OTC/ MANE-VU Fall Meeting

November 19, 2014

Hyatt Regency Hotel
Arlington, Virginia

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

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Charge to the Committee

LARGEST CONTRIBUTOR ANALYSIS

Using the most recent emission inventory data available to:

- **Identify the largest individuals and groupings of NOx emitters *within states where* that *state* contributes at least 1% of the 2008 ozone NAAQS of 75 ppb to OTC states;**
- **Identify emission sources with the highest short-term emissions of NOx and VOC;**
- **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.**

DISTRIBUTED AND EMERGENCY GENERATOR INVENTORY

Obtain information from system operators concerning the location, operation and emissions of all units that participate or plan to participate with the system operator to analyze the air quality impact of these engines and make recommendations for potential control strategies to the Commission.

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Largest Contributor (EGU) Analysis

The draft EGU Emissions Inventory Analysis Whitepaper includes:

- Analysis of 2011 and 2012 state level ozone season EGU NOx emissions (tons) and ozone season state average EGU NOx emission rate (lb/mmBtu) data.
- Analysis 1 - NOx controls and EGU retirements
- Analysis 2 - Short Term (Hourly) EGU NOx Emissions - 2012
- Analysis 3 - EGU NOx emissions during the 2011 Ozone Season including emissions, fuel type, and temperature charts.
- Analysis 4 - "Coal SCR Scorecard" Analysis - 2011 & 2012
- Analysis 5 - Recommendation for modeling of Short Term NOx emission limits for EGUs

- The draft EGU Emission Inventory Analysis Whitepaper will be used to model certain control strategies when the 2011 modeling platform is created

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Largest Contributor Cost Analysis

- Largest Contributor Workgroup is looking into both the capital cost and the operating and maintenance cost of pollution control devices.
- Preliminary SCR and SNCR control costs were reproduced using the Sargent & Lundy control cost methodology developed for EPA's IPM Model v.5.13
- S&L SCR control cost methodology includes 2004 to 2006 industry cost estimates, additional 2010 cost estimates prepared by consultants for UARG, and S&L in-house data for recent SCR Projects (2007-2012). Data converted to 2012 dollars based on Chemical Engineering Plant Index (CEPI) data
- S&L SNCR control cost methodology includes S&L in-house data from recent quotes (2009 to 2012) for lump sum contracts
- Detailed examples of the SCR and SNCR control cost spreadsheet analyses can be found at:

http://www.epa.gov/airmarkets/progsregs/epa-ipm/docs/v513/attachment5_3.pdf &
http://www.epa.gov/airmarkets/progsregs/epa-ipm/docs/v513/attachment5_4.pdf

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Largest Contributor Cost Analysis: SCR Cost Development Methodology Sample Inputs for 500 MW Coal-fired Boiler

Variable	Designation	Units	Value
Unit Size	A	(MW)	**500**
Retrofit Factor	B		**1**
Heat Rate	C	(Btu/kWh)	**10000**
NOx Rate			**0.5**
SO2 Rate			**3**
Type of Coal			Bituminous
Coal Factor			1
Heat Rate Factor			1
Heat Input			5.00E+09
NOx Removal Effic			**90**
NOx Removal Fact			1.125
NOx Removed			2250
Urea Rate (100%)			1572
Steam Required			1776
Aux Power (Include			0.56
Urea Cost (50% wt solution)	R	($/ton)	**310**
Catalyst Cost	S	($/m3)	**8000**
Aux Power Cost	T	($/kWh)	**0.06**
Steam Cost	U	($/klb)	**4**
Operating Labor Rate	V	($/hr)	**60**

Boiler Size: 500
Heat Rate (Btu/kWh): 10,000
NOx Control Technology: SCR
NOx Removal Efficiency (%): 90
Variable O&M ($/MWH): 1.72
Capital Cost ($/kW): 297
Fixed O&M ($/kW-yr): 0.75

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Largest Contributor Cost Analysis: SNCR Cost Development Methodology Sample Inputs for 500 MW Coal-fired Boiler

