

# ATTACHMENT C

City's presentation to the SAPCB and Virginia DEQ, November 19,  
2007

**State Air Pollution Control Board  
&  
Department of Environmental Quality**

**Presentation**

By  
**City of Alexandria**

November 19, 2007



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**Proposed Permit Does not Adequately Address  
PM<sub>2.5</sub> Emissions and Impacts**

- PM<sub>2.5</sub> has been a major concern for Alexandrians since downwash was identified in 2004
- Virginia's 9 VAC 5-80-1180.A.3 prohibits the issuance of a permit unless the facility has been *"designed, built and equipped to operate without preventing or interfering with the attainment or maintenance of any ambient air quality standard (AAQS) and without causing or exacerbating a violation of any applicable ambient air quality standard"*.
- As part of the state SIP due in April 2008, VDEQ must address any "hot spots" within the PM<sub>2.5</sub> nonattainment area
- VDEQ's current approach of using PM<sub>10</sub> as a surrogate for PM<sub>2.5</sub> is inadequate and irresponsible considering the area's PM<sub>2.5</sub> nonattainment status



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## Proposed PM<sub>2.5</sub> Limit is not Protective of NAAQS and Public Health

- The federal Clean Air Fine Particle Implementation Rule which became final on April 25, 2007 states that
 

*"Upon promulgation of this final rule, the EPA will no longer accept the use of PM<sub>10</sub> emissions information as a surrogate for PM<sub>2.5</sub> emissions information given that both pollutants are regulated by a National Ambient Air Quality Standard and are therefore considered regulated air pollutants"*
- Several states have adopted policies for PM<sub>2.5</sub> permitting that agree with Alexandria's approach
  - *Ambient air quality modeling for primary PM<sub>2.5</sub>*
  - *Follow EPA guidance proposed in September 2007 using SILs*
  - *Examples: CT, NJ, NY, MI, PA*
- There are several federal guidance documents which describe the acceptability of using AERMOD to estimate a facility's local-scale impacts of primary PM<sub>2.5</sub>



## Proposed PM<sub>2.5</sub> Limit is not Protective of NAAQS and Public Health

**Modeled Primary PM<sub>2.5</sub> Impacts from PRGS for Boilers Alone  
(Five-Stack Configuration)**

Modeled Scenario	Averaging Period	Modeled PM <sub>2.5</sub> Rate (lb/MMBtu)	Modeled Impacts on Marina Towers (µg/m <sup>3</sup> )	Monitored Background <sup>(1)</sup> (µg/m <sup>3</sup> )	Total Impact (µg/m <sup>3</sup> )	24-Hr NAAQS (µg/m <sup>3</sup> )
3 Base Boilers 3, 4 & 5 at min load, 24 hrs/day	24-hr	0.035	21.7 <sup>(1)</sup>	34.1	55.8	35
2 Base Boilers 4 & 5 at min load, 24 hrs/day	24-hr	0.055	22.1 <sup>(2)</sup>	34.1	56.2	35
2 Base Boilers 4 & 5 at min load, 24 hrs/day	Annual	0.055	3.3 <sup>(2)</sup>	14.2	17.7	15

• EPA's proposed SILs: 0.3-1.0 ug/m<sup>3</sup> (annual), 1.2-5.0 ug/m<sup>3</sup> (24-hr)

(1), (2) See City of Alexandria letter to SAPCB dated November 17, 2007



## Proposed PM<sub>2.5</sub> Limit is not Protective of NAAQS and Public Health

### Calculated PM<sub>2.5</sub> Emission Limits Necessary for NAAQS Compliance

Averaging Period	Proposed SOP Limit (lb/MMBtu)	Modeled PM <sub>2.5</sub> Impact at Proposed SOP Limit <sup>10</sup> (µg/m <sup>3</sup> )	U.S. EPA's Proposed PM <sub>2.5</sub> SILs (µg/m <sup>3</sup> )	Calculated PM <sub>2.5</sub> Limit for Impacts to be Below SIL (lb/MMBtu)
24-hr	0.055	22.1	5.0	0.012
			4.0	0.010
			1.2	0.003
Annual	0.055	3.5	1.0	0.016
			0.8	0.013
			0.3	0.005



