OTC Committee Meeting

September 12, 2013

Hall of States
Washington, D.C.

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

OZONE TRANSPORT COMMISSION

Outline

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

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 has determined the Top 25 Ozone season NOx emitters for 2011 and 2012 in the OTC Modeling Domain.

- 2012 shows more units with SCR in the Top 25 emitters list than in 2011.

Analysis of daily EGU NOx emissions during the 2011 Ozone Season including emissions, fuel type, and temperature charts.

Analysis of 2011 and 2012 state level ozone season EGU NOx emissions and ozone season state average EGU NOx emission rate data.

Peak emissions on HEDD days vary greatly both in terms of level of emissions, EGU type & fuel mix.

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Top 25 NOx Emitters 2011 OS

State	Facility Name	Facility ID	Unit ID	SO2 (tons)	Avg. NOx Rate	NOx (tons)
IN	Rockport	6166	MB2	15215.217	0.2431	5,339
PA	Keystone	3136	2	12003.958	0.363	5,044
PA	Keystone	3136	1	11465.644	0.3717	4,855
PA	Hatfield's Ferry Power Station	3179	1	240.25	0.4923	4,288
PA	Conemaugh	3118	2	1741.005	0.317	4,086
PA	Hatfield's Ferry Power Station	3179	2	211.755	0.4746	3,984
AR	White Bluff	6009	1	8193.767	0.2755	3,956
PA	Conemaugh	3118	1	1581.72	0.3411	3,890
PA	Brunner Island	3140	3	3941.335	0.376	3,834
AR	White Bluff	6009	2	7577.479	0.2798	3,794
IN	Rockport	6166	MB1	10408.895	0.2372	3,616
OH	W H Zimmer Generating Station	6019	1	7574.883	0.2189	3,559
AR	Independence	6641	1	6946.97	0.2591	3,302
PA	Montour	3149	1	4217.97	0.3323	3,298
PA	Montour	3149	2	4088.761	0.3159	3,132
PA	Hatfield's Ferry Power Station	3179	3	272.927	0.432	2,848
MI	Monroe	1733	2	10698.832	0.2851	2,811
GA	Harllee Branch	709	4	13145.319	0.4076	2,806
WV	Fort Martin Power Station	3943	1	1001.621	0.3514	2,660
NY	Lafarge Building Materials, Inc.	880044	41000			2,647
AR	Independence	6641	2	5911.525	0.227	2,463
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

OTC Modeling Domain -2
Data by Tom McNevin, Ph.D.
NJDEP (4/12/13)

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Pink Highlight Indicates Unit with SCR Controls

TOP 25 NOx Emitters 2012 OS

State	Facility Name	Facility ID	Unit ID	SO2 (tons)	Avg. NOx Rate	NOx (tons)
MO	New Madrid Power Plant	2167	1	3783.145	0.627	5,786
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
MO	New Madrid Power Plant	2167	2	2741.181	0.505	4,134
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
AR	White Bluff	6009	1	7759.429	0.278	3,504
AR	White Bluff	6009	2	8209.766	0.246	3,383
MO	Thomas Hill Energy Center	2168	MB2	1842.916	0.684	3,236
AR	Independence	6641	2	8125.013	0.205	2,816
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

OTC Modeling Domain -2
Data by Tom McNevin, Ph.D. NJDEP (4/12/13)

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Pink Highlight Indicates Unit with SCR Controls

Additional Analysis

State	No. Steam EGUs With At Least 1-hr with NOx Emissisons > 1-ton/hr Between 6/20/12 and 6/21/12	Range of Highest Hourly NOx Emissions Rate (lb/MMBTU)
AR	4	0.2329 - 0.3549
FL	1	0.5159
IA	1	0.286
IL	1	0.9969
IN	2	0.2250 - 0.2250
LA	2	0.5600 - 0.6218
MA	1	0.4758
MI	2	0.4219 - 0.4220
MO	2	0.7300 - 0.8749
MS	1	0.4488
NC	3	0.4090 - 0.5878
OH	4	0.4190 - 0.5209
PA	14	0.3189 - 0.5740
WV	1	0.7259