Variable	Designation	Units	Value
Boiler Type	BT		Tangential
Unit Size	A	(MW)	500
Retrofit Factor	B		1
Heat Rate	C	(Bttu/kWh)	10000
NOx Rate	D	(lb/MMBtu)	0.5
SO2 Rate			2
Type of Coal			Bituminous
Coal Factor			1
Heat Rate Factor			1
Heat Input			5.00E+09
NOx Removal Efficien			25
NOx Removed			625
Urea Rate (100%)			1630
Water Required			30978
Heat Rate Penalty in VOM? [v]			0.73
Aux Power in VOM? [v]			0.05
Dilution Water Rate	P	(1000 gph)	3.72
Urea Cost (50% wt solution	Q	($/ton)	310
Aux. Power Cost	R	($/kWh)	0.06
Dilution Water Cost	S	($/kgal)	1
Operating Labor Rate	T	($/hr)	60
Replacement Coal Cost	U	($/MMBtu)	2

Boiler Size: 500
Heat Rate (Btu/kWh): 10,000
NOx Control Technology: SNCR
NOx Removal Efficiency (%): 25
Variable O&M ($/MWH): 1.19
Capital Cost ($/kW): 23
Fixed O&M ($/kW-yr): 0.20

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Largest Contributor SCR Cost Analysis

	Unit 1	Unit 2	Unit 3
Boiler Size	153.1 MW	403.7 MW	958.8 MW
Capital Cost ($/ton)	$11,185	$12,214	$8,796
Fixed O/M ($/ton)	$815	$465	$265
Variable O/M ($/ton)	$746	$1,308	$1,514
Total ($/ton	$12,746	$13,987	$10,575
Total Operating Cost ($/ton)	$1,561	$1,773	$1,779
2011 Ozone Season Capacity	23.7%	35.1%	73.9%

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Cost of Allowances

- CAIR NOx Allowance Cost (Ozone Season): $25*
- CSAPR Predicted NOx Allowance Cost (Ozone Season) $300-600**

The allowance price includes both the cost of the ozone season allowance and the annual allowance.
*argusmedia.com - Issue 21-221 Friday November 14, 2014
** argusmedia.com- Issue 21-207 Monday October 27, 2014

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EMF is one-stop-shopping for air emission work

- Remote access
- Organized file storage
- Emissions data analysis tools
  - Graphical capabilities – Map emissions
- Future Inventory development
- Temporalize inventory (e.g. daily or ozone season inventory can be prepared)
- Strategy cost analysis tools
- Prepare modeling files

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Inventories in EMF

MARAMA 2007

- 70+ inventory and activity files

MARAMA 2017/2020 v3_3(from 2007) future "on-the-books" and "what-if" inventories

- Area
- Nonroad mobile & MAR
- Nonhourly point

EPA 2011/2018 v1 Modeling Platform

- 27 inventory and activity files

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ICI Boiler Update

- ICI Boiler Workgroup is researching ICI boiler emissions to determine their significance and whether more analysis is necessary
- Initial analyses using EMF indicate that ICI boiler emissions will become a larger portion of total emissions in 2018
- ICI Boiler Workgroup is still reviewing EPA data with the recent release of NEI version 2 data

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Distributed and Emergency Generator Inventory

- Delaware challenged elements of the RICE NESHAP
  - Remote exemption
  - 100 hour provison
- OTC tracking the impact of the Order 745 decision
- OTC considering doing a bounding exercise to estimate DR emissions in modeling scenarios, due to lack of ability to ascertain data from ISO's

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Other SAS Committee Updates

Consumer Products Rule

- OTC Sent EPA a request to adopt the OTC Consumer Products Model Rule as a National Rule
  - Available at http://www.otcair.org

AIM

- OTC released Model Rule to Stakeholders for review. Will review and update rule as needed in preparation to send the OTC AIM Model Rule to EPA to adopt as a National Rule.

Vapor Recovery

- Delaware has proposed regulation for the Stage II program
- Continue to look at ways to improve Stage I
- Looking at Low Permeation Hoses, Dripless Nozzles, and Pressure Monitoring and Management

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Next Steps for the Committee

- Continue to evaluate EGU NOx real world emission data including daily EGU NOx emissions during ozone season episodes and HEDD days
- Use Largest Contributor analyses in ERTAC EGU modeling
- Continue to look at ICI Boiler Emissions
- Continue developing the AIM model rule to send to EPA.
- Continue to evaluate Vapor Recovery strategy options.
- Continue to provide an economic impact assessment of each new or significantly revised strategy that is presented to the Commission for action or consideration

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Questions?

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