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## Baghouses are Required to Adequately Control PM<sub>2.5</sub> Emissions

- Alexandria's analyses to date show the critical need for baghouses on all five boilers to lower PM<sub>2.5</sub> emissions to levels that are protective of NAAQS and public health
- Alexandria requests that the Board earnestly consider the benefits of baghouses at PRGS
  - *State-of-the-art technology for PM<sub>2.5</sub> control on a continuous basis*
  - *Provide multi-pollutant control, e.g., mercury, acid gases, enhanced removal of SO<sub>2</sub> with trona*
- Trona use increases PM emissions and triggers NSR, thus requiring LAER, i.e., baghouses



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## Trona Does not Reduce PM Emissions

Boiler #3 Stack Testing Results in December 2006 on Filterable PM<sub>10</sub>

PARAMETER	TRONA OFF		TRONA ON	
	Average	Test Results	Average	Test Results
Hot ESP Removal Efficiency (designed for 99%)	99.01	99.76, 99.55, 97.72	98.99	98.56, 98.93, 99.47
Cold ESP Removal Efficiency (designed for 96%)	71.24	49.83, 73.34, 90.56	88.83	93.21, 90.34, 82.94
Total PM <sub>10</sub> Removal Efficiency	99.85	99.88, 99.88, 99.78	99.90	99.90, 99.90, 99.91



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## Trona Does not Reduce PM Emissions

Mirant opacity data showed increase in opacity with trona injection, and potentially PM<sub>2.5</sub> emissions (~20,000 data points for each boiler)

Boiler	Average Opacity		% Increase in Opacity, %
	Pre-Trona (Jun-Aug 2005)	Post-Trona (Jun-Aug 2006)	
1	2.86	6.03	110.8
2	4.16	6.76	62.5
3	3.62	3.74	3.3
4	2.61	3.10	18.7
5	2.55	4.10	60.8

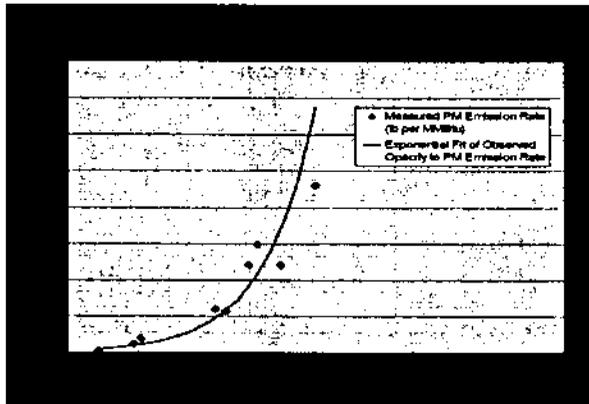
Boiler #3 showed the least negative impacts of trona on opacity. However, it was the only boiler used for comparing scenarios with and without trona in 2006 stack testing



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## Trona Does not Reduce PM Emissions



Quote from VDEQ:

"The Department is neither aware of nor is in possession of any documents, studies, or analyses relating the two or discussing the effect of increased opacity on emissions of total PM"



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## Fugitive Emissions Impacts Must Be Fully Evaluated to Protect Public Health

- Alexandria's analysis shows significant increase in fugitive emissions since the use of trona which effectively increases the amount of fly ash by >100%
- The permit should include requirement for an enclosed fly ash handling operation and transportation to minimize fugitive emissions impact to local population
  - *Trona contains up to 2% silica, a known carcinogen*



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## PM & CO CEMS Should Be an Immediate Requirement for this Permit

Partial List of PM CEMS (PS-11 certified) Installed in the US and Used for Monitoring and/or Compliance Purposes

