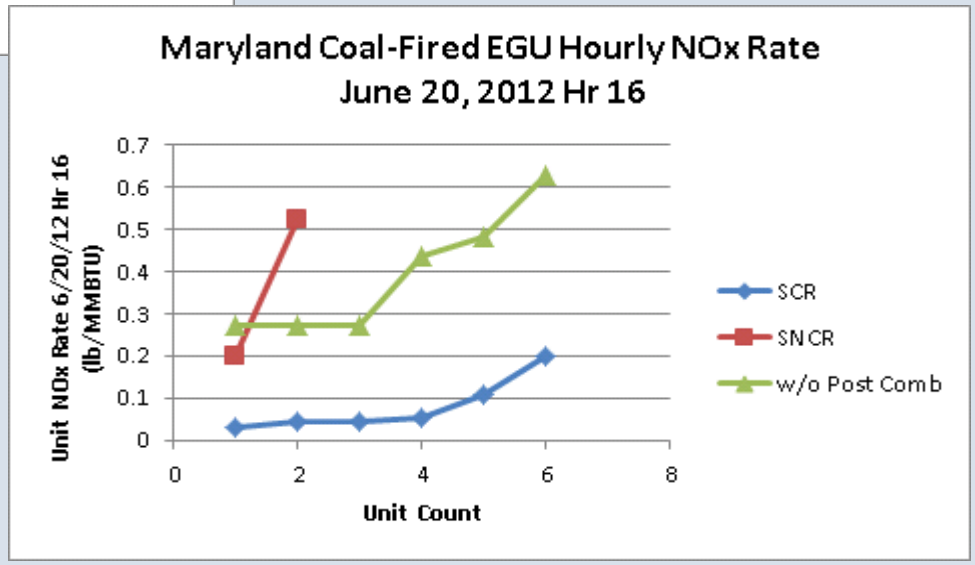

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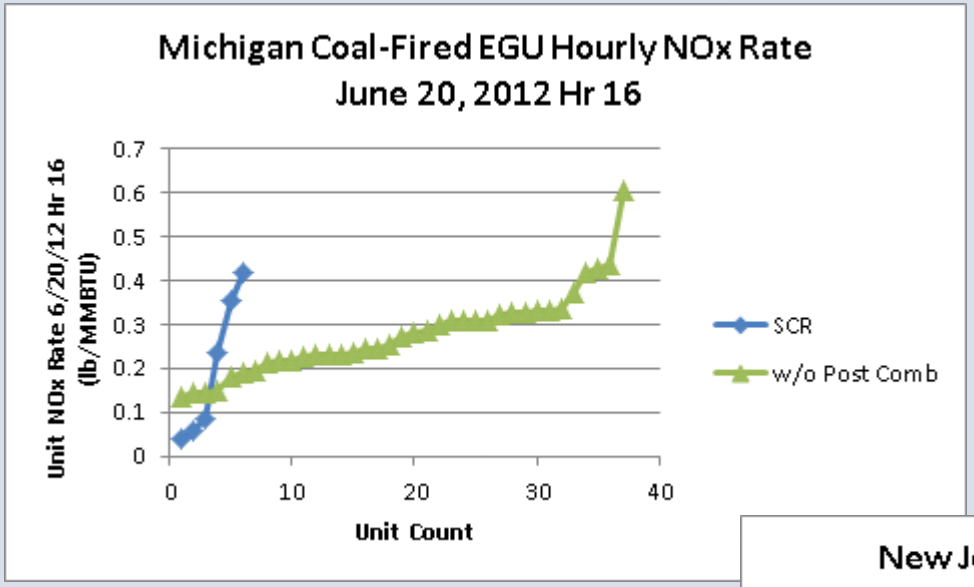