Potential EGU NOx Reductions from Retirements & Approach 1 Controls

Preliminary Results

Approach 1 applied different levels of NOx control to EGUs in CAMD database depending on unit type, unit size & primary fuel type

Approach 1 is described in detail in OTC LC EGU Subgroup Emissions Inventory Workplan currently posted on the OTC website

EGU retirements list

- Used multiple data sources – DOE-EIA Electric Power Monthly, newspapers, company press releases, integrated operating plans, state air agency data, etc.
- Intended to cover only coal-fired EGUs retirements but current draft includes some EGUs combusting other types of fuel
- List will continue to change as utility plans change

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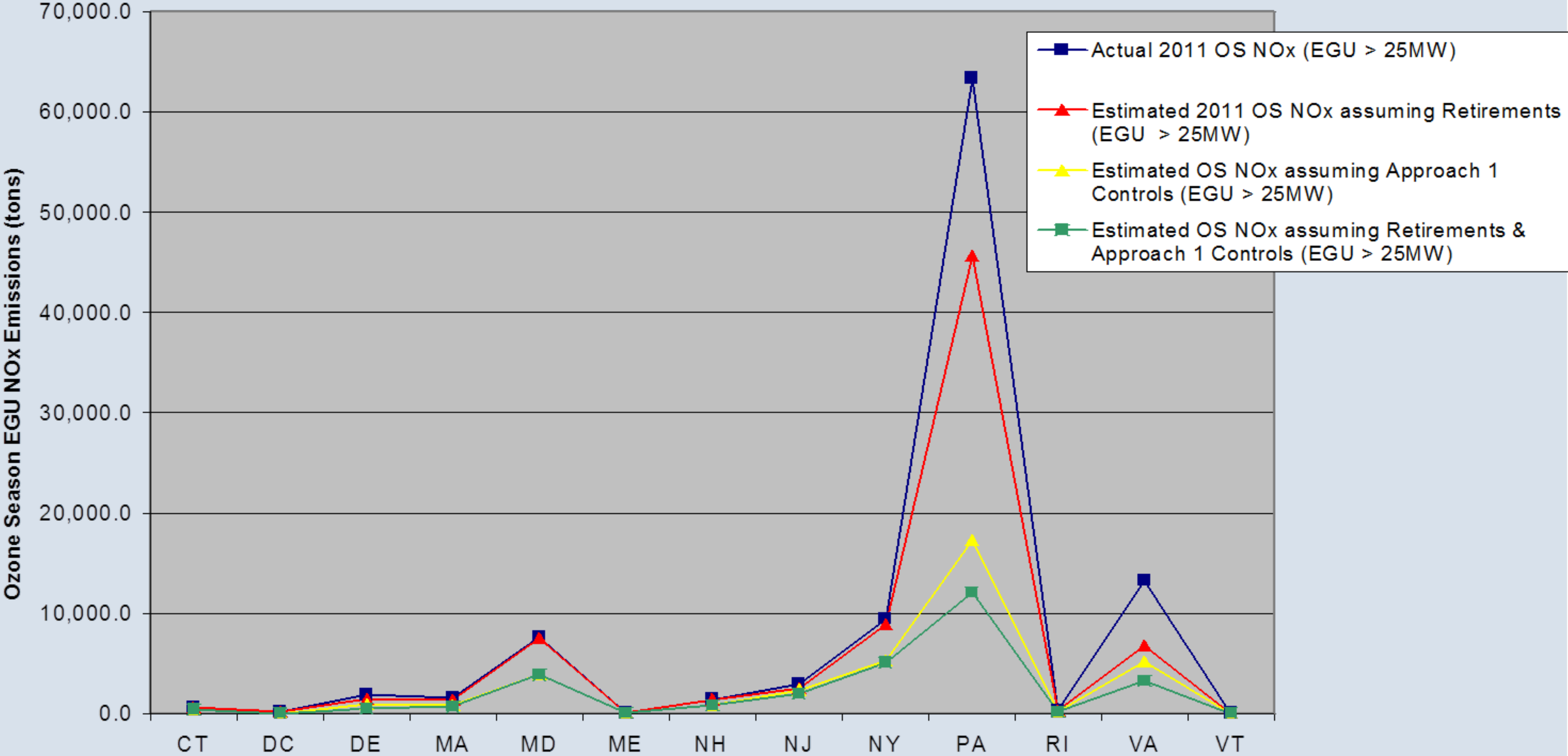
Estimated Impact of EGU Retirements & Approach 1 NOx Controls on Ozone Season EGU NOx Emissions