Source	PM CEMS Installation Date	PM CEMS Technology
Tampa Electric - Big Bend Unit 4	Feb 2002	Beta Attenuation
Dominion Generation - Mt. Storm Units 1 & 2	Jul 2004	Beta Attenuation
We Energies - Oak Creek Units 5 & 6	Jan 2005	Beta Attenuation
We Energies - Pleasant Prairie Units 1 & 2	Sep 2006	Beta Attenuation
Western Kentucky Energy - Henderson Unit 2	Aug 2005	Beta Attenuation
Western Kentucky Energy - Henderson Unit 1	Feb 2007	Beta Attenuation
Kentucky Utilities Company - Ghent Station		Light Scatter
Kentucky Utilities Company - Mill Creek Station		Light Scatter
Minnkota Power Coop - M.R. Young Unit 2	Jul 2007	Beta Attenuation
DOE Oak Ridge TSCA Incinerator	Dec 2004	Beta Attenuation
Rayonier Pulp Mill - Recovery Boiler	Apr 2003	Beta Attenuation
Kennecott Utah Copper - Primary Smelter	Dec 2005	Beta Attenuation
Sunoco Refinery - FCCU/CO Boiler Stack	Apr 2007	Beta Attenuation



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## Pollution Control Measures Must Be Operated to minimize Emissions at All Times

- Virginia regulation 9VAC 5-40-20 E states that

*"[a]t all times, including periods of startup, shutdown, soot blowing and malfunction, owners shall, to the extent practicable, maintain and operate any affected facility including associated air pollution control equipment in a manner consistent with air pollution control practices for minimizing emissions."*

- Mirant has proven to be capable of controlling SO<sub>2</sub> emissions to below 0.3 lb/MMBtu on a sustainable basis. The SOP should not permit SO<sub>2</sub> emissions >0.3 lb/MMBtu for any operating scenario
- A single short term emission limit should be imposed



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## PM and Other Emission Limits are Arbitrary and Unreasonable

- The proposed SOP specifies same PM, PM<sub>10</sub> and PM<sub>2.5</sub> emission limit of 0.055 lb/MMBtu for all boilers
- The following are December 2006 stack test results when trona was in use (in lb/MMBtu)

PM	0.018 - 0.029	(<52% of proposed limit)
PM <sub>10</sub>	0.014 - 0.016	(<29% of proposed limit)
PM <sub>2.5</sub>	0.012 - 0.013	(<23% of proposed limit)
- The plant reported PM emissions of 0.03 lb/MMBtu for 2006



## All NSR Issues Must Be Resolved

- All NSR issues must be promptly resolved:
  - Past
    - *Past NSR violations for LNB, SOFA and trona installations*
    - *Increase in the maximum heat input rates as compared to the rated capacities as listed in PRGS's current SOP*
  - Proposed
    - *Use of an alternate sorbent other than trona*
    - *A pre-construction NSR permit must be issued for the stack merger project if Mirant wishes to pursue this project*



## Use of Alternate Sorbent Must not Be pre-Authorized

- Testing of alternate sorbent must require a complete protocol
- PM<sub>10</sub>/PM<sub>2.5</sub> stack test must be required
  - *With and without sorbent*
  - *Upstream and downstream of ESPs*
  - *Similar to Dec 2006 stack test required by VDEQ for iron*
- Testing must be done on all boilers
- Test results must be analyzed before allowing a new sorbent in the SOP
- Applicability of NSR must be assessed



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## Proposed Emission Limits Exceed Baseline

Pollutant	Baseline Emissions (tons/yr)	Proposed SOP Limits (tons/yr)	Proposed Increase (tons/yr)
SO <sub>2</sub>	3,813	3,813	0
NOx	1,880	3,700	1,820
PM <sub>10</sub>	135	377	242
PM <sub>2.5</sub>	116	163	47

- Emissions must be limited to baseline or NSR regulations must be applied



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## Summary of Alexandria's Requests

Alexandria respectfully requests that:

- PM<sub>2.5</sub> emissions from PRGS be modeled and NAAQS-compliant emission limits be established in the permit
- Short term (hourly and daily) emissions are arbitrary and unreasonable. They must be revised to reflect actual operating performance
- Baghouses must be required on all five boilers to protect PM<sub>2.5</sub> NAAQS and public health



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## Summary of Alexandria's Requests

- Based on present pollution control performance and/or NAAQS compliance criteria, the limits in the SOP must not exceed the following:

• SO <sub>2</sub>	< 0.30 lb/MMBtu	(trona optimization)
• NO <sub>x</sub>	< 0.22 lb/MMBtu	(LNB/SOFA optimization)
• PM	< 0.03 lb/MMBtu	(ESP performance)
• PM <sub>10</sub>	< 0.02 lb/MMBtu	(ESP performance)
• PM <sub>2.5</sub>	< 0.003 - 0.011 lb/MMBtu	(NAAQS compliance)
• CO	< 0.20 lb/MMBtu	(BACT)
• Hg	< 37 lb/yr	(actual baseline emissions)
• Coal sulfur	< 0.9 wt%	(current limit for PRGS)