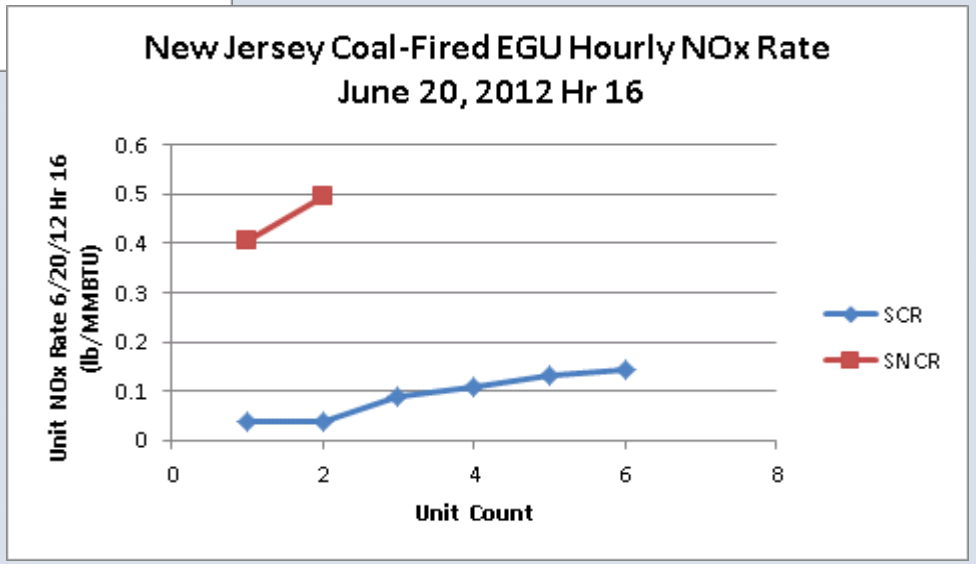

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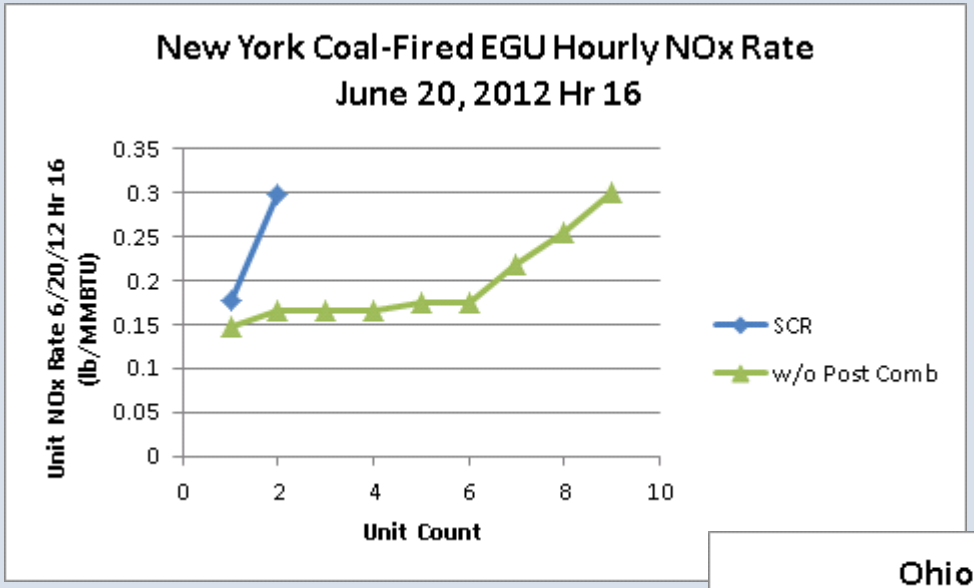