OTC States

Preliminary Results



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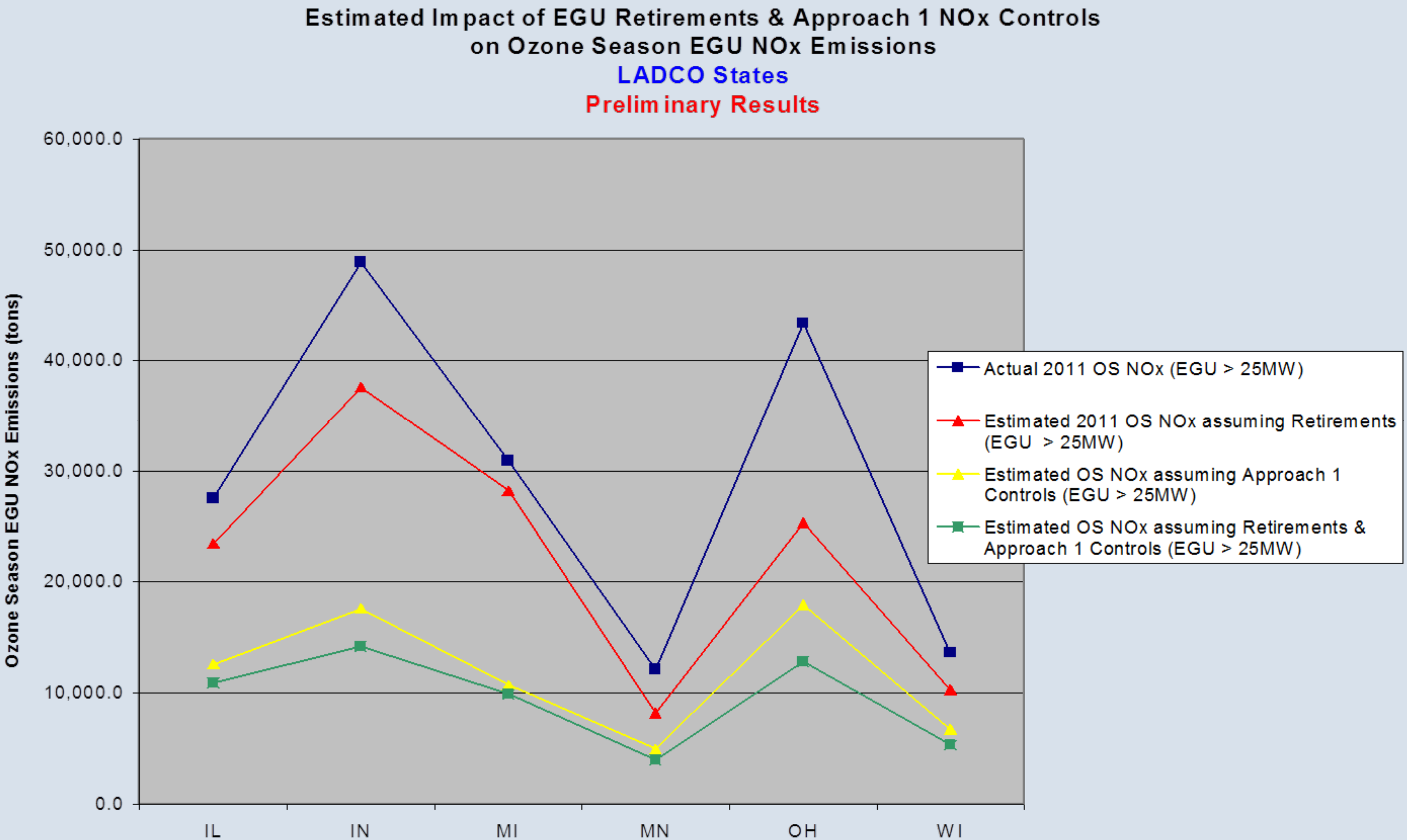