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## Summary of Alexandria's Requests

- Annual emissions must not exceed baseline emissions during the most recent 24-month period
- CEMS for CO and PM must be an immediate requirement for all five boilers
- Reference to trona as a PM control must be removed from the SOP



## Summary of Alexandria's Requests

- The SOP must not be used to pre-authorize the use of sodium bicarbonate or another alternate sorbent without a complete evaluation and NSR applicability analysis
- Limits and compliance requirements of CAIR and CAMR, which will take effect after the SOP is issued, must be identified in the SOP



## Virginians Exposed to PRGS

### Virginia Exposure Profile for Children Within 30 Miles of a Coal-Fired Power Plant

Data Sources: U.S. Census Population Estimates for 1997; "Estimated Prevalence and Incidence of Lung Disease by Lung Association Territory," American Lung Association, 2001 (data is for 1998).

#### Exposure from Plants in State

Plant	State	County	Exposed Population	Children Under 18	Children in Poverty	Pediatric Asthma
Clinch River	VA	Russell	257,092	62,806	17,385	3,231
Glen Lvn	VA	Giles	189,101	37,542	7,652	2,034
Potomac River	VA	Alexandria	1,647,644	346,929	31,787	21,483
Bremo Bluff	VA	Fluvanna	275,546	55,211	9,973	3,330
Chesterfield	VA	Chesterfield	995,523	222,784	40,490	12,973
Chesapeake	VA	Chesapeake	1,423,982	355,198	77,682	20,293
Possum Point	VA	Prince William	1,795,714	382,757	36,846	23,653
Yorktown	VA	York	1,080,626	269,002	64,124	14,748
Clover	VA	Halifax	137,086	31,360	7,399	1,790



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## EarthTech Health Effect Evaluation

- In response to concerns raised by SAPCB, City of Alexandria took the initiative to evaluate the health impacts of emissions from the PRGS and their associated costs
- EarthTech was contracted to carry out such evaluation, using EPA's methodologies with focus on
  - 800-meter grid around the PRGS;
  - Broader population in a 93-km grid considered in the DOE Special Environmental Evaluation



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## How Health Effects/Costs Were Estimated to Evaluate the State Operating Permit

- Similar to methods used by EPA to calculate benefits of air regulations
- AERMOD (an EPA approved computer program) was used to model emissions of PM from the Potomac River Generating Station
- Modeled air concentrations are input into BenMAP (an EPA computer program) and effect estimates and costs are selected from the programs database



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## How Much Do Adverse Health Effects Cost? (800-meter Grid)

Health Effect	Annual Predicted Cases	Direct Costs U.S. 2007\$ by Case	1-Year Direct Costs Totals \$2007
Premature mortality - all cause	4.10	7,648,032	31,353,106
Chronic bronchitis	3.99	410,043	1,635,498
Nonfatal heart attacks	6.89	42,564	293,163
Respiratory	2.68	65,221	47,535
Cardiovascular	3.88	26,400	20,961
Asthma-related ER visits	3.11	316	984
Acute bronchitis	3.86	72	278
Upper respiratory symptoms	49.01	32	1,555
Lower respiratory symptoms	50.67	19	965
Asthma exacerbations	46.33	89	4,136
Work loss days	1045.25	217	226,324
Minor restricted activity days	5569.83	61	341,573
One-Year, Total Direct Costs, 2007 Dollars			33,952,808



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### **Estimated Total Costs of Health Effects (in 2007 US Dollars)**

- Total Estimated Costs for Health Effects over a 30 year period and based on a "worst-case" scenario from the proposed State Operating Permit, for people within 800 meters of the Potomac River Generating Station (PRGS) would be **\$665 million**
- Total Estimated Costs for Health Effects over a 30 year period, based on the Department of Energy's Special Environmental Analysis for the PRGS (2006) – Administrative Consent Order Extension Scenario – would be **Over \$3 Billion**