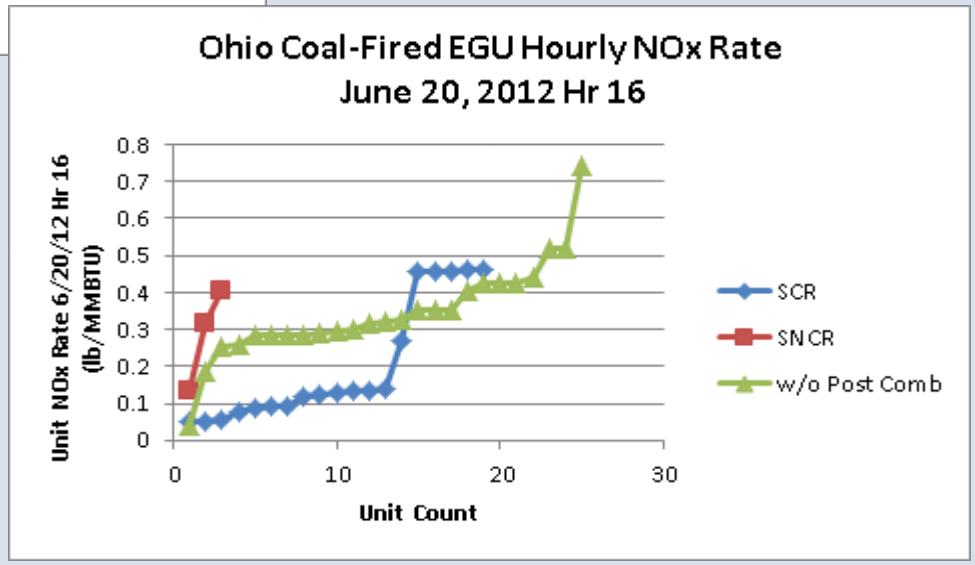

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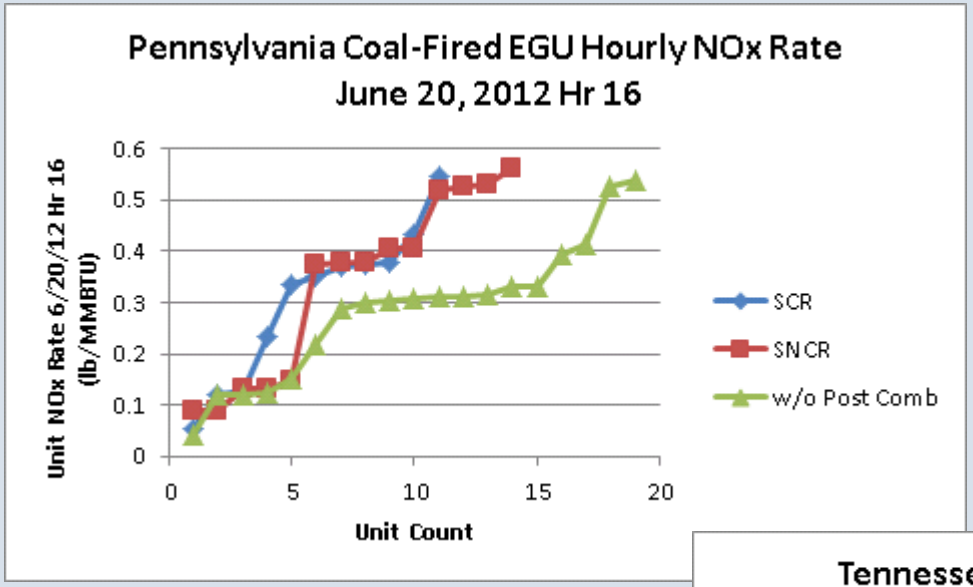