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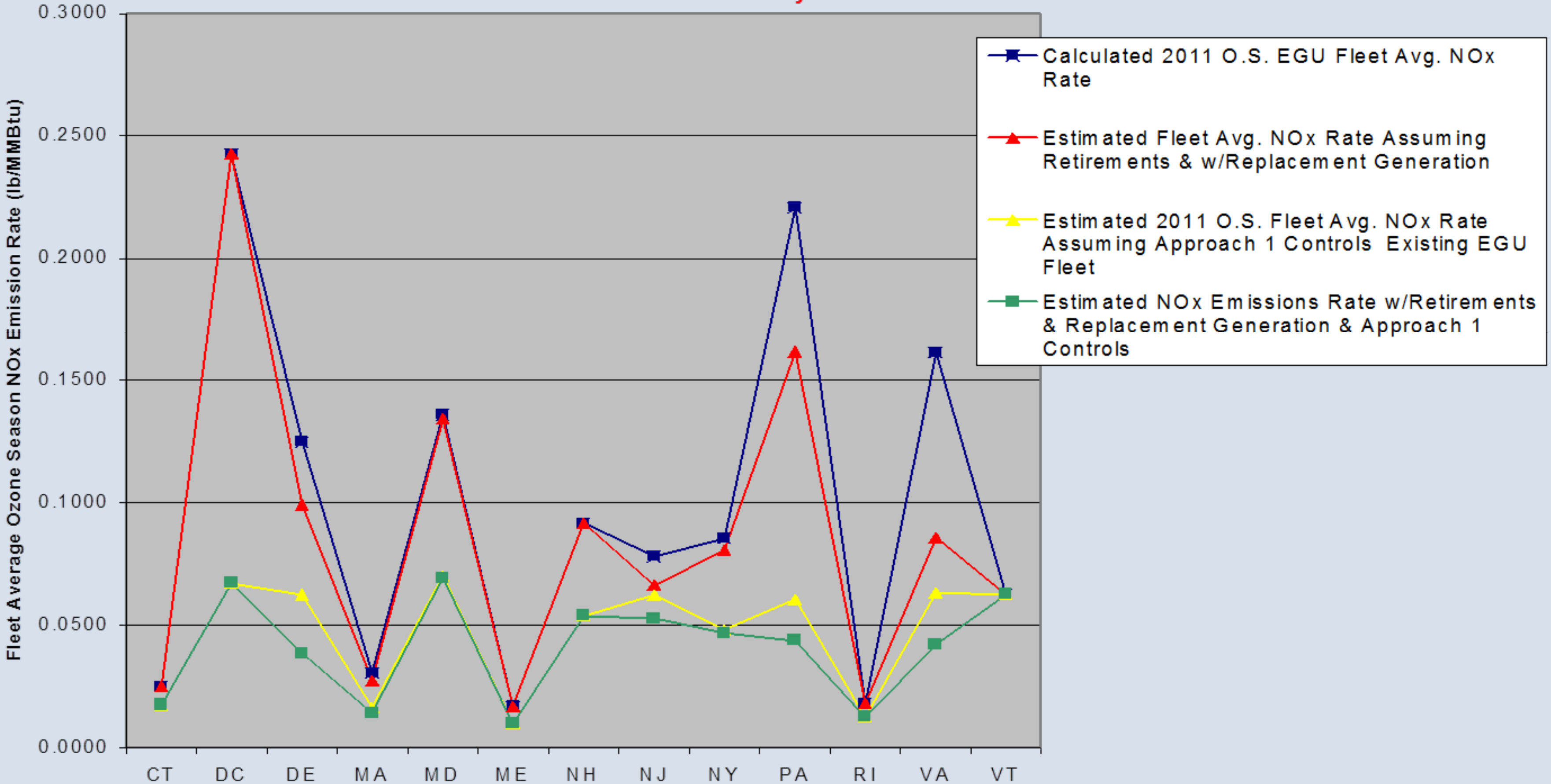
Estimated Impact of EGU Retirements & Approach 1 NOx Controls on Ozone Season Fleet Average EGU NOx Emission Rates
OTC States
Preliminary Results



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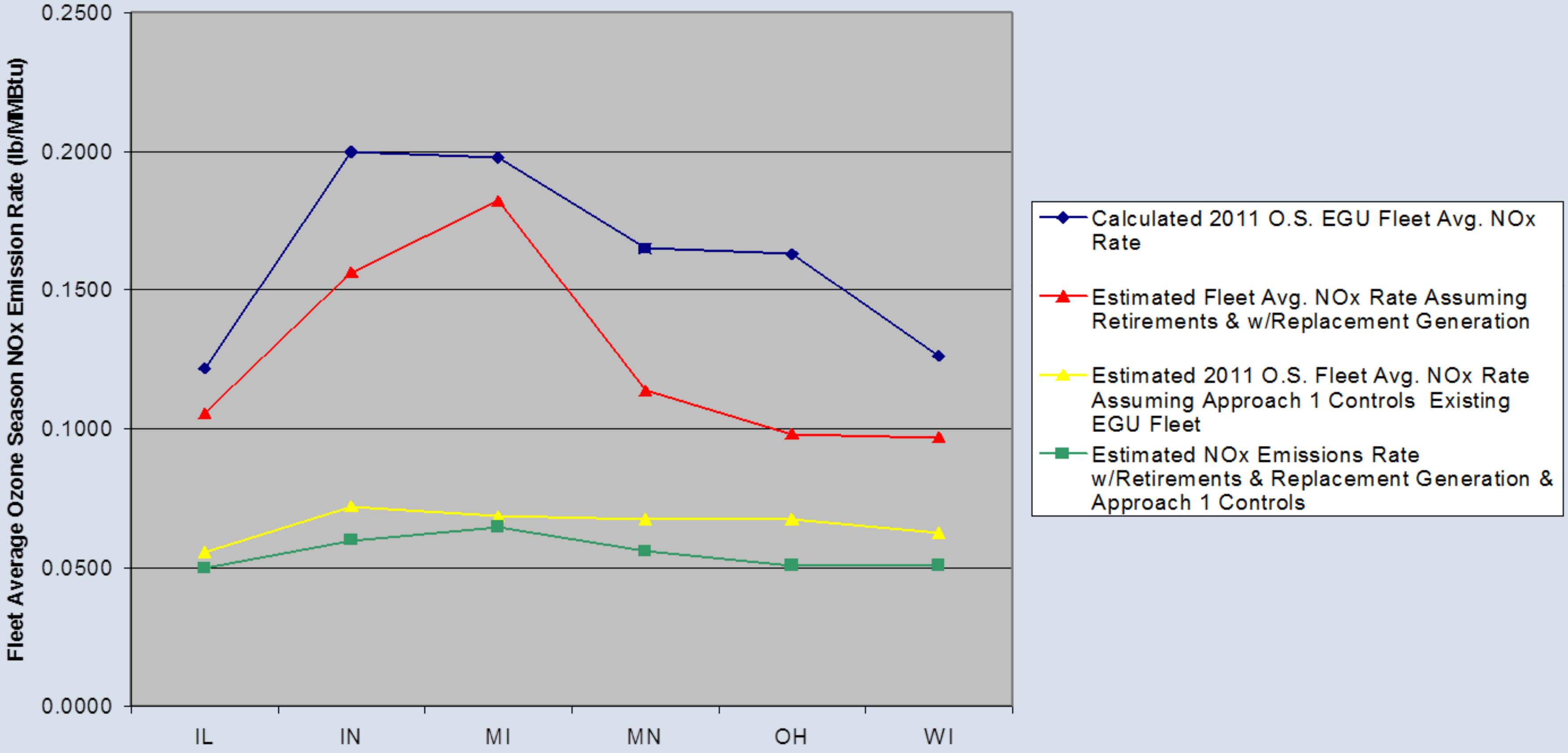
Estimated Impact of EGU Retirements & Approach 1 NOx Controls on Ozone Season Fleet Average EGU NOx Emission Rates