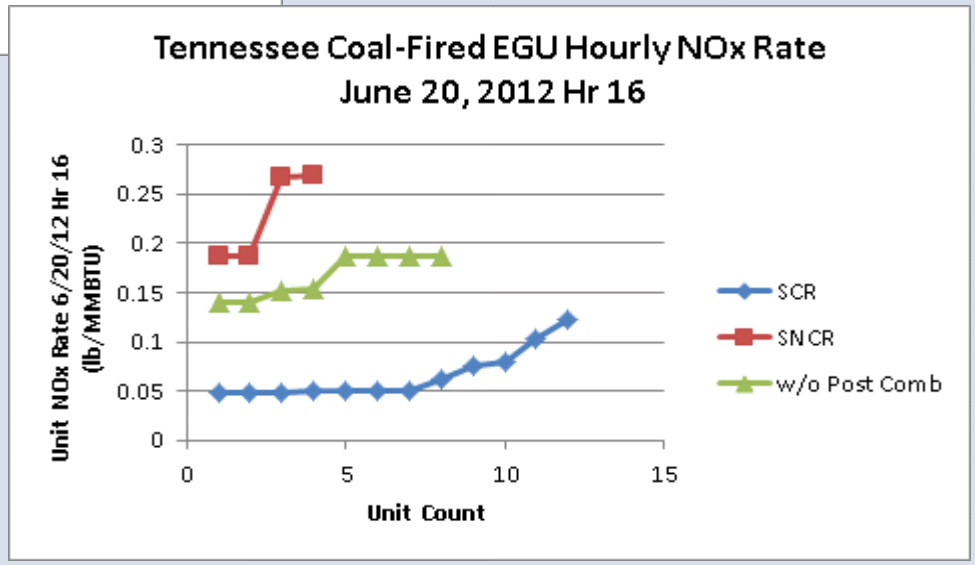

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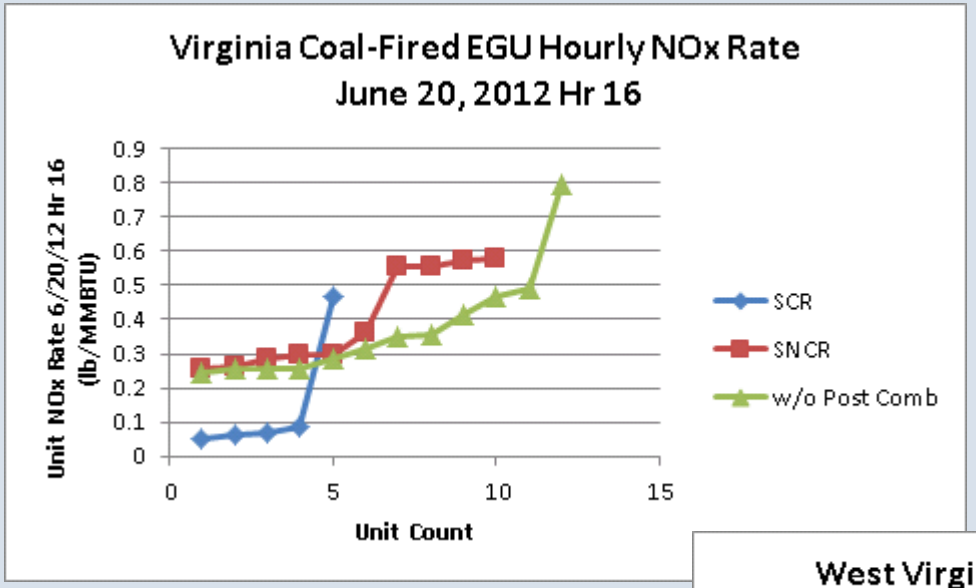

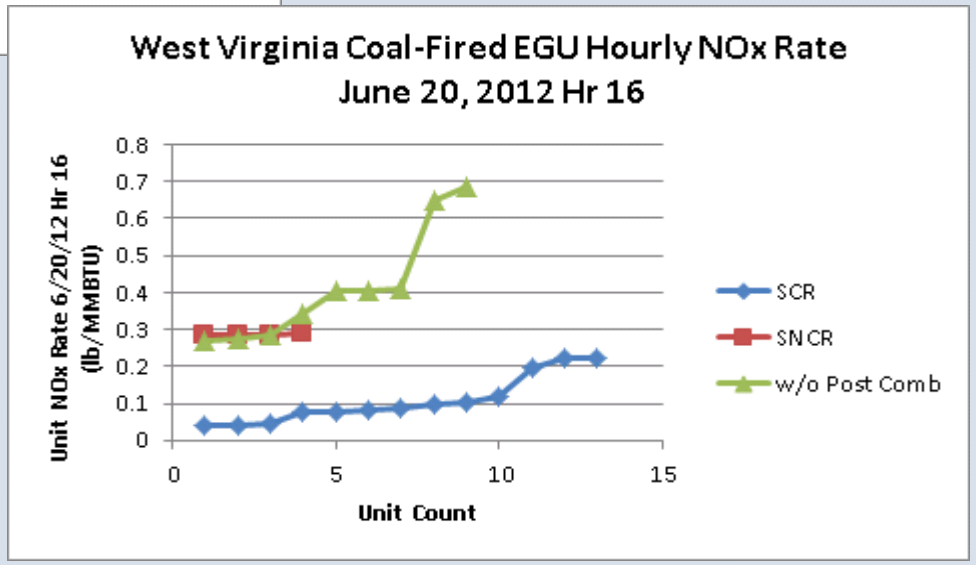

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