LADCO States

Preliminary Results



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State Rules Summary
Short Term NOx Limits for EGU Boilers & Turbines

- These Short Term NOx Limits listed as “Current Thinking” not intended to reflect technological edge of NOx control capability, but rather to represent NOx control retrofit capability for much of the EGU Industry
- State rules included in analysis are from CT, DE, NH, NJ, NY & WI

  EGU boiler NOx limits in state rules – 24 hr avg. (rolling avg. or calendar day avg.)
- EGU turbine NOx limits in state rules varied from state to state (1hr avg., 24 hr avg, 30 day rolling avg.)
- For EGU boilers assumed 0.1 lb/MM Btu ≈ 1.0 lb/MWh
- For Simple cycle turbines assumed 50 ppmvd@15%O2 ≈ 0.1838 lb/MM Btu
- For Combined cycle turbines assumed 42 ppmvd@15%O2 ≈ 0.3887 lb/MMBtu

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State Rules Summary (CT, DE, NH, NJ, NY, & WI)

Short Term NOx Limits for EGU Boilers

Unit Type	Heat Input (MM Btu/hr)	Boiler Type	Current Thinking (lb/MMBtu) 24 hr. avg.	Range (lb/MMBtu) 24 hr. avg.	Range (lb/MWh)
Boiler – Solid Fuel	**HI≥ 1000**	Arch, Cell or CFB	0.125	0.125 - 0.150	1.25 - 1.5
		Cyclone Dry Bottom	0.200	0.125 - 0.150	1.25 - 1.5
		Cyclone Wet Bottom		0.125 - 1.40	1.25 - 14.0
		Stoker	0.150	0.08 - 0.30	0.8 - 3.0
		Tangential	0.125	0.12 - 0.38	1.2 - 3.8
		Wall	0.125	0.12 - 0.50	1.2 – 5.0

State Rules Summary (Cont'd) (CT, DE, NH, NJ, NY, & WI)

Short Term NOx Limits for EGU Boilers

Unit Type	Heat Input (MM Btu/hr)	Boiler Type	Current Thinking (lb/MMBtu) 24 hr. avg.	Range (lb/MMBtu) 24 hr. avg.	Range (lb/MWh)
Boiler – Solid Fuel	HI<1000	Arch or Cell CFB	0.150 0.125	0.125 - 0.150 0.125 - 0.150	1.25 - 1.5 1.25 - 1.5
		Cyclone Dry Bottom	0.200	0.125 - 0.150	1.25 - 1.5
		Cyclone Wet Bottom		0.20 - 0.92	2.0 - 9.2
		Stoker	0.150	0.125 - 0.30	1.25 - 3.0
		Tangential	0.150	0.120 - 0.38	1.2 - 3.8
		Wall	0.150	0.120 - 0.50	1.2 - 5.0

State Rules Summary (Cont'd) (CT, DE, NH, NJ, NY, & WI)

Short Term NOx Limits for EGU Boilers

Unit Type	Heat Input (MM Btu/hr)	Boiler Type	Current Thinking (lb/MMBtu) 24 hr. avg.	Range (lb/MMBtu) 24 hr. avg.	Range (lb/MWh)
Boiler - Gas	All	All	0.125	0.08 - 0.125	0.8 - 1.25
Boiler - Distillate Oil	All	All	0.125	0.125 - 0.15	1.25 - 1.5
Boiler – Residual Oil	All	All	0.150	0.125 - 0.20	1.25 - 2.0

State Rules Summary (Cont'd) (CT, DE, NH, NJ, NY, & WI)

Short Term NOx Limits for EGU Turbines

Unit Type	Heat Input (MM Btu/hr)	Turbine Type	Current Thinking (ppmvd@15%O_2)	Range (ppmvd@15%O_2)	Range (lb/MWh)
Combustion Turbine Gas Fuel	All	Simple Cycle	50	25 - 55	1.0 - 2.2
Combustion Turbine Gas Fuel	All	Combined Cycle	42	25 - 43.3	0.75 - 1.3
Combustion Turbine Oil Fuel	All	Simple Cycle	100	42 - 100	1.6 - 3.81
Combustion Turbine Oil Fuel	All	Combined Cycle	65	42 - 88	1.2 - 2.51

NEXT STEPS FOR EGU SUBGROUP

- Workgroup is preparing data in a form so the ERTAC model could be used to model different scenarios:
  - Ozone benefits from NOx reductions due to EGU retirements
  - Ozone benefits from NOx reductions if Approach 1 controls were applied
  - Ozone benefits from NOx reductions if Short Term NOx limits were applied
  - Contribution assessments for individual states before and after Approach 1 or Short Term NOx limits were applied

- Prepare draft whitepaper describing results of all analyses conducted by the Workgroup

- Draft recommendations based on analyses conducted by the Workgroup and ERTAC modeling results

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Largest Contributor Analysis- EMF Project

- 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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EMF Project

- MARAMA to develop a regional emissions inventory analysis team and platform
- Using USEPA developed software:
    - Emission Modeling Framework (EMF)
    - With COST tools
- State team use tools to project annual inventory and evaluate strategies.
- To get there: Software adapted, staff trained, platform set up, growth files developed.

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Benefits of EMF

- Annual inventory projection capability
- Develop in-house capability to prepare SMOKE-ready input files for multiple years
- Analyze effectiveness and cost of strategies

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Use a team approach to build capacity

- Form a regional emissions inventory analysis team
- Contractor support to adapt EPA software
- Train team members to use software
- Set up platform on Cloud or dedicated server at MARAMA
- Contractor support to develop growth factors

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Preliminary timeline

Mar-Aug 2013

• MARAMA downloads and works with the software

July 2013

•Contract with UNC

May - Jul 2013

• RFP & contract for growth and control factors

Aug 2013 – Mar 2014

• UNC contract implemented

•Users Manual

•Team Training

•Modify EMF

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Work Completed to date

- Set the EMF up with the server on the Amazon cloud and the client on a MARAMA desktop
- Selected SRA as the contractor for the growth and control factors. We are working on a contract with SRA
- Working on a contract with the University of North Carolina for EMF modifications, a user's guide, and regional team training

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Distributed and Emergency Generator Inventory

- Workgroup has requested information (location, operations, emissions of Demand Response units) from the system operators and aggregators however, this information is not being provided voluntarily.

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Distributed and Emergency Generator Additional Efforts

- Contacted EIA regarding form 861
    - Contained some information, but not sufficient to determine air quality impacts of demand response engines

- RICE NESHAP – limited reconsideration
    - Timing for compliance with the ultra low sulfur diesel (ULSD) fuel requirement for emergency compression ignition (CI) engines
    - Timing and required information for the reporting requirement for emergency engines that operate or are contractually obligated to be available for more than 15 hours per calendar year
    - Conditions in 40 CFR 60.4211(f)(3)(i), 60.4243(d)(3)(i) and 63.6640(f)(4)(ii) for operation for up to 50 hours per calendar year in non-emergency situations as part of a financial arrangement with another entity.

    - Comments are due November 4, 2013

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Demand Response

Conclusion

- Demand Response engine use is widespread, and the lack of information/data available to the states make it difficult to determine their impact on air quality

- OTC needs the requested information to develop accurate control Strategy recommendations

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Other SAS Committee Updates

Consumer Products Rule

- Preparing final package to submit to EPA on adopting OTC model rule as a national rule

Vapor Recovery

- Continue to look at improvements to Stage I systems, and decommissioning of Stage II systems

2008 Ozone NAAQS Comments

- Submitted comments to EPA regarding the proposed 2008 ozone NAAQS implementation rule, available on the OTC website

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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
- Finalize the Consumer Products model rule to send to EPA.
- Continue packaging the AIM model rule to send to EPA.
- Continue to evaluate Vapor Recovery strategy options.

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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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